

DS #:

5205

APN:

137-28-101-002

PROJECT:

Summit Village 29 Stockpile

SUBMITTAL:

2nd

SCANNED BY/DATE:

CHECKED BY/DATE:



CITY OF LAS VEGAS		DATE:
INTER-OFFICE MEMORANDUM		December 26, 2019
TO: Land Development Services Department of Building & Safety		FROM: Jennifer Shinn, P.E. Flood Control, Engr. Associate Department of Public Works
SUBJECT:	Drainage Study for:	COPIES TO:
	Summerlin Village 29 Stockpile	GCW Engineers
Cross Streets:	Sky Vista Drive	Howard Hughes
File Number:	F:\Depot\DSMemos\DS5205B.doc	Bart Anderson, P.E., DevCo
Parcel Number:	137-28-101-002	
Zoning Action:	N/A	
FEMA Flood Zone	YES NO X	
Proposed Storm Drain	YES NO X	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	10/16/2019	10/30/2019	See Comments Below	\$400.00	3612300: \$400
2 nd Submittal	12/9/2019	12/26/2019		\$0.00	N/C
TOTAL FEES (LDDRS):				\$400.00	----

REMARKS:

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

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

1. Provide a note on the plan that states "Stockpile to comply with the approved Dust Mitigation Plan # _____."
2. Provide a note on the plan indicating the time limit of the proposed stockpile as outlined in the approved Dust Mitigation Plan.

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

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

END OF REMARKS

jks

T/R/S: T20S/R59E/28
AREA K-28

**SUPPLEMENT TO THE TECHNICAL DRAINAGE STUDY FOR A
STOCKPILE PERMIT
SUMMERLIN VILLAGE 29**

62029-200

December 2019

Prepared for:

**The Howard Hughes Company, LLC
10845 Griffith Peak Drive, Suite 160
Las Vegas, Nevada 89135
Phone: (702) 791-4000**



HYDROLOGIC CRITERIA AND DRAINAGE MANUAL
DRAINAGE STUDY INFORMATION FORM

Name of Development: Summerlin Village 29 Stockpile Date: December 2019

Location of Development: a) Descriptive (Cross Streets) North/South: N/A

East/West: Sky Vista Drive

b) Section: 28 Township: 20 Range: 59

c) APN : 137-28-101-002

Name of Owner: The Howard Hughes Company, LLC

Telephone No.: (702) 791-4300 Fax No.: (702) 791-4385 E-Mail Address: _____

Address: 10845 Griffith Peak Drive Ste #160, Las Vegas, NV 89135

Contact Person-Name: Cameron Bencini, P.E. Telephone No.: (702) 804-2126

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

Firm: GCW, Inc.

Address: 1555 South Rainbow Boulevard, Las Vegas, 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	☐	Stockpile

1. Total Owned Land Area: At Site: 593.55 Acres Being Developed/Disturbed: 14.7 Ac

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.): _____

5. Approximate upstream land area which drains to the subject site: Less than 1 Ac

6. Has the site drainage been evaluated in the past? ☒ YES ☐ NO If yes, please identify documentation: "Detention Basin No. 5 / Diversion Berm Final Design Report" By G.C. Wallace, 2001.

"Update #2 to the Technical Drainage Study for Village 23B Sky Vista Drive, Alta Drive to Far Hills Avenue," GCW, Inc. April 2019.

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Site drains to a 42" RCP, which goes into a 60" RCP on Sky Vista Drive which conveys water south.

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



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

***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

Project #: 62029-200

December 9, 2019

Oh Sang Kwon, P.E.
City of Las Vegas, Public Works
333 N. Rancho Drive, 7th Floor
Las Vegas, NV 89106

Re: Supplement to the Technical Drainage Study for a Stockpile Permit Summerlin Village 29

Dear Mr. Kwon,

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

Cordially,

Cameron Bencini, P.E.
GCW, INC.



**SUPPLEMENT TO THE TECHNICAL DRAINAGE STUDY FOR A
STOCKPILE PERMIT
SUMMERLIN VILLAGE 29**

62029-200

December 2019

**Authored By:
Cameron Bencini, P.E.
Nelson Baggs, E.I.**

Prepared By:

**GCW, Inc.
1555 S. Rainbow Blvd.
Las Vegas, Nevada 89146
Phone: (702) 804-2000
Fax: (702) 804-2299**

62029-200

December 9, 2019

Jennifer Shinn
Engineering Associate
Department of Public Works
333 N. Rancho Drive – 7th Floor
Las Vegas, NV 89106

**Subject: Supplement to the Technical Drainage Study for a Stockpile Permit
Summerlin Village 29**

This letter addresses City of Las Vegas (CLV) review comments received by email on October 30, 2019, included in the Appendix. The comments are individually addressed below.

Comment 1:

Provide a copy of the Planning Development Department approval of the stockpile.

Response:

A copy of the Planning Department approval has been included.

Comment 2:

Provide a copy of the approved Clark County Dust Mitigation Plan with the BMPs prior to final approval of the civil improvement plans.

Response:

A copy of the approved Clark County Dust Mitigation Plan has been included in the Appendix.

Comment 3:

Provide a note of the plan that states “Stockpile to comply with the approved Dust Mitigation Plan#____.” (Can be addressed on IPs)

Response:

This comment will be addressed on IPs.

Comment 4:

Provide a note on the plan indicating the time limit of the proposed stockpile as outlined in the approved Dust Mitigation Plan. (Can be addressed on IPs)

Response:

This comment will be addressed on IPs.

If you have any questions or require additional information, please do not hesitate to contact GCW at (702) 804-2000.

Respectfully,

GCW, INC.



Nelson Baggs, E.I.

APPENDIX

From: Jennifer Shinn <jshinn@LasVegasNevada.GOV>
Sent: Wednesday, October 30, 2019 10:39 AM
To: Cameron Bencini <CBencini@gcwengineering.com>
Subject: Summerlin Village 29 Stockpile

Hi Cameron,

A few comments on the stockpile submittal:

1. Provide a copy of the Planning and Development Department approval of the stockpile. **(Need this one in order to conditionally approve)**
2. Provide a copy of the approved Clark County Dust Mitigation Plan with the BMPs prior to final approval of the civil improvement plans. (I can conditionally approve the study but cannot approve the IPs until this is received)
3. Provide a note on the plan that states "Stockpile to comply with the approved Dust Mitigation Plan # ____." (Can be addressed on IPs)
4. Provide a note on the plan indicating the time limit of the proposed stockpile as outlined in the approved Dust Mitigation Plan. (Can be addressed on IPs)

I can put this project on hold and wait for the supplemental information at no charge (Item #1), or can formally issue a comment letter (\$400 resubmittal fee). Please let me know how you would like to proceed.

Thank you,

Jennifer Shinn

Engineering Associate

Department of Public Works | City Engineering Division

Phone: (702) 229-6131

333 N. Rancho, floor | Las Vegas, NV 89106



lasvegasnevada.gov



Your opinion is important! Click [here](#) to take a short survey.

December 3, 2019

Linda Hartman-Maynard
Planner
333 North Rancho Boulevard
Planning Department, 3rd Floor
Las Vegas, NV 89106

RE: Village 29 – Stockpile Permit

Dear Linda:

On behalf of Howard Hughes Corporation (HHC), we kindly request your approval for the Village 29 Stockpile.

The Village 29 Stockpile is being proposed on a portion of Parcel 137-28-101-002, located west of Sky Vista Drive in Village 23B also known as The Paseos. The stockpile is being located approximately 1,089 feet west of the nearest existing development and will not provide any adverse impact to the existing development. The proposed 10-ft stockpile will house approximately 202,414 cubic yards of fill material, which will be used for future development. HHC acknowledges that approval of the stockpile will be granted for 12-months and maybe extended for an additional year.

A Technical Drainage Study for the proposed stockpile was submitted to CLV for review, and as a result an approval from CLV Planning and Development Department is being requested.

Included with this letter is the proposed V29 Stockpile Construction Plans for your review and to provide additional information.

Please do not hesitate to contact us if you have any questions or need additional information. Thank you for your time and consideration.

Sincerely,



Jennifer Veras
Project Coordinator

PLANS APPROVED
PLANNING
Dept. of Planning
City of Las Vegas, Nevada

LHM DEC 04 2019
2' GRADE DIFFERENCE
Conforms to the minimum requirement of
LVMC Title 19: applicable Master Plan
Development standards and/or Conditions of
Approval. Make No Change Without Approval.
Plan is Not a Permit to Violate Any Ordinance.



Department of Air Quality
4701 W. Russell Rd. Suite 200 2nd Floor
Las Vegas, NV 89118
Main Number: (702)455-5942
Fax Number: (702)383-9994

Dust Control Operating Permit (DCOP) For Construction Activities

This permit does not exempt the permittee from compliance with the Endangered Species Act

Permit #: 45131 - Revision #10
Permittee: The Howard Hughes Company, LLC.
Project: Village 23B Borrow Site
Project Address: NW Of Sky Vista Dr/Alta Dr.
Cross Streets: Sky Vista Dr/Alta Dr. NW
Effective Date: 6/23/2019
Expiration Date: 6/23/2020
Revision Date: 11/13/2019
Project Acreage: 85.5
Area: WNW - West/Northwest

Notes/Additional Permit Conditions

ADD ACREAGE

Onsite Project Manager:

Name: Angela Henderson
Company: The Howard Hughes Company, LLC.
Phone Number: 702.279.4636

Responsible Official:

Name: Angela Henderson
Company: The Howard Hughes Company, LLC.
Phone Number: 702.791.4420
Cell Number: 702.279.4636

Dust control measures must occur 24 hours a day, 7 days a week.

This permit is not valid until all fees are paid in full and a complete copy of the permit with conditions and the dust mitigation plan is posted on the project site.

It is a condition of the issuance of any operating permit required by the commission or pursuant to any local ordinance for the control of air pollution that the holder of the operating permit agrees to permit inspection of the premises to which the permit relates by any authorized officer of the department at any time during the holder's hours of operation without prior notice. This condition must be stated on each application form and operating permit. NRS 445B.580.

The issuance of this PERMIT does not relieve the PERMITTEE from compliance with all other applicable federal, state, county and local ordinances and regulations. Issuance of this PERMIT shall not be a defense to violations of any applicable ordinances or regulations.

MOD 10 AP

Dust Control Operating Permit (DCOP) Application Clark County Department of Air Quality				For DAQ Use Only			
NOTE: Demolition by implosion is not covered by this application -- use Implosion Operating Permit Application.				Invoice Number: ✓ 040011			
Application Type (Select One):		Applicant Type (Select One):		RECEIVED CC DAQ 2019 NOV 7 AM 10:21 6-23-20			
☐ New ☐ Renewal ☒ Modification		☒ Property Owner ☐ Easement Holder ☐ Government					
		☐ Developer ☐ Contractor					
1. Responsible Official (Applicant) Information:							
Responsible Official Name:		Responsible Official Title:		Permittee (Owner/Company/Organization Name):			
ANGELA HENDERSON		MANAGER OF CONSTRUCTION		THE HOWARD HUGHES COMPANY			
Permittee Mailing and Email Address Information							
Number:	Direction:	Street:		Street Type:	Suite:	PO Box:	
10801	W	CHARLESTON		BLVD	300		
City:	LAS VEGAS			State:	NV	Zip:	89135
Email:	ANGELA.HENDERSON@HOWARDHUGHES.COM			Primary Communication Method: ☒ Email ☐ US Postal			
Phone Numbers							
Office:	702-791-4420	Extension:		Cell:	702-279-4636	Fax:	702-791-4450
2. Construction Site Superintendent or other designated On-site Representative:							
Name:		Title:		Company:			
ANGELA HENDERSON		MANAGER OF CONSTRUCTION		THE HOWARD HUGHES COMPANY			
Email:	ANGELA.HENDERSON@HOWARDHUGHES.COM			Dust Card #:	DM1501007	Card Expires:	11/06/2020
Office:	702-791-4420	Extension:		Cell:	702-279-4636	Fax:	702-791-4450
3. Project Information:							
Permit # (For new permit, enter NEW; otherwise, enter existing DCOP #):				45131		Project Attributes (check all that apply):	
Project Name (same as signage):		VILLAGE 23B BORROW SITE				☐ Residential ☐ Commercial ☐ Government Facility ☐ Infrastructure Utilities ☐ Flood Control ☐ Airport ☐ Soil Remediation ☐ Structure Demolition ☐ Roadway ☐ Blasting	
Project Description:							
THE SITE WILL BE USED FOR THE EXPORTING OF THE MATERIAL FOR ANOTHER PROJECT							
Modification Acreage Added:		77.5	Modification Acreage Removed:		0		
Project Modification Description:							
EXPORT MATERIAL OUT OF THE DETENTION BASIN AND STOCKPILING ONTO VILLAGE 29							
Portable crushing and/or powered screening equipment supporting an on-site single construction activity and remaining onsite for less than 12 months is exempt from the stationary source permitting requirements of AQR Section 12.1 and will instead be subject to the conditions of the Dust Control Operating Permit issued pursuant to AQR Section 94. This exemption does not apply to equipment listed as emission units in a current minor source permit unless the permit states otherwise.						Projects less than two weeks in duration may qualify for a sign waiver.	
Will portable crushing or powered screening occur onsite? ☐ Yes ☒ No						Does the project qualify for a sign waiver request? ☐ Yes ☒ No	
If yes, what is the anticipated date that equipment will be brought onsite?						Is a sign waiver requested for this project? ☐ Yes ☒ No	
What is the duration equipment will remain onsite?							

Project Physical Location											
Number:		Direction:		Street:				Street Type:		Suite:	
		NW		SKY VISTA DR / ALTA Dr.				Dr.			
City:		LAS VEGAS				State:		NV		Zip: 89135	
List major cross streets and the proximity to the intersection:											
1st Cross Street:				2nd Cross Street:				Proximity:			
SKY VISTA DR				ALTA DR				NW			
4. Project Disturbed Surface Area:											
a. Project Disturbed Surface Area Information:											
Nonlinear Area Disturbed (Acreage in Tenths)											
(e.g., project site, stockpiles, staging areas, etc.)											
New/Current Total Nonlinear Project Acreage:				8✓		Total Proposed Nonlinear Project Acreage (new/renewal/modifications):				85.5	
Linear Area Disturbed (Not Within Nonlinear Area)											
(e.g., new unpaved access roads, off-site that may include trenching for utilities, street development, road work, etc.)											
Enter total number of linear segments:										0	
New/Current DCOP Maximum Linear Dimensions: (enter dimensions for new/current DCOP)						Proposed DCOP Maximum Linear Dimensions: (enter dimensions for DCOP modification/renewal DCOP)					
Linear Length:		Length Unit of Measure:		Linear Width (feet):		Linear Length:		Length Unit of Measure:		Linear Width (feet):	
0		Feet		0		0		Feet		0	
New/Current Total Linear Project Acreage:				0		Proposed Total Linear Project Acreage:				0	
(1) Nonlinear Area Acreage Subtotal:		85.5		(2) Linear Area Acreage Subtotal:		0		Total Project Area Disturbed (1) + (2):		85.5	
								Modification Acreage Increase:		77.5	
b. Project Parcel. List a parcel number for the project. Particulate Emission Potential (PEP) will automatically be determined by the parcel number. If your project spans multiple parcel numbers, DAQ reserves the right to request the parcel number be changed to account for a higher soil PEP.								Parcel Number		Project PEP	
								13733512003		MODERATE HIGH	
If the project acreage is ten acres or more or if project trenching activities are one mile in length or more, a detailed supplement to the Dust Mitigation Plan must be submitted with this application in accordance with Section 94.5.5 of the Clark County Air Quality Regulations (AQRs) and Appendix B of the Construction Activities Dust Control Handbook.											
Project Map Must Be Attached to DCOP Application NOTE: Air Quality does not accept engineering drawings.											
5. Responsible Official (Applicant) Certification Statement. By signing this permit application, the signatory certifies the following:											
a. As the Responsible Official (applicant), I am authorized on behalf of the Owner Builder/Company/Organization (permittee) listed in Section 1 to apply for this Dust Control Operating Permit (DCOP) and to commit to all of the terms and conditions therein.											
b. Before disturbing soils on a parcel, enacting a grade change, constructing a structure and/or appurtenances, or installing, constructing, or modifying equipment that emits an air pollutant, you must contact and obtain all required permits from Clark County's Department of Comprehensive Planning, Building Department, Department of Air Quality (Title 30 Notice) and the municipality with jurisdiction.											
c. The permit issued in response to this application is not a substitute for obtaining the property owner's permission to use land associated with the project. Issuance of the DCOP is intended only for controlling the emission of air pollutants and assuring compliance with the AQRs. Clark County cannot be held liable for any unauthorized use of the land.											
d. If applying on behalf of the permittee listed in Section 1, the permittee shall be responsible for complying with requirements of this DCOP and the AQRs. Otherwise, the applicant listed in Section 1 shall be the responsible party.											
e. The permittee accepts responsibility for assuring that all contractors, subcontractors, and other persons on the construction site defined by this permit comply with the terms and conditions of the DCOP, the associated Dust Mitigation Plan and the AQRs.											
f. In accordance with the DCOP and the AQRs, the applicant and the permittee shall consent to inspection of the site during normal hours of operation by DAQ staff without prior notice to determine compliance with the terms and conditions of the DCOP and the AQRs.											

- g. If the project has 50 or more acres of actively disturbed soil, the permittee shall notify DAQ and identify the on-site Dust Control Monitor for the project(s). In addition, this notification requirement applies to the following circumstances:
- When the permittee has common control of multiple adjacent projects that individually have less than 50 acres of actively disturbed soil, but the combined project has 50 or more acres of actively disturbed soil; or
 - When the permittee has common control of multiple projects that are not adjacent, but are within a common master-planned community and have 50 or more acres of actively disturbed soil.
- The permittee shall notify DAQ using the current notification form, which is available on the DAQ website and at the front counter of the main office, before disturbing the soil. The Dust Control Monitor must be on-site at all times when construction activities occur and shall manage dust prevention and control on-site.

Applicant Certification

ANGELA HENDERSON		10-29-2019
Responsible Official Name	Applicant's Signature	Signature Date

Advisories

- a. DCOP acreage fee is based on total project acreage of disturbed surface area (Item 4.a. of this application), which is rounded up to the next whole acre. If the project is less than 1 acre, a minimum of 1 acre shall apply to the project for fee purposes. All fees must be paid in full at the time of application; otherwise, the application cannot be accepted.
- b. Any payment made to the department in conjunction with this application may only be refunded to the permittee with the approval of the Board of County Commissioners. Approved refunds may not be issued to a preparer. Only the applicant or permittee may request a refund, which must contain written justification, a completed federal W-9 Form, a copy of the invoice/receipt, a completed Clark County Supplier Addition/Maintenance/Update form, and a copy of the cancelled check (front & back). The Control Officer shall have sole discretion to approve/disapprove the request for refund approval.
- c. Stormwater Advisory: Be advised that all land disturbances that exceed 1 acre or are adjacent to a waterway must submit a "Notice of Intent" to the Nevada Division of Environmental Protection that certifies a Storm Water Pollution Prevention Plan has been developed and is maintained for the site. Contact NDEP at (775) 687-9429 for an application, information, and instructions.
- d. Payment : Invoice payments must be made by check, money order, or credit card. Checks and money orders must be made payable to **Department of Air Quality or DAQ**. Credit card payment must be made in person at the DAQ main office.

WNW/212
JHM
11.12.19



DUST MITIGATION PLAN

Permit # : 45131

Project Name: VILLAGE 23B BORROW SITE

Company (Permittee): THE HOWARD HUGHES COMPANY

Total Project Area Disturbed: 85.5	Particulate Emission Potential (PEP):	MODERATE HIGH
------------------------------------	---------------------------------------	---------------

If the project acreage is ten acres or more or if project trenching activities are one mile in length or more, a detailed supplement to the Dust Mitigation Plan must be submitted with this application in accordance with Section 94.5.5 of the Clark County Air Quality Regulations (AQRs) and Appendix B of the Construction Activities Dust Control Handbook.

Water Source (check all that apply)

Water Application Method (check all that apply)

- ☒ Hydrant with Jones Valve
- ☒ Stand Tanks
- ☐ Ponds
- ☐ Well
- ☐ Other (Describe Below):

- ☒ Fire Hose
- ☒ Water Trucks/Pulls
- ☐ Other (Describe Below):

Project Activities:

The Dust Mitigation Plan applies to the following project activities: **Backfilling** (Filling area previously excavated or trenched); **Blasting - Abrasive** (Sandblasting and/or abrasive blasting); **Blasting Soil & Rock** (Explosive blasting of soil and rock); **Clearing & Grubbing** (Clearing and grubbing for site preparation and vacant land cleanup); **Clearing Forms, Foundations and Slabs** (Clearing and cleaning of forms, foundations and slabs prior to pouring concrete); **Crushing** (Crushing of construction and demolition debris, rock and soil); **Cut and/or Fill** (Cut and/or fill soils for site grade preparation); **Demolition - Mechanical/Manual** (Mechanical and manual demolition of walls, stucco, concrete, freestanding structures, buildings, load-bearing walls and/or removal of transit pipe); **Disturbed Soil** (Disturbed soil throughout project including between structures); **Disturbed Land - Long Term Stabilization** (Large tracts of disturbed land that will not have continuing activity for more than 30 days); **Dust Suppressants** (Selection and use of chemical and organic dust suppressing agents and other dust palliatives); **Importing/Exporting Materials** (Importing or exporting of soil, aggregate, decorative rock, debris, Type II and other bulk material); **Landscaping** (Installation of sod, decorative rock, desert or other landscape material); **Paving/Subgrade Preparation** (Subgrade preparation for paving streets, parking lots, etc.); **Sawing/Cutting Material** (Sawing or cutting materials such as concrete, asphalt, block or pipe); **Screening** (Screening of rock, soil or construction debris); **Staging Areas** (Staging areas, equipment storage, vehicle parking lots, and material storage areas); **Stockpiles** (Stockpiling of materials, such as Type II, other soils, rock or debris, for future use or export); **Trackout Prevention and Cleanup** (Prevention and cleanup of mud, silt and soil tracked out onto paved roads); **Traffic - Unpaved Routes and Parking** (Construction related traffic on unpaved interior and/or access roads and unpaved employee/worker parking areas); **Trenching** (Trenching with track or wheel mounted excavator, shovel, backhoe or trencher); and **Truck Loading** (Loading trucks with materials including construction and demolition debris, rock and soil).

This DCP Application and Dust Mitigation Plan does not include project activities related to **Demolition - Implosion** (Implosive demolition of a structure, using explosives).

Best Management Practices (BMPs) - Control Measures:

The permittee shall comply with all requirements of Section 94 of the AQRs, all requirements of the current *Clark County Dust Control Handbook*, and all provisions of the DCOP issued from this application.

For each project activity listed in this Dust Mitigation Plan, the permittee shall comply with the requirements for the associated BMPs in the *Dust Control Handbook*. Where options are listed for a BMP requirement, the permittee shall apply one or more of the control measures to comply with the requirement. The permittee will apply corresponding control measures for the PEP for the project soil type(s).

Clark County Department of Air Quality

Construction Site Dust Control Monitor

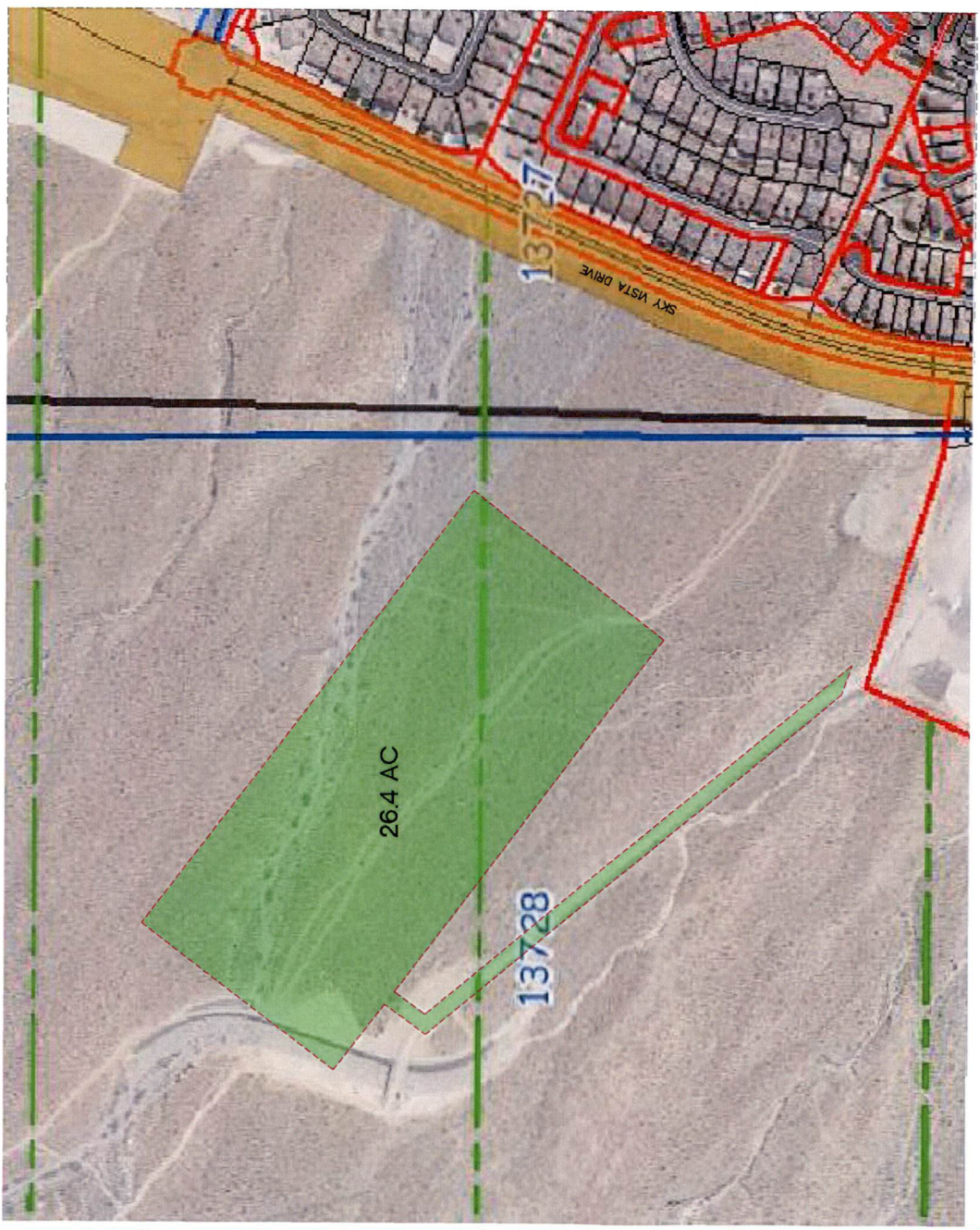
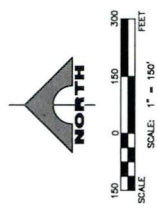
1. Applicant (Permittee) Information:

Company (Permittee):	THE HOWARD HUGHES COMPANY				# of Permits:	1
Air Quality Regulation Section 94.7.5 requires a Dust Control Monitor for any construction project that has 50 acres or more of disturbed soils. This requirement is applicable to multiple sites that are individually permitted at less than 50 acres each, if they are adjacent to one another, under common ownership, or are within a master planned community, and together they have 50 acres or more of disturbed soil.						
Dust Control Monitor's Name:		Company/Organization:		Dust Monitor Card #:	1902011 ✓	
DAVID ANGUIANO		JC COMPANIES		Card Expires:	02/05/2022	
Office:		Extension:		Cell:	702-755-4149	Fax:
Project Name(s), Permit Number(s) & Acreage (in tenths):						
Project Name				Permit #	Project Acreage	
VILLAGE 23B BORROW SITE				45131	85.5	
				Total Acreage:	85.5	

P5.1/2

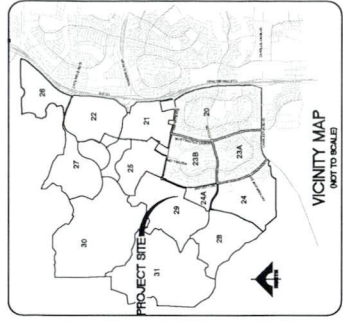
45131 MOD 10 = +77.5(85.5) 137 33512 003

dm 11-12-19



LEGEND

 VILLAGE 29 STOCKPILE - 26.4 ACRES



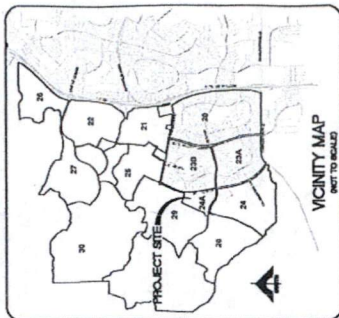
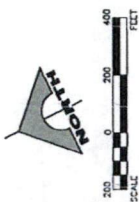
SUMMERLIN

VILLAGE 29 STOCKPILE

OCTOBER 17, 2019

DRAWING EXH 1 OF 1 SHEETS		THE HOWARD HUGHES COMPANY, L.L.C.		SUMMERLIN VILLAGE 29 STOCKPILE		AIR QUALITY CONTROL EXHIBIT	
PROJECT NO. 62029-200		GCV ENGINEERS \ SURVEYORS 1555 S. RAINBOW BLVD. LAS VEGAS, NV 89146 T: 702.804.2299 F: 702.804.2299 gcvengineering.com		DATE 10/17/19		DATE 10/17/19	
DESCRIPTION		DATE		DATE		DATE	

45131 MOD 10



LEGEND

**VILLAGE 24A DETENTION BASIN
MODIFICATIONS (SKY VISTA DRIVE
AND ALTA DRIVE) - 51.1 ACRES**

SUMMERLIN



**DETENTION BASIN
MODIFICATIONS
(SKY VISTA DRIVE AND ALTA
DRIVE)**

AUGUST 19, 2019

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Best Management Practices (BMPs) & Control Measures

BMP 01

BACKFILLING

Definition: Filling area previously excavated or trenched.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: Stabilize backfill material when not actively handling.

- 01-01 Water backfill material to maintain moisture or to form crust when not actively handling.
- 01-02 Apply and maintain a dust palliative to backfill material to form crust when not actively handling.
- 01-03 Cover or enclose backfill material when not actively handling.

Requirement: Stabilize backfill material during handling.

- 01-04 Empty loader bucket slowly and minimize drop height from loader bucket.
- 01-05 Dedicate water truck or large hose to backfilling equipment and apply water as needed.

Requirement: Stabilize backfill material during handling based on project soil type.

- 01-07 L & ML: Apply and mix water into the backfill material until optimum moisture is reached.
- 01-08 MH: Apply and mix water and tackifier solution into the backfill material until optimum moisture is reached.
- 01-09 H: Apply and mix water and surfactant solution into the backfill material until optimum moisture is reached.

Requirement: Stabilize soil at completion of backfilling activity.

- 01-10 Apply water and maintain disturbed soils in a stable condition until permanent stabilization is complete.
- 01-11 Apply and maintain a dust palliative on disturbed soils to form a crust following backfilling activity.

Requirement: Stabilize material while using pipe padder equipment.

- 01-12 Mix moist soil with dry soil until the optimum moisture is reached.
- 01-13 Dedicate water truck or large hose to equipment and apply water as needed.

Best Management Practices (BMPs) & Control Measures

BMP 02

BLASTING - ABRASIVE

Definition: Sandblasting and/or abrasive blasting.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: Stabilize surface soils where support equipment and vehicles will operate.

- 02-01 Pre-water and maintain surface soils in a stabilized condition where support equipment and vehicles will operate.
- 02-02 Apply and maintain a dust palliative on surface soils where support equipment and vehicles will operate.

Requirement: Limit visible emissions to no more than an average of 40% opacity for any period aggregating 3 minutes in any 60-minute period pursuant to Air Quality Regulations.

- 02-03 Hydro-blasting, using water as the propellant, must be conducted in a manner to maintain visible emissions within opacity standards.
- 02-04 Dry, unconfined blasting with abrasive material must use only those abrasives that are approved and certified by the California Air Resources Board (CARB) for such use (see Attachment 3: CARB-Approved Abrasives Information).

Requirement: Stabilize particulate matter in surrounding area following blasting.

- 02-05 Clean particulate material from surrounding area and water disturbed soils following blasting.
- 02-06 Apply and maintain a dust palliative to surrounding area following blasting.

Best Management Practices (BMPs) & Control Measures

BMP 03

BLASTING - SOIL & ROCK

Definition: Explosive blasting of soil and rock.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: A Blasting Supplemental form must be filled out, submitted and approved by the DAQEM prior to any blasting (see Appendix A: Dust Control Permit Supplemental Forms)

Requirement: No blasting within 1,500 feet of a residential area, occupied building or major roadway, when wind direction is toward these structures.

Requirement: Blasting shall be between the hours of 8:00 a.m. and 4:30 p.m., excluding Saturdays, Sundays and holidays unless prior permission is obtained from the Control Officer.

Requirement: No blasting allowed when the National Weather Service forecasts wind gusts above 25 miles per hour (mph).

- 03-01 Prior to setting explosive charges in holes, document current and predicted weather conditions as provided by the National Weather Service. If the current forecast is for wind gusts of 25 mph or greater or they are forecasted to be 25 mph or greater within the next 24 hours, do not charge any blast holes. When setting explosive charges, monitor weather reports for wind gusts of 25 mph or greater on the National Weather Service Radio and/or Internet sites. If wind gusts above 25 mph are stated, d

Requirement: Stabilize surface soils where drills, support equipment and vehicles will operate.

- 03-02 Pre-water and maintain surface soils in a stabilized condition where drills, support equipment and vehicles will operate.
- 03-03 Apply and maintain a dust palliative on surface soils where drills, support equipment and vehicles will operate.

Requirement: Stabilize soil during blast preparation activities.

- 03-04 Limit the blast footprint area to no larger than what can be practically stabilized immediately following the blast.
- 03-05 Maintain surface rock and vegetation where possible to reduce exposure of disturbed soil to wind.

Requirement: Stabilize soil during blast preparation activities based on project soil type.

- 03-06 L & ML: Presoak surface soils to depth of the caliche or bedrock with water using water trucks, water pulls, sprinklers or wobblers.
- 03-07 MH: Presoak surface soils to depth of the caliche or bedrock with water and tackifier mixture using water trucks, water pulls, sprinklers or wobblers.
- 03-08 H: Presoak surface soils to depth of the caliche or bedrock with water and surfactant mixture using water trucks, water pulls, sprinklers or wobblers.

Requirement: Stabilize soil after blasting.

03-09 Water disturbed soils to form crust immediately following blast and safety clearance.

03-10 Apply and maintain a dust palliative to form crust immediately following blast and safety clearance.

Best Management Practices (BMPs) & Control Measures

BMP 04

CLEARING & GRUBBING

Definition: Clearing and grubbing for site preparation and vacant land cleanup.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: Stabilize surface soils where support equipment and vehicles will operate.

- 04-01 Pre-water and maintain surface soils in a stabilized condition where support equipment and vehicles will operate.
- 04-02 Apply and maintain a dust palliative on surface soils where support equipment and vehicles will operate.

Requirement: Stabilize soil during clearing and grubbing activities.

- 04-03 L & ML: Apply water during clearing and grubbing activities.
- 04-04 MH: Apply water and tackifier mixture during clearing and grubbing activities.
- 04-05 H: Apply water and surfactant mixture during clearing and grubbing activities.

Requirement: Stabilize disturbed soil immediately after clearing and grubbing activities.

- 04-06 Water disturbed soils to form crust immediately following clearing and grubbing activities.
- 04-07 Apply and maintain a dust palliative on disturbed soils to form crust immediately following clearing and grubbing activities.

Best Management Practices (BMPs) & Control Measures

BMP 05

CLEARING FORMS, FOUNDATIONS AND SLABS

Definition: Clearing and cleaning of forms, foundations and slabs prior to pouring concrete.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: Limit visible emissions to no more than an average of 20% opacity for any period aggregating 3 minutes in any 60-minute period pursuant to Air Quality Regulations.

05-01 Use single stage pours, unless prohibited by engineering design or building code, to minimize clearing.

Requirement: Limit visible emissions to no more than an average of 20% opacity for any period aggregating 3 minutes in any 60-minute period by complying with at least one of the additional control measures.

05-02 Use water spray to clear forms, foundations and slabs.

05-03 Use sweeping and water spray to clear forms, foundations and slabs.

05-04 Use industrial vacuum to clear forms, foundations and slabs prior to the use of high pressure air to blow soil and debris.

05-05 Use industrial vacuum to clear forms, foundations and slabs.

Best Management Practices (BMPs) & Control Measures

BMP 06

CRUSHING

Definition: Crushing of construction and demolition debris, rock and soil.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: Obtain the appropriate Operating Permit for powered crushers prior to engaging in crushing activity. Comply with permit conditions.

Requirement: Stabilize surface soils where support equipment and vehicles will operate.

06-01 Pre-water and maintain surface soils in a stabilized condition where support equipment and vehicles will operate.

06-02 Apply and maintain a dust palliative to surface soils where support equipment and vehicles will operate.

Requirement: Stabilize material before crushing.

06-03 Pre-water material prior to loading into crusher.

06-04 Test material to determine moisture content and silt loading, crush only material that is at optimum moisture content.

Requirement: Stabilize material during crushing.

06-05 Apply water to stabilize material so as to remain in compliance with opacity standards and permit conditions, during crushing.

06-06 Monitor emissions opacity. Make adjustments to remain in compliance with opacity standards and permit conditions.

Requirement: Stabilize material after crushing.

06-07 Water crushed material to form crust immediately following crushing.

06-08 Apply and maintain a dust palliative to crushed material.

Best Management Practices (BMPs) & Control Measures

BMP 07

CUT AND/OR FILL

Definition: Cut and/or fill soils for site grade preparation.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: Stabilize surface soils where support equipment and vehicles will operate.

- 07-01 Pre-water and maintain surface soils in a stabilized condition where support equipment and vehicles will operate.
- 07-02 Apply and maintain a dust palliative to surface soils where support equipment and vehicles will operate.

Requirement: Pre-water soils based on project soil type.

- 07-03 Dig a test hole to depth of cut or equipment penetration to determine if soils are moist at depth. Continue to pre-water if not moist to depth of cut.
- 07-04 L & ML: Pre-water with sprinklers or wobblers to allow time for penetration.
- 07-05 L & ML: Pre-water with water trucks or water pulls to allow time for penetration.
- 07-06 MH: Pre-water with a water and tackifier mixture using sprinklers or wobblers to allow time for penetration.
- 07-07 MH: Pre-water with a water and tackifier mixture using water trucks or water pulls to allow time for penetration.
- 07-08 H: Pre-water with a water and surfactant mixture using sprinklers or wobblers to allow time for penetration.
- 07-09 H: Pre-water with a water and surfactant mixture using water trucks or water pulls to allow time for penetration.

Requirement: Stabilize soil during cut activities.

- 07-10 Apply water, using water truck or water pull, to depth of cut prior to subsequent cuts.
- 07-11 No cut activities fill only.

Requirement: Stabilize soil after cut and fill activities.

- 07-12 Water disturbed soils to form crust following fill and compaction.
- 07-13 Apply and maintain a dust palliative on disturbed soils to form crust following fill and compaction.

Best Management Practices (BMPs) & Control Measures

BMP 08

DEMOLITION - IMPLOSION

Definition: Implosive demolition of a structure, using explosives.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: A Demolition Supplemental form (see Appendix A) and a Supplement To The Dust Mitigation Plan (see Appendix B) must be filled out, submitted and approved by the Control Officer prior to implosion.

Requirement: An asbestos survey must be conducted on any facility before demolition can commence.

Requirement: A complete Clark County NESHAP Notification form must be submitted to the DAQEM at least ten working days prior to demolition. The asbestos survey must be attached to this notification.

Requirement: All friable and non-friable asbestos containing material must be removed from the facility prior to implosion.

Requirement: Confine blasting to times when wind direction is away from closest residential areas, occupied buildings and major roadways.

Requirement: Implosion time must be pre-approved by the Control Officer.

Requirement: Monitor and document current weather conditions and weather predictions from National Weather Service.

- 08-01 Prior to setting explosive charges, obtain and document current and predicted weather conditions as provided by the National Weather Service. If wind advisory (over 20 miles per hour gusts or average wind speed of 10 miles per hour) is current or forecasted for blast period, do not set charges and do not blast. Maintain a calibrated anemometer and log ambient air velocity and direction within 1,000 feet of the implosion site, beginning at least 1 (one) hour prior to and 15 minutes after the impl

Requirement: Stabilize surface area where support equipment and vehicles will be operated.

- 08-02 Restrict support equipment and vehicles to existing paved and/or stable areas.
- 08-03 If paved and/or stable areas do not already exist, pre-water and maintain surface soils in a stabilized condition where support equipment and vehicles will operate.
- 08-04 If paved and/or stable areas do not already exist, apply and maintain a dust palliative on surface soils where support equipment and vehicles will be operated.

Requirement: Stabilize demolition debris immediately following blast and safety clearance.

- 08-05 Apply water to debris immediately following blast and safety clearance.
- 08-06 Apply and maintain a dust palliative to debris immediately following blast and safety clearance.

Requirement: Stabilize and clean surrounding area immediately following blast and safety clearance.

- 08-07 Water all disturbed soil surfaces to establish crust and prevent wind erosion of soil.
- 08-08 Thoroughly clean blast debris from paved and other surfaces following blast and safety clearance.

Best Management Practices (BMPs) & Control Measures

BMP 09

DEMOLITION - MECHANICAL/MANUAL

Definition: Mechanical and manual demolition of walls, stucco, concrete, freestanding structures, buildings, load-bearing walls and/or removal of transit pipe.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: For renovation or demolition of a structure, a Demolition Supplemental form (see Appendix A) must be filled out, submitted and approved by the Control Officer prior to commencing demolition.

Requirement: An asbestos survey must be conducted on any facility or structure that is subject to NESHAP requirements before demolition can commence.

Requirement: A complete Clark County NESHAPS Notification form must be submitted to the DAQEM at least ten working days prior to demolition. The asbestos survey must be attached to this notification.

Requirement: Stabilize surface soils where support equipment and vehicles will operate.

- 09-01 Pre-water and maintain surface soils in a stabilized condition where support equipment and vehicles will operate.
- 09-02 Apply and maintain a dust palliative to surface soils where support equipment and vehicles will operate.
- 09-03 Area where support equipment and vehicles will operate is completely covered with paving or concrete.

Requirement: Stabilize demolition debris during handling.

- 09-04 Apply water to demolition debris during handling.

Requirement: Stabilize debris following demolition.

- 09-05 Apply water to stabilize demolition debris.
- 09-06 Apply a dust palliative to stabilize demolition debris.

Requirement: Stabilize surrounding area following demolition.

- 09-07 Apply water to stabilize surrounding area following demolition.
- 09-08 Apply and maintain a dust palliative to stabilize surrounding area following demolition.

Best Management Practices (BMPs) & Control Measures

BMP 10

DISTURBED SOIL

Definition: Disturbed soil throughout project including between structures.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: For each non-linear project to be permitted for 5 acres or less; install perimeter wind barrier 3 feet or more in height made of material with a porosity of 50% or less.

Requirement: Limit vehicle traffic and disturbance of soils where possible.

- 10-01 Limit vehicle traffic and disturbance of soils with the use of fencing, barriers, barricades, and/or wind barriers.

Requirement: Stabilize and maintain stability of all disturbed soil throughout construction site.

- 10-02 Apply water to stabilize disturbed soils. Soils must be kept in a sufficiently damp, crusted or covered condition.
- 10-03 Apply and maintain a dust palliative based on soil type and future plans.

Requirement: Soil conditions, including preventive and corrective measures, must be recorded every day the construction project is active.

- 10-04 Record soil conditions and dust control actions in daily project records.

Best Management Practices (BMPs) & Control Measures

BMP 11

DISTURBED LAND - LONG TERM STABILIZATION

Definition: Large tracts of disturbed land that will not have continuing activity for more than 30 days.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: Stabilize soil to meet standards required by Air Quality Regulation Section 90.

- 11-01 Apply and maintain a dust palliative on disturbed soils for long-term stabilization.
- 11-02 Stabilize disturbed soil with vegetation for long-term stabilization.
- 11-03 Pave or apply surface rock for long-term stabilization.
- 11-04 Use wind breaks in accordance with a site-specific plan approved by the Control Officer and Region IX Administrator of the EPA.
- 11-05 Apply water and maintain soils in a visible damp or crusted condition for temporary stabilization.

Requirement: Prevent access to limit soil disturbance.

- 11-06 Prevent access by fencing, ditches, vegetation, berms or other suitable barrier or means approved by the Control Officer.

Best Management Practices (BMPs) & Control Measures

BMP 12

DUST SUPPRESSANTS - SELECTION AND USE

Definition: Selection and use of chemical and organic dust suppressing agents and other dust palliatives.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: Follow CCHD “Interim Policy on Dust Palliatives Use In Clark County, Nevada”.

Requirement: Record use of suppressants and dust palliatives and retain records.

Requirement: Follow applicable federal and state regulations.

Requirement: Select method of long-term stabilization taking into consideration future land use.

- 12-01 For traffic area applications use Table 1: Traffic Area Application Requirements, Appropriate Use of Liquid Dust Palliatives and Application Rates, from the Interim Policy on Dust Palliatives Use in Clark County, Nevada.
- 12-02 For non-traffic area applications use Table 2: Non-Traffic Area Application Requirements, Appropriate Use of Liquid Dust Palliatives and Application Rates, from the Interim Policy on Dust Palliatives Use in Clark County, Nevada.

Best Management Practices (BMPs) & Control Measures

BMP 13

IMPORTING/EXPORTING MATERIALS

Definition: Importing or exporting of soil, aggregate, decorative rock, debris, Type II and other bulk material.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: Limit visible dust opacity from vehicular operations.

13-01 Apply water and limit vehicle speeds to 15 mph on the work site.

13-02 Apply and maintain dust suppressant on haul routes.

Requirement: Check belly-dump truck seals regularly and remove any trapped rocks to prevent spillage.

Requirement: Maintain 3-6 inches of freeboard to minimize spillage.

Requirement: Stabilize materials during transport on site.

13-03 Use tarps or other suitable enclosures on haul trucks.

13-04 Stabilize materials with water.

Requirement: Clean wheels and undercarriage of haul trucks prior to leaving construction site.

Best Management Practices (BMPs) & Control Measures

BMP 14

LANDSCAPING

Definition: Installation of sod, decorative rock, desert or other landscape material.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: Stabilize soils, materials and slopes during handling.

- 14-01 L & ML: Apply water prior to leveling or any other earth moving activity to keep the soil moist throughout the process.
- 14-02 MH: Apply a water and tackifier mixture prior to leveling or any other earth moving activity to keep the soil moist throughout the process.
- 14-03 H: Apply a water and surfactant mixture prior to leveling or any other earth moving activity to keep the soil moist throughout the process.

Requirement: Stabilize soils, materials and slopes at completion of activity.

- 14-04 Stabilize sloping surfaces using soil binders until vegetation or ground cover can effectively stabilize the slope.
- 14-05 Apply water and maintain sloping surfaces in a crusted condition.
- 14-06 Maintain effective cover over materials.

Best Management Practices (BMPs) & Control Measures

BMP 15

PAVING/SUBGRADE PREPARATION

Definition: Subgrade preparation for paving streets, parking lots, etc.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: Stabilize soils prior to activities.

- 15-01 Pre-water subgrade surface until optimum moisture content is reached and maintained.

Requirement: Stabilize soils during activities.

- 15-02 Maintain at least 70% of optimum moisture content for Type II material while aggregate is being applied.

Requirement: Stabilize soils following activities.

- 15-03 Place tack coat on Type II aggregate base immediately after it is applied.
- 15-04 Apply water to Type II aggregate base immediately after it is applied.

Requirement: Stabilize adjacent disturbed soils following paving activities.

- 15-05 Stabilize adjacent disturbed soils following paving activities by crusting with water.
- 15-06 Stabilize adjacent disturbed soils following paving activities by applying a dust palliative.
- 15-07 Stabilize adjacent disturbed soils following paving activities with immediate landscaping activity or installation of vegetative or rock cover.
- 15-08 There are no soils adjacent to paving activities.

Best Management Practices (BMPs) & Control Measures

BMP 16

SAWING/CUTTING MATERIAL

Definition: Sawing or cutting materials such as concrete, asphalt, block or pipe.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: Limit visible emissions to no more than an average of 20% opacity, pursuant to Air Quality Regulations.

16-01 Use water to control dust when cutting materials.

16-02 Use a vacuum to collect dust when cutting materials.

Best Management Practices (BMPs) & Control Measures

BMP 17

SCREENING

Definition: Screening of rock, soil or construction debris.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: If using a powered screen, obtain the appropriate Operating Permit for powered screens prior to engaging in screening activity. Comply with permit conditions.

Requirement: Drop material through the screen slowly and minimize drop height.

Requirement: Stabilize surface soils where support equipment and vehicles will operate.

- 17-01 Pre-water and maintain surface soils in a stabilized condition where support equipment and vehicles will operate.
- 17-02 Apply and maintain a dust palliative on surface soils where support equipment and vehicles will operate.

Requirement: Pre-treat material prior to screening.

- 17-03 Apply sufficient water to obtain at least 70% optimum moisture in material prior to screening.
- 17-04 Apply a dust suppressant to material prior to screening.

Requirement: Stabilize material during screening.

- 17-05 Dedicate water truck or large hose to screening operation and apply water as needed to prevent dust.
- 17-06 Apply water to material as it is being dropped through the screen.
- 17-07 Install wind barrier upwind of screen as high as the screen drop point and made of material with a porosity of 50% or less.

Requirement: Stabilize material and surrounding area immediately after screening.

- 17-08 Apply water to stabilize screened material and surrounding area after screening.
- 17-09 Apply and maintain a dust palliative to stabilize screened material and surrounding area after screening.

Best Management Practices (BMPs) & Control Measures

BMP 18

STAGING AREAS

Definition: Staging areas, equipment storage, vehicle parking lots, and material storage areas.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: Limit visible dust opacity from vehicular operations.

- 18-01 Limit vehicle speeds to 15 mph in the staging area and on all unpaved access routes.
- 18-02 Apply and maintain dust suppressant on all vehicle traffic areas in the staging areas and unpaved access routes.

Requirement: Stabilize staging area soils during use.

- 18-03 Pre-water and maintain surface soils in a stabilized condition where support equipment and vehicles will operate.
- 18-04 Apply and maintain a dust palliative to surface soils where support equipment and vehicles will be operated.

Requirement: Stabilize staging area soils at project completion.

- 18-05 Apply a dust palliative.
- 18-06 Apply screened or washed Type II aggregate.
- 18-07 Use wind breaks in accordance with a site-specific plan approved by the Control Officer and Region IX Administrator of the EPA.
- 18-08 Pave with thin paving.
- 18-09 Completed project will cover staging area with buildings, paving, and/or landscaping.
- 18-10 Apply water to form adequate crust and prevent access.

Best Management Practices (BMPs) & Control Measures

BMP 19

STOCKPILES

Definition: Stockpiling of materials, such as Type II, other soils, rock or debris, for future use or export.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: To the extent possible, maintain stockpile to avoid steep sides or faces.

Requirement: Stockpile location and height must be maintained pursuant to Air Quality Regulations. Stockpiles located within 100 yards of occupied buildings must not be constructed over 8 feet in height.

19-01 Stockpiles will not be constructed over 8 feet in height.

19-02 Stockpiles will be constructed over 8 feet high and must have a road bladed to the top to allow water truck access or must have a sprinkler irrigation system installed, used and maintained.

Requirement: Stabilize surface soils where support equipment and vehicles will operate.

19-03 Pre-water and maintain surface soils in a stabilized condition where support equipment and vehicles will operate.

19-04 Apply and maintain a dust palliative on surface soils where support equipment and vehicles will operate.

Requirement: Stabilize stockpile materials during handling.

19-05 Maintain stockpile materials with at least 70% optimum moisture content.

19-06 Remove material from the downwind side of the stockpile, when safe to do so.

Requirement: Stabilize stockpile materials during handling based on the project soil type.

19-07 L & ML: Apply water during stacking, loading and unloading operations.

19-08 MH: Apply a water and tackifier mixture during stacking, loading and unloading operations.

19-09 H: Apply a water and surfactant mixture during stacking, loading and unloading operations.

Requirement: Stabilize stockpiles at completion of activity.

19-10 Water stockpiles to form a crust immediately at the completion of activity.

19-11 Apply and maintain a dust palliative to all outer surfaces of the stockpiles.

19-12 Provide and maintain wind barriers on 3 sides of the pile, whose length is no less than equal to the length of the pile, whose distance from the pile is no more than twice the height of the pile, whose height is equal to the pile height, and made of material with a porosity of 50% or less.

19-13 Apply a cover or screen to stockpiles.

Best Management Practices (BMPs) & Control Measures

BMP 20

TRACKOUT PREVENTION AND CLEANUP

Definition: Prevention and cleanup of mud, silt and soil tracked out onto paved roads.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: In soils that have a PEP classification of “High”, pave construction activities roadways as early as possible.

Requirement: Use of soil to create a ramp for vehicle access over a curb is prohibited.

Requirement: Trackout conditions, including preventive and corrective measures, must be recorded daily for every day that the construction project access is used by vehicles.

20-01 Record soil conditions and dust control actions in daily project records.

Requirement: Prevent dust from trackout.

20-02 Immediately clean trackout from paved surfaces to maintain dust control. Trackout must not extend 50 feet or more.

20-03 Maintain dust control during working hours and clean trackout from paved surfaces at the end of the work shift/day. Trackout must not extend 50 feet or more and must be cleaned daily, at minimum.

Requirement: Install and maintain trackout control devices in effective condition at all access points where paved and unpaved access or travel routes intersect.

20-04 Install gravel pad(s) consisting of 1” to 3” rough diameter, clean, wellgraded gravel or crushed rock. Minimum dimensions must be 30 feet wide by 3 inches deep, and, at minimum, 50’ or the length of the longest haul truck, whichever is greater. Re-screen, wash or apply additional rock in gravel pad to maintain effectiveness.

20-05 Install wheel shakers. Clean wheel shakers on a regular basis to maintain effectiveness.

20-06 Install wheel washers. Maintain wheel washers on a regular basis to maintain effectiveness.

20-07 Install wheel shakers in the event that trackout cannot be controlled with gravel pads.

20-08 Install wheel washer in the event that trackout cannot be controlled with gravel pads and wheel shakers.

20-09 Motorized vehicles will only operate on paved surfaces.

Requirement: All exiting traffic must be routed over selected trackout control device(s).

20-10 Clearly establish and enforce traffic patterns to route traffic over selected trackout control device(s).

20-11 Limit site accessibility to routes with trackout control devices in place by installing effective barriers on unprotected routes.

Best Management Practices (BMPs) & Control Measures

BMP 21

TRAFFIC - UNPAVED ROUTES AND PARKING

Definition: Construction related traffic on unpaved interior and/or access roads and unpaved employee/worker parking areas.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: Limit visible dust opacity from vehicular operations.

21-01 Limit vehicle speeds to 15 mph on all unpaved routes and parking areas.

21-02 Apply and maintain dust palliative on all vehicle travel areas.

Requirement: Stabilize all haul routes.

21-03 Apply water to haul routes and maintain in a stabilized condition.

21-04 Apply a dust palliative to haul routes and maintain in a stabilized condition.

21-05 Apply gravel to haul routes and maintain in a stabilized condition.

21-06 Supplement dust palliative or aggregate applications with watering, if necessary.

Requirement: Stabilize all off-road and parking areas.

21-07 Apply water to off-road traffic and parking areas and maintain in a stabilized condition.

21-08 Apply gravel to off-road traffic and parking areas and maintain in a stabilized condition.

21-09 Apply recycled asphalt (or other suitable material) to off-road traffic and parking areas and maintain in a stabilized condition.

21-10 Apply and maintain a dust palliative (designed for vehicle traffic) to off-road traffic and parking areas and maintain in a stabilized condition.

Best Management Practices (BMPs) & Control Measures

BMP 22

TRENCHING

Definition: Trenching with track or wheel mounted excavator, shovel, backhoe or trencher.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: Stabilize surface soils where trenching equipment, support equipment and vehicles will operate.

- 22-01 Pre-water and maintain surface soils in a stabilized condition where trenching equipment, support equipment and vehicles will operate.
- 22-02 Apply and maintain a dust palliative to surface soils where trenching equipment, support equipment and vehicles will operate.

Requirement: Presoak soils prior to trenching activities based on the project soil type.

- 22-03 Pre-water surface, pre-trench to 18" depth, soak soils via pre-trench prior to deep trenching.
- 22-04 L & ML: Presoak soil with water using sprinklers or wobblers.
- 22-05 L & ML: Presoak with water, using water truck and/or water pull.
- 22-06 MH: Presoak soil with a water and tackifier mixture using water pulls and/or water trucks.
- 22-07 MH: Presoak soil with a water and tackifier mixture using sprinklers or wobblers.
- 22-08 H: Presoak soil with a water and surfactant mixture using water pulls and/or water trucks.
- 22-09 H: Presoak soil with a water and surfactant mixture using sprinklers or wobblers.

Requirement: Stabilize soil during trenching activities based on the project soil type.

- 22-10 L & ML: Complete trenching with a dedicated water truck or large hose maintaining water as needed to prevent dust.
- 22-11 L & ML: Use spray nozzles mounted on trenching machine.
- 22-12 MH: Complete trenching with a dedicated water truck or large hose maintaining a water and tackifier mixture as needed to prevent dust.
- 22-13 H: Complete trenching with a dedicated water truck or large hose maintaining a water and surfactant mixture as needed to prevent dust.

Requirement: Stabilize soils at the completion of trenching activities.

- 22-14 Use water to form crust on excavated soil windrow as it is formed.
- 22-15 Use dust palliative to form crust on excavated soil windrow as it is formed.

Best Management Practices (BMPs) & Control Measures

BMP 23

TRUCK LOADING

Definition: Loading trucks with materials including construction and demolition debris, rock and soil.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: Ensure all loads are covered prior to leaving the construction site and traveling on public roadways.

Requirement: Stabilize surface soils where loaders, support equipment and vehicles will operate.

- 23-01 Pre-water and maintain surface soils in a stabilized condition where loaders, support equipment and vehicles will operate.
- 23-02 Apply and maintain a dust palliative on surface soils where loaders, support equipment and vehicles will operate.

Requirement: Stabilize material during loading.

- 23-03 Empty loader bucket slowly and keep loader bucket close to the truck to minimize the drop height while dumping.

Requirement: Stabilize material during loading based on the project soil type.

- 23-04 L & ML: Mix material with water prior to loading.
- 23-05 L & ML: Spray material with water while loading.
- 23-06 MH: Mix material with a water and tackifier mixture prior to loading.
- 23-07 MH: Spray material with a water and tackifier mixture while loading.
- 23-08 H: Mix material with a water and surfactant mixture prior to loading.
- 23-09 H: Spray material with a water and surfactant mixture while loading.

TECHNICAL DRAINAGE STUDY FOR A STOCKPILE PERMIT
SUMMERLIN VILLAGE 29

62029-200

October 2019

Prepared for:

**The Howard Hughes Company, LLC
10801 W. Charleston Blvd., 3rd Floor
Las Vegas, Nevada 89135
Phone: (702) 791-4300**

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL
DRAINAGE STUDY INFORMATION FORM

Name of Development: Summerlin Village 29 Stockpile Date: 10/14/2019

Location of Development: a) Descriptive (Cross Streets) North/South: N/A

East/West: Sky Vista Drive

b) Section: 28 Township: 20 Range: 59

c) APN : 137-28-101-002

Name of Owner: The Howard Hughes Company, LLC

Telephone No.: (702) 791-4000 Fax No.: (702) 791-4450 E-Mail Address: _____

Address: 10845 Griffith Peak Drive Ste #160, Las Vegas, NV 89135

Contact Person-Name: Cameron Bencini, P.E. Telephone No.: (702) 804-2126

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

Firm: GCW, Inc.

Address: 1555 South Rainbow Boulevard, Las Vegas, 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	☐	Stockpile

1. Total Owned Land Area: At Site: 593.55 Acres Being Developed/Disturbed: 14.7 Ac

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.): _____

5. Approximate upstream land area which drains to the subject site: Less than 1 Ac

6. Has the site drainage been evaluated in the past? ☒ YES ☐ NO If yes, please identify documentation: "Detention Basin No. 5 / Diversion Berm Final Design Report" By G.C. Wallace, 2001.

"Update #2 to the Technical Drainage Study for Village 23B Sky Vista Drive, Alta Drive to Far Hills Avenue," GCW, Inc. April 2019.

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Site drains to a 42" RCP, which goes into a 60" RCP on Sky Vista Drive which conveys water south.

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



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



CITY OF LAS VEGAS

MINIMUM DRAINAGE STUDY CRITERIA STANDARD FORM 2 CHECKLIST SUPPLEMENT

(Revised 5/18/11)

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

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

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

I. GENERAL REQUIREMENT		
Yes	No	
	N/A	A notarized letter from the adjacent property owner(s) allowing off-site grading. (A copy of the letter must be received prior to final acceptance of the drainage study.)
x		Copies of all conditions of approval for development related to this property. (e.g. zoning, use permit, tentative map, etc.) Verify compliance with conditions.
x		An electronic copy of the complete submittal is required to be submitted with one original hard copy of the study. Electronic documents should be on a universal computer-readable digital output device replicating your submittal. An Indexed Portable Document Format (PDF) or Print Ready CAD file formats with a minimum of 300dpi are the desired formats. If figures are in color, they must be scanned in color and saved as a separate file. <u>CB</u> by initial here, the engineer on record acknowledges that the electronic copy is an identical replicate of the original hard copy submitted to the City of Las Vegas.

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

CITY OF LAS VEGAS MINIMUM DRAINAGE STUDY CRITERIA CHECKLIST

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

III. Local Entity Criteria - City of Las Vegas – Manual Section 1600		
Yes	No	
	N/A	Concrete valley gutters are required in parking lots with slopes less than 1 percent. Slopes through cul-de-sac must be at a 1 percent minimum where flow is drained through the cul-de-sac.
	N/A	Ten-foot wide public drainage easements to be privately maintained are allowed for flow less than 20 cfs. The depth of flow entering the easement must be checked using the submerged weir calculation.
x		The limits of the flood zones and the base flood elevations (BFE) must be shown on all grading plans for all developments within a Special Flood Hazard Zone A, AO, AE, etc.
	N/A	Minimum finish floor elevation is 6 inches above highest adjacent top of curb. Finish floor calculations must include allowances for super elevations on curves and velocity head for tee intersections.
	N/A	Finished floor elevations for buildings adjacent to public drainage easements must be a minimum of 18 inches above the Q100 weir of submerged weir elevation, whichever is greater.

CITY OF LAS VEGAS MINIMUM DRAINAGE STUDY CRITERIA CHECKLIST

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

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

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

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL		
DRAINAGE SUBMITTAL CHECKLIST		
Project Name: Summerlin Village 29 Stockpile	Map ID:	
Firm Name: GCW, Inc.	Engineer: Cameron Bencini, P.E.	
Address: 1555 South Rainbow Boulevard		
City: Las Vegas	State: NV	Zip: 89146
Phone Number: (702) 804-2126	Fax Number: (702) 804-2299	
Property Owner: The Howard Hughes Company, LLC		
Address: 10845 Griffith Peak Drive, Ste #160		
City: Las Vegas	State: NV	Zip: 89135
Reviewed By:	Date Received:	Date Accepted for Review:
The following checklist is intended as a guide for the engineer preparing a Technical Drainage Study to submit to the local entity and Clark County Regional Flood Control District (if necessary). The listed items are the minimum information required prior to the entity performing a review. The engineer will remain responsible to ensure the Technical Drainage Study is prepared within the guidelines as set forth in the Clark County Regional Flood Control District (CCRFCDD) Hydrologic Criteria and Drainage Design Manual (MANUAL). This document is intended as an aid in preparing Technical Drainage Studies. Each study submitted is reviewed for compliance with local and regional criteria. This form is not intended to be all inclusive and does not limit the extent of the information, calculations or exhibits which may be necessary to properly evaluate the intended land use. If items are not applicable for the subject site, provide N/A. I. GENERAL REQUIREMENT Yes No ☒ _____ Design Manual Standard Form 1 with the engineer's seal and signature. _____ <u>N/A</u> Design Manual Standard Form 4. ☒ _____ 2 copies of the 24" x 36" Drainage Plan. _____ <u>N/A</u> A notarized letter from the adjacent property owner(s) allowing off-site grading or discharge. II. MAPS AND EXHIBITS Yes No ☒ _____ A copy of a current Flood Insurance Rate Map (FIRM) with the site delineated. ☒ _____ A copy of the current CCRFCDD Master Plan Update Figure, (F-x), for Flood Control Facilities and Environmental areas with the site delineated.		
REFERENCE:		STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

II. MAPS AND EXHIBITS (Continued)

Yes No

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

III. DRAINAGE PLAN

Yes No

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

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
☐	☒	Streets with off-set crowns.
☒	☐	Proposed contours or spot elevations in sufficient detail to exhibit intended drainage patterns and slopes.
☒	☐	Property lines.
☒	☐	Right-of-way lines and widths, existing and proposed.
☒	☐	Existing improvements and their elevations.
☒	☐	Delineation of proposed on-site drainage basins indicating area and 10-year and 100-year storm peak flows at basin concentration points.
☒	☐	Concentration points and drainage flow direction with Q100 and V100 and D100 in streets.
☒	☐	Cumulative flows, velocity, and direction of flow at upstream and downstream ends of site for the 10-year and 100-year flows.
☐	☒	Location and cross-section of street capacity calculations.
☐	☒	Cross-sectional detail for channels, including cutoff wall locations.
☒	☐	Existing and proposed drainage facilities, appurtenances, and connections (i.e., sidewalk, ditches, swales, storm drain systems, unimproved and improved channels, and culverts, etc.) stating size, material, shape, and slope with plan and profile and HGL calculations.
☐	☒	Existing and proposed drainage easements and widths shown with sufficient detail. A cross sectional detail must be provided that shows appropriate lining and reinforcement.
☐	☒	Location and detail of existing, proposed, and future block wall openings. Minimum size is 16" x 48". Wrought iron gate is required for flows > 10 cfs.
☐	☒	Location and detail of flood walls illustrating depth of flow, proposed grouting height, etc.
☐	☒	Perimeter retaining wall locations. All existing and proposed walls (retaining screen and flood) must be shown with adjacent ground elevations. Flood walls with 8-inch concrete masonry unit.
☒	☐	Building and/or lot numbers.
☒	☐	Alignment of all existing, proposed, or future Regional Facilities adjacent to the site.
☒	☐	Limits of existing floodplain based on current FIRM or best available information; limits of proposed floodplains based on best available information.

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes No

_____ N/A For areas in Zone A, AE, AH, and AO, base flood elevations (BFEs) must be shown for each lot; BFEs may be listed on each lot, or in a table. Finish floor elevations must be a minimum of 18 inches above BFE.

_____ N/A Appropriately elevated "humps" 6 inches above the 100 year water surface elevation at site accesses where the intent is to protect the site from the Q100 flows.

_____ N/A Street slopes for perimeter and interior streets. The minimum slope is 0.4 percent.

_____ N/A Location and detail of best management practice (BMP) for parking lots and low impact development (LID) (if required).

IV. HYDROLOGIC ANALYSIS

Yes No

x _____ Appropriate soil information and Soils Map for existing and future conditions with subbasins and property delineated.

_____ N/A Input and output information for existing conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models.

x _____ Input and output information for future conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models.

_____ N/A Use of correct precipitation values in and around the McCarran Airport rainfall area.

x _____ A discussion in the text of the hydrologic analysis justifying subbasin boundaries and cutoffs, supporting assumptions, and calculations.

x _____ A summary table of stormwater flows showing basin area, Q10 and Q100 for both individual basins and combined basin flows, where applicable.

x _____ Copies of supporting technical information referenced from a previously approved study and a statement accepting these results.

x _____ On-site facilities must perpetuate flows through or around the site without significantly impacting adjacent property owners in accordance with current Nevada Drainage Law.

_____ N/A Calculation for impervious area for parking lots and LIDs (if required).

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

V. HYDRAULIC ANALYSIS

Yes	No	
_____	<u>N/A</u>	Flow split calculations and supporting documentation or reference for the method of flow split calculations used.
_____	<u>N/A</u>	Normal depth street flow calculations and cross section diagrams for all interior and perimeter streets. Provide "d x v" products for the Q100 and Q10 flows representing the worst case for interior and all perimeter streets. Q100 d x v < 8. Q10 d x v < 6 and 12 foot dry lane for rights-of-way > 80 feet. Calculations must be labeled by street name as indicated on the Grading Plan.
_____	<u>N/A</u>	A summary table of interior and exterior street capacity calculations showing the street name, Q100 flow, slope, depth of flow, velocity and depth times velocity product and streets needing to meet 12 foot dry lane criteria.
_____	<u>N/A</u>	Appropriate hydraulic calculations for block wall openings assuming a 50 percent vertical clogging factor. (Assume the lower half of the opening is plugged.)
_____	<u>N/A</u>	Appropriate hydraulic calculations at drainage easement entrance and discharge locations to set finish floor elevations. Hydraulic calculations must include submerged weir, superelevation and tee intersection losses, where appropriate.
_____	<u>N/A</u>	Provide necessary freeboard requirements to set the finished floor elevations of all proposed buildings, 2 x depth of flow or depth of flow plus 18 inches of freeboard, whichever is less. The minimum requirement is 6 inches above adjacent upstream top of curb. Buildings adjacent to drainage easements must always be provided with 18 inches of freeboard above the Q100 weir height or flow depth, whichever is greater.
_____	<u>N/A</u>	A complete water surface profile analysis (HEC-2, HEC-RAS, etc.) for channel flows and FEMA Zone A flood zones. • Field survey data. • Input and output information. • Plotted cross-sections based on survey with proper encroachments. • A map showing the location of the cross-sections. • Analysis of both sub and super-critical flow segments. • A summary table and a discussion of the results in the text of the report.
_____	<u>N/A</u>	Provide a 50 percent clogging factor in the capacity calculation for drop inlets.
_____	<u>N/A</u>	Hydraulic calculations for culverts and storm drains. D-Load calculations must be provided for storm drain pipes in public rights-of-way, including headwater pool inundation.
_____	<u>N/A</u>	The mitigation of nuisance water, both during construction and in the fully developed condition, must be addressed.
_____	<u>N/A</u>	Provide BMP type, size and supporting calculations for parking lots and LIDs (if required).

REFERENCE:

STANDARD FORM 2

Project #: 62029-200

October 15, 2019

Oh Sang Kwon, P.E.
City of Las Vegas, Public Works
333 N. Rancho Drive, 7th Floor
Las Vegas, NV 89106

Re: Technical Drainage Study for Summerlin Village 29 Stockpile

Dear Mr. Kwon,

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

Cordially,

Cameron Bencini, P.E.
GCW, INC.



TECHNICAL DRAINAGE STUDY FOR A STOCKPILE PERMIT

SUMMERLIN VILLAGE 29

62029-200
October 2019

Authored By:

George Hoang, E.I.

Prepared by:

GCW, Inc.
1555 S. Rainbow Blvd.
Las Vegas, NV 89146
Phone: (702) 804-2000
Fax: (702) 804-2299

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I. INTRODUCTION

The Howard Hughes Company, LLC is proposing to place approximately 202,414 cubic yards of stockpile fill material on roughly 15.3 acres of parcel 137-28-101-002. This parcel is located within Summerlin Village 29. The proposed stockpile will be in place for one year. The purpose of this study is to accompany grading plans and to address the onsite grading of the stockpile. The development of the future parcel improvements will be addressed in a separate technical drainage study.

The following tasks were performed in the preparation of this study:

- Determine the FEMA floodplain designation for the project site.
- Identify CCRFCD regional facility alignments adjacent or affected by the project.
- Review pertinent approved drainage studies in the area for evaluation of drainage impacts affecting the project.
- Determine existing and proposed drainage characteristics.
- Show no adverse post project impacts associated with the stockpile.

II. LOCATION AND DESCRIPTION

The proposed site is located within Section 28, Township 20, Range 59 within the jurisdictional limits of the City of Las Vegas (CLV). The site is presently undeveloped. Please refer to **Figure 1** in **Appendix A** for the location of the project site.

Note the Dust Mitigation Plan is currently under review. Upon approval, the approval letter will be submitted to CLV Public Works.

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

Based on the FEMA Flood Insurance Rate Map (FIRM) Community Panel 32003C2125E, dated September 27, 2002, and 32003C2150E, dated September 27, 2002, the project site lies within a Zone X or outside the 0.2% annual chance flood. Therefore, this project is not located in a FEMA designated Special Flood Hazard Area (SFHA). **Figure 2** in **Appendix A** shows the site delineated on the FEMA FIRM.

IV. CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT (CCRFCD)

Figures 3 and 4, included in **Appendix A**, are based on information provided in the CCRFCD 2018 Las Vegas Valley Master Plan Update, Figure F-22 and F-22T. Figure 3 shows the project site in relation to the 2018 MPU sub basins and land use for the area. **Figure 4** shows the project site in relation to CCRFCD facilities in the area according to the 2018 MPU. As shown on **Figure 4** of **Appendix A**, the site is adjacent to CCRFCD APM5 0047. Facility APM5 0047 is described as a diversion berm with gabion bank protection, which drains in a south-easterly direction, and eventually into facility APM5 0000, described as a 384 Acre-Feet detention basin (referred to as Detention Basin No. 5 in the DB5 Study). The stockpile does not impact either facility, nor is it impacted by these facilities.

V. REFERENCED STUDIES

In preparation of this study, the following approved drainage studies and improvement plans were referenced to determine the hydrology of the area. These studies have been reviewed and accepted as suitable for reference material. A brief synopsis of the pertinence of each of the referenced items is as follows:

- The project entitled *Detention Basin No. 5 / Diversion Berm Final Design Report*, hereinafter referred to as the DB5 Study (Reference 3) was referenced to show the existing condition drainage patterns. More specifically, this study sized and constructed the diversion berm and channel north west of the site.
- The project entitled *Update #2 to the Technical Drainage Study for Village 23B Sky Vista Drive, Alta Drive to Far Hills Avenue*, hereinafter referred to as the Sky Vista Study (Reference 4) was referenced to show watershed delineation for the area, existing and ultimate drainage patterns for the stockpile area. In addition, this study sized and constructed the downstream infrastructure within Skye Vista Drive where the project site drains.

VI. EXISTING DRAINAGE CONDITION

The existing condition for the project site is the interim conditions of the Skye Vista Study. More specifically, the interim considers the following;

- The Regional Facilities APM5 0047 and APM5 000 are constructed
- The downstream infrastructure is constructed within Skye Vista Road.
- The site is currently undeveloped with desert shrub “poor” condition

The impacts from the offsite flows are limited. Due to Regional Facility APM5 0047, runoff approaching from the northwest is diverted away from the site and conveyed towards Regional Facility APM5 0000, a 384 acre-feet detention basin.

Runoff from the area designated for the stockpile flows in a south-easterly direction and is collected into a 42” or by a 54” reinforced concrete pipe beneath Skye Vista Drive.

VII. INTERIM (STOCKPILE) DRAINAGE CONDITION

In the interim condition, the offsite watershed remains the same as in the existing condition, however a stockpile is now placed at the upstream end of parcel 137-28-101-002. More specifically, the interim condition assumes the following;

- The stockpile is now provided and has been analyzed with a “newly graded” curve number

The stockpile is located within Basins XOFF6, XOFF7, XOFF9 and XOFF10. In general, the interim drainage patterns follow the existing drainage patterns. Basins XOFF6 and XOFF7 drain to the existing 42” RCP within Skye Vista Drive; while, Basins XOFF9 and XOFF10 drain to the existing 54” RCO within Skye Vista Drive.

Discussion

Upon construction of the stockpile, the runoff from the local watershed will change in the following;

EXISTING VS. INTERIM COMPARISON FOR 100 YEAR FLOW RATE			
Basin ID	Existing Q₁₀₀ (cfs)	Interim Q₁₀₀ (cfs)	Δ (cfs)
XOFF6	65	72	7
XOFF7	21	27	6
XOFF9	16	18	2
XOFF10	97	97	0

Due to the increase in curve number from the change to “newly graded”, the runoff from the local watershed has increased. The increase in flow should be considered acceptable for the following reasons;

- The 54” RCP in sump was sized for the ultimate condition in which it has a maximum capacity of 228 cfs; while in the interim condition only 39 cfs is conveyed
- Although it doesn’t meet manual criteria, the sump of the 42” RCP has the capacity to convey the additional 13 cfs with 1.75-ft of freeboard.
- The stockpile is a temporary condition (>1-year)
- Downstream of the 42-in and 54-in RCPs, the system has capacity to convey any increase (307 cfs design vs 123 cfs proposed)

Due to the reasoning above, the proposed conditions of the stockpile should be considered acceptable.

Refer to **Appendix B** and **C** for Hydraulic Computations and Reference Material, respectively.

VIII. ULTIMATE (STOCKPILE) DRAINAGE CONDITION

The ultimate condition for the project site are the ultimate conditions referenced from the Skye Vista Study. Since this study has explicitly described the fully developed conditions of the Village 29 area, no hydrologic analysis was provided for this project.

IX. CONCLUSIONS AND RECOMMENDATIONS

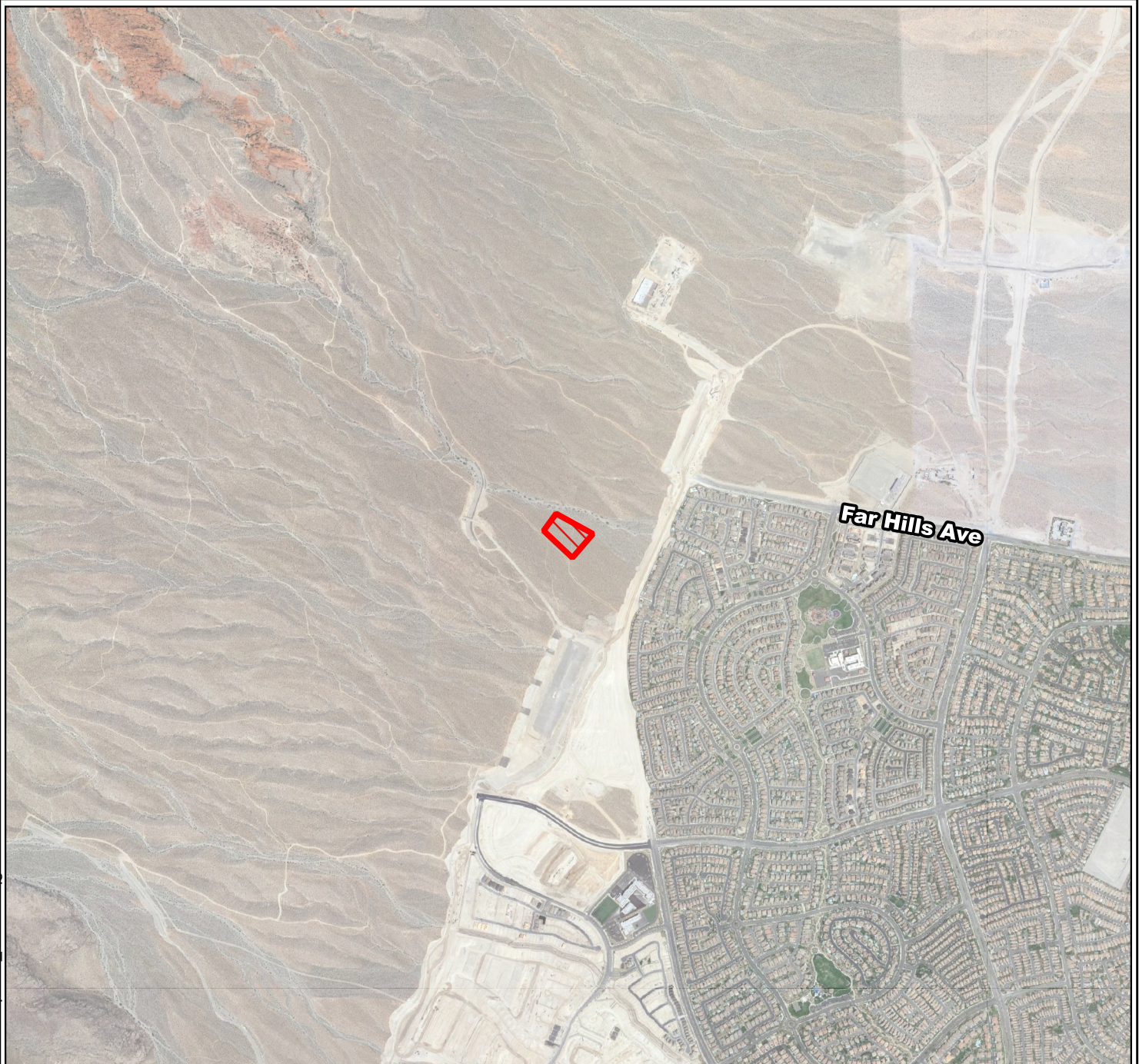
1. Methodology used in this report is in compliance with the Clark County Regional Flood Control District (CCRFCD) criteria.
2. The proposed project lies within a Zone X. The project is not currently located in a FEMA-designated Special Flood Hazard Area.
3. The project is not adjacent to CCRFCD facilities.
4. The proposed stockpile does not affect existing flow patterns or adversely impact downstream properties or facilities.
5. The stockpile will remain for one year.

X. REFERENCES

1. CCRFCD 2013 Las Vegas Valley Master Plan Update. 2018.
2. Clark County Regional Flood Control District. *Hydrologic Criteria and Drainage Design Manual*. August 1999.
3. G.C. Wallace. *Detention Basin no. 5 / Diversion Berm Final Design Report*. January 2001.
4. GCW, Inc. *Update #2 to the Technical Drainage Study for Village 23B Sky Vista Drive, Alta Drive to Far Hills Avenue*. April 2019

APPENDIX A

EXHIBITS

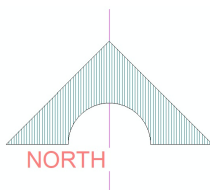


Legend

 **Project Site**

GRAPHIC SCALE

0 1000 2000 3000 4000 ft



THE HOWARD HUGHES CORPORATION, LLC
SUMMERLIN VILLAGE 29 STOCKPILE

FIGURE 1 LOCATION MAP

GCV
ENGINEERS SURVEYORS

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

\\Pandora\Data\Projects\600\62029-200\Division\Fct\GIS\Maps\1905-Upfront_ Exhibits.qgz



LEGEND

 Project Site

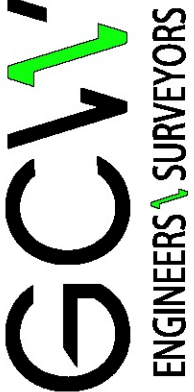
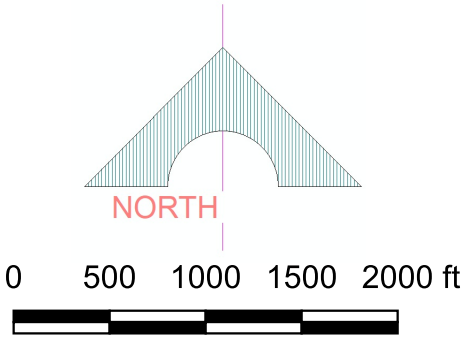
FEMA FLOOD ZONE

 ZONE SHADED X

 Zone A

 ZONE AE

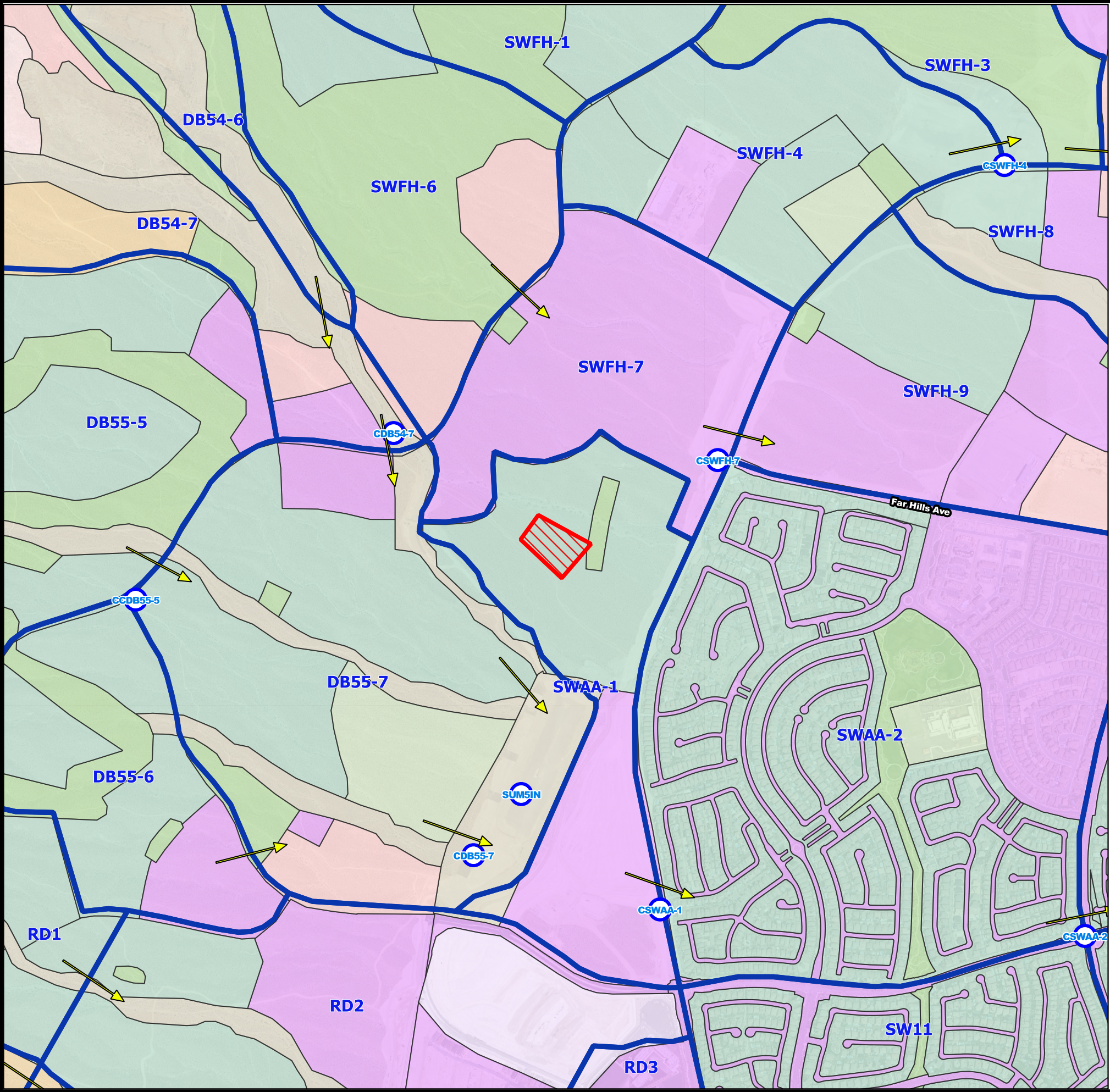
 Zone AO



DATE: OCT 2019
DRAFTER:
DESIGNER: GH
PROJECT NO:6029-300

THE HOWARD HUGHES CORPORATION, LLC
SUMMERLIN VILLAGE 29 STOCKPILE
FEMA FIRM MAP

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LEGEND



Project Site

Planned Land Use



Undeveloped Land, Open desert



Parks, Golf Courses



Rural, 0.5-1 units per acre (uses 1 unit/acre)



Low-Density Residential, 1-2 units per acre (uses 2 units/acre)



Medium-Density Residential, 2-4 units per acre (uses 3 units/acre)



High-Density Residential, 4-8 units per acre (uses 6 units/acre)



Public Facility and Residential, 8-12 units/acre



Very High-Density Residential, 12 units/acre or more



Commercial, Retail, Casino, High Rise Condominiums



Light Industrial



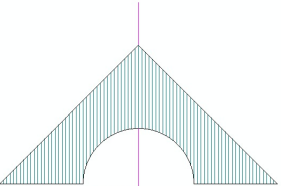
Heavy Industrial



Schools



Lakes



NORTH

0 500 1000 1500 2000 ft



DATE: OCT 2019

DRAFTER:

DESIGNER: GH

PROJECT NO: 6029-300

THE HOWARD HUGHES CORPORATION, LLC

SUMMERLIN VILLAGE 29 STOCKPILE

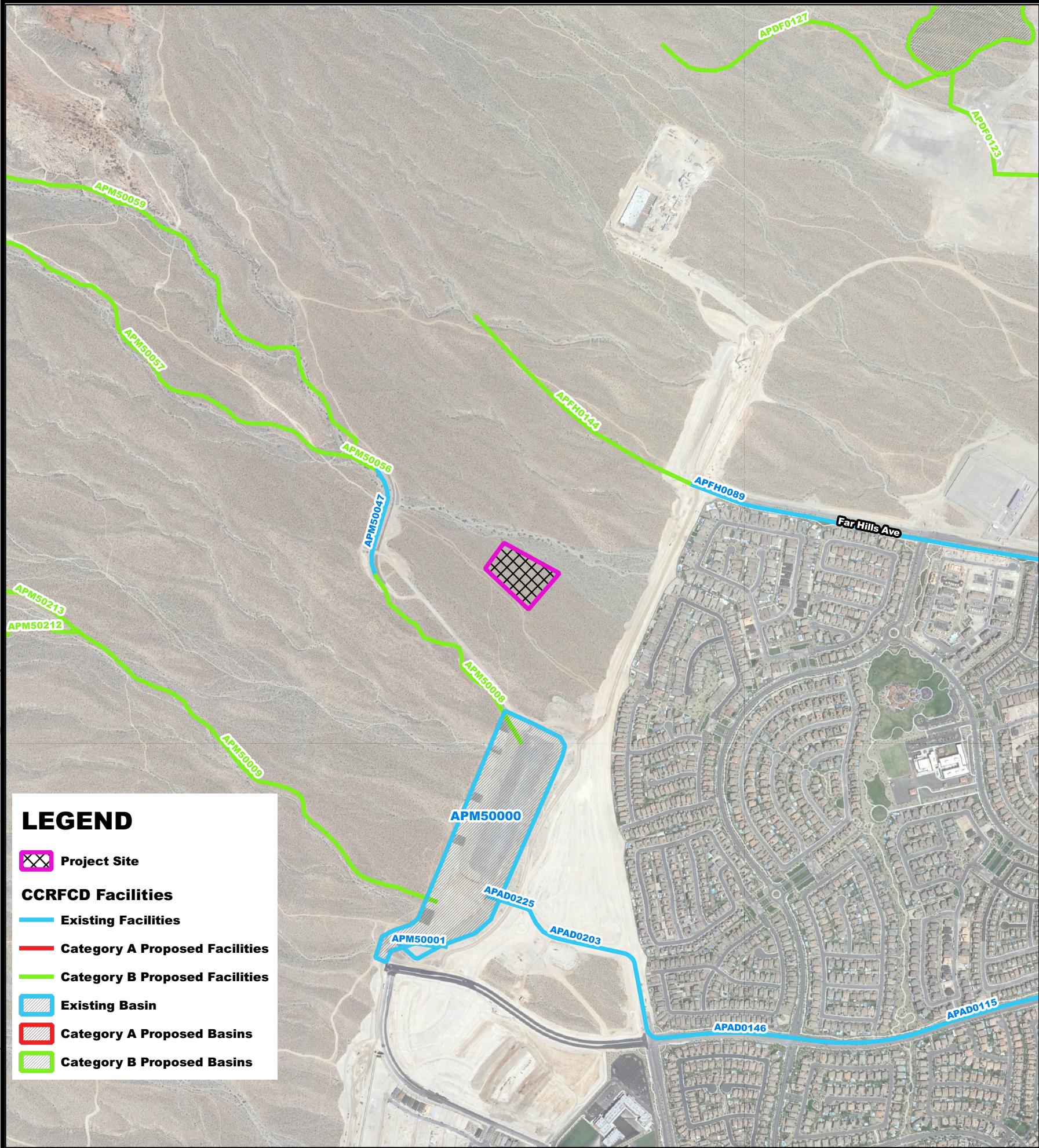
2018 CCRFCD WATERSHED MAP

SHEET

FIGURE 3

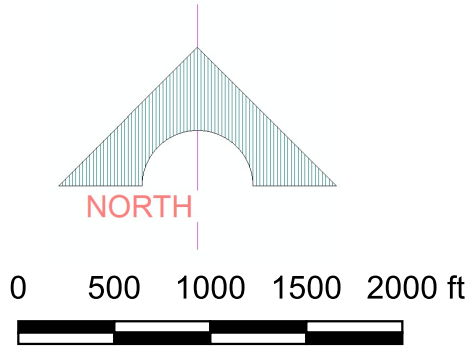
SHEET 1 OF 1

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MPU ID	DESCRIPTION	TRIB A	DESIGN Q	STATUS
APAD0225	2: 7' X 5.5' RCB OUTLET	6.73	2137	COM
APFH0144	5' X 4' RCB	0.28	456	PRO
APFH0061	8' X 6' RCB	0.5	839	COM
APDF0127	6' X 6' RCB	0.69	853	PRO
APM50056	CONC CHNL 80'W 4'D 2:1 SS	4.13	3634	PRO
APM50047	DIVERSION BERM WITH GABION BANK PROTECTION	4.13	3634	COM
APM50009	CONC CHNL 50'W 4'D 2:1 SS	2.6	3495	PRO
APM50212	CONC CHNL 30'W 3'D 2:1 SS	0.64	1092	PRO
APM50213	CONC CHNL 50'W 3'D 2:1 SS	1.3	1729	PRO
APAD0115	10' X 8' RCB	7.63	2629	COM
APAD0203	2: 7' X 5.5' RCB	6.95	2200	COM
APDF0073	6' X 4' RCB	1.52	486	PRO
APM50001	12,153 CFS PMF SPILLWAY	6.73	12153	COM
APM50008	CONC CHNL 50'W 4.5'D 2:1 SS	4.13	3634	PRO
APAD0146	10' X 8' RCB	6.95	2200	COM
APFH0089	8' X 6' RCB	0.5	839	COM
APDF0123	42" RCP	1.29	141	PRO
APM50057	CONC CHNL 50'W 3'D 2:1 SS	0.81	1664	PRO
APM50059	CONC CHNL 100'W 3'D 2:1 SS	3.31	2606	PRO

MPU ID	DESCRIPTION	TRIB A	DESIGN Q	STATUS
APM50000	384 AC-FT DETENTION BASIN #5	6.73	6856	COM
APDF0125	130 AC-FT GRAND PARK DETENTION BASIN	1.29	1543	PRO



DATE: OCT 2019

DRAFTER:

DESIGNER: GH

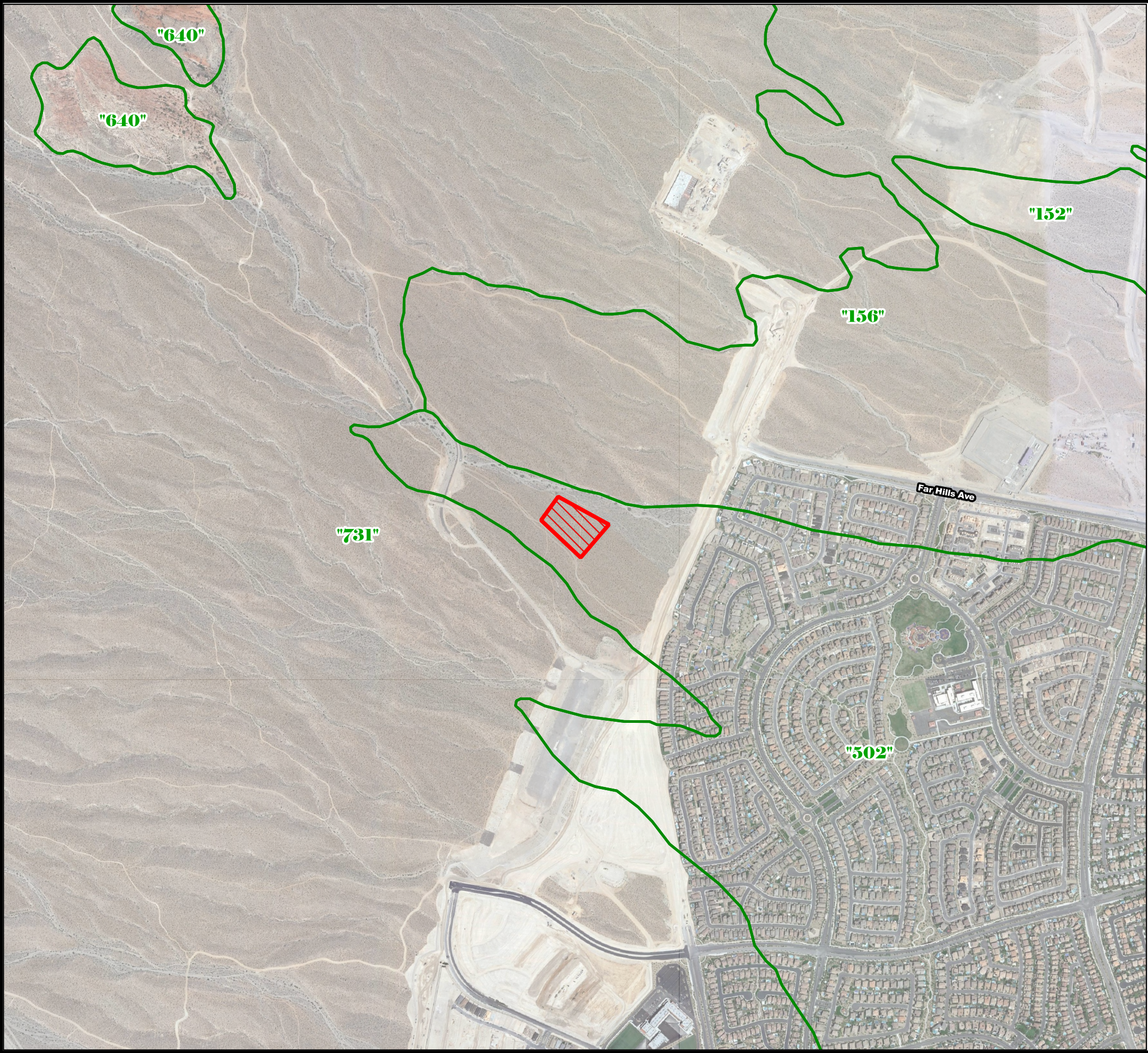
PROJECT NO:6029-300

THE HOWARD HUGHES CORPORATION, LLC

SUMMERLIN VILLAGE 29 STOCKPILE

2018 CCRFCD FACILITIES MAP

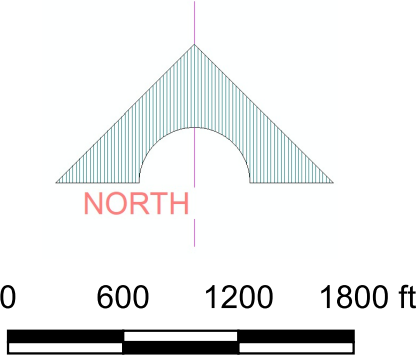
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LEGEND

-  Project Site
-  Existing Basins
-  Soil Index Boundary

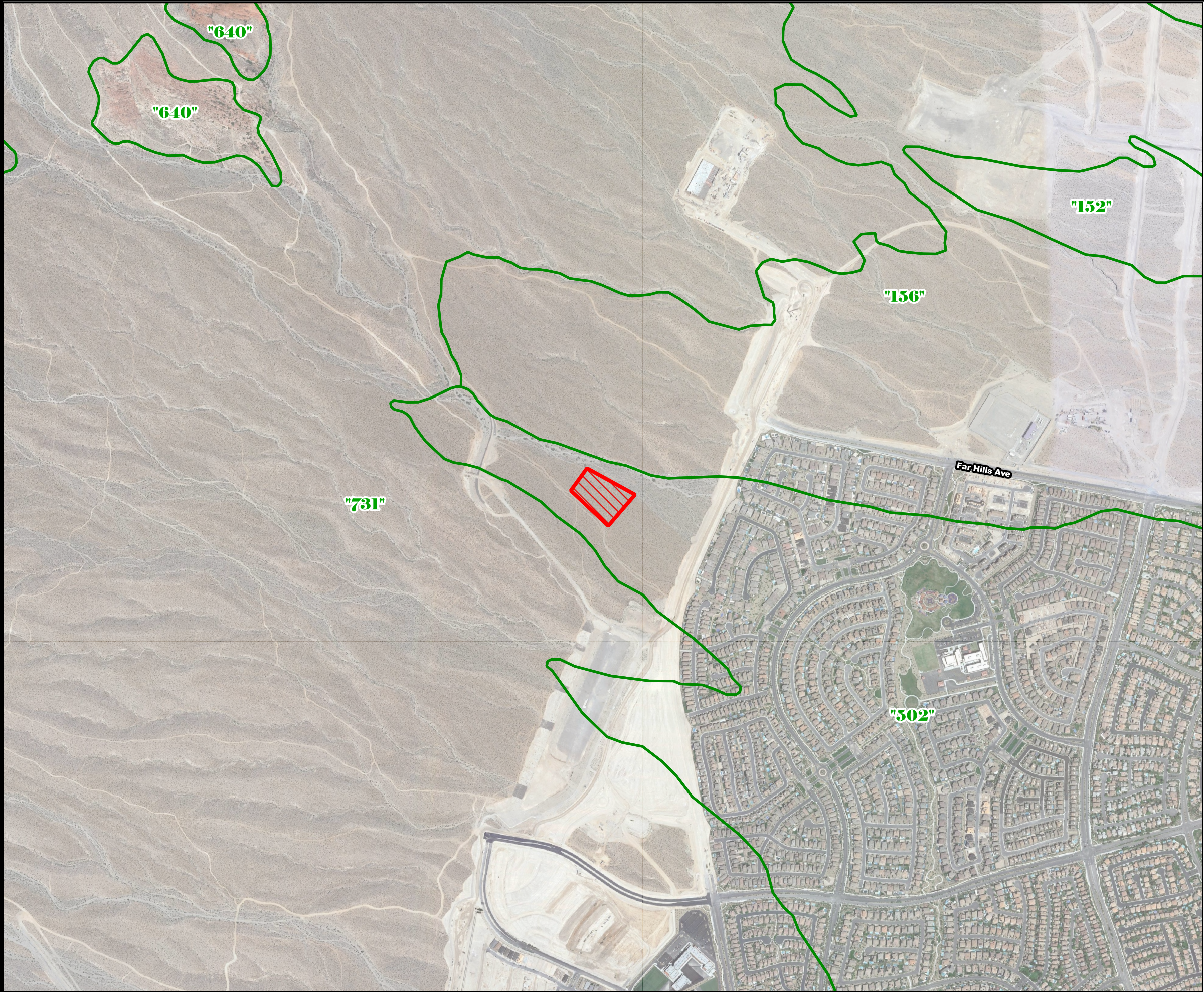
Index #	% HSG A	% HSG B	% HSG C	% HSG D	Rock-OC
152	0	0	0	100	0
156	1	10	0	89	0
502	60	0	0	40	0
731	10	2	0	88	0
640	0	0	0	10	90



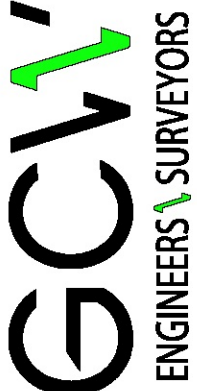
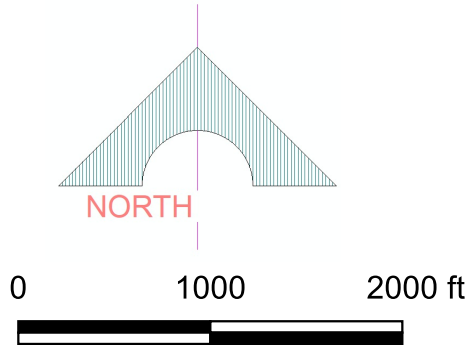
DATE: OCT 2019
DRAFTER:
DESIGNER: GH
PROJECT NO:6029-300

THE HOWARD HUGHES CORPORATION, LLC
SUMMERLIN VILLAGE 29 STOCKPILE
EXISTING CONDITIONS SOILS MAP

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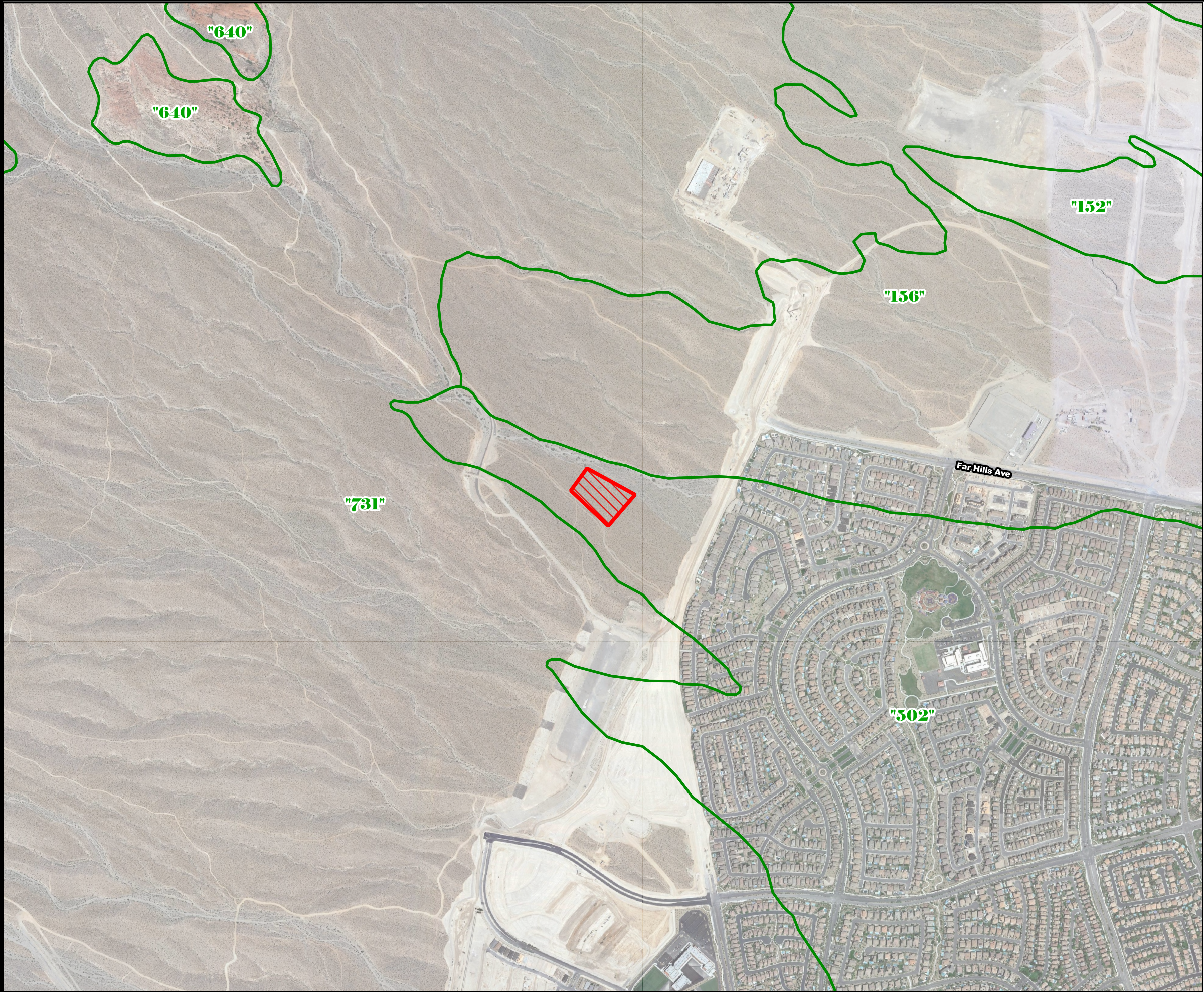
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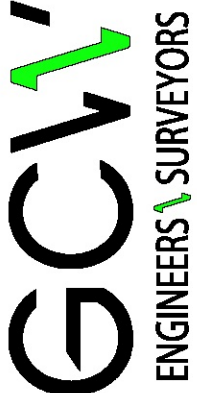
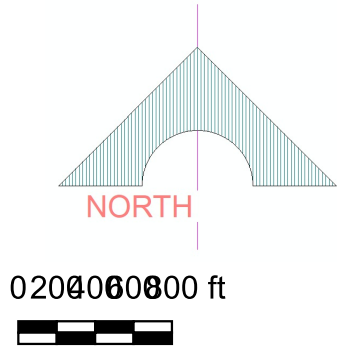
DATE: OCT 2019
DRAFTER:
DESIGNER: GH
PROJECT NO:6029-300

THE HOWARD HUGHES CORPORATION, LLC
SUMMERLIN VILLAGE 29 STOCKPILE
PROPOSED / INTERIM CONDITION SOILS MAP

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LEGEND



DATE: OCT 2019
DRAFTER:
DESIGNER: GH
PROJECT NO: 6029-300

THE HOWARD HUGHES CORPORATION, LLC
SUMMERLIN VILLAGE 29 STOCKPILE
ULTIMATE / DEVELOPED CONDITION SOILS MAP

 **Project Site**

 **Existing Basins**

 **McCarran Rainfall Area**

0 500 1000 1500 2000 ft

DATE: OCT 2019

DRAFTER:

DESIGNER: GH

PROJECT NO:6029-300

THE HOWARD HUGHES CORPORATION, LLC

SUMMERLIN VILLAGE 29 STOCKPILE

RAINFALL MAP

SHEET

FIGURE 6

SHEET 1 OF 1

APPENDIX B

HYDROLOGIC AND HYDRAULIC CALCULATIONS

Summerlin Village 29 Stockpile					
WEIGHTED CURVE NUMBERS					
Interim Conditions					
Basin	Soil	Percent	CN	Land Use	WCN
XOFF6	502	22.0%	84.7	Newly Graded	83.7
	502	12.0%	73.0	Desert Shrub Poor	
	731	66.0%	85.3	Desert Shrub Poor	
XOFF7	502	37.6%	84.7	Newly Graded	77.4
	502	62.4%	73.0	Desert Shrub Poor	
XOFF8	502	100.0%	73.0	Desert Shrub Poor	73.0
XOFF9	502	19.0%	84.7	Newly Graded	75.2
	502	81.0%	73.0	Desert Shrub Poor	
XOFF10	502	0.7%	84.7	Newly Graded	83.6
	502	22.3%	73.0	Desert Shrub Poor	
	731	4.0%	85.3	Desert Shrub Poor	
	156	73.0%	86.7	Desert Shrub Poor	

HYDROLOGIC CRITERIA AND DESIGN MANUAL

TIME OF CONCENTRATION



HOWARD HUGHES COMPANY, LLC
SUMMERLIN VILLAGE 29 STOCKPILE
INTERIM CONDITION

Project No: 62029-200

Date: 15-Oct-19

Calculated by: GH

SUB-BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc CHECK URBANIZED BASINS		Tc	Tag	REMARKS
DESIG:	DEV./EX. (D or E)	CN	K	AREA Ac	AREA Sq Mi	INITIAL LENGTH Feet	SLOPE %	Ti Min	TRAVEL LENGTH Feet	SLOPE %	V1 VELOCITY fps	V2 VELOCITY fps	Tt Min	TOTAL LENGTH Feet	Tc = (L/180)+10 Min	Min	Tag = 0.6Tc/60 Hours	Remarks:
(1)		(16)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9a)	(9b)	(10)	(11)	(12)	(13)	(14)	(15)	
XOFF6	E	83.7	0.7148	31.2	0.0488	500	4.9	9.1	2390	4.9	3.3	6.5	7.4	2890	N/A	16.5	0.165	3.34
XOFF7	E	77.4	0.6317	15.1	0.0236	500	5.4	10.7	1780	5.4	3.5	6.9	5.5	2280	N/A	16.2	0.162	3.34
XOFF9	E	75.2	0.6026	9.9	0.0155	130	5.4	5.8	1850	5.2	3.4	6.7	5.8	1980	N/A	11.7	0.117	3.34
XOFF10	E	83.6	0.7135	41.9	0.0655	360	6.4	7.1	3130	5.4	3.4	6.8	8.8	3490	N/A	16.0	0.160	3.34
Tc = Ti + Tt Ti = 1.8 (1.1 - K) L^{1/2} / S^{1/3} K = 0.0132 (CN) - 0.39 Tag = 0.6 Tc V1 applies to the first 500 feet of travel distance; V2 applies to the remaining travel distance. For the travel time (Tt) calculations, Existing: V1 = 14.8*(S/100)^{1/2} V2 = 29.4*(S/100)^{1/2} Developed: V1 = 20.2*(S/100)^{1/2} V2 = 30.6*(S/100)^{1/2}																		
REFERENCE:														STANDARD FORM 4				


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1*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
*   JUN 1998
*   VERSION 4.1
*
* RUN DATE 15OCT19 TIME 09:22:58
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                                INT.OUT

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

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X   X XXXXXXX XXXX      X
X   X X      X   X      XX
X   X X      X          X
XXXXXXX XXXX X      XXXX X
X   X X      X          X
X   X X      X   X      X
X   X XXXXXXX XXXXX      XXX

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

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

1 HEC-1 INPUT PAGE 1

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

*** FREE ***

*DIAGRAM
1 ID *****
2 ID * .....*
3 ID * : SUMMERLIN VILLAGE 29 : *
4 ID * : STOCKPILE : *
5 ID * : INTERIM CONDITIONS : *
6 ID * : DEVELOPED ONSITE : *
7 ID * : UNDEVELOPED OFFSITE : *
8 ID * : .....*
9 ID * : RETURN PERIOD_ _ _ _10 & 100-YEAR : *
10 ID * : DISTRIBUTION_ _ _ _6-HOUR SDN3 : *
11 ID * : PROJECT NO_ _ _ _62029-200 : *
12 ID * : FILENAME_ _ _ _ _ INTERIM.H1 : *
13 ID * : DATE_ _ _ _ _ 10/15/2019 : *
14 ID * : MODELED BY_ _ _ _ GH : *
15 ID * : .....*
16 ID * : .....*
17 ID * : .....*
18 ID *****
19 ID
20 ID JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:
21 ID
22 ID AREA DARF
23 ID SQ.MI.
24 ID
25 ID 0.0 - 0.5 1.00
26 ID 0.5 - 1.0 0.98
27 ID 1.0 - 2.0 0.95
28 ID 2.0 - 4.0 0.92
29 ID 4.0 - 6.0 0.91
30 ID 6.0 - 8.0 0.89
31 ID
32 ID IT 5 0 0 200
33 ID IO 5 0
34 ID IN 5 0
35 ID JR PREC 1.0 0.54
*
* BASIN PARAMETERS FOR OFFSITE BASINS TAKEN
* DIRECTLY FROM 2008 MPU AND ONSITE DEVELOPMENT PLANS:
*
* THE FOLLOWING SECTION OF HYDROLOGY WAS DEVELOPED BASED ON G.C. WALLACE'S
* 2006 SUMMERLIN WEST: EXISTING OFFSITE/PROPOSED ONSITE DRAINAGE CONDITION
* HYDROLOGIC MODEL (11-20-06); THE HYDROLOGY WAS REVISED IN ORDER TO
* INCORPORATE ALL EXISTING/PROPOSED MPU FACILITIES
*
36 KK XOFF12
37 BA 0.044
38 PB 3.34
39 PC 0.000 .0200 .0570 .0700 .0870 .1080 .1240 .1300 .1300 .1300

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		INT.OUT									
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42	PC	.2510	.2560	.2700	.2780	.2810	.2830	.2950	.3220	.3520	.4090
43	PC	.4990	.5900	.7100	.7440	.7810	.8120	.8190	.8350	.8510	.8560

1

HEC-1 INPUT

PAGE 2

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45	PC	.9820	.9850	.9870	.9890	.9900	.9930	.9930	.9940	.9950	.9980
46	PC	.9980	.9990	1.000							
47	LS	0	86.7								
48	UD	0.140									
	*										
49	KK	XOFF11									
50	BA	0.067									
51	PB	3.34									
52	LS	0	86.6								
53	UD	0.175									
	*										
54	KK	XOFF10									
55	BA	0.066									
56	PB	3.34									
57	LS	0	83.6								
58	UD	0.160									
	*										
59	KK	CP2A									
60	HC	3									
	*										
61	KK	RD1									
62	KM	ROADWAY									
63	BA	0.0033									
64	LS	0	98.0								
65	UD	.078									
	*										
66	KK	CP2									
67	HC	2									
	*										
68	KK	XOFF9									
69	BA	0.016									
70	PB	3.34									
71	LS	0	75.2								
72	UD	0.117									
	*										
73	KK	XOFF8									
74	BA	0.005									
75	PB	3.34									
76	LS	0	84.7								
77	UD	0.100									
	*										

1

HEC-1 INPUT

PAGE 3

LINE	ID	1	2	3	4	5	6	7	8	9	10
78	KK	XOFF7									
79	BA	0.024									
80	PB	3.34									
81	LS	0	77.4								
82	UD	0.162									
	*										
83	KK	XOFF6									
84	BA	0.049									
85	PB	3.34									
86	LS	0	83.7								
87	UD	0.165									
	*										
88	KK	CP4									
89	HC	4									
	*										
90	KK	3-1									
91	KM	COMPARE TO MPU BASIN DB54-1 (CURVE NUMBER CHANGED FROM 87.2)									
92	BA	2.22									
93	PB	3.75									
94	LS	0	87.0								
95	UD	0.582									
	*										
96	KK	R3-1									

INT.OUT

97	KM	ROUTE R3-1 THROUGH 3-2					
98	KM	EXISTING NATURAL WASH					
99	RD	3322 0.092 0.030 0 TRAP 125 0					
	*						
100	KK	3-2					
101	KM	COMPARE TO MPU BASIN DB54-5 (CURVE NUMBER CHANGED FROM 85. 2)					
102	BA	0.226					
103	PB	3.67					
104	LS	0 85.6					
105	UD	0.108					
	*						
106	KK	CP3.1					
107	KM	COMBINE R3-1 AND 3-2					
108	HC	2					
	*						
109	KK	RCP3.1					
110	KM	ROUTE CP3.1 TO CP3.3 THROUGH 3-E VI A					
111	KM	(PORTION OF FACILITY APM50059)					
112	RD	7900 0.070 0.013 0 TRAP 125 2					
	*						

1

HEC-1 INPUT

PAGE 4

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

113	KK	3-D					
114	KM	PORTION OF BASINS DB54-6R (PB=3. 56)					
115	BA	0.3329					
116	PB	3.59					
117	LS	0 84.6					
118	UD	0.223					
	*						
119	KK	CP3.3					
120	KM	COMBI NE 3-D, RCP3.1,					
121	HC	2					
	*						
122	KK	RCP3.3					
123	KM	ROUTE CP3.3 TO CP3 . 4 THROUGH 3-E VIA A					
124	KM	(PORTION OF FACILITY APM50059)					
125	RD	1000 0.070 0.013 0 TRAP 125 2					
	*						
126	KK	3-3					
127	KM	PORTION OF MPU BASIN DB54-3					
128	BA	0.1737					
129	PB	3.65					
130	LS	0 88.0					
131	UD	0.081					
	*						
132	KK	R3-3					
133	KM	ROUTE R3 - 3 THROUGH A PORTIO N OF 3- E TO CP 3 . 2					
134	KM	NATURAL WASH					
135	RD	2233 0.054 0.030 0 TRAP 100 0					
	*						
136	KK	3-4					
137	KM	PORTIO N OF MPU BASI N DB54-3					
138	BA	0.3457					
139	PB	3.68					
140	LS	0 88.0					
141	UD	0.092					
	*						
142	KK	R3-4					
143	KM	ROUTE R3 - 4 THROUGH A PORTIO N OF 3- E TO CP3 . 2					
144	KM	NATURAL WASH					
145	RD	3300 0.097 0.030 0 TRAP 100 0					
	*						
146	KK	3-5					
147	KM	COMPARE TO MPU BASI N DB54- 2 (S LI GHTLY LARGER PORT IO N OF DB54 - 4)					
148	BA	0.2936					
149	PB	3.65					
150	LS	0 87.7					
151	UD	0.094					
	*						

1

HEC-1 INPUT

PAGE 5

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

152	KK	R3-5					
153	KM	ROUTE R3 - 5 THROUGH A PORTIO N OF 3 - E TO CP 3 . 2					

						INT.OUT
154	KM	(PORTI ON OF FACI LI TY APM5 00 57)				
155	RD	4400 0.068 0.013 0 TRAP	50	2		
	*					
156	KK	CP3.2				
157	KM	COMBINE R3 - 5 , R3- 4 AND R3 - 3				
158	HC	3				
	*					
159	KK	RCP3.2				
160	KM	ROUTE RCP 3 . 2 THROUGH A PORTI ON OF 3- E TO CP 3. 4				
161	KM	(PORTION OF FACI LIT Y APM500 57)				
162	RD	5500 0.068 0.013 0 TRAP	50	2		
	*					
163	KK	3-E				
164	KM	PORTI ON OF BASI NS DB54-4 (PB=3 . 60) AND DB54 - 6R (PB=3. 56)				
165	BA	0.5442				
166	PB	3.57				
167	LS	0 85.8				
168	UD	0.238				
	*					
169	KK	CP3.4				
170	KM	COMBI NE 3 - E, RCP3 . 2 AND RCP 3 . 3				
171	HC	3				
	*					
172	KK	RCP3.4				
173	KM	ROUTE RCP3 . 4 TO CPDBS				
174	KM	(FACI LI TI ES APM50056, APM500 47 AND APM5 0 0 0 8)				
175	RD	3365 0.052 0.013 0 TRAP	80	2		
	*					
176	KK	3-6				
177	KM	PORTIO N OF MPU BASI N DBSS- 3 AND DBSS-4				
178	BA	0.0887				
179	PB	3.62				
180	LS	0 88.0				
181	UD	0.074				
	*					
182	KK	R3-6				
183	KM	ROUTE 3 - 6 THROUGH A PORTION OF 3- J AND A PORTION OF 3 - K TO CP 3. 5				
184	KM	EXI STI NG NATURAL WASHES				
185	RD	4500 0.080 0.030 0 TRAP	100	0		
	*					

1

HEC-1 INPUT

PAGE 6

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

186	KK	3-7				
187	KM	PORTION OF MPU BASI N DBSS- 3 AND DBSS-4				
188	BA	0.1714				
189	PB	3.61				
190	LS	0 87.2				
191	UD	0.048				
	*					
192	KK	R3-7				
193	KM	ROUTE 3-7 THROUGH A PORTION OF 3-K TO CP3.5				
194	KM	PORTION OF FACILITY ID APM50213				
195	RD	4340 0.073 0.013 0 TRAP	50	2		
	*					
196	KK	3-J				
197	KM	PORTION OF MPU BASIN DB55-4				
198	BA	0.1529				
199	PB	3.59				
200	LS	0 78.6				
201	UD	0.168				
	*					
202	KK	R3-J				
203	KM	ROUTE 3-J THROUGH A PORTION OF 3-K TO CP3.5				
204	KM	NATURAL WASHES				
205	RD	2700 0.074 0.030 0 TRAP	100	0		
	*					
206	KK	CP3.5				
207	KM	COMBINE R3-J , R3-7 AND R3-6				
208	HC	3				
	*					
209	KK	RCP3.5				
210	KM	ROUTE CP3.5 THROUGH A PORTION OF 3-K TO CP3.6				
211	KM	PORTION OF FACILITY ID APM50213				
212	RD	2100 0.073 0.013 0 TRAP	50	2		

INT.OUT

*

213 KK 3-8
 214 KM COMPARE TO MPU BASIN DB55-1
 215 BA 0.6386
 216 PB 3.70
 217 LS 0 87.8
 218 UD 0.196
 *

219 KK R3-8
 220 KM ROUTE 3-8 THROUGH A PORTION OF 3-K TO CP3.6
 221 KM FACILITY ID APM50212
 222 RD 6695 0.075 0.013 0 TRAP 30 2
 *

1

HEC-1 INPUT

PAGE 7

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

223 KK 3-K
 224 KM COMPARE TO MPU BASIN DB55-7
 225 BA 0.8890
 226 PB 3.54
 227 LS 0 87.6
 228 UD 0.296
 *

229 KK CP3.6
 230 KM COMBI NE 3-K, R3-8 AND RCP3.5
 231 HC 3
 *

232 KK RCP3.6
 233 KM ROUTE CP3.6 TO CPDB5
 234 KM FACILITY ID APM500009
 235 RD 4180 0.058 0.013 0 TRAP 50 2
 *

236 KK 3-N
 237 KM COMPARE TO MPU BASIN DB55-8
 238 BA 0.4532
 239 PB 3.46
 240 LS 0 88.9
 241 UD 0.269
 *

242 KK 3-M
 243 KM COMPARE TO MPU BASIN DB55-8
 244 BA 0.1924
 245 PB 3.48
 246 LS 0 88.8
 247 UD 0.147
 *

248 KK R3-M
 249 KM ROUTE 3-M TO CPDB5
 250 KM FACILITY ID PORTION OF APM500009
 251 RD 4500 0.0528 0.013 0 TRAP 7 0
 *

252 KK CPDB5
 253 KM COMBINE 3-M, 3-N, RCP3.6 AND RCP3.4
 254 KM TOTAL INFLOW TO SUMMERLIN #5 DETENTION BASIN
 255 KO 0
 256 HC 4
 *

1

HEC-1 INPUT

PAGE 8

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

263 SQ 0 192 276 391 505 616 725 813 900 982
 264 SQ 1176 1368 1534 1683 1804 1920 2033 2315 3725 23201
 265 SE 3532.5 3535 3536 3537 3538 3539 3540 3541 3542 3543
 266 SE 3545 3547 3549 3551 3553 3555 3557 3563 3564 3569
 267 SS 3563 435.6 3 1.5
 *

268 KK 60RCP
 269 DT 7X5
 270 DI 0 1000 1600 2000 2400
 271 DQ 0 1000 1400 1700 2000

INT.OUT

```

*
272    KK  XOFF5
273    BA  0.009
274    PB  3.34
275    LS   0    78.7
276    UD  0.100
*

277    KK  CPA1
278    KM  DB5 flow from 60" RCP and XOFF5
279    HC   2
*

280    KK  CPA
281    HC   2
*

282    KK  XOFF4
283    BA  0.002
284    PB  3.34
285    LS   0    73.0
286    UD  0.100
*

287    KK  XOFF3
288    BA  0.007
289    PB  3.34
290    LS   0    76.4
291    UD  0.132
*

292    KK  XOFF2
293    BA  0.034
294    PB  3.34
295    LS   0    83.5
296    UD  0.140
*

```

1

HEC-1 INPUT

PAGE 9

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

```

297    KK  CP5
298    HC   4
*

299    KK  7X5
300    DR  7X5
*

301    KK  CPB
302    HC   2
*

303    KK  XOFF1
304    BA  0.037
305    PB  3.34
306    LS   0    85.3
307    UD  0.117
*

308    KK  RD2
309    BA  0.0158
310    LS   0    98.0
311    UD  .158
*

312    KK  CPC
313    HC   3
*

314    ZZ

```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

```

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

36  XOFF12
    .
    .
49  . XOFF11
    .
    .
54  . . XOFF10
    . .
    . .
59  CP2A.....

```


61	.	RD1	.	.	.
66	CP2.....	.	.	.	.
68	.	XOFF9	.	.	.
73	.	.	XOFF8	.	.
78	.	.	.	XOFF7	.
83	.	.	.	.	XOFF6
88	CP4.....	.	.	.	.
90	.	.	3-1	.	.
	.	.	V	.	.
	.	.	V	.	.
96	.	R3-1	.	.	.
100	.	.	.	3-2	.
106	.	CP3.1.....	.	.	.
	.	.	V	.	.
	.	.	V	.	.
109	.	RCP3.1	.	.	.
113	.	.	.	3-D	.
119	.	CP3.3.....	.	.	.
	.	.	V	.	.
	.	.	V	.	.
122	.	RCP3.3	.	.	.
126	.	.	.	3-3	.
	.	.	.	V	.
	.	.	.	V	.
132	.	R3-3	.	.	.
136	.	.	.	.	3-4
	.	.	.	.	V
	.	.	.	.	V
142	.	.	.	R3-4	.
146	.	.	.	.	3-5
	.	.	.	.	V
	.	.	.	.	V
152	.	.	.	.	R3-5
156	.	.	CP3.2.....	.	.
	.	.	V	.	.
	.	.	V	.	.
159	.	RCP3.2	.	.	.
163	.	.	.	3-E	.
169	.	CP3.4.....	.	.	.
	.	.	V	.	.
	.	.	V	.	.
172	.	RCP3.4	.	.	.
176	.	.	.	3-6	.
	.	.	.	V	.
	.	.	.	V	.
182	.	R3-6	.	.	.
186	.	.	.	.	3-7
	.	.	.	.	V
	.	.	.	.	V

```

192      .      .      .      .      .      R3-7      INT.OUT
      .      .      .      .      .      .      .
196      .      .      .      .      .      .      3-J
      .      .      .      .      .      .      V
      .      .      .      .      .      .      V
202      .      .      .      .      .      .      R3-J
      .      .      .      .      .      .      .
      .      .      .      .      .      .      .
206      .      .      .      .      .      CP3.5.....
      .      .      .      .      .      V
      .      .      .      .      .      V
209      .      .      .      .      .      RCP3.5
      .      .      .      .      .      .
      .      .      .      .      .      .
213      .      .      .      .      .      .      3-8
      .      .      .      .      .      .      V
      .      .      .      .      .      .      V
219      .      .      .      .      .      .      R3-8
      .      .      .      .      .      .      .
      .      .      .      .      .      .      .
223      .      .      .      .      .      .      3-K
      .      .      .      .      .      .      .
      .      .      .      .      .      .      .
229      .      .      .      .      .      CP3.6.....
      .      .      .      .      .      V
      .      .      .      .      .      V
232      .      .      .      .      .      RCP3.6
      .      .      .      .      .      .
      .      .      .      .      .      .
236      .      .      .      .      .      .      3-N
      .      .      .      .      .      .      .
      .      .      .      .      .      .      .
242      .      .      .      .      .      .      3-M
      .      .      .      .      .      .      V
      .      .      .      .      .      .      V
248      .      .      .      .      .      .      R3-M
      .      .      .      .      .      .      .
      .      .      .      .      .      .      .
252      .      .      .      .      .      CPDB5.....
      .      .      .      .      .      V
      .      .      .      .      .      V
257      .      .      .      .      .      DB5
      .      .      .      .      .      .
      .      .      .      .      .      .
269      .      .      .      .      .      .      7X5
268      .      .      .      .      .      60RCP
      .      .      .      .      .      .
      .      .      .      .      .      .
272      .      .      .      .      .      .      XOFF5
      .      .      .      .      .      .      .
      .      .      .      .      .      .      .
277      .      .      .      .      .      CPA1.....
      .      .      .      .      .      .
      .      .      .      .      .      .
280      .      .      .      .      .      CPA.....
      .      .      .      .      .      .
      .      .      .      .      .      .
282      .      .      .      .      .      .      XOFF4
      .      .      .      .      .      .      .
      .      .      .      .      .      .      .
287      .      .      .      .      .      .      XOFF3
      .      .      .      .      .      .      .
      .      .      .      .      .      .      .
292      .      .      .      .      .      .      XOFF2
      .      .      .      .      .      .      .
      .      .      .      .      .      .      .
297      .      .      .      .      .      CP5.....
      .      .      .      .      .      .
      .      .      .      .      .      .
300      .      .      .      .      .      .      7X5
300      .      .      .      .      .      .      7X5
301      .      .      .      .      .      .      .
      .      .      .      .      .      .      .
303      .      .      .      .      .      .      XOFF1
      .      .      .      .      .      .      .
      .      .      .      .      .      .      .
308      .      .      .      .      .      .      RD2
      .      .      .      .      .      .      .
      .      .      .      .      .      .      .
312      .      .      .      .      .      .      CPC.....

```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

1*****
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *

* U.S. ARMY CORPS OF ENGINEERS *

```

*          JUN 1998          *
*          VERSION 4.1        *
*          *                  *
* RUN DATE 15OCT19 TIME 09:22:58 *
*          *                  *
*****

```

INT.OUT

```

*          HYDROLOGIC ENGINEERING CENTER *
*          609 SECOND STREET              *
*          DAVIS, CALIFORNIA 95616        *
*          (916) 756-1104                *
*          *                              *
*****

```

```

*****
*          *
* : ..... SUMMERLIN VILLAGE 29 : *
* : ..... STOCKPILE : *
* : ..... INTERIM CONDITIONS : *
* : ..... DEVELOPED ONSITE : *
* : ..... UNDEVELOPED OFFSITE : *
* : ..... : *
* : RETURN PERIOD_ _ _ _ 10 & 100-YEAR : *
* : DISTRIBUTION_ _ _ _ 6-HOUR SDN3 : *
* : PROJECT NO_ _ _ _ 62029-200 : *
* : FILENAME_ _ _ _ _ INTERIM.H1 : *
* : DATE_ _ _ _ _ 10/15/2019 : *
* : MODELED BY_ _ _ _ GH : *
* : ..... : *
* : ..... : *
* : ..... : *
*****

```

JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:

AREA SQ.MI.	DARF
0.0 - 0.5	1.00
0.5 - 1.0	0.98
1.0 - 2.0	0.95
2.0 - 4.0	0.92
4.0 - 6.0	0.91
6.0 - 8.0	0.89

```

33 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         200 NUMBER OF HYDROGRAPH ORDINATES
           NDDATE     1 0 ENDING DATE
           NDTIME     1635 ENDING TIME
           ICENT      19 CENTURY MARK

           COMPUTATION INTERVAL .08 HOURS
           TOTAL TIME BASE 16.58 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      .54

```

*** **

```

*****
*          *
*          *
252 KK      CPDB5  *
*          *
*****

```

```

255 KO      OUTPUT CONTROL VARIABLES
           IPRNT      5 PRINT CONTROL

```


IPLLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

INT.OUT

*** **

* *
257 KK * DB5 *
* *

259 KO OUTPUT CONTROL VARIABLES
 IPRNT 5 PRINT CONTROL
 IPLLOT 0 PLOT CONTROL
 QSCAL 0. HYDROGRAPH PLOT SCALE

1

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

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO PRECIPITATION	
				RATIO 1	RATIO 2
				1.00	.54
HYDROGRAPH AT					
+	XOFF12	.04	1 FLOW	75.	29.
			TIME	3.58	3.58
HYDROGRAPH AT					
+	XOFF11	.07	1 FLOW	107.	40.
			TIME	3.58	3.58
HYDROGRAPH AT					
+	XOFF10	.07	1 FLOW	97.	33.
			TIME	3.58	3.58
3 COMBINED AT					
+	CP2A	.18	1 FLOW	279.	101.
			TIME	3.58	3.58
HYDROGRAPH AT					
+	RD1	.00	1 FLOW	8.	4.
			TIME	3.50	3.50
2 COMBINED AT					
+	CP2	.18	1 FLOW	286.	105.
			TIME	3.58	3.58
HYDROGRAPH AT					
+	XOFF9	.02	1 FLOW	18.	4.
			TIME	3.58	3.58
HYDROGRAPH AT					
+	XOFF8	.00	1 FLOW	8.	3.
			TIME	3.50	3.50
HYDROGRAPH AT					
+	XOFF7	.02	1 FLOW	27.	7.
			TIME	3.58	3.58
HYDROGRAPH AT					
+	XOFF6	.05	1 FLOW	72.	24.
			TIME	3.58	3.58
4 COMBINED AT					
+	CP4	.09	1 FLOW	125.	38.
			TIME	3.58	3.58
HYDROGRAPH AT					
+	3-1	2.22	1 FLOW	2356.	927.
			TIME	4.00	4.08
ROUTED TO					
+	R3-1	2.22	1 FLOW	2346.	924.
			TIME	4.08	4.08
HYDROGRAPH AT					
+	3-2	.23	1 FLOW	435.	168.
			TIME	3.50	3.58
2 COMBINED AT					
+	CP3.1	2.45	1 FLOW	2421.	957.
			TIME	4.08	4.08

							INT.OUT
ROUTED TO							
+	RCP3.1	2.45	1	FLOW TIME	2409. 4.08	960. 4.17	
HYDROGRAPH AT							
+	3-D	.33	1	FLOW TIME	495. 3.67	180. 3.67	
2 COMBINED AT							
+	CP3.3	2.78	1	FLOW TIME	2582. 4.08	1015. 4.17	
ROUTED TO							
+	RCP3.3	2.78	1	FLOW TIME	2580. 4.08	1014. 4.17	
HYDROGRAPH AT							
+	3-3	.17	1	FLOW TIME	397. 3.50	163. 3.50	
ROUTED TO							
+	R3-3		.17	1 FLOW TIME	373. 3.58	148. 3.58	
HYDROGRAPH AT							
+	3-4	.35	1	FLOW TIME	767. 3.50	314. 3.50	
ROUTED TO							
+	R3-4	.35	1	FLOW TIME	739. 3.58	292. 3.58	
HYDROGRAPH AT							
+	3-5	.29	1	FLOW TIME	634. 3.50	256. 3.50	
ROUTED TO							
+	R3-5	.29	1	FLOW TIME	609. 3.58	251. 3.58	
3 COMBINED AT							
+	CP3.2	.81	1	FLOW TIME	1721. 3.58	692. 3.58	
ROUTED TO							
+	RCP3.2	.81	1	FLOW TIME	1650. 3.58	658. 3.67	
HYDROGRAPH AT							
+	3-E	.54	1	FLOW TIME	821. 3.67	308. 3.67	
3 COMBINED AT							
+	CP3.4	4.14	1	FLOW TIME	4121. 3.67	1501. 3.67	
ROUTED TO							
+	RCP3.4	4.14	1	FLOW TIME	4066. 3.67	1493. 3.75	
HYDROGRAPH AT							
+	3-6	.09	1	FLOW TIME	206. 3.50	85. 3.50	
ROUTED TO							
+	R3-6	.09	1	FLOW TIME	185. 3.67	76. 3.67	
HYDROGRAPH AT							
+	3-7	.17	1	FLOW TIME	429. 3.50	176. 3.50	
ROUTED TO							
+	R3-7	.17	1	FLOW TIME	365. 3.50	156. 3.58	
HYDROGRAPH AT							
+	3-J	.15	1	FLOW TIME	203. 3.58	57. 3.58	
ROUTED TO							
+	R3-J	.15	1	FLOW TIME	197. 3.67	58. 3.75	
3 COMBINED AT							
+	CP3.5	.41	1	FLOW TIME	702. 3.58	231. 3.58	
ROUTED TO							

						INT.OUT
+	RCP3.5	.41	1	FLOW TIME	682. 3.58	227. 3.67
HYDROGRAPH AT +	3-8	.64	1	FLOW TIME	1151. 3.58	461. 3.58
ROUTED TO +	R3-8	.64	1	FLOW TIME	1141. 3.67	456. 3.67
HYDROGRAPH AT +	3-K	.89	1	FLOW TIME	1269. 3.75	506. 3.75
3 COMBINED AT +	CP3.6	1.94	1	FLOW TIME	2996. 3.67	1169. 3.67
ROUTED TO +	RCP3.6	1.94	1	FLOW TIME	2931. 3.67	1167. 3.75
HYDROGRAPH AT +	3-N	.45	1	FLOW TIME	687. 3.67	279. 3.67
HYDROGRAPH AT +	3-M	.19	1	FLOW TIME	367. 3.58	152. 3.58
ROUTED TO +	R3-M	.19	1	FLOW TIME	356. 3.58	144. 3.58
4 COMBINED AT +	CPDB5	6.72	1	FLOW TIME	8005. 3.67	3049. 3.75
ROUTED TO +	DB5	6.72	1	FLOW TIME	2286. 5.08	1469. 4.33
						** PEAK STAGES IN FEET **
						1 STAGE 3562.38 3548.22 TIME 5.08 4.33
DIVERSION TO +	7X5	6.72	1	FLOW TIME	1915. 5.08	1313. 4.33
HYDROGRAPH AT +	60RCP	6.72	1	FLOW TIME	372. 5.08	156. 4.33
HYDROGRAPH AT +	XOFF5	.01	1	FLOW TIME	12. 3.50	3. 3.58
2 COMBINED AT +	CPA1	6.73	1	FLOW TIME	373. 5.00	157. 4.33
2 COMBINED AT +	CPA	6.83	1	FLOW TIME	400. 4.92	162. 4.33
HYDROGRAPH AT +	XOFF4	.00	1	FLOW TIME	2. 3.58	0. 3.58
HYDROGRAPH AT +	XOFF3	.01	1	FLOW TIME	8. 3.58	2. 3.58
HYDROGRAPH AT +	XOFF2	.03	1	FLOW TIME	52. 3.58	18. 3.58
4 COMBINED AT +	CP5	6.87	1	FLOW TIME	413. 4.92	165. 4.50
HYDROGRAPH AT +	7X5	.00	1	FLOW TIME	1915. 5.08	1313. 4.33
2 COMBINED AT +	CPB	6.87	1	FLOW	2323.	1478.

				TIME	4.92	4.33	INT.OUT			
HYDROGRAPH AT										
+	XOFF1	.04	1	FLOW TIME	61. 3.58	23. 3.58				
HYDROGRAPH AT										
+	RD2	.02	1	FLOW TIME	35. 3.58	18. 3.58				
3 COMBINED AT										
+	CPC	6.92	1	FLOW TIME	2341. 4.92	1482. 4.33				
1										
SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)										
INTERPOLATED TO COMPUTATION INTERVAL										
ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	DT	PEAK	TIME TO PEAK	VOLUME	
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)	
FOR PLAN = 1	RATIO=	.00								
R3-1	MANE		2.66	2349.13	244.73	2.41	5.00	2345.98	245.00	2.41
CONTINUITY SUMMARY (AC-FT) - INFLOW= .2851E+03 EXCESS= .0000E+00 OUTFLOW= .2852E+03 BASIN STORAGE= .7278E-02 PERCENT ERROR= .0										
FOR PLAN = 1	RATIO=	.00								
R3-1	MANE		3.86	924.57	247.23	.93	5.00	924.19	245.00	.93
CONTINUITY SUMMARY (AC-FT) - INFLOW= .1095E+03 EXCESS= .0000E+00 OUTFLOW= .1096E+03 BASIN STORAGE= .7590E-02 PERCENT ERROR= .0										
FOR PLAN = 1	RATIO=	.00								
RCP3.1	MANE		4.25	2420.08	246.38	2.39	5.00	2408.70	245.00	2.39
CONTINUITY SUMMARY (AC-FT) - INFLOW= .3118E+03 EXCESS= .0000E+00 OUTFLOW= .3118E+03 BASIN STORAGE= .1258E-01 PERCENT ERROR= .0										
FOR PLAN = 1	RATIO=	.00								
RCP3.1	MANE		5.00	959.99	250.00	.92	5.00	959.99	250.00	.92
CONTINUITY SUMMARY (AC-FT) - INFLOW= .1194E+03 EXCESS= .0000E+00 OUTFLOW= .1194E+03 BASIN STORAGE= .1037E-01 PERCENT ERROR= -.1										
FOR PLAN = 1	RATIO=	.00								
RCP3.3	MANE		.52	2581.07	245.48	2.35	5.00	2579.57	245.00	2.35
CONTINUITY SUMMARY (AC-FT) - INFLOW= .3484E+03 EXCESS= .0000E+00 OUTFLOW= .3484E+03 BASIN STORAGE= .1140E-02 PERCENT ERROR= .0										
FOR PLAN = 1	RATIO=	.00								
RCP3.3	MANE		.75	1014.41	250.15	.89	5.00	1014.28	250.00	.89
CONTINUITY SUMMARY (AC-FT) - INFLOW= .1324E+03 EXCESS= .0000E+00 OUTFLOW= .1324E+03 BASIN STORAGE= .1214E-02 PERCENT ERROR= .0										
FOR PLAN = 1	RATIO=	.00								
R3-3	MANE		3.25	379.69	214.50	2.41	5.00	372.79	215.00	2.41
CONTINUITY SUMMARY (AC-FT) - INFLOW= .2227E+02 EXCESS= .0000E+00 OUTFLOW= .2232E+02 BASIN STORAGE= .6444E-02 PERCENT ERROR= -.3										
FOR PLAN = 1	RATIO=	.00								
R3-3	MANE		4.25	152.47	216.75	.94	5.00	148.36	215.00	.94
CONTINUITY SUMMARY (AC-FT) - INFLOW= .8704E+01 EXCESS= .0000E+00 OUTFLOW= .8724E+01 BASIN STORAGE= .6768E-02 PERCENT ERROR= -.3										
FOR PLAN = 1	RATIO=	.00								
R3-4	MANE	3.50	759.69	213.50	2.44	5.00	739.13	215.00	2.44	
CONTINUITY SUMMARY (AC-FT) - INFLOW= .4493E+02 EXCESS= .0000E+00 OUTFLOW= .4502E+02 BASIN STORAGE= .8519E-02 PERCENT ERROR= -.2										
FOR PLAN = 1	RATIO=	.00								
R3-4	MANE	4.25	301.93	216.75	.95	5.00	292.36	215.00	.95	

INT.OUT

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1756E+02 EXCESS= .0000E+00 OUTFLOW= .1760E+02 BASIN STORAGE= .6986E-02 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00
R3-5 MANE 2.90 613.70 214.79 2.38 5.00 609.16 215.00 2.38

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3725E+02 EXCESS= .0000E+00 OUTFLOW= .3729E+02 BASIN STORAGE= .2899E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00
R3-5 MANE 3.75 254.05 213.75 .93 5.00 251.45 215.00 .92

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1449E+02 EXCESS= .0000E+00 OUTFLOW= .1451E+02 BASIN STORAGE= .4266E-02 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00
RCP3.2 MANE 2.52 1673.65 216.35 2.41 5.00 1650.24 215.00 2.41

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1046E+03 EXCESS= .0000E+00 OUTFLOW= .1046E+03 BASIN STORAGE= .3557E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00
RCP3.2 MANE 3.51 679.30 217.79 .94 5.00 657.61 220.00 .94

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4070E+02 EXCESS= .0000E+00 OUTFLOW= .4073E+02 BASIN STORAGE= .3590E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00
RCP3.4 MANE 1.39 4099.79 221.68 2.34 5.00 4065.74 220.00 2.34

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5154E+03 EXCESS= .0000E+00 OUTFLOW= .5154E+03 BASIN STORAGE= .3367E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCP3.4 MANE 2.04 1504.27 222.50 .89 5.00 1493.14 225.00 .89

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1959E+03 EXCESS= .0000E+00 OUTFLOW= .1959E+03 BASIN STORAGE= .3286E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
R3-6 MANE 3.25 190.55 217.75 2.39 5.00 184.79 220.00 2.39

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1124E+02 EXCESS= .0000E+00 OUTFLOW= .1130E+02 BASIN STORAGE= .9859E-02 PERCENT ERROR= -.6

FOR PLAN = 1 RATIO= .00
R3-6 MANE 4.25 78.32 221.00 .93 5.00 75.87 220.00 .93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4384E+01 EXCESS= .0000E+00 OUTFLOW= .4414E+01 BASIN STORAGE= .1072E-01 PERCENT ERROR= -.9

FOR PLAN = 1 RATIO= .00
R3-7 MANE 3.23 410.12 213.24 2.31 5.00 364.53 210.00 2.30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2109E+02 EXCESS= .0000E+00 OUTFLOW= .2113E+02 BASIN STORAGE= .2918E-02 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00
R3-7 MANE 3.75 164.36 213.75 .89 5.00 156.15 215.00 .88

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8091E+01 EXCESS= .0000E+00 OUTFLOW= .8111E+01 BASIN STORAGE= .3049E-02 PERCENT ERROR= -.3

FOR PLAN = 1 RATIO= .00
R3-J MANE 4.50 199.90 220.50 1.61 5.00 197.19 220.00 1.62

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1311E+02 EXCESS= .0000E+00 OUTFLOW= .1314E+02 BASIN STORAGE= .5881E-02 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00
R3-J MANE 2.50 58.36 225.00 .47 5.00 58.36 225.00 .47

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3850E+01 EXCESS= .0000E+00 OUTFLOW= .3861E+01 BASIN STORAGE= .6928E-02 PERCENT ERROR= -.5

FOR PLAN = 1 RATIO= .00

						INT.OUT			
RCP3.5	MANE	1.30	691.02	216.53	2.07	5.00	681.83	215.00	2.07

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4551E+02 EXCESS= .0000E+00 OUTFLOW= .4552E+02 BASIN STORAGE= .1608E-02 PERCENT ERROR= .0

FOR PLAN = 1	RATIO=	.00							
RCP3.5	MANE	1.96	231.25	217.58	.74	5.00	227.09	220.00	.74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1636E+02 EXCESS= .0000E+00 OUTFLOW= .1637E+02 BASIN STORAGE= .1368E-02 PERCENT ERROR= .0

FOR PLAN = 1	RATIO=	.00							
R3-8	MANE	2.99	1146.42	218.06	2.44	5.00	1140.71	220.00	2.43

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8291E+02 EXCESS= .0000E+00 OUTFLOW= .8295E+02 BASIN STORAGE= .3930E-02 PERCENT ERROR= .0

FOR PLAN = 1	RATIO=	.00							
R3-8	MANE	4.12	459.85	222.32	.95	5.00	455.52	220.00	.95

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3241E+02 EXCESS= .0000E+00 OUTFLOW= .3243E+02 BASIN STORAGE= .3195E-02 PERCENT ERROR= -.1

FOR PLAN = 1	RATIO=	.00							
RCP3.6	MANE	1.64	2993.73	221.55	2.28	5.00	2930.53	220.00	2.28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2362E+03 EXCESS= .0000E+00 OUTFLOW= .2362E+03 BASIN STORAGE= .3355E-02 PERCENT ERROR= .0

FOR PLAN = 1	RATIO=	.00							
RCP3.6	MANE	2.32	1171.05	224.78	.87	5.00	1167.16	225.00	.87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9011E+02 EXCESS= .0000E+00 OUTFLOW= .9013E+02 BASIN STORAGE= .2992E-02 PERCENT ERROR= .0

FOR PLAN = 1	RATIO=	.00							
R3-M	MANE	1.71	358.75	215.64	2.32	5.00	355.58	215.00	2.32

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2381E+02 EXCESS= .0000E+00 OUTFLOW= .2381E+02 BASIN STORAGE= .2177E-02 PERCENT ERROR= .0

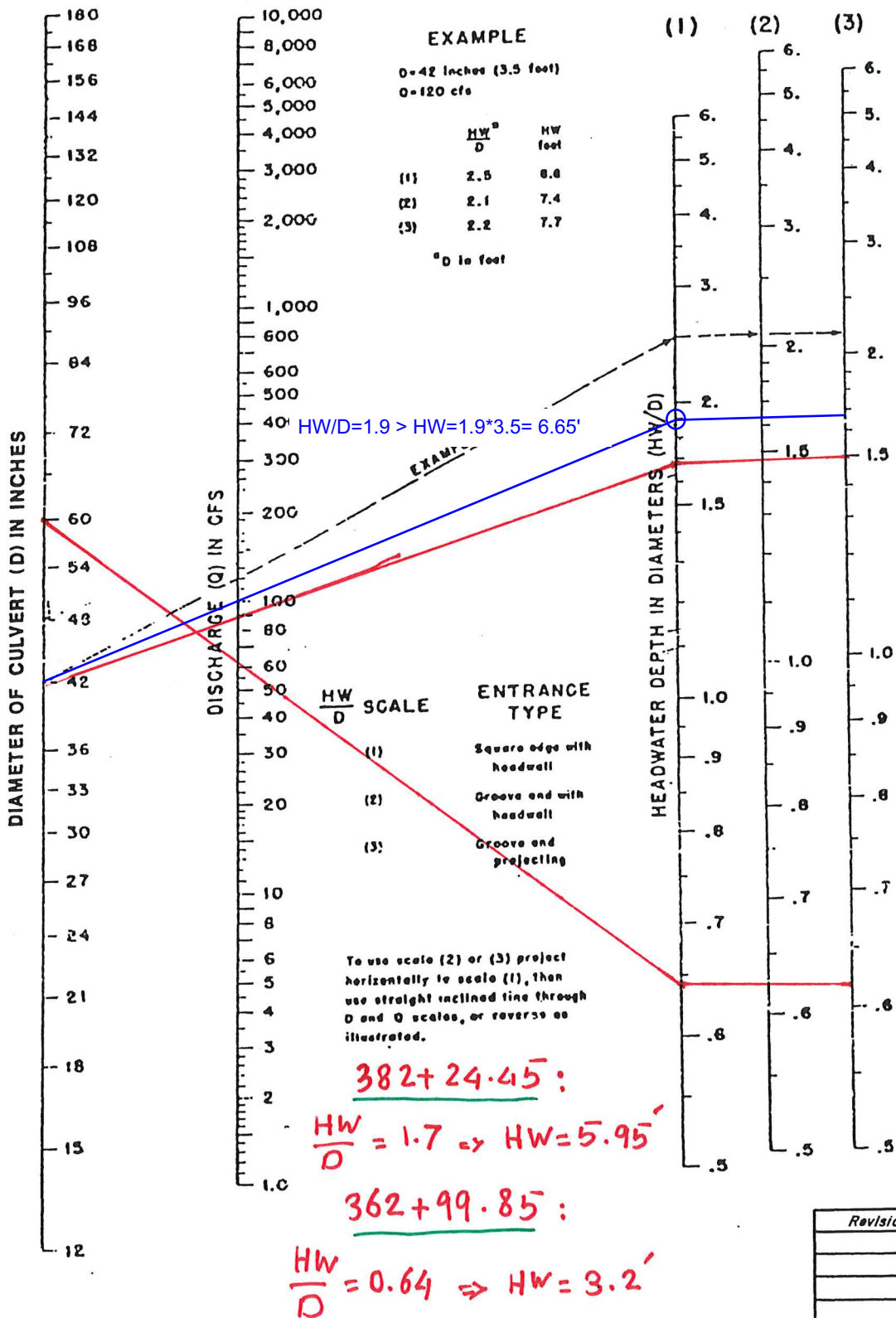
FOR PLAN = 1	RATIO=	.00							
R3-M	MANE	2.43	148.01	216.62	.92	5.00	143.89	215.00	.92

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9402E+01 EXCESS= .0000E+00 OUTFLOW= .9405E+01 BASIN STORAGE= .2331E-02 PERCENT ERROR= -.1

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

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

NOMOGRAPH - INLET CONTROL RCP



Revision	Date

APPENDIX C

REFERENCED MATERIALS

V. HYDROLOGY**EXCERPT FROM DB5 STUDY DESCRIBING
DRAINAGE PATTERN RESULTING FROM
DIVERSION BERM.**

Since minimal natural or man-made activities have transpired since the completion of the analyses presented in Reference 1, which could require modifications to the delineated watershed outlined in Reference 1, the items presented in the aforementioned reference study remain status quo. The hydrologic exhibit prepared in Reference 1 has been duplicated as presented in Figure 5.

In short, the sub-basins were annotated to reflect the point of ingress. The four series (i.e. 4-1, 4-2, etc) are sub-basins that were previously slated to be captured by what was once planned DB4. Approximately 2,732 acres, translating to a 100-year runoff value of approximately of 4,052 cfs will be diverted into DB5. The five series (i.e. 5-1, 5-2, etc) represents watersheds tributary to DB5. The total inflow designed to be captured by expanded DB5 is approximately 7,084 cfs with an associated area of approximately 4,336 acres. The sub-basins in the five series represented conservative curve numbers that served to evaluate the watershed in an 100-year event. The detention basin was also evaluated utilizing the original hydrology model for DB5 (Reference 5) combined with the four series sub-basins to more accurately represent the PMF event and the parameters for which the spillway was designed. The results of this model are shown on the stage curve figures and on the improvement drawings to preserve consistency with the model used for the PMF design . Through detention and throttling of the peak inflow, DB5 will be designed to attenuate the outflow to approximately 2,300 cfs during the 100-year storm event in either scenario.

The intent of the diversion berm is to guide the 100-year storm flows towards DB5. The design of the overall system, which includes the control structure (5: 12-feet by 5-feet), will convey in it's entirety the 100-year storm event, but limit the PMF storm event from adversely impacting the revised DB5.

The HEC-1 model was slightly modified to account for the stage (elevation), storage, and runoff, based on actual grading of the detention basin. The revised model, along with all of the hydrologic parameters extracted from Reference 1 used to determine the lag time for each watershed, is presented in the attached Appendix.

Table 2 summarizes the referenced runoff values for all watersheds provided in Figure 5.

TABLE 2 SUMMARY OF HEC-1 MODEL		
BASIN/LOCATION*	AREA (Acres)	Q ₁₀₀ (Cfs)
Watersheds Proposed to be Diverted		
4-1	1,412.5	2,906
4-2	173.4	674
4-3	302.4	1,204
4-4	171.7	549
4-5	140.9	456
4-6	515.7	1,102
4-7	19.6	54
Watersheds Directly Tributary to DB5		
5-1	451.9	1,335
5-2	59.0	167
5-3	137.3	534
5-4	142.7	424
5-5	122.5	339
5-6	56.8	161
5-7	282.0	655
5-8	347.5	787
Combination Points		
C-1 (Comb. 4-1 & 4-5)	1,553.5	2,970
C-2 (Comb. 4-2, 4-3, & 4-4)	647.5	2,189
C-3 (Comb. C-1, C-2, & 4-6)	2,716.6	4,058
C-4 (Comb. C-3 & 4-7)	2,736.2	4,052
C-5 (Comb. 5-1 & 5-2)	510.9	1,361
C-6 (Comb. 5-3 & 5-4)	280.1	888
C-7 (Comb. C-5, C-6, & 5-5)	913.4	2,381
C-8 (Comb. C-7, 5-6, 5-7, & 5-8)	1,599.7	3,379
C-9 (C-4 & C-8)	4,335.9	7,084
DB5MOD (Outflow from DB5)	4,335.0	2,291

*See Figure 5

The items discussed above assume that the storm flows are devoid of any debris. In sizing the detention basin, potential bulking was also taken into account. Reference 1 addressed this issue and the following is a summary of what was discussed.

Lining of the diversion berm is limited to the bottom width and the embankment on the low side. Erosion protection scheme comprise of gabions along the section of the channel mentioned. Minor grading will be provided at the transition sections at the upstream and downstream end of the diversion berm as presented in the attached improvement package. Since the diversion berm and the conveyance in the natural wash is one (1) contiguous system, the hydraulic model accounts for both working in juxtaposition. The hydraulic modeling is consistent with approach presented in Reference 1 with minor changes in the results.

The sections that were delineated along the diversion system employed in the HEC-Ras model and ran under the shell of Boss RMS is presented in Figure 7. The worksheets generated by the model output are presented in the attached Appendix. The hydraulic parameters for each cross section are presented in Table 3. Cross sections 130 through 170 represents the engineered diversion berm.

Table 3
Hydraulic Summary/Freeboard Criteria
Diversion Berm/Natural Wash
 $Q_{100} \sim 4,058$ cfs

Station	Min. Ch. El (ft)	WSE (ft)	D ₁₀₀ (ft)	Vel. (ft/s)	Fr. #	F _b (per Manual) (ft)	Berm/X-Ridge El. (LOB)	F _b (Avail) (LOB) (ft)
40	3579.3	3586.7	7.4	18.1	1.72	1.9	3590.0	3.3
50	3584.4	3590.2	5.7	20.7	1.92	1.9	3594.0	3.9
60	3595.5	3603.0	7.5	15.3	1.41	1.8	3608.0	5.0
70	3604.2	3609.8	5.6	20.6	1.93	1.9	3614.0	4.2
80	3615.3	3621.8	6.5	17.6	1.77	1.8	3626.0	4.2
90	3629.3	3636.5	7.2	20.0	1.79	2.0	3638.7	2.2
100	3639.5	3647.5	8.0	16.6	1.51	1.8	3652.0	4.5
110	3654.0	3657.6	3.7	20.0	2.27	1.8	3662.0	4.4
120	3664.7	3671.1	6.4	8.6	1.05	1.4	3674.0	3.0
130	3668.1	3672.0	3.9	16.2	1.59	1.6	3672.0	0.0
140	3672.7	3676.7	4.0	16.0	1.57	1.6	3676.8	0.1
150	3677.4	3681.4	4.0	15.3	1.51	1.6	3681.4	0.0
160	3681.7	3685.5	3.9	13.4	1.34	1.5	3685.7	0.2
170	3684.0	3687.1	3.1	14.1	1.65	1.5	3687.1	0.0
175	3686.4	3689.6	3.2	13.6	1.63	1.5	3690.0	0.4
180	3688.8	3691.6	2.8	13.6	1.55	1.5	3700.0	8.4
190	3698.7	3701.5	2.8	14.8	1.89	1.5	3710.0	8.6
200	3706.6	3710.9	4.3	11.7	1.27	1.5	3724.0	13.1

Table 3 Hydraulic Summary/Freeboard Criteria Diversion Berm/Natural Wash Q₁₀₀ ~ 4,058 cfs								
Station	Min. Ch. El (ft)	WSE (ft)	D ₁₀₀ (ft)	Vel. (ft/s)	Fr. #	F _b (per Manual) (ft)	Berm/X- Ridge El. (LOB)	F _b (Avail) (LOB) (ft)
210	3715.0	3717.8	2.8	20.4	2.56	1.7	3728.0	10.2
220	3724.6	3729.9	5.4	10.9	1.00	1.5	3738.0	8.1

* See Figure 7

HYDRAULIC TABLE FROM REFERENCED DB5 STUDY SHOWING NO FLOWS OVERTOPPING DIVERSION BERM.

In Table 3, the minimum freeboard requirement was based on the equation for a super-critical flow regime presented in Section 706.2.4 of the Manual (Reference 3).

The function of the 5: 12-feet by 5-feet RCBC is to provide downstream control and induce a back-water affect upstream of the noted facilities. This in turn reduces the amount of runoff traversing along the natural wash as well as reduce the amount of PMF storm runoff entering DB5. As noted earlier, the PMF storm event that impacts the proposed diversion berm is approximately 22,133 cfs. Of this value, the control structure throttles the runoff to approximately 5,600 cfs during the PMF storm event. Approximately 17,533 cfs weirs out of the system prior to entering the natural wash. A hydraulic model conducted in HEC-RAS isolating the diversion berm with the control structure in place is presented in the attached Appendix. The expected 100-year runoff is approximately 4,058 cfs entering the detention basin. The additional 1,542 cfs during the PMF storm event that enter DB5 does not adversely impact the existing spillway. The weir length on the spillway is adequate to accommodate the PMF storm flows.

Easement Dedication - A setback, to protect future development within the periphery of the natural wash immediately downstream of the diversion berm, is required. Though the natural wash is a stable channel and maintenance of the conveyance area is present, a setback is proposed to insure that future developments are not adversely impacted by the potential migration of storm flows. The minimum width requirement was based on the top width of the 100-year water surface plus 25-feet on each side of the natural wash. Therefore, a buffer of an additional 50-feet added to the top width of the 100-year water surface elevation is proposed.

Summerlin Village 23B Sky Vista Drive					
WEIGHTED CURVE NUMBERS					
Interim Conditions					
Basin	Soil	Percent	CN	Land Use	WCN
XOFF1	731	100.0%	85.3	Desert Shrub Poor	85.3
XOFF2	731	85.0%	85.3	Desert Shrub Poor	83.5
	502	15.0%	73.0		
XOFF3	731	28.0%	85.3	Desert Shrub Poor	76.4
	502	72.0%	73.0		
XOFF4	502	100.0%	73.0	Desert Shrub Poor	73.0
XOFF5	731	46.0%	85.3	Desert Shrub Poor	78.7
	502	54.0%	73.0		
XOFF6	731	66.0%	85.3	Desert Shrub Poor	81.1
	502	34.0%	73.0		
XOFF7	502	100.0%	73.0	Desert Shrub Poor	73.0
XOFF8	502	100.0%	73.0	Desert Shrub Poor	73.0
XOFF9	502	100.0%	73.0	Desert Shrub Poor	73.0
XOFF10	731	4.0%	85.3	Desert Shrub Poor	83.5
	502	23.0%	73.0		
	156	78.0%	86.7		
XOFF11	731	6.0%	85.3	Desert Shrub Poor	86.6
	156	94.0%	86.7		
XOFF12	156	100.0%	86.7	Desert Shrub Poor	86.7
RD1	502	100.0%	98	Street and Roads	98.0
RD2	731	100.0%	98	Street and Roads	98.0

REVISED BASINS

REVISED BASINS

HYDROLOGIC CRITERIA AND DESIGN MANUAL

TIME OF CONCENTRATION



HOWARD HUGHES PROPERTIES INC.
SUMMERLIN VILLAGE 23B SKY VISTA DRIVE
INTERIM CONDITION

REVISED BASINS

Project No: 62023B-240

Date: 10-Apr-18

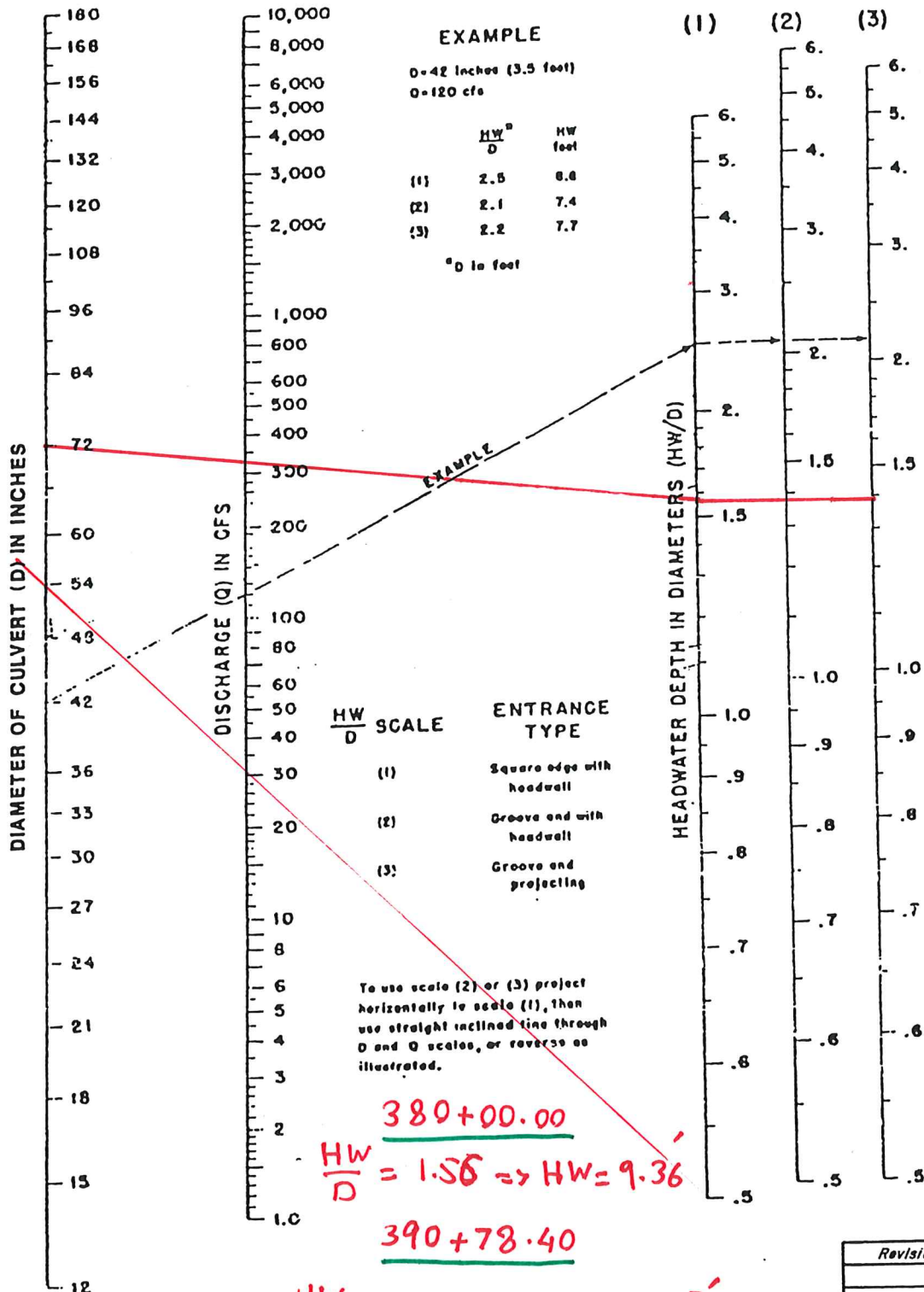
Calculated by: JR

SUB-BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc CHECK		Tc	Tag	REMARKS								
DATA						TIME (Ti)			(Tt)					URBANIZED BASINS												
DESIG:	DEV./EX. (D or E)	CN	K	AREA Ac	AREA Sq Mi	INITIAL LENGTH Feet	SLOPE %	Ti Min	TRAVEL LENGTH Feet	SLOPE %	V1 VELOCITY fps	V2 VELOCITY fps	Tt Min	TOTAL LENGTH Feet	Tc = (L/180)+10 Min	Min	Tag = 0.6Tc/60 Hours	Remarks:								
(1)		(16)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9a)	(9b)	(10)	(11)	(12)	(13)	(14)	(15)									
XOFF1	E	85.3	0.7360	23.4	0.0366	240	6.3	5.5	1880	4.7	3.2	6.4	6.2	2120	N/A	11.7	0.117	3.34								
XOFF2	E	83.5	0.7122	21.6	0.0338	150	1.7	7.2	1855	3.9	2.9	5.8	6.8	2005	N/A	14.0	0.140	3.34								
XOFF3	E	76.4	0.6185	4.3	0.0067	270	1.5	12.5	210	11.0	4.9	9.8	0.7	480	N/A	13.2	0.132	3.34								
XOFF4	E	73.0	0.5736	1.1	0.0017	50	2.0	5.3	250	6.8	3.9	7.7	1.1	300	N/A	6.4	0.100	3.34								
XOFF5	E	78.7	0.6488	5.6	0.0088	140	8.2	4.6	600	4.3	3.1	6.1	3.0	740	N/A	7.8	0.100	3.34								
XOFF6	E	81.8	0.6898	31.2	0.0488	500	4.9	9.7	2390	4.9	3.3	6.5	7.4	2890	N/A	17.1	0.171	3.34								
XOFF7	E	73.0	0.5736	15.1	0.0236	500	5.4	12.0	1780	5.4	3.5	6.9	5.5	2280	N/A	17.6	0.176	3.34								
XOFF8	E	73.0	0.5736	4.4	0.0052	330	8.3	10.2	580	5.8	3.6	7.1	2.5	900	N/A	12.8	0.128	3.34								
XOFF9	E	73.0	0.5736	9.9	0.0155	130	5.4	6.2	1850	5.2	3.4	6.7	5.8	1980	N/A	12.0	0.120	3.34								
XOFF10	E	83.5	0.7122	41.9	0.0655	360	6.4	7.1	3130	5.4	3.4	6.8	8.8	3490	N/A	16.0	0.160	3.34								
XOFF11	E	86.6	0.7531	43.1	0.0673	500	5.8	7.8	3670	5.8	3.6	7.1	9.8	4170	N/A	17.5	0.175	3.34								
XOFF12	E	86.7	0.7544	28.3	0.0442	270	7.0	5.3	3180	5.8	3.6	7.1	8.7	3450	N/A	14.0	0.140	3.34								
RD1	D	98.0	0.9036	2.1	0.0033	40	2.0	1.8	900	1.1	2.1	3.2	6.0	940	15.2	7.8	0.078	3.34								
RD2	D	98.0	0.9036	10.1	0.0158	40	2.0	1.8	4050	2.8	3.4	5.1	14.0	4090	32.7	15.8	0.158	3.34								
Tc = Ti + Tt Tag = 0.6 Tc Ti = 1.8 (1.1 - K) L ^{1/2} / S ^{1/3} K = 0.0132 (CN) - 0.39														For the travel time (Tt) calculations, V1 applies to the first 500 feet of travel distance; V2 applies to the remaining travel distance.					Existing: V1 = 14.8*(S/100) ^{1/2} V2 = 29.4*(S/100) ^{1/2}				Developed: V1 = 20.2*(S/100) ^{1/2} V2 = 30.6*(S/100) ^{1/2}			
REFERENCE:																			STANDARD FORM 4							

REVISED BASINS

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

NOMOGRAPH - INLET CONTROL RCP



Revision	Date

ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
APAD 0203	E	ANGEL PARK - ALTA DRIVE BRANCH						
	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	SUMSDB	GOW3A	6.73	3.40
APBE 0022	E	ANGEL PARK - BELTWAY BRANCH						
	E	CONC CHNL 20"W 7'D 2:1 SS	1556	3366	CCSWFH15	GOW3A	3.39	1.81
	E	CONC CHNL 20"W 7'D 2:1 SS	1583	3366	CCSWFH15	GOW3A	3.39	2.77
	E	8' X 8' RCBC @ FAR HILLS	777	1048	CSWFH-15	GOW3A	0.59	2.32
	E	CONC CHNL 10"W 5'D 2:1 SS	1465	1048	CSWFH-15	GOW3A	0.59	1.88
	E	CONC CHNL 10"W 4'D 2:1 SS	1685	1048	CSWFH-15	GOW3A	0.59	0.80
	P0	8' X 6' RCB	5012	781	CSWFH-12	GOW3A	0.41	1.30
	P0	6' X 5' RCB	2858	606	CSWFH-11	GOW3A	0.31	3.00
APCH 0000	E	ANGEL PARK - CARRIAGE HILL BRANCH						
	E	8' X 6' RCB	152	399	CSWFH-14	GOW3A	0.21	0.87
	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 0002	E	ANGEL PARK - DESERT FOOTHILLS 2 BRANCH						
	E	7' X 6' RCB	883	674	SWAA-2	GOW3A	0.68	1.08
APDF 0000	P0	ANGEL PARK - DESERT FOOTHILLS BRANCH						
	P0	10' X 6' RCB	1788	1428	CSWFH-9	GOW3B	0.80	3.55
	P0	8' X 6' RCB	1813	968	CSWFH-8	GOW3A	1.80	2.00
	P0	6' X 4' RCB	1922	486	CSWFH-4	GOW3A	1.52	4.40
	P0	42" RCP	1076	141	GPDB	GOW3A	1.29	6.00
	P0	130 AC-FT GRAND PARK DETENTION BASIN		1543	CSWFH-3	GOW3A	1.29	
	P0	6' X 6' RCB	2977	853	SWFH-1	GOW3A	0.69	3.80
	P0	5' X 4' RCB	2197	509	SWFH-2	GOW3A	0.37	5.70
APFH 0000	E	ANGEL PARK - FAR HILLS BRANCH						
	E	2: 8' X 8' RCB	1070	2494	CCSWFH14	GOW3B	1.51	3.50
	E	2: 8' X 8' RCB	250	2149	CCSWFH9	GOW3B	1.30	4.19
	E	16' X 8' RCAP	1951	2149	CCSWFH-9	GOW3B	1.30	5.10
	E	8' X 6' RCB	1435	839	CSWFH-7	GOW3A	0.50	2.00
	E	8' X 6' RCB	2946	839	CSWFH-7	GOW3A	0.50	2.00
	P0	5' X 4' RCB	2497	456	SWFH-6	GOW3A	0.28	5.50
APM5 0000	E	DETENTION BASIN #5						
	E	384 AC-FT DETENTION BASIN #5		6856	SUM5IN	GOW3A	6.73	
	P0	CONC CHNL 50"W 4.5'D 2:1 SS	2102	3634	CCDB54-7	GOW3A	4.13	5.20
	P0	CONC CHNL 50"W 4'D 2:1 SS	4180	3495	CDB55-7	GOW3A	2.60	5.80
	E	DIVERSION BERM WITH GABION BANK PROTECTION	1000	3634	CCDB54-7	GOW3A	4.13	1.30
	P0	CONC CHNL 80"W 4'D 2:1 SS	264	3634	CCDB54-7	GOW3A	4.13	1.30
	P0	CONC CHNL 50"W 3'D 2:1 SS	9922	1664	CDB54-4	GOW3A	0.81	6.80
	P0	CONC CHNL 100"W 3'D 2:1 SS	9075	2606	CDB54-7	GOW3A	3.31	7.00
	P0	CONC CHNL 30"W 3'D 2:1 SS	6695	1092	DB55-1	GOW3A	0.64	7.50
	P0	CONC CHNL 50"W 3'D 2:1 SS	6522	1729	CDB55-5	GOW3A	1.30	7.30
APSP 0183	E	ANGEL PARK - SUMMERLIN PARKWAY						
	E	CONC CHNL 10"W 6'D 2:1 SS	1680	884	C11B-1	GOW3A	0.84	1.70
GOB3 0000	E	GOWAN LONE MOUNTAIN SYST. 3 BELTWAY						
	E	66" RCP	1370	341	SV22-1	GOW3A	0.18	4.50
GOBE 0000	E	GOWAN LONE MOUNTAIN SYST. BELTWAY						
	E	20' X 10' RCBC @ ACCESS RD	30	1044	CSV22	GOW3A	0.67	5.67
	E	CONC CHNL 20"W 5'D 2:1 SS	1100	1044	CSV22	GOW3A	0.67	6.50
	E	CONC CHNL 11"W 6.8'D 0:1 SS	2143	1044	CSV22	GOW3A	0.67	6.50
	E	CONC CHNL 15"W 7.5'D 0:1 SS	487	1044	CSV22	GOW3A	0.67	3.93
	E	CONC CHNL 17"W 7.5'D 0:1 SS	844	1044	CSV22	GOW3A	0.67	0.76
	E	2: 10' X 9' RCBC @ LAKE MEAD	400	782	SV22-2	GOW3A	0.49	0.50
	E	CONC CHNL 20"W 9'D 2:1 SS	627	782	SV22-2	GOW3A	0.49	0.50
	E	CONC CHNL 20"W 6'D 2:1 SS	1021	782	SV22-2	GOW3A	0.49	0.50
	E	CONC CHNL 20"W 6'D 2:1 SS	638	782	SV22-2	GOW3A	0.49	0.50
	E	CONC CHNL 10"W 5.5'D 2:1 SS	1500	782	SV22-2	GOW3A	0.49	1.02
GOL3 0010	E	GOWAN LONE MOUNTAIN SYSTEM-BRANCH 3						
	E	CONC CHNL 20"W 10'D 0:1 SS	3037	3277	CRLCLMT1R	GOW3A	7.31	2.78
	E	TRANSITION STRUCTURE	100	3277	CRLCLMT1R	GOW3A	7.31	3.50
	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

NEAREST CCRFCD FACILITIES

ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
GOL3 0100	E	GOWAN LONE MOUNTAIN SYSTEM-BRANCH 3						
	E	CONC CHNL 20"W 10'D 0:1 SS	200	1271	CRCSV22	GOW3A	4.99	5.67
	E	96" RCP OUTLET	670	666	DET26	GOW3A	4.31	0.29
	E	305 AC-FT VILLAGE 26 DETENTION BASIN		3615	VIL26IN	GOW3A	4.31	
	E	CONC CHNL 20"W 7.5'D 0:1 SS	2720	3615	VIL26IN	GOW3A	4.31	6.50
	E	CONC CHNL 20"W 8'D 0:1 SS	563	3615	VIL26IN	GOW3A	4.31	3.91
	E	14' X 14" RCB	890	3615	VIL26IN	GOW3A	4.31	0.88
	E	Dual 10' X 14" RCB	124	3615	VIL26IN	GOW3A	4.31	0.57
	P0	CONC CHNL 50"W 4'D 2:1 SS	4060	3524	CSV26-1	GOW3A	4.02	6.08
	P0	CONC CHNL 50"W 3.5'D 2:1 SS	6215	2281	30	GOW3A	2.44	7.95
GOL4 0000	E	GOWAN LONE MOUNTAIN SYSTEM-BRANCH 4						
	E	14' X 8' RCB	554	2243	CLMT1R	GOW3A	2.33	2.50
	E	2: 9' X 8' RCB	820	2243	CLMT1R	GOW3A	2.33	4.74
	E	SOIL CEMENT CHNL 60"W 8'D 3-4:1 SS	320	2243	CLMT1R	GOW3A	2.33	2.00
	E	SOIL CEMENT CHNL 42"W 6'D 3-4:1 SS	700	2243	CLMT1R	GOW3A	2.33	1.00
	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

*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).



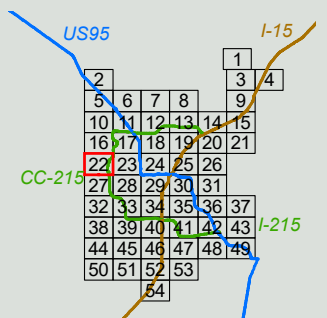
2018
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

**FIGURE F-22
FLOOD CONTROL FACILITIES**

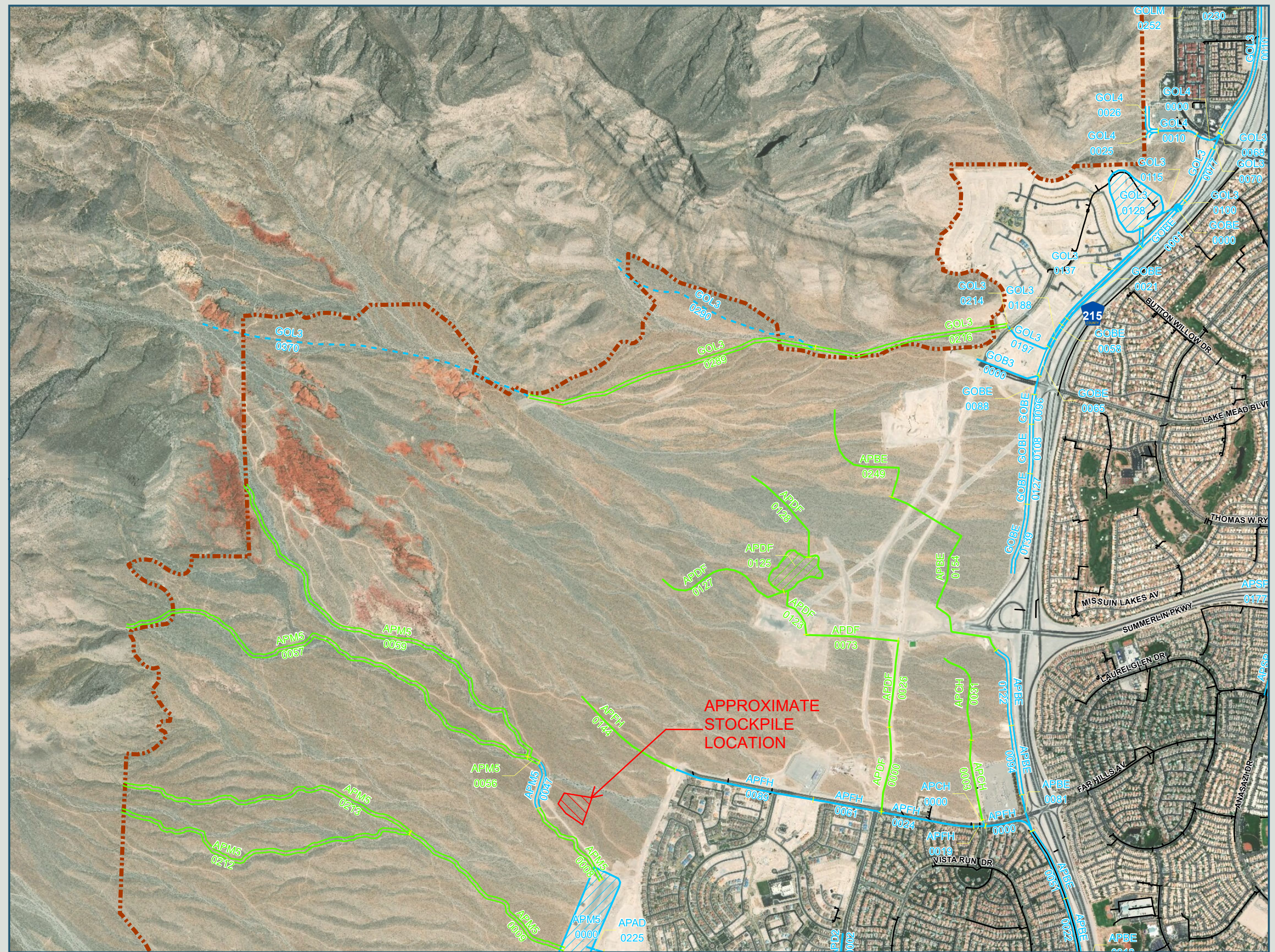
- LEGEND**
- Ultimate Development Boundary
 - Existing Facilities
 - Category A Proposed Facilities
 - Category B Proposed Facilities
 - Local Existing Facilities
 - Detention Basin
 - Culvert or Bridge Crossing
 - Stormdrain
 - Lined Channel
 - Unlined Channel
 - Levee/Dike
 - Natural Wash/Floodway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



NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevation (BFEs)** and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevation (BFEs) shown on this map apply only landward of 0.0' North American Vertical Datum (NAVD). Users of this FIRM should be aware that coastal flood elevations may also be provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this community. Elevations shown in the Summary of Stillwater Elevations table should be used for construction, and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures in this jurisdiction.

The **projection** used in the preparation of this map is Universal Transverse Mercator (UTM), Zone 11. The **horizontal datum** is NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

Vertical Network Branch, NCG13
National Geodetic Survey, NOAA
Silver Spring Metro Center 3
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3191

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit their website at www.ngs.noaa.gov.

Base map information shown on this FIRM was provided in digital format by Clark County Regional Flood Control District. This information was converted using Orthophotography, dated 1999 or newer, and GBR/DIME data. Segments were digitized off of the orthophotography based on center of pavement.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

An accompanying Flood Insurance Study report, Letters of Map Revision or Letters of Map Amendment revising portions of this panel, and digital versions of this PANEL may be available. Contact the **FEMA Map Service Center** at the following phone numbers and Internet address for information on all related products available from FEMA:

Phone: 800-358-9616
FAX: 800-358-9620
www.fema.gov/msc

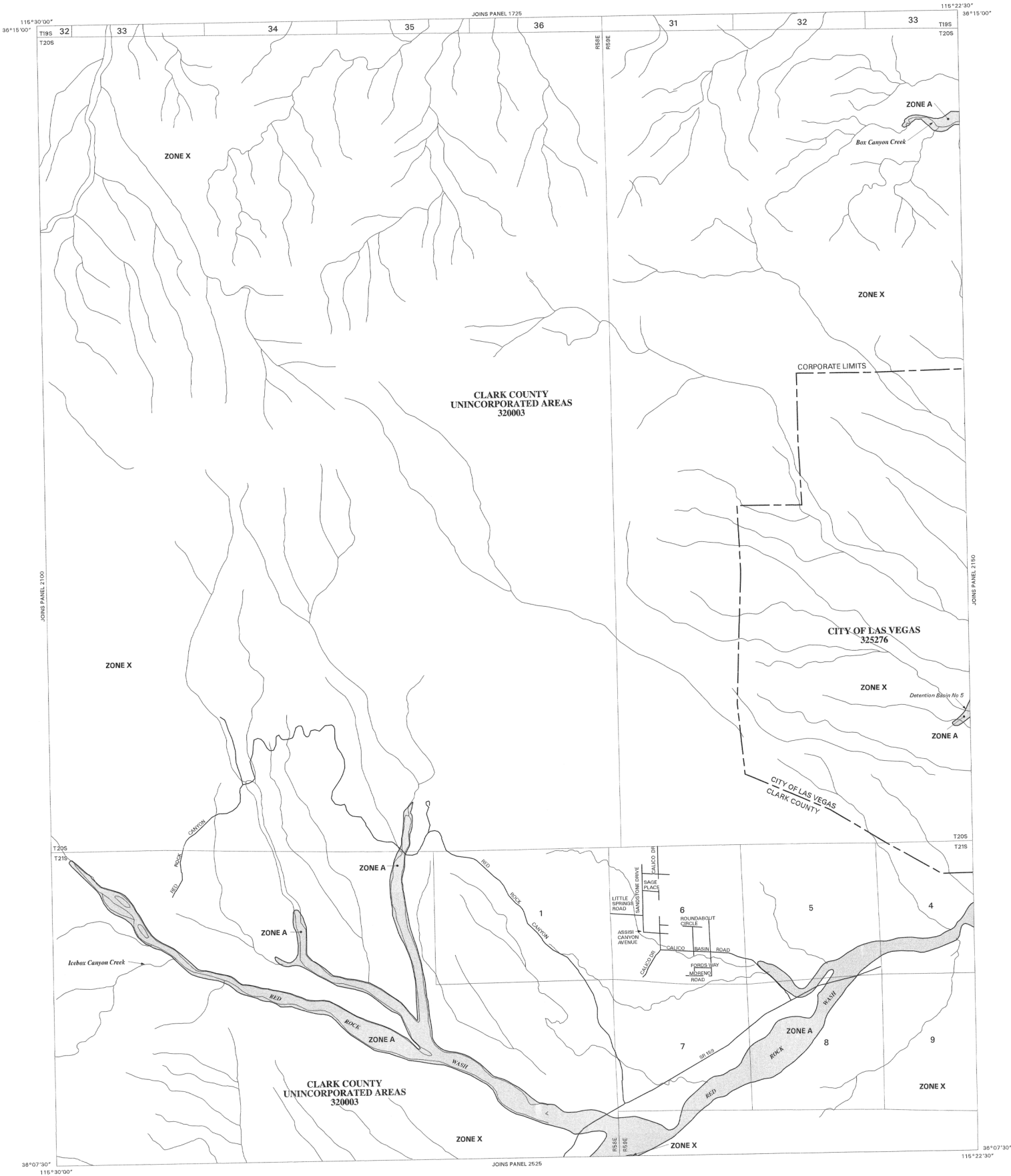
If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA-MAP** (1-877-336-2627) or visit the FEMA website at www.fema.gov.

This map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report may reflect stream channel distances that differ from what is shown on this map.

This Digital Flood Insurance Rate Map (DFIRM) was produced through a unique partnership between Clark County and the Federal Emergency Management Agency (FEMA). Clark County has developed a long-term approach of floodplain management to decrease the costs associated with flooding. This is demonstrated by the Clark County commitment to share and maintain floodplain layers within their Geographic Information System Management Office (GISMO).

This DFIRM reflects several innovative features. These include:
+ Southern Nevada GIS+ Cooperation among local governmental agencies throughout Clark County. The foundation of cooperation is the GIS Interlocal Agreements formed between fourteen regional participants. In part, the agreements specify that the Clark County GIS Management Office (GISMO) will be responsible for maintaining a GIS data warehouse and associated Southern Nevada GIS Metadata.

+ The GISMO's responsibilities go beyond maintaining the GIS data warehouse. GISMO also maintains the Street Centerline Database used by 911 dispatch services. This centerline database serves as the base map for this DFIRM.
DIGITAL DATA AVAILABILITY: <http://www.co.clark.nv.us/cert/gismo/gisra.htm>



LEGEND

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

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

- ZONE A** No base flood elevations determined.
- ZONE AE** Base flood elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.
- ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR** Area of special flood hazard formerly protected from the 1% annual chance flood event by a flood control system that was subsequently deteriorated. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood event.
- ZONE A99** Area to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no base flood elevations determined.
- ZONE V** Coastal flood zone with velocity hazard (wave action); no base flood elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

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

OTHER FLOOD AREAS

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

OTHER AREAS

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

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

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

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

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

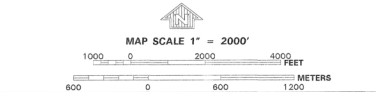
*Referenced to the North American Vertical Datum of 1988

- Cross Section Line
- Transect Line
- Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 1000-meter Universal Transverse Mercator grid values, zone 11
- 5000-foot grid ticks
- Bench mark (see explanation in Notes to Users section of this FIRM panel).
- River Mile

MAP REPOSITORY
Refer to Repository Listing on Index Map
EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
AUGUST 16, 1995
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
September 27, 2002: to update corporate limits, to change base flood elevations, to add base flood elevations, to add special flood hazard areas, to change special flood hazard areas, to delete special flood hazard areas, to change zone designations, to add roads and road names, to incorporate previously issued letters of map revision, to incorporate previously issued letters of map amendment, and to change floodway.

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

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



NATIONAL FLOOD INSURANCE PROGRAM

CLARK COUNTY, NEVADA AND INCORPORATED AREAS

PANEL 2125 E

FIRM

FLOOD INSURANCE RATE MAP

CLARK COUNTY, NEVADA AND INCORPORATED AREAS

PANEL 2125 OF 4090

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

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

NUMBER: 32003

PANEL: 2125

SUFFIX: E

Notice to User: The Map Number shown below should be used when placing map orders. The Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER

32003C2125 E

MAP REVISED:

SEPTEMBER 27, 2002

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevation (BFEs)** and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevation (BFEs) shown on this map apply only landward of 0.0' North American Vertical Datum (NAVD). Users of this FIRM should be aware that coastal flood elevations may also be provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this community. Elevations shown in the Summary of Stillwater Elevations table should be used for construction, and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures in this jurisdiction.

The **projection** used in the preparation of this map is Universal Transverse Mercator (UTM) Zone 11. The **horizontal datum** is NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1928 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

Vertical Network Branch, NCG13
National Geodetic Survey, NOAA
Silver Spring Metro Center 3
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3191

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit their website at www.ngs.noaa.gov.

Base map information shown on this FIRM was provided in digital format by Clark County Regional Flood Control District. This information was converted using Orthophotography, dated 1999 or newer, and G8F/DIME data. Segments were digitized off of the orthophotography based on center of pavement.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

An accompanying Flood Insurance Study report, Letters of Map Revision or Letters of Map Amendment revising portions of this panel, and digital versions of this PANEL may be available. Contact the **FEMA Map Service Center** at the following phone numbers and Internet address for information on all related products available from FEMA:

Phone: 800-368-5616
FAX: 800-368-9620
www.fema.gov/msc

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA-MAP** (1-877-336-2627) or visit the FEMA website at www.fema.gov.

This map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report may reflect stream channel distances that differ from what is shown on this map.

This Digital Flood Insurance Rate Map (DFIRM) was produced through a unique partnership between Clark County and the Federal Emergency Management Agency (FEMA). Clark County has developed a long-term approach of floodplain management to decrease the costs associated with flooding. This is demonstrated by the Clark County commitment to share and maintain floodplain layers within their Geographic Information System Management Office (GISMO).

This DFIRM reflects several innovative features. These include: + Southern Nevada GIS - Cooperation among local governmental agencies throughout Clark County. The foundation of cooperation is the GIS Interlocal Agreements formed between fourteen regional participants. In part, the agreements specify that the Clark County GIS Management Office (GISMO) will be responsible for maintaining a GIS data warehouse and associated Southern Nevada GIS Metadata.

+ The GISMO's responsibilities go beyond maintaining the GIS data warehouse. GISMO also maintains the Street Centerline Database used by 911 dispatch services. This centerline database serves as the base map for this DFIRM.
DIGITAL DATA AVAILABILITY: <http://www.co.clark.nv.us/cel/gis/mo/gis/mo.htm>

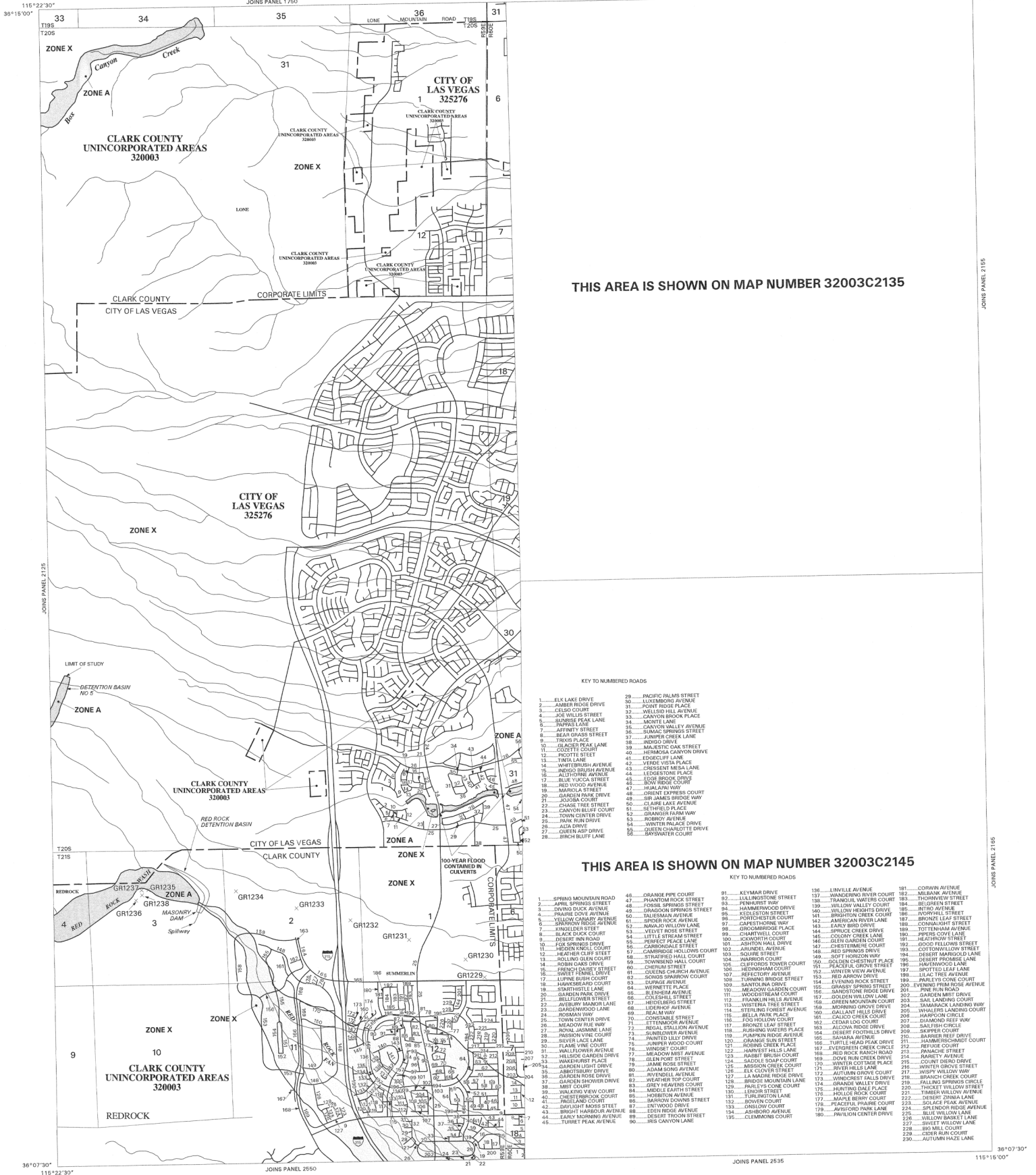
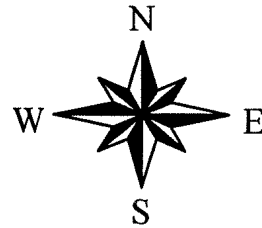


FIGURE 5 DRAINAGE MAP

 DELINEATED WATERSHEDS
 EXISTING CONTOURS
 EXISTING DETENTION BASIN NO. 5
 FLOW DIRECTION



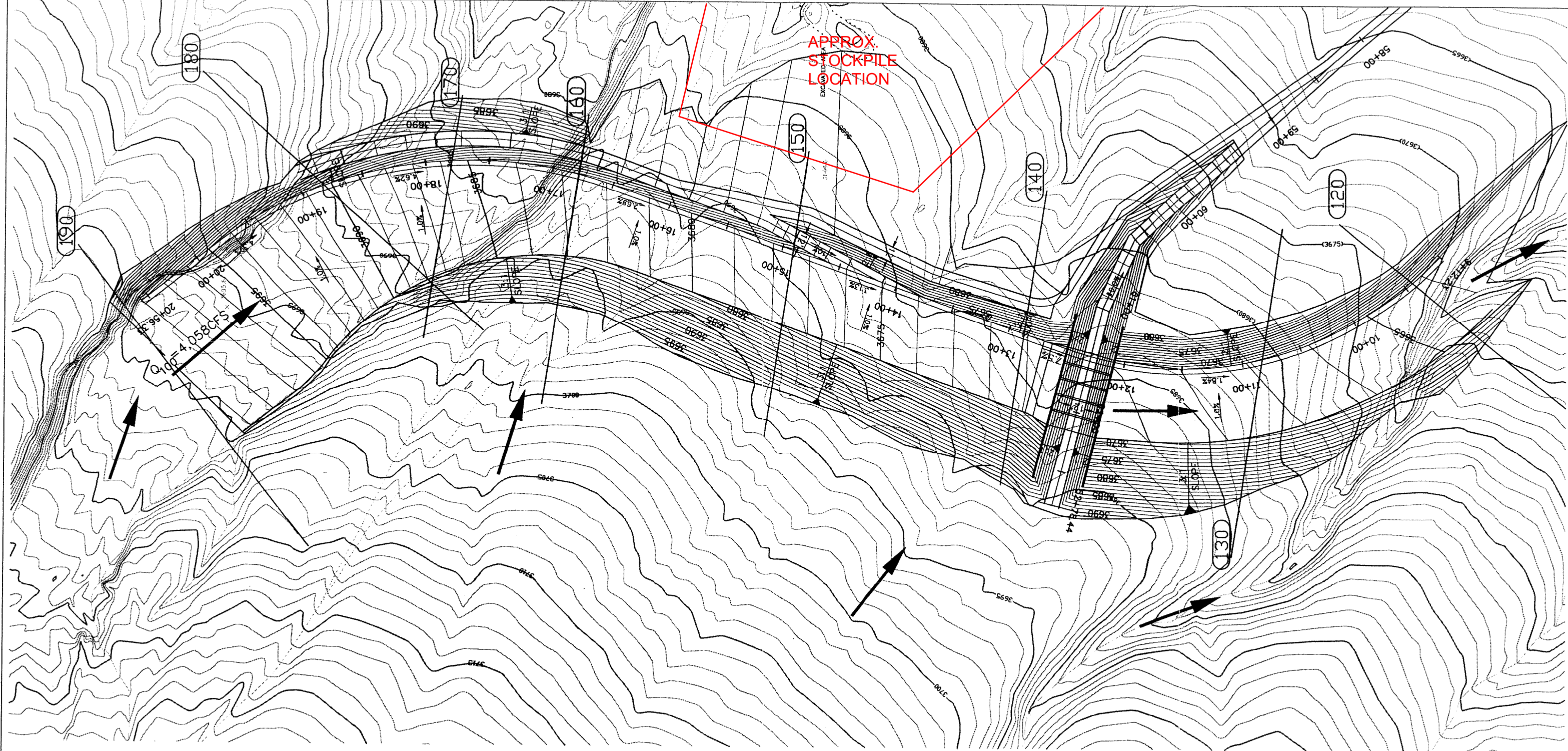
WATSH ID	Area, ac	Q100, cfs
4-1	1412.5	2906
4-2	173.4	674
4-3	302.4	1204
4-4	171.7	549
4-5	140.9	456
4-6	515.7	1102
4-7	19.6	54
5-1	451.9	1335
5-2	59.0	167
5-3	137.3	534
5-4	142.7	424
5-5	122.5	339
5-6	56.8	161
5-7	282.0	655
5-8	347.5	787
C-1	1553.5	2970
C-2	647.5	2189
C-3	2716.6	4058
C-4	2736.2	4052
C-5	510.9	1361
C-6	280.1	888
C-7	913.4	2381
C-8	1599.7	3379
C-9	4335.9	7084

C-1: COMBINE 4-1 & 4-5
 C-2: COMBINE 4-2, 4-3, & 4-4
 C-3: COMBINE C-1, C-2, & 4-6
 C-4: COMBINE C-3 & 4-7
 C-5: COMBINE 5-1 & 5-2
 C-6: COMBINE 5-3 & 5-4
 C-7: COMBINE C-5, C-6, & 5-5
 C-8: COMBINE C-7, 5-6, 5-7, & 5-8
 C-9: COMBINE C-4 & C-8

0 2000 4000 Feet
 1"=2000'

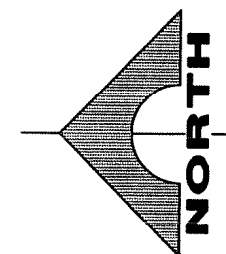


G. C. Wallace, Inc.
 1555 South Rainbow Blvd.
 Las Vegas, NV 89146
 702-804-2000

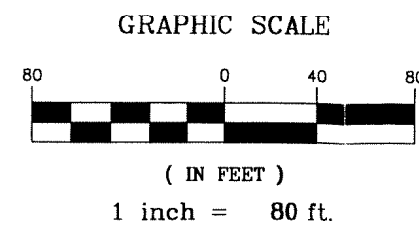


LEGEND

-  EXISTING 2-FT. CONTOUR INTERVAL
-  PROPOSED 1-FT. CONTOUR INTERVAL
-  HEC-2 CROSS-SECTION (SEE FIGURE 7)
-  FLOW DIRECTION

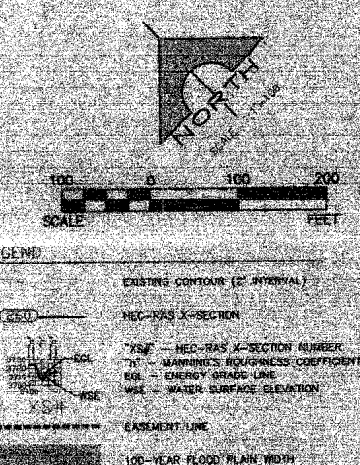
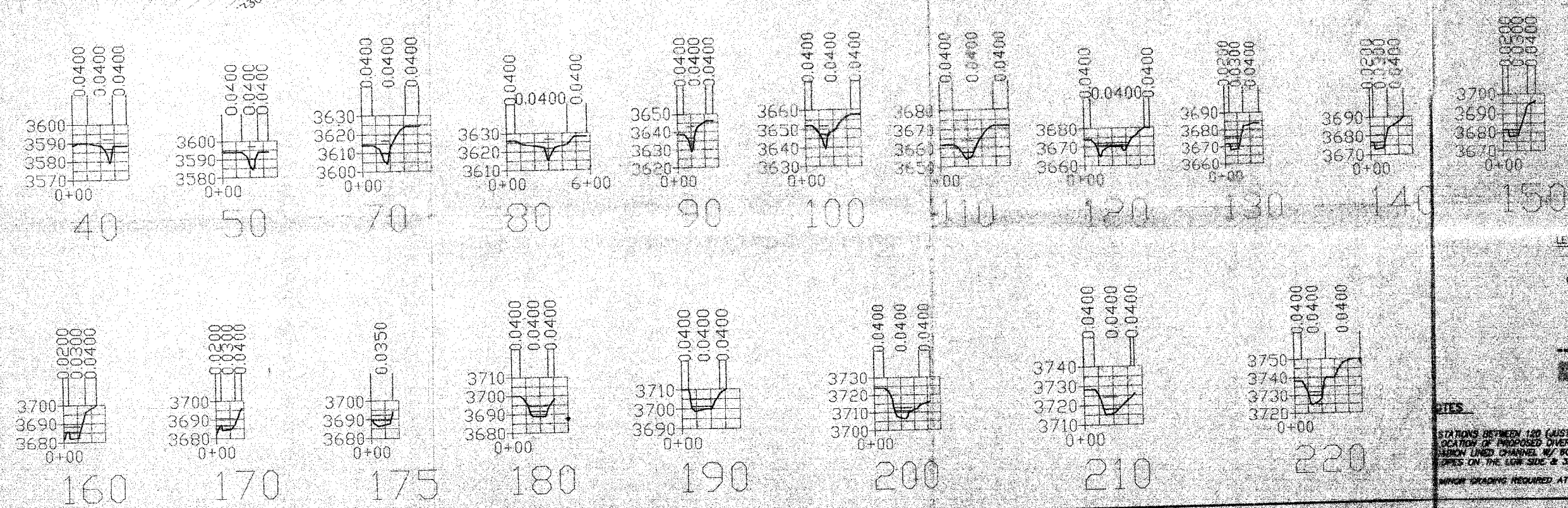
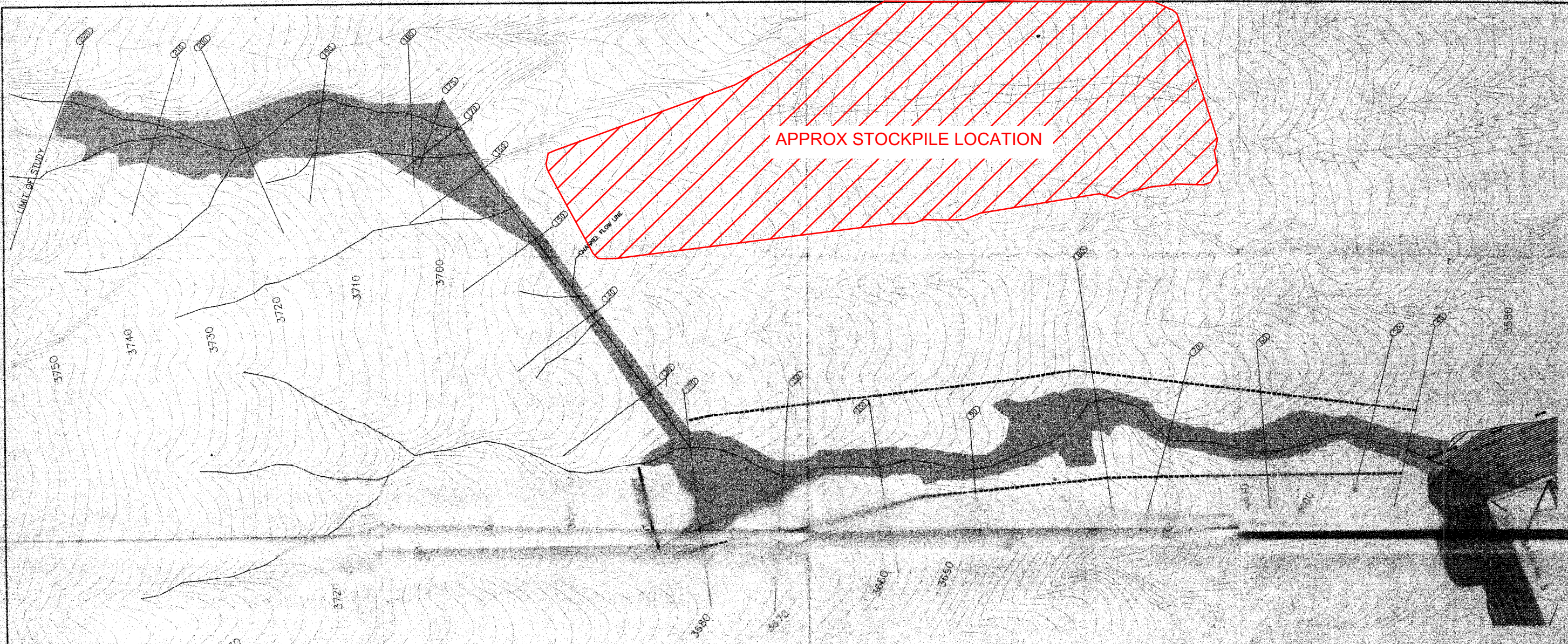


SCALE : 1"=80'



THE HOWARD HUGHES CORP.
DETENTION BASIN No.5\DIVERSION BERM
FINAL DESIGN REPORT

FIGURE 6 DIVERSION BERM



NOTES

STATIONS BETWEEN 120 (JUST UPSTREAM) AND 170 (JUST UPSTREAM) - LOCATION OF PROPOSED DIVERSION BERM/CHANNEL

SECTION LINE: CHANNEL W/ 60-FOOT BOTTOM WIDTH & 2:1 (Horizontal/Vertical) SIDE SLOPES ON THE LOW SIDE & 3:1 (Horizontal/Vertical) SIDE SLOPES ON THE HIGH SIDE

MINOR SHADING REQUIRED AT THE CONNECTION TO THE NATURAL WASH

THE HOWARD HUGHES CORP.

DEFLECTION BASIN NO. 5 DIVERSION BERM

FIGURE 7-HEC-RAS CROSS SECTIONAL EXHIBIT

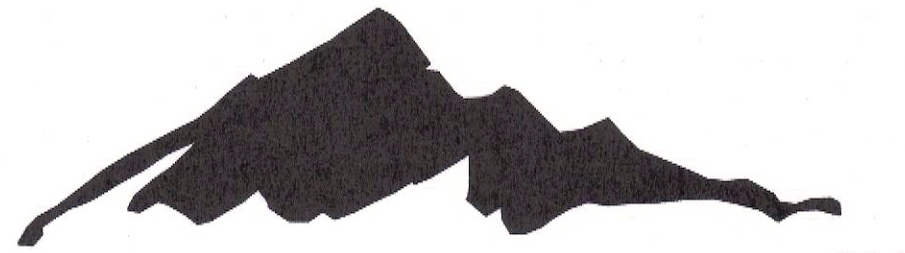
DATE: 10/1/00

BY: J. C. WALLACE, INC.

PROJECT: 100-YEAR FLOOD PLAIN WIDTH

1 OF 1

SUMMERLIN



The map shows a grid of sections labeled A through K. A shaded area labeled 'VILLAGE 29' is located in the center, covering sections J and K. To the left of the shaded area is 'VILLAGE 30B'. To the right is 'VILLAGE 25'. Below the shaded area is 'VILLAGE 23B'. A road labeled 'SUNSET DRIVE' runs along the right side of the map. A north arrow is located in the top left corner.

1 COVER SHEET
2 TEMPORARY STOCKPILE PLAN
3 SECTIONS

STOCKPILE CAPACITY (APPROXIMATE) _____ 202,414 CY

AVAR	AIR VALVE, AIR RELEASE ASSEMBLY
DIP	DUCTILE IRON PIPE
FG	FINISH GRADE
PZ	PRESSURE ZONE
RCB	REINFORCED CONCRETE BOX
RCP	REINFORCED CONCRETE PIPE
SD	STORM DRAIN
SS	SANITARY SEWER
TC	TOP OF CURB
TYP	TYPICAL
WATR	WATER

Call
811

1-800-227-2600

1-702-227-2929



FREWAY AND ARTERIAL STEM OF TRANSPORTATION

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 MATERIALS 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. THE CONTRACTOR SHALL GRADE TO THE LINES AND ELEVATIONS SHOWN ON THE PLANS WITHIN THE FOLLOWING HORIZONTAL AND VERTICAL TOLERANCES AND DEGREES OF COMPACTION, IN THE AREAS INDICATED:

	HORIZONTAL/VERTICAL	COMPACTION
A. PAVEMENT AREA SUBGRADE	0.1±	+0.0' TO -0.1' SEE SOILS REPORT
B. ENGINEERED FILL	0.5±	+0.1' TO -0.1' SEE SOILS REPORT
7. REPORT COMPACTION TESTING WILL BE PERFORMED BY THE OWNER OR HIS REPRESENTATIVE.
7. ALL CUT AND FILL SLOPES SHALL BE PROTECTED UNTIL EFFECTIVE EROSION CONTROL HAS BEEN ESTABLISHED.
8. THE USE OF POTABLE WATER WITHOUT A SPECIAL PERMIT FOR BUILDING OR CONSTRUCTION PURPOSES INCLUDING CONSOLIDATION OF BACKFILL OR DUST SUPPRESSION IS PROHIBITED. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS FOR CONSTRUCTION WATER.
9. THE CONTRACTOR SHALL MAINTAIN THE STREETS, SIDEWALKS AND ALL OTHER PUBLIC RIGHT-OF-WAY IN A CLEAN, SAFE AND USABLE CONDITION. ALL SPILLS OF SOIL, ROCK OR CONSTRUCTION DEBRIS SHALL BE PROMPTLY REMOVED FROM THE PUBLICLY OWNED PROPERTY DURING CONSTRUCTION AND UPON COMPLETION OF THE PROJECT. ALL ADJACENT 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 HWY OWN EXPENSE AND AT THE DIRECTION OF THE CITY ENGINEER. CONSTRUCTION INCLUDES DITCHES, BERMES, ROAD SIGNS AND BARRICADES, ETC.

REvised 4/15/10

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

CITY OF LAS VEGAS PLANNING DEPARTMENT

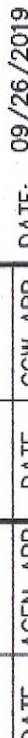
DATE _____

ALLEN PAVELKA, P.E. 9029
CITY ENGINEER
CITY OF LAS VEGAS, NEVADA

DATE _____

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

CLV#:



PROJECT NO.	62029-200
DESIGN:	APM
DRAWN:	APM
CHECK:	LG/MF
PLOT DATE:	10-10-19
PLOT TIME:	14:50:01

1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146

GCLV
ENGINEERS SURVEYORS

THE HOWARD HUGHES COMPANY, LLC

SUMMERLIN VILLAGE 29 STOCKPILE

COVER SHEET

DRAWING

1
OF 3 SHOTS

ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" AND "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 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 CITY PLANS LIBRARY ARE APPROVED 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 BE RESPONSIBLE FOR THE LOCATION OF ALL UNDERGROUND AND OVERHEAD INTERFERENCE'S WHICH MAY AFFECT HIS OPERATION DURING CONSTRUCTION AND SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID DAMAGE TO SAME. THE CONTRACTOR SHALL USE EXTREME CAUTION WHEN WORKING NEAR OVERHEAD UTILITIES SO AS TO SAFELY PROTECT ALL PERSONNEL AND EQUIPMENT, AND SHALL BE RESPONSIBLE FOR ALL COST AND LIABILITY IN CONNECTION THEREWITH.

3. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY STEPS NECESSARY TO PROTECT EXISTING UTILITY LINES, STRUCTURES AND STREET IMPROVEMENTS 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 SHALL BE TO 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 ALL PERMITS IN THE PUBLIC RIGHT-OF-WAY. THE CONTRACTOR SHALL SECURE FOR 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 A SMOOTH DRIVE. DRIVEWAYS SHALL BE CONSTRUCTED TO NEW CONSTRUCTION TO THE EXTENT OF THE TRANSITIONS TO BE AS SHOWN ON PLANS.

12. ALL GRADING WORK SHALL CONFORM TO THE SOLS REPORT AS PREPARED BY N/A CONTRACTOR. REPORT # N/A. DATE N/A. APPROVED BY THE CITY ENGINEER, AND AS SHOWN ON THESE PLANS.

13. EXACT LOCATION OF ALL SAWCUT LINES MAY BE ADJUSTED OR DETERMINED IN THE FIELD BY A CITY INSPECTOR. ANY ADJUSTMENT SHALL BE APPROVED BY THE CITY ENGINEER. EXISTING PAVEMENT CONDITION REQUIRES RELOCATIONS.

14. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PROTECT EXISTING PERMANENT SURVEY MONUMENTS. ANY MONUMENTS DISTURBED SHALL BE REPLACED AND ADJUSTED PER AVAILABLE RECORDS IN ACCORDANCE WITH N.R.S. STATUTE NO. 625.80 & CITY OF LAS VEGAS TITLE 18, APPENDIX D.

15. UTILITY COMPANY METER BOXES, MANHOLE LIDS, VALVE COVERS, ETC., SHALL BE LOCATED OUT OF DRIVEWAYS, DRIVEWAY 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 TRIANGLE. ALL 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 WORKING DEVICES SUCH AS MARKER BALLS, LONG 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 LANE.

21. PRIOR HAUNCHING AND PRIOR TO BACKFILL OPERATIONS WHICH WOULD PROTECT SANITARY AND STORM DRAIN FACILITIES, CONTRACTOR IS REQUIRED TO SCHEDULE CLV AND TRENCH UTILITY SURVEY INSPECTION. DETERMINATION OF FINAL LOCATION COORDINATES. FACILITIES TO BE LOCATED BY CLV SHALL BE LOCATED AT A MINIMUM OF 10 FEET FROM THE INVERT LOCATION OF PUBLIC SEWER MANHOLE, STORM DRAIN MANHOLE, AND TRANSITION STRUCTURES. STORM DRAIN LATERALS AT THE CONNECTION TO THE STORM DRAIN MAIN AND AT THE CONNECTION TO A DROPPED THE CONNECTION OF SEWER SERVICE LATERALS TO THE SEWER MAIN AND WHERE THE SERVICE LATERAL EXIT THE PUBLIC RIGHT-OF-WAY, SEWER AND STORM DRAIN MAIN ALIGNMENT, INCLUDING DEFLECTION POINTS.

OR

(WAY BE USED ONLY ON PROJECTS ASSOCIATED WITH A TENTATIVE MAP CONTAINING 5 LOTS OR MORE)

• SANITARY SEWER AND STORM DRAIN FINAL LOCATION MAP(S) SHALL BE PROVIDED TO THE CITY ENGINEER PRIOR TO THE ACCEPTANCE OF FACILITY LOCATION INSPECTION. THE MAP(S) SHALL INCLUDE 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 DROPPED THE CONNECTION OF SEWER SERVICE LATERALS TO THE SEWER MAIN AND WHERE THE SEWER SERVICE LATERALS EXIT THE PUBLIC RIGHT-OF-WAY, SEWER AND STORM DRAIN MAIN ALIGNMENT, INCLUDING DEFLECTION POINTS. THE MAP(S) SHALL BE DESCRIBED BY COORDINATES WHICH SHALL BE BASED ON THE VERTICAL HORIZONTAL AND VERTICAL CONTROL NETWORKS OF THE CITY OF LAS VEGAS. FINAL LOCATION MAPS MUST BE SEALED AND CERTIFIED BY A NEVADA PROFESSIONAL LAND SURVEYOR TO HAVE POSITIONAL CERTAINTE'S OF ± 0.05 METERS (± 0.3 FEET) HORIZONTALLY AND VERTICALLY. A SEPARATE ELECTRONIC COMMA DELIMITED FILE FOR THE SANITARY SEWER AND STORM DRAIN FACILITIES SHALL ACCOMPANY THE SANITARY SEWER AND STORM DRAIN FINAL LOCATION MAP(S).

22. CCTV VIDEO INSPECTION IS REQUIRED FOR ALL SEWER AND STORM DRAINS. THE CCTV VIDEO INSPECTIONS NEED TO BE PERFORMED PER THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS LATEST EDITION.

23. A SEPARATE BORING PERMIT IS REQUIRED FOR ALL BORING ACTIVITIES.

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

GCV
ENGINEERS \ SURVEYORS

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

