DS #: 5160

APN: 139-36-710-022

PROJECT: Reyes Coca-Cola Bottling

SUBMITTAL: 1st

SCANNED BY/DATE:

CHECKED BY/DATE:

CITY OF LAS VEGAS
NEVADA

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: July 31, 2019
TO: **Land Development Services** Department of Building & Safety				FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for: **Reyes Coca-Cola Bottling**			**COPIES TO:** Slater Hanifan Group
Cross Streets:	SEC of Stewart Avenue & Mojave Road			Martin Harris Construction
File Number:	F:\Depot\DSMemos\DS5160A.doc			Bart Anderson, P.E., DevCo
Parcel Number:	139-36-710-022			CCRFCD
Zoning Action:	SDR-76586			
FEMA Flood Zone	YES	NO	X	
Proposed Storm Drain	YES	NO	X	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1st Submittal	7/18/2019	7/31/2019	See Comments Below	$400.00	3497204: $400
			TOTAL FEES (LDDRS):	**$400.00**	**----**

REMARKS:

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

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

1. Provide a copy of the zoning/planning conditions associated with this site (**SDR-76586**) with the next submittal to verify compliance with conditions. *Flood Control* will not issue conditional approval of the drainage study without the associated zoning/planning conditions (issued by the *City Council*). Any associated conditions of approval that revise the site drainage parameters will require that the drainage study be revised and resubmitted.

2. The site is adjacent to or crosses an existing or proposed *Clark County Regional Flood Control District* (CCRFCD) master planned facility. Therefore, CCRFCD concurrence is required prior to final approval of the drainage study.

   Please note that effective March 15, 2019, the CCRFCD adopted new requirements for drainage study concurrence submittal. Follow the link below for specific guidance.

   http://gustfront.ccrfcd.org/LandDev/LandDev.aspx

3. The engineer proposed riprap of d_{50}=6" behind the sidewalk in *Stewart Avenue* according to *Cross Sections A/D-1* and *B/D-1*. Note that the 100-year flow velocity in *Stewart* is 9.99 ft/s, the proposed riprap size appears to be not adequate. Provide riprap sizing calculation in the next submittal and upsize the riprap accordingly.

4. *Construction Note #7* stated curb opening per Detail 6 on Sheet D-1, however, there is no Detail 6 to be found on the Detail Sheet. Review and revise accordingly.

5. Cross Sections H/D-1, I/D-1, J/D-1 and K-D/1 call out new fence by others is not acceptable. The fence shall be constructed with the subject improvement plans. Identify whether it is chain link fence or block wall clearly in the next submittal.

In an effort to increase administrative efficiency, for all original and re-submittal packages including updates and the addenda, the City of Las Vegas Public Works Department requires both a hardcopy and a digital copy (PDF) on CD for the drainage study.

A letter sealed and signed by a Nevada registered civil engineer must be included in every submittal certifying documents on the electronic CD matches 100% of the hardcopy submittal. The new submittal requirement is effective on May 1, 2019. If there are any questions regarding these new requirements, please contact Albert Sung in the City Flood Control Section at (702) 229-6541.

Sample Letter to certify CD.pdf

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

END OF REMARKS
ays

T/R/S: T20S/R61E/36
AREA M-36

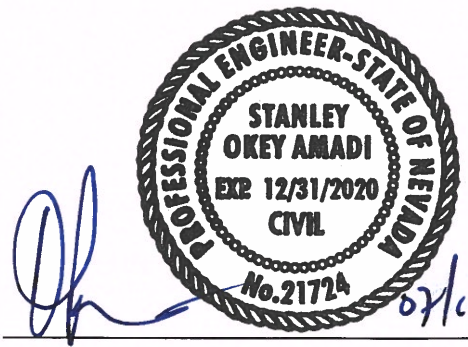
TECHNICAL DRAINAGE STUDY
Reyes Coca-Cola Bottling, LLC

City of Las Vegas, Nevada

Job No.: MHC1901.000
Date: July 2019

Prepared By:
Slater Hanifan Group, Inc.
5740 S. Arville Street, Suite 216
Las Vegas, Nevada 89118
Phone: 702-284-5300 ▪ Fax: 702-284-5399

Prepared For:
Martin Harris Construction
3030 S. Highlands Drive
Las Vegas, NV 89109
Phone: 702-385-5257 ▪ Fax: 702-474-8257



Stanley Okey Amadi, P.E., CFM
NV Professional Engineer No. 21724

Assisted by: Caitlyn Alcantara, E.I.

MHC1901-000

July 18, 2019

Albert Sung, P.E.– Flood Control Project Engineer
City of Las Vegas Department of Public Works
333 N. Rancho Drive
Las Vegas, Nevada 89106

Subject: Technical Drainage Study for Reyes Coca-Cola Bottling, L.L.C.

Mr. Sung:

This letter certifies that all items provided on the *Technical Drainage Study for Reyes Coca-Cola Bottling, L.L.C.* submittal CD match the paper version bound into the study.

Respectfully Submitted,
SLATER HANIFAN GROUP, A Westwood Team

Stanley Okey Amadi, P.E., CFM
Project Manager – Flood Control Division

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Reyes Coca-Cola Bottling, L.L.C. Date: July 2019

Location of Development: a) Descriptive (Cross Streets): North/South: Mojave Road
East/West: Stewart Avenue

b) Section: 36 Township: 20 S. Range: 61 E.

c) APN: 139-36-710-022

Name of Owner: Martin Harris Construction

Telephone No.: (702) 250-7491 Fax No.: E-mail Address: steve.eaton@martinharris.com

Address: 3030 South Highland Drive Las Vegas NV 89109

Contact Person – Name: Stanley Okey Amadi, P.E., CFM Telephone No.: (702) 284-5300

*E-mail Address: samadi@shg-inc.com Fax No.: (702) 284-5399

Firm: Slater Hanifan Group, A Westwood Team

Address: 5740 S. Arville #216 Las Vegas NV 89118

Type of Land Development/Land Disturbance Process:

☐	Rezoning	☐	Subdivison 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: 20.31 acres Being Developed/Disturbed: 9 acres

2. Is a portion or all of the subject property located in a 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

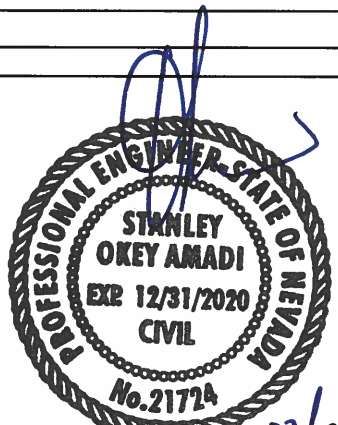
4. Proposed type of development (Residential, Commercial, Etc.): Commercial

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

6. Has the site drainage been evaluated in the past? ☒ Yes** ☐ No If yes, please identify documentation: Technical Drainage Study for Coca-Cola Distribution Center (DS623), Technical Drainage Study for Coca Cola Distribution Center Expansion (DS1890), Coca-Cola Enterprises Warehouse Expansion (DS4377)

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: North on to Stewart Avenue, southeast on to Technology Court, East on to Spectrum Boulevard

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



Engineer's Seal 07/18/19

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.

*Newly 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

CITY OF LAS VEGAS

MINIMUM DRAINAGE STUDY CRITERIA
STANDARD FORM 2 CHECKLIST SUPPLEMENT

(Revised 5/18/11)

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

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

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

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

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.
-	N/A	Back of lot elevations and lot drainage pattern for all lots including common lots.
-	N/A	Sites with a grade difference two feet above or below existing ground are required to have approval from City of Las Vegas Current Planning. Current Planning approval is required prior to final approval of the drainage study.
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.)
-	N/A	This project uses a solid grouted stem wall (or approved alternate) at the back of sidewalk to provide erosion protection for landscaped areas where the depth of flow in the roadway exceeds the back of walk elevation. A corresponding cross-section detail is included.
-	N/A	Commercial and Common Lot Landscape areas are not allowed to drain over the sidewalk. The grading plans show flow lines with grades and sidewalk under drains for all landscape areas draining to the public ROW.

III. Local Entity Criteria - City of Las Vegas – Manual Section 1600		
Yes	No	
-	N/A	Concrete valley gutters are required in parking lots with slopes less than 1 percent. Slopes through cul-de-sac must be at a 1 percent minimum where flow is drained through the cul-de-sac.
-	N/A	Ten-foot wide public drainage easements to be privately maintained are allowed for flow less than 20 cfs. The depth of flow entering the easement must be checked using the submerged weir calculation.
-	N/A	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.

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

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

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

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name: Reyes Coca -Cola	Map ID:
Firm Name: Slater Hanifan Group	Engineer: Stanley Okey Amadi, P.E.
Address: 5740 S. Arville #216	
City: Las Vegas	State: NV Zip: 89118
Phone Number: (702) 284-5300	Fax Number: (702) 284-5399
Property Owner: Martin Harris Construction	
Address: 3030 South Highland Drive	
City: Las Vegas	State: NV Zip: 89109

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	
X	-	Design Manual **Standard Form 1** with the engineer's seal and signature.
X	-	Design Manual **Standard Form 4**.
X	-	2 copies of the 24" x 36" Drainage Plan.
-	N/A	A notarized letter from the adjacent property owner(s) allowing off-site grading or discharge.

II. MAPS AND EXHIBITS

Yes	No	
X	-	A copy of a current Flood Insurance Rate Map (FIRM) with the site delineated.
X	-	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	
X	-	Off-site drainage basin maps for existing, interim and future conditions showing the existing topography, basin boundaries, concentration points, and flows in cfs.
X	-	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.
X	-	Vicinity Map with local and major cross streets identified and a north arrow.

III. DRAINAGE PLAN

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

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
-	N/A	Streets with off-set crowns.
X	-	Proposed contours or spot elevations in sufficient detail to exhibit intended drainage patterns and slopes.
X	-	Property lines.
X	-	Right-of-way lines and widths, existing and proposed.
X	-	Existing improvements and their elevations.
X	-	Delineation of proposed on-site drainage basins indicating area and 10-year and 100-year storm peak flows at basin concentration points.
X	-	Concentration points and drainage flow direction with Q_{100} and V_{100} and D_{100} in streets.
X	-	Cumulative flows, velocity, and direction of flow at upstream and downstream ends of site for the 10-year and 100-year flows.
X	-	Location and cross-section of street capacity calculations.
X	-	Cross-sectional detail for channels, including cutoff wall locations.
X	-	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.
X	-	Existing and proposed drainage easements and widths shown with sufficient detail. A cross sectional detail must be provided that shows appropriate lining and reinforcement.
X	-	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.
X	-	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.
X	-	Building and/or lot numbers.
X	-	Alignment of all existing, proposed, or future Regional Facilities adjacent to the site.
-	N/A	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**

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

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

IV. HYDROLOGIC ANALYSIS

Yes	No	
X	-	Appropriate soil information and Soils Map for existing and future conditions with subbasins and property delineated.
X	-	Input and output information for existing conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models.
X	-	Input and output information for future conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models.
X	-	Use of correct precipitation values in and around the McCarran Airport rainfall area.
X	-	A discussion in the text of the hydrologic analysis justifying subbasin boundaries and cutoffs, supporting assumptions, and calculations.
X	-	A summary table of stormwater flows showing basin area, Q_{10} and Q_{100} for both individual basins and combined basin flows, where applicable.
X	-	Copies of supporting technical information referenced from a previously approved study and a statement accepting these results.
X	-	On-site facilities must perpetuate flows through or around the site without significantly impacting adjacent property owners in accordance with current Nevada Drainage Law.
X	-	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.
X	-	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.
X	-	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.
X	-	Appropriate hydraulic calculations for block wall openings assuming a 50 percent vertical clogging factor. (Assume the lower half of the opening is plugged.)
-	N/A	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.
X	-	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.
X	-	The mitigation of nuisance water, both during construction and in the fully developed condition, must be addressed.
X	-	Provide BMP type, size and supporting calculations for parking lots and LIDs (if required).

REFERENCE:	STANDARD FORM 2

SLATER HANIFAN GROUP
a Westwood team

Water Quality Design Storm

Project Name: MHC1901 Reyes Coca-Cola Expansion
Date: 7/18/2019
File Name: MHC1901 Storm Water Quality v140411.xls
By: CAA

Data:

Reference:

Project is located in: Township: 20 S. Range: 61 E. Section: 36 — APN Map

Site is located in the McCarran Airport Rainfall Area — Figure 513*

1.00 inches

2-Year Precipitation for the McCarran Rainfall Area: 0.72 inches — Table 505*

Actual Percent Impervious: 85 %

Project Site Area: 8 acres

BMP Design Precipitation Calculations:

$D2_{SITE}$=	0.72	2-Year Precipitation (in) for the project site
D2 ratio =	1.00	Ratio of D2 site to D2 McCarran Airport Area
D_{85}=	0.32	85th Percentile Rainfall Depth (in)

BMP Design Peak Discharge Calculations:

Q_P/A (90%)=	0.47	Unit Discharge for 90% Average Percent Impervious Area (cfs/acre)
Adjustment to Q_P/A =	0.97	Adjustment to Q_P/A Relative to 90% Average Percent Impervious
Adjusted Q_P/A =	0.46	Adjusted Unit Discharge (cfs/acre)
Q_P =	4	Peak Design Discharge (cfs)

BMP Design Runoff Volume Calculations:

Vol/A (90%)=	0.0341	Unit Runoff Volume for the 90% impervious condition (ac-ft/acre)
Adjusted Vol/A =	0.0331	Adjusted Unit Runoff Volume (ac-ft/acre)
Volume =	0.2781	Runoff Volume (ac-ft)

Equations:

$D2_{SITE}$ =(Rainfall)*(Precipitation Adjustment Ratio)
D2 ratio = ($D2_{SITE}$) / ($D2_{McCARRAN}$)
D_{85} = (0.32)*(D2 Ratio)
Q_P/A = 1.5042*(D_{85}) - 0.0066
Adjustment to Q_P/A and Vol/A = 0.0059 (Percent Impervious) + 0.4688
Adjusted Q_P/A = (Q_P/A)*(Adjustment to Q_P/A)
Q_P = (Q_P/A)*(A)
Vol/A = 0.0887*(D_{85}) + 0.0057

* Equations taken from the Clark County Regional Flood Control District - Hydrologic Criteria and Drainage Design Manual

5740 S. Arville St., Suite 216 - Las Vegas, NV 89118
Ph. 702-284-5300 - Fx. 702-284-5399

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- Exhibit A – Location Map
- Exhibit B – FEMA FIRM Panel Map
- Exhibit C1 – 2018 CCRFCD MPU Facility Map
- Exhibit C2 – 2018 CCRFCD Facility Inventory
- Exhibit C3 – 2018 CCRFCD MPU Hydrologic Map
- Exhibit D – Soils Map
- Exhibit E1 – CLV Neighborhood Study Future Drainage
- Exhibit E2 – CLV Neighborhood Study Master Plan
- Exhibit F – Existing Condition Drainage Map
- Exhibit G – Proposed Condition Drainage Map

Appendix B Hydrologic Data
- Precipitation Information
- Curve Number Data and Computations
- Lag Time Computations – Standard Form 4
- Water Quality Design Storm Computations

Appendix C HEC-1 Analyses
- Existing Condition HEC-1
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Appendix D Hydraulic Analyses
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- Swale Computations

Appendix E Approval Letters of Referenced Studies

Appendix F Grading Plan, Profile and Detail Sheets

1 INTRODUCTION

1.1 Project Overview & Study Purpose

Martin Harris Construction is proposing to expand and develop approximately 8.5 acres of an existing 20-acre project site located south of Stewart Avenue, east of Mojave Road, west of Spectrum Boulevard, and northwest of Technology Court and existing commercial developments. For the purpose of this study, the proposed project will be identified as *Coke Expansion* (hereinafter referred to as the project site).

The purpose of this study is to provide a detailed hydrologic and hydraulic analysis for the proposed improvements to protect the property from onsite and offsite runoff in accordance with local stormwater criteria.

1.2 Site Description

The Coke Expansion site is bound by Stewart Avenue to the north, Mojave Road to the west Spectrum Boulevard to the east, and by Technology Court and existing commercial developments to the southeast. The project site lies within APN 139-36-710-002. A location map identified as Exhibit A is included in Appendix A for reference.

No street improvements are being proposed for any of the adjacent rights-of-way as the streets are all fully improved adjacent to the site.

Based on past studies, the project site was previously developed in 1991, and the commercial building was expanded twice in 1996 and 2009 respectively. Note that the Coke Expansion site encompasses the addition of another building, changes in grading to existing asphalt, and the addition of landscaping and asphalt/parking area to accommodate the building expansion.

1.3 FEMA Flood Zone Designation

The project site is not located within a FEMA designated Special Flood Hazard Area (SFHA). The site has been identified on the current Flood Insurance Rate Map (FIRM) Panels 32003C2186F, dated November 16, 2011, designating that the site is located within a FEMA Zone X (unshaded). A Zone X (unshaded) is described as an area determined to be outside the 0.2% annual chance flood plain. Exhibit B identifying the project site on the FIRM Panels has been included in Appendix A for reference.

1.4 CCRFCD Facility Information

The site has been identified on the current 2018 CCRFCD MPU Figure F-30, which is included as Exhibit C1 in Appendix A for reference. Per the 2018 CCRFCD MPU (Reference 1), an 8' X 8' reinforced concrete box (RCB) is proposed in Stewart Avenue, north of the project site. Since the facility is adjacent to the project site concurrence from CCRFCD will be required.

1.5 CCRFCD Hydrology Information

Figure W-5, from the 2018 Las Vegas Valley Flood Control Master Plan Update (MPU, Reference 1), is included in the 2018 MPU, shows that the Project site lies within MPU sub-basin CA05 which drains northeast along Stewart Avenue into sub-basin CH73. Exhibit C3 identifying the project site on the MPU figure has been included in Appendix A for reference.

1.6 Prior Approved Studies

The following approved drainage studies and improvement plans have addressed prior improvements within the site and have been reviewed to help in preparation of this study. These studies and plans have analyzed the project site previously and have been provided to illustrate the history of the project as their analyses have not been deemed comprehensive to address the proposed improvements. Hydrologic and/or hydraulic computations from the previously approved studies have not been utilized; however, the studies have been identified for informational purposes.

1. *Drainage Study for Coca-Cola Distribution Center* prepared by Century Engineering Corporation, is the initial study of the project site.

2. *Drainage Study for Coca-Cola Bottling Company of Los Angeles, Proposed Addition to Las Vegas Distribution Center* prepared by Azimuth Engineering & Surveying, Inc, updates the study and expands the existing building to the existing footprint.

3. *Technical Drainage Study for Coca-Cola Enterprises Warehouse Expansion,* prepared by A.J. Koltavary / Civil Engineer proposed to expand the warehouse by adding a building similar to the proposed project site. The study did not propose improvements into the undeveloped portion of the project site.

Approval letters from the above studies have been included in Appendix F for reference.

2 METHODOLOGY

2.1 Compliance

The methodologies utilized in the preparation of this study are in compliance with the Clark County Regional Flood Control District's Hydrologic Criteria and Drainage Design Manual (CCRFCD Manual, Reference 2).

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 HEC-1 Flood Hydrograph Package program was utilized to model the drainage sub-basins analyzed by this study.

Precipitation: The site is located within the McCarran Rainfall Area. The precipitation values utilized in the HEC-1 models are 1.58 and 2.77 inches for the 10-year and 100-year

storm events, respectively. The precipitation values have been referenced from Table 505 of the CCRFCD Manual. Additionally, since the drainage area is less than 8 square miles, the SDN 3 design storm distribution referenced from Table 503 of the CCRFCD Manual was used. Relevant tables and figures from the CCRFCD Manual have been included in Appendix B.

Curve Number: The SCS curve number loss rate methodology was utilized to approximate infiltration for the drainage basins. The soils information within the watershed was obtained from the NRCS Soil Survey of the Las Vegas Valley Area (Soil Survey, Reference 3). The soil survey delineates soil types and lists the Hydrologic Soils Group (HSG) for each family. As depicted on the Soils Map (Exhibits D1 and D2, located in Appendix A), the project site and its adjacent tributary areas are located within the following soil types:

- Soil 282 – Land silty clay loam is composed of 100% HSG 'C'.
- Soil 325 – McCarran fine sandy loam, 0 to 4 percent slopes is composed of 100% HSG 'A'.

A composite curve number for each land use utilized in this study's hydrologic analysis has been obtained utilizing the percentages identified above, and the computations are included in Appendix B.

Note the following regarding the land uses analyzed in this study. The associated CCRFCD Manual curve number tables have been included in Appendix B.

- The undeveloped land within the basin boundaries and offsite is typical of southern Nevada desert, undeveloped with sparse desert shrub; therefore, a curve number associated with a "desert shrub (poor)" has been utilized for the undeveloped offsite and onsite areas.
- Proposed and existing roadways are analyzed as a "roadway" land use which generates a curve number of 98 for all soil types.
- There are areas on the project site which appear to have been mass graded. These areas have been analyzed with a "newly graded" land use.
- The project site will be developed as commercial to denote 85% impervious and 15% "open space (good)" land use. The impacting watershed generally consists of commercial and industrial development, a commercial land use was utilized to conservatively assess the offsite flow impacting streets adjacent to the project site.

Lag Time: The lag time is defined as the time measured from the center of mass of excess 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 basin to the outlet point of the basin. Standard Form 4, as outlined in the CCRFCD Manual, was utilized to determine the lag times for basins modeled. The lag time computations have been included in Appendix B.

2.3 Hydraulic Modeling

Street Flow: Street flows have been analyzed utilizing the FlowMaster Version 8i software by Haestad Methods. The CCRFCD Manual criteria states that the velocity times depth factor (v x d) for street flow for the 10-year storm event must be less than or equal to 6, with a maximum depth of 1-ft. The velocity times depth factor (v x d) for street flow for the 100-year storm event must be less than or equal to 8, with a maximum depth of 2-ft.

Mojave Road and Stewart Avenue have an 80-ft right-of-way or greater adjacent to the project site. Therefore, both streets are required to satisfy the 10-year dry lane criteria per the CCRFCD Manual. In addition, a 12-ft dry lane, not including the center turn lane, is expected per Manual criteria.

Drainage Swales and Ditches: Drainage swales and ditches have been analyzed utilizing the FlowMaster Version 8i software by Haestad Methods.

2.4 Structural Best Management Practices

Water Quality Design Storm: The water quality 85th percentile rainfall depth has been determined by utilizing Table 505 of the CCRFCD Manual, in conjunction with the equations and procedures described in Section 1502.3 of the CCRFCD Manual. The precipitation value utilized in designing project site BMPs is 0.72 inches.

Low Impact Development (LID): The site has been analyzed in the large category for parking lots, as the total parking lot area is greater than 1 acre. Large category parking lots require that BMPs treat stormwater runoff from at least 75% of the parking lot area.

3 EXISTING DRAINAGE CONDITION

3.1 Definition of Existing Condition

The existing drainage condition considers the project site and surrounding areas generally as they are in their current state. A majority of the project site is developed with existing asphalt and a commercial warehouse building. A portion of the project site is undeveloped on the southwest corner of Stewart Avenue and Spectrum Boulevard, east of the existing building.

3.2 Discussion of Existing Condition

Refer to Exhibit F, included in Appendix A, for a detailed illustration of the existing condition drainage patterns. This condition was assessed to establish flow rates, depths, and velocities to adjacent streets.

Referenced Offsite Flows: There is a large area west of the Stewart Avenue and Mojave Road intersection that impacts Stewart Avenue adjacent to the project site. Another large area west of the project site impacts Mojave Road before the Stewart Avenue and Mojave Road intersection. Note that there is an existing high point in Mojave Road just north of Charleston Boulevard. Both flows have been conservatively referenced from the city of Las Vegas Central Neighborhood Flood Control Master Plan. Refer to Exhibits E1 & E2 in Appendix A for the relevant reference material.

Offsite Flows: Five (5) street basins and one (1) offsite basin has been analyzed. Street basins have been analyzed to include buildings that contribute directly to the street. Offsite basin OFF1 quantifies flow impacting Technology Court through easements, which includes a portion of the project site.

Onsite: The site is analyzed as three basins based on which street the basin contributes. Basins ON1E, ON2E, and ON3E contribute to Stewart Avenue, Technology Court, and Spectrum Boulevard respectively.

3.3 Summary of Existing Condition Flows

A summary of existing condition flow rates, as determined by the HEC-1 analysis, is presented in a summary table on Exhibit F, included in Appendix A. Refer to Appendix C for the existing condition HEC-1 model.

3.4 Summary of Existing Drainage Facilities

There are three existing u-channels that currently drain the onsite area. Two (2) drain flow generated by basin ON1E to Stewart Avenue and one drains flow generated by basin ON2E to Technology Court.

3.5 Summary of Existing Condition Street Flows

Stewart Avenue (Section SA) and Mojave Road (Section MR) are 100-ft rights-of-way (ROW) that have been modeled as a full street to establish flow depths, velocities, and satisfaction of design criteria in the existing condition. Technology Court (Section TC) and Spectrum Boulevard (Section SB) are 60-ft ROWs. Major storm criteria is met for all streets but Stewart Avenue whose DxV value is above 12. Neither section SA nor section MR meets the 10-year dry lane criteria. Minor storm DxV criteria is met for all streets but Stewart Avenue whose DxV value for the minor storm is above 6.

4 PROPOSED DRAINAGE CONDITION

4.1 Definition of Proposed Condition

The proposed condition assumes that the project site is developed as shown on the plans included with this study. The offsite remains as described in the existing condition.

The plans and drainage exhibits show an additional building and parking area being added for the expansion.

4.2 Discussion of Proposed Condition

Refer to Exhibit G, included in Appendix A, for a detailed illustration of the proposed condition drainage patterns.

Referenced Offsite Flows: The referenced offsite flows remain as addressed in the existing condition. Refer to Section 3.2 of this report for further discussion.

Offsite Flows: The offsite flows also remain as addressed in the existing condition. Refer to Section 3.2 of this report for further discussion.

Onsite: Like the existing condition, the site is analyzed as three basins based on which street the basin contributes to. Basins ON1, ON2, and ON3 contribute to Stewart Avenue, Technology Court, and Spectrum Boulevard respectively.

4.3 Summary of Proposed Condition Flows

A summary of proposed condition flow rates, as determined by the HEC-1 Analysis, is presented in a summary table on Exhibit G, included in Appendix A. Refer to Appendix C for the proposed condition HEC-1 Analysis.

Several onsite basins were prorated and subdivided into sub-basins to help quantify flow rates for various hydraulic sections. Please refer to Exhibit G, included in Appendix A, for a summary of the sub-basin flow rates.

4.4 Summary of Proposed Drainage Facilities

Three BMP swales have been proposed by the Coke Expansion to treat and drain flow generated by the three onsite basins. The three, existing u-channels will remain to drain flow similarly to the existing condition. To ensure adequate treatment of parking lot flows, the proposed swale Section S2 collects and conveys flows that formerly drained through the existing u-channel at the northeast corner of the project site.

4.5 Summary of Proposed Condition Street Flows

Like in the existing condition, Sections TC and SB meet all 10-year and 100-year criteria. Section MR remains unchanged from the existing condition to the proposed condition and therefore still meets the 10-year and 100-year depth and velocity times depth criteria but not 10-year dry lane criteria. Though the flow impacting Section SA adjacent to the project site has decreased, 100-year and 10-year criteria are still not met due to the large offsite flow. Note that though the overall flow to Stewart Avenue downstream of the site has increased by six (6) and four (4) cfs for the 100-year and 10-year storm events respectively, the development of the Coke Expansion has not negatively impacted adjacent streets. The largest depth of flow increase was 0.05' at Section SB while Section SA did not change in either depth or DxV values over the existing condition.

A comparison of the existing and proposed condition flow rates in the adjacent streets is provided in the table below.

Table 1: Flow Comparison Summary Table

Point of Comparison	Existing		Proposed	
	Q_{100} (cfs)	Q_{10} (cfs)	Q_{100} (cfs)	Q_{10} (cfs)
Mojave Road	363	153	363	153
	MOJ1 + MOJ2 + CA04*			
Stewart Avenue	752	305	749	304
	CP1			

Technology Court	41	22	44	23
	CP2			
Spectrum Boulevard	53	27	62	62
	CP3			
Overall	805	332	811	336
	CP4			

5 SUMMARY OF LOW IMPACT DEVELOPMENT

Definition: The project site has been designed with Best Management Practices (BMPs) in the form of Low Impact Development (LID) measures for the control of site runoff from large impervious areas. With a total parking lot area of about 3.9 acres, the site is considered a large category, thus requiring LID computations. Refer to Exhibit G, included in Appendix A, for a detailed illustration of the BMPs utilized for the LID measures, as well as pertinent LID and BMP design considerations. Refer to Appendix B for the referenced 85% water quality storm event calculations.

Discussion: The onsite parking lot flows are routed through one of three (3) proposed onsite swales. The three swales labeled and analyzed as Sections S1, S2, and S3 contribute to Stewart Avenue, Technology Court, and Spectrum Boulevard respectively. As shown in the summary tables on the exhibit, at least 75% treatment is provided so the development meets the minimum Manual requirements. Refer to Exhibit G for a detailed illustration of the basin areas, BMP locations and summary tables.

6 Summary of Finished Floor Elevations

The City of Las Vegas criteria requires that all finished floors be elevated at least twice the depth of street flow, measured from the gutter flowline at the high side of the lot, up to a maximum of 18-inches above the water surface elevation in the street. The finished floor elevation for the proposed building has been checked against the flow depths within the perimeter streets.

7 CONCLUSIONS & RECOMMENDATIONS

1. The project site is not located within a FEMA designated SFHA.
2. The project is adjacent to a proposed regional facility. Therefore, it is assumed that Clark County Regional Flood Control concurrence will be required.
3. At least 75% of the parking lot area flows have been treated per Manual criteria.
4. Grading, plan and profile and details sheets for the improvements included with this study support the drainage patterns and conclusions detailed in this study.

8 REFERENCES

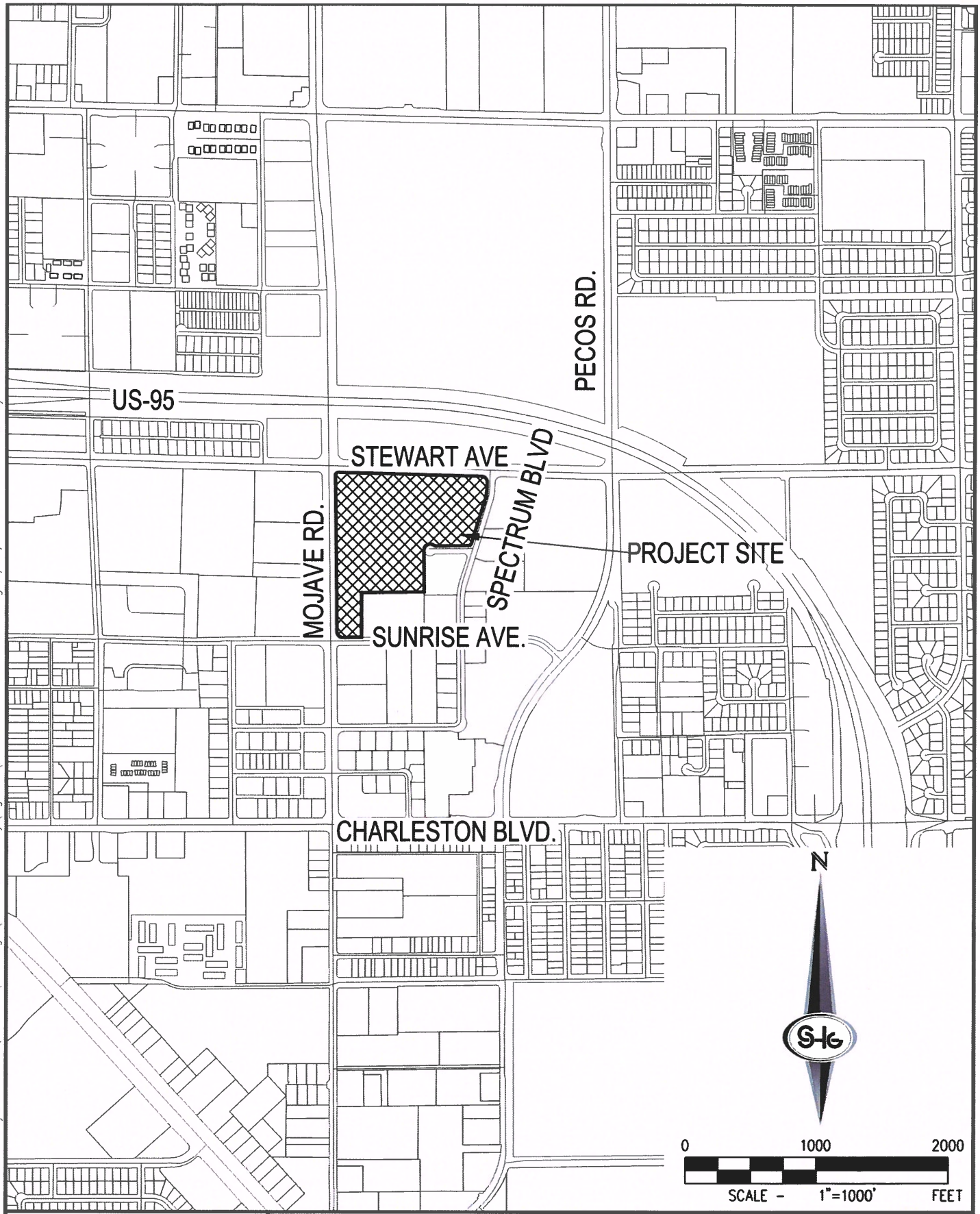
1. *Las Vegas Valley Flood Control Master Plan Update.* ATKINS, Louis Berger Group and Parsons Brinckerhoff, 2018.

2. *Hydrologic Criteria and Drainage Design Manual.* Clark County Regional Flood Control District, 1999.

3. *Soil Survey of Las Vegas Valley Area, Nevada.* U.S. Department of Agriculture, Natural Resources Conservation Services, July 2019.

APPENDIX A

Drainage Exhibits



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MARTIN HARRIS CONSTRUCTION

REYES COCA-COLA BOTTLING, L.L.C.

LOCATION MAP

DATE: JULY 2019	PROJECT NO. MHC1901.000
DRAFTER: GNS	
DESIGNER: CAA	EXHIBIT A
CHECKED: SOA	SHEET 1 OF 1

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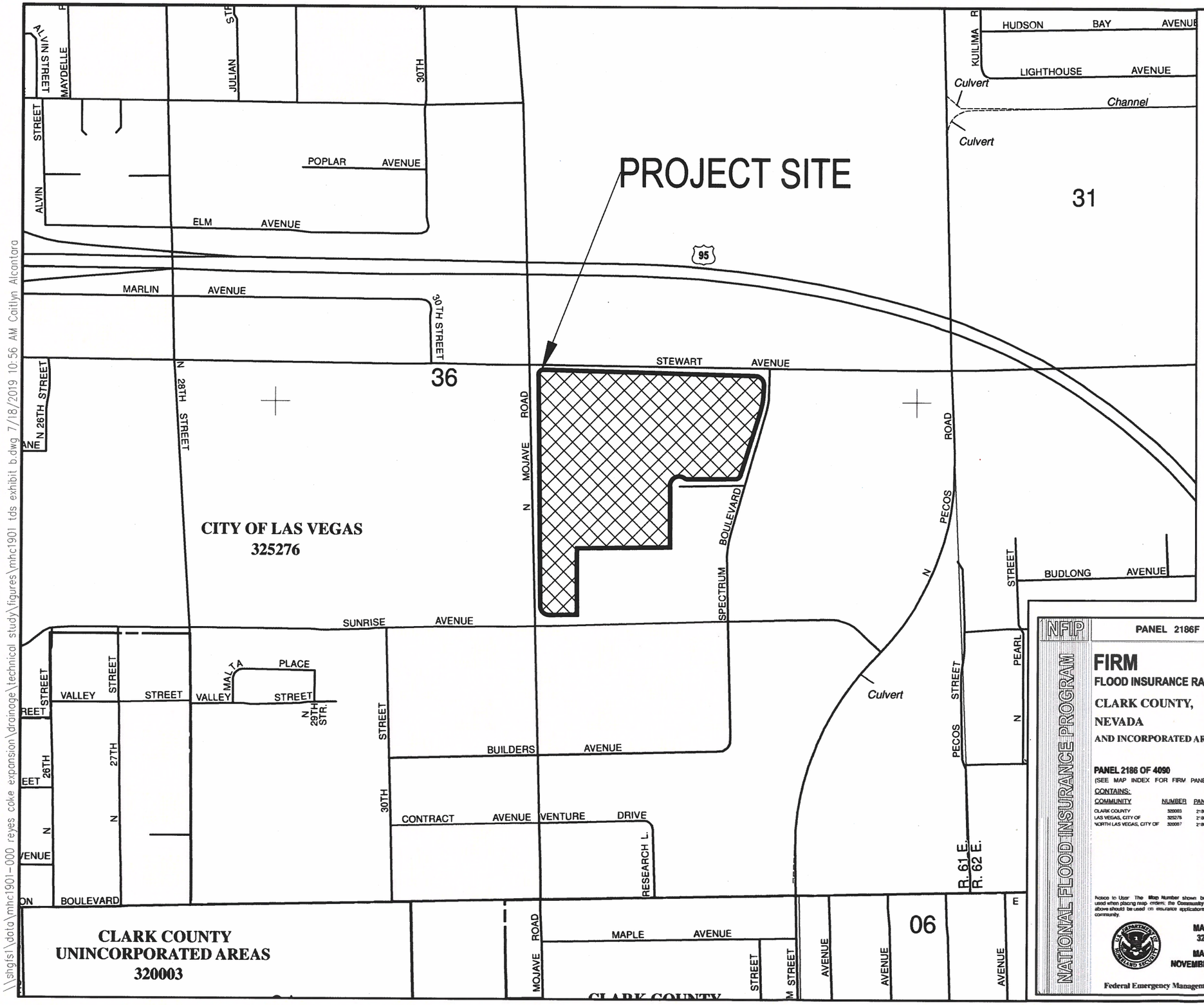

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SCALE – 1"=500' FEET

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 cross 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.

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2186F

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

PANEL 2186 OF 4090
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CLARK COUNTY	320003	2186	F
LAS VEGAS, CITY OF	325276	2186	F
NORTH LAS VEGAS, CITY OF	320007	2186	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
32003C2186F
MAP REVISED
NOVEMBER 16, 2011

Federal Emergency Management Agency

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

MARTIN HARRIS CONSTRUCTION

REYES COCA-COLA BOTTLING, L.L.C.

FEMA FIRM PANEL MAP

DATE: JULY 2019
DRAFTER: GNS
DESIGNER: CAA
CHECKED: SOA
PROJECT NO. MHC1901.000

EXHIBIT B
SHEET 1 OF 1

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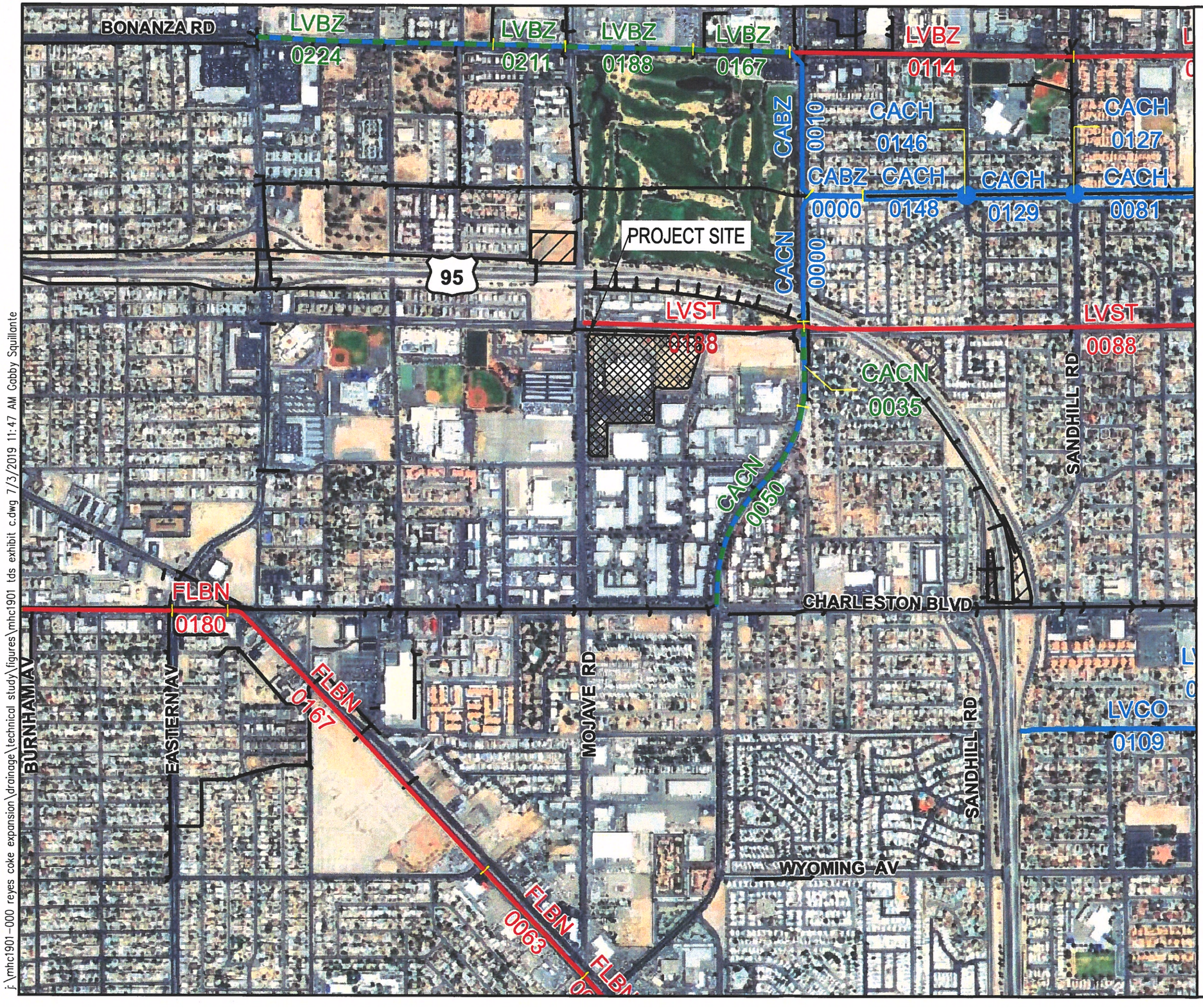

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SCALE – 1"=1000' FEET

REGIONAL FLOOD CONTROL DISTRICT

2018
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE F-30

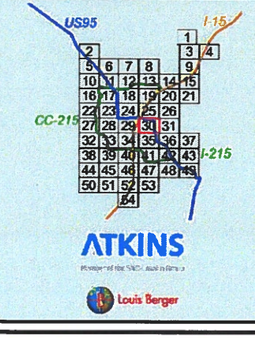
FLOOD CONTROL FACILITIES

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



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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

MARTIN HARRIS CONSTRUCTION

REYES COCA-COLA EXPANSION
2018 CCRFCD MPU FACILITY MAP

DATE:	JULY 2019
DRAFTER:	GNS
DESIGNER:	CAA
CHECKED:	SOA
PROJECT NO.	MHC1901.000

EXHIBIT C1

SHEET 1 OF 1

j:\mhc1901-000 reyes coke expansion\drainage\technical study\figures\mhc1901 tds exhibit c.dwg 7/3/2019 11:47 AM Gobby Squillante

ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
BHSA		**BOULDER HIGHWAY SAHARA AVENUE**						
0030	P	16' X 14' RCB	1350	3952	CSA13*	SW3	7.93	0.50
0026	P	14' X 11' RCB	4000	3952	CSA13*	SW3	7.93	1.30
0075	P	12' X 11' RCB	5280	3952	CSA13	SW3	7.93	2.11
0175	P	14' X 14' RCB	6000	3952	CSA13	SW3	7.93	0.67
0239	P	14' X 12' RCB	2300	3869	CSA11	SW3	7.55	0.87
CABZ		**CEDAR AVENUE - BONANZA**						
0030	E	72" RCP	525					0.30
0010	E	60" RCP	1450					0.30
CACH		**CEDAR AVENUE CHANNEL**						
0030	E	CONC CHNL 10'W 8'D 1.5:1 SS (REPLACED W/ CACH-0001)	1681	2427	CCCA10-C	SW3	3.05	0.20
0031	P	CONC CHNL 22'W 12'D 0:1SS (REPLACES CACH0030)	1055	2427	CCCA10-C	SW3	3.05	0.20
0020	P	CONC CHNL 21'W 8.50-12'D 0:1SS (REPLACES CACH0000)	460	766	CCA10-C	SW3	0.90	2.19
0027	E	2: 15' X 5' RCEC @ MARION	82	766	CCA10-C	SW3	0.90	0.35
0029	E	CONC CHNL 10'W 5'D 1.5:1 SS	1284	766	CCA10-C	SW3	0.90	0.37
0051	E	2: 15' X 5' RCEC @ PAGE	64	766	CCA10-C	SW3	0.90	0.38
0053	E	CONC CHNL 10'W 5'D 1.5:1 SS	1275	766	CCA10-C	SW3	0.90	0.38
0079	E	2: 15' X 6' RCEC @ LAMB	100	594	CCA08-C	SW3	0.70	0.38
0031	E	CONC CHNL 12'W 5'D 1.5:1 SS	2562	594	CCA08-C	SW3	0.70	0.20
0127	E	1: 12' X 4' RCEC 2:1 1' X 4' RC3C @ SANDHILL	80	594	CCA08-C	SW3	0.70	0.20
0129	E	CONC CHNL 10'W 5'D 1.5:1 SS	971	594	CCA08-C	SW3	0.70	0.26
0146	E	2: 12' X 5.5' RCBC @ HONOLULU	62	594	CCA08-C	SW3	0.70	0.53
0148	E	CONC CHNL 10'W 5'D 1.5:1 SS	959	594	CCA08-C	SW3	0.70	0.53
CACN		**CEDAR AVENUE - CHARLESTON**						
0030	E	72" RCP	1867					0.41
0014	E	2: 48" RCP (REPLACE W/ CACN0035)	685	430	CCH70C	SW3	0.40	0.30
0035	PO	8' X 6' RCB (REPLACES CACN0034)	685	430	CCH70C	SW3	0.40	0.30
0049	E	66" RCP (REPLACE W/ CACN0050)	2146	430	CCH70C	SW3	0.40	0.50
0050	PO	6' X 7' RCB (REPLACES CACN0049)	2146	430	CCH70C	SW3	0.40	0.50
COLM		**COLORADO / LAMB**						
0030	E	72" RCP	1500	275	CH94	SW3	0.36	0.97
FLAG		**FLAMINGO WASH - ALGONQUIN**						
0026	E	69" RCP	427	432	FW21	FLAM3A	0.47	1.30
FLBN		**FLAMINGO - BOULDER HIGHWAY NORTH**						
0011	E	4: 10' X 6' RCE	350	4898	CCFR03	Boulder4	11.25	0.58
0038	E	2: 12' X 12' RCB	1055	4898	CCFR03	Boulder4	11.25	0.20
0028	E	3: 16' X 8' RCE	275	4898	CCFR03	Boulder4	11.25	0.20
0033	E	1: 15' X 12' RCB AND 1: 16' X 10' RCB	405	4898	CCFR03	Boulder4	11.25	0.20
0038	P	15' X 10' RCB	987	2471	CFR03	SW3	3.40	0.20
0056	P	24' X 6' RCB	391	2471	CFR03	SW3	3.40	7.30
0053	P	20' X 8' RCB	1393	2372	CFR04	SW3	3.21	0.68
0157	P	18' X 8' RCB	3565	2372	CFR04	SW3	3.21	0.38
0150	P	14' X 8' RCB	494	2013	CCH67A	SW3	2.43	1.50
0235	P	10' X 8' RCB	4478	2013	CCH67A	SW3	2.43	2.90
0275	P	12' X 8' RCB	223	1584	CCCH56	SW3	1.75	2.50
0230	P	10' X 6' RCB	925	928	CCH56	SW3	1.00	2.22
0231	P	10' X 7' RCB	2800	928	CCH56	SW3	1.00	1.33
0312	P	7' X 4' RCB	2160	621	CCH52	SW3	0.62	4.20
0342	P	7' X 4' RCB	2425	621	CCH52	SW3	0.62	4.20
FLBS		**FLAMINGO - BOULDER HIGHWAY SOUTH**						
0010	F	UNLINED MEDIAN CHNL 67'W 6.5'D 4.5:1 SS	4060	684	CB4	FLAM3A	1.58	1.10
0157	E	UNLINED MEDIAN CHNL 67'W 3.5'D 9:1 SS	8850	348	CB4H	FLAM3A	0.63	0.90
FLDN		**DESERT INN DRAIN EAST**						
0030	E	69" RCP (REPLACE W/ FLDN0031)	6160	959	CFW30AW	FLAM3A	2.12	1.22
0031	PO	12' X 9' RCB (REPLACES FLDN0030)	6160	959	CFW30AW	FLAM3A	2.12	1.22
0116	E	54" RCP (REPLACE W/ FLDN0117)	2330	954	CFW29	FLAM3A	1.82	1.77
0117	PO	10' X 9' RCB (REPLACES FLDN0116)	2330	954	CFW29	FLAM3A	1.82	1.77
0150	E	48" RCP (REPLACE W/ FLDN0151)	2950	742	CFW28	FLAM3A	1.51	1.28
0151	PO	10' X 9' RCB (REPLACES FLDN0150)	2950	742	CFW28	FLAM3A	1.51	1.28
FLMP		**FLAMINGO WASH-MARYLAND PARKWAY SYSTEM**						
0030	P	12' X 6' RCB	664	689	CCH60A	SW3	0.75	0.78
0013	P	12' X 4' RCB	1535	689	CCH60A	SW3	0.75	0.48

ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
FLMP		**FLAMINGO WASH-MARYLAND PARKWAY SYSTEM**						
3042	P	6' X 4' RCB	1345	245	DFLAM	SW3	0.31	0.95
3068	P	42" RCP	475	245	DFLAM	SW3	0.31	0.61
FLWA		**FLAMINGO WASH**						
3086	E	CONC CHNL 90'W 8'D 3:1 SS	2685	9548	CFW36	FLAM5B	35.21	0.40
3136	E	CONC CHNL 70'W 10'D 0:1 SS	1470	9548	CFW36	FLAM5B	35.21	0.40
3136	E	TRANSITION CONC CHNL 104'W 12'D TO 70'W 10'D 0:1 SS	250	9548	CFW36	FLAM5B	35.21	3.79
3141	E	CONC CHNL 104'W 12'D 0:1 SS	450	9548	CFW36	FLAM5B	35.21	0.96
3150	E	CONC CHNL 104'W 9'D 0:1 SS	225	9548	CFW36	FLAM5B	35.21	6.00
3174	E	8: 10' X 6' RCBC @ LAMB	110	9504	CFW34	FLAM5B	34.77	1.40
3176	E	TRANSITION CONC CHNL 70'W 9'D TO 104'W 9'D 0:1 SS	250	9504	CFW34	FLAM5B	34.77	0.36
3181	E	CONC CHNL 70'W 9'D 3:1 SS	1270	9504	CFW34	FLAM5B	34.77	0.35
3200	E	CONC CHNL 70'W 8'D TO 12'D W/ PIER 0:1 SS	755	9504	CFW34	FLAM5B	34.77	0.50
3228	E	FREE SPAN BRIDGE 130'W 10'D @ I-515	170	9504	CFW34	FLAM5B	34.77	0.80
3228	E	CONC CHNL 70'W 8'D TO 12'D 0:1 SS	1500	9371	CFW33	FLAM5B	34.43	0.80
3255	E	2 SPAN BRIDGE 150'W 9'D @ BOULDER HWY	65	9371	CFW33	FLAM5B	34.43	1.00
3256	E	CONC CHNL 60'W 7.5'D 0:1 SS	40	6750	CFW33W	FLAM5B	23.17	1.00
3257	E	2 SPAN BRIDGE 150'W 9'D @ BOULDER HWY	60	6750	CFW33W	FLAM5B	23.17	1.00
3258	E	CONC CHNL 60'W 7.5'D 0:1 SS	750	6750	CFW33W	FLAM5B	23.17	0.44
3273	E	FREE SPAN BRIDGE 60'W 9'D @ MMMHP	20	6750	CFW33W	FLAM5B	23.17	0.40
3274	E	CONC CHNL 60'W 8.1'D 0:1 SS	1370	6750	CFW33W	FLAM5B	23.17	1.00
3295	E	CONC CHNL 60'W 8.1'D 0:1 SS	430	6416	CFW31	FLAM5B	21.56	0.80
3307	E	CONC CHNL 60'W 8.1'D 2:1 SS	410	6416	CFW31	FLAM5B	21.56	0.70
3314	E	CONC CHNL 60'W 8.1'D 2:1 SS	1500	6106	CFW30B	FLAM5B	20.79	0.90
3347	E	5: 10' X 8' RCBC @ MOJAVE	80	6106	CFW30B	FLAM5B	20.79	0.94
3348	E	CONC CHNL 30'W 12'D 1:1 SS	1150	6106	CFW30B	FLAM5B	20.79	0.70
3375	E	5: 10' X 8' RCBC @ DESERT INN	140	6074	CFW23	FLAM5B	18.30	2.70
3377	E	CONC CHNL 50'W 9.5'D 0:1 SS	1372	6074	CFW23	FLAM5B	18.30	1.04
3399	E	FREE SPAN BRIDGE 63'W 16'D @ MCLEOD	130	6074	CFW23	FLAM5B	18.30	0.50
3401	E	CONC CHNL 50'W 11.5'D 0:1 SS	107	6074	CFW23	FLAM5B	18.30	0.50
3406	E	CONC CHNL 33'W 11.5'D 0:1 SS	716	5277	CFW23W	FLAM5B	17.42	0.79
3419	E	CONC CHNL 33'-50'W 9.8'D 0:1 SS	208	5277	CFW23W	FLAM5B	17.42	2.00
3425	E	CONC CHNL 50'W 9.8'D 0:1 SS	1686	5277	CFW23W	FLAM5B	17.42	0.76
3455	E	CONC CHNL 50'-75'W 9.8'D 0:1 SS	170	5277	CFW23W	FLAM5B	17.42	1.83
3458	E	CONC CHNL 75'-86'W 9.8'D 0:1 SS	347	5277	CFW23W	FLAM5B	17.42	1.50
3471	E	5: 10' X 8' RCBC @ EASTERN	110	1841*	CFW22W*	FLAM5B	14.32	1.30
3472	E	22' X 8' RCBC @ EASTERN	110	3406*	CFW22W*	FLAM5B	14.32	0.50
3473	E	GRASS CHNL 66'W 15'D 2:1 SS	100	5247	CFW22W	FLAM5B	14.32	0.47
3477	E	3 SPAN BRIDGE 47'W 15'D	70	5247	CFW22W	FLAM5B	14.32	0.80
3476	E	GRASS CHNL 66'W 15'D 2:1 SS	520	5247	CFW22W	FLAM5B	14.32	0.47
3481	E	3: 50" CMAP @ TIOGA (REPLACE W/ FLWA0482)	60	5247	CFW22W	FLAM5B	14.32	0.87
3482	P	4: 20' X 6' RCBC @ TICOA (REPLACES FLWA0481)	60	5247	CFW22W	FLAM5B	14.32	0.87
3485	E	GRASS CHNL 66'W 15'D 2:1 SS	300	5247	CFW22W	FLAM5B	14.32	0.83
FW15		**FREEWAY CHANNEL FROM DESERT INN TO EXPRESSWAY**						
3000	E	3: 12' X 10' RCB	2770	3885	CAL93	Boulder4	8.93	0.17
LCCH		**LAS VEGAS CREEK CHANNEL**						
3000	E	2: 12' X 7' RCB	730	3272	CAL93C	MEADOWS4	8.90	1.28
3015	E	2: 12' X 6' RCB	2035	3050	CLC20-C	MEADOWS4	5.60	0.82
LVBZ		**LAS VEGAS WASH - BONANZA**						
3000	P	2: 12' X 7' RCB	1760	1753	CBN15-C	SW3	2.15	0.40
3025	P	2: 12' X 7' RCB	2700	1753	CBN15-C	SW3	2.15	0.40
3064	P	2: 12' X 7' RCB	2630	1503	CBN12-C	SW3	1.87	0.40
3114	P	2: 12' X 6' RCB	2240	1311	CBN10-C	SW3	1.54	0.40
3166	E	54" RCP (REPLACE W/ LVBZ0137)	930	1106	CBN09	SW3	1.29	0.45
3167	PO	10' X 9' RCB (REPLACES LVBZ0166)	930	1106	CBN09	SW3	1.29	0.45
3187	E	48" RCP (REPLACE W/ LVBZ0188)	1235	1106	CBN09	SW3	1.29	0.71
3188	PO	9' X 9' RCB (REPLACES LVBZ0187)	1235	1106	CBN09	SW3	1.29	0.71
3210	E	42" RCP (REPLACE W/ LVBZ0211)	704	1004	CBN08	SW3	1.05	1.37
3211	PO	8' X 8' RCB (REPLACES LVBZ0210)	704	1004	CBN08	SW3	1.05	1.37
3225	E	36" RCP (REPLACE W/ LVBZ0224)	2275	856	CBN03	SW3	0.84	0.72
3224	PO	8' X 8' RCB (REPLACES LVBZ0223)	2275	856	CBN03	SW3	0.84	0.72

ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
LVCA		**LAS VEGAS WASH - CHARLESTON**						
0000	P	12' X 8' RCB	4600	385	CCH77-C	SW3	1.16	0.30
LVCO		**COLORADO AVENUE SYSTEM**						
0012	E	14' X 6' RCB	2560	1144	CNEL06	SW3	1.32	0.24
0064	E	10' X 8' RCB	2165	301	CCCH94	SW3	1.00	0.24
0106	E	10' X 8' RCB	590	402	CCH92-C	SW3	0.37	0.24
0109	E	10' X 5' RCB	2350	402	CCH92-C	SW3	0.37	0.67
LVOE		**OWENS AVENUE - EAST**						
0345	P	13' X 12' RCB	390	2676	DLVOE	SW5	22.61	0.60
LVST		**LAS VEGAS WASH - STEWART**						
0000	P	10' X 10' RCB	4684	1316	CST03-C	SW3	1.40	0.66
0088	P	10' X 9' RCB	4654	1135	CST01-C	SW3	1.18	0.66
0188	P	8' X 8' RCB	1980	301	CCAD4	SW3	0.59	0.40
LVWH		**WASHINGTON AVENUE CHANNEL**						
0389	E	12' X 8' RCB	2110	1562*	CV1-C*	SW5SC	14.95	0.50
0426	E	16' X 8' RCB	150	1562*	CV1-C*	SW5SC	14.95	1.08
0429	E	SPLITTER STRUCTURE (2: 12' X 8' RCB)	190	2870	DCLC21	SW5	22.61	1.50
0431	E	3: 14.33' X 10' RCB	965	2870	DCLC21	SW5	22.61	0.15
0446	E	JUNCTION STRUCTURE	69	2870	DCLC21	SW5	22.61	0.15
0447	E	3: 14.33' X 10' RCB	1965	5193	CCAL93	SW5	22.05	0.15
0484	E	CONFLUENCE STRUCTURE	455	5193	CCAL93	SW5	22.05	0.15
SAEA		**SAHARA AVENUE - EASTERN LATERAL**						
0000	P	10' X 7' RCB	1440	492	CFR02	SW3	0.65	0.20
VAVD		**VEGAS VALLEY DRIVE**						
0000	P	7' X 5' RCB	1300	349	CFW41	FLAM3A	1.30	2.10
0025	P	54" RCP	5300	349	CFW41	FLAM3A	1.30	1.60
VBCH		**VAN BUSKIRK CHANNEL**						
0000	E	12' X 3' RCB	500	537	CVB16	FLAM3A	1.16	1.00
0008	E	8' X 5' RCB	5490	537	CVB16	FLAM3A	1.16	1.00
VBEA		**VAN BUSKIRK - EASTERN AVE**						
0000	P	10' X 6' RCB	3020	996	CVB11	FLAM3A	2.85	1.20
VBMC		**VAN BUSKIRK - MCLEOD DRIVE**						
0000	E	2: 8' X 8' RCB	3850	931	CVB13	FLAM3A	2.99	0.50
VBTW		**VAN BUSKIRK - TWAIN**						
0000	E	18" RCP (REPLACE W/ VBTW0001)	6640	379	CB2	FLAM3A	0.74	0.70
0001	PO	84" RCP (REPLACES VBTW0000)	6640	379	CB2	FLAM3A	0.74	0.70
WAGC		**WASHINGTON AVENUE CHANNEL - GRAND CENTRAL**						
0000	E	2: 12' X 4' RCB	700	505	LC21	SW3	0.56	0.20
0014	E	1: 12' X 4' RCB AND 1: 11' X 4' RCB	2440	505	LC21	SW3	0.56	0.20
0060	E	12' X 4' RCB	455	505	LC21	SW3	0.56	0.20
WAPR		**WASHINGTON AVENUE CHANNEL PARALLEL**						
0132	E	2: 9' X 8' RCB	387	1562*	CV1-C*	SW5SC	14.95	1.67

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP

MARTIN HARRIS CONSTRUCTION

REYES COCA-COLA EXPANSION
2018 CCRFCD MPU FACILITY MAP

DATE: JULY 2019
DRAFTER: GNS
DESIGNER: CAA
CHECKED: SOA
PROJECT NO. MHC1901.000

EXHIBIT C2
SHEET 1 OF 1

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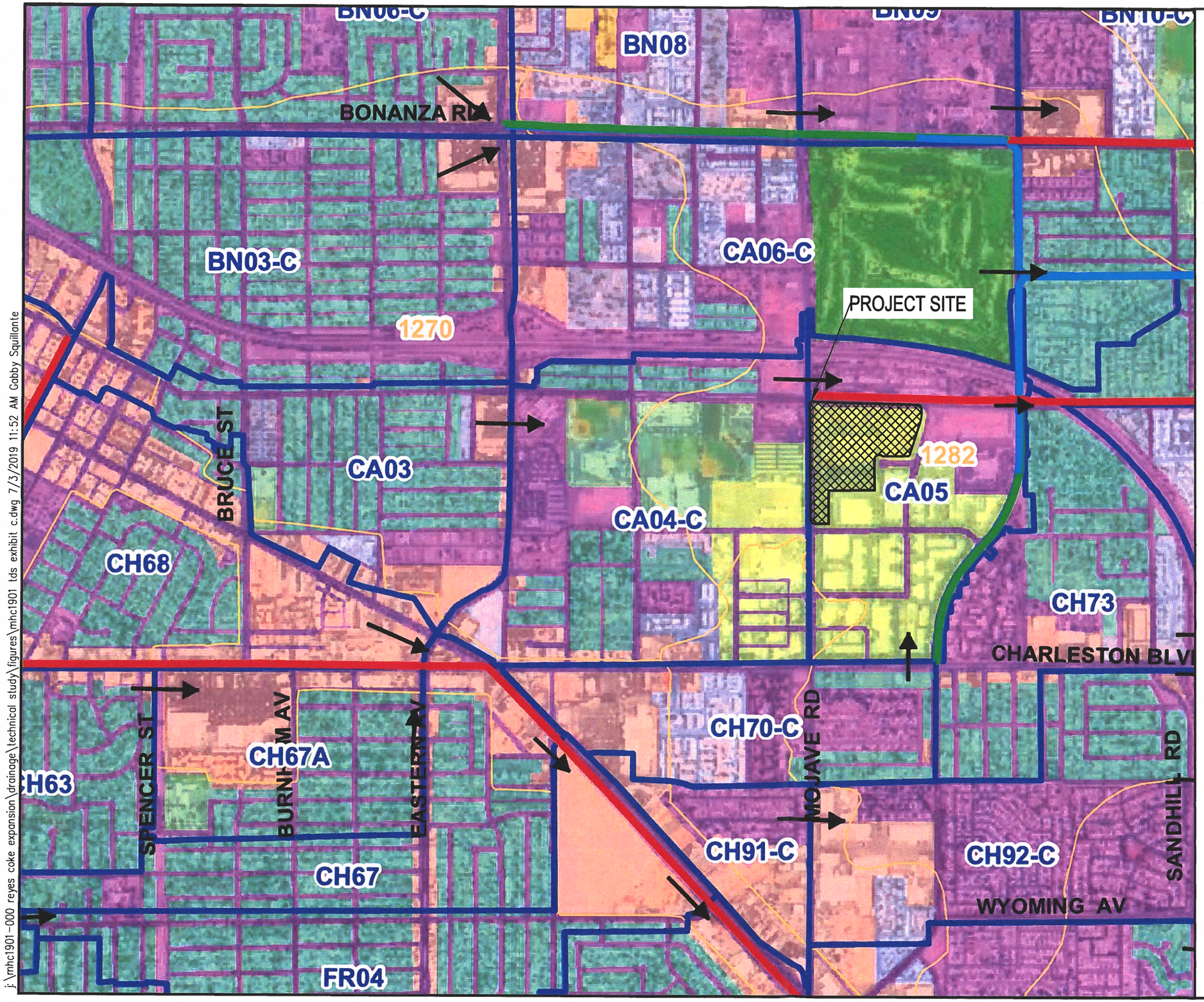

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SCALE – 1"=1000' FEET

REGIONAL FLOOD CONTROL DISTRICT

2018 Las Vegas Valley Master Plan Update

Figure W-5
Central Watershed

Legend

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

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

MARTIN HARRIS CONSTRUCTION

REYES COCA-COLA EXPANSION
2018 CCRFCD MPU WATERSHED MAP

DATE:	JULY 2019
DRAFTER:	GNS
DESIGNER:	CAA
CHECKED:	SOA
PROJECT NO.	MHC1901.000

EXHIBIT C3
SHEET 1 OF 1

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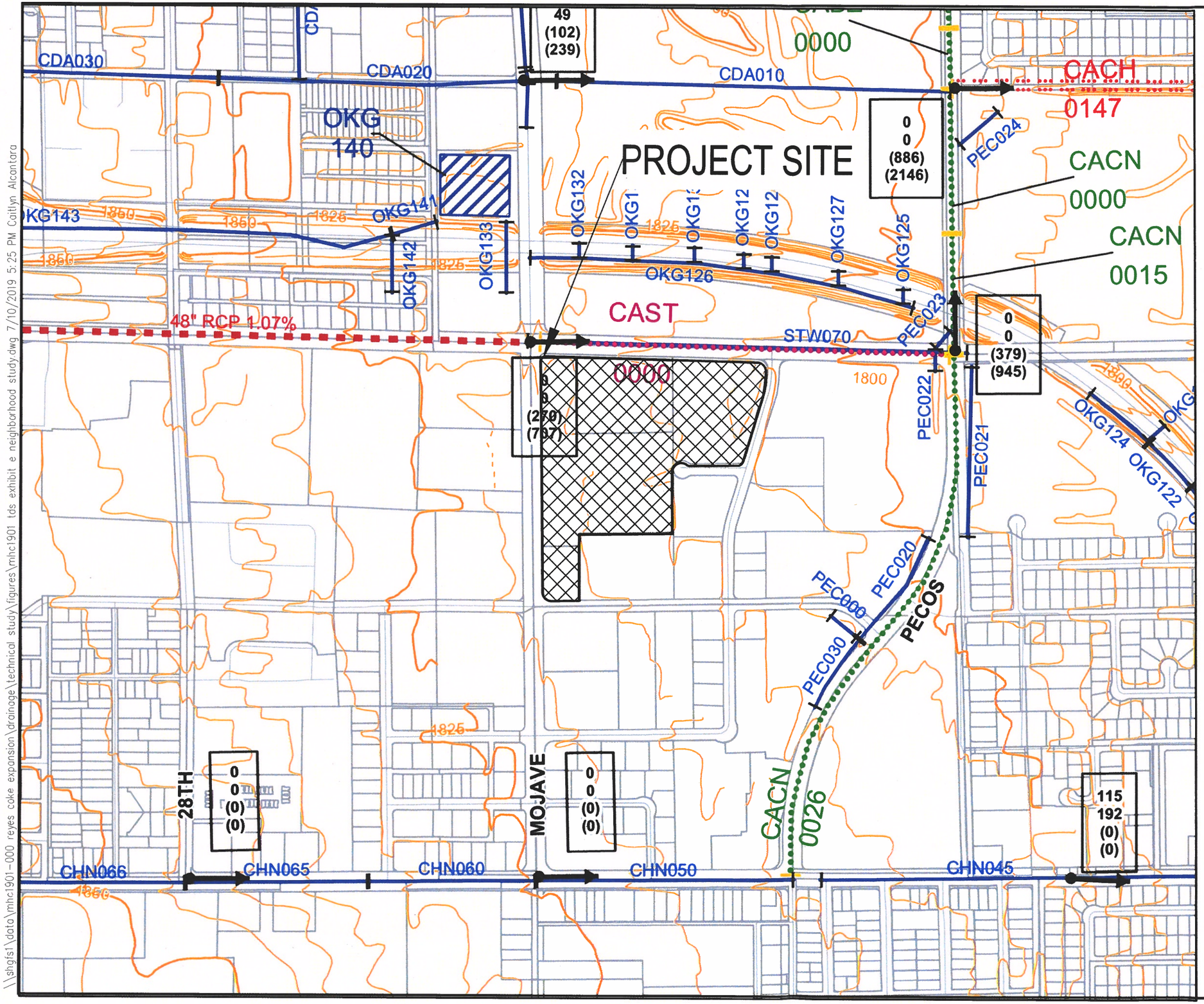

City of Las Vegas

CENTRAL NEIGHBORHOOD FLOOD CONTROL MASTER PLAN

LEGEND

- Existing Regional Facility
- Category A Proposed Regional Facility (2002 MPU)
- Category B Proposed Regional Facility (2002 MPU)
- Category A Proposed Regional Facility (2004 CNFCMP)
- Existing Local Facility
- Proposed Local Facility
- Regional Culvert
- Regional Bridge
- Regional Pipeline
- Regional Channel
- Regional Levee
- Local Detention Basin
- Local Storm Drain
- Local Culvert
- Proposed Local Storm Drain
- Regional ID-Mile Separator
- Local Facility Separator

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

MARTIN HARRIS CONSTRUCTION

REYES COCA-COLA EXPANSION

NEIGHBORHOOD STUDY FUTURE DRAINAGE

DATE:	JULY 2019
DRAFTER:	GNS
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CHECKED:	SOA
PROJECT NO.	MHC1901.000

EXHIBIT E1

SHEET 1 OF 1

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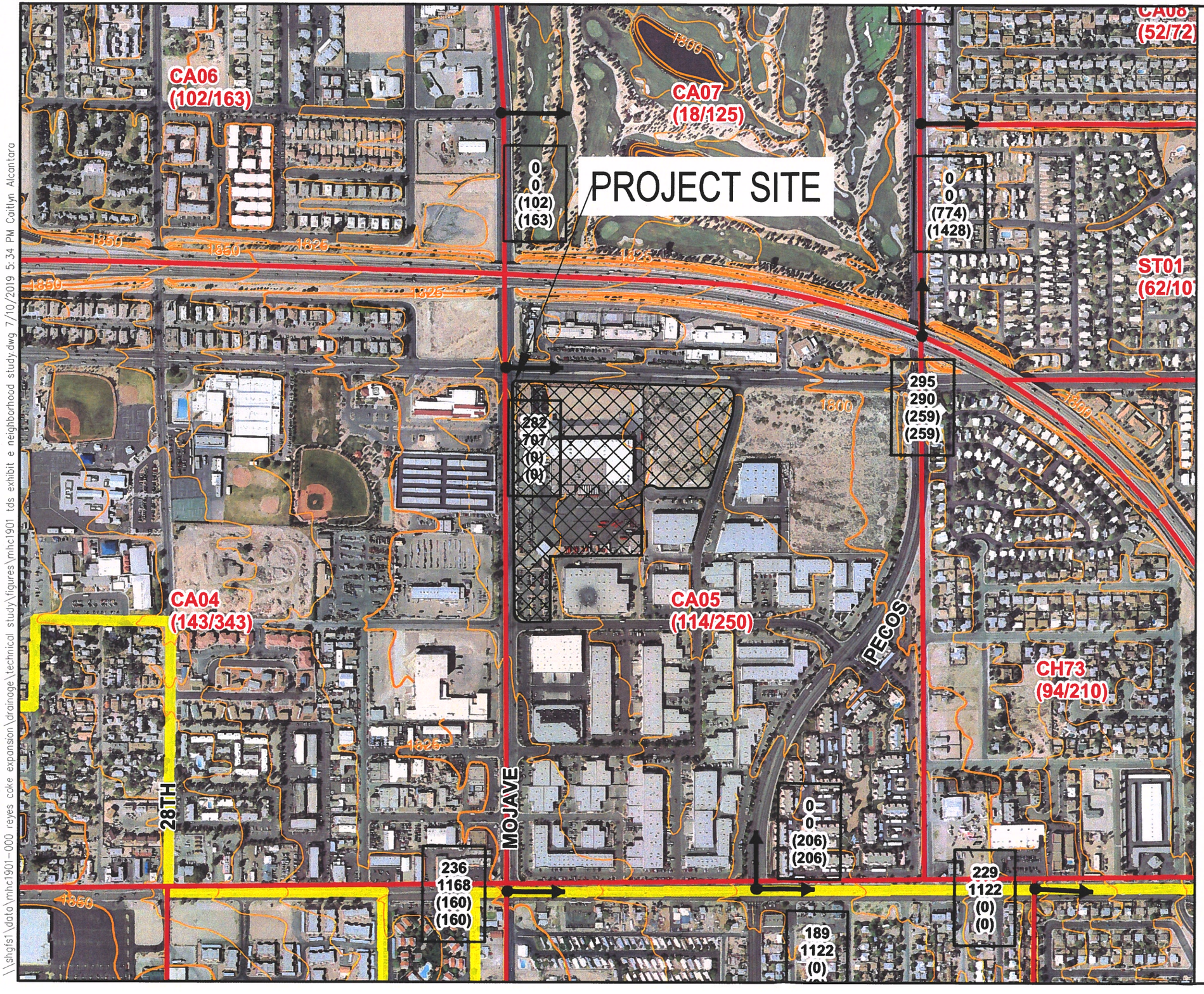

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SCALE - 1"=500' FEET

City of Las Vegas

CENTRAL NEIGHBORHOOD FLOOD CONTROL MASTER PLAN

LEGEND

- Sub-basin Boundary
- LV12 — Basin ID
- (10yr./100yr.) — Contributing flow from the basin (cfs)
- Flow Arrow
- 250 / 500 / (300) / (800) — 10-Year Street Flow / 100-Year Street Flow / 10-Year Facility Flow / 100-Year Facility Flow
- (Flows in CFS)
- Study Area Limit

SLATER HANIFAN GROUP
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP

MARTIN HARRIS CONSTRUCTION

REYES COCA-COLA EXPANSION

NEIGHBORHOOD STUDY MASTER PLAN

DATE:	JULY 2019
DRAFTER:	GNS
DESIGNER:	CAA
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PROJECT NO.	MHC1901.000

EXHIBIT E2

SHEET 1 OF 1

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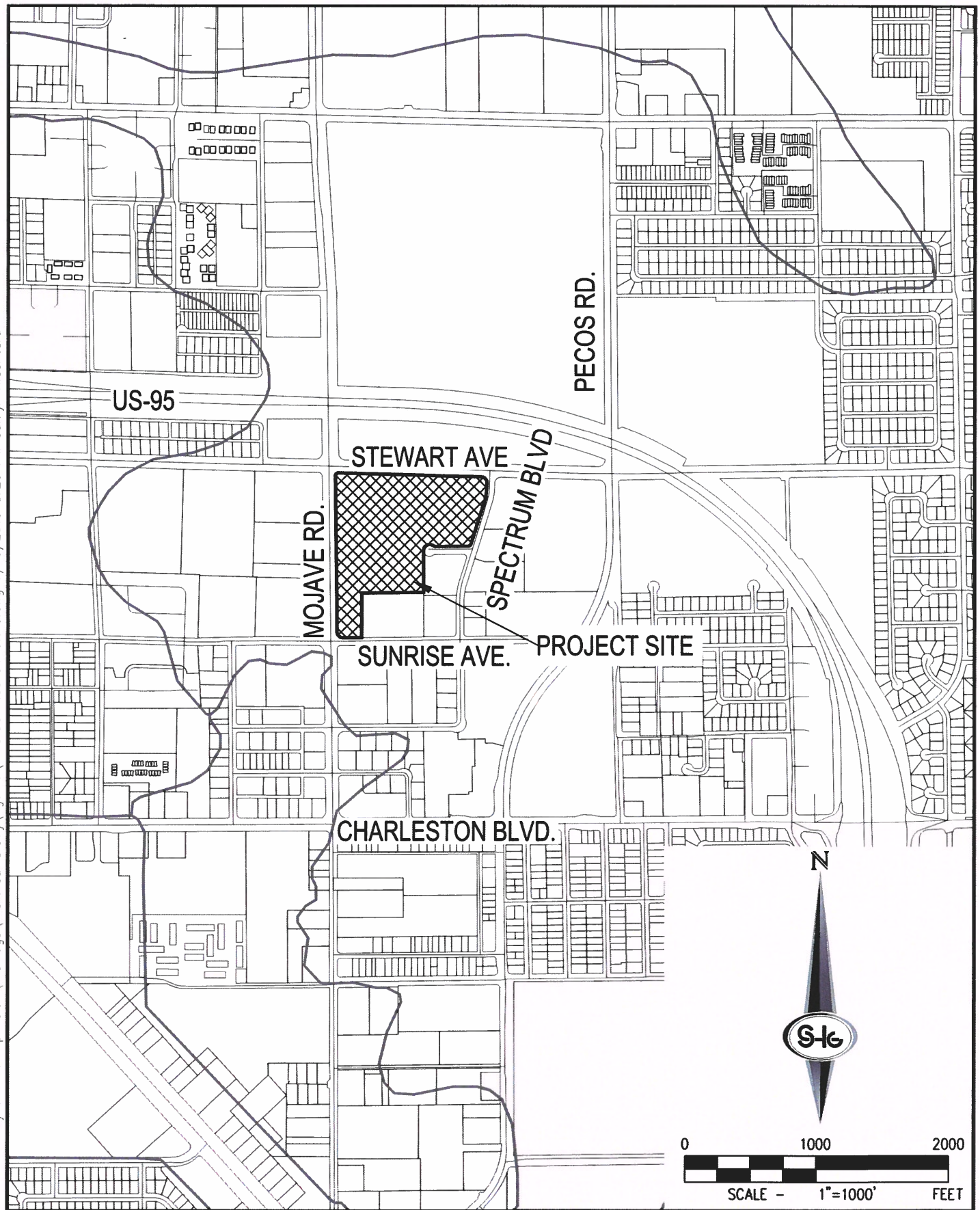

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MARTIN HARRIS CONSTRUCTION

REYES COCA-COLA EXPANSION

SOILS MAP

DATE: JULY 2019	PROJECT NO. MHC1901.000
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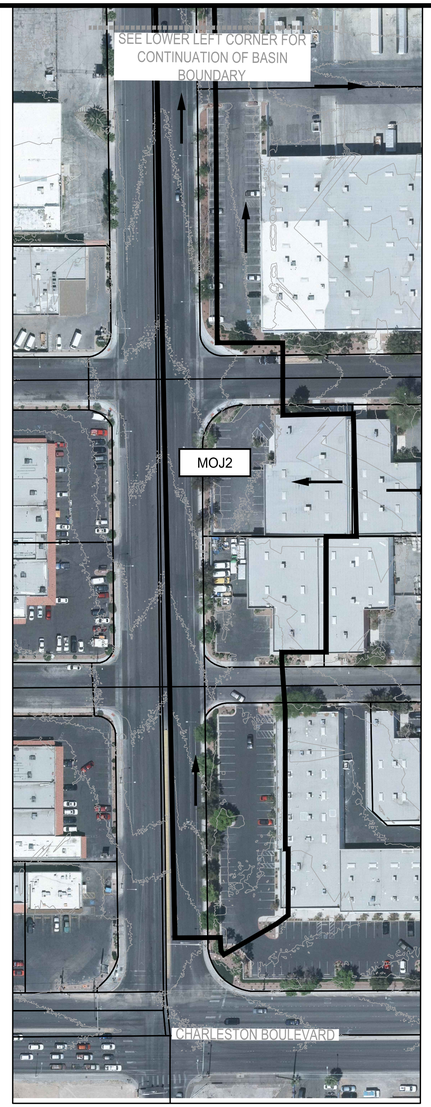
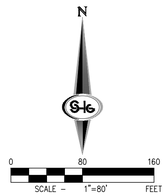
DESIGNER: CAA	EXHIBIT D
CHECKED: SOA	SHEET 1 OF 1





LEGEND

- BASIN BOUNDARY
- ID — BASIN ID
- ID — CONCENTRATION POINT ID
- FLOW DIRECTION
- ID — FLOWMASTER SECTION

Existing Condition Flow Rate Summary

Basin/Concentration Point ID	Area (ac)	Q_{100} (cfs)	Q_{10} (cfs)
ON1E	7.5	19	9
ON2E	7.3	19	10
ON3E	3.0	6	2
OFF1	6.8	21	11
MOJ1	3.5	10	5
MOJ2	3.7	10	5
STEW	2.5	8	4
SPEC	2.5	7	4
TECH	0.4	2	1
CA04*	N/A	343	143
CPSA* FLOW ON STEWART AVENUE AT THE STEWART AND MOJAVE INTERSECTION	N/A	707	282
CP1 Q = MOJ1+MOJ2+ON1E+STEW+CPSA*	N/A	752	305
CP2 Q = OFF1+ON2E+TECH	N/A	41	22
CP3 Q = CP2+SPEC+ON3E	N/A	53	27
CP4 Q = CP1+CP3	N/A	805	332

*REFERENCED FROM CITY OF LAS VEGAS CENTRAL NEIGHBORHOOD FLOOD CONTROL MASTER PLAN

Existing Condition 100-Year Street Flow Summary

Section ID	Q_{100} (cfs)	Slope (%)	Depth (ft)	Velocity (fps)	DxV
MR (Q = CA04* + MOJ1 + MOJ2)	363	0.40	1.32	4.88	6.4
		0.58	1.24	5.46	6.8
SA (Q = CP1)	752	0.61	1.64	7.41	12.1
		1.56	1.37	10.01	13.7
TC (Q = CP2)	41	0.40	0.78	2.81	2.2
		1.12	0.68	4.05	2.8
SB (Q = CP3)	53	0.40	1.04	3.68	3.8
		1.30	0.87	5.62	4.9

Existing Condition 10-Year Street Flow Summary

Section ID	Q_{10} (cfs)	Slope (%)	Depth (ft)	Velocity (fps)	DxV	Dry Lane (ft)
MR (Q = CA04* + MOJ1 + MOJ2)	153	0.40	1.02	3.48	3.5	0.5
		0.58	0.96	3.98	3.8	4.5
SA (Q = CP1)	305	0.61	1.19	5.27	6.3	0.0
		1.56	1.04	7.00	7.3	1.0

SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS

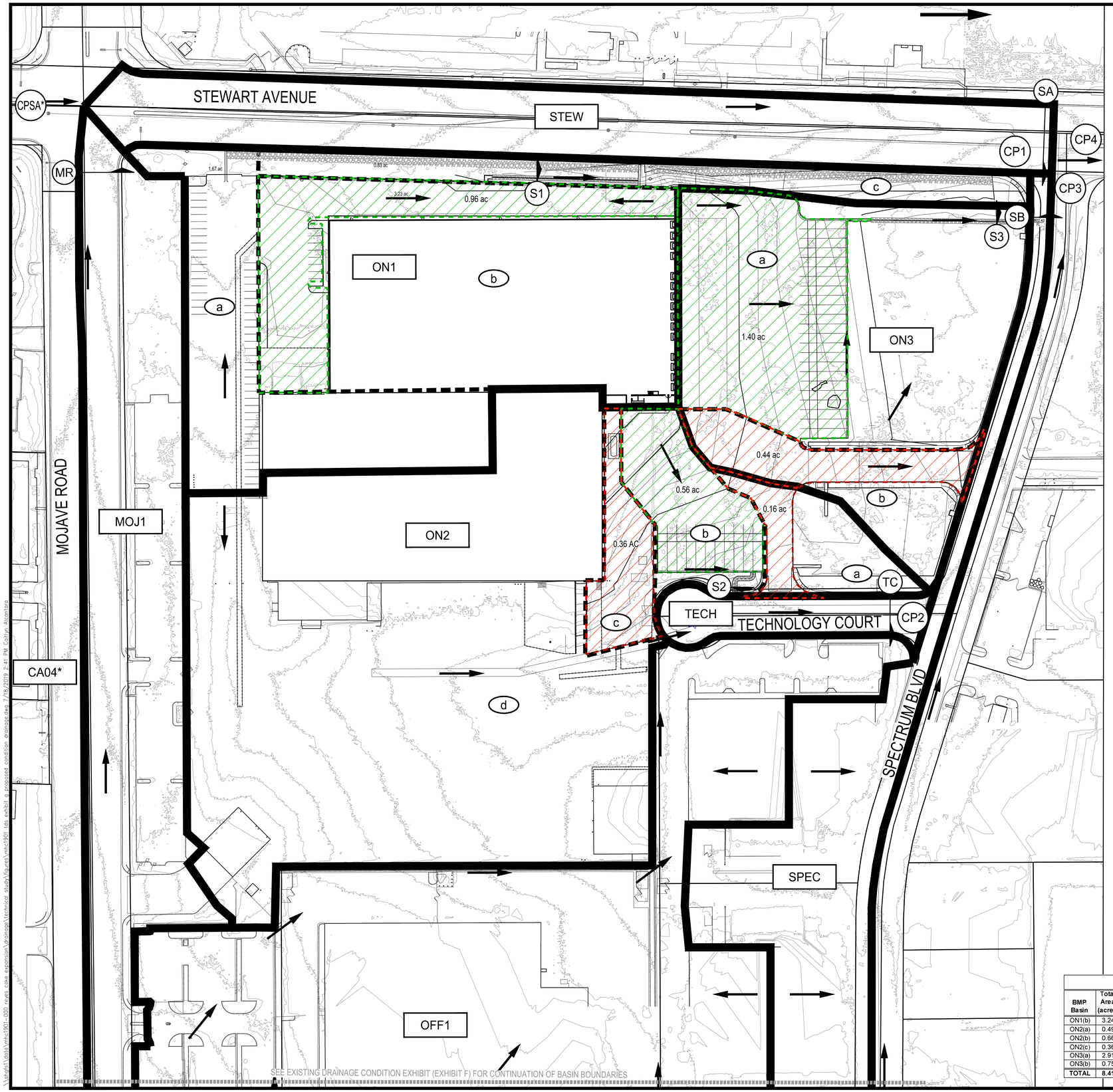
MARTIN HARRIS CONSTRUCTION
REYES COCA-COLA
EXISTING DRAINAGE CONDITION

36 T20S R61E

DATE: JULY 2019
DRAFTER: GNS
DESIGNER: CAA
CHECKED: SOA
PROJECT NO. MHC1901.000

EXHIBIT F
SHEET 1 OF 1

\\shfs1\data\Vmhc1901-000 reyes coke expansion\drainage\technical study\figures\vmhc1901 tds exhibit f existing condition drainage.dwg 7/18/2019 2:49 PM Caitlyn Arcentoro



Proposed Condition Flow Rate Summary

Basin/Concentration Point ID	Area (ac)	Q_{100} (cfs)	Q_{10} (cfs)
ON1	5.8	16	8
ON2	8.3	22	11
ON3	3.7	11	6
OFF1	6.8	21	11
MOJ1	3.5	10	5
MOJ2	3.7	10	5
STEW	2.5	8	4
SPEC	2.5	7	4
TECH	0.4	2	1
CA04*	N/A	343	143
CPSA* FLOW ON STEWART AVENUE AT THE STEWART AND MOJAVE INTERSECTION	N/A	707	282
CP1 Q = CPSA*+MOJ1+MOJ2+ON1+STEW	N/A	749	304
CP2 Q = OFF1+ON2+TECH	N/A	44	23
CP3 Q = CP2+SPEC+ON3	N/A	62	32
CP4 Q = CP1+CP3	N/A	811	336

*REFERENCED FROM CITY OF LAS VEGAS CENTRAL NEIGHBORHOOD FLOOD CONTROL MASTER PLAN

LEGEND

- BASIN BOUNDARY
- PRORATED SUBBASIN BOUNDARY
- ID — BASIN ID
- ID — PRORATED SUBBASIN ID
- ID — CONCENTRATION POINT ID
- FLOW DIRECTION
- ID — FLOWMASTER SECTION
- TREATED PARKING LOT AREA
- UNTREATED PARKING LOT AREA

Proposed Condition 100-Year Street Flow Summary

Section ID	Q_{100} (cfs)	Slope (%)	Depth (ft)	Velocity (fps)	DxV
SA (Q = CP1)	749	0.61	1.64	7.40	12.1
		1.56	1.37	9.99	13.7
TC (Q = CP2)	44	0.40	0.79	2.87	2.3
		1.12	0.69	4.13	2.8
SB (Q = CP3)	62	0.40	1.09	3.92	4.3
		1.3	0.91	5.87	5.3

N

0 40 80
SCALE – 1"=40' FEET

Proposed Condition 10-Year Street Flow Summary

Section ID	Q_{10} (cfs)	Slope (%)	Depth (ft)	Velocity (fps)	DxV	Dry Lane (ft)
SA (Q = CP1)	304	0.61	1.18	5.26	6.2	0.0
		1.56	1.03	6.99	7.2	1.0

Prorated Flow Summary

Basin ID	Q_{100} (cfs)	Area (acres)	100-yr Unit Flow (cfs/acre)
ON1	16	5.76	2.8
ON2	22	8.29	2.7
ON3	11	3.66	3.0
Subbasin ID	**Q_{100} (cfs)**	**Area (acres)**	**100-yr Unit Flow (cfs/acre)**
ON1(a)	5	1.68	2.8
ON1(b)	9	3.24	2.8
ON1(c)	2	0.84	2.8
TOTAL	***16***	***5.76***	
ON2(a)	1	0.49	2.7
ON2(b)	2	0.66	2.7
ON2(c)	1	0.36	2.7
ON2(d)	18	6.78	2.7
TOTAL	***22***	***8.29***	
ON3(a)	9	2.91	3.0
ON3(b)	2	0.75	3.0
TOTAL	***11***	***3.66***	

Water Quality Storm Flow (Q_{BMP} = 85% Storm)

Basin	Q_{BMP} (cfs)	Gross Area (acres)	Unit Flow* (cfs/acre)
ON1(a)	0.8	1.68	0.46
ON1(b)	1.5	3.24	0.46
ON1(c)	0.4	0.84	0.46
ON2(a)	0.2	0.49	0.46
ON2(b)	0.3	0.66	0.46
ON2(c)	0.2	0.36	0.46
ON2(d)	3.1	6.78	0.46
ON3(a)	1.3	2.91	0.46
ON3(b)	0.3	0.75	0.46

* Unit flow from Q_{BMP} computations

Proposed Condition Onsite Hydraulic Section Summary

Section ID	Q_{100} (cfs)	Section Description	Slope (%)	Depth (ft)	Velocity (fps)
Section S1 (Q = ON1(b))	9.0	Triangular Swale, 8-ft TW 4:1SS, D_{50}=3-inch Riprap	1.00	0.90	2.76
		4-ft x 0.5-ft U-Channel	1.00	0.41	5.54
Section S2 (Q = ON2(b))	2.0	Triangular Swale, 4-ft TW 4:1SS, D_{50}=3-inch Riprap	1.00	0.51	1.90
Section S3 (Q = Half of ON3(a))	4.5	Triangular Swale, 6-ft TW 4:1SS, D_{50}=3-inch Riprap	1.00	0.69	2.38
		2-ft x 0.5-ft U-Channel	1.00	0.44	5.17

Proposed Condition Treatment Summary

BMP Basin	Total Area (acres)	Parking Lot Area (acres)	Q_{BMP} (cfs)	Swale Length (ft)	Minimum Required Swale Length (feet)	Parking Area to BMP < 1 acre	Swale > 40-ft per acre of parking	Treatment Description	Treatment %	Treated Parking Area (acres)
ON1(b)	3.24	0.96	1.5	180	38	Yes	No	Section S1	100%	0.96
ON2(a)	0.49	0.16	0.2	0	6	Yes	No	No Treatment	0%	0.00
ON2(b)	0.66	0.56	0.3	40	22	Yes	No	Section S2	100%	0.56
ON2(c)	0.36	0.36	0.2	0	14	Yes	No	No Treatment	0%	0.00
ON3(a)	2.91	1.40	1.3	196	56	No	Yes	Section S3	100%	1.40
ON3(b)	0.75	0.44	0.3	0	18	Yes	No	No Treatment	0%	0.00
TOTAL	8.41	3.88	4						75%	2.92

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS

MARTIN HARRIS CONSTRUCTION

REYES COCA-COLA BOTTLING, L.L.C.

PROPOSED CONDITION DRAINAGE

36 T20S R61E

DATE: JULY 2019
DRAFTER: GNS
DESIGNER: CAA
CHECKED: SOA
PROJECT NO.
MHC1901.000

EXHIBIT G
SHEET 1 OF 1

\\shpfs1\data\mhc1901-000 reyes coke expansion\drainage\technical study\figures\mhc1901 tds exhibit g proposed condition drainage.dwg 7/18/2019 2:41 PM Collyn Alcontora

APPENDIX B

Hydrologic Data

Precipitation Information

SLATER HANIFAN GROUP
a Westwood team

Rainfall and Precipitation Computation

Project Name: MHC1901: Reyes Coca -Cola Expansion
Date: 7/2/2019
File Name: MHC1901 Precipitation Calcs v180117.xls
By: CAA

Data:

Reference:

Project is located in: Township: 20 S. Range: 61 E. Section: 36 — APN Map

Site is located in the McCarran Airport Rainfall Area — Figure 513*

Six Hour Depth Area Reduction Factors (DARF):

Area (gross acres):	36.5	=	0.0570 square miles	Table 502*
DARF		=	1.00	

Calculations:

P_{10} = 1.58 — 10-Year Precipitation (in)
P_{100} = 2.77 — 100-Year Precipitation (in)

P10/P100= 0.57 — HEC-1 Multiple Ratio Value

Equations:

P=(Rainfall)*(Precipitation Adjustment Ratio)*(Depth Area Reduction Factor)

* Equations taken from the Clark County Regional Flood Control District - Hydrologic Criteria and Drainage Desi

5740 S. Arville St., Suite 216 - Las Vegas, NV 89118
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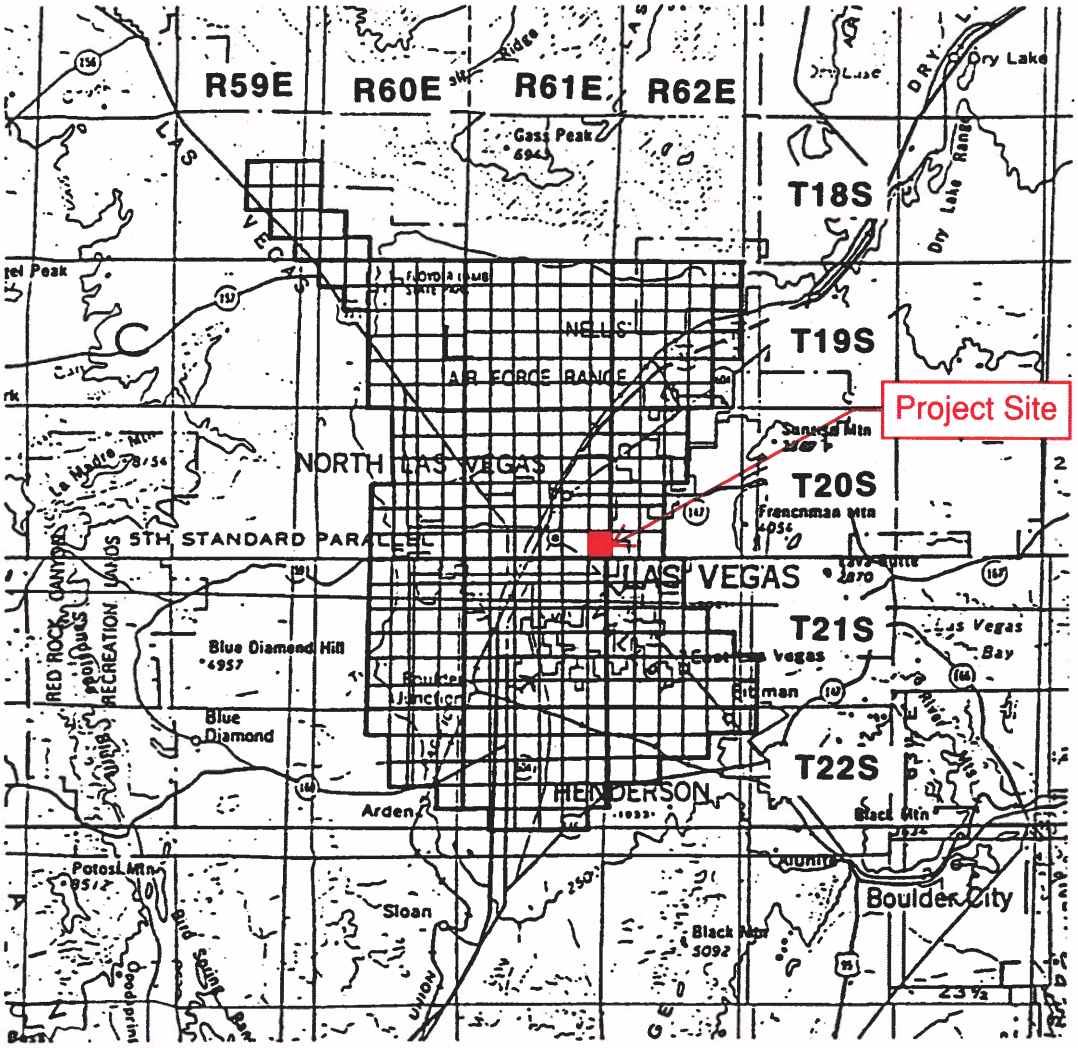
McCARRAN AIRPORT RAINFALL AREA



TOWNSHIP	RANGE	SECTIONS	TOWNSHIP	RANGE	SECTIONS
18 South	59 East	13-15,22-26,36	20 South	62 East	4-9,16-20,29-32
18 South	60 East	30-32	21 South	60 East	1-4,9-16,21-28,33-36
19 South	60 East	1-6,8-16,21-28,33-36	21 South	61 East	ALL SECTIONS
19 South	61 East	ALL SECTIONS	21 South	62 East	4-9,15-23, 25-36
19 South	62 East	2-11,14-23,27-34	22 South	60 East	1-4,10-15,24
20 South	60 East	1-3,10-15,21-28,33-36	22 South	61 East	1-24,26-29
20 South	61 East	ALL SECTIONS	22 South	62 East	1-10,17-18

Notes:
1. Refer to Table 505 and Figure 516 Depth-Duration- Frequency values in the McCarran Airport Rainfall Area.
2. Refer to Table 506 and Figure 517 for Time-Intensity-Frequency values on the McCarran Airport Rainfall Area.

Revision	Date

WRC ENGINEERING

REFERENCE:
USACE, Los Angeles District, 1988

FIGURE 513

DEPTH-DURATION-FREQUENCY VALUES FOR McCARRAN AIRPORT RAINFALL AREA

(IN INCHES)

TIME	RECURRENCE INTERVAL					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
5 min.	0.15	0.27	0.35	0.46	0.54	0.63
10 min.	0.25	0.44	0.57	0.74	0.89	1.02
15 min.	0.33	0.57	0.74	0.97	1.15	1.32
30 min.	0.44	0.78	1.01	1.31	1.55	1.79
1 hour	0.52	0.89	1.15	1.50	1.78	2.06
2 hour	0.59	1.01	1.30	1.70	2.01	2.30
3 hour	0.64	1.08	1.39	1.82	2.15	2.48
6 hour	0.72	1.22	1.58	2.05	2.41	2.77
24 hour (TR-55)	1.20	1.60	1.80	2.40	2.70	2.96

NOTE: 1. Refer to Figure 513 for a description and drawing of the area included in the McCarran Airport Rainfall Area.

2. The 24 hour values presented above are for use with TR-55 only.

3. Table 501 adjustments not required.

Revision	Date

SIX HOUR DEPTH-AREA REDUCTION FACTORS

Drainage Area (Square Miles)	Six-Hour Depth-Area Reduction Factor
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.

Revision	Date

SIX-HOUR STORM DISTRIBUTIONS

Storm Time (In Minutes)	Percent of Total Storm Depth SDN3	SDN4	SDN5	Storm Time (In Minutes)	Percent of Total Storm Depth 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

Curve Numbers Data and Computations

SLATER HANIFAN GROUP
a Westwood team

Soil Data & Curve Number Computation

Project Name & Number: MHC1901: REYES COCA-COLA EXPANSION
Date: 7/11/2019
By: CAA

Data:

Reference: Exhibit D NRCS Soil Data

Soil Type - Soil Survey Area & Version, Soil Description				A	B	C	D
LV	282	Las Vegas Valley 2016	Land silty clay loam	0%	0%	100%	0%

Land Use	A	B	C	D
Roadway	98	98	98	98
Commercial	89	92	94	95
Desert Shrub (poor)	63	77	85	88
Newly Graded	77	86	91	94

EXISTING CONDITION

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP PERCENTS A	B	C	D	LAND USE CN A	B	C	D	SUBAREA ACRES	CURVE NUMBER
ON1E	LV	282	67.9%	Commercial	0%	0%	100%	0%	89	92	94	95	5.06	63.84
	LV	282	19.2%	Desert Shrub (poor)	0%	0%	100%	0%	63	77	85	88	1.43	16.32
	LV	282	12.9%	Newly Graded	0%	0%	100%	0%	77	86	91	94	0.96	11.73
		TOTAL PERCENT	100.0%									TOTAL AREA & COMPOSITE CURVE NUMBER:	7.45	91.9

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP PERCENTS A	B	C	D	LAND USE CN A	B	C	D	SUBAREA ACRES	CURVE NUMBER
ON2E	LV	282	100.0%	Commercial	0%	0%	100%	0%	89	92	94	95	7.28	94.00
		TOTAL PERCENT	100.0%									TOTAL AREA & COMPOSITE CURVE NUMBER:	7.28	94.0

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP PERCENTS A	B	C	D	LAND USE CN A	B	C	D	SUBAREA ACRES	CURVE NUMBER
ON3E	LV	282	84.8%	Desert Shrub (poor)	0%	0%	100%	0%	63	77	85	88	2.51	72.08
	LV	282	15.2%	Newly Graded	0%	0%	100%	0%	77	86	91	94	0.45	13.83
		TOTAL PERCENT	100.0%									TOTAL AREA & COMPOSITE CURVE NUMBER:	2.96	85.9

PROPOSED CONDITION

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP PERCENTS A	B	C	D	LAND USE CN A	B	C	D	SUBAREA ACRES	CURVE NUMBER
ON1	LV	282	100.0%	Commercial	0%	0%	100%	0%	89	92	94	95	5.76	94.00
		TOTAL PERCENT	100.0%									TOTAL AREA & COMPOSITE CURVE NUMBER:	5.76	94.0

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP PERCENTS A	B	C	D	LAND USE CN A	B	C	D	SUBAREA ACRES	CURVE NUMBER
ON2	LV	282	100.0%	Commercial	0%	0%	100%	0%	89	92	94	95	8.29	94.00
		TOTAL PERCENT	100.0%									TOTAL AREA & COMPOSITE CURVE NUMBER:	8.29	94.0

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP PERCENTS A	B	C	D	LAND USE CN A	B	C	D	SUBAREA ACRES	CURVE NUMBER
ON3	LV	282	100.0%	Commercial	0%	0%	100%	0%	89	92	94	95	3.66	94.00
		TOTAL PERCENT	100.0%									TOTAL AREA & COMPOSITE CURVE NUMBER:	3.66	94.0

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP PERCENTS A	B	C	D	LAND USE CN A	B	C	D	SUBAREA ACRES	CURVE NUMBER
OFF1	LV	282	100.0%	Roadway	0%	0%	100%	0%	98	98	98	98	6.84	98.00
		TOTAL PERCENT	100.0%									TOTAL AREA & COMPOSITE CURVE NUMBER:	6.84	98.0

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP PERCENTS A	B	C	D	LAND USE CN A	B	C	D	SUBAREA ACRES	CURVE NUMBER
MOJ1	LV	282	42.4%	Commercial	0%	0%	100%	0%	89	92	94	95	1.48	39.86
	LV	282	57.6%	Roadway	0%	0%	100%	0%	98	98	98	98	2.01	56.44
		TOTAL PERCENT	100.0%									TOTAL AREA & COMPOSITE CURVE NUMBER:	3.49	96.3

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP PERCENTS				LAND USE CN				SUBAREA ACRES	CURVE NUMBER
					A	B	C	D	A	B	C	D		
MOJ2	LV	282	34.2%	Commercial	0%	0%	100%	0%	89	92	94	95	1.27	32.18
	LV	325	13.2%	Commercial	100%	0%	0%	0%	89	92	94	95	0.49	11.75
	LV	325	29.6%	Roadway	100%	0%	0%	0%	98	98	98	98	1.10	29.06
	LV	282	22.9%	Roadway	0%	0%	100%	0%	98	98	98	98	0.85	22.45
TOTAL PERCENT			100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:									3.71	95.4

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP PERCENTS				LAND USE CN				SUBAREA ACRES	CURVE NUMBER
					A	B	C	D	A	B	C	D		
STEW	LV	282	100.0%	Roadway	0%	0%	100%	0%	98	98	98	98	2.45	98.00
TOTAL PERCENT			100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:									2.45	98.0

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP PERCENTS				LAND USE CN				SUBAREA ACRES	CURVE NUMBER
					A	B	C	D	A	B	C	D		
SPEC	LV	282	68.7%	Commercial	0%	0%	100%	0%	89	92	94	95	1.71	64.55
	LV	282	31.3%	Roadway	0%	0%	100%	0%	98	98	98	98	0.78	30.70
TOTAL PERCENT			100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:									2.49	95.3

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP PERCENTS				LAND USE CN				SUBAREA ACRES	CURVE NUMBER
					A	B	C	D	A	B	C	D		
TECH	LV	282	100.0%	Roadway	0%	0%	100%	0%	98	98	98	98	0.43	98.00
TOTAL PERCENT			100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:									0.43	98.0

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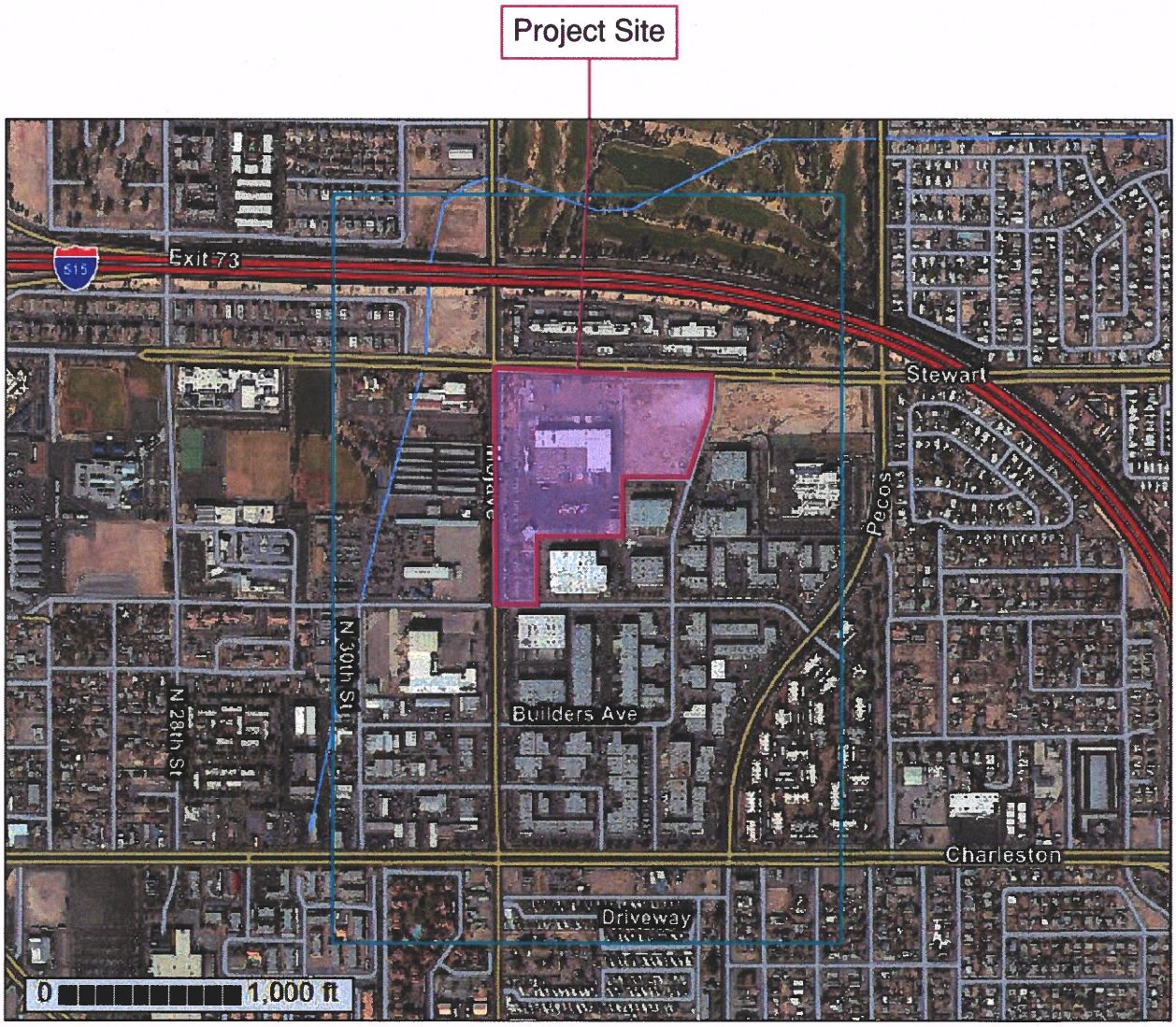
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Las Vegas Valley Area, Nevada, Part of Clark County



July 10, 2019

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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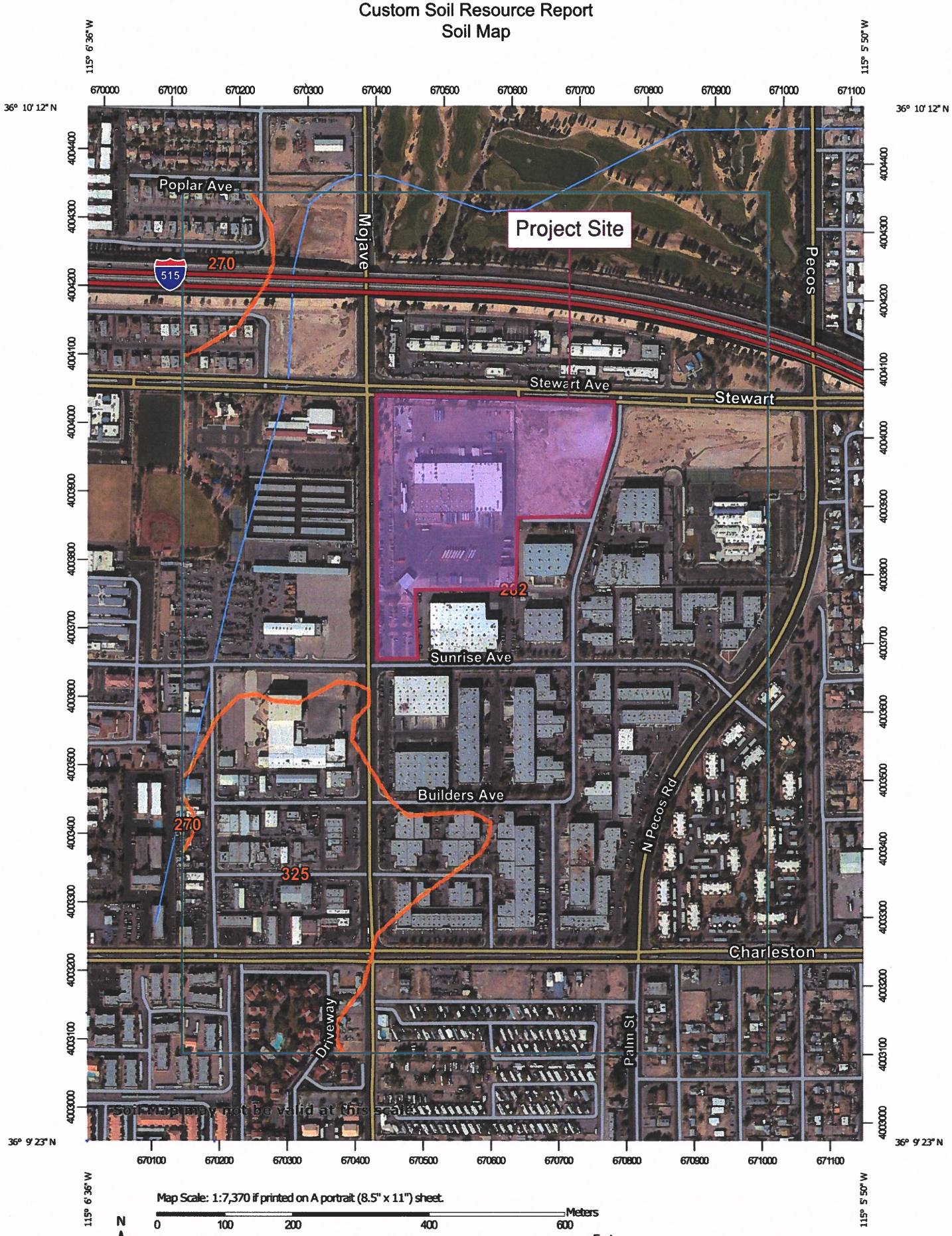
Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



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 13, Sep 14, 2018

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

Date(s) aerial images were photographed: Sep 26, 2013—Feb 25, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	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
270	Land silt loam, drained	6.5	2.4%
282	Land silty clay loam	223.7	83.2%
325	McCarran fine sandy loam, 0 to 4 percent slopes	38.6	14.3%
Totals for Area of Interest		**268.7**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the

development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Las Vegas Valley Area, Nevada, Part of Clark County

270—Land silt loam, drained

Map Unit Setting

National map unit symbol: hrbl
Elevation: 1,200 to 2,400 feet
Mean annual precipitation: 4 to 6 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 230 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Land and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Land

Setting

Landform: Alluvial flats
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 6 inches: silt loam
H2 - 6 to 60 inches: stratified silt loam to silty clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 0.57 in/hr)
Depth to water table: About 42 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 10 percent
Salinity, maximum in profile: Strongly saline (16.0 to 32.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 90.0
Available water storage in profile: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): 6w
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: C
Ecological site: SODIC TERRACE (R030XY040NV)
Hydric soil rating: No

282—Land silty clay loam

Map Unit Setting

National map unit symbol: hrbn
Elevation: 1,200 to 2,400 feet
Mean annual precipitation: 4 to 6 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 230 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Land and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Land

Setting

Landform: Alluvial flats
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 2 inches: silty clay loam
H2 - 2 to 64 inches: stratified silt loam to silty clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 0.57 in/hr)
Depth to water table: About 36 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 10 percent
Salinity, maximum in profile: Strongly saline (16.0 to 32.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 90.0
Available water storage in profile: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): 6w
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: C
Ecological site: SALINE BOTTOM (R030XY024NV)
Hydric soil rating: No

325—McCarran fine sandy loam, 0 to 4 percent slopes

Map Unit Setting

National map unit symbol: hrbv
Elevation: 1,600 to 2,400 feet
Mean annual precipitation: 4 to 6 inches
Mean annual air temperature: 63 to 66 degrees F
Frost-free period: 235 to 260 days
Farmland classification: Not prime farmland

Map Unit Composition

Mccarran and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mccarran

Setting

Landform: Alluvial flats
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from limestone

Typical profile

H1 - 0 to 9 inches: fine sandy loam
H2 - 9 to 48 inches: gypsiferous material
H3 - 48 to 62 inches: gypsiferous material

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 70 percent
Gypsum, maximum in profile: 40 percent
Salinity, maximum in profile: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 12.0
Available water storage in profile: Very low (about 1.3 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Other vegetative classification: SHALLOW LIMY 5-8 P.Z. (030XB031NV_2)
Hydric soil rating: No

Soil Information for All Uses

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

Water Features

This folder contains tabular reports that present soil hydrology information. The reports (tables) include all selected map units and components for each map unit. Water Features include ponding frequency, flooding frequency, and depth to water table.

Hydrologic Soil Group and Surface Runoff

This table gives estimates of various soil water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or

RUNOFF CURVE NUMBERS
(URBAN AREAS[1])

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

See Table 602A

Developing urban areas					
Newly graded areas (pervious areas only, no vegetation)[5]		77	86	91	94

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

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

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

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

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

Revision	Date

RUNOFF CURVE NUMBERS
(SEMIARID RANGELANDS[1])

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

[1]Average runoff condition, and I_a = 0.2S.

[2]*Poor:* <30% ground cover (litter, grass, and brush overstory).
Fair: 30 to 70% ground cover.
Good: >70% ground cover.

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

Revision	Date

Lag Time Computations - Standard Form 4

SLATER HANIFAN GROUP
a Westwood team

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL
TIME OF CONCENTRATION

Project Name & Number: MHC1901: REYES COCA-COLA EXPANSION
Description: EXISTING & PROPOSED CONDITION
By: CAA
Date: 7/11/2019

SUB-BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc Check Urbanized Basins		Tlag
DESIG:	DEV./EX. (D or E)	CN	K [1]	AREA Ac	AREA Mi^2 [2]	INITIAL LENGTH Feet	SLOPE %	Ti Min [3]	TRAVEL LENGTH Feet	SLOPE %	V1 VELOCITY FPS [4]	V2 VELOCITY FPS [5]	Tt Min [6]	Tc Calc. [7]	Total Length Feet [8]	Tc Check [9]	Tlag Hours [10]
EXISTING CONDITION																	
ON1E	D	91.9	0.823	7.45	0.0116	280	1.00	8.34	390	1.00	2.02	3.06	3.22	11.56	670	13.722	0.116
ON2E	D	94.0	0.851	7.28	0.0114	265	1.00	7.30	730	1.10	2.12	3.21	5.13	12.43	995	15.528	0.124
ON3E	D	85.9	0.744	2.96	0.0046	140	1.80	6.24	550	0.70	1.69	2.56	5.26	11.49	690	13.833	0.115
OFF1	D	98.0	0.904	6.84	0.0107	200	1.00	5.00	805	1.00	2.02	3.06	5.79	10.79	1005	15.583	0.108
MOJ1	D	96.3	0.881	3.49	0.0055	50	2.00	2.21	1250	0.40	1.28	1.94	12.98	15.19	1300	17.222	0.152
MOJ2	D	95.4	0.869	3.71	0.0058	50	2.00	2.33	1270	0.60	1.56	2.37	10.74	13.07	1320	17.333	0.131
STEW	D	98.0	0.904	2.45	0.0038	50	2.00	1.98	1150	0.90	1.92	2.90	8.08	10.06	1200	16.667	0.101
SPEC	D	95.3	0.868	2.49	0.0039	100	1.00	4.18	1160	0.70	1.69	2.56	9.23	13.40	1260	17.000	0.134
TECH	D	98.0	0.904	0.43	0.0007	30	2.00	1.54	315	0.40	1.28	1.94	4.11	5.65	345	11.917	0.056
PROPOSED CONDITION																	
ON1	D	94.0	0.851	5.76	0.0090	215	1.00	6.58	450	1.10	2.12	3.21	3.54	10.12	665	13.694	0.101
ON2	D	94.0	0.851	8.29	0.0130	265	1.00	7.30	730	1.10	2.12	3.21	5.13	12.43	995	15.528	0.124
ON3	D	94.0	0.851	3.66	0.0057	60	1.00	3.47	575	1.40	2.39	3.62	3.83	7.31	635	13.528	0.073

[1] K = 0.0132 (CN) - 0.39
[2] A = Area/640
[3] Ti = (1.8 (1.1-K) L^0.5)/S^0.33
[4] For Existing Conditions: V1 = 14.8 * (S/100)^0.5
For Developed Conditions: V1 = 20.2 * (S/100)^0.5
[5] For Existing Conditions: V2 = 29.4 * (S/100)^0.5
For Developed Conditions: V2 = 30.6 * (S/100)^0.5
[6] Tt = L/(60*V)
[7] Tc = Ti + Tt
[8] Total L = Initial L + Travel L
[9] Tc = (L/180) + 10
[10] Tlag = (0.6*Tc)/60
[11] Min Tlag =0.05

Note: For Travel Time Calcs: V1 applies to first 500 feet and V2 applies to remaining distance.

REFERENCE :

STANDARD FORM 4

Water Quality Design Storm Computations

SLATER HANIFAN GROUP
a Westwood team

Water Quality Design Storm

Project Name: MHC1901 Reyes Coca-Cola Expansion
Date: 7/18/2019
File Name: MHC1901 Storm Water Quality v140411.xls
By: CAA

Data:

Reference:

Project is located in: Township: 20 S. Range: 61 E. Section: 36 — APN Map

Site is located in the McCarran Airport Rainfall Area — Figure 513*

1.00 inches

2-Year Precipitation for the McCarran Rainfall Area: 0.72 inches — Table 505*

Actual Percent Impervious: 85 %

Project Site Area: 8 acres

BMP Design Precipitation Calculations:

$D2_{SITE}$=	0.72	2-Year Precipitation (in) for the project site
D2 ratio =	1.00	Ratio of D2 site to D2 McCarran Airport Area
D_{85}=	0.32	85th Percentile Rainfall Depth (in)

BMP Design Peak Discharge Calculations:

Q_p/A (90%)=	0.47	Unit Discharge for 90% Average Percent Impervious Area (cfs/acre)
Adjustment to Q_P/A =	0.97	Adjustment to Q_P/A Relative to 90% Average Percent Impervious
Adjusted Q_P/A =	0.46	Adjusted Unit Discharge (cfs/acre)
Q_P =	4	Peak Design Discharge (cfs)

BMP Design Runoff Volume Calculations:

Vol/A (90%)=	0.0341	Unit Runoff Volume for the 90% impervious condition (ac-ft/acre)
Adjusted Vol/A =	0.0331	Adjusted Unit Runoff Volume (ac-ft/acre)
Volume =	0.2781	Runoff Volume (ac-ft)

Equations:

$D2_{SITE}$ =(Rainfall)*(Precipitation Adjustment Ratio)
D2 ratio = ($D2_{SITE}$) / ($D2_{McCARRAN}$)
D_{85} = (0.32)*(D2 Ratio)
Q_P/A = 1.5042*(D_{85}) - 0.0066
Adjustment to Q_P/A and Vol/A = 0.0059 (Percent Impervious) + 0.4688
Adjusted Q_P/A = (Q_P/A)*(Adjustment to Q_P/A)
Q_P = (Q_P/A)*(A)
Vol/A = 0.0887*(D_{85}) + 0.0057

* Equations taken from the Clark County Regional Flood Control District - Hydrologic Criteria and Drainage Design Manual

5740 S. Arville St., Suite 216 - Las Vegas, NV 89118
Ph. 702-284-5300 - Fx. 702-284-5399

APPENDIX C

HEC-1 Analyses

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1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998               *
*            VERSION 4.1               *
*                                      *
*  RUN DATE   11JUL19  TIME  07:54:00  *
*                                      *
****************************************
```

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

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

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

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

1 HEC-1 INPUT PAGE 1

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

*** FREE ***
                    *DIAGRAM
                1   ID     SLATER HANIFAN GROUP, A WESTWOOD TEAM
                2   ID     MARTIN HARRIS CONSTRUCTION
                3   ID     REYES COCA-COLA EXPANSION
                4   ID
                5   ID     DRAINAGE CONDITION -- EXISTING
                6   ID     RETURN PERIOD ------- 100 & 10-YEAR
                7   ID     DISTRIBUTION -------- 6-HOUR SDN3
                8   ID     PROJECT NO. --------- MHC1901.000
                9   ID     FILENAME ------------ EX.H1
               10   ID     DATE ---------------- JULY 2019
               11   ID     MODELED BY ---------- CAA/SOA
               12   ID
               13   ID        RETURN PERIOD           RATIO
               14   ID        100-YR                  1.00
               15   ID        10-YR                   0.57
               16   ID
               17   ID
               18   IT       5       0       0     300
               19   IO       5       0       0
               20   IN       5       0       0
               21   JR    PREC    1.00    0.57
                    *

               22   KK    MOJ1
               23   PB    2.77
               24   PC       0   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
               25   PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
               26   PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
               27   PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
               28   PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
               29   PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
               30   PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
               31   PC   0.998   0.999       1
               32   BA  0.0055
               33   LS       0    96.3
               34   UD   0.152
                    *

               35   KK    MOJ2
               36   BA  0.0058
               37   LS       0    95.4
               38   UD   0.131
                    *

               39   KK    ON1E
               40   BA  0.0116
               41   LS       0    91.9
               42   UD   0.116
                    *
```

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

  43          KK    STEW
  44          BA  0.0038
  45          LS       0    98.0
  46          UD   0.101
              *

  47          KK     CP1
  48          HC       4
              *

  49          KK    OFF1
  50          BA  0.0107
  51          LS       0    98.0
  52          UD   0.108
              *

  53          KK    ON2E
  54          BA  0.0114
  55          LS       0    94.0
  56          UD   0.124
              *

  57          KK    TECH
  58          BA  0.0007
  59          LS       0    98.0
  60          UD   0.056
              *

  61          KK     CP2
  62          HC       3
              *

  63          KK    SPEC
  64          BA  0.0039
  65          LS       0    95.3
  66          UD   0.134
              *

  67          KK    ON3E
  68          BA  0.0046
  69          LS       0    85.9
  70          UD   0.115
              *

  71          KK     CP3
  72          HC       3
              *

  73          KK     CP4
  74          HC       2
              *
  75          ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

    22       MOJ1
                .
                .
    35          .       MOJ2
                .          .
                .          .
    39          .          .       ON1E
                .          .          .
                .          .          .
    43          .          .          .       STEW
                .          .          .          .
                .          .          .          .
    47        CP1.....................................
                .
                .
    49          .       OFF1
                .          .
                .          .
    53          .          .       ON2E
                .          .          .
                .          .          .
    57          .          .          .       TECH
                .          .          .          .
                .          .          .          .
    61          .        CP2.........................
```

```
                .          .
                .          .
    63          .          .       SPEC
                .          .          .
                .          .          .
    67          .          .          .       ON3E
                .          .          .          .
                .          .          .          .
    71          .         CP3.........................
                .          .
                .          .
    73         CP4.............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *               JUN   1998              *
 *            VERSION 4.1                *
 *                                       *
 *  RUN DATE   11JUL19  TIME  07:54:00   *
 *                                       *
 *****************************************
```

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

SLATER HANIFAN GROUP, A WESTWOOD TEAM
MARTIN HARRIS CONSTRUCTION
REYES COCA-COLA EXPANSION

DRAINAGE CONDITION -- EXISTING
RETURN PERIOD ------- 100 & 10-YEAR
DISTRIBUTION -------- 6-HOUR SDN3
PROJECT NO. --------- MHC1901.000
FILENAME ------------ EX.H1
DATE ---------------- JULY 2019
MODELED BY ---------- CAA/SOA

RETURN PERIOD	RATIO
100-YR	1.00
10-YR	0.57

```
  19 IO         OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE

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

                  COMPUTATION INTERVAL     .08 HOURS
                      TOTAL TIME BASE   24.92 HOURS

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

      JP         MULTI-PLAN OPTION
                      NPLAN          1  NUMBER OF PLANS

      JR         MULTI-RATIO OPTION
                     RATIOS OF PRECIPITATION
                   1.00       .57
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


                                                                  RATIOS APPLIED TO PRECIPITATION
 OPERATION       STATION      AREA     PLAN            RATIO 1  RATIO 2
                                                         1.00       .57
```

HYDROGRAPH AT						
+	MOJ1	.01	1	FLOW	10.	5.
				TIME	3.58	3.58
HYDROGRAPH AT						
+	MOJ2	.01	1	FLOW	10.	5.
				TIME	3.58	3.58
HYDROGRAPH AT						
+	ON1E	.01	1	FLOW	19.	9.
				TIME	3.58	3.58
HYDROGRAPH AT						
+	STEW	.00	1	FLOW	8.	4.
				TIME	3.50	3.50
4 COMBINED AT						
+	CP1	.03	1	FLOW	45.	23.
				TIME	3.58	3.58
HYDROGRAPH AT						
+	OFF1	.01	1	FLOW	21.	11.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	ON2E	.01	1	FLOW	19.	10.
				TIME	3.58	3.58
HYDROGRAPH AT						
+	TECH	.00	1	FLOW	2.	1.
				TIME	3.50	3.50
3 COMBINED AT						
+	CP2	.02	1	FLOW	41.	22.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	SPEC	.00	1	FLOW	7.	4.
				TIME	3.58	3.58
HYDROGRAPH AT						
+	ON3E	.00	1	FLOW	6.	2.
				TIME	3.58	3.58
3 COMBINED AT						
+	CP3	.03	1	FLOW	53.	27.
				TIME	3.50	3.50
2 COMBINED AT						
+	CP4	.06	1	FLOW	98.	50.
				TIME	3.58	3.58

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

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*             JUN  1998                *
*          VERSION 4.1                 *
*                                      *
*  RUN DATE   17JUL19  TIME  14:35:34  *
*                                      *
****************************************
```

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

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

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

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

1 HEC-1 INPUT PAGE 1

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

 *** FREE ***
                    *DIAGRAM
               1    ID     SLATER HANIFAN GROUP, A WESTWOOD TEAM
               2    ID     MARTIN HARRIS CONSTRUCTION
               3    ID     REYES COCA-COLA EXPANSION
               4    ID
               5    ID     DRAINAGE CONDITION -- PROPOSED
               6    ID     RETURN PERIOD ------- 100 & 10-YEAR
               7    ID     DISTRIBUTION -------- 6-HOUR SDN3
               8    ID     PROJECT NO. --------- MHC1901.000
               9    ID     FILENAME ------------ PRO.H1
              10    ID     DATE ---------------- JULY 2019
              11    ID     MODELED BY ---------- CAA/SOA
              12    ID
              13    ID        RETURN PERIOD           RATIO
              14    ID        100-YR                  1.00
              15    ID        10-YR                   0.57
              16    ID
              17    ID
              18    IT       5       0       0     300
              19    IO       5       0       0
              20    IN       5       0       0
              21    JR    PREC    1.00    0.57
                    *
              22    KK    MOJ1
              23    PB    2.77
              24    PC       0   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
              25    PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
              26    PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
              27    PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
              28    PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
              29    PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
              30    PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
              31    PC   0.998   0.999       1
              32    BA  0.0055
              33    LS       0    96.3
              34    UD   0.152
                    *
              35    KK    MOJ2
              36    BA  0.0058
              37    LS       0    95.4
              38    UD   0.131
                    *
              39    KK     ON1
              40    BA  0.0090
              41    LS       0    94.0
              42    UD   0.101
                    *
```

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

            43          KK    STEW
            44          BA  0.0038
            45          LS       0    98.0
            46          UD   0.101
                        *

            47          KK     CP1
            48          HC       4
                        *

            49          KK    OFF1
            50          BA  0.0107
            51          LS       0    98.0
            52          UD   0.108
                        *

            53          KK     ON2
            54          BA  0.0130
            55          LS       0    94.0
            56          UD   0.124
                        *

            57          KK    TECH
            58          BA  0.0007
            59          LS       0    98.0
            60          UD   0.056
                        *

            61          KK     CP2
            62          HC       3
                        *

            63          KK    SPEC
            64          BA  0.0039
            65          LS       0    95.3
            66          UD   0.134
                        *

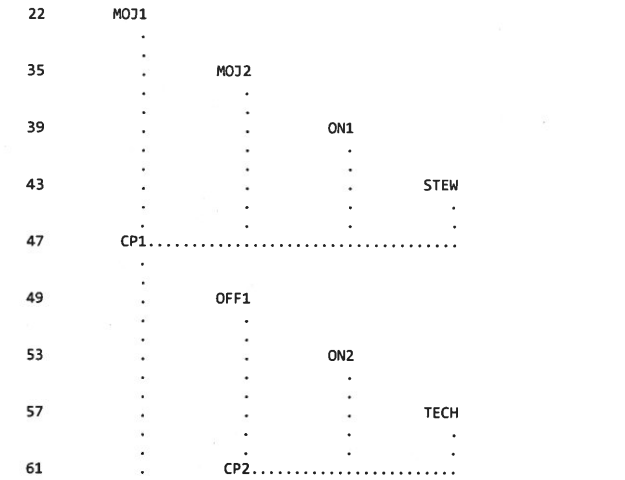
            67          KK     ON3
            68          BA  0.0057
            69          LS       0    94.0
            70          UD   0.073
                        *

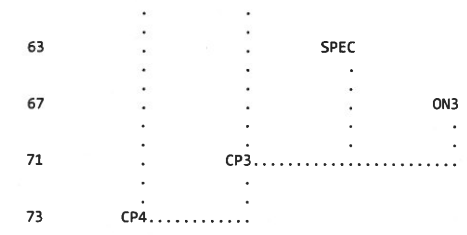
            71          KK     CP3
            72          HC       3
                        *

            73          KK     CP4
            74          HC       2
                        *
            75          ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK





(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN   1998               *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   17JUL19  TIME  14:35:34   *
*                                       *
*****************************************
```

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

SLATER HANIFAN GROUP, A WESTWOOD TEAM
MARTIN HARRIS CONSTRUCTION
REYES COCA-COLA EXPANSION

DRAINAGE CONDITION -- PROPOSED
RETURN PERIOD ------- 100 & 10-YEAR
DISTRIBUTION -------- 6-HOUR SDN3
PROJECT NO. --------- MHC1901.000
FILENAME ------------ PRO.H1
DATE ---------------- JULY 2019
MODELED BY ---------- CAA/SOA

RETURN PERIOD	RATIO
100-YR	1.00
10-YR	0.57

```
  19 IO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

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

                   COMPUTATION INTERVAL      .08 HOURS
                        TOTAL TIME BASE   24.92 HOURS

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

     JP          MULTI-PLAN OPTION
                       NPLAN          1  NUMBER OF PLANS

     JR          MULTI-RATIO OPTION
                     RATIOS OF PRECIPITATION
                    1.00       .57
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


                                                                    RATIOS APPLIED TO PRECIPITATION
 OPERATION       STATION      AREA    PLAN            RATIO 1  RATIO 2
                                                        1.00       .57
```

HYDROGRAPH AT						
+	MOJ1	.01	1	FLOW	10.	5.
				TIME	3.58	3.58
HYDROGRAPH AT						
+	MOJ2	.01	1	FLOW	10.	5.
				TIME	3.58	3.58
HYDROGRAPH AT						
+	ON1	.01	1	FLOW	16.	8.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	STEW	.00	1	FLOW	8.	4.
				TIME	3.50	3.50
4 COMBINED AT						
+	CP1	.02	1	FLOW	42.	22.
				TIME	3.50	3.58
HYDROGRAPH AT						
+	OFF1	.01	1	FLOW	21.	11.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	ON2	.01	1	FLOW	22.	11.
				TIME	3.58	3.58
HYDROGRAPH AT						
+	TECH	.00	1	FLOW	2.	1.
				TIME	3.50	3.50
3 COMBINED AT						
+	CP2	.02	1	FLOW	44.	23.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	SPEC	.00	1	FLOW	7.	4.
				TIME	3.58	3.58
HYDROGRAPH AT						
+	ON3	.01	1	FLOW	11.	6.
				TIME	3.50	3.50
3 COMBINED AT						
+	CP3	.03	1	FLOW	62.	32.
				TIME	3.50	3.50
2 COMBINED AT						
+	CP4	.06	1	FLOW	104.	54.
				TIME	3.50	3.50

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

APPENDIX D

Hydraulic Analyses

Existing Condition Street Sections

Worksheet for Section MR: 100-Yr EX (Min %)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.40	%
Discharge	363.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.48
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+50.00	1.03
0+93.00	0.17
0+93.00	0.13
0+94.50	0.00
0+94.50	0.48
0+95.00	0.50
1+00.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+07.00, 0.13)	0.013
(0+07.00, 0.13)	(0+93.00, 0.13)	0.016
(0+93.00, 0.13)	(1+00.00, 0.60)	0.013

Options

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

Worksheet for Section MR: 100-Yr EX (Min %)

Results

Normal Depth		1.32	ft
Elevation Range	0.00 to 1.03 ft		
Flow Area		74.39	ft²
Wetted Perimeter		102.51	ft
Hydraulic Radius		0.73	ft
Top Width		100.00	ft
Normal Depth		1.32	ft
Critical Depth		1.32	ft
Critical Slope		0.00403	ft/ft
Velocity		4.88	ft/s
Velocity Head		0.37	ft
Specific Energy		1.69	ft
Froude Number		1.00	
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	1.32	ft
Critical Depth	1.32	ft
Channel Slope	0.40	%
Critical Slope	0.00403	ft/ft

Cross Section for Section MR: 100-Yr EX (Min %)

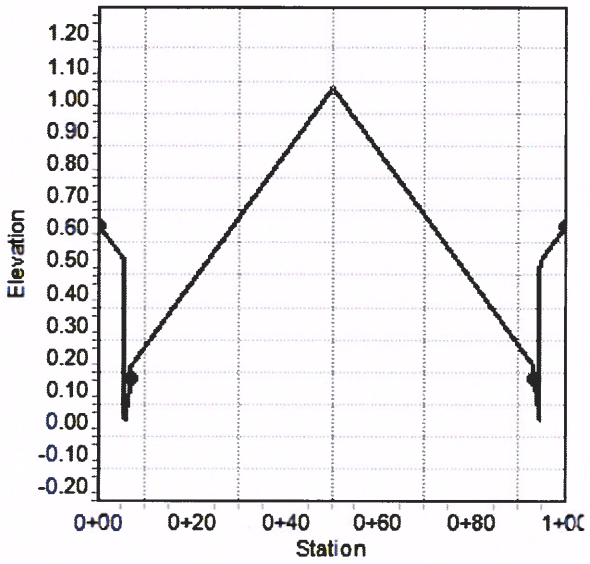
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.40	%
Normal Depth	1.32	ft
Discharge	363.00	ft³/s

Cross Section Image



Worksheet for Section MR: 100-Yr EX (Max %)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.58	%
Discharge	363.00	ft^3/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.48
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+50.00	1.03
0+93.00	0.17
0+93.00	0.13
0+94.50	0.00
0+94.50	0.48
0+95.00	0.50
1+00.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+07.00, 0.13)	0.013
(0+07.00, 0.13)	(0+93.00, 0.13)	0.016
(0+93.00, 0.13)	(1+00.00, 0.60)	0.013

Options

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

Worksheet for Section MR: 100-Yr EX (Max %)

Results

Normal Depth		1.24	ft
Elevation Range	0.00 to 1.03 ft		
Flow Area		66.51	ft²
Wetted Perimeter		102.36	ft
Hydraulic Radius		0.65	ft
Top Width		100.00	ft
Normal Depth		1.24	ft
Critical Depth		1.32	ft
Critical Slope		0.00403	ft/ft
Velocity		5.46	ft/s
Velocity Head		0.46	ft
Specific Energy		1.71	ft
Froude Number		1.18	
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	1.24	ft
Critical Depth	1.32	ft
Channel Slope	0.58	%
Critical Slope	0.00403	ft/ft

Cross Section for Section MR: 100-Yr EX (Max %)

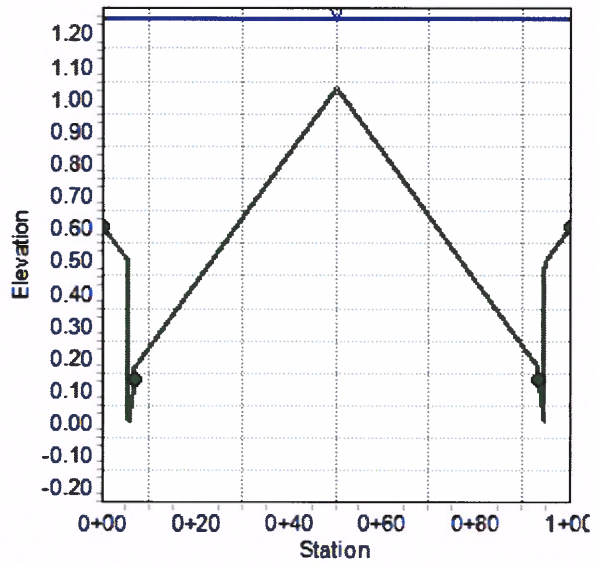
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.58	%
Normal Depth	1.24	ft
Discharge	363.00	ft^3/s

Cross Section Image



Worksheet for Section SA: 100-Yr EX (Min %)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.61	%
Discharge	752.00	ft^3/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.48
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+47.50	1.03
0+47.50	1.51
0+50.00	1.53
0+52.50	1.51
0+52.50	1.03
0+93.00	0.17
0+93.00	0.13
0+94.50	0.00
0+94.50	0.48
0+95.00	0.50
1+00.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+07.00, 0.13)	0.013
(0+07.00, 0.13)	(0+47.50, 1.03)	0.016
(0+47.50, 1.03)	(0+52.50, 1.03)	0.013
(0+52.50, 1.03)	(0+93.00, 0.13)	0.016

Worksheet for Section SA: 100-Yr EX (Min %)

Input Data

Start Station	Ending Station	Roughness Coefficient
(0+93.00, 0.13)	(1+00.00, 0.60)	0.013

Options

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

Results

Normal Depth		1.64	ft
Elevation Range	0.00 to 1.53 ft		
Flow Area		101.42	ft²
Wetted Perimeter		104.11	ft
Hydraulic Radius		0.97	ft
Top Width		100.00	ft
Normal Depth		1.64	ft
Critical Depth		1.83	ft
Critical Slope		0.00344	ft/ft
Velocity		7.41	ft/s
Velocity Head		0.85	ft
Specific Energy		2.49	ft
Froude Number		1.30	
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	1.64	ft
Critical Depth	1.83	ft

Worksheet for Section SA: 100-Yr EX (Min %)

GVF Output Data

Channel Slope	0.61	%
Critical Slope	0.00344	ft/ft

Cross Section for Section SA: 100-Yr EX (Min %)

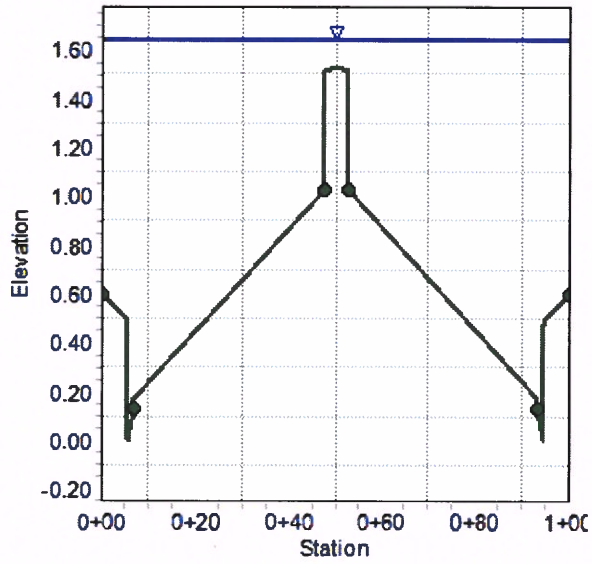
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.61	%
Normal Depth	1.64	ft
Discharge	752.00	ft^3/s

Cross Section Image



Worksheet for Section SA: 100-Yr EX (Max %)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.56	%
Discharge	752.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.48
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+47.50	1.03
0+47.50	1.51
0+50.00	1.53
0+52.50	1.51
0+52.50	1.03
0+93.00	0.17
0+93.00	0.13
0+94.50	0.00
0+94.50	0.48
0+95.00	0.50
1+00.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+07.00, 0.13)	0.013
(0+07.00, 0.13)	(0+47.50, 1.03)	0.016
(0+47.50, 1.03)	(0+52.50, 1.03)	0.013
(0+52.50, 1.03)	(0+93.00, 0.13)	0.016

Worksheet for Section SA: 100-Yr EX (Max %)

Input Data

Start Station	Ending Station	Roughness Coefficient
(0+93.00, 0.13)	(1+00.00, 0.60)	0.013

Options

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

Results

Normal Depth		1.37	ft
Elevation Range	0.00 to 1.53 ft		
Flow Area		75.16	ft²
Wetted Perimeter		98.28	ft
Hydraulic Radius		0.76	ft
Top Width		95.00	ft
Normal Depth		1.37	ft
Critical Depth		1.83	ft
Critical Slope		0.00349	ft/ft
Velocity		10.01	ft/s
Velocity Head		1.56	ft
Specific Energy		2.92	ft
Froude Number		1.98	
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	1.37	ft
Critical Depth	1.83	ft

Worksheet for Section SA: 100-Yr EX (Max %)

GVF Output Data

Channel Slope	1.56	%
Critical Slope	0.00349	ft/ft

Cross Section for Section SA: 100-Yr EX (Max %)

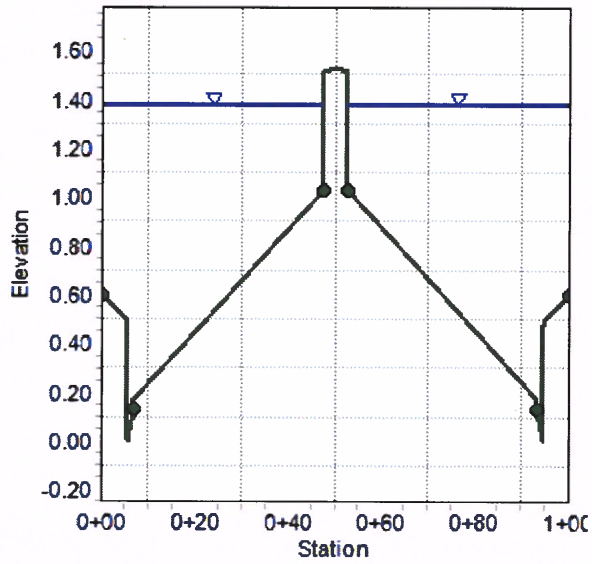
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.56	%
Normal Depth	1.37	ft
Discharge	752.00	ft^3/s

Cross Section Image



Worksheet for Section TC: 100-Yr EX (Min %)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.40	%
Discharge	41.00	ft^3/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.48
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+30.00	1.03
0+53.00	0.17
0+53.00	0.13
0+54.50	0.00
0+54.50	0.48
0+55.00	0.50
0+60.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+07.00, 0.13)	0.013
(0+07.00, 0.13)	(0+53.00, 0.13)	0.016
(0+53.00, 0.13)	(0+60.00, 0.60)	0.013

Options

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

Worksheet for Section TC: 100-Yr EX (Min %)

Results

Normal Depth		0.78	ft
Elevation Range	0.00 to 1.03 ft		
Flow Area		14.58	ft²
Wetted Perimeter		47.93	ft
Hydraulic Radius		0.30	ft
Top Width		46.50	ft
Normal Depth		0.78	ft
Critical Depth		0.75	ft
Critical Slope		0.00520	ft/ft
Velocity		2.81	ft/s
Velocity Head		0.12	ft
Specific Energy		0.90	ft
Froude Number		0.89	
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	0.78	ft
Critical Depth	0.75	ft
Channel Slope	0.40	%
Critical Slope	0.00520	ft/ft

Cross Section for Section TC: 100-Yr EX (Min %)

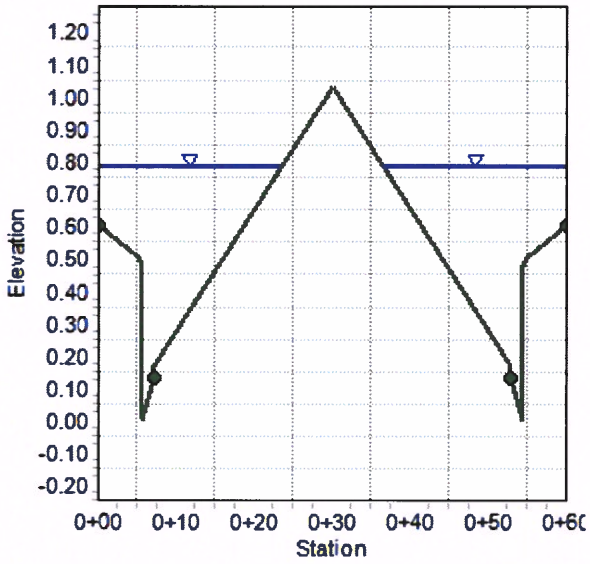
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.40	%
Normal Depth	0.78	ft
Discharge	41.00	ft³/s

Cross Section Image



Worksheet for Section TC: 100-Yr EX (Max %)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.12	%
Discharge	41.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.48
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+30.00	1.03
0+53.00	0.17
0+53.00	0.13
0+54.50	0.00
0+54.50	0.48
0+55.00	0.50
0+60.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+07.00, 0.13)	0.013
(0+07.00, 0.13)	(0+53.00, 0.13)	0.016
(0+53.00, 0.13)	(0+60.00, 0.60)	0.013

Options

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

Worksheet for Section TC: 100-Yr EX (Max %)

Results

Normal Depth		0.68	ft
Elevation Range	0.00 to 1.03 ft		
Flow Area		10.13	ft²
Wetted Perimeter		42.29	ft
Hydraulic Radius		0.24	ft
Top Width		41.07	ft
Normal Depth		0.68	ft
Critical Depth		0.75	ft
Critical Slope		0.00512	ft/ft
Velocity		4.05	ft/s
Velocity Head		0.25	ft
Specific Energy		0.93	ft
Froude Number		1.44	
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	0.68	ft
Critical Depth	0.75	ft
Channel Slope	1.12	%
Critical Slope	0.00512	ft/ft

Cross Section for Section TC: 100-Yr EX (Max %)

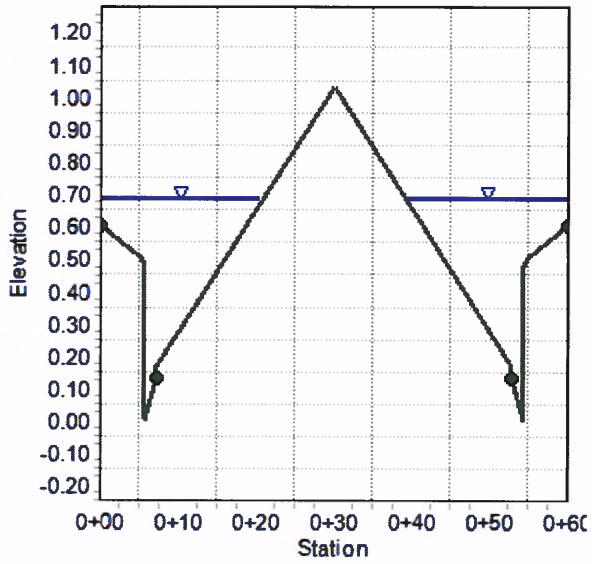
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.12	%
Normal Depth	0.68	ft
Discharge	41.00	ft^3/s

Cross Section Image



Worksheet for Section SB: 100-Yr EX (Min %)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.40	%
Discharge	53.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.48
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+30.00	1.03

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+07.00, 0.13)	0.013
(0+07.00, 0.13)	(0+30.00, 1.03)	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	1.04	ft
Elevation Range	0.00 to 1.03 ft	
Flow Area	14.38	ft²
Wetted Perimeter	31.00	ft
Hydraulic Radius	0.46	ft

Worksheet for Section SB: 100-Yr EX (Min %)

Results

Top Width		30.00	ft
Normal Depth		1.04	ft
Critical Depth		1.02	ft
Critical Slope		0.00460	ft/ft
Velocity		3.68	ft/s
Velocity Head		0.21	ft
Specific Energy		1.25	ft
Froude Number		0.94	
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	1.04	ft
Critical Depth	1.02	ft
Channel Slope	0.40	%
Critical Slope	0.00460	ft/ft

Cross Section for Section SB: 100-Yr EX (Min %)

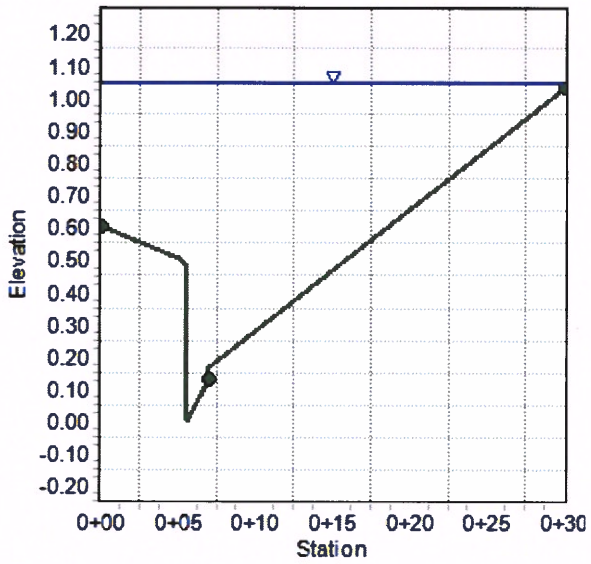
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.40	%
Normal Depth	1.04	ft
Discharge	53.00	ft³/s

Cross Section Image



Worksheet for Section SB: 100-Yr EX (Min %)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.40	%
Discharge	53.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.48
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+30.00	1.03

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+07.00, 0.13)	0.013
(0+07.00, 0.13)	(0+30.00, 1.03)	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	1.04	ft
Elevation Range	0.00 to 1.03 ft	
Flow Area	14.38	ft²
Wetted Perimeter	31.00	ft
Hydraulic Radius	0.46	ft

Worksheet for Section SB: 100-Yr EX (Min %)

Results

Top Width		30.00	ft
Normal Depth		1.04	ft
Critical Depth		1.02	ft
Critical Slope		0.00460	ft/ft
Velocity		3.68	ft/s
Velocity Head		0.21	ft
Specific Energy		1.25	ft
Froude Number		0.94	
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		1.04	ft
Critical Depth		1.02	ft
Channel Slope		0.40	%
Critical Slope		0.00460	ft/ft

Cross Section for Section SB: 100-Yr EX (Min %)

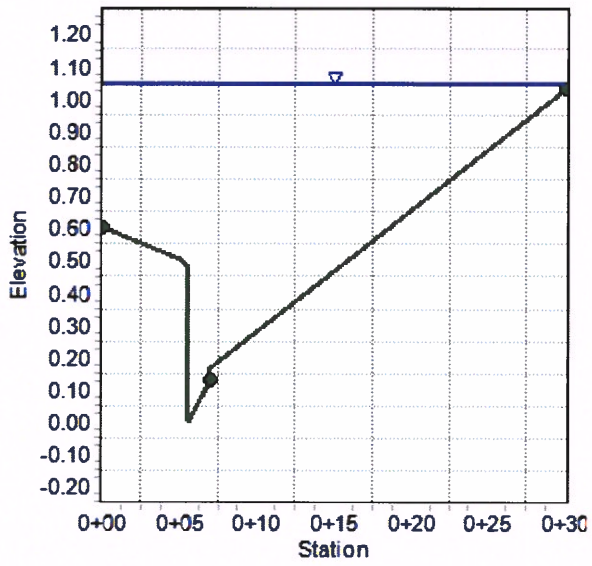
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.40	%
Normal Depth	1.04	ft
Discharge	53.00	ft³/s

Cross Section Image



Worksheet for Section SB: 100-Yr EX (Max %)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.30	%
Discharge	53.00	ft^3/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.48
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+30.00	1.03

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+07.00, 0.13)	0.013
(0+07.00, 0.13)	(0+30.00, 1.03)	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	0.87	ft
Elevation Range	0.00 to 1.03 ft	
Flow Area	9.43	ft^2
Wetted Perimeter	26.41	ft
Hydraulic Radius	0.36	ft

Worksheet for Section SB: 100-Yr EX (Max %)

Results

Top Width		25.60	ft
Normal Depth		0.87	ft
Critical Depth		1.02	ft
Critical Slope		0.00453	ft/ft
Velocity		5.62	ft/s
Velocity Head		0.49	ft
Specific Energy		1.36	ft
Froude Number		1.63	
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	0.87	ft
Critical Depth	1.02	ft
Channel Slope	1.30	%
Critical Slope	0.00453	ft/ft

Cross Section for Section SB: 100-Yr EX (Max %)

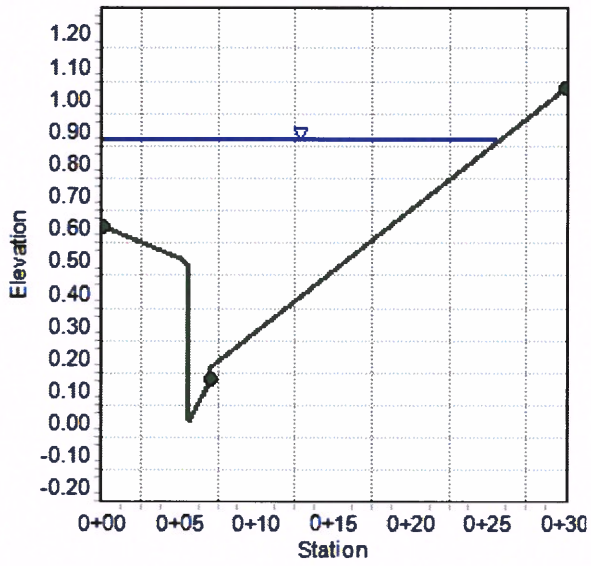
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.30	%
Normal Depth	0.87	ft
Discharge	53.00	ft³/s

Cross Section Image



Worksheet for Section MR: 10-Yr EX (Min %)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.40	%
Discharge	153.00	ft^3/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.48
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+50.00	1.03
0+93.00	0.17
0+93.00	0.13
0+94.50	0.00
0+94.50	0.48
0+95.00	0.50
1+00.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+07.00, 0.13)	0.013
(0+07.00, 0.13)	(0+93.00, 0.13)	0.016
(0+93.00, 0.13)	(1+00.00, 0.60)	0.013

Options

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

Worksheet for Section MR: 10-Yr EX (Min %)

Results

Normal Depth		1.02	ft
Elevation Range	0.00 to 1.03 ft		
Flow Area		44.01	ft²
Wetted Perimeter		100.69	ft
Hydraulic Radius		0.44	ft
Top Width		98.78	ft
Normal Depth		1.02	ft
Critical Depth		0.99	ft
Critical Slope		0.00480	ft/ft
Velocity		3.48	ft/s
Velocity Head		0.19	ft
Specific Energy		1.21	ft
Froude Number		0.92	
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	1.02	ft
Critical Depth	0.99	ft
Channel Slope	0.40	%
Critical Slope	0.00480	ft/ft

Cross Section for Section MR: 10-Yr EX (Min %)

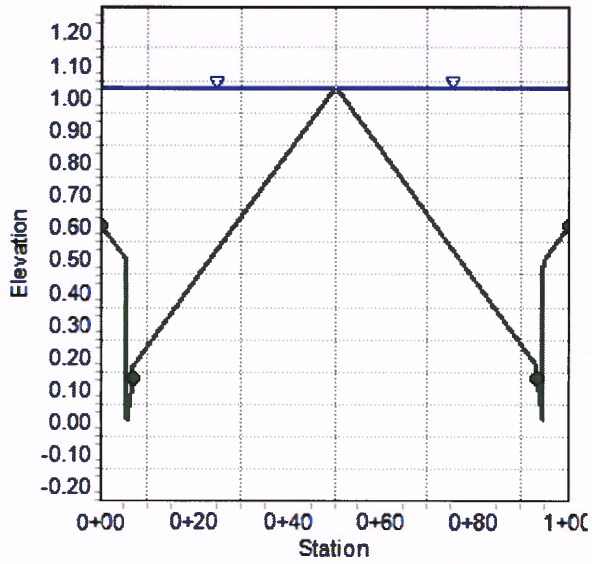
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.40	%
Normal Depth	1.02	ft
Discharge	153.00	ft³/s

Cross Section Image



Worksheet for Section MR: 10-Yr EX (Max %)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.58	%
Discharge	153.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.48
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+50.00	1.03
0+93.00	0.17
0+93.00	0.13
0+94.50	0.00
0+94.50	0.48
0+95.00	0.50
1+00.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+07.00, 0.13)	0.013
(0+07.00, 0.13)	(0+93.00, 0.13)	0.016
(0+93.00, 0.13)	(1+00.00, 0.60)	0.013

Options

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

Worksheet for Section MR: 10-Yr EX (Max %)

Results

Normal Depth		0.96	ft
Elevation Range	0.00 to 1.03 ft		
Flow Area		38.39	ft²
Wetted Perimeter		94.72	ft
Hydraulic Radius		0.41	ft
Top Width		92.93	ft
Normal Depth		0.96	ft
Critical Depth		0.99	ft
Critical Slope		0.00479	ft/ft
Velocity		3.98	ft/s
Velocity Head		0.25	ft
Specific Energy		1.21	ft
Froude Number		1.09	
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	0.96	ft
Critical Depth	0.99	ft
Channel Slope	0.58	%
Critical Slope	0.00479	ft/ft

Cross Section for Section MR: 10-Yr EX (Max %)

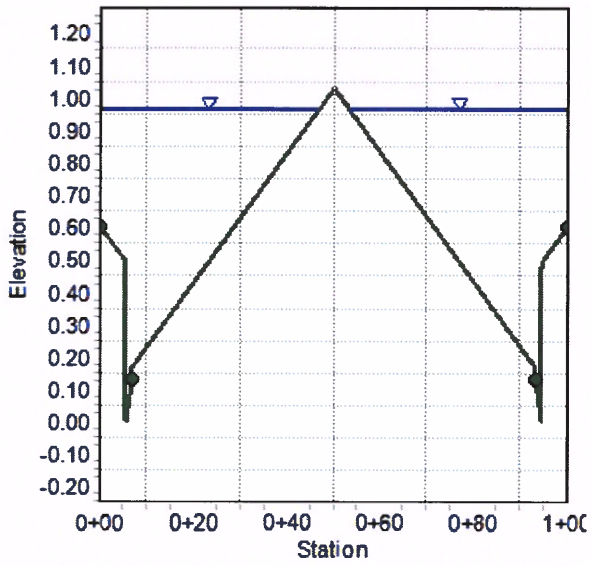
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.58	%
Normal Depth	0.96	ft
Discharge	153.00	ft³/s

Cross Section Image



Worksheet for Section SA: 10-Yr EX (Min %)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.61	%
Discharge	305.00	ft^3/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.48
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+47.50	1.03
0+47.50	1.51
0+50.00	1.53
0+52.50	1.51
0+52.50	1.03
0+93.00	0.17
0+93.00	0.13
0+94.50	0.00
0+94.50	0.48
0+95.00	0.50
1+00.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+07.00, 0.13)	0.013
(0+07.00, 0.13)	(0+47.50, 1.03)	0.016
(0+47.50, 1.03)	(0+52.50, 1.03)	0.013
(0+52.50, 1.03)	(0+93.00, 0.13)	0.016

Worksheet for Section SA: 10-Yr EX (Min %)

Input Data

Start Station	Ending Station	Roughness Coefficient
(0+93.00, 0.13)	(1+00.00, 0.60)	0.013

Options

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

Results

Normal Depth		1.19	ft
Elevation Range	0.00 to 1.53 ft		
Flow Area		57.82	ft²
Wetted Perimeter		97.55	ft
Hydraulic Radius		0.59	ft
Top Width		95.00	ft
Normal Depth		1.19	ft
Critical Depth		1.26	ft
Critical Slope		0.00415	ft/ft
Velocity		5.27	ft/s
Velocity Head		0.43	ft
Specific Energy		1.62	ft
Froude Number		1.19	
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	1.19	ft
Critical Depth	1.26	ft

Worksheet for Section SA: 10-Yr EX (Min %)

GVF Output Data

Channel Slope	0.61	%
Critical Slope	0.00415	ft/ft

Cross Section for Section SA: 10-Yr EX (Min %)

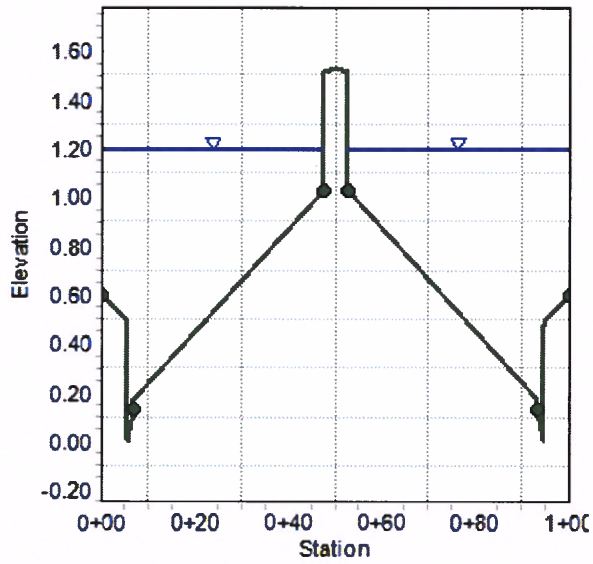
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.61	%
Normal Depth	1.19	ft
Discharge	305.00	ft³/s

Cross Section Image



Worksheet for Section SA: 10-Yr EX (Max %)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.56	%
Discharge	305.00	ft^3/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.48
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+47.50	1.03
0+47.50	1.51
0+50.00	1.53
0+52.50	1.51
0+52.50	1.03
0+93.00	0.17
0+93.00	0.13
0+94.50	0.00
0+94.50	0.48
0+95.00	0.50
1+00.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+07.00, 0.13)	0.013
(0+07.00, 0.13)	(0+47.50, 1.03)	0.016
(0+47.50, 1.03)	(0+52.50, 1.03)	0.013
(0+52.50, 1.03)	(0+93.00, 0.13)	0.016

Worksheet for Section SA: 10-Yr EX (Max %)

Input Data

Start Station	Ending Station	Roughness Coefficient
(0+93.00, 0.13)	(1+00.00, 0.60)	0.013

Options

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

Results

Normal Depth		1.04	ft
Elevation Range	0.00 to 1.53 ft		
Flow Area		43.55	ft²
Wetted Perimeter		96.95	ft
Hydraulic Radius		0.45	ft
Top Width		95.00	ft
Normal Depth		1.04	ft
Critical Depth		1.26	ft
Critical Slope		0.00416	ft/ft
Velocity		7.00	ft/s
Velocity Head		0.76	ft
Specific Energy		1.80	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	1.04	ft
Critical Depth	1.26	ft

Worksheet for Section SA: 10-Yr EX (Max %)

GVF Output Data

Channel Slope	1.56	%
Critical Slope	0.00416	ft/ft

Cross Section for Section SA: 10-Yr EX (Max %)

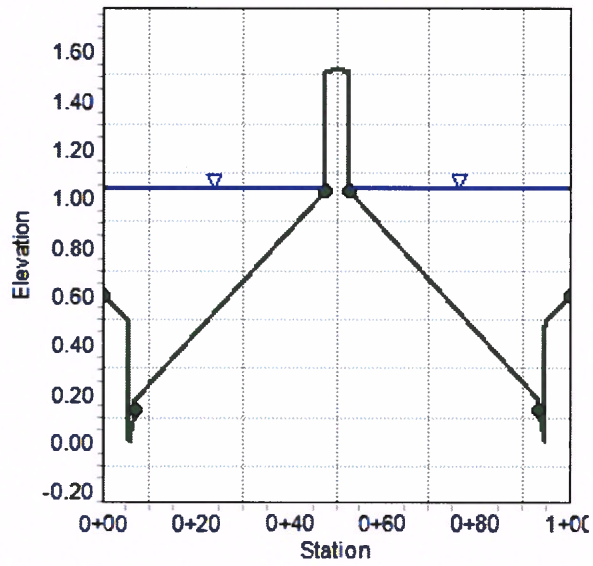
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.56	%
Normal Depth	1.04	ft
Discharge	305.00	ft³/s

Cross Section Image



Proposed Condition Street Sections

Worksheet for Section SA: 100-Yr PRO (Min %)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.61	%
Discharge	749.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.48
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+47.50	1.03
0+47.50	1.51
0+50.00	1.53
0+52.50	1.51
0+52.50	1.03
0+93.00	0.17
0+93.00	0.13
0+94.50	0.00
0+94.50	0.48
0+95.00	0.50
1+00.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+07.00, 0.13)	0.013
(0+07.00, 0.13)	(0+47.50, 1.03)	0.016
(0+47.50, 1.03)	(0+52.50, 1.03)	0.013
(0+52.50, 1.03)	(0+93.00, 0.13)	0.016

Worksheet for Section SA: 100-Yr PRO (Min %)

Input Data

Start Station	Ending Station	Roughness Coefficient
(0+93.00, 0.13)	(1+00.00, 0.60)	0.013

Options

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

Results

Normal Depth		1.64	ft
Elevation Range	0.00 to 1.53 ft		
Flow Area		101.18	ft²
Wetted Perimeter		104.10	ft
Hydraulic Radius		0.97	ft
Top Width		100.00	ft
Normal Depth		1.64	ft
Critical Depth		1.83	ft
Critical Slope		0.00344	ft/ft
Velocity		7.40	ft/s
Velocity Head		0.85	ft
Specific Energy		2.49	ft
Froude Number		1.30	
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	1.64	ft
Critical Depth	1.83	ft

Worksheet for Section SA: 100-Yr PRO (Min %)

GVF Output Data

Channel Slope	0.61	%
Critical Slope	0.00344	ft/ft

Cross Section for Section SA: 100-Yr PRO (Min %)

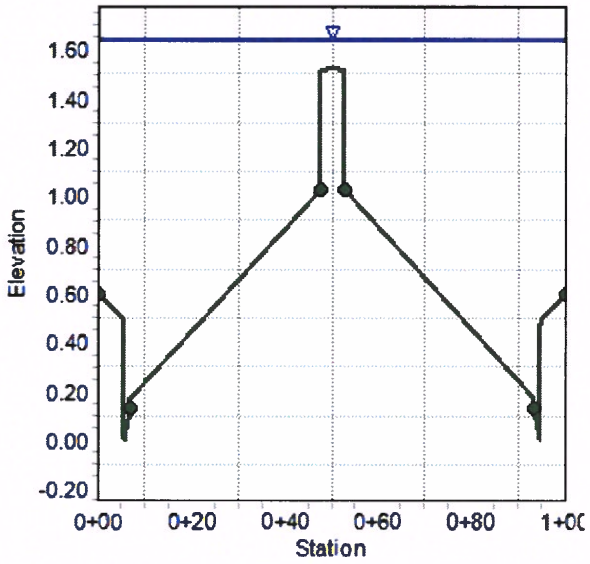
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.61	%
Normal Depth	1.64	ft
Discharge	749.00	ft³/s

Cross Section Image



Worksheet for Section SA: 100-Yr PRO (Max %)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.56	%
Discharge	749.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.48
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+47.50	1.03
0+47.50	1.51
0+50.00	1.53
0+52.50	1.51
0+52.50	1.03
0+93.00	0.17
0+93.00	0.13
0+94.50	0.00
0+94.50	0.48
0+95.00	0.50
1+00.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+07.00, 0.13)	0.013
(0+07.00, 0.13)	(0+47.50, 1.03)	0.016
(0+47.50, 1.03)	(0+52.50, 1.03)	0.013
(0+52.50, 1.03)	(0+93.00, 0.13)	0.016

Worksheet for Section SA: 100-Yr PRO (Max %)

Input Data

Start Station	Ending Station	Roughness Coefficient
(0+93.00, 0.13)	(1+00.00, 0.60)	0.013

Options

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

Results

Normal Depth		1.37	ft
Elevation Range	0.00 to 1.53 ft		
Flow Area		74.97	ft²
Wetted Perimeter		98.28	ft
Hydraulic Radius		0.76	ft
Top Width		95.00	ft
Normal Depth		1.37	ft
Critical Depth		1.83	ft
Critical Slope		0.00350	ft/ft
Velocity		9.99	ft/s
Velocity Head		1.55	ft
Specific Energy		2.92	ft
Froude Number		1.98	
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	1.37	ft
Critical Depth	1.83	ft

Worksheet for Section SA: 100-Yr PRO (Max %)

GVF Output Data

Channel Slope	1.56	%
Critical Slope	0.00350	ft/ft

Cross Section for Section SA: 100-Yr PRO (Max %)

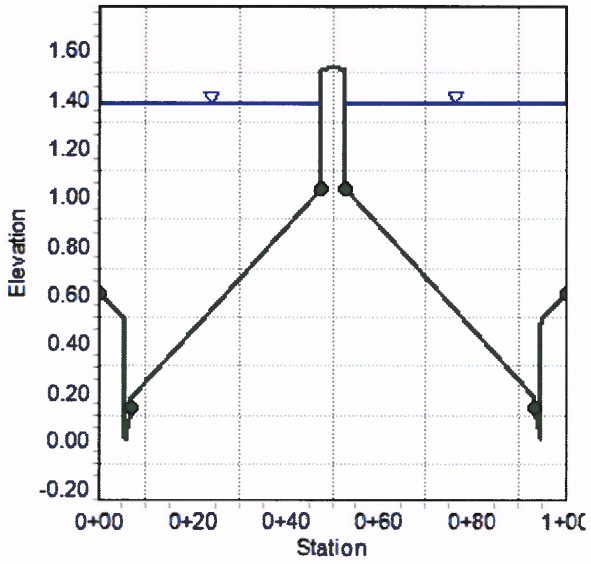
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.56	%
Normal Depth	1.37	ft
Discharge	749.00	ft^3/s

Cross Section Image



Worksheet for Section TC: 100-Yr PRO (Min %)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.40	%
Discharge	44.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.48
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+30.00	1.03
0+53.00	0.17
0+53.00	0.13
0+54.50	0.00
0+54.50	0.48
0+55.00	0.50
0+60.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+07.00, 0.13)	0.013
(0+07.00, 0.13)	(0+53.00, 0.13)	0.016
(0+53.00, 0.13)	(0+60.00, 0.60)	0.013

Options

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

Worksheet for Section TC: 100-Yr PRO (Min %)

Results

Normal Depth		0.79	ft
Elevation Range	0.00 to 1.03 ft		
Flow Area		15.33	ft²
Wetted Perimeter		48.83	ft
Hydraulic Radius		0.31	ft
Top Width		47.36	ft
Normal Depth		0.79	ft
Critical Depth		0.77	ft
Critical Slope		0.00515	ft/ft
Velocity		2.87	ft/s
Velocity Head		0.13	ft
Specific Energy		0.92	ft
Froude Number		0.89	
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	0.79	ft
Critical Depth	0.77	ft
Channel Slope	0.40	%
Critical Slope	0.00515	ft/ft

Cross Section for Section TC: 100-Yr PRO (Min %)

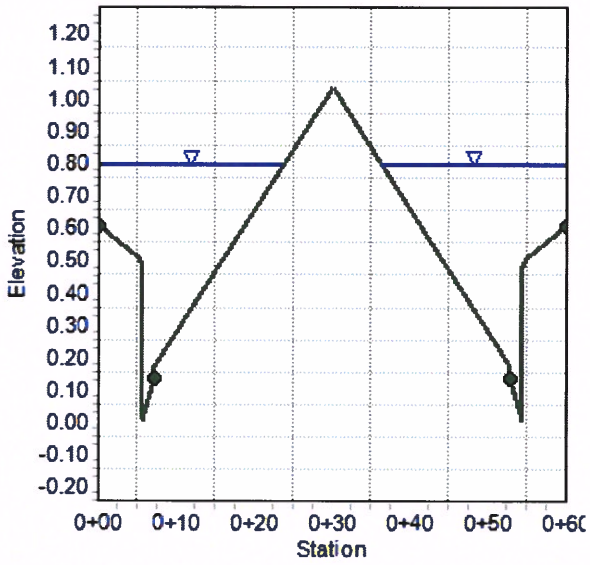
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.40	%
Normal Depth	0.79	ft
Discharge	44.00	ft^3/s

Cross Section Image



Worksheet for Section TC: 100-Yr PRO (Max %)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.12	%
Discharge	44.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.48
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+30.00	1.03
0+53.00	0.17
0+53.00	0.13
0+54.50	0.00
0+54.50	0.48
0+55.00	0.50
0+60.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+07.00, 0.13)	0.013
(0+07.00, 0.13)	(0+53.00, 0.13)	0.016
(0+53.00, 0.13)	(0+60.00, 0.60)	0.013

Options

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

Worksheet for Section TC: 100-Yr PRO (Max %)

Results

Normal Depth		0.69	ft
Elevation Range	0.00 to 1.03 ft		
Flow Area		10.65	ft²
Wetted Perimeter		43.00	ft
Hydraulic Radius		0.25	ft
Top Width		41.75	ft
Normal Depth		0.69	ft
Critical Depth		0.77	ft
Critical Slope		0.00507	ft/ft
Velocity		4.13	ft/s
Velocity Head		0.27	ft
Specific Energy		0.95	ft
Froude Number		1.44	
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	0.69	ft
Critical Depth	0.77	ft
Channel Slope	1.12	%
Critical Slope	0.00507	ft/ft

Cross Section for Section TC: 100-Yr PRO (Max %)

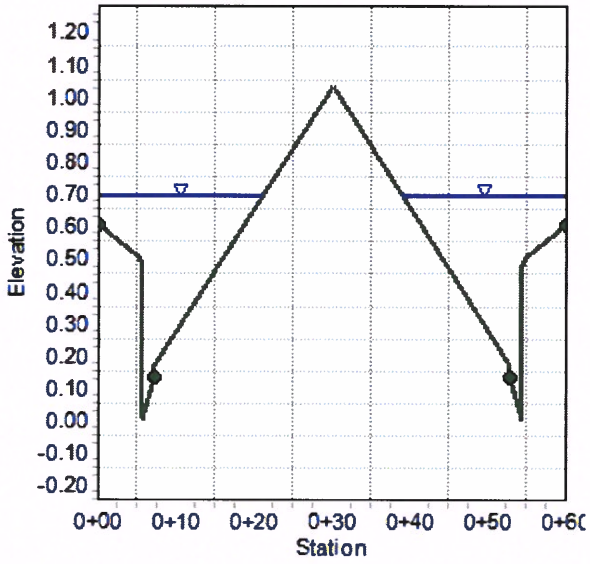
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.12	%
Normal Depth	0.69	ft
Discharge	44.00	ft^3/s

Cross Section Image



Worksheet for Section SB: 100-Yr PRO (Min %)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.40	%
Discharge	62.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.48
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+30.00	1.03

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+07.00, 0.13)	0.013
(0+07.00, 0.13)	(0+30.00, 1.03)	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	1.09	ft
Elevation Range	0.00 to 1.03 ft	
Flow Area	15.82	ft²
Wetted Perimeter	31.09	ft
Hydraulic Radius	0.51	ft

Worksheet for Section SB: 100-Yr PRO (Min %)

Results

Top Width		30.00	ft
Normal Depth		1.09	ft
Critical Depth		1.07	ft
Critical Slope		0.00446	ft/ft
Velocity		3.92	ft/s
Velocity Head		0.24	ft
Specific Energy		1.33	ft
Froude Number		0.95	
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	1.09	ft
Critical Depth	1.07	ft
Channel Slope	0.40	%
Critical Slope	0.00446	ft/ft

Cross Section for Section SB: 100-Yr PRO (Min %)

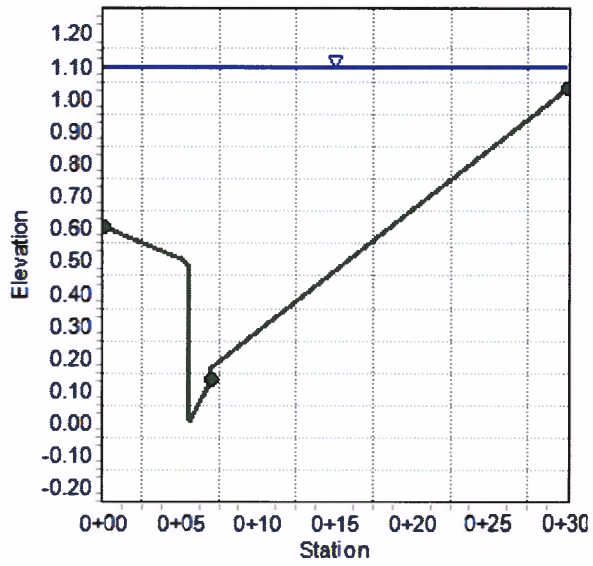
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.40	%
Normal Depth	1.09	ft
Discharge	62.00	ft^3/s

Cross Section Image



Worksheet for Section SB: 100-Yr PRO (Max %)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.30	%
Discharge	62.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.48
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+30.00	1.03

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+07.00, 0.13)	0.013
(0+07.00, 0.13)	(0+30.00, 1.03)	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	0.91	ft
Elevation Range	0.00 to 1.03 ft	
Flow Area	10.57	ft²
Wetted Perimeter	27.61	ft
Hydraulic Radius	0.38	ft

Worksheet for Section SB: 100-Yr PRO (Max %)

Results

Top Width		26.76	ft
Normal Depth		0.91	ft
Critical Depth		1.07	ft
Critical Slope		0.00442	ft/ft
Velocity		5.87	ft/s
Velocity Head		0.54	ft
Specific Energy		1.44	ft
Froude Number		1.65	
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	0.91	ft
Critical Depth	1.07	ft
Channel Slope	1.30	%
Critical Slope	0.00442	ft/ft

Cross Section for Section SB: 100-Yr PRO (Max %)

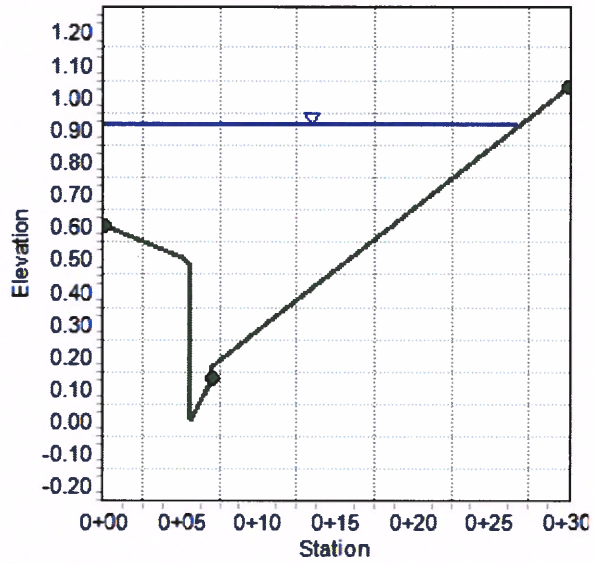
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.30	%
Normal Depth	0.91	ft
Discharge	62.00	ft^3/s

Cross Section Image



Worksheet for Section SA: 10-Yr PRO (Min %)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.61	%
Discharge	304.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.48
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+47.50	1.03
0+47.50	1.51
0+50.00	1.53
0+52.50	1.51
0+52.50	1.03
0+93.00	0.17
0+93.00	0.13
0+94.50	0.00
0+94.50	0.48
0+95.00	0.50
1+00.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+07.00, 0.13)	0.013
(0+07.00, 0.13)	(0+47.50, 1.03)	0.016
(0+47.50, 1.03)	(0+52.50, 1.03)	0.013
(0+52.50, 1.03)	(0+93.00, 0.13)	0.016

Worksheet for Section SA: 10-Yr PRO (Min %)

Input Data

Start Station	Ending Station	Roughness Coefficient
(0+93.00, 0.13)	(1+00.00, 0.60)	0.013

Options

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

Results

Normal Depth		1.18	ft
Elevation Range	0.00 to 1.53 ft		
Flow Area		57.75	ft²
Wetted Perimeter		97.55	ft
Hydraulic Radius		0.59	ft
Top Width		95.00	ft
Normal Depth		1.18	ft
Critical Depth		1.26	ft
Critical Slope		0.00415	ft/ft
Velocity		5.26	ft/s
Velocity Head		0.43	ft
Specific Energy		1.62	ft
Froude Number		1.19	
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	1.18	ft
Critical Depth	1.26	ft

Worksheet for Section SA: 10-Yr PRO (Min %)

GVF Output Data

Channel Slope	0.61	%
Critical Slope	0.00415	ft/ft

Cross Section for Section SA: 10-Yr PRO (Min %)

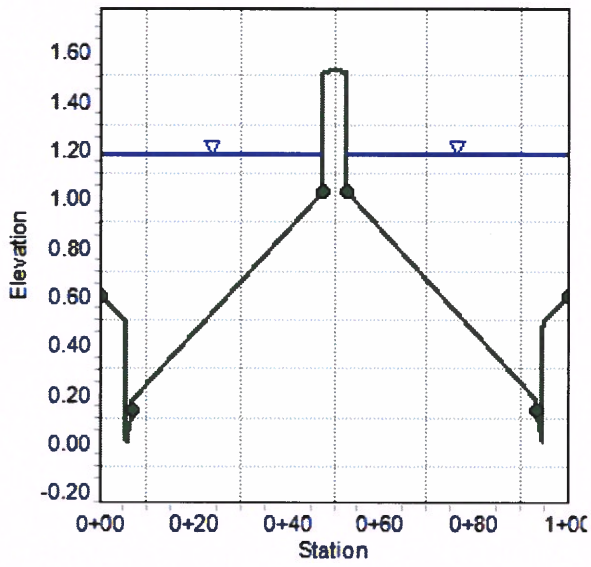
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.61	%
Normal Depth	1.18	ft
Discharge	304.00	ft³/s

Cross Section Image



Worksheet for Section SA: 10-Yr PRO (Max %)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.56	%
Discharge	304.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.48
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+47.50	1.03
0+47.50	1.51
0+50.00	1.53
0+52.50	1.51
0+52.50	1.03
0+93.00	0.17
0+93.00	0.13
0+94.50	0.00
0+94.50	0.48
0+95.00	0.50
1+00.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+07.00, 0.13)	0.013
(0+07.00, 0.13)	(0+47.50, 1.03)	0.016
(0+47.50, 1.03)	(0+52.50, 1.03)	0.013
(0+52.50, 1.03)	(0+93.00, 0.13)	0.016

Worksheet for Section SA: 10-Yr PRO (Max %)

Input Data

Start Station	Ending Station	Roughness Coefficient
(0+93.00, 0.13)	(1+00.00, 0.60)	0.013

Options

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

Results

Normal Depth		1.03	ft
Elevation Range	0.00 to 1.53 ft		
Flow Area		43.47	ft²
Wetted Perimeter		96.95	ft
Hydraulic Radius		0.45	ft
Top Width		95.00	ft
Normal Depth		1.03	ft
Critical Depth		1.26	ft
Critical Slope		0.00416	ft/ft
Velocity		6.99	ft/s
Velocity Head		0.76	ft
Specific Energy		1.79	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	1.03	ft
Critical Depth	1.26	ft

Worksheet for Section SA: 10-Yr PRO (Max %)

GVF Output Data

Channel Slope	1.56	%
Critical Slope	0.00416	ft/ft

Cross Section for Section SA: 10-Yr PRO (Max %)

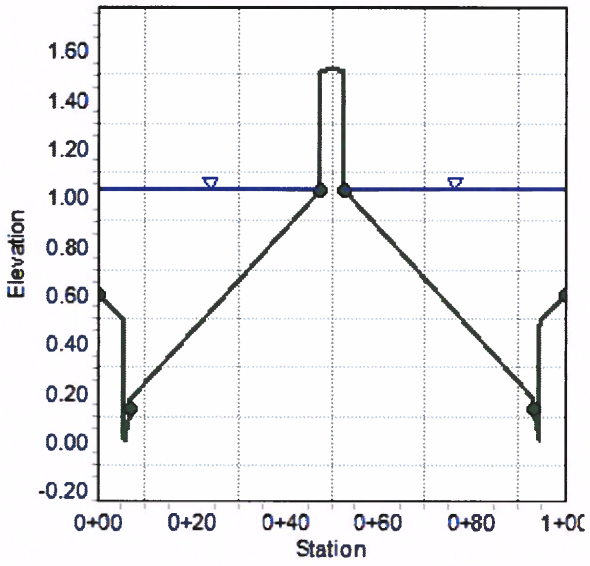
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.56	%
Normal Depth	1.03	ft
Discharge	304.00	ft^3/s

Cross Section Image



Swale Computations

Worksheet for S1

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.031	
Channel Slope	1.00	%
Left Side Slope	4.00	H:V
Right Side Slope	4.00	H:V
Discharge	9.00	ft^3/s

Results

Normal Depth	0.90	ft
Flow Area	3.26	ft^2
Wetted Perimeter	7.44	ft
Hydraulic Radius	0.44	ft
Top Width	7.22	ft
Critical Depth	0.79	ft
Critical Slope	0.01984	ft/ft
Velocity	2.76	ft/s
Velocity Head	0.12	ft
Specific Energy	1.02	ft
Froude Number	0.73	
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	0.90	ft
Critical Depth	0.79	ft
Channel Slope	1.00	%
Critical Slope	0.01984	ft/ft

Cross Section for S1

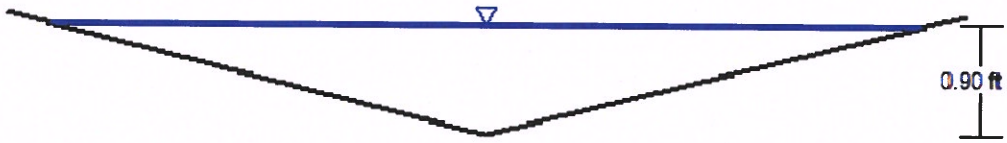
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.031	
Channel Slope	1.00	%
Normal Depth	0.90	ft
Left Side Slope	4.00	H:V
Right Side Slope	4.00	H:V
Discharge	9.00	ft³/s

Cross Section Image



V: 1
H: 1

Worksheet for S1: U-Channel

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	1.00	%
Bottom Width	4.00	ft
Discharge	9.00	ft^3/s

Results

Normal Depth	0.41	ft
Flow Area	1.62	ft^2
Wetted Perimeter	4.81	ft
Hydraulic Radius	0.34	ft
Top Width	4.00	ft
Critical Depth	0.54	ft
Critical Slope	0.00416	ft/ft
Velocity	5.54	ft/s
Velocity Head	0.48	ft
Specific Energy	0.88	ft
Froude Number	1.53	
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	0.54	ft
Channel Slope	1.00	%
Critical Slope	0.00416	ft/ft

Cross Section for S1: U-Channel

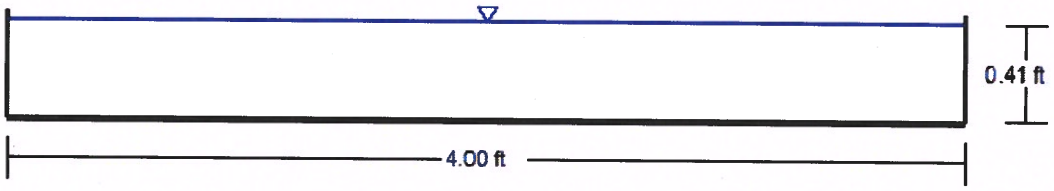
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	1.00	%
Normal Depth	0.41	ft
Bottom Width	4.00	ft
Discharge	9.00	ft³/s

Cross Section Image



V: 1
H: 1

SLATER HANIFAN GROUP
a Westwood team

Block Wall Opening Computation

FACILITY DESCRIPTION

Project Name & Number: MHC1901: REYES COCA-COLA EXPANSION
Date: 7/11/2019
By: CAA

Known Information:

H =	Height of Opening (ft)	2.00
L =	Length of Opening (ft)	4.00
Cf =	Clogging Factor (%)	50

Weir Conditions:

$Q=Cw*L*H_{clg}3/2$

Cw =	Weir Coefficient	2.70
H_{clg} =	Height with clogging	1.0
Q =	Flow allowed through opening	10.8

Orifice Conditions:

$Q=Co*A_{clg}*(2gH_{clg})1/2$

Co =	Orifice Coefficient	0.67
A_{clg} =	Area with clogging	4.00
Q =	Flow allowed through opening	15.2

Worst Case Scenario Occurs Under Weir Conditions

Allowed Flow Through Opening = 10.8 cfs

5740 S. Arville St., Suite 216 - Las Vegas, NV 89118
Ph. 702-284-5300 - Fx. 702-284-5399

Worksheet for S2

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.031	
Channel Slope	1.00	%
Left Side Slope	4.00	H:V
Right Side Slope	4.00	H:V
Discharge	2.00	ft^3/s

Results

Normal Depth	0.51	ft
Flow Area	1.05	ft^2
Wetted Perimeter	4.23	ft
Hydraulic Radius	0.25	ft
Top Width	4.11	ft
Critical Depth	0.43	ft
Critical Slope	0.02425	ft/ft
Velocity	1.90	ft/s
Velocity Head	0.06	ft
Specific Energy	0.57	ft
Froude Number	0.66	
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	0.51	ft
Critical Depth	0.43	ft
Channel Slope	1.00	%
Critical Slope	0.02425	ft/ft

Cross Section for S2

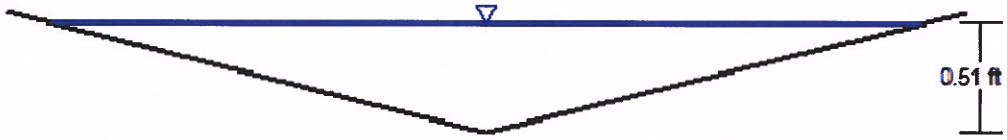
Project Description

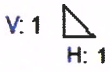
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.031	
Channel Slope	1.00	%
Normal Depth	0.51	ft
Left Side Slope	4.00	H:V
Right Side Slope	4.00	H:V
Discharge	2.00	ft^3/s

Cross Section Image





Worksheet for S3

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.030	
Channel Slope	1.00	%
Left Side Slope	4.00	H:V
Right Side Slope	4.00	H:V
Discharge	4.50	ft^3/s

Results

Normal Depth	0.69	ft
Flow Area	1.89	ft^2
Wetted Perimeter	5.67	ft
Hydraulic Radius	0.33	ft
Top Width	5.50	ft
Critical Depth	0.60	ft
Critical Slope	0.02038	ft/ft
Velocity	2.38	ft/s
Velocity Head	0.09	ft
Specific Energy	0.78	ft
Froude Number	0.72	
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	0.69	ft
Critical Depth	0.60	ft
Channel Slope	1.00	%
Critical Slope	0.02038	ft/ft

Cross Section for S3

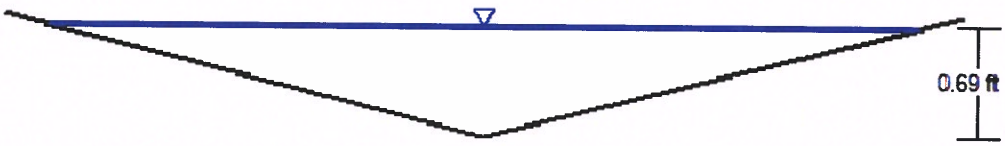
Project Description

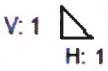
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.030	
Channel Slope	1.00	%
Normal Depth	0.69	ft
Left Side Slope	4.00	H:V
Right Side Slope	4.00	H:V
Discharge	4.50	ft³/s

Cross Section Image





Worksheet for S3: U-Channel

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	1.00	%
Bottom Width	2.00	ft
Discharge	4.50	ft^3/s

Results

Normal Depth	0.44	ft
Flow Area	0.87	ft^2
Wetted Perimeter	2.87	ft
Hydraulic Radius	0.30	ft
Top Width	2.00	ft
Critical Depth	0.54	ft
Critical Slope	0.00538	ft/ft
Velocity	5.17	ft/s
Velocity Head	0.41	ft
Specific Energy	0.85	ft
Froude Number	1.38	
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	0.44	ft
Critical Depth	0.54	ft
Channel Slope	1.00	%
Critical Slope	0.00538	ft/ft

Cross Section for S3: U-Channel

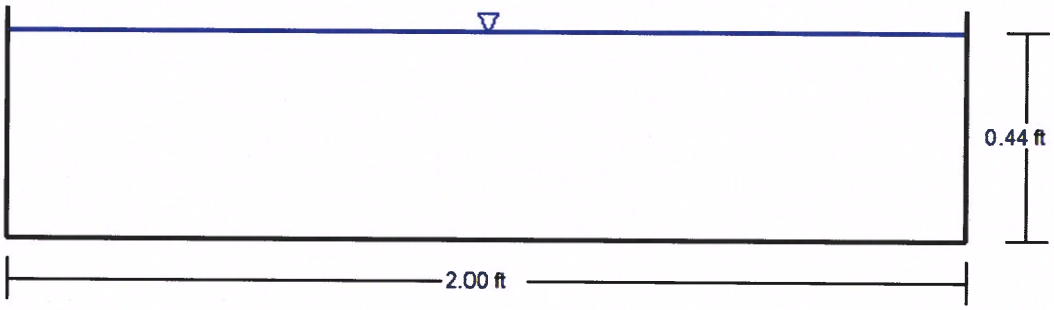
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	1.00	%
Normal Depth	0.44	ft
Bottom Width	2.00	ft
Discharge	4.50	ft³/s

Cross Section Image



V: 1
H: 1

APPENDIX E

Approval Letters of Referenced Studies

M-220
2-111-88
Rec 1/2/91

Century Engineering Corporation

CIVIL ENGINEERS ◆ PLANNERS ◆ SURVEYORS

930 S. Third Street, Suite 100-B • Las Vegas, Nevada 89101
Telephone: Office (702) 386-5977

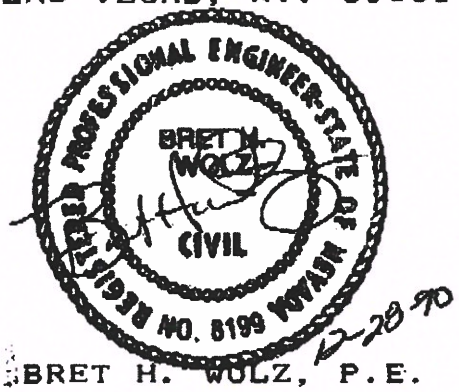
DRAINAGE STUDY
for
COCA-COLA DISTRIBUTION CENTER

PREPARED FOR:

COCA-COLA ENTERPRISES
1334 SOUTH CENTRAL AVE.
LOS ANGELES, CA. 90021

PREPARED BY:

CENTURY ENGINEERING CORPORATION
930 S. THIRD ST. SUITE #100-B
LAS VEGAS, NV. 89101



BRET H. WOLZ, P.E.
and
BRUCE A. CUNNINGHAM

JOB NO. 6062.02

DECEMBER 1990

CITY OF LAS VEGAS

INTER-OFFICE MEMORANDUM

DATE: February 27, 1991

TO:

Joel Harris
Land Development Services
Department of Public Works

FROM: RLT for

T. Chiatovich, PE
Chief Flood Control
Dept. Public Works

SUBJECT:

"COCA-COLA DISTRIBUTION CENTER" Drainage Study
File No. DS623B
Date of Engineer's Stamp: 02/12/91
Date Received by City: 02/19/91

COPIES TO:

Century Engineering
Charles Kajkowski, PE
John McNellis, PE
CCRFCD

HISTORY:

1st Submittal 01/22/91 - Not Acceptable
2nd Submittal - See Comments Below

REMARK:

2nd Submittal (Revised)

The drainage study for the subject project has been reviewed and

__X__ is acceptable in concept subject to the following conditions:

_____ must be resubmitted or supplemented.

1. Resubmittals can be easiest reviewed if the CLV comments are addressed by each item.

2. The street capacity calculation in Mojave Road for 370 cfs needs to allow for the 2-inch drop across the gutter.

3. A typical cross section for the concrete pad on the west side of the main building should be shown with appropriate cross slopes.

4. A note should be shown on the Grading Plan indicating a ten-foot wrought iron gate needs to be provided at the east end of the site if a block wall is be constructed by either one of the two property owners.

5. The CCRFCD review and approval is required.

END OF REMARKS

ssn

T/R/S: 20/61/36
M36, Z-111-88

DRAINAGE STUDY
FOR
COCA-COLA BOTTLING COMPANY OF LOS ANGELES
PROPOSED ADDITION TO LAS VEGAS DISTRIBUTION CENTER
SE CORNER OF MOJAVE ROAD AND STEWART AVENUE
A PORTION OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 36, TOWNSHIP 20 SOUTH, RANGE 61 EAST, M.D.M.

A.P.N. 139-36-710-002
139-36-710-005
139-36-710-013

JULY, 1996

PREPARED FOR: COCA-COLA ENTERPRISES
8729 CLETA STREET
DOWNEY, CALIFORNIA 90241

PREPARED BY: AZIMUTH ENGINEERING & SURVEYING, INC.
301 W. BASIC ROAD
HENDERSON, NEVADA 89015

File

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM	DATE: August 7, 1996
TO: Dan Bender Land Development Services Department of Public Works	FROM: Dennis W. Stransky, P.E. Flood Control Section Department of Public Works
SUBJECT: Drainage Study for: **Coca Cola Distribution Center** FILE NO. H:\DEPOT\DS\DS1890B.DOC	COPIES TO: Azimuth Engineering & Surveying, Inc. Coca Cola Enterprises John McNellis

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES
1st Submittal	07/10/96	07/19/96	Not Accepted	$250
2nd submittal	08/01/96	08/07/96	See Below	$250
			TOTAL FEES:	$500.00

REMARKS:

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 concurrence

1. The limits and top of berm elevations of the temporary berm along Mojave Road must be shown on the Grading Plan. The location must be approved by the City Engineer.
2. Sidewalk underdrains must be provided at the two drainage outlets into Stewart Avenue. Standard Detail numbers or details must be provided.

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
dws

T/R/S 20S/61E/36
AREA M-36

DS4377
(UPDATE TO DS1890)
REC'D: 10-16-09

TECHNICAL DRAINAGE STUDY AMENDMENT #400 - M-36

FOR

DS# 1890

COCA-COLA ENTERPRISES

WAREHOUSE EXPANSION

230 N. MOJAVE RD.
LAS VEGAS, NEVADA

A PORTION OF THE SOUTHEAST QUARTER (SE1/4) OF SECTION 36, TOWNSHIP 20 SOUTH, RANGE 61 EAST, M.D.M.

139-36-710-022

PREPARED FOR

COCA-COLA ENTERPRISES, INC
230 N. MOJAVE RD.
LAS VEGAS, NEVADA

PREPARED BY

A.J. KOLTAVARY/ CIVIL ENGINEER
17802 MITCHELL NORTH
IRVINE, CA 92614

SEPTEMBER, 2009

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM			DATE: December 14, 2009
TO: **Land Development Services** Department of Public Works			FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for **Coca-Cola Enterprises Warehouse Expansion**		COPIES TO: A.J. Koltavary Civil Engineer
Cross Streets:	SEC of Stewart Avenue & Mojave Road		Coca-Cola Enterprises
File Number:	F:\Depot\DSMemos\DS4377B.doc		Bart Anderson, P.E., DevCo
Parcel Number:	139-36-710-022		CCRFCD
Zoning Action:	SDR-32475		
FEMA Flood Zone:	YES	NO X	
Proposed Storm Drain:	YES	NO X	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Transaction #:
1st Submittal	10/16/2009	10/28/2009	Not Approved	$400.00	131737: $400
2nd Submittal	12/2/2009	12/10/2009	See Comments Below	$400.00	134388: $400
			TOTAL FEES (LDDRS):	**$800.00**	---

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:
	must be resubmitted or supplemented including the following:
X	is conditionally approved subject to Clark County Regional Flood Control District concurrence.

1. **This drainage study is acceptable in concept**; however, *City of Las Vegas* will not formally accept the study until the *Clark County Regional Flood Control District* (CCRFCD) has issued a letter of concurrence. The Engineer should contact the CCRFCD to confirm that they have begun their review.
2. The study stated about the vacation of an existing public drainage easement and the dedication of a new public drainage easement (privately maintained). It appears that this existing drainage easement is not necessary for conveyance of any offsite drainage purposes, ie, the proposed drainage easement is also not needed. Address and resolve this issue prior to the final approval of the drainage study.
3. **Second request**: Label an existing storm drain system in *Stewart Avenue* with *City of Las Vegas* recorded drawing number on the grading plans. Identify all associated drop inlets, laterals and manholes etc with type and size information clearly labeled.

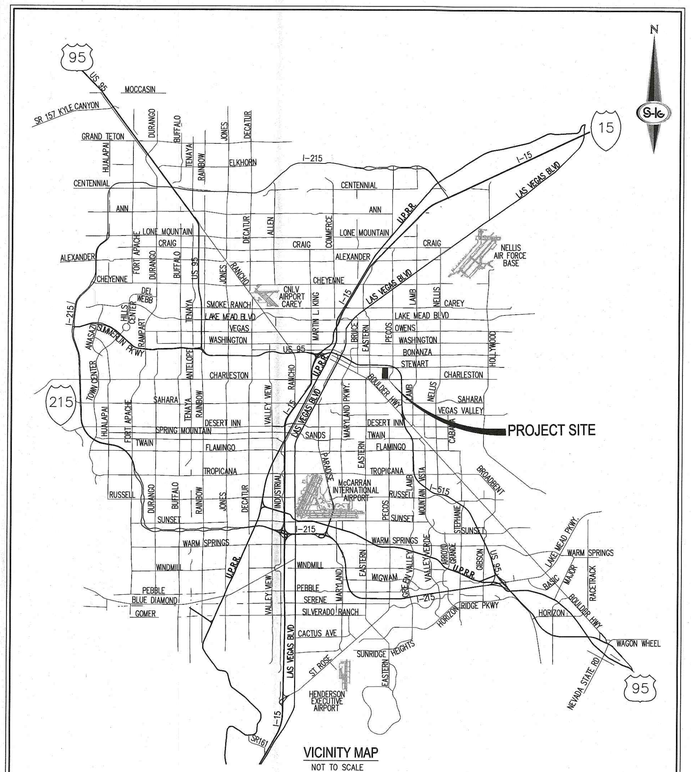
NOTE: Please be advised that all land surface area disturbances over 1 acre or any area adjacent to a water way must submit to the *Nevada Division of Environmental Protection* a "Notice of Intent" to discharge that certifies a stormwater pollution prevention plan has been developed and is maintained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

END OF REMARKS
ays

T/R/S: T20S/R61E/36
AREA M-36

APPENDIX F

Grading Plan, and Profile and Detail Sheets



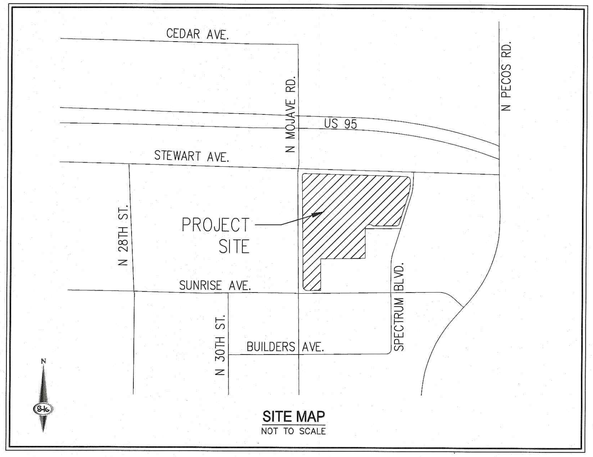
VICINITY MAP
NOT TO SCALE

IMPROVEMENT PLANS FOR REYES COCA-COLA BOTTLING, L.L.C. CITY OF LAS VEGAS, NEVADA

COMMERCIAL SUBDIVISION

APN: 139-36-710-022

SHEET INDEX	
#	Sheet Title
1	COVER SHEET
2	NOTES SHEET
3	ABBREVIATIONS LEGEND & QUANTITY SHEET
4	DEMOLITION SHEET 1
5	GRADING SHEET 1
6	GRADING SHEET 2
7	GRADING SHEET 3
8	DETAIL SHEET 1
9	DETAIL SHEET 2
10	UTILITY SHEET 1
11	UTILITY SHEET 2
13	UTILITY SHEET 3
14	TRAFFIC & HORIZONTAL CONTROL SHEET 1
15	TRAFFIC & HORIZONTAL CONTROL SHEET 2
16	TRAFFIC & HORIZONTAL CONTROL SHEET 3



SITE MAP
NOT TO SCALE

LEGAL DESCRIPTION

PARCEL I:

THAT PORTION OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 36, TOWNSHIP 20 SOUTH, RANGE 61 EAST, M.D.M., IN THE CITY OF LAS VEGAS, COUNTY OF CLARK, STATE OF NEVADA, BEING THAT PORTION OF LOT ONE (1), BLOCK ONE (1) OF THE LAS VEGAS SPECTRUM AS SHOWN BY MAP THEREOF ON FILE IN BOOK 43 OF PLATS, PAGE 10 OF CLARK COUNTY, NEVADA RECORDS, DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHEAST CORNER (NE COR.) OF THE SOUTHEAST QUARTER (SE 1/4);
THENCE NORTH 88°02'09" WEST, ALONG THE NORTH LINE THEREOF, 1,446.52 FEET;
THENCE SOUTH 00°13'30" EAST, 433.54 FEET TO THE TRUE POINT OF BEGINNING;
THENCE SOUTH 89°46'30" WEST, 665.00 FEET TO A POINT ON THE EAST RIGHT-OF-WAY LINE OF MOJAVE ROAD;
THENCE SOUTH 00°13'30" EAST, ALONG THE EAST RIGHT-OF-WAY LINE, 570.00 FEET;
THENCE NORTH 89°46'30" EAST, 190.00 FEET;
THENCE NORTH 00°13'30" WEST, 70.00 FEET;
THENCE NORTH 89°46'30" EAST, 475.00 FEET;
THENCE NORTH 00°13'30" WEST, 500.00 FEET TO THE TRUE POINT OF BEGINNING.

NOTE: THE ABOVE METES AND BOUNDS DESCRIPTION APPEARED PREVIOUSLY IN THAT CERTAIN DOCUMENT RECORDED AUGUST 7, 1990 IN BOOK 900807 AS INSTRUMENT NO. 00307 AND RE-RECORDED JUNE 16, 2006 IN BOOK 20060616 AS INSTRUMENT NO. 02478, ALL OF OFFICIAL RECORDS, CLARK COUNTY, NEVADA.

PARCEL II:

THAT PORTION OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 36, TOWNSHIP 20 SOUTH, RANGE 61 EAST, M.D.M., IN THE CITY OF LAS VEGAS, COUNTY OF CLARK, STATE OF NEVADA, BEING THAT PORTION OF LOT ONE (1), BLOCK ONE (1) OF THE LAS VEGAS SPECTRUM AS SHOWN BY MAP THEREOF ON FILE IN BOOK 43 OF PLATS, PAGE 10 OF CLARK COUNTY, NEVADA RECORDS, DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTHEAST CORNER OF THE SOUTHEAST QUARTER (SE 1/4) OF SAID SECTION 36;
THENCE ALONG THE SOUTH LINE OF SAID SOUTHEAST QUARTER (SE 1/4), NORTH 89°48'08" WEST A DISTANCE OF 2,199.15 FEET TO THE CENTERLINE OF MOJAVE ROAD AS SHOWN ON SAID PLAT OF THE LAS VEGAS SPECTRUM;
THENCE ALONG SAID CENTERLINE OF MOJAVE ROAD, NORTH 00°13'30" WEST A DISTANCE OF 2,261.39 FEET;
THENCE NORTH 89°46'30" EAST A DISTANCE OF 50.00 FEET TO THE TRUE POINT OF BEGINNING ON THE EAST RIGHT-OF-WAY LINE OF SAID MOJAVE ROAD, ALSO BEING THE NORTHWEST CORNER OF THAT CERTAIN PARCEL OF LAND DESCRIBED BY DEED TO COCA-COLA BOTTLING COMPANY OF LOS ANGELES, RECORDED AUGUST 7, 1990 IN BOOK 900807 AS INSTRUMENT NUMBER 00307 OF CLARK COUNTY, NEVADA RECORDS;
THENCE ALONG SAID EAST RIGHT-OF-WAY LINE OF MOJAVE ROAD, NORTH 00°13'30" WEST A DISTANCE OF 351.78 TO THE BEGINNING OF A TANGENT CURVE CONCAVE SOUTHEASTERLY AND HAVING A RADIUS OF 55.00 FEET;
THENCE NORTHEASTERLY ALONG SAID TANGENT CURVE, THROUGH A CENTRAL ANGLE OF 92°11'21", AN ARC DISTANCE OF 88.50 FEET TO THE SOUTH RIGHT-OF-WAY LINE OF STEWART AVENUE AS SHOWN ON SAID PLAT OF THE LAS VEGAS SPECTRUM;
THENCE TANGENT TO SAID CURVE ALONG SAID SOUTH RIGHT-OF-WAY LINE OF STEWART AVENUE, SOUTH 88°02'09" EAST A DISTANCE OF 608.35 FEET TO THE NORTHERLY PROLONGATION OF THE EAST LINE OF SAID COCA-COLA PARCEL;
THENCE ALONG THE NORTHERLY PROLONGATION OF THE EAST LINE OF SAID COCA-COLA PARCEL, SOUTH 00°13'30" EAST A DISTANCE OF 383.50 FEET TO THE NORTHEAST CORNER OF SAID COCA-COLA PARCEL;
THENCE ALONG THE NORTH LINE OF SAID COCA-COLA PARCEL, SOUTH 89°48'30" WEST A DISTANCE OF 665.00 FEET TO THE TRUE POINT OF BEGINNING.

NOTE: THE ABOVE METES AND BOUNDS DESCRIPTION APPEARED PREVIOUSLY IN THAT CERTAIN DOCUMENT RECORDED APRIL 28, 1995 IN BOOK 950428 AS INSTRUMENT NO. 01969 OF OFFICIAL RECORDS, CLARK COUNTY, NEVADA.

PARCEL III:

THAT PORTION OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 36, TOWNSHIP 20 SOUTH, RANGE 61 EAST, M.D.M., IN THE CITY OF LAS VEGAS, COUNTY OF CLARK, STATE OF NEVADA, BEING THAT PORTION OF LOT ONE (1), BLOCK ONE (1) OF THE LAS VEGAS SPECTRUM AS SHOWN BY MAP THEREOF ON FILE IN BOOK 43 OF PLATS, PAGE 10 OF CLARK COUNTY, NEVADA RECORDS, DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTHEAST CORNER OF THE SOUTHEAST QUARTER (SE 1/4) OF SAID SECTION 36;
THENCE ALONG THE SOUTH LINE OF SAID SOUTHEAST QUARTER (SE 1/4), NORTH 89°48'08" WEST A DISTANCE OF 2,199.15 FEET TO THE CENTERLINE OF MOJAVE ROAD AS SHOWN ON SAID PLAT OF THE LAS VEGAS SPECTRUM;
THENCE ALONG SAID CENTERLINE OF MOJAVE ROAD, NORTH 00°13'30" WEST A DISTANCE OF 1,691.39 FEET;
THENCE NORTH 89°46'30" EAST A DISTANCE OF 50.00 FEET TO THE TRUE POINT OF BEGINNING ON THE EAST RIGHT-OF-WAY LINE OF SAID MOJAVE ROAD, ALSO BEING THE SOUTHWEST CORNER OF THAT CERTAIN PARCEL OF LAND DESCRIBED BY DEED TO COCA-COLA BOTTLING COMPANY OF LOS ANGELES, RECORDED AUGUST 7, 1990 IN BOOK 900807 AS INSTRUMENT NUMBER 00307 OF CLARK COUNTY, NEVADA RECORDS;
THENCE ALONG THE SOUTH BOUNDARY OF SAID COCA-COLA PARCEL, CONTINUING NORTH 89°48'30" EAST A DISTANCE OF 190.00 FEET TO THE WEST LINE OF THAT CERTAIN PARCEL OF LAND DESCRIBED BY DEED TO LEWIS PROPERTIES, INC., RECORDED JANUARY 19, 1990 IN BOOK 900119 AS INSTRUMENT NUMBER 00837 OF CLARK COUNTY, NEVADA RECORDS;
THENCE ALONG THE WEST BOUNDARY OF SAID LEWIS PROPERTIES PARCEL, SOUTH 00°13'30" EAST A DISTANCE OF 270.00 FEET TO THE NORTH RIGHT-OF-WAY LINE OF SUNRISE AVENUE AS SHOWN ON SAID PLAT OF THE LAS VEGAS SPECTRUM;
THENCE ALONG SAID NORTH RIGHT-OF-WAY LINE OF SUNRISE AVENUE, SOUTH 89°46'30" WEST A DISTANCE OF 145.00 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE NORTHEASTERLY AND HAVING A RADIUS OF 45.00 FEET;
THENCE NORTHWESTERLY ALONG SAID TANGENT CURVE, THROUGH A CENTRAL ANGLE OF 90°00'00", AN ARC DISTANCE OF 70.69 FEET TO THE EAST RIGHT-OF-WAY LINE OF MOJAVE ROAD;
THENCE TANGENT TO SAID CURVE, ALONG SAID EAST RIGHT-OF-WAY LINE OF MOJAVE ROAD, NORTH 00°13'30" WEST A DISTANCE OF 225.00 FEET TO THE TRUE POINT OF BEGINNING.

NOTE: THE ABOVE METES AND BOUNDS DESCRIPTION APPEARED PREVIOUSLY IN THAT CERTAIN DOCUMENT RECORDED APRIL 28, 1995 IN BOOK 950428 AS INSTRUMENT NO. 01969 OF OFFICIAL RECORDS, CLARK COUNTY, NEVADA.

PARCEL IV:

THAT PORTION OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 36, TOWNSHIP 20 SOUTH, RANGE 61 EAST, M.D.M., IN THE CITY OF LAS VEGAS, COUNTY OF CLARK, STATE OF NEVADA, BEING THAT PORTION OF LOT ONE (1), BLOCK ONE (1) OF THE LAS VEGAS SPECTRUM AS SHOWN BY MAP THEREOF ON FILE IN BOOK 43 OF PLATS, PAGE 10 OF CLARK COUNTY, NEVADA RECORDS, DESCRIBED AS FOLLOWS:

COMMENCING AT THE INTERSECTION OF THE CENTER LINE OF STEWART AVENUE WITH THE CENTER LINE OF SPECTRUM BOULEVARD AS SHOWN ON RECORD OF SURVEY RECORDED IN FILE 79, PAGE 16, OFFICIAL RECORDS OF SAID CLARK COUNTY;
THENCE ALONG SAID CENTER LINE OF STEWART AVENUE, NORTH 88°02'09" WEST A DISTANCE OF 507.42 FEET;
THENCE SOUTH 00°13'30" EAST A DISTANCE OF 50.04 FEET TO THE SOUTHERLY LINE OF SAID STEWART AVENUE AND THE TRUE POINT OF BEGINNING;
THENCE CONTINUING SOUTH 00°13'30" EAST A DISTANCE OF 563.26 FEET TO THE POINT OF CUSP OF A NON TANGENT CURVE CONCAVE SOUTHEASTERLY HAVING A RADIUS OF 45.50 FEET, A RADIAL THROUGH SAID POINT OF CUSP BEARS SOUTH 83°36'44" EAST;
THENCE EASTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 122°06'49" AN ARC DISTANCE OF 96.97 FEET TO THE BEGINNING OF A TANGENT REVERSE CURVE CONCAVE NORTHERLY HAVING A RADIUS OF 25.00 FEET;
THENCE EASTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 38°43'35" AN ARC DISTANCE OF 16.90 FEET;
THENCE NORTH 89°46'30" EAST A DISTANCE OF 243.26 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE NORTHWESTERLY HAVING A RADIUS OF 25.00 FEET;
THENCE NORTHEASTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 72°48'08" AN ARC DISTANCE OF 31.77 FEET;
THENCE NORTH 16°58'22" EAST A DISTANCE OF 335.21 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE WESTERLY HAVING A RADIUS OF 370.00 FEET;
THENCE NORTHERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 15°00'31" AN ARC DISTANCE OF 96.92 FEET;
THENCE NORTH 01°57'51" EAST A DISTANCE OF 42.31 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE SOUTHWESTERLY HAVING A RADIUS OF 45.00 FEET;
THENCE NORTHWESTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 90°00'00" AN ARC DISTANCE OF 70.69 FEET TO SAID SOUTHERLY LINE OF STEWART AVENUE;
THENCE ALONG SAID SOUTHERLY LINE NORTH 88o02'09" WEST A DISTANCE OF 430.52 FEET TO THE TRUE POINT OF BEGINNING.

NOTE: THE ABOVE METES AND BOUNDS DESCRIPTION APPEARED PREVIOUSLY IN THAT CERTAIN DOCUMENT RECORDED JUNE 19, 1998 IN BOOK 980619 AS INSTRUMENT NO. 02012 OF OFFICIAL RECORDS, CLARK COUNTY, NEVADA.

016448.0605: 26856767.4

DEVIATIONS FROM STANDARDS

NONE

SWPPP NOTE

NOTE: ALL LAND SURFACE AREA DISTURBANCES OVER 1 ACRE REQUIRE A STORMWATER DISCHARGE PERMIT ISSUED BY THE NEVADA DIVISION OF ENVIRONMENTAL PROTECTION (NDEP). A PHASED CONSTRUCTION UNIT IN A CONTIGUOUS SUBDIVISION IS CONSIDERED UNDER CONSTRUCTION UNTIL ALL STRIPPED SURFACE AREAS HAVE BEEN COVERED BY PAVING, BUILDING CONSTRUCTION OR PLANTING. A STORMWATER DISCHARGE PERMIT APPLICATION AND ASSOCIATED INFORMATION MAY BE DOWNLOADED FROM THE WEB SITE: HTTP://WWW.STATE.NV.US/BMPC/STORM01.HTM PROJECTS THAT DISTURB MORE THAN ONE ACRE OF LAND MUST SUBMIT TO NDEP A "NOTICE OF INTENT" FOR INCLUSION UNDER STORMWATER PERMIT NO. NVR100000 ALONG WITH THE APPROPRIATE FILLING FEE.

GEOTECHNICAL ENGINEER

PREPARED BY: NOVA GEOTECHNICAL & INSPECTIONAL SERVICES
ADDRESS: 4480 WEST HACIENDA AVE. SUITE 104, LAS VEGAS, NEVADA 89118.
PHONE: (702) 873-3478
PROJECT No. G-18-248
DATED: JANUARY 28, 2019.

APPROVALS

CITY ENGINEER--ALLEN PAVELKA PE, #9029 DATE

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

LAS VEGAS FIRE AND RESCUE DATE

CITY OF LAS VEGAS – PLANNING DEPARTMENT DATE

THIS PLAN MEETS THE APPLICABLE STANDARDS OF THE PLANNING DEPARTMENT.

CENTRAL TELEPHONE CO. DBA CENTURYLINK DATE

THE AFFIXED CENTURYLINK APPROVAL DOES NOT ASSUME OR GUARANTEE LIABILITY FOR KNOWN OR UNKNOWN CONFLICTS WITH EXISTING OR PROPOSED IMPROVEMENTS. RESOLUTION OF ANY CONFLICT WILL BE ACCOMPLISHED PURSUANT TO LOCAL ORDINANCES, NEVADA REVISED STATUES AND / OR PUBLIC UTILITY COMMISSION RULES AND REGULATIONS.

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES
PROJECT NO. ###### FIRST APPROVED DATE: _____
LVVWD APPROVED FIRE FLOW 1,500 GPM AT 20 PSI RESIDUAL
MAXIMUM AVAILABLE FIRE SPRINKLER FLOW _____ GPM
SHEETS: ADD FIELD
LVVWD APPROVAL IS VALID FOR ONE (1) YEAR FROM SIGNATURE DATE. IF CONSTRUCTION IS NOT STARTED, PLANS MUST BE RESUBMITTED FOR REVIEW AND APPROVAL.

NV ENERGY DATE

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

SOUTHWEST GAS CORPORATION DATE

COX COMMUNICATIONS LAS VEGAS, INC. DATE

OWNER/DEVELOPER	ENGINEER
LONE OAK, LLC 232 N MOJAVE ROAD LAS VEGAS, NV. 89101 PH: (714) 933-9455 FX: (714) 822-4727 CONTACT: TRAWS GIBSON	SLATER HANIFAN GROUP, INC. 5740 S. ARVILLE STREET, SUITE 216 LAS VEGAS, NV 89118 PH: (702) 284-5300 FX: (702) 284-5399 CONTACT: TOM MILLER

BENCHMARK

CITY OF LAS VEGAS BENCHMARK 2LV012BC4, RIVET & PLATE IN TOP OF CURB, AT SE CORNER OF STEWART & MOJAVE.

ELEVATION = 552.357 METERS
ELEVATION = 1812.19 U.S. SURVEY FEET (NAVD 88)

BASIS OF BEARINGS

NORTH 00°13'30" WEST, BEING THE BEARING OF A PORTION OF MOJAVE ROAD AS SHOWN BY MAP THEREOF IN BOOK 43, PAGE 10 OF PLATS, OFFICIAL RECORDS, CLARK COUNTY, NEVADA.

FEMA FLOOD ZONE INFORMATION

THE PROJECT IS LOCATED WITHIN A FEMA DESIGNATED ZONE "X (OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN) ON THE FLOOD INSURANCE RATE MAP (FIRM) PANEL 32003C2186F DATED NOVEMBER 16, 2011.

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY.
CALL BEFORE YOU DO OVERHEAD
1-702-227-2929

FAST
Call before you UnderGround
1-702-432-5300
FREEWAY & ARTERIAL SYSTEM OF TRANSPORTATION (F.A.S.T.)

Call before you Dig
AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.
Call 811
OR
1-800-227-2600

SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NV.

REYES COCA-COLA-COLA-BOTTLING, L.L.C.

230 NORTH MOJAVE ROAD LAS VEGAS, NV 89101

COVER SHEET

S36 T20 R61

DATE: 07/16/19
DRAFTER: EV
DESIGNER: AP
CHECKED: TM

PROJECT NO.
MHC1901-000

PROFESSIONAL ENGINEER - STATE OF NEVADA
ARMANDO PINEDA
EXP. 12-31-19
CIVIL
No. 19299
7-18-19

C-1
SHEET 1 OF 16

CLV# XXX

J:\mhc1901-000 reyes coke expansion\Civil\Improv\rev1801-000 cvr.dwg 7/18/2019 2:02 PM Edwin Velo

STORMWATER RUNOFF MANAGEMENT

(REQUIRED FOR ALL SITES GREATER THAN 1 ACRE (43,560 SQ.FT.))

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 ACCUMULATE IN, THE PUBLIC RIGHTS OF WAYS 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 TITLE 24.40 AND THE LAS VEGAS VALLEY CONSTRUCTION SITE BEST MANAGEMENT PRACTICES 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 NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.5.
4. AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL INSPECT ALL DISTURBED AREAS, AREAS USED FOR STORAGE OF MATERIALS AND EQUIPMENT THAT ARE EXPOSED TO PRECIPITATION, VEHICLE ENTRANCE AND EXIT LOCATIONS AND ALL BMPS WEEKLY, AND WITHIN 24 HOURS AFTER ANY ACTUAL 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 NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.12.
5. ACCUMULATED SEDIMENT IN BMPS SHALL BE REMOVED WITHIN SEVEN DAYS AFTER A STORMWATER RUNOFF EVENT OR PRIOR TO THE NEXT ANTICIPATED STORM EVENT, WHICHEVER IS EARLIER. SEDIMENT MUST BE REMOVED WHEN BMP DESIGN CAPACITY HAS BEEN REDUCED BY 50 PERCENT OR MORE.

SOUTHERN NEVADA - SOUTHWEST GAS CORPORATION GENERAL NOTES

1. IN THE EVENT OF NATURAL GAS EMERGENCIES CALL 911 AND 1-877-860-6020
2. MINIMUM HORIZONTAL AND VERTICAL CLEARANCES BETWEEN NATURAL GAS FACILITIES AND ANY UNDERGROUND UTILITIES AND/OR STRUCTURES, INCLUDING BUT NOT LIMITED TO WATER, SEWER, STORM DRAIN, COMMUNICATIONS, AND ELECTRICAL SHALL BE AT LEAST 12-INCHES OR GREATER AS DICTATED BY LOCAL CODES AND STANDARDS.
   A) ANY DEVIATION FROM SPECIFIED MINIMUM CLEARANCES MUST BE APPROVED BY ALL AFFECTED UTILITIES AND/OR MUNICIPALITIES
3. FOR VALVE ADJUSTMENT CONTACT 702-668-6107 48 HOURS PRIOR TO CONSTRUCTION.
4. IN THE EVENT OF NATURAL GAS CONFLICT WITH PROPOSED UTILITIES AND STRUCTURES CONTACT 702-365-2099

CAUTION: HIGH PRESSURE GAS

CALL SOUTHWEST GAS AT 702-400-1789 FOR STANDBY WHEN EXCAVATING OVER OR NEAR HIGH PRESSURE GAS LINES 48 HOURS PRIOR TO CONSTRUCTION

SOUTHWEST GAS APPROVAL

SOUTHWEST GAS CORPORATION — DATE

BENCHMARK

CITY OF LAS VEGAS BENCHMARK 2LV0126C4, RIVET & PLATE IN TOP OF CURB, AT SE CORNER OF STEWART & MOJAVE.

ELEVATION = 552.357 METERS
ELEVATION = 1812.19 U.S. SURVEY FEET (NAVD 88)

BASIS OF BEARINGS

NORTH 00°13'30" WEST, BEING THE BEARING OF A PORTION OF MOJAVE ROAD AS SHOWN BY MAP THEREOF IN BOOK 43, PAGE 10 OF PLATS, OFFICIAL RECORDS, CLARK COUNTY, NEVADA.

2.2 CITY OF LAS VEGAS SEWER NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS AND THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, AS AMENDED. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO BE AWARE OF THE CONTENTS OF THE ABOVE SPECIFICATIONS.
2. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PERFORM CONSTRUCTION AS PER PLANS. ANY ADDITIONS, DELETIONS, OR CHANGES SHALL FIRST MEET WITH THE APPROVAL OF THE CITY ENGINEER.
3. CHISEL "S" OR "G" IN CURBS WHERE SEWER OR GAS LATERALS PASS UNDER THE CURB.
4. POLYVINYL (PVC) SEWER PIPE SHALL MEET ASTM D-3034 SDR 35 SPECIFICATIONS, INSTALLED WITH SAND BEDDING AND BACKFILL OF TYPE II AGGREGATE BASE.
5. ALL MANHOLES PAVED IN STREETS EIGHTY (80') FOOT R/W AND LARGER SHALL HAVE CONCRETE COLLARS. STREETS LESS THAN EIGHTY (80') FOOT R/W WILL REQUIRE RETROFIT IF PAVING DOES NOT CONFORM TO CITY STANDARDS AT THE MANHOLE.
6. TEE SADDLES SHALL BE USED TO CONNECT SEWER LATERALS TO EXISTING MAIN LINES UP TO TWELVE INCH (12") DIAMETER. CONNECTIONS TO FIFTEEN INCH (15") OR LARGER MAINS SHALL REQUIRE SPECIAL PROCEDURES IN LINE WITH SHALL BE USED ON LINES TWELVE INCHES (12") OR ABOVE.
7. WATER MAINS SHALL BE PROTECTED IN ACCORDANCE WITH LVVWD STANDARDS WHENEVER A SEWER MAIN CROSSES OVER A WATER MAIN OR THE SEWER IS LESS THAN EIGHTEEN INCH (18") UNDER A WATER MAIN.
8. ALL CONTRACTORS INSTALLING SEWER MAINS THAT WILL BE UNDER THE JURISDICTION OF THE CITY OF LAS VEGAS MUST BE STATE OF NEVADA CLASS "A" CONTRACTORS.
9. THE CITY OF LAS VEGAS WILL NOT ACCEPT ANY SEWER MAINS WHICH HAVE A VERTICAL DEFLECTION OF MORE THAN ONE TENTH (0.1) OF A FOOT FROM THE APPROVED CONSTRUCTION PLANS AT ANY LOCATION. SEWER MAINS FOUND TO EXCEED THIS TOLERANCE WILL HAVE TO BE REPAIRED OR REMOVED OR REPLACED TO THE SATISFACTION OF THE CITY ENGINEER PRIOR TO ACCEPTANCE BY THE CITY OF LAS VEGAS.
10. INSTALLATION OF CURVED SEWER REQUIRES THE USE OF C-900 PIPE WHICH ALLOWS FOR PIPE DEFLECTION AT THE JOINTS.

LAS VEGAS VALLEY WATER DISTRICT (LVVWD) STANDARD NOTES

LVVWD PROJECT # ADD FIELD (REVISED 08/01/2017)

1. NO WORK SHALL BEGIN UNTIL THE WATER PLANS HAVE BEEN APPROVED FOR CONSTRUCTION BY THE LVVWD. FOLLOWING WATER PLAN APPROVAL, NOTICE SHALL BE GIVEN TO THE LVVWD COMMUNICATION SUPPORT CENTER (258-7171) TWO (2) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION. FOR FUTURE INSPECTIONS, NOTICE MUST BE GIVEN BY 2:00 P.M. THE BUSINESS DAY PRIOR TO THE REQUESTED LVVWD INSPECTION. WHEN REQUESTING INSPECTIONS, PLEASE REFER TO THE PROJECT # IDENTIFIED ABOVE.
2. ALL WORK SHALL CONFORM TO LVVWD STANDARD PLATES, DRAWINGS, AND SPECIFICATIONS, AND TO THE 2010 EDITION OF THE UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR POTABLE WATER SYSTEMS (UDACS). THE LATEST EDITION OF UDACS SHALL SUPERSEDE ANY CONFLICTS CONTAINED IN THE APPROVED DRAWINGS AND/OR SPECIFICATIONS.
3. ALL WORK, EXCEPT AS MODIFIED BY THESE PLANS OR BY NOTE 2 ABOVE, SHALL BE DONE IN ACCORDANCE WITH THE MOST RECENT DRAFT OR EDITION OF THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFFSITE IMPROVEMENT, CLARK COUNTY AREA.
4. A SINGLE PIPE MATERIAL SHALL BE USED THROUGHOUT THE PROJECT UNLESS OTHERWISE APPROVED BY THE LVVWD.
5. ALL SERVICE LATERALS TWO (2) INCHES IN DIAMETER AND SMALLER SHALL BE TYPE K COPPER TUBING WITH LVVWD APPROVED SERVICE SADDLES.
6. ALL WATER METER BOXES SHALL BE LOCATED OUTSIDE OF DRIVEWAY AREAS.
7. ALL VALVES SHALL BE LOCATED OUTSIDE OF DRIVEWAYS, VALLEY AND CURB GUTTERS.
8. ALL WATER AND STORM DRAIN OR SANITARY SEWER CROSSINGS SHALL CONFORM TO SECTION 2.22 OF THE 2010 EDITION OF THE UDACS.
9. ALL WATER FACILITIES AND APPURTENANCES SHALL BE DISINFECTED, PRESSURE TESTED, AND HAVE AN ACCEPTABLE PASSING HEALTH WATER SAMPLE OBTAINED, PRIOR TO OPERATION AND USE.
10. THE CONTRACTOR MUST OBTAIN ALL METERS TWO (2) INCHES AND SMALLER FROM LVVWD CENTRAL STORES. TELEPHONE 258-3152 OR 258-3802, TWO (2) WORKING DAYS PRIOR TO METER PICKUP.
11. ANY INTERRUPTION OF SERVICE MUST BE PERFORMED IN ACCORDANCE WITH UDACS SECTION 3.14.01, AND APPROVED BY THE LVVWD INSPECTION DIVISION PRIOR TO SHUTDOWN. PROPER WRITTEN NOTIFICATION MUST BE GIVEN TO ALL AFFECTED CUSTOMERS.
12. ALL WATER FACILITY CONSTRUCTION MATERIALS USED MUST BE AS LISTED ON THE LVVWD APPROVED PRODUCT'S LIST FOR NEW FACILITIES, LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS BY SUBMITTING SHOP DRAWINGS.
13. TELEPHONE "CALL BEFORE YOU DIG" AT "811" OR 1-800-227-2600.
14. THE INSTALLATION OF LVVWD MUNICIPAL WATER FACILITIES WITHIN ALL STREETS IS ASSUMED TO BE IN COMPLIANCE WITH THE UNIFORM STANDARDS, INCLUDING THE PLACEMENT OF ASPHALT PAVING STREET SURFACES. ANY REPAIR WORK DONE BY THE LVVWD TO THE MUNICIPAL WATER FACILITIES WILL INCLUDE THE PLACEMENT OF AN APPROPRIATELY SIZED ASPHALT REPAIR PATCH ON THE STREET SURFACE.

    ANY DECORATIVE PAVING SURFACE WITHIN THE STREET IS THE RESPONSIBILITY OF THE OWNER'S ASSOCIATION, OR THE INDIVIDUAL PROPERTY OWNERS IF NO OWNER'S ASSOCIATION IS IN EXISTENCE, OR THE AGENCY HAVING JURISDICTION. DECORATIVE SURFACE MATERIALS PLACED WITHIN THE TEN FOOT EASEMENT ABUTTING A PUBLIC OR PRIVATE STREET, IF DISTURBED BY THE LVVWD DURING THE REPAIR OR OPERATION OF ITS FACILITIES, WILL BE REPLACED BY LVVWD WITH AN APPROPRIATELY SIZED PLAIN FINISH CONCRETE PATCH. THE LVVWD WILL NOT RESTORE, AND WILL NOT BE RESPONSIBLE FOR THE RESTORATION OF, ANY DECORATIVE PAVING SURFACE WITHIN THE STREET. THE LVVWD WILL NOT ATTEMPT TO MATCH COLOR OR FINISH OF ANY ADJACENT MATERIALS.

K. NO LEAD COMPLIANCE NOTE:
TO COMPLY WITH THE FEDERAL SAFE DRINKING WATER ACT, ALL WATER WORKS BRASS PRODUCTS PROPOSED TO BE RELOCATED, OR INSTALLED AS NEW MUST BE INSTALLED WITH THE LEAD FREE APPROVED PRODUCT. THE OLD LEADED PRODUCT MAY NOT BE REUSED.

GRADING NOTES

1. INDICATED GRADES OTHER THAN T.C., F.G. & GUTTER F.L. ARE ROUGH GRADES.
2. THE ROUGH GRADING PLANS SHALL BE ON THE JOB SITE AT ALL TIMES. THE ROUGH GRADING SHALL BE FINISHED IN CONFORMANCE WITH THE LINES AND GRADES SHOWN ON THE PLANS. THE GRADING QUANTITIES ARE BASED ON THE ELEVATION AND DETAILS SHOWN ON THE PLANS. ANY DEVIATIONS FROM THE PLANS WILL RESULT IN QUANTITY CHANGES.
3. CARE SHALL BE EXERCISED IN GRADING CORNER LOTS.
4. ROUGH PAD ELEVATIONS SHALL BE GRADED TO WITHIN 0.1' OF THE PAD ELEVATIONS SHOWN ON THE PLANS. WHEN GRADING IS COMPLETE PER THE PLANS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER SO THAT THE LOTS CAN BE INSPECTED. AT THAT TIME THE ENGINEER SHALL ALSO DECIDE IF ANY ADDITIONAL DITCHES OR BERMS ARE REQUIRED. THE CONTRACTOR IS REQUESTED NOT TO REMOVE ANY OF HIS ROUGH GRADING EQUIPMENT UNTIL HE RECEIVES GRADING APPROVAL FROM THE ENGINEER.
5. SOILS REPORT PREPARED BY NOVA GEOTECHNICAL SERVICES & INSPECTIONAL SERVICES, PROJECT NO. G-18-248, DATED 01/28/2019.
6. EARTHWORK QUANTITIES (RAW):
   -CUT = 412 CUBIC YARDS.
   -FILL = 32,714 CUBIC YARDS

   A) THE ABOVE QUANTITIES DO NOT REFLECT LOSSES DUE TO SUBSIDENCE OR SHRINKAGE.
   B) THE ABOVE QUANTITIES DO REFLECT USING NATIVE MATERIAL IN LIEU OF TYPE I GRAVEL BASE MATERIAL FOR STREET SECTIONS.
   C) THE ABOVE QUANTITIES DO NOT REFLECT ANY EARTHWORK WHICH MAY BE REQUIRED BY THE ENGINEER TO CONSTRUCT ADDITIONAL PROTECTIVE DITCHES OR BERMS NOT SHOWN ON THESE DRAWINGS.

CITY OF LAS VEGAS FIRE AND RESCUE GENERAL NOTES

1. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE LAS VEGAS FIRE AND RESCUE ADOPTED FIRE CODE ORDINANCE # 6631 FOR HYDRANT SPECIFICATIONS AND HYDRANT INSTALLATION SPECIFICATIONS.
2. ONLY FIRE HYDRANTS THAT ARE ON THE LAS VEGAS VALLEY WATER DISTRICT'S – APPROVED PRODUCTS LIST ARE ALLOWED TO BE INSTALLED.
3. A PERMIT IS REQUIRED FROM LAS VEGAS FIRE AND RESCUE FOR THE INSTALLATION OF ON-SITE WATER LINES AND FIRE HYDRANTS. THE PERMIT AND CONTRACTORS MATERIAL TEST CERTIFICATE FOR UNDERGROUND PIPING FORM SHALL BE OBTAINED FROM THE FIRE PROTECTION ENGINEER BEFORE COMMENCEMENT OF WORK. IFC § 105.6.15
4. ON ANY RESIDENTIAL OR COMMERCIAL INSTALLATIONS, FIRE HYDRANTS SHALL BE INSTALLED AND FIRE APPARATUS ACCESS ROADS SHALL BE MAINTAINED BEFORE COMMENCEMENT OF ANY COMBUSTIBLE CONSTRUCTION. ALL FIRE HYDRANTS SHALL BE IN GOOD WORKING ORDER AND SHALL BE CAPABLE OF DELIVERING THE REQUIRED FIRE FLOW. IFC § 3310, § 3312
5. TO IDENTIFY THE FIRE HYDRANT LOCATIONS, THE CONTRACTOR SHALL PLACE A BLUE REFLECTIVE MARKER AT THE CENTER LINE OF THE STREET ADJACENT TO THE FIRE HYDRANTS. IFC § 507.5.7.3
6. ALL UNDERGROUND INSPECTIONS, PRESSURE AND FLUSH VERIFICATIONS OF ALL FIRE HYDRANTS AND FIRE LINES, SHALL BE CONDUCTED BEFORE COVERING THE LINES. CENTER LOADING IS ACCEPTABLE FOR THE HYDRO TESTS WITH PRIOR FIRE PREVENTION APPROVAL. IFC § 106.3
7. ALL ON-SITE UNDERGROUND WATER MAINS AND MATERIALS SHALL BE U.L. LISTED, A.W.W.A APPROVED AND SHALL BE RATED FOR THE APPROPRIATE WORKING PRESSURE. IFC § 507.2.1, NFPA 24
8. PAINTING OF CURBS, FIRE HYDRANTS, PADS, PROTECTION OF FIRE HYDRANTS FROM PHYSICAL DAMAGE, AND ALL OTHER WORK NECESSARY PER PLANS SHALL BE COMPLETED BEFORE APPROVAL BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION. IFC § 507
9. PRIVATE HYDRANTS SHALL BE PAINTED RED. IFC § 507.5.7.1
10. PRIOR TO THE FINAL OCCUPANCY, A FIRE FLOW TEST SHALL BE WITNESSED BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION TO VERIFY AVAILABILITY OF THE REQUIRED FIRE FLOW. IFC § 507
11. FIRE HYDRANT SPACING SHALL BE AS FOLLOWS: IFC § C102
    - RESIDENTIAL – 500 FT UNSPRINKLERED; 600 FT SPRINKLERED.
    - COMMERCIAL – 300 FT UNSPRINKLERED; 400 FT SPRINKLERED.
12. WHERE THE WATER MAINS ARE EXTENDED ALONG STREETS OR NEW STREETS ARE INSTALLED WHERE FIRE HYDRANTS ARE NOT NEEDED FOR PROTECTION OF THE STRUCTURES, FIRE HYDRANTS SHALL BE INSTALLED AT A MAXIMUM OF 1000 FT SPACING, TO PROVIDE FOR TRANSPORTATION HAZARDS. WHERE STREETS ARE PROVIDED WITH MEDIAN DIVIDERS OR HAVE FOUR (4) OR MORE TRAFFIC LANES AND HAVE A TRAFFIC COUNT OF MORE THAN 30,000 PER DAY, HYDRANTS ARE REQUIRED ON EACH SIDE OF THE STREET SPACED AT 500 FT ON AN ALTERNATING BASIS. IFC § C102.8
13. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN THE RADIUS OF A CUL-DE-SAC OR WITHIN 20 FT OF THE PERIMETER OF THE RADIUS OF THE CUL-DE-SAC.
14. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN 6 FT OF ANY CURB RETURN, DRIVEWAY, POWER POLE, STREETLIGHT OR ANY OTHER OBSTRUCTION. IFC § C102.10
15. A MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A ONE-TWO FAMILY DWELLING SHALL NOT EXCEED 300 FT, AS MEASURED BY AN APPROVED ROUTE. IFC § C102.4
16. THE MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A FIRE DEPARTMENT CONNECTION (FDC) SHALL NOT EXCEED 100 FT, AS MEASURED BY AN APPROVED ROUTE. IFC § C102.7
17. THE MAXIMUM DISTANCE FROM A HYDRANT TO THE END OF A DEAD-END STREET SHALL NOT EXCEED 200 FT. IFC § C102.6
18. TWO (2) SOURCES OF SUPPLY ARE REQUIRED WHENEVER THERE IS 4 OR MORE FIRE HYDRANTS/SPRINKLER LEAD-INS ARE INSTALLED ON A SINGLE SYSTEM. FOR SYSTEMS REQUIRED TO HAVE TWO (2) SOURCES OF WATER SUPPLY, SECTIONAL CONTROL VALVES SHALL BE INSTALLED SO THAT NO MORE THAN 2 FIRE HYDRANTS AND/OR FIRE SPRINKLER LEAD-INS CAN BE OUT OF SERVICE DUE TO A SERVICE INTERRUPTION. FOR SYSTEMS PERMITTED TO HAVE ONE SOURCE OF WATER SUPPLY, SECTIONAL CONTROL VALVES SHALL BE INSTALLED SO THAT NO MORE THAN 3 FIRE HYDRANTS AND/OR FIRE SPRINKLER LEAD-INS CAN BE OUT OF SERVICE DUE TO A SERVICE INTERRUPTION. IFC § C104
19. ALL FIRE APPARATUS ACCESS ROADS SHALL BE PAVED TO PROVIDE ALL-WEATHER DRIVING CAPABILITIES, AND SHALL BE DESIGNED AND MAINTAINED TO SUPPORT THE IMPOSED LOADS OF THE FIRE APPARATUS. IFC § 503.2.3
20. THE GRADIENT FOR THE FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 12% ANGLES OF APPROACH AND ANGLES OF DEPARTURE SHALL NOT EXCEED 6% FOR 25 FT PRIOR TO OR AFTER THE GRADE CHANGE. ADJACENT TO THE STRUCTURES GRADIENT SHALL NOT EXCEED 6%. IFC § 503.2.7, § 503.2.8
21. THE TURNING RADIUS OF THE FIRE APPARATUS ACCESS ROADS SHALL BE NO LESS THAN 52 FT OUTSIDE AND 28 FT INSIDE TURNING RADIUS. IFC § 503.2.4
22. VERTICAL CLEARANCE OF ALL FIRE APPARATUS ACCESS ROADS SHALL NOT BE LESS THAN 13FT 6 INS. IFC § 503.2.1
23. FIRE DEPARTMENT ACCESS ROADS SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF NOT LESS THAN 33 FT WITH PARKING ON BOTH SIDES MEASURED TO FACE OF CURB. NOT LESS THAN 28 FT WIDE WITH PARKING RESTRICTED TO ONE SIDE MEASURED TO FACE OF CURB. NOT LESS THAN 24 FT WIDE WITH NO PARKING ON EITHER SIDE MEASURED TO FACE OF CURB. FIRE LANES THROUGH PARKING LOTS SHALL BE NOT LESS THAN 24 FT. IFC § 503.2.1.1
24. A FIRE APPARATUS ACCESS ROAD SHALL BE REQUIRED WHEN ANY PORTION OF AN EXTERIOR WALL OF THE FIRST STORY IS LOCATED MORE THAN 150 FT FROM A FIRE DEPARTMENT VEHICLE ACCESS. IFC § 503.1.1
25. APPROVED SECONDARY FIRE APPARATUS ACCESS SHALL BE PROVIDED FOR ON OR MORE DWELLING UNITS, ROAD(S) WITH DEAD- ENDS OR A SINGLE POINT OF ACCESS IN EXCESS OF 600 FT. CLV REGULATION AND MOU
26. ALL DEAD-END FIRE APPARATUS ROADS AND/OR FIRE LANES, PUBLIC OR PRIVATE, IN EXCESS OF 150 FT IN LENGTH SHALL BE PROVIDED WITH AN APPROVED TURN AROUND HAVING A MINIMUM DIAMETER OF 81 FT. CLV REGULATION
27. ALL FIRE APPARATUS ACCESS ROADS SHALL BE MARKED BY PLACING APPROVED SIGNS AT THE START OF THE DESIGNATED FIRE LANE, ONE SIGN AT THE END OF THE FIRE LANE AND WITH SIGNS AT INTERVALS OF 100 FT ALONG THE DESIGNATED FIRE LANES. SIGNS TO BE PLACED ON BOTH SIDES OF AN ACCESS ROADWAY IF NEEDED TO PREVENT PARKING ON EITHER SIDE. SIGNS TO BE INSTALLED NO HIGHER THAN 10 FT OR LESS THAN 6 FT FROM THE ROADWAY LEVEL. THE CURB ALONG OR ON THE PAVEMENT OR CEMENT (IF NO CURB IS PROVIDED) SHALL BE PAINTED WITH A RED WEATHER RESISTANT PAINT IN ADDITION TO THE SIGNS. IFC § 503.3
28. ELECTRICALLY CONTROLLED ACCESS GATES SHALL BE PROVIDED WITH AN APPROVED EMERGENCY VEHICLE DETECTOR/RECEIVER SYSTEM. IFC § 503.6
29. WHERE STREETS ARE PROVIDED WITH MEDIAN DIVIDERS, OR HAVING FOUR OR MORE TRAVEL LANES AND A TRAFFIC COUNT OF MORE THAN 30,000 VEHICLES PER DAY, ALL HYDRANTS BEING UTILIZED TO DELIVER FIRE FLOW TO THE PROPOSED LOCATION SHALL BE LOCATED ON THE SAME SIDE OF THE STREET AS THE PROPOSED DEVELOPMENT. CLV REGULATION

2.5 CITY OF LAS VEGAS GRADING NOTES

1. IN THE EVENT THAT ANY UNFORESEEN CONDITIONS NOT COVERED BY THESE NOTES ARE ENCOUNTERED DURING GRADING OPERATIONS, THE OWNER/ENGINEER SHALL BE IMMEDIATELY NOTIFIED FOR DIRECTION.
2. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PERFORM ALL NECESSARY CUTS AND FILLS WITHIN THE LIMITS OF THIS PROJECT AND THE RELATED OFF-SITE WORK, SO AS TO GENERATE THE DESIRED SUBGRADE, FINISH GRADES AND SLOPES SHOWN.
3. CONTRACTOR SHALL TAKE FULL RESPONSIBILITY FOR ALL EXCAVATION. ADEQUATE SHORING SHALL BE DESIGNED AND PROVIDED BY THE CONTRACTOR TO PREVENT UNDERMINING OF ANY ADJACENT FEATURES OR FACILITIES AND/OR CAVING OF THE EXCAVATION.
4. THE CONTRACTOR IS WARNED THAT AN EARTHWORK BALANCE WAS NOT NECESSARILY THE INTENT OF THIS PROJECT. ANY ADDITIONAL MATERIAL REQUIRED OR LEFTOVER MATERIAL FOLLOWING EARTHWORK OPERATIONS BECOMES THE RESPONSIBILITY OF THE CONTRACTOR.
5. THE GRADING CONTRACTOR IS RESPONSIBLE TO COORDINATE WITH THE OWNER TO PROVIDE FOR THE REQUIREMENTS OF THE PROJECT STORM WATER POLLUTION PREVENTION PLAN (SWPPP) AND ASSOCIATED PERMIT.
6. CONTRACTOR SHALL GRADE TO THE LINES AND ELEVATIONS SHOWN ON THE PLANS WITHIN THE FOLLOWING HORIZONTAL AND VERTICAL TOLERANCES AND DEGREES OF COMPACTION, IN THE AREAS INDICATED:

	HORIZONTAL	VERTICAL COMPACTION	
A. PAVEMENT AREA SUBGRADE	0.1'+	+0.0' TO -0.1'	SEE SOILS REPORT
B. ENGINEERED FILL	0.5'+	+0.1' TO -0.1'	SEE SOILS REPORT

COMPACTION TESTING WILL BE PERFORMED BY THE OWNER OR HIS REPRESENTATIVE.

7. ALL CUT AND FILL SLOPES SHALL BE PROTECTED UNTIL EFFECTIVE EROSION CONTROL HAS BEEN ESTABLISHED.
8. THE USE OF POTABLE WATER WITHOUT A SPECIAL PERMIT FOR BUILDING OR CONSTRUCTION PURPOSES INCLUDING CONSOLIDATION OF BACKFILL OR DUST CONTROL IS PROHIBITED. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS FOR CONSTRUCTION WATER.
9. THE CONTRACTOR SHALL MAINTAIN THE STREETS, SIDEWALKS AND ALL OTHER PUBLIC RIGHT-OF-WAY IN A CLEAN, SAFE AND USABLE CONDITION. ALL SPILLS OF SOIL, ROCK OR CONSTRUCTION DEBRIS SHALL BE PROMPTLY REMOVED FROM THE PUBLICLY OWNED PROPERTY DURING CONSTRUCTION AND UPON COMPLETION OF THE PROJECT. ALL ADJACENT PROPERTY, PRIVATE OR PUBLIC SHALL BE MAINTAINED IN A CLEAN, SAFE AND USABLE CONDITION.
10. IN THE EVENT THAT ANY TEMPORARY CONSTRUCTION ITEM IS REQUIRED THAT IS NOT SHOWN ON THESE DRAWINGS, THE OWNER AGREES TO PROVIDE AND INSTALL SUCH ITEM AT HIS OWN EXPENSE AND AT THE DIRECTION OF THE CITY ENGINEER. TEMPORARY CONSTRUCTION INCLUDES DITCHES, BERMS, ROAD SIGNS AND BARRICADES, ETC.

UTILITY LOCATION NOTE TO CONTRACTOR

EXISTING UTILITY LOCATIONS SHOWN HEREIN 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 OR UTILITIES NOT SHOWN IN THEIR PROPER LOCATIONS. CALL BEFORE YOU DIG: 1 (800) 227-2600; SOUTHWEST GAS CORPORATION: 702-400-1789 (STANDBY CONTACT NUMBER)

2.1 CITY OF LAS VEGAS GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA NEVADA", LATEST ISSUE; THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION, CLARK COUNTY AREA NEVADA", LATEST REVISED EDITION; THE "SUMMERLIN IMPROVEMENT STANDARDS" FOR WORK IN THE SUMMERLIN AREA; AND OTHER APPLICABLE APPROVED STANDARDS ISSUED BY THE CONTROLLING AGENCY; THE UNIFORM BUILDING CODE; AND ALL LOCAL CITY CODES AND ORDINANCES APPLICABLE, EXCEPT AS NOTED ON THIS SHEET AS "DEVIATIONS FROM STANDARDS".
2. THE EXISTENCE AND LOCATION OF ANY OVERHEAD OR UNDERGROUND UTILITY LINES, PIPES, OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A RESEARCH OF THE AVAILABLE RECORDS. EXISTING UTILITIES AS SHOWN FROM CLV PLANS LIBRARY ARE APPROXIMATE AND FOR RECORD PURPOSES. EXISTING UTILITIES ARE LOCATED ON PLANS ONLY FOR THE CONVENIENCE OF THE CONTRACTOR, EXISTING UTILITY SERVICE LATERALS MAY NOT BE SHOWN ON THE PLANS. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, LOCATE ALL UNDERGROUND AND OVERHEAD INTERFERENCES WHICH MAY AFFECT HIS OPERATION DURING CONSTRUCTION AND SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID DAMAGE TO SAME. THE CONTRACTOR SHALL USE EXTREME CAUTION WHEN WORKING NEAR OVERHEAD UTILITIES SO AS TO SAFELY PROTECT ALL PERSONNEL AND EQUIPMENT, AND SHALL BE RESPONSIBLE FOR ALL COST AND LIABILITY IN CONNECTION THEREWITH.
3. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT EXISTING UTILITY LINES, STRUCTURES AND STREET IMPROVEMENTS WHICH ARE TO REMAIN IN PLACE, FROM DAMAGE, AND ALL SUCH IMPROVEMENTS OR STRUCTURES DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR REPLACED SATISFACTORY TO THE CITY ENGINEER AND OWNING UTILITY COMPANY AT THE EXPENSE OF THE CONTRACTOR.
4. ALL CONSTRUCTION SHALL BE AS SHOWN ON THESE PLANS, ANY REVISIONS SHALL HAVE THE PRIOR WRITTEN APPROVAL OF THE CITY ENGINEER.
5. TYPE V CEMENT SHALL BE USED IN ALL OFF-SITE CONCRETE WORK. CONCRETE TO BE 3000 P.S.I. MINIMUM @ 28 DAYS. MIX DESIGNS TO BE APPROVED BY THE CITY, PRIOR TO THE USE ON THE PROJECT.
6. PERMITS ARE REQUIRED FOR ANY WORK IN THE PUBLIC RIGHT-OF-WAY. THE CONTRACTOR SHALL SECURE ALL PERMITS AND INSPECTIONS REQUIRED FOR THIS CONSTRUCTION.
7. EXPANSION JOINTS REQUIRED, MAXIMUM EVERY 300'IN EXTRUDED-TYPE CURB.
8. AC PAVEMENT TO BE ONE-HALF INCH (½") ABOVE LIP OF ALL GUTTERS AFTER COMPACTION, EXCEPT AT SIDEWALK RAMPS AND CROSS GUTTERS.
9. CURB AND GUTTER FOUND TO BE UNACCEPTABLE TO THE CITY OF LAS VEGAS SHALL BE REMOVED AND REPLACED PER STANDARD DRAWING 216.
10. SIDEWALK RAMPS SHALL BE CONSTRUCTED IN EACH QUADRANT OF AN INTERSECTION PER STANDARD DRAWING 235. EXACT LOCATION OF RAMPS MAY BE ADJUSTED IN THE FIELD BY A CITY INSPECTOR.
11. CONTRACTOR SHALL PROVIDE ALL NECESSARY HORIZONTAL AND VERTICAL TRANSITIONS BETWEEN NEW CONSTRUCTION AND EXISTING SURFACES TO PROVIDE FOR PROPER DRAINAGE AND FOR INGRESS AND EGRESS TO NEW CONSTRUCTION. THE EXTENT OF THE TRANSITIONS TO BE AS SHOWN ON PLANS.
12. ALL GRADING WORK SHALL CONFORM TO THE SOILS REPORT AS PREPARED BY ADD GEO, REPORT #ADD FIELD, ADD FIELD APPROVED BY THE CITY ENGINEER, AND AS SHOWN ON THESE PLANS.
13. EXACT LOCATION OF ALL SAWCUT LINES MAY BE

ABBREVIATIONS

AC	ASPHALTIC CONCRETE OR ACRE
AGG	AGGREGATE BASE
APN	ASSESSORS PARCEL NUMBER
APPROX. OR ~	APPROXIMATE
AVE	AVENUE
@	AT
BC	BEGIN CURVE OR BACK OF CURB
BCR	BEGINNING OF CURB RETURN
BHW	BOTTOM OF HEADWALL
BLDG	BUILDING
BLVD	BOULEVARD
BM	BENCHMARK
BVC	BEGIN VERTICAL CURVE
BWV	BACK WATER VALVE
CC	CLARK COUNTY
CCAUSD	CLARK COUNTY AREA UNIFORM STANDARD DRAWINGS
CCPW	CLARK COUNTY PUBLIC WORKS
CCRFCD	CLARK COUNTY REGIONAL FLOOD DISTRICT
CCWRD	CLARK COUNTY WATER RECLAMATION DISTRICT
CE	COMMON ELEMENT
CL,C/L,C	CENTERLINE
CLR	CLEAR OR CLEARANCE
CLSM	CONTROLLED LOW STRENGTH MATERIAL
CLV	CITY OF LAS VEGAS
CML&C	CEMENT MORTAR LINED AND COATED
CMU	CONCRETE MASONRY UNIT
CNLV	CITY OF NORTH LAS VEGAS
COH	CITY OF HENDERSON
CONC	CONCRETE
CT	COURT
CY OR CU YD	CUBIC YARD
DCWCS	DESIGN AND CONSTRUCTION FOR WASTEWATER COLLECTION SYSTEMS
DE	DRAINAGE EASEMENT
DET	DETAIL
DI	DUCTILE IRON OR DRAIN INLET
DIA, ø	DIAMETER
DIP	DUCTILE IRON PIPE
DR	DRIVE
DWG(S)	DRAWING
DWY	DRIVEWAY
EA	EACH
EOR	END CURB RETURN
EG	EXISTING GROUND
ELEV	ELEVATION
ESMT	EASEMENT
EP	EDGE OF PAVEMENT
ERU	EQUIVALENT RESIDENTIAL UNIT
EVC	END VERTICAL CURVE
EX OR EXIST	EXISTING
FC	FACE OF CURB
FF	FINISHED FLOOR
FG	FINISHED GRADE
FGH	FINISHED GRADE, HIGH SIDE
FGL	FINISHED GRADE, LOW SIDE
FH	FIRE HYDRANT
FL	FLOWLINE
FT	FEET OR FOOT
FUT	FUTURE
GRD	GRADE OR GROUND
GB	GRADE BREAK OR GRADE CHANGE
GV	GATE VALVE
HDPE	HIGH DENSITY POLYETHYLENE
HOA	HOME OWNERS ASSOCIATION
HORZ	HORIZONTAL
HP	HIGH POINT
HWL	HIGH WATER LEVEL
HDWL OR HW	HEADWALL
HYD	HYDRAULIC OR HYDRANT
ID	INSIDE DIAMETER
IN	INCH
INT	INTERSECTION
INV	INVERT ELEVATION
IP	IRON PIPE
IRRG	IRRIGATION
LF	LINEAR FEET
LMC	LANDSCAPE MAINTENANCE CORPORATION
LP	LOW POINT
LT OR L	LEFT
LVVWD	LAS VEGAS VALLEY WATER DISTRICT
LWL	LOW WATER LEVEL
MAX	MAXIMUM
MECH	MECHANICAL
MH	MANHOLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MUE	MUNICIPAL UTILITY EASEMENT
NDOT	NEVADA DEPARTMENT OF TRANSPORTATION
NTS	NOT TO SCALE
NUE	NONEXCLUSIVE UTILITY EASEMENT
NVE	NV ENERGY
OC	ON CENTER
OD	OUTSIDE DIAMETER OR OVERALL DIMENSION
OFF	OFFSET
ORIG	ORIGINAL
PAE	PUBLIC OR PEDESTRIAN ACCESS EASEMENT
PB	PULL BOX
PC	POINT OF CURVE
PCC	POINT OF COMPOUND CURVE
PDE	PUBLIC DRAINAGE EASEMENT
℄ OR PL	PROPERTY LINE
POB	POINT OF BEGINNING
POC	POINT OF CURVATURE
POE	POINT OF ENDING
PRC	POINT OF REVERSE CURVATURE
PRELIM	PRELIMINARY
PROP	PROPOSED
PRV	PRESSURE REDUCING VALVE
PUE	PUBLIC UTILITY EASEMENT
PT	POINT OF TANGENT OR POINT
PVC	POLYVINYL CHLORIDE
PVI	POINT OF VERTICAL INTERSECTION
QTY	QUANTITY
R	RADIUS
RCA	REINFORCED CONCRETE ARCH
RCB	REINFORCED CONCRETE BOX
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
ROWY ESMT	ROADWAY EASEMENT
REQD	REQUIRED
REV	REVISION
RG	ROUGH GRADE
RT OR R	RIGHT
RW, ROW	RIGHT OF WAY
S	SLOPE
SCH	SCHEDULE
SD	STORM DRAIN
SDDI	STORM DRAIN DROP INLET
SDMH	STORM DRAIN MANHOLE
SEC	SECTION
SF	SQUARE FEET
SHT	SHEET
SLTC	STREET LIGHT & TRAFFIC CONTROL ESMT
SNWA	SOUTHERN NEVADA WATER AUTHORITY
SPECS	SPECIFICATIONS
ST	STREET
SSMH	SANITARY SEWER MANHOLE
STA	STATION
STD	STANDARD
STL	STEEL
STLT	STREET LIGHT
SW	SIDEWALK
SWG	SOUTHWEST GAS
SWR OR SS	SANITARY SEWER
SY	SQUARE YARD
TAN	TANGENT
TC	TOP OF CURB
TF	TOP OF FLOOR OR TOP OF FOOTING
TG	TOP OF GRATE
THRU	THROUGH
THW	TOP OF HEADWALL
TP	TOP OF PIPE
TW	TOP OF WALL
TRW	TOP OF RETAINING WALL
TSW	TOP OF SCREEN WALL
TYP	TYPICAL
UDACS	UNIFORM DESIGN AND CONSTRUCTION STANDARDS
UE	UTILITY EASEMENT
VC	VERTICAL CURVE
VERT	VERTICAL
VG	VALLEY GUTTER
WI	WROUGHT IRON
WL	WATER LINE
WPZ	WATER PRESSURE ZONE
WT	WEIGHT
WTR	WATER LINE

SPECIAL NOTE

IN THE EVENT THAT ANY TEMPORARY CONSTRUCTION ITEM IS REQUIRED WHICH IS NOT SHOWN ON THESE DRAWINGS. THE OWNER AGREES TO PROVIDE AND INSTALL SUCH ITEM AT HIS OWN EXPENSE AND AT THE DIRECTION OF THE CITY OF LAS VEGAS DEPT. OF PUBLIC WORKS. TEMPORARY CONSTRUCTION ITEMS INCLUDE: PAVEMENT TRANSITIONS, PROTECTIVE DITCHES AND BERMS, ROAD SIGNS AND BARRICADES, ETC.

NOTICE TO CONTRACTOR

-QUANTITIES SHOWN ARE ESTIMATES ONLY AND ARE INTENDED TO ILLUSTRATE SCOPE OF WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE EXACT QUANTITIES INVOLVED.

-EXISTING UTILITY LOCATIONS SHOWN HEREIN 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 OR UTILITIES NOT SHOWN IN THEIR PROPER LOCATIONS. CALL BEFORE YOU DIG: (800) 227-2600

LEGEND

EXISTING	PROPOSED	DESCRIPTION
(1900)	1900	5' CONTOUR
		1' CONTOUR
		STRIPING
		SEWER MANHOLE
		CURB AND GUTTER
EX 8" PVC SS	8" PVC SS	SANITARY SEWER PIPE AND FLOW ARROW
EX 8" PVC WTR	8" PVC WTR	WATER PIPE
		WATER GATE VALVE
		FIRE HYDRANT
		WATER BLOW-OFF
		WATER LATERAL W/ METER
		SANITARY SEWER LATERAL
		STREETLIGHT
		EDGE OF PAVEMENT
		TRAFFIC SIGN
PAD= XXX.X FF = XXX.X	PAD= XXX.X FF = XXX.X	PAD ELEVATION FINISHED FLOOR ELEVATION
TC 100.00	TC 100.00	ELEVATION
		RETAINING WALL
		STORM DRAIN W/ MANHOLE

	EXISTING GAS GATE VALVE
@MH	EXISTING UNKNOWN MANHOLE
GAS	EXISTING GAS, SIZE PER PLAN
	EXISTING POWER POLE
	EXISTING TRAFFIC SIGNAL
	EXISTING WALL
	WATER PIPE FITTING
POC	WATER POINT OF CONNECTION
POC	SEWER POINT OF CONNECTION
	DAYLIGHT LINE
	STREET CENTERLINE
	RIGHT-OF-WAY
	MATCHLINE
	BOUNDARY LINE
	PHASE LINE
℄	PROPERTY LINE
	FLOWLINE
	SAWCUT
FILL / CUT	CUT/FILL TRANSITION LINE
	SIDEWALK
	EX STRIPING TO BE OBLITERATED
	GRADE BREAK LINE
	REFLECTIVE RAISED PAVEMENT MARKERS
BWV	BACK WATER VALVE
	WROUGHT IRON FENCE
	PONY WALL
	DECORATIVE PERIMETER WALL
	DECORATIVE PERIMETER RETAINING WALL
	PROPOSED CURB AND GUTTER WITH RIGHT-OF-WAY AT BACK OF CURB
	EXISTING CURB AND GUTTER WITH RIGHT-OF-WAY AT BACK OF CURB
	FUTURE CURB AND GUTTER WITH RIGHT-OF-WAY AT BACK OF CURB

	PROPOSED SCARP AREA
	DRIVEWAY
	PROPOSED RIP RAP
	SIGHT VISIBILITY ZONE PER STD DWG NO. 201.2
	HANDICAP RAMP

QUANTITIES

			PRIVATE	PUBLIC
DRAINAGE				
1.	RIPRAP D50=3", THK=6"	SF	2538	–
2.	RIPRAP D50=12", THK=24"	SF	23302	–
3.	SIDEWALK UNDER DRAIN	SF	–	21
4.	CONCRETE DRAINAGE 2' FLUME	LF	30	–
5.	CONCRETE DRAINAGE 4' FLUME	LF	15	–
SEWER SYSTEM				
1.	4" PVC SEWER LATERAL (PRIVATE)	LF	–	–
2.	8" PVC SEWER PIPE (PUBLIC)	LF	–	–
3.	STANDARD 48" SEWER MANHOLE (PUBLIC)	EA	–	–
4.	8" SEWER PIPE CAP	EA	–	–
5.	BACK WATER VALVE	EA	–	–
6.	8" C-900 WATER QUALITY SEWER PIPE (PUBLIC)	EA	–	–
7.				
WATER SYSTEM				
1.	FIRE HYDRANT ASSEMBLY W/6" GATE VALVE PER UDACS PLATE NO. 40	EA	–	–
2.	6" PVC WATER PIPE (CLASS 150)	LF	–	–
3.	8" PVC WATER PIPE (CLASS 150)	LF	–	–
4.	8" DIP WATER PIPE (CLASS 53)	LF	–	–
5.	8" GATE VALVE WITH VALVE BOX PER UDACS PLATE NO. 30 & 39	EA	–	–
6.	8" X 6" TEE PER UDACS PLATE NO. 31	EA	–	–
7.	8" X 8" TEE PER UDACS PLATE NO. 31	EA	–	–
8.	8" 5 DEGREE BEND WITH RESTRAINED JOINTS	EA	–	–
9.	8" 11.25 DEGREE BEND PER UDACS PLATE NO. 31	EA	–	–
10.	8" 22.5 DEGREE BEND PER UDACS PLATE NO. 31	EA	–	–
11.	8" 45 DEGREE BEND PER UDACS PLATE NO. 31	EA	–	–
12.	8" 90 DEGREE BEND PER UDACS PLATE NO. 31	EA	–	–
13.	CAP AND 2" BLOW-OFF ASSEMBLY W/CAP PER UDACS PLATE NO. 36	EA	–	–
14.	1" COPPER SERVICE W/ 3/4" METER PER UDACS PLATE NO. 2	EA	–	–
15.	1" COPPER SERVICE W/ 1" METER PER UDACS PLATE NO. 4	EA	–	–
16.	1" COPPER SERVICE W/ 3/4" METER & 1" RPPA PER UDACS PLATE NO. 4 & 8	EA	–	–
		EA	–	
STREET IMPROVEMENTS				
1.	2" A.C. PAVEMENT W/ 4" TYPE II OVER 6" TYPE I AGGREGATE BASE	SY	–	–
2.	STANDARD 18" TYPE "L" ISLAND CURB & GUTTER W/6" TYPE I AGGREGATE BASE	LF	–	–
3.	STANDARD 8" TYPE "A" ISLAND CURB W/6" TYPE I AGGREGATE BASE	LF	–	–
4.	STANDARD 30" TYPE "ROLL" CURB & GUTTER W/6" TYPE I AGGREGATE BASE	LF	–	–
5.	4' WIDE CONCRETE SIDEWALK W/4" TYPE II AGGREGATE BASE	SF	–	–
6.				–
7.				
TRAFFIC SIGNALS				
1.	30" STOP SIGN WITH POST (R1-1)	EA	–	–
2.	9" STREET NAME SIGN (D-3, BROWN W/ WHITE LETTERS)(6 POLES x 2 PER POLE=12)	EA	–	–
3.	BLUE COLORED REFLECTIVE RAISED PAVEMENT MARKER	EA	–	–
4.	CROSSWALK MARKINGS	LF	–	–
5.				
6.				
7.				
8.				
DRY UTILITIES				
1.	100W H.P.S. LUMINAIRE STREET LIGHT W/DECORATIVE POLE	EA	–	–
2.	1-1/4" PVC STREET LIGHT CONDUIT WITH (2) #4 AND (1) #8 CONDUCTORS	LF	–	–
3.	NO. 3-1/2 PULL BOX W/METAL COVER	EA	–	–
4.	150 AMP SERVICE PEDESTAL (IRR)	EA	–	–
5.	200 AMP SERVICE PEDESTAL (STLT)	EA	–	–
6.				

APPROVED FOR CONSTRUCTION

AS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES

PROJECT NO. PROJ # FIRST APPROVED DATE:
VVWD APPROVED FIRE FLOW FLOW ! GPM AT 20 PS RESIDUAL

SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NV.

REYES COCA-COLA-BOTTLING, L.L.C.

230 NORTH MOJAVE ROAD LAS VEGAS, NV 89101

ABBREVIATIONS LEGEND & QUANTITY SHEET

S36
T20
R61

DATE: 07/16/19
DRAFTER: EV
DESIGNER: AP
CHECKED: TM

PROJECT NO.
MHC1901-000

C-3
SHEET 3 OF 16

CLV# XXX

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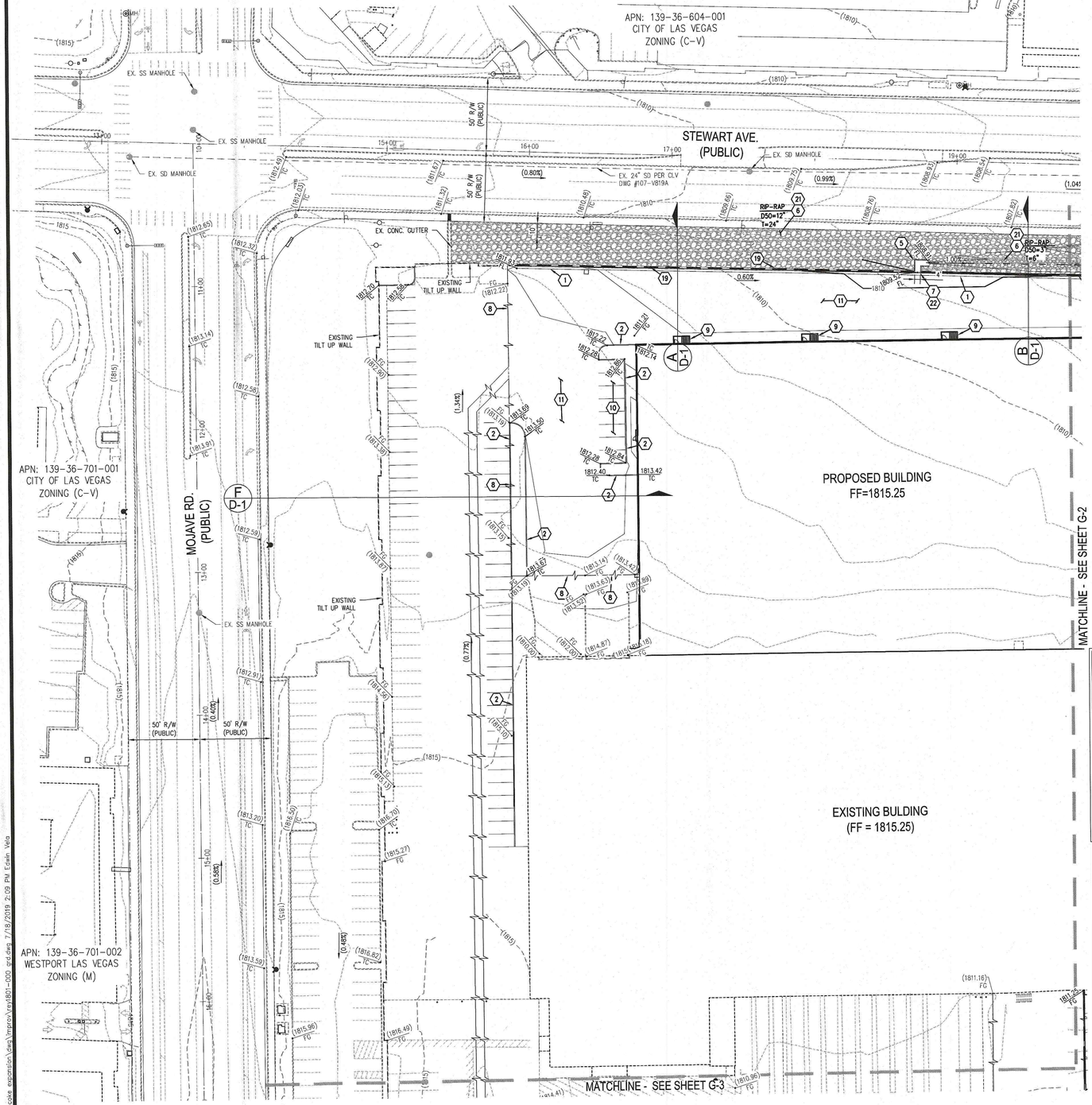
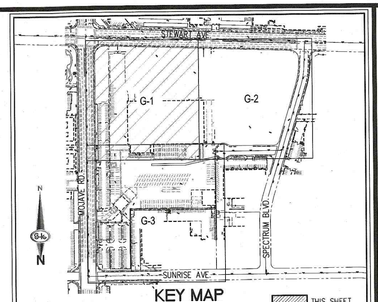
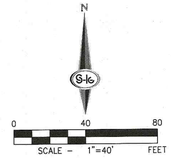






GRADING NOTES

1. CONSTRUCT "L" TYPE CURB & GUTTER PER CCAUSD DWG NO. 216.
2. CONSTRUCT 6" A-TYPE CURB PER DETAIL 4, SHEET D-1.
3. INSTALL SIDEWALK UNDERDRAIN PER CCAUSD# 236
4. CONSTRUCT COMMERCIAL DRIVEWAY CCAUSD NO. 225 WITH CONCRETE CROSS GUTTER PER CCAUSD NO. 228.
5. CONSTRUCT CONCRETE DRAINAGE FLUME PER DETAIL 2, SHEET D-1.
6. INSTALL RIP-RAP (SIZE PER PLAN) OVER 12" TYPE II GRANULAR BEDDING (PER SPEC 704.03.04) COMPACTED TO 90%.
7. CONSTRUCT 2' CURB OPENING PER DETAIL 6, SHEET D-1.
8. SAWCUT & MATCH EXISTING A.C.
9. SEE ARCHITECTURAL PLANS FOR RAMP, STAIR, AND HANDRAIL DETAILS.
10. CONSTRUCT 2" AC PAVEMENT OVER 10" TYPE II AGGREGATE BASE.
11. CONSTRUCT 3" AC PAVEMENT OVER 16" TYPE II AGGREGATE BASE.
12. CONSTRUCT 5" PCC PAVEMENT OVER 6" TYPE II AGGREGATE BASE.
13. INSTALL NEW FENCE. REFER TO ARCHITECT PLANS FOR DETAILS.
14. CONSTRUCT 10' WIDE 5" PCC PAVEMENT OVER 6" TYPE II AGGREGATE BASE FOR GUARDSHACK AND SHADE STRUCTURES REFER TO ARCHITECT PLANS.
15. CONSTRUCT CASE I SIDEWALK RAMP PER PLANS, USING ARMOR TILE TRUNCADE DOMES OR EQUIVALENT PER CCAUSD No. 235
16. CONSTRUCT 5' SIDEWALK, UNLESS INDICATED OTHERWISE ON PLANS PER CCAUSD No. 234.
17. CONSTRUCT INDUSTRIAL DRIVEWAY, PER CCAUSD No. 224.
18. PROPOSED WALL BY OTHERS.
19. CONSTRUCT 12" A-TYPE CURB PER DETAIL 5, SHEET D-1.
20. NOT USED
21. CONSTRUCT WALL OPENING PER DETAIL A ON THIS SHEET.
22. CONSTRUCT DEPRESSED CURB PER DETAIL 1, SHEET D-1.
23. CONSTRUCT CONCRETE PAD FOR SLIDDING TRACK GATE

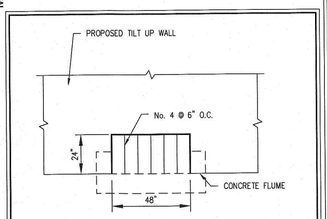
SEE SHEET C-3 FOR ABBREVIATIONS

QUANTITIES

			PRIVATE	PUBLIC
DRAINAGE				
1.	RIPRAP D50=3", THK=6"	SF	2538	–
2.	RIPRAP D50=12", THK=24"	SF	23302	–
3.	SIDEWALK UNDER DRAIN	SF	–	21
4.	CONCRETE DRAINAGE 2' FLUME	LF	30	–
5.	CONCRETE DRAINAGE 4' FLUME	LF	15	–

GENERAL NOTES

1. SEE HORIZONTAL CONTROL PLANS FOR CENTERLINE AND BACK OF CURB CURVE DATA.
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND REPORT ALL DISCREPANCIES TO THE ENGINEER.
3. ALL IMPROVEMENTS TO BE PROTECTED FROM EROSION BY SWPPP.
4. MAXIMUM/MINIMUM SLOPES AND MINIMUM STREET SECTIONS NOT TO EXCEED THAT SHOWN ON GEOTECH REPORT.
5. SEE DETAIL SHEETS FOR SECTIONS AND DETAILS.
6. ALL PUBLIC AND PRIVATE DRAINAGE IMPROVEMENTS TO BE BONDED FOR AND INSPECTED.
7. CONSTRUCTION OF WALLS REQUIRES A SEPARATE BUILDING PERMIT AND APPROVAL.
8. EXISTING UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. CONTRACTOR TO VERIFY LOCATION AND ELEVATION OF EXISTING UTILITY STRUCTURES AND FACILITIES AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION. CONTRACTOR TO PROTECT IN PLACE DURING CONSTRUCTION. ENGINEER/OWNER SHALL BE NOTIFIED OF PRIOR DAMAGE TO EXISTING FACILITIES PRIOR TO CONSTRUCTION. CONTRACTOR WILL BE RESPONSIBLE FOR REPAIR/REPLACING FACILITIES IF ENGINEER/OWNER IS NOT NOTIFIED OF EXISTING DAMAGE PRIOR TO CONSTRUCTION COMMENCING.
9. NO STRUCTURE, VEGETATION, OR OBJECTS OF ANY KIND IS PERMITTED OVER TWENTY-FOUR (24) INCHES IN HEIGHT (MEASURED FROM THE TOP OF THE ADJACENT CURB IF CURB EXIST) WITHIN THE SIGHT VISIBILITY ZONES.
10. ALL ON-SITE STORM DRAINS AND THE ASSOCIATED FACILITIES ARE PRIVATELY OWNED AND TO BE MAINTAINED.
11. CONTRACTOR TO VERIFY ALL HANDICAP ACCESSIBLE ROUTES AND PARKING STALLS ARE IN CONFORMANCE WITH A.D.A ACCESSIBILITY GUIDELINES AND DO NOT EXCEED MAXIMUM SLOPES IN ANY DIRECTION PRIOR TO CONSTRUCTION. CONTRACTOR TO NOTIFY ENGINEER OF ANY DISCREPANCIES.
12. CONSTRUCT A.D.A. ROUTE, HAND RAILS, PARKING, SIGNAGE & RAMPS TO COMPLY WITH ICC/ANSI A117.1-2001A.
13. ALL AREAS, AS INDICATED ON THIS SET OF PLANS, SHOWN TO BE PAVED OR HARDSCAPE SHALL REMAIN NATURAL DESERT OR LANDSCAPING.



A WALL OPENING DETAIL
NOT TO SCALE

STORMWATER RUNOFF MANAGEMENT

(REQUIRED FOR ALL SITES GREATER THAN 1 ACRE (43,560 SQ.FT.))

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 ACCUMULATE IN, THE PUBLIC RIGHTS OF WAYS AS A RESULT OF CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS SITE DEVELOPMENT OR CONSTRUCTION PROJECT. SUCH MATERIALS SHALL BE PREVENTED FROM ENTERING THE STORM SEWER SYSTEM.
2. ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT PRACTICES MAY BE REQUIRED OF THE OWNER AND HIS OR HER AGENTS DUE TO UNFORESEEN EROSION PROBLEMS OR IF THE SUBMITTED PLAN DOES NOT MEET THE PERFORMANCE STANDARDS SPECIFIED IN THE CITY OF LAS VEGAS AND THE LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDANCE MANUAL.
3. TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE AND NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. SOME EXCEPTIONS MAY APPLY; REFER TO NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.5.
4. AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL INSPECT ALL DISTURBED AREAS, AREAS USED FOR STORAGE OF MATERIALS AND EQUIPMENT THAT ARE EXPOSED TO PRECIPITATION, VEHICLE ENTRANCE AND EXIT LOCATIONS AND ALL BMPS WEEKLY, AND WITHIN 24 HOURS AFTER ANY ACTUAL 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 NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.12.
5. ACCUMULATED SEDIMENT IN BMPS SHALL BE REMOVED WITHIN SEVEN DAYS AFTER A STORMWATER RUNOFF EVENT OR PRIOR TO THE NEXT ANTICIPATED STORM EVENT, WHICHEVER IS EARLIER. SEDIMENT MUST BE REMOVED WHEN BMP DESIGN CAPACITY HAS BEEN REDUCED BY 50 PERCENT OR MORE.

FEMA FLOOD ZONE DESIGNATION

THE PROJECT IS LOCATED WITHIN A FEMA DESIGNATED ZONE 'X' (OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN) ON THE FLOOD INSURANCE RATE MAP (FIRM) PANEL 32003C2186F DATED NOVEMBER 16, 2011.

GEOTECHNICAL ENGINEER

PREPARED BY: NOVA GEOTECHNICAL & INSPECTIONAL SERVICES
ADDRESS: 4480 WEST HACIENDA AVE. SUITE 104. LAS VEGAS, NEVADA 89118.
PHONE: (702) 873-3478
PROJECT No. G-18-248
DATED: JANUARY 28, 2019.

FAST
Call before you
UnderGround
1-702-432-5300
FREEWAY & ARTERIAL SYSTEM OF TRANSPORTATION (F.A.S.T.)

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 811
OR
1-800-227-2600

EARTHWORK QUANTITIES

EARTHWORK QUANTITIES (RAW):
–CUT = 412 CUBIC YARDS.
–FILL = 32,714 CUBIC YARDS

A) THE ABOVE QUANTITIES DO NOT REFLECT LOSSES DUE TO SUBSIDENCE OR SHRINKAGE.
B) THE ABOVE QUANTITIES DO REFLECT USING NATIVE MATERIAL IN LIEU OF TYPE I GRAVEL BASE MATERIAL FOR STREET SECTIONS.
C) THE ABOVE QUANTITIES DO NOT REFLECT ANY EARTHWORK WHICH MAY BE REQUIRED BY THE ENGINEER TO CONSTRUCT ADDITIONAL PROTECTIVE DITCHES OR BERMS NOT SHOWN ON THESE DRAWINGS.

BASIS OF BEARING

NORTH 00°13'30" WEST, BEING THE BEARING OF A PORTION OF MOJAVE ROAD AS SHOWN BY MAP THEREOF IN BOOK 43, PAGE 10 OF PLATS, OFFICIAL RECORDS, CLARK COUNTY, NEVADA.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK 2LV0126C4, RIVET & PLATE IN TOP OF CURB, AT SE CORNER OF STEWART & MOJAVE.

ELEVATION = 552.357 METERS
ELEVATION = 1812.19 U.S. SURVEY FEET (NAVD 88)

FLOOD CERIFICATION

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED FLOOD STUDY CLV #_____ ON FILE AT THE CITY OF LAS VEGAS FOR THE SUBJECT PROJECT.

ARMANDO PINEDA, P.E. 18290 — DATE 7-18-19

APPROVALS

ARMANDO PINEDA
Exp. 12-31-2019
CIVIL
No. 18290
PROFESSIONAL ENGINEER - STATE OF NEVADA
7-18-19

SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NV.

REYES COCA-COLA-BOTTLING, L.L.C.

230 NORTH MOJAVE ROAD LAS VEGAS, NV 89101

GRADING SHEET 1

S36 T20 R61

DATE: 07/16/19
DRAFTER: EV
DESIGNER: AP
CHECKED: TM

PROJECT NO.
MHC1901-000

G-1
SHEET 5 OF 16

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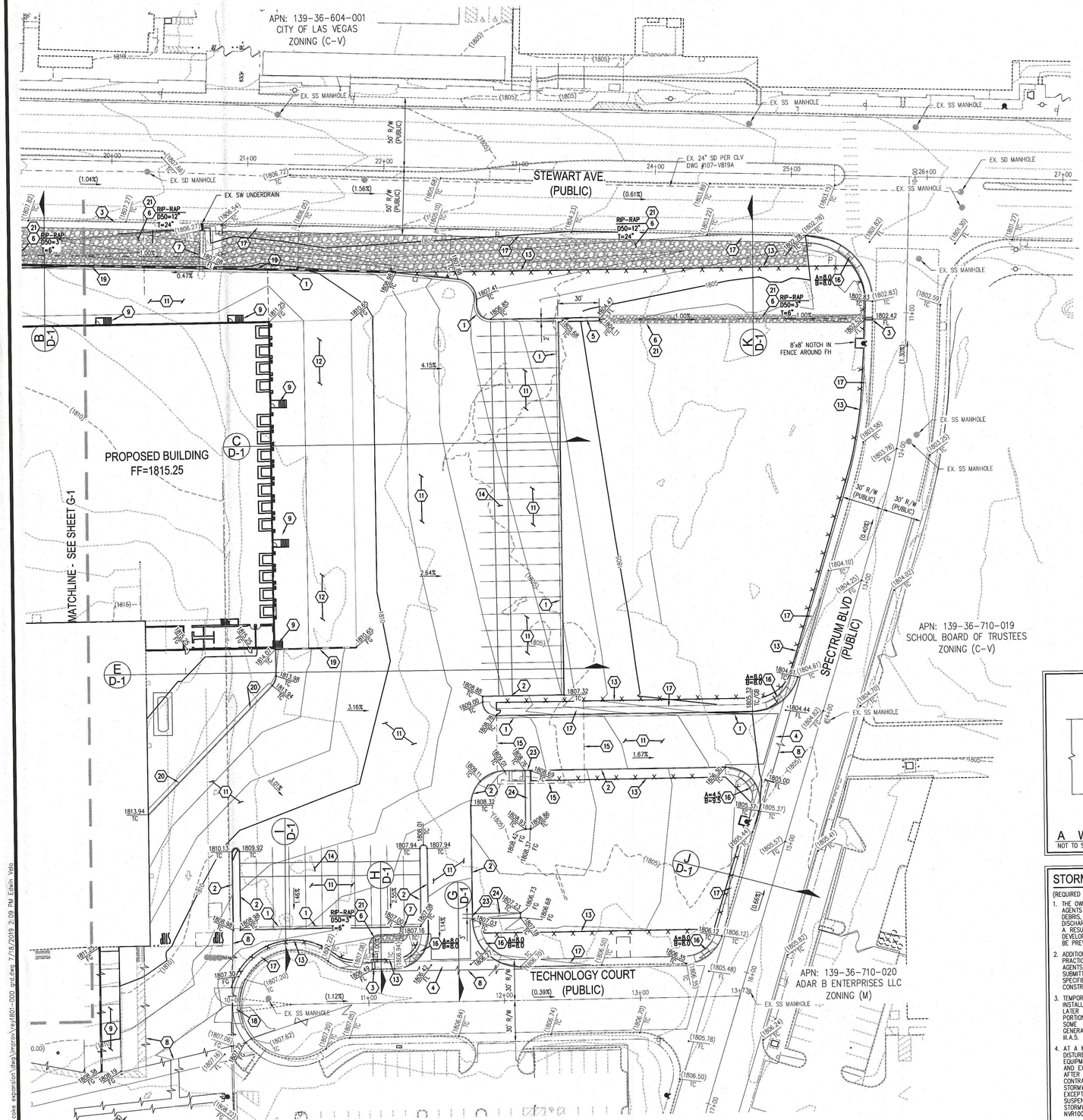
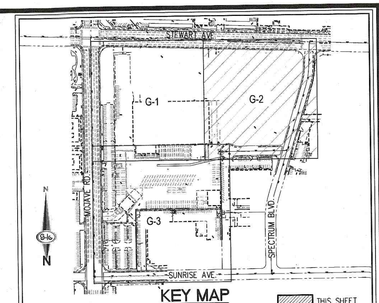
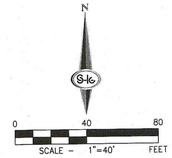






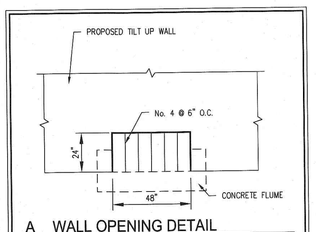
GRADING NOTES

1. CONSTRUCT "L" TYPE CURB & GUTTER PER CCAUSD DWG NO. 216.
2. CONSTRUCT 6" A-TYPE CURB PER DETAIL 4, SHEET D-1.
3. INSTALL SIDEWALK UNDERDRAIN PER CCAUSD# 236
4. CONSTRUCT COMMERCIAL DRIVEWAY CCAUSD NO. 225 WITH CONCRETE CROSS GUTTER PER CCAUSD NO. 228.
5. CONSTRUCT CONCRETE DRAINAGE FLUME PER DETAIL 2, SHEET D-1.
6. INSTALL RIP-RAP (SIZE PER PLAN) OVER 12" TYPE II GRANULAR BEDDING (PER SPEC 704.03.04) COMPACTED TO 90%.
7. CONSTRUCT 2' CURB OPENING PER DETAIL 6, SHEET D-1.
8. SAWCUT & MATCH EXISTING A.C.
9. SEE ARCHITECTURAL PLANS FOR RAMP, STAIR, AND HANDRAIL DETAILS.
10. CONSTRUCT 2" AC PAVEMENT OVER 10" TYPE II AGGREGATE BASE.
11. CONSTRUCT 3" AC PAVEMENT OVER 16" TYPE II AGGREGATE BASE.
12. CONSTRUCT 5" PCC PAVEMENT OVER 6" TYPE II AGGREGATE BASE.
13. INSTALL NEW FENCE. REFER TO ARCHITECT PLANS FOR DETAILS.
14. CONSTRUCT 10' WIDE 5" PCC PAVEMENT OVER 6" TYPE II AGGREGATE BASE.
15. FOR GUARDSHACK AND SHADE STRUCTURES REFER TO ARCHITECT PLANS.
16. CONSTRUCT CASE I SIDEWALK RAMP PER PLANS, USING ARMOR TILE TRUNCADE DOMES OR EQUIVALENT PER CCAUSD No. 235
17. CONSTRUCT 5' SIDEWALK, UNLESS INDICATED OTHERWISE ON PLANS PER CCAUSD No. 234.
18. CONSTRUCT INDUSTRIAL DRIVEWAY, PER CCAUSD No. 224.
19. PROPOSED WALL BY OTHERS.
20. CONSTRUCT 12" A-TYPE CURB PER DETAIL 5, SHEET D-1.
21. NOT USED
22. CONSTRUCT WALL OPENING PER DETAIL A ON THIS SHEET.
23. CONSTRUCT DEPRESSED CURB PER DETAIL 1, SHEET D-1.
24. CONSTRUCT CONCRETE PAD FOR SLIDDING TRACK GATE

SEE SHEET C-3 FOR ABBREVIATIONS

QUANTITIES

			PRIVATE	PUBLIC
DRAINAGE				
1.	RIPRAP D50=3", THK=6"	SF	2538	–
2.	RIPRAP D50=12", THK=24"	SF	23302	–
3.	SIDEWALK UNDER DRAIN	SF		21
4.	CONCRETE DRAINAGE 2' FLUME	LF	30	–
5.	CONCRETE DRAINAGE 4' FLUME	LF	15	–



A WALL OPENING DETAIL
NOT TO SCALE

STORMWATER RUNOFF MANAGEMENT

(REQUIRED FOR ALL SITES GREATER THAN 1 ACRE (43,560 SQ.FT.))

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 ACCUMULATE IN, THE PUBLIC RIGHTS OF WAYS AS A RESULT OF CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS SITE DEVELOPMENT OR CONSTRUCTION PROJECT. SUCH MATERIALS SHALL BE PREVENTED FROM ENTERING THE STORM SEWER SYSTEM.
2. ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT PRACTICES MAY BE REQUIRED OF THE OWNER AND HIS OR HER AGENTS DUE TO UNFORESEEN EROSION PROBLEMS OR IF THE SUBMITTED PLAN DOES NOT MEET THE PERFORMANCE STANDARDS SPECIFIED IN THE CITY OF LAS VEGAS AND THE LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDANCE MANUAL.
3. TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE AND NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. SOME EXCEPTIONS MAY APPLY; REFER TO NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.5.
4. AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL INSPECT ALL DISTURBED AREAS, AREAS USED FOR STORAGE OF MATERIALS AND EQUIPMENT THAT ARE EXPOSED TO PRECIPITATION, VEHICLE ENTRANCE AND EXIT LOCATIONS AND ALL BMPS WEEKLY, AND WITHIN 24 HOURS AFTER ANY ACTUAL 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 NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.12.
5. ACCUMULATED SEDIMENT IN BMPS SHALL BE REMOVED WITHIN SEVEN DAYS AFTER A STORMWATER RUNOFF EVENT OR PRIOR TO THE NEXT ANTICIPATED STORM EVENT, WHICHEVER IS EARLIER. SEDIMENT MUST BE REMOVED WHEN BMP DESIGN CAPACITY HAS BEEN REDUCED BY 50 PERCENT OR MORE.

GENERAL NOTES

1. SEE HORIZONTAL CONTROL PLANS FOR CENTERLINE AND BACK OF CURB CURVE DATA.
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND REPORT ALL DISCREPANCIES TO THE ENGINEER.
3. ALL IMPROVEMENTS TO BE PROTECTED FROM EROSION BY SWPPP.
4. MAXIMUM/MINIMUM SLOPES AND MINIMUM STREET SECTIONS NOT TO EXCEED THAT SHOWN ON GEOTECH REPORT.
5. SEE DETAIL SHEETS FOR SECTIONS AND DETAILS.
6. ALL PUBLIC AND PRIVATE DRAINAGE IMPROVEMENTS TO BE BONDED FOR AND INSPECTED.
7. CONSTRUCTION OF WALLS REQUIRES A SEPARATE BUILDING PERMIT AND APPROVAL.
8. EXISTING UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. CONTRACTOR TO VERIFY LOCATION AND ELEVATION OF EXISTING UTILITY STRUCTURES AND FACILITIES AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION. CONTRACTOR TO PROTECT IN PLACE DURING CONSTRUCTION. ENGINEER/OWNER SHALL BE NOTIFIED OF PRIOR DAMAGE TO EXISTING FACILITIES PRIOR TO CONSTRUCTION. CONTRACTOR WILL BE RESPONSIBLE FOR REPAIR/REPLACING FACILITIES IF ENGINEER/OWNER IS NOT NOTIFIED OF EXISTING DAMAGE PRIOR TO CONSTRUCTION COMMENCING.
9. NO STRUCTURE, VEGETATION, OR OBJECTS OF ANY KIND IS PERMITTED OVER TWENTY-FOUR (24) INCHES IN HEIGHT (MEASURED FROM THE TOP OF THE ADJACENT CURB IF CURB EXIST) WITHIN THE SIGHT VISIBILITY ZONES.
10. ALL ON-SITE STORM DRAINS AND THE ASSOCIATED FACILITIES ARE PRIVATELY OWNED AND TO BE MAINTAINED.
11. CONTRACTOR TO VERIFY ALL HANDICAP ACCESSIBLE ROUTES AND PARKING STALLS ARE IN CONFORMANCE WITH A.D.A ACCESSIBILITY GUIDELINES AND DO NOT EXCEED MAXIMUM SLOPES IN ANY DIRECTION PRIOR TO CONSTRUCTION. CONTRACTOR TO NOTIFY ENGINEER OF ANY DISCREPANCIES.
12. CONSTRUCT A.D.A. ROUTE, HAND RAILS, PARKING, SIGNAGE & RAMPS TO COMPLY WITH ICC/ANSI A117.1-2003A.
13. ALL AREAS, AS INDICATED ON THIS SET OF PLANS, SHOWN TO BE PAVED OR HARDSCAPE SHALL REMAIN NATURAL DESERT OR LANDSCAPING.

FEMA FLOOD ZONE DESIGNATION

THE PROJECT IS LOCATED WITHIN A FEMA DESIGNATED ZONE 'X' (OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN) ON THE FLOOD INSURANCE RATE MAP (FIRM) PANEL 32003C2186F DATED NOVEMBER 16, 2011.

GEOTECHNICAL ENGINEER

PREPARED BY: NOVA GEOTECHNICAL & INSPECTIONAL SERVICES
ADDRESS: 4480 WEST HACIENDA AVE. SUITE 104 LAS VEGAS, NEVADA 89118.
PHONE: (702) 873-3478
PROJECT No. G-18-248
DATED: JANUARY 28, 2019.

EARTHWORK QUANTITIES

EARTHWORK QUANTITIES (RAW):
-CUT = 412 CUBIC YARDS.
-FILL = 32,714 CUBIC YARDS

A) THE ABOVE QUANTITIES DO NOT REFLECT LOSSES DUE TO SUBSIDENCE OR SHRINKAGE.
B) THE ABOVE QUANTITIES DO REFLECT USING NATIVE MATERIAL IN LIEU OF TYPE I GRAVEL BASE MATERIAL FOR STREET SECTIONS.
C) THE ABOVE QUANTITIES DO NOT REFLECT ANY EARTHWORK WHICH MAY BE REQUIRED BY THE ENGINEER TO CONSTRUCT ADDITIONAL PROTECTIVE DITCHES OR BERMS NOT SHOWN ON THESE DRAWINGS.

BASIS OF BEARING

NORTH 00°13'30" WEST, BEING THE BEARING OF A PORTION OF MOJAVE ROAD AS SHOWN BY MAP THEREOF IN BOOK 43, PAGE 10 OF PLATS, OFFICIAL RECORDS, CLARK COUNTY, NEVADA.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK 2LVD126C4, RIVET & PLATE IN TOP OF CURB, AT SE CORNER OF STEWART & MOJAVE.

ELEVATION = 552.357 METERS
ELEVATION = 1812.19 U.S. SURVEY FEET (NAVD 88)

FLOOD CERIFICATION

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED FLOOD STUDY CLV #_____ ON FILE AT THE CITY OF LAS VEGAS FOR THE SUBJECT PROJECT.

ARMANDO PINEDA, P.E. 18290 — DATE 7-18-19

APPROVALS

SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300
FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NV.

REYES COCA-COLA-BOTTLING, L.L.C.

230 NORTH MOJAVE ROAD LAS VEGAS, NV 89101

GRADING SHEET 2

S56 T20 R61

DATE: 07/16/19
DRAFTER: EV
DESIGNER: AP
CHECKED: TM

PROJECT NO.
MHC1901-000

PROFESSIONAL ENGINEER — STATE OF NEVADA — ARMANDO PINEDA — Exp. 12-31-2019 — CIVIL — No. 18290 — 7-18-19

G-2
SHEET 6 OF 16

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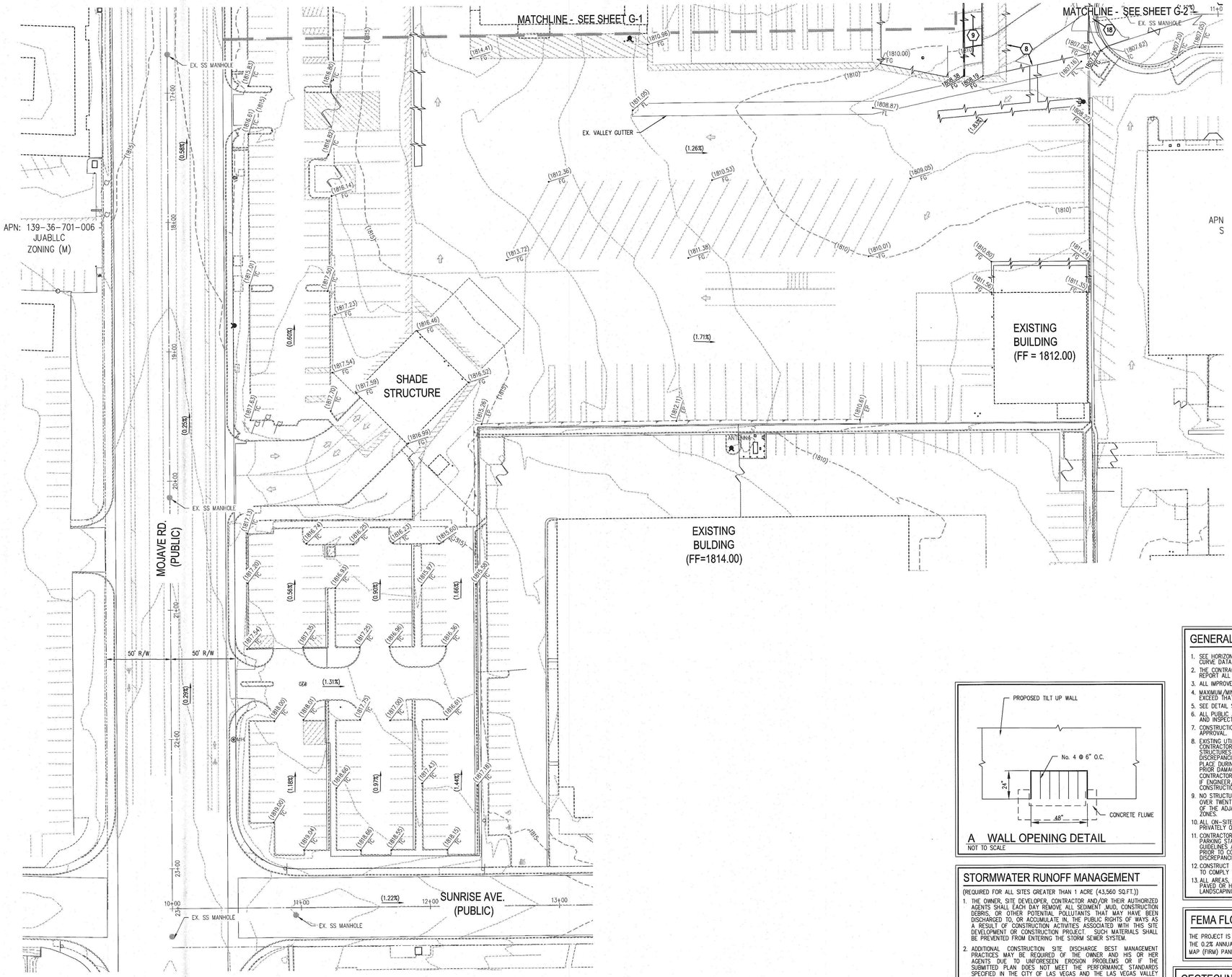

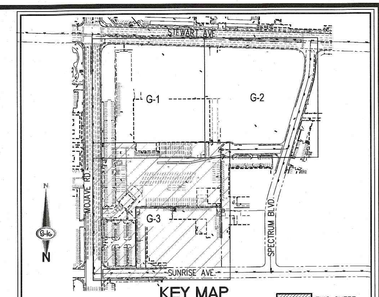

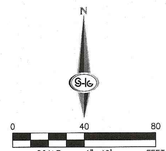

GRADING NOTES

1. CONSTRUCT "L" TYPE CURB & GUTTER PER CCAUSD DWG NO. 216.
2. CONSTRUCT 6" A-TYPE CURB PER DETAIL 4, SHEET D-1.
3. INSTALL SIDEWALK UNDERDRAIN PER CCAUSD# 236
4. CONSTRUCT COMMERCIAL DRIVEWAY CCAUSD NO. 225 WITH CONCRETE CROSS GUTTER PER CCAUSD NO. 228.
5. CONSTRUCT CONCRETE DRAINAGE FLUME PER DETAIL 2, SHEET D-1.
6. INSTALL RIP-RAP (SIZE PER PLAN) OVER 12" TYPE II GRANULAR BEDDING (PER SPEC 704.03.04) COMPACTED TO 90%.
7. CONSTRUCT 2' CURB OPENING PER DETAIL 6, SHEET D-1.
8. SAWCUT & MATCH EXISTING A.C.
9. SEE ARCHITECTURAL PLANS FOR RAMP, STAIR, AND HANDRAIL DETAILS.
10. CONSTRUCT 2" AC PAVEMENT OVER 10" TYPE II AGGREGATE BASE.
11. CONSTRUCT 3" AC PAVEMENT OVER 16" TYPE II AGGREGATE BASE.
12. CONSTRUCT 5" PCC PAVEMENT OVER 6" TYPE II AGGREGATE BASE.
13. INSTALL NEW FENCE. REFER TO ARCHITECT PLANS FOR DETAILS.
14. CONSTRUCT 10' WIDE 5" PCC PAVEMENT OVER 6" TYPE II AGGREGATE BASE.
15. FOR GUARDSHACK AND SHADE STRUCTURES REFER TO ARCHITECT PLANS.
16. CONSTRUCT CASE I SIDEWALK RAMP PER PLANS, USING ARMOR TILE TRUNCADE DOMES OR EQUIVALENT PER CCAUSD No. 235
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ARMANDO PINEDA, P.E. 18290 — 7-18-19 DATE

APPROVALS

A WALL OPENING DETAIL
NOT TO SCALE

GENERAL NOTES

1. SEE HORIZONTAL CONTROL PLANS FOR CENTERLINE AND BACK OF CURB CURVE DATA.
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND REPORT ALL DISCREPANCIES TO THE ENGINEER.
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STORMWATER RUNOFF MANAGEMENT

(REQUIRED FOR ALL SITES GREATER THAN 1 ACRE (43,560 SQ.FT.))

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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 ACTUAL 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 NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.12.
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FEMA FLOOD ZONE DESIGNATION

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GEOTECHNICAL ENGINEER

PREPARED BY: NOVA GEOTECHNICAL & INSPECTIONAL SERVICES
ADDRESS: 4480 WEST HACIENDA AVE. SUITE 104 LAS VEGAS, NEVADA 89118.
PHONE: (702) 873-3478
PROJECT No. G-18-248
DATED: JANUARY 28, 2019.

QUANTITIES		PRIVATE	PUBLIC
DRAINAGE			
1.	RIPRAP D50=3", THK=6"	SF	2538	–
2.	RIPRAP D50=12", THK=24"	SF	23302	–
3.	SIDEWALK UNDER DRAIN	SF	–	21
4.	CONCRETE DRAINAGE 2' FLUME	LF	30	–
5.	CONCRETE DRAINAGE 4' FLUME	LF	15	–

FAST Call before you UnderGround 1-702-432-5300 FREEWAY & ARTERIAL SYSTEM OF TRANSPORTATION (F.A.S.T)

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CALL BEFORE YOU DO OVERHEAD
1-702-227-2929

Call before you Dig
AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.
Call 811 OR 1-800-227-2600

SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NV

REYES COCA-COLA-BOTTLING, L.L.C.

230 NORTH MOJAVE ROAD LAS VEGAS, NV 89101

GRADING SHEET 3

S36
T20
R61

DATE: 07/16/19
DRAFTER: EV
DESIGNER: AP
CHECKED: TM

PROJECT NO.
MHC1901-000

PROFESSIONAL ENGINEER STATE OF NEVADA ARMANDO PINEDA Exp. 12-31-2019 CIVIL No. 18290
7-18-19

G-3
SHEET 7 OF 16

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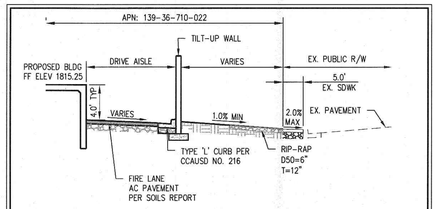

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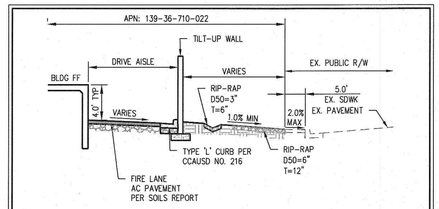

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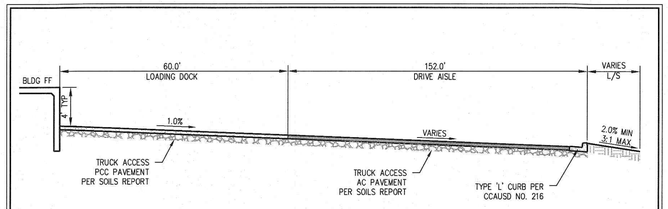

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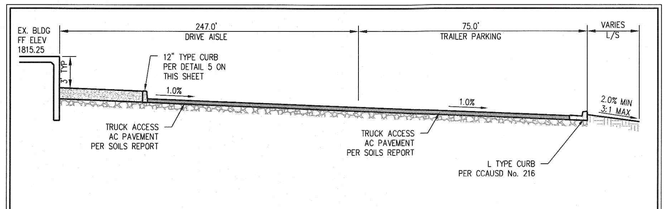

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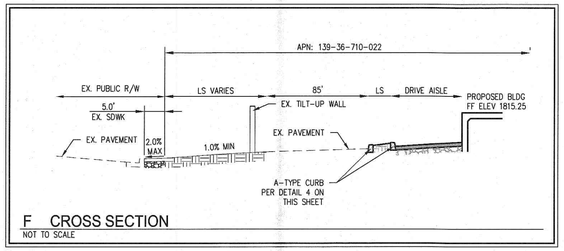

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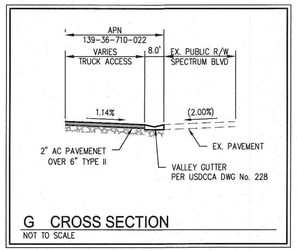

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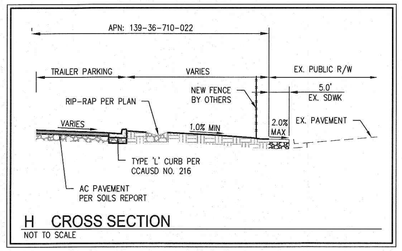

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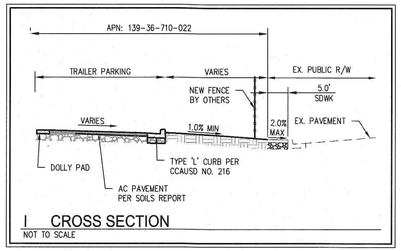

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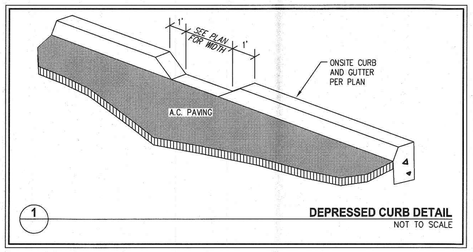

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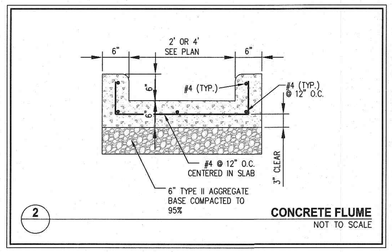
NOT TO SCALE



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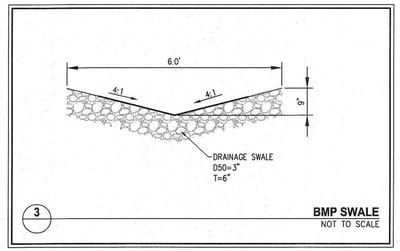
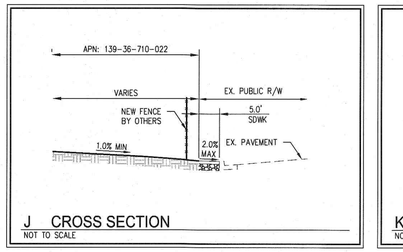
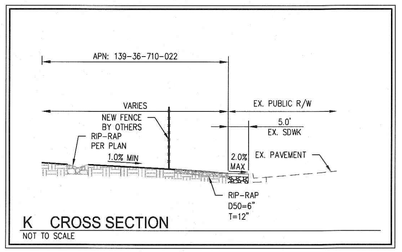
NOT TO SCALE



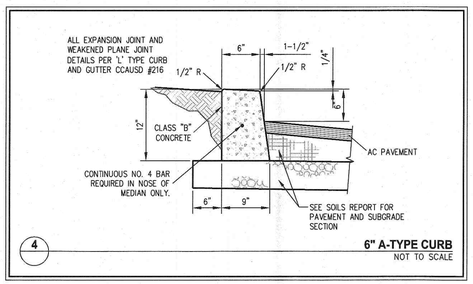
3 BMP SWALE
NOT TO SCALE



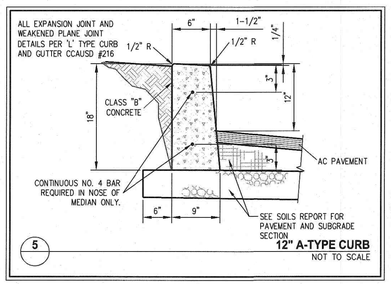
J CROSS SECTION
NOT TO SCALE



K CROSS SECTION
NOT TO SCALE



4 6" A-TYPE CURB
NOT TO SCALE



5 12" A-TYPE CURB
NOT TO SCALE

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NV.

REYES COCA-COLA-BOTTLING, L.L.C.

230 NORTH MOJAVE ROAD LAS VEGAS, NV 89101

DETAIL SHEET 1

S36 T20 R61

DATE: 07/16/19
DRAFTER: EV
DESIGNER: AP
CHECKED: TM
PROJECT NO.
MHC1901-000

PROFESSIONAL ENGINEER STATE OF NEVADA
ARMANDO PINEDA
Exp. 12-31-2019
CIVIL
No. 18290
7-12-19

D-1
SHEET 8 OF 16

CLV# XXX

J:\mhc\1901-000 reyes coke expansion\dwg\arancv\reyl901-000 dtl.dwg 7/18/2019 2:10 PM Edwin Velo