

DS #: 4805

APN: 139.33-311-002

PROJECT: Valley Hospital Drainage Improvements

SUBMITTAL: 1st Submittal

SCANNED BY/DATE:

CHECKED BY/DATE:



CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM		DATE: June 20, 2016
TO: Land Development Services Department of Building & Safety		FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for:	
	Valley Hospital – Update for Drainage Improvements	
Cross Streets:	NWC of Goldring Avenue & Shadow Lane	
File Number:	F:\Depot\DSMemos\DS4805A.doc	
Parcel Number:	139-33-311-002	
Zoning Action:		
FEMA Flood Zone	YES	NO X
Proposed Storm Drain	YES	NO X
COPIES TO:		
		Taney Engineering
		Valley Health System, LLC
		Bart Anderson, P.E., DevCo

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	6/1/2016	6/20/2016	See Comments Below	\$400.00	446009: \$400
			TOTAL FEES (LDDRS):	\$400.00	----

REMARKS:

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

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

- Standard Form 1:** Correct the numerical value in the "Location of Development: Range" from 60 to 61.

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

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

END OF REMARKS

ays

T/R/S: T20S/R61E/33
AREA M-33

 *** FAX TX REPORT ***

TRANSMISSION OK

JOB NO. 0276
 DESTINATION ADDRESS 7023625233
 PSWD/SUBADDRESS
 DESTINATION ID
 ST. TIME 06/20 14:05
 USAGE T 01' 09
 PGS. 1
 RESULT OK

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REMARKS:

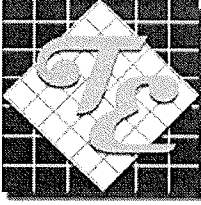
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TANEY ENGINEERING

6030 SOUTH JONES BLVD.
LAS VEGAS, NV 89118
TELEPHONE: 702-362-8844
FAX: 702-362-5233

Transmittal

☐ **Priority** ☐ **Must be delivered by:**

☐ **AM**

☐ **PM**

To:	Albert Sung Flood Control-7 th Floor	From:	Janna Felipe jannaf@taneycorp.com
Company:	City of Las Vegas	Date:	June 1, 2016
Address:	333 N. Rancho Las Vegas, NV 89106	Job No.:	VLL-15-001
Project:	Valley Hospital Drainage Improvements	Folder:	Hydrology
Re:	Drainage Study Update - Initial Submittal	Project #	

Items Attached

1. (1) Technical Drainage Study
2. (1) TDS Improvement Plans
3. (1) Disk of TDS
4. (1) Taney Check #22336, \$100.00; Taney Check #22337, \$300.00

COMMENTS:

For Review

RECEIVED BY

Signature: _____

Print name: _____

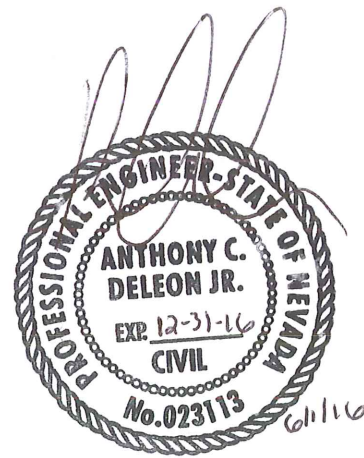
Date: _____

Time: _____



TANEY ENGINEERING

UPDATE #3
TO THE
TECHNICAL DRAINAGE STUDY
FOR
Valley Hospital
COMMERCIAL DEVELOPMENT



**CITY OF LAS VEGAS
NEVADA**

June 2016

Prepared by:

Taney Engineering
6030 S. Jones, Suite #100
Las Vegas, Nevada 89118
Telephone: (702) 362-8844
Fax: (702) 362-5233

Prepared for:

Valley Hospital
620 Shadow Lane
Las Vegas, NV 89106
Telephone: (702) 388-4910
Fax: (702) 388-4765

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL
DRAINAGE STUDY INFORMATION FORM

Name of Development: Valley Hospital Date: Jun 1, 2016

Location of Development: a) Descriptive (Cross Streets) North/South: Shadow Lane

East/West: Goldring Avenue

b) Section: 33 Township: 20 Range: 60

c) APN : 139-33-311-002

Name of Owner: Valley Health System L L C

Telephone No.: (702) 388-4910 Fax No.: (702) 388-4765 E-Mail Address: greg.lewis@uhsinc.com

Address: 620 Shadow Lane, Las Vegas NV. 89106

Contact Person-Name: Anthony Deleon, P.E. Telephone No.: (702) 362-8844

* E-Mail Address: AnthonyD@taneycorp.com Fax No.: (702) 362-5233

Firm: Taney Engineering

Address: 6030 S. Jones, Suite 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: 21.5+/- acres Being Developed/Disturbed: 4.85+/- 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

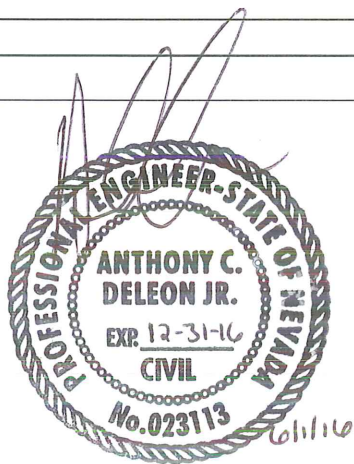
4. Proposed type of development (Residential, Commercial, Etc.): Commercial

5. Approximate upstream land area which drains to the subject site: 5.38+/- acres

6. Has the site drainage been evaluated in the past? ☒ YES ☐ NO If yes, please identify documentation: DS 3208 Update #1 Valley Hospital Expansion, DS 4158 Update #2 Valley Hospital Surgery Expansion

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: On site flow will be discharged to Shadow Lane.

8. Briefly describe your proposed schedule for the subject project: A.S.A.P



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



TANEY ENGINEERING

6030 SOUTH JONES BLVD, SUITE 100

LAS VEGAS, NV 89118

TELEPHONE: 702-362-8844

Fax: 702-362-5233

June 1, 2016
Job No. VLL-15-001

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

Subject: Update #3 to the Technical Drainage Study for Valley Hospital

Dear Mr. Sung:

Taney Engineering is pleased to submit Update #3 to the Technical Drainage Study for **Valley Hospital**. This update addresses changes to the project site plan. The project is located on the northwest corner of Shadow Lane and Goldring Avenue.

Update #1 for the Valley Hospital expansion was completed by CivilWorks Inc. and was approved by The City of Las Vegas on October 2, 2002 DS 3208. Update #2 was completed by Nevada By Design and was approved by the City of Las Vegas on May 3, 2007, DS 4158, for the expansion of the surgery department. Any pertinent reference material can be found in Appendix C.

This update is for a revision of the improvements put in place with the Valley Hospital Expansion. The grading plans for the update are shown in Appendix C. The site plan has been revised to redirect flow from the emergency exit put in place during the expansion. The design intent is to prevent ponding and flooding of the building while keeping as much of the existing improvements.

The proposed changes route water away from the door with the use of sloped sidewalks and a 3' valley gutter to convey the water away from the entrance. The door will also be raised to a new grade to prevent the water from flooding the building.

The overall drainage patterns remain the same. Offsite flow is conveyed around the site via Goldring Avenue and the existing channels that are around the site. Refer to the referenced basin maps for additional information. The hydrologic analysis has not been updated; and the proposed high points on Goldring Avenue are roughly at the same location as it was previously approved. The referenced basin boundaries have been shown on Figure 6.



A weighted area calculation was made to account for the upstream flow from Basin D-ON1. Figure 7 can be referenced to see the use of Basin D-ON1 A in order to quantify the amount of storm water passing by this problem area. The boundary was made between cross section 1 and 2. The weighted area calculation was not applied to cross section 3 as the full flow rate is expected at that location.

Hydraulics

Cross section 1 provides hydraulic calculations for the changes to the curb and gutter in front of the emergency room door as shown on Section B on sheet GD1. Cross section 2 provides calculations for entrance between cross section 1 and 3. The sidewalk is at a 2% grade sloping away from the building. The streets are sloped in a manner that allows the water to be transferred to the 3' valley gutter as shown on Section C on sheet GD1. Cross section 3 provides calculations for the area in front of the parking garage as shown on Section G on sheet GD1.

All hydraulic calculations and cross sections can be found in Appendix B. See Figure 7 for a summary of the cross section results and the location of each of the three cross sections. All street sections meet VxD and depth requirements for the 10-year and 100-year storm events.

The existing finished floor elevations do not meet the criteria of being set at a vertical distance above the gutter flow line of at least twice the depth of flow in the gutter flow line up to a maximum of 18 inches above the water surface elevation in the street per section 304.4 of the HCDDM. It should be noted that this is an existing condition wherein the buildings flood. The improvements that are proposed in this update improve the current situation by preventing ponding in front of the doors and flooding of the building.

Floodplain Info

Since the most recent update, the Federal Emergency Management Agency (FEMA), Flood Insurance Rate Map (FIRM) has been updated. The project site is located on Community Panel Numbers 32003C2170F, revised November 16, 2011. The project is still located in a Zone 'X'. Zone 'X' is described as an area determined to be outside the 0.2% annual chance floodplain. The most current panels have been used and are included in Appendix A.

2008 MPU

The Las Vegas Valley Flood Control Master Plan Update of the Clark County Regional Flood Control District (MPU) has also been updated since the original study was approved. The project site is located on Figure F-31 of the 2013 MPU and Figure H-31 of the 2008 MPU. Copies are provided in Appendix A as Figures 4 and 5, respectively.

**Table 1: Cross Section Summary**

Cross Section	Description	Q (cfs)	Depth (ft)	Velocity (ft/s)	DxV
CROSS SECTION 1 10YR	CS1	7.2	0.31	1.58	0.49
CROSS SECTION 1 100YR	CS1	13.5	0.38	1.92	0.73
CROSS SECTION 2 10 YR	CS2	7.2	0.32	1.61	0.52
CROSS SECTION 2 100 YR	CS2	13.5	0.39	1.93	0.75
CROSS SECTION 3 10 YR	CS3	8	0.33	1.64	0.54
CROSS SECTION 3 100 YR	CS3	15	0.39	1.98	0.77

If there are any question or you need any additional information, please do not hesitate to contact our office.

Sincerely,

TANEY ENGINEERING

A handwritten signature in blue ink, reading "Robert Lovelady".

Robert Lovelady



APPENDICES

APPENDIX A

Figures

APPENDIX B

Hydraulic Calculations

APPENDIX C

Reference Material

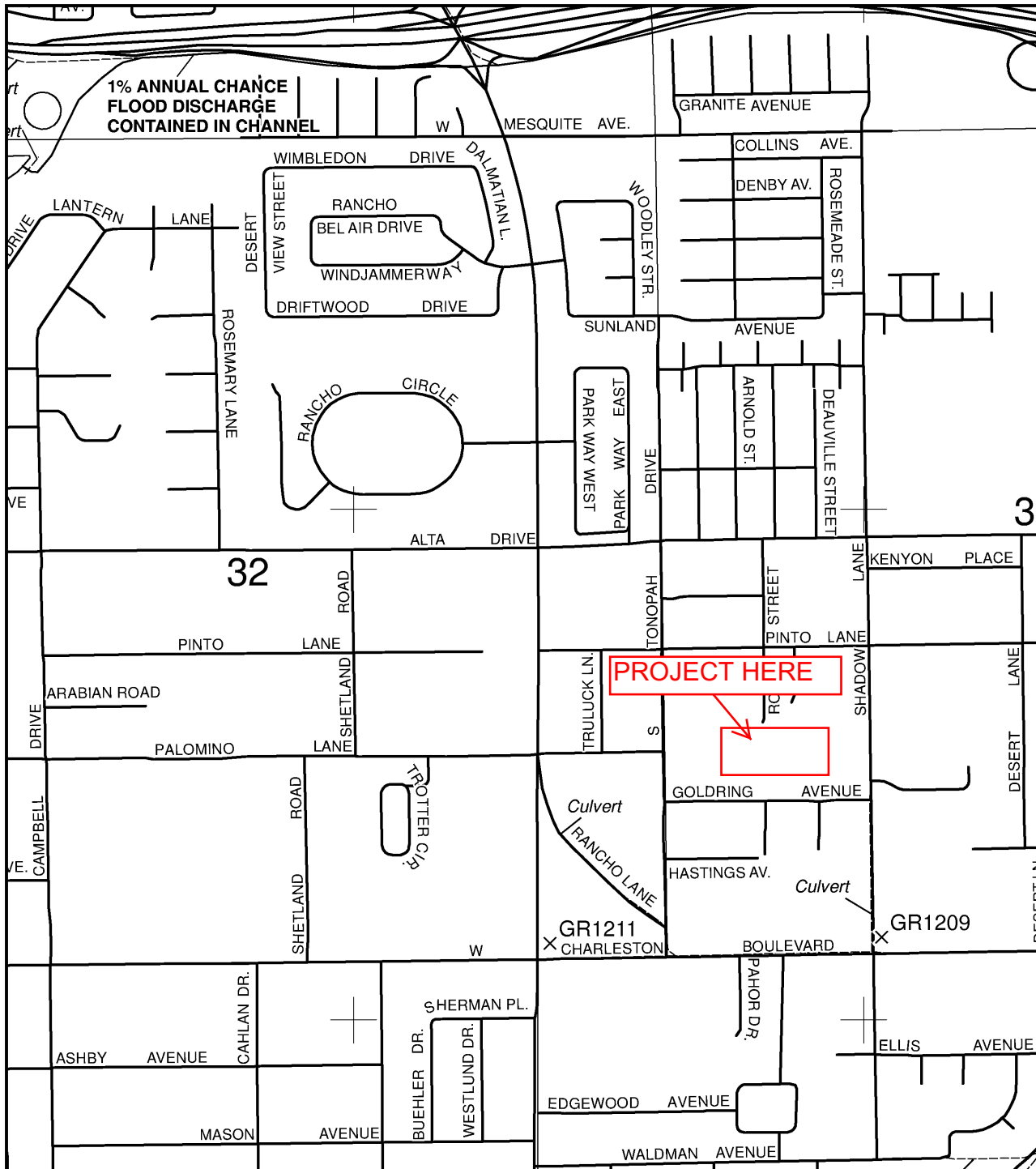
APPENDIX D

Improvement Plans



APPENDIX A

Figures





MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

500 0 1000 2000 METERS

PANEL 2170F

FIRM

FLOOD INSURANCE RATE MAP

CLARK COUNTY, NEVADA

AND INCORPORATED AREAS

PANEL 2170 OF 4090
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CLARK COUNTY	320003	2170	F
LAS VEGAS, CITY OF	325276	2170	F
NORTH LAS VEGAS, CITY OF	320007	2170	F

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



MAP NUMBER
32003C2170F

MAP REVISED
NOVEMBER 16, 2011

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

FIGURE 3

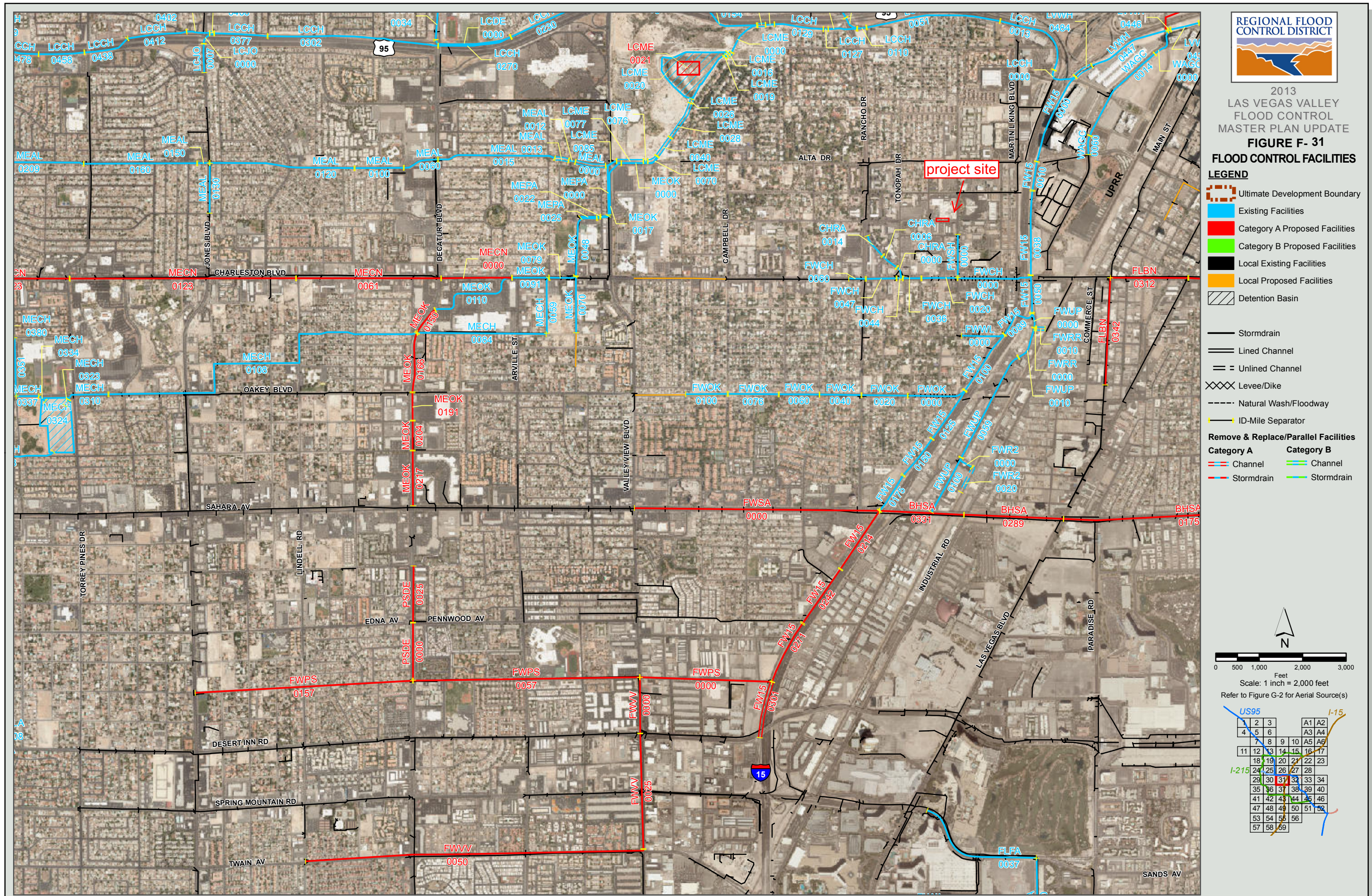


FIGURE 4



City of Las Vegas

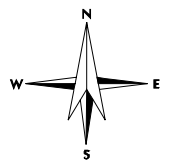
CITY - WIDE HYDROLOGY ANALYSIS

LEGEND

- EXISTING REGIONAL DETENTION BASINS
- PROPOSED REGIONAL DETENTION BASINS
- EXISTING LOCAL DETENTION BASINS
- EXISTING REGIONAL BRIDGES
- PROPOSED REGIONAL BRIDGES
- EXISTING LOCAL BRIDGES
- EXISTING REGIONAL CULVERT
- PROPOSED REGIONAL CULVERT
- EXISTING LOCAL CULVERT
- EXISTING REGIONAL PIPELINE
- PROPOSED REGIONAL PIPELINE
- EXISTING LOCAL PIPELINE
- EXISTING REGIONAL CHANNEL
- PROPOSED REGIONAL CHANNEL
- EXISTING LOCAL CHANNEL
- EXISTING REGIONAL DIKE/LEEVE
- PROPOSED REGIONAL DIKE/LEEVE
- EXISTING LOCAL DIKE/LEEVE
- EXISTING STORM WATER PUMPING STATION
- PROPOSED BELTWAY ALIGNMENT

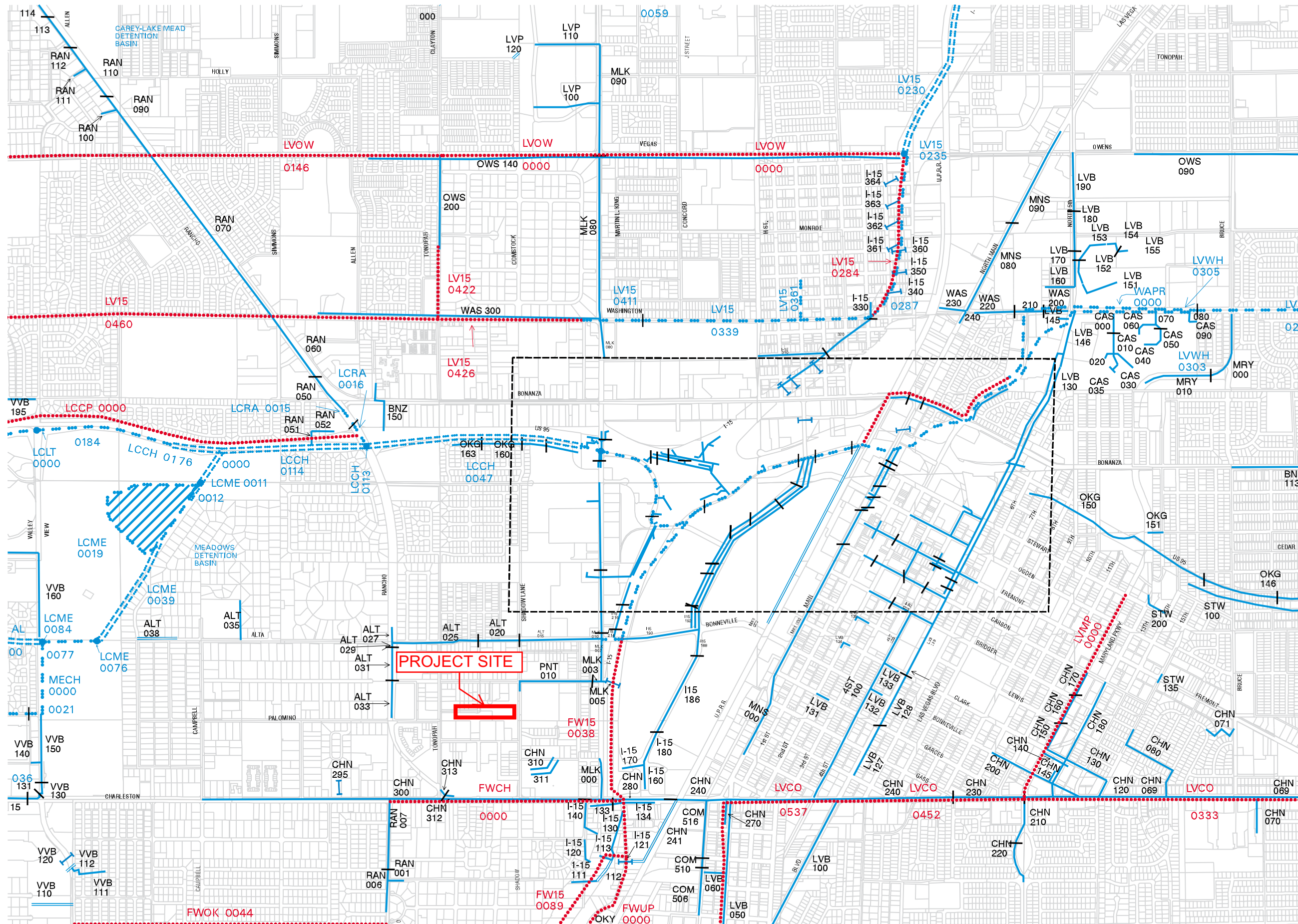
FIGURE F-14

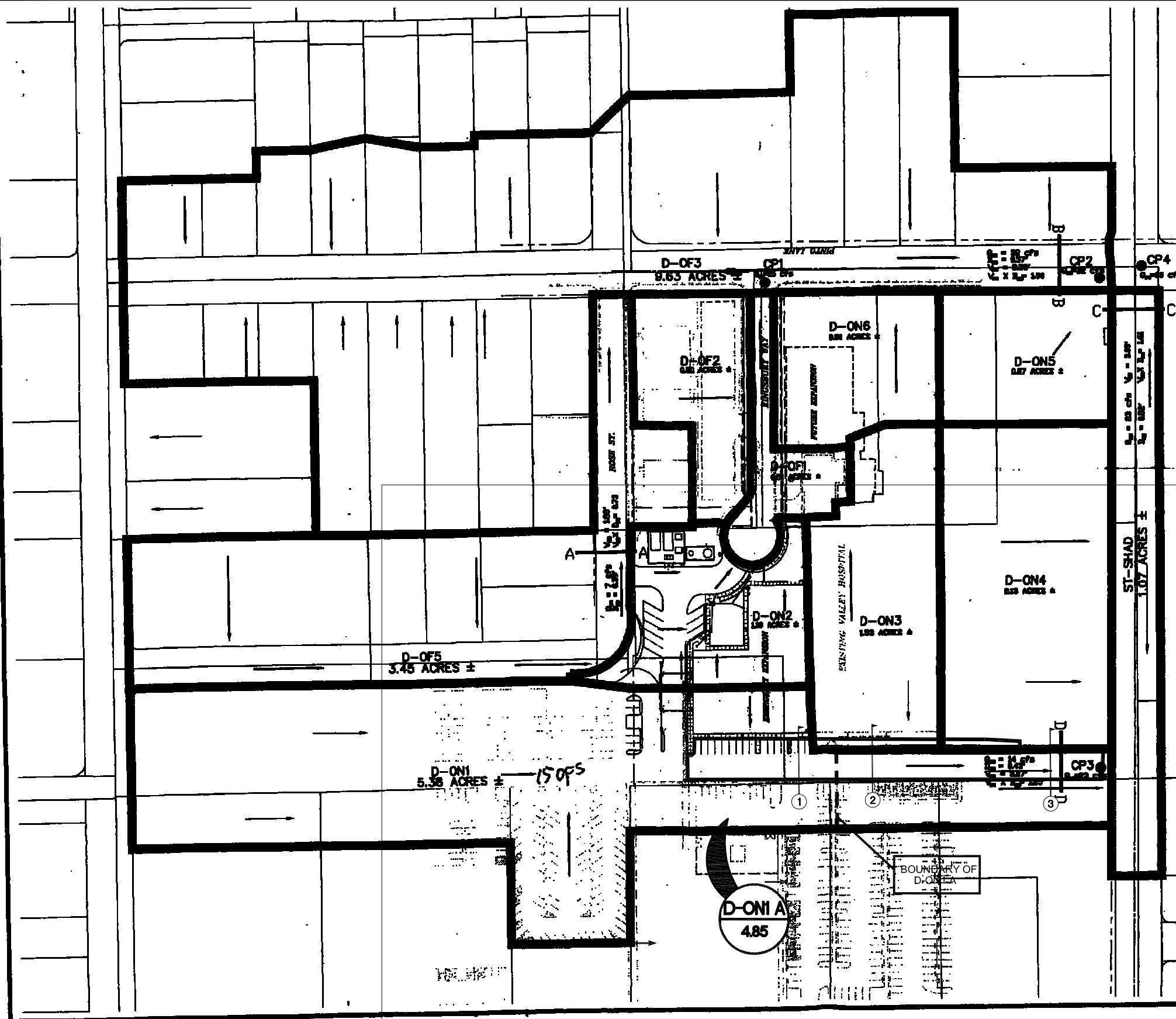
1	2			
3	4			
5	6			
7	8	9	10	
11	12	13	14	15
16	17	18	19	



Scale: 1 inch = 1600 feet

FLOOD CONTROL FACILITIES

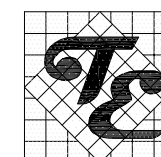
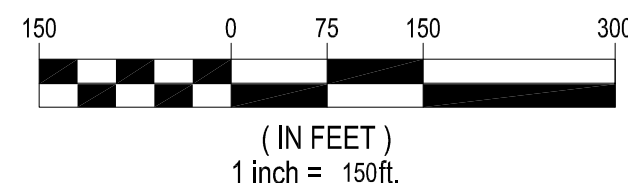




Ultimate Condition			
Basin	Area (acres)	Q ₁₀ (cfs)	Q ₁₀₀ (cfs)
D-ON1	5.38	8	15
D-ON1 A	4.85	7.2	13.5

*D-ON1 A IS A PORTION OF D-ON1 AND HAS BEEN SHOWN TO SATISFY THE AREA WEIGHTED FLOW CALC SHOWN HERE.

Cross Section	Description	Q (cfs)	Depth (ft)	Velocity (ft/s)	DxV
CROSS SECTION 1 10YR	CS1	7.2	0.31	1.58	0.49
CROSS SECTION 1 100YR	CS1	13.5	0.38	1.92	0.73
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CROSS SECTION 2 100 YR	CS2	13.5	0.39	1.93	0.75
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TANEY ENGINEERING
6030 S. JONES BLVD STE#100
LAS VEGAS, NV 89118
(702) 362-8844 FAX: (702) 362-5233

FIGURE 7
DEVELOPED BASIN MAP
VALLEY HOSPITAL



APPENDIX B

Hydraulic Calculations

Project Description

Input Data

Station (ft)	Elevation (ft)
--------------	----------------

Roughness Segment Definitions

(0+47.7, 0.48)	(0+30.9, 0.08)	0.016
(0+30.9, 0.08)	(0+27.9, 0.08)	0.013
(0+27.9, 0.08)	(0+09.0, 0.27)	0.016
(0+09.0, 0.27)	(0+04.0, 0.37)	0.013
(0+04.0, 0.37)	(0+00.0, 0.45)	0.013

Options

Results

Bentley Systems, Inc. Bentley FlowMaster V8i (SELECTseries 1) [08.11.01.03]

Worksheet for Update Cross Section 1 - 10yr

Results

Flow Area	4.54	ft ²
Wetted Perimeter	33.62	ft
Hydraulic Radius	0.14	ft
Top Width	33.62	ft
Normal Depth	0.31	ft
Critical Depth	0.28	ft
Critical Slope	0.00721	ft/ft
Velocity	1.58	ft/s
Velocity Head	0.04	ft
Specific Energy	0.35	ft
Froude Number	0.76	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.31	ft
Critical Depth	0.28	ft
Channel Slope	0.40000	%
Critical Slope	0.00721	ft/ft

Cross Section for Update Cross Section 1 - 10yr

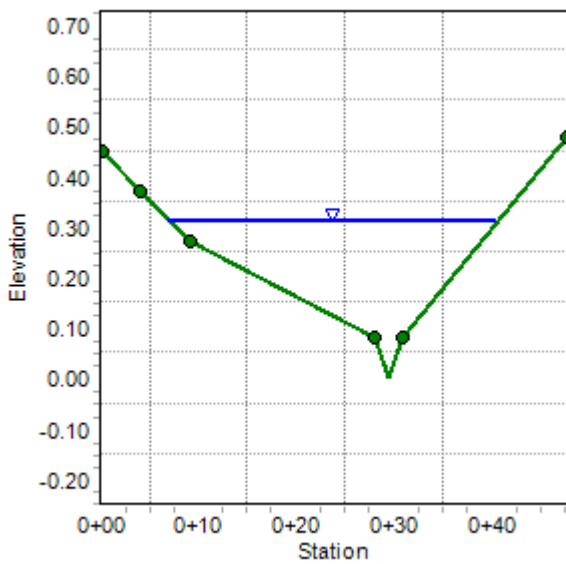
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.40000	%
Normal Depth	0.31	ft
Discharge	7.20	ft ³ /s

Cross Section Image



Worksheet for Update Cross Section 1- 100yr

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.40000 %
Discharge 13.50 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+47.7	0.48
0+30.9	0.08
0+29.4	0.00
0+27.9	0.08
0+09.0	0.27
0+04.0	0.37
0+00.0	0.45

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+47.7, 0.48)	(0+30.9, 0.08)	0.016
(0+30.9, 0.08)	(0+27.9, 0.08)	0.013
(0+27.9, 0.08)	(0+09.0, 0.27)	0.016
(0+09.0, 0.27)	(0+04.0, 0.37)	0.013
(0+04.0, 0.37)	(0+00.0, 0.45)	0.013

Options

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

Results

Normal Depth 0.38 ft
Elevation Range 0.00 to 0.48 ft

Worksheet for Update Cross Section 1- 100yr

Results

Flow Area	7.03	ft ²
Wetted Perimeter	39.84	ft
Hydraulic Radius	0.18	ft
Top Width	39.83	ft
Normal Depth	0.38	ft
Critical Depth	0.35	ft
Critical Slope	0.00638	ft/ft
Velocity	1.92	ft/s
Velocity Head	0.06	ft
Specific Energy	0.44	ft
Froude Number	0.81	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.38	ft
Critical Depth	0.35	ft
Channel Slope	0.40000	%
Critical Slope	0.00638	ft/ft

Cross Section for Update Cross Section 1- 100yr

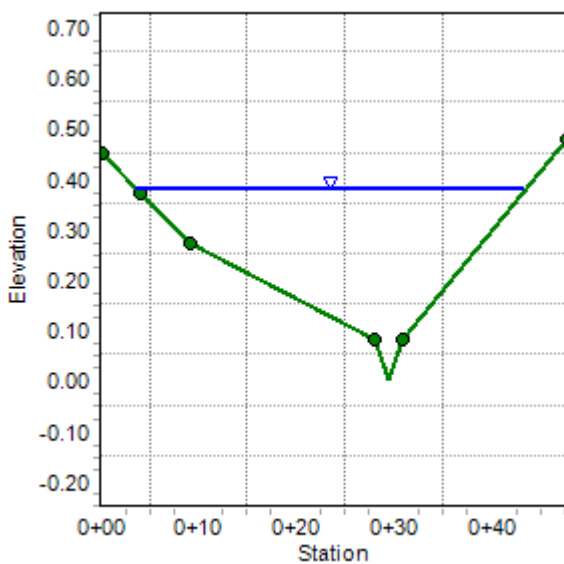
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.40000	%
Normal Depth	0.38	ft
Discharge	13.50	ft ³ /s

Cross Section Image



Project Description

Input Data

Worksheet for Update Cross Section 2- 10yr

Results

Hydraulic Radius	0.14	ft
Top Width	32.14	ft
Normal Depth	0.32	ft
Critical Depth	0.30	ft
Critical Slope	0.00717	ft/ft
Velocity	1.61	ft/s
Velocity Head	0.04	ft
Specific Energy	0.36	ft
Froude Number	0.76	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.32	ft
Critical Depth	0.30	ft
Channel Slope	0.40000	%
Critical Slope	0.00717	ft/ft

Cross Section for Update Cross Section 2- 10yr

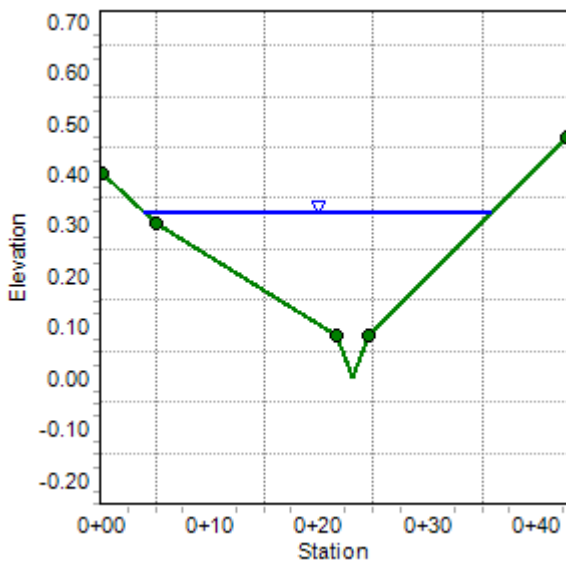
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.40000	%
Normal Depth	0.32	ft
Discharge	7.20	ft ³ /s

Cross Section Image



Project Description

Input Data

Elevation (ft)

Roughness Segment Definitions

Roughness Coefficient

(0+42.8, 0.47)	(0+24.6, 0.08)	0.016
(0+24.6, 0.08)	(0+21.6, 0.08)	0.013
(0+21.6, 0.08)	(0+05.0, 0.30)	0.016
(0+05.0, 0.30)	(0+00.0, 0.40)	0.013

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

Normal Depth	0.39	ft
Elevation Range	0.00 to 0.47	ft
Flow Area	6.99	ft²
Wetted Perimeter	39.03	ft

Worksheet for Update Cross Section 2- 100yr

Results

Hydraulic Radius	0.18	ft
Top Width	39.02	ft
Normal Depth	0.39	ft
Critical Depth	0.37	ft
Critical Slope	0.00637	ft/ft
Velocity	1.93	ft/s
Velocity Head	0.06	ft
Specific Energy	0.45	ft
Froude Number	0.80	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.39	ft
Critical Depth	0.37	ft
Channel Slope	0.40000	%
Critical Slope	0.00637	ft/ft

Cross Section for Update Cross Section 2- 100yr

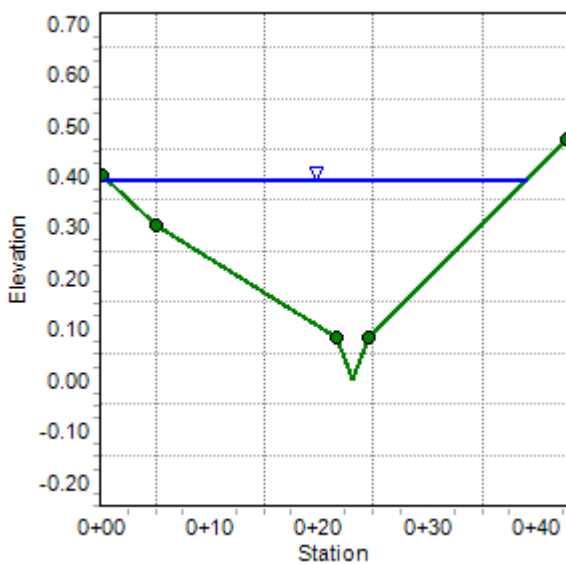
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.40000	%
Normal Depth	0.39	ft
Discharge	13.50	ft ³ /s

Cross Section Image



Project Description

Input Data

0+43.4	0.40
0+21.8	0.08
0+20.3	0.00
0+18.8	0.08
0+15.0	0.14
0+10.0	0.24
0+00.0	0.34

(0+43.4, 0.40)	(0+21.8, 0.08)	0.016
(0+21.8, 0.08)	(0+18.8, 0.08)	0.013
(0+18.8, 0.08)	(0+15.0, 0.14)	0.016
(0+15.0, 0.14)	(0+00.0, 0.34)	0.013

Options

Results

6/1/2016 10:03:04 AM 27 Siemens Company Drive Suite 200 W Watertown, CT 06795 USA +1-203-755-1666 Page 1 of 2

Worksheet for Update Cross Section 3- 10yr

Results

Wetted Perimeter	37.38	ft
Hydraulic Radius	0.13	ft
Top Width	37.37	ft
Normal Depth	0.33	ft
Critical Depth	0.30	ft
Critical Slope	0.00640	ft/ft
Velocity	1.64	ft/s
Velocity Head	0.04	ft
Specific Energy	0.37	ft
Froude Number	0.80	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.33	ft
Critical Depth	0.30	ft
Channel Slope	0.40000	%
Critical Slope	0.00640	ft/ft

Cross Section for Update Cross Section 3- 10yr

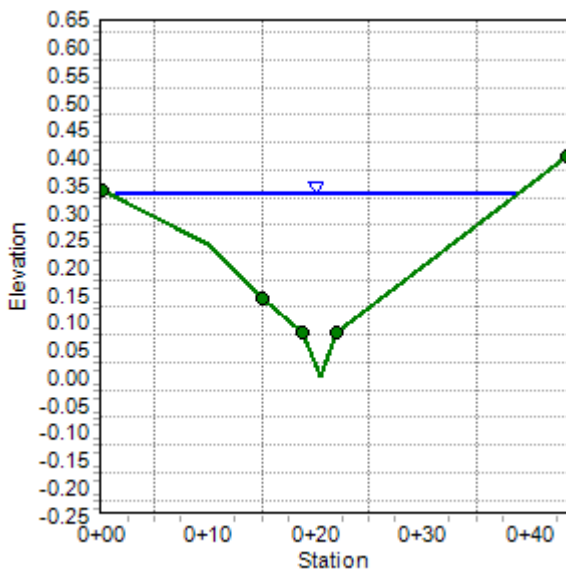
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.40000	%
Normal Depth	0.33	ft
Discharge	8.00	ft ³ /s

Cross Section Image



Project Description

Input Data

Station (ft)	Elevation (ft)
100	100
200	100
300	100
400	100
500	100
600	100
700	100
800	100
900	100
1000	100
1100	100
1200	100
1300	100
1400	100
1500	100
1600	100
1700	100
1800	100
1900	100
2000	100
2100	100
2200	100
2300	100
2400	100
2500	100
2600	100
2700	100
2800	100
2900	100
3000	100
3100	100
3200	100
3300	100
3400	100
3500	100
3600	100
3700	100
3800	100
3900	100
4000	100
4100	100
4200	100
4300	100
4400	100
4500	100
4600	100
4700	100
4800	100
4900	100
5000	100
5100	100
5200	100
5300	100
5400	100
5500	100
5600	100
5700	100
5800	100
5900	100
6000	100
6100	100
6200	100
6300	100
6400	100
6500	100
6600	100
6700	100
6800	100
6900	100
7000	100
7100	100
7200	100
7300	100
7400	100
7500	100
7600	100
7700	100
7800	100
7900	100
8000	100
8100	100
8200	100
8300	100
8400	100
8500	100
8600	100
8700	100
8800	100
8900	100
9000	100
9100	100
9200	100
9300	100
9400	100
9500	100
9600	100
9700	100
9800	100
9900	100
10000	100

Roughness Segment Definitions

(0+43.4, 0.40)	(0+21.8, 0.08)	0.016
(0+21.8, 0.08)	(0+18.8, 0.08)	0.013
(0+18.8, 0.08)	(0+15.0, 0.14)	0.016
(0+15.0, 0.14)	(0+00.0, 0.34)	0.013

Options

Results

Bentley Systems, Inc. Bentley FlowMaster V8i (SELECTseries 1) [08.11.01.03]

Worksheet for Update Cross Section 3- 100yr

Results

Wetted Perimeter	43.19	ft
Hydraulic Radius	0.18	ft
Top Width	43.13	ft
Normal Depth	0.39	ft
Critical Depth	0.37	ft
Critical Slope	0.00591	ft/ft
Velocity	1.98	ft/s
Velocity Head	0.06	ft
Specific Energy	0.45	ft
Froude Number	0.83	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.39	ft
Critical Depth	0.37	ft
Channel Slope	0.40000	%
Critical Slope	0.00591	ft/ft

Cross Section for Update Cross Section 3- 100yr

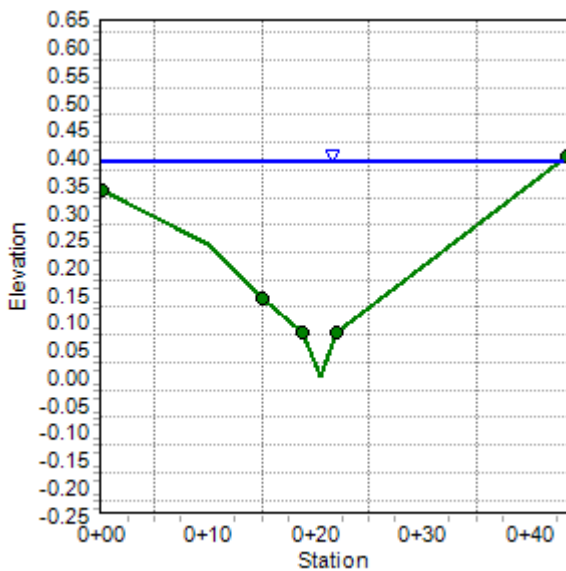
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.40000	%
Normal Depth	0.39	ft
Discharge	15.00	ft ³ /s

Cross Section Image

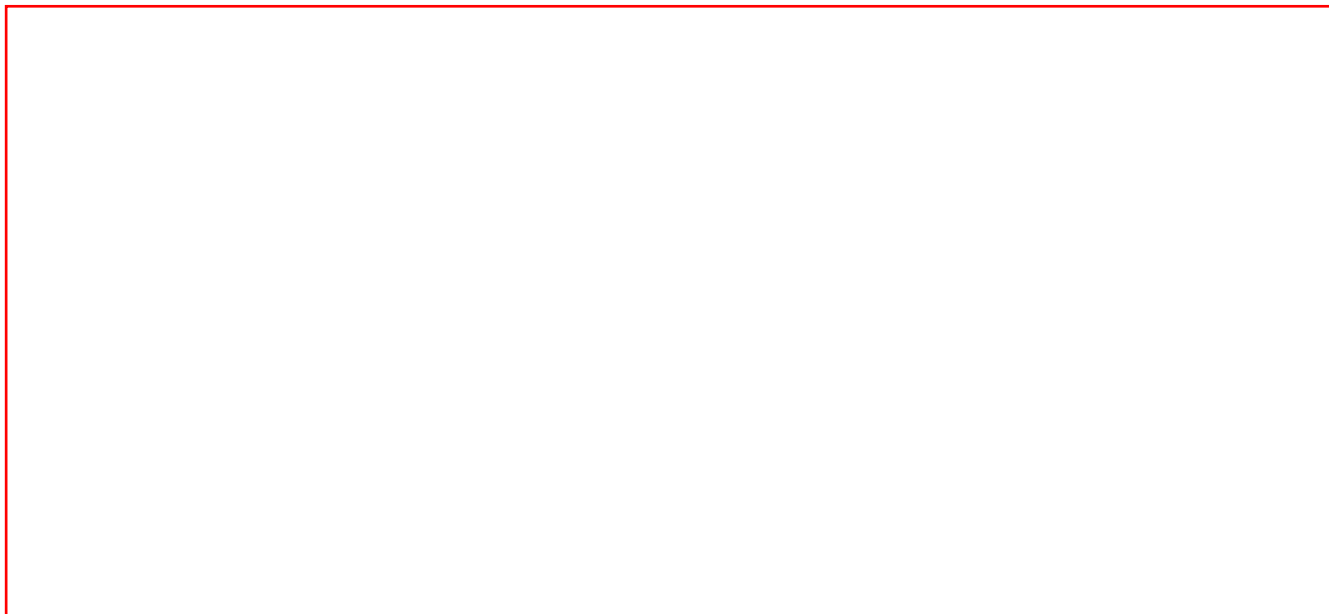




APPENDIX C

Reference Material









APPENDIX D

Improvement Plans

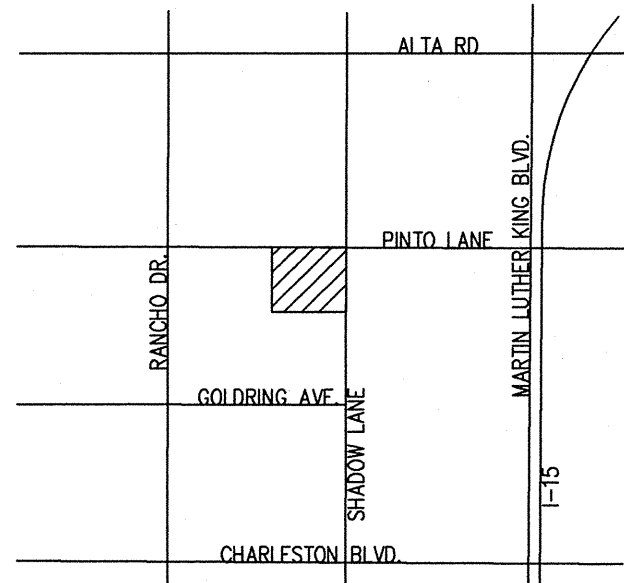
IMPROVEMENT PLANS FOR VALLEY HOSPITAL (DRAINAGE IMPROVEMENT) A COMMERCIAL PROJECT CITY OF LAS VEGAS, NEVADA APN: 139-33-311-002

ENGINEER
TANEY ENGINEERING
6030 SOUTH JONES BLVD SUITE#100
LAS VEGAS, NV 89118
(702) 362-8844 PHONE (702) 362-5233 FAX

DEVELOPER
VALLEY HOSPITAL
620 SHADOW LANE
LAS VEGAS, NV 89106
(702) 388-4910

SITE MAP

NOT TO SCALE

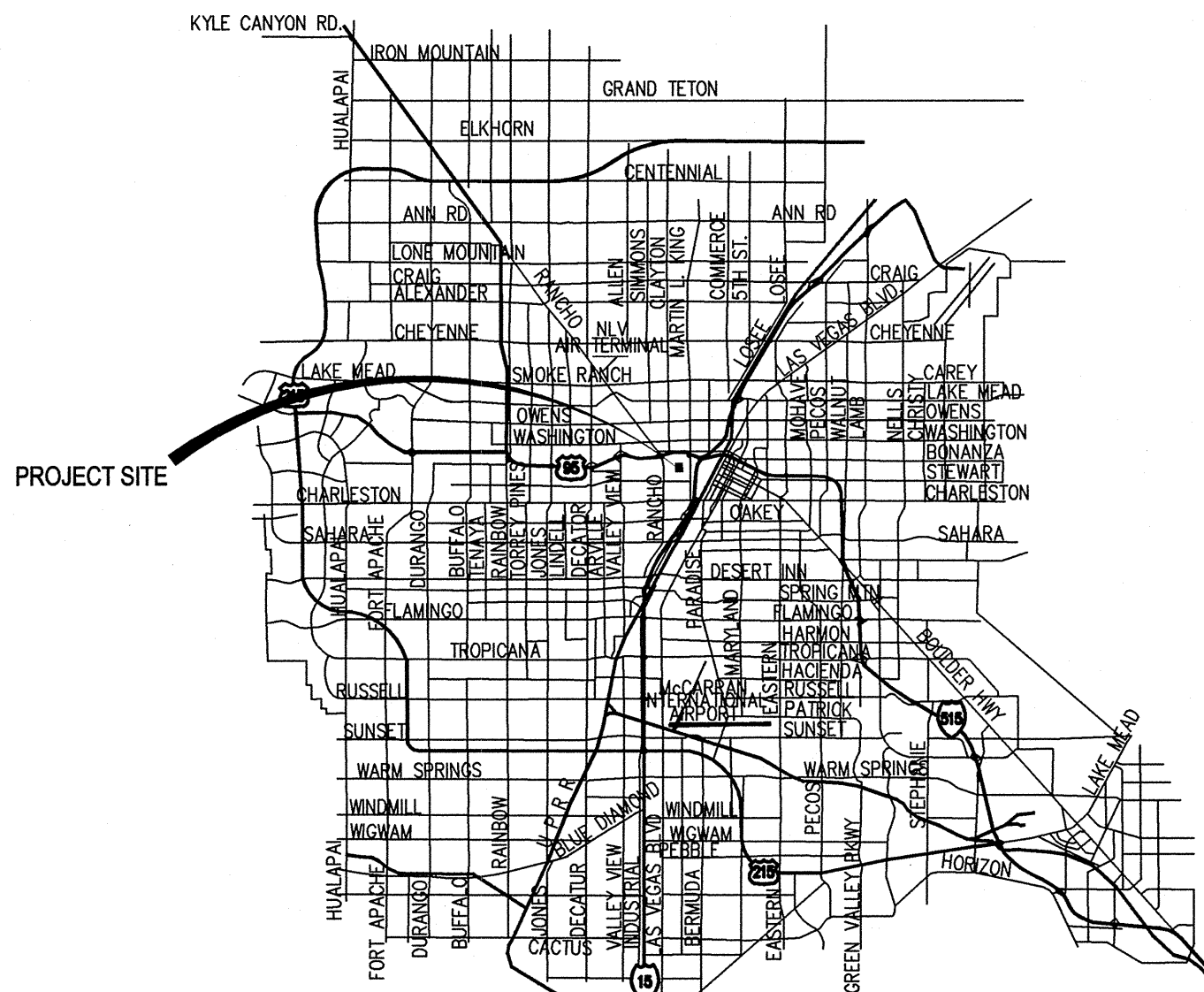


ABBREVIATIONS

AC	ASPHALTIC CONCRETE	FG	FINISH GRADE	R	RADIUS
AVE	AVENUE	FH	FIRE HYDRANT	RCB	REINFORCED CONCRETE BOX
BC	BACK OF CURB	FL	FLOW LINE	ROP	REINFORCED CONCRETE PIPE
BCR	BACK OF CURB RADIUS	FT	FEET	ROW	RIGHT-OF-WAY
BFE	BASE FLOOD ELEVATION	G	GRADING	RT	RIGHT
BFP	BACK FLOW PREVENTOR	GB	GRADE BREAK	SD	STORM DRAIN
BLM	BUREAU OF LAND MANAGEMENT	GFF	GARAGE FINISH FLOOR	SHT	SHEET
BM	BENCHMARK	HP	HIGH POINT	STLT	STREETLIGHT
BRPM	BLUE RAISED PAVEMENT MARKER	HFG	HIGH PRESSURE GAS	SWM	SOUTHERN NEVADA WATER AUTHORITY
BVC	BEGIN VERTICAL CURVE	INV	INVERT	SS	SANITARY SEWER
BW	BOTTOM OF EXISTING WALL	LF	LINEAR FEET	ST	STREET
CATV	CABLE TELEVISION	LN	LANE	STA	STATION
CC	CLARK COUNTY	LS	LANDSCAPE	STD	STANDARD
CCFD	CLARK COUNTY FIRE DEPARTMENT	LT	LEFT	SVZ	SIGHT VISIBILITY ZONE
CCWRD	CLARK COUNTY WATER RECLAMATION DISTRICT	LVWD	LAS VEGAS VALLEY WATER DISTRICT	SW	SIDEWALK
CL	CENTERLINE	MAX	MAXIMUM	SY	SQUARE YARD
CLSM	CONTROLLED LOW STRENGTH MATERIAL	MH	MANHOLE	TC	TOP OF CURB
CLV	CITY OF LAS VEGAS	MIN	MINIMUM	TELE	TELEPHONE
CMP	CORRUGATED METAL PIPE	NO	NUMBER	TF	TOP OF FOOTING
CMLV	CITY OF NORTH LAS VEGAS	NTS	NOT TO SCALE	T.O.P.	TOP OF PIPE
CO	CLEAN OUT, SEWER	OC	ON CENTER	TR	TOP OF RETAINING
COH	CITY OF HENDERSON	PB	PULL BOX	TW	TOP OF WALL
CY	CUBIC YARD	PC	POINT OF CURVE	TYP	TYPICAL
CSWS	DESIGN AND CONSTRUCTION STANDARDS FOR WASTE WATER COLLECTION SYSTEMS	PCC	POINT OF COMPOUND CURVE	UDCS	UNIFORM DESIGN AND CONSTRUCTION STANDARDS
DG	DESIGN GRADE	PI	POINT OF INTERSECTION	UT	UTILITY
DI	DROP INLET	PL	PROPERTY LINE	USD	UNIFORM STANDARD DRAWING
DIP	DUCTILE IRON PIPE	PLT	PLATE	VC	VERTICAL CURVE
DR	DRIVE	POC	POINT OF CONNECTION	VCP	VITRIFIED CLAY PIPE
EC	END OF CURVE	PP	POWER POLE	VG	VALLEY GUTTER
EG	EXISTING GRADE	P&P	PLAN AND PROFILE	W	WATER
ELEC	ELECTRICAL	PRC	POINT OF REVERSE CURVE	ZC	ZERO LIP CURB
EP	EDGE OF PAVEMENT	PROJ	PROJECT		
EVC	END VERTICAL CURVE	PRV	PRESSURE REDUCING VALVE		
EX	EXISTING	PT	POINT OF TANGENCY		
FF	FINISH FLOOR ELEVATION	PVC	POLYVINYL CHLORIDE		

VICINITY MAP

NOT TO SCALE



UTILITY DISCLAIMER

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

BASIS OF BEARING

SOUTH 89°51'00" EAST, BEING THE CENTER LINE OF PINTO LANE AS SHOWN PER PARCEL MAP FILE 5, PAGE 7, CLARK COUNTY OFFICIAL RECORDS

BENCHMARK

RIVET AND PLATE IN TOP OF CURB @ THE SOUTHEAST CORNER OF ALTA DRIVE AND SHADOW LANE.
BENCHMARK: 0LV01 33WB
625.7337 METERS OR 2052.93 FEET
CONVENSION TO SITE BENCHMARK IS BENCHMARK + .20'

LEGAL DESCRIPTION

A PORTION OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 33 TOWNSHIP 20 SOUTH, RANGE 61 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA

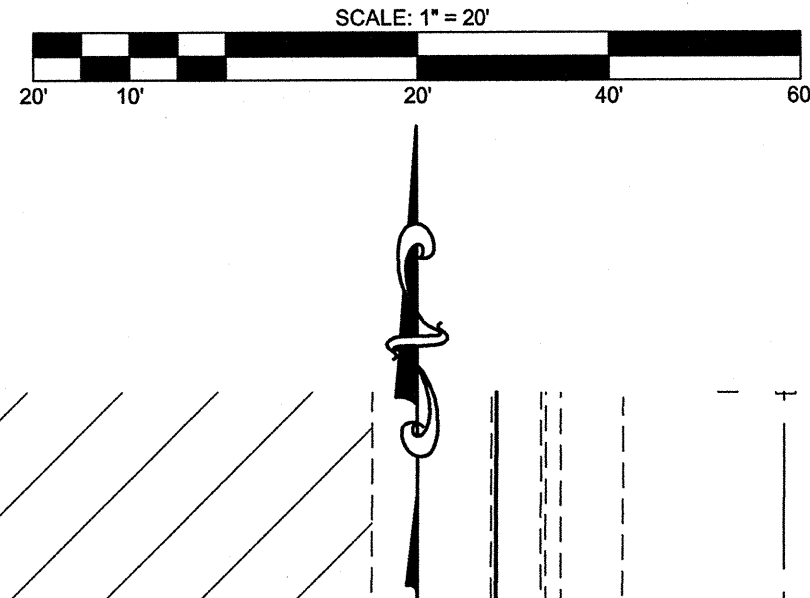
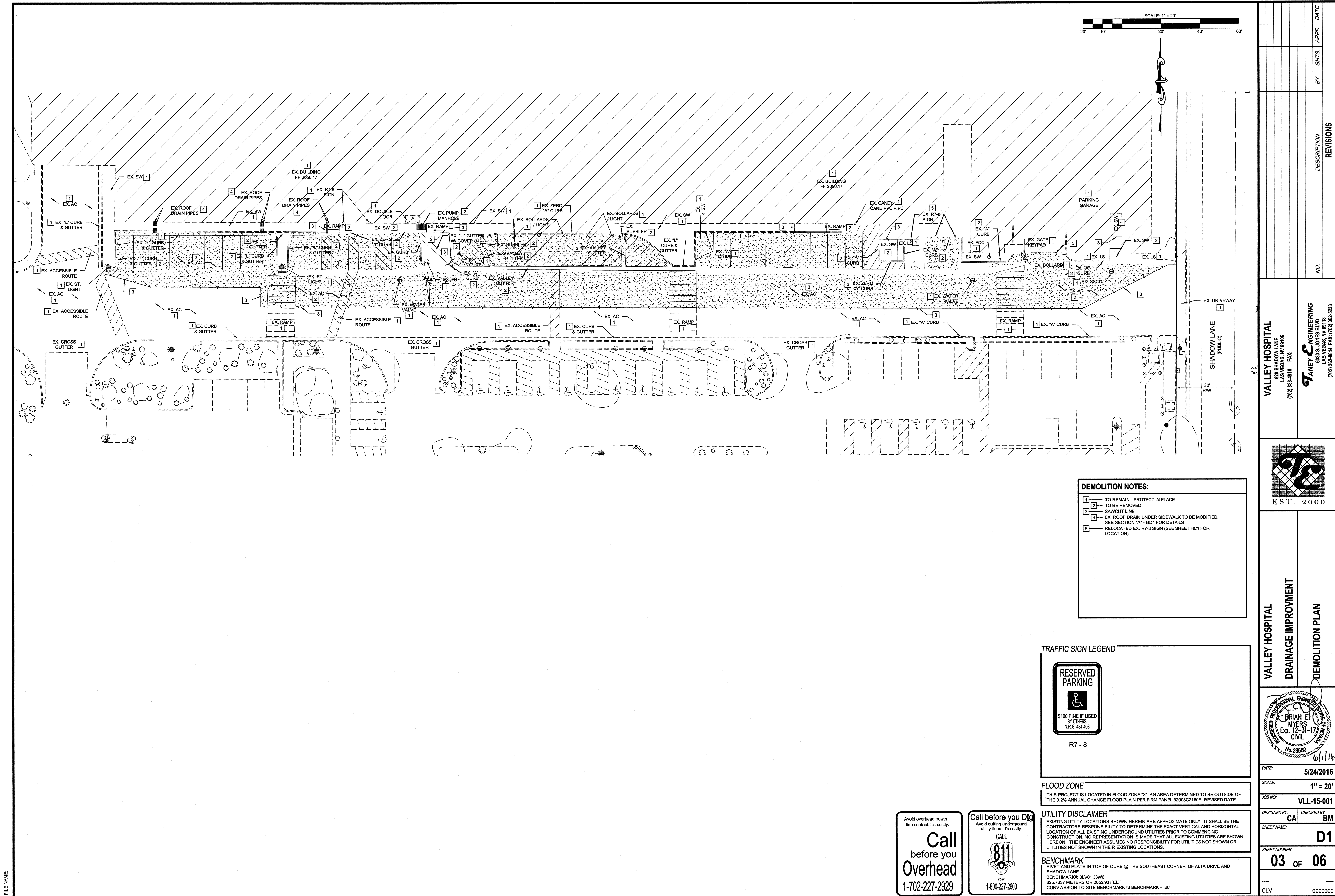
Avoid overhead power line contact. It's costly.
Call before you Overhead
1-702-227-2929

Call before you Dig
Avoid cutting underground utility lines. It's costly.
CALL 811
OR
1-800-227-2600

LEGEND

	EXISTING (10.00)	PROPOSED 10.00 [10.00]
DESIGN ELEVATION		
FUTURE ELEVATION		
SCARP (SLOPE VARIES)		
CONTOUR (1' INTERVAL)		
CONTOUR (5' INTERVAL)		
DIRECTION OF FLOW		
RETAINING WALL		
NUMBER OF RETAINING COURSES		
CMU WALL		
SOLID GROUTED WALL - NO RETAINING		
CUT-OFF WALL		
CENTERLINE		
RIGHT-OF-WAY		
CUT LINE-ASPHALT		
CURB AND GUTTER		
FENCE		
POWER POLE		
SIDEWALK RAMP		
CURB DROP INLET		
STORM DRAIN WIMANHOLE		
SIDEWALK		
PROPERTY LINE		
CUT-FILL LINE		
EDGE OF PAVEMENT		
SIGHT VISIBILITY ZONE		
CAP & 2' BLOW OFF VALVE		
WATERLINE FITTINGS		
GATE VALVE		
FIRE HYDRANT		
SEWER LINE WIMANHOLE		
SEWER LATERAL		
WATER LINE		
WATER LATERAL WIMETER		
PRESSURE REDUCING VALVE		
BACKWATER VALVE		
200A SERVICE PEDESTAL		
STREET LIGHT CONDUIT		
F.A.S.T. CONDUIT		
TRAFFIC SIGN		
STOP SIGN W/STREET NAME SIGN		
100W HPS LUMINAIRE W/11 GA. POLE		
250W HPS LUMINAIRE W/11 GA. POLE		
400W HPS LUMINAIRE W/11 GA. POLE		

DATE	5/24/2016
BY	CA
SHTS.	N/A
APPR.	BM
DESCRIPTION	VALLEY HOSPITAL DRAINAGE IMPROVEMENT COVER SHEET
NO.	C1
REVISIONS	01 OF 06
FILE NAME:	CLV 0000000



DEMOLITION NOTES:

- 1 - TO REMAIN - PROTECT IN PLACE
- 2 - TO BE REMOVED
- 3 - SAWCUT LINE
- 4 - EX. ROOF DRAIN UNDER SIDEWALK TO BE MODIFIED. SEE SECTION 'A' - GD1 FOR DETAILS
- 5 - RELOCATED EX. R7-8 SIGN (SEE SHEET HC1 FOR LOCATION)

TRAFFIC SIGN LEGEND

R7 - 8

FLOOD ZONE

THIS PROJECT IS LOCATED IN FLOOD ZONE "X", AN AREA DETERMINED TO BE OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOOD PLAIN PER FIRM PANEL 32003C2150E, REVISED DATE.

UTILITY DISCLAIMER

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

BENCHMARK

RIVET AND PLATE IN TOP OF CURB @ THE SOUTHEAST CORNER OF ALTA DRIVE AND SHADOW LANE.
BENCHMARK# 01V01 33W6
625.7337 METERS OR 2052.93 FEET
CONVENSION TO SITE BENCHMARK IS BENCHMARK + .20'

Avoid overhead power line contact, it's costly.

Call before you Overhead

1-702-227-2929

Call before you Dig

Avoid cutting underground utility lines, it's costly.

CALL 811

OR 1-800-227-2600

REVISIONS			
NO.	DESCRIPTION	BY	DATE

VALLEY HOSPITAL
630 SHADOW LANE
LAS VEGAS, NV 89106
(702) 388-4810 FAX: (702) 388-4810

ANNEY & ENGINEERING
6303 S. JONES BLVD
LAS VEGAS, NV 89118
(702) 388-3444 FAX: (702) 388-5233

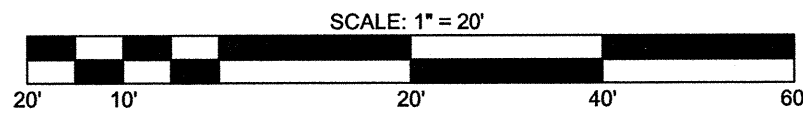
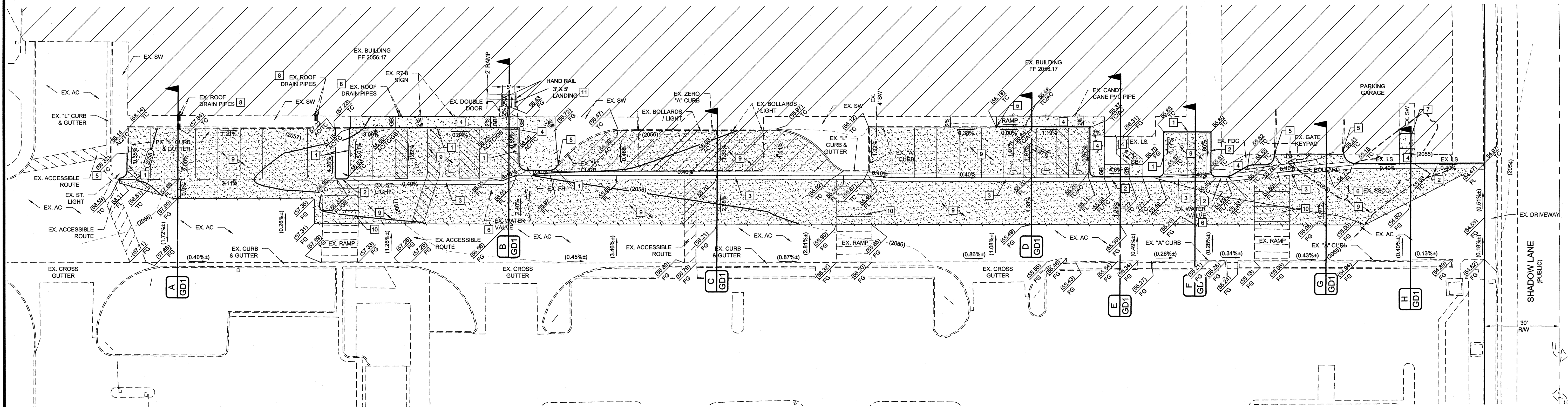
EST. 2000

VALLEY HOSPITAL
DRAINAGE IMPROVEMENT
DEMOLITION PLAN

6/1/16

DATE: 5/24/2016
SCALE: 1" = 20'
JOB NO: VLL-15-001
DESIGNED BY: CA CHECKED BY: BM
SHEET NAME: D1
SHEET NUMBER: 03 OF 06
CLV 0000000

FILE NAME:



CONSTRUCTION NOTES:

1. INSTALL "A" TYPE CURB (USD #219)
2. INSTALL 24" L-TYPE CURB & GUTTER (USD #216)
3. INSTALL VALLEY GUTTER (DETAIL "T" - SHEET GD1)
4. 4" THICK CONCRETE SIDEWALK (USD #234)
5. PROP. TC GARDE TO MATCH EX. TC GRADE AT SAWCUT LINE
6. ADJUST TO GRADE
7. SAWCUT EX. SW AT SECOND JOINT FROM TC AND MATCH GRADES
8. ROOF DRAIN TO BE MODIFIED TO DRAIN ACROSS SIDEWALK
9. INSTALL NEW 2" AC OVER TYPE 6" TYPE II AB
10. RECONSTRUCT RAMP TO MATCH EX. RAMP
11. INSTALL LANDING, RAMP AND HANDRAIL FOR ACCESSIBLE ROUTE. (DESIGN BY OTHERS).

FLOOD ZONE

THIS PROJECT IS LOCATED IN FLOOD ZONE "X", AN AREA DETERMINED TO BE OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOOD PLAIN PER FIRM PANEL 32003C2150E, REVISED DATE.

UTILITY DISCLAIMER

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GRADING NOTES

COMPLETION OF SECTION II OF DRAINAGE COMPLIANCE REPORT REQUIRED.

ADD 2000 FEET TO ALL GRADE TAGS TO GET ACTUAL ELEVATION.

THE ELEVATION DIFFERENCE BETWEEN THE PAD AND FINISH FLOOR IS DETERMINED FROM THE MINIMUM THICKNESS REQUIRED PER THE GEOTECHNICAL REPORT. FINISH FLOORS MAY INCREASE DEPENDING ON THE TYPE OF SOIL AND FOUNDATION PLAN USED. NOTE THAT THE STRUCTURAL PLANS & GEOTECHNICAL REPORT SHALL SUPERSEDE THE CIVIL IMPROVEMENT PLANS.

ALL PRIVATE STREETS AND DRAINAGE EASEMENTS ARE TO BE PRIVATELY OWNED AND MAINTAINED BY THE HOMEOWNERS ASSOCIATION (H.O.A.).

ALL WORK TO BE PERFORMED OUTSIDE OF THE PROJECT BOUNDARY AND ON PRIVATE PROPERTY SHALL NOT BE PERFORMED UNTIL WRITTEN PERMISSION AND EASEMENTS HAVE BEEN OBTAINED FROM THE OFFSITE OWNER AND GIVEN TO THE GOVERNING ENTITY.

CONTRACTOR SHALL VERIFY HORIZONTAL AND VERTICAL LOCATION OF EXISTING UTILITIES AND NOTIFY THE DESIGN ENGINEER IMMEDIATELY OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION.

BENCHMARK

RIVET AND PLATE IN TOP OF CURB @ THE SOUTHEAST CORNER OF ALTA DRIVE AND SHADOW LANE.
BENCHMARK#: 0LV01 33W6
625.7337 METERS OR 2052.93 FEET
CONVENSION TO SITE BENCHMARK IS BENCHMARK + 20'

GRADING CERTIFICATION

I CERTIFY THIS GRADING PLAN COMPLIES WITH THE APPROVED DRAINAGE STUDY, HTE# XX-XXXX, ON FILE WITH CLARK COUNTY FOR THIS PROJECT.

BRIAN E. MYERS, PE DATE

ACCEPTANCE OF PLANS FOR FILING

BY: DEVELOPMENT AND FLOOD CONTROL DATE

VALLEY HOSPITAL
620 SHADOW LANE
LAS VEGAS, NV 89106
(702) 388-4910 FAX:

ANNEY & ENGINEERING
8030 S. JONES BLVD
LAS VEGAS, NV 89118
(702) 382-2844 FAX: (702) 382-2833



VALLEY HOSPITAL
DRAINAGE IMPROVEMENT

GRADING PLAN



DATE: 6/1/2016

SCALE: 1"=20'

JOB NO: VLL-15-001

DESIGNED BY: CA CHECKED BY: BM

SHEET NAME: G1

SHEET NUMBER: 05 OF 06

CLV 0000000



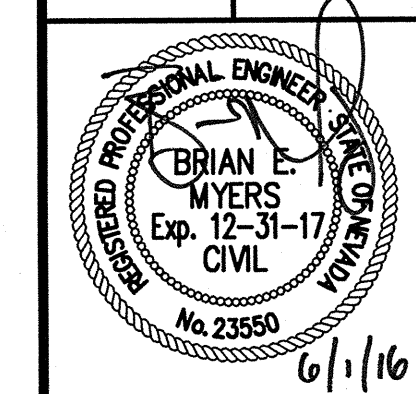
VALLEY HOSPITAL
620 SHADOW LANE
LAS VEGAS, NV 89106
(702) 388-4910 FAX:



VALLEY HOSPITAL

DRAINAGE IMPROVEMENT

GRADING DETAIL



DATE:		6/1/2016	
SCALE:		N/A	
JOB NO:		VLL-15-001	
DESIGNED BY:	CA	CHECKED BY:	BM
SHEET NAME:		GD1	
SHEET NUMBER:			
06		OF	06
CLV		0000000	