

DS #:

4983.1

APN:

139-34-112-001

PROJECT:

18 Fremont Street Hotel & Casino - update #1

SUBMITTAL:

3rd

SCANNED BY/DATE:

CHECKED BY/DATE:



CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM			DATE: August 31, 2020
TO: Land Development Services Department of Building & Safety			FROM: Jennifer Shinn, P.E Flood Control Engr. Associate Department of Public Works
SUBJECT: Drainage Study for: 18 Fremont Street Hotel & Casino – Update #1			COPIES TO: Lochsa Engineering
Cross Streets:	NEC of Main St. and Fremont St.		18 Fremont Street Acquisition, LLC
File Number:	F:\Depot\DSMemos\DS4983C.doc		Bart Anderson, P.E., DevCo
Parcel Number:	139-34-112-001		
Zoning Action:	SDR-73004		
FEMA Flood Zone	YES	NO	X
Proposed Storm Drain	YES	X	NO

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	4/17/2018	5/1/2018	See Comments Below	\$400.00	495221: \$400
2 nd Submittal	10/1/2018	10/3/2018		\$400.00	499489: \$400
3 rd Submittal	8/17/2020	8/31/2020	Approved	\$100.00	3958516: \$100
TOTAL FEES (LDDRS):				\$900.00	----

REMARKS:

3rd Submittal: Update #2 to revise drop inlet connection in Main Street

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.

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/R561E/34
AREA M-34

Technical Drainage Study Update for 18 Fremont Street Hotel and Casino

August, 2020

Prepared for:

18 Fremont Street Acquisition, LLC
1 Fremont Street,
Las Vegas, Nevada 89101
(702) 385-1906

Prepared by:

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

Lochsa Job No. 171126.55

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL
DRAINAGE STUDY INFORMATION FORM

Name of Development: 18 Fremont Street Hotel and Casino Date: August 13, 2020

Location of Development: a) Descriptive (Cross Streets) North/South: Main Street
East/West: Ogden Avenue

b) Section: 34 Township: 20 South Range: 61 East

c) APN : 139-34-112-001 and 139-34-113-001

Name of Owner: 18 Fremont Street Acquisition, LLC

Telephone No.: (702) 385 - 1906 Fax No.: _____ E-Mail Address: _____

Address: 1 Fremont Street, Las Vegas, NV 89101

Contact Person-Name: Hani M. Noshi, Ph.D., P.E., CFM Telephone No.: (702) 365-9312

* E-Mail Address: hani@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: 4.84 +/- Acres Being Developed/Disturbed: 4.84 +/- 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 (Hotel/Casino and Garage)

5. Approximate upstream land area which drains to the subject site: 20 +/- acres

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

"TDS for 18 Fremont Street Hotel and Casino" DS 4983

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: _____

The Garage roof drains will drain easterly into the existing Main Street storm drain, following existing pattern

The Hotel roof drains will drain northerly and easterly onto Ogden Av. and 1st Street, respectively, following existing pattern

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

August 17, 2020

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

Subject: **Technical Drainage Study Update for 18 Fremont Street Hotel and Casino**
(Previous DS 4983)
Lochsa Job No. 171126.55

Mr. Sung:

This letter certifies that all items provided in the electronic submittal for the above drainage study update match the paper copy bound into the study.

Respectfully submitted,

LOCHSA ENGINEERING

Hani Noshi, Ph.D., P.E., CFM
Principal



08/14/20

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name: 18 Fremont Street Hotel and Casino		Map ID:																									
Firm Name: Lochsa Engineering		Engineer: Hani M. Noshi, Ph.D., P.E., CFM																									
Address: 6345 South Jones Boulevard, Suite 100																											
City: Las Vegas		State: Nevada	Zip: 89118																								
Phone Number: (702) 365-9312		Fax Number: (702) 365-9317																									
Property Owner: 18 Fremont Street Acquisition, LLC																											
Address: 1 Fremont Street																											
City: Las Vegas		State: Nevada	Zip: 89101																								
Reviewed By:		Date Received:	Date Accepted for Review:																								
The following checklist is intended as a guide for the engineer preparing a Technical Drainage Study to submit to the local entity and Clark County Regional Flood Control District (if necessary). The listed items are the minimum information required prior to the entity performing a review. The engineer will remain responsible to ensure the Technical Drainage Study is prepared within the guidelines as set forth in the Clark County Regional Flood Control District (CCRFCD) Hydrologic Criteria and Drainage Design Manual (MANUAL). This document is intended as an aid in preparing Technical Drainage Studies. Each study submitted is reviewed for compliance with local and regional criteria. This form is not intended to be all inclusive and does not limit the extent of the information, calculations or exhibits which may be necessary to properly evaluate the intended land use. If items are not applicable for the subject site, provide N/A. I. GENERAL REQUIREMENT <table style="width: 100%; border: none;"> <tr> <td style="width: 10%; text-align: center;">Yes</td> <td style="width: 10%; text-align: center;">No</td> <td></td> </tr> <tr> <td style="text-align: center;"><u> X </u></td> <td style="text-align: center;"><u> </u></td> <td>Design Manual Standard Form 1 with the engineer's seal and signature.</td> </tr> <tr> <td style="text-align: center;"><u> X </u></td> <td style="text-align: center;"><u> </u></td> <td>Design Manual Standard Form 4.</td> </tr> <tr> <td style="text-align: center;"><u> X </u></td> <td style="text-align: center;"><u> </u></td> <td>2 copies of the 24" x 36" Drainage Plan.</td> </tr> <tr> <td style="text-align: center;"><u> </u></td> <td style="text-align: center;"><u> N/A </u></td> <td>A notarized letter from the adjacent property owner(s) allowing off-site grading or discharge.</td> </tr> </table> II. MAPS AND EXHIBITS <table style="width: 100%; border: none;"> <tr> <td style="width: 10%; text-align: center;">Yes</td> <td style="width: 10%; text-align: center;">No</td> <td></td> </tr> <tr> <td style="text-align: center;"><u> X </u></td> <td style="text-align: center;"><u> </u></td> <td>A copy of a current Flood Insurance Rate Map (FIRM) with the site delineated.</td> </tr> <tr> <td style="text-align: center;"><u> X </u></td> <td style="text-align: center;"><u> </u></td> <td>A copy of the current CCRFCD Master Plan Update Figure, (F-x), for Flood Control Facilities and Environmental areas with the site delineated.</td> </tr> </table>				Yes	No		<u> X </u>	<u> </u>	Design Manual Standard Form 1 with the engineer's seal and signature.	<u> X </u>	<u> </u>	Design Manual Standard Form 4 .	<u> X </u>	<u> </u>	2 copies of the 24" x 36" Drainage Plan.	<u> </u>	<u> N/A </u>	A notarized letter from the adjacent property owner(s) allowing off-site grading or discharge.	Yes	No		<u> X </u>	<u> </u>	A copy of a current Flood Insurance Rate Map (FIRM) with the site delineated.	<u> X </u>	<u> </u>	A copy of the current CCRFCD Master Plan Update Figure, (F-x), for Flood Control Facilities and Environmental areas with the site delineated.
Yes	No																										
<u> X </u>	<u> </u>	Design Manual Standard Form 1 with the engineer's seal and signature.																									
<u> X </u>	<u> </u>	Design Manual Standard Form 4 .																									
<u> X </u>	<u> </u>	2 copies of the 24" x 36" Drainage Plan.																									
<u> </u>	<u> N/A </u>	A notarized letter from the adjacent property owner(s) allowing off-site grading or discharge.																									
Yes	No																										
<u> X </u>	<u> </u>	A copy of a current Flood Insurance Rate Map (FIRM) with the site delineated.																									
<u> X </u>	<u> </u>	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> X </u>	<u> </u>	Streets with off-set crowns.
<u> X </u>	<u> </u>	Proposed contours or spot elevations in sufficient detail to exhibit intended drainage patterns and slopes.
<u> X </u>	<u> </u>	Property lines.
<u> X </u>	<u> </u>	Right-of-way lines and widths, existing and proposed.
<u> X </u>	<u> </u>	Existing improvements and their elevations.
<u> X </u>	<u> </u>	Delineation of proposed on-site drainage basins indicating area and 10-year and 100-year storm peak flows at basin concentration points.
<u> X </u>	<u> </u>	Concentration points and drainage flow direction with Q_{100} and V_{100} and D_{100} in streets.
<u> X </u>	<u> </u>	Cumulative flows, velocity, and direction of flow at upstream and downstream ends of site for the 10-year and 100-year flows.
<u> X </u>	<u> </u>	Location and cross-section of street capacity calculations.
<u> X </u>	<u> </u>	Cross-sectional detail for channels, including cutoff wall locations.
<u> X </u>	<u> </u>	Existing and proposed drainage facilities, appurtenances, and connections (i.e., sidewalk, ditches, swales, storm drain systems, unimproved and improved channels, and culverts, etc.) stating size, material, shape, and slope with plan and profile and HGL calculations.
<u> </u>	<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> </u>	<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> </u>	<u> N/A </u>	Location and detail of flood walls illustrating depth of flow, proposed grouting height, etc.
<u> </u>	<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.
<u> X </u>	<u> </u>	Building and/or lot numbers.
<u> </u>	<u> N/A </u>	Alignment of all existing, proposed, or future Regional Facilities adjacent to the site.
<u> </u>	<u> N/A </u>	Limits of existing floodplain based on current FIRM or best available information; limits of proposed floodplains based on best available information.

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
☐	☒ 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.
☐	☒ X	Appropriately elevated "humps" 6 inches above the 100 year water surface elevation at site accesses where the intent is to protect the site from the Q_{100} flows.
☒ X	☐	Street slopes for perimeter and interior streets. The minimum slope is 0.4 percent.
☐	☒ N/A	Location and detail of best management practice (BMP) for parking lots and low impact development (LID) (if required).

IV. HYDROLOGIC ANALYSIS

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

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

V. HYDRAULIC ANALYSIS

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

REFERENCE:

STANDARD FORM 2



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 (CCRFC) 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 CCRFC Hydrologic Criteria and Drainage Design Manual (Design Manual).

An appointment must be made to preview this checklist in conjunction with CCRFC 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.)
		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. <u>H.N.</u> by initial here, the engineer on record acknowledges that the electronic copy is an identical replicate of the original hard copy submitted to the City of Las Vegas.

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

August 17, 2020

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

Subject: **Update to the "Technical Drainage Study for 18 Fremont Street Hotel and Casino"**
(Original Study DS 4983)
Lochsa Job #171126.55.27

Dear Mr. Sung,

This letter is intended as an Update to the approved "*Technical Drainage Study for 18 Fremont Street Hotel and Casino*" (hereinafter will be referred to as the 'Original Study'). The Original Study was prepared by Lochsa Engineering and approved by the City of Las Vegas (CLV) on October 3, 2018 (DS 4983). This Update is being submitted to address revisions to the previously approved storm drain laterals to the Main Street's 42"RCP mainline storm drain.

As shown in the attached copy of the previously approved Sheets C4.01 and C4.02, the Original Study proposed two (2) on-grade drop inlets along the west side of Main Street as in-kind replacements for the two existing drop inlets. The upstream drop inlet is a 30ft-long (with full-length grates) that was proposed to drain into the 42"RCP Main Street mainline through an existing 45" x 29" elliptic RCP lateral (36"RCP equivalent) and a proposed 36"RCP extension. The downstream drop inlet is a 15ft-long (with full-length grates) that was proposed to drain into the Main Street mainline through an existing 30"RCP lateral and a proposed 30"RCP extension.

During the construction of the previously approved 30"RCP lateral extension for the 15ft drop inlet, a conflict with an existing NV Energy power conduit bank was encountered. Due to this conflict, it was not feasible to connect the 15ft drop inlet to the existing 30"RCP lateral. Therefore, the plans have been revised to allow for the 15ft drop inlet to drain directly into the Main Street mainline through a new 30"RCP lateral. As shown in the attached revised grading plan Sheets C5.01 and C6.01, a new manhole is being proposed to connect the proposed 30"RCP lateral with the 42"RCP mainline. In addition, a second manhole is being proposed along this 30"RCP lateral to change it to 38"x 24" elliptic RCP (30" equivalent) and continue below the fiber optic line and above the electrical conduit bank.

As shown in the attached excerpts and referenced offsite basin map (OFF1), the Original Study determined the total area draining towards the west half of Main Street as offsite basin MAINW(26/48cfs, 10-year/100-year). The Original Study established that basin MAINW stretches between Ogden watershed and the highpoint at Clark Avenue. There are several drop

inlets and an existing 36"RCP storm drain along the Main Street (upstream the project site), which were expected to intercept a portion of the runoff from basin MAINW. However, the Original Study conservatively assumed the entire runoff from MAINW will continue as surface flows towards the proposed 30ft and 15ft drop inlets. As shown in the attached excerpts, the Original Study determined the 100-year flows intercepted through the 30ft and 15ft drop inlets to be 38cfs and 10cfs (9.25cfs), respectively. **These intercepted flows through the drop inlets remain unchanged from the Original Study.**

The Original Study delineated the entire proposed Parking Garage (at the southwest corner of Main Street/Ogden Avenue intersection) as onsite basin ND1(4/8cfs). The approved plans directed the roof drains for onsite basin ND1 into an 18"HDPE onsite storm drain to drain into the back of the 15ft drop inlet. As shown in the revised grading plan, the parking garage roof drains are now collecting into two (2) 12"HDPE onsite pipes that drain into the 30ft and the 15ft drop inlets. **Thus, each 12"HDPE will drain approximately 4cfs (i.e. approximately half of onsite basin ND1) into each drop inlet during the 100-year storm events.**

As shown in the attached excerpts, the Original Study provided normal depth calculations and inlet control Nomograph calculations to illustrate the sufficient capacity for the 36"RCP lateral extension (associated with the 30ft drop inlet) and the 30"RCP(associated with the 15ft drop inlet). As discussed above, the 36"RCP lateral is now revised to convey additional 4cfs (from half of basin ND1), whereas the 30"RCP lateral will convey 4cfs less than the approved 100-year flow value. **Thus, during 100-year storm events, the 36"RCP lateral will convey 42cfs (38cfs +4cfs) and the 30"RCP lateral will convey 14cfs (10cfs + 4cfs).** The revised normal depth calculation is provided for the 36"RCP lateral to illustrate its sufficient capacity. In addition, the CCRFCD's Standard Form 6 is utilized to model the 30"RCP lateral for the 15ft drop inlet. Review of proposed Energy Grade Line (EGL) and Hydraulic Grade Line (HGL) values indicates that the revised storm drain lateral provides sufficient capacity to convey the 100-year design flow. The revised normal depth and Standard Form 6 calculations are included with this Update.

It is worth mentioning that, since the approval of the Original Study, we've recently obtained the "Final Drainage Design Report for the Phase 2 Main Street Improvements", prepared by VTN in February 2016. As shown in the attached relevant excerpts, the Main Street Report provided the most detailed hydrologic analysis for Main Street. The hydrologic and hydraulic analyses accounted for the existing drop inlets and the 36"RCP storm drain along Main Street (upstream our project site). As shown in the attached referenced Figure EX A.1 and HEC-1 output, the Report determined the surface flows conveyed through Main Street along our project site (just upstream of the intersection with Ogden Avenue) as combination point CMS13(15/31cfs). As discussed above, the Original Study conservatively determined the surface flows within the west half of Main Street along the project site as offsite basin MAINW(26/48cfs). Since the 100-year surface flows utilized in the Original Study is approximately 17cfs more than the determined flows in the Main Street Report, the Original Study remains to represent more conservative street flow depth, drop inlet and storm drain lateral hydraulic calculations. **Therefore, the hydraulic calculations in this Update remain based on the previously approved analysis from the Original Study.**

Master Planning Information

The “2018 Las Vegas Valley Flood Control Master Plan Update”, dated September 2018, as prepared by ATKINS, for the Clark County Regional Flood Control District (CCRFCD) illustrates the existing and proposed regional master planned facilities around the site. As shown in Figure F-30, there are no existing or proposed CCRFCD facilities adjacent to or crossing through the site.

Floodplain Information

As discussed in the Original Study, the project site is covered by Flood Insurance Rate Maps (FIRMs) for the Clark County, Nevada, and incorporated areas, Community Panel Numbers: 32003C2170F, Effective Date: November 16, 2011. Review of the FIRMs indicates that subject project site falls entirely within Zone “X” (unshaded), described by FEMA as: “Areas determined to be outside the 0.2% annual chance floodplain.” Please refer to the attached referenced Figure 2 from the Original Study for the location of the site on a portion of the FIRM.

Compliance with Regulations and Adopted Plans

The subject drainage study update is specifically provided as a support document for the aforementioned revisions to the previously approved storm drain laterals across Main Street. This update is in conformance with the approved “Technical Drainage Study for Fremont Street Hotel and Casino”, by Lochsa Engineering (DS 4983, approved in October 2018).

The drainage design associated with the proposed revisions is based on generally accepted engineering practices and is in compliance with the CCRFCD’s “Hydrologic Criteria and Drainage Design Manual”, the 2018 MPU and the approved Original Study. The proposed improvements will not introduce any negative impact to the existing drainage facilities or drainage patterns. Please refer to the attached grading plan and details for further clarification of the proposed improvements.

If you have any questions or further comments, please contact our office at your convenience.

Sincerely,
LOCHSA ENGINEERING

Hani M. Noshi, Ph.D., P.E., CFM
Principal



Standard Form 6 Calculation for the Proposed 30" RCP Lateral to the
15ft Drop Inlet

&

Normal Depth Calculation for Existing/Extended 36"RCP Lateral to the
30ft Drop Inlet

CONDUIT DATA

Q100 $\equiv$ 10 cfs from 1st D.I. + 4 cfs from Basin ND1

Revision

* Starting HGL = Conservatively assuming Full Flow Pipe at the Outlet
 * Starting EGL = HGL + 1.0 x Velocity Head

(CCRFCD Drainage Design Manual, Figure 815)
(CCRFCD Drainage Design Manual, Table 1001 (2 of 2))

Existing/Extended 36"RCP for the 30ft D.I. @ Main Street

Worksheet for Circular Channel

Project Description	
Worksheet	Existing/Extended 36"RCP for the 30ft D.I. @
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coeff	0.013
Slope	0.005000 ft/ft
Diameter	36 in
Discharge	42.26 cfs

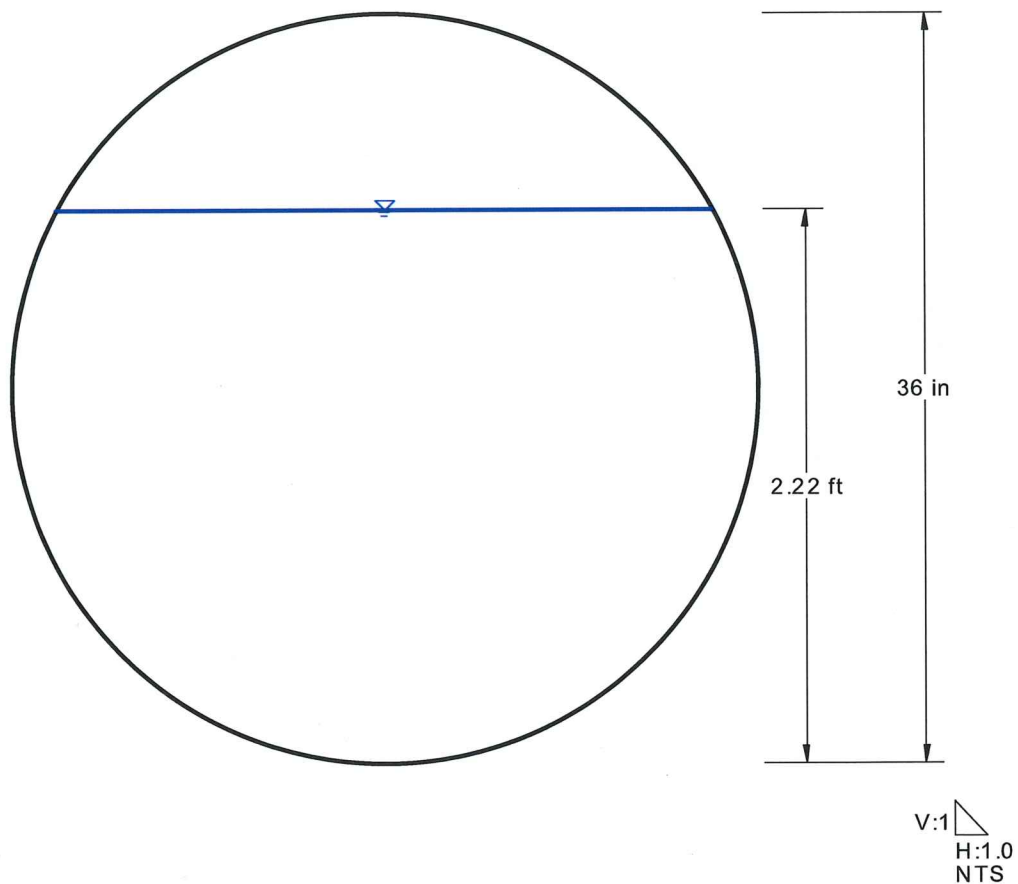
Results	
Depth	2.22 ft
Flow Area	5.6 ft ²
Wetted Perime	6.21 ft
Top Width	2.64 ft
Critical Depth	2.12 ft
Percent Full	73.9 %
Critical Slope	0.005603 ft/ft
Velocity	7.55 ft/s
Velocity Head	0.88 ft
Specific Energy	3.10 ft
Froude Numbe	0.91
Maximum Disc	50.73 cfs
Discharge Full	47.16 cfs
Slope Full	0.004015 ft/ft
Flow Type	Subcritical

Notes: * $Q_{100} = 42.26 \text{ cfs} = 38.26 \text{ cfs}$ (100-year intercepted flows through the 30ft Existing/Relocated Drop Inlet within Main Street) + 4cfs (approximately half of onsite basin ND1(4/8cfs) from the 12"HDPE roof drain)

Existing/Extended 36"RCP for the 30ft D.I. @ Main Street
Cross Section for Circular Channel

Project Description	
Worksheet	Existing/Extended 36"RCP for the 30ft D.I. @
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coeffic	0.013
Slope	005000 ft/ft
Depth	2.22 ft
Diameter	36 in
Discharge	42.26 cfs



Updated CCRFCD Facilities Map from the 2018 MPU

Project Site

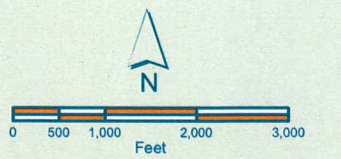


2018
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

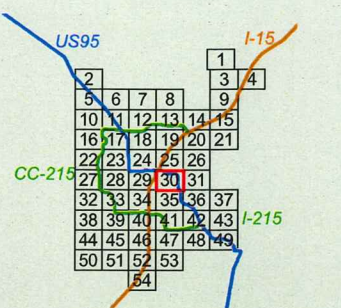
FIGURE F-30
FLOOD CONTROL FACILITIES

LEGEND

- Ultimate Development Boundary
- Existing Facilities
- Category A Proposed Facilities
- Category B Proposed Facilities
- Local Existing Facilities
- Detention Basin
- Culvert or Bridge Crossing
- Stormdrain
- Lined Channel
- Unlined Channel
- Levee/Dike
- Natural Wash/Floodway
- ID-Mile Separator
- Remove & Replace/Parallel Facilities
 - Category A
 - Channel
 - Stormdrain
 - Crossing
 - Category B
 - Channel
 - Stormdrain
 - Crossing



AerialSource: Esri World Imagery 2017



ATKINS

Member of the SNC-Lavalin Group

Louis Berger

ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
BHSA		BOULDER HIGHWAY SAHARA AVENUE						
0000	P	16' X 14' RCB	1350	3952	CSA13*	SW3	7.93	0.50
0026	P	14' X 11' RCB	4000	3952	CSA13*	SW3	7.93	1.30
0075	P	12' X 11' RCB	5280	3952	CSA13	SW3	7.93	2.11
0175	P	14' X 14' RCB	6000	3952	CSA13	SW3	7.93	0.67
0289	P	14' X 12' RCB	2300	3669	CSA11	SW3	7.55	0.87
CABZ		CEDAR AVENUE - BONANZA						
0000	E	72" RCP	525					0.30
0010	E	60" RCP	1450					0.30
CACH		CEDAR AVENUE CHANNEL						
0000	E	CONC CHNL 10'W 8'D 1.5:1 SS (REPLACED W/ CACH0001)	1681	2427	CCCA10-C	SW3	3.05	0.20
0001	P	CONC CHNL 22'W 12'D 0:1SS (REPLACES CACH0000)	1055	2427	CCCA10-C	SW3	3.05	0.20
0020	P	CONC CHNL 31'W 6.5:12'D 0:1SS (REPLACES CACH0000)	460	766	CCA10-C	SW3	0.90	2.19
0027	E	2: 15' X 5' RCB @ MARION	82	766	CCA10-C	SW3	0.90	0.35
0029	E	CONC CHNL 10'W 8'D 1.5:1 SS	1284	766	CCA10-C	SW3	0.90	0.37
0051	E	2: 15' X 5' RCB @ PAGE	64	766	CCA10-C	SW3	0.90	0.38
0053	E	CONC CHNL 10'W 6'D 1.5:1 SS	1275	766	CCA10-C	SW3	0.90	0.38
0079	E	2: 15' X 6' RCB @ LAMB	100	594	CCA08-C	SW3	0.70	0.38
0081	E	CONC CHNL 12'W 6'D 1.5:1 SS	2562	594	CCA08-C	SW3	0.70	0.20
0127	E	1: 12' X 4' RCB @ 2:11' X 4' RCB @ SANDHILL	80	594	CCA08-C	SW3	0.70	0.20
0129	E	CONC CHNL 10'W 8'D 1.5:1 SS	971	594	CCA08-C	SW3	0.70	0.26
0146	E	2: 12' X 5.5' RCB @ HONOLULU	62	594	CCA08-C	SW3	0.70	0.53
0148	E	CONC CHNL 10'W 8'D 1.5:1 SS	959	594	CCA08-C	SW3	0.70	0.53
CACN		CEDAR AVENUE - CHARLESTON						
0000	E	72" RCP	1867					0.41
0034	E	2: 48" RCP (REPLACE W/ CACN0035)	685	430	CCH70C	SW3	0.40	0.30
0035	P0	8' X 6' RCB (REPLACES CACN0034)	685	430	CCH70C	SW3	0.40	0.30
0049	E	66" RCP (REPLACE W/ CACN0050)	2146	430	CCH70C	SW3	0.40	0.60
0050	P0	6' X 7' RCB (REPLACES CACN0049)	2146	430	CCH70C	SW3	0.40	0.60
COLM		COLORADO / LAMB						
0000	E	72" RCP	1500	275	CH94	SW3	0.36	0.87
FLAG		FLAMINGO WASH - ALGONQUIN						
0026	E	60" RCP	427	432	FW21	FLAM3A	0.47	1.30
FLBN		FLAMINGO - BOULDER HIGHWAY NORTH						
0001	E	4: 10' X 6' RCB	350	4898	CCFR03	Boulder4	11.25	0.58
0008	E	2: 12' X 12' RCB	1055	4898	CCFR03	Boulder4	11.25	0.20
0028	E	3: 16' X 6' RCB	275	4898	CCFR03	Boulder4	11.25	0.20
0033	E	1: 15' X 10' RCB AND 1: 16' X 10' RCB	405	4898	CCFR03	Boulder4	11.25	0.20
0038	P	15' X 10' RCB	987	2471	CFR03	SW3	3.40	0.20
0056	P	24' X 6' RCB	391	2471	CFR03	SW3	3.40	7.00
0063	P	20' X 6' RCB	1393	2372	CFR04	SW3	3.21	0.68
0167	P	18' X 6' RCB	3565	2372	CFR04	SW3	3.21	0.38
0180	P	14' X 6' RCB	494	2013	CCH67A	SW3	2.43	1.80
0205	P	10' X 6' RCB	4478	2013	CCH67A	SW3	2.43	2.00
0275	P	12' X 6' RCB	223	1584	CCH56	SW3	1.75	2.50
0280	P	10' X 6' RCB	925	928	CCH56	SW3	1.00	2.22
0281	P	10' X 7' RCB	2800	928	CCH56	SW3	1.00	1.33
0312	P	7' X 4' RCB	2160	621	CCH52	SW3	0.62	4.20
0342	P	7' X 4' RCB	2425	621	CCH52	SW3	0.62	4.20
FLBS		FLAMINGO - BOULDER HIGHWAY SOUTH						
0000	E	UNLINED MEDIAN CHNL 0'W 6.5'D 4.5:1 SS	4060	684	CB4	FLAM3A	1.38	1.30
0167	E	UNLINED MEDIAN CHNL 0'W 3.5'D 9:1 SS	8850	348	CB4N	FLAM3A	0.63	0.90
FLDN		DESERT INN DRAIN EAST						
0000	E	60" RCP (REPLACE W/ FLDN0001)	6160	959	CFW30AW	FLAM3A	2.12	1.22
0001	P0	12' X 5' RCB (REPLACES FLDN0000)	6160	959	CFW30AW	FLAM3A	2.12	1.22
0116	E	54" RCP (REPLACE W/ FLDN0117)	2330	954	CFW29	FLAM3A	1.82	1.77
0117	P	10' X 5' RCB (REPLACES FLDN0116)	2330	954	CFW29	FLAM3A	1.82	1.77
0180	E	48" RCP (REPLACE W/ FLDN0161)	2950	742	CFW28	FLAM3A	1.51	1.28
0161	P0	10' X 5' RCB (REPLACES FLDN0160)	2950	742	CFW28	FLAM3A	1.51	1.28
FLMP		FLAMINGO WASH-MARYLAND PARKWAY SYSTEM						
0000	P	12' X 6' RCB	664	689	CCH60A	SW3	0.75	0.78
0013	P	12' X 4' RCB	1535	689	CCH60A	SW3	0.75	0.48

ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
FLMP		FLAMINGO WASH-MARYLAND PARKWAY SYSTEM						
0042	P	6' X 4' RCB	1345	245	DFLAM	SW3	0.31	0.95
0068	P	42" RCP	475	245	DFLAM	SW3	0.31	0.61
FLWA		FLAMINGO WASH						
0080	E	CONC CHNL 90'W 8'D 0:1 SS	2665	9548	CFW36	FLAM5B	35.21	0.40
0130	E	CONC CHNL 70'W 10'D 0:1 SS	1470	9548	CFW36	FLAM5B	35.21	0.40
0136	E	TRANSITION CONC CHNL 104'W 12'D TO 70'W 10'D 0:1 SS	255	9548	CFW36	FLAM5B	35.21	3.79
0141	E	CONC CHNL 104'W 12'D 0:1 SS	450	9548	CFW36	FLAM5B	35.21	0.96
0150	E	CONC CHNL 104'W 9'D 0:1 SS	225	9548	CFW36	FLAM5B	35.21	6.00
0174	E	9: 10' X 6' RCB @ LAMB	110	9504	CFW34	FLAM5B	34.77	1.40
0176	E	TRANSITION CONC CHNL 70'W 9'D TO 104'W 9'D 0:1 SS	290	9504	CFW34	FLAM5B	34.77	0.36
0181	E	CONC CHNL 70'W 9'D 0:1 SS	1270	9504	CFW34	FLAM5B	34.77	0.36
0200	E	CONC CHNL 70'W 8'D TO 12'D W/ PIER 0:1 SS	755	9504	CFW34	FLAM5B	34.77	0.50
0226	E	FREE SPAN BRIDGE 100'W 10'D @ I-515	170	9504	CFW34	FLAM5B	34.77	0.80
0228	E	CONC CHNL 70'W 8'D TO 12'D 0:1 SS	1500	9371	CFW33	FLAM5B	34.43	0.80
0255	E	2 SPAN BRIDGE 150'W 9'D @ BOULDER HWY	65	9371	CFW33	FLAM5B	34.43	1.00
0256	E	CONC CHNL 60'W 7.5'D 0:1 SS	40	6750	CFW33W	FLAM5B	23.17	1.00
0257	E	2 SPAN BRIDGE 150'W 9'D @ BOULDER HWY	60	6750	CFW33W	FLAM5B	23.17	1.00
0258	E	CONC CHNL 60'W 7.5'D 0:1 SS	750	6750	CFW33W	FLAM5B	23.17	0.44
0273	E	FREE SPAN BRIDGE 60'W 9'D @ MMMHP	20	6750	CFW33W	FLAM5B	23.17	0.40
0274	E	CONC CHNL 60'W 8.1'D 0:1 SS	1370	6750	CFW33W	FLAM5B	23.17	1.00
0295	E	CONC CHNL 60'W 8.1'D 0:1 SS	430	6416	CFW31	FLAM5B	21.56	0.80
0307	E	CONC CHNL 60'W 8.1'D 2:1 SS	410	6416	CFW31	FLAM5B	21.56	0.70
0314	E	CONC CHNL 60'W 8.1'D 2:1 SS	1500	6106	CFW30B	FLAM5B	20.19	0.90
0347	E	5: 10' X 8' RCB @ MOJAVE	80	6106	CFW30B	FLAM5B	20.19	0.94
0348	E	CONC CHNL 30'W 12'D 1:1 SS	1150	6106	CFW30B	FLAM5B	20.19	0.70
0375	E	5: 10' X 8' RCB @ DESERT INN	140	6074	CFW23	FLAM5B	18.30	2.70
0377	E	CONC CHNL 50'W 9.5'D 0:1 SS	1372	6074	CFW23	FLAM5B	18.30	1.04
0399	E	FREE SPAN BRIDGE 60'W 16'D @ MCLEOD	130	6074	CFW23	FLAM5B	18.30	0.50
0401	E	CONC CHNL 50'W 11.5'D 0:1 SS	107	6074	CFW23	FLAM5B	18.30	0.50
0406	E	CONC CHNL 33'W 11.5'D 0:1 SS	716	5277	CFW23W	FLAM5B	17.42	0.79
0419	E	CONC CHNL 33'W 9.8'D 0:1 SS	206	5277	CFW23W	FLAM5B	17.42	2.00
0423	E	CONC CHNL 50'W 9.8'D 0:1 SS	1686	5277	CFW23W	FLAM5B	17.42	0.76
0455	E	CONC CHNL 50'W 7.5'D 0:1 SS	170	5277	CFW23W	FLAM5B	17.42	1.83
0458	E	CONC CHNL 75'W 9.8'D 0:1 SS	347	5277	CFW23W	FLAM5B	17.42	1.50
0471	E	5: 10' X 8' RCB @ EASTERN	110	1841^	CFW22W*	FLAM5B	14.32	1.30
0472	E	22' X 8' RCB @ EASTERN	110	3406^	CFW22W*	FLAM5B	14.32	0.50
0473	E	GRASS CHNL 60'W 15'D 2:1 SS	100	5247	CFW22W	FLAM5B	14.32	0.47
0477	E	3 SPAN BRIDGE 47'W 15'D	10	5247	CFW22W	FLAM5B	14.32	0.80
0478	E	GRASS CHNL 60'W 15'D 2:1 SS	520	5247	CFW22W	FLAM5B	14.32	0.47
0481	E	3: 90" CMAP @ TIOGA (REPLACE W/ FLWA0482)	60	5247	CFW22W	FLAM5B	14.32	0.87
0482	P	4: 20' X 6' RCB @ TIOGA (REPLACES FLWA0481)	60	5247	CFW22W	FLAM5B	14.32	0.87
0483	E	GRASS CHNL 60'W 15'D 2:1 SS	300	5247	CFW22W	FLAM5B	14.32	0.63
FW15		FREEWAY CHANNEL FROM DESERT INN TO EXPRESSWAY						
0000	E	3: 12' X 10' RCB	2170	3685	CAL93	Boulder4	8.93	0.17
LCCH		LAS VEGAS CREEK CHANNEL						
0000	E	2: 12' X 7' RCB	730	3212	CAL93C	MEADOWS4	9.90	1.28
0013	E	2: 12' X 6' RCB	2035	3050	CLC20-C	MEADOWS4	9.60	0.82
LVBZ		LAS VEGAS WASH - BONANZA						
0000	P	2: 12' X 7' RCB	1760	1753	CBN15-C	SW3	2.15	0.40
0025	P	2: 12' X 7' RCB	2700	1753	CBN15-C	SW3	2.15	0.40
0064	P	2: 12' X 7' RCB	2630	1603	CBN12-C	SW3	1.87	0.40
0114	P	2: 12' X 6' RCB	2740	1311	CBN10-C	SW3	1.54	0.40
0166	E	54" RCP (REPLACE W/ LVBZ0167)	930	1106	CBN09	SW3	1.29	0.45
0167	P0	10' X 9' RCB (REPLACES LVBZ0166)	930	1106	CBN09	SW3	1.29	0.45
0187	E	48" RCP (REPLACE W/ LVBZ0188)	1235	1106	CBN09	SW3	1.29	0.71
0188	P	9' X 9' RCB (REPLACES LVBZ0187)	1235	1106	CBN09	SW3	1.29	0.71
0210	E	42" RCP (REPLACE W/ LVBZ0211)	704	1004	CBN08	SW3	1.05	1.37
0211	P0	8' X 8' RCB (REPLACES LVBZ0210)	704	1004	CBN08	SW3	1.05	1.37
0223	E	36" RCP (REPLACE W/ LVBZ0224)	2275	856	CBN03	SW3	0.84	0.72
0224	P0	8' X 8' RCB (REPLACES LVBZ0223)	2275	856	CBN03	SW3	0.84	0.72

ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
LVCA		LAS VEGAS WASH - CHARLESTON						
0000	P	12' X 8' RCB	4600	985	CCH77-C	SW3	1.16	0.30
LVCO		COLORADO AVENUE SYSTEM						
0012	E	14' X 8' RCB	2560	1144	CNEL06	SW3	1.32	0.24
0064	E	10' X 8' RCB	2165	901	CCCH94	SW3	1.00	0.24
0106	E	10' X 8' RCB	590	402	CCH92-C	SW3	0.37	0.24
0109	E	10' X 5' RCB	2350	402	CCH92-C	SW3	0.37	0.67
LVOE		OWENS AVENUE - EAST						
0345	P	13' X 12' RCB	990	2576	DLVOE	SW5	22.61	0.60
LVST		LAS VEGAS WASH - STEWART						
0000	P	10' X 10' RCB	4684	1316	CST03-C	SW3	1.40	0.56
0088	P	10' X 9' RCB	4654	1135	CST01-C	SW3	1.18	0.56
0188	P	8' X 8' RCB	1980	601	CCA04	SW3	0.59	0.40
LWVH		WASHINGTON AVENUE CHANNEL						
0389	E	12' X 8' RCB	2110	1562 ^A	CV1-C ^A	SW5SC	14.95	0.90
0426	E	16' X 8' RCB	150	1562 ^A	CV1-C ^A	SW5SC	14.95	1.08
0429	E	SPLITTER STRUCTURE (2: 12' X 8' RCB)	190	2870	DCLC21	SW5	22.61	1.90
0431	E	3: 14.33' X 10' RCB	665	2870	DCLC21	SW5	22.61	0.15
0446	E	JUNCTION STRUCTURE	69	2870	DCLC21	SW5	22.61	0.15
0447	E	3: 14.33' X 10' RCB	1955	5193	CCAL93	SW5	22.05	0.15
0484	E	CONFLUENCE STRUCTURE	455	5193	CCAL93	SW5	22.05	0.15
SAEA		SAHARA AVENUE - EASTERN LATERAL						
0000	P	10' X 7' RCB	1440	492	CFR02	SW3	0.65	0.20
VAVD		VEGAS VALLEY DRIVE						
0000	P	7' X 5' RCB	1300	649	CFW41	FLAM3A	1.30	2.10
0025	P	84" RCP	5300	649	CFW41	FLAM3A	1.30	1.60
VBCH		VAN BUSKIRK CHANNEL						
0000	E	12' X 3' RCB	500	637	CVB16	FLAM3A	1.16	1.00
0008	E	8' X 5' RCB	5490	637	CVB16	FLAM3A	1.16	1.00
VBEA		VAN BUSKIRK - EASTERN AVE						
0000	P	10' X 6' RCB	3020	896	CVB11	FLAM3A	2.65	1.30
VBCM		VAN BUSKIRK - MCLEOD DRIVE						
0000	E	2- 8' X 6' RCB	3850	931	CVB13	FLAM3A	2.99	0.50
VBTW		VAN BUSKIRK - TWAIN						
0000	E	18" RCP (REPLACE W/ VBTW0001)	6640	379	CB2	FLAM3A	0.74	0.70
0001	P0	84" RCP (REPLACES VBTW0000)	6640	379	CB2	FLAM3A	0.74	0.70
WAGC		WASHINGTON AVENUE CHANNEL - GRAND CENTRAL						
0000	E	2: 12' X 4' RCB	700	505	LC21	SW3	0.56	0.20
0014	E	1: 12' X 4' RCB AND 1: 11' X 4' RCB	2440	505	LC21	SW3	0.56	0.20
0060	E	12' X 4' RCB	455	505	LC21	SW3	0.56	0.20
WAPR		WASHINGTON AVENUE CHANNEL PARALLEL						
0132	E	2- 9' X 8' RCB	387	1562 ^A	CV1-C ^A	SW5SC	14.95	1.67

Excerpts from the

“Technical Drainage Study for 18 Fremont Street Hotel and Casino”
(DS 4983)

CITY OF LAS VEGAS		DATE:
INTER-OFFICE MEMORANDUM		October 3, 2018
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:	
	18 Fremont Street Hotel & Casino	
Cross Streets:	NEC of Main St. and Fremont St.	
File Number:	F:\Depot\DSMemos\DS4983A.doc	
Parcel Number:	139-34-112-001	
Zoning Action:	SDR-73004	
FEMA Flood Zone	YES	NO X
Proposed Storm Drain	YES	NO X
COPIES TO:		
Lochsa Engineering		
18 Fremont Street Acquisition, LLC		
Bart Anderson, P.E., DevCo		

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	4/17/2018	5/1/2018	See Comments Below	\$400.00	495221: \$400
2 nd Submittal	10/1/2018	10/3/2018		\$400.00	499489: \$400
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.

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/R561E/34
AREA M-34

Addendum 1 to the Technical Drainage Study for 18 Fremont St Hotel & Casino

September 2018

Prepared for:

18 Fremont Street Acquisition, LLC
1 Fremont St
Las Vegas, NV 89101
(702) 385-1906

Prepared by:

Lochsa Engineering
6345 S Jones Blvd, Ste 100
Las Vegas, NV 89118
(702) 365-9312

Lochsa Job No. 171126

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL
DRAINAGE STUDY INFORMATION FORM

Name of Development: 18 FREMONT HOTEL & CASINO Date: SEPTEMBER 27, 2018
Location of Development: a) Descriptive (Cross Streets) North/South: MAIN ST
East/West: OGDEN AVE
b) Section: 34 Township: 20 S Range: 61 E
c) APN : 139-34-112-001 AND 139-34-113-001

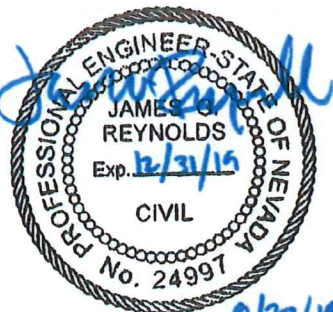
Name of Owner: 18 FREMONT STREET ACQUISITION LLC
Telephone No.: (702) 385-1906 Fax No.: _____ E-Mail Address: _____
Address: 1 FREMONT ST LAS VEGAS, NV 89101

Contact Person-Name: JAMES G. REYNOLDS, P.E. Telephone No.: 702-365-9312
* E-Mail Address: JAMES.REYNOLDS@LOCHSA.COM Fax No.: 702-365-9317
Firm: LOCHSA ENGINEERING
Address: 6345 S JONES BLVD STE 100 LAS VEGAS NV 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: 4.84 ACRES +/- Being Developed/Disturbed: 4.84 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 (HOTEL/CASINO)
5. Approximate upstream land area which drains to the subject site: 20 ACRES +/-
6. Has the site drainage been evaluated in the past? ☐ YES ☒ NO If yes, please identify documentation: _____
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: GARAGE ROOF DRAINS WILL DRAIN EASTERLY IN TO EXISTING MAIN ST STORM DRAIN FOLLOWING EXISTING PATTERNS; HOTEL ROOF DRAINS NORTHERLY AND EASTERLY IN TO OGDEN AVE, AND 1ST STREET, RESPECTIVELY
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.**

Local Entity File No.	Revision	Date

REFERENCE:

STANDARD FORM 1

September 27, 2018 ←

Ms. Jennifer Shinn, P.E.
Department of Public Works – Flood Control
City of Las Vegas
333 N Rancho Dr
Las Vegas, NV 89106

Subject: **Addendum #1 to the Technical Drainage Study for 18 Fremont Hotel & Casino (DS 4983)**
Lochsa Job No. 171126

Dear Ms. Shinn:

Lochsa Engineering is in receipt of your comment letter dated May 1, 2018 for the above referenced project. Each comment has been reprinted and individually addressed as follows:

Comment 1: Provide a copy of the zoning/planning conditions associated with this site 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.

Response 1: The zoning/planning conditions for the project are provided in the Appendix of this submittal.

Comment 2: The finish floor elevation does not meet the Regional Flood Control District minimum criteria of twice the Q100 depth of flow up to 18-inches above the water surface (CCRFCD Manual Section 304.4.E.1) or 6-inch minimum above the highest adjacent top of curb (CCRFCD Manual Section 1602 304.4.E.1). The following finished floor elevation should be revised or alternate flood protection provided.

LOT	FF shown	Min FF
New Building	2021.25'	2023.71'

As an alternative, each lot must be discussed in the drainage study, shown to be flood protected, and any necessary flood improvements shown on the grading plan.

Response 2:

An existing 5-ft combination drop inlet in the east side of Main St south of the Fremont St intersection was not considered in the initial submittal. Based on a tributary area of 0.68 acres (62% of off-site basin MAINE), prorated 100-year peak flow at the inlet is approx. 1.9 cfs (62% of 3 cfs). A FlowMaster worksheet that uses one-half the opening and grate length (2.5-ft) curb is provided in the Appendix. The calculation shows intercepted flow of approx. 1.3 cfs, leaving 0.6 cfs as bypass flow that continues northerly in existing curb and gutter past the project site. As a conservative measure, 1 cfs is assumed to bypass the inlet.

existing
5-ft D.I.
on east
side
of
Main
St.

Section E shown on the revised Drainage Plan Sheet D2 included with this submittal models Main St at the upstream end of the proposed building utilizes the aforementioned surface flow of 1 cfs and a longitudinal slope of 0.4%. The existing cross slope in Main St at Section E is approx. 3% at the section. There is also an existing curb ramp at the section. As a conservative measure, the ramp is ignored to yield a higher depth in the gutter. Worst case depth in the street at Section E at the building is 0.31 ft. FlowMaster worksheet for Section is provided in the Appendix of this submittal.

The existing sidewalk near the building entrance is relatively flat, with little cross slope from the building face to existing top-of-curb. The grading plans have been revised to delineate an area of existing sidewalk to be removed and replaced to improve drainage. Proposed finish grade at the sidewalk at the southwest building entrance is now 2023.46 ft., which is more than twice the depth of flow above the gutter flow line elevation at Section E (2022.80 ft). Though the proposed building finish floor elevation of 2021.25 ft is below the sidewalk, the sidewalk is considered to protect the building and meets the twice-the-depth-of-flow criterion.

Note grading constraints preclude raising the proposed FF of the building, which comprises an entire block previously occupied by several buildings. The proposed FF matches existing sidewalk elevation in Fremont St near the southeast building corner.

Comment 3: It is unclear how the roof of the proposed building drains, as there are no roof drain discharge locations indicated on the plans. Review and revised accordingly.

Response 3:

Roof drain locations are shown on the revised grading plan included with this submittal. Three (3) roof drains discharge on the surface in to Ogden Ave, and one (1) outlets on the surface in to 1st St to the east. Locations are also called out on the revised Drainage Plan Sheet DR2 included with this submittal. These locations are consistent with the on-site basin delineation as previously submitted.

Note, per discussion with Albert Sung, P.E., of CLV, a required foundation drain is shown connecting in to the existing 36-in storm drain in Main St at a proposed manhole on the revised grading plans included with this submittal. These flows are pumped from the soil outside the basement, which is below the water table, by a lift station. The pipe shown in the proposed right-of-way is 18-in RCP as required; the internal connection to the lift station and sand/oil separator will be detailed on the plumbing plans.

Comment 4: The maximum storm drain drop inlet length is 20-feet with a maximum spacing of 20-feet between drop inlets. Revise the grading plan and provide updated hydraulic calculations.

Response 4: The two (2) drop inlets proposed with this project are in-kind replacements for existing inlets that must be removed to facilitate construction of the off-site improvements adjacent to the garage on the west side of Main St. The proposed 30-ft inlet and 15-ft inlet are approximately 60 ft apart. Per e-mail correspondence with Jennifer Shin dated 6/25/18, the inlets and their locations as shown on the grading plans included with the previous submittal are acceptable. No new hydraulic calculations are therefore required.

Please refer to a printout of the e-mail thread in the Appendix. The lengths of the existing inlets to be removed have also been added to the revised grading plans included with this submittal.

Comment 5: *City of Las Vegas does not allow HDPE pipe in public right-of-ways or public drainage easements. Note that City of Las Vegas only allows the use of HDPE storm drain pipes for privately owned and privately maintained storm drain systems which serve and are located exclusively on private properties. Any proposed HDPE storm drain pipes must also meet all design criteria established by the Clark County Regional Flood Control District and must be installed per Clark County Regional Transportation Commission Uniform Standard Drawings and Specifications.*

Response 5: Noted. The 29 lf reach between the proposed storm drain manhole and back of the proposed 15-ft drop inlet in the west side of Main St is called out as 18-in RCP on the revised grading plans. This manhole has also been called out to be privately maintained. The remaining proposed storm drain is located on APN 139-34-112-001 (private) and is to be privately maintained.

Comment 6: Concrete sidewalks shall be constructed per CCAUSD Dwg. No 234 and Las Vegas Downtown Centennial Standards.

Response 6: Noted. Sidewalks are called out to be constructed per CCAUSD No. 225 and the City of Las Vegas Downtown Centennial Plan standard.

Comment 7: Sidewalk ramps shall be constructed per CCAUSD Dwg. No. 235 and Las Vegas Downtown Centennial Standards.

Response 7: Noted. Sidewalk ramps are called out to be constructed per CCAUSD No. 235 and the City of Las Vegas Downtown Centennial Plan standard.

Comment 8: Driveways shall be constructed per Las Vegas Downtown Centennial Standards.

Response 8: It is acknowledged that the proposed driveways do not meet the Las Vegas Downtown Centennial standard. Per correspondence between Demetrius Karanikolas, P.E., PTOE, Principal Traffic Engineer of Lochsa Engineering and Victor Bolanos, Senior Engineering Associate of CLV, the proposed driveways will be reviewed during plan review. Should changes to the driveways be required as a result of plan review, an update to this study will be submitted if warranted.

Comment 9: Label the existing storm drain facilities in Main Street with the CLV Drawing Number.

Response 9: The existing storm drain in Main St has been labeled with CLV Drawing Numbers (107v2011 and 107v6255). 

Comment 10: Review and revise the section details directional arrows shown on the Grading Plans.

Response 10: Section details have been reviewed and directional arrows revised as needed. Refer to the revised Sheet C6.01 included with this submittal.

Comment 11: The proposed finish floor elevations shown on section details B and C on Sheet C6.01 do not match the elevations shown on the Grading Plans. Review and revise accordingly.

Response 11: Proposed finish floor elevations have been revised on section details B and C. Refer to the revised Sheet C6.01 included with this submittal.

Comment 12: Section Detail D calls out proposed AC pavement adjacent to the proposed building rather than a concrete sidewalk to match existing. Confirm the ground cover in this area.

Response 12: Section detail D has been revised to indicate concrete adjacent to the proposed building.

RESPONSE 2

**Ex 5-ft Drop Inlet East 1/2 Main St South of Fremont
Worksheet for Combination Inlet On Grade**

Project Description	
Worksheet	Ex 5' DI (South of Fren
Type	Combination Inlet On C
Solve For	Efficiency

Input Data	
Discharge	1.90 cfs
Local Depression	2.0 in
Local Depression \	2.00 ft
Slope	0.004000 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.086667 ft/ft
Road Cross Slope	0.020000 ft/ft
Mannings Coefficient	0.016
Curb Opening Len	2.50 ft
Grate Width	1.50 ft
Grate Length	2.50 ft
Grate Type	3 mm (P-1-7/8")
Clogging	0.0 %

Options	
Calculation Opt	Use Both
Grate Flow Opt	Include None

Results	
Efficiency	0.70
Intercepted Flow	1.33 cfs
Bypass Flow	0.57 cfs
Spread	10.29 ft
Depth	0.31 ft
Flow Area	1.13 ft ²
Gutter Depression	1.2 in
Total Depression	3.2 in
Velocity	1.68 ft/s
Splash Over Velocity	9.11 ft/s
Frontal Flow Factor	1.00
Side Flow Factor	0.30
Grate Flow Ratio	0.57
Equivalent Cross Slo	0.074327 ft/ft
Active Grate Length	2.50 ft
Length Factor	0.00
Total Interception Len	0.00 ft

← PROPORTED FLOW FROM OFF-SITE BASIN MAIN

5'
← } HALF LENGTH TO ACCOUNT FOR 50% CLOGGING FACTOR

⇒ ≤ 0.6 cfs ⇒ ASSUME 1 CFS CONVEYED
NORTHEAST TOWARD PROJECT SITE

SO, we're conservative
assuming
additional
10 cfs to be
conveyed
through

Several similar
5 ft D.I.'s
exist along
Main St. east half
up to
Clark Av.

the upstream
36" RCP

RESPONSE 4

James Reynolds

From: Jennifer Shinn <jshinn@LasVegasNevada.GOV>
Sent: Monday, June 25, 2018 8:44 AM
To: James Reynolds
Cc: Hani Noshi; Nicole Goudie
Subject: RE: 171126 18 Fremont Hotel & Casino TDS (DS 4983)

Good morning James,

Replacing the 2 existing inlets in-kind and at the 60-foot spacing is acceptable. My apologies, as the comment should have read "minimum spacing". Please provide a copy of this email as part of the addendum.

Thank you,

Jennifer Shinn, P.E.

Engineering Associate
Department of Public Works | City Engineering Division
Phone: (702) 229-6131
333 N. Rancho, floor | Las Vegas, NV 89106



lasvegasnevada.gov



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

From: James Reynolds <James.Reynolds@lochsa.com>
Sent: Friday, June 22, 2018 4:14 PM
To: Jennifer Shinn <jshinn@LasVegasNevada.GOV>
Cc: Hani Noshi <Hani@lochsa.com>; Nicole Goudie <nikki@lochsa.com>
Subject: 171126 18 Fremont Hotel & Casino TDS (DS 4983)

Hello Jennifer,

I am working on the addendum to the TDS for 18 Fremont Hotel & Casino (DS 4983), and I have a question regarding one of the comments in your letter dated 5/1/18. Comment no. 4 states, "The maximum storm drain drop inlet length is 20-feet with a maximum spacing of 20-feet between drop inlets. Revise the grading plan and provide updated hydraulic calculations."

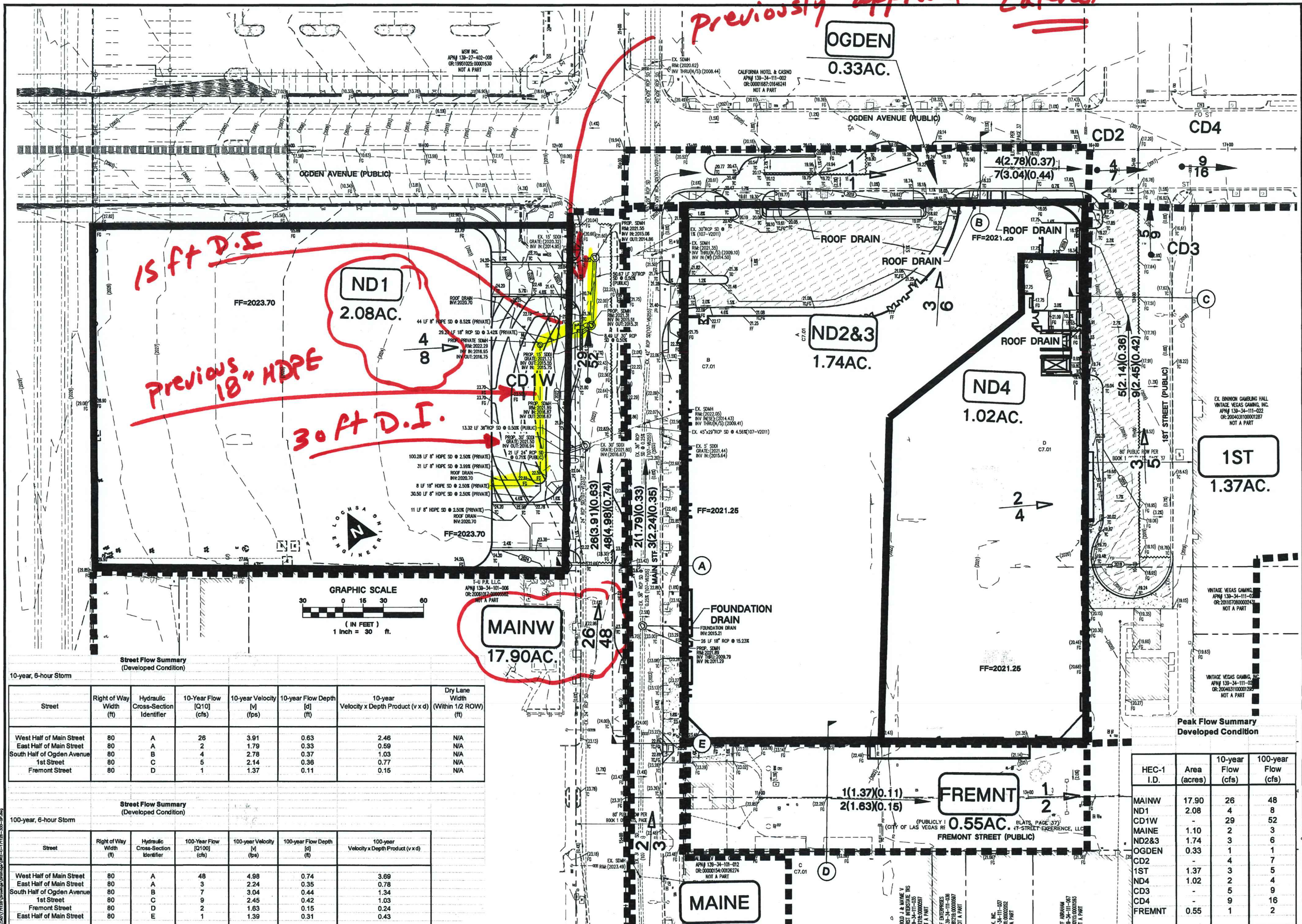
We are replacing two existing inlets in the west side of Main St in-kind: one (1) 30-ft inlet, and one (1) 15-ft inlet. Please confirm it's CNLV's preference the existing 30 ft inlet be replaced with a 20-ft inlet. If so, we can look at upsizing the 15-ft to 20-ft to make up the for reduction in intercepted flows.

Additionally, the proposed inlets are approx. 60 ft apart. If the comment should have read "minimum spacing," we meet the criterion. If not, please provide clarification on the spacing requirement.

Thank you,

James G. Reynolds, P.E., LEED AP

Previously Approved Lateral



15 ft D.I.
Previous 18" HDPE
30 ft D.I.

Street Flow Summary
(Developed Condition)

Street	Right of Way Width (ft)	Hydraulic Cross-Section Identifier	10-year Flow [Q10] (cfs)	10-year Velocity [V] (fps)	10-year Flow Depth [d] (ft)	10-year Velocity x Depth Product (v x d)	Dry Lane Width (Within 1/2 ROW) (ft)
West Half of Main Street	80	A	26	3.91	0.63	2.46	N/A
East Half of Main Street	80	A	2	1.79	0.33	0.59	N/A
South Half of Main Street	80	B	4	2.78	0.37	1.03	N/A
South Half of Ogden Avenue	80	C	5	2.14	0.38	0.77	N/A
1st Street	80	D	1	1.37	0.11	0.15	N/A

Street Flow Summary
(Developed Condition)

Street	Right of Way Width (ft)	Hydraulic Cross-Section Identifier	100-year Flow [Q100] (cfs)	100-year Velocity [V] (fps)	100-year Flow Depth [d] (ft)	100-year Velocity x Depth Product (v x d)
West Half of Main Street	80	A	48	4.98	0.74	3.69
East Half of Main Street	80	A	3	2.24	0.35	0.78
South Half of Ogden Avenue	80	B	7	3.04	0.44	1.34
1st Street	80	C	2	2.45	0.42	1.03
Fremont Street	80	D	2	1.63	0.15	0.24
East Half of Main Street	80	E	1	1.39	0.31	0.43

Peak Flow Summary
Developed Condition

HEC-1 I.D.	Area (acres)	10-year Flow (cfs)	100-year Flow (cfs)
MAINW	17.90	26	48
ND1	2.08	4	8
CD1W	1.10	29	52
MAINE	1.74	2	3
ND2&3	1.74	3	6
OGDEN	0.33	1	1
CD2	-	4	7
1ST	1.37	3	5
ND4	1.02	2	4
CD3	-	5	9
CD4	-	9	16
FREMNT	0.55	1	2

ONSITE BASIN MAP
(DEVELOPED CONDITION)
18 FREMONT STREET
HOTEL AND CASINO
CITY OF LAS VEGAS

PROJECT No.: 171126
DATE: 09/27/18
SCALE: 1"=30'
DRAWN BY: HN
DESIGNED BY: HN
CHECKED BY: HN

SEAL
GUY M. MORRIS
CIVIL ENGINEER
No. 14526
09/27/18
SHEET No. DR2
SHEET 2 OF 2
CLV No.



Technical Drainage Study for 18 Fremont Street Hotel and Casino

April, 2018

Prepared for:

18 Fremont Street Acquisition, LLC
1 Fremont Street,
Las Vegas, Nevada 89101
(702) 385-1906

Prepared by:

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

Lochsa Job No. 171126

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL
DRAINAGE STUDY INFORMATION FORM

Name of Development: 18 Fremont Street Hotel and Casino Date: April 17, 2018
Location of Development: a) Descriptive (Cross Streets) North/South: Main Street
East/West: Ogden Avenue
b) Section: 34 Township: 20 South Range: 61 East
c) APN : 139-34-112-001 and 139-34-113-001

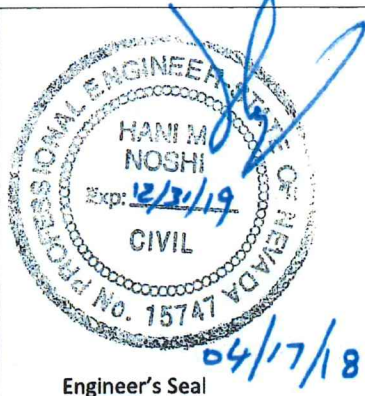
Name of Owner: 18 Fremont Street Acquisition, LLC
Telephone No.: (702) 385 - 1906 Fax No.: _____ E-Mail Address: _____
Address: 1 Fremont Street, Las Vegas, NV 89101

Contact Person-Name: Hani M. Noshi, Ph.D., P.E., CFM Telephone No.: (702) 365-9312
* E-Mail Address: hani@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: 4.84 +/- Acres Being Developed/Disturbed: 4.84 +/- 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 (Hotel/Casino and Garage)
5. Approximate upstream land area which drains to the subject site: 20 +/- acres
6. Has the site drainage been evaluated in the past? ☐ YES ☒ NO If yes, please identify documentation: _____
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: _____
The Garage roof drains will drain easterly into the existing Main Street storm drain, following existing pattern
The Hotel roof drains will drain northerly and easterly onto Ogden Av. and 1st Street, respectively, following existing pattern
8. Briefly describe your proposed schedule for the subject project: ASAP



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

***New Required Field**

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

Local Entity File No.	Revision	Date

REFERENCE:

STANDARD FORM 1

2. DRAINAGE DESCRIPTION

In the CCRFCD's 2008 MPU (Reference 2), the valley was hydrologically divided into ten watersheds and each watershed was further subdivided into sub-basins. The onsite and offsite basins impacting the subject project area fall within the Central watershed. As shown in Figure H-32 of the 2008 MPU, the project site is all located within sub-basins LC21 and CH59-C.

2.1 Existing Drainage Condition

The watershed encompassing the project area is entirely develop and generally slopes easterly and southeasterly. Thus, these offsite flows from the west, will be conveyed northerly within Main Street. At the Main Street intersections with the easterly avenues, the majority of the flows are expected to split easterly, due to the much steeper easterly slopes at the intersections. Due to the limited contributing area from the west, the pronounced crown and the continuous median along Main Street, offsite flows may be confined within the western half of Main Street. Therefore, a more conservative analysis is utilized in this study for the west half of Main Street. On the other hand, the runoff flows conveyed within the eastern half of Main Street is determined to be limited to the runoff generated through the eastern right of way (ROW).

Main
Street

The most current hydrologic and hydraulic analysis for the surrounding areas was provided in the "Technical Drainage Study for La Bayou Casino Building Expansion", approved on January 24, 2017 (Reference 5, DS4849; will be referred to as La Bayou Study). The La Bayou Study analyzed the Fremont Street along the portion of the project site. As shown in the attached referenced Figure

DR2, La Bayou Study determined the flows through Fremont Street to be limited to basin FD1(1/1cfs).

For the determination of the flows conveyed along the west side of Main Street, the "Technical Drainage Study for 500 South Main Street Parking Garage" was reviewed. The Garage Study was approved on April 11, 201 (Reference 6, DS4518). Review of the drainage exhibits and the approved grading plan from the Garage Study illustrates the existing highpoint along Main Street profile, just north of the intersection with Clark Avenue. Thus, for the conservative determination of the flows within the west half of Main Street, the watershed area is assumed to stretch between Ogden watershed and Clark Avenue.

Clark Av. is the south cut off

There is an existing 42" RCP storm drain mainline within Main Street, along the project site. As shown in the attached referenced drawings, the storm drain was constructed as part of the "Ogden Avenue Underpass and Roadway" (CLV Drawing No. 107-V2011). There are two existing drop inlets along the west side of the Main Street, within the project boundaries. The upstream drop inlet is 30ft-long (with full-length grates), which drains into the Main Street mainline through an existing 45" x 29" elliptic RCP lateral (36" RCP equivalent). The downstream drop inlet is 15ft-long (with full-length grates), which drains into the Main Street mainline through an existing 30" RCP lateral. On the east half of Main Street, only a 5ft (with full-length grates) drop inlet was constructed.

To delineate the offsite basins impacting Main Street, Fremont Street and 1st Street along the site, the 2ft-contour aerial from GISMO's website is utilized. The delineation of the offsite basins is

Offsite Basin
map

depicted on Exhibit OFF1, labeled as the 'Offsite Drainage Map (Existing/Developed Conditions)'.

The offsite flows conveyed within the west half of Main Street is delineated as offsite basin MAINW(26/48cfs, 10-year/100-year). Offsite basin MAINE(2/3cfs) represents the area draining onto the east half of Main Street. Similarly, runoff flows conveyed through Ogden Avenue, 1st Street and Fremont Street are delineated as offsite basins OGDEN(1/1cfs), 1ST(3/5cfs) and FREMNT(1/2cfs).

The HEC-1 Flood Hydrograph Package is utilized in the subject study to determine the relevant runoff flows. Utilizing the 1-ft topographic map for the project site, the site is delineated into four onsite basins labeled as NX1(4/8cfs), NX2(2/4cfs), NX3(1/2cfs) and NX4(2/4cfs). The delineation of the onsite basin is depicted on Exhibit DR1, labeled as the 'Onsite Drainage Map, Existing Condition'. Onsite basin NX1 represents the entire existing surface parking at the southwest corner of Main Street/Ogden Avenue intersection. Runoff from onsite basin NX1 travels easterly and northeasterly towards an existing 6ft x 3ft grate. The grate drains into the back of the existing 15ft drop inlet within Main Street, through an existing 38" x 24" Elliptic RCP (30"RCP equivalent). Onsite basins NX2, NX3 and NX4 represents the western, northern and eastern portion of the existing Las Vegas Club roofs, draining onto Main Street, Ogden Avenue and 1st Street, respectively.

As shown in the attached HEC-1 and onsite/offsite exhibits, runoff from MAINW represents the total flows (within the western half of Main Street) draining towards the existing 30ft and 15ft drop inlets. As shown in the attached FlowMaster on-grade drop inlet hydraulic calculations, the

existing 30ft and 15ft drop inlets will intercept the entire runoff from MAINW. Runoff from MAINW and NX1 is combined at combination point CX1 W(29/52cfs), which represents the total flows conveyed into the Main Street mainline through the existing laterals within the western half. Similarly, runoff from MAINE drains towards the existing 5ft drop inlet, within the east half of Main Street. As shown in the attached FlowMaster on-grade drop inlet hydraulic calculations, the existing 5ft drop inlet will intercept the majority of the runoff from MAINE.

Runoff from onsite basin NX2 drains onto Main Street (near the intersection with Ogden Avenue), and turns easterly into Ogden Avenue. Thus, runoff from NX2, NX3 and OGDEN is combined at combination point CX2(4/7cfs), which represents the total flows within Ogden Avenue(south half) along the site. Runoff from NX4 is combined with 1ST at combination point CX3(5/9cfs), which represents the total flows conveyed within 1ST Street along the site. Runoff from CX2 and CX3 is combined at combination point CX4(9/16cfs), which is represents the total flows conveyed within Ogden Avenue (south half) just downstream the project site.

Normal depth calculations are being provided for west half and east half of Main Street (Section A), Ogden Avenue (Section B), 1ST Street (Section C) and Fremont Street (Section D). As shown in the attached FlowMaster output, flows within all perimeter streets are well below the maximum allowable velocity x depth ($v \times d$) values of 6.0 and 8.0 during 10- and 100-year storm events, respectively. Main Street, Ogden Avenue and 1ST Street are non-standard 80ft ROW, with curb-to-curb width of only 60ft and 20ft of total sidewalks. Thus, the 12ft dry lane is not applicable during the 10-year storm events.

Total available flows for the 36"/42" RCP from the west half.

2.2 Interim Drainage Condition

For the interim condition, the analysis of the offsite basins will remain the same as in the existing conditions. Thus, the offsite runoff flow values and pattern upstream the subject site remains as described in the existing condition. The proposed improvements consist of a Hotel/Casino building at the southeast corner of Main Street and Ogden Avenue, replacing the existing Las Vegas Club. The project also proposes a parking garage at the southwest corner of Main Street and Ogden Avenue, replacing the existing surface parking.

As discussed previously, there are two existing drop inlets along the west side of the Main Street, within the project boundaries. The upstream drop inlet is 30ft-long (with full-length grates), which drains into the Main Street mainline through an existing 45" x 29" elliptic RCP lateral (36"RCP equivalent). This 30ft drop inlet is being slightly relocated to better align with the proposed turn-right lane. A 36"RCP extension is also being proposed to the existing lateral. The downstream drop inlet is 15ft-long (with full-length grates), which drains into the Main Street mainline through an existing 30"RCP lateral. This 15 drop inlet is being slightly relocated to the south of the proposed driveway entrance to the parking garage. A 30"RCP extension is also being proposed to the existing lateral. Normal depth calculations and inlet control Nomograph calculations are provided to illustrate the sufficient capacity for the proposed lateral extensions.

The HEC-1 Flood Hydrograph Package is utilized in the subject study to determine the relevant runoff flows. Utilizing the grading plan for the project site, the site is delineated into three onsite basins labeled as ND1(4/8cfs), ND2&3(3/6cfs) and ND4(2/4cfs). The delineation of the

onsite basin is depicted on Exhibit DR2, labeled as the 'Onsite Drainage Map, Developed Condition'. Onsite basin ND1 represents the entire proposed Parking Garage at the southwest corner of Main Street/Ogden Avenue intersection. Runoff from roof drains for onsite basin ND1 is combined along an 18"HDPE onsite storm drain, to drain into the back of the relocated 15ft drop inlet within Main Street (following the existing pattern). Onsite basins ND2&3 and ND4 represents the roof for the proposed Hotel/Casino building, draining onto Ogden Avenue and 1st Street, respectively.

As shown in the attached HEC-1 and onsite/offsite exhibits, runoff from MAINW represents the total flows (within the western half of Main Street) draining towards the existing 30ft and 15ft drop inlets. Similar to the existing condition, the attached FlowMaster on-grade drop inlet hydraulic calculations, illustrate the existing/relocated 30ft and 15ft drop inlets will intercept the entire runoff from MAINW. Runoff from MAINW and ND1 is combined at combination point CD1W(29/52cfs), which represents the total flows conveyed into the Main Street mainline through the existing/extended laterals within the western half. Similarly, runoff from MAINE drains towards the existing 5ft drop inlet, within the east half of Main Street. As shown in the attached FlowMaster on-grade drop inlet hydraulic calculations, the existing 5ft drop inlet will intercept the majority of the runoff from MAINE.

Runoff from onsite basin ND2&3 drains northerly onto Ogden Avenue through roof drains. Thus, runoff from ND2&3 and OGDEN is combined at combination point CD2(4/7cfs), which represents the total flows within Ogden Avenue(south half) along the site. Runoff from ND4 is

combined with 1ST at combination point CD3(5/9cfs), which represents the total flows conveyed within 1st Street along the site. Runoff from CD2 and CD3 is combined at combination point CD4(9/16cfs), which is represents the total flows conveyed within Ogden Avenue (south half) just downstream the project site.

As discussed in the existing condition, normal depth calculations are being provided for west half and east half of Main Street (Section A), Ogden Avenue (Section B), 1st Street (Section C) and Fremont Street (Section D). As shown in the attached FlowMaster output, flows within all perimeter streets remain unchanged from the existing conditions. The flows within the perimeter streets are well below the maximum allowable velocity x depth ($v \times d$) values of 6.0 and 8.0 during 10- and 100-year storm events, respectively. Main Street, Ogden Avenue and 1st Street are non-standard 80ft ROW, with curb-to-curb width of only 60ft and 20ft of total sidewalks. Thus, the 12ft dry lane is not applicable during the 10-year storm events.

As shown in the attached grading plan and exhibits, the finished floor (FF) elevation for the proposed Garage (2023.70ft) is set to elevation that is twice the 100-year flow depth above Main Street flowline (measured at the upstream side). Similarly, the FF for the proposed Hotel/Casino (2021.25ft) is set to elevation more than twice the 100-year flow depth above Ogden Avenue and 1st Street. On the other hand, the FF for the Hotel/Casino does not meet the requirement of being twice 100-year flow depth above Main Street and Fremont Street. However, the existing finished grades along the west and south boundaries of the proposed Hotel/Casino provide flood protection to a minimum of twice the 100-year flow depth within Main Street (east half) and Fremont Street.

2.3 Future Drainage Condition

For the future condition, both the site and all the local offsite basins are assumed to be fully developed. Since the offsite watershed is already entirely developed, the future drainage pattern and runoff values remain as described for the interim condition.

2.4 Master Planning Information

updated in 2013

The "2008 Las Vegas Valley Flood Control Master Plan Update" (2008 MPU, Reference 2), dated September 2008, as prepared by Post Buckley Schuh and Jernigan, Inc. (PBS&J), in association with Louis Berger Group and Parsons Brinckerhoff, illustrates the existing and proposed regional master planned facilities. The CCRFCD facility exhibits and inventory tables were updated in 2013. Review of Figure F-32 of the 2013 MPU indicates that proposed improvements are not adjacent to a regional facility.

2.5 Floodplain Information

The project site is covered by Flood Insurance Rate Map (FIRM) for the Clark County, Nevada, and incorporated areas, Community Panel Number: 32003C2170F, Effective Date: November 16, 2011. The Site is entirely within FEMA Flood Zone "X" (unshaded), defined 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 FIRM Map Index.

3. PROPOSED DRAINAGE FACILITIES

3.1 General Description

The proposed improvements consist of a Hotel/Casino building at the southeast corner of Main Street and Ogden Avenue, replacing the existing Las Vegas Club. The project also proposes a parking garage at the southwest corner of Main Street and Ogden Avenue, replacing the existing surface parking.

As discussed previously, there are two existing drop inlets along the project site, within the west side of the Main Street. The upstream drop inlet is 30ft-long (with full-length grates), which drains into the Main Street mainline through an existing 45" x 29" elliptic RCP lateral (36"RCP equivalent). This 30ft drop inlet is being slightly relocated to better align with the proposed turn-right lane. A 36"RCP extension is also being proposed to the existing lateral, to connect to the relocated drop inlet. The downstream drop inlet is 15ft-long (with full-length grates), which drains into the Main Street mainline through an existing 30"RCP lateral. This 15 drop inlet is being slightly relocated to the south of the proposed driveway entrance to the parking garage. A 30"RCP extension is also being proposed to the existing lateral, to connect to the relocated drop inlet.

An 18"HDPE onsite storm drain is proposed to intercept and convey the flows from the Garage roof drains. The storm drain is designed to drain into the back of the relocated 15ft drop inlet, following the existing drainage pattern. Normal depth calculations and inlet control Nomograph calculations are provided to illustrate the sufficient capacity for the proposed lateral extensions and the 18"HDPE onsite storm drain.

Now 2: 12" HDPE drain into the 15ft 30ft D.I.'s

Web Soil Survey 2.0 (Reference 3) indicates that the site soil type could not be identified. Thus, the soil type 'C' is being utilized in this study, following the 2008 MPU determination. The CN values for the different land use were determined from Table 602 (page 1) of the CCRFCD HCDDM. The runoff hydrograph is determined from the design precipitation for each sub-basin using the Soil Conservation Service (SCS) unit hydrograph method. Calculations used in the hydrologic analysis for the onsite basins for existing and proposed conditions are attached in Appendix A.

3.4 Facility Design Calculations

All drainage facilities within this project have been designed in accordance with the CCRFCD "*Hydrologic Criteria and Drainage Design Manual*" (Reference 1). The onsite drainage plan has been developed to closely resemble existing drainage patterns, and to minimize any impact to the adjacent properties.

The project proposes the relocation of existing drop inlets and extension of existing laterals. The project also proposes an 18"HDPE onsite storm drain to intercept and convey the flows from the Garage roof drains. Normal depth calculations and inlet control Nomograph calculations are provided to illustrate the sufficient capacity for the proposed lateral extensions and the 18"HDPE onsite storm drain. FlowMaster (on-grade) drop inlet hydraulic calculations are also provided for the existing/relocated 30ft and 15ft drop inlets to illustrate they intercept the entire runoff being conveyed along the west side of Main Street.

4. CONCLUSIONS AND RECOMMENDATIONS

1. This project is in compliance with the applicable drainage laws as recognized by the State of Nevada.
2. This project is in compliance with the CCRFCD "2008 Las Vegas Valley Flood Control Master Plan", as well as the CCRFCD "*Hydrologic Criteria and Drainage Design Manual*".
3. The site is located entirely within areas designated by FEMA as Zone "X" (unshaded), described by FEMA "*Areas determined to be outside the 0.2% annual chance floodplain.*"
4. The drainage facilities for this project have been designed to convey runoff from the 100-year storm safely through the site. In addition, they have been designed based on generally accepted engineering practices.
5. The proposed improvements do not introduce any increase in runoff flows or change in drainage pattern from the existing condition.
6. The project proposes the relocation of existing drop inlets and extension of existing laterals, ^{now 2:12" HDPE} along the west half of Main Street. The project also proposes an 18"HDPE onsite storm drain to intercept and convey the flows from the Garage roof drains, to drain into the back of the relocated drop inlet, following the existing drainage pattern. Hydraulic calculations illustrate the sufficient capacity for the proposed lateral extensions and the 18"HDPE onsite storm drain. The calculations also illustrate that the existing/relocated drop inlets will intercept the entire runoff being conveyed along the west side of Main Street.
7. The proposed finished floor elevations for the proposed buildings are either raised (or flood protected) to elevations more than twice the 100-year flow depths within perimeter streets.

**Peak Flow Summary
Existing Condition**

HEC-1 I.D.	Area (acres)	10-year Flow (cfs)	100-year Flow (cfs)
MAINW	17.90	26	48
NX1	2.08	4	8
CX1W	-	29	52
MAINE	1.10	2	3
NX2	1.07	2	4
OGDEN	0.33	1	1
NX3	0.60	1	2
CX2	-	4	7
1ST	1.37	3	5
NX4	1.10	2	4
CX3	-	5	9
CX4	-	9	16
FREMNT	0.55	1	2

**Peak Flow Summary
Developed Condition**

HEC-1 I.D.	Area (acres)	10-year Flow (cfs)	100-year Flow (cfs)
MAINW	17.90	26	48
ND1	2.08	4	8
CD1W	-	29	52
MAINE	1.10	2	3
ND2&3	1.74	3	6
OGDEN	0.33	1	1
CD2	-	4	7
1ST	1.37	3	5
ND4	1.02	2	4
CD3	-	5	9
CD4	-	9	16
FREMNT	0.55	1	2

Total
 flow
 into
 existing
 36"/42" RCP
 mainline
 from 30 ft
 ± 15 ft
 D.I's.

Street Flow Summary
(Existing and Developed Conditions)

10-year, 6-hour Storm

Street	Right of Way Width (ft)	Hydraulic Cross-Section Identifier	10-Year Flow [Q10] (cfs)	10-year Velocity [v] (fps)	10-year Flow Depth [d] (ft)	10-year Velocity x Depth Product (v x d)	Dry Lane Width (Within 1/2 ROW) (ft)
West Half of Main Street	80(Non Standard)	A	26	3.91	0.63	2.46	N/A
East Half of Main Street	80(Non Standard)	A	2	1.79	0.33	0.59	N/A
South Half of Ogden Avenue	80(Non Standard)	B	4	2.78	0.37	1.03	N/A
1st Street	80(Non Standard)	C	5	2.14	0.36	0.77	N/A
Fremont Street	80(Non Standard)	D	1	1.37	0.11	0.15	N/A

Street Flow Summary
(Existing and Developed Conditions)

100-year, 6-hour Storm

Street	Right of Way Width (ft)	Hydraulic Cross-Section Identifier	100-Year Flow [Q100] (cfs)	100-year Velocity [v] (fps)	100-year Flow Depth [d] (ft)	100-year Velocity x Depth Product (v x d)
West Half of Main Street	80(Non Standard)	A	48	4.98	0.74	3.69
East Half of Main Street	80(Non Standard)	A	3	2.24	0.35	0.78
South Half of Ogden Avenue	80(Non Standard)	B	7	3.04	0.44	1.34
1st Street	80(Non Standard)	C	9	2.45	0.42	1.03
Fremont Street	80(Non Standard)	D	2	1.63	0.15	0.24

HEC-1 MODEL OUTPUT

(DEVELOPED CONDITION)


```

1*****
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
* JUN 1998
* VERSION 4.1
* RUN DATE 16APR18 TIME 18:02:13
* *****

```

D

```

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

```

```

X X XXXXXX XXXX X
X X X X X XX
X X X X X X
XXXXXX XXXX X XXXX X
X X X X X X
X X X X X X
X X XXXXXX XXXX XXX

```

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

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

1

HEC-1 INPUT

PAGE 1

```

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
*DIAGRAM
1 ID *****18 FREMONT STREET HOTEL AND CASINO*****
2 ID
3 ID *****--TECHNICAL DRAINAGE STUDY--*****
4 ID DEVELOPED CONDITION - ONSITE AND OFFSITE
5 ID USING SCS METHODS AND KINEMATIC WAVE ROUTING
6 ID MASTER PLAN ADJUSTED 6-HOUR RAINFALL AND STORM DISTRIBUTION
7 ID
8 ID LOCHSA JOB # 171126
9 ID
10 ID
11 ID INPUT FILE NAME: D.DAT
12 ID
13 ID APRIL 2018
14 ID
15 ID *****
16 ID *****
17 ID MCCARRAN AIRPORT RAINFALL AREA
18 ID 10 & 100 YEAR - 6 HOUR STORM EVENT
19 ID PRECIPITATION:
20 ID 10-YEAR : 1.58 INCHES
21 ID 100-YEAR : 2.77 INCHES
22 ID 10-YEAR/100-YEAR : 1.58/2.77= 0.5704
23 ID *****
24 ID *****
25 ID *****
26 ID *****
27 ID * SDN 3 VALUES *
28 ID *****
29 ID
30 JR PREC .5704 1.000
31 IT 5 0 0 300
32 ID 5 0 0
33 IN 5 0 0
*

```

Developed

```

34 KK MAINW
35 KM OFFSITE FLOWS CONVEYED THROUGH THE WEST HALF OF MAIN STREET
36 KM THE BASIN STRETCHES UP TO THE HIGHPOINT JUST NORTH OF
37 KM MAIN ST/CLARK AV. INTERSECTION, PER THE APPROVED PLANS FROM THE
38 KM "TDS FOR 500 SOUTH MAIN STREET PARKING GARAGE STUDY", DS4518
39 KM
40 KM RUNOFF FROM MAINW IS ENTIRELY INTERCEPTED THROUGH THE RELOCATED
41 KM ON-GRADE 30FT AND 15FT DROP INLETS (BOTH WITH FULL GRATE LENGTH)
42 PB 2.77
43 BA .02797
44 PC .000 .020 .057 .070 .087 .108 .124 .130 .130 .130
45 PC .130 .130 .130 .133 .140 .142 .148 .158 .172 .181
46 PC .190 .197 .199 .200 .201 .204 .214 .229 .241 .249
47 PC .251 .256 .270 .278 .281 .283 .295 .322 .352 .409
48 PC .499 .590 .710 .744 .781 .812 .819 .835 .851 .856
49 PC .860 .868 .876 .888 .910 .926 .937 .950 .970 .976
50 PC .982 .985 .987 .989 .990 .993 .993 .994 .995 .998
51 PC .998 .999 .999 1.00
52 LS 0 98

```

1

HEC-1 INPUT

PAGE 2

```

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
53 UD .190
*
54 KK ND1
55 KM ONSITE BASIN ND1
56 KM RUNOFF GENERATED THROUGH THE PROPOSED GARAGE AT THE SOUTHWEST CORNER
57 KM OF MAIN/OGDEN INTERSECTION
58 KM THE ROOFS WILL BE COMBINED TO DRAIN INTO THE BACK OF THE DOWNSTREAM
59 KM RELOCATED DROP INLET, FOLLOWING THE EXISTING DRAINAGE PATTERN
60 BA .00325
61 LS 0 98
62 UD .050

```

✱

1

HFC-1 INPUT

PAGE 3

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

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

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

Scatter plot showing the relationship between the number of species (Y-axis) and the number of genera (X-axis). The Y-axis ranges from 34 to 84, and the X-axis ranges from 1 to 10. Data points are labeled: MAINW, ND1, CD1w, MAINE, ND2&3, and OGDEN. A blue line connects the points for CD1w and ND1, and another blue line connects the points for ND1 and ND2&3. The point for CD1w is circled in blue.

D FLOW

total flows Draining into
Main st. storm Drain mainline
from the west half.

D

HYDROGRAPH AT	ND1	.00	1	FLOW	4.	8.
+				TIME	3.50	3.50
2 COMBINED AT	CD1W	.03	1	FLOW	29.	52.
+				TIME	3.58	3.58
HYDROGRAPH AT	MAINE	.00	1	FLOW	2.	3.
+				TIME	3.58	3.58
HYDROGRAPH AT	ND2&3	.00	1	FLOW	3.	6.
+				TIME	3.50	3.50
HYDROGRAPH AT	OGDEN	.00	1	FLOW	1.	1.
+				TIME	3.50	3.50
2 COMBINED AT	CD2	.00	1	FLOW	4.	7.
+				TIME	3.50	3.50
HYDROGRAPH AT	1ST	.00	1	FLOW	3.	5.
+				TIME	3.50	3.50
HYDROGRAPH AT	ND4	.00	1	FLOW	2.	4.
+				TIME	3.50	3.50
2 COMBINED AT	CD3	.00	1	FLOW	5.	9.
+				TIME	3.50	3.50
2 COMBINED AT	CD4	.01	1	FLOW	9.	16.
+				TIME	3.50	3.50
HYDROGRAPH AT	FREMNT	.00	1	FLOW	1.	2.
+				TIME	3.50	3.50

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

APPENDIX B

HYDRAULIC ANALYSIS

**Hydraulic Capacity Calculations for Existing/Relocated Drop Inlets
along Main Street**

(100-Year, Existing/Developed Conditions)

30-FT Modified Type 'C' @ (Existing/Relocated, 100-Year)

Worksheet for Combination Inlet On Grade

Project Description	
Worksheet	30-FT Modified Type 'C' @ (Existing/Relocate
Type	Combination Inlet On Grade
Solve For	Efficiency

Input Data	
Discharge	48.00 cfs
Local Depression	2.0 in
Local Depression \	2.00 ft
Slope	0.011000 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.086667 ft/ft
Road Cross Slope	0.020000 ft/ft
Mannings Coefficient	0.016
Curb Opening Length	15.00 ft
Grate Width	1.50 ft
Grate Length	13.75 ft
Grate Type	3 mm (P-1-7/8")
Clogging	0.0 %

Options	
Calculation Opt	Use Both
Grate Flow Opt	Include None

Results	
Efficiency	0.80
Intercepted Flow	38.26 cfs
Bypass Flow	9.74 cfs
Spread	30.04 ft
Depth	0.69 ft
Flow Area	8.87 ft ²
Gutter Depression	1.2 in
Total Depression	3.2 in
Velocity	5.23 ft/s
Splash Over Velocity	79.43 ft/s
Frontal Flow Factor	1.00
Side Flow Factor	0.74
Grate Flow Ratio	0.20
Equivalent Cross Slope	0.039184 ft/ft
Active Grate Length	13.75 ft
Length Factor	0.02
Total Interception Length	65.82 ft

Intercepted through
the 30 FT D.I.

Bypass

Notes: * $Q_{10}/100 = 26/48\text{cfs}$ (Runoff conveyed within the western half of Main Street upstream the D.I.) = runoff from offsite basin MAINW(26/48cfs).

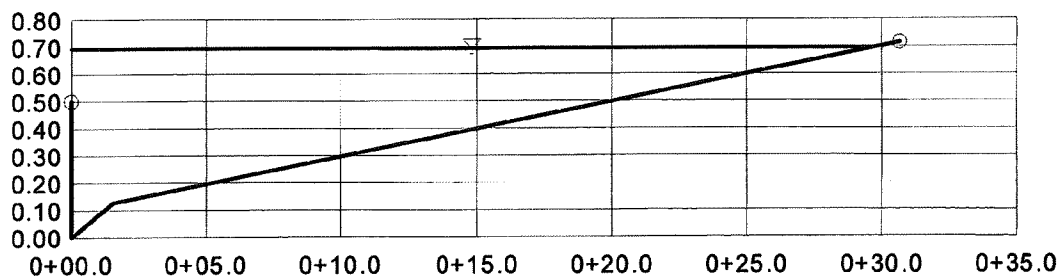
* Half the drop inlet length is used in the calculation to account for a 50% Clogging.

* Per the Clark County uniform standard drawing 412A, the first 2.5ft of the grate length is not utilized to account for the solid lid.

30-FT Modified Type 'C' @ (Existing/Relocated, 100-Year) Cross Section for Combination Inlet On Grade

Project Description	
Worksheet	30-FT Modified Type 'C' @ (Existing/Relocate
Type	Combination Inlet On Grade
Solve For	Efficiency

Section Data	
Discharge	48.00 cfs
Local Depression	2.0 in
Local Depression \	2.00 ft
Efficiency	0.80
Slope	0.011000 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.086667 ft/ft
Road Cross Slope	0.020000 ft/ft
Mannings Coefficient	0.016
Curb Opening Length	15.00 ft
Grate Width	1.50 ft
Grate Length	13.75 ft
Grate Type	3 mm (P-1-7/8")
Clogging	0.0 %



V:10.0
H:1
NTS

15-FT Modified Type 'C' @ (Existing/Relocated, 100-Year) **Worksheet for Combination Inlet On Grade**

Project Description	
Worksheet	15-FT Modified Type 'C' @ (Existing/Relocate
Type	Combination Inlet On Grade
Solve For	Efficiency

Input Data	
Discharge	9.74 cfs
Local Depression	2.0 in
Local Depression \	2.00 ft
Slope	0.011000 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.086667 ft/ft
Road Cross Slope	0.037000 ft/ft
Mannings Coefficient	0.016
Curb Opening Length	15.00 ft
Grate Width	1.50 ft
Grate Length	13.75 ft
Grate Type	3 mm (P-1-7/8")
Clogging	0.0 %

Options	
Calculation Opt	Use Both
Grate Flow Opt	Include None

Results	
Efficiency	0.95
Intercepted Flow	9.25 cfs
Bypass Flow	0.49 cfs
Spread	11.11 ft
Depth	0.47 ft
Flow Area	2.16 ft ²
Gutter Depression	0.9 in
Total Depression	2.9 in
Velocity	4.06 ft/s
Splash Over Velocity	79.43 ft/s
Frontal Flow Factor	1.00
Side Flow Factor	0.89
Grate Flow Ratio	0.48
Equivalent Cross Slope	0.079958 ft/ft
Active Grate Length	13.75 ft
Length Factor	0.06
Total Interception Length	21.96 ft

Notes: * Q100 = 9.74cfs = bypassed flows from the 30ft D.I.

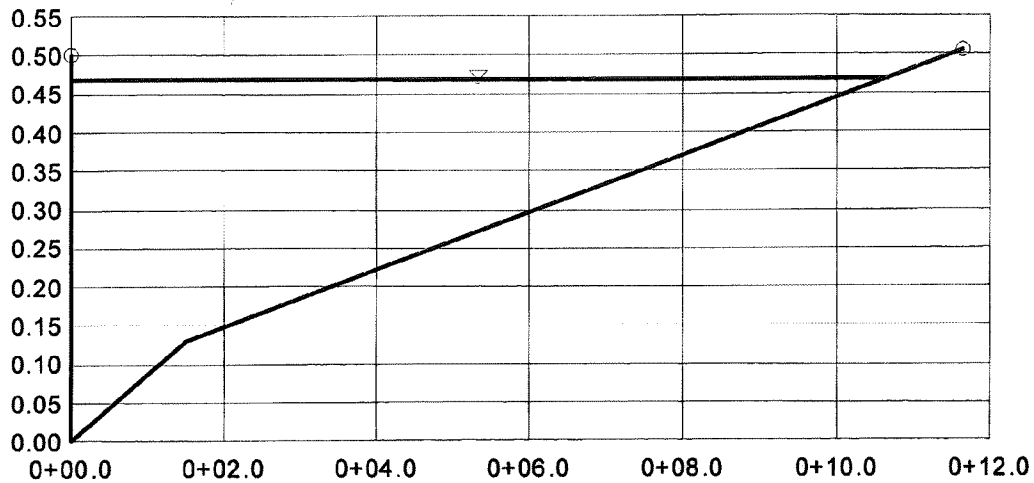
* Half the drop inlet length is used in the calculation to account for a 50% Clogging.

* Per the Clark County uniform standard drawing 412A, the first 2.5ft of the grate length is not utilized to account for the solid lid.

15-FT Modified Type 'C' @ (Existing/Relocated, 100-Year) Cross Section for Combination Inlet On Grade

Project Description	
Worksheet	15-FT Modified Type 'C' @ (Existing/Relocate
Type	Combination Inlet On Grade
Solve For	Efficiency

Section Data	
Discharge	9.74 cfs
Local Depression	2.0 in
Local Depression \	2.00 ft
Efficiency	0.95
Slope	0.011000 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.086667 ft/ft
Road Cross Slope	0.037000 ft/ft
Mannings Coefficient	0.016
Curb Opening Length	15.00 ft
Grate Width	1.50 ft
Grate Length	13.75 ft
Grate Type	3 mm (P-1-7/8")
Clogging	0.0 %



V:10.0
H:1
NTS

Normal Depth and Inlet Nomograph Calculations for Existing/Extended

36"RCP and 30"RCP Main Street Laterals

(100-Year, Existing/Developed Conditions)



Laterals

Existing/Extended 36"RCP for the 30ft D.I. @ Main Street
Worksheet for Circular Channel

30ft
D.I

Project Description	
Worksheet	Existing/Extended 36"RCP for the 30ft D.I. @
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coeff	0.013
Slope	005000 ft/ft
Diameter	36 in
Discharge	38.26 cfs

Results	
Depth	2.05 ft
Flow Area	5.1 ft ²
Wetted Perime	5.84 ft
Top Width	2.79 ft
Critical Depth	2.01 ft
Percent Full	68.4 %
Critical Slope	0.005259 ft/ft
Velocity	7.43 ft/s
Velocity Head	0.86 ft
Specific Energ	2.91 ft
Froude Numbe	0.96
Maximum Disc	50.73 cfs
Discharge Full	47.16 cfs
Slope Full	0.003291 ft/ft
Flow Type	Subcritical

now revised
to add
4 cfs from
half of ND1
through the
12" HDPE

Notes: * Q100 = 38.26cfs = 100-year intercepted flows through the 30ft Existing/Relocated Drop Inlet within Main Street

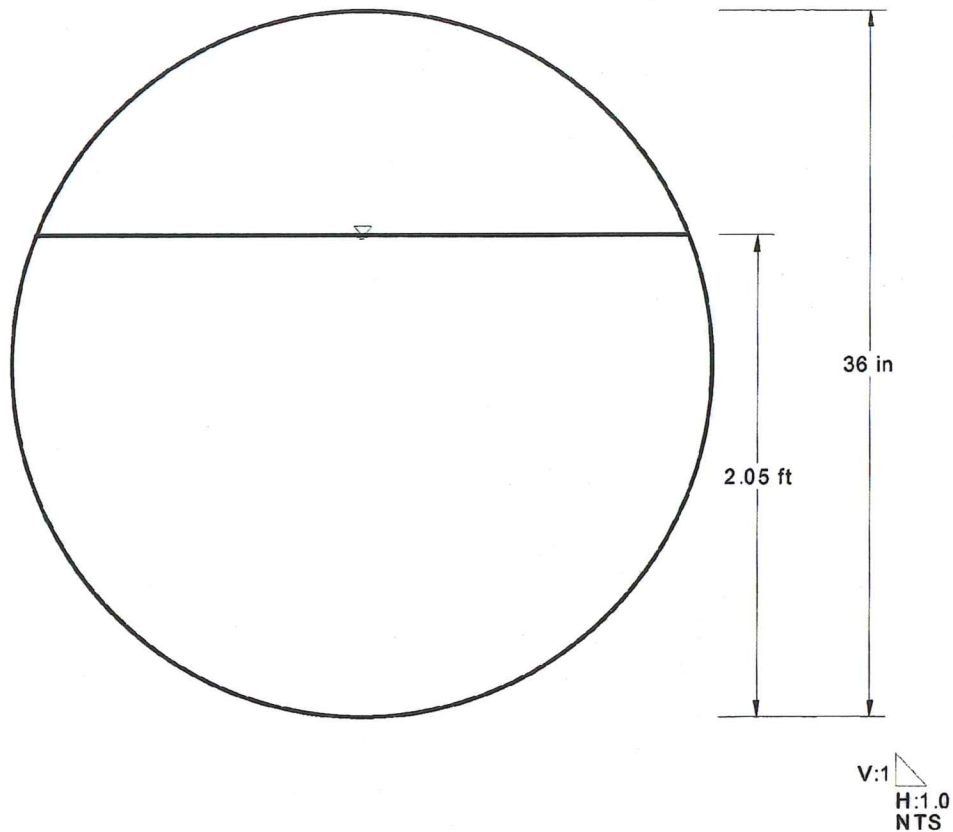
add
+ 4 cfs from half
ND1 (4/8 cfs)

Existing/Extended 36"RCP for the 30ft D.I. @ Main Street
Cross Section for Circular Channel

Project Description	
Worksheet	Existing/Extended 36"RCP for the 30ft D.I. @
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coeff	0.013
Slope	005000 ft/ft
Depth	2.05 ft
Diameter	36 in
Discharge	38.26 cfs

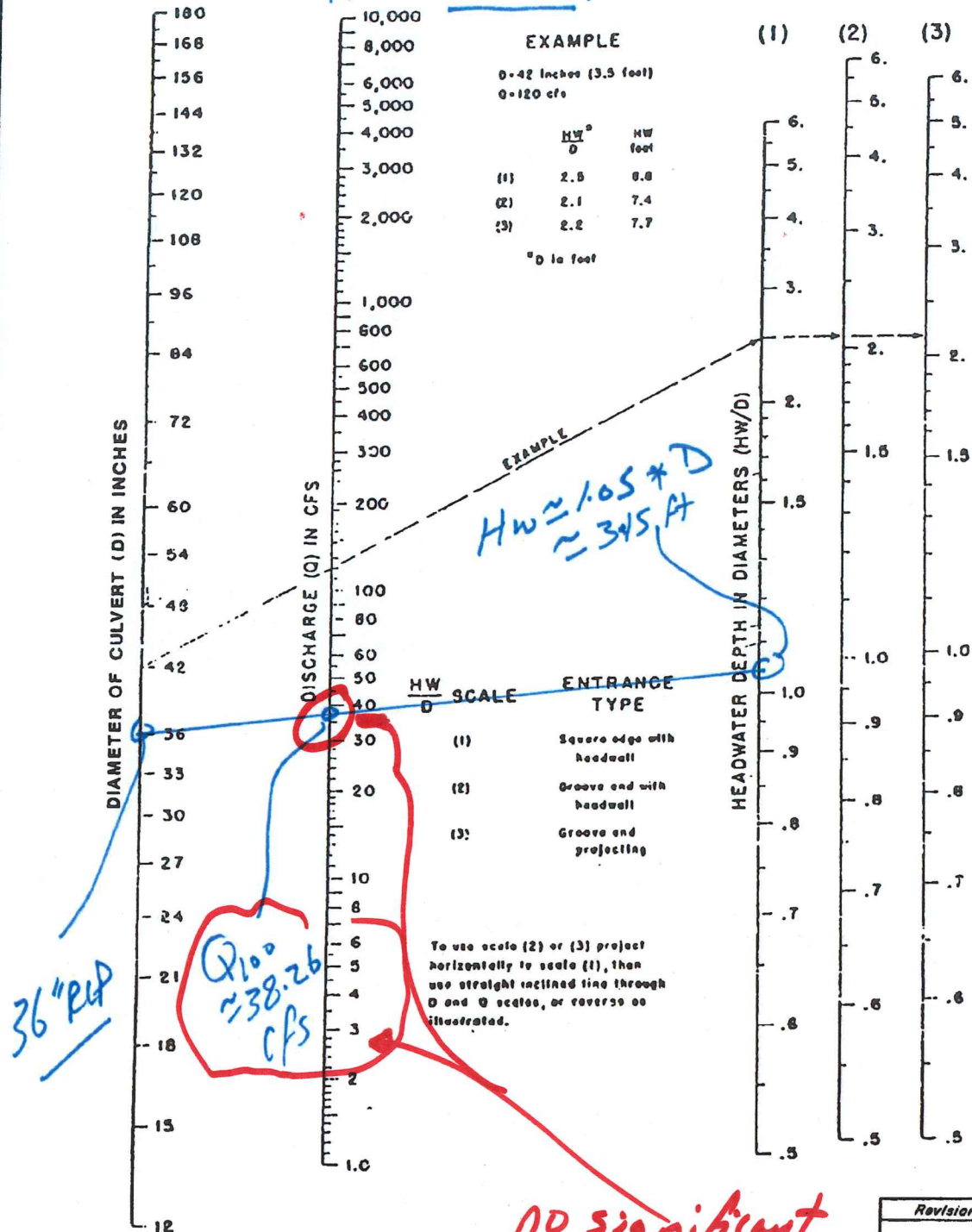
← Should now be
≈ 42 cfs



HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

NOMOGRAPH - INLET CONTROL RCP

for 36" RCP



NO significant change for 42 cfs.

Revision	Date

WRC
ENGINEERING

REFERENCE:

USDOT, FHWA, HDS, No. 5, 1985

FIGURE 1005

Existing/Extended 30"RCP for the 15ft D.I. @ Main Street Worksheet for Circular Channel

Project Description	
Worksheet	Existing/Extended 30"RCP for the 15ft D.I. @
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coeff	0.013
Slope	005000 ft/ft
Diameter	30 in
Discharge	17.25 cfs

Results	
Depth	1.39 ft
Flow Area	2.8 ft ²
Wetted Perime	4.20 ft
Top Width	2.48 ft
Critical Depth	1.41 ft
Percent Full	55.5 %
Critical Slope	0.004807 ft/ft
Velocity	6.16 ft/s
Velocity Head	0.59 ft
Specific Energy	1.98 ft
Froude Numbe	1.02
Maximum Disc	31.20 cfs
Discharge Full	29.00 cfs
Slope Full	0.001769 ft/ft
Flow Type	Supercritical

Notes: * $Q_{100} = 17.25 \text{ cfs} = 9.25 \text{ cfs}$ (100-year intercepted flows through the 15ft Existing/Relocated Drop Inlet within Main Street) + 8cfs (100-year runoff flows from onsite basin NX1(4/8cfs) or ND1(4/8cfs), draining directly into the back of the 15ft drop inlet)

15ft
D.I

see below

now reduced
to 14 cfs

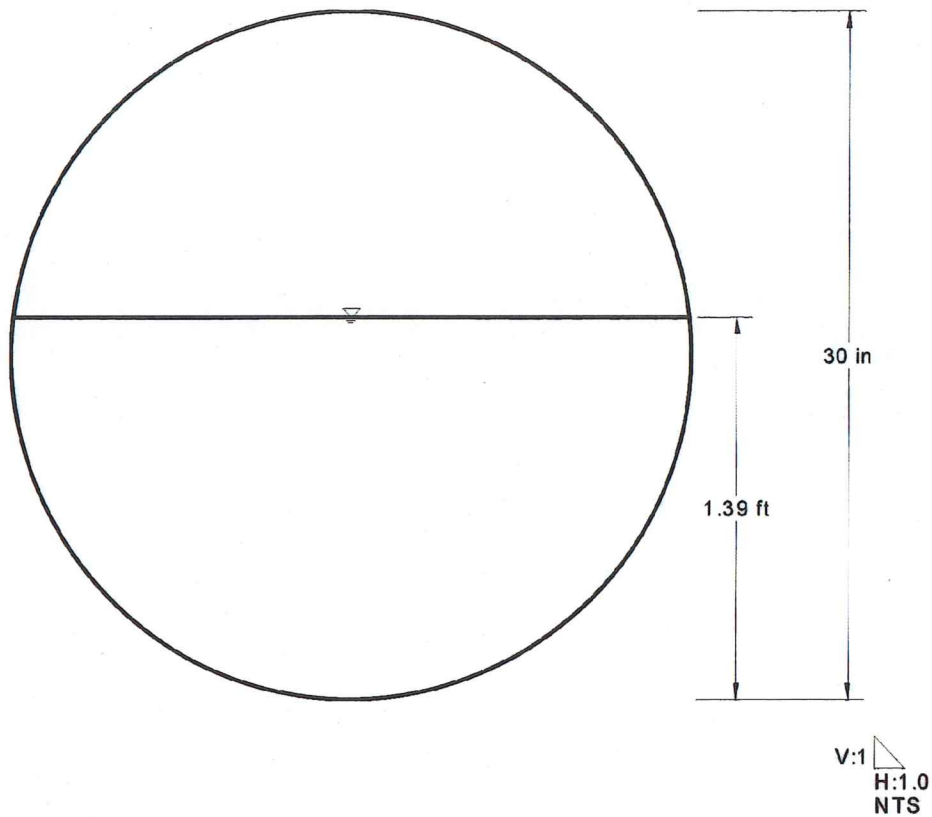
The 8cfs
Should now be
reduced to
4 cfs (i.e. half of
ND1)

Existing/Extended 30"RCP for the 15ft D.I. @ Main Street
Cross Section for Circular Channel

Project Description	
Worksheet	Existing/Extended 30"RCP for the 15ft D.I. @
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coeff	0.013
Slope	005000 ft/ft
Depth	1.39 ft
Diameter	30 in
Discharge	17.25 cfs

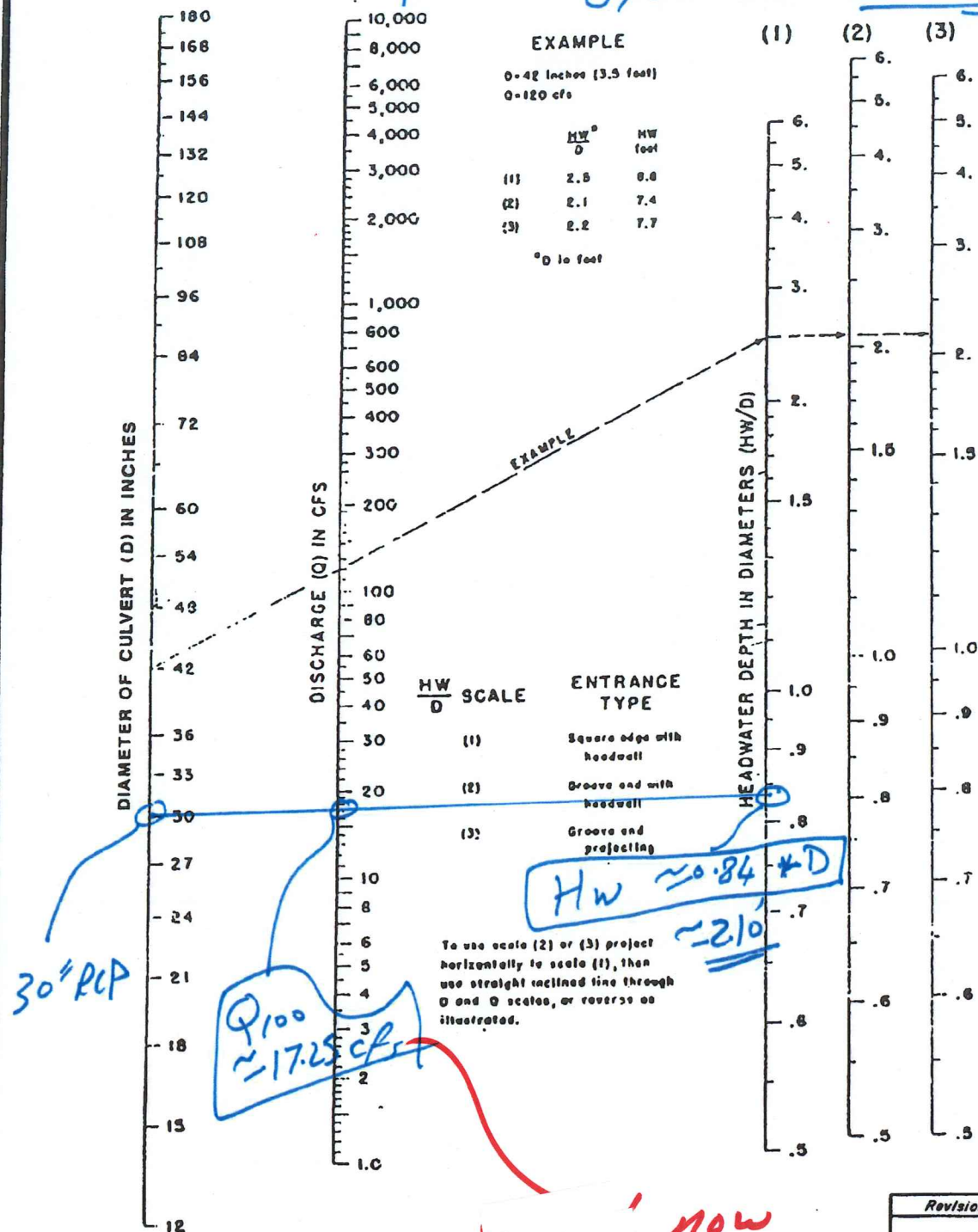
Now Reduced to
14 cfs



HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

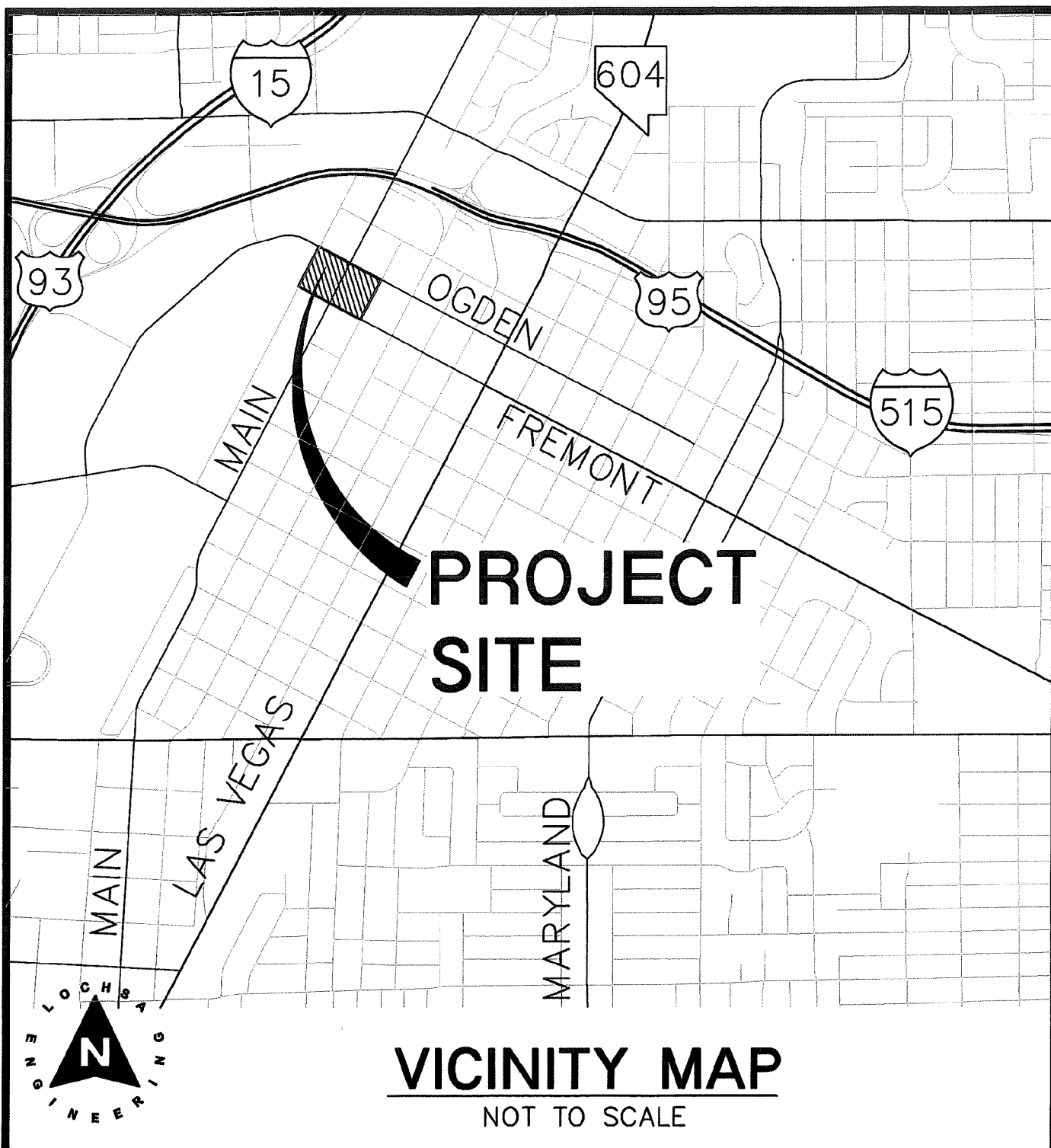
NOMOGRAPH - INLET CONTROL RCP

for Existing/Extended 30" RCP



APPENDIX C

FIGURES



DRAWN BY:	REF	SCALE:	N.T.S.
CHECKED BY:	CWB	DATE:	04-02-2018

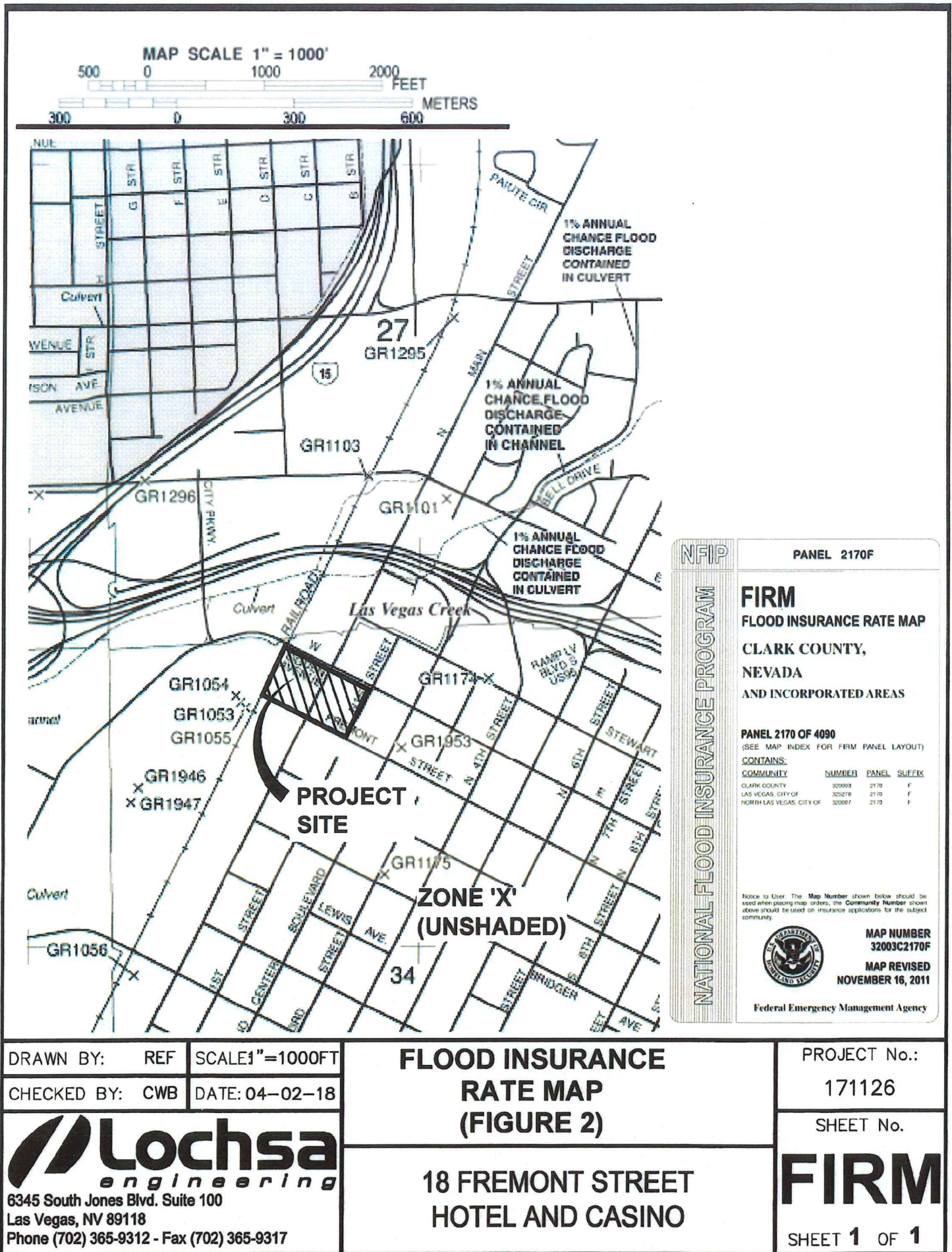
Lochsa
engineering
6345 South Jones Blvd. Suite 100
Las Vegas, NV 89118
Phone (702) 365-9312 - Fax (702) 365-9317

**VICINITY
MAP
(FIGURE 1)**

**18 FREMONT STREET
HOTEL AND CASINO**

PROJECT No.:
171126
SHEET No.

V-M
SHEET 1 OF 1



APPENDIX D

DRAINAGE MAPS

Excerpts from the

“Final Drainage Design Report for the Phase 2 Main Street Improvements”
(February 2016)



Prepared for the
CITY OF LAS VEGAS, NEVADA • February 2016

Final Drainage Design Report for the Phase 2

MAIN STREET IMPROVEMENTS

Las Vegas Boulevard to Bonneville Avenue



Prepared by



and



Final Drainage Design Report
for the Phase 2

MAIN STREET IMPROVEMENTS

Las Vegas Boulevard to Bonneville Avenue

February 2016

Prepared for



CITY OF LAS VEGAS
NEVADA

Prepared by



W.O. #7318

and



difference between the total precipitation volume and the loss volume is the direct runoff volume.

The SCS curve number method was developed to compute both types of precipitation losses. This method uses a curve number (CN) index to relate precipitation losses to soil type, land use, and vegetative cover conditions.

3.3.1 Soil Survey

Infiltration losses are related to the SCS Soil Classifications. SCS soils fall into four hydrologic soil groups: Group A, Group B, Group C, and Group D, which were developed based on infiltration rates. SCS Group A soil has a high infiltration rate, such as for sands and gravels. SCS Group D, on the other hand, has a low infiltration rate, such as for clay soil. The project site and tributary watershed are composed of soil group C. A soils map, showing soils types throughout the tributary basin areas has been developed. **Refer to Appendix B.2, CN Map**

3.3.2 Land Use

The Phase 2 Main Street Improvement Project watershed hydrology is based on future condition land use designations, as defined in the CCRFCD 2008 MPU. A land use map, showing land use designations throughout the tributary basin areas has been developed, **Refer to Appendix B.2, CN Map,**

3.3.3 Curve Number Calculations

Composite curve number calculations have been developed by assessing the soils types and land use within each basin, and pro-rating the resultant curve number, to develop a composite curve number associated with each basin. **Refer to Appendix B.2, CN Calculations,**

3.4 LOCAL HYDROLOGY MODEL



The Local Hydrology Model has been prepared to analyze local street flow criteria per the CCRFCD HCDDM in area of the project north of Charleston Blvd. This includes

Main Street and Commerce Street from Charleston Boulevard north to the project limits near Interstate 515. Main Street south of Charleston Boulevard has not been analyzed for this submittal. Previously, the study proposed a CCRFCD Regional Flood Control Facility in the project area south of Charleston. At this time; however, the regional facility will not be built. A nuisance drain will be designed for this portion of the project, and no hydrology is necessary for this area. A Local Hydrology Subbasin Map has been prepared showing the basin delineations and flow rates. **Refer to Figure 2, Local Hydrology Model Subbasin Map, Standard Form 4, Appendix B.3, CN Calculations, Appendix B.2, and HEC-1 analysis, Appendix B.1.**

Using the flows determined from the hydrology model, street flow calculations have been prepared to determine facility requirements for meeting local drainage criteria. Manning's Equation analysis has been performed based on proposed street sections and slopes to determine the allowable capacity for each reach. Due to the increase in sidewalk width and decrease in paved roadway width associated with the project, street flow capacities are typically in the low single digits. **Refer to Appendix C.3, Street Flow Calculations.**

Based on review of allowable street flow capacities, drop inlets and storm drain mainline have been proposed as necessary to meet local drainage criteria as outlined in the HCDDM. Typically, drop inlets that are already required for other purposes (drop inlets required for low points caused by sidewalk "bulb-outs", nuisance flow inlets at curb returns etc.) are sufficient for intercepting the required flow needed for meeting local drainage criteria. Flows intercepted by proposed drop inlets have been calculated using FHWA's HEC-22 methodology. **Refer to Appendix C.1, Drop Inlet Calculations.** A spreadsheet has been utilized for performing this calculation. Flows intercepted by, and bypassing, drop inlets have also been tabulated in this spreadsheet, creating an accounting within the spreadsheet of proposed condition street flows and proposed storm drain facility flows. These proposed condition flows have been used to perform proposed condition street flow calculations which are included with the street flow capacity calculations in the Appendix. **Refer to Appendix C.3, Street Flow Calculations.** In addition, the results of the proposed condition street flow calculations are included in Table 3.5.1 below.

TABLE 3.5.1
PHASE 2 MAIN STREET IMPROVEMENT
STREET FLOW SUMMARY TABLE

LOCATION CROSS STREET	10-YR FLOW EXISTING (CFS)	10-YR FLOW PROPOSED (CFS)	STREET FLOW CAPACITY ¹ (CFS)	REQUIRED COLLECTION (CFS)	ACTUAL COLLECTION ³ (CFS)	STREET FLOW VELOCITY (FPS)	STREET FLOW DEPTH (FT)	VELOCITY x DEPTH
Coolidge Ave	7	7.0	4.0	3.0	2.8	2.0	0.4	0.8
Hoover Ave	6	5.2	4.0	1.0	2.8	1.5	0.4	0.6
Gass Ave	25	16	note ²	n/a	7.9	1.1	0.6	0.7
Garces Ave	7	9.0	5.0	4.0	4.4	1.3	0.5	0.7
Bonneville Ave	8	4.5	4.0	1.5	4.9	0.9	0.4	0.4

1) maximum capacity available while still maintaining dry lane in both directions (single dry lane for one-way streets)

2) Main Street does not maintain positive slope at this location. Street flows are conveyed down side street.

3) See Drop Inlet Calculations, Appendix C.1

4.0 STORM DRAINS

The purpose of the Main Street Phase 2 Project is to design a hydraulically efficient stormwater conveyance facility that meets the design criteria presented in the CCRFCD HCDDM. Hydraulic analysis has been performed using the Water Surface Pressure Gradient for Windows (WSPGW) software to model the storm drain mainlines, for the RCP in Main Street that connects to the original Phase 1 (Segment 2) storm drain. The lateral pipes have been modeled using the Clark County Regional Flood Control Standard Form 6. Roadway capacities have been checked using a Manning's calculation. Inlet calculations have been performed based on FHWA HEC-22 with clogging factors derived from the CCRFCD HCDDM.

The Local Storm Drain Systems consist of a series of drop inlets and laterals to intercept the flow and meet CCRFCD street flow criteria. Drop inlets utilized for the project are Type DM2. Where conflicts occur with dry utilities within the sidewalk area Type "DM2" combination drop inlets were used. A modified Type "A" inlet was also created for use where the grate of the Type "DM2" inlets conflicted with proposed bike lanes. Additional rebar reinforcement and concrete thickness was added to the curb face of the inlet to reduce crushing potential for the inlet from vehicular loads.

Where drop inlets are needed to meet CCRFCD street flow criteria, inlets were designed using procedures described in HEC-22 and the CCRFCD HCDDM. Spreadsheets have been developed to perform these



Final Drainage Design Report for the Phase 2
MAIN STREET IMPROVEMENTS
Las Vegas Boulevard to Bonneville Avenue

A.3

Subbasin Map North of Charleston



LEGEND

HEC-1 NODE
SUBBASIN NAME
SUBBASIN BOUNDARY
10 YR / 100 YR FLOW

CH5XX
MSX
X / XX CFS

NOTE: REFER TO DROP INLET INTERCEPTION CALCULATIONS FOR PROPOSED FACILITY FLOWS

PUBLIC WORKS DEPARTMENT		LOCAL HYDROLOGY SUBBASIN MAP		MAIN COMMERCE ONE-WAY COUPLET	
400 E. STEWART AVE LAS VEGAS, NV 89101 702-229-6272		2727 SOUTH RAINBOW BOULEVARD LAS VEGAS, NEVADA 89146-5148 FAX (702) 872-7597 WEB SITE WWW.VTNV.COM		1:250'	
DRAWN BY: NAME		DESIGNED BY: NAME		CHECKED BY: NAME	
DATE		DATE		DATE	
PROJECT NO. 7318		SCALE 1" = 250'		VERT. 1" = 1'	
EX A.3		REV		DATE BY	
		1			
		2			
		3			
		4			
		5			
		6			
		7			

Surface Flows CMS13 (156)



Final Drainage Design Report for the Phase 2
MAIN STREET IMPROVEMENTS
Las Vegas Boulevard to Bonneville Avenue

B.1

Local Hydrology HEC-1 Model

```

*****
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
* JUN 1998
* VERSION 4.1
* RUN DATE 17NOV13 TIME 16:02:02
*****

```

LP100SD3.OUT

```

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

```

```

X X XXXXXX XXXX X
X X X X XX
X X X X X
XXXXXX XXXX X XXXX
X X X X X
X X X X X
X X XXXXXX XXXX XXX

```

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

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

1 HEC-1 INPUT PAGE 1

```

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
*DIAGRAM
*** FREE ***
1 ID MAIN COMMERCE ONE-WAY COUPLET
2 ID LOCAL DRAINAGE HYDROLOGY MODEL
3 ID PREPARED FOR CITY OF LAS VEGAS
4 ID INPUT FILE = LP100SD3.DAT
5 ID INPUT FILE DATE = SEPT 2012
6 ID DESIGN STORM = 100-YEAR 6-HR STORM
7 ID STORM DISTRIBUTION = SDN #3
8 ID
9 ID JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:
10 ID
11 ID AREA DARF
12 ID SQ. MI.
13 ID 0-0.5 0.99
14 ID 0.5-1 0.975
15 ID 1-2 0.95
16 ID 2-3 0.925
17 ID 3-4 0.915
18 ID 4-5 0.908
19 ID 5-6 0.903
20 ID 6-7 0.895
21 ID 7-8 0.885
22 ID
23 IT 5 0 0 250
24 IT 5 0 0
25 IN 5 0 0
26 JR PREC 0.99 0.975 0.95 0.925 0.915 0.908 0.903 0.895 0.885
*
27 KK MS2
28 BA 0.008
29 PB 2.77
30 PC 0.000 0.020 0.057 0.070 0.087 0.108 0.124 0.130 0.130 0.130
31 PC 0.130 0.130 0.130 0.133 0.140 0.142 0.148 0.158 0.172 0.181
32 PC 0.190 0.197 0.199 0.200 0.201 0.204 0.214 0.229 0.241 0.249
33 PC 0.251 0.256 0.270 0.278 0.281 0.283 0.295 0.322 0.352 0.409
34 PC 0.499 0.590 0.710 0.744 0.781 0.812 0.819 0.835 0.851 0.856
35 PC 0.860 0.868 0.876 0.888 0.910 0.926 0.937 0.950 0.970 0.976
36 PC 0.982 0.985 0.987 0.989 0.990 0.993 0.993 0.994 0.995 0.998
37 PC 0.998 0.999 1.000
38 LS 0 94.1
39 UD 0.159
*
40 KK DCOOLSD
41 KM DIVERT FLOW INTERCEPTED BY MAIN ST STORM DRAIN
42 DT DCOOLSD
43 DI 0 13
44 DQ 0 2.8
*

```

1 HEC-1 INPUT PAGE 2

```

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
45 KK DCOOLN
46 KM DIVERT FLOW EAST IN COOLIDGE AVE
47 KM REMAINING FLOW NORTH IN MAIN ST
48 DT DCOOLN
49 DI 0 11
50 DQ 0 5.9
*
51 KK RMS2
52 KM ROUTE DCOOLN TO MS3
53 KM MAIN ST
54 RD 480 0.003 0.016 0 TRAP 0 50

```


LP100SD3.OUT

```

*
55      KK      MS3
56      BA      0.004
57      LS              94.4
58      UD      0.136
*

59      KK      CMS3
60      KM      COMBINE DCOOLN AND MS3
61      KM      HOOVER AND MAIN
62      HC      2
*

63      KK      DHOOVSD
64      KM      DIVERT FLOW INTERCEPTED BY MAIN ST STORM DRAIN
65      DT      DHOOVSD
66      DI              11
67      DQ      0      2.7
*

68      KK      DHOOVN
69      KM      DIVERT FLOW EAST IN HOOVER AVE
70      KM      REMAINING FLOW NORTH IN MAIN ST
71      DT      DHOOVE
72      DI              8.3
73      DQ      0      4.9
*

74      KK      RCMS3
75      KM      ROUTE CMS3 TO MS4
76      KM      MAIN ST
77      RD      460      0.003      0.016      0      TRAP      0      50
*

78      KK      MS4
79      BA      0.004
80      LS              95.1
81      UD      0.135
*

```

1

HEC-1 INPUT

PAGE 3

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

```

82      KK      CMS4
83      KM      COMBINE CMS3 AND MS4
84      KM      GASS AND MAIN
85      HC      2
*

86      KK      CS8
87      BA      0.035
88      LS              94.9
89      UD      0.241
*

90      KK      DCOMMSD
91      KM      DIVERT FLOW INTERCEPTED BY COMMERCE ST STORM DRAIN
92      DT      DCOMMSD
93      DI              5      100
94      DQ      0      5      5
*

95      KK      MS5
96      BA      0.001
97      LS              94.5
98      UD      0.122
*

99      KK      CMS5
100     KM      COMBINE CS8 AND MS5
101     KM      COMMERCE AND MAIN
102     HC      2
*

103     KK      DCOMMS
104     KM      REMAINING FLOW SOUTH IN MAIN ST THEN EAST IN GASS AVE
105     KM      DIVERT FLOW NORTH IN MAIN ST
106     DT      DCOMMN
107     DI              20      40      60      80      100
108     DQ      0      5      11      22      30      38
*

109     KK      CGASS
110     KM      COMBINE CMS4 AND COMMS
111     KM      GASS AND MAIN
112     HC      2
*

113     KK      DGASSSD
114     KM      DIVERT FLOW INTERCEPTED BY MAIN ST STORM DRAIN
115     DT      DGASSSD
116     DI              6      12      24      48
117     DQ      0      3      5      9      9
*

```

1

HEC-1 INPUT

PAGE 4

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

```

118     KK      DCOMMN
119     KM      RETRIEVE FLOW NORTH IN MAIN ST FROM COMMERCE ST
120     DR      DCOMMN
*

```

LP100SD3.OUT

```

121 KK RDCOMMN
122 KM ROUTE DCOMMN TO MS6A
123 KM MAIN ST
124 RD 220 0.002 0.016 0 TRAP 0 50
*

125 KK MS6A
126 BA 0.004
127 LS 0 94.6
128 UD 0.142
*

129 KK CMS6A
130 KM COMBINE DCOMMN AND MS6A
131 KM GARCES AND MAIN
132 HC 2
*

133 KK DGARCS
134 KM DIVERT FLOW INTERCEPTED BY MAIN ST STORM DRAIN
135 DT DGARCS
136 DI 0 20
137 DQ 0 3.3
*

138 KK DGARCN
139 KM DIVERT FLOW EAST IN GARCES AVE
140 KM REMAINING FLOW NORTH IN MAIN ST
141 DT DGARCE
142 DI 0 16.7
143 DQ 0 5
*

144 KK RGARCN
145 KM ROUTE GARCN TO MS6B
146 KM MAIN ST
147 RD 500 0.001 0.016 0 TRAP 0 50
*

148 KK MS6B
149 BA 0.008
150 LS 0 94.6
151 UD 0.152
*

```

1

HEC-1 INPUT

PAGE 5

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

```

152 KK CMS6B
153 KM COMBINE GARCN AND MS6B
154 KM BONNEVILLE AND MAIN
155 HC 2
*

156 KK DBONNSD
157 KM DIVERT FLOW INTERCEPTED BY MAIN ST STORM DRAIN
158 DT DBONNSD
159 DI 0 5 20
160 DQ 0 5 9
*

161 KK MS7
162 BA 0.0001
163 LS 0 91.0
164 UD 0.107
*

165 KK MS8
166 BA 0.001
167 LS 0 95.3
168 UD 0.122
*

169 KK CMS8
170 KM COMBINE CMS6, MS7 AND MS8
171 KM BONNEVILLE AND MAIN
172 HC 3
*

173 KK MS9
174 BA 0.007
175 LS 0 94.5
176 UD 0.154
*

177 KK DCLRKS
178 KM DIVERT FLOW INTERCEPTED BY MAIN ST STORM DRAIN
179 DT DCLRKS
180 DI 0 12
181 DQ 0 2.4
*

182 KK DCLRKN
183 KM DIVERT FLOW EAST IN CLARK AVE
184 KM REMAINING FLOW NORTH IN MAIN ST
185 DT DCLRKE
186 DI 0 100
187 DQ 0 0
*

```

1

HEC-1 INPUT

PAGE 6

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

188 KK RDCLRKN

LP100SD3.OUT

```

189 KM ROUTE DCLRKN TO MS10
190 KM MAIN ST
191 RD 480 0.001 0.016 0 TRAP 0 50
    *

192 KK MS10
193 BA 0.008
194 LS 0 94.4
195 UD 0.136
    *

196 KK CMS10
197 KM COMBINE DCLRKN AND MS10
198 KM LEWIS AND MAIN
199 HC 2
    *

200 KK DLWISSD
201 KM DIVERT FLOW INTERCEPTED BY MAIN ST STORM DRAIN
202 DT DLWISSD
203 DI 0 21
204 DQ 0 4.6
    *

205 KK DLEWSN
206 KM DIVERT FLOW EAST IN LEWIS AVE
207 KM REMAINING FLOW NORTH IN MAIN ST
208 DT DLEWSE
209 DI 0 17
210 DQ 0 12.5
    *

211 KK RDLEWSN
212 KM ROUTE DLEWSN TO MS11
213 KM MAIN ST
214 RD 480 0.001 0.016 0 TRAP 0 50
    *

215 KK MS11
216 BA 0.009
217 LS 0 94.6
218 UD 0.148
    *

219 KK CMS11
220 KM COMBINE DLEWSN AND MS11
221 KM BRIDGER AND MAIN
222 HC 2
    *

```

1

HEC-1 INPUT

PAGE 7

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

```

223 KK DBRDGSD
224 KM DIVERT FLOW INTERCEPTED BY MAIN ST STORM DRAIN
225 DT DBRDGSD
226 DI 0 18
227 DQ 0 3.7
    *

228 KK DBRDGN
229 KM DIVERT FLOW EAST IN BRIDGER AVE
230 KM REMAINING FLOW NORTH IN MAIN ST
231 DT DBRDGE
232 DI 0 14.3
233 DQ 0 2
    *

234 KK RDBRDGN
235 KM ROUTE DBRDGN TO MS12
236 KM MAIN ST
237 RD 480 0.002 0.016 0 TRAP 0 50
    *

238 KK MS12
239 BA 0.009
240 LS 0 94.6
241 UD 0.148
    *

242 KK CMS12
243 KM COMBINE DBRDGN AND MS12
244 KM CARSON AND MAIN
245 HC 2
    *

246 KK DCRSNSD
247 KM DIVERT FLOW INTERCEPTED BY MAIN ST STORM DRAIN
248 DT DCRSNSD
249 DI 0 26
250 DQ 0 4.4
    *

251 KK DCRSNN
252 KM DIVERT FLOW EAST IN CARSON AVE
253 KM REMAINING FLOW NORTH IN MAIN ST
254 DT DCRSNE
255 DI 0 21.6
256 DQ 0 10
    *

257 KK RDCRSNN
258 KM ROUTE DCRSNN TO MS13
259 KM MAIN ST
260 RD 900 0.004 0.016 0 TRAP 0 50
    *

```

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

261 KK DFREMSD
262 KM DIVERT FLOW INTERCEPTED BY MAIN ST STORM DRAIN
263 DT DFREMSD
264 DI 0 11
265 DQ 0 4.2
*

266 KK MS13
267 BA 0.016
268 LS 0 94.3
269 UD 0.174
*

270 KK CMS13
271 KM COMBINE DCRSNN AND MS13
272 KM OGDEN AND MAIN
273 HC 2
*

274 KK DOGDNN
275 KM DIVERT FLOW EAST IN OGDEN AVE
276 KM REMAINING FLOW NORTH IN MAIN ST
277 DT DOGDNE
278 DI 0 30
279 DQ 0 3.4
*

280 KK RDOGDNN
281 KM ROUTE DOGDNN TO MS14
282 KM MAIN ST
283 RD 480 0.005 0.016 0 TRAP 0 50
*

284 KK MS14
285 BA 0.009
286 LS 0 94.3
287 UD 0.149
*

288 KK CMS14
289 KM COMBINE DOGDNN AND MS14
290 KM STEWART AND MAIN
291 HC 2
*

292 KK DSTEWN
293 KM DIVERT FLOW EAST IN STEWART AVE
294 KM REMAINING FLOW NORTH IN MAIN ST
295 DT DSTEW
296 DI 0 40
297 DQ 0 2
*

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

298 KK RDSTEWN
299 KM ROUTE DSTEWN TO MS15
300 KM MAIN ST
301 RD 450 0.001 0.016 0 TRAP 0 50
*

302 KK MS15
303 BA 0.007
304 LS 0 94.4
305 UD 0.147
*

306 KK CMS15
307 KM COMBINE DSTEWN AND MS15
308 KM US95 AND MAIN
309 HC 2
*

310 KK RCMS15
311 KM ROUTE CMS15 TO MS16
312 KM MAIN ST
313 RD 800 0.007 0.016 0 TRAP 0 50
*

314 KK MS16
315 BA 0.007
316 LS 0 94.4
317 UD 0.147
*

318 KK CMS16
319 KM COMBINE MS15 AND MS16
320 KM BONANZA AND MAIN
321 HC 2
*

322 KK DCOOLSD
323 KM RETRIEVE STORM DRAIN FLOW AT COOLIDGE
324 DR DCOOLSD
*

325 KK RCOOLSD
326 KM ROUTE STORM DRAIN FLOW FROM COOLIDGE TO HOOVER
Page 5

327 RD 475 0.0025 0.013 0 LP100SD3.OUT
 * CIRC 1.5
 328 KK DHOOVSD
 329 KM RETRIEVE STORM DRAIN FLOW AT HOOVER
 330 DR DHOOVSD
 *
 1 HEC-1 INPUT PAGE 10

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

331 KK CHOOV
 332 KM COMBINE STORM DRAIN FLOW
 333 KM MAIN AND HOOVER
 334 HC 2
 *
 335 KK RHOOVSD
 336 KM ROUTE STORM DRAIN FLOW FROM HOOVER TO GASS
 337 RD 540 0.0025 0.013 0 CIRC 2.0
 *
 338 KK DGASSSD
 339 KM RETRIEVE STORM DRAIN FLOW AT GASS
 340 DR DGASSSD
 *
 341 KK CGASS
 342 KM COMBINE STORM DRAIN FLOW
 343 KM MAIN AND GASS
 344 HC 2
 *
 345 KK RGASSSD
 346 KM ROUTE STORM DRAIN FLOW FROM GASS TO COMMERCE
 347 RD 270 0.0025 0.013 0 CIRC 2.5
 *
 348 KK DCOMMSD
 349 KM RETRIEVE STORM DRAIN FLOW AT COMMERCE
 350 DR DCOMMSD
 *
 351 KK CCOMM
 352 KM COMBINE STORM DRAIN FLOW
 353 KM MAIN AND COMMERCE
 354 HC 2
 *
 355 KK RCOMMSD
 356 KM ROUTE STORM DRAIN FLOW FROM COMMERCE TO GARCES
 357 RD 230 0.0025 0.013 0 CIRC 3.0
 *
 358 KK DGARCS
 359 KM RETRIEVE STORM DRAIN FLOW AT GARCES
 360 DR DGARCS
 *
 361 KK CGARCS
 362 KM COMBINE STORM DRAIN FLOW
 363 KM MAIN AND GARCES
 364 HC 2
 *

1 HEC-1 INPUT PAGE 11

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

365 KK RGARCS
 366 KM ROUTE STORM DRAIN FLOW FROM GARCES TO BONNEVILLE
 367 RD 460 0.0025 0.013 0 CIRC 3.0
 *
 368 KK DBONNSD
 369 KM RETRIEVE STORM DRAIN FLOW AT BONNEVILLE
 370 DR DBONNSD
 *
 371 KK CBONN
 372 KM COMBINE STORM DRAIN FLOW
 373 KM MAIN AND BONNEVILLE
 374 HC 2
 *
 375 KK RBONNSD
 376 KM ROUTE STORM DRAIN FLOW FROM BONNEVILLE TO CLARK
 377 RD 650 0.0025 0.013 0 CIRC 3.0
 *
 378 KK DCLRKSD
 379 KM RETRIEVE STORM DRAIN FLOW AT CLARK
 380 DR DCLRKSD
 *
 381 KK CCLRK
 382 KM COMBINE STORM DRAIN FLOW
 383 KM MAIN AND CLARK
 384 HC 2
 *
 385 KK RCLRKSD
 386 KM ROUTE STORM DRAIN FLOW FROM CLARK TO LEWIS
 387 RD 340 0.0025 0.013 0 CIRC 3.0
 *

LP100SD3.OUT

```

388      KK DLWISSD
389      KM RETRIEVE STORM DRAIN FLOW AT LEWIS
390      DR DLWISSD
      *

391      KK CLWIS
392      KM COMBINE STORM DRAIN FLOW
393      KM MAIN AND LEWIS
394      HC 2
      *

395      KK RLWIS
396      KM ROUTE STORM DRAIN FLOW FROM LEWIS TO BRIDGER
397      RD 460 0.0025 0.013 0 CIRC 3.0
      *

```

1

HEC-1 INPUT

PAGE 12

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

```

398      KK DBRDGSD
399      KM RETRIEVE STORM DRAIN FLOW AT BRIDGER
400      DR DBRDGSD
      *

401      KK CBRDG
402      KM COMBINE STORM DRAIN FLOW
403      KM MAIN AND BRIDGER
404      HC 2
      *

405      KK RBRDG
406      KM ROUTE STORM DRAIN FLOW FROM BRIDGER TO CARSON
407      RD 475 0.0025 0.013 0 CIRC 3.0
      *

408      KK DCRSNSD
409      KM RETRIEVE STORM DRAIN FLOW AT CARSON
410      DR DCRSNSD
      *

411      KK CCRSN
412      KM COMBINE STORM DRAIN FLOW
413      KM MAIN AND CARSON
414      HC 2
      *

415      KK RCRSN
416      KM ROUTE STORM DRAIN FLOW FROM CARSON TO FREMONT
417      RD 490 0.0025 0.013 0 CIRC 3.0
      *

418      KK DFREMSD
419      KM RETRIEVE STORM DRAIN FLOW AT FREMONT
420      DR DFREMSD
      *

421      KK CFREM
422      KM COMBINE STORM DRAIN FLOW
423      KM MAIN AND FREMONT
424      HC 2
      *

425      KK RFREM
426      KM ROUTE STORM DRAIN FLOW FROM FREMONT TO OGDEN
427      RD 460 0.0025 0.013 0 CIRC 3.0
428      ZZ

```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

```

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

27      MS2
      .
      .
42      .-----> DCOOLSD
40      DCOOLSD
      .
      .
48      .-----> DCOOLE
45      DCOOLN
      V
51      RMS2
      .
      .
55      .      MS3
      .
      .
59      CMS3.....
      .
      .
65      .-----> DHOOVSD
63      DHOOVSD
      .
      .
71      .-----> DHOOVE
68      DHOOVN
      V
74      RCMS3
      .
      .

```

```

78      .      MS4
82      CMS4 .....
86      .      CS8
92      .      DCOMMSD -----> DCOMMSD
90      DCOMMSD
95      .      MS5
99      CMS5 .....
106     .      DCOMMS -----> DCOMMN
103     DCOMMS
109     CGASS .....
115     .      DGASSSD -----> DGASSSD
113     DGASSSD
120     .      DCOMMN <----- DCOMMN
118     DCOMMN
121     V
121     RDCOMMN
125     .      MS6A
129     CMS6A .....
135     .      DGARCSD -----> DGARCSD
133     DGARCSD
141     .      DGARCE -----> DGARCE
138     DGARCN
144     V
144     RGARCN
148     .      MS6B
152     CMS6B .....
158     .      DBONNSD -----> DBONNSD
156     DBONNSD
161     .      MS7
165     .      MS8
169     CMS8 .....
173     .      MS9
179     .      DCLRKS -----> DCLRKS
177     DCLRKS
185     .      DCLRKE -----> DCLRKE
182     DCLRKN
188     V
188     RDCLRKN
192     .      MS10
196     CMS10 .....
202     .      DLWISSD -----> DLWISSD
200     DLWISSD
208     .      DLEWSE -----> DLEWSE
205     DLEWSN
211     V
211     RDLEWSN
215     .      MS11

```

→ into 36" RLP
SD.

Approx.
total
surface flow
within
Main st.
near intersection with
Ogden

LP100SD3.OUT
 1-2 0.95
 2-3 0.925
 3-4 0.915
 4-5 0.908
 5-6 0.903
 6-7 0.895
 7-8 0.885

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

IT HYDROGRAPH TIME DATA
 NMIN 5 MINUTES IN COMPUTATION INTERVAL
 IDATE 1 0 STARTING DATE
 ITIME 0000 STARTING TIME
 NQ 250 NUMBER OF HYDROGRAPH ORDINATES
 NDDATE 1 0 ENDING DATE
 NDTIME 2045 ENDING TIME
 ICENT 19 CENTURY MARK

COMPUTATION INTERVAL .08 HOURS
 TOTAL TIME BASE 20.75 HOURS

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

JP MULTI-PLAN OPTION
 NPLAN 1 NUMBER OF PLANS

JR MULTI-RATIO OPTION
 RATIOS OF PRECIPITATION
 .99 .98 .95 .93 .92 .91 .90 .89 .88

1

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

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION								
					RATIO 1 .99	RATIO 2 .98	RATIO 3 .95	RATIO 4 .93	RATIO 5 .92	RATIO 6 .91	RATIO 7 .90	RATIO 8 .89	RATIO 9 .88
HYDROGRAPH AT +	MS2	.01	1	FLOW TIME	13. 3.58	13. 3.58	12. 3.58	12. 3.58	12. 3.58	12. 3.58	12. 3.58	12. 3.58	11. 3.58
DIVERSION TO +	DCOOLSD	.01	1	FLOW TIME	3. 3.58	3. 3.58	3. 3.58	3. 3.58	3. 3.58	3. 3.58	3. 3.58	3. 3.58	2. 3.58
HYDROGRAPH AT +	DCOOLSD	.01	1	FLOW TIME	10. 3.58	10. 3.58	10. 3.58	9. 3.58	9. 3.58	9. 3.58	9. 3.58	9. 3.58	9. 3.58
DIVERSION TO +	DCOOLE	.01	1	FLOW TIME	6. 3.58	5. 3.58	5. 3.58	5. 3.58	5. 3.58	5. 3.58	5. 3.58	5. 3.58	5. 3.58
HYDROGRAPH AT +	DCOOLN	.01	1	FLOW TIME	5. 3.58	5. 3.58	5. 3.58	4. 3.58	4. 3.58	4. 3.58	4. 3.58	4. 3.58	4. 3.58
ROUTED TO +	RMS2	.01	1	FLOW TIME	5. 3.67	5. 3.67	4. 3.67	4. 3.67	4. 3.67	4. 3.67	4. 3.67	4. 3.67	4. 3.67
HYDROGRAPH AT +	MS3	.00	1	FLOW TIME	7. 3.58	7. 3.58	6. 3.58	6. 3.58	6. 3.58	6. 3.58	6. 3.58	6. 3.58	6. 3.58
2 COMBINED AT +	CMS3	.01	1	FLOW TIME	11. 3.58	11. 3.58	10. 3.58	10. 3.58	10. 3.58	10. 3.58	10. 3.58	10. 3.58	10. 3.58
DIVERSION TO +	DHOOVSD	.01	1	FLOW TIME	3. 3.58	3. 3.58	3. 3.58	2. 3.58	2. 3.58	2. 3.58	2. 3.58	2. 3.58	2. 3.58
HYDROGRAPH AT +	DHOOVSD	.01	1	FLOW TIME	8. 3.58	8. 3.58	8. 3.58	8. 3.58	8. 3.58	7. 3.58	7. 3.58	7. 3.58	7. 3.58
DIVERSION TO +	DHOOVE	.01	1	FLOW TIME	5. 3.58	5. 3.58	5. 3.58	4. 3.58	4. 3.58	4. 3.58	4. 3.58	4. 3.58	4. 3.58
HYDROGRAPH AT +	DHOOVN	.01	1	FLOW TIME	3. 3.58	3. 3.58	3. 3.58	3. 3.58	3. 3.58	3. 3.58	3. 3.58	3. 3.58	3. 3.58
ROUTED TO +	RCMS3	.01	1	FLOW TIME	3. 3.67	3. 3.67	3. 3.67	3. 3.67	3. 3.67	3. 3.67	3. 3.67	3. 3.67	3. 3.67
HYDROGRAPH AT +	MS4	.00	1	FLOW	7. 7.	7. 7.	7. 7.	6. 6.	6. 6.	6. 6.	6. 6.	6. 6.	6. 6.

				TIME	3.58	LP100SD3.OUT 3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
+	2 COMBINED AT	CMS4	.02	1 FLOW TIME	10. 3.58	10. 3.58	9. 3.58	9. 3.58	9. 3.58	9. 3.58	9. 3.58	9. 3.58	9. 3.58
+	HYDROGRAPH AT	CS8	.04	1 FLOW TIME	50. 3.67	49. 3.67	48. 3.67	46. 3.67	46. 3.67	45. 3.67	45. 3.67	45. 3.67	44. 3.67
+	DIVERSION TO	DCOMMSD	.04	1 FLOW TIME	5. 2.50	5. 3.17	5. 3.17	5. 3.17	5. 3.17	5. 3.17	5. 3.17	5. 3.17	5. 3.17
+	HYDROGRAPH AT	DCOMMSD	.04	1 FLOW TIME	45. 3.67	44. 3.67	43. 3.67	41. 3.67	41. 3.67	40. 3.67	40. 3.67	40. 3.67	39. 3.67
+	HYDROGRAPH AT	MS5	.00	1 FLOW TIME	2. 3.58	2. 3.58	2. 3.58	2. 3.58	2. 3.58	2. 3.58	2. 3.58	2. 3.58	2. 3.58
+	2 COMBINED AT	CMS5	.04	1 FLOW TIME	46. 3.67	46. 3.67	44. 3.67	43. 3.67	42. 3.67	42. 3.67	41. 3.67	41. 3.67	40. 3.67
+	DIVERSION TO	DCOMMN	.04	1 FLOW TIME	15. 3.67	14. 3.67	13. 3.67	12. 3.67	12. 3.67	12. 3.67	12. 3.67	11. 3.67	11. 3.67
+	HYDROGRAPH AT	DCOMMS	.04	1 FLOW TIME	32. 3.67	31. 3.67	31. 3.67	30. 3.67	30. 3.67	30. 3.67	30. 3.67	29. 3.67	29. 3.67
+	2 COMBINED AT	CGASS	.05	1 FLOW TIME	41. 3.58	40. 3.58	39. 3.58	38. 3.58	38. 3.67	38. 3.67	37. 3.67	37. 3.67	37. 3.67
+	DIVERSION TO	DGASSSD	.05	1 FLOW TIME	9. 3.50	9. 3.50	9. 3.50	9. 3.50	9. 3.50	9. 3.50	9. 3.50	9. 3.50	9. 3.50
+	HYDROGRAPH AT	DGASSSD	.05	1 FLOW TIME	32. 3.58	31. 3.58	30. 3.58	29. 3.58	29. 3.67	29. 3.67	28. 3.67	28. 3.67	28. 3.67
+	HYDROGRAPH AT	DCOMMN	.00	1 FLOW TIME	15. 3.67	14. 3.67	13. 3.67	12. 3.67	12. 3.67	12. 3.67	12. 3.67	11. 3.67	11. 3.67
+	ROUTED TO	RDCOMMN	.00	1 FLOW TIME	14. 3.67	14. 3.67	13. 3.67	12. 3.67	12. 3.67	11. 3.67	11. 3.67	11. 3.67	11. 3.67
+	HYDROGRAPH AT	MS6A	.00	1 FLOW TIME	7. 3.58	7. 3.58	6. 3.58	6. 3.58	6. 3.58	6. 3.58	6. 3.58	6. 3.58	6. 3.58
+	2 COMBINED AT	CMS6A	.00	1 FLOW TIME	20. 3.67	19. 3.67	18. 3.67	17. 3.67	17. 3.67	16. 3.67	16. 3.67	16. 3.67	16. 3.67
+	DIVERSION TO	DGARCSA	.00	1 FLOW TIME	3. 3.67	3. 3.67	3. 3.67	3. 3.67	3. 3.67	3. 3.67	3. 3.67	3. 3.67	3. 3.67
+	HYDROGRAPH AT	DGARCSA	.00	1 FLOW TIME	16. 3.67	16. 3.67	15. 3.67	14. 3.67	14. 3.67	14. 3.67	14. 3.67	13. 3.67	13. 3.67
+	DIVERSION TO	DGARCE	.00	1 FLOW TIME	5. 3.67	5. 3.67	4. 3.67	4. 3.67	4. 3.67	4. 3.67	4. 3.67	4. 3.67	4. 3.67
+	HYDROGRAPH AT	DGARCN	.00	1 FLOW TIME	11. 3.67	11. 3.67	10. 3.67	10. 3.67	10. 3.67	10. 3.67	9. 3.67	9. 3.67	9. 3.67
+	ROUTED TO	RGARCN	.00	1 FLOW TIME	11. 3.75	11. 3.75	10. 3.75	10. 3.75	9. 3.75	9. 3.75	9. 3.75	9. 3.75	9. 3.75
+	HYDROGRAPH AT	MS6B	.01	1 FLOW TIME	13. 3.58	13. 3.58	13. 3.58	12. 3.58	12. 3.58	12. 3.58	12. 3.58	12. 3.58	12. 3.58
+	2 COMBINED AT	CMS6B	.01	1 FLOW TIME	21. 3.67	21. 3.67	20. 3.67	19. 3.67	19. 3.67	19. 3.67	18. 3.67	18. 3.67	18. 3.67
+	DIVERSION TO	DBONNSD	.01	1 FLOW TIME	9. 3.67	9. 3.67	9. 3.67	9. 3.67	9. 3.67	9. 3.67	9. 3.67	9. 3.67	8. 3.67
+	HYDROGRAPH AT	DBONNSD	.01	1 FLOW TIME	12. 3.67	11. 3.67	11. 3.67	10. 3.67	10. 3.67	10. 3.67	10. 3.67	10. 3.67	10. 3.67
+	HYDROGRAPH AT	MS7	.00	1 FLOW TIME	0. 3.50	0. 3.50	0. 3.50	0. 3.50	0. 3.50	0. 3.50	0. 3.50	0. 3.50	0. 3.50
+	HYDROGRAPH AT	MS8	.00	1 FLOW TIME	2. 3.58	2. 3.58	2. 3.58	2. 3.58	2. 3.58	2. 3.58	2. 3.58	2. 3.58	2. 3.58

LP100SD3.OUT												
3 COMBINED AT	CMS8	.01	1	FLOW TIME	13. 3.58	13. 3.58	13. 3.58	12. 3.58	12. 3.58	12. 3.58	11. 3.58	11. 3.58
HYDROGRAPH AT	MS9	.01	1	FLOW TIME	12. 3.58	11. 3.58	11. 3.58	11. 3.58	11. 3.58	11. 3.58	10. 3.58	10. 3.58
DIVERSION TO	DCLRKSD	.01	1	FLOW TIME	2. 3.58	2. 3.58	2. 3.58	2. 3.58	2. 3.58	2. 3.58	2. 3.58	2. 3.58
HYDROGRAPH AT	DCLRKSD	.01	1	FLOW TIME	9. 3.58	9. 3.58	9. 3.58	9. 3.58	9. 3.58	8. 3.58	8. 3.58	8. 3.58
DIVERSION TO	DCLRKE	.01	1	FLOW TIME	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
HYDROGRAPH AT	DCLRKN	.01	1	FLOW TIME	9. 3.58	9. 3.58	9. 3.58	9. 3.58	9. 3.58	8. 3.58	8. 3.58	8. 3.58
ROUTED TO	RDCLRKN	.01	1	FLOW TIME	9. 3.67	8. 3.67	8. 3.67	8. 3.67	8. 3.67	8. 3.67	8. 3.67	8. 3.67
HYDROGRAPH AT	MS10	.01	1	FLOW TIME	14. 3.58	13. 3.58	13. 3.58	13. 3.58	12. 3.58	12. 3.58	12. 3.58	12. 3.58
2 COMBINED AT	CMS10	.02	1	FLOW TIME	21. 3.58	21. 3.58	20. 3.58	20. 3.58	19. 3.58	19. 3.58	19. 3.58	19. 3.58
DIVERSION TO	DLWISSD	.02	1	FLOW TIME	5. 3.58	5. 3.58	4. 3.58	4. 3.58	4. 3.58	4. 3.58	4. 3.58	4. 3.58
HYDROGRAPH AT	DLWISSD	.02	1	FLOW TIME	17. 3.58	16. 3.58	16. 3.58	15. 3.58	15. 3.58	15. 3.58	15. 3.58	14. 3.58
DIVERSION TO	DLEWSE	.02	1	FLOW TIME	12. 3.58	12. 3.58	12. 3.58	11. 3.58	11. 3.58	11. 3.58	11. 3.58	11. 3.58
HYDROGRAPH AT	DLEWSN	.02	1	FLOW TIME	4. 3.58	4. 3.58	4. 3.58	4. 3.58	4. 3.58	4. 3.58	4. 3.58	4. 3.58
ROUTED TO	RDLEWSN	.02	1	FLOW TIME	4. 3.75	4. 3.75	4. 3.75	4. 3.75	4. 3.75	4. 3.75	4. 3.75	4. 3.75
HYDROGRAPH AT	MS11	.01	1	FLOW TIME	15. 3.58	15. 3.58	14. 3.58	14. 3.58	14. 3.58	14. 3.58	14. 3.58	13. 3.58
2 COMBINED AT	CMS11	.02	1	FLOW TIME	18. 3.58	18. 3.58	17. 3.58	17. 3.58	17. 3.58	17. 3.58	16. 3.58	16. 3.58
DIVERSION TO	DBRDGSD	.02	1	FLOW TIME	4. 3.58	4. 3.58	4. 3.58	3. 3.58	3. 3.58	3. 3.58	3. 3.58	3. 3.58
HYDROGRAPH AT	DBRDGSD	.02	1	FLOW TIME	15. 3.58	14. 3.58	14. 3.58	13. 3.58	13. 3.58	13. 3.58	13. 3.58	13. 3.58
DIVERSION TO	DBRDGE	.02	1	FLOW TIME	2. 3.58	2. 3.58	2. 3.58	2. 3.58	2. 3.58	2. 3.58	2. 3.58	2. 3.58
HYDROGRAPH AT	DBRDGN	.02	1	FLOW TIME	13. 3.58	12. 3.58	12. 3.58	12. 3.58	11. 3.58	11. 3.58	11. 3.58	11. 3.58
ROUTED TO	RDBRDGN	.02	1	FLOW TIME	12. 3.67	12. 3.67	11. 3.67	11. 3.67	11. 3.67	11. 3.67	11. 3.67	10. 3.67
HYDROGRAPH AT	MS12	.01	1	FLOW TIME	15. 3.58	15. 3.58	14. 3.58	14. 3.58	14. 3.58	14. 3.58	14. 3.58	13. 3.58
2 COMBINED AT	CMS12	.03	1	FLOW TIME	26. 3.58	26. 3.58	25. 3.58	24. 3.58	24. 3.58	23. 3.58	23. 3.58	23. 3.58
DIVERSION TO	DCRSNSD	.03	1	FLOW TIME	4. 3.58	4. 3.58	4. 3.58	4. 3.58	4. 3.58	4. 3.58	4. 3.58	4. 3.58
HYDROGRAPH AT	DCRSNSD	.03	1	FLOW TIME	22. 3.58	21. 3.58	21. 3.58	20. 3.58	20. 3.58	19. 3.58	19. 3.58	19. 3.58
DIVERSION TO	DCRSNE	.03	1	FLOW TIME	10. 3.58	10. 3.58	10. 3.58	9. 3.58	9. 3.58	9. 3.58	9. 3.58	9. 3.58
HYDROGRAPH AT	DCRSNN	.03	1	FLOW	12. 3.58	11. 3.58	11. 3.58	11. 3.58	11. 3.58	10. 3.58	10. 3.58	10. 3.58

11.60 cfs surface at Main/canyon intersection

				TIME	3.58	LP100SD3.OUT 3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO													
+	RDCRSNN	.03	1	FLOW TIME	11. 3.75	11. 3.75	11. 3.75	10. 3.75	10. 3.75	10. 3.75	10. 3.75	10. 3.75	10. 3.75
DIVERSION TO													
+	DFREMSD	.03	1	FLOW TIME	4. 3.75	4. 3.75	4. 3.75	4. 3.75	4. 3.75	4. 3.75	4. 3.75	4. 3.75	4. 3.75
HYDROGRAPH AT													
+	DFREMSD	.03	1	FLOW TIME	7. 3.75	7. 3.75	7. 3.75	6. 3.75	6. 3.75	6. 3.75	6. 3.75	6. 3.75	6. 3.75
HYDROGRAPH AT													
+	MS13	.02	1	FLOW TIME	26. 3.58	25. 3.58	24. 3.58	24. 3.58	23. 3.58	23. 3.58	23. 3.58	23. 3.58	22. 3.58
2 COMBINED AT													
+	CMS13	.05	1	FLOW TIME	31. 3.58	30. 3.58	30. 3.58	29. 3.58	28. 3.58	28. 3.58	28. 3.58	28. 3.58	27. 3.58
DIVERSION TO													
+	DOGDNE	.05	1	FLOW TIME	4. 3.58	3. 3.58	3. 3.58	3. 3.58	3. 3.58	3. 3.58	3. 3.58	3. 3.58	3. 3.58
HYDROGRAPH AT													
+	DOGDNN	.05	1	FLOW TIME	28. 3.58	27. 3.58	26. 3.58	25. 3.58	25. 3.58	25. 3.58	25. 3.58	24. 3.58	24. 3.58
ROUTED TO													
+	RDOGDNN	.05	1	FLOW TIME	27. 3.67	27. 3.67	26. 3.67	25. 3.67	25. 3.67	24. 3.67	24. 3.67	24. 3.67	24. 3.67
HYDROGRAPH AT													
+	MS14	.01	1	FLOW TIME	15. 3.58	15. 3.58	14. 3.58	14. 3.58	14. 3.58	14. 3.58	13. 3.58	13. 3.58	13. 3.58
2 COMBINED AT													
+	CMS14	.06	1	FLOW TIME	40. 3.58	40. 3.58	38. 3.58	37. 3.58	37. 3.58	36. 3.58	36. 3.58	36. 3.58	35. 3.58
DIVERSION TO													
+	DSTEWE	.06	1	FLOW TIME	2. 3.58	2. 3.58	2. 3.58	2. 3.58	2. 3.58	2. 3.58	2. 3.58	2. 3.58	2. 3.58
HYDROGRAPH AT													
+	DSTEWN	.06	1	FLOW TIME	38. 3.58	38. 3.58	36. 3.58	35. 3.58	35. 3.58	34. 3.58	34. 3.58	34. 3.58	33. 3.58
ROUTED TO													
+	RDSTEWN	.06	1	FLOW TIME	37. 3.67	36. 3.67	35. 3.67	34. 3.67	33. 3.67	33. 3.67	33. 3.67	32. 3.67	32. 3.67
HYDROGRAPH AT													
+	MS15	.01	1	FLOW TIME	12. 3.58	12. 3.58	11. 3.58	11. 3.58	11. 3.58	11. 3.58	11. 3.58	10. 3.58	10. 3.58
2 COMBINED AT													
+	CMS15	.07	1	FLOW TIME	46. 3.67	46. 3.67	44. 3.67	43. 3.67	42. 3.67	42. 3.67	41. 3.67	40. 3.67	40. 3.67
ROUTED TO													
+	RCMS15	.07	1	FLOW TIME	45. 3.75	44. 3.75	43. 3.75	42. 3.75	41. 3.75	40. 3.75	40. 3.75	40. 3.75	39. 3.75
HYDROGRAPH AT													
+	MS16	.01	1	FLOW TIME	12. 3.58	12. 3.58	11. 3.58	11. 3.58	11. 3.58	11. 3.58	11. 3.58	10. 3.58	10. 3.58
2 COMBINED AT													
+	CMS16	.07	1	FLOW TIME	54. 3.67	53. 3.67	52. 3.67	50. 3.67	49. 3.67	49. 3.67	48. 3.67	48. 3.67	47. 3.67
HYDROGRAPH AT													
+	DCOOLSD	.00	1	FLOW TIME	3. 3.58	3. 3.58	3. 3.58	3. 3.58	3. 3.58	3. 3.58	3. 3.58	3. 3.58	2. 3.58
ROUTED TO													
+	RCOOLSD	.00	1	FLOW TIME	3. 3.58	3. 3.58	3. 3.58	2. 3.58	2. 3.58	2. 3.58	2. 3.58	2. 3.58	2. 3.58
HYDROGRAPH AT													
+	DHOOVSD	.00	1	FLOW TIME	3. 3.58	3. 3.58	3. 3.58	2. 3.58	2. 3.58	2. 3.58	2. 3.58	2. 3.58	2. 3.58
2 COMBINED AT													
+	CHOOV	.00	1	FLOW TIME	5. 3.58	5. 3.58	5. 3.58	5. 3.58	5. 3.58	5. 3.58	5. 3.58	5. 3.58	5. 3.58
ROUTED TO													
+	RHOOVSD	.00	1	FLOW TIME	5. 3.67	5. 3.67	5. 3.67	5. 3.67	5. 3.67	5. 3.67	5. 3.67	5. 3.67	5. 3.67
HYDROGRAPH AT													
+	DGASSSD	.00	1	FLOW TIME	9. 3.50	9. 3.50	9. 3.50	9. 3.50	9. 3.50	9. 3.50	9. 3.50	9. 3.50	9. 3.50
2 COMBINED AT													
+	CGASS	.00	1	FLOW TIME	14. 3.67	14. 3.67	14. 3.67	14. 3.67	14. 3.67	14. 3.67	14. 3.67	14. 3.67	14. 3.67
ROUTED TO													
+	RGASSSD	.00	1	FLOW TIME	14. 3.67	14. 3.67	14. 3.67	14. 3.67	14. 3.67	14. 3.67	14. 3.67	14. 3.67	14. 3.67

P100
surface
flows
within
Main
St.
at
Ogden

LP100SD3.OUT												
HYDROGRAPH AT	DCOMMSD	.00	1	FLOW	5.	5.	5.	5.	5.	5.	5.	5.
+				TIME	2.50	3.17	3.17	3.17	3.17	3.17	3.17	3.17
2 COMBINED AT	CCOMM	.00	1	FLOW	19.	19.	19.	19.	19.	19.	19.	19.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO	RCOMMSD	.00	1	FLOW	19.	19.	19.	19.	19.	19.	19.	18.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT	DGARCS	.00	1	FLOW	3.	3.	3.	3.	3.	3.	3.	3.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT	CGARC	.00	1	FLOW	22.	22.	22.	22.	21.	21.	21.	21.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO	RGARCS	.00	1	FLOW	22.	22.	22.	21.	21.	21.	21.	21.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT	DBONNSD	.00	1	FLOW	9.	9.	9.	9.	9.	9.	9.	8.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT	CBONN	.00	1	FLOW	31.	31.	31.	30.	30.	30.	30.	29.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO	RBOONSD	.00	1	FLOW	31.	31.	30.	30.	29.	29.	29.	29.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT	DCLRKS	.00	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT	CCLRK	.00	1	FLOW	33.	33.	32.	32.	31.	31.	31.	31.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO	RCLRKS	.00	1	FLOW	33.	32.	32.	31.	31.	31.	31.	31.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT	DLWISSD	.00	1	FLOW	5.	5.	4.	4.	4.	4.	4.	4.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT	CLWIS	.00	1	FLOW	37.	37.	36.	35.	35.	35.	35.	34.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO	RLWIS	.00	1	FLOW	37.	36.	36.	35.	35.	34.	34.	34.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT	DBRDGSD	.00	1	FLOW	4.	4.	4.	3.	3.	3.	3.	3.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT	CBRDG	.00	1	FLOW	40.	40.	39.	38.	38.	38.	37.	37.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO	RBRDG	.00	1	FLOW	40.	39.	38.	38.	37.	37.	37.	36.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT	DCRSNSD	.00	1	FLOW	4.	4.	4.	4.	4.	4.	4.	4.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT	CCRSN	.00	1	FLOW	44.	43.	42.	42.	41.	41.	41.	40.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO	RCCSN	.00	1	FLOW	43.	43.	42.	41.	41.	40.	40.	39.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT	DFREMSD	.00	1	FLOW	4.	4.	4.	4.	4.	4.	4.	4.
+				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT	CFREM	.00	1	FLOW	47.	47.	46.	45.	44.	44.	44.	43.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO	RFREM	.00	1	FLOW	47.	46.	45.	45.	44.	44.	43.	43.
+				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	DT	INTERPOLATED TO COMPUTATION PEAK	INTERPOLATED TO INTERVAL TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1	RATIO=	.00							

Total Q100
through 36" RCP
at Junction
with Ex. 42" RCP

DEPARTMENT OF PUBLIC WORKS

AS-BUILT PLANS

Mayor:
CAROLYN G. GOODMAN

City Council:
STAVROS S. ANTHONY (Mayor Pro-Tem)
LOIS TARKANIAN
STEVEN D. ROSS
RICKI T. BARLOW
BOB COFFIN
BOB BEERS

City Manager:
ELIZABETH N. FRETWELL

Director of Public Works:
JORGE CERVANTES, P.E., P.T.O.E.

City Engineer:
DAVID N. BOWERS, P.E., P.T.O.E.



MAIN STREET PHASE 1 IMPROVEMENT PROJECT FROM BONNEVILLE AVE. TO I-515

Funded By:
CITY OF LAS VEGAS

Reviewed By:

CLV CITY ENGINEER DATE

CLV PROJECT MANAGER DATE

CLV CITY TRAFFIC ENGINEER DATE

CLV CONSTRUCTION MANAGER DATE

CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT DATE

REGIONAL TRANSPORTATION COMMISSION
OF SOUTHERN NEVADA DATE

FREEWAY AND ARTERIAL SYSTEMS
OF TRANSPORTATION F.A.S.T. DATE

SOUTHWEST GAS CORPORATION DATE

CENTRAL TELEPHONE COMPANY, d/b/a CENTURYLINK DATE
THE AFFIXED CENTURYLINK NEVADA APPROVAL DOES NOT ASSUME OR
GUARANTEE LIABILITY FOR KNOWN OR UNKNOWN CONFLICTS WITH EXISTING OR
PROPOSED IMPROVEMENTS. RESOLUTION OF ANY CONFLICT WILL BE
ACCOMPLISHED PURSUANT TO LOCAL ORDINANCES, NEVADA REVISED STATUTES
AND/OR PUBLIC UTILITY COMMISSION STANDARD REGULATIONS.

COX COMMUNICATIONS LAS VEGAS, INC. DATE

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

NV ENERGY - TRANSMISSION DATE

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES MANAGER
DATE: PROJECT# 116660
SHEETS: CV, GN, ...

THE SIGNATURE ABOVE ACKNOWLEDGES THAT THE UTILITY COMPANY
REPRESENTATIVE HAS REVIEWED THE PLANS, AND THAT TO THE BEST
OF HIS OR HER KNOWLEDGE THE UTILITY LINES ARE SHOWN IN THE
CORRECT LOCATIONS AND ARE THE CORRECT SIZES. WHILE SUCH DATA
HAS BEEN COLLECTED WITH REASONABLE CARE, THERE IS NO
EXPRESSED OR IMPLIED GUARANTEE THAT THE LOCATIONS ARE EXACT.
THE CONTRACTOR SHALL BEAR THE RESPONSIBILITY OF OBTAINING THE
ACTUAL FIELD LOCATIONS.

THE SIGNATURE ABOVE FURTHER ACKNOWLEDGES THAT THE UTILITY
COMPANY DOES NOT ANTICIPATE CONSTRUCTION OR MAINTENANCE IN
THE PROJECT AREA FOR FIVE (5) YEARS IN CONFORMANCE WITH THE
CLV NO-CUT POLICY.

CLV BID NO. 14.47554

HB 47554

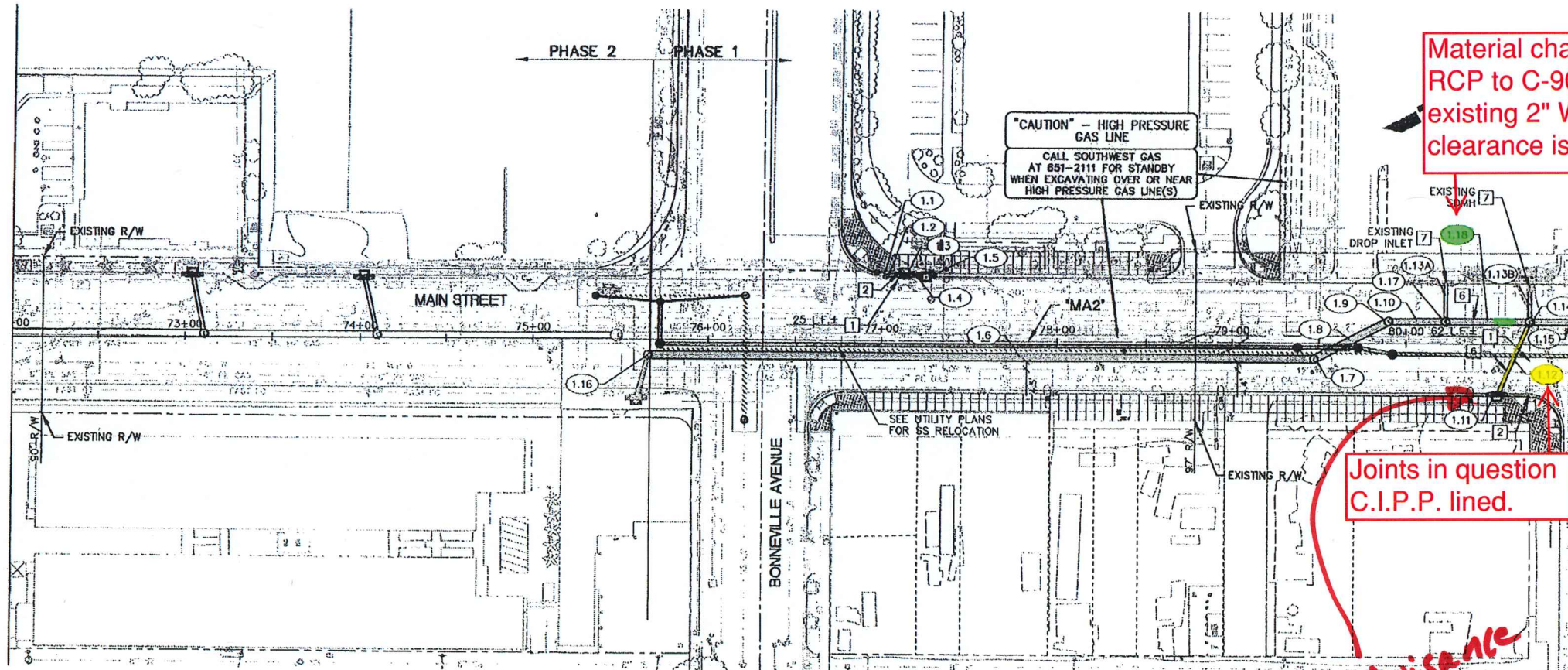
REVISIONS	NO.	DATE	DESCRIPTION	APP'D

DEPARTMENT OF PUBLIC WORKS
CAPITAL PROJECT MANAGEMENT
CITY ENGINEER: DAVID N. BOWERS, P.E., P.T.O.E.
PROGRAM MANAGER: MICHAEL STURDIVANT, P.E.
DESIGNED BY: SW
DRAWN BY: BE
CHECKED BY: BE
DATE: JAN 2014
CA Group Inc
2785 S. RAINBOW BLVD
LAS VEGAS, NV 89146
PHONE: (702) 885-5555
FAX: (702) 885-5557

TITLE
MAIN STREET PHASE 1 IMPROVEMENTS
BONNEVILLE AVE TO I-515

COVER SHEET

Sheet
CV
XX of XX
DRAWING NO.
47554



Material change from RCP to C-905 due to existing 2" W/L clearance issues.

Joints in question C.I.P.P. lined.

Advisance

ACP WATER NOTE:
ALL EXISTING ASBESTOS CEMENT (ACP) WATERLINES CROSSING A TRENCH EXCAVATION GREATER THAN 6 FT. WIDE SHALL BE REPLACED WITH DUCTILE IRON PIPE (DIP).
ALL WATERLINES CROSSING TRENCH WIDTHS GREATER THAN 6 FT. SHALL HAVE A PIPE SUPPORT DETAIL SUBMITTED TO THE DISTRICT FOR APPROVAL PRIOR TO EXCAVATION.

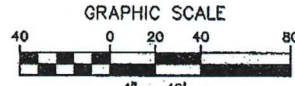
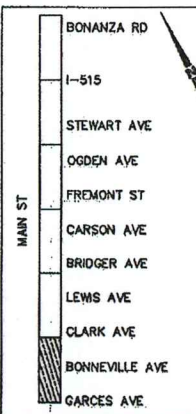
CONSTRUCTION NOTES:

- 1.1 "MA2" 77+00.73, 36.81' LT CONSTRUCT CONCRETE COLLAR SEE DETAIL SHEET D-7
- 1.2 INSTALL 12.44-LF 18" RCP SEE PROFILE BONNEVILLE SD SHEET DP-3
- 1.3 "MA2" 77+12.98, 39.00' LT CONSTRUCT 5' TYPE "DM2" DROP INLET PER USDOCA STD. DWG. 412.1 & 421
- 1.4 INSTALL 12.44-LF 18" RCP SEE PROFILE BONNEVILLE SD SHEET DP-3
- 1.5 "MA2" 77+25.23, 36.83' LT CONSTRUCT CONCRETE COLLAR SEE DETAIL SHEET D-7
- 1.6 INSTALL 381.59-LF 45"x29" HERCP BACKFILL W/ MIN. 4" CLSM SLURRY AND ELASTOMERIC SEALANT ON ALL JOINTS INSIDE AND OUT
- 1.7 "MA2" 79+47.22, 9.34' RT CONSTRUCT 60" TYPE III SDMH PER USDOCA DWG. NO. 406
- 1.8 INSTALL 48.03-LF 45"x29" HERCP BACKFILL W/ MIN. 4" CLSM SLURRY AND ELASTOMERIC SEALANT ON ALL JOINTS INSIDE AND OUT
- 1.9 "MA2" 79+89.93, 12.61' LT CONSTRUCT 60" TYPE III SDMH PER USDOCA DWG. NO. 406
- 1.10 INSTALL 32.49-LF 36" RCP
- 1.11 "MA2" 80+51.73, 30.00' RT CONSTRUCT 5' TYPE "DM2" DROP INLET PER USDOCA STD. DWG. 412.1 & 421
- 1.12 INSTALL 46.46-LF 18" C-905 OR EQUIVALENT (SEE PROFILE MA2 80+70 LATERAL 13)
- 1.13A INSTALL 21.76-LF 18" RCP
- 1.13B INSTALL 18.93-LF 18" RCP
- 1.14 "MA2" 80+69.99, 12.72' LT CONSTRUCT 48" TYPE II SDMH PER USDOCA DWG. NO. 405.1
- 1.15 INSTALL 143.26-LF 36" C-905 OR EQUIVALENT
- 1.16 CONSTRUCT BRICK AND MORTAR PLUG SEE DETAIL SHEET D-7
- 1.17 "MA2" 80+22.42, 12.66' LT CONSTRUCT 48" TYPE II SDMH PER USDOCA DWG. NO. 405.1
- 1.18 INSTALL 47.57-LF 36" RCP

REMOVAL/MISC NOTES:

- 1 REMOVE EXISTING STORM DRAIN
- 2 REMOVE EXISTING DROP INLET
- 3 REMOVE EXISTING MANHOLE
- 4 ABANDON EXISTING STORM DRAIN AND FILL WITH CEMENT SLURRY
- 5 BRICK AND MORTAR CAP EXISTING STORM DRAIN PIPE
- 6 USE ELASTOMERIC SEALANT ON JOINTS (INSIDE AND OUT) WITHIN 10' OF WATER CROSSING PER UDACS 2.22
- 7 PROTECT IN PLACE

APPROVED FOR CONSTRUCTION
LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES MANAGER
DATE: 04/18/14 PROJECT# 116660



Call before you Dig
1-702-227-2929
HV ENERGY ENVIRONMENT AND SAFETY SERVICES DEPARTMENT

DEPARTMENT OF PUBLIC WORKS
CAPITAL PROJECT MANAGEMENT
CITY ENGINEER: DAVID N. BOWERS, P.E. P.I.C.E.
PROGRAM MANAGER: MICHAEL STURDIVANT, P.E.
DESIGNED BY: LL
DRAWN BY: EM
CHECKED BY: CH
DATE: JAN 2014

MAIN STREET PHASE 1 IMPROVEMENTS
DRAINAGE PLAN
"MA2" 72+00.00 TO "MA2" 81+00.00

Sheet D-1
47 of 115
DRAWING NO. 47554

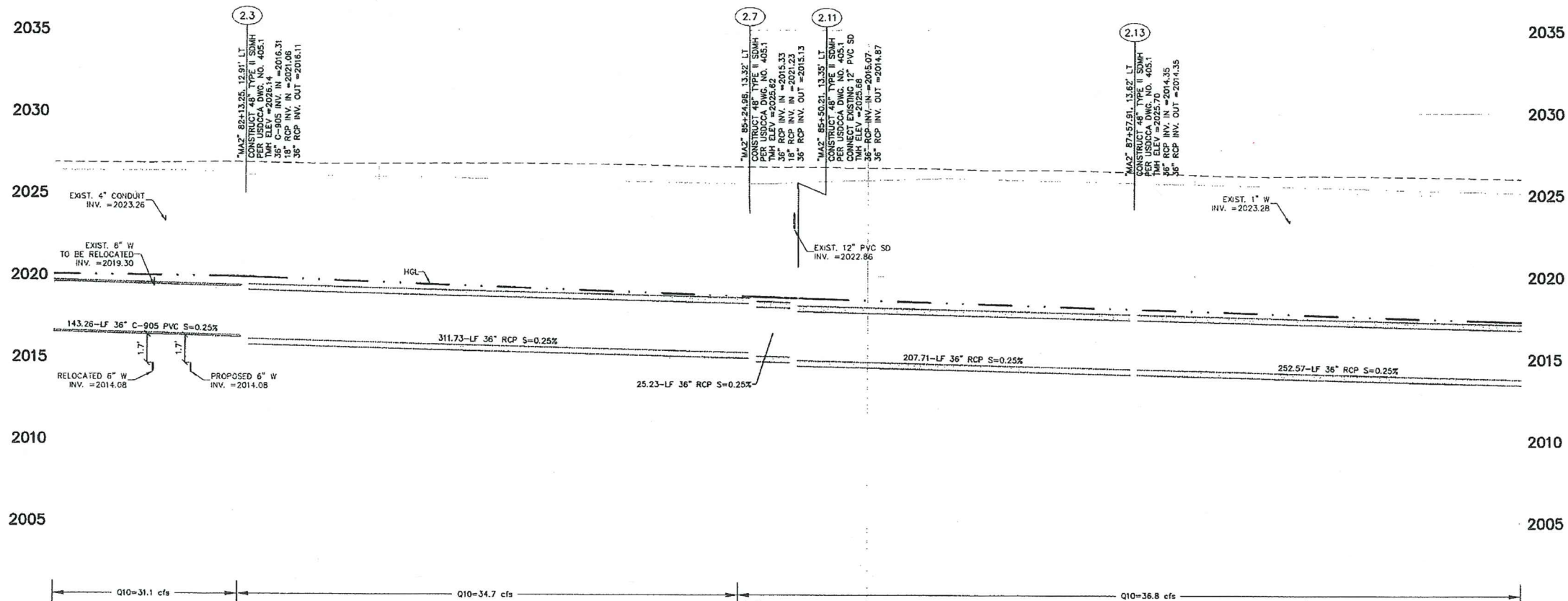
H:\7318\Sheet\SEGMENT 2\SD-1-8 Main.dwg 06/04/2014 13:47

MATCH LINE "MA2" 81+00.00 SEE SHEET D-1

MATCH LINE "MA2" 90+00.00 SEE SHEET D-3

D.I
Q10 = 2.4 cfs

D.I
Q10 = 2.14 cfs



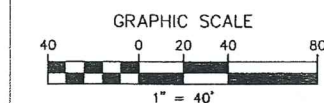
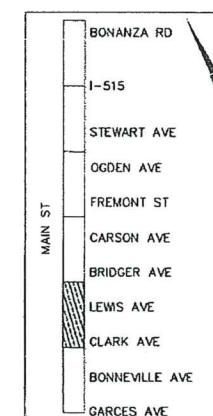
CONSTRUCTION NOTES:

- (2.1) "MA2" 81+93.62, 36.48' LT
CONSTRUCT 5' TYPE "DM2" DROP INLET
PER USDOCA STD. DWG. 412.1 & 421
- (2.2) INSTALL 30.68-LF 18" RCP
SEE PROFILE MA2 82+13 LATERAL 14
- (2.3) "MA2" 82+13.25, 12.91' LT
CONSTRUCT 48" TYPE II SDMH
PER USDOCA DWG. NO. 405.1
- (2.4) INSTALL 311.73-LF 36" RCP
- (2.5) "MA2" 85+19.90, 28.50' LT
CONSTRUCT 5' TYPE "DM2" DROP INLET
PER USDOCA STD. DWG. 412.1 & 421
- (2.6) INSTALL 16.01-LF 18" RCP
SEE PROFILE MA2 85+25 LATERAL 15
- (2.7) "MA2" 85+24.98, 13.32' LT
CONSTRUCT 48" TYPE II SDMH
PER USDOCA DWG. NO. 405.1
- (2.8) INSTALL 25.23-LF 36" RCP
- (2.9) NOT USED
- (2.10) NOT USED
- (2.11) "MA2" 85+50.21, 13.35 LT
CONST. 48" TYPE II SDMH
PER USDOCA DWG. NO. 405.1
CONNECT EXISTING 12" PVC SD
SEE PROFILE MA1 56+11 LATERAL 16
SHEET DP-1
- (2.12) INSTALL 207.71-LF 36" RCP
- (2.13) "MA2" 87+57.91, 13.62 LT
CONST. 48" TYPE II SDMH
PER USDOCA DWG. NO. 405.1
- (2.14) INSTALL 252.57-LF 36" RCP

REMOVAL/MISC NOTES:

- 1 REMOVE EXISTING STORM DRAIN
- 2 REMOVE EXISTING DROP INLET
- 3 REMOVE EXISTING MANHOLE
- 4 ABANDON EXISTING STORM DRAIN
AND FILL WITH CEMENT SLURRY
- 5 BRICK AND MORTAR CAP EXISTING
STORM DRAIN PIPE

APPROVED FOR CONSTRUCTION
[Signature]
LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES MANAGER
DATE: 06/18/14 PROJECT# 116660
SHEETS: 48 of 115



Call before you Overhead
1-702-227-2929
NV ENERGY ENVIRONMENT AND
SAFETY SERVICES DEPARTMENT

Call before you Dig
811
BRIAN TROY RUIZ
EXP. 12/31/15
CIVIL
PROFESSIONAL ENGINEER STATE OF NEVADA
No. 15987

SHEET KEY MAP

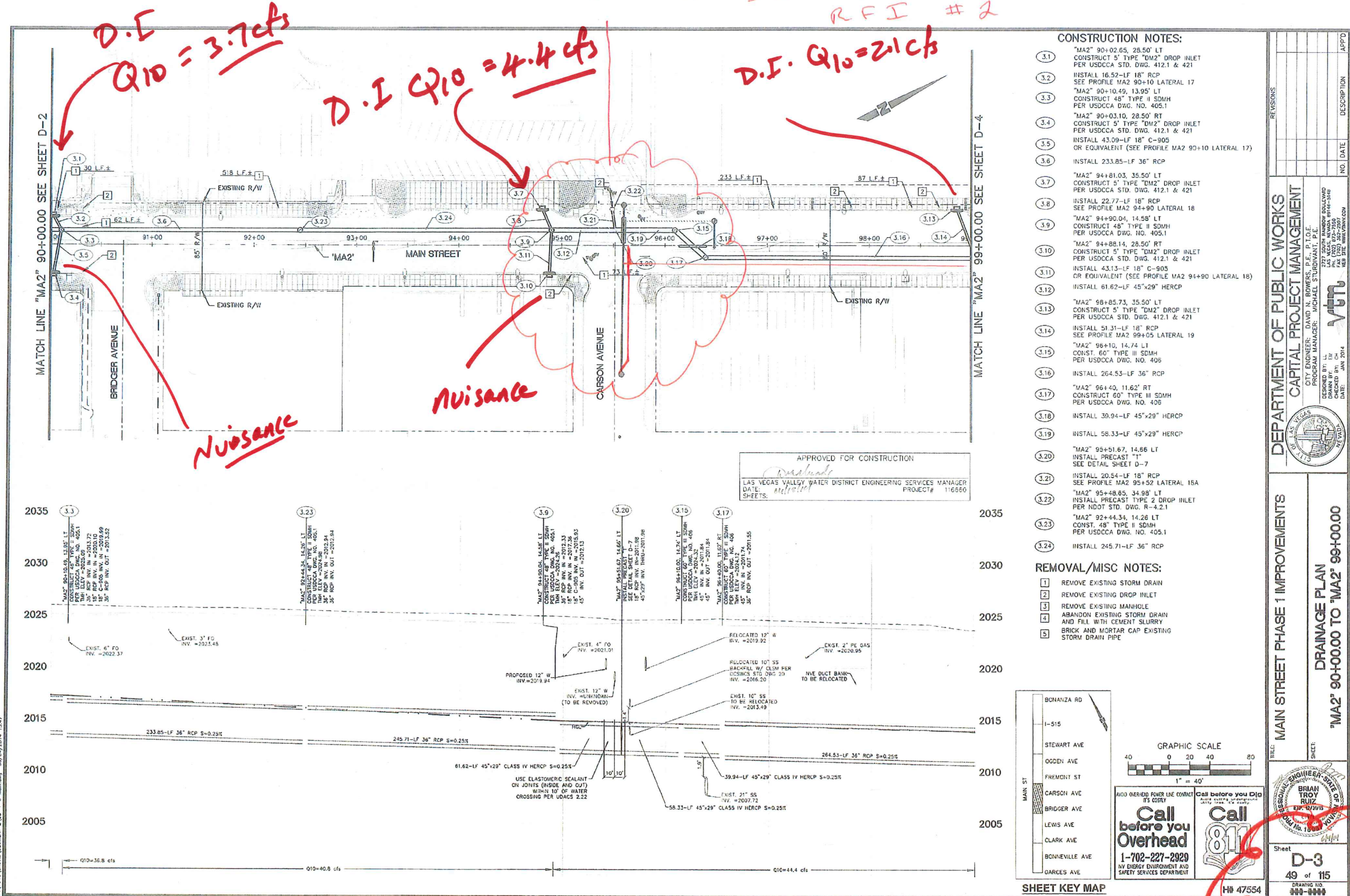
H# 47554

REVISIONS		DESCRIPTION		APP'D
NO.	DATE			

DEPARTMENT OF PUBLIC WORKS
CAPITAL PROJECT MANAGEMENT
CITY ENGINEER: DAVID N. BOWERS, P.E., P.O.E.
PROGRAM MANAGER: MICHAEL STURDIVANT, P.E.
DESIGNED BY: LL
DRAWN BY: EM
CHECKED BY: CH
DATE: JAN 2014
2277 SOUTH RAINBOW BOULEVARD
LAS VEGAS, NEVADA 89146-5148
TEL: (702) 975-2550
FAX: (702) 975-2550
WEB SITE: WWW.VNVV.COM

MAIN STREET PHASE 1 IMPROVEMENTS
DRAINAGE PLAN
"MA2" 81+00.00 TO "MA2" 90+00.00
SHEET: D-2
48 of 115
DRAWING NO. 116660

Carson's S/S & storm drain pipe locations have moved due to existing conflicts, check log for new locations.
RFI #2



MATCH LINE "MA2" 99+00.00 SEE SHEET D-3

MATCH LINE "MA2" 108+00.00 SEE SHEET D-5

CONSTRUCTION NOTES:

- 4.1 INSTALL 69.77-LF 36" RCP
- 4.2 "MA2" 99+71.97, 25.64' RT
CONSTRUCT 5' TYPE "DM2" DROP INLET
PER USDOCA STD. DWG. 412.1 & 421
- 4.3 INSTALL 13.44-LF 18" RCP
SEE PROFILE MA2 99+74 LATERAL 20
- 4.4 "MA2" 99+74.30, 12.41' RT
CONSTRUCT 48" TYPE II SDMH
PER USDOCA DWG. NO. 405.1
- 4.5 INSTALL 331.19-LF 36" RCP
- 4.6 "MA2" 103+05.49, 12.74' RT
CONSTRUCT 60" TYPE III SDMH
PER USDOCA DWG. NO. 406
- 4.7 INSTALL 128.40-LF 42" RCP
- 4.8 "MA2" 104+33.80, 17.44' RT
EX CONCRETE JUNCTION
STRUCTURE SEE CONNECTION
DETAIL SHEET D-7
- 4.9 INSTALL 8.62-LF 18" RCP
SEE PROFILE MA2 104+34 LATERAL 21
- 4.10 "MA2" 104+29.64, 25.00' RT
CONSTRUCT 5' TYPE "DM2" DROP INLET
PER USDOCA STD. DWG. 412.1 & 421
- 4.11 "MA2" 99+04.53, 12.25' RT
CONSTRUCT 48" TYPE II SDMH
PER USDOCA DWG. NO. 405.1

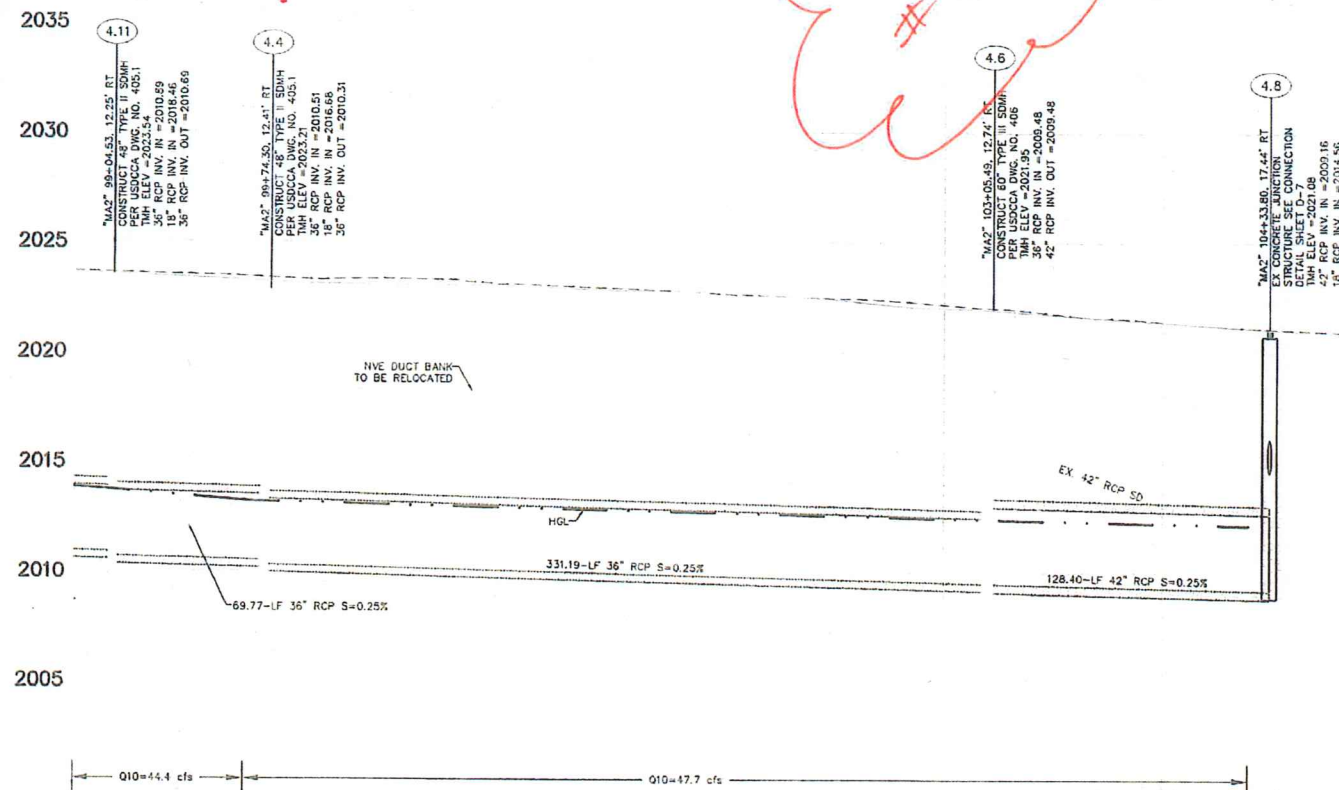
REMOVAL/MISC NOTES:

- 1 REMOVE EXISTING STORM DRAIN
- 2 REMOVE EXISTING DROP INLET
- 3 REMOVE EXISTING MANHOLE
- 4 ABANDON EXISTING STORM DRAIN
AND FILL WITH CEMENT SLURRY
- 5 BRICK AND MORTAR CAP EXISTING
STORM DRAIN PIPE
- 7 PROTECT IN PLACE

D.I.
Q₁₀ = 291 cfs

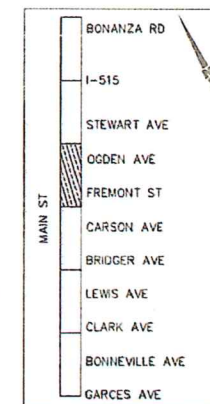
THIS D.I.
WAS moved
South Due To
CONDUIT CONFLICT.
moved to STA 103.05+00

RFI
#8

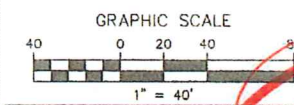


2035
2030
2025
2020
2015
2010
2005

APPROVED FOR CONSTRUCTION
LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES MANAGER
DATE: 06/18/2014
SHEETS: 116660



SHEET KEY MAP



Call before you Dig
1-702-227-2929
NV ENERGY ENVIRONMENT AND
SAFETY SERVICES DEPARTMENT

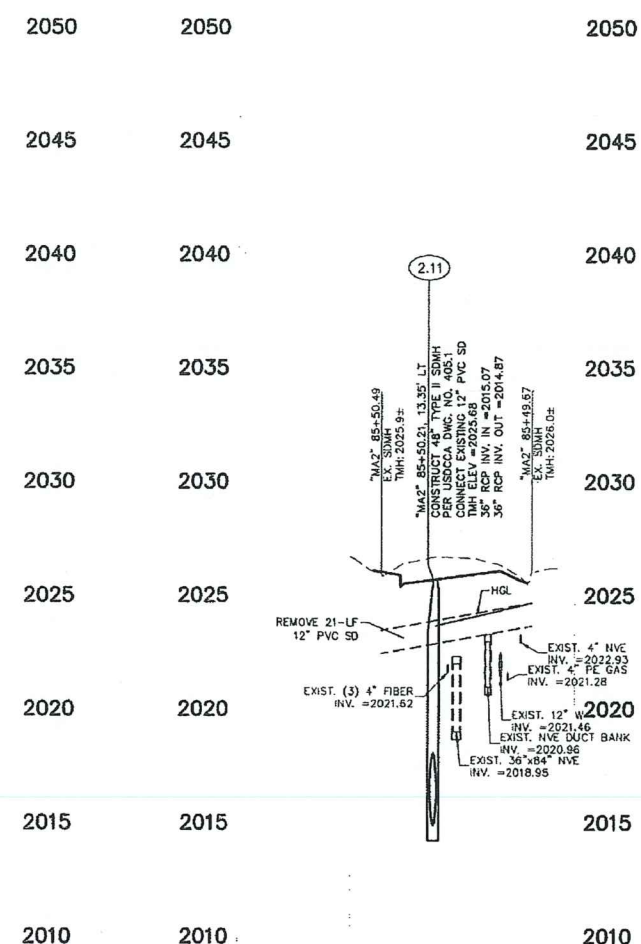
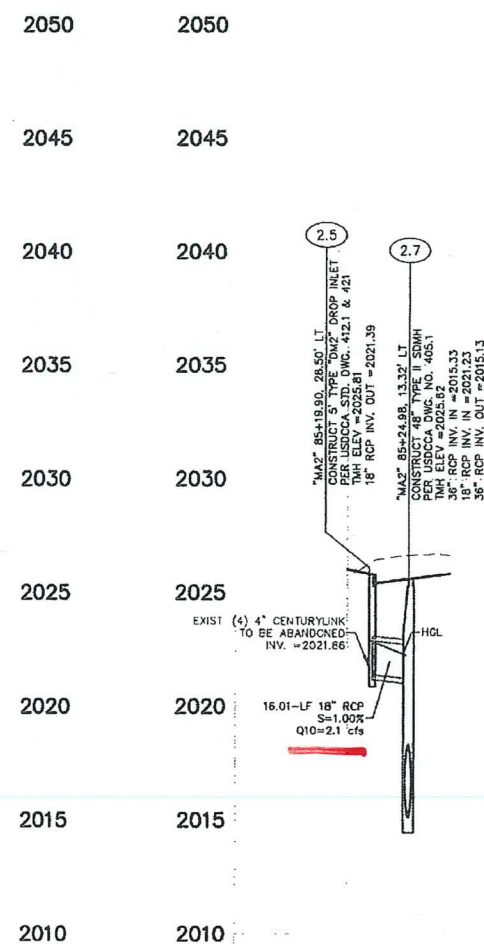
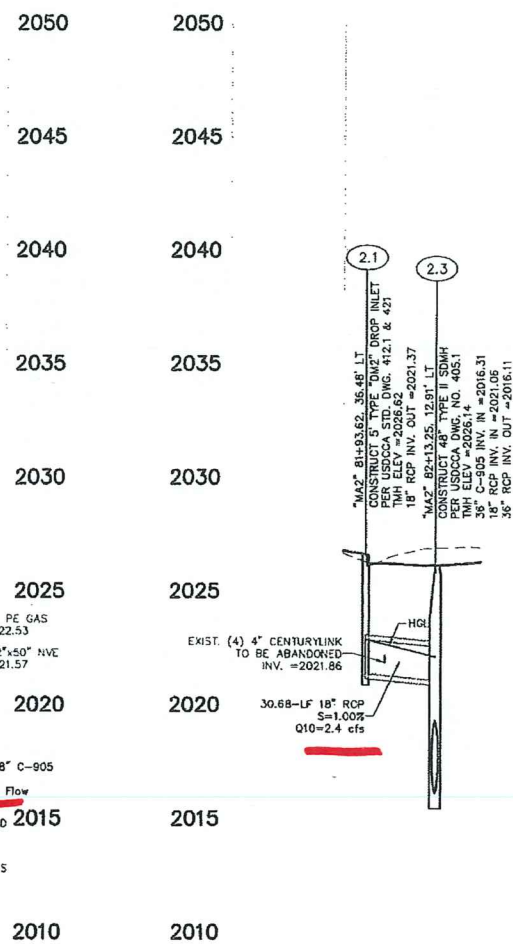
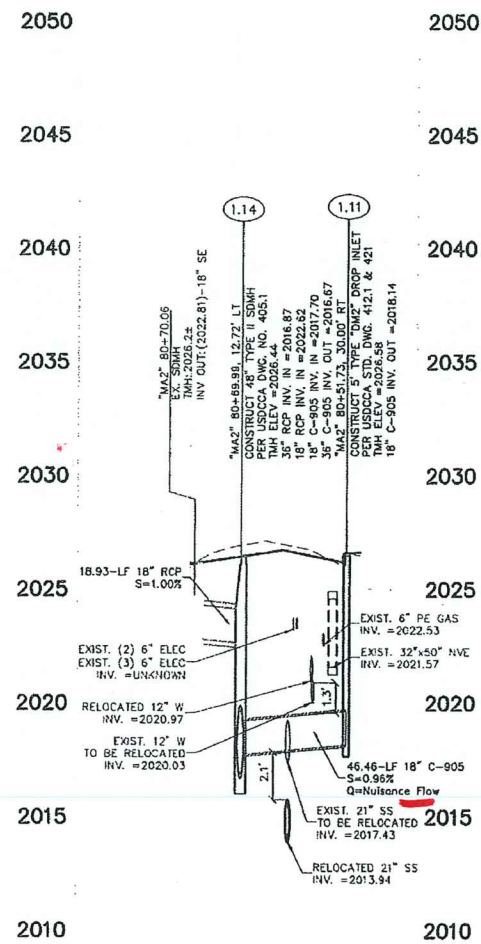
MAIN STREET PHASE 1 IMPROVEMENTS

DRAINAGE PLAN
"MA2" 99+00.00 TO "MA2" 108+00.00

DEPARTMENT OF PUBLIC WORKS
CAPITAL PROJECT MANAGEMENT

CITY ENGINEER: DAVID N. BOWERS, P.E., P.T.O.E.
PROGRAM MANAGER: MICHAEL STURDIVANT, P.E.
DESIGNED BY: L.L.
CHECKED BY: C.H.
DATE: JAN 2014
VETN

Sheet
D-4
50 of 115
DRAWING NO.
H# 47554



APPROVED FOR CONSTRUCTION

Don Hardy

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES MANAGER

DATE: 06/18/14 PROJECT# 116660

SHEETS:

AVOID OVERHEAD POWER LINE CONTACT
IT'S COSTLY

**Call
before you
Overhead**

1-702-227-2929
NV ENERGY ENVIRONMENT AND
SAFETY SERVICES DEPARTMENT

Call before you Dig
Avoid cutting underground
utility lines. It's costly.

**Call
811**

A circular professional engineer seal for the State of Nevada. The outer ring contains the text "PROFESSIONAL ENGINEER - STATE OF NEVADA" at the top and "No. 15987" at the bottom. The center of the seal contains the name "BRIAN TROY RUIZ", the expiration date "EXP. 12/31/15", and the discipline "CIVIL". There are handwritten initials "BR" in the upper right and "TDR" in the lower right of the seal.

Sheet
DP-1
54 of 115
DRAWING NO.
###-###

MAIN STREET PHASE 1 IMPROVEMENTS

DRAINAGE PROFILES LATERALS

DEPARTMENT OF PUBLIC WORKS

DEPARTMENT OF PUBLIC WORKS
CAPITAL PROJECT MANAGEMENT

CITY ENGINEER: DAVID N. BOWERS, P.E., P.T.O.E.
PROGRAM MANAGER: MICHAEL STODOLAN, P.E.

CITY ENGINEER: DAVID N. BOWERS, P.E., P.T.O.E.
PROGRAM MANAGER: MICHAEL STODOLANTZ, P.E.

PROGRAM MANAGER: MICHAEL SUKUTVANI, F.E.

SIGNED BY: LL
AWN BY: EM
ECKED BY: CH

**2727 SOUTH RAINBOW BOULEVARD
LAS VEGAS, NEVADA 89140-5148
PH. (702) 873-7550
FAX (702) 742-2407**

THE PROFILES

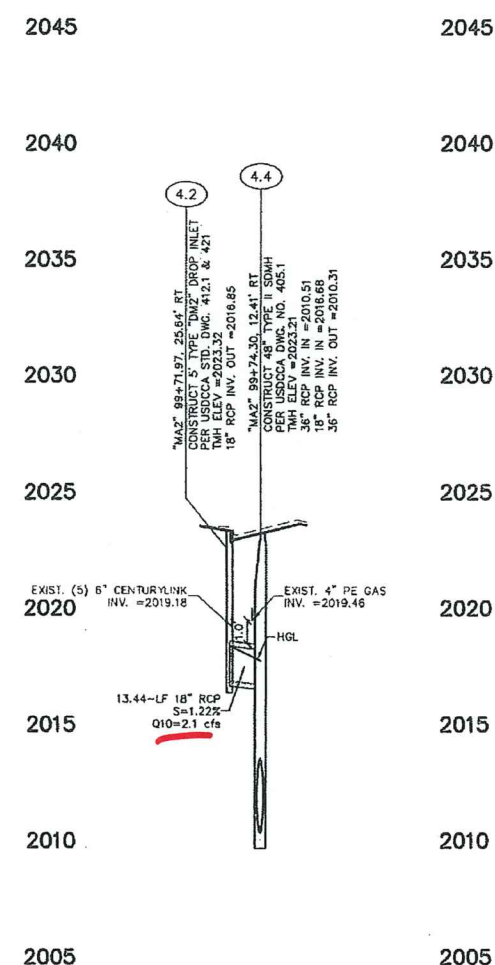
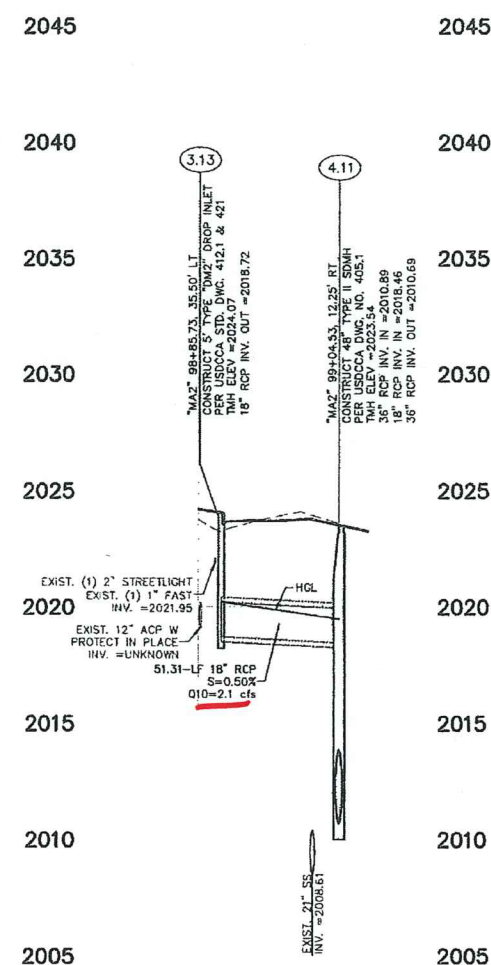
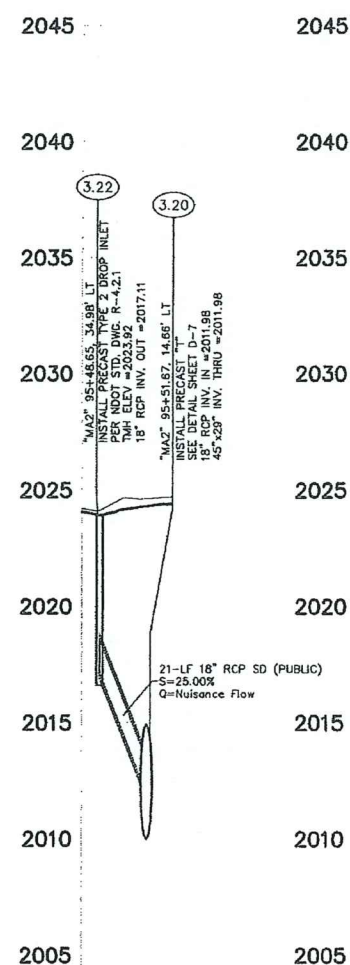
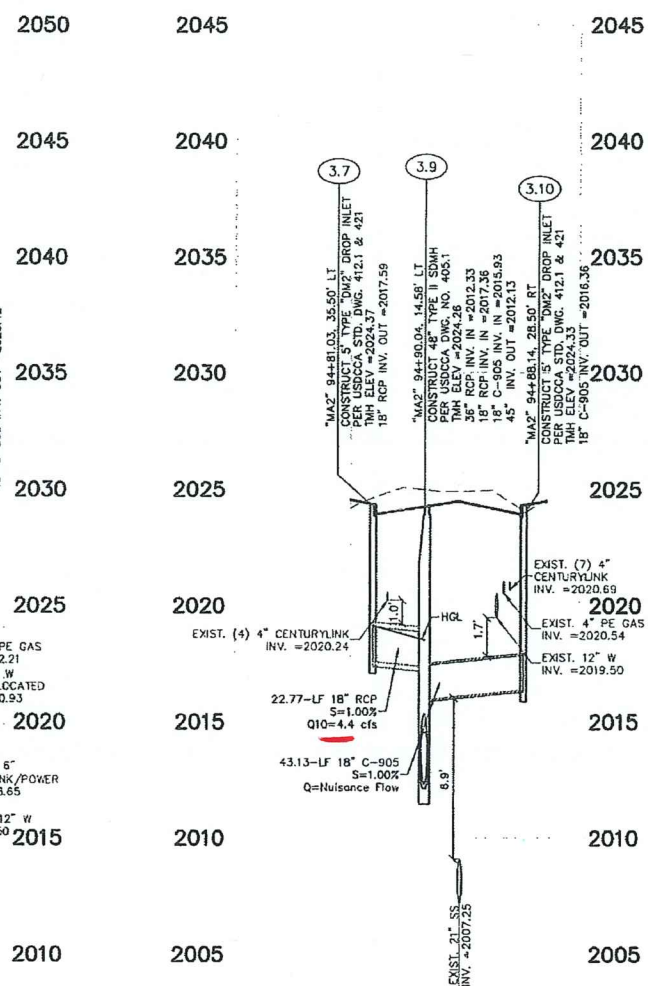
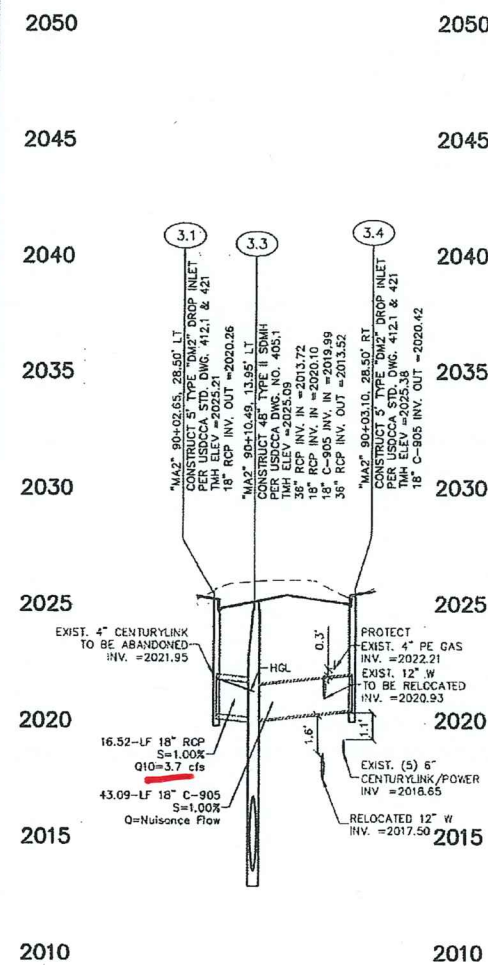
DRAINAGE LATTICE

1

STATE OF

6/9/04

115
NO.
##



H:\7318\Sheets\SEGMENT 2\SD-DP1-2.dwg 06/04/2014 13:47

APPROVED FOR CONSTRUCTION

Don Meade

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES MANAGER

DATE: 6/6/18/19 PROJECT# 116660

SHEETS:

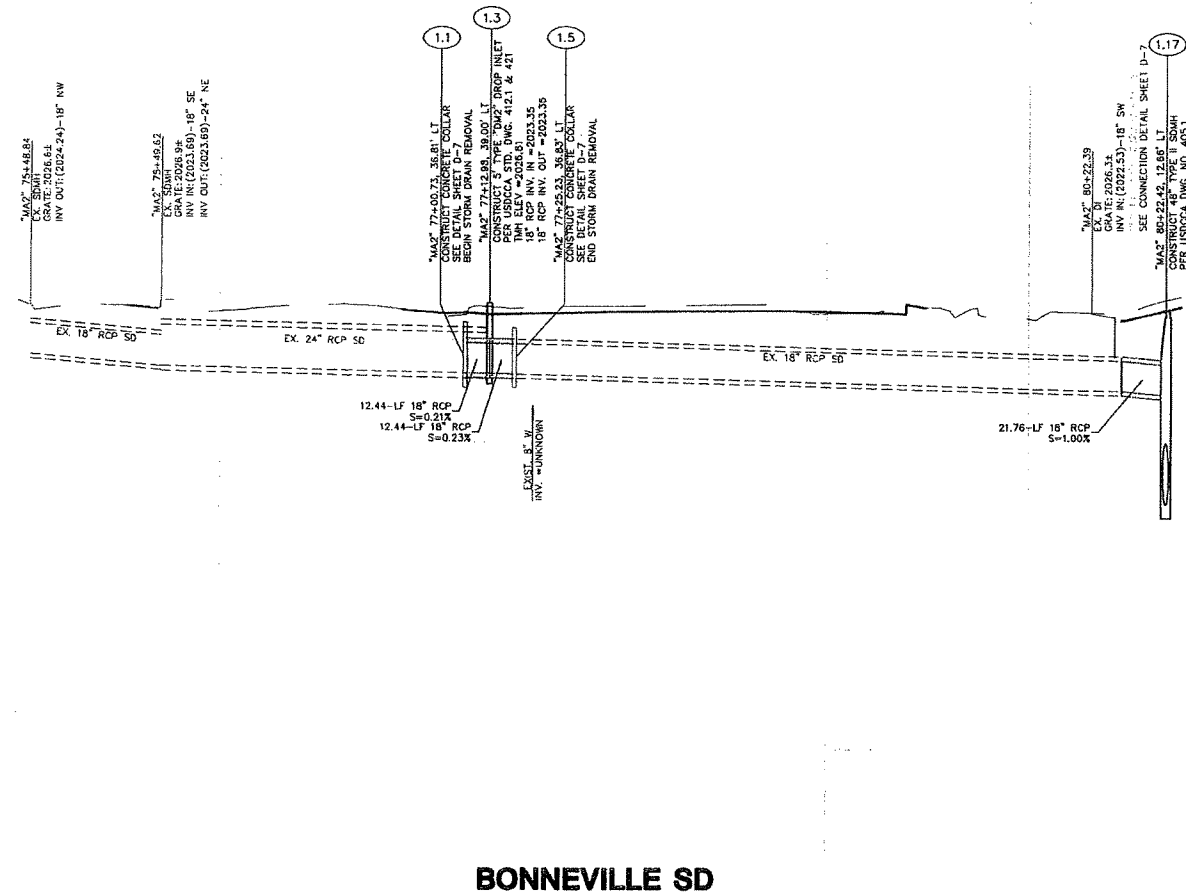
**AVOID OVERHEAD POWER LINE CONTACT
IT'S COSTLY**

**Call
before you
Overhead**

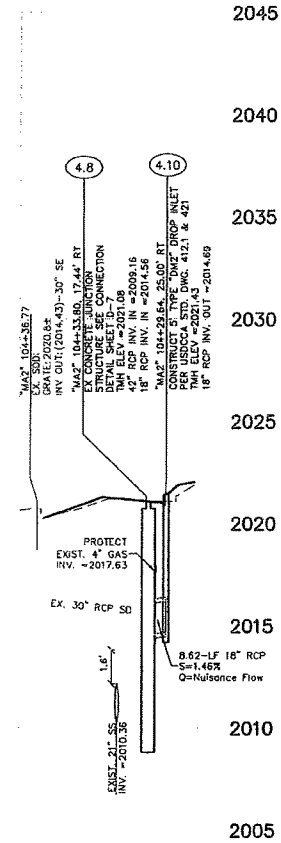
1-702-227-2929

**NV ENERGY ENVIRONMENT AND
SAFETY SERVICES DEPARTMENT**

[illegible]



Year	35th RCP INV. OUT. in 2016.99
2005	10
2010	25
2015	65
2020	85
2025	95
2030	100
2035	100
2040	100
2045	100



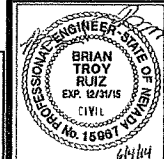
APPROVED FOR CONSTRUCTION

[Signature]

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES MANAGER

DATE: 6/18/14 PROJECT# 116660

SHEETS:



Sheet
DP-3
56 of 115
DRAWING NO.
###-###

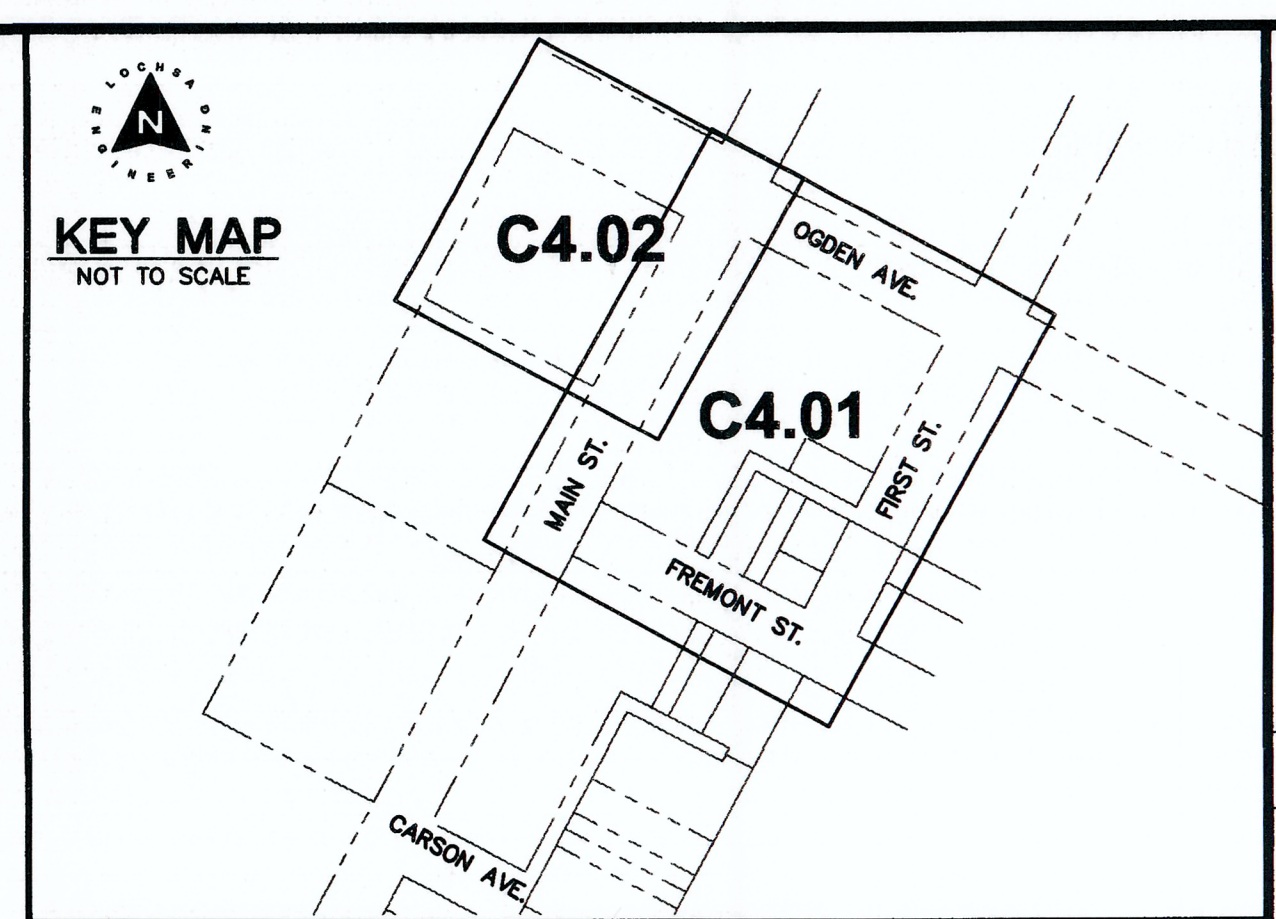
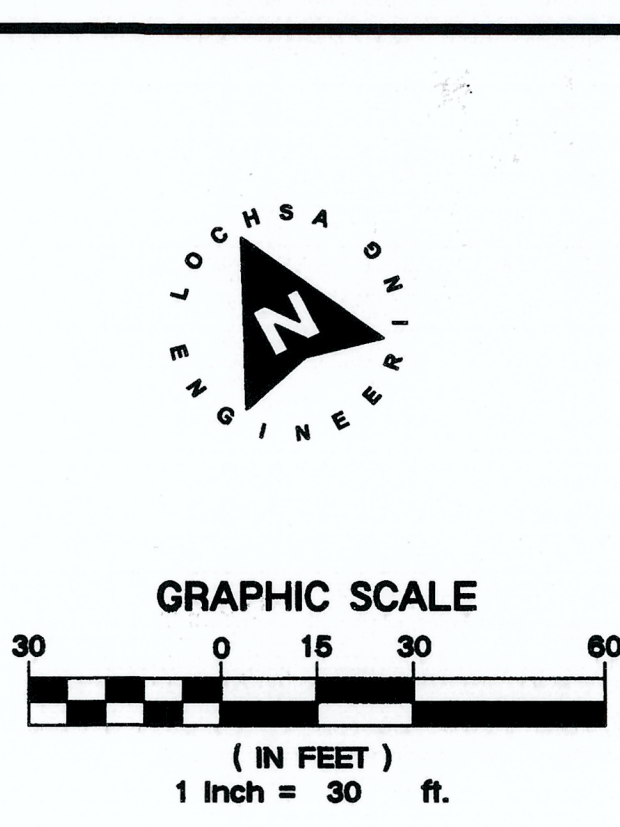
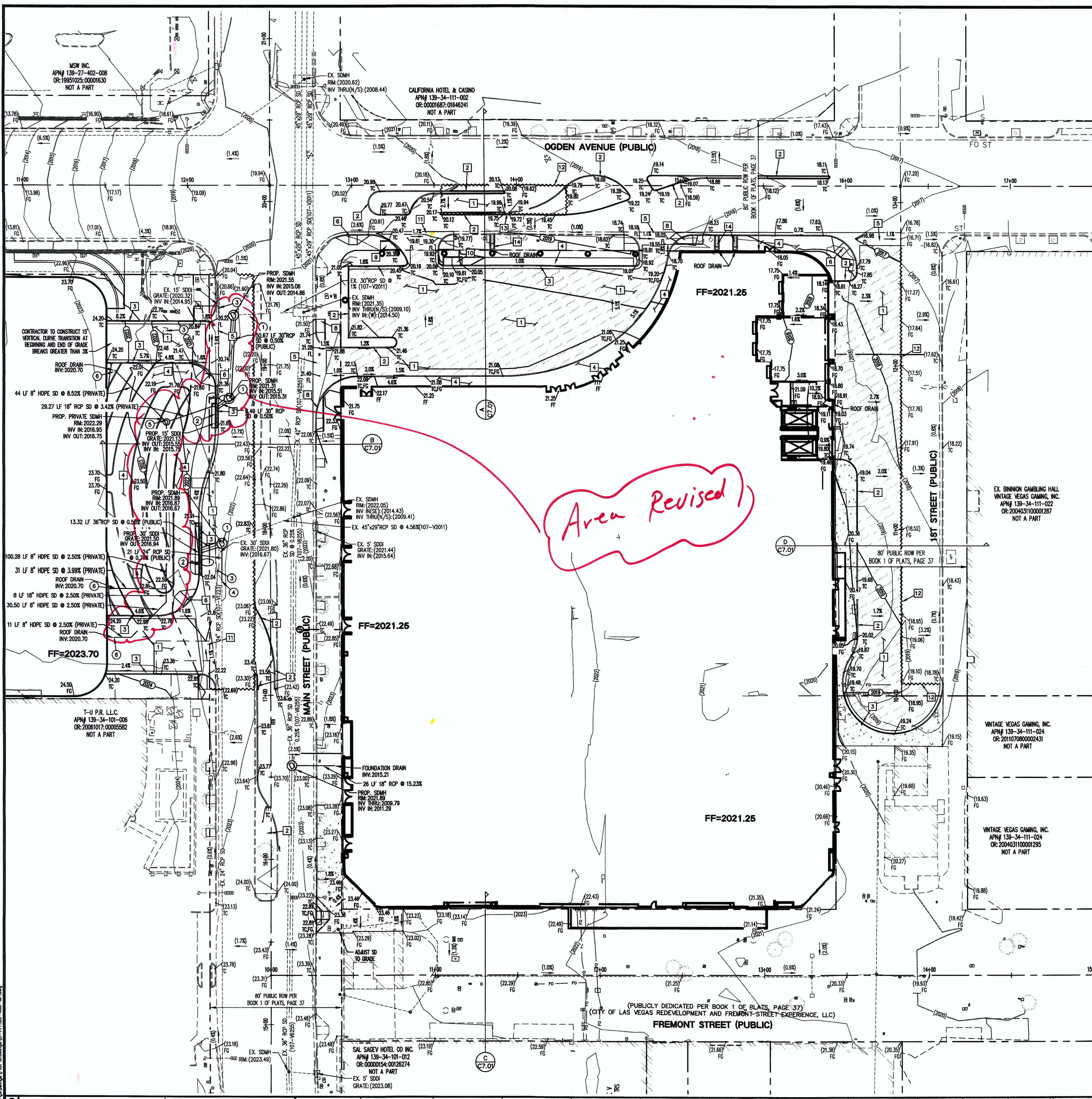
[illegible]


DEPARTMENT OF PUBLIC WORKS
CAPITAL PROJECT MANAGEMENT
 CITY ENGINEER: DAVID N. POWERS, P.E.
 PROGRAM MANAGER: MICHAEL STUBBART, P.E.
 DESIGNED BY: LL
 DRAWN BY: EM
 CHECKED BY: JN
 DATE: JAN 2014

 2727 SOUTH BARRROW BOULEVARD
 LAS VEGAS, NEVADA 89146-5148
 PHONE: (702) 522-2500
 FAX: (702) 522-2507
 WWW.VDM-INC.COM

TITLE: MAIN STREET PHASE 1 IMPROVEMENTS

SHEET: DRAINAGE PROFILES
LATERALS



STORM DRAIN CONSTRUCTION NOTES:

- NOT ALL NOTES USED ON THIS SHEET -
- 1. INSTALL 72" STORM DRAIN MANHOLE PER C.C.A.U.S.D. NO. 403 WITH CONCRETE COLLAR PER CCAUSD #408. REFER TO C.C.A.U.S.D. NO. 409 FOR MANHOLE COVER AND RING.
- 2. INSTALL MODIFIED TYPE "C" DROP INLET WITH GRATE PER CCAUSD #412.1. INSTALL STAMP PER CCAUSD #421
- 3. REMOVE EXISTING INLET.
- 4. CONTRACTOR TO CONNECT EXISTING 24" ROP TO NEW MANHOLE AT SAME SLOPE. CONTRACTOR TO FIELD VERIFY THE EXISTING INVERT AND REPORT ANY ISSUES TO ENGINEERING.
- 5. INSTALL 48" STORM DRAIN MANHOLE PER C.C.A.U.S.D. NO. 403 WITH CONCRETE COLLAR PER CCAUSD #408. REFER TO C.C.A.U.S.D. NO. 409 FOR MANHOLE COVER AND RING.
- 6. CAP ROOF DRAIN. SEE PLUMBING PLANS FOR CONTINUATION.
- 7. EX. SIDEWALK UNDER DRAIN TO BE REMOVED SIDEWALK TO BE REMOVED BETWEEN JOINTS AND REPLACED.

CONSTRUCTION NOTES:

- 1. ALL CONSTRUCTION TO BE DONE IN ACCORDANCE WITH "CLARK COUNTY AREA STANDARD DRAWINGS (C.C.A.U.S.D.)" LATEST EDITION AND/OR REGULATING ENTITY HAVING JURISDICTION.
- 2. NOT ALL NOTES USED ON THIS SHEET -
- 3. CONSTRUCT AC PAVEMENT PER DETAIL 2 ON C7.01.
- 4. CONSTRUCT "A" TYPE CURB PER DETAIL 1 ON C7.01.
- 5. CONSTRUCT "L" TYPE CURB PER CCAUSD No. 216.
- 6. CONSTRUCT CONC. SIDEWALK PER CCAUSD No. 234. REFER TO ARCH. PLANS FOR FINISHING SPECIFICATIONS.
- 7. CONSTRUCT CROSS GUTTER PER CCAUSD No. 228.
- 8. CONSTRUCT CASE II SIDEWALK RAMP PER CCAUSD No. 235.
- 9. CONSTRUCT CASE I SIDEWALK RAMP PER CCAUSD No. 235.
- 10. CONSTRUCT SIDEWALK RAMP PER DETAIL 5 ON C7.01.
- 11. CONSTRUCT SIDEWALK RAMP PER DETAIL 3 ON C7.01.
- 12. CONSTRUCT SIDEWALK RAMP PER DETAIL 4 ON C7.01.
- 13. CONSTRUCT COMMERCIAL DRIVEWAY PER CCAUSD No. 222.1 WITH CROSS GUTTER PER CCAUSD No. 228.
- 14. SAWCUT AND MATCH EXISTING.
- 15. CONSTRUCT 2" "U" CHANNEL PER DETAIL 6 ON C7.01.
- 16. INSTALL SIDEWALK DRAIN PER CCAUSD No. 236. WITH 2" GRATE FOR ROOF DRAIN. PER DETAIL X ON X

CUT	FILL
5284 CY	480 CY

NOTE: CUT/FILL QUANTITIES ARE TO FINISHED GRADE & DO NOT INCLUDE MATERIAL THICKNESS, FOOTINGS, ETC.

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: 32003C2107. EFFECTIVE DATE: NOVEMBER 16, 2011. THE SITE FALLS WITHIN ZONE "X", DESCRIBED BY FEMA AS: AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN.

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/MATERIAL, UNLESS OTHERWISE SPECIFIED BY 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 SHOULD BE INCLUDED IN 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 NOT BE RESPONSIBLE FOR ANY "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. REFER TO THE REPORT PREPARED BY XXXX, PROJECT No. XXXX.

GRADING PLAN CERTIFICATION

NAME: GUY M. MORRIS PE # 14526 DATE: 09/27/18

CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT.

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.

SAFETY ALERT

Call Before You Dig

Call Before You Overhead

Call Before You UnderGround

A.P.N.:
139-34-113-001 & 139-34-112-001

BASIS OF BEARINGS:
BASIS OF BEARINGS FOR THIS SURVEY IS THE CENTERLINE OF OGDEN AVENUE BETWEEN MAIN STREET AND FIRST STREET, AS SHOWN ON FILE 67, PAGE 79 OF SURVEYS. SAID LINE BEARS: S62°04'36"E

BENCHMARK:
BENCHMARK BLV0134NNW BEING A RIVET & PLATE TOP CURB NE CORNER MAIN ST. & FREMONT ST. ELEVATION=2023.19 FEET (616.689 METERS)

CL OR SURVEY LINE	EASEMENT LINE	DESCRIPTION:	CONTOUR LINES	EDGE OF PAVEMENT	"A" TYPE CURBS	"L" TYPE CURBS	WALLS	FENCES	AC PAVEMENT	CONCRETE	SPOT ELEVATIONS	SIGNS	MANHOLE W/ DESCRIPTION	MANHOLE DESCRIPTIONS	FIRE HYDRANTS	GATE VALVES	REDUCERS	CLEAN OUTS	UTILITY BOX OR VAULT	BACKWATER VALVES	100W HPS STREETLIGHTS	150W HPS STREETLIGHTS	200W HPS STREETLIGHTS	250W HPS STREETLIGHTS
CL OR SURVEY LINE	EASEMENT LINE	EXISTING:	(2210)								(12.34)													
PROPERTY LINE	SAWCUT LINE	PROPOSED:	(2122)								(12.34)													
ROW LINE	SCARP LINE																							

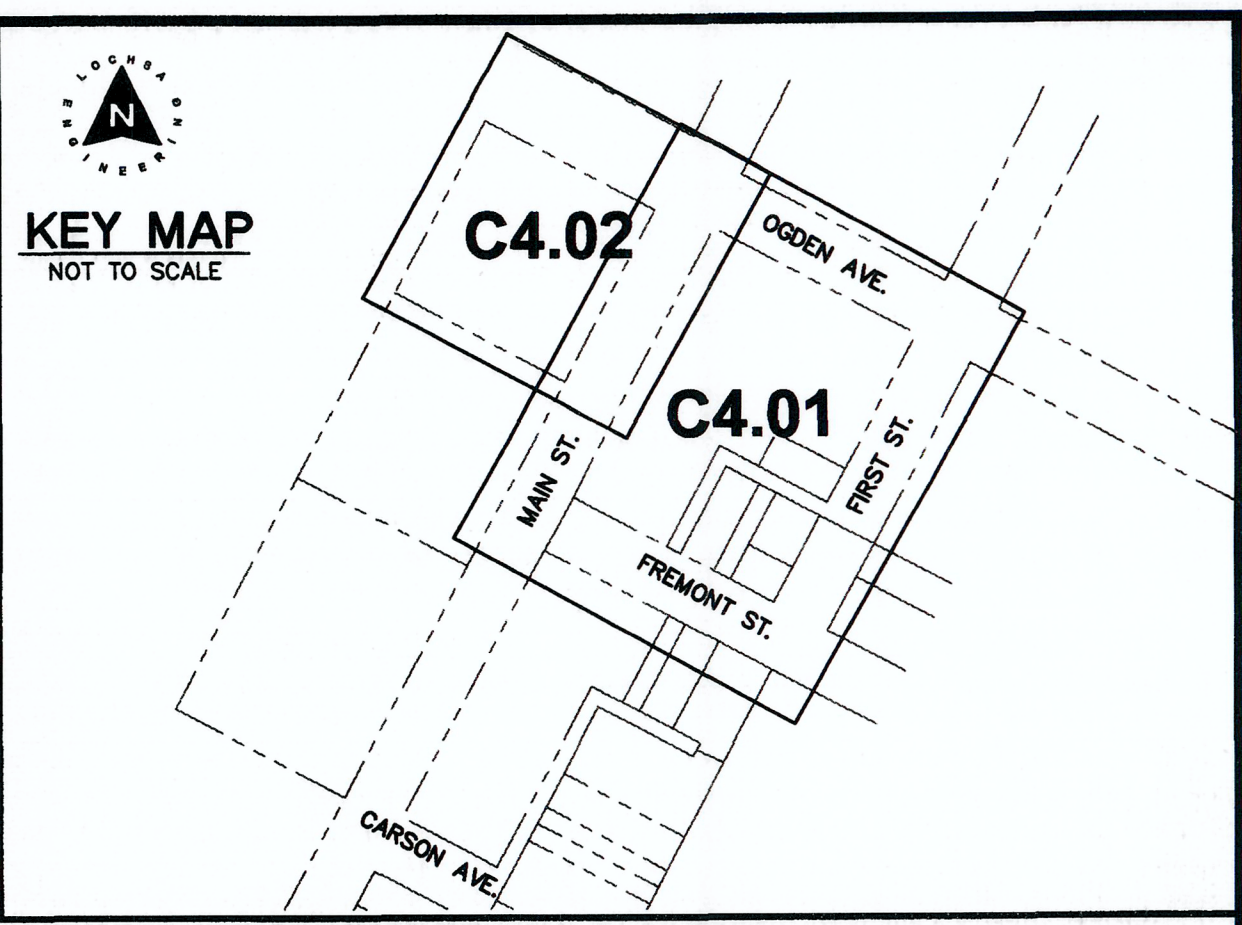
Lochsa Engineering

18 FREMONT STREET
HOTEL AND CASINO
CITY OF LAS VEGAS

PROJECT No.: 171126
DATE: 09/27/18
SCALE: 1"=30'
DRAWN BY: NMG
DESIGNED BY: NMG
CHECKED BY: GMM

Professional Engineer Seal:
GUY M. MORRIS
PE # 14526
EXP. 12-31-19

Sheet Information:
SHEET No. 11 of 17
CLV No.



CONSTRUCTION NOTES:

1. ALL CONSTRUCTION TO BE DONE IN ACCORDANCE WITH "CLARK COUNTY AREA UNIFORM STANDARD DRAWINGS (C.C.A.U.S.D.)" LATEST EDITION AND/OR REGULATING ENTITY HAVING JURISDICTION.
2. NOT ALL NOTES COVERED ON THIS SHEET --
3. 1) CONSTRUCT C&P PAVEMENT PER DETAIL 2 ON C7.01.
4. 2) CONSTRUCT "A" TYPE CURB PER DETAIL 1 ON C7.01.
5. 3) CONSTRUCT "L" TYPE CURB PER CAUSAD NO. 216.
6. 4) CONSTRUCT CONC. SIDEWALK PER CCAUSD NO. 234. REFER TO ARCH. PLANS FOR FINISHING SPECIFICATIONS.
7. 5) CONSTRUCT CROSS GUTTER PER CCAUSD NO. 228.
8. 6) CONSTRUCT CASE 2 SIDEWALK RAMP PER CCAUSD NO. 235.
9. 7) CONSTRUCT CASE 1 SIDEWALK RAMP PER CCAUSD NO. 235.
10. 8) CONSTRUCT SIDEWALK RAMP PER DETAIL 5 ON C7.01.
11. 9) CONSTRUCT SIDEWALK RAMP PER DETAIL 3 ON C7.01.
12. 10) CONSTRUCT SIDEWALK RAMP PER DETAIL 4 ON C7.01.
13. 11) CONSTRUCT COMMERCIAL DRIVEWAY PER CCAUSD NO. 222.
14. 12) WITH CROSS GUTTER PER CCAUSD NO. 228.
15. 13) SAWCUT AND MATCH EXISTING.
16. 14) CONSTRUCT 2' "U" CHANNEL PER DETAIL 6 ON C7.01.
17. 15) INSTALL SIDEWALK DRAIN PER CCAUSD NO. 236. WITH 2' GRATE FOR ROOF DRAIN. PER DETAIL X ON X.

CUT	FILL
5254 CY	450 CY

NOTE: CUT/FILL QUANTITIES ARE TO FINISHED GRADE & DO NOT INCLUDE MATERIAL THICKNESS'S, FOOTINGS, ETC.

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

THE PROJECT SITE IS COVERED BY THE FLOOD INSURANCE RATE MAP (FIRM) FOR THE CLARK COUNTY AND INCORPORATED AREAS, NEVADA, COMMUNITY PANEL NUMBER: 32003C2170F, EFFECTIVE DATE: NOVEMBER 16, 2011. THE SITE FALLS WITHIN ZONE 'X', DESCRIBED BY FEMA AS: AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN.

3. CONTRACTOR SHALL DETERMINE HIS OWN FOOTING OR BASEMENT EXCAVATION QUANTITIES. THE CONTRACTOR SHALL ALLOW FOR ROUGH GRADING. ADDITIONALLY, STRUCTURE BACKFILL COSTS SHOULD BE INCLUDED IN THE COST OF THE STRUCTURE, UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS.
3. CONTRACTOR SHALL NOTIFY LOOCHA ENGINEERING WITHIN 24 HOURS OF OMISSIONS AND ERRORS DISCOVERED ON PLANS. LOOCHA ENGINEERING WILL NOT BE RESPONSIBLE FOR ANY CORRECTIVE WORK DONE BY OTHERS.
4. CONTRACTOR TO ENSURE POSITIVE DRAINAGE. NO PONDING OR UNCONTROLLED DRAINAGE. ALL DRAINAGE RECOMMENDATIONS IS OBTAINED IN THE PROJECT GEOTECHNICAL REPORT, INCLUDING BUT NOT LIMITED TO EXCAVATION, GRADING AND COMPACTION. REFER TO THE REPORT PREPARED BY XXXXX PROJECT NO. XXXX.

NAME: GUY M. MORRIS PE # 14526 DATE

CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT.

NOTE:

LOCASIA 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 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.

SAFETY ALERT



Call before you dig!
Avoid hitting underground utility lines. It's costly.

NE

Call
Before You
Overhead

UNDERSTANDING TRAFFIC
SIGNALS AND STREET
LIGHT SYSTEMS COMBATS
IT'S COSTLY.

Call
before you
UnderGround

1-702-432-5300

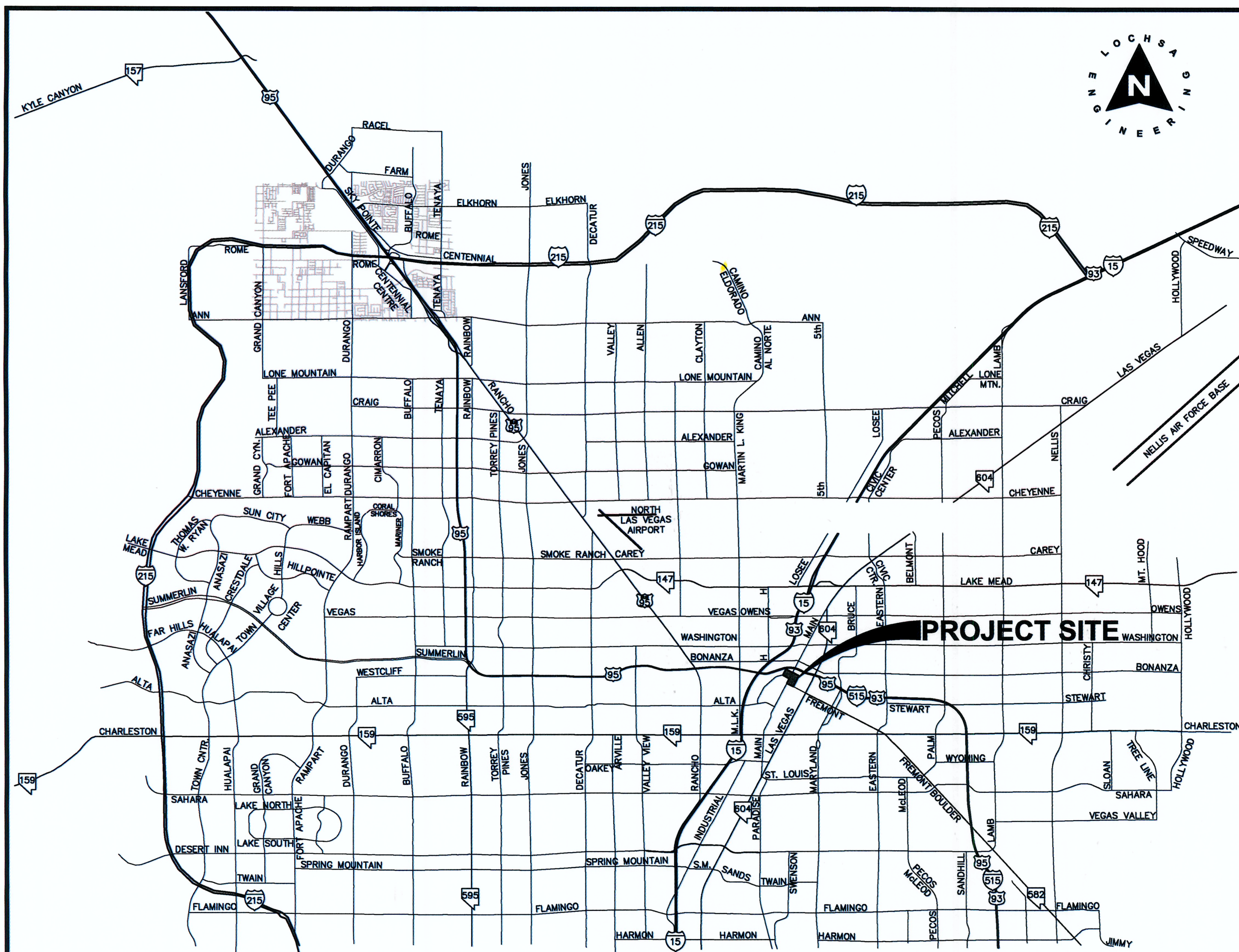
Call
811

or

1-702-227-2929 FREIGHT AND AIRFAIR SYSTEM OF TRANSPORTATION 1-800-227-2600

BACKWATER VALVES	100w HPS STREETLIGHTS	150w HPS STREETLIGHTS	200w HPS STREETLIGHTS	250w HPS STREETLIGHTS
				

(BWV)	(BWV)	(BWV)	(BWV)	(BWV)
(BWV)				



IMPROVEMENT PLANS FOR 18 FREMONT STREET HOTEL AND CASINO CITY OF LAS VEGAS

REV #	REVISION DESCRIPTION	SHEETS	APPD BY	DATE APPD
1	REVISED UTILITY LAYOUTS TO ADDRESS CONFLICTS IN THE FIELD	C5.01, C5.02, C6.01		
2	ADDED NV ENERGY AND SWG PLANS TO SET	C1.01		
3	ADDED PEDESTRIAN BRIDGE TO PLANS AND DETAILS. REVISED SDMH INV.	C3.01, C3.02, C4.01, C4.02, C5.01, C5.02, C6.01, C7.01		
4	REVISED SS AND SD POINTS OF CONNECTION	C5.01, C5.02, C6.01		
5	REVISED SD LAYOUT AND CONNECTION FOR FIELD CONFLICT	C4.01, C4.02 C5.01, C5.02		

ABBREVIATIONS			
ABAN	ABANDON	INV	INVERT
AIP	ABANDON IN PLACE	ISL	ISLAND
AGG	AGGREGATE	JB	JUNCTION BOX
ALT	ALTERNATE	JLOC	JUNCTION OF CURB
A	ANODE, GAS	LT	LEFT
AS	ASBESTOS CEMENT PIPE	LF	LINEAR FEET
ACP	ASPHALTIC CONCRETE	LARC	LARGE CARPARK
AVE	AVENUE	LVWD	LAS VEGAS VALLEY WATER DISTRICT
BC	BACK OF CURB	MH	MANHOLE
BCR	BACK OF CURB RADIUS	MAX	MAXIMUM
BVC	BEGINNING OF VERTICAL CURVE	MIN	MINIMUM
BM	BENCHMARK	MON	MONOLITHIC
BDRY LINE	BOUNDARY LINE	N/O	NORTH OF
CATV	CABLE TELEVISION	NOT	NOT TO SCALE
C-C	CENTERLINE	OC	ON CENTER
CBC	CITY OF BOULDER CITY	OG	OPEN-GRADED PAVEMENT, ORIGINAL GROUND
CLV	CITY OF LAS VEGAS	PINT	POINT OF INTERSECTION
COH	CITY OF HENDERSON	PI	POINT OF REVERSE CURVE
CM	CITY OF MESQUITE	PC	POINT OF CURVE
CNLV	CITY OF NORTH LAS VEGAS	PT	POINT OF TANGENCY
CC	CLARK COUNTY	PCC	POINT OF COMPOUND CURVE
CCSD	CLARK COUNTY SANITATION DISTRICT	PPC	PORTLAND CEMENT CONCRETE
CC	CLEAN OUT, SEWER	PP	POWER POLE
COMM	COMMERCIAL	P	POWER
CONC, PCC	CONCRETE	PL	PROPERTY LINE
CONST	CONSTRUCTION OR CONSTRUCT	PROP	PROPOSED
COR	CORNER	PB	PULL BOX
CMP	CORRUGATED METAL PIPE	RP	RADIUS POINT
CSAP	CORRUGATED STEEL ARCH PIPE	R	RADIUS
C&G	CORRUGATED STEEL PIPE	RR	RAILROAD
C&G	CURB & GUTTER	REINF	REINFORCED
CIP	CAST IRON PIPE	RC	REINFORCED CONCRETE
COLLUM	COLUMN	ROB	REINFORCED CONCRETE BOX
CU YD, Y	CUBIC YARD	ROC	REINFORCED CONCRETE PIPE
CU FT, CF	CUBIC FOOT	RELOC	RELOCATE
CU YD, Y	CUBIC YARD	RT	RIGHT
DEPT	DEPARTMENT	R/W	RIGHT-OF-WAY
DIA	DIAMETER	RD	ROAD
DWY	DRIVEWAY	S&S	SANITARY SEWER
DI	DROP INLET	SHT	SHEET
ESMT	EASEMENT	S/O	SOUTH OF
E/O	EAST OF	SW	SIDEWALK
E	EDGE OF PAVEMENT	SQ FT, SF	SQUARE FOOT
EM	EDGE OF OIL	SQ YD, SF	SQUARE YARD
E	ELECTRIC	STA	STATION
EM	ELECTRIC METER	SHIP	STEEL HIGH-PRESSURE PIPE
ELEV	ELEVATION	SD	STORM DRAIN
ELV	EMBANKMENT	STD	STANDARD
END	END OF CURB RETURN	STRUC	STRUCTURAL OR STRUCTURE
EC	END OF CURVE	SURV	SURVEY
EBPS	CATHODE PROTECTION BOND STATION	STRT	STREETLIGHT
ETS	CATHODE PROTECTION TEST STATION	TELE	TELEPHONE
END	END OF VERTICAL CURVE	TEMP	TEMPORARY
EXIST	EXISTING	TBA	TO BE ADJUSTED
EXV	EXISTING	TOP	TOP OF CURB
FG	FINISH GRADE	TOP	TOP OF PIPE
FA	FIRE ALARM	TS	TRAFFIC SIGNAL
FI	FIRE HYDRANT	TSI	TRAFFIC SIGNAL INTERCONNECT
FL	FLOW LINE	TRANS	TRANSITION
GALV	GALVANIZED	TYP	TYPICAL
GAS	GAS METER	UG	UNDERGROUND
GR	GAS PRESSURE REGULATOR	VAR	VARIABLE
PL-G	PLASTIC GAS	VERT	VERTICAL
SG	STEEL GAS	VC	VERTICAL CURVE
GB	GRADE BREAK	VG	VARIABLE GUTTER
GUT	GUTTER	VGP	VITRIFIED CLAY PIPE
HDWL	HEADWALL	W	WATER
IN	INCH	WM	WATER METER
INT	INTERSECTION	W/O	WEST OF
		Y	YARD

DEVELOPER	
18 FREMONT STREET AQUISIION LLC 1 FREMONT ST. LAS VEGAS, NV 89101 CONTACT: SUSAN HITCH PHONE: 702-777-6912	
OWNER	
18 FREMONT STREET ACQUISITIONS, LLC 1 FREMONT STREET LAS VEGAS, NV 89101	
UTILITY PROVIDERS	
WATER:	 LAS VEGAS VALLEY WATER DISTRICT
SEWER:	CITY OF LAS VEGAS
GAS:	 SOUTHWEST GAS CORPORATION
ELECTRIC:	 NV ENERGY
TELEPHONE:	CENTURYLINK
CABLE TV:	 COX COMMUNICATIONS LAS VEGAS, INC
TRASH:	 REPUBLIC SILVER STATE DISPOSAL SERVICE

APPROVALS	
ALLEN PAVELKA, PE., #9029 CITY ENGINEER	DATE
APPROVAL OF THESE PLANS IS LIMITED TO THOSE IMPROVEMENTS CONSTRUCTED IN THE DEDICATED RIGHT-OF-WAY AND/OR DEDICATED EASEMENTS. THIS APPROVAL DOES NOT AUTHORIZE THE CONSTRUCTION OF ANY IMPROVEMENTS THAT DEVIATE FROM ADOPTED STANDARDS AND/OR SPECIFICATIONS, EXCEPT THOSE SPECIFICALLY LISTED UNDER DEVIATIONS FROM STANDARD. THE ENGINEER SHALL RESOLVE ANY DEVIATION OTHER THAN THOSE LISTED IN DEVIATIONS FROM STANDARDS IN FAVOR OF THE UNIFORM STANDARDS DRAWINGS AND SPECIFICATIONS CLARK COUNTY AREA, NEVADA.	
CITY OF LAS VEGAS DEPARTMENT OF PLANNING	DATE
NOTE: THIS PLAN CONFORMS TO THE APPLICABLE STANDARDS OF THE PLANNING DEPARTMENT.	
LAS VEGAS FIRE AND RESCUE	DATE
PREVIOUSLY SIGNED 5-6-19	
LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES PROJECT No. <u>135386</u> FIRST APPROVED DATE: _____ SHEETS: C1.01, C1.02, C5.01, C5.02, C6.01, C7.01	DATE
PREVIOUSLY SIGNED 4-22-19	
SOUTHWEST GAS CORPORATION	DATE
PREVIOUSLY SIGNED 4-10-19	
NV ENERGY	DATE
NV ENERGY ACKNOWLEDGES THAT WE HAVE RECEIVED YOUR PLANS AND WILL PROVIDE SERVICE TO ALL ELECTRICAL NEEDS ASSOCIATED WITH THIS PROJECT. NV ENERGY RESERVES THE RIGHT TO ADDRESS ANY EXISTING OR FUTURE CONFLICTS UNTIL THE FINAL DESIGN IS COMPLETED. THE NEW SERVICE AND THE RESOLUTION OF ANY CONFLICTS WILL BE ACCOMPLISHED PURSUANT TO THE NEVADA PUBLIC UTILITY COMMISSION'S RULES AND REGULATIONS.	
PREVIOUSLY SIGNED 4-16-19	
COX COMMUNICATIONS LAS VEGAS, INC.	DATE
PREVIOUSLY SIGNED 4-12-19	
CENTRAL TELEPHONE COMPANY D.B.A. CENTURYLINK	DATE
THE AFFIXED CENTURYLINK APPROVAL DOES NOT ASSUME OR GUARANTEE LIABILITY FOR KNOWN OR UNKNOWN CONFLICTS WITH EXISTING OR PROPOSED IMPROVEMENTS. RESOLUTION OF ANY CONFLICT WILL BE ACCOMPLISHED PURSUANT TO LOCAL	

DWG # Sheet # Sheet Title			Plan and Profile	
General			15	C6.01 MAIN STREET
1	C1.01	COVER SHEET	Detail Sheets	
2	C1.02	NOTES SHEET	16	C7.01 DETAIL SHEET
Demolition Plans			Landscape Plans	
			L0.00 ~ L3.07	
	C2.01	SHEET 1 OF 2	NV ENERGY PLANS SHEET 1 OF 7 SHEET 2 OF 7 SHEET 3 OF 7 SHEET 4 OF 7 SHEET 5 OF 7 SHEET 6 OF 7 SHEET 7 OF 7	
4	C2.02	SHEET 2 OF 2		
Horizontal Control Plans				
5	C3.01	SHEET 1 OF 2		
6	C3.02	SHEET 2 OF 2		
Traffic Control Plans			SWG PLANS SHEET 1 OF 5 SHEET 2 OF 5 SHEET 3 OF 5 SHEET 4 OF 5 SHEET 5 OF 5	
7	C3.03	TRAFFIC CONTROL PLAN		
9	C3.04	TRAFFIC SIGNAL PLAN		
Grading Plans				
10	C4.00	OVERALL SITE GRADING		
11	C4.01	SHEET 1 OF 2	UTILITY PLANS SHEET 1 OF 5 SHEET 2 OF 5 SHEET 3 OF 5 SHEET 4 OF 5 SHEET 5 OF 5	
12	C4.02	SHEET 2 OF 2		
Utility Plans				
13	C5.01	SHEET 1 OF 2		
14	C5.02	SHEET 2 OF 2		

GENERAL SITE INFORMATION

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.

A.P.N.:

139-34-115-001 & 139-34-112-001

BASIS OF BEARINGS:

BASIS OF BEARINGS FOR THIS SURVEY IS THE CENTERLINE OF OGDEN AVENUE BETWEEN MAIN STREET AND FIRST STREET, AS SHOWN ON FILE 67, PAGE 79 OF SURVEYS. SAID LINE BEARS: S62°04'38"E

BENCHMARK:

BENCHMARK BLV0134NNW BEING A RIVET & PLATE TOP

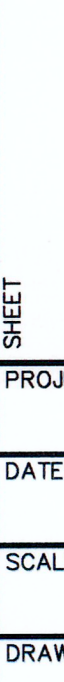
SAFETY ALERT

AHEAD METERS
DOWN AND TO
LEFT BEFORE
YOU GO ANY
DEEPER

Call before you
Underground

Call before you
Underground

1-702-432-5300

		8346 South Jones Blvd. Las Vegas, NV 89118 Phone (703) 385-0312 Fax (703) 385-0317 www.lochsa.com	
GENERAL COVER SHEET		18 FREMONT STREET HOTEL AND CASINO CITY OF LAS VEGAS	
PROJECT No.: 171126		TITLE	
DATE: 08/13/20		SCALE: N/A	
DRAWN BY: NMG		DESIGNED BY: NMG	
CHECKED BY: GMM		SEAL	
		SHEET No. C1.01 SHEET 1 of 15 CLY No. 1077521 L18-02490	

CITY OF LAS VEGAS STREETLIGHT NOTES

1. ALL STREET LIGHTING INSTALLATIONS SHALL BE IN ACCORDANCE WITH THE STREET LIGHTING PLANS, THE "UNIFORM STANDARD SPECIFICATION FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA", LATEST REVISION (USS), AND THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA" (USD), LATEST REVISION.
2. NO DEVIATION OF STREET LIGHT, PULL BOX, CONDUITS, ETC., LOCATIONS SHALL BE PERMITTED WITHOUT WRITTEN APPROVAL OF THE TRAFFIC AND CITY ENGINEER, ANY DEVIATION FROM THE PLAN LOCATION WILL REQUIRE COMPLIANCE WITH SECTION 623 OF THE USS.
3. ALL EXISTING STREET LIGHTING SHALL REMAIN OPERATIONAL DURING CONSTRUCTION IN ACCORDANCE WITH SECTION 623 G.03.01 OF THE USS.
4. ALL EMPTY CONDUIT SHALL HAVE AT LEAST ONE GREEN NO. #8 AWG WIRE INSTALLED AS TRACER WIRE IN ACCORDANCE WITH SECTION 623 G.02.01 OF THE USS PRIOR TO BACKFILLING AND FINAL INSPECTION.
5. ANY STRUCTURE SUCH AS BLOCK WALLS, CHAIN LINK FENCES, RETAINING WALLS, ETC., SHALL LEAVE A MINIMUM CLEARANCE IN COMPLIANCE WITH USD 320A WHEN POLE IS INSTALLED BEHIND SIDEWALK, AND SHALL AT NO TIME COMPLETELY ENCLOSE THE STREET LIGHTING POLE.
6. AS-BUILT DRAWINGS SHALL BE SUPPLIED TO THE TRAFFIC ENGINEERING DIVISION PRIOR TO ANY PRE-FINAL INSPECTION. THE AS-BUILT DRAWING NEEDS TO BE STAMPED AS-BUILT AND SIGNED BY THE PREPARER.
7. SERVICE POINTS SHALL BE COORDINATED WITH NV ENERGY, AND WHEREVER POSSIBLE, BE LOCATED NEAR THE CENTER OF THE CIRCUIT. SERVICEPOINTS SHALL BE SHOWN ON THE PLANS.
8. WHEREVER THERE IS AN OVERHEAD UTILITY THAT MAY CONFLICT WITH THE INSTALLATION OF STREETLIGHTING CIRCUITS AND/OR POLES, THESE CONFLICTS MUST BE RESOLVED BETWEEN THE DEVELOPER AND THE UTILITIES INVOLVED BEFORE STREETLIGHT BASES ARE INSTALLED. AT NO EXPENSE TO THE CITY OF LAS VEGAS.
9. THE CONTRACTOR SHALL FURNISH COMPLETE CONDUIT, WIRE, ETC. FROM SERVICE TO TRANSFORMERS AND CONTROL SYSTEMS IF REQUIRED ON THE PLANS.

REVISED JUNE 28, 2016 (LD VERSION)

CITY OF LAS VEGAS GRADING NOTES

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

	HORIZONTAL	VERTICAL	COMPACTION
A. PAVEMENT AREA SUBGRADE	0.1"	+0.0 TO -0.1"	SEE SOILS REPORT
B. ENGINEERED FILL	0.2"	+0.1 TO -0.1"	SEE SOILS REPORT

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

REVISED 04/15/10

CITY OF LAS VEGAS SEWER NOTES

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

REVISED 04/15/10

CITY OF LAS VEGAS FIRE DEPARTMENT NOTES

1. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE LAS VEGAS FIRE & RESCUE ADOPTED FIRE CODE ORDINANCE #6329 FOR HYDRANT SPECIFICATIONS AND HYDRANT INSTALLATION SPECIFICATIONS.
2. ONLY FIRE HYDRANTS THAT ARE ON THE LAS VEGAS VALLEY WATER DISTRICT'S - APPROVED PRODUCTS LIST ARE ALLOWED TO BE INSTALLED.
3. A PERMIT IS REQUIRED FROM LAS VEGAS FIRE & RESCUE FOR THE INSTALLATION OF ON-SITE WATER LINES AND FIRE HYDRANTS. THE PERMIT AND CONTRACTORS MATERIAL TEST CERTIFICATE FOR UNDERGROUND PIPING FORM SHALL BE OBTAINED FROM THE FIRE PROTECTION ENGINEER BEFORE COMMENCEMENT OF WORK. [IFC § 105.7.12]
4. ON ANY RESIDENTIAL OR COMMERCIAL INSTALLATIONS, FIRE HYDRANTS SHALL BE INSTALLED AND FIRE APPARATUS ACCESS ROADS SHALL BE MAINTAINED BEFORE COMMENCEMENT OF ANY COMBUSTIBLE CONSTRUCTION. ALL FIRE HYDRANTS SHALL BE IN GOOD WORKING ORDER AND SHALL BE CAPABLE OF DELIVERING THE REQUIRED FIRE FLOW. [IFC § 3310, § 3312]
5. TO IDENTIFY THE FIRE HYDRANT LOCATIONS, THE CONTRACTOR SHALL PLACE A BLUE REFLECTIVE MARKER AT THE CENTER LINE OF STREET ADJACENT TO THE FIRE HYDRANTS. [IFC § 507.5.7.3]
6. ALL UNDERGROUND INSPECTIONS, PRESSURE AND FLUSH VERIFICATIONS OF ALL FIRE HYDRANTS AND FIRE LINES, SHALL BE CONDUCTED BEFORE COVERING THE LINES. CENTER LOADING IS ACCEPTABLE FOR THE HYDRO TESTS WITH PRIOR FIRE PREVENTION APPROVAL. [IFC § 108.5]
7. ALL ON-SITE UNDERGROUND WATER MAINS AND MATERIALS SHALL BE U.L. LISTED A.W.W.A. APPROVED AND SHALL BE RATED FOR THE APPROPRIATE WORKING PRESSURE. [IFC § 507.2.1, NFPA 24]
8. PAINTING OF CURBS, FIRE HYDRANTS, PADS, PROTECTION OF FIRE HYDRANTS FROM PHYSICAL DAMAGE, AND ALL OTHER WORK NECESSARY PER PLANS SHALL BE COMPLETED BEFORE APPROVAL BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION. [IFC § 507]
9. PRIVATE HYDRANTS SHALL BE PAINTED RED. [IFC § 507.5.7.1]
10. PRIOR TO THE FINAL OCCUPANCY, A FIRE FLOW TEST SHALL BE WITNESSED BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION TO VERIFY AVAILABILITY OF THE REQUIRED FIRE FLOW. [IFC § 507]
11. FIRE HYDRANT SPACING SHALL BE AS FOLLOWS: [IFC § C102]

	RESIDENTIAL	COMMERCIAL
500 FEET UNSPRINKLERED; 600 FEET SPRINKLERED.		
300 FEET UNSPRINKLERED; 400 FEET SPRINKLERED.		
12. WHERE THE WATER MAINS ARE EXTENDED ALONG STREETS OR NEW STREETS ARE INSTALLED WHERE FIRE HYDRANTS ARE NOT NEEDED FOR PROTECTION OF STRUCTURES, FIRE HYDRANTS SHALL BE INSTALLED AT A MAXIMUM OF 1000 FT SPACING, TO PROVIDE FOR TRANSPORTATION HAZARDS, WHERE STREETS ARE PROVIDED WITH MEDIAN DIVIDERS OR HAVE FOUR (4) OR MORE TRAFFIC LANES AND HAVE A TRAFFIC COUNT OF MORE THAN 30,000 PER DAY, HYDRANTS ARE REQUIRED ON EACH SIDE OF THE STREET SPACED AT 500 FT ON AN ALTERNATING BASIS. [IFC § C102.6]
13. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN THE RADIUS OF A CUL-DE-SAC OR WITHIN 20 FT OF THE PERIMETER OF THE RADIUS OF THE CUL-DE-SAC.
14. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN 6 FT OF ANY CURB RETURN, DRIVEWAY, POWER POLE, STREETLIGHT OR ANY OTHER OBSTRUCTION. [IFC § C102.12]
15. A MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A ONE-TWO FAMILY DWELLING SHALL NOT EXCEED 300 FT, AS MEASURED BY AN APPROVED ROUTE. [IFC § C102.4]
16. THE MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A FIRE DEPARTMENT CONNECTION (FDC) SHALL NOT EXCEED 100 FT, AS MEASURED BY AN APPROVED ROUTE. [IFC § C102.7]
17. THE MAXIMUM DISTANCE FROM A HYDRANT TO THE END OF A DEAD-END STREET SHALL NOT EXCEED 200 FT. [IFC § C102.6]
18. TWO (2) SOURCES OF SUPPLY ARE REQUIRED WHENEVER THERE IS 4 OR MORE FIRE HYDRANTS/SPRINKLER LEAD-INS ARE INSTALLED ON A SINGLE SYSTEM. SECTIONAL CONTROL VALVES SHALL BE INSTALLED SO THAT NO MORE THAN 2 FIRE HYDRANTS CAN BE OUT OF SERVICE DUE TO A BREAK IN A WATER MAIN. [IFC § C104]
19. ALL FIRE APPARATUS ACCESS ROADS SHALL BE PAVED TO PROVIDE ALL-WEATHER DRIVEWAY CAPABILITIES, AND SHALL BE DESIGNED AND MAINTAINED TO SUPPORT THE IMPOSED LOADS OF THE FIRE APPARATUS. [IFC § 503.2.3]
20. THE GRADIENT FOR THE FIRE APPARATUS ROADS SHALL NOT EXCEED 12% ANGLES OF APPROACH AND ANGLES OF DEPARTURE SHALL NOT EXCEED 6% FOR 25 FT PRIOR TO OR AFTER THE GRADE CHANGE. ADJACENT TO THE STRUCTURES GRADIENT SHALL NOT EXCEED 6%. [IFC § 503.2.7, § 503.2.8]
21. THE TURNING RADIUS OF THE FIRE APPARATUS ACCESS ROADS SHALL BE NO LESS THAN 52 FT OUTSIDE AND 28 FT INSIDE TURNING RADIUS. [IFC § 503.2.4]
22. VERTICAL CLEARANCE OF ALL FIRE APPARATUS ACCESS ROADS SHALL NOT BE LESS THAN 13 FT 6 INS. [IFC § 503.2.1]
23. FIRE DEPARTMENT ACCESS ROADS SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF NOT LESS THAN 40 FT FLOW LINE TO FLOW LINE WITH PARALLEL PARKING PERMITTED ON BOTH SIDES, NOT LESS THAN 32 FT WIDE, FLOW-LINE TO FLOW-LINE, WHERE PARKING IS PERMITTED ONLY ON ONE SIDE OF THE FIRE APPARATUS ACCESS ROAD, NOT LESS THAN 24 FT WIDE, FLOW-LINE TO FLOW-LINE, WHERE NO PARKING IS PERMITTED ON EITHER SIDE. FIRE LINES THROUGH PARKING LOTS SHALL NOT BE LESS THAN 24 FT. [IFC § 503.2.1.1]
24. FIRE APPARATUS ACCESS ROAD SHALL BE REQUIRED WHEN ANY PORTION OF AN EXTERIOR WALL OF THE FIRST STORY IS LOCATED MORE THAN 150 FT FROM A FIRE DEPARTMENT VEHICLE ACCESS. THIS DISTANCE COULD BE INCREASED TO 250 FT IF THE BUILDING IS SPRINKLERED. [IFC § 503.1.1]
25. APPROVED SECONDARY FIRE APPARATUS ACCESS SHALL BE PROVIDED FOR 100 OR MORE DWELLING UNITS, ROAD(S) WITH DEAD-ENDS OR WITH A SINGLE POINT OF ACCESS IN EXCESS OF 600 FT COMMERCIAL AND INDUSTRIAL DEVELOPMENTS WHERE BUILDINGS EXCEED 2 STORIES OR 30 FT IN HEIGHT, OR EXCEEDING 62,000 SQ FT IN AREA. [IFC § 503.1.2]
26. ALL DEAD-END FIRE APPARATUS ROADS AND/OR FIRE LINES, PUBLIC OR PRIVATE, IN EXCESS OF 150 FT IN LENGTH SHALL BE PROVIDED WITH AN APPROVED TURN AROUND HAVING A MINIMUM DIAMETER OF 81 FT. [IFC § 503.2.5]
27. ALL FIRE APPARATUS ACCESS ROADS SHALL BE MARKED BY PLACING APPROVED SIGNS AT THE START OF THE DESIGNATED FIRE LANE, ONE SIGN AT THE END OF THE FIRE LANE AND WITH SIGNS AT INTERVALS OF 100 FT ALONG THE DESIGNATED FIRE LANES. SIGNS TO BE PLACED ON BOTH SIDES OF AN ACCESS ROADWAY IF NEEDED TO PREVENT PARKING ON EITHER SIDE. SIGNS TO BE INSTALLED NO HIGHER THAN 10 FT OR LESS THAN 6 FT FROM THE ROADWAY LEVEL. THE CURB ALONG OR ON THE PAVEMENT OR CEMENT (IF NO CURB IS PROVIDED) SHALL BE PAINTED WITH RED WEATHER RESISTANT PAINT IN ADDITION TO THE SIGNS. [IFC § 503.3]
28. ELECTRONICALLY CONTROLLED ACCESS GATES SHALL BE PROVIDED WITH AN APPROVED EMERGENCY VEHICLE DETECTOR/RECEIVER SYSTEM. SAID SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE IFC § 503.6 AND IFC APPENDIX M.

EFFECTIVE DATE: 03-01-2016

DEVIATIONS FROM STANDARDS

NONE.

CITY OF LAS VEGAS GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA NEVADA", LATEST EDITION, THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA NEVADA", LATEST REVISION, THE "SUMMERLIN IMPROVEMENT STANDARDS" FOR WORK IN THE SUMMERLIN AREA, AND OTHER APPLICABLE APPROVED STANDARDS ISSUED BY THE CONTROLLING AGENCY, THE UNIFORM BUILDING CODE, AND ALL LOCAL CITY CODES AND ORDINANCES APPLICABLE, EXCEPT AS NOTED ON THIS SHEET AS "DEVIATIONS FROM STANDARDS".
2. THE EXISTENCE AND LOCATION OF ANY OVERHEAD OR UNDERGROUND UTILITY LINES, PIPES, OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A RESEARCH OF THE AVAILABLE RECORDS. EXISTING UTILITIES AS SHOWN FROM CLV PLANS LIBRARY ARE APPROXIMATE AND FOR RECORD PURPOSES. EXISTING UTILITIES ARE LOCATED ON PLANS ONLY FOR THE CONVENIENCE OF THE CONTRACTOR. EXISTING UTILITY SERVICE LATERALS MAY NOT BE SHOWN ON THE PLANS. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, LOCATE ALL UNDERGROUND AND OVERHEAD INTERFERENCES WHICH MAY AFFECT HIS OPERATION DURING CONSTRUCTION AND SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID DAMAGE TO SAME. THE CONTRACTOR SHALL USE EXTREME CAUTION WHEN WORKING NEAR OVERHEAD UTILITIES SO AS TO SAFELY PROTECT ALL PERSONNEL AND EQUIPMENT, AND SHALL BE RESPONSIBLE FOR ALL COST AND LIABILITY IN CONNECTION THEREWITH.
3. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT EXISTING UTILITY LINES, STRUCTURES AND STREET IMPROVEMENTS WHICH ARE TO REMAIN IN PLACE, FROM DAMAGE, AND ALL SUCH IMPROVEMENTS OR STRUCTURES DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR REPLACED SATISFACTORY TO THE CITY ENGINEER AND OWNING UTILITY COMPANY AT THE EXPENSE OF THE CONTRACTOR.
4. ALL CONSTRUCTION SHALL BE AS SHOWN ON THESE PLANS, ANY REVISIONS SHALL HAVE THE PRIOR WRITTEN APPROVAL OF THE CITY ENGINEER.
5. TYPE V CEMENT SHALL BE USED IN ALL OFF-SITE CONCRETE WORK. CONCRETE TO BE 3000 P.S.I. MINIMUM @ 28 DAYS. MIX DESIGNS TO BE APPROVED BY THE CITY, PRIOR TO THE USE ON THE PROJECT.
6. PERMITS ARE REQUIRED FOR ANY WORK IN THE PUBLIC RIGHT-OF-WAY. THE CONTRACTOR SHALL SECURE ALL PERMITS AND INSPECTIONS REQUIRED FOR THIS CONSTRUCTION.
7. EXPANSION JOINTS REQUIRED, MAXIMUM EVERY 300' IN EXTRUDED-TYPE CURB.
8. AC PAVEMENT TO BE ONE-HALF INCH (1/2") ABOVE LIP OF ALL GUTTERS AFTER COMPACTION, EXCEPT AT SIDEWALK RAMP AND CROSS GUTTERS.
9. CURB AND GUTTER DRAIN TO BE UNACCEPTABLE TO THE CITY OF LAS VEGAS SHALL BE REMOVED AND REPLACED PER STANDARD DRAWING 216.
10. SIDEWALK RAMPS SHALL BE CONSTRUCTED IN EACH QUADRANT OF AN INTERSECTION PER STANDARD DRAWING 235. EXACT LOCATION OF RAMPS MAY BE ADJUSTED IN THE FIELD BY A CITY INSPECTOR.
11. CONTRACTOR SHALL PROVIDE ALL NECESSARY HORIZONTAL AND VERTICAL TRANSITIONS BETWEEN NEW CONSTRUCTION AND EXISTING SURFACES TO PROVIDE FOR PROPER DRAINAGE AND FOR INGRESS AND EGRESS TO NEW CONSTRUCTION. THE EXTENT OF THE TRANSITIONS TO BE AS SHOWN ON PLANS.
12. ALL GRADING WORK SHALL CONFORM TO THE SOILS REPORT AS PREPARED BY THE (COMPANY, REPORT #, DATE) APPROVED BY THE CITY ENGINEER, AND AS SHOWN ON THESE PLANS.
13. EXACT LOCATION OF ALL SAWCUT LIDS MAY BE ADJUSTED OR DETERMINED IN THE FIELD BY A CITY OF LAS VEGAS ENGINEER IF LOCATION ON PLANS IS NOT CLEARLY SHOWN, OR EXISTING PAVEMENT CONDITION REQUIRES RELOCATIONS.
14. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PROTECT EXISTING PERMANENT SURVEY MONUMENTS. ANY MONUMENTS DISTURBED SHALL BE REPLACED AND ADJUSTED PER AVAILABLE RECORDS IN ACCORDANCE WITH N.R.S. STATUTE NO. 626.380 & CITY OF LAS VEGAS TITLE 16, APPENDIX D.
15. UTILITY COMPANY METER BOXES, MANHOLE LIDS, VALVE COVERS, ETC., SHALL BE LOCATED OUT OF DRIVEWAYS, DRIVEWAY APRONS, FLOWLINES, AND CROSS GUTTERS UNLESS WRITTEN APPROVAL IS GRANTED BY THE UTILITY COMPANY AND THE CITY ENGINEER.
16. WALL NOTES:
 16. ALL WALLS, NEW OR EXISTING, ARE ONLY SHOWN ON CIVIL PLANS FOR THE PURPOSE OF REVIEWING GRADING RELATIONSHIPS, FLOOD CONTROL, AND SIGHT DISTANCE AT INTERSECTIONS. NEW WALLS REQUIRE A SEPARATE PERMIT AND INSPECTION BY THE BUILDING DEPARTMENT.
 17. ASPHALT MIX DESIGN MUST BE SUBMITTED AND APPROVED BY THE CITY ENGINEER PRIOR TO THE PLACEMENT OF ASPHALT WITHIN CITY RIGHT OF WAY.
 18. CONTRACTOR SHALL ADJUST ALL NEW AND EXISTING INLETS, VALVE BOXES, MANHOLE RIMS, AND SEWER CLEAN OUTS, ETC. TO FINISH GRADE AS APPLICABLE WHETHER OR NOT THEY ARE SHOWN ON THE PLANS.
 19. MATERIALS, HANDLING AND PLACEMENT OF PORTLAND CEMENT CONCRETE SHALL BE IN ACCORDANCE WITH APPLICABLE SECTIONS OF NOTOT OR THE CLARK COUNTY AREA SPECIFICATIONS (AS APPLICABLE) AND THE PLANS AND DETAILS SHOWN HEREON.
 20. WHEN INSTALLING UNDERGROUND FACILITIES THAT REQUIRE UNDERGROUND LOCATING DEVICES SUCH AS MARKER BALLS, LOCATING RIBBON, ETC., THE CONTRACTOR SHALL PROVIDE WRITTEN DOCUMENTATION TO OFFER INSPECTION AND TESTING CERTIFYING THAT ALL DEVICES HAVE BEEN PLACED AND VERIFIED TO BE IN GOOD WORKING CONDITION PRIOR TO THE CONSTRUCTION OF ANY ROAD BASE.
 21. AFTER HAUNCHING AND PRIOR TO BACKFILL OPERATIONS WHICH WOULD COVER SANITARY SEWER AND STORM DRAIN FACILITIES, CONTRACTOR IS REQUIRED TO SCHEDULE CLV OPEN-TRENCH UTILITY SURVEY INSPECTION FOR DETERMINATION OF FINAL LOCATION COORDINATES. FACILITIES TO BE LOCATED BY CLV SHALL INCLUDE AT A MINIMUM THE HORIZONTAL AND VERTICAL (INVERT) LOCATION OF PUBLIC SEWER MANHOLES, STORM DRAIN MANHOLES AND TRANSITION STRUCTURES, STORM DRAIN LATERALS AT THE CONNECTION TO THE STORM DRAIN MAIN AND AT THE CONNECTION TO A DROP INLET, THE CONNECTION OF SEWER SERVICE LATERALS TO THE SEWER MAIN AND WHERE THE SEWER SERVICE LATERALS EXIT THE PUBLIC RIGHT-OF-WAY, SEWER AND STORM DRAIN MAIN ALIGNMENT, INCLUDING DEFLECTION POINTS, OR
 22. CCTV VIDEO INSPECTION IS REQUIRED FOR ALL SEWER AND STORM DRAINS. THE CCTV VIDEO INSPECTIONS NEED TO BE PERFORMED PER THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS LATEST EDITION.
 23. A SEPARATE BORING PERMIT IS REQUIRED FOR ALL BORING ACTIVITIES.

REVISED 08/04/2018

SOUTHERN NEVADA - SOUTHWEST GAS CORPORATION GENERAL NOTES:

1. IN THE EVENT OF NATURAL GAS EMERGENCIES CALL 911 AND 1-877-860-6020.
 2. MINIMUM HORIZONTAL AND VERTICAL CLEARANCE BETWEEN NATURAL GAS FACILITIES AND ANY UNDERGROUND UTILITIES AND/OR STRUCTURES, INCLUDING BUT NOT LIMITED TO WATER, SEWER, STORM DRAIN, COMMUNICATIONS, AND ELECTRIC SHALL BE AT LEAST 12-INCHES OR GREATER AS DICTATED BY LOCAL CODES AND STANDARDS.
 - A) ANY DEVIATION FROM SPECIFIED MINIMUM CLEARANCES MUST BE APPROVED BY ALL AFFECTED UTILITIES AND/OR MUNICIPALITIES.
 3. FOR VALVE ADJUSTMENT CONTACT 702-528-7881 14 DAYS PRIOR TO CONSTRUCTION.
 4. IN THE EVENT OF A NATURAL GAS CONFLICT WITH PROPOSED UTILITIES AND STRUCTURES CONTACT 702-365-2099.
- ALL CIVIL IMPROVEMENT PLANS MUST INCLUDE SOUTHWEST GAS CORPORATION HIGH PRESSURE NOTES ON THE NOTES SHEET AND ALL SHEETS DEPICTING HIGH PRESSURE NATURAL GAS MAINS AS INDICATED BELOW:

CAUTION: HIGH PRESSURE GAS!
CALL SOUTHWEST GAS AT 702-278-8451 FOR STANBY WHEN
EXCAVATING OVER OR NEAR HIGH PRESSURE GAS LINES 48
HOURS PRIOR TO CONSTRUCTION.

CITY OF LAS VEGAS TRAFFIC NOTES

1. ALL CONSTRUCTION SIGNING, BARRICADING, AND TRAFFIC DELINEATION SHALL CONFORM TO THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", LATEST EDITION.
2. THE STREET SIGN CONTRACTOR SHALL OBTAIN STREET NAMES AND BLOCK NUMBERING FROM THE PLANNING DEPARTMENT PRIOR TO CONSTRUCTION.
3. BEFORE ANY WORK IS STARTED IN THE RIGHT-OF-WAY, THE CONTRACTOR SHALL INSTALL ALL ADVANCE WARNING SIGNS FOR THE CONSTRUCTION THE CONTRACTOR SHALL INSTALL TEMPORARY STOP SIGNS AT ALL NEW STREET ENCROACHMENTS INTO EXISTING CITY STREETS WHERE WARRANTED IMMEDIATELY AFTER FIRST GRADING WORK IS ACCOMPLISHED, AND SHALL MAINTAIN SAID SIGNS UNTIL PERMANENT SIGNS ARE INSTALLED.
4. WHEN A DESIGNATED "SUGGESTED ROUTE TO SCHOOL" IS ENCLOSED UPON BY A CONSTRUCTION WORK ZONE AND PUBLIC WORKS STAFF IDENTIFIES A NEED FOR STUDENTS TO BE ASKED IN THE SAFE THAT WORK ZONE, THE CONTRACTOR SHALL BE REQUIRED TO PROVIDE A QUALIFIED "CROSSING GUARD". THE GUARD SHALL BE PRESENT FOR THE FULL DURATION OF TIME THAT CHILDREN ARE LIKELY TO BE PRESENT.
5. IF THE IMPROVEMENTS NECESSITATE THE OBLITERATION, TEMPORARY OBSTRUCTION, TEMPORARY REMOVAL OR RELOCATION OF ANY EXISTING TRAFFIC PAVEMENT MARKING, SUCH PAVEMENT MARKING SHALL BE RESTORED OR REPLACED WITH LIKE MATERIALS TO THE SATISFACTION OF THE CITY TRAFFIC ENGINEER.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND INSTALLING ALL PERMANENT SIGNS SHOWN ON THE PLANS. ALL NEW TRAFFIC SIGNS SHALL UTILIZE TYPE X RETROREFLECTIVE SHEETING IN ACCORDANCE WITH COAUS 627 AND 716 AND SHALL HAVE AN ANTI-GRAFFITI PROTECTIVE OVERLAY FILM THAT IS A MATCHING COMPONENT TO, AND OF THE SAME MANUFACTURE AS THE RETROREFLECTIVE SHEETING TO WHICH IT IS APPLIED. STREET NAME SIGNS SHALL CONFORM IN THEIR ENTIRETY TO CURRENT CITY STANDARDS. ALL OTHER SIGNS SHALL BE STANDARD SIZE UNLESS OTHERWISE SPECIFIED ON THE PLANS. ALL SIGN POSTS SHALL BE INSTALLED IN ACCORDANCE WITH THE CURRENT CITY STANDARDS.
7. WHEN A PROPOSED STREET LIGHT STANDARD IS LOCATED WITHIN FIVE (5') FEET OF ANY PROPOSED SIGN SHOWN ON THE PLANS TO BE MOUNTED ON A SIGNPOST, THE SIGN SHALL BE MOUNTED ON THE STREET LIGHT STANDARD AND THE SIGNPOST SHALL BE ELIMINATED.
8. ALL PERMANENT TRAFFIC CONTROL DEVICES CALLED FOR HEREON SHALL BE IN PLACE AND IN FINAL POSITION PRIOR TO ALLOWING ANY PUBLIC TRAFFIC ONTO THE PORTIONS OF THE ROAD(S) BEING IMPROVED HERE, HOWEVER, REGARDLESS OF THE STATUS OF COMPLETION OF PAVING OR OTHER OFF-SITE IMPROVEMENTS CALLED FOR BY THESE PLANS.
9. STREET SIGNS AND STOP SIGNS SHALL BE INSTALLED PER CITY STANDARD SPECIFICATIONS FOR PLACEMENT OF STREET NAME SIGNS. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY TRAFFIC CONTROL DEVICES AND FLAGGERS TO INSURE THE SAFETY OF THE PUBLIC IN OR AROUND THE WORK ZONE. THE CONTRACTOR SHALL HAVE A CERTIFIED ATSSA TRAFFIC CONTROL TECHNICIAN OR NEHA WORK ZONE SAFETY SPECIALIST SET UP, MAINTAIN AND/OR REMOVE ALL TRAFFIC CONTROL DEVICES IN THE CITY OF LAS VEGAS RIGHT OF WAY.
10. WORK IN PUBLIC STREETS, ONCE BEGUN, SHALL BE EXPEDITED TO COMPLETION SO AS TO PROVIDE MINIMUM INCONVENIENCE TO ADJACENT PROPERTY OWNERS AND TO THE TRAVELING PUBLIC.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING CITIZENS AREA TRANSIT (C.A.T.) IF THE CONSTRUCTION INTERRUPTS OR RELOCATES A BUS STOP OR HAS AN ADVERSE EFFECT ON BUS SERVICE ON THAT STREET TO ARRANGE FOR TEMPORARY RELOCATION OF STOP.
12. GUARDS SHALL BE OBTAINED BY CONTACTING THE METROPOLITAN POLICE DEPARTMENT SPECIAL EVENTS UNIT (PHONE 728-3442) WHO WILL PROVIDE OFFICERS PROPERLY TRAINED IN TRAFFIC CONTROL. FEES FOR THE USE OF THESE OFFICERS SHALL BE SET BY METRO AND WILL BE PAID BY THE CONTRACTOR. THE CONTRACTOR IS RESPONSIBLE FOR ALL ARRANGEMENTS WITH METRO.
13. ANY WORK WITHIN 300' OF A SIGNALIZED INTERSECTION WILL BE NIGHT WORK, UNLESS DIRECTED BY THE CITY OF LAS VEGAS TRAFFIC ENGINEER.
14. THE CONTRACTOR SHALL CONTACT THE TRAFFIC ENGINEERING DIVISION (TRANSPORTATION SECTION) THROUGH THE PROJECT OFFSITE INSPECTOR PRIOR TO INITIATING PLANS TO RECEIVE DIRECTION FOR ANY PERMANENT OR TEMPORARY MODIFICATIONS TO THE APPROVED DRAWINGS REGARDING FINAL PAVEMENT TRANSITIONS, MARKINGS AND SIGNING THAT ARE REQUIRED TO MATCH ADJACENT ROADWAY SEGMENTS. THE CONTRACTOR SHALL PROVIDE A DRAINING FOR APPROVAL BY THE TRAFFIC ENGINEERING DIVISION DEPICTING ANY ADJUSTMENTS TO THE FINAL PAVEMENT MARKINGS AND SIGNAGE, WHICH MAY INCLUDE OMITTING, ADDING OR MODIFYING PAVEMENT MARKINGS AND THE PLANS AND DETAILS SHOWN HEREON.

REVISED 7/3/13

LAS VEGAS VALLEY WATER DISTRICT NOTES

- LVVWD PROJECT # 135386
1. NO WORK SHALL BEGUN UNTIL THE WATER PLANS HAVE BEEN APPROVED FOR CONSTRUCTION BY THE LVVWD. FOLLOWING WATER PLAN APPROVAL, NOTICE SHALL BE GIVEN TO THE LVVWD COMMUNICATION SUPPORT CENTER (258-7171) TWO (2) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION. FOR FUTURE INSPECTIONS, NOTICE MUST BE GIVEN BY 2:00 P.M. THE BUSINESS DAY PRIOR TO THE REQUESTED LVVWD INSPECTION. WHEN REQUESTING INSPECTIONS, PLEASE REFER TO THE PROJECT # IDENTIFIED ABOVE.
 2. ALL WORK SHALL CONFORM TO LVVWD STANDARD PLATES, DRAWINGS, AND SPECIFICATIONS, AND TO THE 2010 EDITION OF THE UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR POTABLE WATER SYSTEMS (UDACS). THE LATEST EDITION OF UDACS SHALL SUPERSEDE ANY CONFLICTS CONTAINED IN THE APPROVED DRAWINGS AND/OR SPECIFICATIONS.
 3. ALL WORK, EXCEPT AS MODIFIED BY THESE PLANS OR BY NOTE 2 ABOVE, SHALL BE DONE IN ACCORDANCE WITH THE MOST RECENT DRAFT OR EDITION OF THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFFSITE IMPROVEMENT, CLARK COUNTY AREA.
 4. A SINGLE PIPE MATERIAL SHALL BE USED THROUGHOUT THE PROJECT UNLESS OTHERWISE APPROVED BY THE LVVWD.
 5. ALL SERVICE LATERALS TWO (2) INCHES IN DIAMETER AND SMALLER SHALL BE TYPE K COPPER TUBING WITH LVVWD APPROVED SERVICE SADDLES.
 6. ALL WATER METER BOXES SHALL BE LOCATED OUTSIDE OF DRIVEWAY AREAS.
 7. ALL VALVES SHALL BE LOCATED OUTSIDE OF DRIVEWAYS, VALLEY AND CURB GUTTERS.
 8. ALL WATER AND STORM DRAIN OR SANITARY SEWER CROSSINGS SHALL CONFORM TO SECTION 2.22 OF THE 2010 EDITION OF THE UDACS.
 9. ALL WATER FACILITIES SHALL BE FILLED, DISINFECTED, PRESSURE TESTED, FLUSHED, FILLED, AND AN ACCESSIBLE WATER SAMPLE OBTAINED, PRIOR TO CONNECTION TO THE LVVWD DISTRIBUTION SYSTEM.
 10. THE CONTRACTOR MUST OBTAIN ALL METERS TWO (2) INCHES AND SMALLER FROM LVVWD CENTRAL ASSESSMENT. TELEPHONE 258-3152 OR 258-3602, TWO (2) WORKING DAYS PRIOR TO METER PICKUP.
 11. ANY INTERRUPTION OF SERVICE MUST BE PERFORMED IN ACCORDANCE WITH UDACS SECTION 3.14.01, AND APPROVED BY THE LVVWD INSPECTION DIVISION PRIOR TO SHUTDOWN. PROPER WRITTEN NOTIFICATION MUST BE GIVEN TO ALL AFFECTED CUSTOMERS.
 12. ALL WATER FACILITY CONSTRUCTION MATERIALS USED MUST BE AS LISTED ON THE LVVWD PRE-APPROVED MATERIALS AND MANUFACTURER'S LISTING FOR NEW FACILITIES, LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS.
 13. TELEPHONE "CALL BEFORE YOU DIG" AT "811" OR 1-800-227-2600.
 14. THE INSTALLATION OF LAS VEGAS VALLEY WATER DISTRICT (LVVWD) MUNICIPAL WATER FACILITIES ASSIGNED TO THIS PROJECT IS ASSUMED TO BE IN COMPLIANCE WITH THE UNIFORM STANDARDS, INCLUDING THE PLACEMENT OF ASPHALT PAVING STREET SURFACES. ANY REPAIR WORK DONE BY THE LVVWD TO THE MUNICIPAL WATER FACILITIES WILL INCLUDE THE PLACEMENT OF AN APPROPRIATELY SIZED ASPHALT REPAIR PATCH ON THE STREET SURFACE.

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

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

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES
PROJECT NO. 135386 FIRST APPROVED DATE: _____

QUANTITIES

DESCRIPTION	PUBLIC QUANTITY	PRIVATE QUANTITY
CURB & GUTTER (TYPE "L" & "A")	1,639 LF	LF
CROSS GUTTER	2,251 SF	SF
SIDEWALK 4"	12,737 SF	SF
SIDEWALK RAMP	13 EA	EA
SIDEWALK UNDERDRAN	3 EA	EA
TYPE II GRAVEL	545 CY	CY
3" AC PAVEMENT	26 SY	SY
4" AC PAVEMENT	1,939 SY	SY
PAVEMENT STRIPING COLLECTOR	829 LF	LF
STREETLIGHT (STANDARD BASE)	2 EA	EA
STREET/STOP SIGNS	10 EA	EA

SEWER QUANTITIES

DESCRIPTION	PUBLIC QUANTITY	PRIVATE QUANTITY
6" SEWER	LF	79.50 LF
8" SEWER	LF	298.11 LF
12" SEWER	LF	25.13 LF
48" SSMH	EA	2 EA
60" SSMH	1 EA	EA
72" SSMH	1 EA	EA

WATER QUANTITIES

DESCRIPTION	PUBLIC QUANTITY	PRIVATE QUANTITY
10" WATER	154 LF	LF
12" WATER	313 LF	LF
IRRIGATION SLEEVES	73 LF	LF

STORM DRAIN QUANTITIES

DESCRIPTION	PUBLIC QUANTITY	PRIVATE QUANTITY
24" STORM DRAIN	21 LF	LF
30" STORM DRAIN	59 LF	LF
36" STORM DRAIN	13 LF	LF
15" MODIFIED TYPE C INLET	1 EA	EA
30" MODIFIED TYPE C INLET	1 EA	EA
72" SSMH	4 EA	EA
48" SSMH	EA	1 EA

A.P.N.:

139-34-113-001 & 139-34-112-001

BASIS OF BEARINGS:

BASIS OF BEARINGS FOR THIS SURVEY IS THE CENTERLINE OF OGDEN AVENUE BETWEEN MAIN STREET AND FIRST STREET, AS SHOWN ON FILE 67, PAGE 79 OF SURVEYS. SAID LINE BEARS: S62°04'36"E

BENCHMARK:

BENCHMARK BLV0134NNW6 BEING A RIVET & PLATE TOP CURB NE CORNER MAIN ST. & FREMONT ST. ELEVATION=2023.19 FEET (616.669 METERS)

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.

SAFETY ALERT

Call Before You Overhead

Call before you dig

Call before you dig

Call before you dig

1-702-227-2929

1-702-432-5300

1-800-227-2600

DESIGNER:

DATE: BY:

REV: 1

18 FREMONT STREET
HOTEL AND CASINO
CITY OF LAS VEGAS

GENERAL
NOTES SHEET

SHEET

TITLE

PROJECT No.: 171126

DATE: 08/13/20

SCALE: NA

DRAWN BY: NMG

DESIGNED BY: NMG

CHECKED BY: GMM

SEALED

REGISTERED PROFESSIONAL ENGINEER - STATE OF NEVADA

QUY M. MORRIS

EXP. 12-31-21

CIVIL

19326

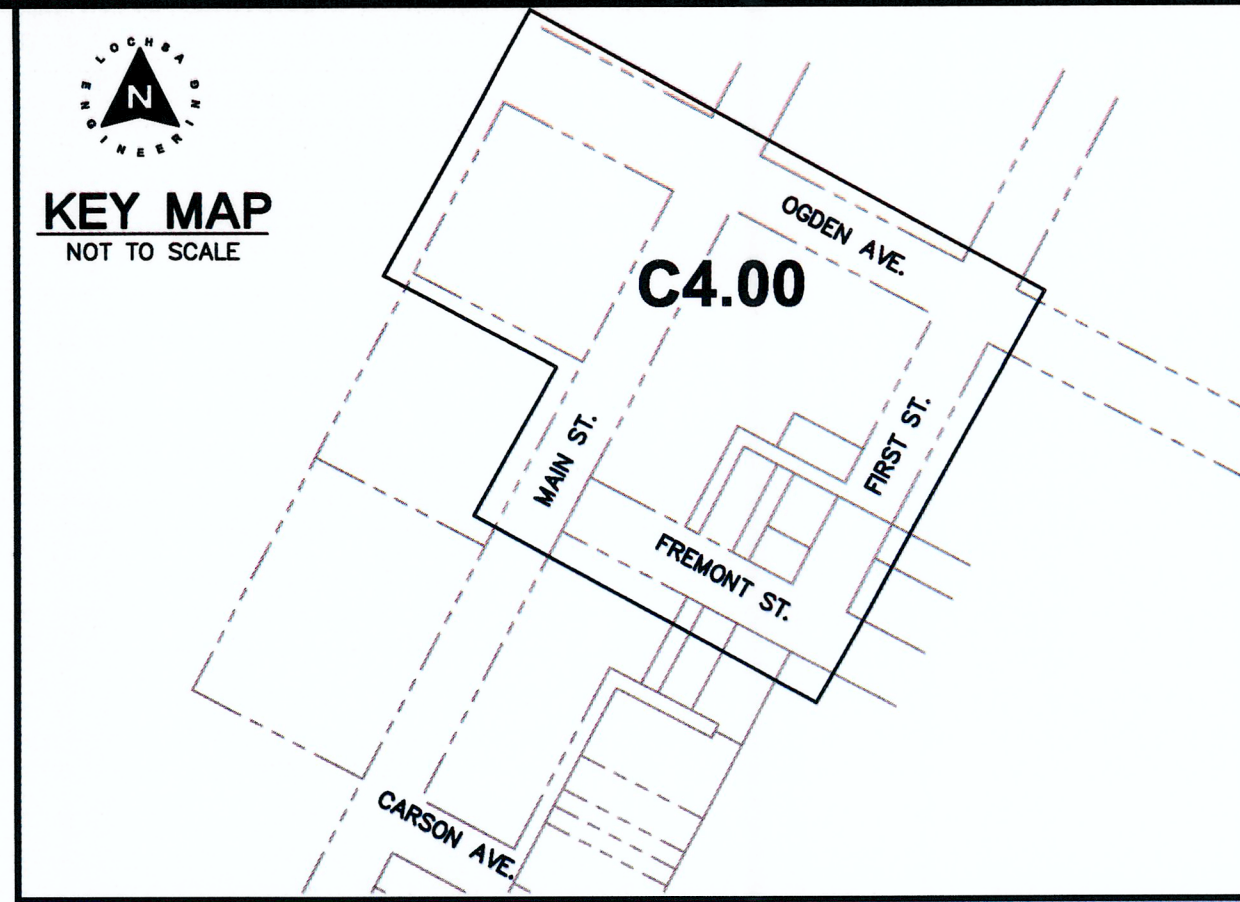
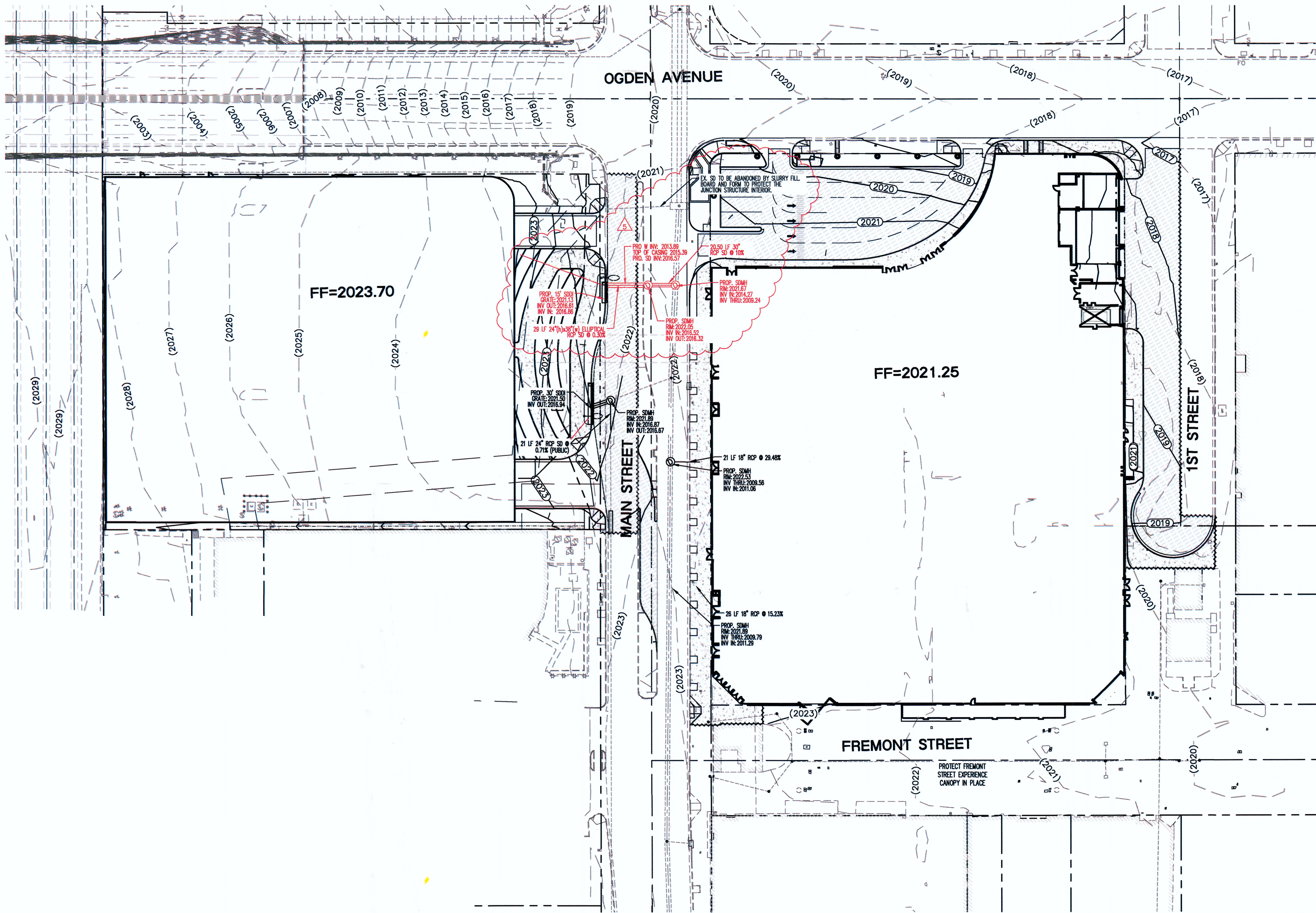
08/13/20

SHEET No. C1.02

SHEET 2 of 15

CLV No. 1077521

L18-02490



STORMWATER MANAGEMENT NOTES:

1. THE OWNER, SITE DEVELOPER, CONTRACTOR, AND/OR THEIR AUTHORIZED AGENTS SHALL EACH DAY REMOVE ALL SEDIMENT, MUD, CONSTRUCTION DEBRIS, OR OTHER POTENTIAL POLLUTANTS THAT MAY HAVE BEEN DISCHARGED TO, OR ACCUMULATED IN, THE PUBLIC RIGHTS OF WAY OF CLARK COUNTY AS A RESULT OF CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS SITE DEVELOPMENT OR CONSTRUCTION PROJECT. SUCH MATERIALS SHALL BE PREVENTED FROM ENTERING THE STORM SEWER SYSTEM.
2. ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT PRACTICES MAY BE REQUIRED OF THE OWNER AND HIS OR HER AGENTS DUE TO UNFORESEEN EROSION PROBLEMS OR IF THE SUBMITTED PLAN DOES NOT MEET THE PERFORMANCE STANDARDS SPECIFIED IN CLARK COUNTY TITLE 24.40 AND THE LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDANCE MANUAL.
3. TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE AND NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. SOME EXCEPTIONS MAY APPLY; REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, 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 A RAIN EVENT OF 0.5 INCHES OR MORE. THE CONTRACTOR OR HIS AGENT SHALL UPDATE OR MODIFY THE STORMWATER POLLUTION PREVENTION PLAN AS NECESSARY. SOME EXCEPTIONS TO WEEKLY INSPECTIONS MAY APPLY, SUCH AS SUSPENSION OF LAND DISTURBANCE ACTIVITIES. REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.12.
5. ACCUMULATED SEDIMENT IN BMPs SHALL BE REMOVED WITHIN SEVEN DAYS AFTER A STORMWATER RUNOFF EVENT OR PRIOR TO THE NEXT ANTICIPATED STORM EVENT, WHICHEVER IS EARLIER. SEDIMENT MUST BE REMOVED WHEN BMP DESIGN CAPACITY HAS BEEN REDUCED BY 50 PERCENT OR MORE.

GRADING PLAN CERTIFICATION

NAME: GUY M. MORRIS PE # 14526 DATE: 08/13/20
CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT.

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.

SAFETY ALERT

Call before you dig. Avoid cutting underground utility lines. It's costly.

Call before you dig. 1-800-227-2800

A.P.N.:

139-34-113-001 & 139-34-112-001

BASIS OF BEARINGS:

BASIS OF BEARINGS FOR THIS SURVEY IS THE CENTERLINE OF OGDEN AVENUE BETWEEN MAIN STREET AND FIRST STREET, AS SHOWN ON FILE 67, PAGE 79 OF SURVEYS. SAID LINE BEARS: S82°04'38"E

BENCHMARK:

BENCHMARK BLVD. BEING A RIVET & PLATE TOP CURB NE CORNER MAIN ST. & FREMONT ST. ELEVATION=2023.19 FEET (616.669 METERS)

CL OR SURVEY LINE	EASEMENT LINE	DESCRIPTION:	CONTOUR LINES	EDGE OF PAVEMENT	"A" TYPE CURBS	"L" TYPE CURBS	WALLS	FENCES	AC PAVEMENT	CONCRETE	SPOT ELEVATIONS	SIGNS	MANHOLE W/ DESCRIPTION	MANHOLE DESCRIPTIONS	FIRE HYDRANTS	GATE VALVES	REDUCERS	CLEAN OUTS	UTILITY BOX OR VAULT	BACKWATER VALVES	100w HPS STREETLIGHTS	150w HPS STREETLIGHTS	200w HPS STREETLIGHTS	250w HPS STREETLIGHTS
PROPERTY LINE	SAWCUT LINE	EXISTING:	(210)								(12.3) BC		⊙	⊙ = SANITARY SEWER		⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
ROW LINE	SCARP LINE	PROPOSED:	(212)								(12.3) BC		⊙	⊙ = STORM DRAIN		⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
													⊙	⊙ = ELECTRICAL		⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
													⊙	⊙ = TELEPHONE		⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙

GRADING PLANS
OVERALL SITE GRADING

18 FREMONT STREET
HOTEL AND CASINO
CITY OF LAS VEGAS

SHEET
PROJECT No.: 171126

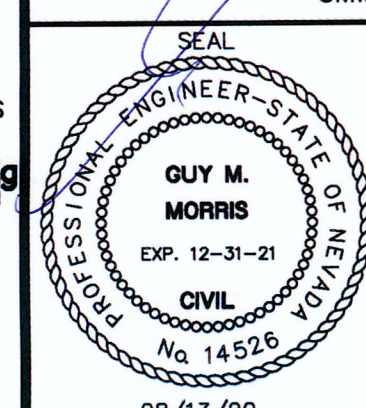
DATE: 08/13/20

SCALE: 1"=40'

DRAWN BY: NMG

DESIGNED BY: NMG

CHECKED BY: GMM

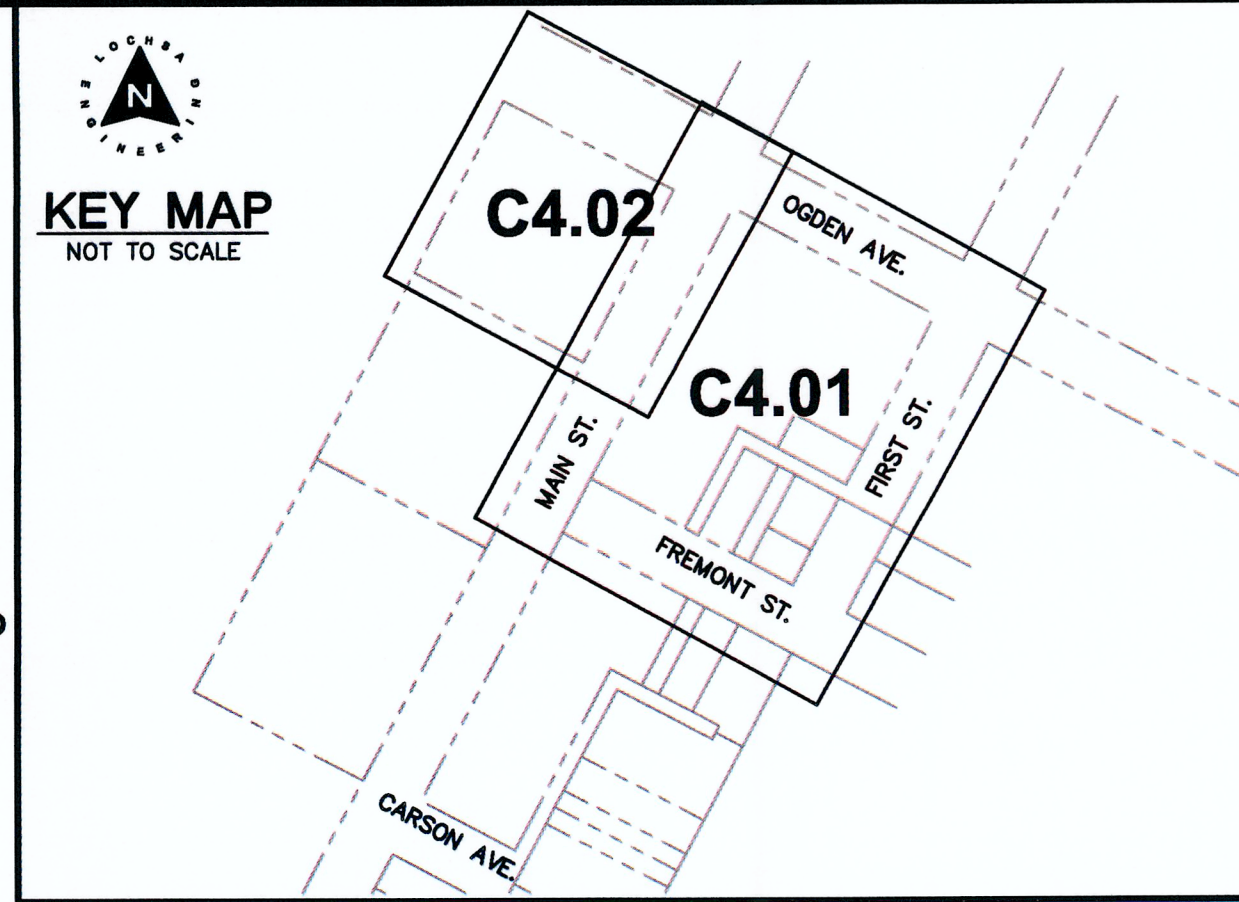
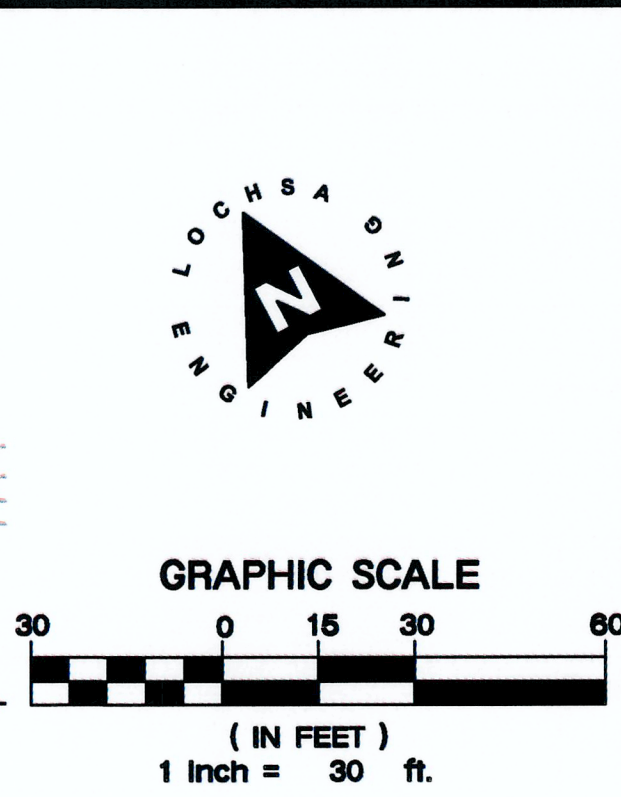
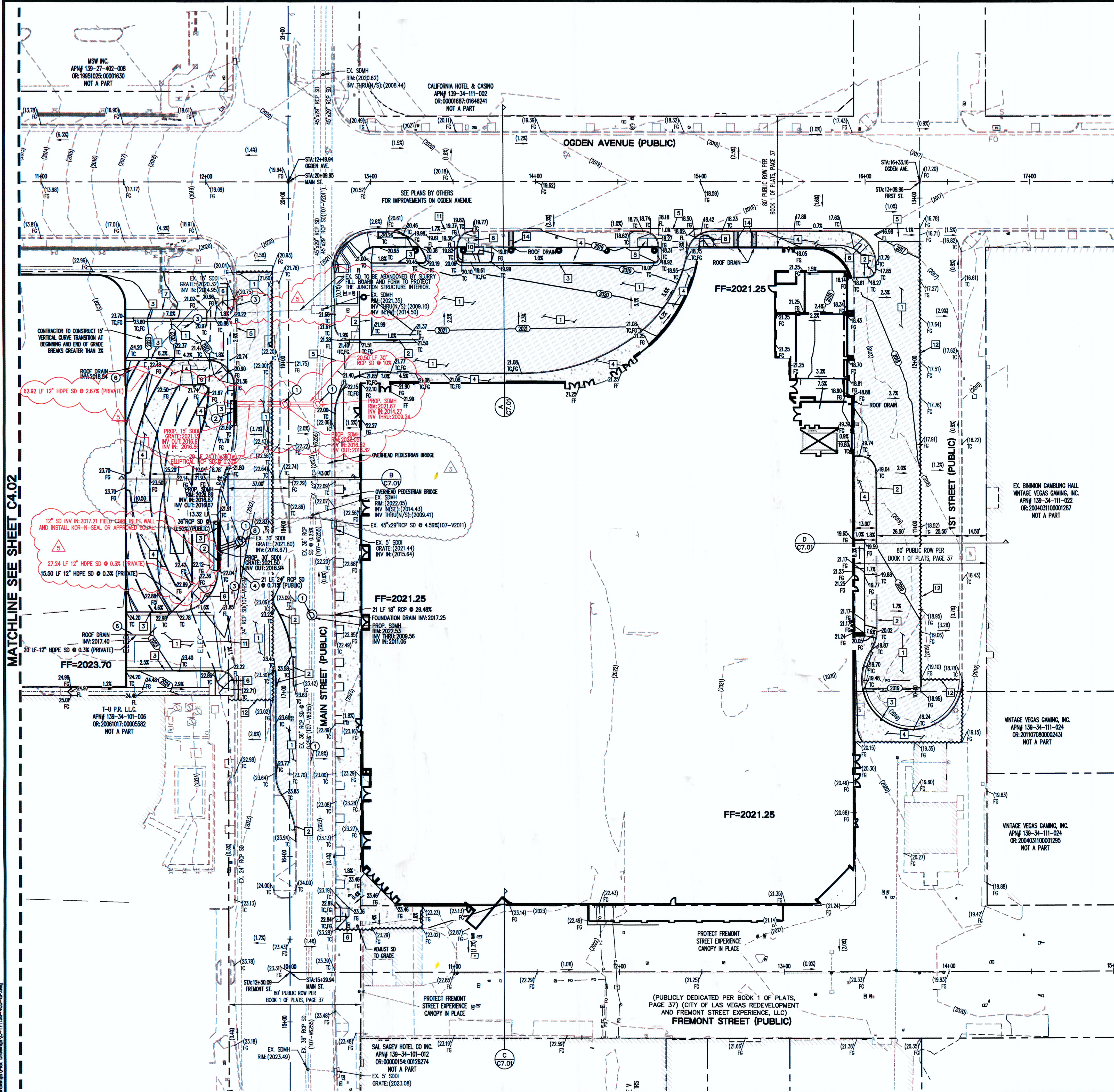


08/13/20

SHEET No. C4.00

CLV No. 1077521

L18-02490



STORM DRAIN CONSTRUCTION NOTES:

- NOT ALL NOTES USED ON THIS SHEET
- INSTALL 22" STORM DRAIN MANHOLE PER C.C.A.U.S.D. NO. 403 WITH CONCRETE COLLAR PER CCAUSD #408. REFER TO C.C.A.U.S.D. NO. 409 FOR MANHOLE COVER AND RING.
- INSTALL MODIFIED TYPE "C" DROP INLET WITH GRATE PER CCAUSD #412.1. INSTALL STAMP PER CCAUSD #421
- REMOVE EXISTING INLET.
- CONTRACTOR TO CONNECT EXISTING 24" RCP TO NEW MANHOLE AT SAME SLOPE. CONTRACTOR TO FIELD VERIFY THE EXISTING INVERT AND REPORT ANY ISSUES TO ENGINEERING.
- INSTALL 48" STORM DRAIN MANHOLE PER C.C.A.U.S.D. NO. 403 WITH CONCRETE COLLAR PER CCAUSD #408. REFER TO C.C.A.U.S.D. NO. 409 FOR MANHOLE COVER AND RING.
- CAP ROOF DRAIN. SEE PLUMBING PLANS FOR CONTINUATION.
- EX. SIDEWALK UNDER DRAIN TO BE REMOVED SIDEWALK TO BE REMOVED BETWEEN JOINTS AND REPLACED..
- CONNECT TO EX. STORM DRAIN.

MAX 2% H.S.
MIN. 5% L.S.
TYPICAL GRADING AWAY FROM BUILDING

CONSTRUCTION NOTES:

- ALL CONSTRUCTION TO BE DONE IN ACCORDANCE WITH CLARK COUNTY AREA UNIFORM STANDARD DRAWINGS (C.C.A.U.S.D.) LATEST EDITION AND/OR REGULATING ENTITY HAVING JURISDICTION
- NOT ALL NOTES USED ON THIS SHEET
- CONSTRUCT AC PAVEMENT PER DETAIL 2 ON C7.01.
- CONSTRUCT "A" TYPE CURB PER DETAIL 1 ON C7.01.
- CONSTRUCT "L" TYPE CURB PER CCAUSD No. 216.
- CONSTRUCT CONC. SIDEWALK PER CCAUSD No. 234.
- REFER TO ARCH. PLANS FOR FINISHING SPECIFICATIONS.
- CONSTRUCT CROSS GUTTER PER CCAUSD No. 228.
- CONSTRUCT CASE II SIDEWALK RAMP PER CCAUSD No. 235.
- INSTALL TURNED DOWN SIDEWALK EDGE WHERE NECESSARY PER DETAIL 3 ON C7.01 ALONG RAMP. INSTALL RAILING ALONG RAMP.
- CONSTRUCT SIDEWALK RAMP PER DETAIL 9 ON C7.01.
- NOT USED
- CONSTRUCT SIDEWALK RAMP PER DETAIL 4 ON C7.01.
- CONSTRUCT COMMERCIAL DRIVEWAY PER CCAUSD No. 222.1 WITH CROSS GUTTER PER CCAUSD No. 228.
- SAWCUT AND MATCH EXISTING.
- CONSTRUCT 2" "U" CHANNEL PER DETAIL 6 ON C7.01.
- INSTALL SIDEWALK DRAIN PER CCAUSD No. 236 WITH 2" GRATE FOR ROOF DRAIN. PER DETAIL 8 ON C7.01

CUT	FILL
5264 CY	480 CY

NOTE: CUT/FILL QUANTITIES ARE TO FINISHED GRADE & DO NOT INCLUDE MATERIAL THICKNESS, FOOTINGS, ETC.

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: 320032C170F, EFFECTIVE DATE: NOVEMBER 16, 2011. THE SITE FALLS WITHIN ZONE "X", DESCRIBED BY FEMA AS: AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN.

GRADING NOTES:

- 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/MATERIAL UNLESS OTHERWISE SPECIFIED BY LANDSCAPE DRAWINGS AND SPECIFICATIONS OR THE SOILS REPORT.
- CONTRACTOR SHALL DETERMINE HIS OWN FOOTING OR BASEMENT EXCAVATION QUANTITIES, EVEN THOUGH SHOWN ON ROUGH GRADING PLANS. ADDITIONALLY, STRUCTURE BACKFILL COSTS SHOULD BE INCLUDED IN THE COST OF THE STRUCTURE, UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS.
- CONTRACTOR SHALL NOTIFY LOCHSA ENGINEERING WITHIN 24 HOURS OF OMISSIONS AND ERRORS DISCOVERED ON PLANS. LOCHSA ENGINEERING WILL NOT BE RESPONSIBLE FOR ANY "CORRECTIVE" WORK DONE BY OTHERS.
- 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. REFER TO THE REPORT PREPARED BY GEOTECHNICAL & ENVIRONMENTAL SERVICES, PROJECT No. 20174217E1 DATED May 7, 2018.

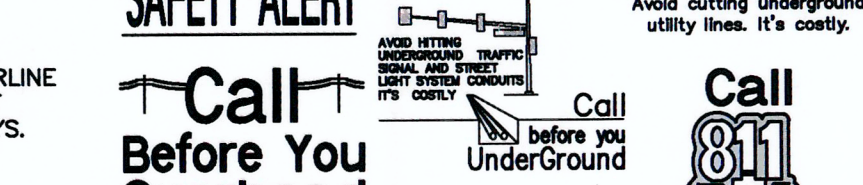
GRADING PLAN CERTIFICATION

NAME: GUY M. MORRIS PE # 14526 DATE: _____
CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT.

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.

SAFETY ALERT



1-702-227-2929 1-702-432-5300 or 1-800-227-2800

A.P.N.:

139-34-113-001 & 139-34-111-001

BASIS OF BEARINGS:

BASIS OF BEARINGS FOR THIS SURVEY IS THE CENTERLINE OF OGDEN AVENUE BETWEEN MAIN STREET AND FIRST STREET, AS SHOWN ON FILE #7, PAGE 79 OF SURVEYS. SAID LINE BEARS: S82°04'36"E

BENCHMARK:

BENCHMARK BLVD DRAINAGE BEING A RIVET & PLATE TOP CURB NE CORNER MAIN ST. & FREMONT ST. ELEVATION=2023.19 FEET (616.669 METERS)

CL OR SURVEY LINE	EASEMENT LINE	DESCRIPTION:	CONTOUR LINES	EDGE OF PAVEMENT	"A" TYPE CURBS	"L" TYPE CURBS	WALLS	FENCES	AC PAVEMENT	CONCRETE	SPOT ELEVATIONS	SIGNS	MANHOLE W/ DESCRIPTION	MANHOLE DESCRIPTIONS	FIRE HYDRANTS	GATE VALVES	REDUCERS	CLEAN OUTS	UTILITY BOX OR VAULT	BACKWATER VALVES	100w HPS STREETLIGHTS	150w HPS STREETLIGHTS	200w HPS STREETLIGHTS	250w HPS STREETLIGHTS
PROPERTY LINE	SAWCUT LINE	EXISTING:	(2210)								(12.34) BC													
ROW LINE	SCARP LINE	PROPOSED:	(2122)								(12.34) BC													

REVISIONS

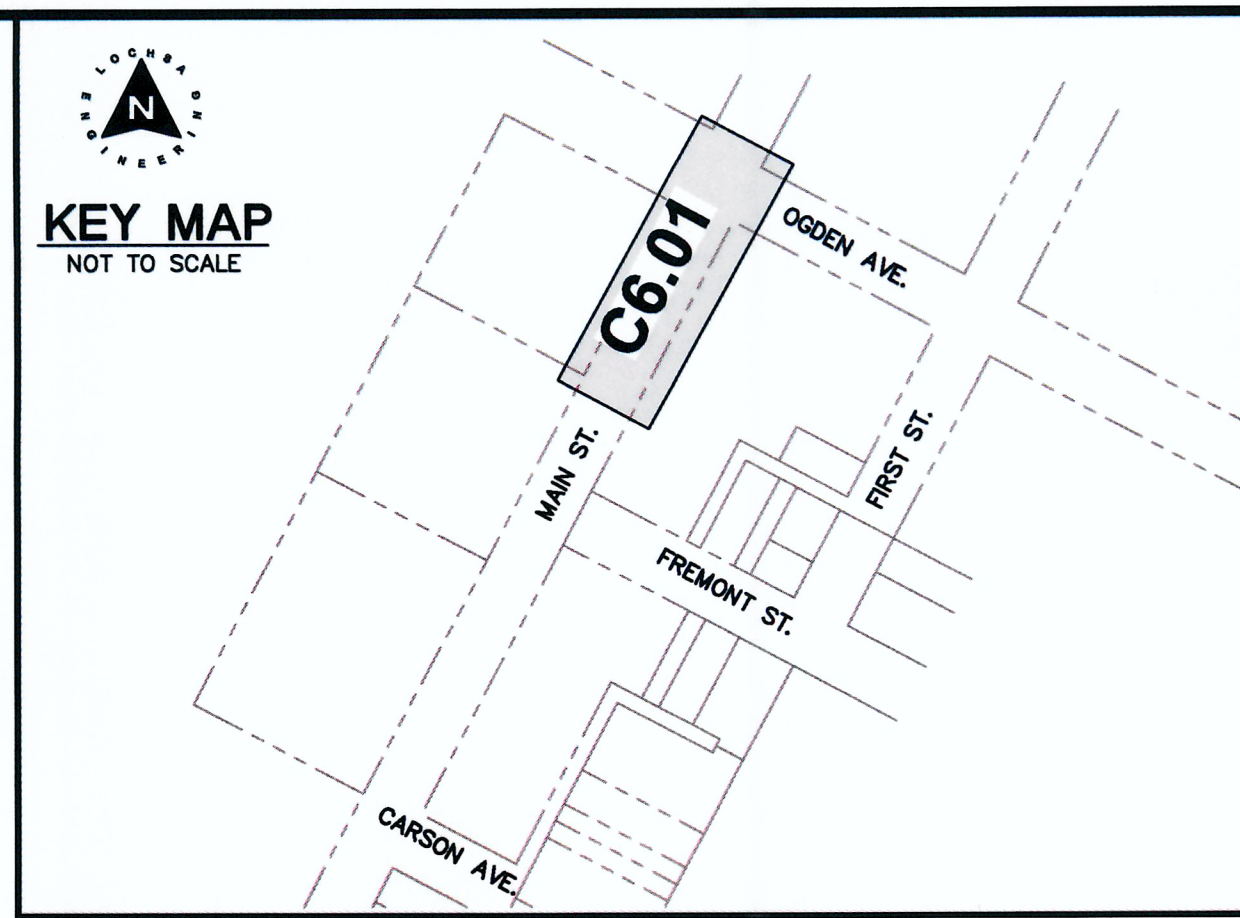
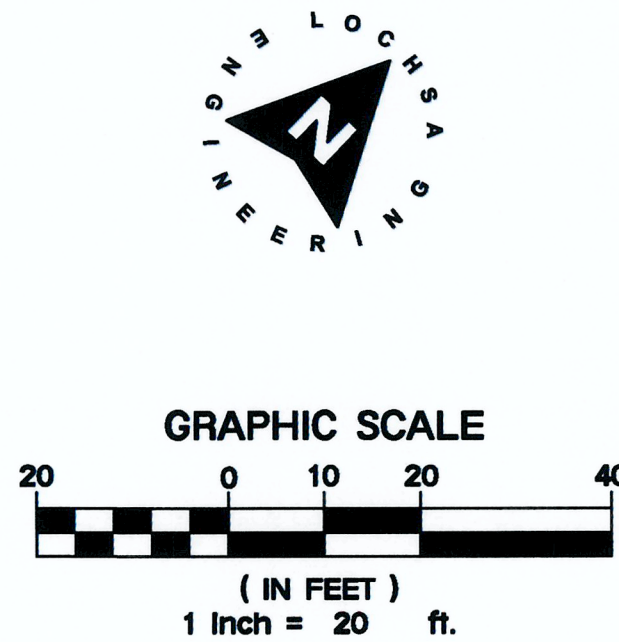
NO.	DATE	DESCRIPTION
1	11-21-19	NMG
2	07/16/20	NMG
3	07/16/20	NMG

18 FREMONT STREET
HOTEL AND CASINO
CITY OF LAS VEGAS

PROJECT No.: 171126
DATE: 08/13/20
SCALE: 1"=30'
DRAWN BY: NMG
DESIGNED BY: NMG
CHECKED BY: GMM

SEAL
GUY M. MORRIS
EXP. 12-31-21
CIVIL
No. 14526
08/13/20
SHEET No. C4.01
SHEET 10 of 15
CLV No. 107V7521
L18-02490

Lochsa Engineering



- ALL WATER CONSTRUCTION TO BE DONE IN ACCORDANCE WITH THE "UNIFORM DESIGN AND CONSTRUCTION STANDARD FOR WATER DISTRIBUTION SYSTEMS" (UDACS). - NOT ALL NOTES USED ON THIS SHEET -
1. EX. ACP WATER TO BE REMOVED BETWEEN CONNECTION POINTS.
2. INSTALL TEE W/THRUST BLOCK PER UDACS PLATE NO. 31 (SAME SIZE AS PIPE)
3. INSTALL UTILITY CROSSING PER UDACS SECTION 2.2.2.02.
4. TRENCH AND BACKFILL PER UDACS PLATE NO. 17. CONTRACTOR TO REPAIR CURBS, GUTTER & SIDEWALK TO MATCH EXISTING TYPE & GRADE.
5. INSTALL GATE VALVE PER UDACS PLATE NO. 30 & 38.
6. INSTALL DUAL 8" BETER AND 10" RPPA PER DETAIL 7.0 C7.01.
7. INSTALL CAP. SEE PLUMBING PLANS FOR CONTINUATION.
8. INSTALL FIRE HYDRANT PER UDACS PLATE NO. 40.
9. CONNECT TO EXISTING 12" ACP WATER.
10. INSTALL 90° BEND W/THRUST BLOCK (SAME SIZE AS PIPE) PER UDACS PLATE NO. 31.
11. INSTALL STEEL CASING PER UDACS PLATE NO. 23.
12. INSTALL 45° BEND W/THRUST BLOCK (SAME SIZE AS PIPE) PER UDACS PLATE NO. 31.
13. REMOVE EX. WATER METER PER UDACS SEC. 2.17.04.

FIRE HYDRANT & LATERAL ABANDONMENT:

WHERE SHOWN ON THE DRAWING, THE CONTRACTOR SHALL ABANDON THE EXISTING FIRE HYDRANT(S) BY REMOVING BOTH THE UPPER AND LOWER FIRE VALVE AND POSITIVE CLOSURE. THE REMAINING PORTION OF THE HYDRANT ASSEMBLY IS CLOSER THAN (2) FEET TO THE EXISTING GRADE. THE EXISTING HYDRANT SHALL BE DELIVERED TO THE AGENCY. THE EXISTING VALVE SHALL BE REMOVED AND POSITIVE CLOSURE SHALL BE PROVIDED BY THE CONTRACTOR BY REMOVING A MINIMUM OF THE TOP TWENTY-FOUR (24) INCHES OF THE VALVE AND A MINIMUM OF THE TOP TWENTY (20) INCHES OF THE BOW WITH A MINIMUM OF EIGHT (8) INCHES OF SAND OR TYPE 1 AGGREGATE BASE. THE REMAINING PORTION OF THE VALVE BOW SHALL BE FILLED WITH CONCRETE HAVING A MINIMUM OF 10% AGGREGATE. THE REMAINING PORTION OF THE VALVE SHALL BE CUT WITHIN ONE (1) FOOT OF THE REMAINING VALVE BOW. ALL SHOWN SHALL BE FLANGED, AND CAPPED. THE EXISTING REMAINING VALVE SHALL BE REMOVED.

UTILITY NOTES:

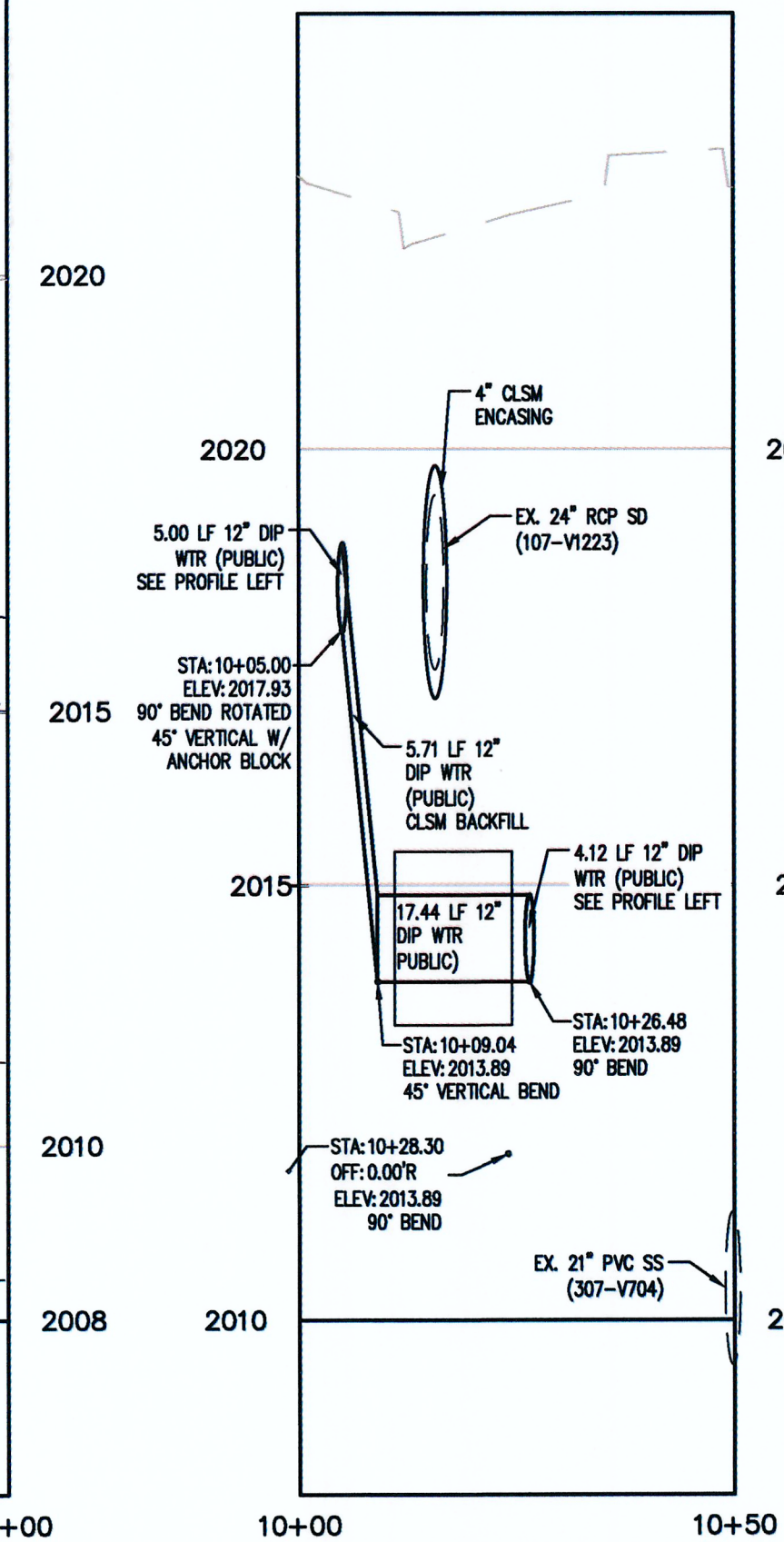
EXISTING SITE UTILITIES HAVE BEEN SHOWN BASED ON THE BEST AVAILABLE INFORMATION. CONTRACTOR SHALL FIELD VERIFY EXISTING UTILITY LOCATIONS PRIOR TO START OF CONSTRUCTION. CONTRACTOR TO EXERCISE CAUTION DURING ALL EXCAVATION OPERATIONS TO AVOID IMPACT TO EXISTING UTILITIES. CONTRACTOR IS RESPONSIBLE TO ADJUST ALL EXISTING MANHOLES, CLEAN-OUT VENTS, VALVES, BOXES AND ANY RELATED UTILITY IMPROVEMENTS ENCOUNTERED DURING CONSTRUCTION.

- ALL WATER, SANITARY SEWER AND STORM DRAIN IMPROVEMENTS SHALL CONFORM TO THE LATEST VERSION OF UDCAS DESIGN AND CONSTRUCTION STANDARDS SPECIFICATIONS FOR WATER COLLECTION SYSTEMS AND APPLICABLE CITY STANDARDS GUIDELINES.
1. ALL ON-SITE WATER LINES 4" - 12" TO BE CL 150, C900 PVC. ALL ON-SITE WATER LINES GREATER THAN 12" TO BE D.I.P. ALL ON-SITE WATER LINES SMALLER THAN 4" TO BE COPPER.
2. CONTRACTOR TO FIELD VERIFY LOCATION OF ALL UTILITY STUBS PRIOR TO CONSTRUCTION.
3. ALL EXISTING UTILITY STRUCTURES WITHIN CONSTRUCTION AREA SHALL BE ADJUSTED TO MATCH FINISH GRADE (I.E. WV, BOX, WMH, ANNODE BOX, FH, TE BOX, ETC.)
4. ALL DIMENSIONS TO UTILITIES ARE TO CENTERLINE OF PIPE UNLESS

EASEMENT WITH TREES, SHRUB
DECORATIVE ROCKS, BLOCK WALL OR FENCE

TREE'S, SHRUBS, OR DECORATIVE ROCKS, AND ANY BLOCK WALL OR OTHER FENCE MATERIAL, SHALL BE DESIGNED AND CONSTRUCTED AROUND THE EASEMENT(S) TO ALLOW THE DISTRICT DIRECT ACCESS TO THE VAULT(S), BACKFLOW ASSEMBLIES, AND PIPING FROM THE ADJACENT RIGHT OF WAY.

NOTE:
PROTECT IN PLACE AND ADJUST LVVWD EXISTING FACILITIES TO FINISHED
GRADE. ALL LVVWD FACILITIES SHALL BE ACCESSIBLE AT ALL TIMES.



water PROFILE VIEW
HORIZONTAL SCALE: 1"=20'
VERTICAL SCALE: 1"=2'

A.P.N.:
139-34-113-001 & 139-34-112-001

BASIS OF BEARINGS:
BASIS OF BEARINGS FOR THIS SURVEY IS THE CENTERLINE OF OGDEN AVENUE BETWEEN MAIN STREET AND FIRST STREET, AS SHOWN ON FILE 67, PAGE 79 OF SURVEYS. SAID LINE BEARS: S62°04'36"E

BENCHMARK:
BENCHMARK BLV0134NNWK BEING A RIVET & PLATE TOP CURB NE CORNER MAIN ST. & FREMONT ST. ELEVATION=2023.19 FEET (616.669 METERS)

NOTE: LOCHSIA 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: GAS, WATER, SANITARY SEWER, STORM SEWER, TELEPHONE, POWER, GAS, AND IRRIGATION LINES PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. IF UNLOCATED UTILITIES ARE FOUND, THE CONTRACTOR IS TO NOTIFY THE PROJECT ARCHITECT, OWNER'S REPRESENTATIVE AND THE PROJECT ENGINEER IMMEDIATELY.

Call
Before You
Overhead

UNDERGROUND TRAFFIC SIGNALS AND STREET LIGHT SYSTEMS CONDUITS ARE COMPLY.

Call
before you
UnderGround

Call
811

or

1-702-227-2929

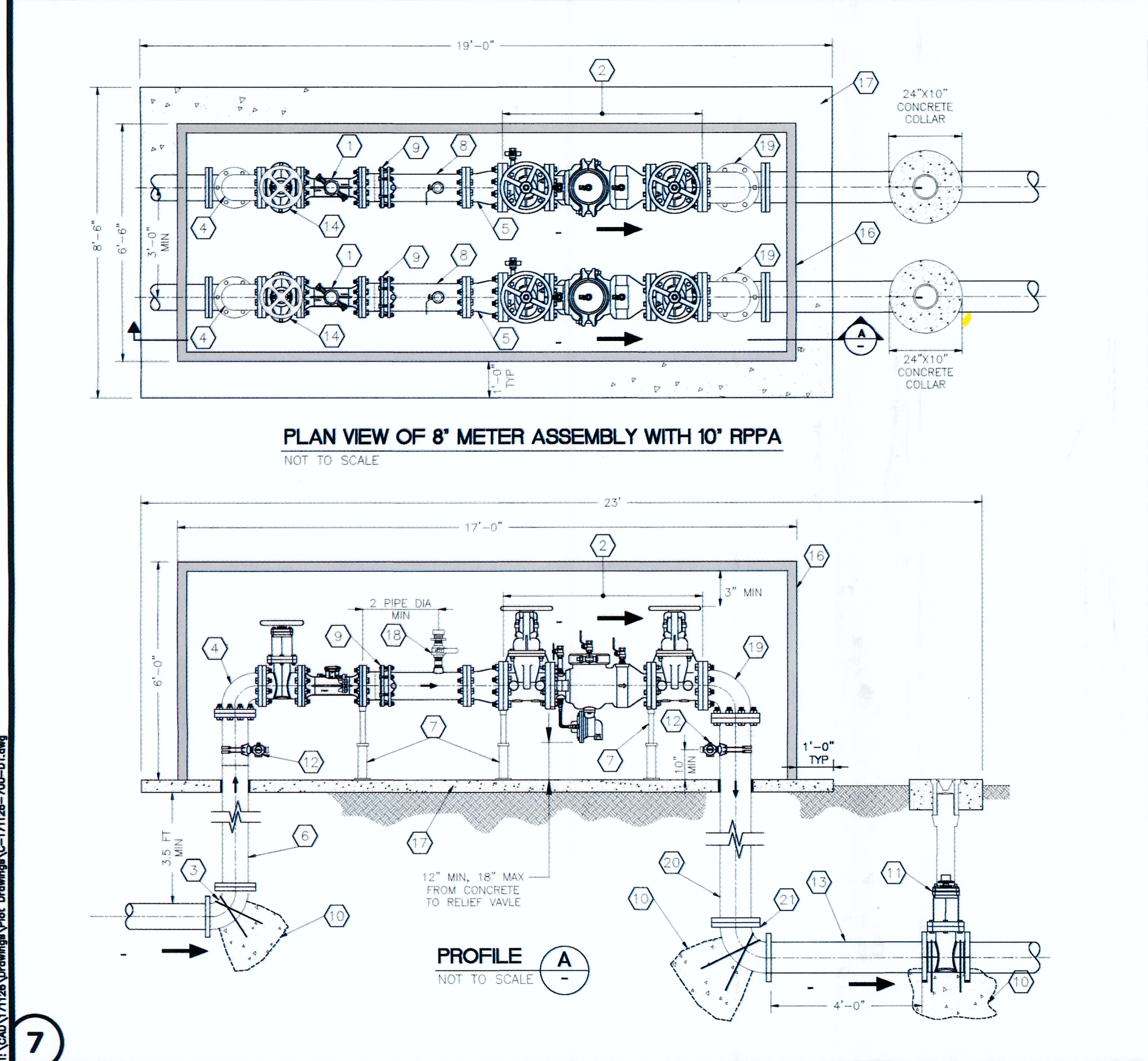
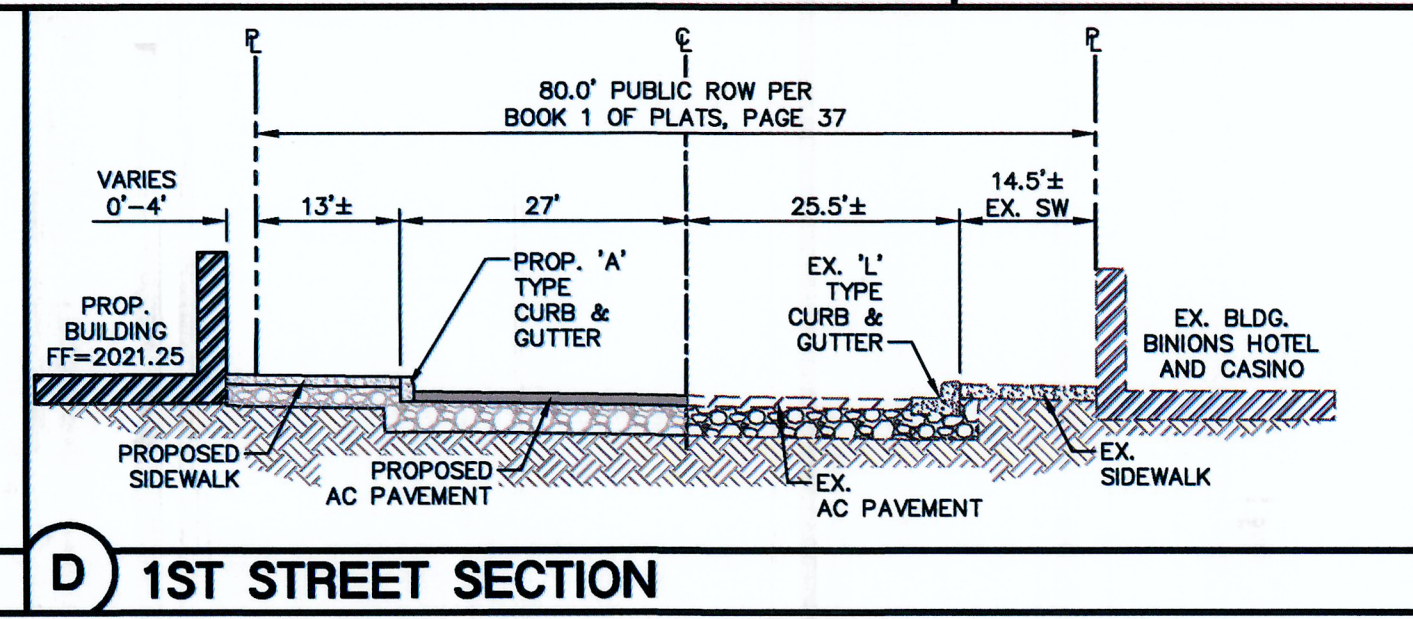
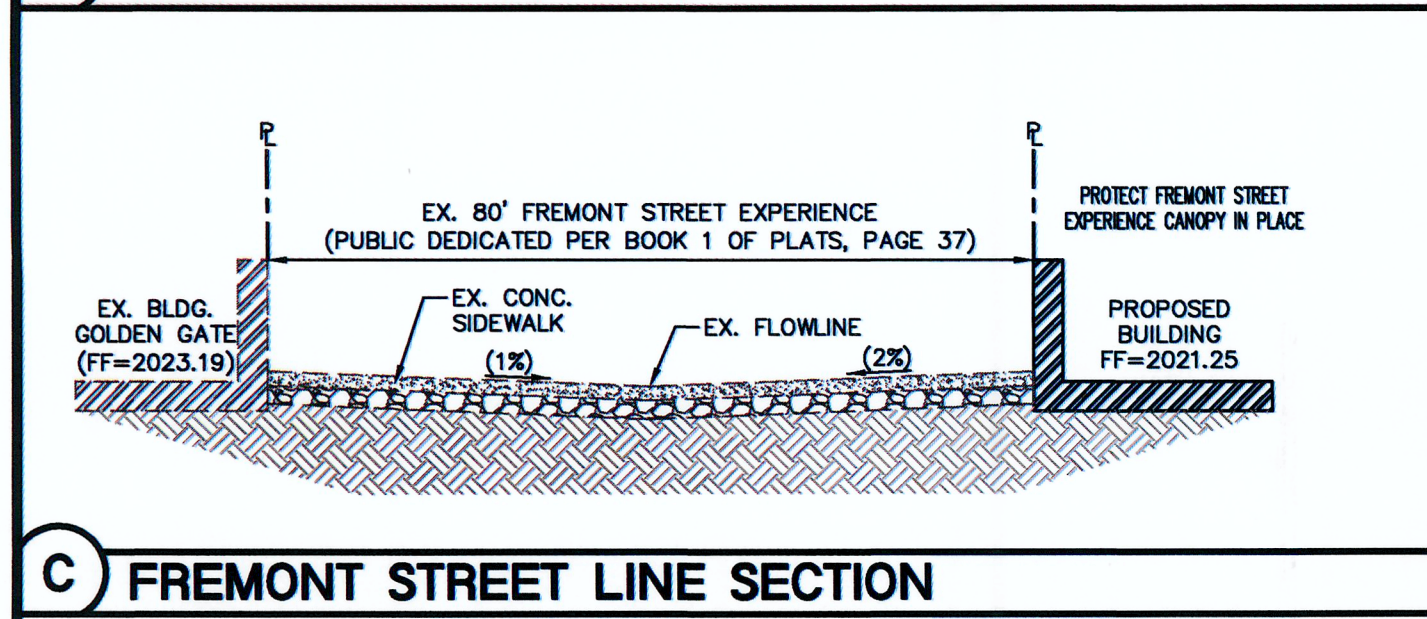
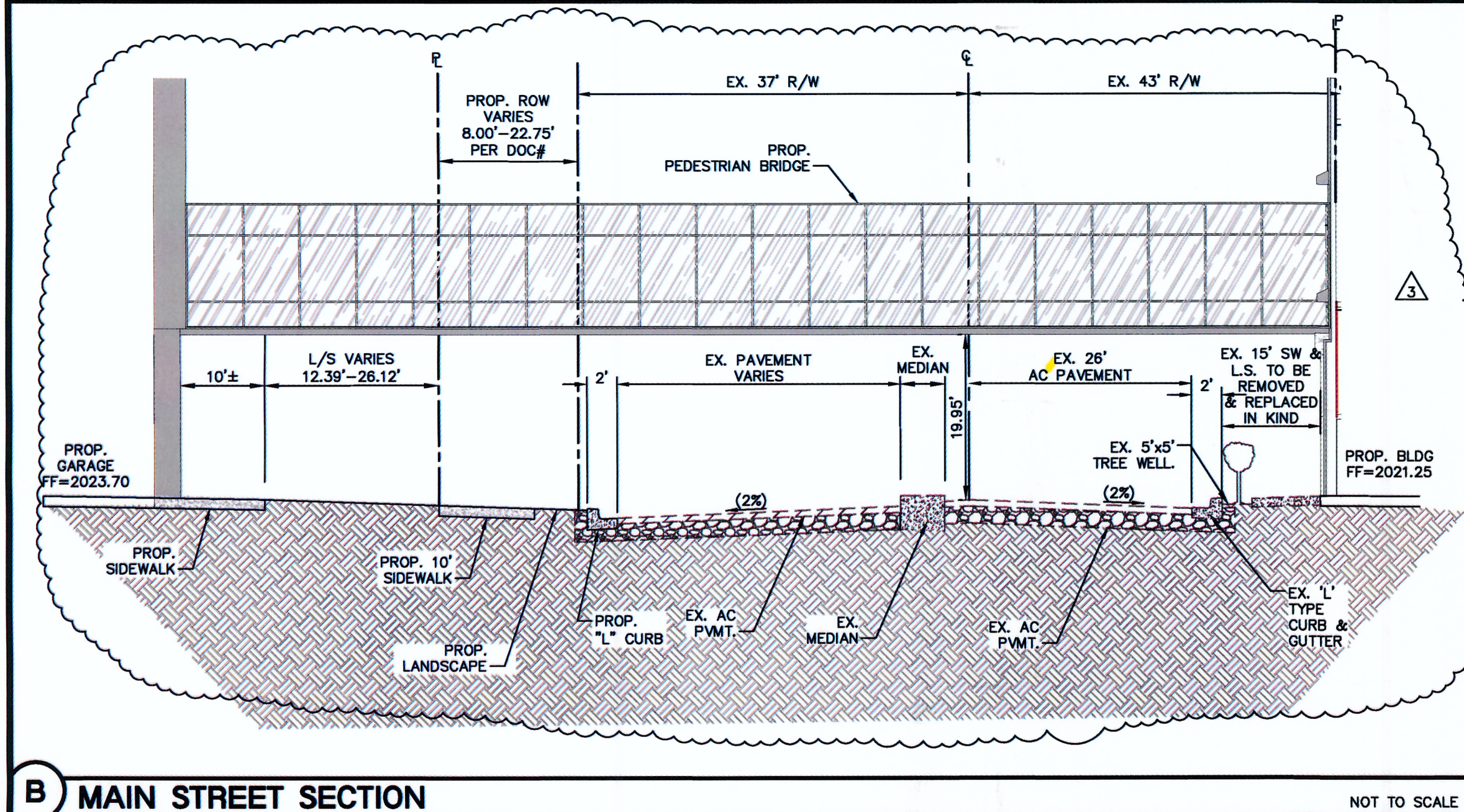
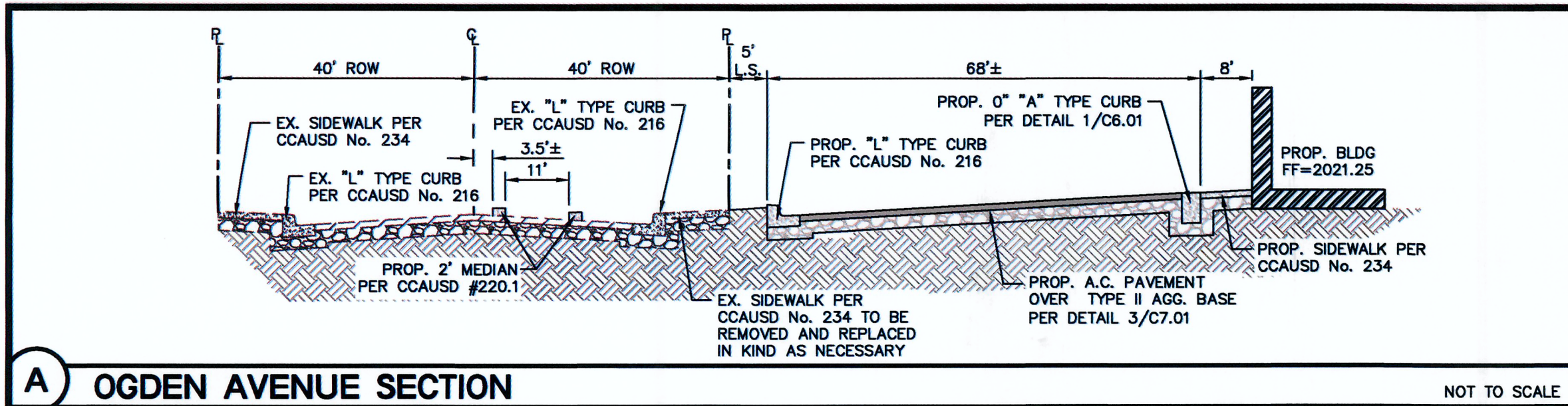
1-702-432-5300

FREEWAY AND ARTERIAL STREET OF DOWNTOWN 1-800-227-2800

WATER VALVES	100w HPS STREETLIGHTS	150w HPS STREETLIGHTS	200w HPS STREETLIGHTS	250w HPS STREETLIGHTS
3WV				
3WV				

SW	()	()	()	()
----	-----	-----	-----	-----

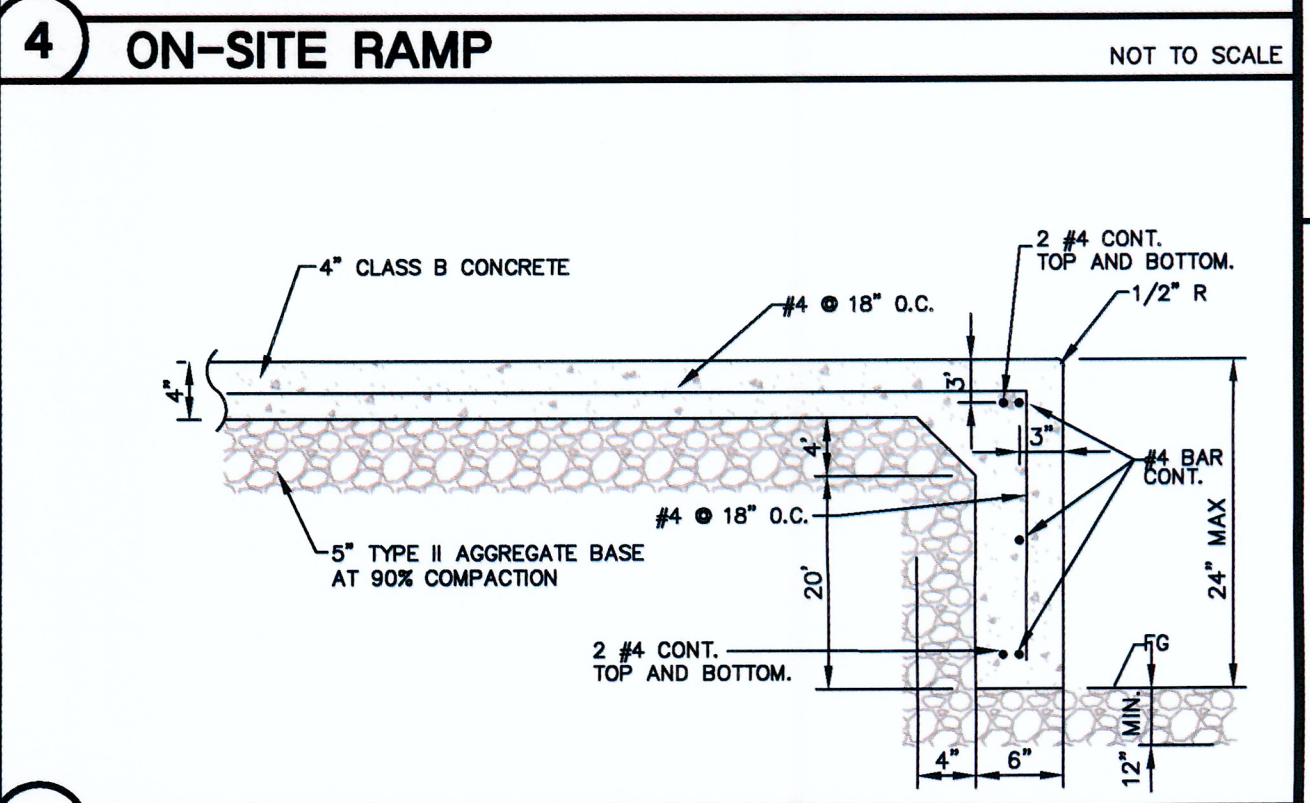
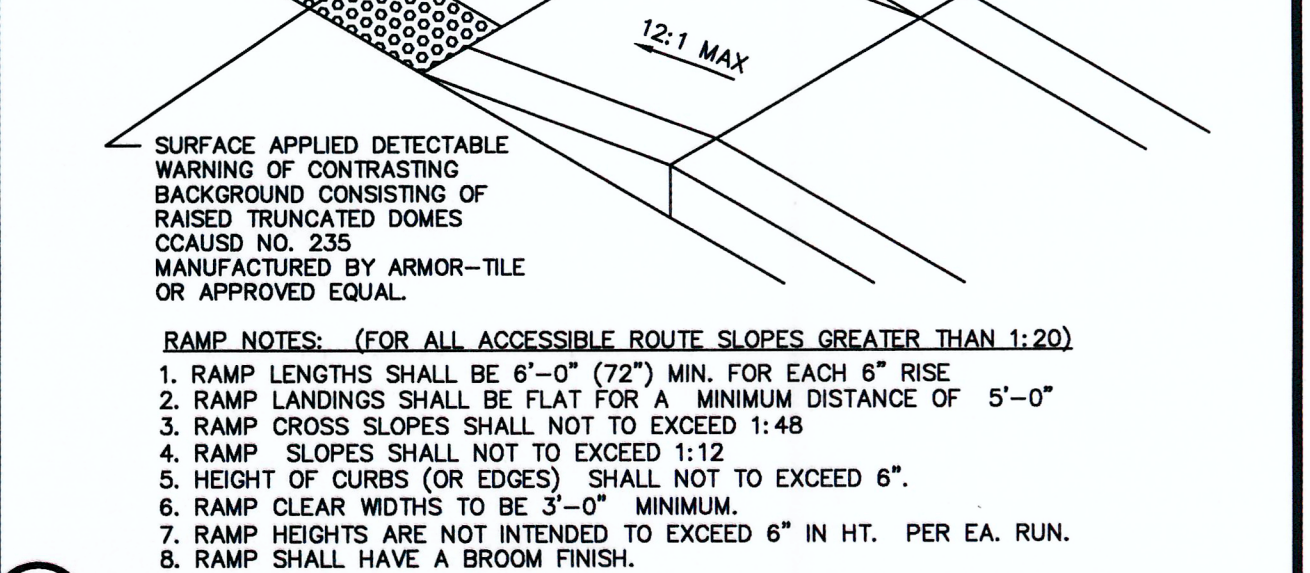
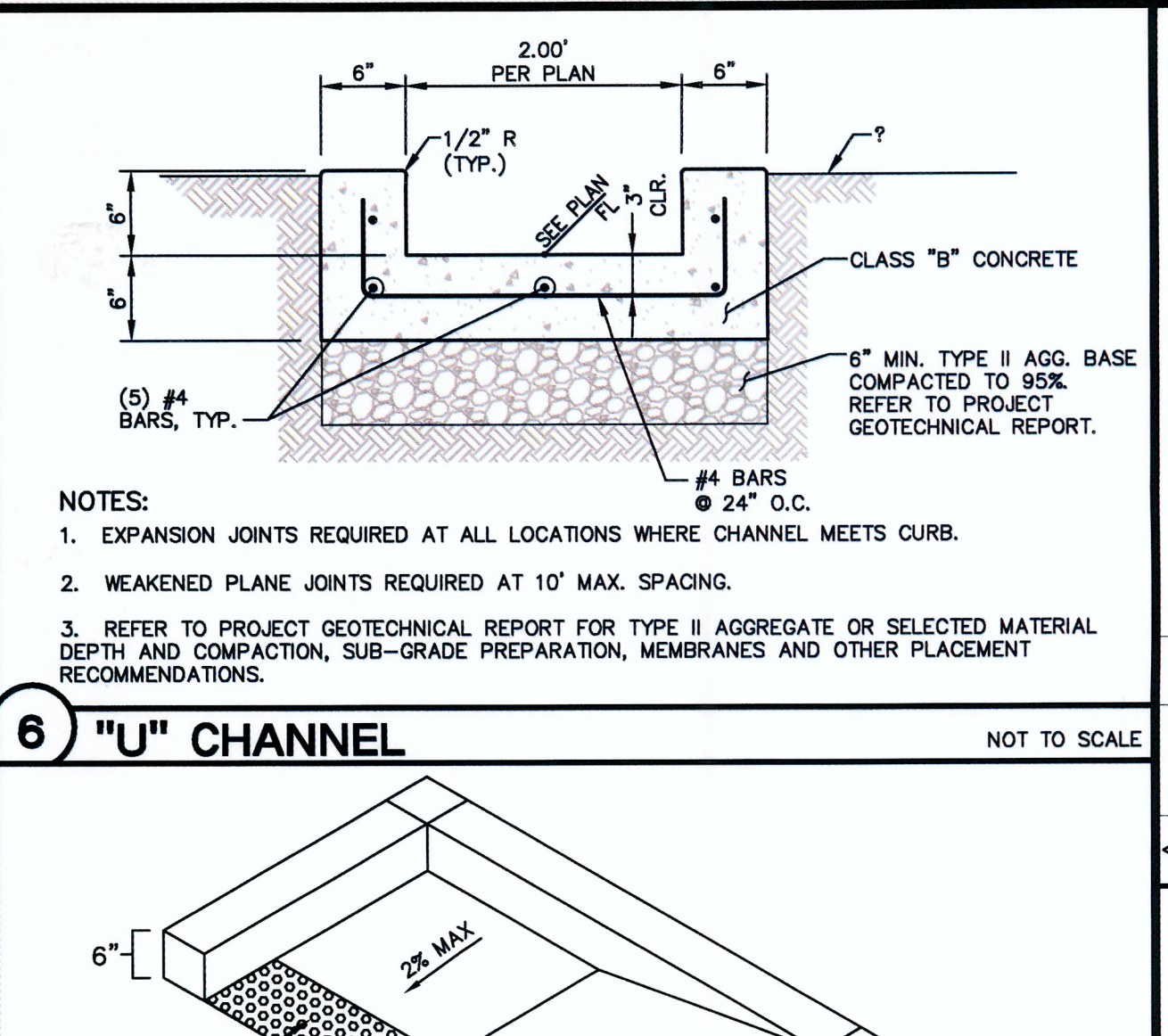
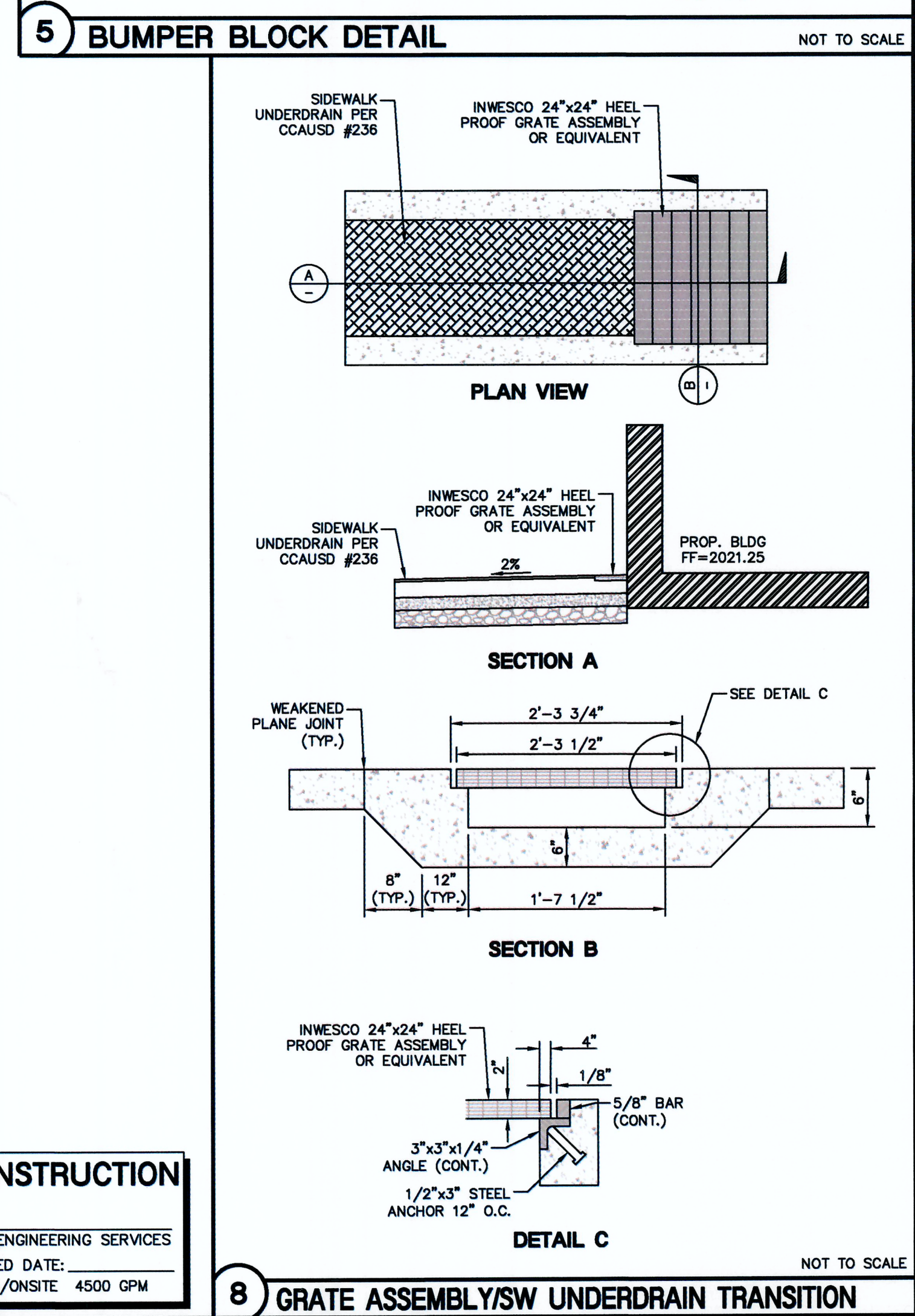
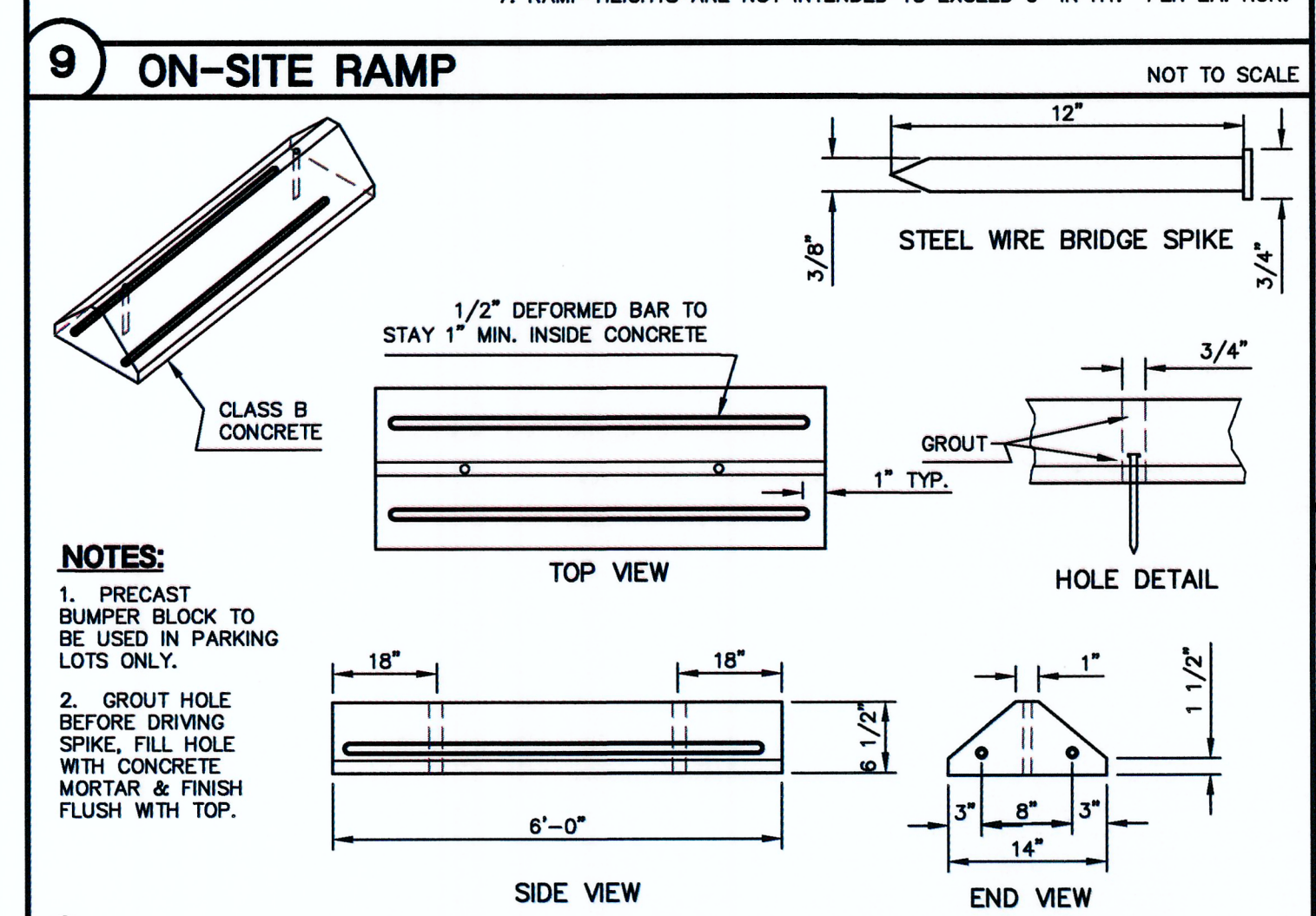
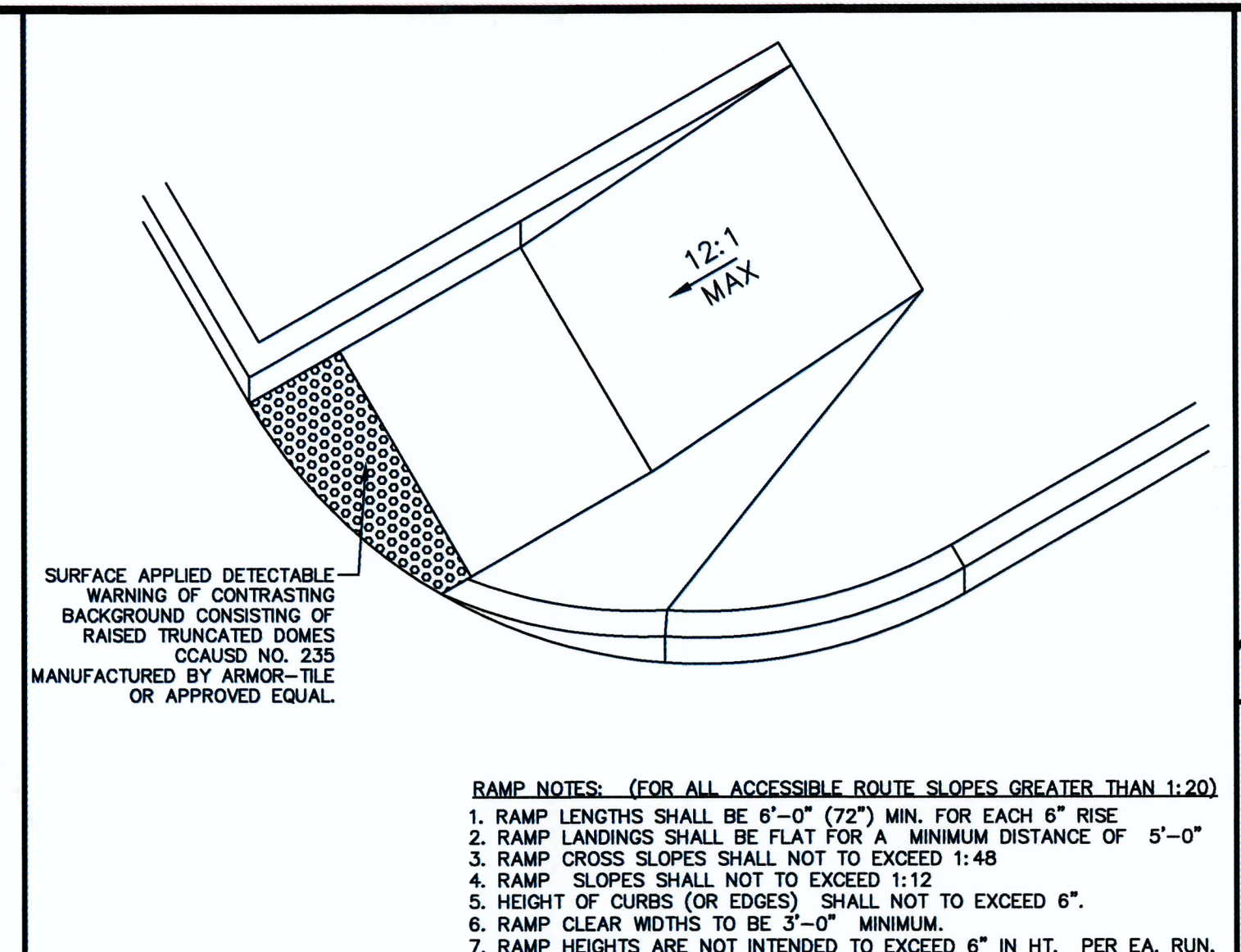
PLAN AND PROFILE MAIN STREET 18 FREMONT STREET HOTEL AND CASINO CITY OF LAS VEGAS Lochsa <i>engineering</i> 6346 South Jones Blvd. Las Vegas, NV 89118 Phone (702) 365-4912 Fax (702) 365-4913 www.lochsa.com	TITLE	171126	
	PROJECT No:	DATE:	08/13/20
	SHEET	SCALE:	1"=20'
	DRAWN BY:	NMG	
	DESIGNED BY:	NMG	
CHECKED BY:	GMM		
08/13/20			
SHEET No. C6.01 SHEET 14 OF 15 CLY No. 107/7521 L18-02490			



- MATERIAL LIST**
- 8" WATER METER (OCTAVE-ULTRASONIC)
 - APPROVED IN LINE 10" REDUCED PRESSURE PRINCIPLE ASSEMBLY RPPA (WITH NRS VALVES)
 - 8" PO X MJ RESTRAINT 90° BEND
 - 8" FLG X FLG 90° BEND
 - 10" X 8" FLG X FLG REDUCER
 - 8" FLG X PE DIP (CUT AS REQUIRED)
 - ADJUSTABLE PIPE SUPPORTS
 - 8" FLG X PE DIP SPOOL WITH 2" TEST PORT
 - 8" RFA RESTRAINED FLANGED COUPLING ADAPTER
 - CONCRETE THRUST/ANCHOR BLOCK
 - PO X PO GATE VALVE TO MATCH PIPE SIZE
 - 2" SERVICE SADDLE AND 2" N.P.T. CORP STOP W/ BRASS CAP (BYPASS TO BE INSTALLED 45° OFFSET FROM FLOW)
 - 10" PE X PE PIPE SPOOL
 - FLG X FLG NRS GATE VALVE
 - NOT USED
 - INSULATED ENCLOSURE
 - CONCRETE PAD (4" THICK) WITH WELDED WIRE FABRIC, 4' x 4' - W1.4 x W1.4
 - 2" BALL VALVE WITH BRASS FIRE HOSE DOUBLE MALE NIPPLE 2" NPT X 2.5" NH ADAPTER AND BRASS CAP
 - 10" FLG X FLG 90° BEND
 - 10" FLG X PE DIP (CUT AS REQUIRED)
 - 10" PO X MJ RESTRAINT 90° BEND
- DIMENSION NOTES:**
1. IF RPPA MODEL "WATTS LF908" IS USED, THE LENGTH OF THE ASSEMBLY GOES FROM 17FT TO 19FT, AND THE WIDTH GOES FROM 3.5FT TO 4FT.

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES
PROJECT No. 135388 FIRST APPROVED DATE:
LVWMD APPROVED FIRE FLOW 4500 GPM/ONSITE 4500 GPM

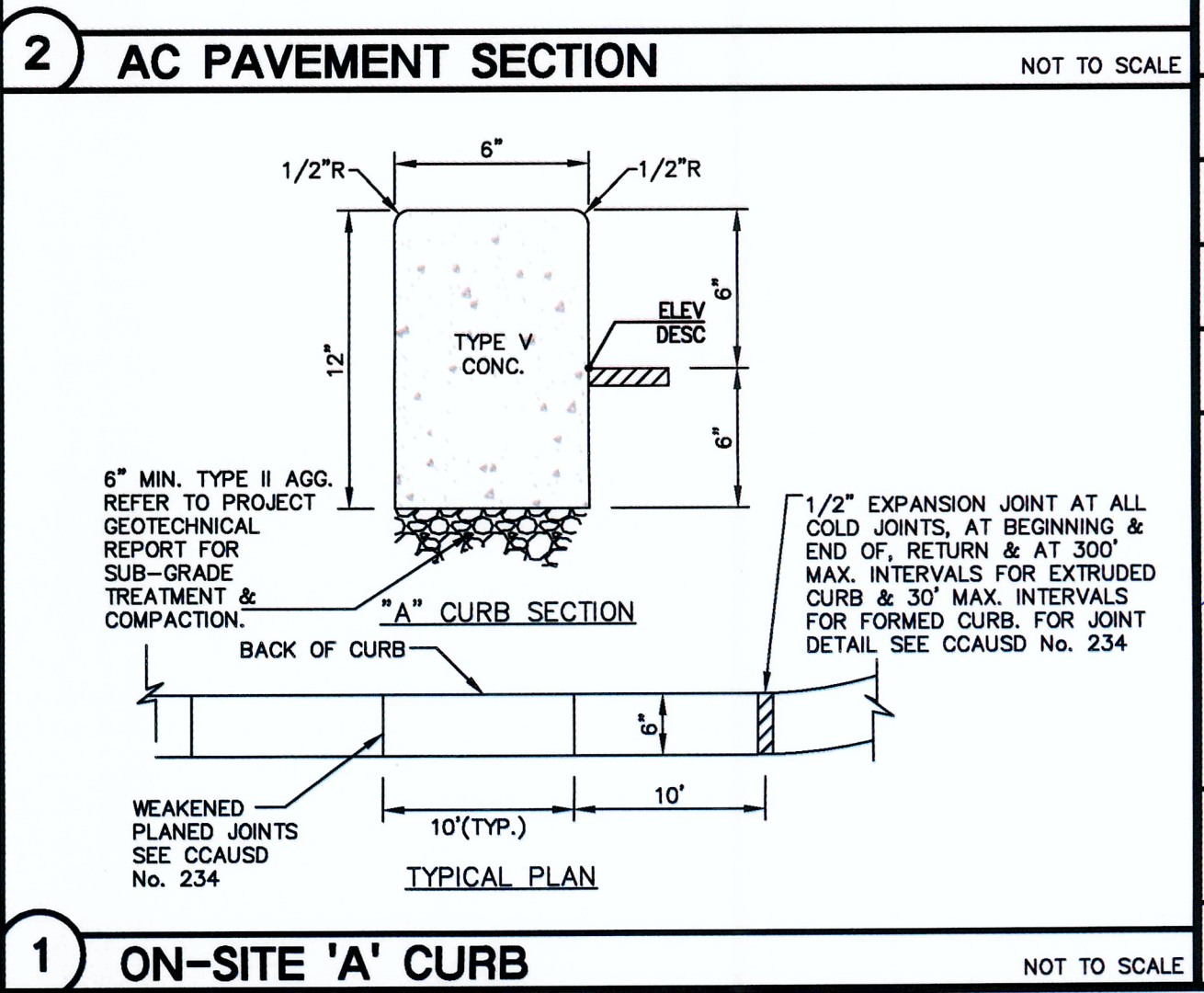


3: AC PAVEMENT SECTION

NOT TO SCALE

TYPE OF TRAFFIC	ASPHALT (inches)	TYPE II BASE COURSE (inches)
AUTOMOBILE PARKING	3	7
MAIN CORRIDORS & HEAVY DUTY TRUCK	3	10

REFER TO PROJECT GEOTECHNICAL REPORT FOR ALL SUB-GRADE PREPARATION & COMPACTION.
NOTE: ALL AGGREGATE BASES SHALL BE COMPACTED PER GEOTECHNICAL REPORT.



Lochsa Engineering

18 FREMONT STREET HOTEL AND CASINO CITY OF LAS VEGAS

PROJECT No.: 171126

DATE: 08/13/20

SCALE: N/A

DRAWN BY: JWN

DESIGNED BY: NMG

CHECKED BY: GMM

GUAY MORRIS
PROFESSIONAL ENGINEER - STATE OF NEVADA
No. 14526
Exp. 12-31-21
CIVIL

SHEET No. **C7.01**
SHEET 15 OF 15
CLV No. 107V7521
L18-02490