

DS #: 5369

APN: 188-31-210-004, 009, 010; 138-31-214-001

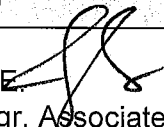
PROJECT: Panther Medical

SUBMITTAL: 1st

SCANNED BY/DATE: _____

CHECKED BY/DATE: _____



CITY OF LAS VEGAS		DATE:
INTER-OFFICE MEMORANDUM		October 15, 2020
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:
	Panther Medical	Panther Hualapai Corner LLC
Cross Streets:	Hualapai Way and Alta Way	Rietz Consulting, Inc.
File Number:	F:\Depot\DSMemos\DS05369A.doc	Bart Anderson, P.E., DevCo
Parcel Number:	138-31-210-004, 009 & 010, 138-31-216-001	
Zoning Action:	20-0027-SDR	
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	9/24/2020	10/7/2020	See Comments Below	\$400.00	4003394: \$400
TOTAL FEES (LDDRS):				\$400.00	----

REMARKS:

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

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

- Per 20-0027-SDR Condition 20, dedicate and construct a right turn lane on Alta Drive into the site per current City of Las Vegas Standards.
- This site accepts offsite flows and conveys them through the site. It is noted that an additional 5-foot Public Drainage Easement to be Privately Maintained is shown on the grading plan along the northern boundary of the site. Public drainage easements must be recorded by separate document prior to the final acceptance of the improvement plans unless they are to be recorded by parcel or final map. No permanent structures including foundations and covered parking overhangs shall encroach into the easement area(s).
- Provide rip-rap calculations for the I2 rip-rap pad.
- The rip-rap calculations references Eq. 743 from the HCDDM, however it is Eq. 734.
- Sheet C4, C5 and C6:** Several Grading Callout 23s callout two different TW elevations at a single location on the proposed retaining wall. Verify the correct TW elevation.
- Sheet C6:** It appears a 2' curb cut (Grading Callout 9) is proposed on the north side of the site just north of the riprap swales. Provide an explanation for the curb cut.

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

END OF REMARKS

HDR/JKS

T/R/S: T20S/R60E/S31

AREA L-31

TECHNICAL DRAINAGE STUDY

For

PANTHER MEDICAL

LAS VEGAS

Date: August 2020

Prepared By:

Rietz Consulting, Inc.
3203 E. Warm Springs Road, Suite #400
Las Vegas, Nevada 89120
Phone: (702) 521-3355

Prepared For:

PANTHER HUALAPAI CORNER LLC
410 S. RAMPART BLVD. SUITE 350
LAS VEGAS, NEVADA 89145



HYDROLOGIC CRITERIA AND DRAINAGE MANUAL
DRAINAGE STUDY INFORMATION FORM

Name of Development: PANTHER MEDICAL Date: 8/27/2020

Location of Development: a) Descriptive (Cross Streets) North/South: HUALAPAI WAY
East/West: ALTA WAY

b) Section: 31 Township: 20S Range: 60E

c) APN : 138-31-210-004, 009 & 010, 138-31-216-001

Name of Owner: PANTHER HUALAPAI CORNER LLC

Telephone No.: _____ Fax No.: _____ E-Mail Address: _____

Address: 410 S. RAMPART BLVD. SUITE 350, LAS VEGAS, NEVADA 89145

Contact Person-Name: Eric Rietz Telephone No.: 702-521-3355

* E-Mail Address: eric.rietz@rietzconsulting.com Fax No.: _____

Firm: Rietz Consulting, Inc.

Address: 3203 E. WARM SPRINGS ROAD #400, LAS VEGAS, NEVADA 89120

Type of Land Development/Land Disturbance Process:

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

1. Total Owned Land Area: At Site: 8.47-acres Being Developed/Disturbed: 5+/- 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

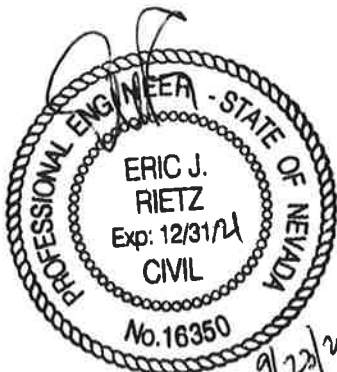
4. Proposed type of development (Residential, Commercial, Etc.): COMMERCIAL

5. Approximate upstream land area which drains to the subject site: 0 ac.

6. Has the site drainage been evaluated in the past? ☒ YES ☐ NO If yes, please identify documentation: DS 1995 AND DS 2990

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: NORTH ADJACENT PARCEL AND ALTA DR.

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

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name: PANTHER MEDICAL

Map ID:

Firm Name: RIETZ CONSULTING INC.

Engineer: ERIC RIETZ

Address: 3203 E. WARM SPRING ROAD #400

City: LAS VEGAS

State: NV

Zip: 89120

Phone Number: (702) 521-3355

Fax Number:

Property Owner: PANTHER HUALAPAI CORNER LLC

Address: 410 S. RAMPART BOULEVARD, SUITE 350

City: LAS VEGAS

State: NV

Zip: 89145

Reviewed By:

Date Received:

Date Accepted for Review:

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

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

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

I. GENERAL REQUIREMENT

Yes

No

☒

☐

Design Manual **Standard Form 1** with the engineer's seal and signature.

☒

☐

Design Manual **Standard Form 4**.

☒

☐

2 copies of the 24" x 36" Drainage Plan.

☒

☐

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 CCRFCD Master Plan Update Figure, (F-x), for Flood Control Facilities and Environmental areas with the site delineated.

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

II. MAPS AND EXHIBITS (Continued)

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

III. DRAINAGE PLAN

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

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

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

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes No

- | | | |
|------------|--------------------------|--|
| <u>N/A</u> | ☐ | For areas in Zone A, AE, AH, and AO, base flood elevations (BFEs) must be shown for each lot; BFEs may be listed on each lot, or in a table. Finish floor elevations must be a minimum of 18 inches above BFE. |
| <u>X</u> | ☐ | Appropriately elevated "humps" 6 inches above the 100 year water surface elevation at site accesses where the intent is to protect the site from the Q_{100} flows. |
| <u>X</u> | ☐ | Street slopes for perimeter and interior streets. The minimum slope is 0.4 percent. |
| <u>X</u> | ☐ | Location and detail of best management practice (BMP) for parking lots and low impact development (LID) (if required). |

IV. HYDROLOGIC ANALYSIS

Yes No

- | | | |
|----------|--------------------------|--|
| <u>X</u> | ☐ | Appropriate soil information and Soils Map for existing and future conditions with subbasins and property delineated. |
| <u>X</u> | ☐ | Input and output information for existing conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models. |
| <u>X</u> | ☐ | Input and output information for future conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models. |
| <u>X</u> | ☐ | Use of correct precipitation values in and around the McCarran Airport rainfall area. |
| <u>X</u> | ☐ | A discussion in the text of the hydrologic analysis justifying subbasin boundaries and cutoffs, supporting assumptions, and calculations. |
| <u>X</u> | ☐ | A summary table of stormwater flows showing basin area, Q_{10} and Q_{100} for both individual basins and combined basin flows, where applicable. |
| <u>X</u> | ☐ | Copies of supporting technical information referenced from a previously approved study and a statement accepting these results. |
| <u>X</u> | ☐ | On-site facilities must perpetuate flows through or around the site without significantly impacting adjacent property owners in accordance with current Nevada Drainage Law. |
| <u>X</u> | ☐ | Calculation for impervious area for parking lots and LIDs (if required). |

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

V. HYDRAULIC ANALYSIS

Yes	No	
<u>N/A</u>	☐	Flow split calculations and supporting documentation or reference for the method of flow split calculations used.
<u>X</u>	☐	Normal depth street flow calculations and cross section diagrams for all interior and perimeter streets. Provide "d x v" products for the Q_{100} and Q_{10} flows representing the worst case for interior and all perimeter streets. $Q_{100} d \times v \leq 8$. $Q_{10} d \times v \leq 6$ and 12 foot dry lane for rights-of-way ≥ 80 feet. Calculations must be labeled by street name as indicated on the Grading Plan.
<u>X</u>	☐	A summary table of interior and exterior street capacity calculations showing the street name, Q_{100} flow, slope, depth of flow, velocity and depth times velocity product and streets needing to meet 12 foot dry lane criteria.
<u>X</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>X</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>X</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 Q_{100} 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>X</u>	☐	The mitigation of nuisance water, both during construction and in the fully developed condition, must be addressed.
<u>X</u>	☐	Provide BMP type, size and supporting calculations for parking lots and LIDs (if required).

REFERENCE:

STANDARD FORM 2



CITY OF LAS VEGAS

MINIMUM DRAINAGE STUDY CRITERIA STANDARD FORM 2 CHECKLIST SUPPLEMENT

(Revised 5/18/11)

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

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

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

I. GENERAL REQUIREMENT		
Yes	No	
X		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. _____ by initial here, the engineer on record acknowledges that the electronic copy is an identical replicate of the original hard copy submitted to the City of Las Vegas.

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

CITY OF LAS VEGAS MINIMUM DRAINAGE STUDY CRITERIA CHECKLIST

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

III. Local Entity Criteria - City of Las Vegas – Manual Section 1600		
Yes	No	
X		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.
	X	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.
X		Minimum finish floor elevation is 6 inches above highest adjacent top of curb. Finish floor calculations must include allowances for super elevations on curves and velocity head for tee intersections.
X		Finished floor elevations for buildings adjacent to public drainage easements must be a minimum of 18 inches above the Q100 weir of submerged weir elevation, whichever is greater.

CITY OF LAS VEGAS MINIMUM DRAINAGE STUDY CRITERIA CHECKLIST

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

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

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

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LIST OF APENDICES

Appendix A Hydrologic Analysis

Supporting Excerpts from HCDDM
Precipitation, Curve Numbers & Standard Form 4
Existing Condition HEC-1 Analysis
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Appendix B Hydraulics

Street Flow Calculations
Onsite Flow Calculations
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Appendix C Reference Material

Excerpts from Drainage study 1995, “Technical Drainage Study for Warren-Walker Preschool”
Excerpts from Drainage study 2990, “Technical Drainage Study for Merryhill School Addition to Warren-Walker Preschool Site”
Excerpts from Drainage study 3417, “Technical Drainage for Peccole at Hualapai and Alta”

Appendix D Plans and Details

1. INTRODUCTION

1.1 Project Overview & Study Purpose

This study is intended to demonstrate design conformance with Clark County Regional Flood Control Drainage Criteria and City of Las Vegas flood control and drainage criteria for a 4.66-acre Medical Office Building within an overall 8.47-acre site located near the northeast corner of the intersection of Hualapai Way and Alta Drive in the City of Las Vegas, Nevada.

The proposed site will be developed with a single medical office building. Offsite improvements adjacent to the site are all complete. Improvements will take place on five parcels at the intersection of Hualapai Way and Alta Drive. Parking improvements will be constructed on APN: 138-31-216-001; existing site access and parking on APN: 138-31-210-010 will be modified; proposed medical office building, parking and drainage improvements will be constructed on APN's: 138-31-210-009 and 004. An existing berm will be relocated to align with the property line on APN: 138-31-210-008. Currently, our client is in negotiations to purchase APN: 138-31-210-008, permission to grade or ownership documents will be provided prior to improvement plan approval.

This Technical Drainage Study was prepared in accordance with criteria specified in the *Clark County Regional Flood Control District (CCRFCD) Hydrologic Criteria and Drainage Design Manual* (latest update), which is referred to in this document as the "*Drainage Manual*". All pertinent reference material and calculations is presented in the Appendix of this report.

1.2 Site Description

The subject site is located in the southwest quarter (SW 1/4) of the northwest quarter (NW 1/4) of Section 31, Township 20 South (T20S) Range 60 East (R60E), on the north side of Alta Drive and west of Hualapai Way. See *Figure 1, Vicinity Map* in the Appendix of this report.

The existing site is undeveloped and sparsely covered in desert brush. Part of the subject site is covered with fill piles. The overall area drains generally east to west. The northern part of the existing site discharges stormwater runoff to the north adjacent parcel. The southern portion of the subject site discharges stormwater runoff to Alta Drive.

1.3 FEMA Flood Zone Designation

The subject site is located within a Zone X Federal Emergency Management Association Special Flood Hazard Zone. According to FEMA FIRM Map Panel 32003C2150E, dated September 27, 2002, the subject site located within a "Zone X" which applies to "areas outside of the 0.2% annual chance floodplain". The associated FEMA map panel has been annotated and included in the appendix of this report.

1.4 CCRFCD Facility Information

Figure F-28, from the 2018 CCRFCD Las Vegas Valley Flood Control Master Plan Update (MPU) shows that the site is not located adjacent to an existing or proposed CCRFCD regional facility. The site is located within sub-basin 57B-3 of the Gowan Watershed. An excerpt from the W-map is included with the site delineated.

1.5 Soils Data

The USDA NRCS Web Soil Survey site was used to determine the soil constituents of the sub-basins studied in this report. Curve numbers were selected from the *2018 MPU Curve Number Matrix*, using the land usage and hydrologic condition of each basin studied, for input to the HEC1 hydrologic model. Curve number matrix for soil 152 (1152) shows that a curve number of 96 for commercial land use should be used. A curve number of 86 is used for the existing site to model desert shrub. A curve number of 98 is used for paved roadways.

1.6 Reference Studies

Several studies have been prepared for the site and the surrounding area. Development in the area of the subject site predominantly occurred in the late 1990's and early 2000's. Much of the recorded information is of poor quality and illegible. However, the vast majority of the local drainage area and upstream regional facilities are fully developed. Local storm drain facilities are present in Hualapai Way and west of Hualapai Way in Alta Drive.

Drainage study 1995, "Technical Drainage Study for Warren-Walker Preschool", was prepared for the existing preschool located near the intersection of Hualapai Way and Alta Drive. This study defined flows from the subject site as well as flows in adjacent roadways. According to this study, all flows west of Hualapai Way are captured in local drainage facilities. This study identified a 100-year flow of 51-cfs in Alta Drive adjacent to the subject site based on local hydrologic calculations. Calculations performed herein differ slightly in routing and discharge locations; 48-cfs is calculated as the 100-year peak flow in Alta Drive adjacent to the subject site. The other 3-cfs discharges to the north adjacent property. Grading plan and necessary excerpts are contained in the appendix.

Drainage study 2990, "Technical Drainage Study for Merryhill School Addition to Warren-Walker Preschool Site", was prepared for the subject site. The improvements proposed in this study were not built and the site remains vacant. The Merryhill study changed drainage patterns slightly and increased flow to Alta Drive, but since the improvements were not constructed the increase did not occur.

Drainage study 3417, "Technical Drainage for Peccole at Hualapai and Alta", was prepared for the office building located at the northeast corner of the intersection of Hualapai Way and Alta Drive. The improvements depicted by this study were constructed. Grading plan and necessary excerpts are contained in the appendix.

Other drainage studies for adjacent residential properties were researched for any impacts to the subject site and none were found.

2. METHODOLOGY

2.1 Compliance

The methodologies utilized in the preparation of this study are in compliance with the *Drainage Manual* (latest update).

2.2 Hydrologic Modeling

Modeling: The SCS Unit Hydrograph Method (SCS Method) was utilized to determine peak flow rates. The SCS Method utilizes precipitation, drainage area, curve number and lag time parameters to determine peak flow rates. The SCS Method routine within the U.S. Army Corp of Engineers **HEC1** was utilized to model the drainage sub-basins analyzed by this study.

Precipitation: The site is located outside the McCarran Rainfall Area, per *Drainage Manual* Figure 513. The precipitation values utilized in the HEC-1 models, per *Drainage Manual* Figures 503 and 506 are 1.40" and 2.2" inches for the 10-year and 100-year storm events, respectively. Adjustment factors of 1.24 and 1.43 were applied to the point precipitation values resulting in 10-year precipitation depth of 1.74" and a 100-year precipitation depth of 3.15". SDN 3 design storm from Table 503 in the *Drainage Manual* has been used for the less than 1-mile square drainage area. Reference tables and figures from the *Drainage Manual* are included in the Appendix.

Curve Number: The SCS curve number loss rate methodology was utilized to approximate infiltration for the drainage sub-basins.

Lag Time: The lag time is defined as the time measured from the center of mass of effective rainfall to the time to peak of the outflow hydrograph. The lag time is related to the time of concentration as 0.6 times the time of concentration. The time of concentration is defined as the time required for runoff to flow from the hydraulically most distant point of a sub-basin to the outlet point of the sub-basin. Standard Form 4, as outlined in the *Drainage Manual*, was utilized to determine the lag times for sub-basins modeled. A copy of lag time computations is included in the appendix.

2.3 Hydraulic Modeling

Street Flow: Normal depth street flows are analyzed utilizing Flowmaster by Haestad Methods.

Hydraulic Sections: Minor hydraulic sections are analyzed by calculating normal depth variables with Flowmaster by Haestad Methods.

3. EXISTING CONDITIONS DRAINAGE

3.1 On-site Existing Conditions

The subject site spreads across four parcels with a mixture of developed and undeveloped land. The subject site includes the existing Warren-Walker preschool site and the Peccole Office building site as well as the remaining undeveloped parcels, 138-31-210-009 and 004. Developed portion of the site were designed to discharge stormwater runoff to Alta Drive. The northern portion of the subject site discharges storm water runoff to the north adjacent parcel, while the southern portion of the undeveloped portion of the site discharges stormwater runoff to Alta Drive. Basins E1 and E2 represent the developed portions of the subject site, which discharge stormwater runoff to Alta Drive. Basins E3 and E4 represent the undeveloped portion of the subject site and discharge to the north adjacent parcel and Alta Drive respectively.

3.2 Offsite Existing Conditions

Offsite runoff is limited to the adjacent roadways and one undeveloped private parcel. Hualapai Way has a high point just north of its intersection with Alta Drive. The northern portion of Hualapai Way drains north and the southern portion drains to Alta Drive. Alta Drive and Hualapai

Way are represented by Basins ALT1 and HUA1 respectively. The undeveloped private parcel located north of the intersection of Hualapai Way and Alta Drive drains northeast through the subject site, discharging stormwater runoff to the north adjacent parcel. This area is designated as OFF1.

Table 1, Existing Flow Summary

Basin ID/Concentration Point	Area (ac)	Q10 (cfs)	Q100 (cfs)
HUA1	1.52	3	6
OFF1	3.67	3	9
E4	3.10	3	8
C1	---	6	17
E1	2.56	5	10
E2	1.53	3	6
E3	1.28	1	3
ALT1	4.70	9	17
C2	---	19	37

4. DEVELOPED CONDITION DRAINAGE

4.1 Onsite Developed Conditions

Onsite developed condition assumes the site and the offsite basin are developed. The subject site has been divided into 7-basins to determine design stormwater runoff flow at pertinent locations. Previous basin E1 is divided into D1A and D1B to determine flow at the outlet of proposed parking located in basin E1. Both D1A and D1B discharge to Alta Drive. Basins D2, D3, D5 and D6 all drain to Alta Drive. Basin D4 drains to the north adjacent parcel and Basin DOFF1 drains through D4 to the north adjacent parcel.

Table 2, Developed Flow Summary

Basin ID/Concentration Point	Area (ac)	Q10 (cfs)	Q100 (cfs)
HUA1	1.52	3	6
DOFF1	3.67	7	14
D4	0.71	1	3
C1	---	9	17
D1A	1.30	3	5
D1B	1.21	3	5
C2	---	5	10
D2	1.06	2	4
D3	1.31	3	5
C3	---	10	20
D5	1.55	3	6
D6	1.34	3	5
C4	---	16	31
ALT1	4.70	9	17
C5	---	25	48

4.2 Offsite Developed Conditions

Offsite developed conditions are defined by the development of DOFF1. All other basins remain as defined in existing conditions.

4.3 Street Flows

Street flow calculations have been performed for adjacent roadway. Section A for Alta Drive is analyzed with flow from concentration point C5 and totals 25 and 48-cfs in the 10 and 100-year storm events respectively.

Table 3, Street Flow Sections

Section	Q10	Q100	D10	D100	V10	V100	D*V10	D*V100
A – Alta Drive	25	48	0.53	0.64	4.39	5.14	2.33	3.29

Finished floor elevation is flood protected from stormwater runoff within adjacent Alta Drive. Finished floor elevation of the proposed structure is 2890.80. Alta Drive adjacent to the building has elevations ranging from 2880 to 2885 leaving a minimum of over 5-feet of freeboard.

Dry lane criteria for Alta Drive is met for the 10-year flow. Top width of flow is 28.37', total width of the section is 70', the remaining dry pavement is 41.63' wide leaving 20.82' feet on each side of the street, which is greater than the required 19-feet.

4.4 Onsite Flow Sections

Several onsite flow sections have been prepared to demonstrate conformance with flow criteria at various design points throughout the site. Section B, as shown on the Developed Drainage Map, represents 3-calculations near the section indicator. Section B1 analyzes the parking lot section; section B2 analyzes the riprap swale at the outlet of the parking lot; section B3 analyzes the BMP swale after the riprap swale. Section B calculations use the flow from Basin D6, 5-cfs.

Section C analyzes the parking lot section. Section C flow is from Basin D5, 6-cfs.

Section D represent two calculations. Section D1 analyzes the riprap swale at the outlet of the parking lot and Section D2 analyses the riprap BMP swale. Section D calculations use flow from D5, 6-cfs.

Section E analyzes the earthen berm on the west adjacent property. Section E analyzes the low slope portion of the berm. The developed flow from Basin DOFF1, 14-cfs, is used.

Section F analyzes the earthen berm on the west adjacent property. Section F analyzes the high slope portion of the berm. The developed flow from Basin DOFF1, 14-cfs, is used.

Section G analyzes the riprap swale that collects offsite flow from Basin DOFF1. The flow from DOFF1, 14-cfs, is used in calculations.

Section H analyzes the offsite flow from DOFF1, 14-cfs, flowing through the parking lot. This section is used to determine the additional width of private drainage easement necessary through the proposed parking lot.

Section I, as shown on the Developed Drainage Map, represents 3-calculations near the section indicator. Section I1 analyzes the curb openings to determine the specific energy at critical depth. Section I1 slope is set at the critical slope. The weir depth is at an elevation of 2889.06 (total specific energy at the section). The finished floor elevation is 2090.80 which is 1.74' above the water surface. The section uses the flow from C1, 17-cfs. Section I2 analyzes the riprap pad at the outlet of the parking lot.

Section J analyzes the flow from basin D3, 5-cfs, in the parking lot adjacent to the building.

Section K analyzes the BMP swale at the outlet of basin D1B. A flow of 5-cfs is used.

All of the analyzed flow sections meet Depth*Velocity products.

Table 4, Onsite Flow Sections

Section	Q100	D100	V100	D*V100
B1 – PARKING LOT	5	0.35	4.95	1.73
B2 – RIPRAP SWALE	5	0.17	4.46	0.76
B3 – BMP SWALE	5	0.35	1.79	0.63
C – PARKING LOT	6	0.36	3.87	1.39
D1 – RIPRAP SWALE	6	0.20	4.12	0.82
D2 – BMP SWALE	6	0.38	1.89	0.72
E – EARTH BERM	14	0.56	2.39	1.34
F – EARTH BERM	14	0.41	4.43	1.82
G – RIPRAP SWALE	14	0.37	3.93	1.45
H – PARKING LOT	14	0.62	3.59	2.23
I1 – CURB OPENINGS	17	0.37	3.01	1.11
I2 – RIPRAP PAD	17	0.50	1.95	0.98
J – PARKING LOT	5	0.45	2.23	1.00
K – BMP SWALE	5	0.35	1.79	0.63

4.5 Riprap

Riprap is used to prevent erosion in numerous locations throughout the developed site. The east outlets of the parking lot contain higher slope riprap lined swales. Section B2 requires 8" riprap and section D1 requires a minimum of 6-inch riprap. Section G requires 6-inch riprap. Riprap calculations can be viewed in the appendix.

4.6 Lower Impact Development

Proposed grading design incorporates features intended to conform to section 1500 of the HCDDM. Impervious areas, pavement and roofs, drain through landscape areas and BMP swales prior to discharge.

Four BMP swales are proposed with development of the proposed site. See BMP exhibit for a delineation of proposed BMP contributing areas. The following table presents results of BMP treatment area calculations.

Table 5, BMP Treatment Summary Table

Pavement Area Designation	Area (ac)	Treated
AREA-1	0.99	Y
AREA-2	0.84	Y
AREA-3	1.00	Y
AREA-4	0.92	Y
NT-1	0.57	N
NT-2	0.47	N
NT-3	0.19	N
TOTAL AREA:	4.98	
TOTAL TREATED AREA:	3.75	75%

5. CONCLUSIONS & RECOMMENDATIONS

The site meets criteria set forth in the Hydrologic Criteria and Drainage Design Manual. Finished floor elevation is adequately flood protected from adjacent roadway and onsite stormwater runoff. Proposed drainage patterns follow previously existing and approved patterns. Adjacent Alta Drive meets dry lane criteria and depth*velocity criteria. Additional drainage easement has been delineated based on the current design. Erosion protection is provided at necessary locations. The design is well prepared and analyses are competently completed; the project should be approved and built based on the information provided herein.

6. REFERENCES

1. **Hydrologic Criteria and Drainage Design Manual**. Clark County Regional Flood Control District, 1990.
2. **Soil Survey of Las Vegas Valley Area**, Nevada. U.S. Department of Agriculture, Soil Conservation Service, July 1985.
3. **FlowMaster Version 8.i**, dated 2009. Prepared by Bentley Systems Inc.
4. HEC1, Hydrologic Engineering Core, ACE
5. Flood Insurance Rate Map #32003C2150E, Clark County, Nevada and Incorporated Areas, printed September 27, 2002
6. Drainage study 1995, "Technical Drainage Study for Warren-Walker Preschool", prepared by Pentacore Engineering, 1996
7. Drainage study 2990, "Technical Drainage Study for Merryhill School Addition to Warren-Walker Preschool Site", prepared by Amec Infrastructure, 2001
8. Drainage study 3417, "Technical Drainage for Peccole at Hualapai and Alta", prepared by Wright Engineers, 2003

STAFF REPORT



AGENDA MEMO - PLANNING

PLANNING COMMISSION MEETING DATE: AUGUST 11, 2020

DEPARTMENT: PLANNING

ITEM DESCRIPTION: APPLICANT/OWNER: PANTHER HUALAPAI CORNER, LLC

**** STAFF RECOMMENDATION(S) ****

CASE NUMBER	RECOMMENDATION	REQUIRED FOR APPROVAL
GPA-78785	Staff recommends APPROVAL.	
ZON-78786	Staff recommends APPROVAL.	GPA-78785
20-0027-SDR1	Staff recommends APPROVAL, subject to conditions:	GPA-78785 ZON-78786

**** NOTIFICATION ****

NEIGHBORHOOD ASSOCIATIONS NOTIFIED 22

NOTICES MAILED 94 - GPA-78785 and ZON-78786
133 - 20-0027-SDR1

PROTESTS 1 - GPA-78785 and ZON-78786
1 - 20-0027-SDR1

APPROVALS 0 - GPA-78785 and ZON-78786
0 - 20-0027-SDR1

**** CONDITIONS ****

20-0027-SDR1 CONDITIONS

Planning

1. Approval of a General Plan Amendment (GPA-78785) and Rezoning (ZON-78786) shall be required, if approved.
2. This approval shall be void two years from the date of final approval, unless exercised pursuant to the provisions of LVMC Title 19.16. An Extension of Time may be filed for consideration by the City of Las Vegas.
3. All development shall be in conformance with the site plan and landscape plan date stamped 07/27/20, and building elevations date stamped 06/23/20, except as amended by conditions herein.
4. The landscape buffer adjacent to Alta Drive shall extend eastward and include APN 138-31-210-004.
5. Reflective glass at the pedestrian level is prohibited. Glass on the second floor and above shall not be greater than twenty-two percent reflectivity so as not to reflect light and solar heat on other buildings, streets and sidewalks.
6. A Waiver from Title 19.08 is hereby approved, to allow a five-foot wide landscape buffer adjacent to Alta Drive where 15 feet is required.
7. A Waiver from Title 19.08 is hereby approved, to allow a five-foot wide landscape buffer adjacent to a portion of the west property line where eight feet is required.
8. A Waiver from Title 19.08 is hereby approved, to allow a seven-foot wide landscape buffer adjacent to the northern property line where eight feet is required.
9. A Waiver from Title 19.04 is hereby approved to allow no sidewalk east of the driveway, adjacent to the north side of Alta Drive.
10. An Exception from Title 19.08 is hereby approved, to allow no parking lot landscape islands adjacent to the north, south and west property lines.

Conditions Page Two

August 11, 2020 - Planning Commission Meeting

11. An Exception from Title 19.08 is hereby approved, to allow no parking lot landscape islands within the parking areas adjacent to the building.
12. An Exception from Title 19.08 is hereby approved, to allow no trees or landscaping over 3 feet tall within the Public Sewer Easement granted per Book 90, Page 18.
13. An Exception from Title 19.08 is hereby approved, to allow the removal of two trees located within the public sewer easement in the parking islands along the east side of Assessor Parcel #138-31-216-001.
14. All necessary building permits shall be obtained and final inspections shall be completed in compliance with Title 19 and all codes as required by the Department of Building and Safety.
15. These Conditions of Approval shall be affixed to the cover sheet of any plan set submitted for building permit.
16. The applicant shall coordinate with the City Surveyor and other city staff to determine the most appropriate mapping action necessary to consolidate the existing lots. The mapping action shall be completed and recorded prior to the issuance of any building permits.
17. A technical landscape plan, signed and sealed by a Registered Architect, Landscape Architect, Residential Designer or Civil Engineer, must be submitted prior to or at the same time application is made for a building permit. A permanent underground sprinkler system is required, which shall be permanently maintained in a satisfactory manner; the landscape plan shall include irrigation specifications. Installed landscaping shall not impede visibility of any traffic control device. The technical landscape plan shall include the following changes from the conceptual landscape plan:
 - All shrubbery shall be a minimum of 5-gallons in size.
 - The landscape buffer adjacent to Alta Drive shall extend eastward and include APN 138-31-210-004.
18. A fully operational fire protection system, including fire apparatus roads, fire hydrants and water supply, shall be installed and shall be functioning prior to construction of any combustible structures.
19. All City Code requirements and design standards of all City Departments must be satisfied, except as modified herein.

Conditions Page Three

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Public Works

20. Concurrent with development of this site, dedicate and construct a right turn lane on Alta Drive into the site per current City of Las Vegas standards. Grant a Pedestrian Access Easement adjacent to Alta Drive for the frontage of this site. Construction of the right turn lane may be deferred if allowed in the approved Traffic Impact analysis.
21. Provide a copy of a recorded Joint Access Agreement for the parcels that share access with this site prior to the issuance of any permits. A mapping action may be used to address this requirement if appropriate.
22. No trees or landscaping over 3 feet tall shall be allowed within the Public Sewer Easement granted per Book 90, Page 18.
23. Concurrent with development, remove the two trees located within the public sewer easement in the parking islands along the east side of Assessor Parcel #138-31-216-001.
24. Prior to the issuance of any permits, grant a private sewer easement over the sewer constructed per drawing #107-V2728.
25. Coordinate with the Sanitary Sewer Planning Section of the Department of Public Works to determine an appropriate location for public sewer connection to this site in Alta Drive, prior to the issuance of any permits.
26. A Traffic Impact Analysis must be submitted to and approved by the Department of Public Works prior to the issuance of any building or grading permits, submittal of any construction drawings or the recordation of a Map subdividing this site, whichever may occur first. The Traffic Impact Analysis shall include a pedestrian circulation/access plan to identify nearby pedestrian attractors and recommend measures to accommodate pedestrians, such as but not limited to pedestrian access, crosswalk, pedestrian activated flashers and temporary sidewalks. Comply with the recommendations of the approved Traffic Impact Analysis prior to occupancy of the site. Phased compliance will be allowed if recommended by the approved Traffic Impact Analysis. No recommendation of the approved Traffic Impact Analysis, nor compliance therewith, shall be deemed to modify or eliminate any condition of approval imposed by the Planning Commission or the City Council on the development of this site.

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

**** STAFF REPORT ****

PROJECT DESCRIPTION

The applicant is proposing to amend a 4.90-acre portion of the Southwest Sector of the General Plan from PF (Public Facilities) to SC (Service Commercial) and rezone the same 4.90 acres from C-V (Civic) to C-1 (Limited Commercial) in order to construct a three-story medical office building with a non-ambulatory surgical center on the north side of Alta Drive, approximately 372 feet east of Hualapai Way.

ISSUES

- A portion of the subject site is encumbered with a sewer easement where trees are prohibited. An Exception is requested to allow only shrubbery in this portion of the parking lot which staff supports.
- The Department of Public Works has waived the sidewalk requirement east of the Alta Drive driveway. In exchange, the applicant will install a deceleration and right hand turn lane instead.

ANALYSIS

General Plan Amendment and Rezoning

The subject sites are part of a commercial subdivision that includes an existing medical office building and a childcare center and is currently designated PF (Public Facilities).

The Public Facilities category allows for large governmental building sites and complexes, police and fire facilities, hospitals and rehabilitation sites, sewage treatment and storm water control facilities, and other uses considered public or semi-public such as libraries and public utility facilities. The applicant is proposing to amend this designation to SC (Service Commercial).

The Service Commercial category allows low to medium intensity retail, office, or other commercial uses that serve primarily local area patrons, and that do not include more intense general commercial characteristics. Examples include neighborhood shopping centers, theaters, and other places of public assembly and public and semi-public uses. This category also includes offices either singly or grouped as office centers with professional and business services.

Staff Report Page Two

August 11, 2020 - Planning Commission Meeting

In conjunction with the General Plan Amendment request, the applicant is proposing to rezone the subject sites from the current zoning district of C-V (Civic) to C-1 (Limited Commercial).

The purpose of the C-V District is to provide for the continuation of existing public and quasi-public uses and for the development of new schools, libraries, public parks, public flood control facilities, police, fire, electrical transmission facilities, Water District and other public utility facilities. In addition, the C-V District may provide for any public or quasi-public use operated or controlled by any recognized religious, fraternal, veteran, civic or service organization.

The proposed C-1 zoning district is intended to provide most retail shopping and personal services, be located on the periphery of residential neighborhoods and be confined to the intersections of primary and secondary thoroughfares along major retail corridors. The C-1 District is consistent with the proposed Service Commercial category of the General Plan.

Staff finds the requested General Plan Amendment and Rezoning to be appropriate for the area, as the site is adjacent to a Collector street and property currently designated Service Commercial and zoned C-1. Therefore, staff recommends approval of the requested General Plan Amendment and the requested Rezoning.

Site Development Plan Review

The applicant is proposing to construct a three-story, 71,400 square-foot medical office building adjacent to an existing childcare center and office building on the north side of Alta Drive, approximately 372 feet east of Hualapai Way. In addition to the office building, the applicant is proposing to develop the currently undeveloped area of the site to the west of the childcare center with additional parking for the overall site.

The floor plan of the first floor depicts a layout with three separate leasable spaces consisting of 12,220 square feet, 4,107 square feet and 3,467 square feet. The second and third floors mirror each other and contain two leasable areas, 9,811 square feet and 11,183 square feet. The first floor is tentatively scheduled to be leased and operated by a non-ambulatory surgical center that would provide 'day surgery' services, with an option for patients to recover on-site (overnight) where recovery care at home is not available. This business model meets the description of a 'Hospital' as "an institution designed within an integrated campus setting, for the diagnosis, care, and treatment of human illness, including surgery and primary treatment." This use is a Conditional Use within the proposed C-1 (Limited Commercial) zoning district:

1. The use shall be located on a secondary thoroughfare or larger.

Alta Drive is designated as an 80-foot wide Collector Street as defined by the Master Plan of Streets and Highways. Title 13 describes a secondary thoroughfare as a major collector with a minimum width of 80 feet meeting this condition.

The building elevations depict a structure that is coherently designed and treated, with a consistent level of detailing and finish as required for all sides of a building per Title 19.08. A Condition of Approval was added by staff to ensure reflectivity levels of the glass do not exceed the limits set forth by Title 19.08.

Residential Adjacency Standards state that no building shall exceed the height of a line drawn from the property line of a protected property at a 3:1 slope directly into the property subject to the residential adjacency standards. For example, a 100-foot high building must be set back 300 feet from the property line of the protected property, if both the property line of the residence property and the grade of the building subject to the standards of residential adjacency are at the same elevation. In this instance, the proposed position and angle of the proposed structure on the subject site allows for the structure to meet the 3:1 slope requirement set forth by Title 19.08.

On the west side of the childcare center within the proposed parking lot area is a sewer easement that limits the height and size of planting materials to three feet in height. An Exception is requested to allow shrubbery to substitute the required trees, which staff supports. The applicant has proposed an alternate parking lot landscape island configuration which also requires an Exception. Staff finds the landscaping provided satisfies the overall intent of Title 19.08 for parking lot landscaping and supports the requested Exception.

Currently, the existing driveway adjacent to Alta Drive does not provide a deceleration or turn lane into the subject site. In addition, there is no pedestrian sidewalk provided east of the subject site. The pedestrian pathway for Alta Drive is provided on the south side of the street. In order to prevent a pedestrian pathway that does not connect to an existing pedestrian pathway, the Department of Public Works has granted an administrative Waiver to the applicant in order to substitute the required sidewalk with a deceleration and turn lane into the subject site. The existing sidewalk on the north side of Alta Drive that extends eastward from Hualapai Way will remain as is and will terminate at the driveway, with a second pedestrian pathway leading north to the childcare and medical building.

Staff finds the proposed development supports the intent of the Commercial Development Standards set forth by Title 19.08 by providing a development that will contribute to the overall attractiveness of the City. Therefore, staff recommends approval with conditions.

FINDINGS (GPA-78785)

Section 19.16.030(I) of the Las Vegas Zoning Code requires that the following conditions be met in order to justify a General Plan Amendment:

- 1. The density and intensity of the proposed General Plan Amendment is compatible with the existing adjacent land use designations,**

The intensity of the proposed Service Commercial is compatible with the adjacent Service Commercial to the west and the Parks/Recreation/Open Space designation to the north.

- 2. The zoning designations allowed by the proposed amendment will be compatible with the existing adjacent land uses or zoning districts,**

The proposed Service Commercial land use designation supports the proposed C-1 zoning district, which is compatible with the existing C-1 to the west and the existing C-V district to the north.

- 3. There are adequate transportation, recreation, utility, and other facilities to accommodate the uses and densities permitted by the proposed General Plan Amendment; and**

Adequate transportation and utility facilities are in existence to accommodate the possible land uses permitted by the proposed Service Commercial land use designation.

- 4. The proposed amendment conforms to other applicable adopted plans and policies.**

The proposed amendment conforms to the goals, objectives and policies of the Las Vegas 2020 Master Plan for quality community planning that creates a cohesive environment.

FINDINGS (ZON-78786)

In order to approve a Rezoning application, pursuant to Title 19.16.090(L), the Planning Commission or City Council must affirm the following:

1. The proposal conforms to the General Plan.

If approved, the proposed C-1 would conform to the proposed SC (Service Commercial) land use designation.

2. The uses which would be allowed on the subject property by approving the rezoning will be compatible with the surrounding land uses and zoning districts.

The C-1 zoning district permits by right land uses such as a Business School, Clinic, Convalescent Care Facility / Nursing Home, Financial Institution, General [bank], General Personal Service [beauty salon, dry cleaners], and General Retail Store, Other Than Listed, which are all compatible with the surrounding land uses.

3. Growth and development factors in the community indicate the need for or appropriateness of the rezoning.

Development factors in the area indicate the appropriateness of the proposed C-1 zoning district.

4. Street or highway facilities providing access to the property are or will be adequate in size to meet the requirements of the proposed zoning district.

Alta Drive is a designated 80-foot wide Collector Street by the Master Plan of Streets and Highways and is adequate in size to accommodate land uses permitted in the C-1 zoning district.

FINDINGS (20-0027-SDR1)

In order to approve a Site Development Plan Review application, per Title 19.16.100(E) the Planning Commission and/or City Council must affirm the following:

1. The proposed development is compatible with adjacent development and development in the area;

The proposed development is a continuation of the existing commercial development on the northeast corner of Alta Drive and Hualapai Way. This development will provide leasable medical office space, additional drive isles, parking and landscaping which is compatible with development in the area.

2. **The proposed development is consistent with the General Plan, this Title, and other duly-adopted city plans, policies and standards;**

The proposed development supports the intent of the Commercial and Industrial Development Standards set forth by Title 19.08, "to promote improved design and enhanced site planning of commercial and industrial development that will contribute to the overall attractiveness of the City."

3. **Site access and circulation do not negatively impact adjacent roadways or neighborhood traffic;**

Site access will remain as currently configured, with additional parking and drive isles being provided within the site to improve site circulation amongst the various buildings.

4. **Building and landscape materials are appropriate for the area and for the City;**

Building materials include concrete tilt-up panels, metal wall panels, and metal canopies and decorative accents. Landscape materials include the 'Chinese Elm' tree and 'Deer Grass' shrubbery. All building and landscape materials proposed are appropriate for the City.

5. **Building elevations, design characteristics and other architectural and aesthetic features are not unsightly, undesirable, or obnoxious in appearance; create an orderly and aesthetically pleasing environment; and are harmonious and compatible with development in the area;**

Building elevations and design characteristics are not unsightly or obnoxious in appearance, and create an orderly and aesthetically pleasing environment. The addition of a medical building with parking is compatible with the existing development in the area.

6. **Appropriate measures are taken to secure and protect the public health, safety and general welfare.**

The proposed development is subject to building permit review as well as regular inspections during construction to secure and protect the public health, safety and general welfare.

BACKGROUND INFORMATION

<i>Related Relevant City Actions by Planning, Fire, Code Enforcement, etc.</i>	
03/08/90	The City Council approved a request for a Reclassification of Property (Z-0017-90) for property located on the east side of Hualapai Way, west of Durango Drive between the south boundary of Angel Park and Sahara Avenue, from N-U (Non-Urban) (under Resolution of Intent to R-1, R-2, R-3, R-PD7, R-PD8, R-MHP, P-R, C-1, C-2 and C-V), to R-3 (Limited Multiple Residence) R-PD7 (Residential Planned Development), and C-1 (Limited Commercial). For proposed single and multi-family dwellings, commercial, office, and resort and casino uses.
12/08/97	The City Council approved a request for a Rezoning (Z-0101-97) on property located on the north side of Alta Drive, approximately 685 feet east of Hualapai Way from U (Undeveloped) Zone [M (Medium Density Residential and ML (Medium Low Density Residential) General Plan Designation] under Resolution of Intent to R-3 (Medium Density Residential) to C-V (Civic), for a proposed private elementary school on 4.89 acres. The Planning Commission recommended approval.
05/18/05	The City Council approved a request for a General Plan Amendment (GPA-6199) to amend a portion of the Southwest Sector Plan of the general Plan from PF (Public Facilities) to SC (Service Commercial) on 4.90 acres adjacent to the northeast corner of Alta Drive and Hualapai Way. The Planning Commission and staff recommended approval. The City Council approved a request for a Rezoning (ZON-6222) from C-V (Civic) to C-1 (Limited Commercial) on 4.90 acres adjacent to the northeast corner of Hualapai way and Alta Drive. The Planning Commission and staff recommended approval.
03/01/06	The City Council approved a request for a Site Development Plan Review (SDR-10810) for a proposed office complex consisting of 40,560 square feet of medical office and 15,000 square feet of professional office with Waivers of building placement, parking lot, and foundation landscaping standards on 7.22 acres on 4.90 acres at the northeast corner of Hualapai Way and Alta Drive. The Planning Commission and staff recommended approvalSDR-10810
05/17/06	The City Council approved a request for a General Plan Amendment (GPA-12062) to amend the Transportation Trails Element of the Master Plan to allow a five-foot trail path where a ten-foot trail path is required at the northeast corner of Hualapai Way and Alta Drive. The Planning Commission and staff recommended approval.

<i>Related Relevant City Actions by Planning, Fire, Code Enforcement, etc.</i>	
08/15/07	The City Council approved a request for a General Plan Amendment (GPA-22501) to amend a portion of the Southwest Sector Plan of the general Plan from SC (Service Commercial) to PF (Public Facilities) on 4.90 acres adjacent to the northeast corner of Alta Drive and Hualapai Way. The Planning Commission and staff recommended approval.
	The City Council approved a request for a Site Development Plan Review (SDR-22502) for a 23,544 square-foot private school, primary on 4.90 acres adjacent to the northeast corner of Alta Drive and Hualapai Way. The Planning Commission and staff recommended approval.
08/05/09	The City Council approved a request for an Extension of Time (EOT-35027) of a previously approved Site Development Plan Review (SDR-22502) for a 23,544 square-foot private school, primary on 4.90 acres adjacent to the northeast corner of Alta Drive and Hualapai Way. Staff recommended approval.
07/14/20	The Planning Commission voted to approve a request for an abeyance of General Plan Amendment (GPA-78785) and Rezoning (ZON-78786) to the August 11, 2020 Planning Commission meeting.

<i>Most Recent Change of Ownership</i>	
11/25/19	A deed was recorded for a change in ownership.

<i>Related Building Permits/Business Licenses</i>
There are no building permits or business licenses related to the subject site.

<i>Pre-Application Meeting</i>	
05/14/20	Staff conducted a pre-application meeting via email and telephone to discuss the submittal requirements for a General Plan Amendment and Rezoning.
06/16/20	Staff conducted a pre-application meeting to discuss the development and submittal requirements for a proposed medical building.

Neighborhood Meeting	
06/25/20	Meeting Start Time 5:30 p.m. Meeting End Time: 5:50 p.m. Attendance: One member of the public (via Webex); 3 applicant representatives; one member of Department of Planning staff; and 2 members of Ward 2 Council staff. A presentation was made by the applicant's representative. The applicant's stated proposal is to develop a three-story medical and surgical center on the subject property. The representative stated that the applicant intends to request abeyance of these items to the August Planning Commission meeting so that plans for the development can be submitted concurrently. The attendee from the public said he was curious as to what was being proposed but had no issues with the request.

Field Check	
06/04/20	Staff performed a routine field check of the subject to observe the proposed site. Nothing of concern was noted by staff during the visit.

Details of Application Request	
Site Area	
Gross Acres	7.45

<i>Surrounding Property</i>	<i>Existing Land Use Per Title 19.12</i>	<i>Planned or Special Land Use Designation</i>	<i>Existing Zoning District</i>
Subject Property	Undeveloped	PF (Public Facilities)	C-V (Civic)
North	Undeveloped	PR-OS (Parks / Recreation / Open Space)	C-V (Civic)
South	Single Family Detached	ML (Medium Low Density Residential)	R-PD7 (Residential Planned Development - 7 Units Per Acre)
East	Undeveloped	PF (Public Facilities)	C-V (Civic)
West	Undeveloped	PF (Public Facilities)	
	Individual Care Center [Child Care]	SC (Service Commercial)	C-1 (Limited Commercial)

<i>Master and Neighborhood Plan Areas</i>	<i>Compliance</i>
No Applicable Master Plan Area	N/A
<i>Special Area and Overlay Districts</i>	<i>Compliance</i>
No Applicable Special Area or Overlay Districts	N/A
<i>Other Plans or Special Requirements</i>	<i>Compliance</i>
Peccole Ranch Phase 1 and 2	Y
Trails	N/A
Las Vegas Redevelopment Plan	N/A
Interlocal Agreement	N/A
Project of Significant Impact (Development Impact Notification Assessment)	N/A
Project of Regional Significance	N/A

DEVELOPMENT STANDARDS*Pursuant to Title 19.08, the following standards apply:*

Standard	Required/Allowed	Provided	Compliance
Min. Setbacks			
• Front	10 Feet	118 Feet	Y
• Side	10 Feet	139 Feet	Y
• Corner	10 Feet	N/A	N/A
• Rear	20 Feet	77 Feet	Y
Max. Lot Coverage	50 %	12 %	Y
Max. Building Height	62 Feet [Residential Adjacency]	53 Feet	Y
Trash Enclosure	Screened, Gated, w/ a Roof or Trellis	By Condition	
Mech. Equipment	Screened		

Residential Adjacency Standards	Required/Allowed	Provided	Compliance
3:1 proximity slope	159 Feet	188 Feet	Y
Trash Enclosure	50 Feet	188+ Feet	Y

Pursuant to Title 19.08, the following standards apply:

Landscaping and Open Space Standards				
Standards	Required		Provided	Compliance
	Ratio	Trees		
Buffer Trees:				
• North	1 Tree / 20 Linear Feet	31 Trees	31 Trees	Y
• South	1 Tree / 20 Linear Feet	27 Trees	27 Trees	Y*
• West	1 Tree / 20 Linear Feet	14 Trees	14 Trees	Y
TOTAL PERIMETER TREES		72 Trees	72 Trees	Y*
Parking Area Trees	1 Tree / 6 Uncovered Spaces, plus 1 tree at the end of each row of spaces	97 Trees	72 Trees	N**
LANDSCAPE BUFFER WIDTHS				
Min. Zone Width				
• North	8 Feet		7 Feet	N***
• South	15 Feet		5 Feet	N***
• West	8 Feet		5 Feet	N***

**The number of trees required and provided will increase with the addition of the landscape buffer required by Condition of Approval Number 4.*

***Exceptions are requested to allow a reduced number of parking lot landscape islands, which staff supports.*

****Waivers are requested to allow reduced landscape buffer widths, which staff supports.*

Street Name	Functional Classification of Street(s)	Governing Document	Actual Street Width (Feet)	Compliance with Street Section
Alta Drive	Collector	Master Plan of Streets and Highways Map	70	Y*

**A Condition of Approval has been added to ensure the half street improvements are completed in conjunction with development, including a deceleration lane and right-hand turn lane.*

Pursuant to Title 19.08 and 19.12, the following parking standards apply:

Parking Requirement							
Use	Gross Floor Area or Number of Units	Required		Provided		Compliance	
		Parking Ratio	Parking		Parking		
			Regular	Handi-capped	Regular	Handi-capped	
Proposed Office, Medical or Dental	71,400 SF	1:200 SF 1 st 2,000 SF	10				
		1:175 SF Remaining	397				
Existing Office, Other Than Listed	29,068 SF	1:300	97				
Existing Individual Care Center [Childcare]	20	1 Per Staff Member	20				
	147	1 Per 10 Children	15				
TOTAL SPACES REQUIRED			539		539		Y
Regular and Handicap Spaces Required			528	11	506	33	Y

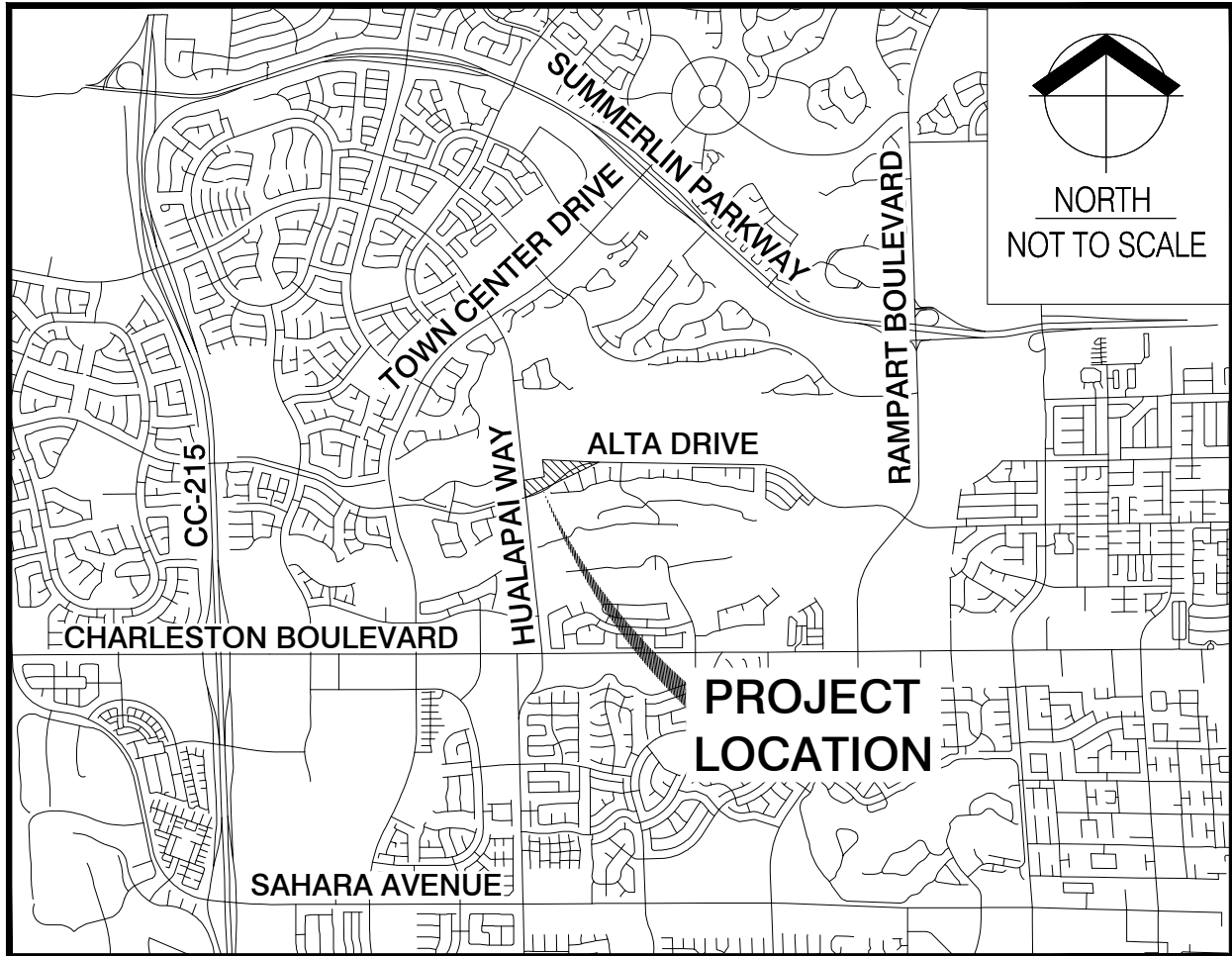
Waivers		
Requirement	Request	Staff Recommendation
A 15-foot wide landscape buffer adjacent to public right-of-way.	A landscape buffer width that tapers to a minimum width of five feet adjacent to Alta Drive.	Approval
An eight-foot wide landscape buffer adjacent to interior lot lines.	To allow a five-foot wide landscape buffer adjacent to a portion of the west property line.	Approval
An eight-foot wide landscape buffer adjacent to interior lot lines.	To allow a seven-foot wide landscape buffer adjacent to the northern property line.	Approval

Exceptions		
Requirement	Request	Staff Recommendation
A parking lot landscape island is required for every six uncovered parking spaces.	To allow no parking lot landscape islands within the parking areas adjacent to the building.	Approval
A parking lot landscape island is required for every six uncovered parking spaces.	To allow no parking lot landscape islands adjacent to the north, south and west property lines.	Approval
A parking lot landscape island is required for every six uncovered parking spaces.	To allow no trees or landscaping over 3 feet tall within the Public Sewer Easement granted per Book 90, Page 18.	Approval
A parking lot landscape island is required for every six uncovered parking spaces.	To allow the removal of two trees located within the public sewer easement in the parking islands along the east side of Assessor Parcel #138-31-216-001.	Approval

Department of Public Works Traffic Study

Proposed 71.40 Thousand Square-Foot Medical Office Building:				
Proposed Use	Description	#Unit	Rate/#Unit	Total
Average Daily Traffic (ADT)	Medical-Dental Office Building [1,000 SF]	71.400	34.80	2,485
AM Peak Hour			2.78	198
PM Peak Hour			3.46	247
Existing Use	Description	#Unit	Rate/#Unit	Total
Average Daily Traffic (ADT)	General Office Building [1,000 SF]	20.068	9.74	195
AM Peak Hour			1.16	23
PM Peak Hour			1.15	23
Existing Use	Description	#Unit	Rate/#Unit	Total
Average Daily Traffic (ADT)	Daycare Center [1,000 SF]	10.700	47.62	510
AM Peak Hour			11.00	118
PM Peak Hour			11.12	119
Total Use	Description	#Unit	Rate/#Unit	Total
Average Daily Traffic (ADT)	Total	102.168	N/A	3,190
AM Peak Hour				339
PM Peak Hour				389
Existing Traffic on Nearby Streets				
Alta Drive				
Average Daily Traffic (ADT)			12,940	
PM Peak Hour (Heaviest 60 Minutes)			1,035	
Hualapai Way				
Average Daily Traffic (ADT)			17,128	
PM Peak Hour (heaviest 60 minutes)			1,370	
Traffic Capacity of Adjacent Streets:				
Adjacent Street ADT Capacity				
Alta Drive			35,490	
Hualapai Way			35,490	
Summary				
This project will add approximately 2,485 trips per day on Alta Drive and Hualapai Way. Currently, Alta Drive is at about 36 percent of capacity and Hualapai Way is at about 48 percent of capacity. With this project, Alta Drive is expected to be at about 43 percent of capacity and Hualapai Way to be at about 55 percent of capacity.				
Based on Peak Hour use, this development will add into the area roughly 247 additional cars, or about four every minute.				

FIGURES



VICINITY MAP

RIETZ
CONSULTING INC.

3203 E. WARM SPRINGS RD. #400
LAS VEGAS, NEVADA 89120
PH: 702.521.3355
FX: 702.891.5397

PANTHER MEDICAL

VICINITY MAP

DATE: 8-2020

DRAFTER: JG

CHECKED: JM

CHECKED: EJH

FIGURE

1

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 conversions 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, N/C613
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 GBT/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/cgit/gismo/gismo.htm>



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36°07'30" 115°22'30" JOINS PANEL 2550

36°07'30" 115°22'30" JOINS PANEL

Soil Map—Las Vegas Valley Area, Nevada, Part of Clark County



FIGURE 3



**Natural Resources
Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

8/18/2020
Page 1 of 3

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

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

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

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

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

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Las Vegas Valley Area, Nevada, Part of Clark County

Survey Area Data: Version 15, Jun 11, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 3, 2019—May 14, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
152	Cave gravelly fine sandy loam, 0 to 4 percent slopes	78.2	100.0%
Totals for Area of Interest		78.2	100.0%

ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
APDG		ANGEL PARK - DURANGO						
0000	E	84" RCP	2600	870	C38B	GOW3A	0.79	0.70
0060	E	72" RCP	1901	390	38A	GOW3A	0.35	0.96
APMD		ANGEL PARK - MIDDLE BRANCH						
0027	E	1: 12" X 10" AND 2: 12" X 2" RCBC @ CANYON RUN	170	5058	C11A-1*	GOW4A	11.81	3.00
0030	E	NATURAL WASH	7000	5058	C11A-1*	GOW4A	11.81	3.00
0132	E	2: 12" X 10" RCBC @ HUALAPAI	120	5058	C11A-1*	GOW4A	11.81	1.00
0133	E	NATURAL WASH	2962	5058	C11A-1*	GOW4A	11.81	3.00
0190	E	3: 12" X 8" RCBC @ TOWN CENTER	236	5058	C11A-1*	GOW4A	11.81	3.53
0195	E	TRANSITION STRUCTURE	145	5058	C11A-1*	GOW4A	11.81	3.59
0198	E	CONC CHNL 62'-68"W 5.5'-7.5'D 2:1 SS	500	5058	C11A-1*	GOW4A	11.81	3.59
0208	E	CONC CHNL 62'-68"W 6.5'-7.5'D 2:1 SS	550	5058	C11A-1*	GOW4A	11.81	2.81
APNO		ANGEL PARK DETENTION BASIN						
0001	E	1,654 AC-FT ANGEL PARK DETENTION BASIN		8677	ANGLPKIN	GOW5A	22.71	
APP1		ANGEL PARK - PECCOLE 1						
0000	E	72" RCP	2982	511	PIC-B	GOW3A	0.51	2.40
0056	E	2: 60" RCP	1385	511	PIC-B	GOW3A	0.51	2.40
APP2		ANGEL PARK - PECCOLE 2						
0000	E	GRASS CHNL 10"W 5'D 2:1 SS	4793	2171	C57B-1	GOW3A	1.87	2.80
APSO		ANGEL PARK - SOUTH BRANCH						
0000	E	2: 12" X 12" RCB	2506	4755	CC57B-4	GOW3A	5.28	1.62
0020	E	2: 12" X 12" RCBC @ RAMPART	360	4755	CC57B-4	GOW3A	5.28	1.80
0050	E	NATURAL WASH	209	4337	C57B-4	GOW3A	4.77	1.84
0067	E	NATURAL WASH	8300	2291	C57B-2	GOW3A	2.69	2.10
0204	E	2: 8" X 8" RCBC @ HUALAPAI	326	1878	C12B	GOW3A	2.02	2.66
0205	E	NATURAL WASH	2380	1878	C12B	GOW3A	2.02	3.46
0254	E	2: 8" X 8" RCBC @ TOWN CENTER DR.	190	1736	C12A	GOW3A	1.76	3.00
0255	E	24" X 12" RCAC @ TOWN CENTER DR.	140	1736	C12A	GOW3A	1.76	3.00
0258	E	NATURAL WASH	3235	1736	C12A	GOW3A	1.76	1.36
FLBF		FLAMINGO WASH - BUFFALO						
0152	E	10" X 7" RCB	3460	863	CLF11	FLAM3A	4.35	0.32
0228	E	96" RCP	1330	800	CLF9	FLAM3A	0.94	1.00
0252	E	9" X 6" RCB	170	800	CLF9	FLAM3A	0.94	1.00
0258	E	96" RCP	1140	800	CLF9	FLAM3A	0.94	0.50
0278	E	90" RCP	2640	557	LF8	FLAM3A	0.51	0.50
0328	E	54" RCP	660	557	LF8	FLAM3A	0.51	0.30
FLDI		DESERT INN DRAIN						
0000	E	9" X 6" RCB	190	1207	CLF4	FLAM3A	1.38	2.71
0004	E	96" RCP	2670	1207	CLF4	FLAM3A	1.38	1.00
0050	E	90" RCP	1390	1207	CLF4	FLAM3A	1.38	1.65
0075	E	84" RCP	1010	941	CLF3	FLAM3A	0.94	1.87
0095	E	96" RCP	200	941	CLF3	FLAM3A	0.94	1.87
0100	E	72" RCP	190	312	LF1	FLAM3A	0.37	1.86
0105	E	60" RCP	2510	312	LF1	FLAM3A	0.37	1.85
FLDR		DURANGO COLLECTOR						
0179	E	60" RCP	1810	277	CUFS23	FLAM3A	0.44	1.21
FLDY		FLAMINGO WASH - DARBY STORM DRAIN						
0000	E	84" RCP	100	611	CLF24	FLAM3A	0.76	0.25
0002	E	10" X 3" RCB	50	611	CLF24	FLAM3A	0.76	0.25
0004	E	60" RCP	680	611	CLF24	FLAM3A	0.76	2.80
0013	E	78" RCP	560	611	CLF24	FLAM3A	0.76	1.79
FLLA		FLAMINGO WASH - LATERAL (FLAMINGO/RAINBOW)						
0227	E	93" RCP	1360	773	CLF28	FLAM3B	1.03	0.40
0254	E	90" RCP	2730	572	CLF27	FLAM3B	0.51	0.40
0304	P0	MODIFY SPILLWAY, RAISE HEIGHT BY 1" (REPLACES FLLA0305)		1556	CLF25	FLAM3A	1.03	
0305	E	1,556 CFS PMF SPILLWAY (REPLACE W/ FLLA0304)		1556	CLF25	FLAM3A	1.03	
0306	E	30" RCP WITH 18" ORIFICE OUTLET	203	30	DIDB	FLAM3A	1.03	0.43
0308	E	62 AC-FT DESERT INN DETENTION BASIN		813	CLF25	FLAM3A	1.03	
0309	P0	UPGRADE TO 70 AC-FT DESERT INN DETENTION BASIN		813	CLF25	FLAM3A	1.03	
0322	E	81" RCP	1370	245	LF25	FLAM3A	0.27	0.50
0345	E	81" RCP	1340	245	LF25	FLAM3A	0.27	0.50
0369	E	72" RCP	670					0.50

ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
FLLA		FLAMINGO WASH - LATERAL (FLAMINGO/RAINBOW)						
0379	E	66" RCP	1320					0.50
FLMN		FLAMINGO WASH - MONTESSOURI NORTH STORM DRAIN						
0000	E	78" RCP	1340	611	CLF24	FLAM3A	0.76	0.50
0025	E	72" RCP	1330	611	CLF24	FLAM3A	0.76	0.50
0050	E	66" RCP	500	405	LF23	FLAM3A	0.38	0.50
0060	E	54" RCP	800	405	LF23	FLAM3A	0.38	0.50
0075	E	48" RCP	30	405	LF23	FLAM3A	0.38	0.50
FLMS		FLAMINGO WASH - MONTESSOURI SOUTH STORM DRAIN						
0000	E	54" RCP	630					0.52
FLSM		SPRING MOUNTAIN DRAIN						
0000	E	60" RCP	4590	114	CLF10W	FLAM3A	2.90	2.50
0083	E	36" RCP	570	87	LAKEDB	FLAM3A	2.68	1.90
0086	E	36" RCP OUTLET	90	87	LAKEDB	FLAM3A	2.68	
0087	E	143 AC-FT LAKES DETENTION BASIN		2032	CLF7	FLAM3A	2.68	
0088	P	UPGRADE TO 180 AC-FT LAKES DETENTION BASIN		2032	CLF7	FLAM3A	2.68	
0100	E	12" X 8" RCB	310	2032	CLF7	FLAM3A	2.68	1.25
0125	E	96" RCP	3040	760	CLF6N	FLAM3A	0.93	0.80
0180	E	90" RCP	2350	552	LF5	FLAM3A	0.55	0.50
GOSO		GOWAN SOUTH FACILITIES						
0297	E	12" X 7" RCB	2124	1987	CW1BB-C	GOW3A	2.14	1.60
0336	E	12" X 7" RCB	602	1745	C1-WESTC	GOW3A	1.84	3.40
0352	E	2: 8" X 5" RCB	2740	1513	C1-DUCHC	GOW3A	1.60	0.73
0404	E	2: 8" X 4" RCB	2660	1242	C1-ALTAC	GOW3A	1.32	0.80
0455	E	2: 12" X 4" RCB	350	749	C1-HOLMC	GOW3A	0.81	0.30
0462	E	12" X 4" RCB	1330	749	C1-HOLMC	GOW3A	0.81	0.30
GOWC		GOWAN SOUTH FACILITIES - WEST CLIFF						
0000	E	24" RCP	5400	272	1-WEST-C	GOW3A	0.24	1.67
LCCH		LAS VEGAS CREEK CHANNEL						
0478	E	60" RCP	1110	171	CLC01-C	SW3	1.20	0.55
0499	E	42" RCP OUTLET	660	87	RAINBWDB	SW3	1.11	1.88
0513	E	102 AC-FT RAINBOW DETENTION BASIN		1027	RAINBWIN	SW3	1.11	
0518	E	60" RCP CONNECTOR PIPE UNDER RAINBOW BLVD	670					1.85
LCLO		LAS VEGAS CREEK - LORENZI						
0000	E	7" X 6" RCB	445	285	DAL00A	SW3	0.41	3.37
0008	E	7" X 6" RCB	2983	285	DAL00A	SW3	0.41	0.40
0054	E	7" X 5" RCB	169	285	DAL00A	SW3	0.41	1.00
MEAL		MEADOWS ALTA						
0209	E	48" RCP	2500	150	DCR2	SW3	0.41	1.70
0256	E	38" X 60" HERCP	81	150	DCR2	SW3	0.41	1.42
0258	E	48" RCP	275	150	DCR2	SW3	0.41	4.31
MECH		EXTENSION OF MEADOWS / CHARLESTON						
0338	E	10" X 8" RCB	2060	1302	C3A-OAKC	SW3	1.32	1.62
0378	E	10" X 8" RCB	745	1302	C3A-OAKC	SW3	1.32	2.00
0380	E	66" RCP	385	372	3-HOLM-C	SW3	0.33	2.00
0387	E	66" RCP	300	452	3A-OAK-C	SW3	0.43	3.08
0390	E	83" X 53" RCP	50	372	3-HOLM-C	SW3	0.33	2.00
0400	E	10" X 6" RCB	1890	918	C3-ELP-C	SW3	0.88	1.43
0405	E	66" RCP	1390	452	3A-OAK-C	SW3	0.43	1.00
0410	E	66" RCP	182	372	3-HOLM-C	SW3	0.33	2.00
0420	E	66" RCP	1410	372	3-HOLM-C	SW3	0.33	2.00
0424	P	6" X 6" RCB	3975	690	C2A-OAK	SW3	0.68	2.50
MECN		MEADOWS - CHARLESTON						
0223	P	6" X 5" RCB	2700	438	COH05-C	SW3	0.34	2.04
RRFA		RED ROCK - FORT APACHE COLLECTOR						
0130	E	66" RCP	690	346	UFR21	FLAM3A	0.51	0.93
0143	E	48" RCP	1330	346	UFR21	FLAM3A	0.51	2.54
0168	E	5" X 3" RCB	114	346	UFR21	FLAM3A	0.51	2.00
0170	E	42" RCP	78	346	UFR21	FLAM3A	0.51	1.30
RRHU		RED ROCK - HUALAPAI COLLECTOR						
0025	E	11" X 5.5" RCAP	3310	1284	CUFR13N	FLAM3A	1.44	1.30
0079	E	8" X 6" RCB	2650	1002	CUFR11	FLAM3A	1.02	1.30

ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
RRHU		RED ROCK - HUALAPAI COLLECTOR						
0129	E	7" X 6" RCB	2630	851	CUFR10	FLAM3A	0.75	1.20

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

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

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



2018 LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FACILITY INVENTORY
FIGURE F-28

L	ID (Facility Identifier)	AABB
E	Parent Stream Name	
G	Stream Name	
E	Mile	0000
N	Distance Above Confluence with Parent Stream (Miles)	
D	Miles in Hundredths	

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

Bottom Width.....W

Depth.....D

Side Slope, H:V.....SS

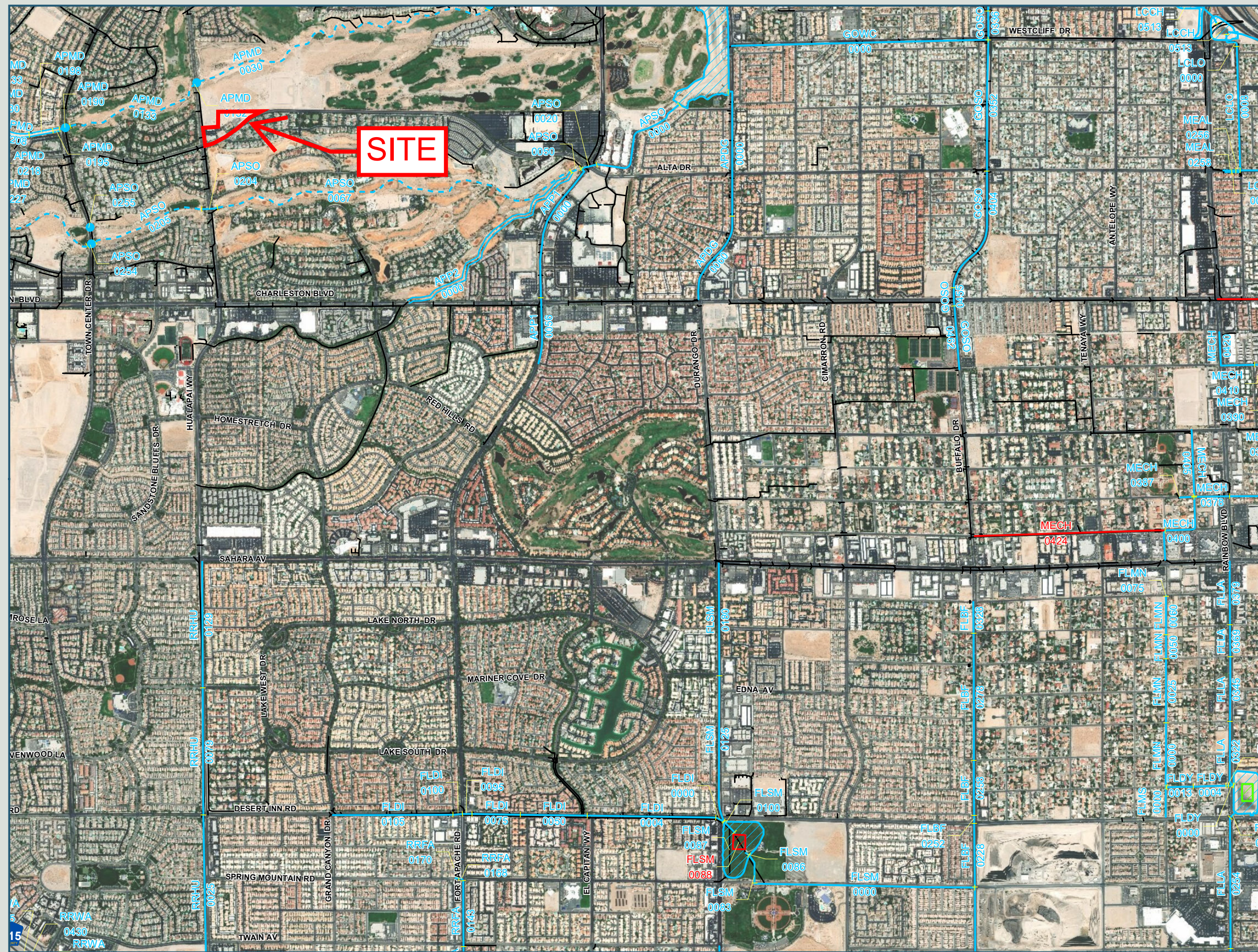
Cast in Place Concrete Pipe.....CIPCP
Corrugated Metal Arch Pipe Culvert.....CMAP
Corrugated Metal Pipe Culvert.....CMP
High Density Polyethylene.....HDPE
Horizontal Elliptical Reinforced Concrete Pipe.....HERCP
Reinforced Concrete Arch Pipe.....RCAP

Construction Features

Reinforced Concrete Arch Culvert.....RCAC
Reinforced Concrete Box.....RCB
Reinforced Concrete Box Culvert.....RCBC
Reinforced Concrete Pipe.....RCP
Reinforced Concrete Pipe Culvert.....RCP
Storm Sewer Pipe.....SSP



FIGURE 4A



2018
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE F-28
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 |

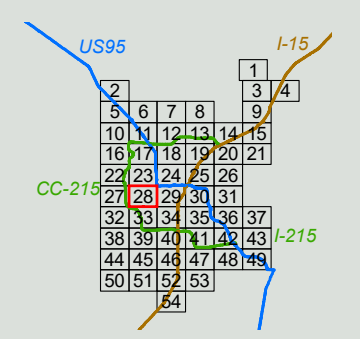
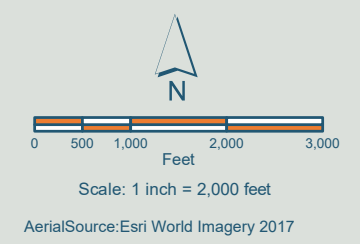


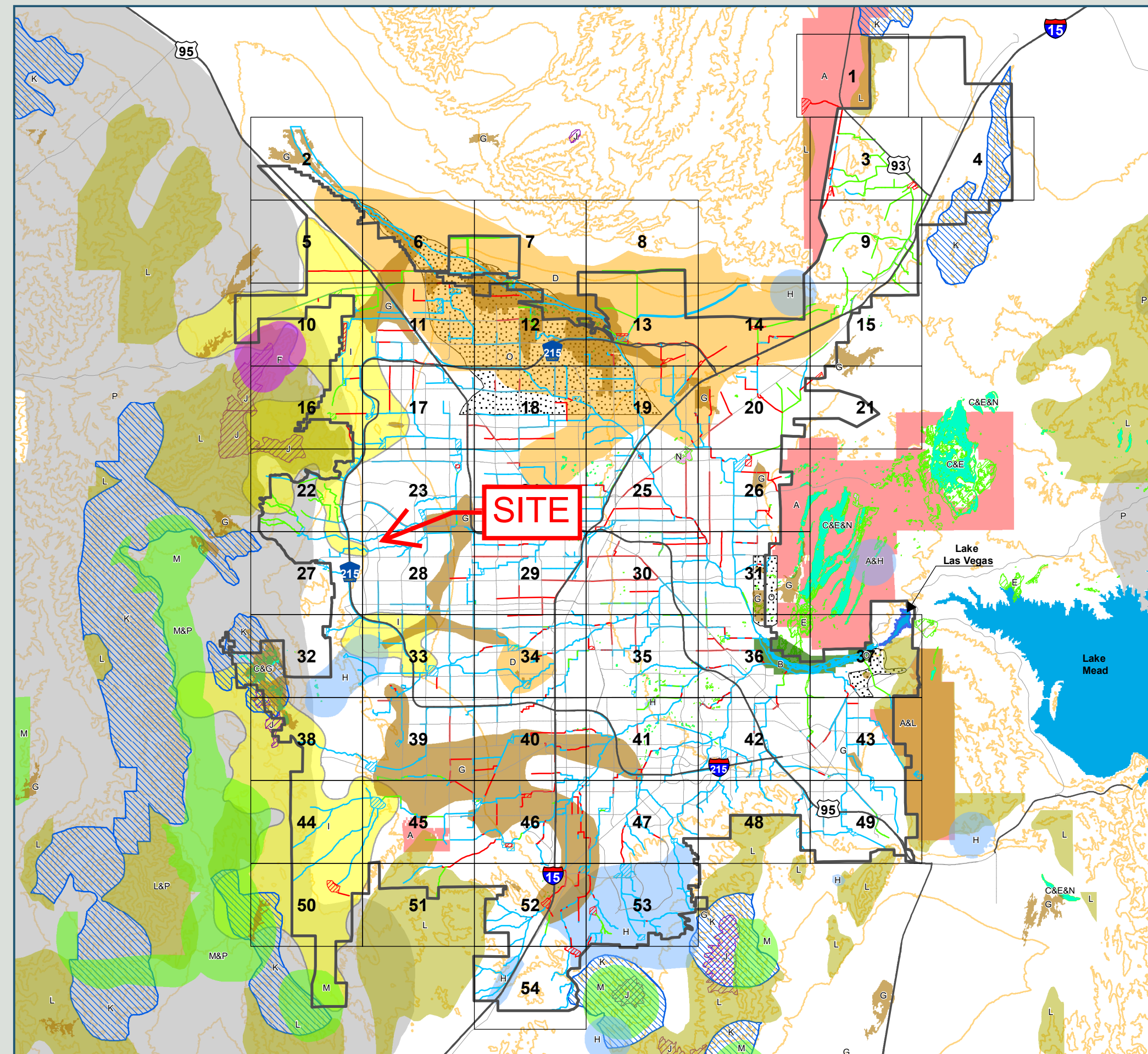
FIGURE 4B



2018
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE G-2

ENVIRONMENTALLY SENSITIVE AREAS



LEGEND

- Ultimate Development Boundary
- Sheet Index
- Areas of Critical Environmental Concern
- Wetland
- White Bearpoppy
- Las Vegas Buckwheat and Las Vegas Bearpoppy
- Las Vegas Bearpoppy
- Mojave Milkvetch
- Mesquite/Acacia
- Rosy Twtone Beardtongue
- Yellow Twtone Beardtongue
- Bluediamond Cholla
- BLM Crucial Bighorn Habitat
- BLM Bighorn Winter Range
- BLM Quail Habitat
- Las Vegas Buckwheat
- Paleontological Sensitive Area
- BLM Horse and Burro Management Area
- Main Highways
- Major Streets
- 500 ft Contours (USGS)
- Flood Control Facilities
 - Existing Facilities
 - Category A Proposed Facilities
 - Category B Proposed Facilities
 - Category A Remove & Replace/Parallel Facilities
 - Category B Remove & Replace/Parallel Facilities

Information displayed on this map is for general reference only. The environmentally sensitive areas presented on this figure are conservative and do not account for areas that are urbanized. These areas are meant to show only where there is a "potential" for sensitive resources to occur and are not meant to define exact locations. The Bureau of Land Management, U.S. Fish and Wildlife Service, Nevada Department of Wildlife, and the Nevada Natural Heritage Program should be consulted for site specific information. Site-specific investigations and species-specific surveys must be conducted for each project to determine whether sensitive environmental resources occur in a specific project area.

*Potential habitat exists for the Mojave desert tortoise, western chuckwalla, banded Gila monster, migratory birds, protected bat species, and desert kit fox on undeveloped land throughout the study area.

*Potential habitat for Gambel's Quail occurs in washes and wetland areas throughout the entire study area.

*Rosy Twtone Beardtongue habitat also exists southwest of the Ultimate Development Boundary.

*Cacti and yucca species occur on undeveloped land throughout the study area.

*Wetlands are known to occur adjacent to the Las Vegas Wash in the eastern portion of the study area.

*Dry ephemeral washes occur throughout the study area.

*Sensitive cultural resources may occur throughout the study area.

*Areas of Critical Environmental Concern (ACEC) are designated by the BLM "to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources or other natural systems or processes, or to protect life and safety from natural hazards". (Reference: Federal Land Policy And Management Act of 1976, 43 USC Sec. 1702).

SOURCES:

*Bureau of Land Management (BLM). 2018. Online Geospatial Data. BLM NV Wilderness Study Areas Polygon. https://navigator.blm.gov/data?keyword=national%20parks&fs_publicRegion=Nevada. Accessed March.

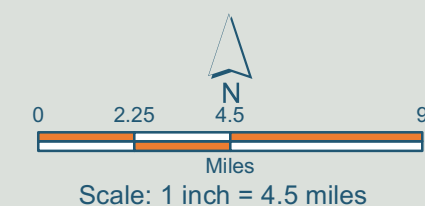
*BLM. 2018. Online Geospatial Data. BLM NV Designated Areas of Critical Environmental Concern Polygons. https://navigator.blm.gov/data?keyword=national%20parks&fs_publicRegion=Nevada. Accessed March.

*BLM

*Soils Based Habitat model. Matt Hamilton of EPG, Inc. under contract with BLM Las Vegas Field Office.

*Gysiferous soils model. TetraSpectra Geomatics for Clark County Desert Conservation Program.

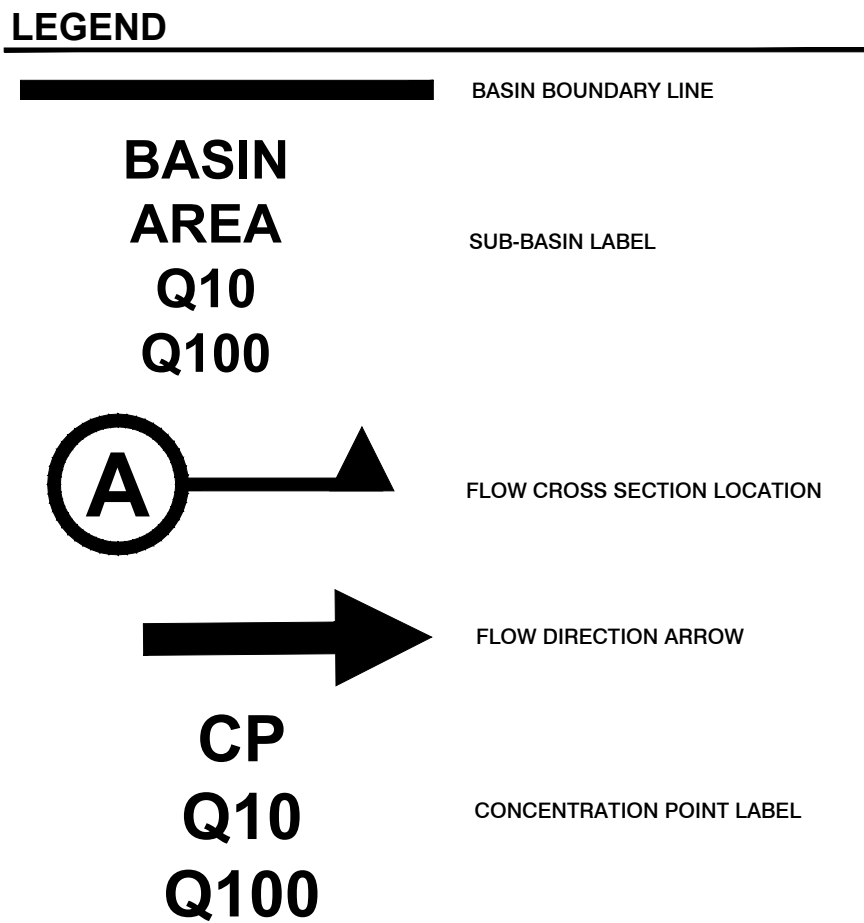
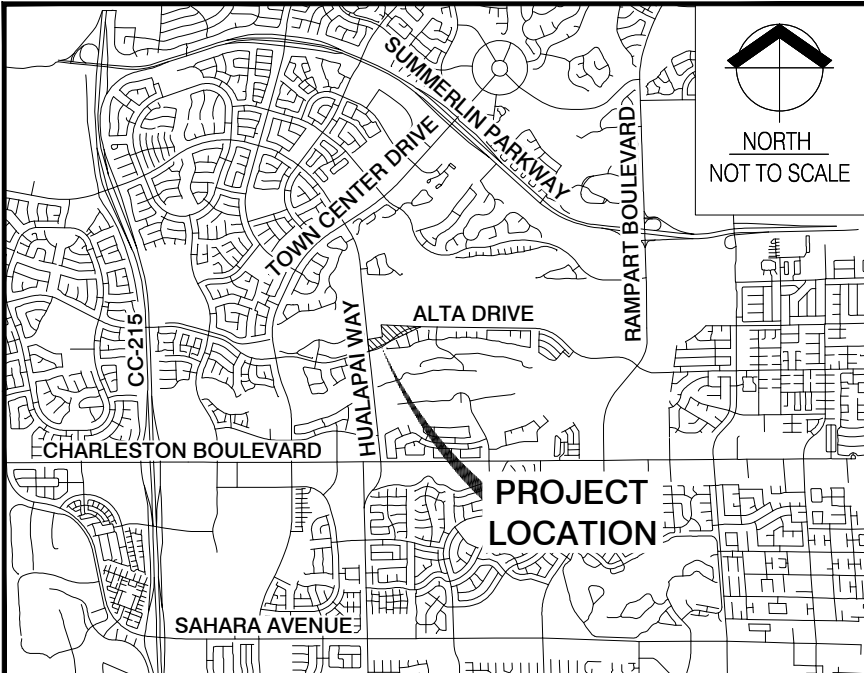
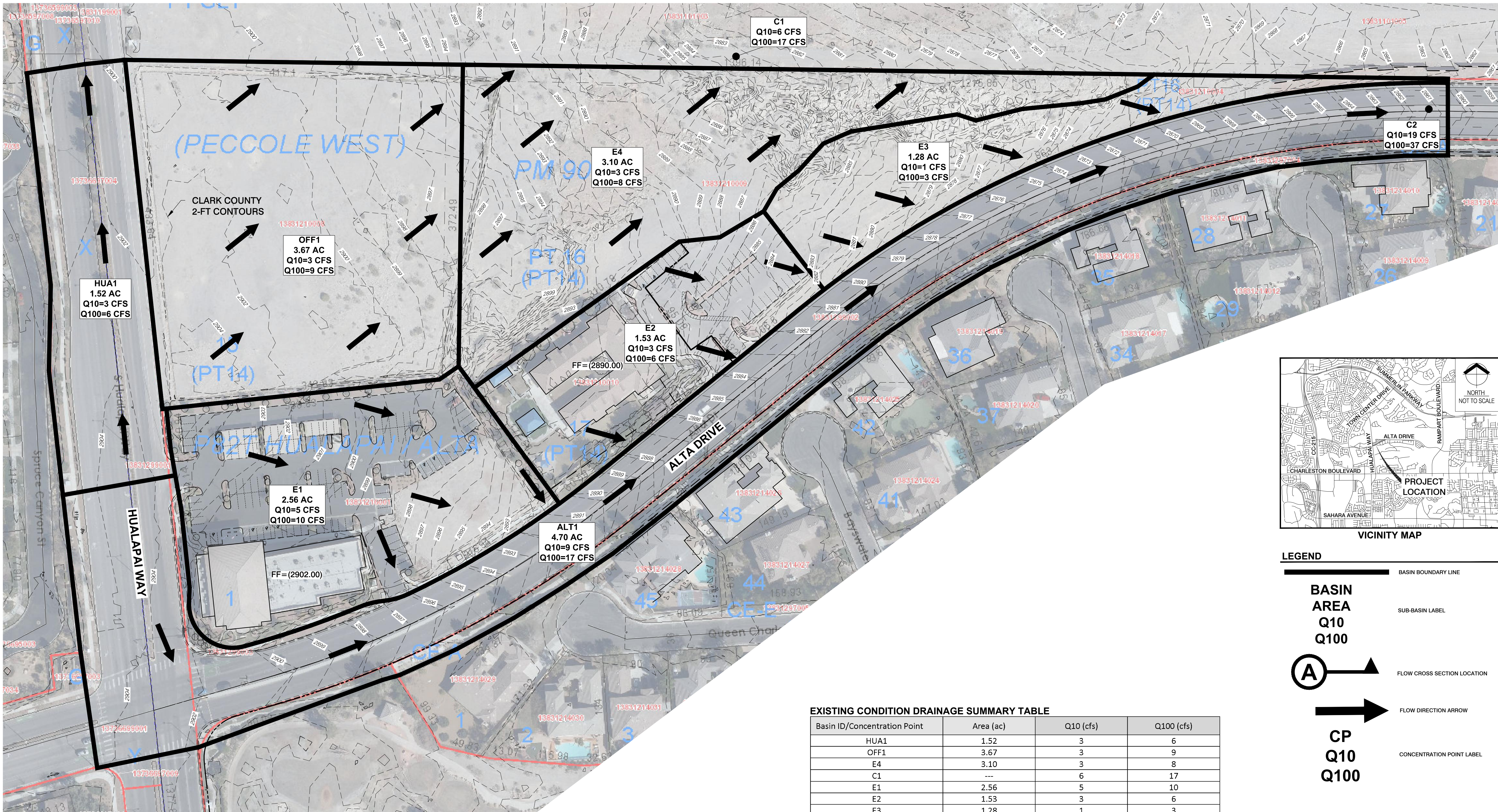
*PBS&J. Clark County Regional Flood Control District 2008 Las Vegas Flood Control Master Plan Update. September 2008.



ATKINS
Member of the SNC-Lavalin Group



FIGURE 4D



EXISTING CONDITION DRAINAGE SUMMARY TABLE			
Basin ID/Concentration Point	Area (ac)	Q10 (cfs)	Q100 (cfs)
HUA1	1.52	3	6
OFF1	3.67	3	9
E4	3.10	3	8
C1	---	6	17
E1	2.56	5	10
E2	1.53	3	6
E3	1.28	1	3
ALT1	4.70	9	17
C2	---	19	37

FLOOD ZONE

THIS SITE IS LOCATED IN ZONE "X", AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN, PER THE FLOOD INSURANCE RATE MAP COMMUNITY PANEL 32000C2150 E. CLARK COUNTY, NEVADA DATED SEPTEMBER 27, 2002.

DISCLAIMER NOTE:

EXISTING UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT VERTICAL AND HORIZONTAL LOCATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN HEREON. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITIES NOT SHOWN IN THEIR PROPER LOCATION.

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Avoid cutting underground utility lines. It's costly.

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LAS VEGAS, NEVADA 89120
PH: 702.521.3355

EXISTING DRAINAGE MAP

PANTHER MEDICAL

APN'S: 138-31-216-001, 138-31-210-004, 009 & 010
LAS VEGAS, NEVADA

DATE: 8/18/2020

DRAFTER: JG

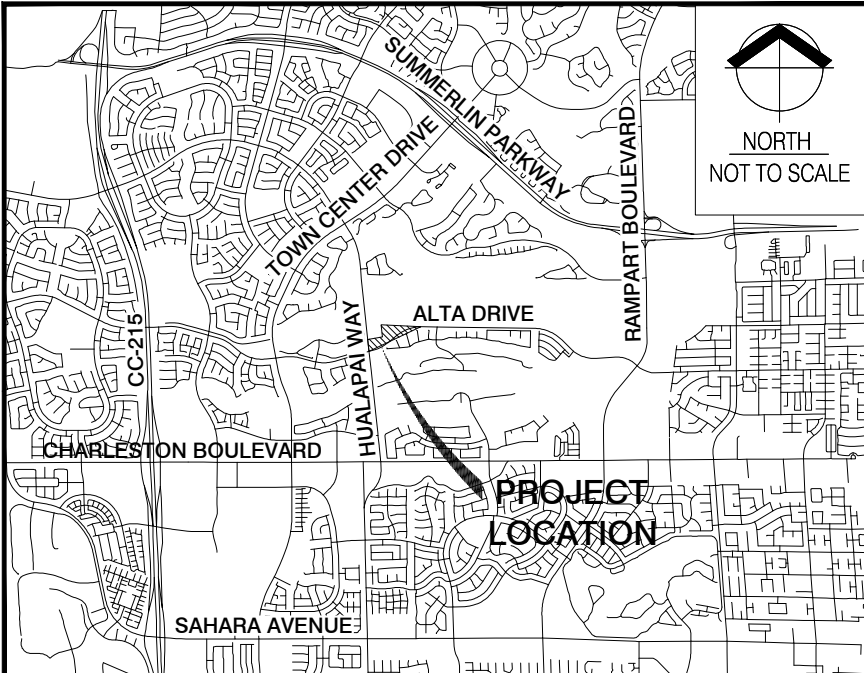
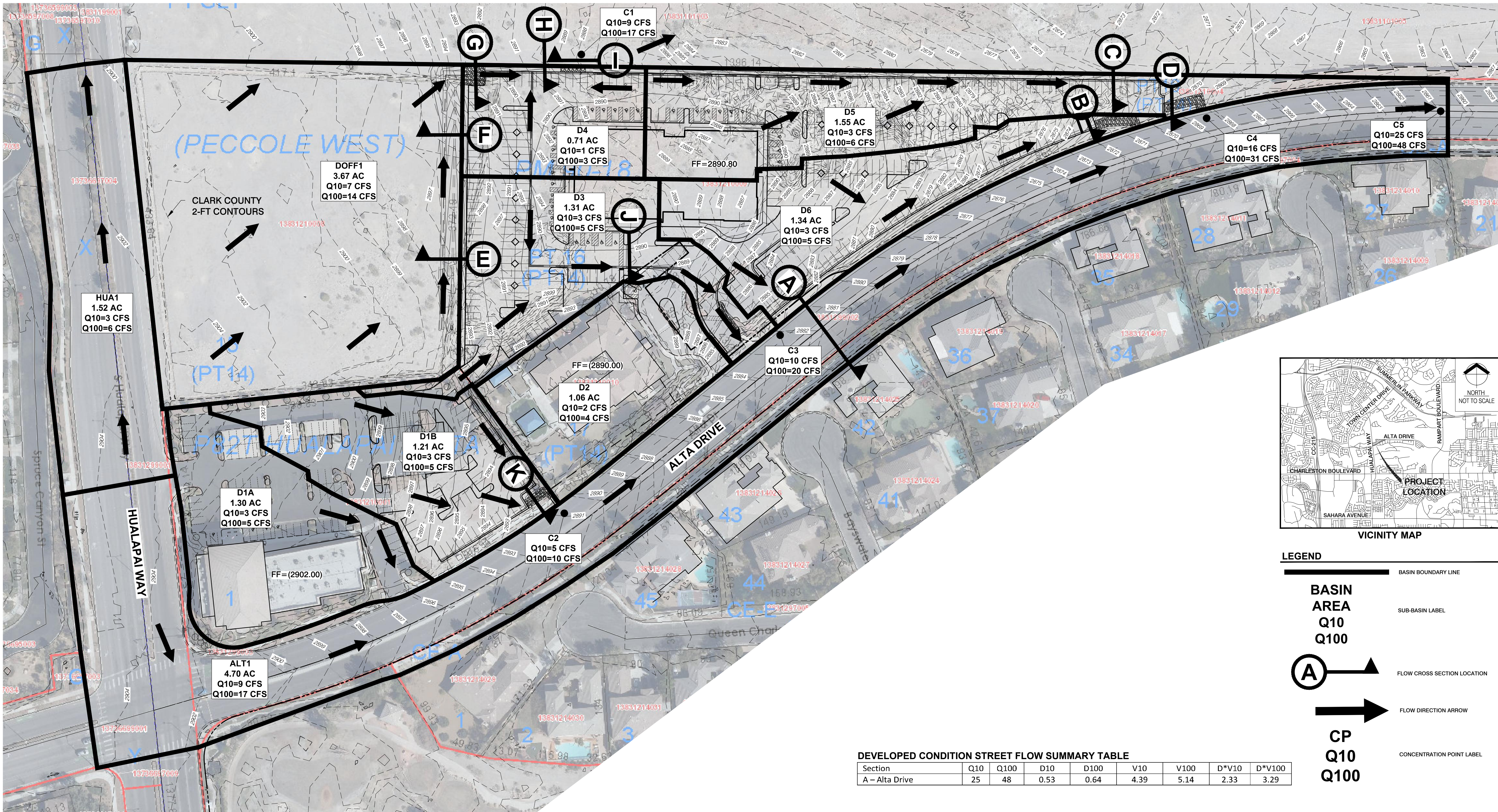
CHECKED: JM

SCALE: 1" = 60'

SHEET

FIG-5

5 OF 7 SHEETS



LEGEND

- BASIN BOUNDARY LINE
- SUB-BASIN LABEL
- FLOW CROSS SECTION LOCATION
- FLOW DIRECTION ARROW
- CONCENTRATION POINT LABEL

BASIN AREA
Q10
Q100

CP
Q10
Q100

DEVELOPED CONDITION STREET FLOW SUMMARY TABLE								
Section	Q10	Q100	D10	D100	V10	V100	D*V10	D*V100
A – Alta Drive	25	48	0.53	0.64	4.39	5.14	2.33	3.29

DEVELOPED CONDITION ONSITE FLOW SUMMARY TABLE				
Section	Q100	D100	V100	D*V100
B1 – PARKING LOT	5	0.35	4.95	1.73
B2 – RIPRAP SWALE	5	0.17	4.46	0.76
B3 – BMP SWALE	5	0.35	1.79	0.63
C – PARKING LOT	6	0.36	3.87	1.39
D1 – RIPRAP SWALE	6	0.20	4.12	0.82
D2 – BMP SWALE	6	0.38	1.89	0.72
E – EARTH BERM	14	0.56	2.39	1.34
F – EARTH BERM	14	0.41	4.43	1.82
G – RIPRAP SWALE	14	0.37	3.93	1.45
H – PARKING LOT	14	0.62	3.59	2.23
I1 – CURB OPENINGS	17	0.37	3.01	1.11
I2 – RIPRAP PAD	17	0.50	1.95	0.98
J – PARKING LOT	5	0.45	2.23	1.00
K – BMP SWALE	5	0.35	1.79	0.63

DEVELOPED CONDITION DRAINAGE SUMMARY TABLE				
Basin ID/Concentration Point	Area (ac)	Q10 (cfs)	Q100 (cfs)	
HUA1	1.52	3	6	
DOFF1	3.67	7	14	
D4	0.71	1	3	
C1	---	9	17	
D1A	1.30	3	5	
D1B	1.21	3	5	
C2	---	5	10	
D2	1.06	2	4	
D3	1.31	3	5	
C3	---	10	20	
D5	1.55	3	6	
D6	1.34	3	5	
C4	---	16	31	
ALT1	4.70	9	17	
C5	---	25	48	

FLOOD ZONE

THIS SITE IS LOCATED IN ZONE "X". AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN, PER THE FLOOD INSURANCE RATE MAP COMMUNITY PANEL 32009C2150 E. CLARK COUNTY, NEVADA DATED SEPTEMBER 27, 2002.

DISCLAIMER NOTE:

EXISTING UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT VERTICAL AND HORIZONTAL LOCATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN HEREON. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITIES NOT SHOWN IN THEIR PROPER LOCATION.

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY.

CALL BEFORE YOU DO OVERHEAD

1-702-227-2929

Call before you Dig

Avoid cutting underground utility lines. It's costly.

Call before you UnderGround

1-702-432-5300

OR

1-800-227-2600

FAST

Call before you UnderGround

1-702-432-5300

FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

RIETZ
CONSULTING INC.

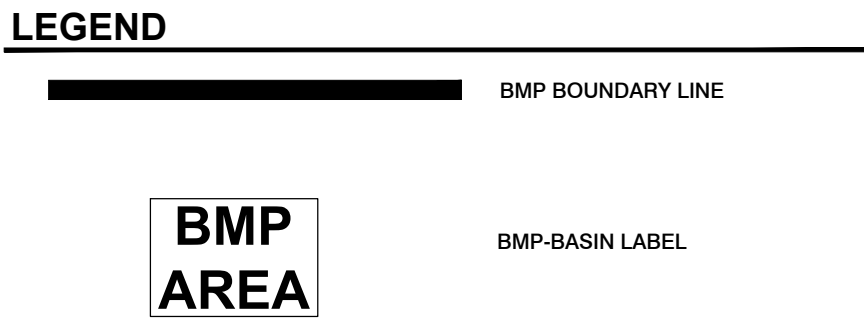
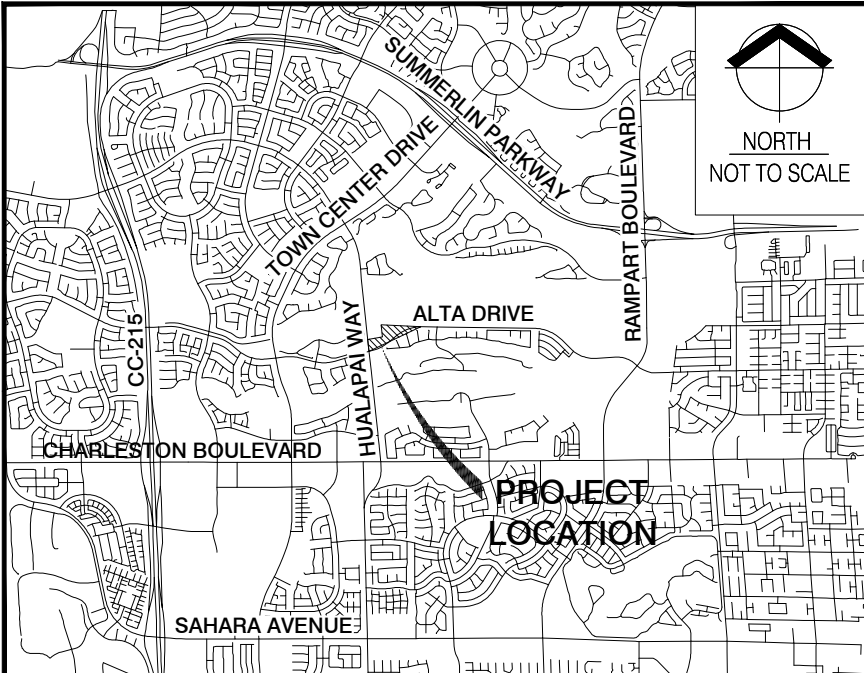
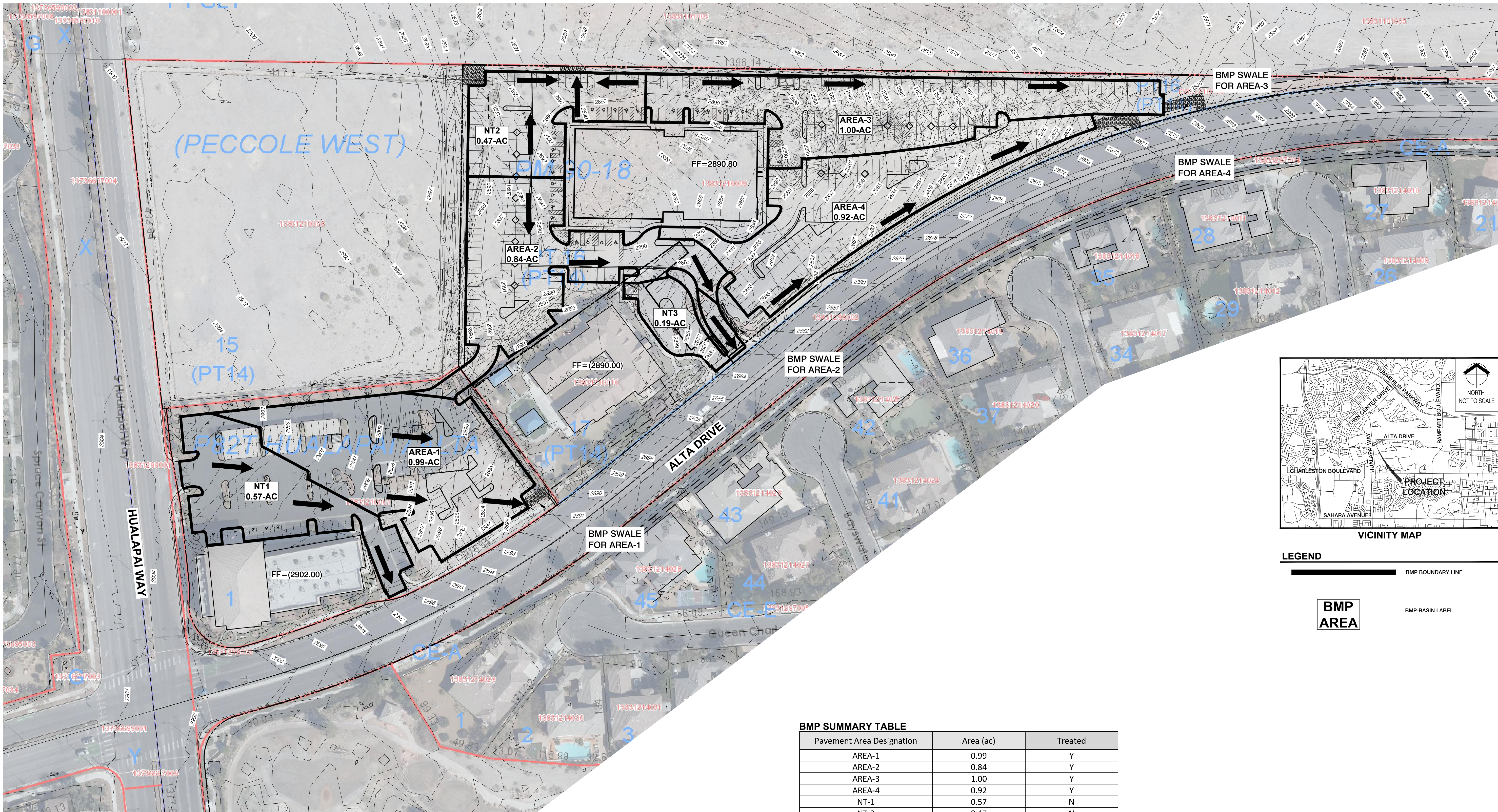


PANTHER MEDICAL
APN'S: 138-31-216-001, 138-31-210-004, 009 & 010
LAS VEGAS, NEVADA

DEVELOPED DRAINAGE MAP

DATE:	8/18/2020
DRAFTER:	JG
CHECKED:	JM
SCALE:	1" = 60'

SHEET
FIG-6
6 OF 7 SHEETS



BMP SUMMARY TABLE		
Pavement Area Designation	Area (ac)	Treated
AREA-1	0.99	Y
AREA-2	0.84	Y
AREA-3	1.00	Y
AREA-4	0.92	Y
NT-1	0.57	N
NT-2	0.47	N
NT-3	0.19	N
TOTAL AREA:	4.98	
TOTAL TREATED AREA:	3.75	75%

FLOOD ZONE

THIS SITE IS LOCATED IN ZONE "X", AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN, PER THE FLOOD INSURANCE RATE MAP COMMUNITY PANEL 32000C2150 E. CLARK COUNTY, NEVADA DATED SEPTEMBER 27, 2002.

DISCLAIMER NOTE:

EXISTING UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT VERTICAL AND HORIZONTAL LOCATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN HEREON. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITIES NOT SHOWN IN THEIR PROPER LOCATION.

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Call before you Dig

Avoid cutting underground utility lines. It's costly.

Call 811

OR

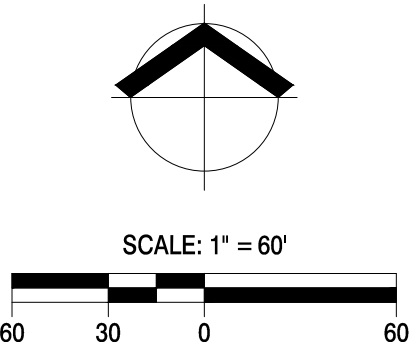
1-800-227-2600

FAST

Call before you UnderGround

1-702-432-5300

FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION



RIETZ CONSULTING INC.

3203 E. WARM SPRINGS RD #400
LAS VEGAS, NEVADA 89120
PH: 702.521.3355

BMP MAP

PANTHER MEDICAL

APN'S: 138-31-216-001, 138-31-210-004, 009 & 010
LAS VEGAS, NEVADA

DATE: 8/18/2020

DRAFTER: JG

CHECKED: JM

SCALE: 1" = 60'

SHEET

FIG-7

SHEET 7 OF 7 SHEETS

APPENDIX A: HYDROLOGY

SUPPORTING EXCERPTS FROM HCDDM

Curve Number Matrix

SOIL MAP UNIT	HYDROLOGIC SOIL GROUP					LAND USE CATEGORY INDEX NUMBER												
	A	B	C	D	ROCK OUTCROP	1	2	3	4	5	6	7	8	9	10	11	12	13
	CN ---->	CN ---->	CN ---->	CN ---->	CN ---->	CN ---->	CN ---->	CN ---->	CN ---->	CN ---->	CN ---->	CN ---->	CN ---->	CN ---->	CN ---->	CN ---->	CN ---->	CN ---->
SOIL TYPE COMPOSITE CN FOR LAND USE CATEGORY																		
1100	6	0	0	59	35	87.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1105	55	40	0	5	0	70.0	56.0	65.0	67.0	69.0	78.0	86.0	91.0	93.0	88.0	93.0	76.0	30.0
1107	0	100	0	0	0	77.0	66.0	73.0	74.0	76.0	83.0	89.0	93.0	94.0	91.0	94.0	81.0	30.0
1112	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1113	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1117	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1120	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1127	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1129	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1130	65	0	25	10	0	71.0	58.0	66.0	68.0	70.0	79.0	87.0	91.0	93.0	89.0	93.0	77.0	30.0
1132	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1133	70	0	10	0	20	71.0	58.0	67.0	68.0	70.0	79.0	87.0	91.0	93.0	89.0	93.0	77.0	30.0
1134	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1135	84	0	0	16	0	67.0	52.0	62.0	64.0	66.0	76.0	85.0	90.0	92.0	87.0	92.0	74.0	30.0
1140	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1141	8	0	2	70	20	86.0	81.0	85.0	86.0	86.0	90.0	93.0	95.0	96.0	94.0	96.0	89.0	30.0
1150	0	0	0	100	0	88.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1152	0	0	0	100	0	88.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1156	1	10	0	89	0	87.0	81.0	84.0	85.0	86.0	90.0	93.0	95.0	95.0	94.0	96.0	89.0	30.0
1160	0	0	100	0	0	87.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1160dn	46	1	0	53	0	76.0	66.0	73.0	74.0	76.0	83.0	89.0	93.0	94.0	91.0	94.0	81.0	30.0
1165	32	40	15	13	0	75.0	64.0	71.0	73.0	74.0	82.0	88.0	92.0	94.0	90.0	94.0	80.0	30.0
1181	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1182	95	0	5	0	0	64.0	48.0	58.0	61.0	63.0	74.0	84.0	89.0	92.0	86.0	92.0	72.0	30.0
1183	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1184	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1187	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1190	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1191	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1192	55	35	0	10	0	70.0	57.0	66.0	68.0	70.0	79.0	87.0	91.0	93.0	88.0	93.0	76.0	30.0
1200	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1206	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1207	3	85	5	7	0	78.0	67.0	74.0	75.0	77.0	83.0	89.0	93.0	94.0	91.0	94.0	82.0	30.0
1222	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1225	9	20	50	21	0	82.0	73.0	79.0	80.0	81.0	86.0	91.0	94.0	95.0	92.0	95.0	85.0	30.0
1230	54	0	0	46	0	75.0	63.0	70.0	72.0	74.0	81.0	88.0	92.0	94.0	90.0	94.0	80.0	30.0
1235	66	25	0	9	0	69.0	55.0	64.0	66.0	68.0	77.0	86.0	91.0	93.0	88.0	93.0	75.0	30.0
1236	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1237	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1240	0	0	0	100	0	88.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1252	0	100	0	0	0	77.0	66.0	73.0	74.0	76.0	83.0	89.0	93.0	94.0	91.0	94.0	81.0	30.0
1255	0	100	0	0	0	77.0	66.0	73.0	74.0	76.0	83.0	89.0	93.0	94.0	91.0	94.0	81.0	30.0
1260	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1262	75	0	0	25	0	69.0	56.0	64.0	67.0	69.0	78.0	86.0	91.0	93.0	88.0	93.0	76.0	30.0
1263	95	0	0	5	0	64.0	48.0	59.0	61.0	64.0	74.0	84.0	89.0	92.0	86.0	92.0	72.0	30.0
1264	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1270	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1278	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1282	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1300	0	0	0	100	0	88.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0

PRECIPITATION ADJUSTMENT RATIOS

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

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

<i>Revision</i>	<i>Date</i>

SIX HOUR DEPTH-AREA REDUCTION FACTORS

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

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

<i>Revision</i>	<i>Date</i>

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

SIX-HOUR STORM DISTRIBUTIONS

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

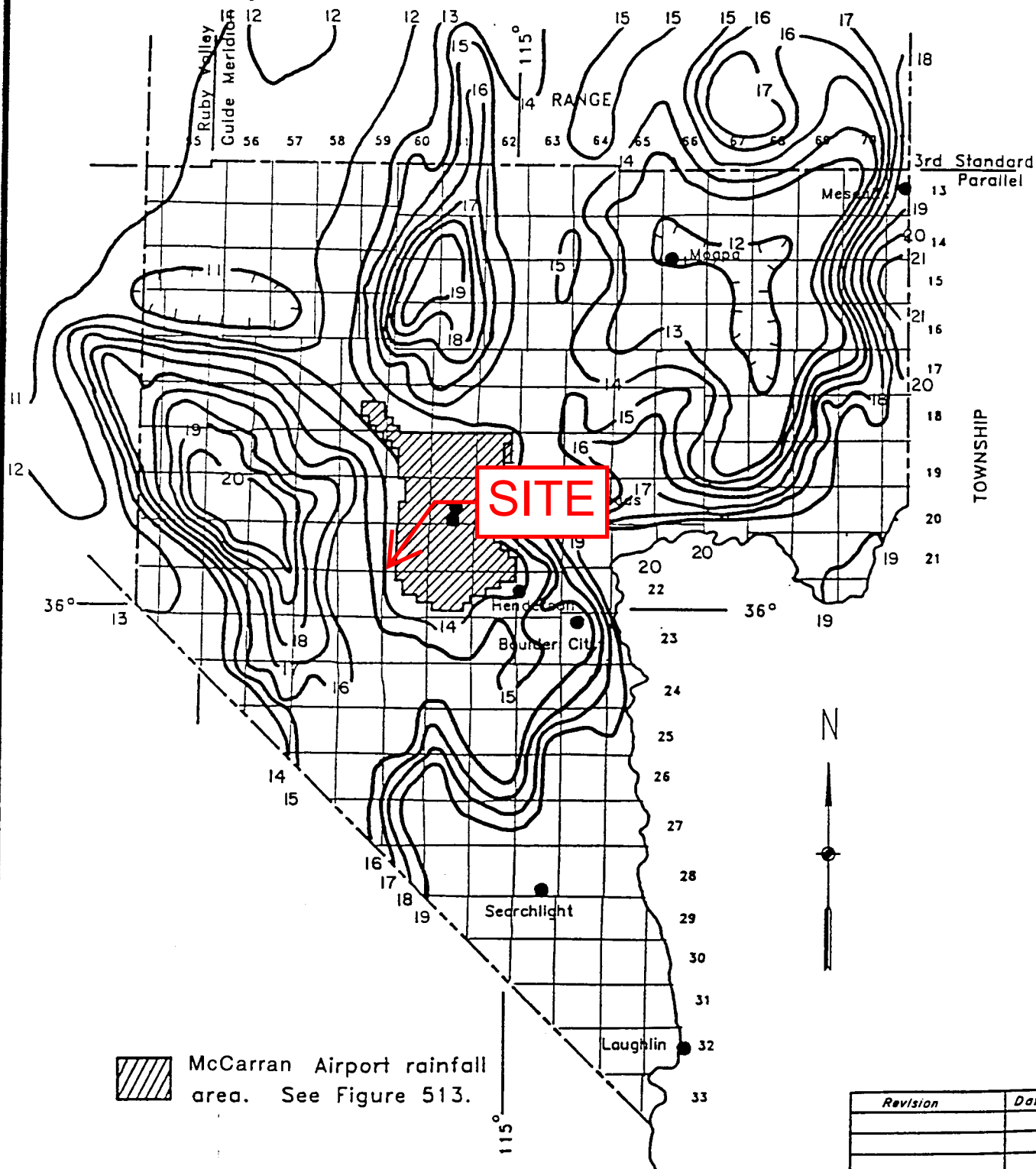
- Notes: 1. For drainage areas less than 8 square miles in size, use SDN 3.
 2. For drainage areas greater than or equal to 8 square miles and less than 12 square miles in size, use SDN 4.
 3. For drainage areas greater than or equal to 12 square miles, use SDN 5.
 4. A graphical representation of these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

Revision	Date

REFERENCE:

TABLE 503

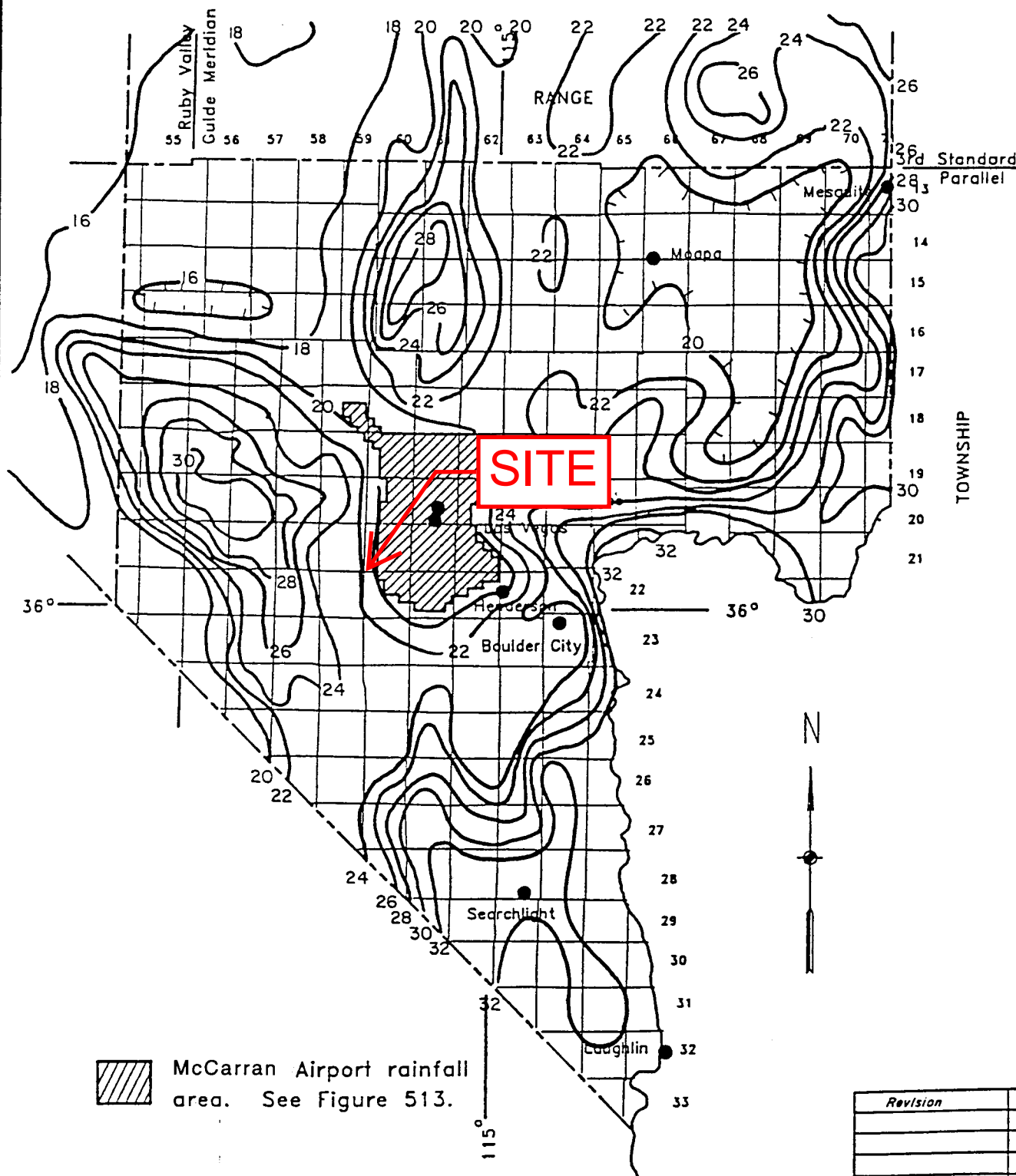
RAINFALL DEPTH-DURATION-FREQUENCY 10-YEAR, 6-HOUR (DEPTHS IN TENTHS OF INCHES)



 McCarran Airport rainfall area. See Figure 513.

Revision	Date

RAINFALL DEPTH-DURATION-FREQUENCY 100-YEAR, 6-HOUR (DEPTHS IN TENTHS OF INCHES)



PRECIPITATION, CURVE NUMBERS & STANDARD FORM

4

Rainfall and Precipitation Computations

Project Name: PANTHER MEDICAL

By: jg



3203 E. Warm Springs Road #400
Las Vegas NV 89120 Ph. 702-521-3355

DATA:

Project is located in: Township: 19S Range: 61E

Site is located OUTSIDE of the McCarren Airport Rainfall Area

Figure 513*

10-YEAR DEPTH: 1.4 " Figure 503

100-YEAR DEPTH: 2.2 " Figure 506

10-YEAR ADJ. 1.24 Table 501

100-YEAR ADJ. 1.43 Table 501

Six Hour Depth Reduction Factors (DARF):

Table 502*

Area (gross acres): 10 = 0.016 square miles
DARF = 1.00

Calculations:

$P_{10} =$ 1.74 10-Year Precipitation (in)

$P_{100} =$ 3.15 100-Year Precipitation (in)

$P_{10}/P_{100} =$ 0.55 HEC-1 Multiple Ratio Value

Equations:

* Clark County Regional Flood Control District - Hydrologic Criteria and Drainage Design Manual

Soil & Curve Number Computations

Project Name: PANTHER MEDICAL

Date: 8/18/2020

By: JG



3203 E. Warm Springs Road #400
Las Vegas NV 89120 Ph. 702-521-3355

DATA:

SOIL UNIT	Commercial CN	DESERT SHRUB	IMPERVIOUS /ROW CN
152	96	86	98

Subbasin	AREA	LANDUSE	Cn
E1	2.56	COM.	96.0
E2	1.53	COM.	96.0
E3	1.28	DESERT SHRUB	86.0
E4	3.10	DESERT SHRUB	86.0
OFF1	3.67	DESERT SHRUB	86.0
ALT1	4.70	ROW	98.0
HUA1	1.52	ROW	98.0
DOFF1	3.67	COM.	96.0
D1A	1.30	COM.	96.0
D1B	1.21	COM.	96.0
D2	1.06	COM.	96.0
D3	1.31	COM.	96.0
D4	0.71	COM.	96.0
D5	1.55	COM.	96.0
D6	1.34	COM.	96.0

TIME OF CONCENTRATION AND HEC-1 INPUT

Project Name: PANTHER MEDICAL

Date: 8/20/2020

By: JG



3203 E. Warm Springs Road #400
Las Vegas NV 89120 Ph. 702-521-3355

SUB-BASIN DATA				INITIAL/OVERLAND TIME (T _i)				TRAVEL TIME (T _t)				T _c	T _c CHECK (URBANIZED BASINS)				
KK		BA													UD		LS
Desig.	DEV./EX. (D or E)	K	AREA ac	AREA MI ²	INITIAL LENGTH FT	SLOPE %	T _i MIN.	TRAVEL LENGTH FT	SLOPE %	V ₁ VEL. FT/S	V ₂ VEL. FT/S	T _t MIN.	T _c Calc.	TOTAL LENGTH FT	T _c Check	TLAG3	CN
		[1]*		[2]*			[3]*			[4]*	[5]*	[6]*		[8]*	[13]*	[15]*	[16]*
E1	D	0.877	2.56	0.00400	200	3.0	3.93	150	2.0	2.86	4.33	0.88	4.81	350	11.94	0.050	96.0
E2	D	0.877	1.53	0.00239	200	1.0	5.67	120	4.5	4.29	6.49	0.47	6.14	320	11.78	0.061	96.0
E3	E	0.745	1.28	0.00200	100	3.0	4.43	500	2.5	2.34	4.65	3.56	7.99	600	N/A	0.100	86.0
E4	E	0.745	3.10	0.00484	150	3.0	5.42	500	2.5	2.34	4.65	3.56	8.98	650	N/A	0.100	86.0
OFF1	E	0.745	3.67	0.00573	350	3.0	8.28	350	2.5	2.34	4.65	2.49	10.78	700	N/A	0.108	86.0
ALT1	D	0.904	4.70	0.00734	40	2.0	1.77	1700	2.5	3.19	4.84	6.74	8.52	1740	19.67	0.085	98.0
HUA1	D	0.904	1.52	0.00238	50	2.0	1.98	500	0.5	1.43	2.16	5.83	7.82	550	13.06	0.078	98.0
DOFF1	D	0.877	3.67	0.00573	350	3.0	5.20	350	2.5	3.19	4.84	1.83	7.03	700	13.89	0.070	96.0
D1A	D	0.877	1.30	0.00203	200	3.0	3.93	150	2.0	2.86	4.33	0.88	4.81	350	11.94	0.050	96.0
D1B	D	0.877	1.21	0.00189	200	3.0	3.93	150	2.0	2.86	4.33	0.88	4.81	350	11.94	0.050	96.0
D2	D	0.877	1.06	0.00166	200	1.0	5.67	120	4.5	4.29	6.49	0.47	6.14	320	11.78	0.061	96.0
D3	D	0.877	1.31	0.00205	75	4.0	2.19	400	2.0	2.86	4.33	2.33	4.52	475	12.64	0.050	96.0
D4	D	0.877	0.71	0.00111	75	4.0	2.19	120	1.0	2.02	3.06	0.99	3.18	195	11.08	0.050	96.0
D5	D	0.877	1.55	0.00242	100	2.0	3.18	650	4.0	4.04	6.12	2.47	5.65	750	14.17	0.057	96.0
D6	D	0.877	1.34	0.00209	100	4.0	2.53	550	2.5	3.19	4.84	2.78	5.31	650	13.61	0.053	96.0

* Clark County Regional Flood Control District - Hydrologic Criteria and Drainage Design Manual

EXISTING CONDITION HEC-1 ANALYSIS

ID
 ID TECHNICAL DRAINAGE STUDY FOR PANTHER MEDICAL
 ID LAS VEGAS, NEVADA
 ID
 ID PREPARED BY:
 ID Rietz Consulting, Inc.
 ID 3203 E. WARM SPRINGS #400
 ID LAS VEGAS, NV 89120
 ID
 ID FILENAME:HA-E.TXT
 ID
 ID
 ID
 *DIAGRAM
 IT 5 0 0 300
 IO 5
 IN 5
 JR PREC 0.55 1.00
 *
 KK HUA1
 KM HUALAPAI DISCHARGES TO THE NORTH
 BA.00238
 PB 3.15
 PC .000 .020 .057 .070 .087 .108 .124 .130 .130 .130
 PC .130 .130 .130 .133 .140 .142 .148 .158 .172 .181
 PC .190 .197 .199 .200 .201 .204 .214 .229 .241 .249
 PC .251 .256 .270 .278 .281 .283 .295 .322 .352 .409
 PC .499 .590 .710 .744 .781 .812 .819 .835 .851 .856
 PC .860 .868 .876 .888 .910 .926 .937 .950 .970 .976
 PC .982 .985 .987 .989 .990 .993 .993 .994 .995 .998
 PC .998 .999 1.00
 LS 0 98.0
 UD 0.078
 *
 KK OFF1
 KM EXISTING OFFSITE BASIN EOFF1 DISCHARGES TO ONSITE BASIN E4
 BA.00573
 LS 0 86.0
 UD 0.108
 *
 KK E4
 KM EXISTING ONSITE BASIN E4 DISCHARGES TO THE NORTHERN ADJACNET PROPERTY
 BA.00484
 LS 0 86.0
 UD 0.100
 *
 KK C1
 KM COMBINE OFF1 AND E4
 HC 2
 *
 KK E1
 KM EXISTING ONSITE BASIN AT NEC OF HUALAPAI AND ALTA DISCHARGES TO ALTA
 BA.00400
 LS 0 96.0
 UD 0.050
 *
 KK E2
 KM EXISTING PRESCHOOL DISCAHRGES TO ALTA
 BA.00239
 LS 0 96.0
 UD 0.061
 *
 KK E3
 KM EXISTING ONSITE BASIN DISCAHRGES TO ALTA
 BA.00200
 LS 0 86.0
 UD 0.100
 *

KK ALT1
BA.00734
LS 0 98.0
UD 0.085
*
KK C2
KM COMBINE ALT1, E1, E2 AND E3 IN ALTA AT EAST END OF PROJECT.
HC 4
*
ZZ

[illegible]

48	UD	0.050	
	*		
49	KK	E2	
50	KM	EXISTING PRESCHOOL DISCAHRGES TO ALTA	
51	BA	.00239	
52	LS	0	96.0
53	UD	0.061	
	*		
54	KK	E3	
55	KM	EXISTING ONSITE BASIN DISCAHRGES TO ALTA	
56	BA	.00200	
57	LS	0	86.0
58	UD	0.100	
	*		
59	KK	ALT1	
60	BA	.00734	
61	LS	0	98.0
62	UD	0.085	
	*		
63	KK	C2	
64	KM	COMBINE ALT1, E1, E2 AND E3 IN ALTA AT EAST END OF PROJECT.	
65	HC	4	
	*		
66	ZZ		

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE	(V) ROUTING	(--->) DIVERSION OR PUMP FLOW
NO.	(.) CONNECTOR	(<---) RETURN OF DIVERTED OR PUMPED FLOW
17	HUA1	
	.	
31	.	OFF1
	.	
36	.	E4
	.	
41	.	C1.....
	.	
44	.	E1
	.	
	.	
	.	

NDTIME 0055 ENDING TIME
ICENT 19 CENTURY MARK

COMPUTATION INTERVAL .08 HOURS
TOTAL TIME BASE 24.92 HOURS

ENGLISH UNITS

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

JP MULTI-PLAN OPTION
NPLAN 1 NUMBER OF PLANS

JR MULTI-RATIO OPTION
RATIOS OF PRECIPITATION
.55 1.00

1

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

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO PRECIPITATION	
				RATIO 1	RATIO 2

HYDROGRAPH AT +	HUAL	.00	1	FLOW	6.
				TIME	3.50

HYDROGRAPH AT +	OFF1	.01	1	FLOW	9.
				TIME	3.58

HYDROGRAPH AT +	E4	.00	1	FLOW	8.
				TIME	3.50

2 COMBINED AT +	C1	.01	1	FLOW	17.
				TIME	3.58

HYDROGRAPH AT +	E1	.00	1	FLOW	10.

HYDROGRAPH AT +	E2	.00	1	TIME FLOW TIME	3.50	3.50
					3.	6.
HYDROGRAPH AT +	E3	.00	1	TIME FLOW TIME	3.50	3.50
					1.	3.
HYDROGRAPH AT +	ALT1	.01	1	TIME FLOW TIME	3.50	17.
					9.	3.50
4 COMBINED AT +	C2	.02	1	TIME FLOW TIME	19.	37.
					3.50	3.50

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

DEVELOPED CONDITION HEC-1 ANALYSIS

ID
 ID TECHNICAL DRAINAGE STUDY FOR PANTHER MEDICAL
 ID LAS VEGAS, NEVADA
 ID
 ID PREPARED BY:
 ID Rietz Consulting, Inc.
 ID 3203 E. WARM SPRINGS #400
 ID LAS VEGAS, NV 89120
 ID
 ID FILENAME:HA-E.TXT
 ID
 ID
 ID
 *DIAGRAM
 IT 5 0 0 300
 IO 5
 IN 5
 JR PREC 0.55 1.00
 *
 KK HUA1
 KM HUALAPAI DISCHARGES TO THE NORTH
 BA.00238
 PB 3.15
 PC .000 .020 .057 .070 .087 .108 .124 .130 .130 .130
 PC .130 .130 .130 .133 .140 .142 .148 .158 .172 .181
 PC .190 .197 .199 .200 .201 .204 .214 .229 .241 .249
 PC .251 .256 .270 .278 .281 .283 .295 .322 .352 .409
 PC .499 .590 .710 .744 .781 .812 .819 .835 .851 .856
 PC .860 .868 .876 .888 .910 .926 .937 .950 .970 .976
 PC .982 .985 .987 .989 .990 .993 .993 .994 .995 .998
 PC .998 .999 1.00
 LS 0 98.0
 UD 0.078
 *
 KK DOFF1
 KM DEVELOPED OFFSITE BASIN DOFF1 DISCHARGES TO ONSITE BASIN D4
 BA.00573
 LS 0 96.0
 UD 0.070
 *
 KK D4
 KM DEVELOPED ONSITE BASIN D4 DISCHARGES TO THE NORTHERN ADJACNET PROPERTY
 BA.00111
 LS 0 96.0
 UD 0.050
 *
 KK C1
 KM COMBINE DOFF1 AND D4 DISCAHRGE TO THE NORTH ADJACENT PROPERTY
 HC 2
 *
 KK D1A
 KM PORTION OF DEVELOPED BASIN D1 THAT DISCAHRGES THROUGH COMMERCIAL DWAY TO ALTA
 BA.00203
 LS 0 96.0
 UD 0.050
 *
 KK D1B
 KM PORTION OF DEVELOPED BASIN D1 THAT DISCAHRGES THROUGH BMP TO ALTA
 BA.00189
 LS 0 96.0
 UD 0.050
 *
 KK C2
 KM COMBINE D1A AND D1B
 HC 2
 *
 KK D2
 KM DEVELOPED PRESCHOOL DISCAHRGES TO ALTA

BA.00166
LS 0 96.0
UD 0.061
*
KK D3
KM DEVELOPED ONSITE BASIN DISCAHRGES TO ALTA THROUGH DRIVEWAY
BA.00205
LS 0 96.0
UD 0.050
*
KK C3
KM COMBINE C2 WIH D2 AND D3
HC 3
*
KK D5
KM NORTHEASTERN PORTION OF DEVELOPED SITE DISCHARGES TO ALTA
BA.00242
LS 0 96.0
UD 0.057
*
KK D6
KM SOUTHEASTERN PORTION OF DEVELOPED SITE DISCHARGES TO ALTA
BA.00209
LS 0 96.0
UD 0.053
*
KK C4
KM COMBINE D5 AND D6 BEFORE DISCHARGE TO ALTA AT EAST END OF SITE
HC 3
*
KK ALT1
BA.00734
LS 0 98.0
UD 0.085
*
KK C5
KM COMBINE ALT1 & C4 IN ALTA AT EAST END OF PROJECT.
HC 2
*
ZZ

```
1 *****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
* JUN 1998
* VERSION 4.1
*
* RUN DATE 28AUG20 TIME 14:54:11
*
* *****
*
* U.S. ARMY CORPS OF ENGINEERS
* HYDROLOGIC ENGINEERING CENTER
* 609 SECOND STREET
* DAVIS, CALIFORNIA 95616
* (916) 756-1104
*
* *****
```

```

X X XXXXXXXX XXXX X
X X X X X XX
X X X X X X
XXXXXX XXXX X XXXX X
X X X X X X
X X X X X X
X X XXXXXXXX XXXX XXX
```

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

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.

THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION

NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,

DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION

KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
1 ID
2 ID TECHNICAL DRAINAGE STUDY FOR PANTHER MEDICAL
3 ID LAS VEGAS, NEVADA
4 ID
5 ID PREPARED BY:
6 ID Rietz Consulting, Inc.
7 ID 3203 E. WARM SPRINGS #400
8 ID LAS VEGAS, NV 89120
9 ID
10 ID FILENAME:HA-E.TXT
11 ID
12 ID
```


13	*DIAGRAM	5	0	0	300		
14	IT	5					
15	IO	5					
16	IN	5					
	JR	PREC	0.55	1.00			
	*						
17	KK	HUA1					
18	KM	HUALAPAI DISCHARGES TO THE NORTH					
19	BA	.00238				.130	.130
20	PB	3.15				.124	.130
21	PC	.000	.020	.057	.070	.087	.108
22	PC	.130	.130	.130	.133	.140	.142
23	PC	.190	.197	.199	.200	.201	.204
24	PC	.251	.256	.270	.278	.281	.283
25	PC	.499	.590	.710	.744	.781	.812
26	PC	.860	.868	.876	.888	.910	.926
27	PC	.982	.985	.987	.989	.990	.993
28	PC	.998	.999	1.00		.993	.994
29	LS	0					
30	UD	0.078					
	*						
31	KK	DOFF1					
32	KM	DEVELOPED OFFSITE BASIN DOFF1 DISCHARGES TO ONSITE BASIN D4					
33	BA	.00573					
34	LS	0	96.0				
35	UD	0.070					
	*						
36	KK	D4					
37	KM	DEVELOPED ONSITE BASIN D4 DISCHARGES TO THE NORTHERN ADJACNET PROPERTY					
38	BA	.00111					
39	LS	0	96.0				
40	UD	0.050					
	*						
41	KK	C1					
42	KM	COMBINE DOFF1 AND D4 DISCAHRGE TO THE NORTH ADJACENT PROPERTY					
43	HC	2					
	*						
LINE	ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10						
	HEC-1 INPUT						
44	KK	D1A					
45	KM	PORTION OF DEVELOPED BASIN D1 THAT DISCAHRGES THROUGH COMMERCIAL DWAY TO ALTA					
46	BA	.00203					
47	LS	0	96.0				

48	UD	0.050	
	*		
49	KK	D1B	
50	KM	PORTION OF DEVELOPED BASIN D1 THAT DISCHARGES THROUGH BMP TO ALTA	
51	BA	.00189	
52	LS	0	96.0
53	UD	0.050	
	*		
54	KK	C2	
55	KM	COMBINE D1A AND D1B	
56	HC	2	
	*		
57	KK	D2	
58	KM	DEVELOPED PRESCHOOL DISCHARGES TO ALTA	
59	BA	.00166	
60	LS	0	96.0
61	UD	0.061	
	*		
62	KK	D3	
63	KM	DEVELOPED ONSITE BASIN DISCHARGES TO ALTA THROUGH DRIVEWAY	
64	BA	.00205	
65	LS	0	96.0
66	UD	0.050	
	*		
67	KK	C3	
68	KM	COMBINE C2 WITH D2 AND D3	
69	HC	3	
	*		
70	KK	D5	
71	KM	NORTHEASTERN PORTION OF DEVELOPED SITE DISCHARGES TO ALTA	
72	BA	.00242	
73	LS	0	96.0
74	UD	0.057	
	*		
75	KK	D6	
76	KM	SOUTHEASTERN PORTION OF DEVELOPED SITE DISCHARGES TO ALTA	
77	BA	.00209	
78	LS	0	96.0
79	UD	0.053	
	*		
		HEC-1 INPUT	
	ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10		

80 KK C4
81 KM COMBINE D5 AND D6 BEFORE DISCHARGE TO ALTA AT EAST END OF SITE

83	KK	ALT1	
84	BA	.00734	
85	LS	0	98.0
86	UD	0.085	
	*		

87	KK	C5	
88	KM	COMBINE AL11 & C4 IN ALTA AT EAST END OF PROJECT.	
89	HC	2	
	*		
90	ZZ		

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

(V) ROUTING	(--->) DIVERSION OR PUMP FLOW
(.) CONNECTOR	(<---) RETURN OF DIVERTED OR PUMPED FLOW

Line	Text
17	HUA1
31	DOFF1
36	D4
41	C1.....
44	D1A
49	D1B
54	C2.....
57	D2
62	D3

67	.	.	.	C3.....	.
70	.	.	.	D5	.
75	.	.	.	D6	.
80	.	.	.	C4.....	.
83	.	.	.	ALT1	.
87	.	.	.	C5.....	.

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```

1 *****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
*
* JUN 1998
*
* VERSION 4.1
*
* RUN DATE 28AUG20 TIME 14:54:11
*
* *****
*
* U.S. ARMY CORPS OF ENGINEERS
*
* HYDROLOGIC ENGINEERING CENTER
*
* 609 SECOND STREET
*
* DAVIS, CALIFORNIA 95616
*
* (916) 756-1104
*
* *****
*

```

TECHNICAL DRAINAGE STUDY FOR PANTHER MEDICAL
LAS VEGAS, NEVADA

PREPARED BY:

Rietz Consulting, Inc.
3203 E. WARM SPRINGS #400
LAS VEGAS, NV 89120

FILENAME:HA-E.TXT

```
14 IO      OUTPUT CONTROL VARIABLES
          IPRINT 5 PRINT CONTROL
          IPLOT  0 PLOT CONTROL
```

QSCAL 0. HYDROGRAPH PLOT SCALE

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

COMPUTATION INTERVAL .08 HOURS
 TOTAL TIME BASE 24.92 HOURS

ENGLISH UNITS

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

JP MULTI-PLAN OPTION
 NPLAN 1 NUMBER OF PLANS

JR MULTI-RATIO OPTION
 RATIOS OF PRECIPITATION
 .55 1.00

1

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

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO PRECIPITATION	
				RATIO 1	RATIO 2
HYDROGRAPH AT +	HUAL	.00	1	FLOW TIME	3. 6.
HYDROGRAPH AT +	DOFF1	.01	1	FLOW TIME	7. 14.
HYDROGRAPH AT +	D4	.00	1	FLOW	1. 3.

+	2 COMBINED AT	C1	.01	1	FLOW TIME	9.3.50	17.3.50
+	HYDROGRAPH AT	D1A	.00	1	FLOW TIME	3.3.50	5.3.50
+	HYDROGRAPH AT	D1B	.00	1	FLOW TIME	3.3.50	5.3.50
+	2 COMBINED AT	C2	.00	1	FLOW TIME	5.3.50	10.3.50
+	HYDROGRAPH AT	D2	.00	1	FLOW TIME	2.3.50	4.3.50
+	HYDROGRAPH AT	D3	.00	1	FLOW TIME	3.3.50	5.3.50
+	3 COMBINED AT	C3	.01	1	FLOW TIME	10.3.50	20.3.50
+	HYDROGRAPH AT	D5	.00	1	FLOW TIME	3.3.50	6.3.50
+	HYDROGRAPH AT	D6	.00	1	FLOW TIME	3.3.50	5.3.50
+	3 COMBINED AT	C4	.01	1	FLOW TIME	16.3.50	31.3.50
+	HYDROGRAPH AT	ALT1	.01	1	FLOW TIME	9.3.50	17.3.50
+	2 COMBINED AT	C5	.02	1	FLOW TIME	25.3.50	48.3.50

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

APPENDIX B: HYDRAULICS

STREET FLOW CALCULATIONS

Worksheet for SECTION A 10-YR

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.02000 ft/ft
Discharge 25.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	2881.44
0+00.50	2881.44
0+00.50	2880.94
0+02.00	2881.10
0+39.00	2882.05
0+68.00	2881.14
0+69.50	2880.97
0+69.50	2881.47
0+70.00	2881.47

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 2881.44)	(0+70.00, 2881.47)	0.016

Options

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

Results

Normal Depth 0.53 ft
Elevation Range 2880.94 to 2882.05 ft
Flow Area 5.69 ft²
Wetted Perimeter 29.43 ft

Worksheet for SECTION A 10-YR

Results

Hydraulic Radius	0.19	ft
Top Width	28.37	ft
Normal Depth	0.53	ft
Critical Depth	0.63	ft
Critical Slope	0.00622	ft/ft
Velocity	4.39	ft/s
Velocity Head	0.30	ft
Specific Energy	0.83	ft
Froude Number	1.73	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.53	ft
Critical Depth	0.63	ft
Channel Slope	0.02000	ft/ft
Critical Slope	0.00622	ft/ft

Cross Section for SECTION A 10-YR

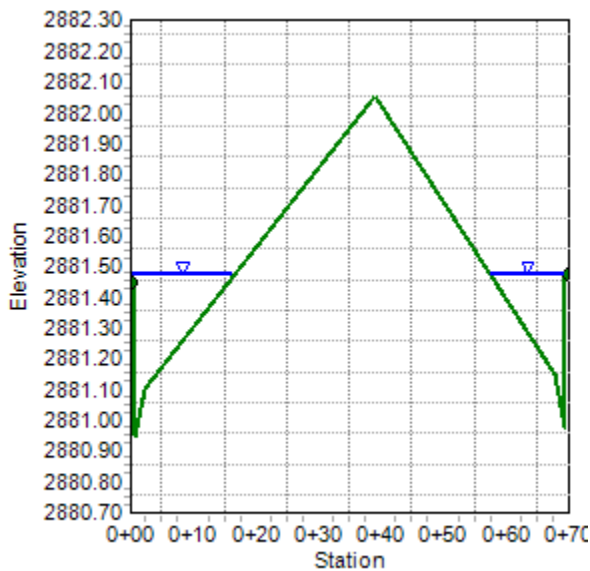
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.02000	ft/ft
Normal Depth	0.53	ft
Discharge	25.00	ft ³ /s

Cross Section Image



Worksheet for SECTION A 100-YR

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.02000 ft/ft
Discharge 48.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	2881.44
0+00.50	2881.44
0+00.50	2880.94
0+02.00	2881.10
0+39.00	2882.05
0+68.00	2881.14
0+69.50	2880.97
0+69.50	2881.47
0+70.00	2881.47

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 2881.44)	(0+70.00, 2881.47)	0.016

Options

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

Results

Normal Depth 0.64 ft
Elevation Range 2880.94 to 2882.05 ft
Flow Area 9.33 ft²
Wetted Perimeter 38.01 ft

Worksheet for SECTION A 100-YR

Results

Hydraulic Radius	0.25	ft
Top Width	36.73	ft
Normal Depth	0.64	ft
Critical Depth	0.77	ft
Critical Slope	0.00569	ft/ft
Velocity	5.14	ft/s
Velocity Head	0.41	ft
Specific Energy	1.05	ft
Froude Number	1.80	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.64	ft
Critical Depth	0.77	ft
Channel Slope	0.02000	ft/ft
Critical Slope	0.00569	ft/ft

Cross Section for SECTION A 100-YR

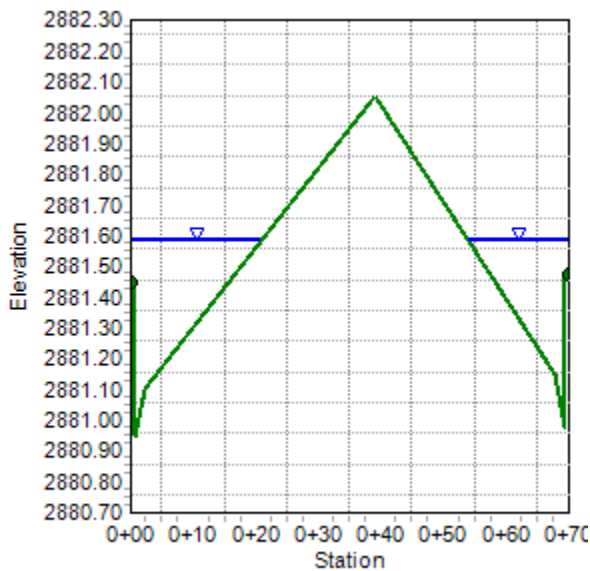
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.02000	ft/ft
Normal Depth	0.64	ft
Discharge	48.00	ft ³ /s

Cross Section Image



ONSITE FLOW CALCULATIONS

Worksheet for SECTION B2 100-YR

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.035	
Channel Slope	0.14030	ft/ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	6.00	ft/ft (H:V)
Bottom Width	6.00	ft
Discharge	5.00	ft ³ /s

Results

Normal Depth	0.17	ft
Flow Area	1.12	ft ²
Wetted Perimeter	7.54	ft
Hydraulic Radius	0.15	ft
Top Width	7.49	ft
Critical Depth	0.26	ft
Critical Slope	0.02971	ft/ft
Velocity	4.46	ft/s
Velocity Head	0.31	ft
Specific Energy	0.48	ft
Froude Number	2.03	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.17	ft
Critical Depth	0.26	ft
Channel Slope	0.14030	ft/ft

Worksheet for SECTION B2 100-YR

GVF Output Data

Critical Slope 0.02971 ft/ft

Cross Section for SECTION B2 100-YR

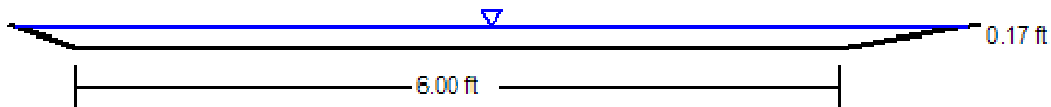
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.035	
Channel Slope	0.14030	ft/ft
Normal Depth	0.17	ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	6.00	ft/ft (H:V)
Bottom Width	6.00	ft
Discharge	5.00	ft ³ /s

Cross Section Image



V: 1
H: 1

Worksheet for SECTION B3 100-YR

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.035	
Channel Slope	0.01000	ft/ft
Left Side Slope	6.00	ft/ft (H:V)
Right Side Slope	6.00	ft/ft (H:V)
Bottom Width	6.00	ft
Discharge	5.00	ft ³ /s

Results

Normal Depth	0.35	ft
Flow Area	2.80	ft ²
Wetted Perimeter	10.21	ft
Hydraulic Radius	0.27	ft
Top Width	10.15	ft
Critical Depth	0.25	ft
Critical Slope	0.03014	ft/ft
Velocity	1.79	ft/s
Velocity Head	0.05	ft
Specific Energy	0.40	ft
Froude Number	0.60	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.35	ft
Critical Depth	0.25	ft
Channel Slope	0.01000	ft/ft

Worksheet for SECTION B3 100-YR

GVF Output Data

Critical Slope 0.03014 ft/ft

Cross Section for SECTION B3 100-YR

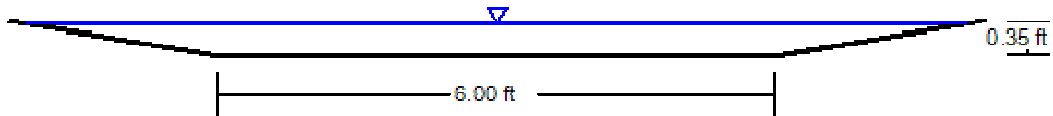
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.035	
Channel Slope	0.01000	ft/ft
Normal Depth	0.35	ft
Left Side Slope	6.00	ft/ft (H:V)
Right Side Slope	6.00	ft/ft (H:V)
Bottom Width	6.00	ft
Discharge	5.00	ft ³ /s

Cross Section Image



V: 1
H: 1

Worksheet for SECTION C 100-YR

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.02500 ft/ft
Discharge 6.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	2872.57
0+00.50	2872.57
0+00.50	2872.07
0+02.00	2872.20
0+18.50	2872.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 2872.57)	(0+18.50, 2872.60)	0.016

Options

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

Results

Normal Depth 0.36 ft
Elevation Range 2872.07 to 2872.60 ft
Flow Area 1.55 ft²
Wetted Perimeter 11.41 ft
Hydraulic Radius 0.14 ft
Top Width 11.04 ft
Normal Depth 0.36 ft
Critical Depth 0.44 ft

Worksheet for SECTION C 100-YR

Results

Critical Slope	0.00692	ft/ft
Velocity	3.87	ft/s
Velocity Head	0.23	ft
Specific Energy	0.59	ft
Froude Number	1.82	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.36	ft
Critical Depth	0.44	ft
Channel Slope	0.02500	ft/ft
Critical Slope	0.00692	ft/ft

Cross Section for SECTION C 100-YR

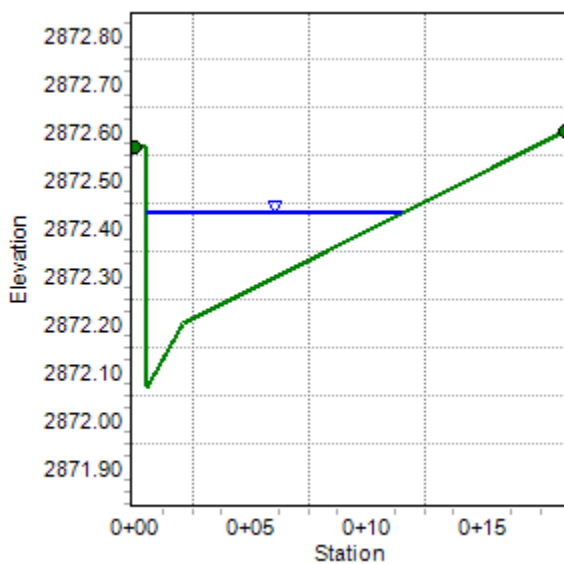
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.02500	ft/ft
Normal Depth	0.36	ft
Discharge	6.00	ft ³ /s

Cross Section Image



Worksheet for SECTION D1 100-YR

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.035	
Channel Slope	0.09770	ft/ft
Left Side Slope	6.00	ft/ft (H:V)
Right Side Slope	6.00	ft/ft (H:V)
Bottom Width	6.00	ft
Discharge	6.00	ft ³ /s

Results

Normal Depth	0.20	ft
Flow Area	1.46	ft ²
Wetted Perimeter	8.46	ft
Hydraulic Radius	0.17	ft
Top Width	8.43	ft
Critical Depth	0.28	ft
Critical Slope	0.02921	ft/ft
Velocity	4.12	ft/s
Velocity Head	0.26	ft
Specific Energy	0.47	ft
Froude Number	1.74	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.20	ft
Critical Depth	0.28	ft
Channel Slope	0.09770	ft/ft

Worksheet for SECTION D1 100-YR

GVF Output Data

Critical Slope 0.02921 ft/ft

Cross Section for SECTION D1 100-YR

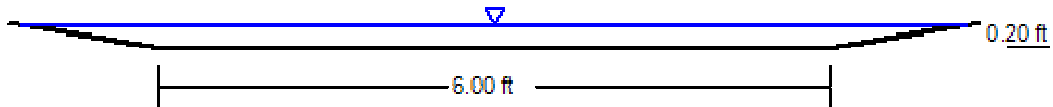
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.035	
Channel Slope	0.09770	ft/ft
Normal Depth	0.20	ft
Left Side Slope	6.00	ft/ft (H:V)
Right Side Slope	6.00	ft/ft (H:V)
Bottom Width	6.00	ft
Discharge	6.00	ft ³ /s

Cross Section Image



V: 1
H: 1

Worksheet for SECTION D2 100-YR

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.035	
Channel Slope	0.01000	ft/ft
Left Side Slope	6.00	ft/ft (H:V)
Right Side Slope	6.00	ft/ft (H:V)
Bottom Width	6.00	ft
Discharge	6.00	ft ³ /s

Results

Normal Depth	0.38	ft
Flow Area	3.17	ft ²
Wetted Perimeter	10.65	ft
Hydraulic Radius	0.30	ft
Top Width	10.59	ft
Critical Depth	0.28	ft
Critical Slope	0.02921	ft/ft
Velocity	1.89	ft/s
Velocity Head	0.06	ft
Specific Energy	0.44	ft
Froude Number	0.61	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.38	ft
Critical Depth	0.28	ft
Channel Slope	0.01000	ft/ft

Worksheet for SECTION D2 100-YR

GVF Output Data

Critical Slope 0.02921 ft/ft

Cross Section for SECTION D2 100-YR

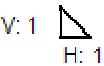
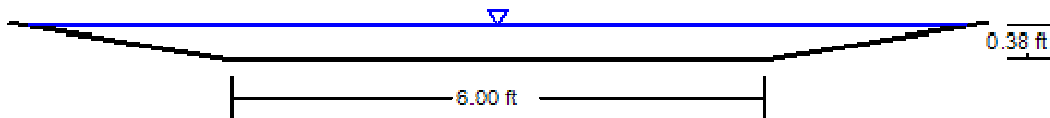
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.035	
Channel Slope	0.01000	ft/ft
Normal Depth	0.38	ft
Left Side Slope	6.00	ft/ft (H:V)
Right Side Slope	6.00	ft/ft (H:V)
Bottom Width	6.00	ft
Discharge	6.00	ft³/s

Cross Section Image



Worksheet for SECTION E 100-YR

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.01230 ft/ft
Discharge 14.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	2898.27
0+30.63	2897.45
0+32.29	2897.17
0+37.29	2897.17
0+46.29	2898.67

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 2898.27)	(0+46.29, 2898.67)	0.030

Options

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

Results

Normal Depth 0.56 ft
Elevation Range 2897.17 to 2898.67 ft
Flow Area 5.86 ft²
Wetted Perimeter 20.47 ft
Hydraulic Radius 0.29 ft
Top Width 20.40 ft
Normal Depth 0.56 ft
Critical Depth 0.50 ft

Worksheet for SECTION E 100-YR

Results

Critical Slope	0.02048	ft/ft
Velocity	2.39	ft/s
Velocity Head	0.09	ft
Specific Energy	0.65	ft
Froude Number	0.79	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.56	ft
Critical Depth	0.50	ft
Channel Slope	0.01230	ft/ft
Critical Slope	0.02048	ft/ft

Cross Section for SECTION E 100-YR

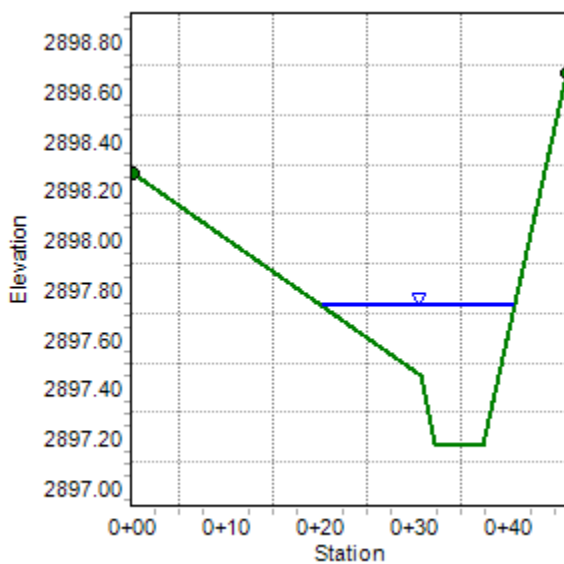
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.01230	ft/ft
Normal Depth	0.56	ft
Discharge	14.00	ft ³ /s

Cross Section Image



Worksheet for SECTION F 100-YR

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.03910 ft/ft
Discharge 14.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	2896.52
0+35.39	2895.30
0+40.88	2894.38
0+45.88	2894.38
0+54.87	2895.67

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 2896.52)	(0+54.87, 2895.67)	0.030

Options

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

Results

Normal Depth 0.41 ft
Elevation Range 2894.38 to 2896.52 ft
Flow Area 3.16 ft²
Wetted Perimeter 10.40 ft
Hydraulic Radius 0.30 ft
Top Width 10.34 ft
Normal Depth 0.41 ft
Critical Depth 0.50 ft

Worksheet for SECTION F 100-YR

Results

Critical Slope	0.01862	ft/ft
Velocity	4.43	ft/s
Velocity Head	0.30	ft
Specific Energy	0.72	ft
Froude Number	1.41	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.41	ft
Critical Depth	0.50	ft
Channel Slope	0.03910	ft/ft
Critical Slope	0.01862	ft/ft

Cross Section for SECTION F 100-YR

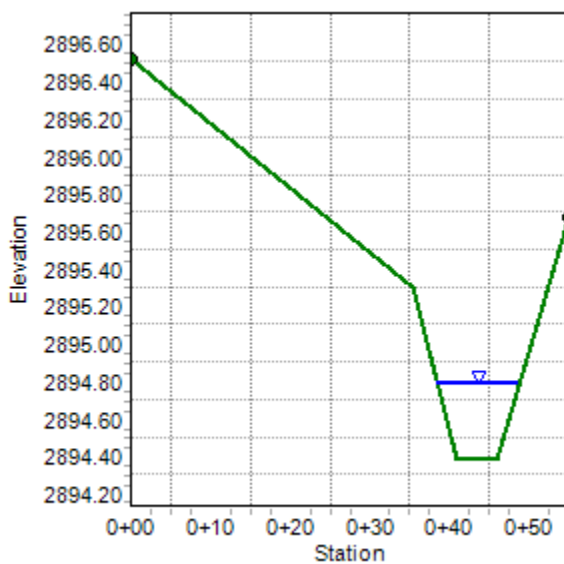
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.03910	ft/ft
Normal Depth	0.41	ft
Discharge	14.00	ft ³ /s

Cross Section Image



Worksheet for SECTION G 100-YR

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.05600 ft/ft
Discharge 14.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	2892.10
0+07.75	2890.89
0+18.50	2891.08
0+24.09	2891.84

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 2892.10)	(0+24.09, 2891.84)	0.035

Options

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

Results

Normal Depth 0.37 ft
Elevation Range 2890.89 to 2892.10 ft
Flow Area 3.56 ft²
Wetted Perimeter 14.53 ft
Hydraulic Radius 0.24 ft
Top Width 14.49 ft
Normal Depth 0.37 ft
Critical Depth 0.44 ft
Critical Slope 0.02693 ft/ft

Worksheet for SECTION G 100-YR

Results

Velocity	3.93	ft/s
Velocity Head	0.24	ft
Specific Energy	0.61	ft
Froude Number	1.40	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.37	ft
Critical Depth	0.44	ft
Channel Slope	0.05600	ft/ft
Critical Slope	0.02693	ft/ft

Cross Section for SECTION G 100-YR

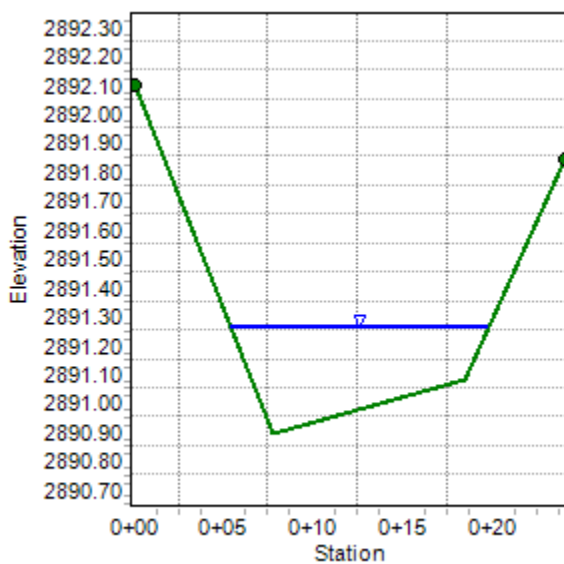
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.05600	ft/ft
Normal Depth	0.37	ft
Discharge	14.00	ft ³ /s

Cross Section Image



Worksheet for SECTION H 100-YR

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.01350 ft/ft
Discharge 14.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	2889.93
0+07.25	2889.41
0+07.75	2889.41
0+07.75	2888.91
0+09.25	2889.08
0+25.75	2889.66

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 2889.93)	(0+07.25, 2889.41)	0.030
(0+07.25, 2889.41)	(0+25.75, 2889.66)	0.016

Options

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

Results

Normal Depth 0.62 ft
Elevation Range 2888.91 to 2889.93 ft
Flow Area 3.90 ft²
Wetted Perimeter 17.14 ft
Hydraulic Radius 0.23 ft
Top Width 16.62 ft

Worksheet for SECTION H 100-YR

Results

Normal Depth	0.62	ft
Critical Depth	0.68	ft
Critical Slope	0.00762	ft/ft
Velocity	3.59	ft/s
Velocity Head	0.20	ft
Specific Energy	0.82	ft
Froude Number	1.31	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.62	ft
Critical Depth	0.68	ft
Channel Slope	0.01350	ft/ft
Critical Slope	0.00762	ft/ft

Cross Section for SECTION H 100-YR

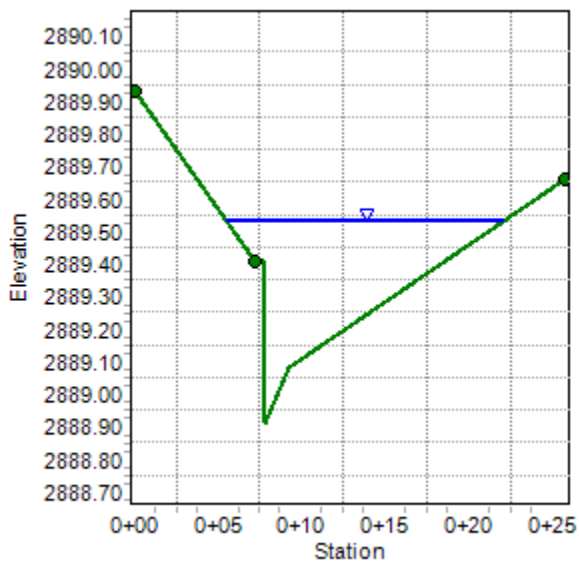
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.01350	ft/ft
Normal Depth	0.62	ft
Discharge	14.00	ft ³ /s

Cross Section Image



Worksheet for SECTION I1 100-YR

Project Description

Friction Method	Manning Formula
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Solve For Normal Depth

Input Data

Channel Slope	0.00677	ft/ft
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Discharge	17.00	ft ³ /s
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Section Definitions

Station (ft)	Elevation (ft)
0+00.00	2889.26
0+01.50	2889.24
0+01.50	2888.74
0+05.50	2888.69
0+05.50	2889.19
0+07.50	2889.16
0+07.50	2888.66
0+11.50	2888.61
0+11.50	2889.11
0+13.50	2889.08
0+13.50	2888.58
0+15.50	2888.55
0+17.50	2888.57
0+17.50	2889.07
0+19.50	2889.09
0+19.50	2888.59
0+23.50	2888.63
0+23.50	2889.13
0+25.50	2889.15
0+25.50	2888.65
0+29.50	2888.69
0+29.50	2889.19
0+31.00	2889.21

Roughness Segment Definitions

Worksheet for SECTION I1 100-YR

Input Data

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 2889.26)	(0+31.00, 2889.21)	0.016

Options

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

Results

Normal Depth	0.37	ft
Elevation Range	2888.55 to 2889.26 ft	
Flow Area	5.64	ft ²
Wetted Perimeter	22.80	ft
Hydraulic Radius	0.25	ft
Top Width	20.00	ft
Normal Depth	0.37	ft
Critical Depth	0.37	ft
Critical Slope	0.00677	ft/ft
Velocity	3.01	ft/s
Velocity Head	0.14	ft
Specific Energy	0.51	ft
Froude Number	1.00	
Flow Type	Critical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.37	ft
Critical Depth	0.37	ft
Channel Slope	0.00677	ft/ft

Worksheet for SECTION I1 100-YR

GVF Output Data

Critical Slope 0.00677 ft/ft

Cross Section for SECTION I1 100-YR

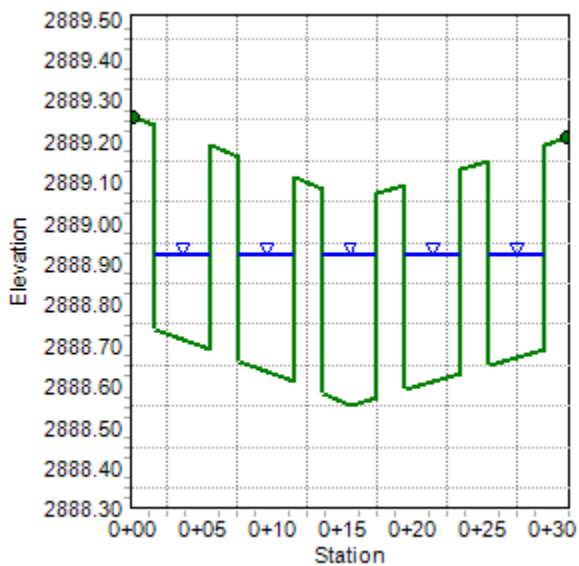
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00677	ft/ft
Normal Depth	0.37	ft
Discharge	17.00	ft ³ /s

Cross Section Image



Worksheet for SECTION I2 100-YR

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.01000 ft/ft
Discharge 17.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	2889.29
0+01.50	2888.88
0+21.09	2888.34
0+29.90	2888.43
0+31.00	2888.84

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 2889.29)	(0+31.00, 2888.84)	0.035

Options

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

Results

Normal Depth 0.50 ft
Elevation Range 2888.34 to 2889.29 ft
Flow Area 8.73 ft²
Wetted Perimeter 28.07 ft
Hydraulic Radius 0.31 ft
Top Width 27.99 ft
Normal Depth 0.50 ft
Critical Depth 0.39 ft

Worksheet for SECTION I2 100-YR

Results

Critical Slope	0.02840	ft/ft
Velocity	1.95	ft/s
Velocity Head	0.06	ft
Specific Energy	0.56	ft
Froude Number	0.62	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.50	ft
Critical Depth	0.39	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.02840	ft/ft

Cross Section for SECTION I2 100-YR

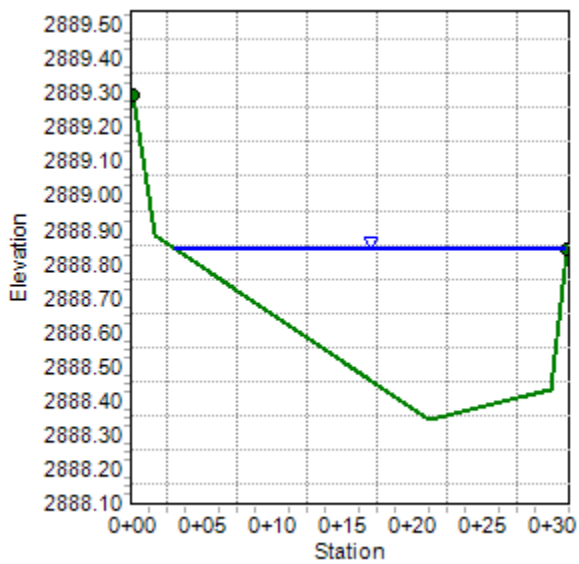
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.01000	ft/ft
Normal Depth	0.50	ft
Discharge	17.00	ft ³ /s

Cross Section Image



Worksheet for SECTION J 100-YR

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.00460 ft/ft
Discharge 5.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	2890.21
0+26.27	2889.10
0+27.27	2889.00
0+28.27	2889.10
0+28.27	2889.60
0+28.77	2889.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 2890.21)	(0+28.77, 2889.60)	0.016

Options

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

Results

Normal Depth 0.45 ft
Elevation Range 2889.00 to 2890.21 ft
Flow Area 2.24 ft²
Wetted Perimeter 10.63 ft
Hydraulic Radius 0.21 ft
Top Width 10.26 ft
Normal Depth 0.45 ft

Worksheet for SECTION J 100-YR

Results

Critical Depth	0.42	ft
Critical Slope	0.00664	ft/ft
Velocity	2.23	ft/s
Velocity Head	0.08	ft
Specific Energy	0.53	ft
Froude Number	0.84	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.45	ft
Critical Depth	0.42	ft
Channel Slope	0.00460	ft/ft
Critical Slope	0.00664	ft/ft

Cross Section for SECTION J 100-YR

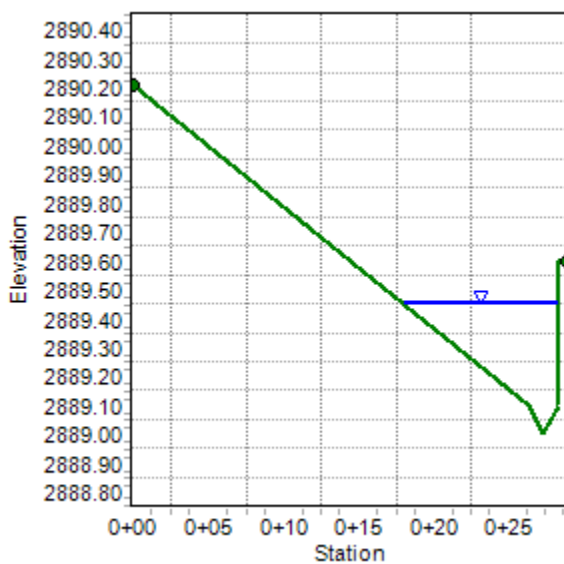
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00460	ft/ft
Normal Depth	0.45	ft
Discharge	5.00	ft ³ /s

Cross Section Image



Worksheet for SECTION K 100-YR

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.035	
Channel Slope	0.01000	ft/ft
Left Side Slope	6.00	ft/ft (H:V)
Right Side Slope	6.00	ft/ft (H:V)
Bottom Width	6.00	ft
Discharge	5.00	ft ³ /s

Results

Normal Depth	0.35	ft
Flow Area	2.80	ft ²
Wetted Perimeter	10.21	ft
Hydraulic Radius	0.27	ft
Top Width	10.15	ft
Critical Depth	0.25	ft
Critical Slope	0.03014	ft/ft
Velocity	1.79	ft/s
Velocity Head	0.05	ft
Specific Energy	0.40	ft
Froude Number	0.60	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.35	ft
Critical Depth	0.25	ft
Channel Slope	0.01000	ft/ft

Worksheet for SECTION K 100-YR

GVF Output Data

Critical Slope 0.03014 ft/ft

Cross Section for SECTION K 100-YR

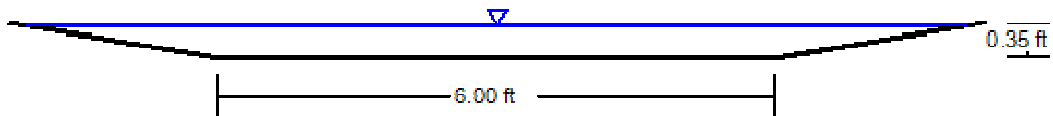
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.035	
Channel Slope	0.01000	ft/ft
Normal Depth	0.35	ft
Left Side Slope	6.00	ft/ft (H:V)
Right Side Slope	6.00	ft/ft (H:V)
Bottom Width	6.00	ft
Discharge	5.00	ft ³ /s

Cross Section Image



V: 1
H: 1

Worksheet for SECTION B1 100-YR

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.04500 ft/ft
Discharge 5.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	2874.81
0+16.50	2874.29
0+18.00	2874.14
0+18.00	2874.64
0+18.50	2874.64

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 2874.81)	(0+18.50, 2874.64)	0.016

Options

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

Results

Normal Depth 0.35 ft
Elevation Range 2874.14 to 2874.81 ft
Flow Area 1.01 ft²
Wetted Perimeter 8.05 ft
Hydraulic Radius 0.13 ft
Top Width 7.70 ft
Normal Depth 0.35 ft
Critical Depth 0.46 ft

Worksheet for SECTION B1 100-YR

Results

Critical Slope	0.00693	ft/ft
Velocity	4.95	ft/s
Velocity Head	0.38	ft
Specific Energy	0.73	ft
Froude Number	2.41	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.35	ft
Critical Depth	0.46	ft
Channel Slope	0.04500	ft/ft
Critical Slope	0.00693	ft/ft

Cross Section for SECTION B1 100-YR

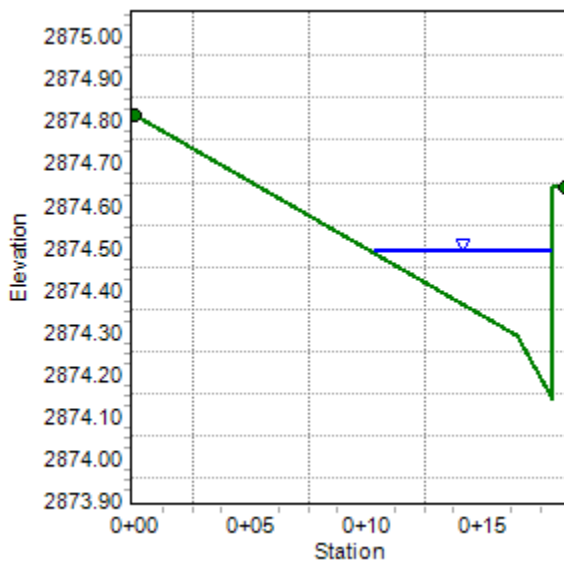
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.04500	ft/ft
Normal Depth	0.35	ft
Discharge	5.00	ft ³ /s

Cross Section Image



RIPRAP CALCULATIONS

Riprap d50 calculation B2

$$V = 3 \cdot (d50)^{0.5} \cdot (S_s - 1) / S^{0.17} \quad \text{HCDDM Eq. 743}$$

V =	5.14 fps	>4.46	OK
d50	0.67 ft		
Ss	2.5		
S	0.1403 ft/ft		

USE D50=8" RIPRAP

Riprap d50 calculation D1

$$V = 3 \cdot (d50)^{0.5} \cdot (S_s - 1) / S^{0.17} \quad \text{HCDDM Eq. 743}$$

V =	4.73 fps	>4.12	OK
d50	0.5 ft		
Ss	2.5		
S	0.0977 ft/ft		

USE D50=6" RIPRAP

Riprap d50 calculation G

$$V = 3 \cdot (d50)^{0.5} \cdot (S_s - 1) / S^{0.17} \quad \text{HCDDM Eq. 743}$$

V =	5.19 fps	>3.93	OK
d50	0.5 ft		
Ss	2.5		
S	0.056 ft/ft		

USE D50=6" RIPRAP

APPENDIX C: REFERENCE MATERIAL

Excerpts from Drainage study
1995, “Technical Drainage
Study for Warren-Walker
Preschool”

1995
L31
\$250

DIANE Phommih
BH

RECEIVED

DEC 23 1996

**CLV PUBLIC WORKS
FLOOD CONTROL**

**TECHNICAL DRAINAGE STUDY
FOR
WARREN - WALKER PRESCHOOL**

December 1996

Prepared for

**Peccole Nevada Corporation
Peccole 1982 Trust
9999 West Charleston
Las Vegas, Nevada 89117**

Project No.: 0197.0010

Prepared by



PENTACORE

6763 W. Charleston Blvd. • Las Vegas, NV 89102
Tel. (702) 258-0115 • Fax (702) 258-0865

CITY OF LAS VEGAS		DATE:
INTER-OFFICE MEMORANDUM		July 3, 1997
TO: Diane Phomninh, P.E. Land Development Services Department of Public Works		FROM: Dennis W. Stransky, P.E. Project Manager, Flood Control Department of Public Works
SUBJECT: Drainage Study for "Warren-Walker Preschool"		COPIES TO: Pentacore Peccole Nevada Corporation John McNellis, P.E.
FILE NO.	H:\DEPOT\DS\DS1995E.DOC	
FEMA Flood Zone	YES	No X
Proposed Storm Drain	YES	No X
		CCRFC

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES
1st Submittal	12/23/96	01/07/97	Not Acceptable	\$250.00
2nd Submittal	02/18/97	02/25/97	Pending CCRFC	\$250.00
CCRFC	04/03/97	04/04/97	Acceptable in Concept	N/C
3rd Submittal	05/29/97	06/05/97	Not Acceptable	\$250.00
4th Submittal	06/23/97	06/25/97	See Below Comments	\$100.00
5th Submittal	07/02/97	07/03/97	See Below Comments	\$100.00
TOTAL FEES				\$950.00

REMARKS:

5th Submittal (Parcel Map Submittal showing Drainage Easements)

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

X	is acceptable in concept subject to conformance to all City standards and the following conditions:
	must be resubmitted or supplemented including the following:
	must have Clark County Regional Flood Control District concurrence

- The study is acceptable for the purpose of recording the Parcel Map. The following comments are continued from the previous memo:
- The 20 foot drainage easements as shown on the Grading Plan must be granted by separate documents or by the Parcel Map as Public Drainage Easements to be Privately Maintained. The drainage easement improvements must be provided with the development of the adjacent parcels.*
- The future Elementary School buildings GC, GB, and RA have finish floor elevations that are lower than adjacent finish grade elevations. These finish floor elevations must be revised so the buildings are a minimum of 6 inches higher than the adjacent grades or the adjacent grades lowered to prevent site runoff into the buildings.*
- A sidewalk underdrain must be provided near the southeast corner of the building where the concrete flume shown in Detail F/5.*
- A technical update to this drainage study will be required for each future development of the remaining parcels.*

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

PLANS SENT TO LAND DEVELOPMENT yes (initial)

END OF REMARKS

gam

T/R/S: 20S/60E/31

AREA L-31



PENTACORE

Civil Engineering
Construction
Administration
Land Surveying
Global Positioning
GIS
Land Planning
Landscape
Architecture
ADA Consulting
Measurement
Technologies

0197.0010

February 18, 1997

Mr. Dennis Stransky
Flood Control Division
City of Las Vegas
400 East Stewart Avenue
Las Vegas, Nevada 89101

**Subject: Technical Drainage Study for Warren-Walker Preschool
Addendum I**

Dear Mr. Stransky

Please find enclosed the response to your review comments, dated January 7, 1997, regarding the above subject. The following items are addressed:

1. Pentacore Engineering has revised the grading plans to show the toe slopes and limits of grading. Revised grading plans sealed by Dan LaRubio are included with this response.
2. The overall site has been raised to better match the existing grades. If required as a condition of final approval grade differences greater than 2 feet will be submitted for review to Current Planning.
3. All grading as proposed is shown within the property boundary. All easements as shown on the revised grading plans have been appropriately labeled.
4. The grading plans have been revised to show a flood/retaining wall along the west side of the site.
5. The development of the school site does not include required improvements for the adjacent future commercial site. The as proposed drainage condition demonstrates the flows west of the school site will drain across the existing curb to the street section. The adjacent site in the as proposed condition will remain undeveloped without improvements to generate nuisance flows. It is assumed the future development will provide for a sidewalk under drain. In addition where required adjacent to the proposed school site a sidewalk under drain has been provided.
6. Section 2.1 of the originally submitted drainage study describes the diversions of all flows west of Hualapai Way by existing improvements. Figures No. 2, No. 4

and No. 5 as originally submitted included all other offsite contributing basins (Hualapai Way and Alta Drive).

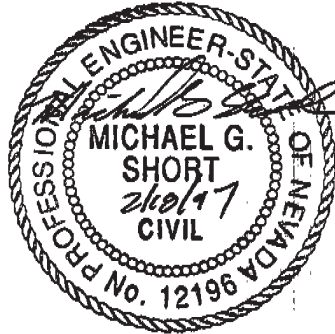
7. The grading plans have been revised to include a bench mark and basis of bearing.

In addition, the minor grading changes described above do not significantly affect the drainage analysis as originally submitted. Where applicable revised hydraulic calculations have been included with this response to reflect those minor grading revisions.

If you have questions or require additional information please do not hesitate to call at 258-0115.

Sincerely,

Michael G. Short, P.E.



cc: Dan LaRubio, P.E.

SITE

Excerpts from Drainage study
2990, “Technical Drainage
Study for Merryhill School
Addition to Warren-Walker
Preschool Site”

10-3-01

RECEIVED

OCT 3 2001

CLV PUBLIC WORKS
FLOOD CONTROL

2990
L31
#250

TECHNICAL DRAINAGE STUDY

FOR

MERRYHILL SCHOOL ADDITION TO
WARREN WALKER PRESCHOOL SITE
LAS VEGAS, NEVADA

PREPARED FOR

NOBEL LEARNING COMMUNITY
ROSE TREE CORPORATE CENTER II
1400 NORTH PROVIDENCE ROAD
SUITE 3055
MEDIA, PA 19063

Prepared by:



AMEC Infrastructure, Inc.
3016 West Charleston Boulevard
Suite 180
Las Vegas, Nevada 89102

Job No. 02-2001-030

September, 2001

CITY OF LAS VEGAS		DATE: July 3, 1997
INTER-OFFICE MEMORANDUM		
TO: Diane Phomninh, P.E. Land Development Services Department of Public Works		FROM: Dennis W. Stransky, P.E. Project Manager, Flood Control Department of Public Works
SUBJECT: Drainage Study for "Warren-Walker Preschool" FILE NO. H:\DEPOT\DS\DS1995E.DOC		COPIES TO: Pentacore Peccole Nevada Corporation John McNellis, P.E. CCRFCD
FEMA Flood Zone:	YES No X	
Proposed Storm Drain	YES No X	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES
1st Submittal	12/23/96	01/07/97	Not Acceptable	\$250.00
2nd Submittal	02/18/97	02/25/97	Pending CCRFCD	\$250.00
CCRFCD	04/03/97	04/04/97	Acceptable in Concept	N/C
3rd Submittal	05/29/97	06/05/97	Not Acceptable	\$250.00
4th Submittal	06/23/97	06/25/97	See Below Comments	\$100.00
5th Submittal	07/02/97	07/03/97	See Below Comments	\$100.00
TOTAL FEES				\$950.00

REMARKS:

5th Submittal (Parcel Map Submittal showing Drainage Easements)

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

X	is acceptable in concept subject to conformance to all City standards and the following conditions:
	must be resubmitted or supplemented including the following:
	must have Clark County Regional Flood Control District concurrence

- The study is acceptable for the purpose of recording the Parcel Map. The following comments are continued from the previous memo:
- The 20 foot drainage easements as shown on the Grading Plan must be granted by separate documents or by the Parcel Map as Public Drainage Easements to be Privately Maintained. The drainage easement improvements must be provided with the development of the adjacent parcels.*
- The future Elementary School buildings GC, GB, and RA have finish floor elevations that are lower than adjacent finish grade elevations. These finish floor elevations must be revised so the buildings are a minimum of 6 inches higher than the adjacent grades or the adjacent grades lowered to prevent site runoff into the buildings.*
- A sidewalk underdrain must be provided near the southeast corner of the building where the concrete flume shown in Detail F/5.*
- A technical update to this drainage study will be required for each future development of the remaining parcels.*

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

PLANS SENT TO LAND DEVELOPMENT yes (initial)

END OF REMARKS

gam

T/R/S: 20S/60E/31

AREA L-31

REGIONAL FLOOD CONTROL MASTER PLAN UPDATE (1997)

The proposed development of this site is in compliance with the Clark County Regional Flood Control Master Plan (Reference 6). There are no Regional Flood Control Master Planned facilities within the area.

OFFSITE DRAINAGE DESCRIPTION

The previously proposed fully improved street section of Hualapai Way provides for all of the offsite stormwater conveyance west of Hualapai Way. The offsite flows west of Hualapai Way adjacent to the site were analyzed within the approved "Conceptual Master Drainage Plan for Summerlin Village 11/12" (Reference 7). The design drainage facilities for Hualapai Way include a 36" storm drain connecting into a 42" storm drain collecting flows from Hualapai Way and diverting them east.

The offsite basins north of the site and east of Hualapai Way drain to the northeast at approximately 3.3 percent. These flows drain away from the site and do not affect on-site flows. The offsite basins adjacent to Alta Drive flow southeastwardly along Alta Drive.

Flows within Alta Drive have been documented in several previous reports, most recently, the *Fourth Submittal, Update #2 of the Drainage Study for Warren Walker Preschool*, dated June 1997. The following table summarizes information contained in the report

Table 1
Alta Drive Roadway Flow Summary

Pre-developed (ie. Post Preschool Construction)

	<u>Q-10</u>	<u>Q-100</u>
SE corner preschool site (Sta 75+00)	16 cfs	34 cfs
SE corner of property (Sta 69+00)	23 cfs	49 cfs

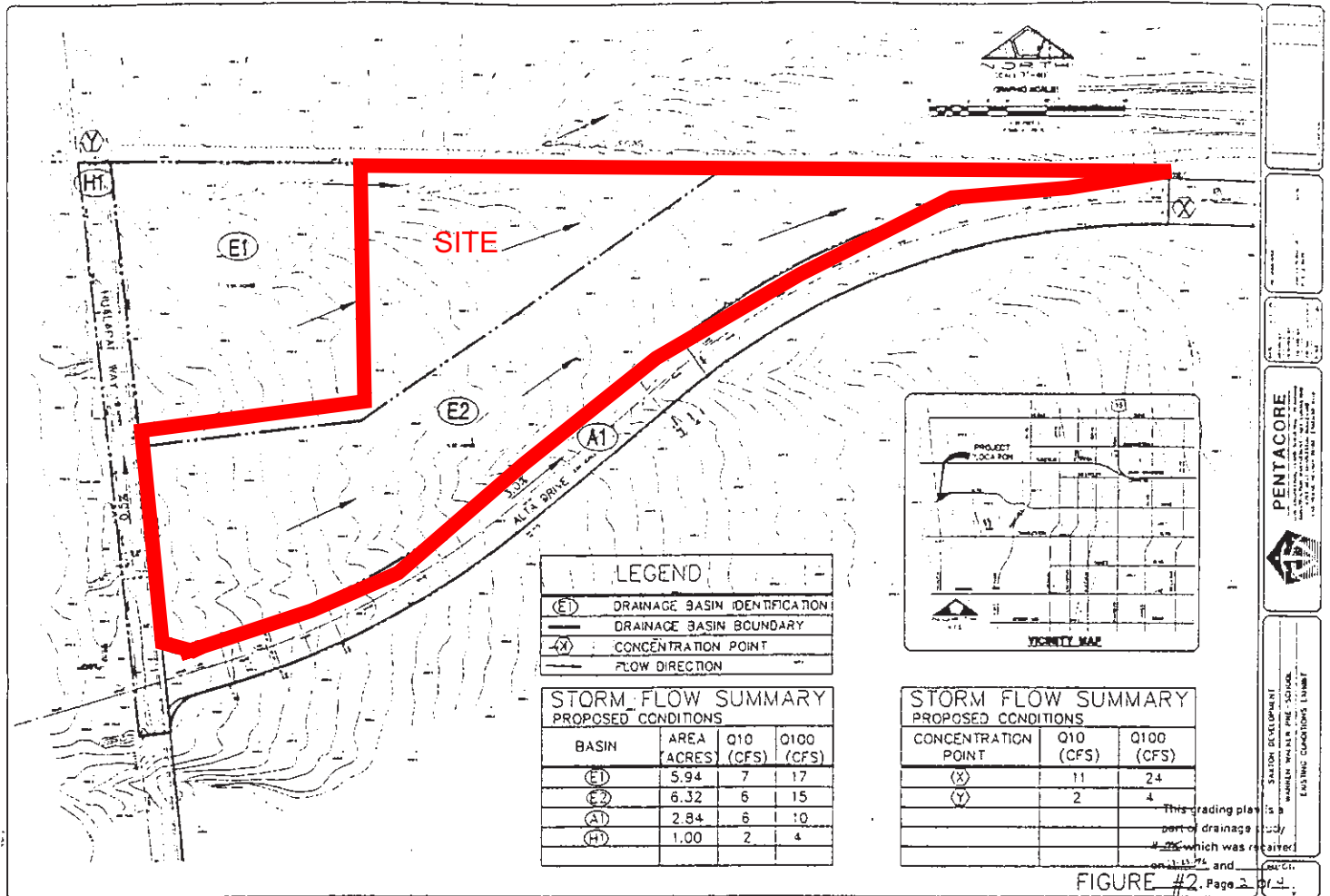
Post-developed (ie. @ Site Buildout)

	<u>Q-10</u>	<u>Q-100</u>
SE corner preschool site (Sta 75+00)	19 cfs	37 cfs
10-year @ SE corner of property (Sta 69+00)	26 cfs	52 cfs

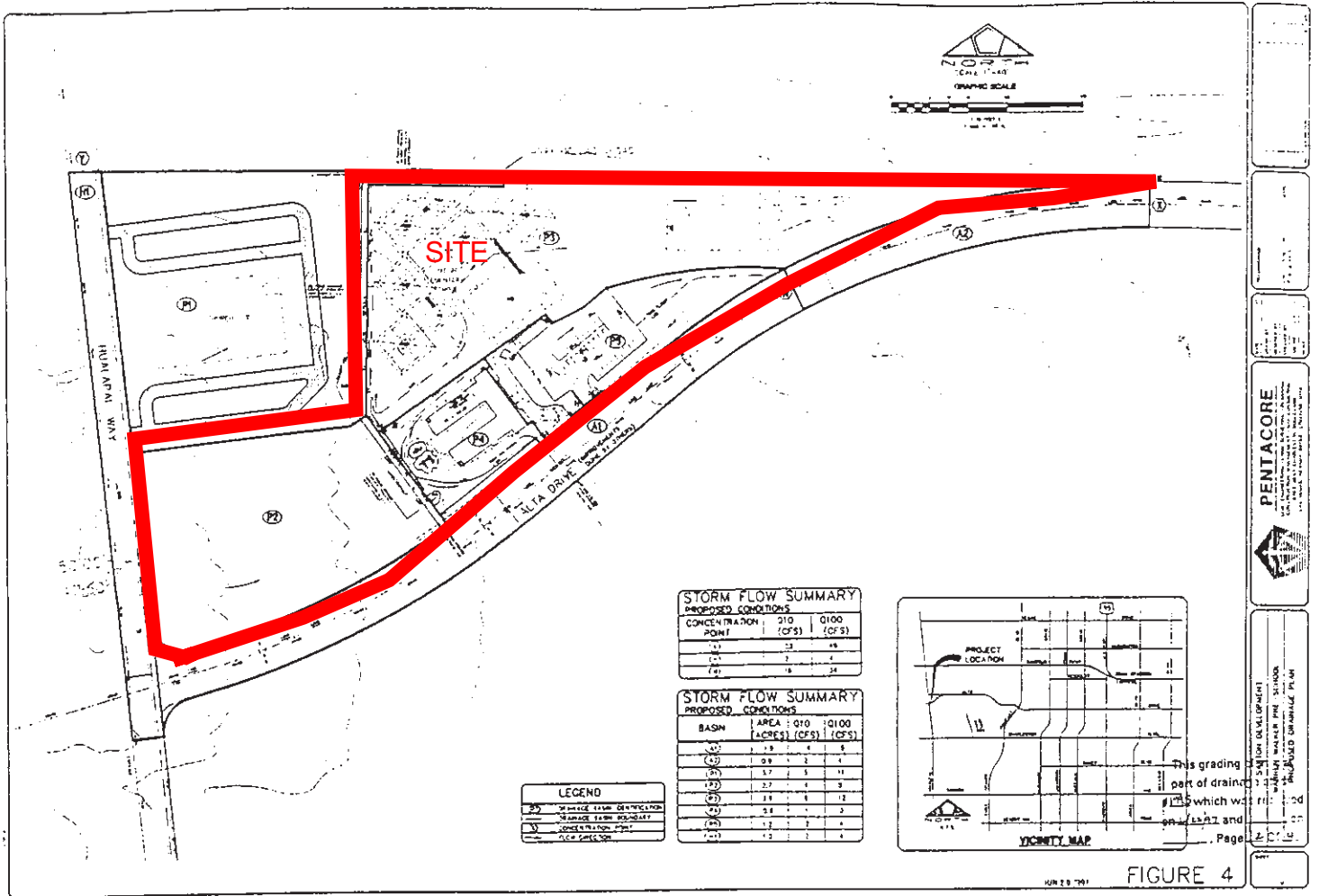
After close scrutiny of previous grading plans and drainage reports, we do not concur with the flows shown in Table 1. The grading plans for the Warren Walker Preschool clearly indicate that drainage areas P1 and a portion of P3 (Reference Drainage Area Maps) discharge into an existing swale north of the site. The HEC-1 models included in the same reports combine the hydrographs of drainage areas P1 and P3 with P4, P5, A1 and A2 at Concentration Point X. This is not indicative of the construction plans or the actual site conditions. As such, the drainage basin boundaries have been adjusted to more accurately depict site conditions. The result is a decrease of flow rate onto Alta Drive due to the diversion of flows to the north. The flow to the north along the existing swale is the historical drainage pattern for the area and is not a watershed diversion.

ONSITE DRAINAGE DESCRIPTION

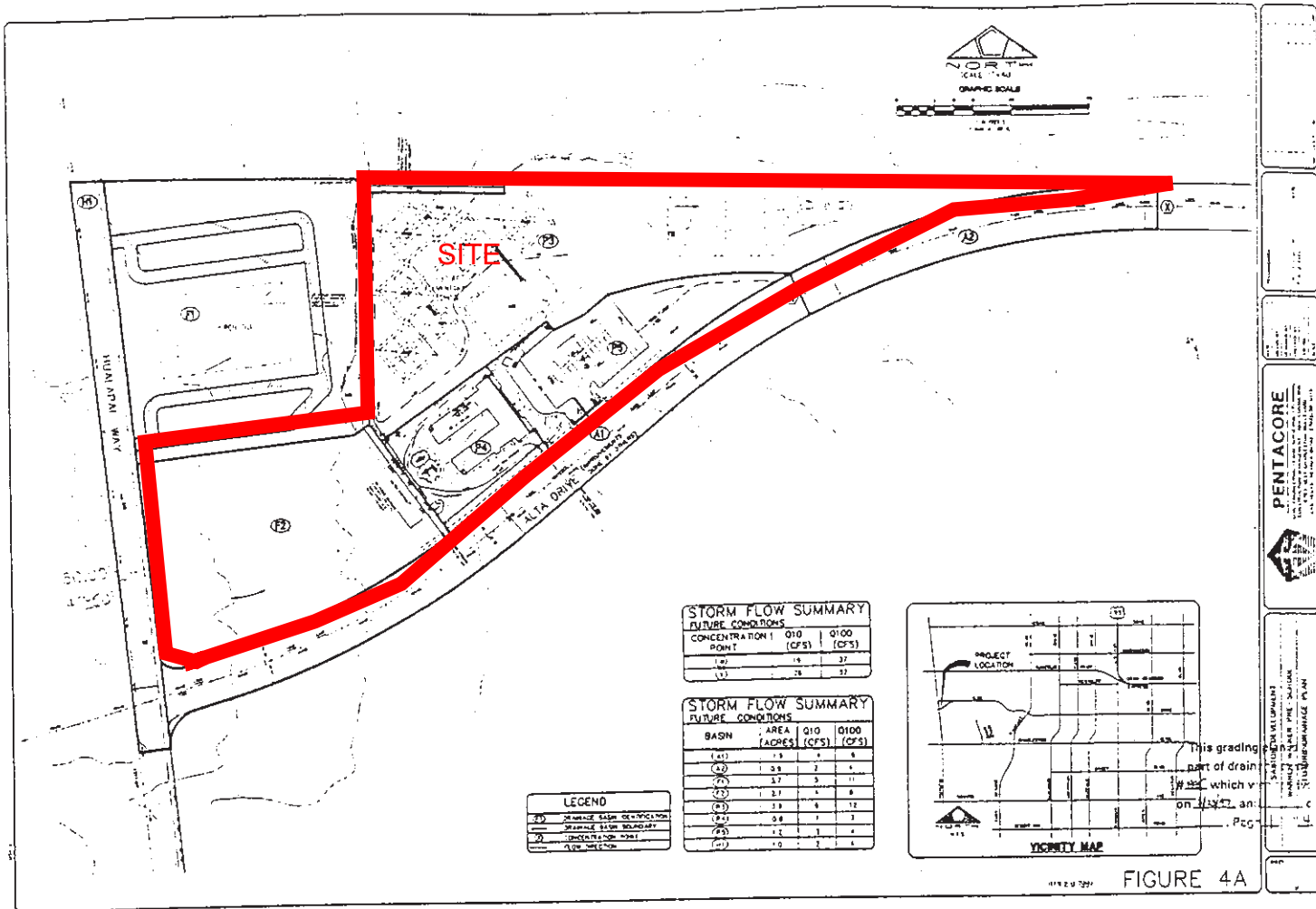
The grading and drainage design for this project emulates the natural drainage pattern with flows being directed west to east. Basin delineations have been created to estimate flows at critical computation points. The basin data is used in the HEC-1 modeling shown in the next portion of this report. The delineated sub-basins are shown on the Drainage Area Map included in this report.



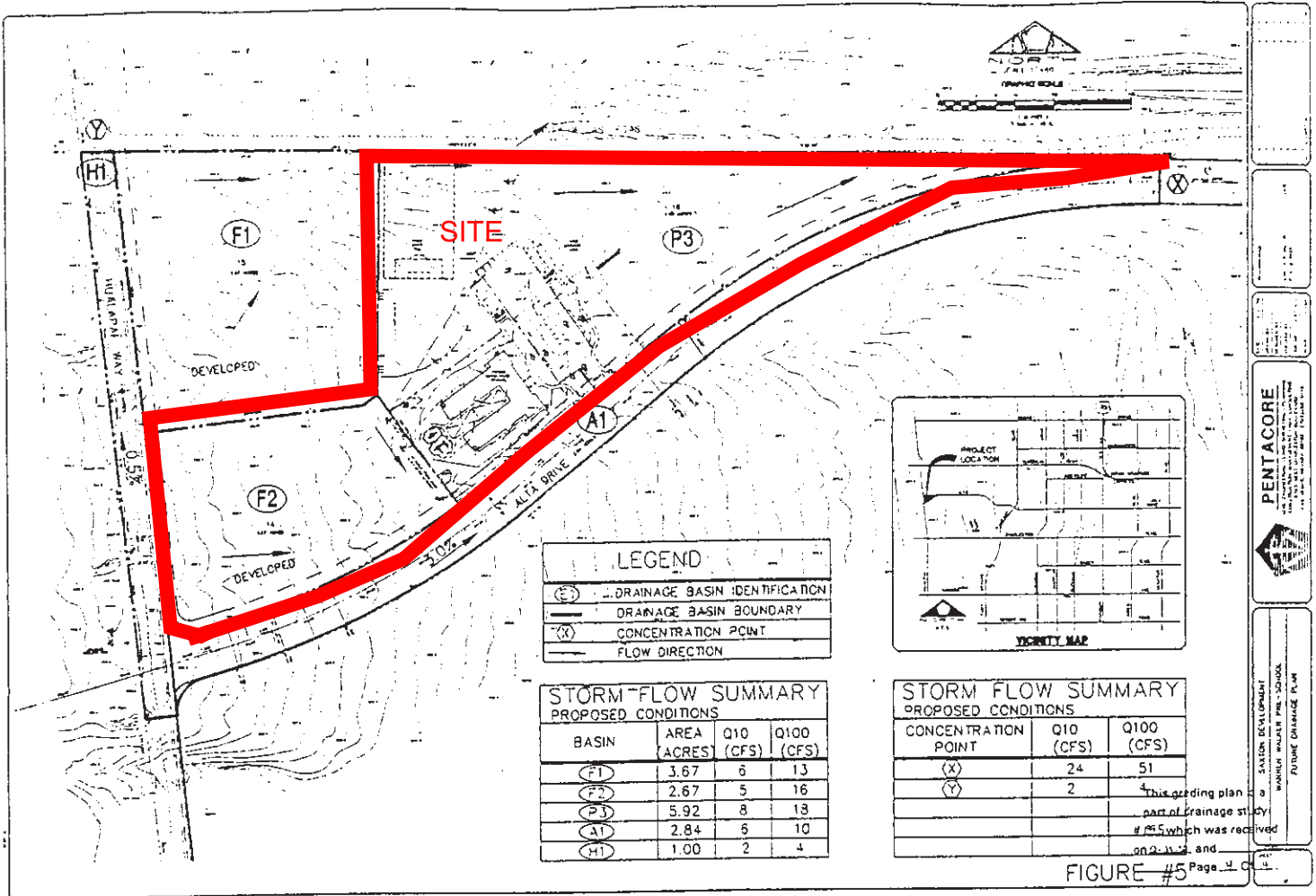
THE SCANNED
DOCUMENT IS
ILLEGIBLE



THE SCANNED
DOCUMENT IS
ILLEGIBLE



THE SCANNED
DOCUMENT IS
ILLEGIBLE



THE SCANNED
DOCUMENT IS
ILLEGIBLE

Excerpts from Drainage study
3417, “Technical Drainage for
Peccole at Hualapai and Alta”

WRIGHT ENGINEERS

Rec'd : 9/11/03

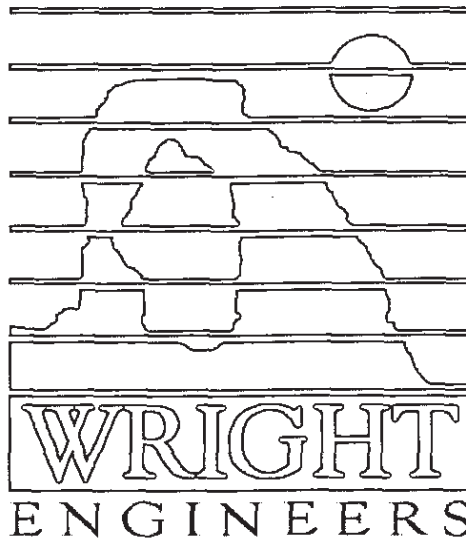
**TECHNICAL DRAINAGE STUDY
FOR
PECCOLE AT HUALAPAI
AND ALTA**

*3417
DS ~~3416~~*

L-31

\$250

**CITY OF LAS VEGAS
August 25, 2003**



**PREPARED FOR:
PECCOLE NEVADA
851 S. RAMPART BLVD. SUITE 220
LAS VEGAS, NV 89145**

CITY OF LAS VEGAS				DATE:	
INTER-OFFICE MEMORANDUM				November 26, 2003	
TO: Land Development Services Department of Public Works				FROM: Albert J. Jankowiak, P.E.  Flood Control Civil Engineer Department of Public Works	
SUBJECT: Drainage Study for: Peccole at Hualapai and Alta				COPIES TO: Wright Engineers	
Cross Streets:		Hualapai Way and Alta Drive		Peccole Nevada	
File Number:		F:\Depot\DSMemos\DS3417B.doc		Bart Anderson, P.E., DevCo	
Parcel Number:		138-31-210-007			
Zoning Action:		SDR-3173			
FEMA Flood Zone	YES	NO	X		
Proposed Storm Drain	YES	NO	X		
HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID G.R. No.
1 st Submittal	9/11/2003	10/6/2003	See Comments Below	\$250.00	111190: \$250
2 nd Submittal	10/22/2003	11/7/2003	See Comments Below	\$400.00	113172: \$400
TOTAL FEES (LDDRS):				\$650.00	----

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.

1. Projects that disturb more than one acre of land must submit to the Nevada Division of Environmental Protection: (1) a "Notice of Intent" to discharge, (2) a request for inclusion in the Stormwater General Permit No. GNV0022241, and (3) a stormwater pollution prevention plan. For more information, please call (775) 687-4670, ext. 3138.
2. The engineer must provide a table on the grading plans that shows a quantity estimate of all on-site and off-site flood control improvements such as solid grouted stem wall, drainage easements, protection berm, riprap, etc. All drainage improvements must be bonded and inspected.
3. The drainage study indicates that the pad for Building-B will be graded with the current site improvements, but the structure will not be constructed. A drainage study update will be required for the construction of Building-B.

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

END OF REMARKS

ajj

T/R/S: T20S/R60E/31
AREA L-31

2.2 On-Site Drainage Basin

Historically, runoff in the form of sheet-flow, flows southeasterly through the property to a 20-foot drainage easement along the eastern edge of the property. One sub-basin indicated as ONX1 defines the existing project site. Refer to Figure 2, *Existing Onsite Drainage Basin Map* in Appendix A for basin location and flow paths. The site is composed of natural desert vegetation.

- ONX1: Sub-basin ONX1 ($Q_{100} = 7$ cfs, $Q_{10} = 3$ cfs) conveys runoff unchannelized, southeasterly across undeveloped land.

2.3 Master Planning Information

According to Figure F-11 of the 2002 CCRFCD'S *Master Plan Update* (Figure 3), no proposed or constructed regional facilities are located adjacent to the project site. This site does not rely on any immediate facilities for flood protection. The middle and southern branches of the Angel Park floodway are located to the north and south of the project site respectively. Descriptions of nearby facilities are shown on the *Master Plan Update* on Figure 3, *Flood Control Facilities*.

2.4 Floodplain Information

The Special Flood Hazard Areas (SFHA) for the incorporated portions of the City of Las Vegas, Clark County, Nevada, are outlined in the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map, dated September 27, 2002. Upon reviewing the Community Panel No. 32003 C2150 E, the proposed site lies within a FEMA designated Zone "X". This area is described to be: areas outside of the 0.2% annual chance flood. See Figure 4, *FEMA Map* (Appendix A).

2.5 Previous Drainage Studies

Flows were referenced from the approved *Technical Drainage Study for the Road Improvements for Alta Drive and Hualapai Way within Summerlin Village 3* by G.C. Wallace (Appendix D). The flow rates and flow patterns were referenced from this study.

3 PROPOSED DRAINAGE FACILITIES

3.1 General Description

Two sub-basins indicated as OND1 and OND2 are used to define the proposed project site. These basins consist of area to be developed within the project site. Refer to the *Drainage Plan* for basin location and flow paths.

- OND1: Basin OND1 (7 cfs, 100-year; 3 cfs, 10-year) runoff is conveyed along interior flow paths to a U-gutter that will direct the flow to the southern edge of the project and into Alta Drive.
- OND2: Basin OND2 (3 cfs, 100-year; 2 cfs, 10-year) runoff is conveyed along interior flow paths and is routed along the eastern edge of the project site to the southeast corner. A desert landscaped 20-foot drainage easement will direct the flow to the southeastern corner where it will drain into Alta Drive.

A review will show that historically 7 cfs (3 cfs in 10-yr event) of water sheet flows in the existing conditions from basin ONX1. With development, this runoff will increase by 3 cfs (2 cfs in 10-yr event). This water will be conveyed within sub-basins OND1 and OND2 to the southern and southeastern borders of the project respectively. Flow will then drain into Alta Drive.

3.2 Hydrologic Analysis

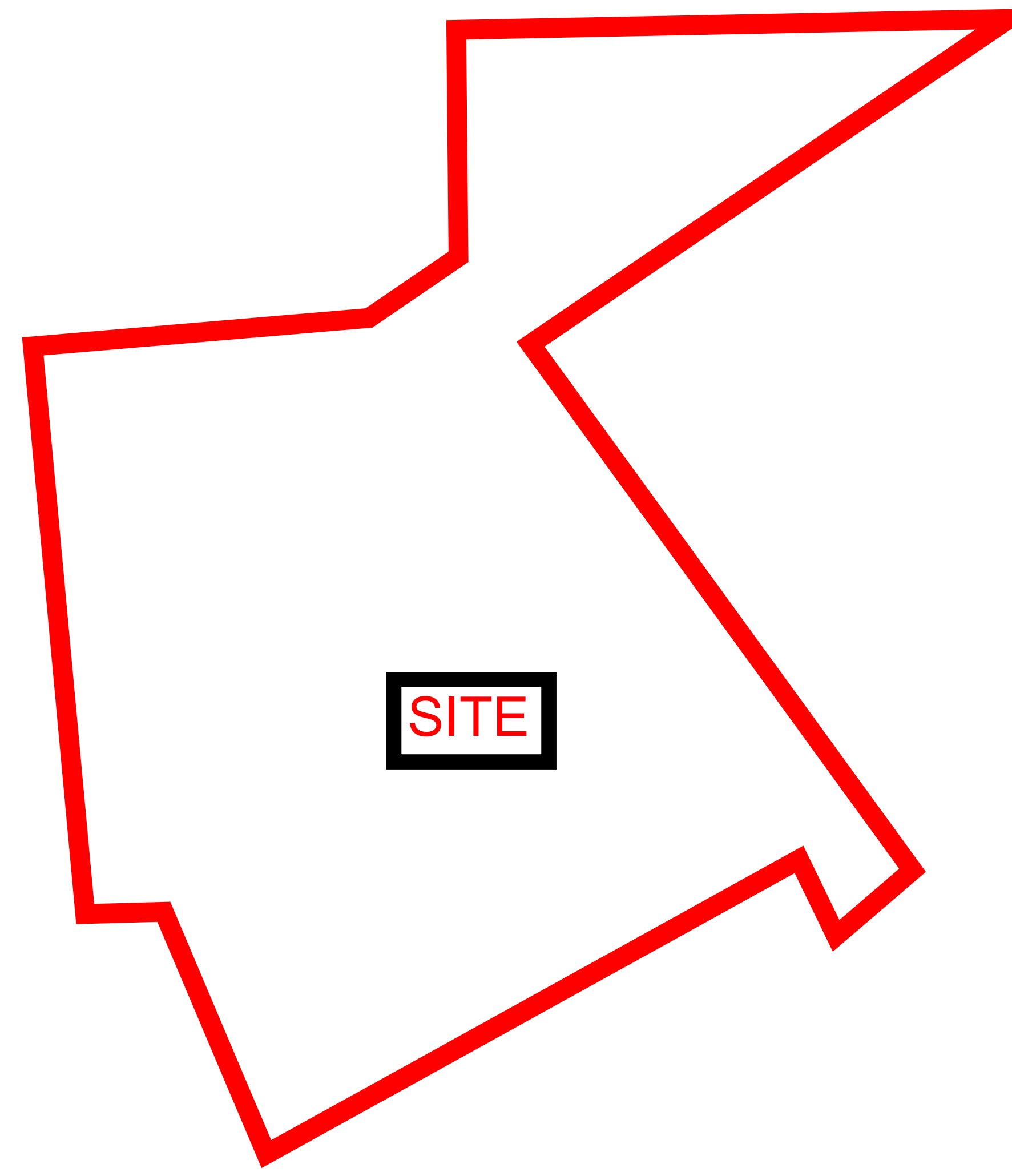
3.2.1 Hydrologic Methodology and Criteria

The U. S. Army Corps of Engineer's HEC-1 *Flood Hydrograph Package* was used to estimate the peak runoff values of the watershed for the 10-year and 100-year, 6-hour storm event. The HEC-1 model was designed for the simulation of flood events in watersheds and river basins. The HEC-1 computer model has the ability to simulate the *surface runoff response of a drainage basin to precipitation* by representing the basin as an interconnected system of hydrologic and hydraulic components. Each component models an aspect of the rainfall-runoff process within a portion of the whole basin. This basin portion is referred to as a sub-basin. The runoff hydrographs of each sub-basin are then combined and a final discharge hydrograph is obtained. Since the study watershed is ungaged, the analysis used to model the onsite runoff incorporated the Soil Conservation Service (SCS) unit hydrograph method to develop a hypothetical flood hydrograph.

Input parameters used for the HEC-1 hydrograph model were determined from the *HC&DDM*. Procedures and calculations of these HEC-1 Parameters are located in Appendix B.

3.2.2 HEC-1 Parameters

Basin Area



APPENDIX D: PLANS & DETAILS

P:\Panther Medical\CD\3DSHEETS\MASTER GRADING.dwg - 3/2/2020 7:57 AM

FLOOD ZONE

THIS SITE IS LOCATED IN ZONE "X", AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN, PER THE FLOOD INSURANCE RATE MAP COMMUNITY PANEL 32003C2150 E. CLARK COUNTY, NEVADA DATED SEPTEMBER 27, 2002

BENCHMARK

CLV 9LV106NWS
RIVET AND PLATE IN TOP OF CURB, AT THE SOUTHWEST CORNER OF CHARLESTON BLVD. AND HUALAPAI WAY, AT THE PC OF CHARLESTON BLVD.
ELEVATION: 888.339 METERS = 2914.50 FEET
NAVD83

BASIS OF BEARING

N 06°05'57" W, BEING THE BEARING OF THE WEST LINE OF THE SOUTHWEST QUARTER (SW ¼) OF THE NORTHWEST QUARTER (NW ¼) OF SECTION 31, TOWNSHIP 20 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SEEN IN BOOK 140, PAGE 22 OF PLATS, RECORDED IN THE CLARK COUNTY, NEVADA'S RECORDER'S OFFICE.

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AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY.

CALL BEFORE YOU DO OVERHEAD

Call before you Dig

Avoid cutting underground utility lines. It's costly.

FAST

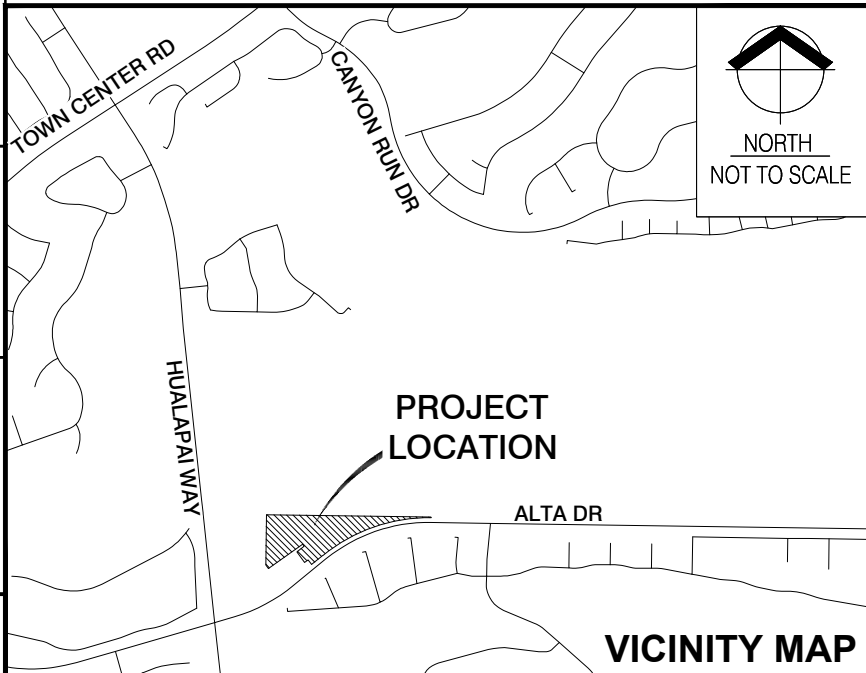
Call before you UnderGround

1-702-432-5300

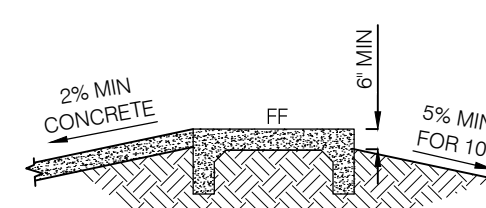
FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

1-702-227-2929

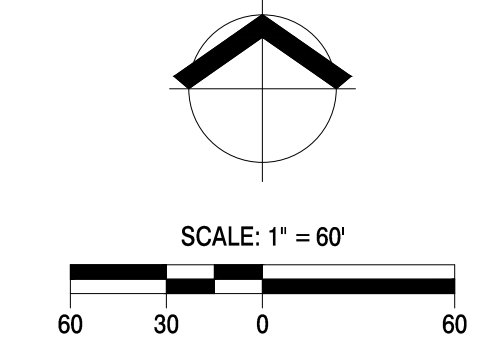
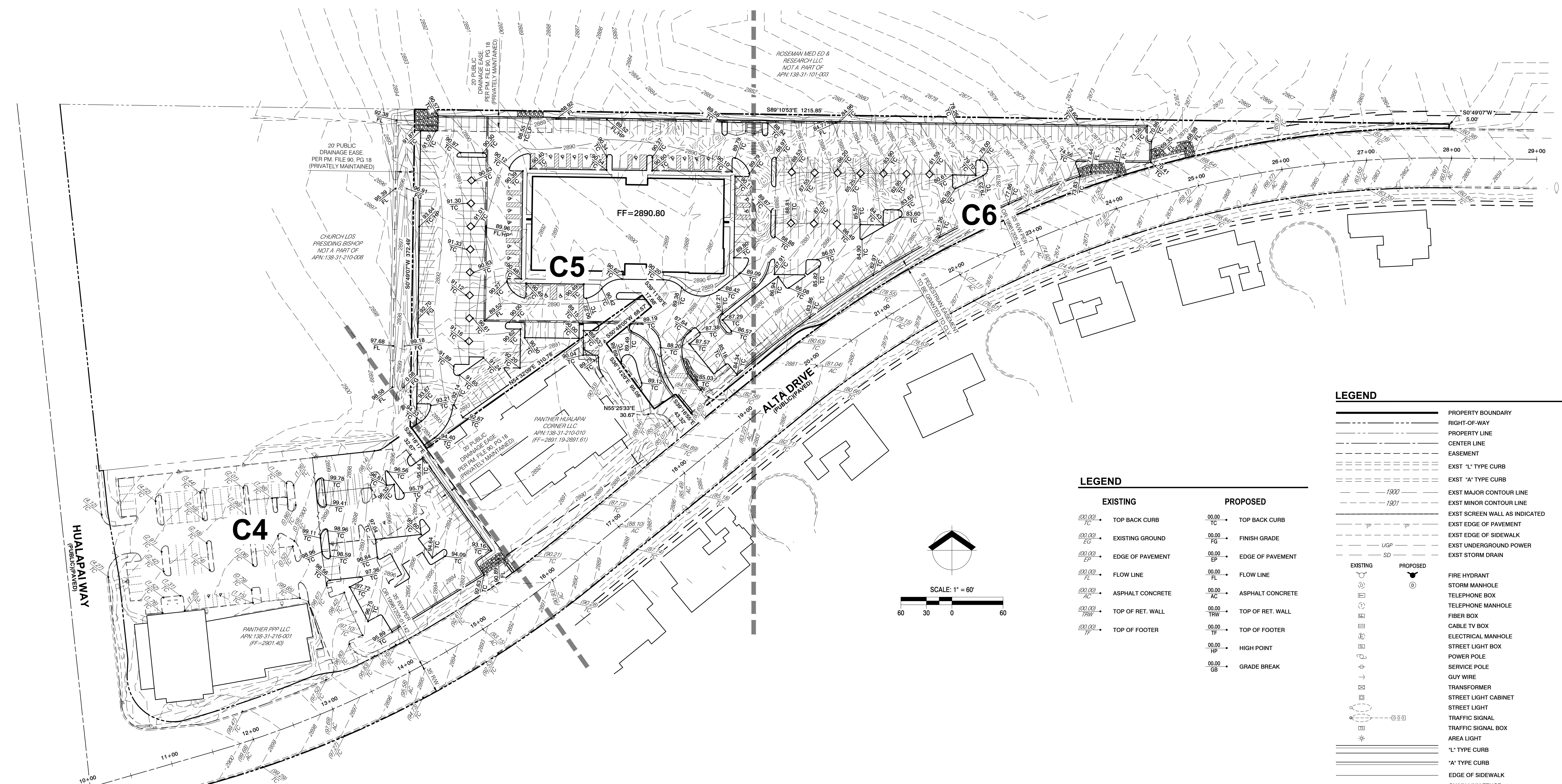
OR
1-800-227-2600



- NOTES**
- CONTRACTOR TO VERIFY LOCATION AND ELEVATION OF EXISTING STRUCTURES AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION.
 - IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY LOCATION AND ELEVATION OF EXISTING UTILITIES PRIOR TO CONSTRUCTION.
 - OWNER RESPONSIBLE TO PROVIDE SURVEY MONUMENTATION AS SHOWN AND TO REPLACE ALL SURVEY MONUMENTATION DAMAGED, DISTURBED, DESTROYED OR OBSCURED DURING CONSTRUCTION.



BUILDING SLAB SECTION



LEGEND	
EXISTING	PROPOSED
TOP BACK CURB	TOP BACK CURB
EXISTING GROUND	FINISH GRADE
EDGE OF PAVEMENT	EDGE OF PAVEMENT
FLOW LINE	FLOW LINE
ASPHALT CONCRETE	ASPHALT CONCRETE
TOP OF RET. WALL	TOP OF RET. WALL
TOP OF FOOTER	TOP OF FOOTER
	HIGH POINT
	GRADE BREAK

LEGEND	
PROPERTY BOUNDARY	
RIGHT-OF-WAY	
PROPERTY LINE	
CENTER LINE	
EASEMENT	
EXST 'L' TYPE CURB	
EXST 'A' TYPE CURB	
EXST MAJOR CONTOUR LINE	
EXST MINOR CONTOUR LINE	
EXST EDGE OF PAVEMENT	
EXST EDGE OF SIDEWALK	
EXST UNDERGROUND POWER	
EXST STORM DRAIN	
FIRE HYDRANT	
STORM MANHOLE	
TELEPHONE MANHOLE	
FIBER BOX	
CABLE TV BOX	
ELECTRICAL MANHOLE	
STREET LIGHT BOX	
POWER POLE	
SERVICE POLE	
GUY WIRE	
TRANSFORMER	
STREET LIGHT CABINET	
STREET LIGHT	
TRAFFIC SIGNAL	
TRAFFIC SIGNAL BOX	
AREA LIGHT	
'L' TYPE CURB	
'A' TYPE CURB	
EDGE OF SIDEWALK	
CHAIN LINK FENCE	
WROUGHT IRON FENCE	
SWALE FLOW LINE	
SAWCUT	

SITE DATA

APN No. 138-31-210-0009	ACREAGE: 4.66	ZONING C-V
----------------------------	------------------	---------------

DATUM

THIS NOTE IS FOR ALL GRADING ELEVATIONS SHOWN HEREON WITH EXCEPTION TO CONTOUR ELEVATIONS, FINISHED FLOORS, AND PAD ELEVATIONS UNLESS OTHERWISE NOTED.

ADD 2800.00' TO ELEVATIONS SHOWN HEREON TO ADJUST THEM TO THE ASSOCIATED DATUM.

GEOTECHNICAL REPORT

PROJECT No. G-20-042	DATE: APRIL 24, 2020
AS PREPARED BY: NOVA GEOTECHNICAL & INSPECTION SERVICES	UPDATED BY:

DRAINAGE CERTIFICATION

I CERTIFY THAT THIS GRADING PLAN CONFORMS TO THE APPROVED DRAINAGE STUDY CLV # XXXXXXXX FOR THIS SITE ON FILE AT CITY OF LAS VEGAS FOR THIS PROJECT.

ERIC J. RIETZ, P.E. No. 16350

RIETZ CONSULTING INC.

3203 E. WARM SPRINGS RD #400
LAS VEGAS, NEVADA 89120
PH: 702.521.3355

MASTER GRADING PLAN

PANTHER MEDICAL
LAS VEGAS, NEVADA
APN # 138-31-210-0009

DATE: 9/1/2020	DRAWN: NUJ	CHECKED: EJR	SCALE: 1"=60'
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SHEET C3

3 OF 8 SHEETS

LEGEND

	PROPERTY BOUNDARY
	RIGHT-OF-WAY
	PROPERTY LINE
	CENTER LINE
	EASEMENT
	EXST "L" TYPE CURB
	EXST "A" TYPE CURB
	EXST MAJOR CONTOUR LINE
	EXST MINOR CONTOUR LINE
	EXST SCREEN WALL AS INDICATED
	EXST EDGE OF PAVEMENT
	EXST EDGE OF SIDEWALK
	EXST UNDERGROUND POWER
	EXST STORM DRAIN

	FIRE HYDRANT
	STORM MANHOLE
	TELEPHONE BOX
	TELEPHONE MANHOLE
	FIBER BOX
	CABLE TV BOX
	ELECTRICAL MANHOLE
	STREET LIGHT BOX
	POWER POLE
	SERVICE POLE
	GUY WIRE
	TRANSFORMER
	STREET LIGHT CABINET
	STREET LIGHT
	TRAFFIC SIGNAL
	TRAFFIC SIGNAL BOX
	AREA LIGHT
	"L" TYPE CURB
	"A" TYPE CURB
	EDGE OF SIDEWALK
	CHAIN LINK FENCE
	WROUGHT IRON FENCE
	SWALE FLOW LINE
	SAWCUT

LEGEND

EXISTING	PROPOSED

FLOOD ZONE

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BENCHMARK

CLV 9LV106NWS
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ELEVATION: 888.339 METERS = 2914.50 FEET
NAVD88

BASIS OF BEARING

N 06°05'57" W, BEING THE BEARING OF THE WEST LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF THE NORTHWEST QUARTER (NW 1/4) OF SECTION 31, TOWNSHIP 20 SOUTH, RANGE 80 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SEEN IN BOOK 140, PAGE 22 OF PLATS, RECORDED IN THE CLARK COUNTY, NEVADA'S RECORDER'S OFFICE.

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1-702-227-2929

Call before you Dig



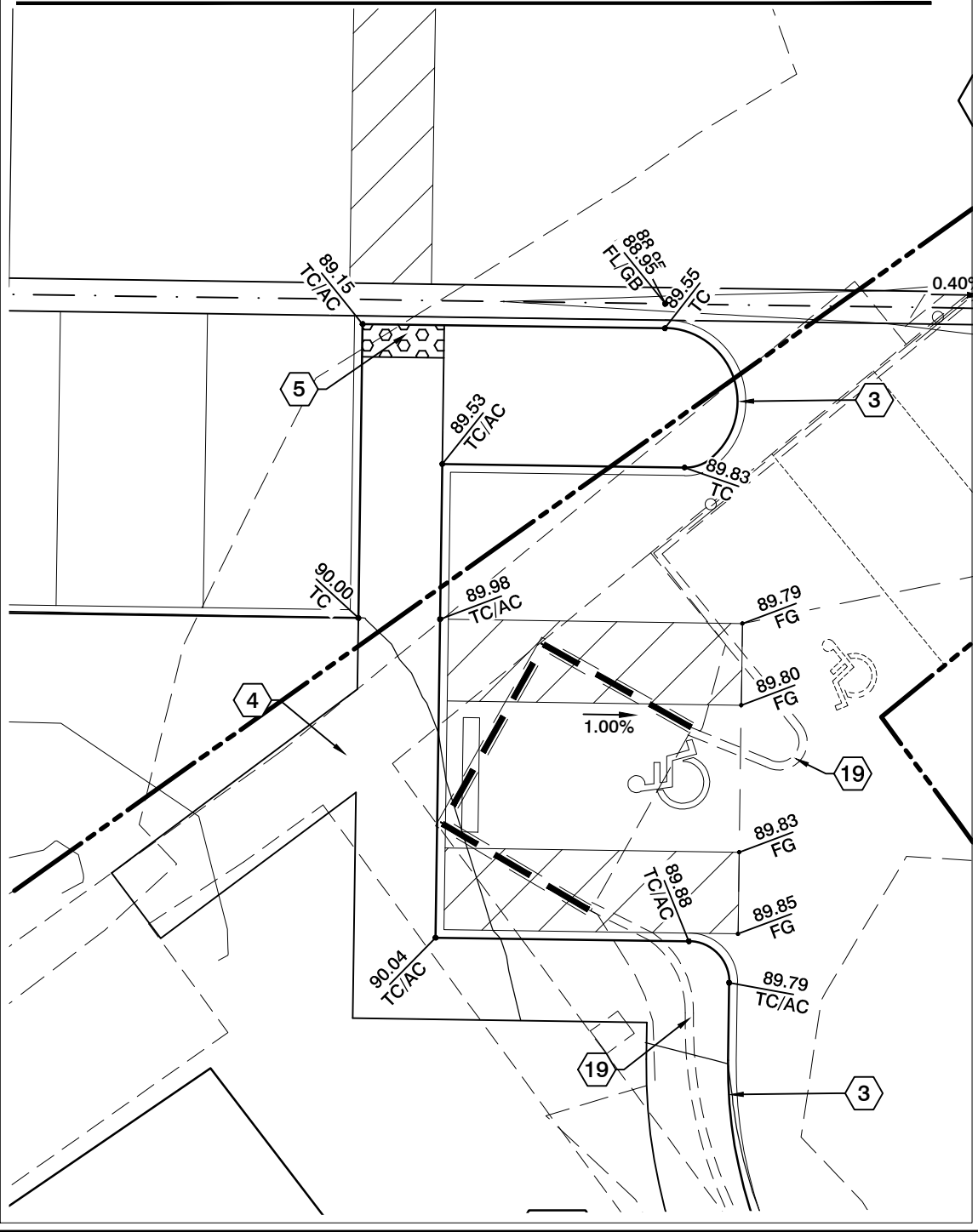
1-800-227-2600



Call before you UnderGround

1-702-432-5300
FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

DETAIL "A", 1" = 10'



CHURCH LDS
PRESIDING BISHOP
NOT A PART OF
APN: 138-31-210-008

CHURCH LDS
PRESIDING BISHOP
NOT A PART OF
APN: 138-31-210-008

20' PUBLIC
DRAINAGE EASE
PER PM FILE 80, PG 18
(PRIVATELY MAINTAINED)

20' PUBLIC
DRAINAGE EASE
PER PM FILE 80, PG 18
(PRIVATELY MAINTAINED)

20' PUBLIC
DRAINAGE EASE
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PER PM FILE 80, PG 18
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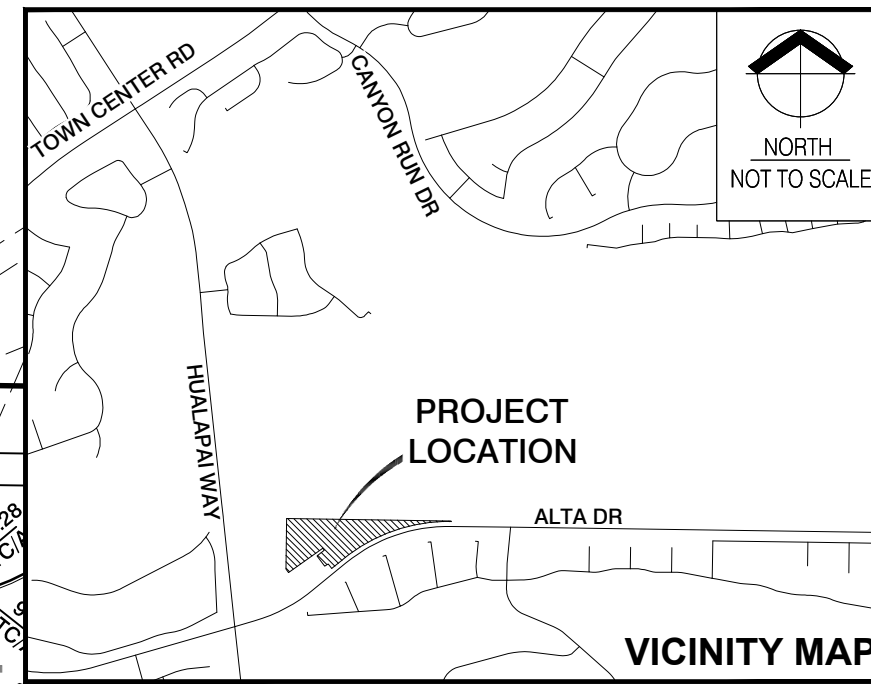
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DRAINAGE EASE
PER PM FILE 80, PG 18
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DRAINAGE EASE
PER PM FILE 80, PG 18
(PRIVATELY MAINTAINED)

20' PUBLIC
DRAINAGE EASE
PER PM FILE 80, PG 18
(PRIVATELY MAINTAINED)



GRADING

1. CONSTRUCT "L" CURB AND GUTTER PER CCAUSD #216
2. TURN OUT "L" CURB TO ENSURE POSITIVE DRAINAGE
3. CONSTRUCT "A" CURB PER CCAUSD #219
4. CONSTRUCT SIDEWALK PER CCAUSD #234
5. CONSTRUCT ARMOR TILE TRUNCATED DOMES OR EQUIV. PER CCAUSD #235
6. CONSTRUCT FLOW LINE AS SHOWN
7. MAIN CORRIDOR (TRUCK ACCESS) INSTALL 3" AC OVER 4" TYPE II AGGREGATE BASE PER SOILS REPORT
8. AUTOMOBILE ROUTE / PARKING. INSTALL 2" AC OVER 4" TYPE II AGGREGATE BASE PER SOILS REPORT
9. INSTALL 2' CURB CUT PER DETAIL B, SHEET C7
10. INSTALL 6' CURB CUT PER DETAIL B, SHEET C7
11. INSTALL TRASH ENCLOSURE (SEE ARCHITECTURAL PLANS FOR DETAILS)
12. INSTALL GENERATOR ENCLOSURE (SEE ARCHITECTURAL PLANS FOR DETAILS)
13. CONSTRUCT 2' CONCRETE VALLEY GUTTER PER DETAIL A, SHEET C7
14. CONSTRUCT BMP SWALE W/ 6" THICK 3' D50 LANDSCAPE ROCK PER DETAIL C, SHEET C7
15. CONSTRUCT 2' CONCRETE FLUME PER DETAIL D, SHEET C7
16. 2' SIDEWALK UNDER DRAIN PER CCAUSD #236
17. PLACE 6"-D50 RIPRAP, 12" THICK, OVER GEOTEXTILE FILTER FABRIC, OVER 6" TYPE II AGGREGATE BASE COMPACTED TO 95%
18. SAWCUT CLEAN EDGE. MEET AND MATCH EXISTING ASPHALT
19. REMOVE EXISTING CURB
20. REMOVE EXISTING ASPHALT
21. CONSTRUCT RETAINING "A" CURB PER DETAIL E, SHEET C7
22. INSTALL 4' CURB CUT PER DETAIL B, SHEET C7
23. RETAINING WALL, SEE STRUCTURAL PLANS FOR DETAILS
24. CONSTRUCT RETAINING "L" CURB PER DETAIL F, SHEET C7
25. PLACE 6"-D50 RIPRAP, 16" THICK, OVER GEOTEXTILE FILTER FABRIC, OVER 6" TYPE II AGGREGATE BASE COMPACTED TO 95%

SITE DATA

APN No. 138-31-210-0009 ACREAGE: 4.66 ZONING: C-V

DATUM

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GEOTECHNICAL REPORT

PROJECT No. G-20-042
DATED: APRIL 24, 2020
AS PREPARED BY: NOVA GEOTECHNICAL & INSPECTION SERVICES
UPDATED BY:

EARTHWORKS

CUT = 13,011 CY
FILL = 6,694 CY
NET = 6,317 CY CUT

DRAINAGE CERTIFICATION

I CERTIFY THAT THIS GRADING PLAN CONFORMS TO THE APPROVED DRAINAGE STUDY CLV # XXXXXXXX FOR THIS SITE ON FILE AT CITY OF LAS VEGAS FOR THIS PROJECT.

ERIC J. RIETZ, P.E. No. 16350

DATE

GRADING PLAN

PANTHER MEDICAL
LAS VEGAS, NEVADA
APN # 138-31-210-009

9/1/2020

NJW

EJR

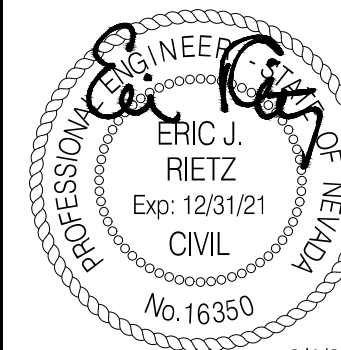
1"=30'

DATE:

DRAFTER:

CHECKED:

SCALE:



SHEET

C4
4 OF 8 SHEETS

###

LEGEND

	PROPERTY BOUNDARY
	RIGHT-OF-WAY
	PROPERTY LINE
	CENTER LINE
	EASEMENT
	EXST 'L' TYPE CURB
	EXST 'A' TYPE CURB
	EXST MAJOR CONTOUR LINE
	EXST MINOR CONTOUR LINE
	EXST SCREEN WALL AS INDICATED
	EXST EDGE OF PAVEMENT
	EXST EDGE OF SIDEWALK
	EXST UNDERGROUND POWER
	EXST STORM DRAIN

	FIRE HYDRANT
	STORM MANHOLE
	TELEPHONE BOX
	TELEPHONE MANHOLE
	FIBER BOX
	CABLE TV BOX
	ELECTRICAL MANHOLE
	STREET LIGHT BOX
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	SERVICE POLE
	GUY WIRE
	TRANSFORMER
	STREET LIGHT CABINET
	STREET LIGHT
	TRAFFIC SIGNAL
	TRAFFIC SIGNAL BOX
	AREA LIGHT
	'L' TYPE CURB
	'A' TYPE CURB
	EDGE OF SIDEWALK
	CHAIN LINK FENCE
	WROUGHT IRON FENCE
	SWALE FLOW LINE
	SAWCUT

LEGEND

EXISTING	PROPOSED

BUILDING SLAB SECTION

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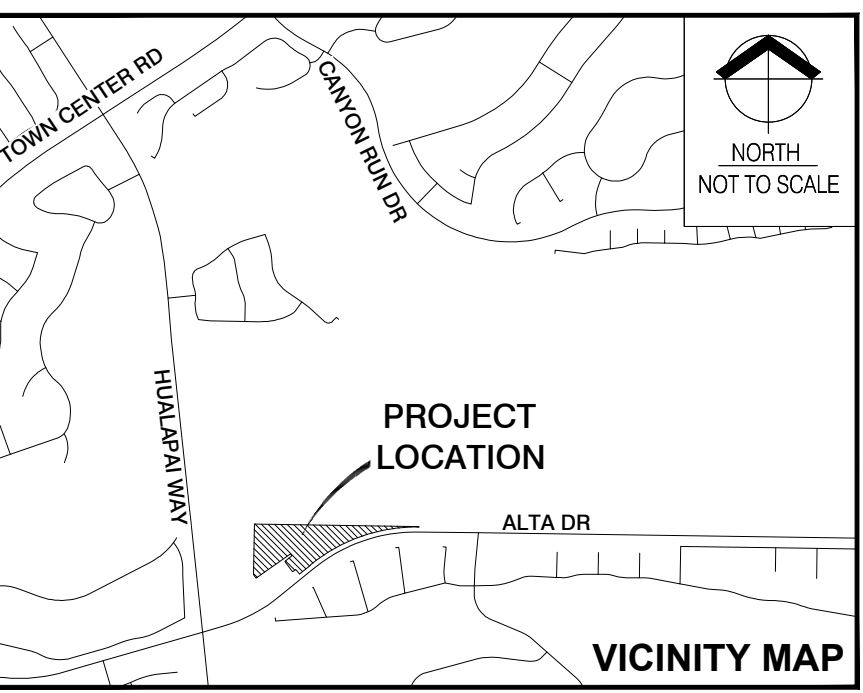
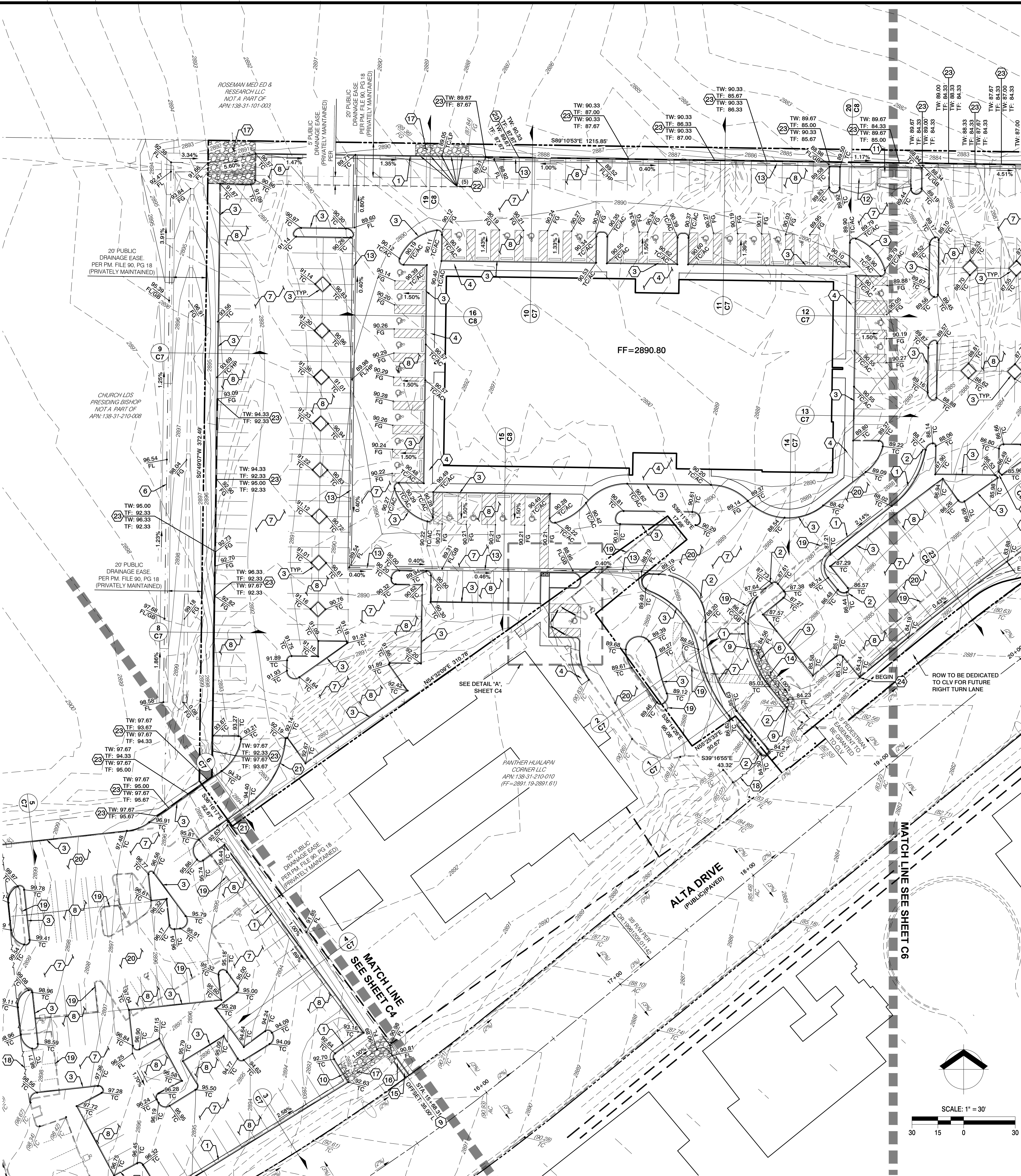
Call 811

OR
1-800-227-2600

FAST

Call before you UnderGround

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FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION



GRADING

- CONSTRUCT 'L' CURB AND GUTTER PER CCAUSD #216
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- CONSTRUCT 'A' CURB PER CCAUSD #219
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- CONSTRUCT 2" CONCRETE FLUME PER DETAIL D, SHEET C7
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- SAWCUT CLEAN EDGE. MEET AND MATCH EXISTING ASPHALT
- REMOVE EXISTING CURB
- REMOVE EXISTING ASPHALT
- CONSTRUCT RETAINING 'A' CURB PER DETAIL E, SHEET C7
- INSTALL 4" CURB CUT PER DETAIL B, SHEET C7
- RETAINING WALL. SEE STRUCTURAL PLANS FOR DETAILS
- CONSTRUCT RETAINING 'L' CURB PER DETAIL F, SHEET C7
- PLACE 6"-D50 RIPRAP, 16" THICK, OVER GEOTEXTILE FILTER FABRIC, OVER 6" TYPE II AGGREGATE BASE COMPACTED TO 95%

SITE DATA

APR No. 138-31-210-0009	ACREAGE 4.66	ZONING C-V
----------------------------	-----------------	---------------

DATUM

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UPDATED BY:

EARTHWORKS

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FILL= 6,694 CY
NET= 6,317 CY CUT

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ERIC J. RIETZ, P.E. No. 16350

DATE

GRADING PLAN

PANTHER MEDICAL
LAS VEGAS, NEVADA
APN # 138-31-210-009

DATE: 9/1/2020

DRAFTER: NJW

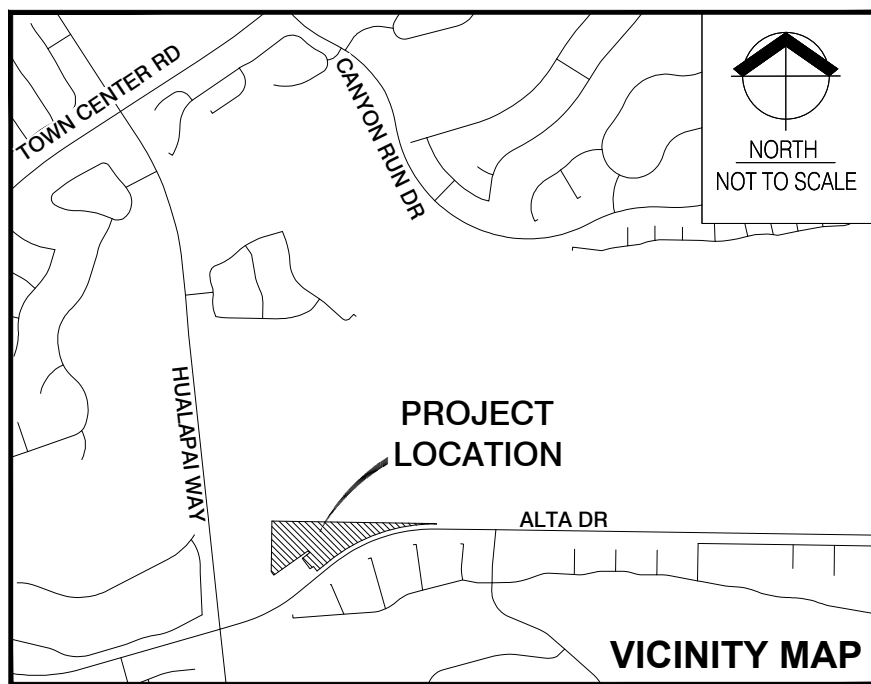
CHECKED: EJR

SCALE: 1"=30'



SHEET
C5
5 OF 8 SHEETS

###

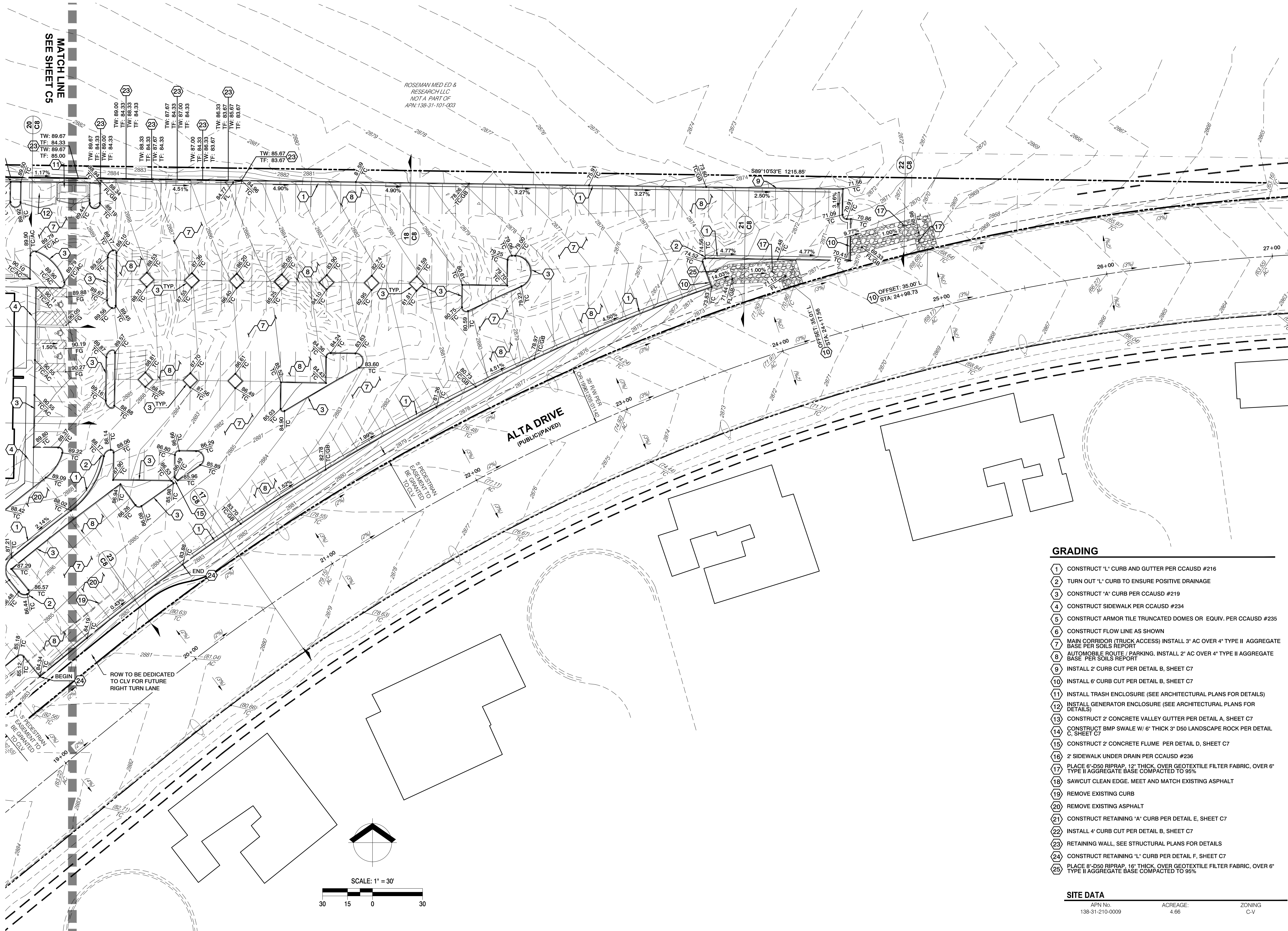


LEGEND

---	PROPERTY BOUNDARY
---	RIGHT-OF-WAY
---	PROPERTY LINE
---	CENTER LINE
---	EASEMENT
---	EXIST 'L' TYPE CURB
---	EXIST 'A' TYPE CURB
---	EXIST MAJOR CONTOUR LINE
---	EXIST MINOR CONTOUR LINE
---	EXIST SCREEN WALL AS INDICATED
---	EXIST EDGE OF PAVEMENT
---	EXIST EDGE OF SIDEWALK
---	EXIST UNDERGROUND POWER
---	EXIST STORM DRAIN
---	FIRE HYDRANT
---	STORM MANHOLE
---	TELEPHONE BOX
---	TELEPHONE MANHOLE
---	FIBER BOX
---	CABLE TV BOX
---	ELECTRICAL MANHOLE
---	STREET LIGHT BOX
---	POWER POLE
---	SERVICE POLE
---	GUY WIRE
---	TRANSFORMER
---	STREET LIGHT CABINET
---	STREET LIGHT
---	TRAFFIC SIGNAL
---	TRAFFIC SIGNAL BOX
---	AREA LIGHT
---	'L' TYPE CURB
---	'A' TYPE CURB
---	EDGE OF SIDEWALK
---	CHAIN LINK FENCE
---	WROUGHT IRON FENCE
---	SWALE FLOW LINE
---	SAWCUT

LEGEND

EXISTING	PROPOSED
---	TOP BACK CURB
---	EXISTING GROUND
---	EDGE OF PAVEMENT
---	FLOW LINE
---	ASPHALT CONCRETE
---	TOP OF RET. WALL
---	TOP OF FOOTER
---	HIGH POINT
---	GRADE BREAK



GRADING

1. CONSTRUCT 'L' CURB AND GUTTER PER CCAUSD #216
2. TURN OUT 'L' CURB TO ENSURE POSITIVE DRAINAGE
3. CONSTRUCT 'A' CURB PER CCAUSD #219
4. CONSTRUCT SIDEWALK PER CCAUSD #234
5. CONSTRUCT ARMOR TILE TRUNCATED DOMES OR EQUIV. PER CCAUSD #235
6. CONSTRUCT FLOW LINE AS SHOWN
7. MAIN CORRIDOR (TRUCK ACCESS) INSTALL 3" AC OVER 4" TYPE II AGGREGATE BASE PER SOILS REPORT
8. AUTOMOBILE ROUTE / PARKING. INSTALL 2" AC OVER 4" TYPE II AGGREGATE BASE PER SOILS REPORT
9. INSTALL 2' CURB CUT PER DETAIL B, SHEET C7
10. INSTALL 6' CURB CUT PER DETAIL B, SHEET C7
11. INSTALL TRASH ENCLOSURE (SEE ARCHITECTURAL PLANS FOR DETAILS)
12. INSTALL GENERATOR ENCLOSURE (SEE ARCHITECTURAL PLANS FOR DETAILS)
13. CONSTRUCT 2' CONCRETE VALLEY GUTTER PER DETAIL A, SHEET C7
14. CONSTRUCT BMP SWALE W/ 6" THICK 3" D50 LANDSCAPE ROCK PER DETAIL C, SHEET C7
15. CONSTRUCT 2' CONCRETE FLUME PER DETAIL D, SHEET C7
16. 2' SIDEWALK UNDER DRAIN PER CCAUSD #236
17. PLACE 6"-D50 RIPRAP, 12" THICK, OVER GEOTEXTILE FILTER FABRIC, OVER 6" TYPE II AGGREGATE BASE COMPACTED TO 95%
18. SAWCUT CLEAN EDGE. MEET AND MATCH EXISTING ASPHALT
19. REMOVE EXISTING CURB
20. REMOVE EXISTING ASPHALT
21. CONSTRUCT RETAINING 'A' CURB PER DETAIL E, SHEET C7
22. INSTALL 4' CURB CUT PER DETAIL B, SHEET C7
23. RETAINING WALL, SEE STRUCTURAL PLANS FOR DETAILS
24. CONSTRUCT RETAINING 'L' CURB PER DETAIL F, SHEET C7
25. PLACE 8"-D50 RIPRAP, 16" THICK, OVER GEOTEXTILE FILTER FABRIC, OVER 6" TYPE II AGGREGATE BASE COMPACTED TO 95%

SITE DATA

APN No. 138-31-210-0009 ACREAGE: 4.66 ZONING: C-V

DATUM

THIS NOTE IS FOR ALL GRADING ELEVATIONS SHOWN HEREON WITH EXCEPTION TO CONTOUR ELEVATIONS, FINISHED FLOORS, AND PAD ELEVATIONS UNLESS OTHERWISE NOTED.

ADD 2800.00' TO ELEVATIONS SHOWN HEREON TO ADJUST THEM TO THE ASSOCIATED DATUM.

GEOTECHNICAL REPORT

PROJECT No. G-20-042
DATED: APRIL 24, 2020
AS PREPARED BY: NOVA GEOTECHNICAL & INSPECTION SERVICES
UPDATED BY:

EARTHWORKS

CUT= 13,011 CY
FILL= 6,894 CY
NET= 6,317 CY CUT

DRAINAGE CERTIFICATION

I CERTIFY THAT THIS GRADING PLAN CONFORMS TO THE APPROVED DRAINAGE STUDY CLV # XXXXXXXX FOR THIS SITE ON FILE AT CITY OF LAS VEGAS FOR THIS PROJECT.

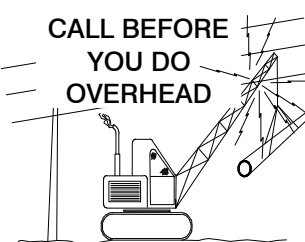
ERIC J. RIETZ, P.E. No. 16350

DATE

DISCLAIMER NOTE:

EXISTING UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT VERTICAL AND HORIZONTAL LOCATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN HEREON. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITIES NOT SHOWN IN THEIR PROPER LOCATION.

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY.



1-702-227-2929

Call before you Dig



1-800-227-2600



Call before you UnderGround

1-702-432-5300
FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

FLOOD ZONE

THIS SITE IS LOCATED IN ZONE "X". AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN, PER THE FLOOD INSURANCE RATE MAP COMMUNITY PANEL 3200302150 E. CLARK COUNTY, NEVADA DATED SEPTEMBER 27, 2002

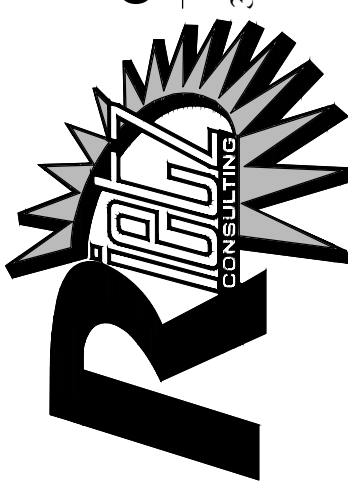
BENCHMARK

CLV 9LV106NWS
RIVET AND PLATE IN TOP OF CURB, AT THE SOUTHWEST CORNER OF CHARLESTON BLVD. AND HUALAPAI WAY, AT THE PC OF CHARLESTON BLVD.
ELEVATION: 888.339 METERS = 2914.50 FEET
NAVD88

BASIS OF BEARING

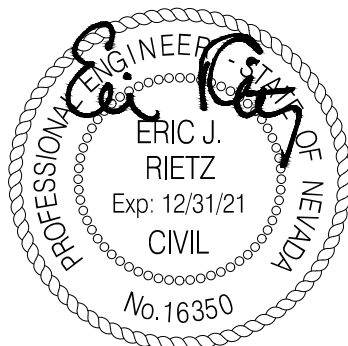
N 06°05'57" W- BEING THE BEARING OF THE WEST LINE OF THE SOUTHWEST QUARTER (SW 1) OF THE NORTHWEST QUARTER (NW 1) OF SECTION 31, TOWNSHIP 20 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SEEN IN BOOK 140, PAGE 22 OF PLATS, RECORDED IN THE CLARK COUNTY, NEVADA'S RECORDERS' OFFICE.

RIETZ CONSULTING INC.



GRADING PLAN
PANTHER MEDICAL
LAS VEGAS, NEVADA
APN # 138-31-210-009

DATE: 9/1/2020
DRAFTER: NJW
CHECKED: EJR
SCALE: 1"=30'



SHEET
C6
6 OF 8 SHEETS

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P:\Panther Medical\CD\SHEETS\DETAILS.dwg - 3/22/2020 7:58 AM

DISCLAIMER NOTE:

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AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY.

CALL BEFORE YOU DO OVERHEAD

1-702-227-2929

Call before you Dig

Avoid cutting underground utility lines. It's costly.

811

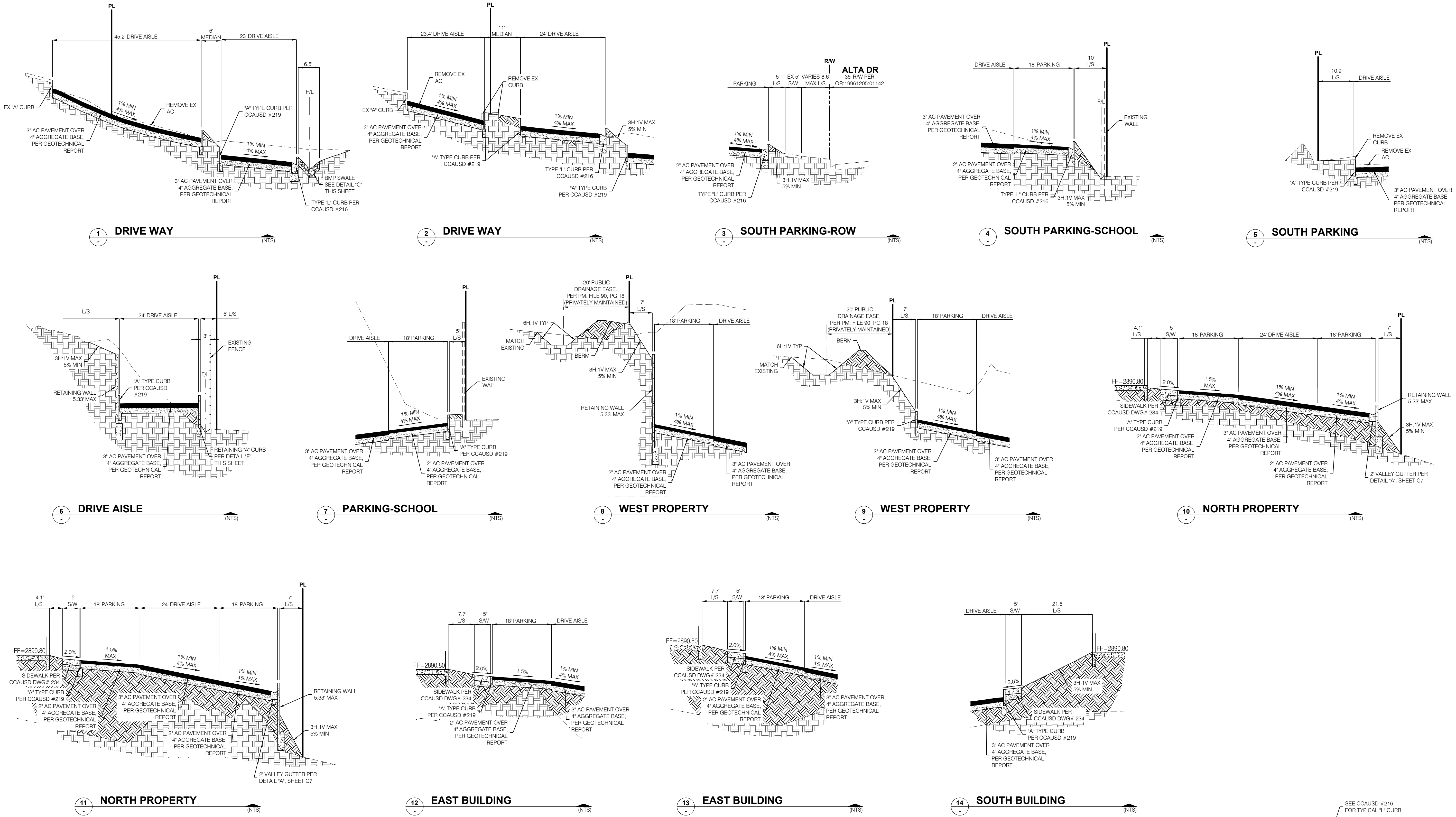
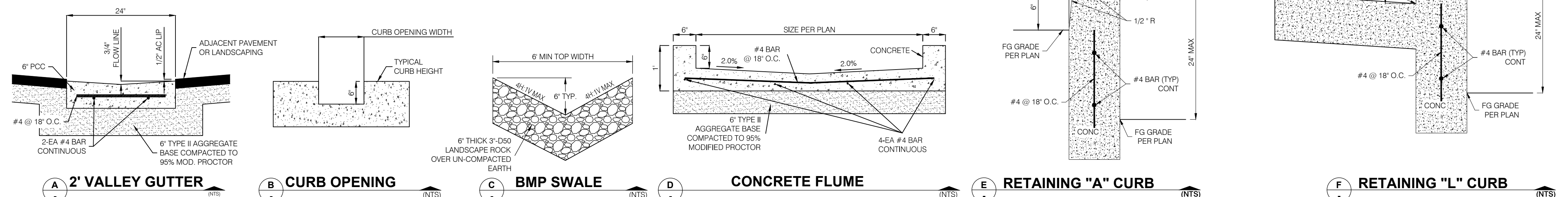
Call before you UnderGround

1-702-432-5300

OR

1-800-227-2600

FREWAY AND ARTERIAL SYSTEM OF TRANSPORTATION



RIETZ CONSULTING INC.

3203 E. WARM SPRINGS RD #400
LAS VEGAS, NEVADA 89120
PH: 702.521.3355

DETAIL SHEET

PANTHER MEDICAL
LAS VEGAS, NEVADA
APN # 138-31-210-009

DATE:	9/1/2020
DRAWN:	NJV
CHECKED:	EJR
SCALE:	N/A

PROFESSIONAL ENGINEER

ERIC J. RIETZ
Exp: 12/31/21
CIVIL
No. 16350

9/1/2020

SHEET

C7

7 OF 8 SHEETS

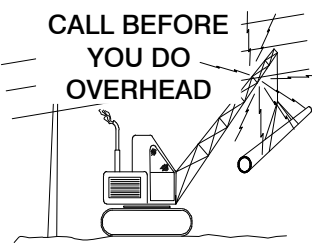
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AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY.



1-702-227-2929

Call before you Dig

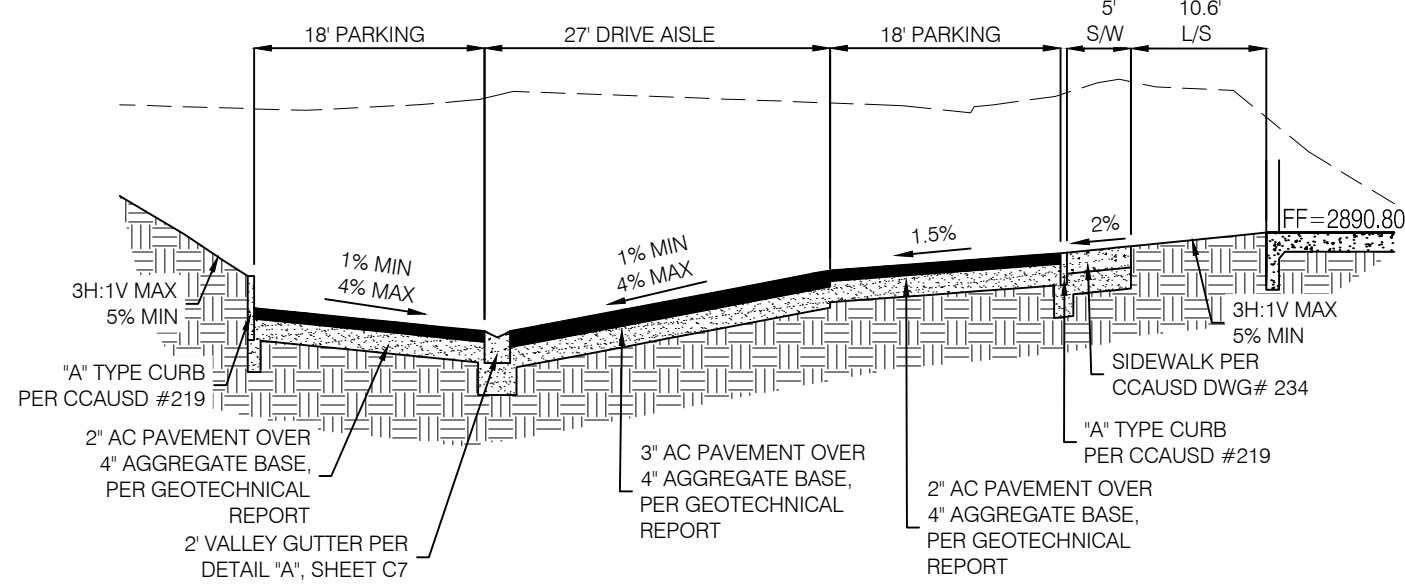


1-800-227-2600

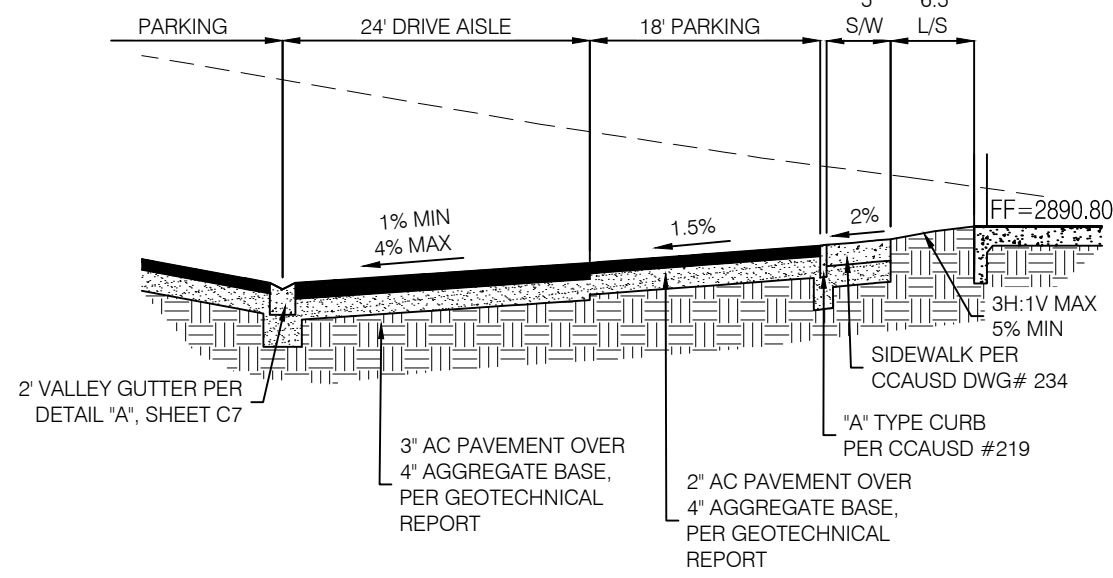


Call before you UnderGround

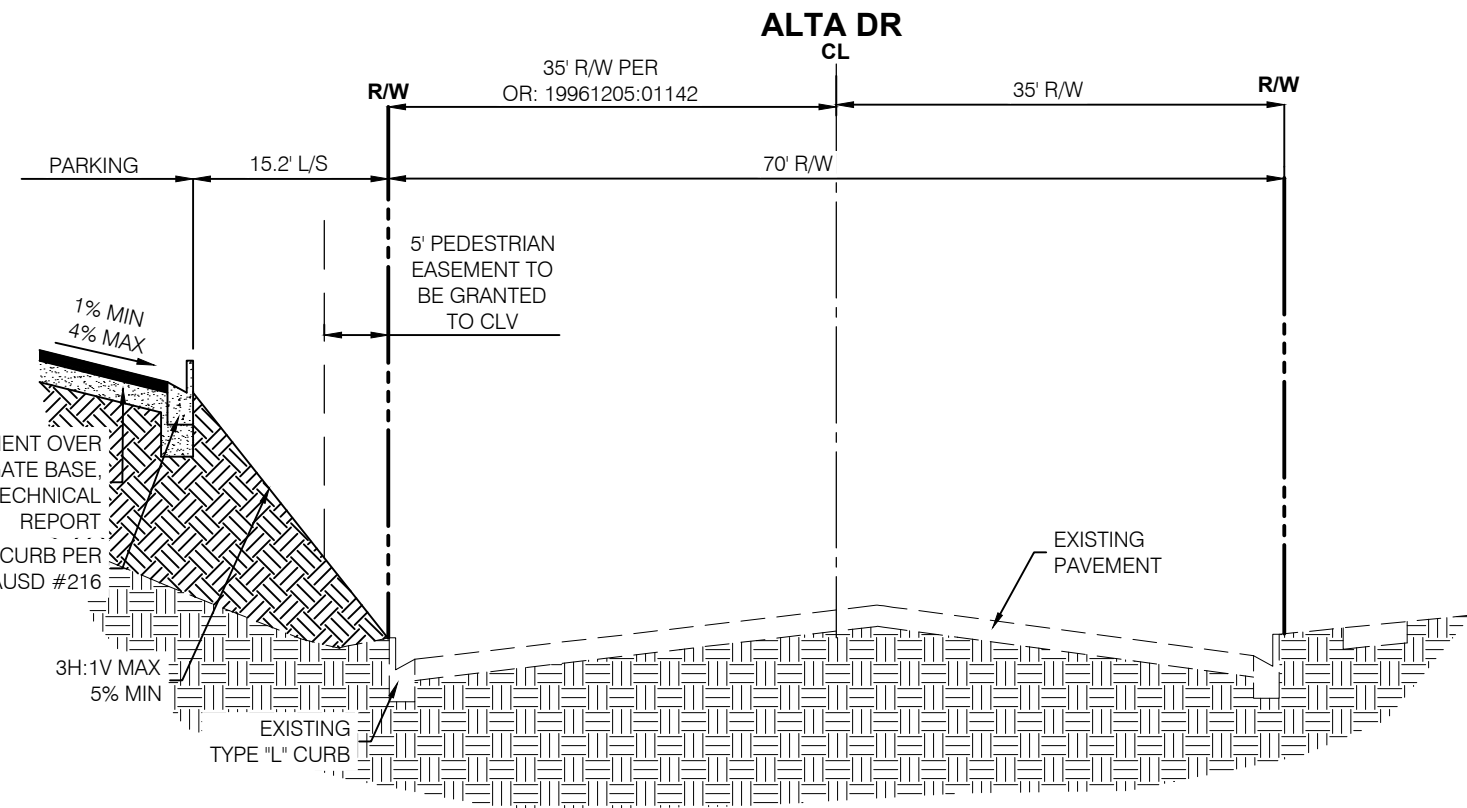
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FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION



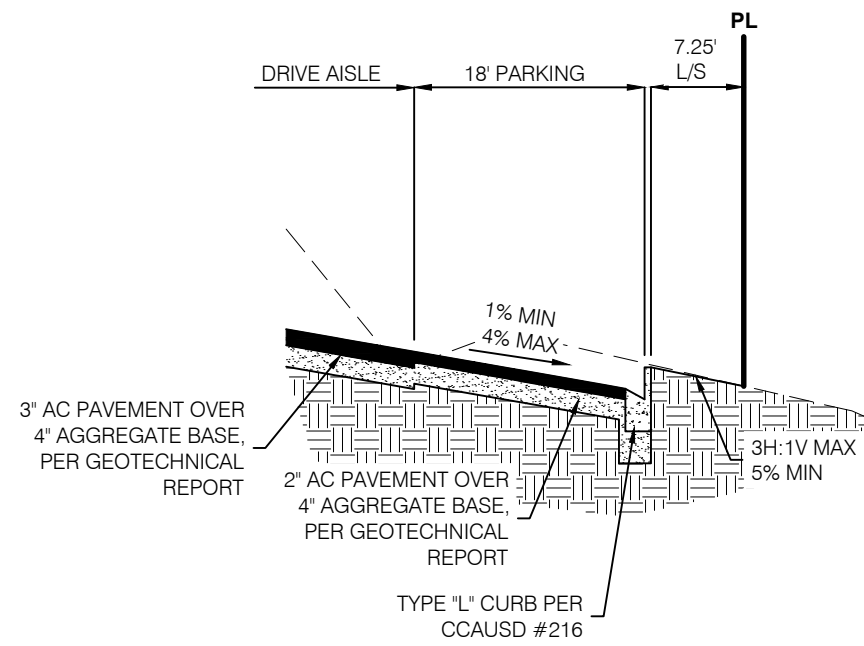
15 SOUTH BUILDING (NTS)



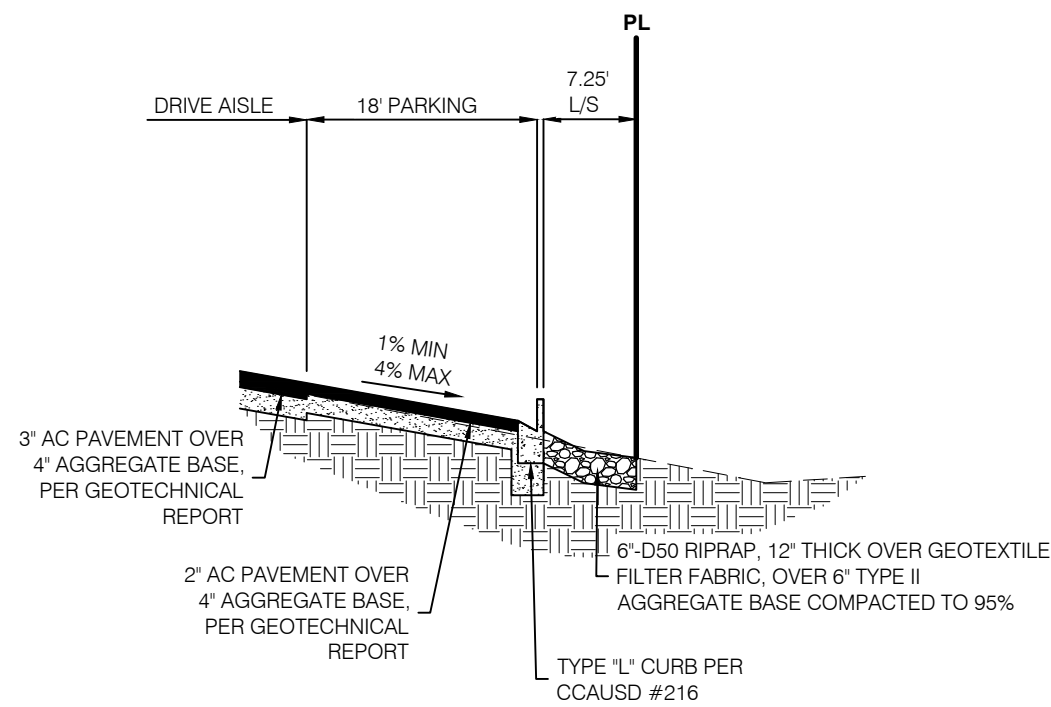
16 WEST BUILDING (NTS)



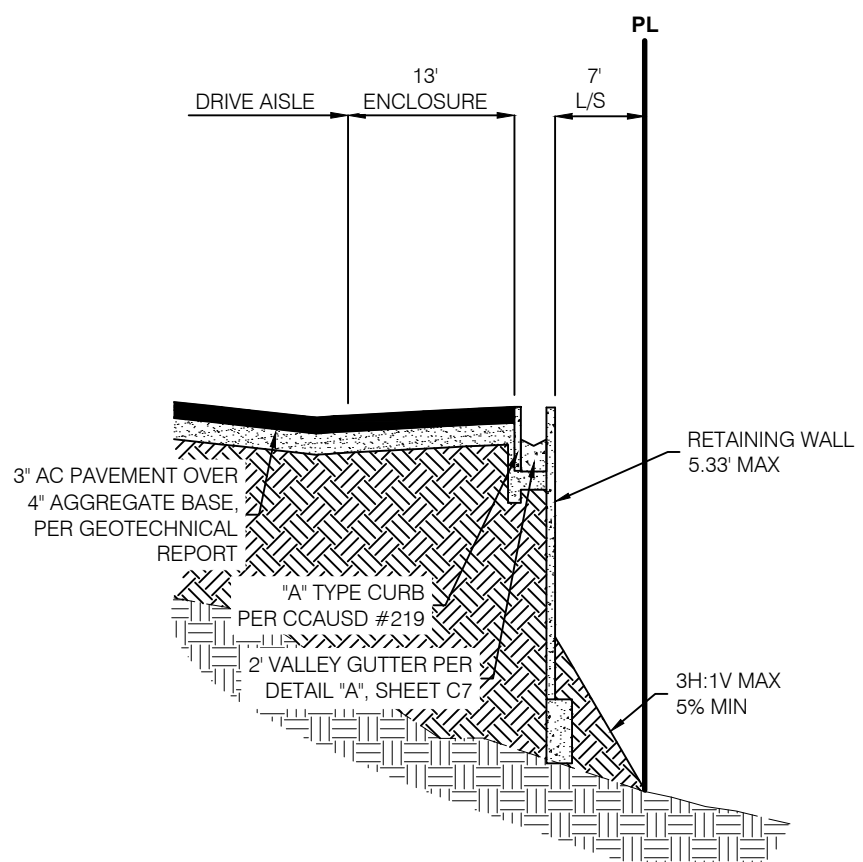
17 ALTA DRIVE (NTS)



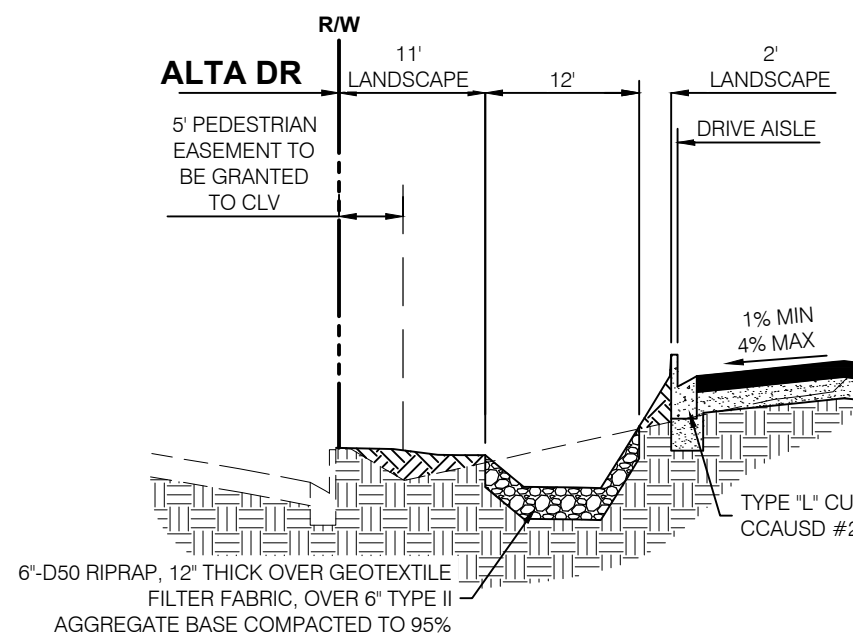
18 NORTH PROPERTY (NTS)



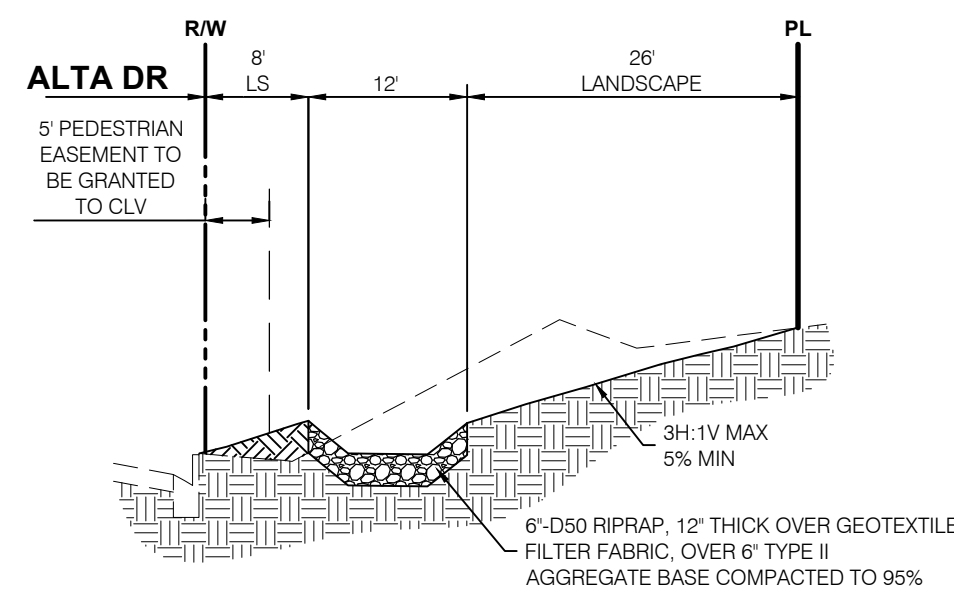
19 NORTH PROPERTY (NTS)



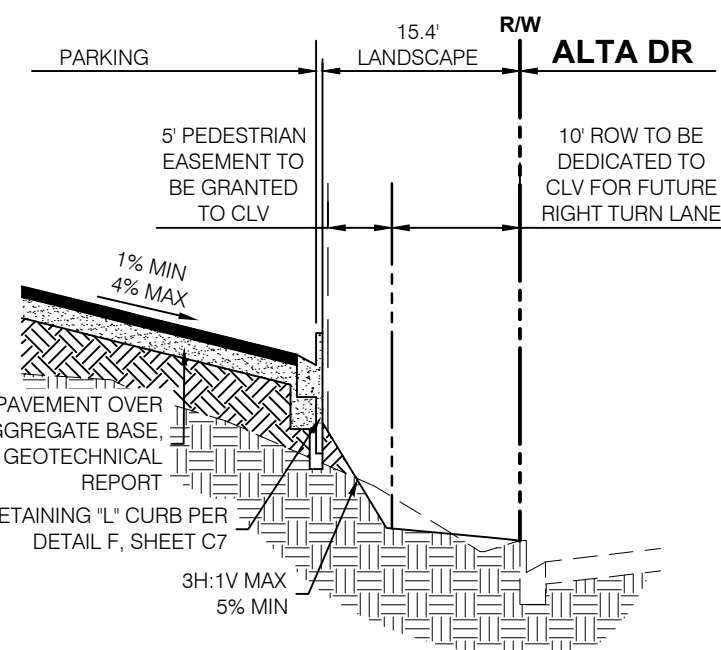
20 NORTH PROPERTY (NTS)



21 SOUTH PROPERTY (NTS)



22 NORTH & SOUTH PROPERTY (NTS)

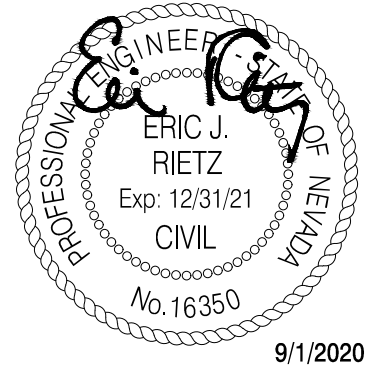


23 SOUTH PROPERTY (NTS)

RIETZ CONSULTING INC.
3203 E. WARM SPRINGS RD #400
LAS VEGAS, NEVADA 89120
PH: 702.521.3355

DETAIL SHEET
PANTHER MEDICAL
LAS VEGAS, NEVADA
APN # 138-31-210-009

DATE:	9/1/2020
DRAFTER:	NJW
CHECKED:	EJR
SCALE:	N/A



SHEET
C8
8 OF 8 SHEETS

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