ADDENDUM #2 TO THE TECHNICAL DRAINAGE STUDY FOR TROPICAL AND REBECCA

CITY OF LAS VEGAS
TCE# 221-24010

Prepared for:
KAVISON HOMES
8975 S. Pecos Rd
Henderson, NV 89074

Prepared by:
TCE
7080 La Cienega, Suite 200
Las Vegas, Nevada 89119
(702) 932-6125
FAX (702) 932-6129

June 2025

THOMASON CONSULTING ENGINEERS

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Tropical and Rebecca DATE: June 12, 2025

Location of development: a) Descriptive (Cross Streets) North/South Rebecca Rd East/West Tropical Pkwy

b) Sect. 26 Twn. 19S Rng 60E

Name of Owner: Kavison Homes Assessors Parcel No.: 125-26-204-003

Telephone No.: (702) 721-6111 Facsimile No.: -

Address: 8975 S. Pecos Road

Henderson, NV 89074

Contact Person-Name: Josh Owen Telephone No: 702-932-6125

Email: jowen@tce-lv.com

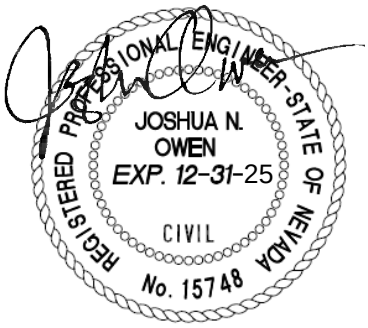
Firm: TCE

Address: 7080 La Cienega Street, Suite 200 Las Vegas, Nevada 89119

Type of Land Development/Land Disturbance Process:

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

1. Total Owned Land Area: At Site: 7.72 Being Developed/Disturbed 7.72
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.)? Residential
5. Approximate upstream land area, which drains to the subject site? 40± acres
6. Has the site drainage been evaluated in the past? YES ☐ NO ☒ If yes, please documentation:
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Perimeter streets
8. Briefly describe your proposed schedule for the subject project: ASAP



Engineer's Seal

06/16/2025

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.

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

Local Entity File No.

Revision	Date

REFERENCE: **STANDARD FORM 1**

June 12, 2025

Jefferson Torrecampo, P.E.
City of Las Vegas
Department of Public Works

Re: Addendum #2 to the Technical Drainage Study for Tropical & Rebecca
DS5855
TCE#221-24010

Mr. Torrecampo:

TCE has reviewed the City of Las Vegas comment letter for the above referenced study dated June 11, 2025. The comments in the subject memorandum have been reproduced in **bold** with accompanying responses as follows:

1. **Appendix C, Hydraulic calculation section 1 on Tropical Parkway: Use the correct Q (Developed Condition) for 10yr/100yr calculations and include flows from referenced study DS3415 (Heller Development).**

   Hydraulic Section 1 has been revised to 12/119 cfs for the 10 and 100 year storms, respectively, and includes flows from the Heller Development. The revised hydraulic calculations, figures, and reference material from the Heller Development drainage study has been included with this addendum.

2. **Appendix C, Freeboard Calculations: On lots 15 through 19, use Hydraulic section 4 since they are all located in DON1.**

   The freeboard calculations have been revised for lots 15 through 19 based upon hydraulic section 4.

THOMASON
CONSULTING
ENGINEERS

7080 La Cienega Street #200
Las Vegas, Nevada 89119

3. **The study uses a 100-year flow of 88cfs in Tropical Parkway assuming the upstream flow from Rebecca & Tropical is 71cfs per referenced study DS3415. However, flows from Joseph Neal Elementary School, NEC and SEC of Rainbow & Tropical will combine with the surface flow and go east on Tropical Parkway impacting the subject development. Therefore, the actual combined flow at Tropical Parkway is greater than what the study uses. Please revise all the calculations.**

   DS5855 has been added to the standard drainage compliance note on the grading plan.

Sincerely,
Thomason Consulting Engineers

Joshua Owen, P.E.

Hydrograph	Basin Area	Q10	Q100
EON1	7.72	5	13
OFF1	5.02	3	9

EON1 BASIN NAME
BASIN BOUNDARY
SOILS BOUNDARY
237 SOILS UNIT

*TDS FOR JOSEPH M. NEAL ELEMENTARY SCHOOL (DS2269)
**NORTHWEST NEIGHBORHOOD STUDY EXISTING FLOWRATE AT RAINBOW (114/261) – ANN ROAD CHANNEL WEST RAINBOW FACILITY FLOW (183 CFS)
+TDS FOR HELLER DEVELOPMENT (DS3415) BASINS OND1+OFFD1

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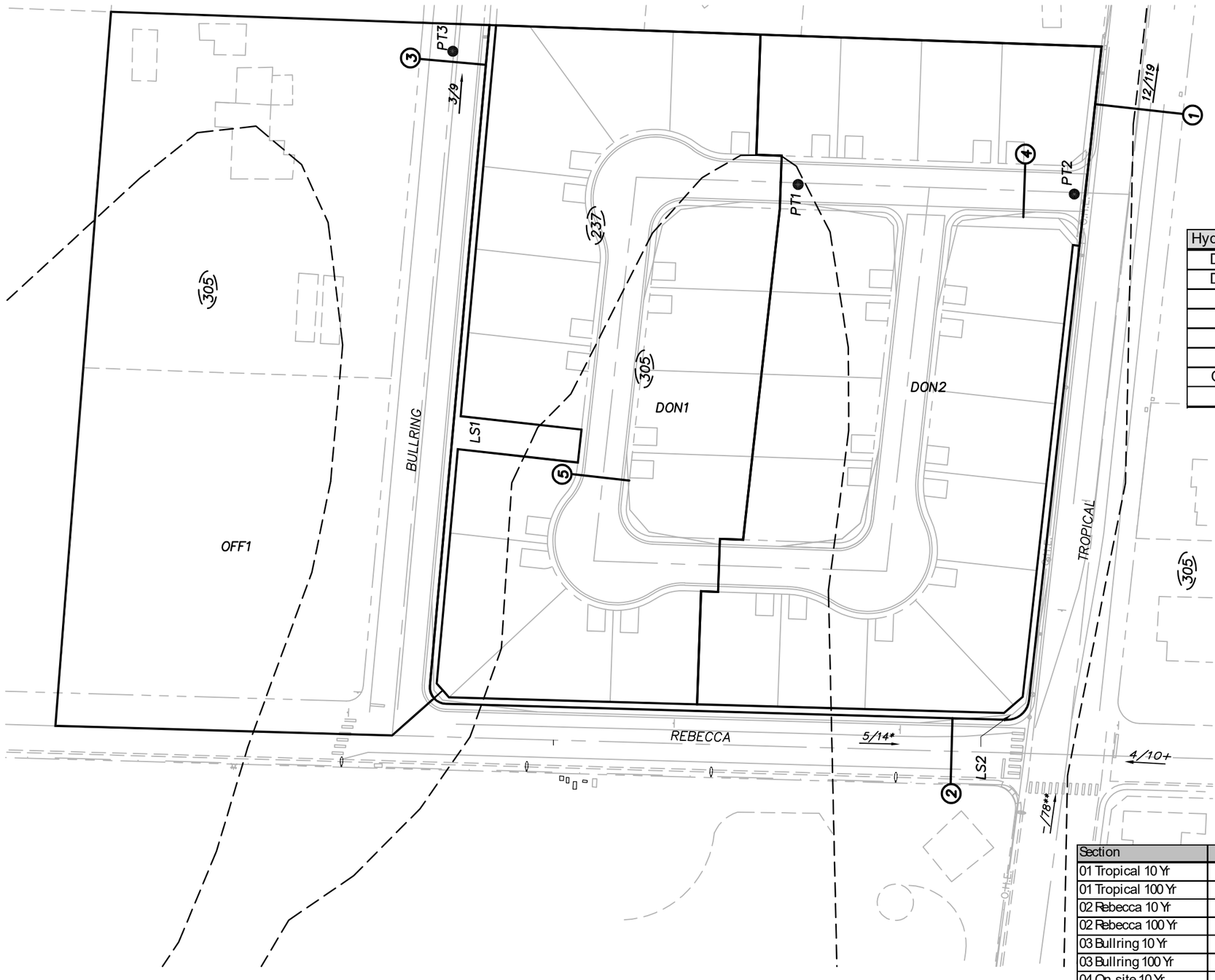
KAVISON HOMES
TROPICAL REBECCA

EXISTING BASINS
FIGURE 5

1



Hydrograph	Basin Area	Q10	Q100
DON1	3.63	4	8
DON2	4.02	4	9
PT1	-	7	17
LS2	0.04	0	0
PT2	-	7	17
LS1	0.03	0	0
OFF1	5.02	3	9
PT3	-	3	9

Section	Q	slope	Depth	Velocity	VxD
01 Tropical 10 Yr	12	0.0069	0.42	2.07	0.87
01 Tropical 100 Yr	119	0.0069	0.85	3.84	3.26
02 Rebecca 10 Yr	5	0.005	0.36	1.70	0.61
02 Rebecca 100 Yr	14	0.005	0.49	2.14	1.04
03 Bullring 10 Yr	3	0.0054	0.27	1.42	0.38
03 Bullring 100 Yr	9	0.0054	0.38	1.87	0.71
04 On-site 10 Yr	7	0.005	0.41	1.73	0.71
04 On-site 100 Yr	17	0.005	0.51	2.10	1.07
05 On-site 10 Yr	2	0.005	0.30	1.35	0.41
05 On-site 100 Yr	4	0.005	0.36	1.57	0.56

*TDS FOR JOSEPH M. NEAL ELEMENTARY SCHOOL (DS2269)
**NORTHWEST NEIGHBORHOOD STUDY EXISTING FLOWRATE AT RAINBOW (114/261) – ANN ROAD CHANNEL WEST RAINBOW FACILITY FLOW (183 CFS)
+TDS FOR HELLER DEVELOPMENT (DS3415) BASINS OND1+OFFD1

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KAVISON HOMES
TROPICAL REBECCA

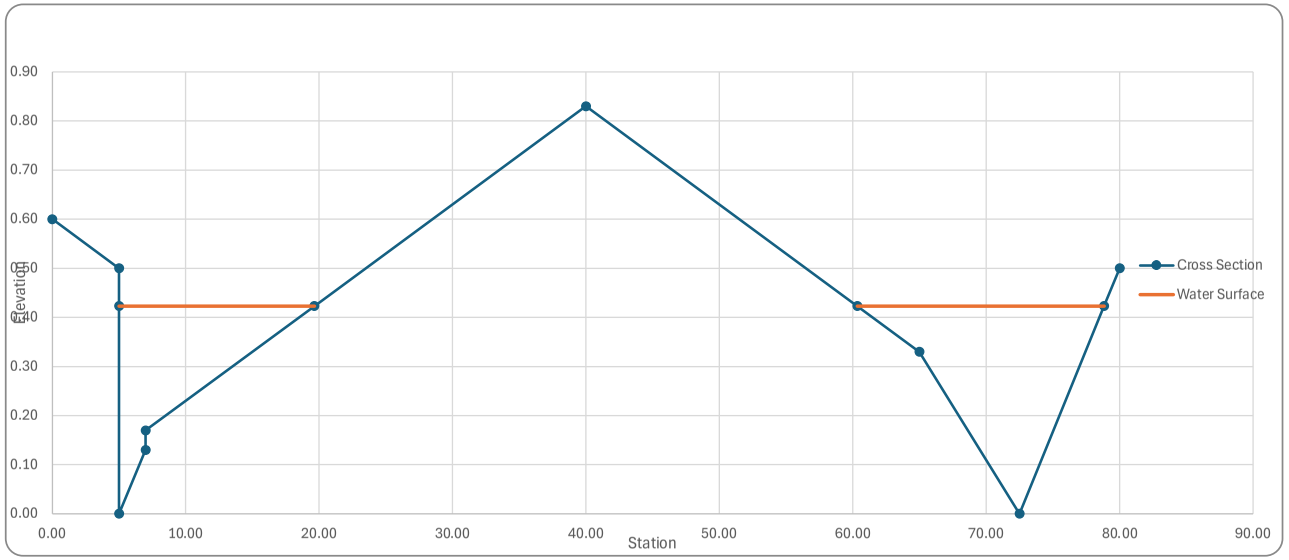
DEVELOPED BASINS
FIGURE 6

1

01 Tropical 10 Yr

Calculation Summary							
Q	**12.0 cfs**	Flow Area	5.81 sqft	Velocity Head	0.07 ft		
s	**0.0069 ft/ft**	Wetted Perimeter	33.64 ft	Specific Energy	0.49 ft		
Composite Manning's n	0.019	Hydraulic Radius	0.17 ft	Fr#	0.87		
Water Surface	0.42 ft	Top Width	33.15 ft	Flow Type	Subcritical		
Normal Depth	**0.42 ft**	Critical WS	0.41 ft				
Velocity Avg (Q/A)	**2.07 ft/s**						
Velocity (Mannings)	2.07 ft/s						
Q(mannings)	12.0						

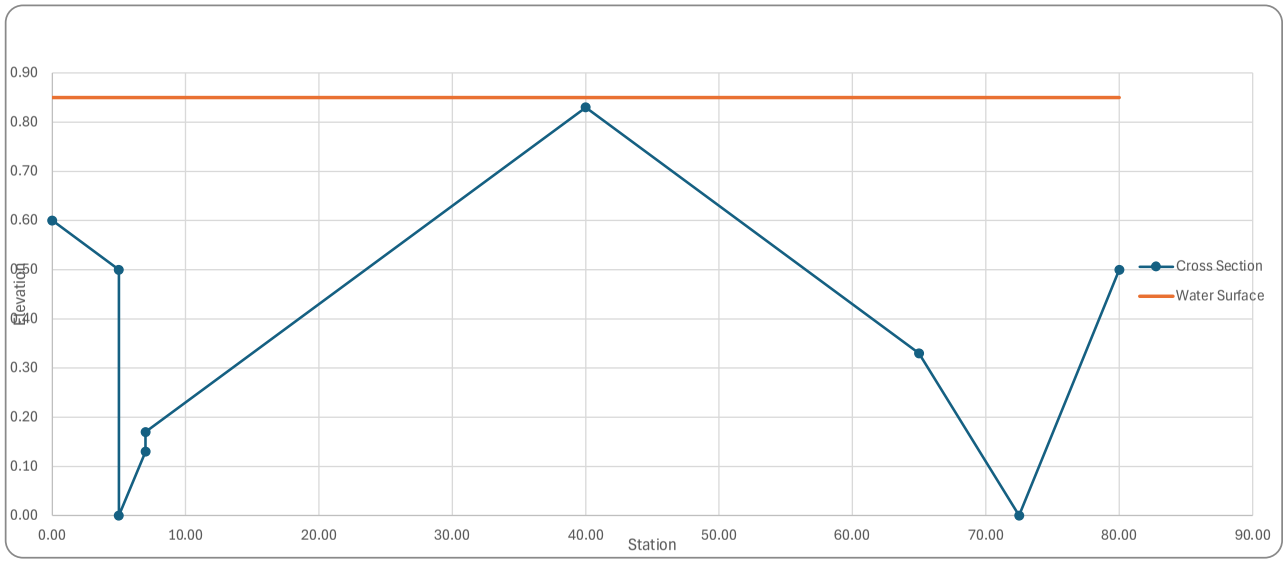
													n(comp)=	0.0185
	CROSS SECTION POINTS			PLOTTED POINTS							Column Sum	5.81	33.64	0.0116
i	Xi-1	Yi-1	ni-1	Xi	Yi	ni	WS	WS-Yi-1	WS-Yi	DeltaX	DeltaY	Ai	Wpi	n(i-1)^2*Wpi
0				0.00	0.60	0.013								
1	0.00	0.60	0.013	5.00	0.50	0.013								
2	5.00	0.50	0.013	5.00	0.42	0.013	0.423							
3	5.00	0.42	0.013	5.00	0.00	0.013	0.423	0	0.423	0.000	-0.423	0	0.423	0.000071
4	5.00	0.00	0.013	7.00	0.13	0.013	0.423	0.423	0.293	2.000	0.13	0.716	2.00422	0.000339
5	7.00	0.13	0.013	7.00	0.17	0.016	0.423	0.293	0.253	0.000	0.04	0	0.04	0.000007
6	7.00	0.17	0.016	19.65	0.42	0.016	0.423	0.253	0	12.650	0.253	1.60022	12.65253	0.003239
7	19.65	0.42	0.016	40.00	0.83	0.016						-	-	0
8	40	0.83	0.016	60.35	0.423	0.016	0.423							
9	60.35	0.423	0.016	65	0.33	0.022	0.423	0	0.093	4.650	-0.093	0.21622	4.65093	0.001191
10	65	0.33	0.022	72.5	0	0.022	0.423	0.093	0.423	7.500	-0.33	1.935	7.50726	0.003634
11	72.5	0	0.022	78.845	0.423	0.022	0.423	0.423	0	6.345	0.423	1.34197	6.35908	0.003078
12	78.845	0.423	0.022	80	0.5	0.022						-	-	0



01 Tropical 100 Yr

Calculation Summary							
Q	**119.0 cfs**	Flow Area	31.01 sqft	Velocity Head	0.23 ft		
s	**0.0069 ft/ft**	Wetted Perimeter	80.58 ft	Specific Energy	1.08 ft		
Composite Manning's n	0.017	Hydraulic Radius	0.38 ft	Fr#	1.09		
Water Surface	0.85 ft	Top Width	80.00 ft	Flow Type	Supercritical		
Normal Depth	**0.85 ft**	Critical WS	0.87 ft				
Velocity Avg (Q/A)	**3.84 ft/s**						
Velocity (Mannings)	3.84 ft/s						
Q(mannings)	119.2						

													n(comp)=	0.0170
	CROSS SECTION POINTS			PLOTTED POINTS							Column Sum	31.01	80.58	0.0234
i	Xi-1	Yi-1	ni-1	Xi	Yi	ni	WS	WS-Yi-1	WS-Yi	DeltaX	DeltaY	Ai	Wpi	n(i-1)^2*Wpi
0				0.00	0.60	0.013	0.85							
1	0.00	0.60	0.013	5.00	0.50	0.013	0.85	0.25	0.35	5.000	-0.1	1.5	5.001	0.000845
2	5.00	0.50	0.013	5.00	0.00	0.013	0.85	0.35	0.85	0.000	-0.5	0	0.5	0.000084
3	5.00	0.00	0.013	7.00	0.13	0.013	0.85	0.85	0.72	2.000	0.13	1.57	2.00422	0.000339
4	7.00	0.13	0.013	7.00	0.17	0.016	0.85	0.72	0.68	0.000	0.04	0	0.04	0.000007
5	7.00	0.17	0.016	40.00	0.83	0.016	0.85	0.68	0.02	33.000	0.66	11.55	33.0066	0.00845
6	40.00	0.83	0.016	65.00	0.33	0.022	0.85	0.02	0.52	25.000	-0.5	6.75	25.005	0.006401
7	65.00	0.33	0.022	72.50	0.00	0.022	0.85	0.52	0.85	7.500	-0.33	5.1375	7.50726	0.003634
8	72.5	0	0.022	80	0.5	0.022	0.85	0.85	0.35	7.500	0.5	4.5	7.51665	0.003638



TROPICAL & REBECCA FREEBOARD CALCULATIONS

Lot	FF	TC	FL	FF-FL	Hydraulic Section	Flow Depth (ft)	Min. Freeboard*	Freeboard Provided	Criteria Met
1	2320.00	2317.48	2317.10	2.90	04 On-site 100 Yr	0.51	1.02	2.39	Yes
2	2320.40	2317.85	2317.47	2.94	04 On-site 100 Yr	0.51	1.02	2.42	Yes
3	2320.80	2318.21	2317.83	2.97	04 On-site 100 Yr	0.51	1.02	2.46	Yes
4	2321.10	2318.58	2318.20	2.91	04 On-site 100 Yr	0.51	1.02	2.39	Yes
5	2321.50	2319.06	2318.68	2.82	04 On-site 100 Yr	0.51	1.02	2.31	Yes
6	2322.10	2319.35	2318.97	3.13	04 On-site 100 Yr	0.51	1.02	2.62	Yes
7	2322.60	2319.57	2319.19	3.41	04 On-site 100 Yr	0.51	1.02	2.90	Yes
8	2322.40	2320.03	2319.65	2.75	04 On-site 100 Yr	0.51	1.02	2.24	Yes
9	2323.00	2320.41	2320.03	2.97	04 On-site 100 Yr	0.51	1.02	2.46	Yes
10	2323.40	2320.79	2320.41	2.99	04 On-site 100 Yr	0.51	1.02	2.48	Yes
11	2323.80	2321.43	2321.05	2.75	05 On-site 100 Yr	0.36	0.88	2.39	Yes
12	2324.40	2321.67	2321.29	3.11	05 On-site 100 Yr	0.36	0.88	2.76	Yes
13	2325.20	2321.94	2321.56	3.64	05 On-site 100 Yr	0.36	0.88	3.29	Yes
14	2324.70	2322.45	2322.07	2.63	05 On-site 100 Yr	0.36	0.88	2.28	Yes
15	2325.00	2322.39	2322.01	2.99	04 On-site 100 Yr	0.51	1.02	2.48	Yes
16	2324.60	2322.39	2322.01	2.59	04 On-site 100 Yr	0.51	1.02	2.08	Yes
17	2324.30	2321.82	2321.44	2.86	04 On-site 100 Yr	0.51	1.02	2.35	Yes
18	2324.00	2321.50	2321.12	2.88	04 On-site 100 Yr	0.51	1.02	2.37	Yes
19	2323.60	2321.21	2320.83	2.77	04 On-site 100 Yr	0.51	1.02	2.26	Yes
20	2322.80	2320.54	2320.16	2.64	04 On-site 100 Yr	0.51	1.02	2.13	Yes
21	2321.80	2319.54	2319.16	2.64	04 On-site 100 Yr	0.51	1.02	2.13	Yes
22	2320.90	2318.54	2318.16	2.74	04 On-site 100 Yr	0.51	1.02	2.23	Yes
23	2320.90	2318.43	2318.05	2.85	04 On-site 100 Yr	0.51	1.02	2.34	Yes
24	2321.80	2319.46	2319.08	2.72	04 On-site 100 Yr	0.51	1.02	2.21	Yes
25	2322.70	2320.49	2320.11	2.59	04 On-site 100 Yr	0.51	1.02	2.08	Yes
26	2323.80	2321.95	2321.57	2.23	04 On-site 100 Yr	0.51	1.02	1.72	Yes
27	2323.80	2322.04	2321.66	2.14	04 On-site 100 Yr	0.51	1.02	1.63	Yes
28	2323.40	2320.87	2320.49	2.91	04 On-site 100 Yr	0.51	1.02	2.40	Yes
29	2323.10	2320.49	2320.11	2.99	04 On-site 100 Yr	0.51	1.02	2.47	Yes
30	2322.40	2320.12	2319.74	2.66	04 On-site 100 Yr	0.51	1.02	2.15	Yes

Greater of TC+0.5' or 2(Flow Depth)

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: December 8, 2003
TO: **Land Development Services** Department of Public Works				FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for: **HELLER DEVELOPMENT**			**COPIES TO:** JPL Engineering
Cross Streets:	SWC of Tropical Parkway & Rebecca Road			Heller Development
File Number:	F:\Depot\DSMemos\DS3415B.doc			Bart Anderson, P.E., DevCo
Parcel Number:	125-26-301-003 & -004			
Zoning Action:				
FEMA Flood Zone	YES	NO	X	
Proposed Storm Drain	YES	NO	X	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID G.R. No.
1st Submittal	9/9/2003	9/23/2003	Not Approved	$250.00	110660: $250
2nd Submittal	11/7 & 12/5/2003	12/8/2003	See Comments Below	$400.00	114108: $400
			TOTAL FEES (LDDRS):	**$650.00**	----

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.

1. The proposed crash gate at the end of the two proposed public drainage easements must be constructed per City of Las Vegas standard drawing #421B. Revise Detail I/C2 accordingly.
2. Per a meeting among the engineer, Fire Department and Flood Control, both drainage easements are also fire access lane. The proposed curb in the easements must be painted red and a sign posted to denote: "*Fire Lane, No Parking*" or approved equivalent.
3. A previous required note on the grading plan: "*All private streets are P.U.E., Public Sewer Easements, and Public Drainage Easements to be privately maintained by HOA*" had not been provided.
4. *All drainage easements must be "Common Lots" and "Public Drainage Easement to be privately maintained by the Homeowners Association" to be labeled in the grading plan and recorded as such on the final map.*
5. *Projects that disturb more than one acre of land must submit to the Nevada Division of Environmental Protection: (1) a "Notice of Intent" to discharge, (2) a request for inclusion in the Stormwater General Permit No. GNV0022241, and (3) a stormwater pollution prevention plan. For more information, please call (775) 687-4670, ext. 3138.*

END OF REMARKS

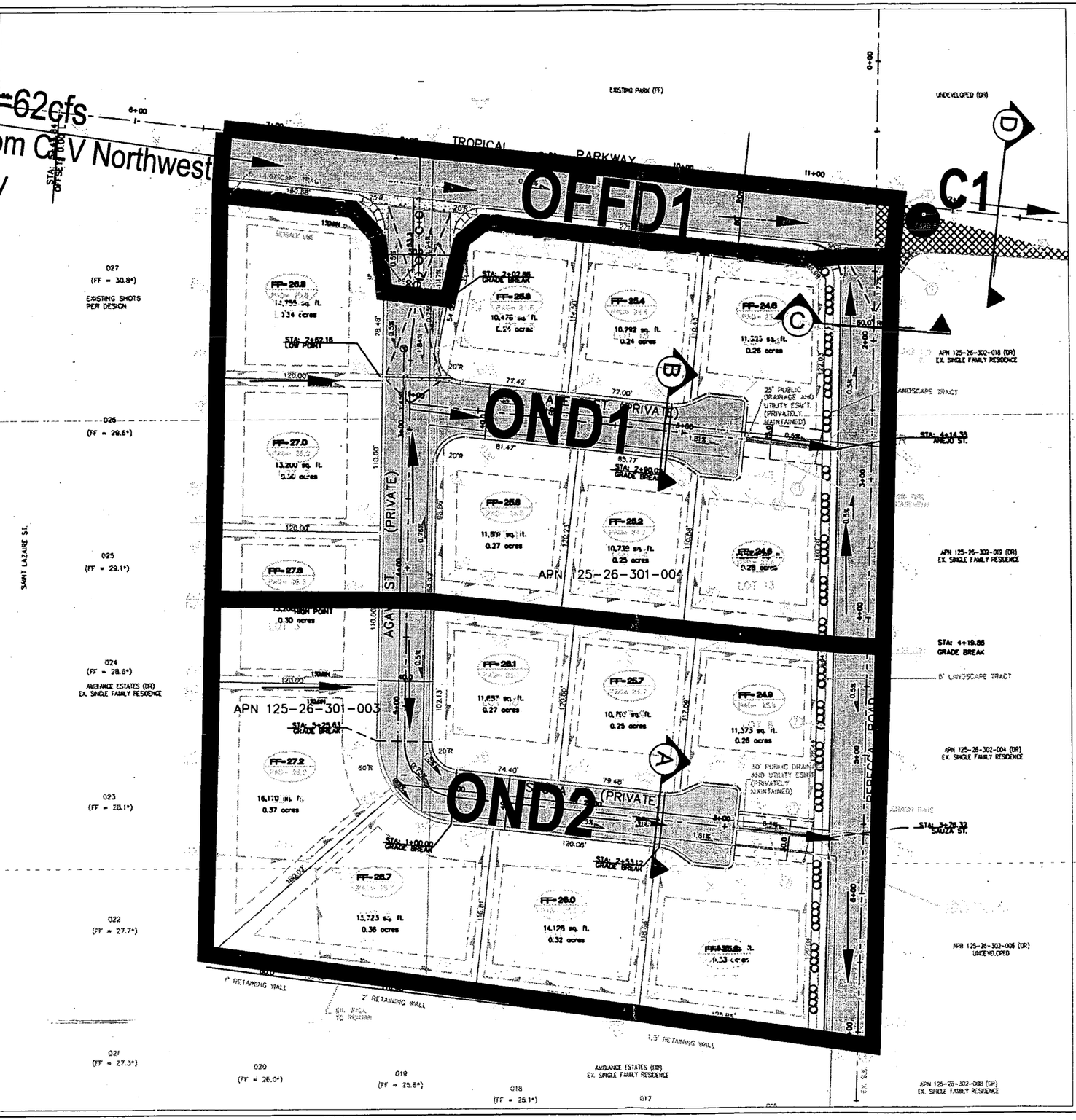
ays

T/R/S: T19S/R60E/26

AREA G-26

~~Q_{10}=0cfs / Q_{100}=62cfs~~

Reference Flow From CLV Northwest Neighborhood Study



BASIN / COMB PT	BASIN AREA (acres)	VELOCITY (fps)	Q_{10} (cfs)	Q_{100} (cfs)
OND1	3.2	1.85	3	7
OND2	3.1	1.72	2	6
OFFD1	0.75	1.82	1	3
C1*	NA	NA	4	71

*Includes reference flow from CLV Northwest Neighborhood Study of 0cfs/62cfs for future conditions

LEGEND

- **OND1** — Basin Name
- Flow Arrow
- Basin Boundary
- (A) — Cross-Section
- C1 — Combination Point

NORTH

GRAPHIC SCALE

80 0 40 80

(IN FEET)

1 inch = 80 ft.

Heller Development

Developed Conditions Drainage Basin Exhibit