ADDENDUM TO THE TECHNICAL DRAINAGE STUDY FOR DUNCAN LEON COMMERCIAL

Date
March 1, 2021

Project Number
20-0014

Prepared for

CACTI GROUNDS MANAGEMENT LLC

720 South 4th Street, Suite #301
Henderson, Nevada 89101

Prepared by

HAUNTEC, PLLC

Civil Engineering Services
800 North Rainbow Boulevard, Suite #144
Las Vegas, Nevada 89107-1190
Phone: (702) 219-5785
email: jhaun@haunteceng.com

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Duncan Leon Commercial Date: 3/3/2021

Location of Development: a) Descriptive (Cross Streets) North/South: Leon Avenue

East/West: Duncan Drive

b) Section: 12 Township: 20 South Range: 60 East

c) APN: 138-12-110-051

Name of Owner: Juan's LLC

Telephone No.: (702)370-5350 Fax No.: N/A E-Mail Address: Cactilandscape@gmail.com

Address: 720 South 4th Street, Suite #301, Henderson, Nevada 89101

Contact Person-Name: Joe Alvin Haun, P.E. M.S.E. **Telephone No.:** (702)219-5785

* **E-Mail Address:** jhaun@hauntecheng.com **Fax No.:** N/A

Firm: HAUNTEC Civil Engineering Services

Address: 800 North Rainbow Boulevard, Suite #144, Las Vegas, NV 89107-1190

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: 0.56 Being Developed/Disturbed: 0.56
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: 13 ac
6. Has the site drainage been evaluated in the past? ☐ **YES** ■ **NO** If yes, please identify documentation:
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: East towards Leon Avenue
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

Updated 05/01/2008

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name: Duncan Leon Commercial	Map ID:
Firm Name: HAUNTEC	Engineer: Joe Alvin Haun, P.E., M.S.E
Address: 800 North Rainbow Boulevard, Suite #144	
City: Las Vegas State: NV Zip: 89107-1190	
Phone Number: (702) 219-5785	Fax Number: N/A
Property Owner: Juan's LLC	
Address: 720 South 4th Street, Suite #301	
City: Henderson State: NV Zip: 89101	

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.
N/A		Design Manual **Standard Form 4**.
✓		2 copies of the 24" x 36" Drainage Plan.
Awaiting the letter		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

DRAINAGE SUBMITTAL CHECKLIST

II. MAPS AND EXHIBITS (Continued)

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

III. DRAINAGE PLAN

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

REFERENCE:	STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

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

REFERENCE:	STANDARD FORM 2

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
✓		For areas in Zone A, AE, AH, and AO, base flood elevations (BFEs) must be shown for each lot; BFEs may be listed on each lot, or in a table. Finish floor elevations must be a minimum of 18 inches above BFE.
✓		Appropriately elevated "humps" 6 inches above the 100 year water surface elevation at site accesses where the intent is to protect the site from the Q_{100} flows.
✓		Street slopes for perimeter and interior streets. The minimum slope is 0.4 percent.
N/A		Location and detail of best management practice (BMP) for parking lots and low impact development (LID) (if required).

IV. HYDROLOGIC ANALYSIS

Yes	No	
✓		Appropriate soil information and Soils Map for existing and future conditions with subbasins and property delineated.
✓		Input and output information for existing conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models.
✓		Input and output information for future conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models.
✓		Use of correct precipitation values in and around the McCarran Airport rainfall area.
✓		A discussion in the text of the hydrologic analysis justifying subbasin boundaries and cutoffs, supporting assumptions, and calculations.
✓		A summary table of stormwater flows showing basin area, Q_{10} and Q_{100} for both individual basins and combined basin flows, where applicable.
N/A		Copies of supporting technical information referenced from a previously approved study and a statement accepting these results.
✓		On-site facilities must perpetuate flows through or around the site without significantly impacting adjacent property owners in accordance with current Nevada Drainage Law.
N/A		Calculation for impervious area for parking lots and LIDs (if required).

REFERENCE:	STANDARD FORM 2

DRAINAGE SUBMITTAL CHECKLIST

V. HYDRAULIC ANALYSIS

Yes	No	
N/A		Flow split calculations and supporting documentation or reference for the method of flow split calculations used.
✓		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 x v $\leq$ 8. Q_{10} d x v $\leq$ 6 and 12 foot dry lane for rights-of-way $\geq$ 80 feet. Calculations must be labeled by street name as indicated on the Grading Plan.
✓		A summary table of interior and exterior street capacity calculations showing the street name, Q_{100} flow, slope, depth of flow, velocity and depth times velocity product and streets needing to meet 12 foot dry lane criteria.
N/A		Appropriate hydraulic calculations for block wall openings assuming a 50 percent vertical clogging factor. (Assume the lower half of the opening is plugged.)
✓		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.
✓		Provide necessary freeboard requirements to set the finished floor elevations of all proposed buildings, 2 x depth of flow or depth of flow plus 18 inches of freeboard, whichever is less. The minimum requirement is 6 inches above adjacent upstream top of curb. Buildings adjacent to drainage easements must always be provided with 18 inches of freeboard above the Q_{100} weir height or flow depth, whichever is greater.
N/A		A complete water surface profile analysis (HEC-2, HEC-RAS, etc.) for channel flows and FEMA Zone A flood zones. • Field survey data. • Input and output information. • Plotted cross-sections based on survey with proper encroachments. • A map showing the location of the cross-sections. • Analysis of both sub and super-critical flow segments. • A summary table and a discussion of the results in the text of the report.
N/A		Provide a 50 percent clogging factor in the capacity calculation for drop inlets.
N/A		Hydraulic calculations for culverts and storm drains. D-Load calculations must be provided for storm drain pipes in public rights-of-way, including headwater pool inundation.
✓		The mitigation of nuisance water, both during construction and in the fully developed condition, must be addressed.
N/A		Provide BMP type, size and supporting calculations for parking lots and LIDs (if required).

REFERENCE:	STANDARD FORM 2

March 1, 2021

HAUNTEC

2721 Ironside Drive
Las Vegas, Nevada 89108
Phone: (702) 219-5785

March 1, 2021

City of Las Vegas, Land Development Services
333 North Rancho Drive
Las Vegas, Nevada 89106

Attn: Peter Jackson, P.E.
Flood Control Project Engineer
Department of Public Works

Subject: Addendum to the Technical Drainage Study for Duncan Leon Commercial
(CLV No.: 5417)
(APN 138-12-110-051)

Dear Mr. Peterson:

This Addendum to the Technical Drainage Study for Duncan Leon Commercial is our response to the City of Las Vegas Comment Letter dated February 23, 2021. Each comment is restated and followed with our response. Please note that the attached Grading Plan corresponds the comments and responses below.

1. This site development is located within a FEMA Special Flood Hazard Area, Zone A with no Base Flood Elevation determined. No permits will be issued until a Conditional Letter of Map Revision-Fill (CLOMR-F) is received from FEMA. Permits may be issued upon the receipt of Conditional Letter of Map Revision - Fill (CLOMR-F) from FEMA.
Response: We understand the criteria. We will follow-up Technical Drainage Study and Addendum with a CLOMR-F application package once the Technical Drainage Study has been conditionally approved.

2. A Letter of Map Revision - Fill (LOMR-F) must be obtained from FEMA after the completion of any project within a FEMA Special Flood Hazard Area (SFHA), Flood Zone "A". The bonded improvements shall include a line item of $50,000.00 for the LOMR-F. The bonded improvements will not be released until the LOMR-F is obtained from FEMA and filed with the City of Las Vegas.
Response: We understand the criteria. We will follow-up CLOMR-F with a LOMR-F application package once the proposed site's improvements have been completed.

3. The site is located within a FEMA Flood Zone A, therefore, CCRFCD review and approval is required prior to final approval of the drainage study. The Engineer must obtain CCRFCD concurrence prior to the City signing off on CLOMR-F Application.
Response: We understand the criteria. Once the City of Las Vegas has Conditionally Approved the Technical Drainage Study, we will submit the Technical Drainage Study and Addendum to Clark County Regional Flood Control for their Concurrence on the study. Then we process the CLOMR-F application package through the City of Las Vegas and Clark County Regional Flood Control District.

4. The Grading Plans indicates the proposed development is entirely within the existing Zone A, Flood Zone boundaries.
Response: This is correct, the entire site lies with in an existing FEMA Designated Flood Zone A.

5. Provide an annotated FIRM that clearly shows that the only the Structure is proposed to be removed from the Zone A, Flood Zone.
Response: The attached FIRM shows only the proposed building to lie outside of the Zone A.

6. The adopted FEMA flow within Duncan is 206 cfs at Rancho per the Rancho/US95 FIS. Adjust the flow rate impacting the site to include Basin OFF-A for a total of 226 cfs within the Street Section for the 100-year event. Update the Report narrative and Tables accordingly. Use the critical depth from the Street flow calculations to establish the Base Flood Elevation (BFE), as FEMA looks at sub-critical flow regime. Update the Street flow depth calculations accordingly. This sets the BFE based upon the entire flow within the Street Right-of-Way.
Response: The Street Capacity Analysis has been updated with the entire flow of 226-cfs. The Street Capacity Analysis is included in the Appendix and summarized in the Table below. Also attached are both the updated Existing Drainage Basin Map and the Developed Drainage Basin Map.

Table 1 – Street Capacity Calculations

EXISTING CONDITION					
STREET	**Q_{10} (cfs)**	**V_{10} (ft/s)**	**D_{10} (ft)**	**VxD (ft^2/s)**	**Dry Lane (ft)**
HS-1: Leon Avenue	8	1.68	0.43	0.72	N/A
HS-2: Duncan Drive	10	2.34	0.41	0.97	N/A
HS-3: Duncan Drive	11	2.40	0.4	1.02	N/A
HS-4: Duncan Drive	11	2.40	0.4	1.02	N/A
STREET	**Q_{100} (cfs)**	**V_{100} (ft/s)**	**D_{100} (ft)**	**VxD (ft^2/s)**	
HS-1: Leon Avenue	15	1.90	0.52	0.99	
HS-2: Duncan Drive	226	6.04	1.03	6.20	
HS-3: Duncan Drive	226	6.04	1.03	6.20	
HS-4: Duncan Drive	226	6.04	1.03	6.20	
DEVELOPED CONDITION					
STREET	**Q_{10} (cfs)**	**V_{10} (ft/s)**	**D_{10} (ft)**	**VxD (ft^2/s)**	**Dry Lane (ft)**
HS-1: Leon Avenue	8	1.68	0.43	0.72	N/A
HS-2: Duncan Drive	10	2.34	0.41	0.97	N/A
HS-3: Duncan Drive	11	2.40	0.4	1.02	N/A
HS-4: Duncan Drive	11	2.40	0.4	1.02	N/A

STREET	Q_{100} (cfs)	V_{100} (ft/s)	D_{100} (ft)	VxD (ft^2/s)
HS-1: Leon Avenue	15	1.90	0.52	0.99
HS-2: Duncan Drive	226	6.04	1.03	6.20
HS-3: Duncan Drive	226	6.04	1.03	6.20
HS-4: Duncan Drive	226	6.04	1.03	6.20

Note:

The streets meet the hydraulic criteria for Depth, Velocity, and DxV.

7. Update Figure 5 & 6 to reflect the 206 cfs at the Rancho Intersection and 226 cfs at the site.
Response: Updated Figures 5 & 6 are attached.

8. Revise the Street flow calculations to reflect an n-value of 0.016 per the HCDDM requirements. Flood Control estimates the flow at critical depth to be nearer to 1.2-feet. Review the calculations and all exhibits and show the revised flow depths accordingly. This will affect the Site Grading and Proposed Building Finish Floor Elevation (FFE). The FFE must be a minimum of 18-inches above the BFE.
Response: Attached is the revised Street Flow Calculations reflecting the n-value of 0.016. The Finished Floor Elevation has been raised to 2250.90 (Minimum of 18" above the BFE) (See attached Grading Plan).

9. Revise the entry and parking lot grading so that the onsite elevations are above the flow depth in the Duncan. The intent is to keep the 100-year flow within the street and out of the site, reducing site impacts.
Response: Attached is the revised Grading Plan.

10. The grading plan needs to show the Base Flood Elevation at the Building.
Response: Attached is the revised Grading Plan.

11. Provide a Public Drainage Easement to be Privately Maintained (site to be privately maintained by the property owner) for the area of the site impacted by the existing Zone A, Flood Zone. All areas of the site not occupied by the proposed Building shall be designated as within the Public Drainage Easement to be Privately Maintained. The easement shall note that the private drainage improvements are privately maintained and the easement must be dedicated and recorded by separate document prior to the final acceptance of the improvement plans. Provide legal description and an exhibit of the drainage easement for Flood Control approval and then submit to City of Las Vegas Right of Way Section for the recordation process after the subject drainage study is conditionally approved.
Response: Attached is the revised Grading Plan showing that the whole site except the building will be in a Public Drainage Easement to be Privately Maintained.

12. Add a Note to the Grading Plan. All areas of the site not occupied by the proposed Building shall be designated as a Public Drainage Easement to be Privately Maintained.
Response: Attached is the revised Grading Plan showing that the whole site except the building will be in a Public Drainage Easement to be Privately Maintained.

13. The engineer shall provide a table on the grading plans that shows the quantity estimate of all on-site improvements. All required drainage improvements within the Public Drainage Easement to be Privately Maintained shall be bonded and inspected. The bonded improvements will not be released until the LOMR-F is obtained from FEMA and filed with the City of Las Vegas.
Response: The attached revised Grading Plan. Shows the table.

14. A portion of the development is shown crossing property lines. Provide Permission to Grade Letter and/or easement for use of adjoining parcel prior to Final Drainage Study approval. An alternative to consider would be a Boundary adjustment.
Response: We have requested a Permission to Grade on the neighboring site. Once we have the letter signed by the neighboring property owner, we will forward the letter to the City of Las Vegas.

15. Revise the pavement grading to show positive drainage away from the west side of the Building.
Response: The attached revised Grading Plan shows the revised proposed drainage grades along the west side of the proposed building.

16. Show a swale from the parking lot low point out to Leon and include a sidewalk underdrain connection into the street.
Response: The attached revised Grading Plan shows the proposed swale grades.

17. Provide existing swale elevation east of the Duncan Valley Gutter to show positive drainage.
Response: The Surveyor has re-shot elevations along the Duncan Valley Gutter. See attached revised Grading Plan.

18. Verify curb grade and slopes along Leon Ave. Show existing Leon R/W width on plans.
Response: The Surveyor has re-shot elevations along the Leon Avenue curb grades and slopes. See attached revised Grading Plan.

19. Verify the Stationing of the driveway centerline.
Response: The Stationing has been check and revised. See attached revised Grading Plan.

March 1, 2021

If additional information is required, please contact me.

Sincerely,

Joe Alvin Haun, PE, MSE
HAUNTEC Civil Engineering Services

March 1, 2021

APPENDIX

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM			DATE: Revised February 25, 2021 February 23, 2021
TO: **Land Development Services** Department of Building & Safety			FROM: Albert Sung, P.E. PBS Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for: **Duncan Leon Commercial**		**COPIES TO:** Hauntec, PLLC
Cross Streets:	Northwest corner of Leon and Duncan		Juan's LLC
File Number:	F:\Depot\DSMemos\DS5417A.ZNAE.doc		Bart Anderson, P.E., DevCo
Parcel Number:	138-12-110-051		CCRFCD
Zoning Action:	20-0132-GPA1, 20-0132-SDR1		
FEMA Flood Zone	YES **X**	NO	
Proposed Storm Drain	YES	NO **X**	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1st Submittal	1/25/2021	2/22/2021	See Comments Below	$400.00	$400
			TOTAL FEES (LDDRS):	**$400.00**	**----**

REMARKS: This site development is within a FEMA Special Flood Hazard Area, Zone A, an area with no Base Flood Elevation. No permits of any kind will be issued for this project until a Conditional Letter of Map Revision - Fill (CLOMR-F) is received from FEMA.

Revised to show acceptance of Planning/Zoning Conditions.

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.

Flood Control recommends that this site remove the Proposed Structure from the Flood Zone. The removal of the Structure from the Flood Zone will not change the FEMA Flood Zone Map. The site will still be in the Mapped Flood Zone.

1. This site development is located within a FEMA Special Flood Hazard Area, Zone A with no Base Flood Elevation determined. **No permits will be issued until a Conditional Letter of Map Revision - Fill (CLOMR-F) is received from FEMA. Permits may be issued upon the receipt of Conditional Letter of Map Revision - Fill (CLOMR-F) from FEMA.**

2. A **Letter of Map Revision - Fill (LOMR-F)** must be obtained from FEMA after the completion of any project within a FEMA Special Flood Hazard Area (SFHA), Flood Zone "A". The bonded improvements shall include a line item of **$50,000.00** for the **LOMR-F**. The bonded improvements will not be released until the **LOMR-F** is obtained from FEMA and filed with the **City of Las Vegas**.

3. The site is located within a *FEMA Flood Zone A*, therefore, CCRFCD review and approval is required prior to final approval of the drainage study. The Engineer must obtain CCRFCD concurrence prior to the City signing off on CLOMR-F Application.

4. The Grading Plans indicates the proposed development is entirely within the existing Zone A, Flood Zone boundaries.

5. Provide an annotated FIRM that clearly shows that the only the Structure is proposed to be removed from the Zone A, Flood Zone.

6. The adopted FEMA flow within Duncan is 206 cfs at Rancho per the Rancho/US95 FIS. Adjust the flow rate impacting the site to include Basin OFF-A for a total of 226 cfs within the Street Section for the 100-year event. Update the Report narrative and Tables accordingly. Use the critical depth from the Street flow calculations to establish the Base Flood Elevation (BFE), as FEMA looks at sub-critical flow regime. Update the Street flow depth calculations accordingly. This sets the BFE based upon the entire flow within the Street Right-of-Way

7. Update Figure 5 & 6 to reflect the 206 cfs at the Rancho Intersection and 226 cfs at the site.

8. Revise the Street flow calculations to reflect an n-value of 0.016 per the HCDDM requirements. Flood Control estimates the flow at critical depth to be nearer to 1.2-feet. Review the calculations and all exhibits and show the revised flow depths accordingly. This will affect the Site Grading and Proposed Building Finish Floor Elevation (FFE). The FFE must be a minimum of 18-inches above the BFE.

9. Revise the entry and parking lot grading so that the onsite elevations are above the flow depth in the Duncan. The intent is to keep the 100-year flow within the street and out of the site, reducing site impacts.

10. The grading plan needs to show the Base Flood Elevation at the Building.

11. Provide a Public Drainage Easement to be Privately Maintained (site to be privately maintained by the property owner) for the area of the site impacted by the existing Zone A, Flood Zone. All areas of the site not occupied by the proposed Building shall be designated as within the Public Drainage Easement to be Privately Maintained. The easement shall note that the private drainage improvements are privately maintained and the easement must be dedicated and recorded by separate document prior to the final acceptance of the improvement plans. Provide legal description and an exhibit of the drainage easement for Flood Control approval and then submit to *City of Las Vegas Right of Way Section* for the recordation process after the subject drainage study is conditionally approved.

12. Add a Note to the Grading Plan. . *All areas of the site not occupied by the proposed Building shall be designated as a Public Drainage Easement to be Privately Maintained.*

13. The engineer shall provide a table on the grading plans that shows the quantity estimate of all on-site improvements. All required drainage improvements within the Public Drainage Easement to be Privately Maintained shall be bonded and inspected. The bonded improvements will not be released until the LOMR-F is obtained from FEMA and filed with the City of Las Vegas.

14. A portion of the development is shown crossing property lines. Provide Permission to Grade Letter and/or easement for use of adjoining parcel prior to Final Drainage Study approval. An alternative to consider would be a Boundary adjustment.

15. Revise the pavement grading to show positive drainage away from the west side of the Building.

16. Show a swale from the parking lot low point out to Leon and include a sidewalk underdrain connection into the street.

17. Provide existing swale elevation east of the Duncan Valley Gutter to show positive drainage.

18. Verify curb grade and slopes along Leon Ave. Show existing Leon R/W width on plans.

19. Verify the Stationing of the driveway centerline.

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
PBJ/AYS

T/R/S: T20S/R60E/12
AREA L-12

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 Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations 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 report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. 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 for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 11. The **horizontal datum** was 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 this FIRM.

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

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC–3, #9202
1315 East–West Highway
Silver Spring, MD 20910–3282

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 its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was provided in digital format by the Clark County GIS Management Office (GISMO).

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 (which contains authoritative hydraulic data)* may reflect stream channel distances that differ from what is shown on this map.

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.

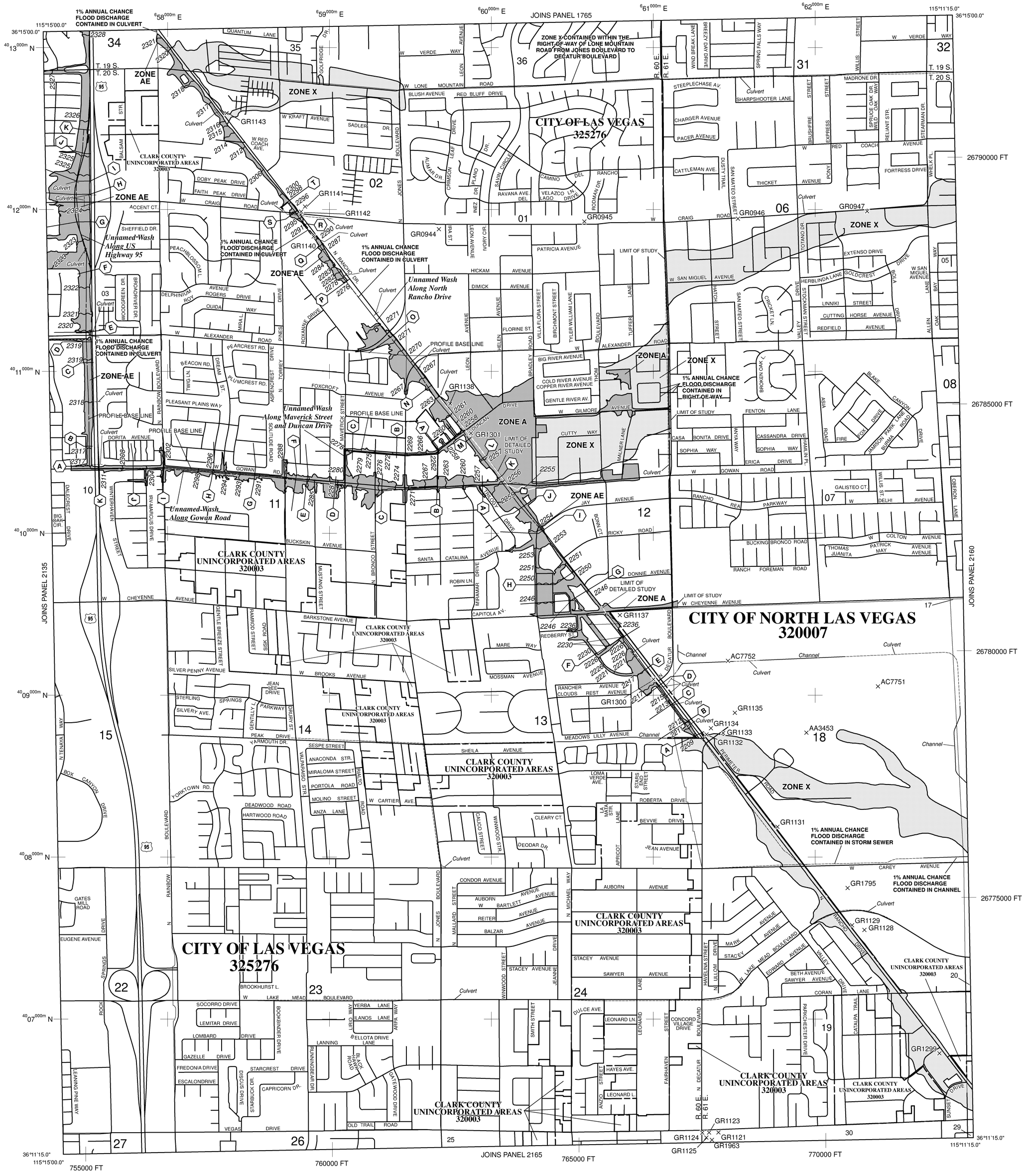
For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service Center website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information eXchange.

The 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 government 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 basemap for this DFIRM.

DIGITAL DATA AVAILABILITY: http://www.co.clark.nv.us/ceit/gismo/gismo.htm



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

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

ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

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

OTHER FLOOD AREAS

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

OTHER AREAS

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

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

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

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

Floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

513 Base Flood Elevation line and value; elevation in feet*

(EL 987) Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

A — A Cross section line

23 — 23 Transect line

97°07'30", 32°22'30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)

4275000mN 1000-meter Universal Transverse Mercator grid ticks, zone 11

6000000 FT 5000-foot grid ticks: Nevada State Plane coordinate system, east zone (FIPSZONE 2701), Transverse Mercator

DX5510 × Bench mark (see explanation in Notes to Users section of this FIRM panel)

M1.5 River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
August 16, 1995
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
September 27, 2002

November 16, 2011 –to reflect updated topographic information, to change floodway, to add Base Flood Elevations, to update corporate limits, to change Base Flood Elevations, to add Special Flood Hazard Areas, to change Special Flood Hazard Areas, to delete Special Flood Hazard Areas, to change zone designations, to add roads and road names, and to incorporate previously issued Letters of Map Revision.

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

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'
500 0 1000 2000 FEET
300 0 300 600 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2155F

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

PANEL 2155 OF 4090
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CLARK COUNTY	320003	2155	F
LAS VEGAS, CITY OF	325276	2155	F
NORTH LAS VEGAS, CITY OF	320007	2155	F

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

MAP NUMBER
32003C2155F
MAP REVISED
NOVEMBER 16, 2011

Federal Emergency Management Agency

HS-1

EXISTING AND DEVELOPED CONDITION

Leon Fully Improved, Q_{10}

Input Parameters

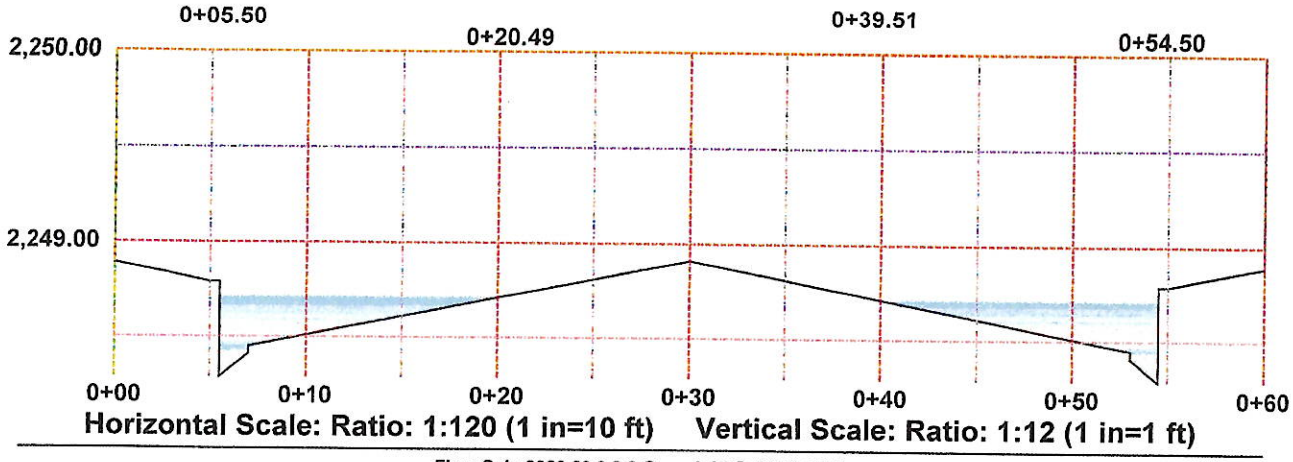
Manning N Value	0.0160
Manning N Method	Same
Channel Slope	0.40000 %
Normal Depth	0.43 ft
Discharge	8.00 cfs
Solve For	Normal Depth

Channel Section

Station (ft)	Elevation (ft)	Start N-Value
0+00.00	2,250.00	0.0160
0+00.00	2,248.89	0.0160
0+05.00	2,248.79	0.0160
0+05.50	2,248.79	0.0160
0+05.50	2,248.29	0.0160
0+07.00	2,248.41	0.0160
0+07.00	2,248.45	0.0160
0+30.00	2,248.91	0.0160
0+53.00	2,248.45	0.0160
0+53.00	2,248.41	0.0160
0+54.50	2,248.29	0.0160
0+54.50	2,248.79	0.0160
0+55.00	2,248.79	0.0160
0+60.00	2,248.89	0.0160
0+60.00	2,250.00	0.0160

Output Parameters

Channel Depth	1.71 ft
Channel Width	60.00 ft
Water Surface Elevation	2,248.72 ft
Flow Area	4.75 sq.ft.
Wetted Perimeter	30.94 ft
Top Width	29.98 ft
Hydraulic Depth	0.158 ft
Hydraulic Radius	0.154 ft
Critical Depth	0.39 ft
Critical Slope	0.74745 %
Velocity	1.68 ft/s
Velocity Head	0.04 ft
Specific Energy	0.47 ft
Froude Number	0.746
Velocity Depth Product	0.72 sq.ft./s
Flow Type	Sub-Critical



HS-1

EXISTING AND DEVELOPED CONDITION

Leon Fully Improved, Q100

Input Parameters

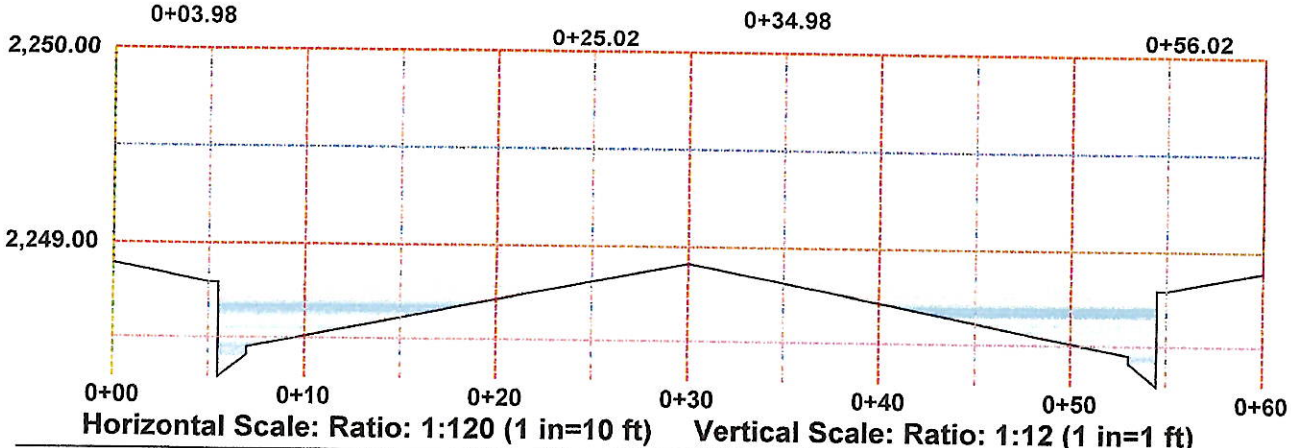
Manning N Value	0.0160
Manning N Method	Same
Channel Slope	0.40000 %
Normal Depth	0.52 ft
Discharge	15.00 cfs
Solve For	Normal Depth

Channel Section

Station (ft)	Elevation (ft)	Start N-Value
0+00.00	2,250.00	0.0160
0+00.00	2,248.89	0.0160
0+05.00	2,248.79	0.0160
0+05.50	2,248.79	0.0160
0+05.50	2,248.29	0.0160
0+07.00	2,248.41	0.0160
0+07.00	2,248.45	0.0160
0+30.00	2,248.91	0.0160
0+53.00	2,248.45	0.0160
0+53.00	2,248.41	0.0160
0+54.50	2,248.29	0.0160
0+54.50	2,248.79	0.0160
0+55.00	2,248.79	0.0160
0+60.00	2,248.89	0.0160
0+60.00	2,250.00	0.0160

Output Parameters

Channel Depth	1.71 ft
Channel Width	60.00 ft
Water Surface Elevation	2,248.81 ft
Flow Area	7.91 sq.ft.
Wetted Perimeter	43.16 ft
Top Width	42.06 ft
Hydraulic Depth	0.188 ft
Hydraulic Radius	0.183 ft
Critical Depth	0.48 ft
Critical Slope	0.68725 %
Velocity	1.90 ft/s
Velocity Head	0.06 ft
Specific Energy	0.58 ft
Froude Number	0.770
Velocity Depth Product	0.99 sq.ft./s
Flow Type	Sub-Critical



HS-2

EXISTING AND DEVELOPED CONDITION

Duncan Fully Improved, Q10

Input Parameters

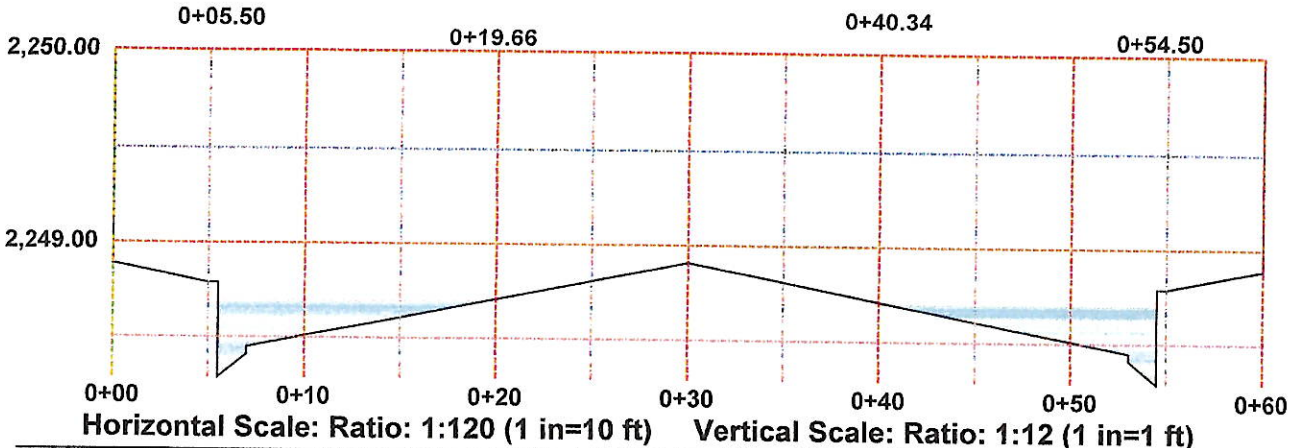
Manning N Value	0.0160
Manning N Method	Same
Channel Slope	0.83000 %
Normal Depth	0.41 ft
Discharge	10.00 cfs
Solve For	Normal Depth

Channel Section

Station (ft)	Elevation (ft)	Start N-Value
0+00.00	2,250.00	0.0160
0+00.00	2,248.89	0.0160
0+05.00	2,248.79	0.0160
0+05.50	2,248.79	0.0160
0+05.50	2,248.29	0.0160
0+07.00	2,248.41	0.0160
0+07.00	2,248.45	0.0160
0+30.00	2,248.91	0.0160
0+53.00	2,248.45	0.0160
0+53.00	2,248.41	0.0160
0+54.50	2,248.29	0.0160
0+54.50	2,248.79	0.0160
0+55.00	2,248.79	0.0160
0+60.00	2,248.89	0.0160
0+60.00	2,250.00	0.0160

Output Parameters

Channel Depth	1.71 ft
Channel Width	60.00 ft
Water Surface Elevation	2,248.70 ft
Flow Area	4.27 sq.ft.
Wetted Perimeter	29.24 ft
Top Width	28.32 ft
Hydraulic Depth	0.151 ft
Hydraulic Radius	0.146 ft
Critical Depth	0.42 ft
Critical Slope	0.72558 %
Velocity	2.34 ft/s
Velocity Head	0.09 ft
Specific Energy	0.50 ft
Froude Number	1.065
Velocity Depth Product	0.97 sq.ft./s
Flow Type	Super-Critical



HS-3 AND HS-4

EXISTING AND DEVELOPED CONDITION

Duncan Fully Improved, Q10

Input Parameters

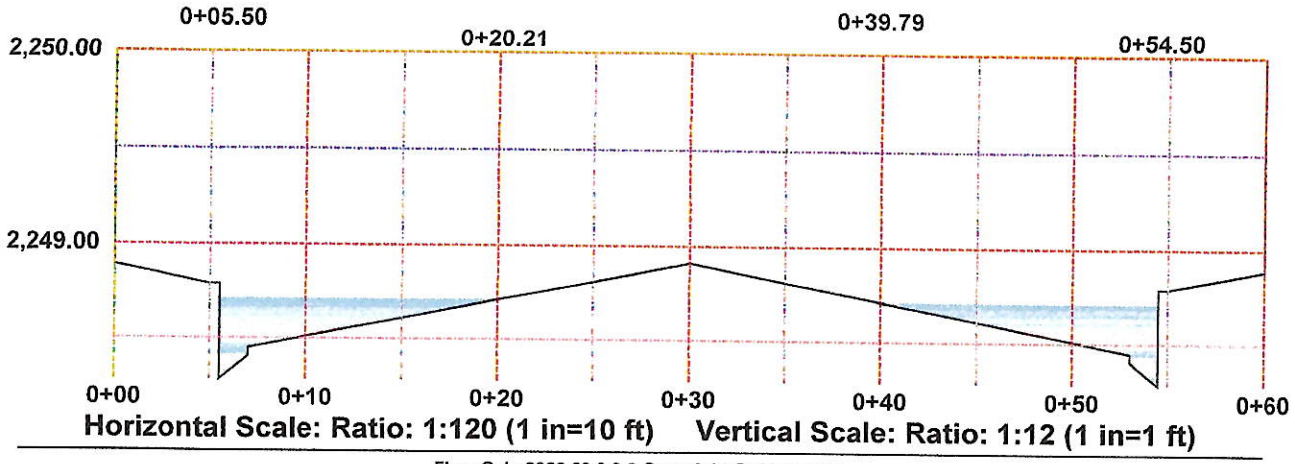
Manning N Value	0.0160
Manning N Method	Same
Channel Slope	0.83000 %
Normal Depth	0.42 ft
Discharge	11.00 cfs
Solve For	Normal Depth

Channel Section

Station (ft)	Elevation (ft)	Start N-Value
0+00.00	2,250.00	0.0160
0+00.00	2,248.89	0.0160
0+05.00	2,248.79	0.0160
0+05.50	2,248.79	0.0160
0+05.50	2,248.29	0.0160
0+07.00	2,248.41	0.0160
0+07.00	2,248.45	0.0160
0+30.00	2,248.91	0.0160
0+53.00	2,248.45	0.0160
0+53.00	2,248.41	0.0160
0+54.50	2,248.29	0.0160
0+54.50	2,248.79	0.0160
0+55.00	2,248.79	0.0160
0+60.00	2,248.89	0.0160
0+60.00	2,250.00	0.0160

Output Parameters

Channel Depth	1.71 ft
Channel Width	60.00 ft
Water Surface Elevation	2,248.71 ft
Flow Area	4.59 sq.ft.
Wetted Perimeter	30.37 ft
Top Width	29.43 ft
Hydraulic Depth	0.156 ft
Hydraulic Radius	0.151 ft
Critical Depth	0.43 ft
Critical Slope	0.71640 %
Velocity	2.40 ft/s
Velocity Head	0.09 ft
Specific Energy	0.51 ft
Froude Number	1.071
Velocity Depth Product	1.02 sq.ft./s
Flow Type	Super-Critical



Horizontal Scale: Ratio: 1:120 (1 in=10 ft) Vertical Scale: Ratio: 1:12 (1 in=1 ft)

HS-2, HS-3, & HS-4

EXISTING AND DEVELOPED CONDITIONS

Duncan Fully Improved, Q100

Input Parameters

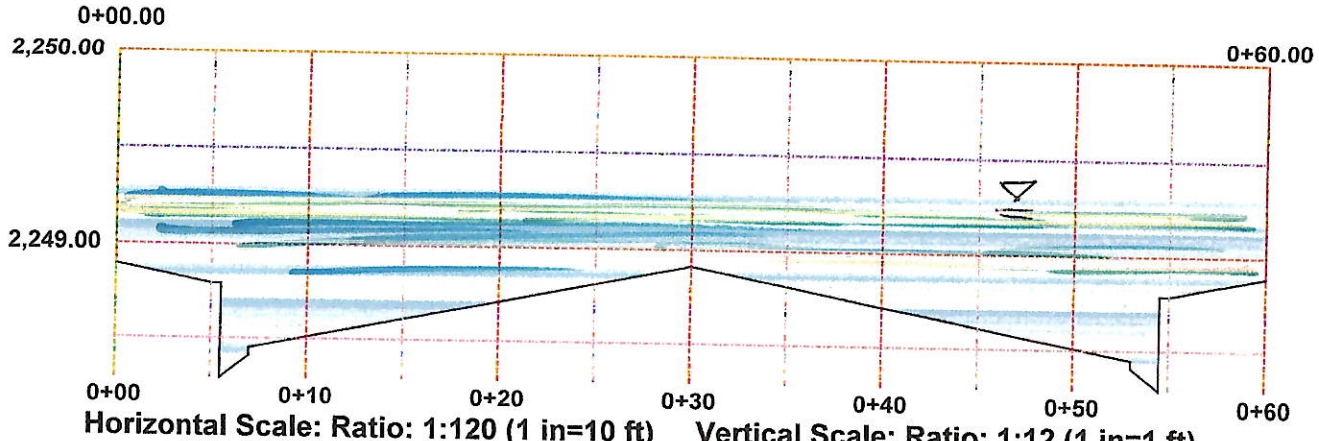
Manning N Value	0.0160
Manning N Method	Same
Channel Slope	0.83000 %
Normal Depth	1.03 ft
Discharge	226.00 cfs
Solve For	Normal Depth

Channel Section

Station (ft)	Elevation (ft)	Start N-Value
0+00.00	2,250.00	0.0160
0+00.00	2,248.89	0.0160
0+05.00	2,248.79	0.0160
0+05.50	2,248.79	0.0160
0+05.50	2,248.29	0.0160
0+07.00	2,248.41	0.0160
0+07.00	2,248.45	0.0160
0+30.00	2,248.91	0.0160
0+53.00	2,248.45	0.0160
0+53.00	2,248.41	0.0160
0+54.50	2,248.29	0.0160
0+54.50	2,248.79	0.0160
0+55.00	2,248.79	0.0160
0+60.00	2,248.89	0.0160
0+60.00	2,250.00	0.0160

Output Parameters

Channel Depth	1.71 ft
Channel Width	60.00 ft
Water Surface Elevation	2,249.32 ft
Flow Area	37.40 sq.ft.
Wetted Perimeter	61.95 ft
Top Width	60.00 ft
Hydraulic Depth	0.623 ft
Hydraulic Radius	0.604 ft
Critical Depth	1.16 ft
Critical Slope	0.42891 %
Velocity	6.04 ft/s
Velocity Head	0.57 ft
Specific Energy	1.59 ft
Froude Number	1.350
Velocity Depth Product	6.20 sq.ft./s
Flow Type	Super-Critical



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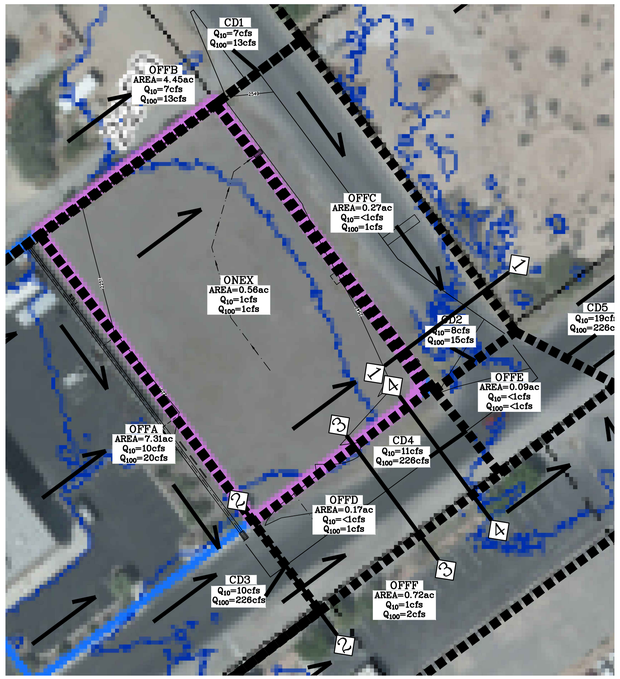
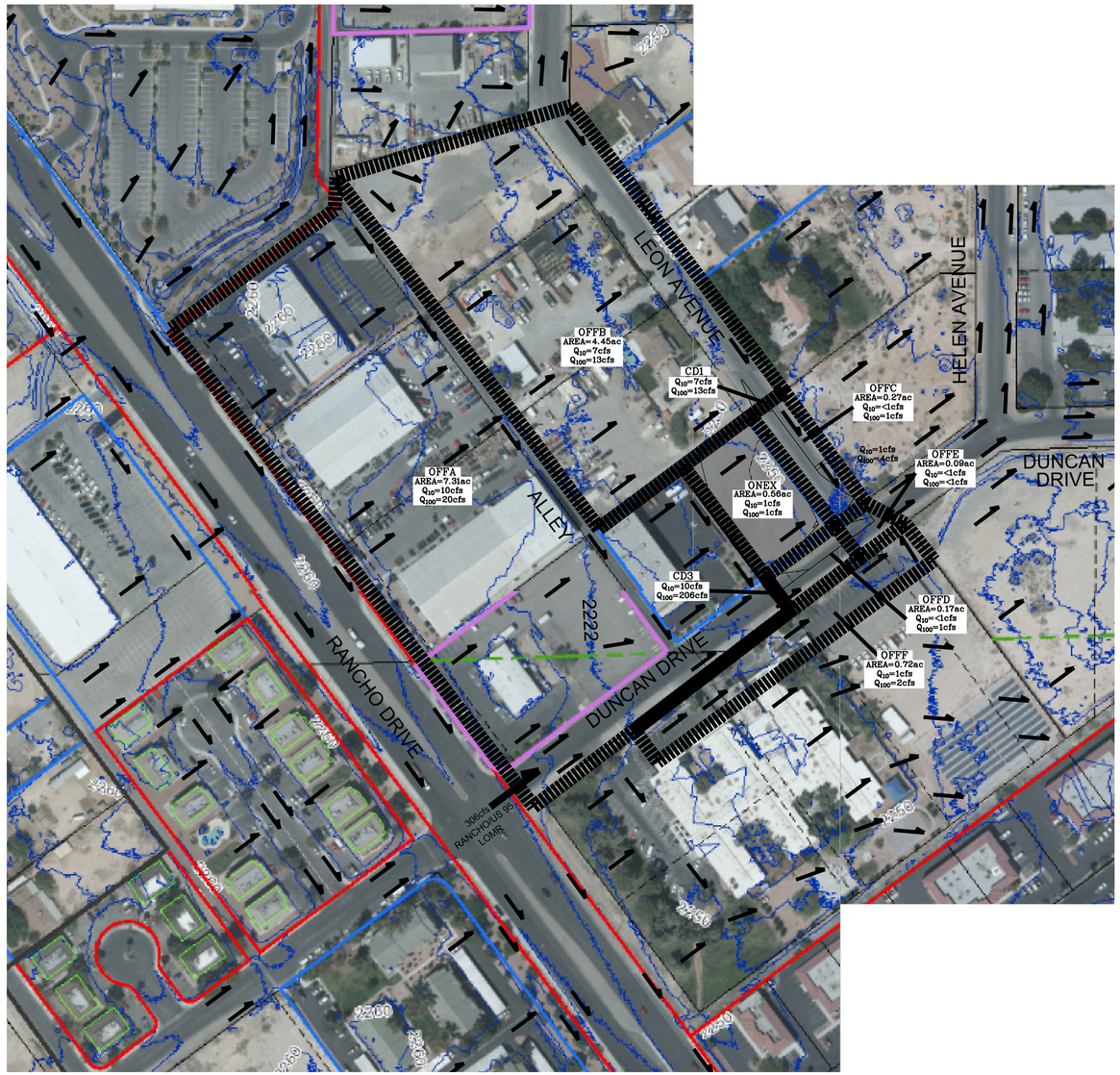


SITE PLAN VIEW
(BLOW–UP VIEW)

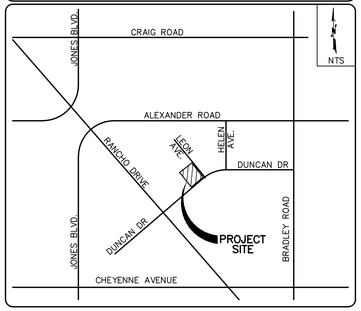
SCALE: 1" = 40'

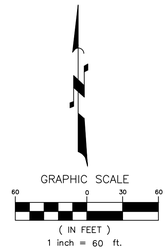


PLAN VIEW

SCALE: 1" = 100'

LOCATION MAP





FLOOD ZONE NOTE

ACCORDING TO FEMA FIRM MAP, COMMUNITY PANEL NUMBER 32003 C 2566 F, DATED NOVEMBER 16, 2011. THE SITE IS LOCATED IN A ZONE X, AN AREA OUTSIDE OF THE 0.2% ANNUAL CHANCE OF FLOODPLAIN.

ENGINEER'S NOTES

1. CONTRACTOR TO VERIFY SITE CONDITIONS PRIOR TO CONSTRUCTION.
2. CONTRACTOR IS RESPONSIBLE FOR DUST AND EROSION CONTROL DURING CONSTRUCTION.
3. ENGINEER TO BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES.
4. THESE PLANS SHALL NOT, IN PART OR IN WHOLE, BE USED FOR CONSTRUCTION UNTIL APPROVED AND SIGNED BY THE GOVERNING AGENCIES.

LEGEND

	SUBDIVISION BOUNDARY
	SECTION LINE
	ADJACENT PARCEL/PROPERTY LINE
	EASEMENT LINE
	TIE LINES
	STREET CENTERLINE
	RIGHT–OF–WAY LINE
	EXISTING CONTOUR LINE
ac	ARCES
(XXX) / (XXX)	EXISITING RUNOFF, (Q10) / (Q100)
XXX / XXX	DEVELOPED RUNOFF, Q10 / Q100
V	AVERAGE VELOCITY, f/s
D	DEPTH OF FLOW, ft
cfs	FLOW RATE, cubic feet per second
◇D	HYDROLOGIC SOIL GROUP, D
	DRAINAGE DIRECTION
◇1 — 1◇	STREET FLOW CROSS SECTION

SECTION	Q_{10}(cfs)	V_{10}(ft/s)	D_{10}(ft)	VxD	Dry Lane (ft)
HS–1	8	1.68	0.43	0.72	N/A
HS–2	10	2.34	0.41	0.97	N/A
HS–3	11	2.40	0.42	1.02	N/A
HS–2	11	2.40	0.42	1.02	N/A
SECTION	Q_{100}(cfs)	V_{100}(ft/s)	D_{100}(ft)	DxV	
HS–1	15	1.90	0.52	0.99	
HS–2	226	6.04	1.03	6.20	
HS–3	226	6.04	1.03	6.20	
HS–4	226	6.04	1.03	6.20	

BASIN FLOW SUMMARY

BASIN I.D.	AREA (acres)	Q10 (cfs)	Q100 (cfs)
OFFA	7.31	10	20
OFFB	4.45	7	13
OFFC	0.27	<1	1
OFFD	0.17	<1	1
OFFE	0.09	<1	<1
OFFF	0.72	1	2
ONEX	0.56	1	1
CD1	–	7	13
CD2	–	8	15
CD3	–	10	226
CD4	–	11	226
CD5	–	19	226

NO.	DATE	BY	REVISIONS:	SHT NO

OWNER: CACTI GROUNDS MANAGEMENT LLC
701 SOUTH 4TH STREET #301
LAS VEGAS, NEVADA 89101
PHONE: (702) 370–5000

ENGINEER: HAUNTEC, PLLC
8065 ANASAZI TRAIL, SUITE #144
LAS VEGAS, NEVADA 89107
PHONE: (702) 219–5785
Email: jhaun@hauntec.com

EXISTING DRAINAGE BASIN

PROJECT: DUNCAN–LEON COMMERCIAL IMPROVEMENT PLANS
CITY OF LAS VEGAS, NEVADA

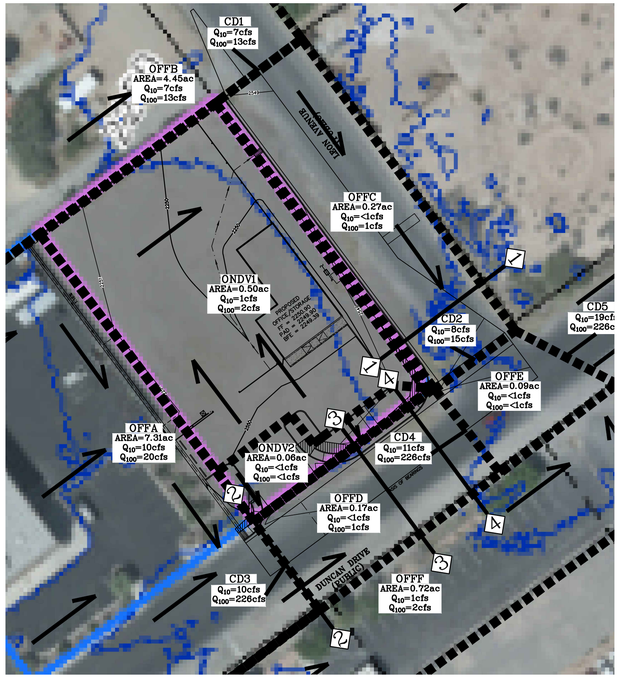
DESIGNED BY:
DRAWN BY:
CHECKED BY:

JOB NO.
20–0014

CLV NO.

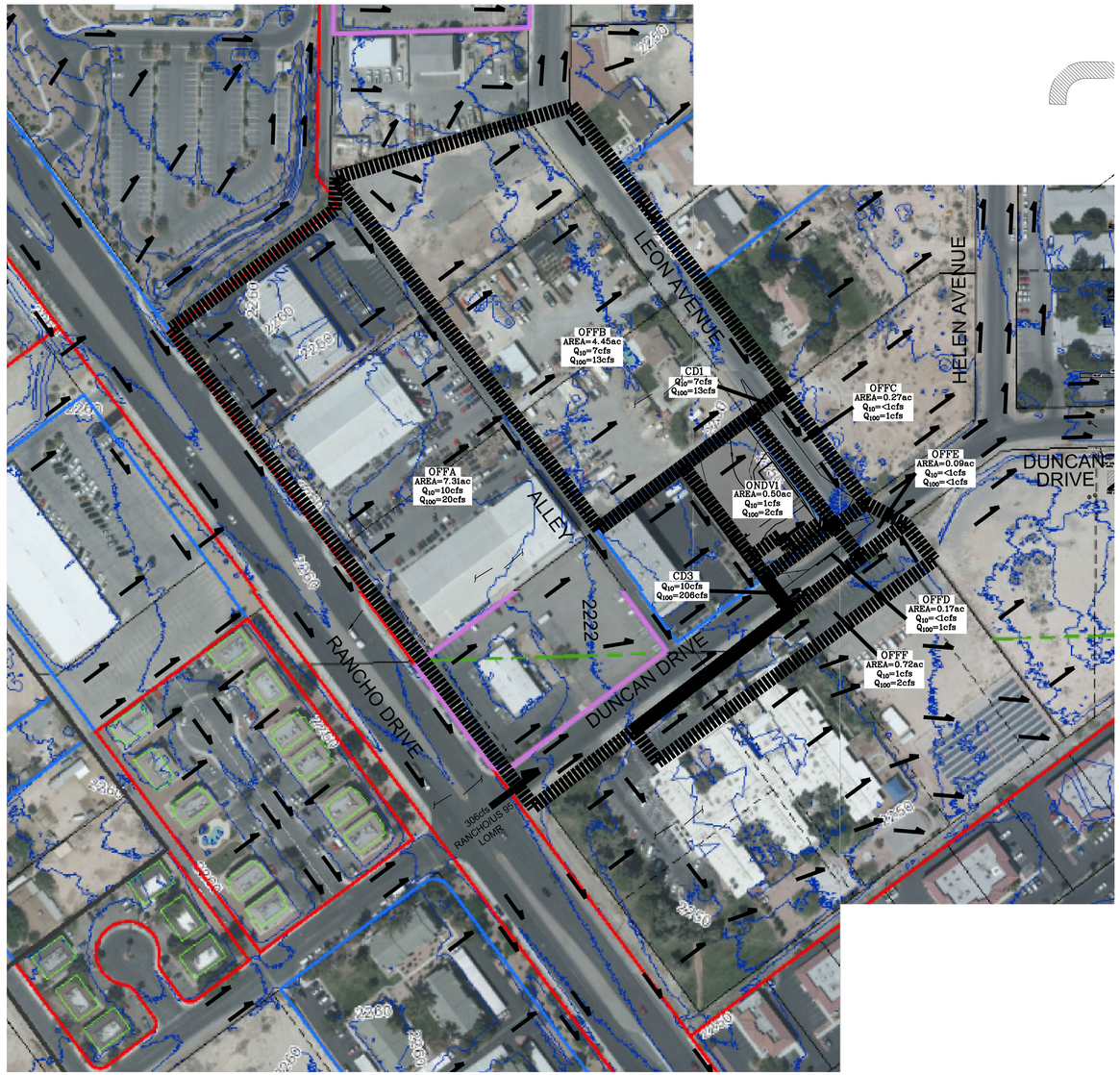
SHEET NO.
ED
1 OF 1

FIGURE 5



SITE PLAN VIEW
(BLOW–UP VIEW)

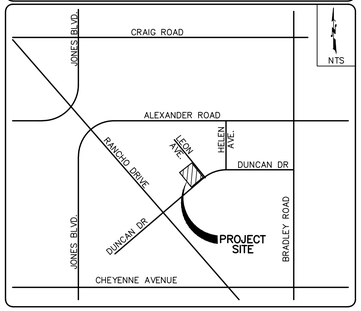
SCALE: 1" = 40'

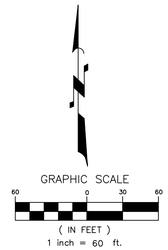


PLAN VIEW

SCALE: 1" = 100'

LOCATION MAP





FLOOD ZONE NOTE

ACCORDING TO FEMA FIRM MAP, COMMUNITY PANEL NUMBER 32003 C 2566 F, DATED NOVEMBER 16, 2011. THE SITE IS LOCATED IN A ZONE X, AN AREA OUTSIDE OF THE 0.2% ANNUAL CHANCE OF FLOODPLAIN.

ENGINEER'S NOTES

1. CONTRACTOR TO VERIFY SITE CONDITIONS PRIOR TO CONSTRUCTION.
2. CONTRACTOR IS RESPONSIBLE FOR DUST AND EROSION CONTROL DURING CONSTRUCTION.
3. ENGINEER TO BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES.
4. THESE PLANS SHALL NOT, IN PART OR IN WHOLE, BE USED FOR CONSTRUCTION UNTIL APPROVED AND SIGNED BY THE GOVERNING AGENCIES.

LEGEND

	SUBDIVISION BOUNDARY
	SECTION LINE
	ADJACENT PARCEL/PROPERTY LINE
	EASEMENT LINE
	TIE LINES
	STREET CENTERLINE
	RIGHT–OF–WAY LINE
	EXISTING CONTOUR LINE
ac	ARCES
(XXX) / (XXX)	EXISITING RUNOFF, (Q10) / (Q100)
XXX / XXX	DEVELOPED RUNOFF, Q10 / Q100
V	AVERAGE VELOCITY, f/s
D	DEPTH OF FLOW, ft
cfs	FLOW RATE, cubic feet per second
◇D	HYDROLOGIC SOIL GROUP, D
	DRAINAGE DIRECTION
1 — 1	STREET FLOW CROSS SECTION

SECTION	Q_{10}(cfs)	V_{10}(ft/s)	D_{10}(ft)	VxD	Dry Lane (ft)
HS–1	8	1.68	0.43	0.72	N/A
HS–2	10	2.34	0.41	0.97	N/A
HS–3	11	2.40	0.42	1.02	N/A
HS–4	11	2.40	0.42	1.02	N/A
SECTION	Q_{100}(cfs)	V_{100}(ft/s)	D_{100}(ft)	DxV	
HS–1	15	1.90	0.52	0.99	
HS–2	226	6.04	1.03	6.20	
HS–3	226	6.04	1.03	6.20	
HS–4	226	6.04	1.03	6.20	

BASIN FLOW SUMMARY

BASIN I.D.	AREA (acres)	Q10 (cfs)	Q100 (cfs)
OFFA	7.31	10	20
OFFB	4.45	7	13
OFFC	0.27	<1	1
OFFD	0.17	<1	1
OFFE	0.09	<1	<1
OFFF	0.72	1	2
ONDV1	0.50	1	2
ONDV2	0.06	<1	<1
CD1	–	7	13
CD2	–	8	15
CD3	–	10	226
CD4	–	11	226
CD5	–	19	226

FIGURE 6

OWNER:
CACTI GROUNDS MANAGEMENT LLC
720 SOUTH 4TH STREET #201
LAS VEGAS, NEVADA 89101
PHONE: (702) 370–5000

ENGINEER:
HAUNTEC, PLLC
8065 RANCHO DRIVE, SUITE #144
LAS VEGAS, NEVADA 89107
PHONE: (702) 219–5785
Email: jhaun@hauntecnv.com

DEVELOPED DRAINAGE BASIN

PROJECT:
DUNCAN–LEON COMMERCIAL
IMPROVEMENT PLANS
CITY OF LAS VEGAS, NEVADA

NO.	DATE	BY	REVISIONS:	SHT NO

DESIGNED BY:
DRAWN BY:
CHECKED BY:

JOB NO.
20–0014

CLV NO.

SHEET NO.
DD
1 OF 1

SWPPP NOTES

1. THE OWNER, SITE DEVELOPER, CONTRACTOR, AND/OR THEIR AUTHORIZED AGENTS SHALL EACH DAY REMOVE ALL SEDIMENT, MUD, CONSTRUCTION DEBRIS, OR OTHER POTENTIAL POLLUTANTS THAT MAY HAVE BEEN DISCHARGED TO, OR ACCUMULATED IN, THE PUBLIC RIGHTS OF WAY OF CLARK COUNTY AS A RESULT OF CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS SITE DEVELOPMENT OR CONSTRUCTION PROJECT. SUCH MATERIALS SHALL BE PREVENTED FROM ENTERING THE STORM SEWER SYSTEM.
2. ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT PRACTICES MAY BE REQUIRED OF THE OWNER AND HIS OR HER AGENTS DUE TO UNFORESEEN EROSION PROBLEMS OR IF THE SUBMITTED PLAN DOES NOT MEET THE PERFORMANCE STANDARDS SPECIFIED IN CLARK COUNTY AND THE LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDANCE MANUAL.
3. TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE AND NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. SOME EXCEPTIONS MAY APPLY: REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SITE STABILIZATION REQUIREMENTS, SCHEDULES, AND DEADLINES.
4. AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL INSPECT ALL DISTURBED AREAS, AREAS USED FOR STORAGE OF MATERIALS AND EQUIPMENT THAT ARE EXPOSED TO PRECIPITATION, VEHICLE ENTRANCE AND EXIT LOCATIONS, AND ALL BMPS WEEKLY, AND WITHIN 24 HOURS AFTER ANY RAIN EVENT OF 0.5 INCHES OR MORE. THE CONTRACTOR OR HIS AGENT SHALL UPDATE OR MODIFY THE STORMWATER POLLUTION PREVENTION PLAN AS NECESSARY. SOME EXCEPTIONS TO WEEKLY INSPECTIONS MAY APPLY, SUCH AS SUSPENSION OF LAND DISTURBANCE ACTIVITIES. REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, INSPECTIONS SECTION.
5. ACCUMULATED SEDIMENT IN BMPS SHALL BE REMOVED WITHIN SEVEN DAYS AFTER A STORMWATER RUNOFF EVENT OR PRIOR TO THE NEXT ANTICIPATED STORM EVENT, WHICHEVER IS EARLIER. SEDIMENT MUST BE REMOVED WHEN BMP DESIGN CAPACITY HAS BEEN REDUCED BY 50 PERCENT OR MORE.
6. AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL RESPOND TO STORMWATER INSPECTION CORRECTIVE ACTIONS IN THE MANNER PRESCRIBED BY CLARK COUNTY, INCLUDING BUT NOT LIMITED TO PROVIDING PHOTOS AND DESCRIPTIONS OF THE CORRECTIONS COMPLETED BY THE CONTRACTOR OR HIS AGENT

ENGINEER'S NOTES

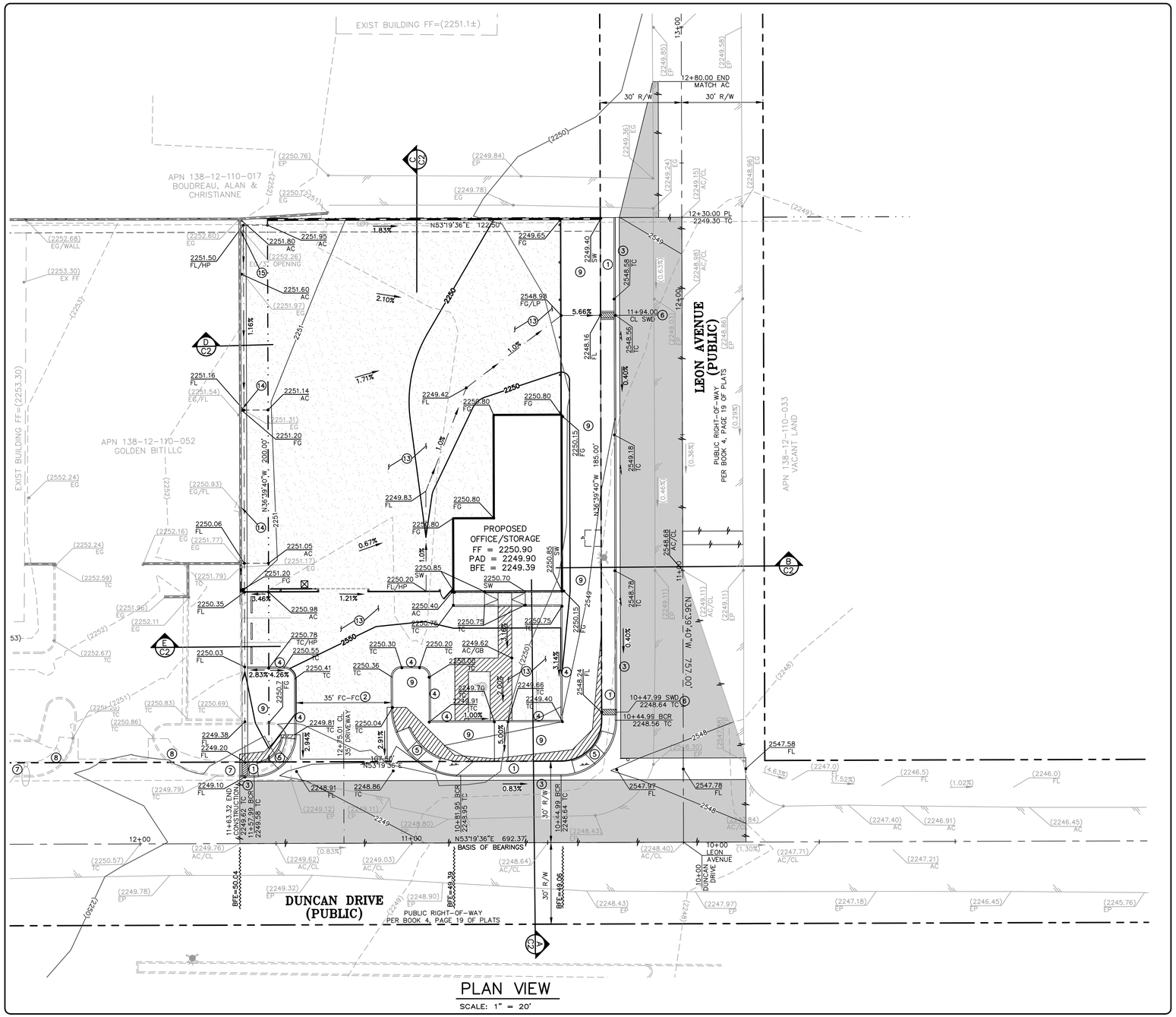
1. CONTRACTOR TO VERIFY SITE CONDITIONS PRIOR TO CONSTRUCTION.
2. CONTRACTOR IS RESPONSIBLE FOR DUST AND EROSION CONTROL DURING CONSTRUCTION.
3. ENGINEER TO BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES.
4. THESE PLANS SHALL NOT, IN PART OR IN WHOLE, BE USED FOR CONSTRUCTION UNTIL APPROVED AND SIGNED BY THE GOVERNING AGENCIES.
5. ALL WORK SHALL CONFORM WITH THE GEOTECHNICAL REPORT PREPARED BY: 3B, INC. PROJECT#: 20143-G DATED: AUGUST 5, 2020 WITH ADDENDUM BY N/A SERVICES LETTER DATED N/A

ESTIMATE DISTURBED ACREAGE

DISTURBED ONSITE: 0.56 ACRES
DISTURBED OFFSITE: 0.28 ACRES
TOTAL: 0.84 ACRES

NOTE

ALL AREAS OF THE SITE NOT OCCUPIED BY THE PROPOSED BUILDING SHALL BE DESIGNATED AS A PUBLIC DRAINAGE EASEMENT TO BE PRIVATELY MAINTAINED.



PLAN VIEW

SCALE: 1" = 20'

CONSTRUCTION NOTES

1. INSTALL 5' WDE CONCRETE SIDEWALK PER CCAUSD No. 234
2. INSTALL COMMERCIAL DRIVEWAY PER CCAUSD No. 225
3. INSTALL "L" TYPE CURB PER CCAUSD No. 216
4. INSTALL "A" TYPE CURB PER CCAUSD No. 219
5. INSTALL SIDEWALK RAMP PER CCAUSD No. 235 – CASE 1
6. INSTALL SIDEWALK DRAIN PER CCAUSD No. 236
7. EXISTING CURB, GUTTER & SIDEWALK TO REMAIN
8. EXISTING SIDEWALK RAMP TO REMAIN
9. INSTALL LANDSCAPE PER LANDSCAPING PLANS
10. INSTALL 2FT WIDE CURB OPENING PER DETAIL E ON SHEET C2
11. EXISTING BLOCK WALL TO REMAIN
12. INSTALL BLOCK WALL PER ARCHITECTURAL PLANS
13. INSTALL ASPHALT PAVEMENT PER GEOTECHNICAL ENGINEERS RECOMMENDATION
14. EXIST CMU BLOCK TURNED SIDEWAYS FOR DRAINAGE THROUGH WALL TO REMAIN
15. EXIST 3" OPENING THROUGH WALL FOR DRAINAGE TO REMAIN

FLOOD ZONE NOTE

ACCORDING TO FEMA FIRM MAP, COMMUNITY PANEL NUMBER 32003 C 2155 F, DATED NOVEMBER 16, 2011, THE SITE IS LOCATED IN ZONE A. ZONE A IS AN AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE OF FLOODING WITH NO BASE FLOOD ELEVATIONS DETERMINED.

STORM WATER NOTES

1. THERE ARE NO EXISTING DRAINAGE STRUCTURES OR FACILITIES ADJACENT OR ON THE PROPERTY.
2. THERE ARE NO EXISTING DRAINAGE EASEMENTS ADJACENT TO THE PROPERTY.
3. THERE ARE NO STORM DRAINS ON THE SITE.

BASIS OF BEARING

S53°19'36"W BEING THE CENTERLINE OF DUNCAN DR. AS SHOWN ON THAT CERTAIN PARCEL MAP ON FILE IN FILE 117, PAGE 61 OF PARCEL MAPS IN THE OFFICE OF THE COUNTY RECORDER, CLARK COUNTY, NEVADA.

LEGAL DESCRIPTION

BEING A PORTION OF THE NORTH HALF (N 1/2) OF THE NORTHWEST QUARTER (NW 1/4) OF SECTION 12, TOWNSHIP 20 SOUTH, RANGE 60 EAST M.D.M., CLARK COUNTY NEVADA MORE PARTICULARLY DESCRIBED AS FOLLOWS:

LOT 1 OF PARCEL MAP FILE 77, PAGE 2 OF PARCEL MAPS AS SHOWN BY MAP THEREOF IN THE OFFICE OF THE RECORDER, CLARK COUNTY, NEVADA.

APN 138-12-110-051

BENCHMARK

CITY OF LAS VEGAS BENCHMARK SLV0012N6

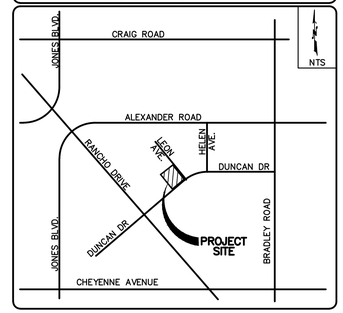
RIVET AND PLATE IN TOP OF CURB AT SOUTHEAST CORNER OF BRADLEY & GILMORE.

ELEVATION = 683.516 METERS (NAVD'88) (PUBLISHED)
2242.50 FEET (CALCULATED)

GEOTECHNICAL NOTE

ALL WORK SHALL CONFORM WITH THE GEOTECHNICAL REPORT
GEOTECHNICAL EXPLORATION REPORT,
PROPOSED COMMERCIAL BUILDINGS 3800 LEON DRIVE
PREPARED BY: 3B, INC.
PROJECT#: 20143-G DATE: AUGUST 5, 2020
UPDATE TO GEOTECHNICAL EVALUATION
NONE
BY: N/A
PROJECT#: N/S DATE: N/A

LOCATION MAP



GRAPHIC SCALE
-20 0 10 20 40
SCALE: 1" = 20'
(IN FEET)

LEGEND

	PROPERTY LINE
	STREET CENTERLINE
	RIGHT-OF-WAY LINE
2165	PROPOSED CONTOUR LINE
(2165)	EXISTING CONTOUR LINE
X X	EXISTING FENCE
	EXISTING EDGE OF PAVEMENT
	EXISTING FIRE HYDRANT
	DRAINAGE SWALE
	SIGHT VISIBILITY ZONE

AC	ASPHALT CEMENT SURFACE
APN	ASSESSOR PARCEL NUMBER
BFE	BASE FLOOD ELEVATION
CCAUSD	CLARK COUNTY AREA UNIFORM STANDARD DRAWING
CL	CENTER LINE
CONC	CONCRETE
E	EAST
EA	EACH
EG	EXISTING GRADE
EX	EXISTING
FG	FINISHED GRADE
FL	FLOW LINE
FT	FEET
INV	INVERT
LF	LINEAR FEET
N	NORTH
NTS	NOT TO SCALE
PL	PROPERTY LINE
PP	POWER POLE
RIM	RIM ELEVATION
S	SOUTH
STA	STATION
SW	SIDEWALK
SWD	SIDEWALK DRAIN
TC	TOP OF CURB
W	WEST

ESTIMATE OF QUANTITIES

ESTIMATE OF PUBLIC QUANTITIES FOR PERMITTING PURPOSES ONLY

IMPROVEMENTS (SITE)	UNIT	PRIVATE (ONSITE)	PUBLIC (OFFSITE)	TOTAL
CUT	CY	0	0	0
FILL	CY	0	0	0
"A" TYPE CURB	LF	170	0	170
"L" TYPE CURB	LF	0	227	227
CONCRETE CROSS GUTTER	SF	0	606	606
SIDEWALK DRAIN	EA	0	2	2
4" CONCRETE SIDEWALK	SF	136	1137	1273
SIDEWALK RAMP	EA	1	3	4
3" AC PAVEMENT/4" TYPE II	SY	575	1073	1648

ALL QUANTITIES SHOWN AS PRIVATE (ONSITE) ARE REQUIRED DRAINAGE IMPROVEMENTS WITHIN THE PUBLIC DRAINAGE EASEMENT TO BE PRIVATELY MAINTAINED AND SHALL BE BONDED AND INSPECTED.

NOTICE TO CONTRACTORS:

QUANTITIES SHOWN ARE FOR PERMITTING PURPOSES ONLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PERFORMING HIS OWN QUANTITY TAKE OFF, AND BID ACCORDINGLY.

CERTIFICATION

I CERTIFY THAT THIS PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT (DSXXXX).

JOE ALVIN HAUN, PE 14439 DATE

NO.	DATE	BY	REVISIONS:	SHT NO

OWNER:
CACTI GROUNDS MANAGEMENT LLC
701 SOUTH 4TH STREET #201
LAS VEGAS, NEVADA 89101
PHONE: (702) 370-5000

ENGINEER:
HAUNTEC, PLLC
8804 CANYON RUN DR, SUITE #144
LAS VEGAS, NEVADA 89107
PHONE: (702) 219-5785
Email: jhaun@hauntecpllc.com

PROJECT:
DUNCAN-LEON COMMERCIAL IMPROVEMENT PLANS
CITY OF LAS VEGAS, NEVADA

GRADING PLAN

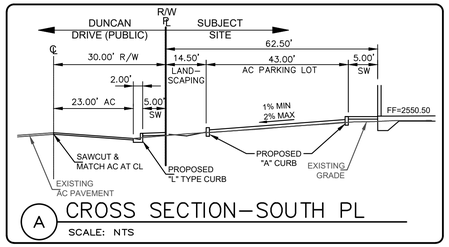
DESIGNED BY:
DRAWN BY:
CHECKED BY:

PROFESSIONAL ENGINEER - STATE OF NEVADA
JOE A. HAUN
EXP: 6/30/21
CIVIL
No. 14439

JOB NO.
20-0014

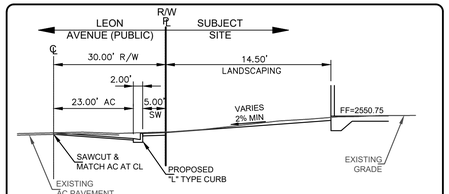
CLV NO.

SHEET NO.
C1
3 OF 8



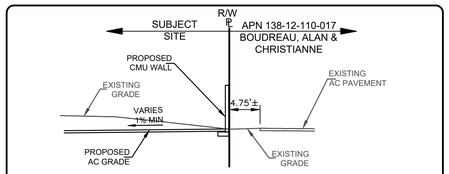
A CROSS SECTION–SOUTH PL

SCALE: NTS



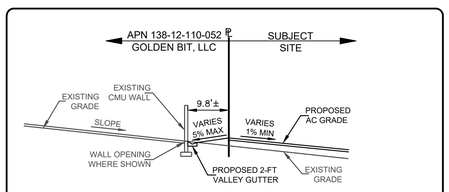
B CROSS SECTION–EAST PL

SCALE: NTS



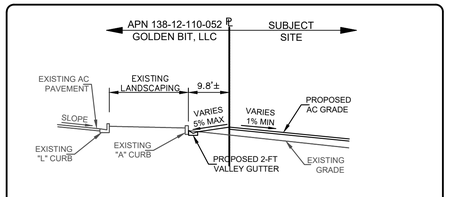
C CROSS SECTION–NORTH PL

SCALE: NTS



D CROSS SECTION–WEST PL

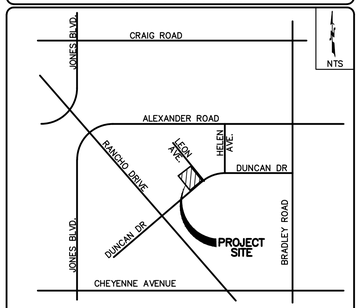
SCALE: NTS

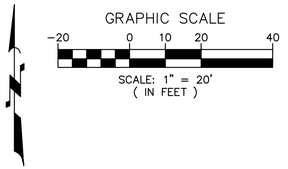


E CROSS SECTION–WEST PL

SCALE: NTS

LOCATION MAP





BENCHMARK

CITY OF LAS VEGAS BENCHMARK 5LV0012N6

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ELEVATION = 683.516 METERS (NAVD'88) (PUBLISHED)
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APN 138–12–110–051

NO.	DATE	BY	REVISIONS:	SHT NO

OWNER:
CACTI GROUNDS MANAGEMENT LLC
720 SOUTH 4TH STREET, #201
LAS VEGAS, NEVADA 89101
PHONE: (702) 370–5000

ENGINEER:
HAUNTEC, PLLC
8804 KINGSBURY BLVD, SUITE #144
LAS VEGAS, NEVADA 89107
PHONE: (702) 219–5785
Email: jhaun@hauntecengr.com

PROJECT:
DUNCAN–LEON COMMERCIAL IMPROVEMENT PLANS
CITY OF LAS VEGAS, NEVADA

DETAIL SHEET

DESIGNED BY:
DRAWN BY:
CHECKED BY:

3/3/2021

JOB NO.
20–0014

CLV NO.

SHEET NO.
C2
4 OF 8