

Addendum #1 to Update #2 to the
Technical Drainage Study for

Grand Canyon Village
Las Vegas, Nevada

W.O. # 8025

Prepared for

**Grand Canyon Village
LLC**

10655 Park Run Drive, Suite 160
Las Vegas, NV 89144
PH: (702) 220-4500

Submitted to:

**City of Las Vegas
Public Works**

495 S Main Street
Las Vegas, NV 89101
PH: (702) 229-6251



HYDROLOGIC CRITERIA AND DRAINAGE MANUAL
DRAINAGE STUDY INFORMATION FORM

Name of Development: Grand Canyon Village Date: June 21, 2022

Location of Development: a) Descriptive (Cross Streets) North/South: Grand Canyon Drive

East/West: Skye Canyon Park Drive

b) Section: 7 Township: 19S Range: 60E

c) APN : 125-07-611-001

Name of Owner: Grand Canyon Village LLC

Telephone No.: (702)-220-4500 Fax No.: _____ E-Mail Address: _____

Address: 10655 Park Run Drive, Suite 160, Las Vegas, NV 89144

Contact Person-Name: Aaron Yup Telephone No.: 702-873-7550

* E-Mail Address: ayup@vtnnv.com Fax No.: 702-362-2597

Firm: VTN Nevada

Address: 2727 S. Rainbow Blvd Las Vegas, NV 89146

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		Mass grade & minor street improvement

1. Total Owned Land Area: At Site: ±24.11 Acres Being Developed/Disturbed: ±12.01 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

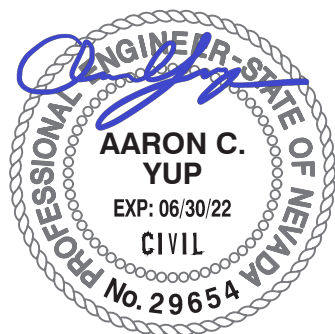
4. Proposed type of development (Residential, Commercial, Etc.): Offsite Streets, mass grading for future commercial

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: Grand Canyon Village TDS (DS5398)

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Eastern boundary in regional facility & frontage road west of US95.

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

ADDENDUM #1 TO UPDATE #2
TO THE TECHNICAL DRAINAGE STUDY
FOR
GRAND CANYON VILLAGE
CITY OF LAS VEGAS, NEVADA
W.O. # 8025
DS #5398

Prepared for:
GRAND CANYON VILLAGE LLC
10655 Park Run Drive, Suite 200
Las Vegas, Nevada 89144
Ph: 702-220-4500

Submitted To:
CITY OF LAS VEGAS PUBLIC WORKS
495 S. Main Street
Las Vegas, Nevada 89101
Ph: 702-229-6251



June 21, 2022
W.O. #8025

City of Las Vegas
Land Development Services
Department of Building Safety

Attention: Albert Sung, P.E.
Flood Control Project Engineer

Subject: Addendum #1 to Update #2 to the Technical Drainage Study for Grand Canyon Village

Mr. Sung:

This letter certifies that all items on the *Addendum #1 to Update #2 to the Technical Drainage Study for Grand Canyon Village* electronic submittal matches the paper version bound into the study.

Respectfully submitted,



Aaron Yup, P.E.



June 21, 2022
W.O. #8025
City of Las Vegas
495 S. Main Street
Las Vegas, NV 89101

Attention: Albert Sung, P.E.
Flood Control Project Engineer

**SUBJECT: ADDENDUM #1 TO UPDATE #2 TO THE TECHNICAL DRAINAGE STUDY FOR
GRAND CANYON VILLAGE (DS #5398)**

Mr. Sung:

This Addendum #1 to Update #2 to the Technical Drainage Study for *Grand Canyon Village (DS5398)* is being submitted to the City of Las Vegas to address review comments dated May 26, 2022.

Comment #1

Sheet SD2: Drop manhole (SDMH #5) is not acceptable. It appears that the reason of proposing a drop manhole is to clear an existing NVE conduit. The engineer may consider adding another storm drain manhole passing the conduit and another pipe to connect to the bottom of SDMH #5. Specify clearly the SDMH to be Type II Manhole per USD 405.1. Address and revise in the next submittal.

RESPONSE: The proposed storm drain has been revised to remove the drop manhole per correspondence with CLV Public Works. Instead, the full removal of the existing 36" RCP stub to be replaced with a connection of 36" RCP ± 12.51 -lf long at $\pm 64.64\%$ slope is now proposed with the connection detail shown on sheet SD2. Additionally, 35.50-lf of 29"x45" HERCP has been proposed between SDMH#4 and SDMH#5, replacing the previously proposed 36" RCP for clearance purposes. Consequently, Type III Manholes are now proposed to accommodate the increased width. A markup and relevant e-mail correspondence with comment from CLV public works showing the proposed storm drain changes has been provided in *Appendix B*.

The adjustment to the storm drain facilities resulted in the revision of Standard Form 6 hydraulic calculations to show that the HGL meets criteria. The newly proposed 29"x45" HERCP has been modeled using the circular equivalent of 36". Note that this update does not propose any revisions to approved hydrology. The revised hydraulic calculations have been provided in *Appendix A*.

I hope this addresses your concerns regarding this project. If there are any questions or any additional information is required, please contact this office.

Respectfully Submitted,
VTN Consulting

Aaron Yup, P.E.

**CLV COMMENT LETTER FOR GRAND
CANYON VILLAGE UPDATE #2
(DS#5398D)**

CITY OF LAS VEGAS			DATE:
INTER-OFFICE MEMORANDUM			May 26, 2022
TO: Land Development Services Department of Building & Safety			FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for:		COPIES TO:
	Grand Canyon Village Mass Grading – Update #2		VTN
Cross Streets:	Grand Canyon Dr. & Skye Canyon Park Dr.		Grand Canyon Village, LLC
File Number:	F:\Depot\DSMemos\DS5398D.doc		Bart Anderson, P.E., DevCo
Parcel Number:	125-07-601-009, 125-07-601-010		NDOT
Zoning Action:	20-0257-SDR1		
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	12/23/2020	1/19/2020	Not Approved	\$400.00	4124257: \$400
2 nd Submittal	1/27/2021	2/25/2021	Approved	\$400.00	4146021: \$400
3 rd Submittal	5/5/2021	5/27/2021	Conditionally Approved	\$100.00	4280787: \$100
4 th Submittal	5/12/2022	5/26/2022	See Comments Below	\$100.00	4785422: \$100
			TOTAL FEES (LDDRS):	\$1,000.00	----

REMARKS:

4th Submittal: Update #2 to replace collar with manhole

3rd Submittal: Update #1 to add deceleration lane, shift driveway, relocate drop inlets, extend storm drain laterals in Oso Blanca Road.

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

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

- Sheet SD2:** Drop manhole (SDMH #5) is not acceptable. It appears that the reason of proposing a drop manhole is to clear an existing NVE conduit. The engineer may consider adding another storm drain manhole passing the conduit and another pipe to connect to the bottom of SDMH #5. Specify clearly the SDMH to be Type II Manhole per USD 405.1. Address and revise in the next submittal.

The followings are repeated until they are complete:

- The project proposes to construct facilities and/or increase flows within Nevada Department of Transportation (NDOT) right-of-way. The engineer must contact NDOT for encroachment permit for the proposed project. NDOT concurrence is required.
- Revise the CLV Drawing # labels to 107V3759 for the existing storm drain facilities in Oso Blanca Road.

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
HDR/JKS

T/R/S: T19S/R60E/S07
AREA G-07

APPENDIX A

HYDRAULIC CALCULATIONS

APPENDIX A.1
REVISED STANDARD FORM 6
CALCULATIONS

Starting HGL and EGL

Tailwater Elevation	Outlet Invert Elevation	Tailwater Depth (ft)	Critical Depth- Dc (ft)	Pipe Diameter- D (ft)	(Dc+D)/2 (ft)	Starting HGL (ft)	Hv (ft)	Starting EGL (ft)
2717.00	2715.54	1.46	2.75	3.0	2.875	2718.415	0.34	2718.75

TWE Referenced from Horse Drive/US95 SD Profile

Phi Index

n Value	Phi
0.013	0.004925

$$Sf = \frac{\Phi H v}{R^{1.33}}$$
$$\Phi = \frac{2g (n^2)}{2.21}$$

STANDARD FORM 6

DEVELOPMENT:	Grand Canyon Village	
CALCULATED BY:	VE	WO# 8025
STORM DRAIN SEGMENT:	Lateral 1.4	
DESCRIPTION:	36" RCP to EX. 10'x6' RCB	

$$H_j = (V_2^2 / 2g) - K_j (V_1^2 / 2g)$$
$$H_m = K_m (V_2^2 / 2g)$$
$$H_b = K_b (V_2^2 / 2g)$$
$$H_i = K_i (V_2^2 / 2g)$$

Segment Number	Segment Type	Starting Station	Ending Station	Diameter (ft)	D/S Invert	U/S Invert	Length (ft)	Area (sq. ft)	Phi	Flow (cfs)	Slope (%)	Velocity (fps)	Hv (ft)	Sf (ft/ft)	Ave. Sf (ft/ft)	Hf (ft)	Hj (ft)	Hm (ft)	Hb (ft)	Hi (ft)	H_ (ft)	H Total (ft)	U/S EGL Elevation	U/S HGL Elevation	Pressure Flow ?	D/S EGL of U/S Segment	Final U/S EGL	Final U/S HGL
1	PIPE	10+60.40	10+47.89	3	2715.54	2723.62	12.51	7.07	0.00492	33.00	64.59	4.67	0.34	0.00244	0.00244	0.03						0.03	2718.78	2718.45	Yes	2726.96	2726.96	2726.62
2	SDMH #5	10+47.89	10+47.89	3	2723.62	2723.62	0.00	7.07	0.00492	33.00	N/A	4.67	0.34	0.00244	0.00244	0.00		0.01				0.01	2726.97	2726.63	Yes	2726.96	2726.97	2726.63
3	PIPE	10+47.89	10+12.39	3	2723.62	2723.80	35.50	7.07	0.00492	33.00	0.51	4.67	0.34	0.00244	0.00244	0.09						0.09	2727.05	2726.71	Yes	2727.14	2727.14	2726.80
4	SDMH #4	10+12.39	10+12.39	3	2723.80	2723.80	0.00	7.07	0.00492	33.00	N/A	4.67	0.34	0.00244	0.00244	0.00		0.01				0.01	2727.15	2726.81	Yes	2727.14	2727.15	2726.81
5	PIPE	10+12.39	10+00.00	3	2723.80	2724.40	12.39	7.07	0.00492	33.00	4.84	4.67	0.34	0.00244	0.00244	0.03						0.03	2727.18	2726.84	Yes	2727.74	2727.74	2727.40
6	INLET	10+00.00	10+00.00	3	2724.40	2724.40	0.00	7.07	0.00492	33.00	N/A	4.67	0.34	0.00244	0.00244	0.00				0.17		0.17	2727.91	2727.57				

Manholes/Transition Losses

	Straight Through Manhole				Junction Manhole					Bend Losses				Inlet Losses		
Segment Number	Deflection Angle	Km	Hv (ft)	Hm (ft)	Junction Angle	Kj	D/S Hv (ft)	U/S Hv (ft)	Hj (ft)	Bend Angle	Kb	Hv (ft)	Hb (ft)	Ki	Hv (ft)	Hi (ft)
1																
2	0	0.02	0.338	0.007												
3																
4	0	0.02	0.338	0.007												

HGL Criteria Check			
Segment Description	TMH Elevation	Cover (ft)	Criteria Met?
PIPE			
SDMH #5	2729.4	2.773	Yes
PIPE			
SDMH #4	2741.6	14.793	Yes

APPENDIX A.2
PREVIOUSLY APPROVED STANDARD
FORM 6 CALCULATIONS FROM GRAND
CANYON VILLAGE (DS#5398)

Starting HGL and EGL

Tailwater Elevation	Outlet Invert Elevation	Tailwater Depth (ft)	Critical Depth- Dc (ft)	Pipe Diameter- D (ft)	(Dc+D)/2 (ft)	Starting HGL (ft)	Hv (ft)	Starting EGL (ft)
2717.00	2715.54	1.46	2.75	3.0	2.875	2718.415	0.34	2718.75

Phi Index

n Value	Phi
0.013	0.004925

$$Sf = \frac{\Phi H v}{R^{1.33}}$$

$$\Phi = \frac{2g (n^2)}{2.21}$$

STANDARD FORM 6

DEVELOPMENT:	Grand Canyon Village
CALCULATED BY:	VE WO# 8025
STORM DRAIN SEGMENT:	Lateral 1.4
DESCRIPTION:	36" RCP to EX. 10'x6' RCB

$$H_j = (V_2^2 / 2g) - K_j (V_1^2 / 2g)$$

$$H_m = K_m (V_2^2 / 2g)$$

$$H_b = K_b (V_2^2 / 2g)$$

$$H_i = K_i (V_2^2 / 2g)$$

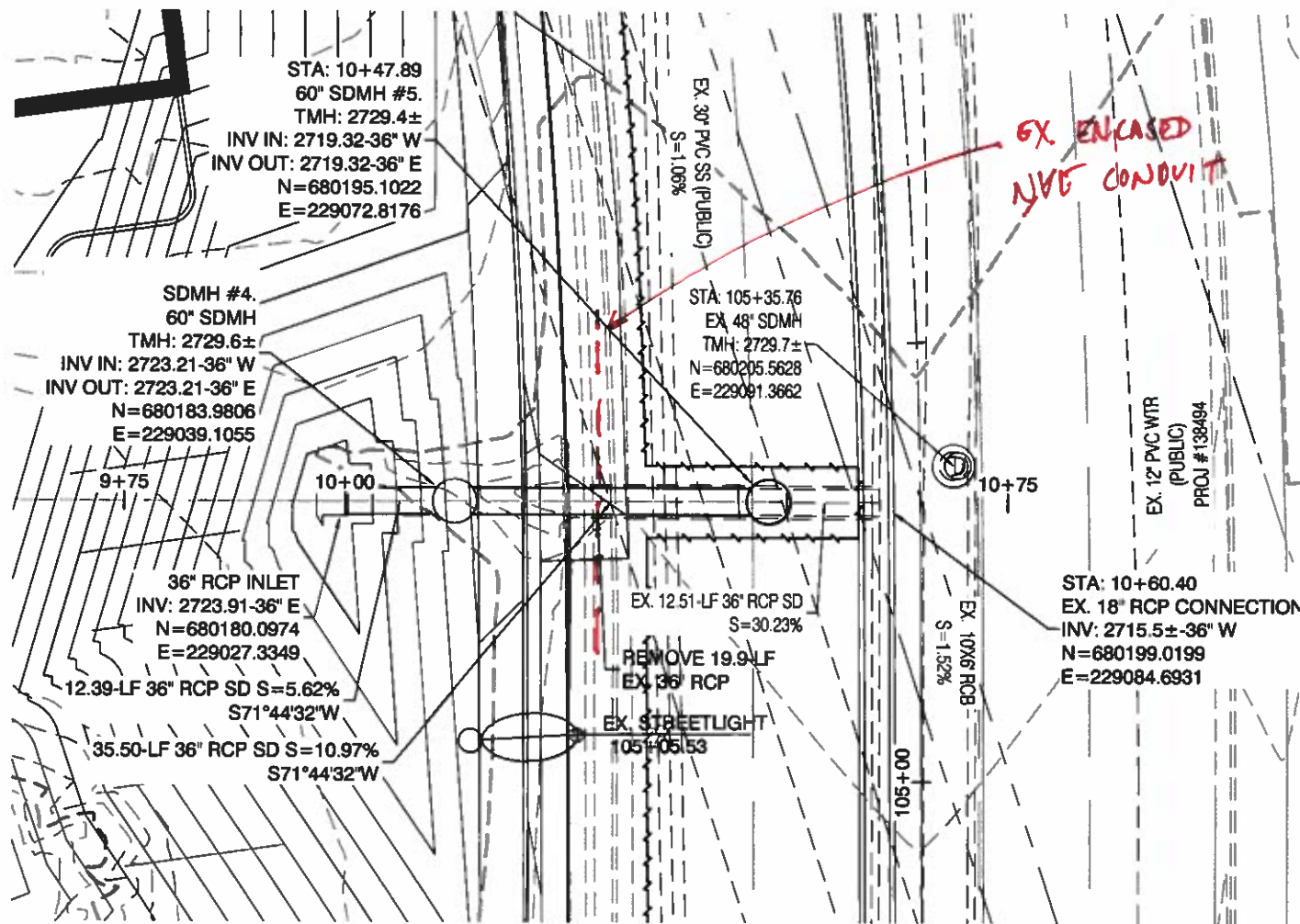
Segment Number	Segment Type	Starting Station	Ending Station	Diameter (ft)	D/S Invert	U/S Invert	Length (ft)	Area (sq. ft)	Phi	Flow (cfs)	Slope (%)	Velocity (fps)	Hv (ft)	Sf (ft/ft)	Ave. Sf (ft/ft)	Hf (ft)	Hj (ft)	Hm (ft)	Hb (ft)	Hi (ft)	H_ (ft)	H Total (ft)	U/S EGL Elevation	U/S HGL Elevation	Pressure Flow ?	D/S EGL of U/S Segment	Final U/S EGL	Final U/S HGL
1	PIPE	10+60.40	10+47.89	3	2715.54	2719.32	12.51	7.07	0.00492	33.00	30.22	4.67	0.34	0.00244	0.00244	0.03						0.03	2718.78	2718.45	Yes	2722.66	2722.66	2722.32
2	SDMH #5	10+47.89	10+47.89	3	2719.32	2719.32	0.00	7.07	0.00492	33.00	N/A	4.67	0.34	0.00244	0.00244	0.00		0.01				0.01	2722.67	2722.33	Yes	2722.66	2722.67	2722.33
3	PIPE	10+47.89	10+12.39	3	2719.32	2723.21	35.50	7.07	0.00492	33.00	10.96	4.67	0.34	0.00244	0.00244	0.09						0.09	2722.75	2722.41	Yes	2726.57	2726.57	2726.21
4	SDMH #4	10+12.39	10+12.39	3	2723.21	2723.21	0.00	7.07	0.00492	34.00	N/A	4.81	0.36	0.00259	0.00252	0.00		0.01				0.01	2726.58	2726.22	Yes	2726.59	2726.59	2726.21
5	PIPE	10+12.39	10+00.00	3	2723.21	2723.91	12.39	7.07	0.00492	35.00	5.65	4.95	0.38	0.00275	0.00267	0.03						0.03	2726.62	2726.24	Yes	2727.31	2727.31	2726.91
6	INLET	10+00.00	10+00.00	3	2723.91	2723.91	0.00	7.07	0.00492	36.00	N/A	5.09	0.40	0.00291	0.00283	0.00				0.20		0.20	2727.51	2727.11				

Manholes/Transition Losses

	Straight Through Manhole				Junction Manhole					Bend Losses				Inlet Losses		
Segment Number	Deflection Angle	Km	Hv (ft)	Hm (ft)	Junction Angle	Kj	D/S Hv (ft)	U/S Hv (ft)	Hj (ft)	Bend Angle	Kb	Hv (ft)	Hb (ft)	Ki	Hv (ft)	Hi (ft)
1																
2	0	0.02	0.338	0.007												
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4	0	0.02	0.338	0.007												

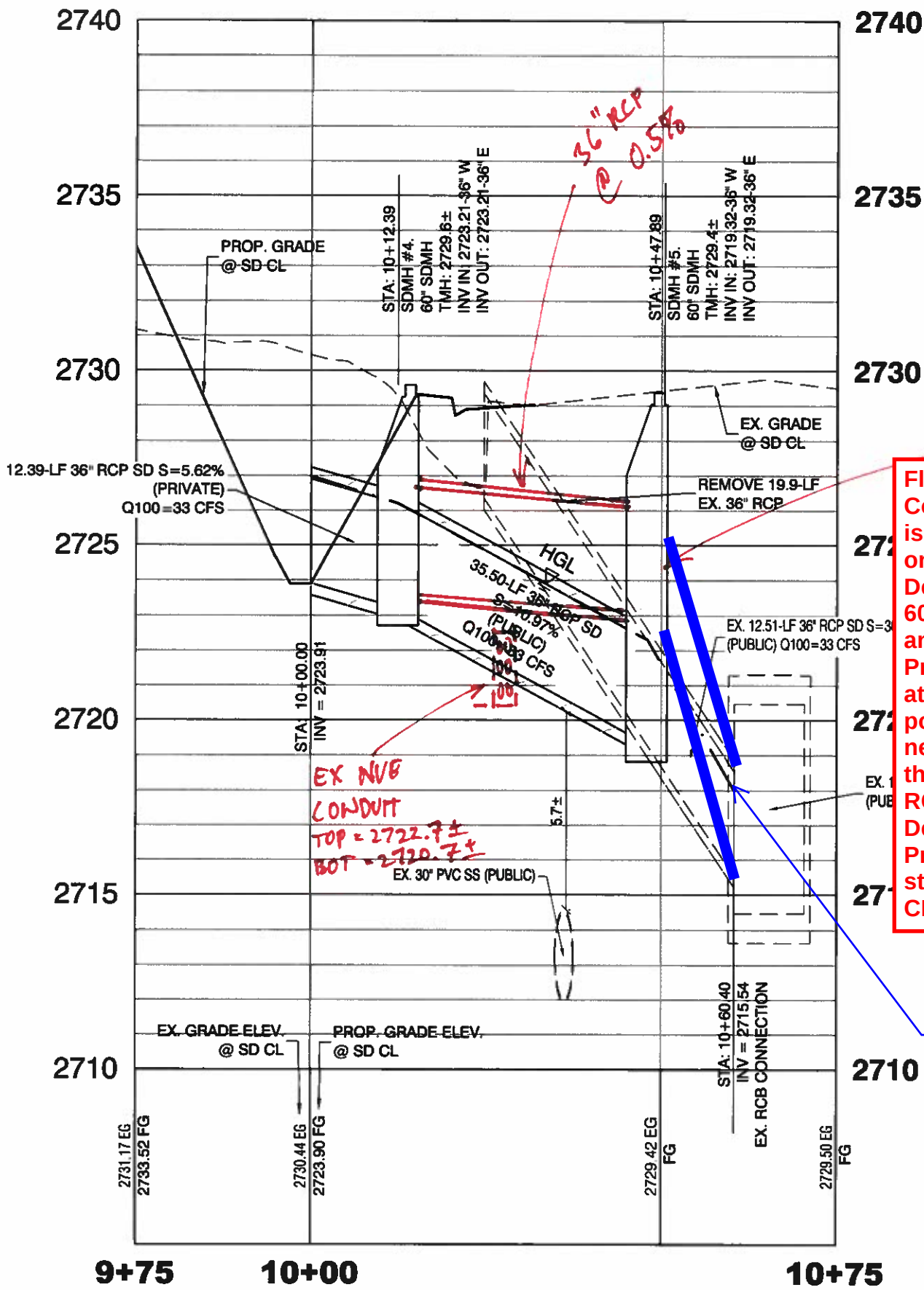
HGL Criteria Check			
Segment Description	TMH Elevation	Cover (ft)	Criteria Met?
PIPE			
SDMH #5	2729.4	7.073	Yes
PIPE			
SDMH #4	2729.6	3.383	Yes

APPENDIX B
IMPROVEMENT PLAN MARKUP AND
CLV CORRESPONDENCE



STORM DRAIN LATERAL 3
(PUBLIC)

PROFILE SCALES:
HORIZ. = 1"=20'
VERT. = 1"=4'



Flood Control - PBJ, 6/2/22
Concept of no Drop Manhole is much better. No Structural on the manhole, reference the Detail being used.
60" manhole with 30" cover and steps to the invert.
Provide concrete collar Detail at the new pipe penetration point into the RCB. You might need your Structural to look at the Connection detail to the RCB. Email over proposed Detail for approval.
Provide new pipe slopes. On steeper RCP connections use CLSM backfill.

if existing pipe is removed to the box and new pipe is reconnected. are structurals calcs needed?
can a collar detail be added?

Aaron Yup

From: Peter Jackson <pjackson@LasVegasNevada.GOV>
Sent: Thursday, June 2, 2022 4:29 PM
To: Daryn Ohta <daryno@vtnnv.com>; Albert Sung <YSung@LasVegasNevada.GOV>
Subject: RE: Grand Canyon Village

Daryn,
See attached mark-up.

Flood Control - PBJ, 6/2/22

Concept of no Drop Manhole is much better. No Structural on the manhole, reference the Detail being used.

60" manhole with 30" cover and steps to the invert.

Provide concrete collar Detail at the new pipe penetration point into the RCB. You might need your Structural to look at the Connection detail to the RCB. Email over proposed Detail for approval.

Provide new pipe slopes. On steeper RCP connections use CLSM backfill.

Thanks,

Peter Jackson, CFM

Senior Engineering Associate
City of Las Vegas | Dept. of Public Works
City Engineering Division, Flood Control Section
City Hall, 5th Floor
495 S Main St. | Las Vegas, Nevada 89101



Work: 702-229-5266 Link: www.lasvegasnevada.gov
pjackson@lasvegasnevada.gov

"Building Community to Make Life Better"



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

From: Daryn Ohta <daryno@vtnnv.com>
Sent: Thursday, June 2, 2022 2:18 PM
To: Albert Sung <YSung@LasVegasNevada.GOV>
Cc: Peter Jackson <pjackson@LasVegasNevada.GOV>
Subject: RE: Grand Canyon Village

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

Albert,

Sorry to keep bothering you about this but the client is anxious to get this resolved quickly since this is something that was found in the field.

If the existing pipe is removed back to the box and new pipe with a different slope is reconnected to the box, will structural calcs be needed? This will eliminate the drop manhole. Would we be able to just add a collar detail at the connection point?

If you would like to discuss this over the phone, please call 702-325-9290.

Thank you,
Daryn Ohta, P.E.

VTN Nevada
2727 S. Rainbow Blvd.
Las Vegas, NV 89146-5148
(P) 702-873-7550
(F) 702-362-2597

From: Albert Sung <YSung@LasVegasNevada.GOV>
Sent: Thursday, June 2, 2022 1:52 PM
To: Daryn Ohta <daryno@vtnnv.com>
Cc: Peter Jackson <pjackson@LasVegasNevada.GOV>
Subject: RE: Grand Canyon Village

Daryn,

All of the 405.x drawings show the base structure of two connecting pipes without any vertical drop in elevation.

I have pdf'd you a simplified sketch of a drop structure which is different from the standard base and that's why it requires a structural design.

Peter Jackson is very knowledgeable in field construction issues. If you still have any queries, please call him directly to discuss. Peter's number is (702) 229-5266.

Thanks!

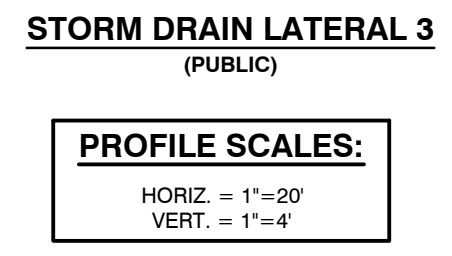
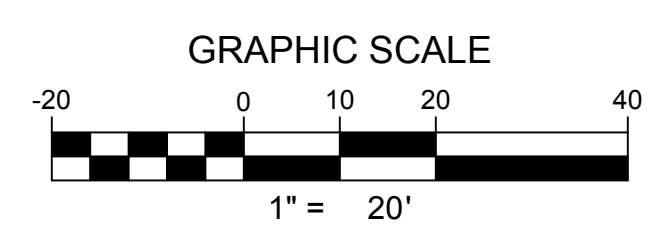
Albert Y. Sung

Project Engineer
Public Works Dept. / Flood Control
(702) 229-6541
495 S. Main Street
Las Vegas, NV 89101



lasvegasnevada.gov





I CERTIFY THAT THIS GRADING PLAN CONFORMS TO THE
APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH
CITY OF LAS VEGAS, #DS5398

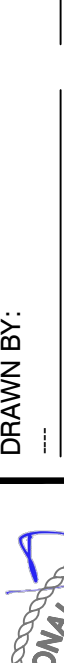
 6/21/22

DARYN M. OHTA, P.E. No. 15906 DATE

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

CALL
811

OR
1-800-227-2600
AND
1-702-455-6000
CLARK COUNTY TRAFFIC
OPERATIONS

 SHEET SD2 26 OF 33 SHEETS DRAWING NO. L21-00992/107Y5163-0	DRAWN BY:	DESIGNED BY: DMO	CHECKED BY:	PROJECT NO: 8625	SCALE: 1"=20' HORIZ. 1"=4' VERT.	STORM DRAIN PLAN & PROFILE 2	GRAND CANYON COMMERCIAL OFFSITES	GRAND CANYON VILLAGE LLC 1085 PARKVIEW DRIVE, STE 160 LAS VEGAS, NEVADA 89144 702-220-4500	CITY OF LAS VEGAS 2727 SOUTH RAINBOW BOULEVARD LAS VEGAS, NEVADA 89146-5148 PH: (702) 873-7550 FAX: (702) 382-2527 WEB: WWW.VTVNV.COM CONSULTING ENGINEERS • PLANNERS • LAND SURVEYORS	1	6-16-22	DMO	REVISE STORM DRAIN PER FIELD CONFLICT W/ INE CONDUTS. ADD COLLAR DETAIL
	DATE	BY	REVISION										