

DS #:

5285

APN:

139.31-602.003

PROJECT:

Springs Preserve Events Plaza

SUBMITTAL:

1st S. Supplement

SCANNED BY/DATE:

CHECKED BY/DATE:



CITY OF LAS VEGAS		DATE: Revision
INTER-OFFICE MEMORANDUM		July 1, 2020
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:	
	Springs Preserve Events Plaza (Springs Preserve Butterfly Playground)	
Cross Streets:	NEQ of Alta Drive & Valley View Boulevard	Lochsa Engineering
File Number:	F:\Depot\DSMemos\DS5285A-Rev.doc	Bart Anderson, P.E., DevCo
Parcel Number:	139-31-602-003	
Zoning Action:	Site Specific SDR not required	
FEMA Flood Zone	YES NO X	
Proposed Storm Drain	YES NO X	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal & Supplement	5/28/2020 & 7/1/2020	6/9/2020 & 7/1/2020	See Comments Below	\$400.00	3878181: \$400
			TOTAL FEES (LDDRS):	\$400.00	----

REMARKS:

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

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

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

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

END OF REMARKS
ays

T/R/S: T20S/R61E/31
AREA M-31

Albert Sung

From: Steve Gebeke
Sent: Wednesday, July 1, 2020 11:18 AM
To: Dianja Gates; Albert Sung; Oh-Sang Kwon; Lucien Paet
Cc: Stevie Parks; Christopher Luquette
Subject: RE: LVVWD Contract C1525 Springs Preserve Events Plaza (Springs Preserve Butterfly Playground) SDR Waiver Request Letter (DS5285A)
Attachments: C1525 Springs Preserve Event Site- Overall Site Plan.pdf; C1525 Waiver SDR Justification Letter_SIGNED.pdf

In the C-V district, all development standards are established through the approval of a site development plan. While the Springs Preserve has been entitled in the past, any changes to the site are subject to review and approval as amendments to the approved SDR through an administrative process. Title 19 allows the building permit process to serve as the SDR in cases where the amendment(s) would be so minor as to have no detrimental impact on the surrounding adjacent uses. After reviewing the attached plan and letter, Planning has determined that the building permit process may serve as the SDR for the proposed improvements as they are located at the interior of the site and not visible from the public ROW. No further entitlements are necessary. Thanks.

No SDR Req'd.

Steve Gebeke, AICP | Planning Supervisor
Department of Planning
Development Services Center
333 N. Rancho Drive, 3rd Floor
702-229-5410 Office | 702-474-7463 Fax



lasvegasnevada.gov



From: Dianja Gates <dianja.gates@snwa.com>
Sent: Wednesday, July 01, 2020 10:40 AM
To: Steve Gebeke <sgebeke@LasVegasNevada.GOV>
Cc: Stevie Parks <Stevie.Parks@lvvwd.com>; Christopher Luquette <christopher.luquette@lvvwd.com>
Subject: LVVWD Contract C1525 Springs Preserve Events Plaza (Springs Preserve Butterfly Playground) SDR Waiver Request Letter (DS5285A)

CAUTION: This email originated from an **External Source**. Please **use caution** before opening attachments, clicking links, or responding to this email. **Do not sign-in with your City of Las Vegas account credentials.**

Good morning Steve,

Attached please find a waiver request letter for the SDR requested during the technical drainage study (DS5285A) review for the subject project. In addition, I have attached the overall site plan for reference.

If you have any questions or need additional information, please contact Christopher Luquette, P.E. at (702) 875-7007.

Sincerely,
Dianja



**LAS VEGAS VALLEY
WATER DISTRICT**

1001 South Valley View Boulevard
Las Vegas, NV 89153
702-870-2011 • lvvwd.com

June 25, 2020

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

Attention: Planning and Development Department

SUBJECT: CONTRACT NO. C1525 – SPRINGS PRESERVE EVENT SITE, WAIVER REQUEST FOR SITE
DEVELOPMENT PLAN REVIEW (JUSTIFICATION)

The Las Vegas Valley Water District (District) is in the process of designing utility infrastructure and facilities to support the improvement of the existing outdoor event area, a small structure for restrooms and vendor/customer use, and other miscellaneous improvements at the Las Vegas Springs Preserve (Springs Preserve), a 160-acre District owned property located at 333 South Valley View Blvd (APN 139-31-602-003).

The existing outdoor event site will receive lighting, electrical, and facility improvement to better support events that currently take place at the Springs Preserve and the multi-purpose structure will provide restroom facilities adjacent to the existing event site, existing playground, existing splash play area, and existing butterfly habitat. The Springs Preserve currently provides portable restrooms to the area for events and would like to reduce or eliminate the need for these types of facilities in the future.

The project consists of the design and construction of grading, domestic water, sewer, electrical, communications, landscaping, and other necessary facilities to enable the installation of the area. The Springs Preserve is an existing developed site with all entitlements already secured. Therefore, no Zoning or Planning submittals or conditions are required. The District respectfully requests a waiver from a site development plan review of this project.

If you have any questions, or require additional information, please contact Christopher M. Luquette, P.E., Senior Civil engineer, at (702) 875-7007.

Sincerely,

Ryan C. Pearson, P.E.
Engineering Division Manager

RCP:CML:SLP:DLG

CONTRACT NUMBER
C1525

REVISIONS:
DRAWING NUMBER L1
SHEET 1 OF 1

DATE
APPROVED BY
RECOMMENDED BY
CHECKED BY
DATE
DATE
DATE

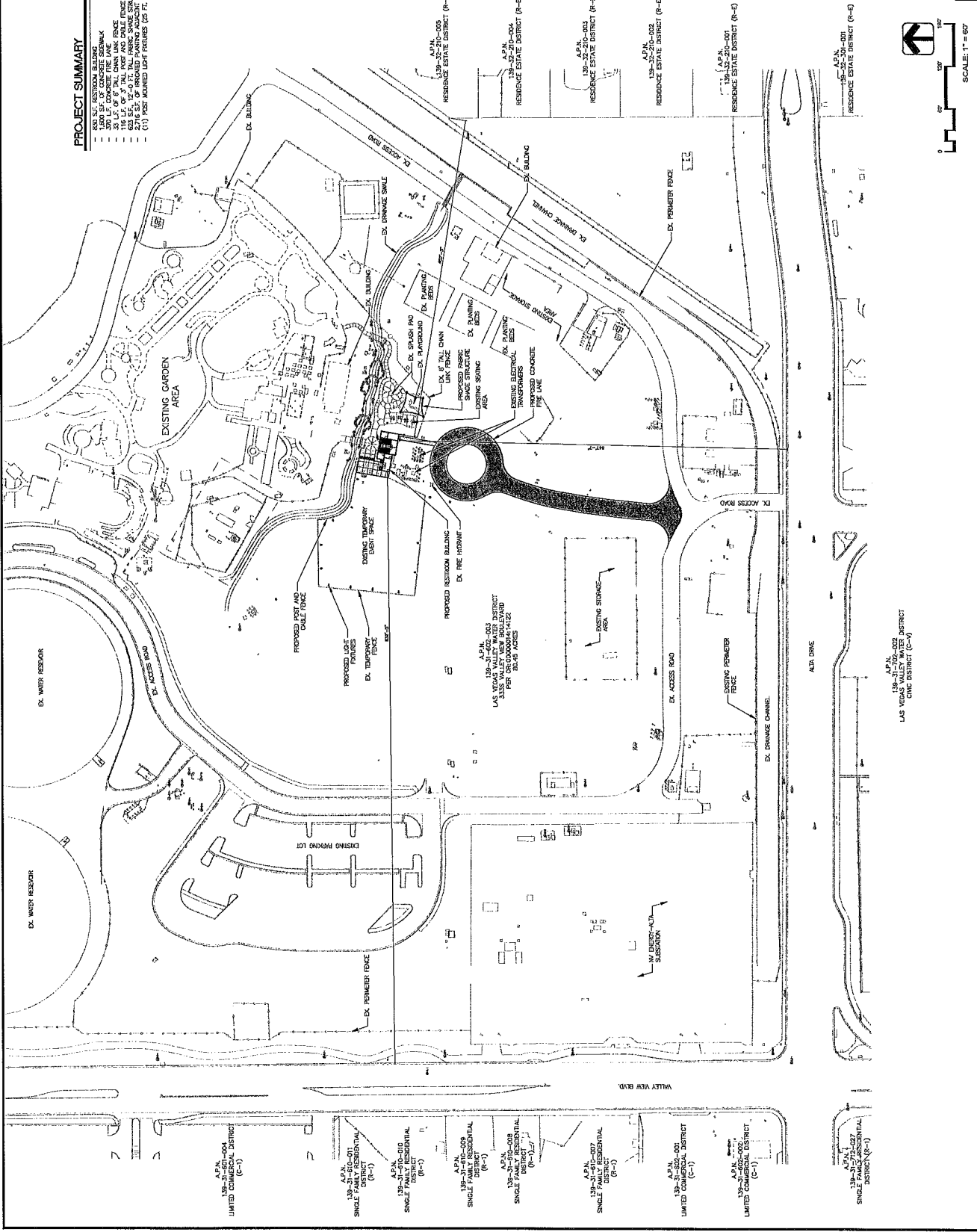
DATE
APPROVED BY
RECOMMENDED BY
CHECKED BY
DATE
DATE
DATE

DATE
APPROVED BY
RECOMMENDED BY
CHECKED BY
DATE
DATE
DATE

DATE
APPROVED BY
RECOMMENDED BY
CHECKED BY
DATE
DATE
DATE

DATE
APPROVED BY
RECOMMENDED BY
CHECKED BY
DATE
DATE
DATE

DATE
APPROVED BY
RECOMMENDED BY
CHECKED BY
DATE
DATE
DATE



CITY OF LAS VEGAS		DATE:
INTER-OFFICE MEMORANDUM		June 9, 2020
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:	COPIES TO:
	Springs Preserve Events Plaza (Springs Preserve Butterfly Playground)	Las Vegas Valley Water District
Cross Streets:	NEQ of Alta Drive & Valley View Boulevard	Lochsa Engineering
File Number:	F:\Depot\DSMemos\DS5285A.doc	Bart Anderson, P.E., DevCo
Parcel Number:	139-31-602-003	
Zoning Action:	SDR-XXXXX	
FEMA Flood Zone	YES NO X	
Proposed Storm Drain	YES NO X	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	5/28/2020	6/9/2020	See Comments Below	\$400.00	Not Paid Yet
			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-XXXXX**) 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.

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/31
AREA M-31

Job No.: 191075
Date: 5/27/2020



TRANSMITTAL

City of Las Vegas Public Works Department
(Flood Control Division)
333 North Rancho Drive
Las Vegas, NV 89106

T 702-365-9312 | F 702-365-9317
6345 S Jones Blvd, Suite 100
Las Vegas, NV 89118

Sent By:

Attention: Mr. Albert Sung, P.E.

- ☒ Our Messenger
☐ Your Messenger
☐ U.S. Mail
☐ Overnight Delivery

RE: Update to TDS for Springs Preserve Events Plaza (Springs Preserve Butterfly Playground)

TRANSMITTED: ☐ Prints ☐ Shop Drawings ☐ Calcs ☐ Specs ☒ Other

Copies	Sheet No.	Description
1		Drainage Study Update, Details and Grading Plan
1		Compact Disc (CD) for Drainage and Plans
1		\$400 submittal check (Design Vision Inc., Check #17044) <i>TO be paid online</i>

☒ For your use ☒ Review as noted ☐ Per your request ☐ Approved and return ____ copies

REMARKS: For your review and approval

Sent By: Chris Blake, E.I.

Received By: _____

**Update to
Technical Drainage Study
For
Springs Preserve Events Plaza
(Springs Preserve Butterfly Playground)**

Lochsa Job No. 191075

March 2020

Prepared for:

Las Vegas Valley Water District
100 City Parkway, Suite #700
Las Vegas, NV 89106
Christopher Luquette, PE
702-875-7007

Prepared by:

Lochsa Engineering
6345 South Jones Boulevard
Suite 100
Las Vegas, Nevada 89118
(702) 365-9312

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL
DRAINAGE STUDY INFORMATION FORM

Name of Development: Spring Preserve Events Plaza Date: March 25, 2020

Location of Development: a) Descriptive (Cross Streets) North/South: Valley View Blvd

East/West: Alta Dr

b) Section: 31 Township: 20 South Range: 61 East

c) APN : 139-31-602-003

Name of Owner: Las Vegas Valley Water District

Telephone No.: 702-875-7007 Fax No.: _____ E-Mail Address: _____

Address: 1001 S. Valley View Blvd Las Vegas, NV 89107

Contact Person-Name: Abdul Bakhshi Telephone No.: (702) 365-9312

* E-Mail Address: Abdul.bakhshi@lochsa.com Fax No.: (702) 365-9317

Firm: Lochsa Engineering

Address: 6345 South Jones Boulevard, Suite 100, Las Vegas, Nevada 89118

Type of Land Development/Land Disturbance Process:

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

1. Total Owned Land Area: At Site: 80.45 +/- Acres Being Developed/Disturbed: 1.40 +/- Acres

2. Is a portion or all of the subject property located in a designated FEMA Flood Hazard Area? ☐ Yes** ☒ No

3. Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? ☒ Yes** ☐ No

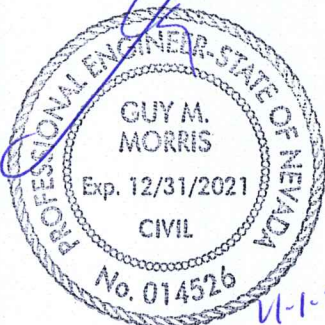
4. Proposed type of development (Residential, Commercial, Etc.): Commercial buildings

5. Approximate upstream land area which drains to the subject site: 4.0 +/- Acres

6. Has the site drainage been evaluated in the past? ☒ YES ☐ NO If yes, please identify documentation: Springs Preserve Butterfly Playground (DS#5077)

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: easterly towards the existing concrete channel

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



Engineer's Seal

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

***New Required Field**

****Review and concurrence of the Clark County Regional Flood Control District is required.**

Revision	Date

Local Entity File No. _____

REFERENCE:

STANDARD FORM 1

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name: Springs Preserve Event Plaza		Map ID:
Firm Name: Lochsa Engineering		Engineer: Guy Morris, PE
Address: 6345 South Jones Boulevard, Ste. 100		
City: Las Vegas	State: NV	Zip: 89118
Phone Number: 702-365-9312	Fax Number: 702-365-9317	
Property Owner: Las Vegas Valley Water District		
Address: 100 City Parkway, Suite 700		
City: Las Vegas	State: NV	Zip: 89106
Reviewed By:	Date Received:	Date Accepted for Review:

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

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

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

I. GENERAL REQUIREMENT

Yes	No	
☒	☐	Design Manual Standard Form 1 with the engineer's seal and signature.
☐	☒ N/A	Design Manual Standard Form 4 .
☐	☒ N/A	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	
☒	☐	A copy of a current Flood Insurance Rate Map (FIRM) with the site delineated.
☒	☐	A copy of the current CCRFCD Master Plan Update Figure, (F-x), for Flood Control Facilities and Environmental areas with the site delineated.

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

II. MAPS AND EXHIBITS (Continued)

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

III. DRAINAGE PLAN

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

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

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

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

- | Yes | No | |
|-------------------------------------|---|--|
| ☐ | ☒ N/A | For areas in Zone A, AE, AH, and AO, base flood elevations (BFEs) must be shown for each lot; BFEs may be listed on each lot, or in a table. Finish floor elevations must be a minimum of 18 inches above BFE. |
| ☒ | ☐ | 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. |
| ☐ | ☒ N/A | Street slopes for perimeter and interior streets. The minimum slope is 0.4 percent. |
| ☐ | ☒ N/A | Location and detail of best management practice (BMP) for parking lots and low impact development (LID) (if required). |

IV. HYDROLOGIC ANALYSIS

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

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

V. HYDRAULIC ANALYSIS

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

REFERENCE:

STANDARD FORM 2



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.)
	N/A	Copies of all conditions of approval for development related to this property. (e.g. zoning, use permit, tentative map, etc.) Verify compliance with conditions.
✓		An electronic copy of the complete submittal is required to be submitted with one original hard copy of the study. Electronic documents should be on a universal computer-readable digital output device replicating your submittal. An Indexed Portable Document Format (PDF) or Print Ready CAD file formats with a minimum of 300dpi are the desired formats. If figures are in color, they must be scanned in color and saved as a separate file. _____ by initial here, the engineer on record acknowledges that the electronic copy is an identical replicate of the original hard copy submitted to the City of Las Vegas.

II. GRADING PLAN INFORMATION		
Yes	No	
✓		(1) 24" X 36" copy of the Grading Plan, (including all Detail Sheets) sealed by the engineer.
✓		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.
✓		Label existing topography at a minimum 5 foot elevation interval including adjacent developments, finished floor elevations of existing buildings and top of existing curbs extending 100 feet* around the perimeter of the site. (*Measured from the centerline of the adjacent roadway.)

CITY OF LAS VEGAS MINIMUM DRAINAGE STUDY CRITERIA CHECKLIST

II. GRADING PLAN INFORMATION		
Yes	No	
	N/A	Proposed on-site and off-site storm drains and other flood control facilities with plan and profile sheets for public storm drains showing the class of pipe, (Class III, IV, V, etc.), design hydraulic grade line, (HGL) and 100 year storm flow. A public drainage easement must be provided over on-site storm drains conveying off-site flows. An overflow path must be provided over all storm drains.
✓		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.
✓		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.
✓		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.
✓		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.
✓		Minimum finish floor elevation is 6 inches above highest adjacent top of curb. Finish floor calculations must include allowances for super elevations on curves and velocity head for tee intersections.
	N/A	Finished floor elevations for buildings adjacent to public drainage easements must be a minimum of 18 inches above the Q100 weir of submerged weir elevation, whichever is greater.

CITY OF LAS VEGAS MINIMUM DRAINAGE STUDY CRITERIA CHECKLIST

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

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

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

April 1, 2020

Albert Sung, P.E.
City of Las Vegas Public Works Department
(Flood Control Division)
333 North Rancho Drive
Las Vegas, NV 89106

Subject: **Springs Preserve Events Plaza**
(Springs Preserve Butterfly Playground)
Lochsa Job No. 191075

Mr. Sung:

This letter certifies that all items provided on the **Springs Preserve Events Plaza (Springs Preserve Butterfly Playground)** electronic submittal matches the paper version bound into the study.

Respectfully submitted,

LOCHSA ENGINEERING

Guy Morris, P.E.



March 25, 2020

Mr. Albert Sung
City of Las Vegas,
Department of Public Works, Flood Control Division
333 N. Rancho Drive,
Las Vegas, NV 89106

Subject: Technical Drainage Study Update for Springs Reserve Event Plaza
(AKA 'Springs Preserve Butterfly Playground')

Previous CLV No.: DS #5077
Assessor's Parcel No. (APN): 139-31-602-003
Lochsa Engineering Project No.: 191075

Dear Mr. Jackson:

This report is intended as an Update to the approved "*Technical Drainage Study for Springs Preserve Butterfly Playground*", hereinafter referred to as the "Original Study." The Original Study was prepared by Greeley and Hansen and approved by City of Las Vegas (DS #5077) on May 28, 2019. The total area of Springs Preserve is 80.45 acres per Clark County Assessors. The existing site conditions includes museums, galleries, outdoor events, a colorful botanical garden and an interpretive trail system. Spring Preserve is used as a community meeting and educational space with undeveloped areas along the southern and eastern perimeters. The property is a combination of paved and landscaped areas and the current site drainage conveys all water easterly toward the Las Vegas Creek-Meadows channel.

In an effort to mitigate potential stormwater flows from washing over and potentially flooding the Butterfly Playground, the approved Original Study proposed a drainage channel between the existing Butterfly Habitat and the Butterfly Playground site. Per the approved grading plan enclosed within this Update, the channel extends from west to easterly direction. The proposed channel that is currently under construction anticipates to intercept runoff from the Butterfly Habitat area and the existing Springs Preserve site runoff originating from the north, west and south direction. The channel is designed to carry the storm runoff generated by the disturbed area (8.93 acres). Additionally, the channel will extend to the northwest to intercept the flow originating from the western parking lot area that could potentially affect the butterfly Playground site. This channel will ultimately terminate and discharge at the Las Vegas Creek-Meadows channel, a Clark County Regional Facility.

The existing area that encompassed the new Butterfly Playground is 8.93 acres, of which 6.35 acres is developed land that is impervious and 2.58 acres is pervious land that consists of landscaping or undeveloped graded soils. The existing drainage pattern are shown in the referenced Figure 2-1 *Existing Drainage Pattern*. Per the original study, the rational method was used to model runoff flows for the 8.93 acres drainage area. The rainfall intensity values used for the drainage basin runoff calculations were 1.15 and 2.06 inches per hour, for the 10 and 100-year. The overall weighted corresponding C-value used for the sub-basins is 0.7598 which results in 7.8 cfs and 13.98 cfs for the 10 and 100-year onsite generated runoff, respectively. Please refer to the excerpts from the Original Study included within this Update.

Lochsa Engineering generally concurs with all the pertinent referenced analyses and results utilized in this study.

The subject site flows in an easterly direction, per the referenced Figure 2-1 *Existing Drainage Pattern*. The subject site was analyzed as a small portion of the overall delineated basin 8.93 acres which ultimately discharges into Las Vegas Creek Meadows channel.

Since the interim conditions of the approved Original Study represent our existing conditions, we will not be providing an existing hydrologic analysis.

Our subject site is 1.40 acres and was analyzed as portion of the Butterfly Playground project (8.93 acres). This subject Update is being submitted to substantiate the drainage design for the proposed buildings and the grading plan.

Please note that the LVVWD Springs Preserve is not required to submit SDR's (NOFA) for onsite improvements.

Master Planning and Site Description

The subject site is 1.40 acres, and located within the Southern Half (S1/2) of the northeast quarter (NE1/4) of Section 31, Township 20 South, Range 61 East, of the M.D.M. within the City of Las Vegas. The property is further identified as the parcel with APN 139-31-602-003. Please refer to the attached Assessor's Parcel Map in the Appendix. The entire site has already been constructed into the subject existing pad, consisting of surface parking and landscaping buffer.

The subject site is located within sub basin AL90-C of the Central Watershed. Refer to the annotated Figure W-5 from the 2018 CCRFCD Las Vegas Valley Master Plan Update (MPU) in the Appendix. Review of the W-5 map indicates that the subject site is comprised of only soil type 1300. As shown in the attached referenced information from the 2018 MPU Curve Number matrix, soil type 1300 consist of mainly soil type 'D', as defined as soils with "high runoff potential".

The subject site is adjacent to multiple existing Clark County Regional Facility channels that ultimately discharges onto the existing detention basin described as 213 ac-ft Meadows Detention Basin (LCME0020). The existing Clark County Regional Facility channels that ultimately discharges onto the detention basin are described as 40'W9.5'D with 0:1SS (LCME0040) and 45'W8.5'D with 0:1 SS (LCME0028) and then Energy Dissipator (LCME0026) before discharging onto the 213AC-FT Meadows Detention Basin (LCME0020). The detention basin, is located northeast corner of the Spring Preserve Park. As shown on the annotated Figure F-29 from the 2018 MPU contained in the Appendix C, the facility is identified as LCME0020.

Floodplain Information

The project site is covered by Flood Insurance Rate Map (FIRM) for the Clark County, Nevada, and incorporated areas, Community Panel Number: 32003C2165D, Effective Date: November 16, 2011. Review of Panel 2165 indicates that the site is entirely located within Zone "X" (unshaded) described by FEMA as: "*Areas determined to be outside the 0.2% annual chance floodplain.*" Please refer to the attached Figure 2 for the location of the site on a portion of the above referenced FIRM.

Proposed Revisions

The proposed improvements per this report comprise of restrooms, concessions, storage, grassy area, fire access road, sidewalks and a proposed building with the proposed finished floor (FF) elevation of 2131.00ft. The proposed improvements per this Update (1.40acres area of disturbance) are just southwest of the Butterfly Habitat building. By using the Ratio method and utilizing the approved 10yr (7.80cfs) and 100yr (13.98cfs) flows from the referenced study for the site area of 8.93 acres, the subject site onsite storm generated runoff is 1.22cfs and 2.19cfs for the 10 and 100 year, respectively. The subject site shall drain northeasterly towards the existing onsite drainage channel that is adjacent to Alta Drive and ultimately drain to the Meadows Detention basin as it follows the historic drainage pattern. We have provided an onsite hydraulic calculation section adjacent to the proposed building to show we have provided double the 100yr depth flood protection.

No additional offsite runoff is expected from our site improvements. The improved area is very minimal and any increase is considered negligible. All existing onsite improvements are to remain (to be protected in place and replaced in-kind if necessary). Refer to the grading plan included with this report.

All the analyses for this project were related to runoff onsite to the Springs Reserve. No additional hydrologic analysis or hydraulic calculations were performed for this report given the

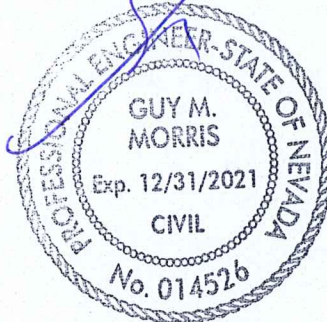
subject site's relatively small basin areas. The subject sites improvements will not present a negative impact to downstream properties.

Should you require any additional information to complete your review, please contact our office.

Sincerely,

LOCHSA ENGINEERING

Abdul Bakhshi



4-1-20

RATIO CALCULATION FOR 10YR & 100YR FLOWS

(GENERATED BY OUR SITE IMPROVEMENTS)

$Q_{10} \approx Q_{100}$ from our Site

Ratio calc.

Approved Flow from Reference Study = 7.80cfs + 13.93cfs
for 8.93ac

our Site $\approx$ 1.40 ac (consists of grass, dirt, concrete, rock)

our site is portion of this area

$$\frac{1.40 \text{ ac}}{Q_{10}} = \frac{8.93 \text{ ac}}{7.80 \text{ cfs}}$$

$Q_{10} = 1.22 \text{ cfs}$

$$\frac{1.40 \text{ ac}}{Q_{100}} = \frac{8.93 \text{ ac}}{13.93 \text{ cfs}}$$

$Q_{100} = 2.19 \text{ cfs}$

APPENDIX A

HYDRAULIC ANALYSIS

Normal Depth Onsite Hydraulic Sections

Section at Upstream Side of Bldg (through the FL/HP)
Worksheet for Irregular Channel

Project Description	
Worksheet	Irregular Channel
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Slope	.005000 ft/ft
Discharge	2.19 cfs

100yr Flow from Ratio CALC.

Options	
Current Roughness Method	used Lotter's Method
Open Channel Weighting	used Lotter's Method
Closed Channel Weighting	Horton's Method

Results	
Mannings Coefficient	0.020
Water Surface Elev.	30.73 ft
Elevation Range	30.50 to 31.00
Flow Area	1.8 ft ²
Wetted Perimeter	15.54 ft
Top Width	15.53 ft
Actual Depth	0.23 ft
Critical Elevation	30.69 ft
Critical Slope	0.012753 ft/ft
Velocity	1.24 ft/s
Velocity Head	0.02 ft
Specific Energy	30.75 ft
Froude Number	0.64
Flow Type	Subcritical

d_{100}

V_{100}

$$FF = 31.00'$$

$$2 \times d_{100} = .46'$$

$$W.S.E. = 30.73'$$

$$d_{100} + .23'$$

$$30.96' < 31.00' (FF)$$

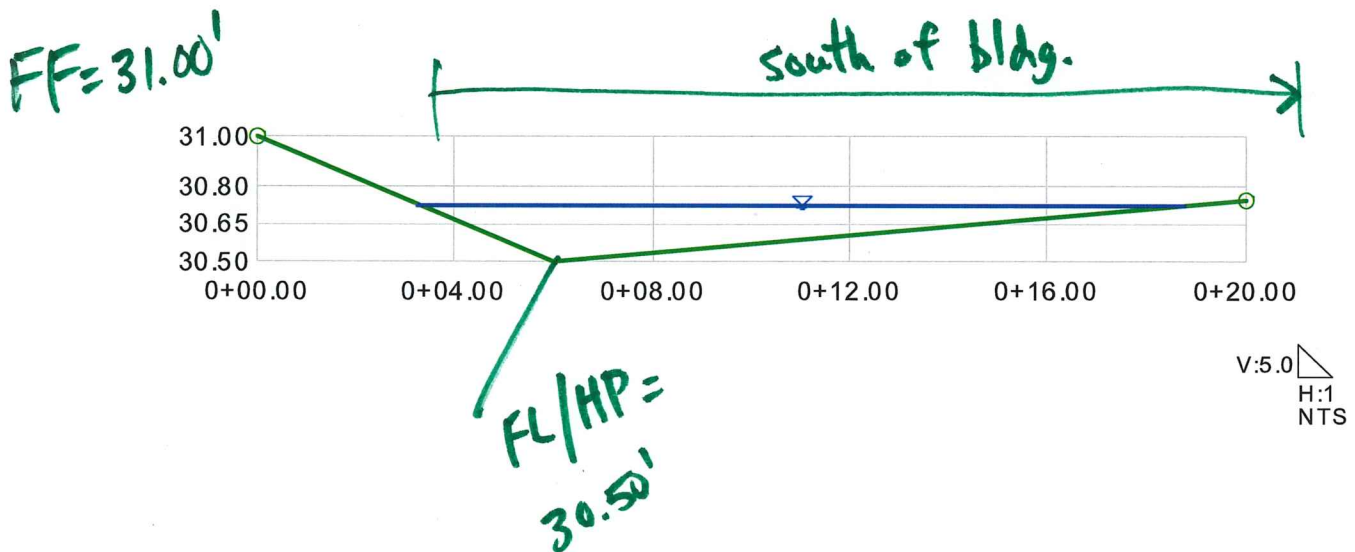
(Meets double 100yr Flow
depth protection)

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+20.00	0.020

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	31.00
0+06.00	30.50
0+20.00	30.75

Section at Upstream Side of Bldg (through the FL/HP) **Cross Section for Irregular Channel**

Project Description	
Worksheet	Irregular Channel
Flow Element	Irregular Channel
Method	Manning's Formul
Solve For	Channel Depth
Section Data	
Mannings Coefficient	0.020
Slope	0.005000 ft/ft
Water Surface Elev.	30.73 ft
Elevation Range	30.50 to 31.00
Discharge	2.19 cfs



APPENDIX B

FIGURES

ASSESSOR'S PARCELS - CLARK COUNTY, NV.
Briana Johnson - Assessor

NOTES

This map is for assessment use only and does NOT represent a survey.

No liability is assumed for the accuracy of the data delineated herein. Information on roads and other non-assessed parcels may be obtained from the Road Document Listing in the Assessor's Office.

This map is compiled from official records, including surveys and deeds, but only contains the information required for assessment. See the recorded documents for more detailed legal information.

USE THIS SCALE(FEET) WHEN MAP REDUCED FROM 1:117 ORIGINAL

0 100 200 400 600 800

MAP LEGEND

- PARCEL BOUNDARY
- SUB BOUNDARY
- PWLD BOUNDARY
- ROAD EASEMENT
- MATCH / LEADER LINE
- HISTORIC LOT LINE
- HISTORIC SUB BOUNDARY
- SECTION LINE

007 ROAD PARCEL NUMBER

001 PARCEL NUMBER

1.00 ACRES

202 PARCEL SUBSEQ NUMBER

PB 24-46 PLAT RECORDING NUMBER

5 BLOCK NUMBER

5 LOT NUMBER

64.3 GOV. LOT NUMBER

BOOK

26 125 124 123

37 138 139 140

64 163 162 161

75 176 177 178

MAP

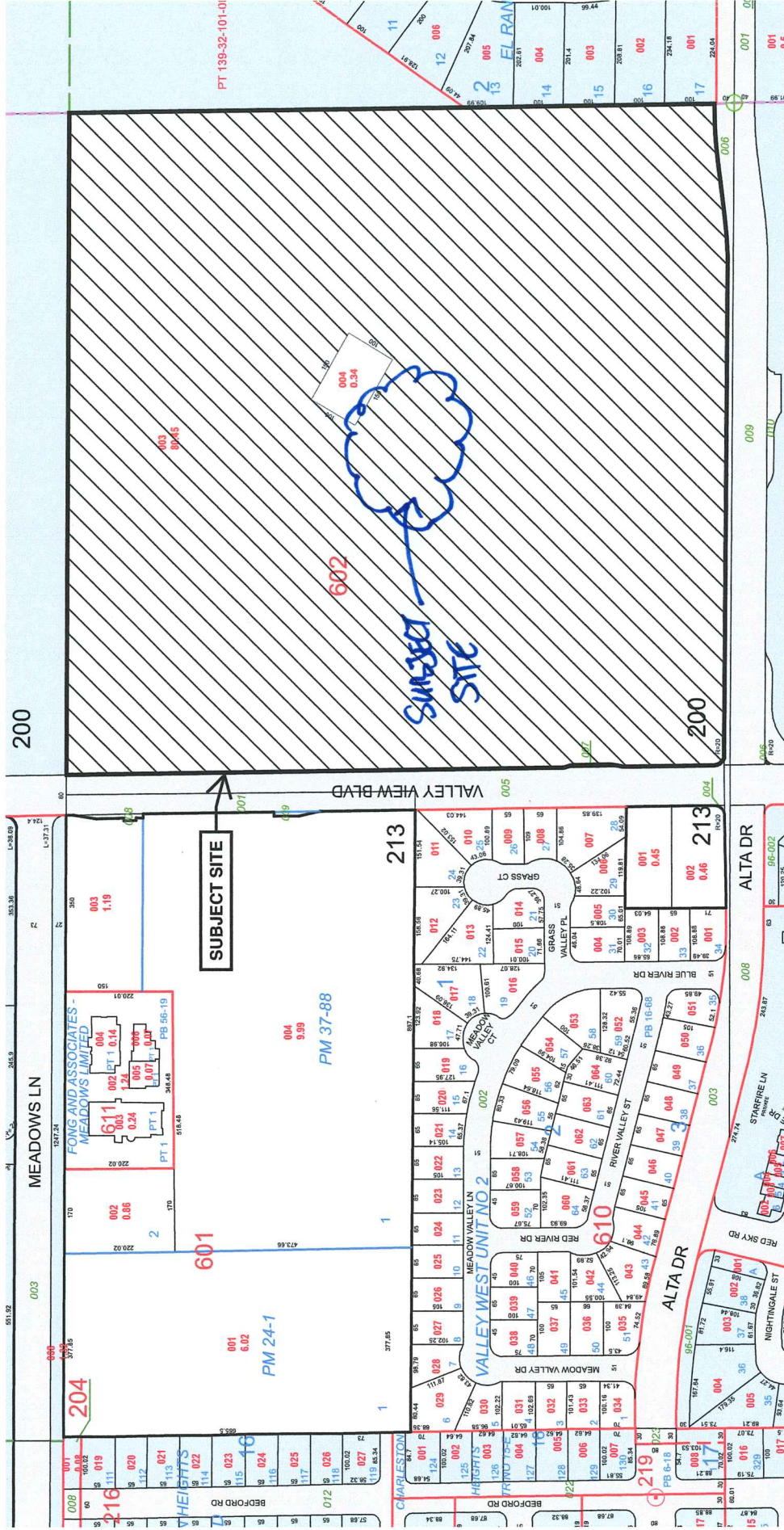
S 2 NE 4

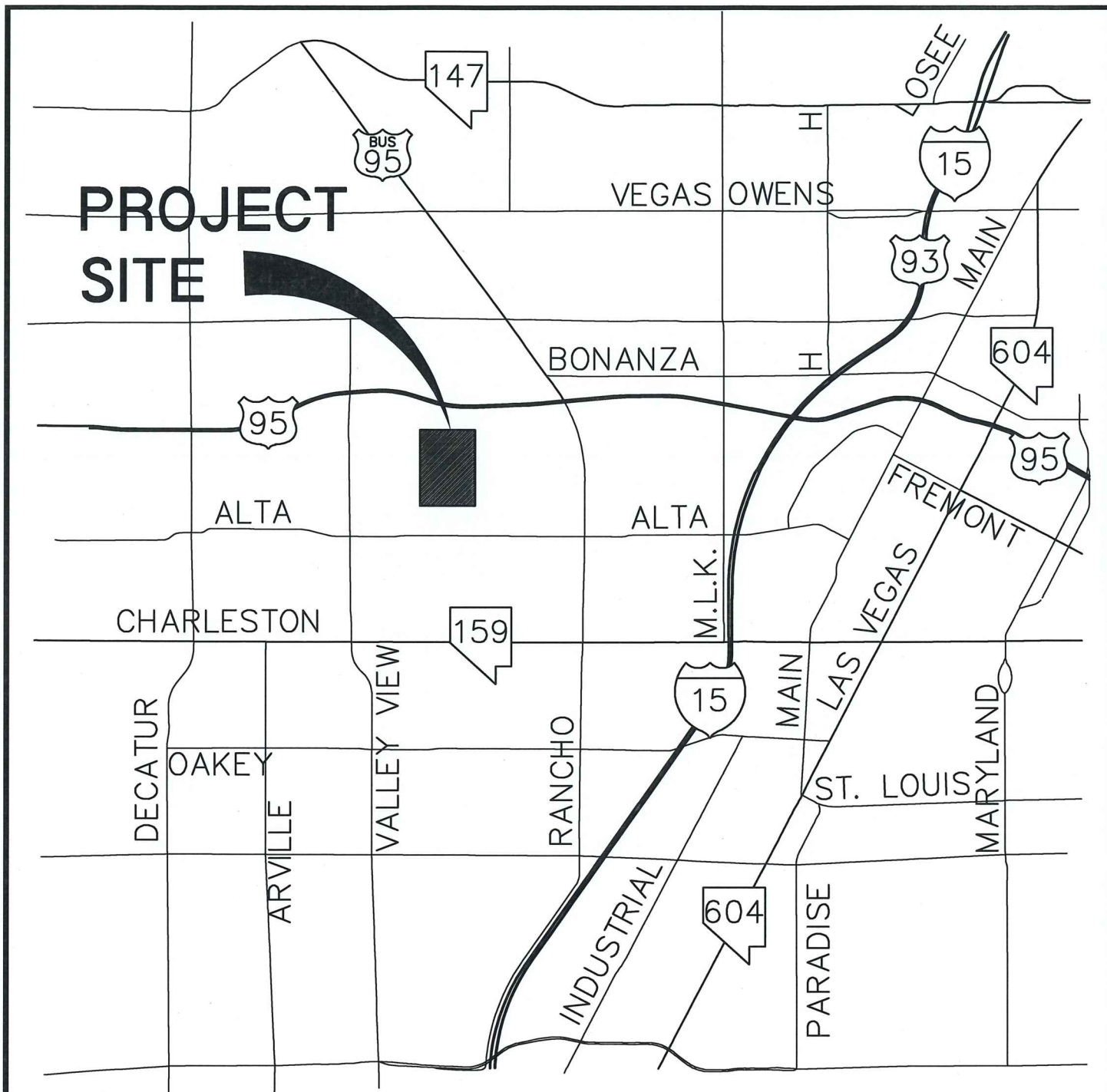
31

139-31-6

Rev: 1/8/2019

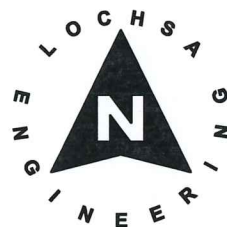
Scale: 1" = 200'





VICINITY MAP

NOT TO SCALE



DRAWN BY: JMD SCALE: N.T.S.

CHECKED BY: HMN DATE: 4/1/20

Lochsa
engineering

6345 South Jones Blvd. Suite 100

Las Vegas, NV 89118

Phone (702) 365-9312 - Fax (702) 365-9317

**VICINITY MAP
(FIGURE 1)**

**SPRINGS PRESERVE
EVENT SITE**

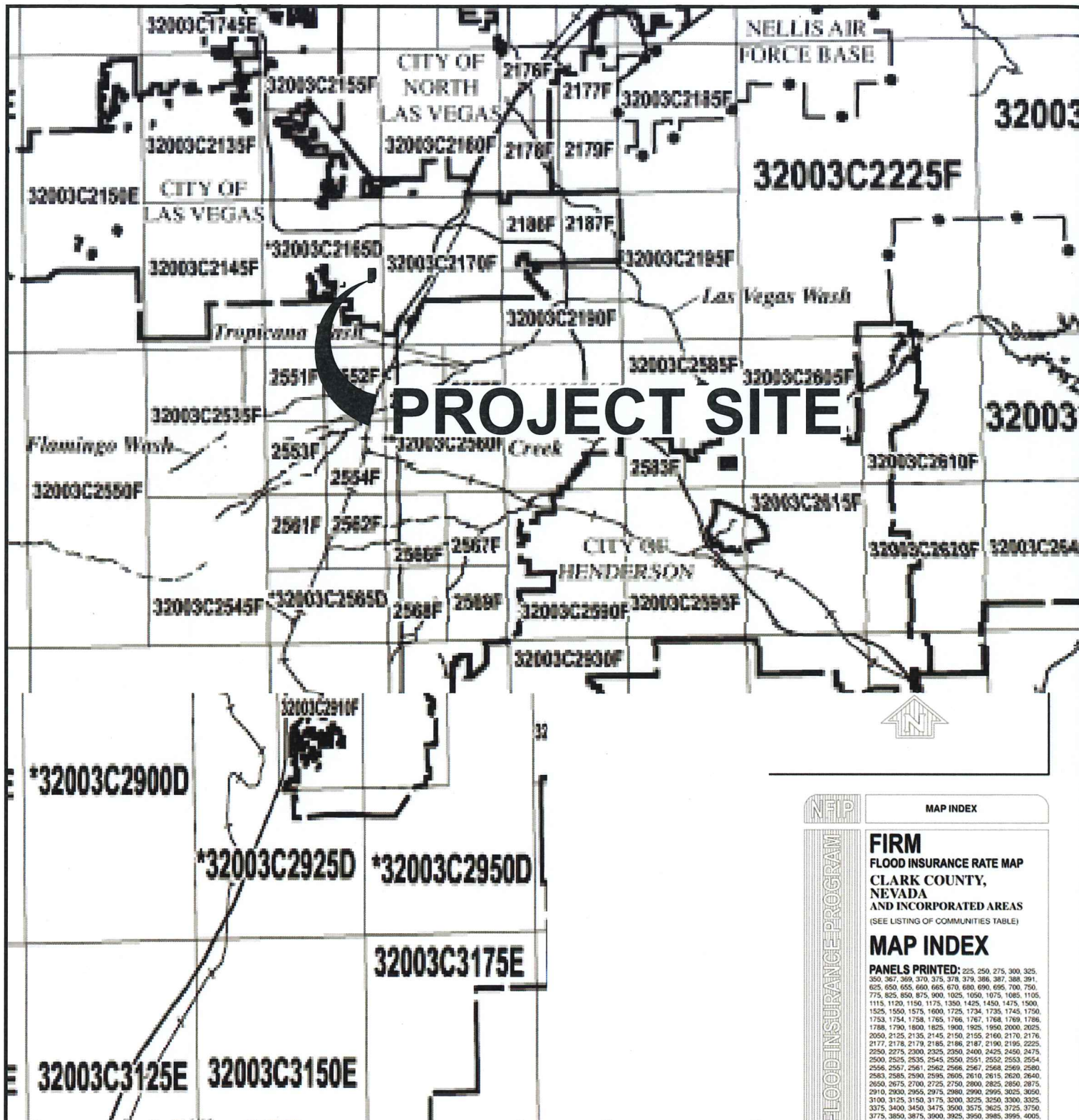
PROJECT No.:

191075

SHEET No.

1

SHEET 1 OF 1



PROJECT SITE WITHIN PANEL *32003C2165 D

*PANEL NOT PRINTED

ENTIRE PANEL IS IN ZONE X

NATIONAL FLOOD INSURANCE PROGRAM

MAP INDEX

FIRM
FLOOD INSURANCE RATE MAP
CLARK COUNTY,
NEVADA
AND INCORPORATED AREAS
(SEE LISTING OF COMMUNITIES TABLE)

MAP INDEX

PANELS PRINTED: 225, 250, 275, 300, 325,
350, 367, 388, 370, 375, 378, 379, 386, 387, 388, 391,
625, 650, 655, 660, 665, 670, 680, 690, 695, 700, 750,
775, 825, 850, 875, 900, 1005, 1050, 1075, 1085, 1105,
1115, 1120, 1150, 1175, 1350, 1425, 1450, 1475, 1500,
1525, 1550, 1575, 1600, 1725, 1734, 1735, 1745, 1750,
1753, 1754, 1758, 1765, 1766, 1767, 1768, 1769, 1786,
1788, 1790, 1800, 1825, 1900, 1925, 1950, 2000, 2025,
2050, 2125, 2135, 2145, 2150, 2155, 2160, 2170, 2176,
2177, 2178, 2179, 2185, 2186, 2187, 2190, 2195, 2225,
2250, 2275, 2300, 2325, 2350, 2400, 2425, 2450, 2475,
2500, 2525, 2535, 2545, 2550, 2551, 2552, 2553, 2554,
2556, 2557, 2561, 2562, 2566, 2567, 2568, 2569, 2580,
2583, 2585, 2590, 2595, 2605, 2610, 2615, 2620, 2640,
2650, 2675, 2700, 2725, 2750, 2800, 2825, 2850, 2875,
2910, 2930, 2955, 2975, 2980, 2990, 2995, 3025, 3050,
3100, 3125, 3150, 3175, 3200, 3225, 3250, 3300, 3325,
3375, 3400, 3450, 3475, 3500, 3575, 3625, 3725, 3750,
3775, 3850, 3875, 3900, 3925, 3950, 3985, 3995, 4005,
4015, 4050, 4070, 4080, 4090

MAP NUMBER
32003CIND0C

MAP REVISED
NOVEMBER 10, 2011

Federal Emergency Management Agency

DRAWN BY: JMD SCALE: NOT TO SCALE

CHECKED BY: HMN DATE: 4/1/20

**FLOOD INSURANCE
RATE MAP
(FIGURE 2)**

PROJECT No.:

191075

SHEET No.

2

SHEET 1 OF 1

Lochsa
engineering

6345 South Jones Blvd. Suite 100

Las Vegas, NV 89118

Phone (702) 365-9312 - Fax (702) 365-9317

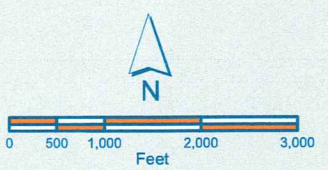
**SPRINGS PRESERVE
EVENT SITE**



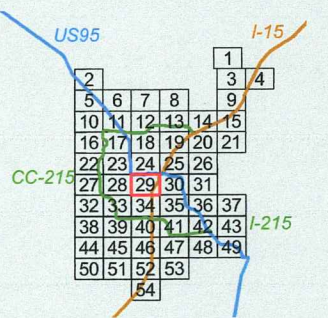
2018
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE F-29
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 |



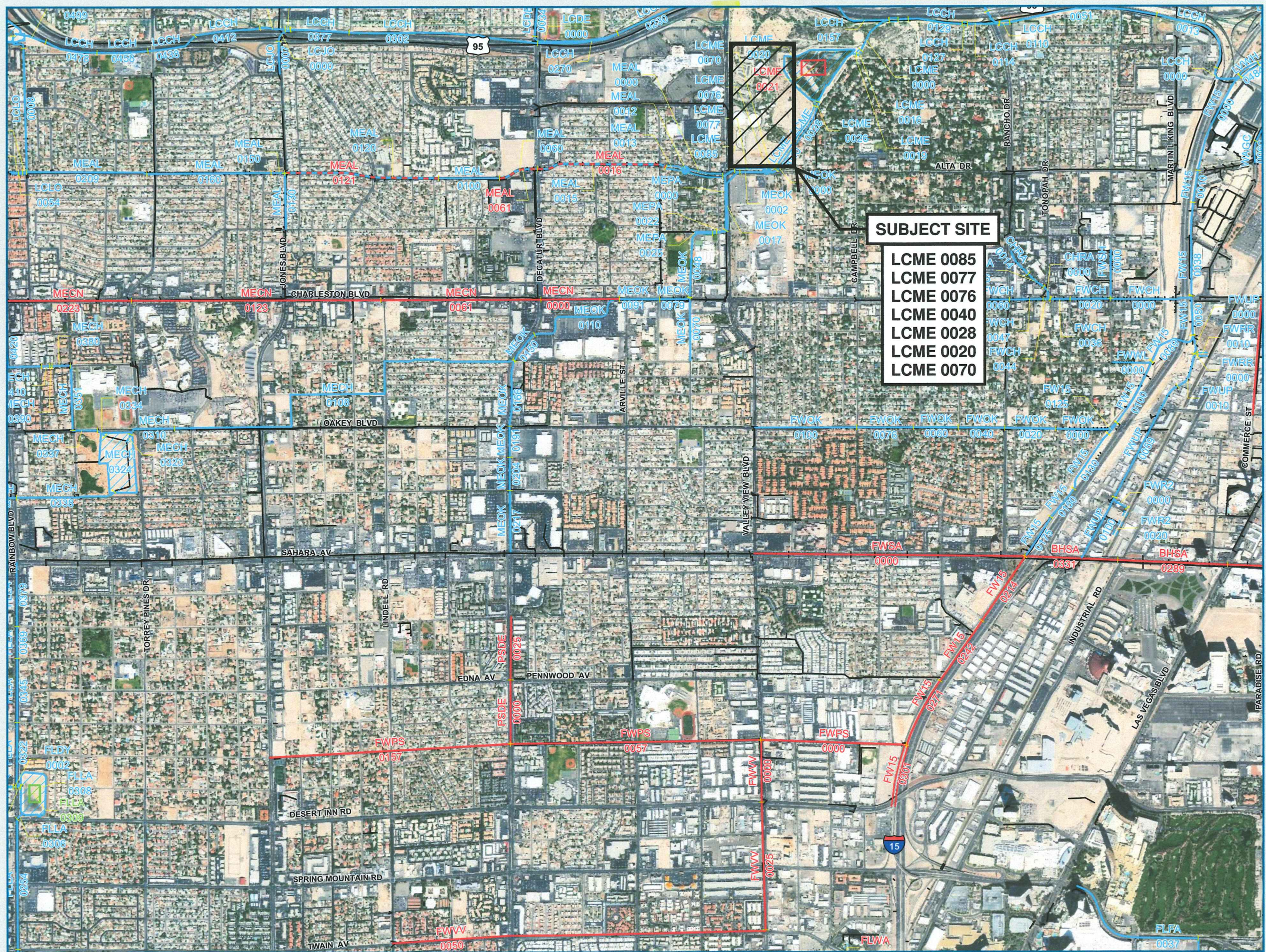
AerialSource:Esri World Imagery 2017



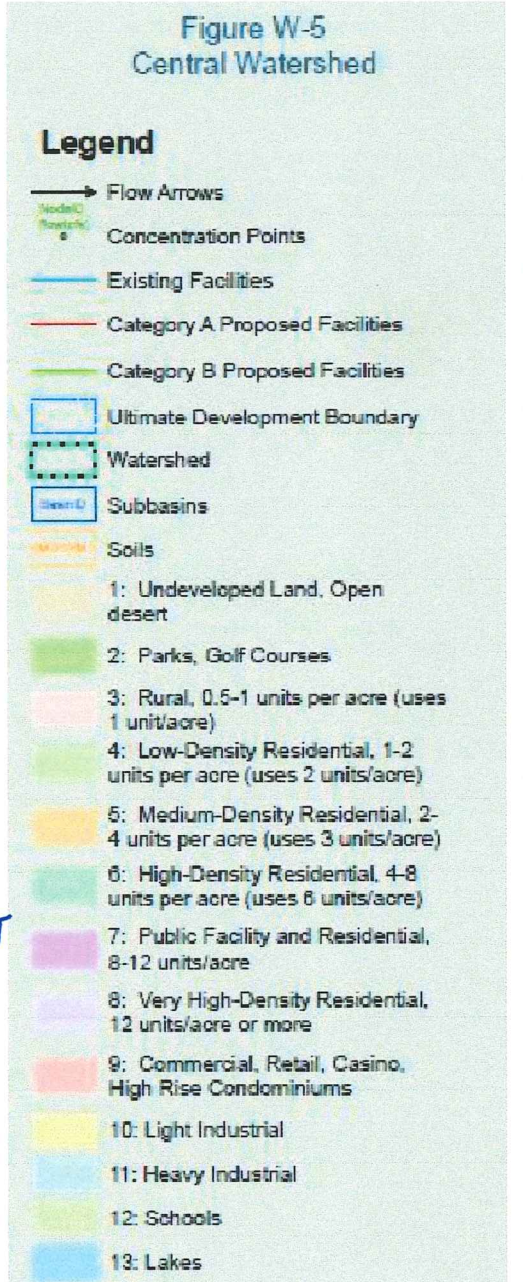
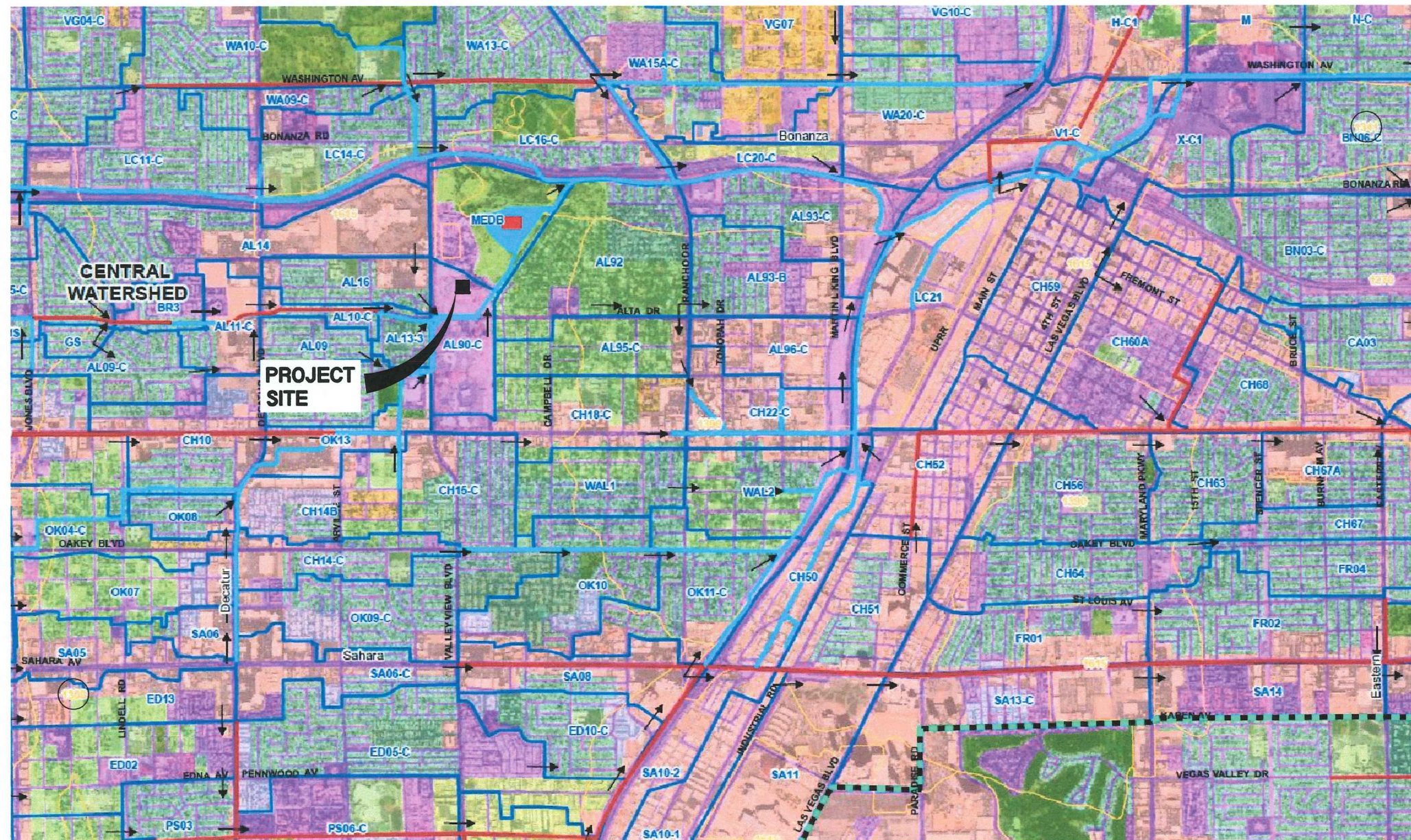
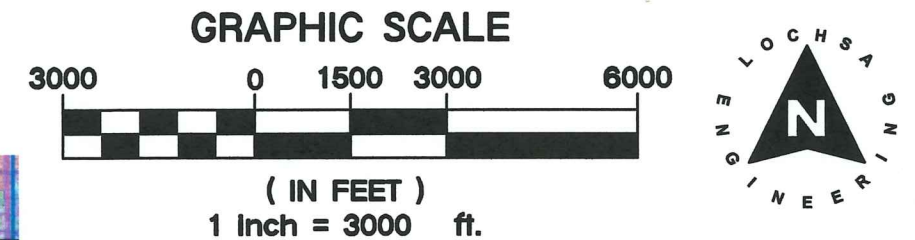
ATKINS

Member of the SNC-Lavalin Group

Louis Berger



WEB SOIL SURVEY



1300: *SUBJECT SITE*
100% D-SOIL

1341:
100% B-SOIL

DRAWN BY: JMD	SCALE: 1"=3000'	FILE NAME: C-191075-WMAP
CHECKED BY: HMN	DATE: 6/12/19	LEGEND
LOCHSA ENGINEERING 6345 SOUTH JONES BLVD., SUITE 100 LAS VEGAS, NV 89118 P: 702 365-9312, F: 702 365-9317		FOUND MONUMENTATION
		CENTER LINE
		ROW LINE
		EASEMENT LINE
		SECTION LINE
		PROPERTY LINE
		ADJACENT PROPERTY LINE

**FIGURE W-5
CENTRAL WATERSHED**

SPRINGS PRESERVE EVENT SITE

PROJECT No.:
191075

SHEET No.

W-5

SHEET 1 OF 1

Curve Number Matrix

SOIL MAP UNIT	HYDROLOGIC SOIL GROUP					LAND USE CATEGORY INDEX NUMBER												
	A	B	C	D	ROCK OUTCROP	1	2	3	4	5	6	7	8	9	10	11	12	13
	CN --->					63	47	57	60	62	74	84	89	92	86	92	71	30
		CN --->				77	66	73	74	76	83	89	93	94	91	94	81	30
			CN --->			85	77	82	83	84	88	92	95	95	93	95	87	30
				CN --->		88	83	86	87	88	91	94	96	96	95	96	90	30
					CN --->	90	90	92	92	92	94	96	96	97	96	97	94	30
	%	%	%	%	%	SOIL TYPE COMPOSITE CN FOR LAND USE CATEGORY												
1100	6	0	0	59	35	87.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1105	55	40	0	5	0	70.0	56.0	65.0	67.0	69.0	78.0	86.0	91.0	93.0	88.0	93.0	76.0	30.0
1107	0	100	0	0	0	77.0	66.0	73.0	74.0	76.0	83.0	89.0	93.0	94.0	91.0	94.0	81.0	30.0
1112	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1113	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1117	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1120	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1127	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1129	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1130	65	0	25	10	0	71.0	58.0	66.0	68.0	70.0	79.0	87.0	91.0	93.0	89.0	93.0	77.0	30.0
1132	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1133	70	0	10	0	20	71.0	58.0	67.0	68.0	70.0	79.0	87.0	91.0	93.0	89.0	93.0	77.0	30.0
1134	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1135	84	0	0	16	0	67.0	52.0	62.0	64.0	66.0	76.0	85.0	90.0	92.0	87.0	92.0	74.0	30.0
1140	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1141	8	0	2	70	20	86.0	81.0	85.0	86.0	86.0	90.0	93.0	95.0	96.0	94.0	96.0	89.0	30.0
1150	0	0	0	100	0	88.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1151	41	0	0	59	0	78.0	68.0	74.0	76.0	77.0	84.0	90.0	93.0	94.0	91.0	94.0	82.0	30.0
1152	0	0	0	100	0	88.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1155	0	0	0	100	0	88.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1156	1	10	0	89	0	87.0	81.0	84.0	85.0	86.0	90.0	93.0	95.0	96.0	94.0	96.0	89.0	30.0
1160	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1160dn	46	1	0	53	0	76.0	66.0	73.0	74.0	76.0	83.0	89.0	93.0	94.0	91.0	94.0	81.0	30.0
1165	32	40	15	13	0	75.0	64.0	71.0	73.0	74.0	82.0	88.0	92.0	94.0	90.0	94.0	80.0	30.0
1181	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1182	95	0	5	0	0	64.0	48.0	58.0	61.0	63.0	74.0	84.0	90.0	92.0	86.0	92.0	72.0	30.0
1183	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1184	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1187	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1190	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1191	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1192	55	35	0	10	0	70.0	57.0	66.0	68.0	70.0	79.0	87.0	91.0	93.0	88.0	93.0	76.0	30.0
1200	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1206	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1207	3	85	5	7	0	78.0	67.0	74.0	75.0	77.0	83.0	89.0	93.0	94.0	91.0	94.0	82.0	30.0
1222	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1225	9	20	50	21	0	82.0	73.0	79.0	80.0	81.0	86.0	91.0	94.0	95.0	92.0	95.0	85.0	30.0
1230	54	0	0	46	0	75.0	63.0	70.0	72.0	74.0	81.0	88.0	92.0	94.0	90.0	94.0	80.0	30.0
1235	66	25	0	9	0	69.0	55.0	64.0	66.0	68.0	77.0	86.0	91.0	93.0	88.0	93.0	75.0	30.0
1236	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1237	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1240	0	0	0	100	0	88.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1252	0	100	0	0	0	77.0	66.0	73.0	74.0	76.0	83.0	89.0	93.0	94.0	91.0	94.0	81.0	30.0
1255	0	100	0	0	0	77.0	66.0	73.0	74.0	76.0	83.0	89.0	93.0	94.0	91.0	94.0	81.0	30.0
1260	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1262	75	0	0	25	0	69.0	56.0	64.0	67.0	69.0	78.0	86.0	91.0	93.0	88.0	93.0	76.0	30.0
1263	95	0	0	5	0	64.0	48.0	59.0	61.0	64.0	74.0	84.0	90.0	92.0	86.0	92.0	72.0	30.0
1264	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1270	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1278	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1282	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1300	0	0	0	100	0	88.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0

100% D-SOIL

Curve Number Matrix

SOIL MAP UNIT	HYDROLOGIC SOIL GROUP					LAND USE CATEGORY INDEX NUMBER												
	A	B	C	D	ROCK OUTCROP	1	2	3	4	5	6	7	8	9	10	11	12	13
	CN --->					63	47	57	60	62	74	84	89	92	86	92	71	30
		CN --->				77	66	73	74	76	83	89	93	94	91	94	81	30
			CN --->			85	77	82	83	84	88	92	95	95	93	95	87	30
				CN --->		88	83	86	87	88	91	94	96	96	95	96	90	30
					CN --->	90	90	92	92	92	94	96	96	97	96	97	94	30
	%	%	%	%	%	SOIL TYPE COMPOSITE CN FOR LAND USE CATEGORY												
1301	0	0	0	100	0	88.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1302	35	20	0	45	0	77.0	67.0	73.0	75.0	76.0	83.0	89.0	93.0	94.0	91.0	94.0	82.0	30.0
1305	5	0	35	60	0	86.0	79.0	83.0	84.0	85.0	89.0	93.0	95.0	96.0	94.0	96.0	88.0	30.0
1307	10	0	30	60	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	96.0	93.0	96.0	87.0	30.0
1313	8	68	0	24	0	79.0	68.0	75.0	76.0	78.0	84.0	90.0	93.0	94.0	91.0	94.0	82.0	30.0
1314	80	5	0	15	0	67.0	53.0	62.0	65.0	67.0	77.0	86.0	91.0	92.0	88.0	92.0	74.0	30.0
1320	0	2	0	83	15	88.0	83.0	87.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1323	0	0	0	85	15	88.0	84.0	87.0	88.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	91.0	30.0
1325	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1326	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1340	9	0	0	71	20	86.0	81.0	85.0	85.0	86.0	90.0	93.0	95.0	96.0	94.0	96.0	89.0	30.0
1341	0	100	0	0	0	77.0	66.0	73.0	74.0	76.0	83.0	89.0	93.0	94.0	91.0	94.0	81.0	30.0
1342	0	7	0	78	15	88.0	83.0	86.0	87.0	87.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1360	15	0	0	35	50	85.0	81.0	84.0	85.0	86.0	90.0	93.0	95.0	96.0	94.0	96.0	89.0	30.0
1380	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1390	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1400	0	0	0	100	0	88.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1415	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1417	5	0	55	10	30	86.0	80.0	84.0	85.0	86.0	89.0	93.0	95.0	96.0	94.0	96.0	89.0	30.0
1419	35	0	55	10	0	78.0	67.0	74.0	75.0	77.0	83.0	89.0	93.0	94.0	91.0	94.0	82.0	30.0
1440	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1450	1	0	0	89	10	88.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1484	0	0	0	100	0	88.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1500	60	0	0	35	5	73.0	61.0	69.0	71.0	73.0	81.0	88.0	92.0	93.0	89.0	93.0	79.0	30.0
1501	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1502	60	0	0	40	0	73.0	61.0	69.0	71.0	72.0	80.0	88.0	92.0	93.0	89.0	93.0	79.0	30.0
1505	55	0	0	40	5	74.0	63.0	70.0	72.0	74.0	81.0	88.0	92.0	94.0	90.0	94.0	80.0	30.0
1506	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1508	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1510	10	0	0	55	35	86.0	82.0	85.0	86.0	87.0	90.0	93.0	95.0	96.0	94.0	96.0	89.0	30.0
1540	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1541	4	0	0	76	20	87.0	83.0	86.0	87.0	87.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1542	60	0	30	10	0	72.0	59.0	67.0	69.0	71.0	80.0	87.0	92.0	93.0	89.0	93.0	78.0	30.0
1545	60	0	10	30	0	73.0	60.0	68.0	70.0	72.0	80.0	88.0	92.0	93.0	89.0	93.0	78.0	30.0
1600	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1605	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1610	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1615	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1630	0	0	0	100	0	88.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1635	7	0	5	63	25	87.0	82.0	85.0	86.0	87.0	90.0	94.0	95.0	96.0	94.0	96.0	89.0	30.0
1640	0	0	0	10	90	90.0	90.0	91.0	91.0	92.0	94.0	96.0	96.0	97.0	96.0	97.0	94.0	30.0
1645	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1674	27	26	0	45	2	78.0	69.0	75.0	76.0	78.0	84.0	90.0	93.0	94.0	91.0	94.0	83.0	30.0
1700	0	0	3	93	4	88.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1710	2	89	0	9	0	78.0	67.0	74.0	75.0	77.0	83.0	89.0	93.0	94.0	91.0	94.0	82.0	30.0
1731	10	2	0	88	0	85.0	79.0	83.0	84.0	85.0	89.0	93.0	95.0	96.0	94.0	96.0	88.0	30.0
1732	3	0	0	96	1	87.0	82.0	85.0	86.0	87.0	90.0	94.0	95.0	96.0	94.0	96.0	89.0	30.0
1753	0	8	0	90	2	87.0	81.0	85.0	86.0	87.0	90.0	93.0	95.0	96.0	94.0	96.0	89.0	30.0
1850	0	0	0	94	6	88.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1853	0	0	0	85	15	88.0	84.0	87.0	88.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	91.0	30.0
1871	17	0	0	83	0	84.0	76.0	81.0	82.0	83.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1999	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0

100% B-SOIL

APPENDIX C

REFERENCES

CITY OF LAS VEGAS		DATE:
INTER-OFFICE MEMORANDUM		May 28, 2019
TO: Land Development Services Department of Building & Safety		FROM: Jennifer Shinn, P.E. Flood Control, Engr. Associate Department of Public Works
SUBJECT:	Drainage Study for: Springs Preserve Butterfly Playground	
Cross Streets:	NEC of Valley View Blvd and Alta Dr	
File Number:	F:\Depot\DSMemos\DS5077D.doc	
Parcel Number:	139-31-602-003	
Zoning Action:		
FEMA Flood Zone	YES	NO X
Proposed Storm Drain	YES X	NO
COPIES TO: Greely and Hansen Las Vegas Valley Water District Bart Anderson, P.E., DevCo CCRFCD		

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	12/13/2018	12/31/2018	See Comments Below	\$400.00	501636: \$400
2 nd Submittal	2/7/2019	2/21/2019		N/C	
3 rd Submittal	3/28/2019	4/11/2019	Conditionally Approved	\$400	3065871: \$400
4 th Submittal	5/28/2019	5/28/2019	Concurrence Received	N/C	
TOTAL FEES (LDDRS):				\$800.00	----

REMARKS:

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

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

Remarks: 3rd Submittal addresses CCRFCD comments

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

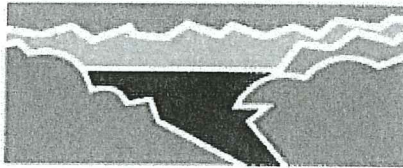
NOTE: Please be advised that all land surface area disturbances over 1 acre or any area adjacent to a water way must submit to the *Nevada Division of Environmental Protection* a "Notice of Intent" to discharge that certifies a stormwater pollution prevention plan has been developed and is maintained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

END OF REMARKS

jks

T/R/S: T20S/R61E/31
AREA M-31

REGIONAL FLOOD
CONTROL DISTRICT



5/28/19
DS 5077
N/C

Steven C. Parrish, P.E.
General Manager/Chief
Engineer

BOARD OF DIRECTORS

Lawrence L. Brown, III
Chair
Clark County

Mayor Debra March
Vice-Chair
City of Henderson

George Gault
City of Mesquite

James B. Gibson
Clark County

Mayor Carolyn Goodman
City of Las Vegas

Isaac Barron
City of North Las Vegas

Mayor Pro Tem
Dr. Lois Tarkanian
City of Las Vegas

Mayor Rodney Woodbury
City of Boulder City

May 23, 2019

Mr. Oh Sang Kwon, P.E.
City of Las Vegas Department of Public Works
333 North Rancho Drive
Las Vegas, NV 89106

DISTRICT CONCURRENCE: SPRINGS PRESERVE BUTTERFLY PLAYGROUND
(DS5077B) (RFCD No. 19-11228)

Dear Mr. Kwon:

Clark County Regional Flood Control District (District) reviewed Technical Drainage Study dated December 11, 2018, Addendum No. 1 dated February 7, 2019, and Addendum No. 2 dated March 28, 2019 for above-mentioned project as submitted by GREELEY AND HANSEN. In addition, District is in receipt of the Conditional Letter of Acceptance from City of Las Vegas Department of Public Works dated April 11, 2019.

District concurs with acceptance of this Technical Drainage Study by City of Las Vegas Department of Public Works with the following condition(s):

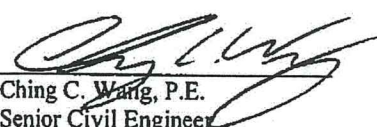
Per District's Uniform Regulations for the Control of Drainage, Section VIII.D.13, the Lead Entity shall provide As-Built plans or record drawings to the District after completion and final inspection of such privately installed flood control facilities that have regional flood control significance.

District's review of this project was limited to issues of Regional Flood Control Significance as defined in *Uniform Regulations for the Control of Drainage*.

Please be aware that as additional information becomes available and/or restudies of Flood Insurance Studies are performed, information submitted by GREELEY AND HANSEN may be superseded. Compliance with regulatory elements and design standards specified in *Uniform Regulations for the Control of Drainage* does not imply a guarantee that properties will be free from flooding or flood damage. The District, its officials, or employees assume no liability for information, data, or conclusions presented by consulting engineers. We, therefore, make no warranties, either expressed or implied, in conducting this review.

STEVEN C. PARRISH, P.E.
General Manager/Chief Engineer

BY:


Ching C. Wang, P.E.
Senior Civil Engineer

CCW:dd

c: Darla Jean Guerrero, P.E., Greeley And Hansen
P:\Letters and Memos\Local Drainage\Land Development & Drainage\2019\L-19-11228as_built.doc

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL													
DRAINAGE STUDY INFORMATION FORM													
Name of Development: <u>Springs Preserve Butterfly Playground</u>		Date: _____											
Location of Development: a) Descriptive (Cross Streets) North/South: <u>Alta Drive (S)/US Hwy 95 (N)</u>													
East/West: <u>Concrete Channel (E)/S. Valley View Blvd. (W)</u>													
b) Section: <u>31</u>		Township: <u>20S</u> Range: <u>61E</u>											
c) APN: <u>139-31-602-003</u>													
Name of Owner: <u>Las Vegas Valley Water District</u>													
Telephone No.: <u>702-258-3930</u>		Fax No.: _____ E-Mail Address: _____											
Address: <u>1001 S. Valley View Blvd, Las Vegas, NV 89107</u>													
Contact Person-Name: <u>Darla Guerrero</u>		Telephone No.: <u>702-272-1898</u>											
* E-Mail Address: <u>dguerrero@greeley-hansen.com</u>		Fax No.: _____											
Firm: <u>Greeley and Hansen</u>													
Address: <u>1120 N. Town Center Dr., Suite 120, Las Vegas, NV 89144</u>													
Type of Land Development/Land Disturbance Process:													
Rezoning	Subdivision Map	Clearing and Grading Only											
Parcel Map	Planned Unit Development	Other (Please specify below)											
Large Parcel Map	X Building Permit												
1. Total Owned Land Area: At Site: <u>80.45 Acres</u> Being Developed/Disturbed: <u>1 Acre</u>													
2. Is a portion or all of the subject property located in a designated FEMA Flood Hazard Area? ☐ Yes** ☒ No													
3. Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? ☒ Yes** ☐ No													
4. Proposed type of development (Residential, Commercial, Etc.): <u>Commercial</u>													
5. Approximate upstream land area which drains to the subject site: <u>8.93 Acres</u>													
6. Has the site drainage been evaluated in the past? ☒ YES ☐ NO If yes, please identify documentation: <u>Site Development of Springs Preserve</u>													
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: <u>Sloan Channel LCME0028</u>													
8. Briefly describe your proposed schedule for the subject project:													
Design is anticipated to be completed by November 2018, the subsequent plans will be put out for bid and followed by a construction period to be completed by June 2019.													
 Engineer's Seal 12-11-18		Submit this form as part of the required drainage study to the local entity which has jurisdiction over the subject property. This form may provide sufficient information to serve as the Conceptual Drainage Study. *New Required Field **Review and concurrence of the Clark County Regional Flood Control District is required. <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Revision</th> <th style="width: 40%;">Date</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table> Local Entity File No. _____		Revision	Date								
Revision	Date												
REFERENCE:		STANDARD FORM 1											
Updated 05/01/2008													

March 28, 2019,

Mr. Ching Wang, P.E.
CCRFC

600 S. Grand Central Parkway, Suite 300
Las Vegas, NV 89106

TO 3rd SUBMITTAL

**COMMENT RESPONSES: SPRINGS PRESERVE BUTTERFLY PLAYGROUND (DS5077B)
(RFCD No. I9-U228)**

Dear Mr. Kwon:

We have the following comment responses:

1. Per the Drainage Study Approval Letter, the project includes a new structural penetration to the existing rectangular channel of the District's MPU facility LCME 0028 and requires structural calculations and approval by the City of Las Vegas prior to District submittal and concurrence. The Structural Approval documentation must be provided with the next submittal and prior to District concurrence.

New structural calculations have been provided to the City of Las Vegas for their review.

2. Per the technical drainage study, the purpose of the proposed facilities is to alleviate stormwater ponding at the existing pipe outfall location. However, the proposed facilities penetrate into the mainline channel at a lower elevation and may cause additional ponding from backwater effects from the mainline channel flow depth. Address the following concerns for the proposed connection to the District's facility LCME 0028:

- a. The proposed dual 24" RCP is shown with an invert elevation of 2117.5 and channel tie-in of 2114.76. Provide hydraulic analysis to address backwater effect from the flow depth in the mainline channel and additional ponding due to the lowered elevation of the proposed pipe. Note that per Sheet C4, the existing HERCP parallel to the proposed facility is at an invert elevation of 2118.43.

A backwater calculation has been completed and has been incorporated into the Drainage Study in Appendix B.

- b. Coordinate with the City of Las Vegas and provide hydraulic analysis to model impacts of the mainline channel. The water surface elevation should be shown on the profile sheet.

The HGL has been added to the profile, see sheet C4.

3. It appears from the hydraulic calculations for the capacity of the proposed pipes that the size of the proposed facility connecting to the regional facility are not warranted. Address limiting the penetration to the existing rectangular channel of the District's MPU facility LCME 0028 or provide discussion on justification.

We have decreased the size of the opening into the channel from the 48" diameter to the 2 - 24" diameter opening.

4. Per the "Riprap at outfall" detail on Sheet C7, it appears the discharge pipe is elevated above flowline in the channel and may create additional ponding on the Springs Preserve site. Clarify detail to ensure positive drainage.

This detail has been revised to reflect the flowline in channel is in-line with the riprap and the culvert invert. See detail on sheet C7.



GREELEY AND HANSEN

5. Per the Clark County Area Uniform Standard Drawings, the maximum ID for a type III manhole is 48", Address whether the type HI manhole can accommodate the proposed dual 24" RCP storm drain facilities.

We have removed the 48-inch pipe and the need for the manhole by continuing the dual 24-inch pipes to the channel.

Thank you

Darla Guerrero, PE
Greeley and Hansen



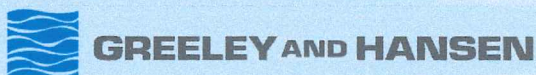
GREELEY AND HANSEN



Springs Preserve Butterfly Playground Drainage Study Project No. C1489

Las Vegas Valley Water District

FINAL Rev. – March 2019



Section 2 Drainage Basin Description

2.1 Off-Site Drainage Description

Springs Preserve started development in 1989 and is within an existing neighborhood of the City of Las Vegas. Off-site flows have not been observed as drainage is handled by the network of storm drains and local streets surrounding the facility. Regional runoff does not enter the property at discrete or non-discrete points. Everything within the surrounding drainage basin is a manmade facility that connects to the Regional Flood Control District's network of flood control infrastructure.

2.2 On-Site Drainage Description

The existing drainage watershed boundaries are all contained within the existing developed site for the Las Vegas Valley Water District Springs Preserve. The site is a developed commercial site that is located at 333 South Valley View Blvd., Las Vegas, Nevada. The existing land is a combination of landscaping, sidewalks, gravel parking lots, and paved roadways. The existing drainage area that encompasses the new Butterfly Playground is 8.93 acres, of which approximately 6.35 acres is developed land that is impervious, and 2.58 acres is pervious land that consists of landscaping, or undeveloped graded soils.

The existing drainage pattern is from the northwest to the southeast. Flow from the northwest is intercepted by the access roadway and diverted to the south where it enters into Las Vegas Creek – Meadows channel. The area that drains through the project location is from the east side of the access road to the site location. The area to the north, south and east all drain towards the Las Vegas Creek – Meadows channel as the contours fall off in that direction. Currently the overland runoff flows through the Butterfly Exhibit and floods that area before discharging into the Las Vegas Creek – Meadows channel.

The existing drainage watershed northern boundary contains the Springs Preserve entrance drive just east of South Valley View Boulevard, north of the twin tanks. The western boundary is the back of the walk of the access road running in a north-south direction between the southwestern and southeastern parking lots. The southern boundary is approximately 250 feet north of the Alta Drive right-of-way along the contour ridgeline. The eastern boundary is formed by the contour ridgelines coming off of the access road which encompass a portion of the existing Springs Preserve site and the new project site. The existing drainage patterns are shown in **Figure 2-1**.

The existing 24-inch x 14-inch HERCP that discharges into the Las Vegas Creek – Meadows channel will remain in use. The project will add two 24-inch diameter RCP outfall pipes. These pipes are being added to alleviate the majority of the existing stormwater ponding that occurs at the existing pipe outfall location. This project includes a drainage channel that will intercept the overland runoff from the northwest and route it around the Butterfly Exhibit and discharge into the Las Vegas Creek – Meadows channel near its existing location. The existing drainage patterns will remain the same with the exception of the new channel and the Butterfly Playground area as shown in **Figure 2-2**.



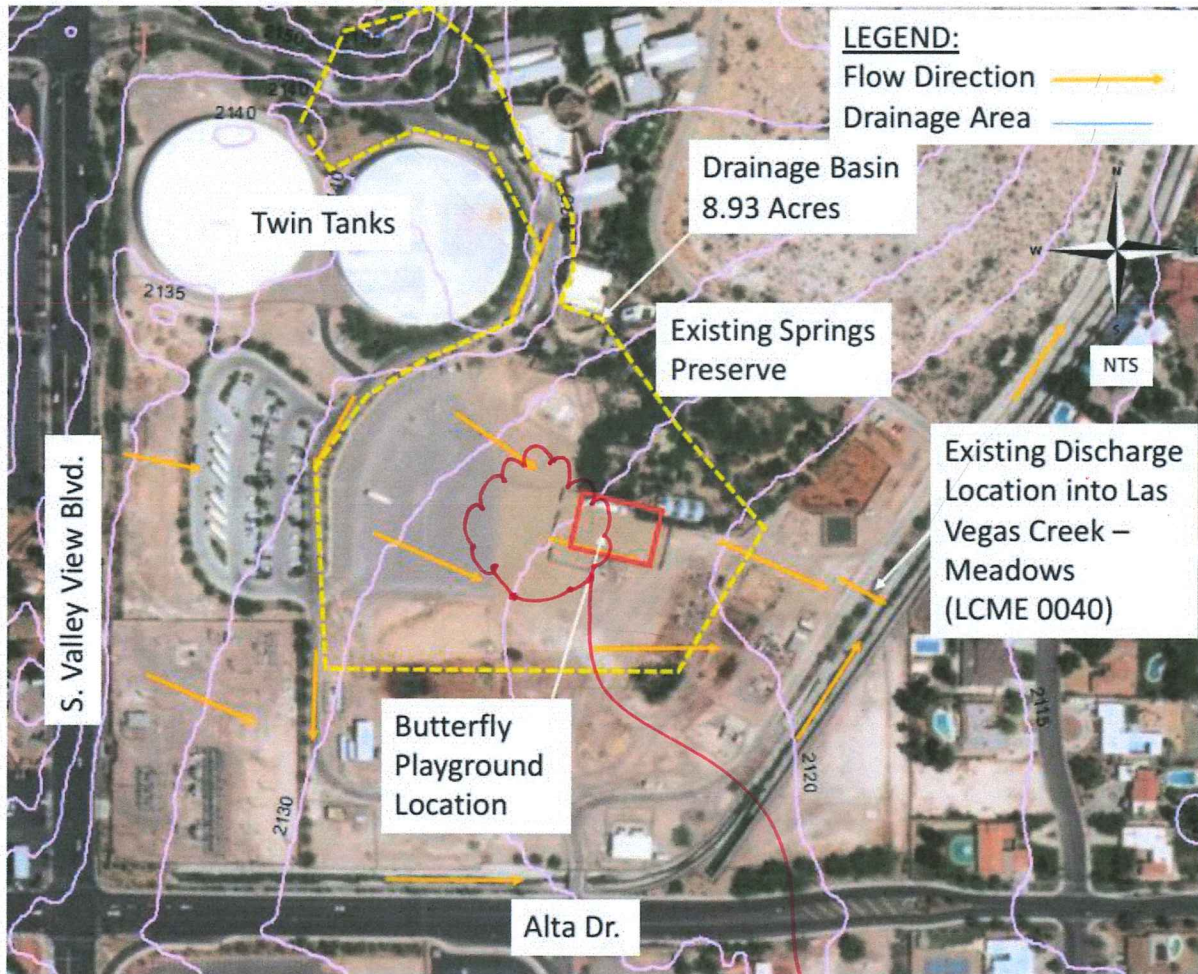


Figure 2-1 Existing Drainage Pattern

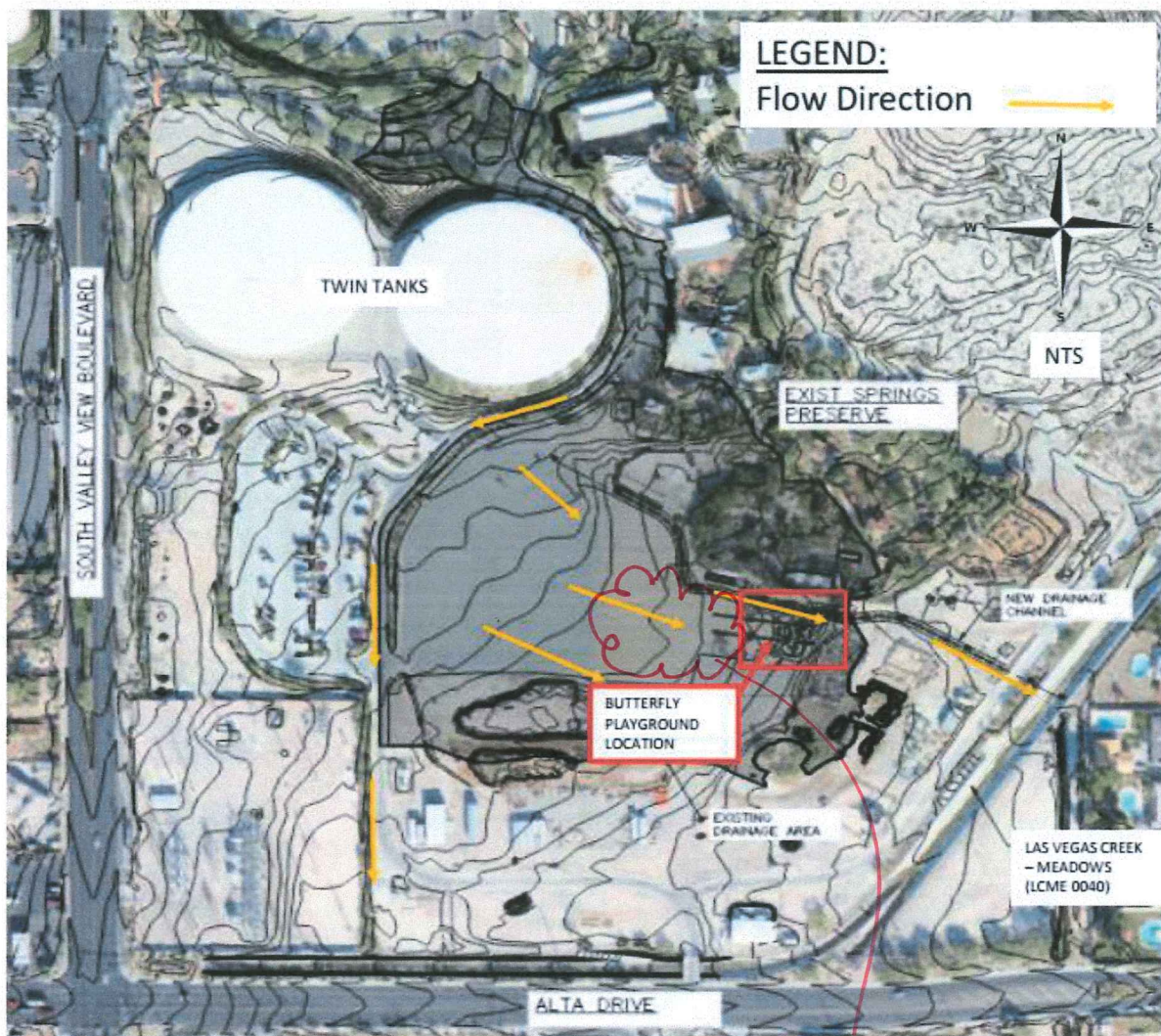


Figure 2-2 Proposed Drainage Pattern

Springs Preserve. Off-site runoff was not included with calculations as it will not contribute to this drainage project and is handled by existing flood control infrastructure.

The existing minor and major storm flows were developed according to *CCRFCD Hydrologic Criteria and Drainage Design Manual* using the Depth-Duration-Frequency and Time-Intensity-Frequency rainfall values for the McCarren Airport Rainfall Area. The minor storm flows are developed 10-year, 1-hour storm event flows. The major storm flows are developed 100-year, 1 hour storm event flows. The rational method was used to model runoff flows for the 8.93 acre drainage area. The rational method is defined by the following equation:

$$Q = CiA$$

Where Q is the runoff flow in cfs, C is the rational method land use coefficient, i is the rainfall intensity in in/hr, and A is the surface area of the drainage area sub-basins. The rainfall intensity values used for the drainage basin runoff calculations are as follows:

- * || • i-10 year = 1.15 in/hr ||
- i-100 year = 2.06 in/hr ||

The corresponding C-values used for the sub-basins are as follows:

- * || • C = 0.95 for developed paved roads, sidewalks, parking lots, and building and walk paths
- C = 0.30 for graded soils
- C = 0.25 for landscaped areas with vegetation and landscaping

The breakdown of sub-basin drainage areas, along with their area values and respective C factors are shown below in **Table 3-3**.

Table 3-3 Cumulative Storm Volumes

Site Drainage Area	ft ²	ac	C	C-weighted
Cleared Area - East of Site	96,533	2.22	0.3	0.0744
Landscape Along Road - W of Parking lot	3,178	0.07	0.25	0.0020
Landscape Along Road - NW of Parking Lot	3,867	0.09	0.25	0.0025
Landscape Along Road (N)	1,609	0.04	0.25	0.0010
Landscape Along Road (N)	947	0.02	0.25	0.0006
Landscape Along Road (N)	3,723	0.09	0.25	0.0024



CONTINUED TO THE
NEXT PAGE

Site Drainage Area	ft ²	ac	C	C-weighted
Landscape Along Road (N)	2,721	0.06	0.25	0.0017
Existing Developed Area	276,435	6.35	0.95	0.6751
Total Drainage Area	389,013	8.93	-	0.7598

The resulting major and minor storm flows for the existing drainage area are:

- Q10-yr = 7.80 cfs
- Q100-yr = 13.98 cfs

*ON-SITE GENERATE FLOW
⇒ 8.93 Acres × 0.7598 × 1.15 = 7.8
× 2.06 = 13.98*

*utilize.
for Ratio
CALC. for
onsite flows*

There are no anticipated proposed drainage basin boundaries as the site is developed and there will be no significant changes to the existing grading, land use, and existing flow paths. The storm flows developed here were used to perform further analysis and computations for **Section 3.6 Facility Design Calculations**.

3.6 Facility Design Calculations

All drainage that will contribute to this project will be from on-site flows, there will not be any flow contributions from areas outside of Springs Preserve

The new drainage channel was designed to convey the predicted 100-year, 1-hour storm event flows. Sizing of the channel utilized open channel hydraulics, specifically, Manning's Equation. The total channel length is approximately 700 linear feet with a minimum slope of 0.04 percent. The channel geometry will be trapezoidal for the entire length. The channel bottom and side slopes will be stone lined to a 6-inch depth, with a 12-inch deep gravel bedding. A Manning's n-value of 0.035 was assumed for these materials. The channel will be a trapezoidal channel with a 4-foot bottom width and side slopes of 2:1 (H:V). The channel top width is 12 feet. **Figure 3-2** below shows what the typical section looks like in the design documents.

Structural calculations for the 2 - 24-inch discharge pipes at the Las Vegas Creek – Meadows channel is included in **Appendix D**.



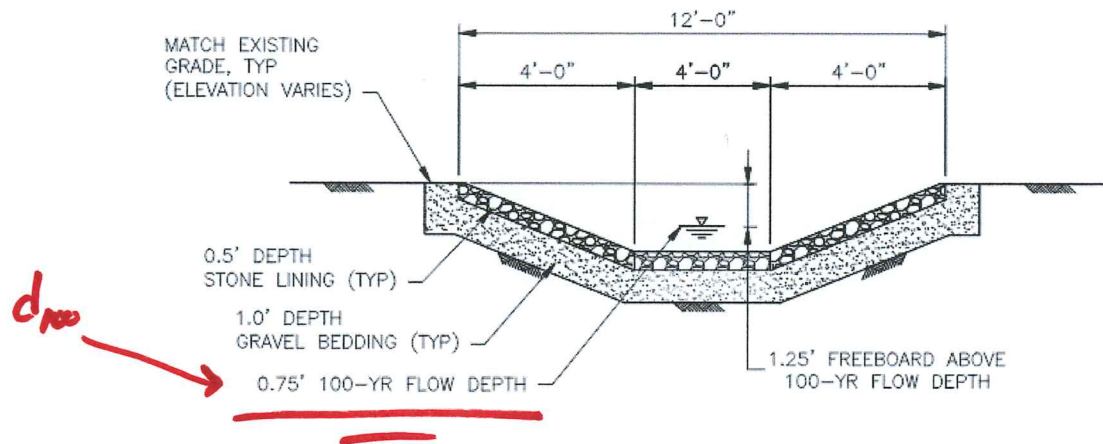


Figure 3-2 Typical Drainage Channel Section

The following are the results for conveyance of stormwater during the major storm event:

- Flow Depth = 0.75 ft ←
- Flow Velocity = 3.39 ft/s ←

The conceptual channel design provides 1.25 feet of freeboard during the major storm event, and is below the maximum permissible channel velocity of 10 ft/s.

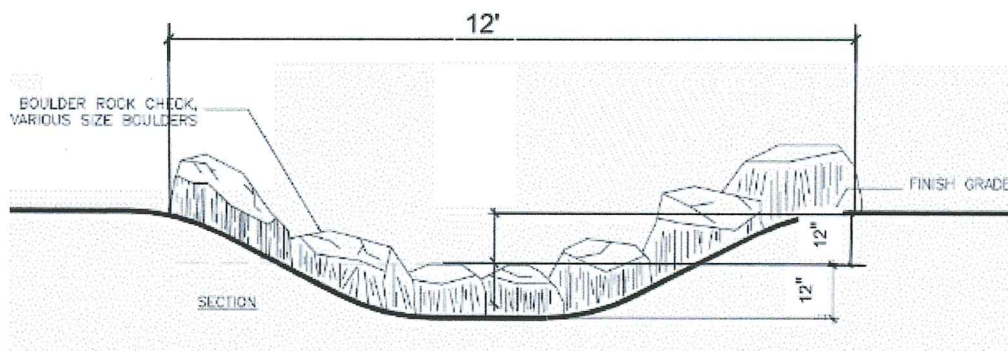
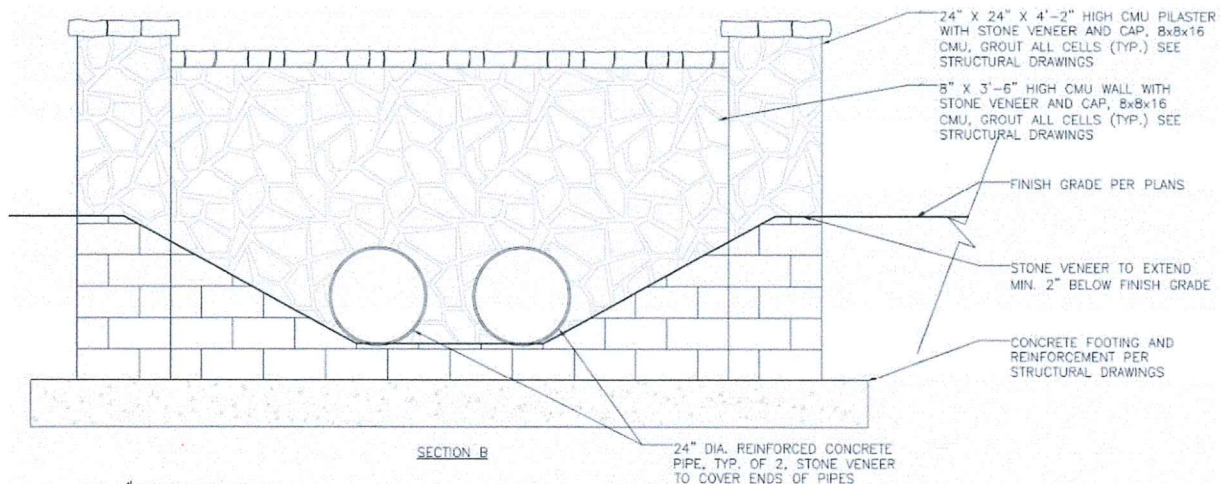


Figure 3-3 Typical Drainage Channel Weir Section

The following are the results of the weir calculations for the major storm event using a Weir Coefficient of 3.0:

- Flow Depth over Weir = 0.10 ft (1.2 inches)
- Flow Rate = 14.0 ft/s



The weir design provides 0.9 feet of freeboard during the major storm event.

Figure 3-4 Typical Bridge Section

The following are the results of the culvert calculations for the major storm event using the minimum slope of 1.7% at Bridge #1:

- Flow Rate = 14.0 ft/s
- Percent of Full Depth = 34%
- Flow Depth Through Culverts = 0.68 ft (8.2 inches)

The culverts provide ample flow through the culverts during the major storm event.

Maintenance of the proposed improvements will be provided by the existing staff of Springs Preserve. Items likely to be required include observation of the channel and removal of accumulated debris after a rain event.

FEMA requirements are not applicable for this location. There are no easements required and all work will be completed in a single phase.

3.7 Backwater Calculations

Backwater calculations were performed from the Las Vegas Creek – Meadows channel through the on-site channel. The initial tailwater elevation for the 100-year storm event was assumed to be approximately 2118.6. This elevation was obtained from the as-built drawings for *Oakey/Meadows Storm Drain Phase I* project. This project reconstructed the channel along Springs Preserve to the Meadows Detention Basin. The backwater calculations show that there will be ponding of approximately 1.2 feet at the inlet of the 24" outfall pipes to 0.65 feet within the main ponding area. The calculations are included in **Appendix A**.



Appendix A

HYDRAULIC CALCULATIONS



SPRINGS PRESERVE DRAINAGE STUDY
 PROJECT NO. C1489

Greeley and Hansen LLC
 December-2018

1 - hr Rainfall Duration Values			
Return Period [yr]	1-Hour Depth [in]	Adjustment Factor (Table 501)	Adjusted 1-Hour Depth [in]
2	0.52	See Note 3	0.52
5	0.89	See Note 3	0.89
10	1.15	See Note 3	1.15
25	1.50	See Note 3	1.50
50	1.78	See Note 3	1.78
100	2.06	See Note 3	2.06

1 - hr Rainfall Intensity Values			
Time [min]	2	5	10
5	1.80	3.24	4.20
10	1.50	2.64	3.42
15	1.32	2.28	2.96
30	0.88	1.56	2.02
60	0.52	0.89	1.15

Return Period [yr]	25	50	100
5	5.52	6.48	7.56
10	4.44	5.34	6.12
25	3.88	4.60	5.28
50	2.62	3.10	3.58
100	1.50	1.78	2.06

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

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

**WRC
ENGINEERING**

REFERENCE:

USACE, Los Angeles District, 1988

TABLE 505



HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

TIME-INTENSITY-FREQUENCY VALUES FOR McCARRAN AIRPORT RAINFALL AREA (IN INCHES PER HOUR)

TIME (min)	RECURRENCE INTERVAL					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
5	1.80	3.24	4.20	5.52	6.48	7.56
10	1.50	2.64	3.42	4.44	5.34	6.12
15	1.32	2.28	2.96	3.88	4.60	5.28
30	0.88	1.56	2.02	2.62	3.10	3.58
60	0.52	0.89	1.15	1.50	1.78	2.06

- NOTE: 1. Refer to Figure 513 for a description and drawing of the area included in the McCarran Airport Rainfall Area.
2. Table 501 adjustments not required.

Revision	Date

**WRC
ENGINEERING**

REFERENCE:

USACE, Los Angeles District, 1988

TABLE 506



SPRINGS PRESERVE DRAINAGE STUDY PROJECT NO. C1489 Greeley and Hansen LLC January-2019									
	ft^2	ac	C	C-weighted	i-10	i-100	Q-10 [cfs]	Q-100 [cfs]	Max Channel Velocity [ft/s]
Total Drainage Area	389013	8.93	-	0.7598	1.15	2.06	7.80	13.98	10
Cleared Area - East of Site	96533	2.22	0.3	0.0744					
Landscape Along Road - W of Parking	3178	0.07	0.25	0.0020					
Landscape Along Road - NW of Parking	3867	0.09	0.25	0.0025					
Landscape Along Road (N)	1609	0.04	0.25	0.0010					
Landscape Along Road (N)	947	0.02	0.25	0.0006					
Landscape Along Road (N)	3723	0.09	0.25	0.0024					
Landscape Along Road (N)	2721	0.06	0.25	0.0017					
Existing Developed Area	276435	6.35	0.95	0.6751					

Trapezoidal Channel Design

$\frac{Qn}{1.49\sqrt{S}} = A \left(\frac{A}{P} \right)^{\frac{2}{3}} = (b + zd) d \left(\frac{(b + zd)d}{(b + 2d\sqrt{1+z^2})} \right)^{\frac{2}{3}}$

✓ d=100

Bottom Width, b [ft]	Side Slope Factor, z	n	Slope, S [%]	Flow Depth, d [ft]	Area, A [ft^2]	Wetted Perimeter, P [ft]	LHS	RHS	Velocity, V [ft/s]	Is Channel Velocity Less than Max?
4	2	0.035	0.015	0.75	4.12	8.49	2.68100	2.54137	3.39	YES

Channel Freeboard [ft]	Channel Depth [ft]	Channel Top Width [ft]
1	2.00	12.00

LEGEND

Inputs	Calculated	Check
Enter Data	Do not enter values, use	Checking against velocity

WEIR CALCULATIONS

$Q = CLH^{3/2}$

SOLVE FOR $H = (Q/CL)^{2/3}$

Q (cfs)	C	L	H (ft)	H (in)
14	3	6	0.24	2.82

The capacity of a weir can be estimated using the following equations:

1. For Horizontal crested weirs:

$Q = CLH^{3/2}$ (1203)

Where Q = Flow in cfs

C = Weir Coefficient

L = Horizontal Length of Weir in ft

H = Head, in ft, Above Weir Crest



HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

MANNING'S ROUGHNESS COEFFICIENTS FOR CHANNEL LINING TYPES

Channel Material	Roughness Coefficient (n)	
	Normal	Maximum
Corrugated Metal	0.025	0.030
Concrete**		
1) Trowel finish	0.013	0.015
2) Float finish	0.015	0.016
3) Unfinished	0.017	0.020
4) Shotcrete, Good section	0.019	0.023
5) Shotcrete, wavy section	0.122	0.025
Asphalt (use maximum value when cars are present)	0.016	0.020
Soil-Cement	0.020	0.025
Constructed channels with earth or sand bottom, sides of		
1) Clean earth; straight	0.022	0.025
2) Earth with grass and weeds	0.025	0.030
3) Earth with trees and shrubs	0.032	0.040
4) Shotcrete	0.022	0.025
5) Soil-cement	0.025	0.028
6) Concrete	0.020	0.024
7) Dry rubble or riprap	0.033	0.036
Natural channels with sand bottom, sides of		
1) Trees and shrubs	0.032	0.040
2) Rock		
Natural channel with rock bottom	0.060	0.090
Overbank floodplains		
1) Desert brush, normal density	0.060	0.080
2) Dense vegetation	0.100	0.160

* Adapted from Chow (1959) and Aldridge and Garrett (1973).

** Manning's Coefficients for Clear Water Only

— City of Tucson Standards Manual for Drainage Design

Revision	Date

REFERENCE:

TABLE 702



HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

MAXIMUM PERMISSIBLE MEAN CHANNEL VELOCITIES

Material / Lining

Maximum Permissible Mean Velocity (fps)

Natural and Improved Unlined Channels

Fine sand, colloidal.....	1.50
Sandy loam, noncolloidal.....	1.75
Silt loam, noncolloidal.....	2.00
Alluvial silts, noncolloidal.....	2.00
Ordinary firm loam.....	2.50
Volcanic ash.....	2.50
Stiff clay, vary colloidal.....	3.75
Alluvial silts, colloidal.....	3.75
Shales and hardpans.....	6.00
Fine gravel.....	2.50
Graded loam to cobbles when noncolloidal.....	3.75
Graded silts to cobbles when colloidal.....	4.00
Coarse gravel, noncolloidal.....	4.00
Cobbles and shingles.....	5.00
Sandy silt.....	2.00
Silty clay.....	2.50
Clay.....	6.00
Poor sedimentary rock.....	10.0

Fully Lined Channels

Unreinforced vegetation.....	5.0
Loose riprap.....	10.0
Crested riprap.....	15.0
Gabions.....	15.0
Soil-Cement.....	15.0
Concrete.....	35.0

- NOTES: 1. For composite lined channels, use the lowest of the maximum mean velocities for the materials used in the composite lining.
2. Deviations from the above values are only allowed with appropriate engineering analysis and/or suitable agreements for maintenance responsibilities.

Revision	Date

**WRC
ENGINEERING**

REFERENCE:

Natural-Fortier and Scobey, 1926
 Fully Lined-Various Sources

TABLE 703



BACKWATER CALCULATIONS



Visual Hydraulics Summary Report - Hydraulic Analysis

Project: Springs Preserve.vhf
Company: Greeley and Hansen
Date:

Current flow conditions

Forward Flow =	13.98 cfs
Return I Flow =	-----
Return II Flow =	-----
Return III Flow =	-----

Section Description

Water Surface Elevation

Starting water surface elevation

2118.6

Culvert

2118.76

Pipe shape = Circular
Diameter = 24 in
Length = 52 ft
Flow = 6.99 cfs
Friction method = Manning's Equation
Friction factor = 0.013
Total fitting K value = 1.5
Pipe area = 3.14 ft²
Pipe hydraulic radius = 0.5
Age factor = 1
Solids factor = 1
Velocity = 2.22 ft/s
Friction loss = 0.05 ft
Fitting loss = 0.12 ft
Total loss = 0.16 ft

Ponding Area

2119.75

Channel shape = Rectangular
Manning's 'n' = 0.035
Channel length = 45 ft
Channel width/diameter = 12 ft
Flow = 13.98 cfs
Downstream channel invert = 2117.5
Channel slope = 0.0422 ft/ft
Channel side slope = not applicable



<u>Section Description</u>	<u>Water Surface Elevation</u>
Area of flow - 8.28 ft² Hydraulic radius - 0.619 Normal depth - 0.31 ft Critical depth - 0.35 ft Depth downstream - 1.26 ft Bend loss - 0 ft Depth upstream - 0.35 ft Velocity - 0.92 ft/s Flow profile - Steep	
Channel - 6+81 to 7+05	2121.3
Channel shape = Trapezoidal Manning's 'n' = 0.035 Channel length = 25 ft Channel width/diameter = 4 ft Flow = 13.98 cfs Downstream channel invert = 2119.4 Channel slope = 0.05 ft/ft Channel side slope - 2:1 Area of flow - 2.87 ft² Hydraulic radius - 0.461 Normal depth - 0.52 ft Critical depth - 0.65 ft Depth downstream - 0.65 ft Bend loss - 0 ft Depth upstream - 0.65 ft Velocity - 4.06 ft/s Flow profile - Steep	
Channel - 5+50 to 6+81	2123.86
Channel shape = Trapezoidal Manning's 'n' = 0.035 Channel length = 134 ft Channel width/diameter = 4 ft Flow = 13.98 cfs Downstream channel invert = 2120.6 Channel slope = 0.019 ft/ft Channel side slope - 2:1 Area of flow - 3.6 ft² Hydraulic radius - 0.538 Normal depth - 0.68 ft Critical depth - 0.65 ft Depth downstream - 0.7 ft Bend loss - 0.07 ft Depth upstream - 0.72 ft Velocity - 3.7 ft/s Flow profile - Mild	

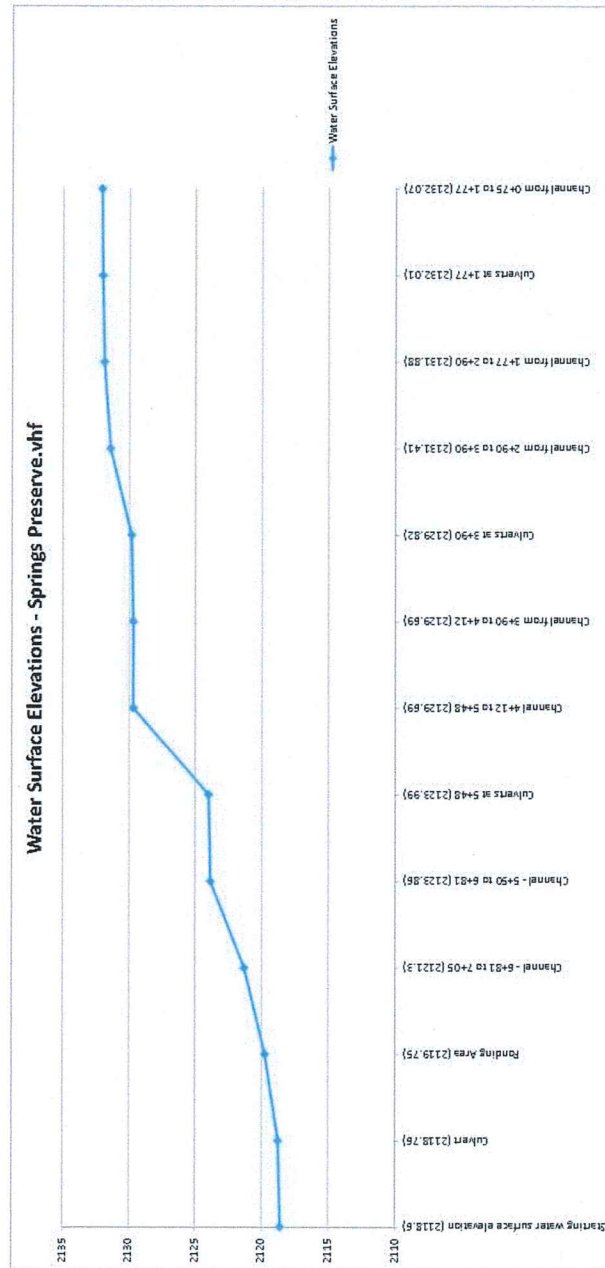
<u>Section Description</u>	<u>Water Surface Elevation</u>
Culverts at 5+48 Pipe shape = Circular Diameter = 24 in Length = 10 ft Flow = 6.99 cfs Friction method = Manning's Equation Friction factor = 0.013 Total fitting K value = 1.5 Pipe area = 3.14 ft ² Pipe hydraulic radius = 0.5 Age factor = 1 Solids factor = 1 Velocity = 2.22 ft/s Friction loss = 0.01 ft Fitting loss = 0.12 ft Total loss = 0.12 ft	2123.99
Channel 4+12 to 5+48 Channel shape = Trapezoidal Manning's 'n' = 0.035 Channel length = 131 ft Channel width/diameter = 4 ft Flow = 13.98 cfs Downstream channel invert = 2123.8 Channel slope = 0.04 ft/ft Channel side slope = 2:1 Area of flow = 2.99 ft ² Hydraulic radius = 0.473 Normal depth = 0.55 ft Critical depth = 0.65 ft Depth downstream = 0.65 ft Bend loss = 0 ft Depth upstream = 0.65 ft Velocity = 4.06 ft/s Flow profile = Steep	2129.69
Channel from 3+90 to 4+12 Channel shape = Trapezoidal Manning's 'n' = 0.035 Channel length = 22 ft Channel width/diameter = 4 ft Flow = 13.98 cfs Downstream channel invert = 2128.55 Channel slope = 0.017 ft/ft Channel side slope = 2:1 Area of flow = 5.7 ft ² Hydraulic radius = 0.73 Normal depth = 0.7 ft	2129.69

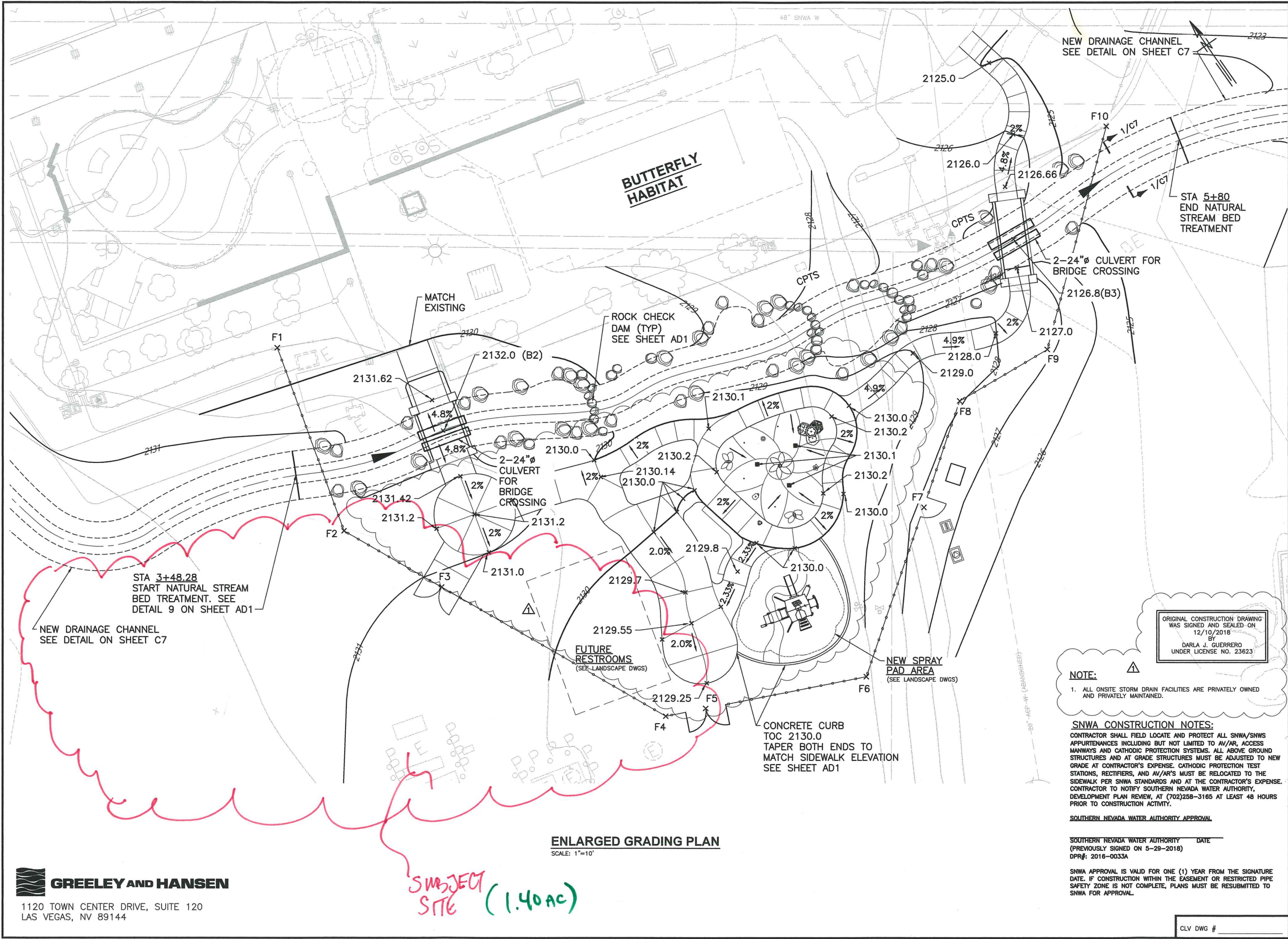


<u>Section Description</u>	<u>Water Surface Elevation</u>
Critical depth - 0.65 ft Depth downstream - 1.14 ft Bend loss - 0 ft Depth upstream - 0.77 ft Velocity - 1.95 ft/s Flow profile - Mild	
Culverts at 3+90	2129.82
Pipe shape = Circular Diameter = 24 in Length = 10 ft Flow = 6.99 cfs Friction method = Manning's Equation Friction factor = 0.013 Total fitting K value = 1.5 Pipe area - 3.14 ft² Pipe hydraulic radius - 0.5 Age factor - 1 Solids factor - 1 Velocity - 2.22 ft/s Friction loss - 0.01 ft Fitting loss - 0.12 ft Total loss - 0.12 ft	
Channel from 2+90 to 3+90	2131.41
Channel shape = Trapezoidal Manning's 'n' = 0.035 Channel length = 100 ft Channel width/diameter = 4 ft Flow = 13.98 cfs Downstream channel invert = 2129 Channel slope = 0.017 ft/ft Channel side slope - 2:1 Area of flow - 3.76 ft² Hydraulic radius - 0.556 Normal depth - 0.7 ft Critical depth - 0.65 ft Depth downstream - 0.82 ft Bend loss - 0.06 ft Depth upstream - 0.71 ft Velocity - 3.04 ft/s Flow profile - Mild	
Channel from 1+77 to 2+90	2131.88
Channel shape = Trapezoidal Manning's 'n' = 0.035 Channel length = 113 ft Channel width/diameter = 4 ft	



<u>Section Description</u>	<u>Water Surface Elevation</u>
Flow = 13.98 cfs Downstream channel invert = 2130.4 Channel slope = 0.004 ft/ft Channel side slope = 2:1 Area of flow = 6.14 ft² Hydraulic radius = 0.761 Normal depth = 1.03 ft Critical depth = 0.65 ft Depth downstream = 1.01 ft Bend loss = 0 ft Depth upstream = 1.03 ft Velocity = 2.31 ft/s Flow profile = Mild	
Culverts at 1+77	2132.01
Pipe shape = Circular Diameter = 24 in Length = 20 ft Flow = 6.99 cfs Friction method = Manning's Equation Friction factor = 0.013 Total fitting K value = 1.5 Pipe area = 3.14 ft² Pipe hydraulic radius = 0.5 Age factor = 1 Solids factor = 1 Velocity = 2.22 ft/s Friction loss = 0.02 ft Fitting loss = 0.12 ft Total loss = 6.99 ft	
Channel from 0+75 to 1+77	2132.07
Channel shape = Trapezoidal Manning's n' = 0.035 Channel length = 102 ft Channel width/diameter = 4 ft Flow = 13.98 cfs Downstream channel invert = 2130.8 Channel slope = 0.004 ft/ft Channel side slope = 12:1 Area of flow = 17.45 ft² Hydraulic radius = 0.604 Normal depth = 0.73 ft Critical depth = 0.47 ft Depth downstream = 1.21 ft Bend loss = 0 ft Depth upstream = 0.86 ft Downstream velocity = 0.62 ft/s	





ENLARGED GRADING PLAN
SCALE: 1"=10'

SUBJECT SITE (1.40 AC)

GREELEY AND HANSEN
1120 TOWN CENTER DRIVE, SUITE 120
LAS VEGAS, NV 89144

VERIFY SCALE
1/2" = 0' 1/2"

BAR REPRESENTS
ONE AND ONE-HALF
INCHES ON ORIGINAL

SCALE
HORIZONTAL
1" = 40'

VERTICAL
1" = 4'

SPRINGS PRESERVE
BUTTERFLY PLAYGROUND

ENLARGED GRADING PLAN

REVISIONS: A REVISED PER TDR REVIEW COMMENTS

DRAWN BY: 01/21/2018

CHECKED BY: 01/21/2018

RECOMMENDED BY: CHRISTOPHER LUQUETTE 01/21/2018

LYNDI SENIOR CIVIL ENGINEER DATE

ACCEPTED BY: RYAN PEARSON 01/21/2018

DESIGN MANAGER DATE

SOUTHERN NEVADA WATER AUTHORITY APPROVAL

SOUTHERN NEVADA WATER AUTHORITY DATE

(PREVIOUSLY SIGNED ON 5-29-2018)

DPR#: 2016-0033A

SNWA APPROVAL IS VALID FOR ONE (1) YEAR FROM THE SIGNATURE DATE. IF CONSTRUCTION WITHIN THE EASEMENT OR RESTRICTED PIPE SAFETY ZONE IS NOT COMPLETE, PLANS MUST BE RESUBMITTED TO SNWA FOR APPROVAL.

CIVIL

C1489

DRAWING NUMBER C6

SHEET 8 OF 41

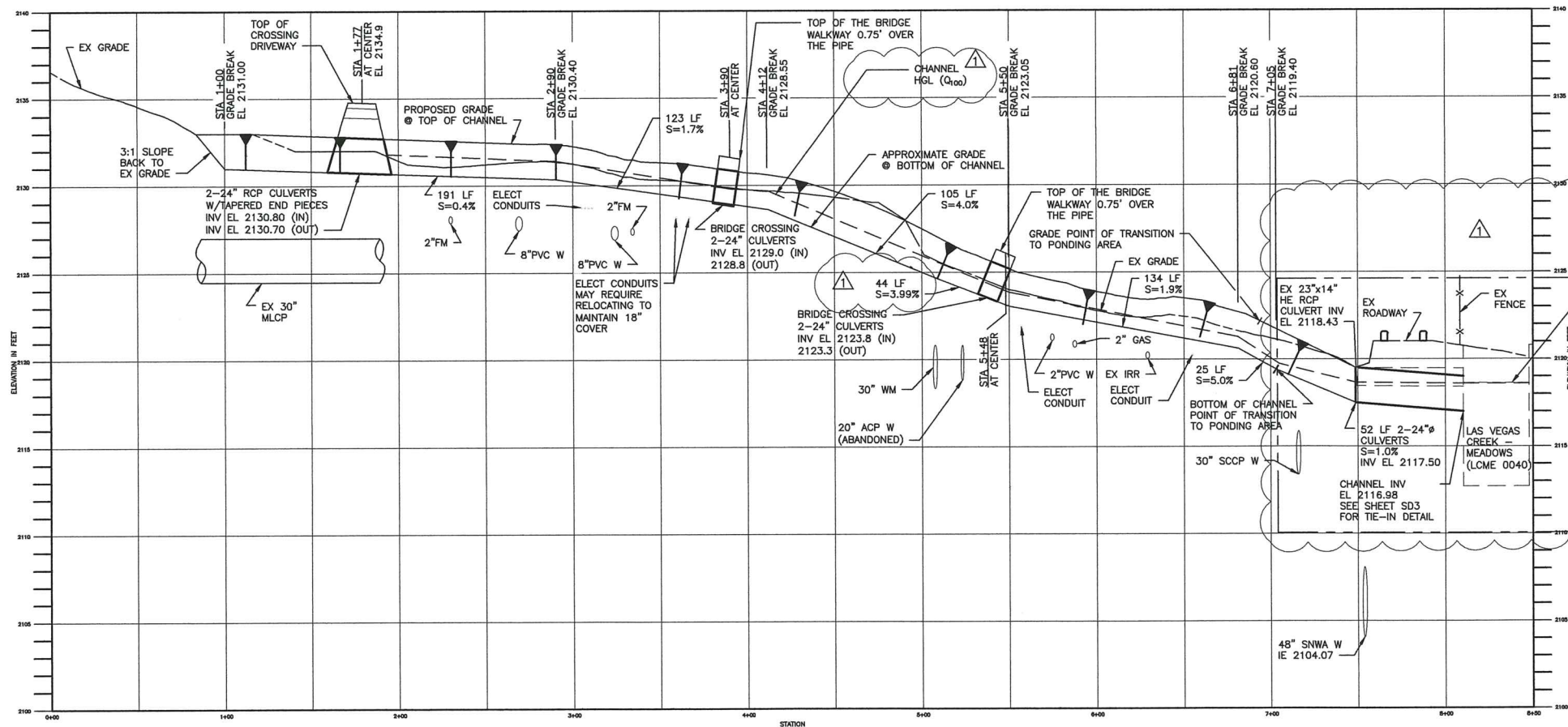
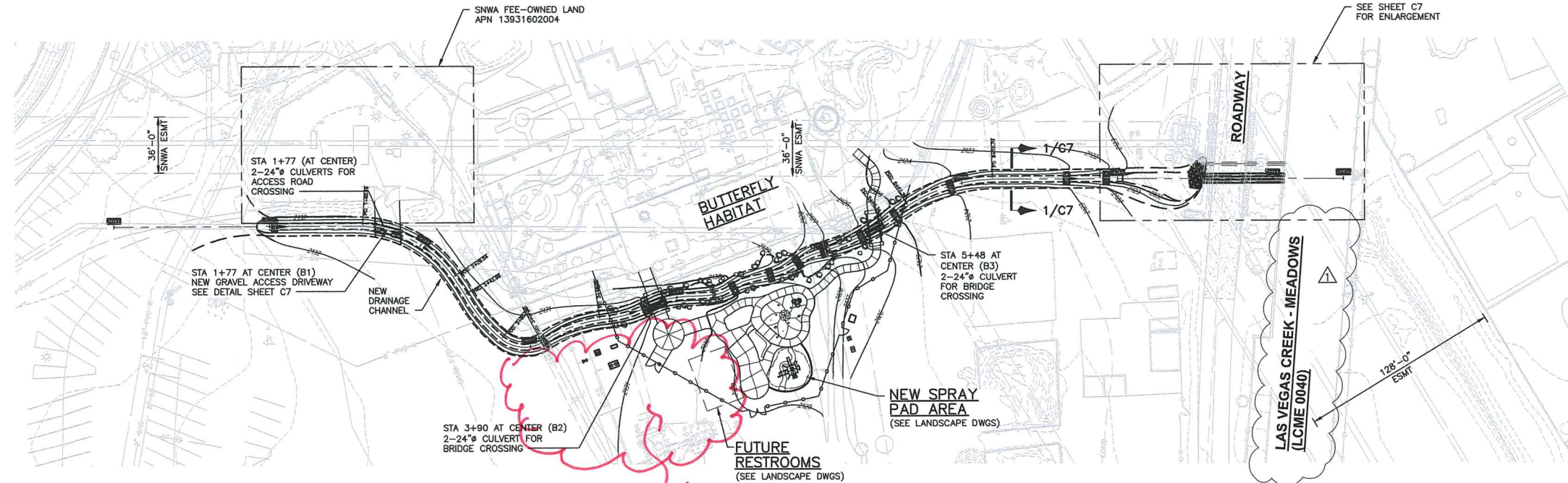
CLV DWG #

REF.

LAS VEGAS VALLEY WATER DISTRICT

southwick
LANDSCAPE ARCHITECTS

1700 W. Horizon Ridge Pkwy, Suite 200
Henderson, NV 89012
702.587.3108
www.southwick.com



BRIDGE COORDINATE POINTS				
POINT ID	NORTHING	EASTING	TOP ELEVATION	DESCRIPTION
B1	768031.7999	172426.9790	2134.90	Q ACCESS DRIVEWAY
B2	767904.0168	172552.6916	2131.25	Q BRIDGE
B3	767873.8678	172697.5732	2126.30	Q BRIDGE

NOTE:

1. MANUAL EXCAVATION ONLY AROUND ALL EXISTING UTILITIES.
2. ALL ONSITE STORM DRAIN FACILITIES ARE PRIVATELY OWNED AND PRIVATELY MAINTAINED.

SNWA CONSTRUCTION NOTES:

CONTRACTOR SHALL FIELD LOCATE AND PROTECT ALL SNWA/SNWS APPURTENANCES INCLUDING BUT NOT LIMITED TO AV/AR, ACCESS MANWAYS AND CATHODIC PROTECTION SYSTEMS. ALL ABOVE GROUND STRUCTURES AND AT GRADE STRUCTURES MUST BE ADJUSTED TO NEW GRADE AT CONTRACTOR'S EXPENSE. CATHODIC PROTECTION TEST STATIONS, RECTIFIERS, AND AV/AR'S MUST BE RELOCATED TO THE SIDEWALK PER SNWA STANDARDS AND AT THE CONTRACTOR'S EXPENSE. CONTRACTOR TO NOTIFY SOUTHERN NEVADA WATER AUTHORITY, DEVELOPMENT PLAN REVIEW, AT (702)258-3165 AT LEAST 48 HOURS PRIOR TO CONSTRUCTION ACTIVITY.

SOUTHERN NEVADA WATER AUTHORITY APPROVAL

SOUTHERN NEVADA WATER AUTHORITY DATE
(PREVIOUSLY SIGNED ON 5-29-2018)
DPR#: 2016-0033A

SNWA APPROVAL IS VALID FOR ONE (1) YEAR FROM THE SIGNATURE DATE. IF CONSTRUCTION WITHIN THE EASEMENT OR RESTRICTED PIPE SAFETY ZONE IS NOT COMPLETE, PLANS MUST BE RESUBMITTED TO SNWA FOR APPROVAL.

LAS VEGAS VALLEY WATER DISTRICT

VERIFY SCALE

1/2" = 1'

BAR REPRESENTS ONE AND ONE-HALF INCHES ON ORIGINAL

SCALE
HORIZ SCALE
VERT SCALE
1" = 4'

SPRINGS PRESERVE
BUTTERFLY PLAYGROUND

NEW DRAINAGE CHANNEL PLAN AND PROFILE

DRAWN BY: 01/21/2018
CHECKED BY: 01/21/2018
RECOMMENDED BY: CHRISTOPHER LUQUETTE
LWWD SENIOR CIVIL ENGINEER
DATE
ACCEPTED BY: RYAN PEARSON
DESIGN MANAGER
DATE



CIVIL

C1489

DRAWING NUMBER C4
SHEET 6 OF 41

CLV DWG #



1120 TOWN CENTER DRIVE, SUITE 120
LAS VEGAS, NV 89144

REF.

April 1, 2020

Albert Sung, P.E.
City of Las Vegas Public Works Department
(Flood Control Division)
333 North Rancho Drive
Las Vegas, NV 89106

Subject: **Springs Preserve Events Plaza**
(Springs Preserve Butterfly Playground)
Lochsa Job No. 191075

Mr. Sung:

This letter certifies that all items provided on the **Springs Preserve Events Plaza (Springs Preserve Butterfly Playground)** electronic submittal matches the paper version bound into the study.

Respectfully submitted,

LOCHSA ENGINEERING

Guy Morris, P.E.



CL OR SURVEY LINE

PROPERTY LINE

LIMITS OF WORK

EASEMENT LINE

SAWCUT LINE

SCARP LINE

DESCRIPTION:

EXISTING:

PROPOSED:

BUILDING OUTLINE

EDGE OF PAVEMENT

"A" TYPE CURBS

"L" TYPE CURBS

WALLS

CONTOUR LINES

AC PAVEMENT

CONCRETE

SPOT ELEVATIONS

SIGNS

MANHOLE W/ DESCRIPTION

MANHOLE DESCRIPTIONS

FIRE HYDRANTS

GATE VALVES

REDUCERS

CLEAN OUTS

UTILITY BOX OR VAULT

BOLLARDS

80' ROW LED STREET LIGHTS

100' ROW LED STREET LIGHTS

INTERSECTION STREET LIGHTS

LAS VEGAS VALLEY WATER DISTRICT

CONTRACT NO. C1525

SPRINGS PRESERVE

EVENT SITE

LAS VEGAS, NEVADA

LIST OF DRAWINGS

SHEET NO	DRAWING NO	DESCRIPTION
2	G2	COVER SHEET
3	G3	NOTE SHEET I
4	G4	NOTE SHEET II
5	G5	OVERALL SITE PLAN
6	SV1	SURVEY SHEET I
7	SV2	SURVEY SHEET II
8	SV3	SURVEY SHEET III
9	SV4	HORIZONTAL CONTROL SHEET I
10	SV5	HORIZONTAL CONTROL SHEET II
11	D1	DEMOLITION PLAN
12	C1	UTILITY PLAN SHEET I
13	C2	UTILITY PLAN SHEET II
14	C3	UTILITY PLAN SHEET III
15	C4	GRADING PLAN SHEET I
16	C5	GRADING PLAN SHEET II
17	C6	GRADING PLAN SHEET III
18	CD1	CIVIL DETAILS

ABBREVIATIONS

ABAN	ABANDON	INV	INVERT
AIP	ABANDON IN PLACE	ISL	ISLAND
AGG	AGGREGATE	JB	JUNCTION BOX
ALT	ALTERNATE	LOC	LENGTH OF CURB
A	ANODE, GAS	LT	LEFT
ACP	ASBESTOS CEMENT PIPE	LF	LINEAR FEET
ACP	ASPHALTIC CONCRETE	LVVWD	LAS VEGAS VALLEY WATER DISTRICT
AVE	AVENUE	MH	MANHOLE
BC	BACK OF CURB	MAX	MAXIMUM
BCR	BACK OF CURB RADIUS	MIN	MINIMUM
BVC	BEGINNING OF VERTICAL CURVE	MON	MONOLITHIC
BM	BENCHMARK	N/O	NORTH OF
BDRY LINE	BOUNDARY LINE	NTS	NOT TO SCALE
CATV	CABLE TELEVISION	OC	ON CENTER
C-C	CENTER TO CENTER	OG	OPEN-GRADED PAVEMENT, ORIGINAL GROUND
CL	CENTERLINE	PVMT	PAVEMENT
CBC	CITY OF BOULDER CITY	PI	POINT OF INTERSECTION
CLV	CITY OF LAS VEGAS	PRC	POINT OF REVERSE CURVE
COH	CITY OF HENDERSON	PC	POINT OF CURVE
CM	CITY OF MESQUITE	PT	POINT OF TANGENCY
CNLV	CITY OF NORTH LAS VEGAS	PCC	POINT OF COMPOUND CURVE
CC	CLARK COUNTY	PCC, CONC	PORTLAND CEMENT CONCRETE
CCWRD	CLARK COUNTY WATER RECLAMATION DISTRICT	PP	POWER POLE
CO	CLEAN OUT, SEWER	P	POWER
COMM	COMMERCIAL	PL	PROPERTY LINE
CONC, PCC	CONCRETE	PROP	PROPOSED
CONST	CONSTRUCTION OR CONSTRUCT	PB	PULL BOX
COR	CORNER	RP	RADIUS POINT
CMP	CORRUGATED METAL PIPE	R	RADIUS
CSAP	CORRUGATED STEEL ARCH PIPE	RR	RAILROAD
CSP	CORRUGATED STEEL PIPE	REINF	REINFORCED
C&G	CURB & GUTTER	RC	REINFORCED CONCRETE
CIP	CAST IRON PIPE	RCB	REINFORCED CONCRETE BOX
COL	COLUMN	RCP	REINFORCED CONCRETE PIPE
CU YD, CY	CUBIC YARD	RELOC	RELOCATE
CU FT, CF	CUBIC FOOT	RT	RIGHT
CULV	CULVERT	R/W	RIGHT-OF-WAY
CF	CURB FACE	RD	ROAD
DEPT	DEPARTMENT	SS	SANITARY SEWER
DIA	DIAMETER	SHT	SHEET
DWY	DRIVEWAY	S/O	SOUTH OF
DI	DROP INLET	SW	SIDEWALK
ESMT	EASEMENT	SQ FT, SF	SQUARE FOOT
E/O	EAST OF	SQ YD, SY	SQUARE YARD
EP	EDGE OF PAVEMENT	STA	STATION
EO	EDGE OF OIL	SHF	STEEL HIGHPRESSURE PIPE
E	ELECTRIC	SD	STORM DRAIN
EM	ELECTRIC METER	STD	STANDARD
ELEV	ELEVATION	STRUCT	STRUCTURAL OR STRUCTURE
EMBK	EMBANKMENT	SURV	SURVEY
ECR	END OF CURB RETURN	SLT	STREETLIGHT
EC	END OF CURVE	TL	TEMPORARY
EBS	CATHODE PROTECTION BOND STATION	TEMP	TEMPORARY
ETS	CATHODE PROTECTION TEST STATION	TBA	TO BE ADJUSTED
EVC	END OF VERTICAL CURVE	TBR	TO BE REMOVED
EXIST	EXISTING	TC	TOP OF CURB
FT	FEET/FOOT	TP	TOP OF PIPE
FG	FINISH GRADE	TS	TRAFFIC SIGNAL
FA	FIRE ALARM	TSI	TRAFFIC SIGNAL INTERCONNECT
FH	FIRE HYDRANT	TRANS	TRANSITION
FYP	FLOW LINE	TYP	TYPICAL
GALV	GALVANIZED	UG	UNDERGROUND
GM	GAS METER	VAR	VARIABLE
GR	GAS PRESSURE REGULATOR	VERT	VERTICAL
PL-G	PLASTIC GAS	VC	VERTICAL CURVE
SG	STEEL GAS	VG	VALLEY GUTTER
GB	GRADE BREAK	VCP	VITRIFIED CLAY PIPE
GUT	GUTTER	W	WATER
HDWL	HEADWALL	WM	WATER METER
IN	INCH	W/O	WEST OF
INT	INTERSECTION	YD	YARD

WASHINGTON

BONANZA

ALTA

ALTA

CHARLESTON

M.L.K.

159

KEY MAP

NOT TO SCALE

APPROVALS

LAS VEGAS FIRE AND RESCUE

DATE

APPROVED FOR CONSTRUCTION

DATE

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES MANAGER

PROJECT NO. FIRST APPROVED DATE:

LWWD APPROVED FIRE FLOW: TOTAL 1500 GPM/ONSITE 1500 GPM

SHEETS: G2

GENERAL SITE INFORMATION

NOTE: UTILITY LOCATIONS SHOWN ARE APPROXIMATE.

UTILITY NOTE:

LOCHSA ENGINEERING ASSUMES NO RESPONSIBILITY FOR EXISTING UTILITY LOCATIONS AND ELEVATIONS. THE UTILITIES SHOWN ON THIS PLAN ARE FROM THE BEST AVAILABLE INFORMATION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY THE LOCATION AND ELEVATION OF ALL UTILITIES, INCLUDING BUT NOT LIMITED TO, THE WATER, FIRE, SANITARY SEWER, STORM SEWER, TELEPHONE, POWER, GAS, AND IRRIGATION LINES PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. IF CONFLICT EXISTS IN THE FIELD, THE CONTRACTOR IS TO NOTIFY THE PROJECT ARCHITECT, OWNER'S REPRESENTATIVE AND THE PROJECT ENGINEER IMMEDIATELY. Call before you Dig. Avoid cutting underground utility lines. It's costly.

CALL 811

OR 1-800-227-2800

FAST

1-702-432-6300

1-702-227-2929

LOCATION MAP

NOT TO SCALE

CAUTION TO CONTRACTOR:

THE CONTRACTOR SHALL BE RESPONSIBLE TO INVESTIGATE AND VERIFY THE ACTUAL LOCATION AND DEPTH OF ALL EXISTING UNDERGROUND FACILITIES AT LEAST 48 HOURS IN ADVANCE OF THE PERFORMANCE OF ANY WORK.

A.P.N.:

139-31-602-003

BASIS OF BEARINGS:

A LINE BETWEEN LAS VEGAS VALLEY WATER DISTRICT PROJECT CONTROL POINTS 300 AND 308. SAID LINE BEARS NORTH 03°01'10" EAST

BENCHMARK:

CITY OF LAS VEGAS BENCHMARK 2LV01295WW6 RIVET AND PLATE TOP CURB EAST SIDE TWIN LAKES DRIVE AT BONANZA ROAD NAVD 88 ELEVATION=648.869 METERS/2,128.63' SURVEY FEET

LAS VEGAS VALLEY WATER DISTRICT

VERIFY SCALE

NTS

SCALE

HORIZ. SCALE

VERT. SCALE

LOCHSA JOB# 191075-50

SPRINGS PRESERVE

EVENT SITE

GENERAL

COVER SHEET

DRAWN BY:

MED

CHECKED BY:

SJS

RECOMMENDED BY:

CHRISTOPHER M. LUQUETTE, P.E.

DATE:

05-19-2020

05-19-2020

ACCEPTED BY:

RYAN C. PEARSON, P.E.

DATE:

05-19-2020

100% PROFESSIONAL ENGINEER-SEAL

GUY M. MORAN

12-31-21

NO 14528

NOVAIN 30

5-19-20

DRAWING-TYPE

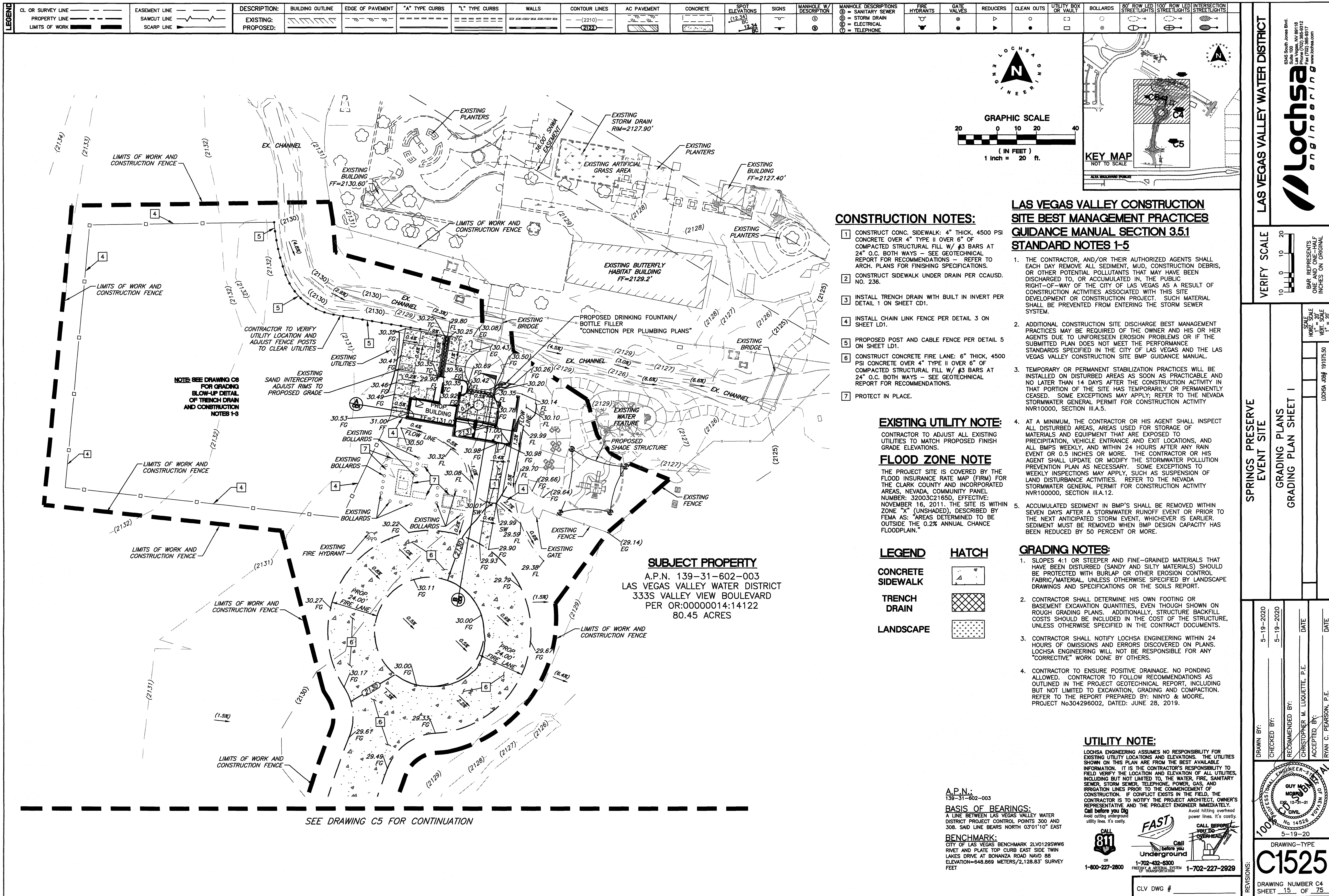
C1525

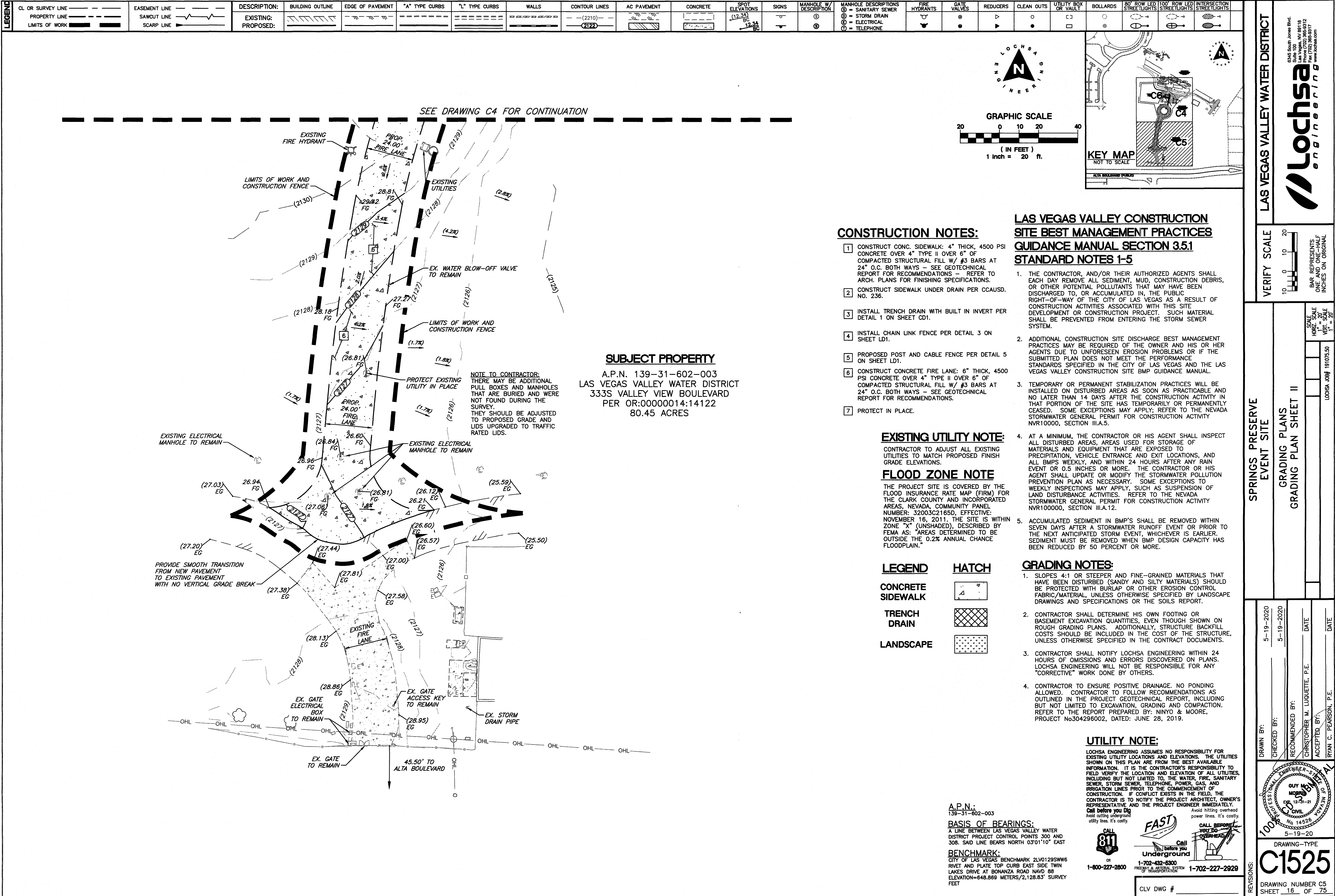
DRAWING NUMBER G2

SHEET 2 OF 75

REVISIONS:

CLV DWG #





CL OR SURVEY LINE	EASEMENT LINE	DESCRIPTION:	BUILDING OUTLINE	EDGE OF PAVEMENT	"A" TYPE CURBS	"L" TYPE CURBS	WALLS	CONTOUR LINES	AC PAVEMENT	CONCRETE	SPOT ELEVATIONS	SIGNS	MANHOLE W/ DESCRIPTION	MANHOLE DESCRIPTIONS ⑤ = SANITARY SEWER	FIRE HYDRANTS	GATE VALVES	REDUCERS	CLEAN OUTS	UTILITY BOX OR VAULT	BOLLARDS	80' ROW LED STREETLIGHTS	100' ROW LED STREETLIGHTS	INTERSECTION STREETLIGHTS
PROPERTY LINE	SAWCUT LINE	EXISTING:												⑤ = STORM DRAIN									
LIMITS OF WORK	SCARP LINE	PROPOSED:												⑥ = ELECTRICAL									

LAS VEGAS VALLEY CONSTRUCTION SITE
BEST MANAGEMENT PRACTICES
GUIDANCE MANUAL SECTION 3.5.1
STANDARD NOTES 1-5

1. THE CONTRACTOR, AND/OR THEIR AUTHORIZED AGENTS SHALL EACH DAY REMOVE ALL SEDIMENT, MUD, CONSTRUCTION DEBRIS, OR OTHER POTENTIAL POLLUTANTS THAT MAY HAVE BEEN DISCHARGED TO, OR ACCUMULATED IN, THE PUBLIC RIGHT-OF-WAY OF THE CITY OF LAS VEGAS AS A RESULT OF ANY CONSTRUCTION ACTIVITY ASSOCIATED WITH THE SITE DEVELOPMENT OR CONSTRUCTION PROJECT. SUCH MATERIAL 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 DURING CONSTRUCTION OF THE PROJECT, OR IF THE SUBMITTED PLAN DOES NOT MEET THE PERFORMANCE STANDARDS SPECIFIED IN THE CITY OF LAS VEGAS AND THE LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDANCE MANUAL.
3. TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE AND NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. SOME EXCEPTIONS MAY APPLY; REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR10000, SECTION III.A.5.
4. AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL INSPECT ALL DISTURBED AREAS, AREAS USED FOR STORAGE OF MATERIALS AND EQUIPMENT THAT ARE EXPOSED TO PRECIPITATION, VEHICLE ENTRANCE AND EXIT LOCATIONS, AND ALL BMPs WEEKLY, AND WITHIN 24 HOURS AFTER ANY RAIN EVENT OR 0.5 INCHES OR MORE. THE CONTRACTOR OR HIS AGENT SHALL UPDATE OR MODIFY THE STORMWATER POLLUTION PREVENTION PLAN TO NECESSARY. ERONE EXCEPTIONS TO WEEKLY INSPECTIONS MAY APPLY, SUCH AS SUSPENSION OF LAND DISTURBANCE ACTIVITIES. REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.12.
5. ACCUMULATED SEDIMENT IN BMP'S SHALL BE REMOVED WITHIN SEVEN DAYS AFTER 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.

GRADING NOTES:

1. SLOPES 4:1 OR STEEPER AND FINE-GRAINED MATERIALS THAT HAVE BEEN DISTURBED (SANDY AND SILTY MATERIALS) SHOULD BE PROTECTED WITH BURLAP OR OTHER EROSION CONTROL FABRIC MATERIALS, UNLESS OTHERWISE SPECIFIED ON LANDSCAPE DRAWINGS AND SPECIFICATIONS OR THE SOILS REPORT.
2. CONTRACTOR SHALL DETERMINE HIS OWN FOOTING OR BASEMENT EXCAVATION QUANTITIES, EVEN THOUGH SHOWN ON ROUGH GRADING PLANS. ADDITIONALLY, STRUCTURE BACKFILL COSTS SHALL BE THE RESPONSIBILITY OF THE COST OF THE STRUCTURE, UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS.
3. CONTRACTOR SHALL NOTIFY LOCHSA ENGINEERING WITHIN 24 HOURS OF OMISSIONS AND ERRORS DISCOVERED ON PLANS. LOCHSA ENGINEERING WILL BE RESPONSIBLE FOR THE "CORRECTIVE" WORK DONE BY OTHERS.
4. CONTRACTOR TO ENSURE POSITIVE DRAINAGE. NO PONDING ALLOWED. CONTRACTOR TO FOLLOW RECOMMENDATIONS AS OUTLINED IN THE PROJECT GEOTECHNICAL REPORT, INCLUDING BUT NOT LIMITED TO EXCAVATION, GRADING AND COMPACTION. REFERENCE TO THE REPORT PREPARED BY: NINYO & MOORE, PROJECT NO.304296002, DATED: JUNE 28, 2019.

EXISTING UTILITY NOTE:

CONTRACTOR TO ADJUST ALL
EXISTING UTILITIES TO MATCH
PROPOSED FINISH GRADE
ELEVATIONS.

FLOOD ZONE NOTE

THE PROJECT SITE IS COVERED BY THE FLOOD INSURANCE RATE MAP (FIRM) FOR THE CLARK COUNTY AND INCORPORATED AREAS, NEVADA, COMMUNITY PANEL NUMBER: 32003C2165D, EFFECTIVE: NOVEMBER 16, 2011. THE SITE IS WITHIN ZONE "X" (UNSHADED), DESCRIBED BY FEMA AS: "AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN."

UTILITY NOTE:

LOCHSA ENGINEERING ASSUMES NO RESPONSIBILITY FOR EXISTING UTILITY LOCATIONS AND ELEVATIONS. THE UTILITIES SHOWN ON THIS PLAN ARE FROM THE BEST AVAILABLE INFORMATION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY THE LOCATION AND ELEVATION OF ALL UTILITIES. THE CONTRACTOR SHALL NOT BE LIMITED TO THE WATER, FIRE, SANITARY SEWER, STORM SEWER, TELEPHONE, POWER, GAS, AND IRRIGATION LINES PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. IF CONFLICT EXISTS IN THE FIELD, THE CONTRACTOR IS TO NOTIFY THE PROJECT ARCHITECT, OWNER'S REPRESENTATIVE AND THE PROJECT ENGINEER IMMEDIATELY **before** any Dig. Avoid cutting underground utility lines. It's costly.

A.P.N.:
139-31-602-003

BASIS OF BEARINGS:
A LINE BETWEEN LAS VEGAS VALLEY WATER DISTRICT PROJECT CONTROL POINTS 300 AND 308. SAID LINE BEARS NORTH 03°01'10" EAST

BENCHMARK:
CITY OF LAS VEGAS BENCHMARK 2LV0129SWW
RIVET AND PLATE TOP CURB EAST SIDE TWIN
LAKES DRIVE AT BONANZA ROAD NAVD 88
ELEVATION=648.869 METERS/2,128.83' SURVEY
FEET

**CALL
811**
OR
1-800-227-2800



FAST

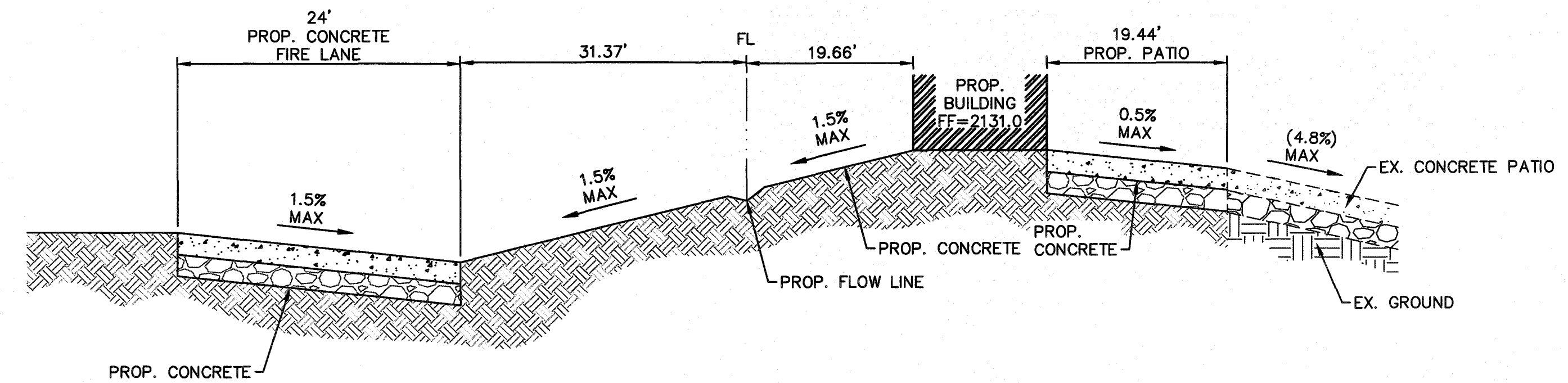
 before
Undergro
-702-432-5300
EWAY & ARTERIAL S

REVISIONS:

DRAWING—TYPE
C1525
DRAWING NUMBER
SHEET 17 OF

DRAWING NUMBER
SHEET 17 OF

DRAWING NUMBER
SHEET 17 OF

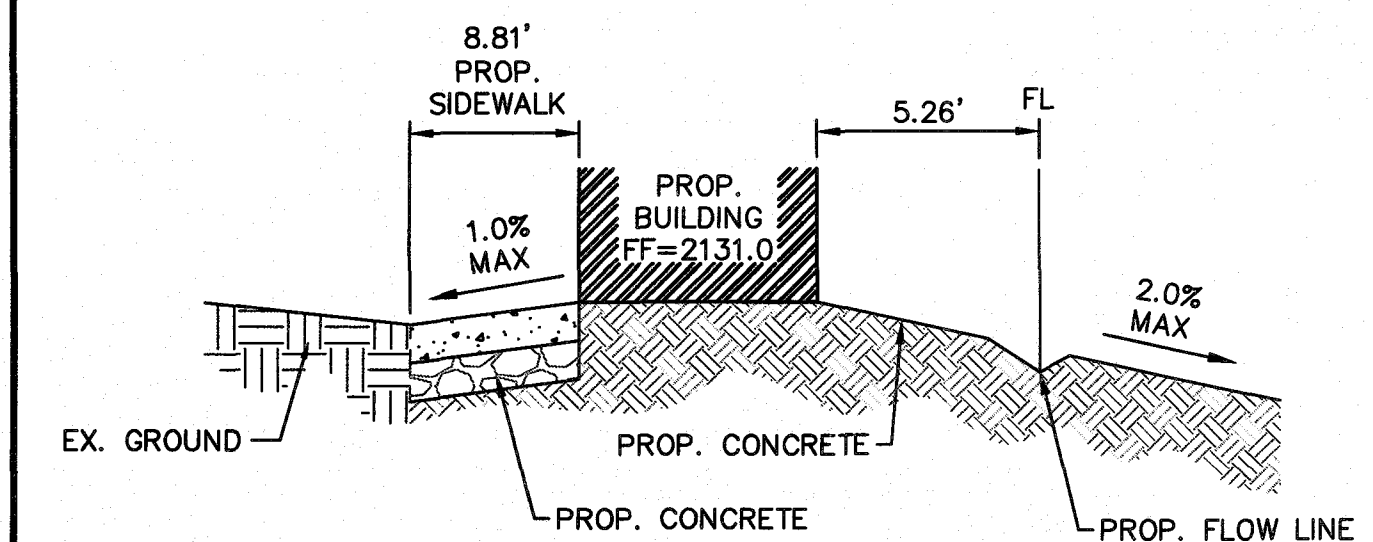


12 NOT USED

NOT TO SCALE

B NORTH SOUTH SECTION

NOT TO SCALE



11 NOT USED

NOT TO SCALE

8 NOT USED

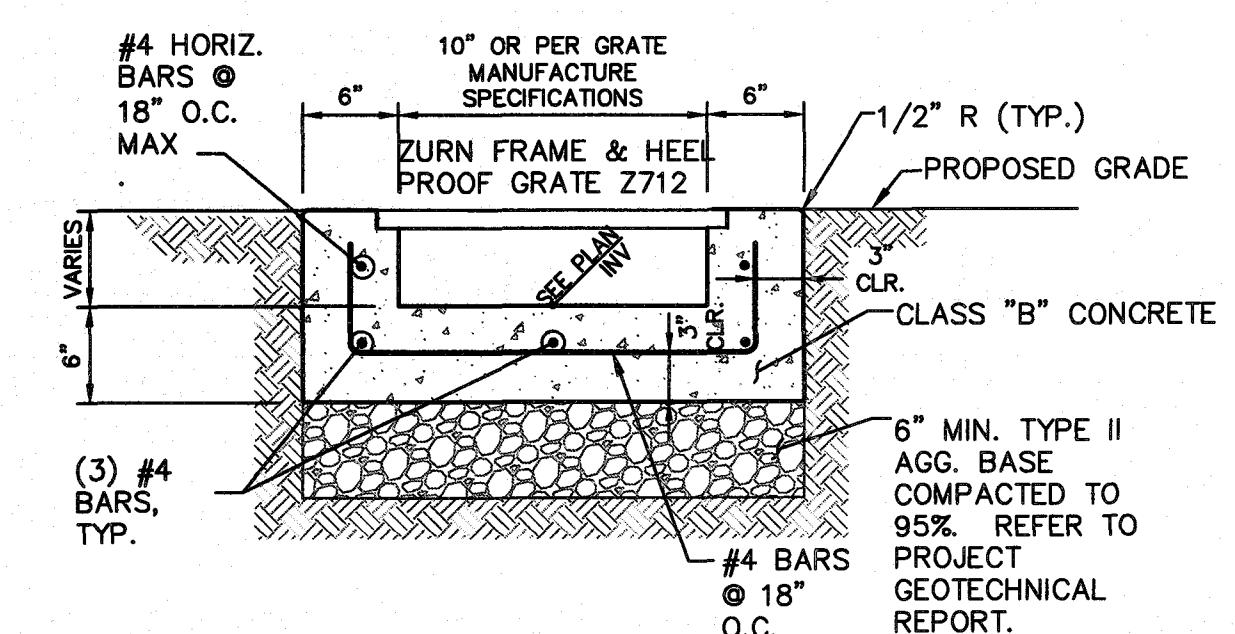
NOT TO SCALE

5 NOT USED

NOT TO SCALE

A EAST WEST SECTION

NOT TO SCALE



NOTES:

1. WEAKENED PLANE JOINTS REQUIRED AT 10' MAX. SPACING.
2. REFER TO PROJECT GEOTECHNICAL REPORT FOR TYPE II AGGREGATE OR SELECTED MATERIAL DEPTH AND COMPACTION, SUB-GRADE PREPARATION, MEMBRANES AND OTHER PLACEMENT RECOMMENDATIONS.

10 NOT USED

NOT TO SCALE

7 NOT USED

NOT TO SCALE

4 NOT USED

NOT TO SCALE

1 TRENCH DRAIN

CLV DWG # _____ NOT TO SCALE

LAS VEGAS VALLEY WATER DISTRICT

SCALE

SPRINGS PRESERVE
EVENT SITE

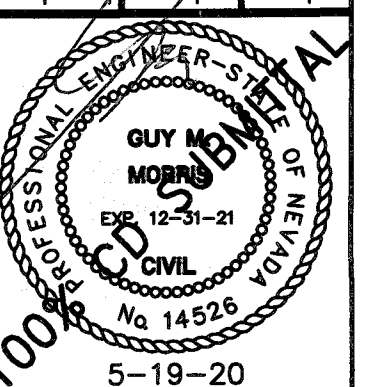
DETAIL SHEETS
CIVIL DETAILS

SCALE
HORIZ. SCALE
N.T.S.
VERT. SCALE
N.T.S.

LOCHSA JOB# 191075.50

DRAWN BY: _____ 5-19-2020

CHECKED BY: _____ 5-19-2020



DRAWING—TYPE
C1525
DRAWING NUMBER CD1
SHEET 18 OF 75