UPDATE #1 TO THE
TECHNICAL DRAINAGE STUDY
FOR
CHALLENGER & ISAAC NEWTON

SINGLE FAMILY RESIDENTIAL

APN: 138-07-401-019

CITY OF LAS VEGAS

Job No: 423018-A-001

January 2024

Prepared for:

Babb Investment CO.

9424 S 300 W

Sandy, UT 84070

Phone: 801-569-2700

mcooper@challengerschool.com

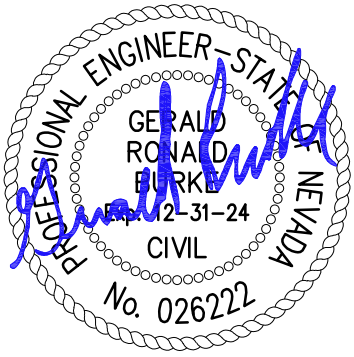
Prepared by:

The WLB Group, Inc.

3663 East Sunset Road – Suite 204

Las Vegas, NV 89120

Phone: 702-458-2551



01-08-24

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: CHALLENGER AT ISAAC NEWTON Date: JANUARY 8, 2024

Location of Development: a) Descriptive (Cross Streets) North/South: METRO ACADEMY WAY

East/West: ISAAC NEWTON WAY

b) Section: 7 Township: 20S Range: 60E

c) APN : 138-07-401-019

Name of Owner: BABB INVESTMENT CO.

Telephone No.: 801-569-2700 Fax No.: E-Mail Address: MCOOPER@CHALLENGERSCHOOL.COM

Address: 9424 S 300 W SANDY, UT 84070

Contact Person-Name: GERALD BURKE, P.E. **Telephone No.:** 702-458-2551

* **E-Mail Address:** GBURKE@WLBGROUP.COM **Fax No.:**

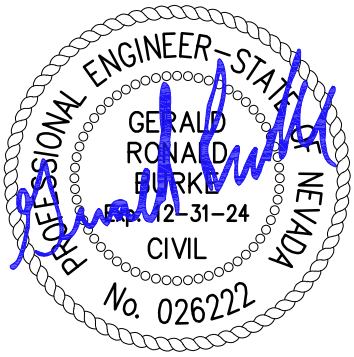
Firm: THE WLB GROUP, INC

Address: 3663 EAST SUNSET ROAD, STE 204, LAS VEGAS, NEVADA 89120

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: 8.03 +/- ACRES Being Developed/Disturbed: 8.03 +/- 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.): SINGLE FAMILY RESIDENTIAL
5. Approximate upstream land area which drains to the subject site: 0 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 ONSITE FLOW FOLLOWS EXISTING DRAINAGE PATTERN AND IS CONVEYED NORTH TOWARDS METRO PARK.
8. Briefly describe your proposed schedule for the subject project: A.S.A.P



01-08-24

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

DS5707

Local Entity File No.

REFERENCE:

STANDARD FORM 1

Updated 05/01/2008

TECHNICAL DRAINAGE STUDY FOR CHALLENGER AT ISAAC NEWTON

January 8, 2024
Job No: **423018-A-001**

City of Las Vegas
Land Development and Flood Control
333 N Rancho Drive
Las Vegas, NV 89106

Update #1 to the Technical Drainage Study for Challenger & Isaac Newton (DS5707)

WLB Group is pleased to submit Technical Drainage Study Update #1 for Challenger & Isaac Newton. The proposed residential development covers 8.03 acres and falls under Zone X, as illustrated in community panel numbers 32003C2135F and 32003C2150E, effective November 16, 2011, and September 27, 2002, respectively. The development is neither adjacent to nor crossed by any Clark County Regional Flood Control Master Planned Facilities. The TDS for Challenger & Isaac Newton was approved by the City of Las Vegas on January 3, 2024. This update addresses a 2-inch reduction in the proposed finished floor elevation, while maintaining the existing drainage patterns and onsite hydrology. Grades for Sunlight Grove Avenue have been revised to minimize cut and retaining wall height. Revised relevant hydraulic analysis has been included.

We hope that the information provided in this update addresses your concerns. If you require any further clarification or have any additional questions, please do not hesitate to contact our office. We appreciate the opportunity to work on this project and look forward to continuing our collaboration with the City of Las Vegas.

Sincerely,
WLB Group

Gaurang Vijay Mistry

REFERENCED MATERIALS

CITY OF LAS VEGAS **INTER-OFFICE MEMORANDUM**				**DATE:** **January 3, 2024**
TO: **Land Development Services** Department of Community Development – Building & Safety Division				**FROM:** Tyler Key Flood Control Engineering Associate Department of Public Works
SUBJECT:	Drainage Study for:			**COPIES TO:**
Challenger & Isaac Newton				The WLB Group
Cross Streets:	NWC Isaac Newton Way/Metro Academy Way			Babb Investment Co.
File Number:	F:\Depot\DSMemos\DS5707C.doc			Bart Anderson, P.E., DevCo
Parcel Number:	138-07-401-019			
Zoning Action:	23-0399-TMP1; 23-0399-SDR1; 23-0399-VAC1 23-0399-MOD1; 23-0399-VAR1 to –VAR3			
FEMA Flood Zone	YES	NO	**X**	
Proposed Storm Drain	YES	NO	**X**	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1st Submittal	10/2/2023	10/16 /2023	Not Approved	$400.00	5465492: $400
2nd Submittal	11/2/2023	11/20/2023	Not Approved	$400.00	5510380: $400
3rd Submittal	12/12/2023	01/03/2024	See Comments Below	$400.00	5554935: $400
			TOTAL FEES (LDDRS):	**$1,200**	**----**

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.

1. Provide a copy of the zoning/planning conditions associated with this site (**23-0399-TMP1; 23-0399-SDR1; 23-0399-VAC1; 23-0399-MOD1; 23-0399-VAR1 to –VAR3**) with the next submittal to verify compliance with conditions. *Flood Control* will not issue conditional approval of the drainage study without the associated zoning/planning conditions (issued by the *City Council*). Any associated conditions of approval that revise the site drainage parameters will require that the drainage study be revised and resubmitted.

2. Sites with a grade difference of 2 feet above or below existing are required to have approval from the *City Planning and Development Department*. The engineer must submit copies of the grading plans and detail sheet with a letter justifying the grade difference to the *City Planning Department* (229-6301). The engineer must provide Planning approval with the next submittal.

***** The City of Las Vegas Flood Control is standardizing the file naming of drainage studies and plans during the digitizing process. When saving the project files in the CD or thumb drive, please follow the system below:**

If drainage study only contains one combined file, use the following naming convention in Document Title:

1st Submittal DS and Plans (for first and original submittal);

2nd Submittal DS and Plans (for second submittal (addendum #1)) etc.

If drainage study contains multiple files, use the following naming convention in Document Title:

1st Submittal DS (for the report of the drainage study)

1st Submittal Plan 1 (could be the drainage condition maps)

1st Submittal Plan 2 (could be the improvement plans) etc.

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.

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, final approval 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.

END OF REMARKS
AYS/TJK

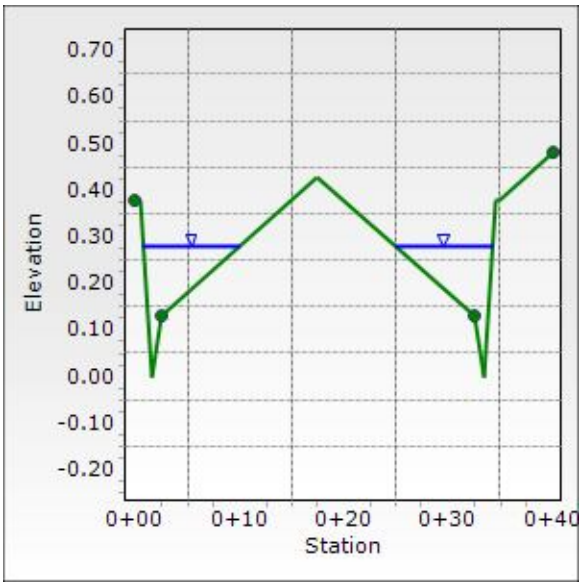
T/R/S: T20S/R60E/07
AREA L-07

FLOWMASTER ANALYSIS

Cross Section for SECTION C - 100 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	3.73 %
Normal Depth	0.28 ft
Discharge	7.00 cfs



Worksheet for SECTION C - 100 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Channel Slope	3.73	%
Discharge	7.00	cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.40	0.38
0+01.50	0.00
0+02.50	0.13
0+17.50	0.43
0+32.50	0.13
0+33.50	0.00
0+34.60	0.38
0+35.00	0.38
0+40.00	0.48

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+02.50, 0.13)	0.013
(0+02.50, 0.13)	(0+32.50, 0.13)	0.016
(0+32.50, 0.13)	(0+40.00, 0.48)	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	0.28	ft
Roughness Coefficient	0.015	
Elevation	0.28	ft
Elevation Range	0.00 to 0.48	ft
Flow Area	1.8	ft²
Wetted Perimeter	18.83	ft
Hydraulic Radius	0.10	ft
Top Width	18.72	ft
Normal Depth	0.28	ft

Worksheet for SECTION C - 100 YR

Results	
Critical Depth	0.35 ft
Critical Slope	0.69 %
Velocity	3.89 ft/s
Velocity Head	0.24 ft
Specific Energy	0.52 ft
Froude Number	2.213
Flow Type	Supercritical

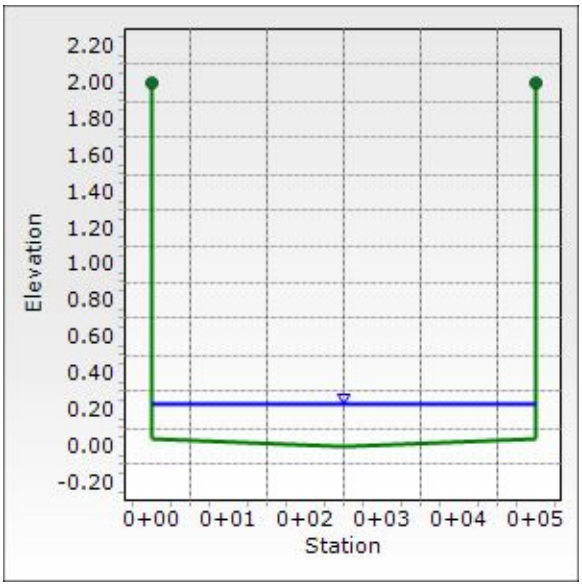
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.28 ft
Critical Depth	0.35 ft
Channel Slope	3.73 %
Critical Slope	0.69 %

Cross Section for SECTION D - 100 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	3.01 %
Normal Depth	0.23 ft
Discharge	7.00 cfs



Worksheet for SECTION D - 100 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Channel Slope	3.01	%
Discharge	7.00	cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	2.00
0+00.00	0.05
0+02.50	0.00
0+05.00	0.05
0+05.00	2.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 2.00)	(0+05.00, 2.00)	0.013

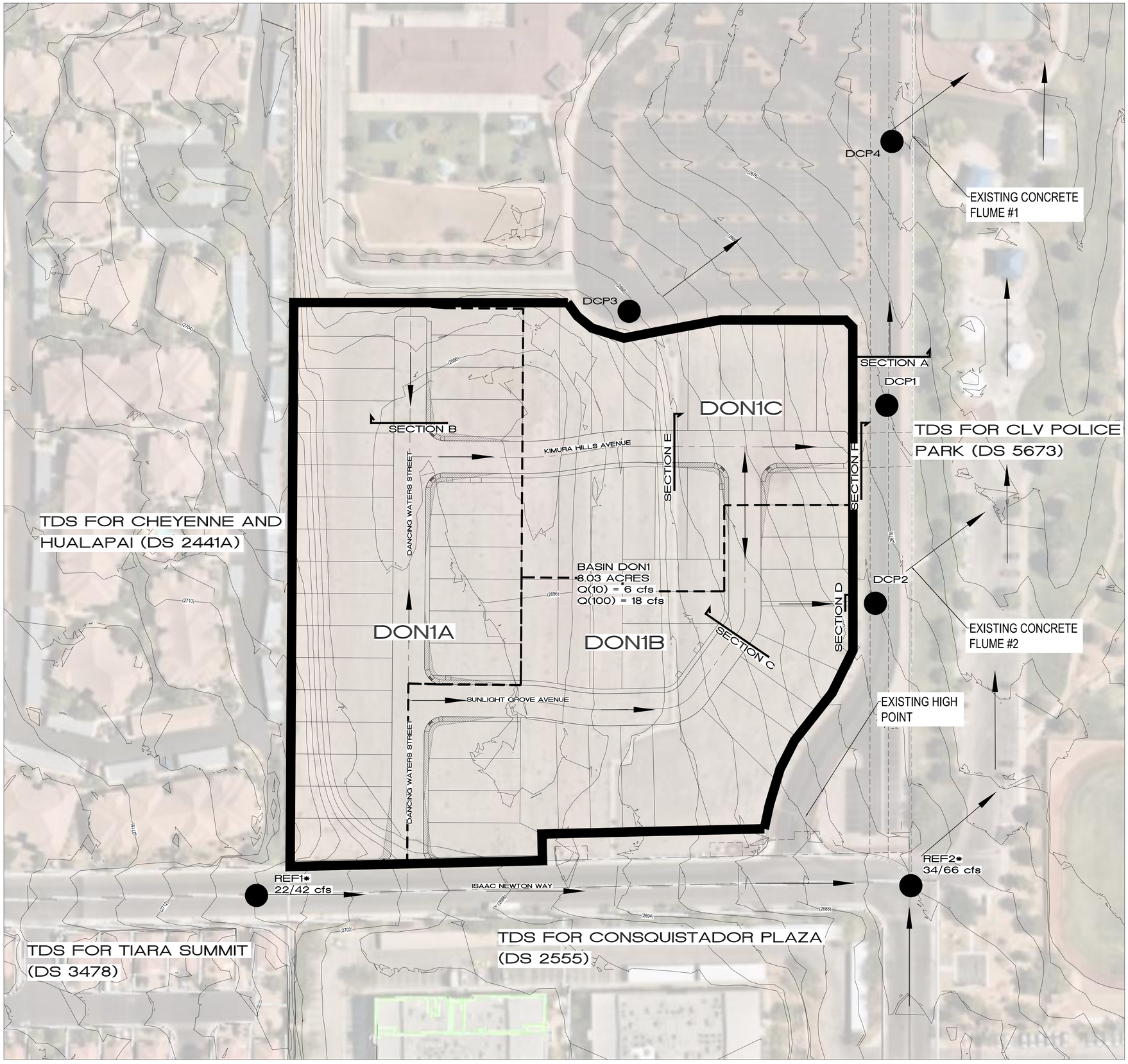
Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results		
Normal Depth	0.23	ft
Roughness Coefficient	0.013	
Elevation	0.23	ft
Elevation Range	0.00 to 2.00	ft
Flow Area	1.0	ft²
Wetted Perimeter	5.37	ft
Hydraulic Radius	0.20	ft
Top Width	5.00	ft
Normal Depth	0.23	ft
Critical Depth	0.42	ft
Critical Slope	0.40	%
Velocity	6.68	ft/s
Velocity Head	0.69	ft
Specific Energy	0.93	ft
Froude Number	2.570	
Flow Type	Supercritical	

Worksheet for SECTION D - 100 YR

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	0.23 ft
Critical Depth	0.42 ft
Channel Slope	3.01 %
Critical Slope	0.40 %



The WLB Group INC. WLB

Engineering • Planning • Surveying • Urban Design • Landscape Architecture
Offices located in Flagstaff, Tucson, Las Vegas, and Tempe
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Prorated Sub Basin Summary					
ONSITE DEVELOPED FLOW REFERENCED FROM TDS FOR POLICE PARK (DS5673)					
Basin ID	**Area (acres)**	**Q_{10} (cfs)**	**Q_{100} (cfs)**	**10 -yr Unit Flow (cfs/acre)**	**100 -yr Unit Flow (cfs/acre)**
DON1	8.03	6	18	0.75	2.20
Subbasin ID	**Area (acres)**	**Q_{10} (cfs)**		**Q_{100} (cfs)**	
DON1A	2.94	2		6	
DON1B	2.98	2		7	
DON1C	2.11	2		5	

CONCENTRATION POINT NOTES -

DCP1 = DON1A + DON1C
DCP2 = DON1B

REFERENCED STUDY NOTES

*REFERENCED FROM UPDATE TO THE TDS FOR POLICE PARK (DS5673)

Developed Condition Concentration Points			
Data Point	**Description**	**Q_{10} (cfs)**	**Q_{100} (cfs)**
REF1	Referenced flow from CLV POLICE PARK (DS 5673)	22	42
REF2	Referenced flow from CLV POLICE PARK (DS 5673)	34	66
DCP1	DON1A + DON1C	4	11
DCP2	DON1B	2	7
DCP3	Developed Condition of existing condition concentration point ECP3	0	0
DCP4	Flow from DCP1	4	11

Developed Condition					
Cross Section	**Description**	**Q (cfs)**	**Slope (%)**	**Depth (ft)**	**Velocity (ft/s)**	**DxV**
SECTION A - 100 YR	DCP1	11.00	0.40	0.41	2.30	0.94
SECTION B - 100 YR	DON1A	6.00	2.00	0.29	2.94	0.85
SECTION C - 100 YR	DON1B	7.00	3.73	0.28	3.89	1.09
SECTION D - 100 YR	DON1B	7.00	3.01	0.23	6.68	1.54
SECTION E - 100 YR	DON1A + 1/2 DON1C	8.50	4.75	0.29	4.45	1.29
SECTION F - 100 YR	DCP1	11.00	4.75	0.20	5.41	1.08

GRAPHIC SCALE
0 25 50 100
HORIZONTAL SCALE 1" = 50 '

LEGEND

BASIN D1	BASIN DESCRIPTION
1 ACRE	BASIN AREA
Q(10) = 10 CFS	10 YEAR FLOW RATE
Q(100) = 100 CFS	100 YEAR FLOW RATE
	HYDRAULIC SECTION
	FLOW DIRECTION
	BASIN BOUNDARY
	SOIL BOUNDARY

FIGURE 9
DRAINAGE BASINS DEVELOPED CONDITIONS