

TECHNICAL DRAINAGE STUDY
UPDATE No. 1
Skye Canyon Phase 3A Infrastructure
City of Las Vegas, Nevada

Job No.: OLY1609.000
Date: May 2019

Prepared By:

Slater Hanifan Group a Westwood Team
5740 S. Arville Street, Suite 216
Las Vegas, Nevada 89118
Phone: 702-284-5300 • Fax: 702-284-5399

Prepared For:

Ninety-Five Management, LLC
11411 Southern Highlands Parkway, Suite 300
Las Vegas, Nevada 89141
Phone: 702-220-6565 • Fax: 702-220-6566



Lant Leavitt, P.E.
NV Professional Engineer No. 18287

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL
DRAINAGE STUDY INFORMATION FORM

Name of Development: Skye Canyon – Phase 3A Infrastructure (UPDATE #1) Date: May 2019
Location of Development: a) Descriptive (Cross Streets): North/South: Skye Village Road
East/West: Grand Canyon Drive
b) Section: 7 Township: 19 South Range: 60 East
c) APN: 125-07-201-007 and a portion of 125-07-101-009

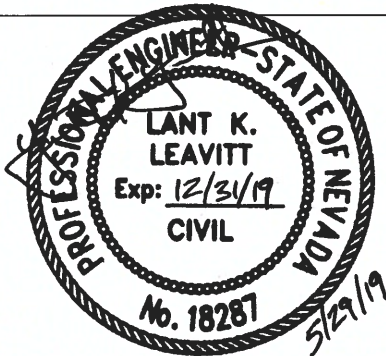
Name of Owner/Developer: M F Land, LLC / Ninety-Five Management, LLC
Telephone No.: 702-220-6565 Fax No.: 702-220-6566 E-mail Address: mbolduc@olympiacompanies.com
Address: 11411 Southern Highlands Parkway, Suite 300; Las Vegas, NV 89141

Contact Person – Name: Lant Leavitt, P.E. Telephone No.: 702-284-5300
*E-mail Address: lleavitt@shg-inc.com Fax No.: 702-284-5399
Firm: Slater Hanifan Group
Address: 5740 S. Arville Street, Suite 216; 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	☐ Roadway & Storm Drain Infrastructure

1. Total Owned Land Area: At Site: 665 Acres Being Developed/Disturbed: 20 Acres +/-
2. Is a portion or all of the subject property located in a 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.): Roadway & Storm Drain Infrastructure
5. Approximate upstream land area which drains to the subject site: 1800 acre +/-
6. Has the site drainage been evaluated in the past? ☒ Yes** ☐ No If yes, please identify documentation: Master Drainage Study for Skye Canyon Update #4 (SHG, DS4420)
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Skye Village Road thru MOHU 0036, And Minor flows thru local facilities discharging to desert shrub east of the project site.
8. Briefly describe your proposed schedule for the subject project: ASAP Upon Substantial Completion of Detention Basin 2 Facilities.
Phase 3A – Roadway Infrastructure per this TDS; Future Phase 3A Residential Subdivisions to follow by separate TDS.



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.

***Newly Required Field**

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

Local Entity File No.	Revision	Date

REFERENCE: **SHG Job No. OLY1609.000**

STANDARD FORM 1

Updated 05/01/2008



OLY1609.000

May 29, 2019

Albert Sung, P.E.
Flood Control Project Engineer
City of Las Vegas Department of Public Works
333 N. Rancho Drive
Las Vegas, Nevada 89106

Subject: Technical Drainage Study Update No. 1 for Skye Canyon Phase 3A Infrastructure (DS 4931)

Mr. Sung:

Submitted for your review is this *Technical Drainage Study Update for Skye Canyon Phase 3A Infrastructure* (hereinafter referred to as the Update Study). The original *Technical Drainage Study for Skye Canyon Phase 3A Infrastructure* (hereinafter referred to as the Original Study) prepared by Slater Hanifan Group (SHG) was approved by the City of Las Vegas (City) on January 31, 2019. The approval letter for the Original Study is provided in Appendix C. The Original Study addressed the development of roadway and infrastructure improvements intended to support the development of approximately 85 acres in the Skye Canyon master planned development, labeled as Phase 3A, see Development Phasing Exhibit provided in Appendix C. Since the approval of the Original Study, improvements plans have been approved and construction has begun. Also, design of onsite parcel development has been started.

Purpose: Based on feedback from onsite parcel developers, two lateral stub locations from the Grand Canyon Drive storm drain are proposed to be revised to better accommodate onsite improvements. The purpose of this Update Study is to provide supporting information and analysis for the proposed storm drain lateral revisions.

Station "GCD" 48+46.25

Preliminary onsite layouts favor draining larger portions of the site to this lateral than were previously anticipated due to the location at the southeastern corner of the parcel. Therefore, to provide flexibility with future site layouts, it is proposed to upsize this lateral to 36-in. The exact amount of flow discharged to this lateral, and its impact on the downstream storm drain will be addressed with the onsite parcel TDS. However, existing downstream storm drain facilities are oversized now that Skye Canyon Phase 3A improvements are being constructed (the existing storm drain this facility connects to is a 66-in RCP.) It is not anticipated that there will be any issue with redirecting some of the parcel 2.02 runoff to this lateral, however, this will be addressed in more detail with the future study. No additional flow is proposed to this facility at this time due to the 30-in lateral stub being plugged in the proposed condition.

Station "GCD" 61+96.73

Two laterals were previously proposed at this location to drain parcel 2.03 (residential development) and parcel 2.04 (park.) Onsite improvements are being designed by SHG for Olympia Group for both parcels, and it is agreed that having two stubs is unnecessary. In addition, the lateral previously proposed for parcel 2.03 enters through the corner of the parcel which conflicts with the preferred site layout. Therefore, the two storm drain lateral stubs are proposed to be combined into one 30-in lateral. An inlet control nomograph computation has been performed for the combined flows for the proposed condition prior to onsite parcel development,

see Appendix B. Also, revised WSPGW hydraulic models are prepared based on the revision, included in Appendix B.

Conclusion

This Update Study provides information and hydraulic analysis of revisions to the approved storm drain facility in Grand Canyon Drive. Storm drain laterals are proposed to be revised at two locations to better accommodate future onsite development. The proposed lateral revisions do not negatively impact storm drain hydraulics, and the proposed revisions conform to the requirements of the Original Study. In addition, this Update Study and the proposed improvements are in conformance with the following:

- This project is in compliance with all the applicable drainage laws as recognized by the state of Nevada as well as all the applicable design standards stipulated in the CCRFCD *“Hydrologic Criteria and Drainage Design Manual”*.
- This project is in compliance with the 2018 CCRFCD “Master Plan Update.”
- The entire project site is located outside of the FEMA designated Special Flood Hazard Area (SFHA). The site and the proposed improvements are located within a FEMA flood Zone “X” (unshaded). Therefore, notification and/or coordination with FEMA are not required for this project.

The revised improvement plans are included with this submittal to support the conclusions detailed in this study. If you have any questions or require additional information, please contact us at (702) 284-5300.

Respectfully Submitted,

SLATER HANIFAN GROUP
a WESTWOOD TEAM

Lant Leavitt, P.E.
Flood Control Division

pc: Mark Failla, P.E., CFM – SHG
Jerry Slater, P.E. – SHG
Rhonda Miller – SHG

LIST OF APPENDICES

Appendix A	Revised Facilities Map
Appendix B	Hydraulic Analyses ▪ Proposed Condition 30-in RCP culvert nomograph ▪ Proposed Condition 30-in RCP WSPGW analysis ▪ Ultimate Condition 30-in RCP WSPGW analysis
Appendix C	Technical Drainage Study for Skye Canyon Phase 3A Infrastructure ▪ Approval Letter ▪ Development Phasing Exhibit ▪ Referenced Drainage Exhibits ▪ Referenced Hydraulic Data ▪ Referenced Improvement Plans
Appendix D	CD of Electronic Files (PDF)

APPENDIX A

Revised Facilities Map

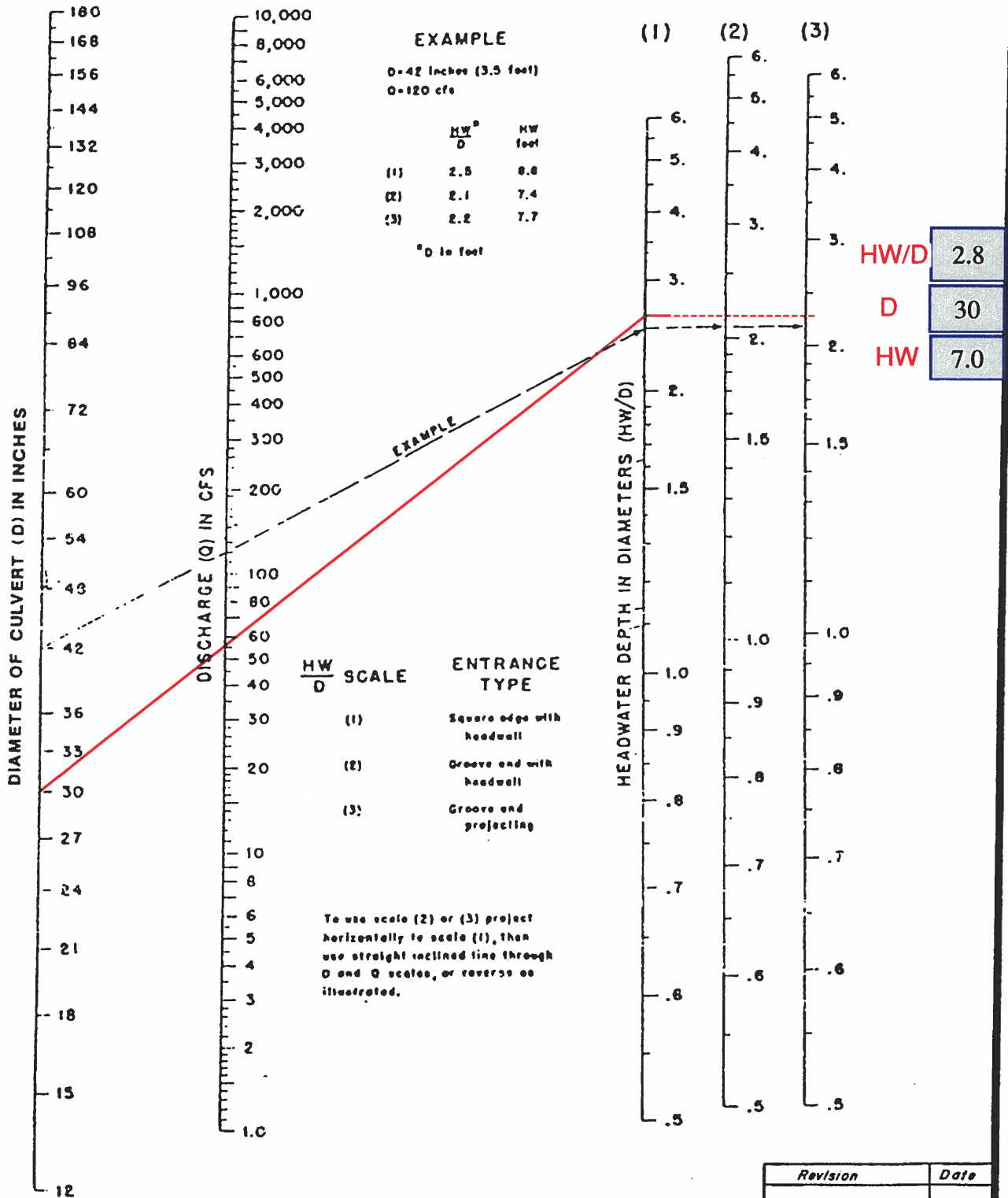
APPENDIX B

Hydraulic Analyses

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

NOMOGRAPH - INLET CONTROL RCP

30-in Lateral: Q=55 CFS



Revision	Date

Proposed Condition WSPG Summary Grand Canyon Drive - P203 Model							
WSPG Station	Plan Station	Storm Drain Dimension	Invert Elevation (ft)	Q ₁₀₀ (cfs)	WSE (ft)	Velocity (ft/s)	HGL Check ¹
1000.00	52+97.92	42" RCP	2760.19	113	2763.69	11.74	N/A
1076.00	53+20.33	42" RCP	2760.57	113	2765.24	11.74	OK
1076.00	53+20.33	36" RCP	2761.07	60	2766.81	8.49	OK
1276.00	55+21.83	36" RCP	2764.07	60	2768.51	8.49	OK
1276.00	55+21.83	30" RCP	2764.57	55	2767.90	11.20	OK
1476.00	57+23.33	30" RCP	2767.58	55	2771.63	11.20	OK
1676.00	59+24.82	30" RCP	2772.58	55	2774.35	14.77	OK
1876.00	61+26.32	30" RCP	2777.59	55	2779.49	13.76	OK
1946.00	61+96.73	30" RCP	2779.34	55	2781.69	11.47	OK
2022.00	61+97.42	30" RCP	2779.96	55	2783.24	11.20	N/A
2022.00	61+97.42	30" RCP	2779.96	55	2783.24	11.20	N/A

1 - 'HGL Check' reflects the minimum 1-ft below finished grade.

P203.WSW

T1 SKYE CANYON INFRASTRUCTURE - PHASE 3A
T2 BY OLYMPIA COMPANIES

T3 PARCEL 2.03 TO BASIN OFF12 - STORM DRAIN PROP COND

SO	1000.0002760.190	42	.013			2763.69			
R	1076.0002760.570	42	.013				69.00	1	
JX	1076.0002761.070	36 36	.013	53.0		2761.07			
R	1276.0002764.070	36	.013				6.00	1	
JX	1276.0002764.570	30 18	.013	5.0		2765.57	48.0		
R	1476.0002767.580	30	.013				6.00	1	
R	1676.0002772.580	30	.013				6.00	1	
R	1876.0002777.590	30	.013				4.00	1	
R	1946.0002779.340	30	.013				90.00	1	
R	2022.0002779.960	30	.013					1	
SH	2022.0002779.960	30	.013						
CD	1 2 0	.000 4.000	10.000	.000	.000	.00			
CD	18 4 1	.000 1.500	.000	.000	.000	.00			
CD	24 4 1	.000 2.000	.000	.000	.000	.00			
CD	30 4 1	.000 2.500	.000	.000	.000	.00			
CD	36 4 1	.000 3.000	.000	.000	.000	.00			
CD	42 4 1	.000 3.500	.000	.000	.000	.00			
CD	48 4 1	.000 4.000	.000	.000	.000	.00			
CD	54 4 1	.000 4.500	.000	.000	.000	.00			

CD	60	4	1	.000	5.000	.000	P203.WSW	.000	.00
Q			55.000		.0				

Program Package Serial Number: 7189

Date: 5-29-2019 Time: 7:43:17

WATER SURFACE PROFILE LISTING

SKYE CANYON INFRASTRUCTURE - PHASE 3A

BY OLYMPIA COMPANIES

PARCEL 2.03 TO BASIN OFF12 - STORM DRAIN PROP COND

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Flow Top Dia.	Height/FT or I.D.	Base Wt	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
1000.000	2760.190	3.500	2763.690	113.00	11.74	2.14	2765.83	.00	3.20	.00	3.500	.000	.00	1 .0
76.000	.0050					.0126	.96	3.50	.00	3.50	.013	.00	.00	PIPE
1076.000	2760.570	4.673	2765.243	113.00	11.74	2.14	2767.39	.00	3.20	.00	3.500	.000	.00	1 .0
JUNCT STR	.0000					.0104	.00	4.67	.00		.013	.00	.00	PIPE
1076.000	2761.070	5.738	2766.808	60.00	8.49	1.12	2767.93	.00	2.50	.00	3.000	.000	.00	1 .0
200.000	.0150					.0081	1.62	5.74	.00	1.91	.013	.00	.00	PIPE
1276.000	2764.070	4.435	2768.505	60.00	8.49	1.12	2769.62	.00	2.50	.00	3.000	.000	.00	1 .0
JUNCT STR	.0000					.0130	.00	4.43	.00		.013	.00	.00	PIPE
1276.000	2764.570	3.331	2767.901	55.00	11.20	1.95	2769.85	.00	2.35	.00	2.500	.000	.00	1 .0
200.000	.0151					.0180	3.60	3.33	.00	2.50	.013	.00	.00	PIPE
1476.000	2767.580	4.053	2771.633	55.00	11.20	1.95	2773.58	.00	2.35	.00	2.500	.000	.00	1 .0
151.852	.0250					.0180	2.73	4.05	.00	1.77	.013	.00	.00	PIPE
1627.852	2771.376	3.090	2774.466	55.00	11.20	1.95	2776.42	.00	2.35	.00	2.500	.000	.00	1 .0
HYDRAULIC JUMP														
1627.852	2771.376	1.773	2773.150	55.00	14.77	3.39	2776.54	.00	2.35	2.27	2.500	.000	.00	1 .0
48.148	.0250					.0248	1.19	1.77	2.03	1.77	.013	.00	.00	PIPE
1676.000	2772.580	1.773	2774.354	55.00	14.77	3.39	2777.74	.00	2.35	2.27	2.500	.000	.00	1 .0
125.195	.0251					.0241	3.02	1.77	2.03	1.77	.013	.00	.00	PIPE

Program Package Serial Number: 7189

Date: 5-29-2019 Time: 7:43:17

WATER SURFACE PROFILE LISTING
SKYE CANYON INFRASTRUCTURE - PHASE 3A

BY OLYMPIA COMPANIES

PARCEL 2.03 TO BASIN OFF12 - STORM DRAIN PROP COND

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Top Dia.	Height/FT or I.D.	Base Wt	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1801.195	2775.716	1.812	2777.529	55.00	14.43	3.23	2780.76	.00	2.35	2.23	2.500	.000	.00	1 .0
74.805	.0251					.0223	1.66	1.81	1.95	1.77	.013	.00	.00	PIPE
1876.000	2777.590	1.897	2779.487	55.00	13.76	2.94	2782.43	.00	2.35	2.14	2.500	.000	.00	1 .0
29.820	.0250					.0202	.60	1.90	1.77	1.77	.013	.00	.00	PIPE
1905.820	2778.335	1.972	2780.308	55.00	13.24	2.72	2783.03	.00	2.35	2.04	2.500	.000	.00	1 .0
22.078	.0250					.0185	.41	1.97	1.64	1.77	.013	.00	.00	PIPE
1927.898	2778.887	2.076	2780.963	55.00	12.63	2.48	2783.44	.00	2.35	1.88	2.500	.000	.00	1 .0
12.870	.0250					.0169	.22	2.08	1.46	1.77	.013	.00	.00	PIPE
1940.767	2779.209	2.196	2781.406	55.00	12.04	2.25	2783.66	.00	2.35	1.63	2.500	.000	.00	1 .0
5.233	.0250					.0159	.08	2.20	1.27	1.77	.013	.00	.00	PIPE
1946.000	2779.340	2.354	2781.694	55.00	11.47	2.04	2783.74	.00	2.35	1.17	2.500	.000	.00	1 .0
6.265	.0082					.0163	.10	2.35	1.00	2.50	.013	.00	.00	PIPE
1952.265	2779.391	2.500	2781.891	55.00	11.20	1.95	2783.84	.00	2.35	.00	2.500	.000	.00	1 .0
69.735	.0082					.0175	1.22	2.50	.00	2.50	.013	.00	.00	PIPE
2022.000	2779.960	3.274	2783.234	55.00	11.20	1.95	2785.18	.00	2.35	.00	2.500	.000	.00	1 .0

Ultimate Condition WSPG Summary Grand Canyon Drive - U203 Model								
WSPG Station	Plan Station	Storm Drain Dimension	Invert Elevation (ft)	Q ₁₀₀ (cfs)	WSE (ft)	Velocity (ft/s)	FG Elevation	HGL Check ¹
1000.00	52+97.92	42" RCP	2760.19	118	2763.69	12.26	N/A	N/A
1076.00	53+20.33	42" RCP	2760.57	118	2765.38	12.26	2768.41	OK
1076.00	53+20.33	36" RCP	2761.07	65	2767.07	9.20	2768.41	OK
1276.00	55+21.83	36" RCP	2764.07	65	2769.06	9.20	2771.39	OK
1276.00	55+21.83	30" RCP	2764.57	55	2768.86	11.20	2771.39	OK
1476.00	57+23.33	30" RCP	2767.58	55	2772.60	11.20	2774.60	OK
1676.00	59+24.82	30" RCP	2772.58	55	2776.33	11.20	2779.54	OK
1876.00	61+26.32	30" RCP	2777.59	55	2779.49	13.76	2785.04	OK
1946.00	61+96.73	30" RCP	2779.34	55	2781.69	11.47	2786.96	OK
2022.00	61+97.42	30" RCP	2779.96	55	2783.23	11.20	N/A	N/A
2022.00	61+97.42	30" RCP	2779.96	55	2783.23	11.20	N/A	N/A

1 - 'HGL Check' reflects the minimum 1-ft below finished grade.

U203.WSW

MAIN ULT COND

2763.69

69.00 1

6.00 1
48.0

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4.00	1
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Program Package Serial Number: 7189

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WATER SURFACE PROFILE LISTING

SKYE CANYON INFRASTRUCTURE - PHASE 3A

BY OLYMPIA COMPANIES

PARCEL 2.03 TO BASIN OFF12 - STORM DRAIN ULT COND

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Flow Top Dia.	Height/FT or I.D.	Base Wt	No With Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
1000.000	2760.190	3.500	2763.690	118.00	12.26	2.34	2766.03	.00	3.24	.00	3.500	.000	.00	1 .0
76.000	.0050					.0138	1.05	3.50	.00	3.50	.013	.00	.00	PIPE
1076.000	2760.570	4.814	2765.384	118.00	12.26	2.34	2767.72	.00	3.24	.00	3.500	.000	.00	1 .0
JUNCT STR	.0000					.0116	.00	4.81	.00		.013	.00	.00	PIPE
1076.000	2761.070	5.997	2767.067	65.00	9.20	1.31	2768.38	.00	2.59	.00	3.000	.000	.00	1 .0
200.000	.0150					.0095	1.90	6.00	.00	2.02	.013	.00	.00	PIPE
1276.000	2764.070	4.988	2769.058	65.00	9.20	1.31	2770.37	.00	2.59	.00	3.000	.000	.00	1 .0
JUNCT STR	.0000					.0137	.00	4.99	.00		.013	.00	.00	PIPE
1276.000	2764.570	4.293	2768.864	55.00	11.20	1.95	2770.81	.00	2.35	.00	2.500	.000	.00	1 .0
200.000	.0151					.0180	3.60	4.29	.00	2.50	.013	.00	.00	PIPE
1476.000	2767.580	5.016	2772.596	55.00	11.20	1.95	2774.54	.00	2.35	.00	2.500	.000	.00	1 .0
200.000	.0250					.0180	3.60	5.02	.00	1.77	.013	.00	.00	PIPE
1676.000	2772.580	3.748	2776.328	55.00	11.20	1.95	2778.28	.00	2.35	.00	2.500	.000	.00	1 .0
115.055	.0251					.0180	2.07	3.75	.00	1.77	.013	.00	.00	PIPE
1791.055	2775.462	3.005	2778.468	55.00	11.20	1.95	2780.42	.00	2.35	.00	2.500	.000	.00	1 .0
HYDRAULIC JUMP														
1791.055	2775.462	1.812	2777.274	55.00	14.43	3.23	2780.51	.00	2.35	2.23	2.500	.000	.00	1 .0
10.141	.0251					.0235	.24	1.81	1.95	1.77	.013	.00	.00	PIPE

APPENDIX C

Excerpts from Skye Canyon Phase 3A Infrastructure TDS:

- **Approval Letters**
- **Development Phasing Exhibit**
- **Referenced Drainage Exhibits**
- **Referenced Hydraulic Data**
- **Referenced Improvement Plans**

CITY OF LAS VEGAS		DATE:
INTER-OFFICE MEMORANDUM		January 31, 2019
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:
	Skye Canyon – Phase 3A Infrastructure	Slater Hanifan Group
Cross Streets:	Skye Village Road & Grand Canyon Drive	M F Land LLC / Ninety-Five Management LLC
File Number:	F:\Depot\DSMemos\DS4931D.doc	Bart Anderson, P.E., DevCo
Parcel Number:	125-07-201-007 & Portion of 125-07-101-009	CCRFCD
Zoning Action:		
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	11/6/2017	1/22/2018	Not Approved	\$400.00	491017: \$400
2 nd Submittal	4/18/2018	5/24/2018	Not Approved	\$400.00	495171: \$400
3 rd Submittal	8/2/2018	8/16/2018	Conditional Approval	\$400.00	497829: \$400
CCRFCD	1/17/2019	1/31/2019	Concurrence Recv'd	N/C	N/C
TOTAL FEES (LDDRS):				\$1,200.00	----

REMARKS: The complex nature of these storm drain infrastructure improvement plans needs to include a complete set of plans with the next submittal.

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.

The following conditions are repeated until they are complete:

1. *Skye Canyon Phase 3A* onsite developments are to be flood protected by *Detention Basin 2*. No occupancy permits within onsite *Phase 3A* will be issued prior to the substantial completion of *Detention Basin 2*.
2. The future MPU facility within Skye Village Road north of the Skye Village/Grand Canyon/Iron Mountain intersection to the proposed MPU facility at the Kyle Canyon interchange area shall be substantially complete before occupancy of residential Units beyond Phase 3A, 3B and 3C. This includes residential development within Phases 4 & 6 and the development of Phase 5 as shown on the Development Phasing Exhibit dated 12/4/2017.
3. **Exhibit I** shows the future abandonment of Phase 3A storm drain improvements (P15 & P33A) once the Ultimate MPU facilities are in place. The City requires that facilities be removed from the roadway if they are no longer needed. These facilities will need to be included in the Maintenance Bond.

4. Update **Exhibit I**, Facility P31 to show the 7' x 5' RCB .
5. Phase 3A includes interim drainage facilities located outside of roadways that shall require Public Drainage Easements to be Privately Maintained by the Master Developer. The Plans have preliminarily identified these easements. Provide an exhibit that shows the easements limits along with legal descriptions for Flood Control to verify easement limits. Once Flood Control has concurred with the easement limits, the plans shall be revised to reflect the final easement locations. Public drainage easements must be recorded by separate document prior to the final acceptance of the improvement plans unless they are to be recorded by parcel or final map.
6. Revise the easement location along *Grand Canyon Drive* to reflect the HEC-RAS analysis for the earthen channel.
7. The engineer must provide a table on the grading plans that shows a quantity estimate of all drainage improvements within Public Drainage Easements. All drainage improvements within Public Drainage Easements must be bonded and inspected.
8. Flood Control understands that the new *Skye Canyon Master Plan Amendment* (MPA) is being included as a part of the 2018 MPU process. Any changes not incorporated in the 2018 MPU must be approved by *City of Las Vegas* and *Clark County Regional Flood Control District* (CCRFCD) and shall be adopted by the *City of Las Vegas City Council* prior to the final approval of the subject improvement plans.
9. The *Design Report for Moccasin Road CCRFCD Flood Control Facility (US95 / Kyle Canyon Road Interchange to CCRFCD Facility LVUP 1076/1077)* must be conditionally approved (90% submittal) prior to the final approval of the subject improvement plans. The connection to these MPU facilities has been shown on the Grand Canyon Improvement plans.
10. The subject *Phase 3A Infrastructure Drainage Study* addresses the included street improvements of *Skye Village Road, Skye Park Drive, Street "E", Grand Canyon Drive*, culvert crossings and storm drain systems with the streets. Technical drainage studies will be required for the future onsite parcels as they develop.
11. Since the streets network and the associated storm drain facilities will eventually be accepted by the **City of Las Vegas**, the engineer/developer must coordinate with *City of Las Vegas Streets & Sanitation Department* for their review and approval prior to the final approval of the improvement plans.
12. Structural plans for the storm drain improvements must be submitted for review by Flood Control and the Building Department. Provide a soil report, structural calculations and specifications, wet stamped structural sets and a grading plan to the *City of Las Vegas Building Department* for processing (call *Building Department* to confirm their submittal requirements). The engineer must provide a copy of *Building Department* approval of the structures to *City Flood Control Section* prior to the final acceptance of the improvement plans. The structural approval is also required to be submitted to CCRFCD prior to concurrence.
13. The submitted RCA plans generally show the required 5-foot minimum stem wall height before the arch section. Revise the RCA plans to show the 5-foot stem wall on all details and sections.
14. The interim channels adjacent to the infrastructure roadways are the Maintenance responsibility of the Master Developer.

15. The project proposed to build temporary drainage facilities including drainage berms/swales over the *Phase 3A* site and along the west side of *Skye Village Road*. Prior to the final plans approval the developer must complete a ***Maintenance and Liability Agreement*** for the interim drainage improvements and post a minimum maintenance bond of \$50,000 or 50-percent of the construction cost for the improvements, whichever is greater. The engineer must submit an estimate of the quantities for construction the facility and an exhibit that adequately shows the location and limits of the drainage facilities to *City Flood Control* for approval. Once the drainage study is conditionally approved, the engineer/developer should contact the *City's Land Development Section* (702-229-6371) to begin the agreement process.

In order for the maintenance bond to be released in the future, a drainage update/letter will be required to justify that the berms/swales are no longer necessary and can be removed.

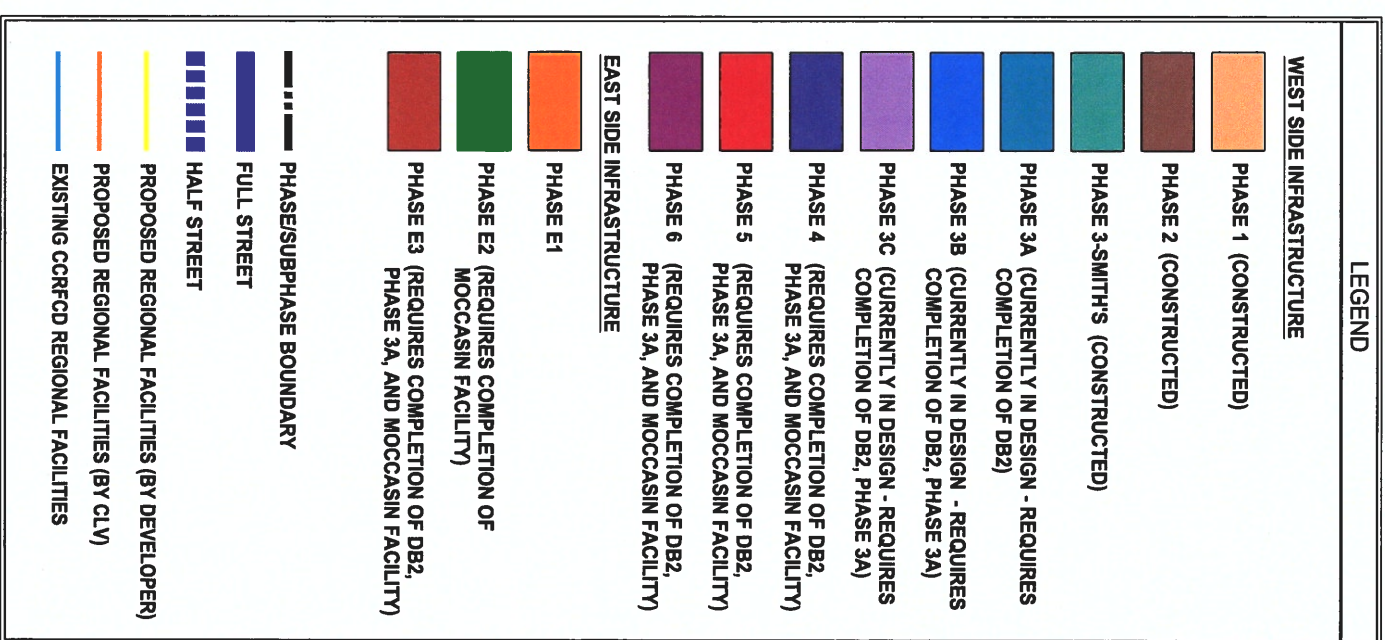
16. **Sheet D-22:** Revise the pipe material of the storm drain lateral between SDMH #16 and the RCA to RCP instead of C900 PVC.
17. Revise the cross section details to show the Drainage Easements.
18. **Sheet S1.14** Revise the detail to reflect a 3-wire Cable Fence.
19. Structural details shall be revised to show the invert slab construction joint to be a minimum of 3-inches above the slab invert at the wall locations.

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, 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.

END OF REMARKS
ays

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



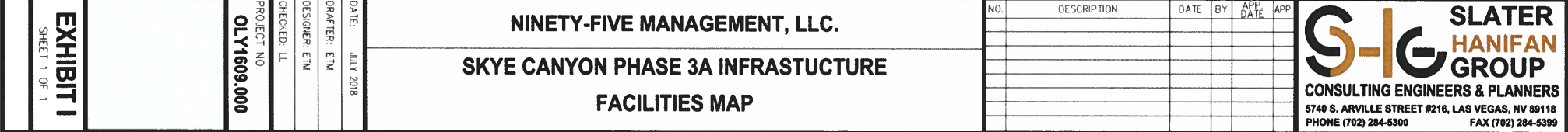
†Referenced from the TBI Study
‡Referenced from the TCC Study
§Referenced from the "Sprints" Study
¶Referenced from the "Water Damage Study Update 1 & 2"
||Referenced from the "Pain Study"
**Referenced from the "Painet 2.0" Study

Proposed Condition 10-Year Street Flow Summary					
Section ID	Q ₉₅ (cfs)	Slope (%)	Depth (ft)	Velocity (fps)	Dry Lane Dv (ft)
10YR	15	0.56	0.48	2.4	1.2
IO = SWR1-SWIR2					21.5



**SLATER
HANIFAN
GROUP**
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

EXHIBIT G



Model "P203"

Ultimate Condition WSPG Summary
Grand Canyon Drive - P203 Model

WSPG Station	Plan Station	Storm Drain Dimension	Invert Elevation (ft)	Q ₁₀₀ (cfs)	WSE (ft)	Velocity (ft/s)	FG Elevation	HGL Check ¹
1000.00	52+97.92	42" RCP	2760.19	113	2763.69	11.74	N/A	N/A
1076.00	53+20.33	42" RCP	2760.57	113	2765.24	11.74	2768.41	OK
1076.00	53+20.33	36" RCP	2761.07	60	2766.81	8.49	2768.41	OK
1276.00	55+21.83	36" RCP	2764.07	60	2768.51	8.49	2771.39	OK
1276.00	55+21.83	30" RCP	2764.57	55	2767.90	11.20	2771.39	OK
1476.00	57+23.33	30" RCP	2767.58	55	2771.63	11.20	2774.60	OK
1676.00	59+24.82	30" RCP	2772.58	55	2774.35	14.84	2779.54	OK
1876.00	61+26.32	30" RCP	2777.59	55	2779.40	14.43	2785.04	OK
1946.00	61+96.73	30" RCP	2779.34	55	2781.23	13.84	2786.96	OK
2022.00	62+37.18	30" RCP	2781.24	55	2783.59	11.47	N/A	N/A
2022.00	62+37.18	30" RCP	2781.24	55	2783.59	11.47	N/A	N/A

1 - 'HGL Check' reflects the minimum 1-ft below finished grade.

T1 SKYE CANYON INFRASTRUCTURE - PHASE 3A									
T2 BY OLYMPIA COMPANIES									
T3 PARCEL 2.03 TO BASIN OFF12 - STORM DRAIN									
SO	1000.0002760.190	42	.013			2763.69			69.00 1
R	1076.0002760.570	42	.013						
JX	1076.0002761.070	36 36	.013	53.0		2761.07			
R	1276.0002764.070	36	.013						6.00 1
JX	1276.0002764.570	30 18	.013	5.0		2765.57		48.0	
R	1476.0002767.500	30	.013						6.00 1
R	1676.0002772.500	30	.013						6.00 1
R	1876.0002777.590	30	.013						4.00 1
R	1946.0002779.340	30	.013						60.00 1
R	2022.0002781.240	30	.013						1
SH	2022.0002781.240	30	.013						
CD	1	2	0	.000	4.000	10.000	.000	.000	
CD	18	4	1	.000	1.500	.000	.000	.000	
CD	24	4	1	.000	2.000	.000	.000	.000	
CD	30	4	1	.000	2.500	.000	.000	.000	
CD	36	4	1	.000	3.000	.000	.000	.000	
CD	42	4	1	.000	3.500	.000	.000	.000	
CD	48	4	1	.000	4.000	.000	.000	.000	
CD	54	4	1	.000	4.500	.000	.000	.000	
CD	60	4	1	.000	5.000	.000	.000	.000	
Q				55.000	.0				

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Program Package Serial Number: 1704
WATER SURFACE PROFILE LISTING
SKYE CANYON INFRASTRUCTURE - PHASE 3A
BY OLYMPIA COMPANIES

Date:10- 8-2017 Time:10: 5:35

PARCEL 2.03 TO BASIN OFF12 - STORM DRAIN

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top	Height/ Base Wt	No Wth
L/Elem	Ch Slope											
1000.000	2760.190	3.500	2763.690	113.00	11.74	2.14	2765.83	.00	3.20	.00	3.500	.00 1 .0
76.000	.0050	-	-	-	-	.0126	.96	3.50	.00	3.50	.013	.00 .00 PIPE
1076.000	2760.570	4.673	2765.243	113.00	11.74	2.14	2767.39	.00	3.20	.00	3.500	.000 .00 1 .0
JUNCT STR .00000	-	-	-	-	-	.0104	.00	4.67	.00	-	.013	.00 .00 PIPE
1076.000	2761.070	5.738	2766.808	60.00	8.49	1.12	2767.93	.00	2.50	.00	3.000	.000 .00 1 .0
200.000	.0150	-	-	-	-	.0081	1.62	5.74	.00	1.91	.013	.00 .00 PIPE
1276.000	2764.070	4.435	2768.505	60.00	8.49	1.12	2769.62	.00	2.50	.00	3.000	.000 .00 1 .0
JUNCT STR .00000	-	-	-	-	-	.0130	.00	4.43	.00	-	.013	.00 .00 PIPE
1276.000	2764.570	3.331	2767.901	55.00	11.20	1.95	2769.85	.00	2.35	.00	2.500	.000 .00 1 .0
200.000	.0151	-	-	-	-	.0180	3.60	3.33	.00	2.50	.013	.00 .00 PIPE
1476.000	2767.580	4.053	2771.633	55.00	11.20	1.95	2773.58	.00	2.35	.00	2.500	.000 .00 1 .0
149.834	.0250	-	-	-	-	.0180	2.69	4.05	.00	1.77	.013	.00 .00 PIPE
1625.834	2771.326	3.102	2774.428	55.00	11.20	1.95	2776.38	.00	2.35	.00	2.500	.000 .00 1 .0
HYDRAULIC JUMP	-	-	-	-	-	-	-	-	-	-	-	-
1625.834	2771.326	1.766	2773.092	55.00	14.84	3.42	2776.51	.00	2.35	2.28	2.500	.000 .00 1 .0
50.166	.0250	-	-	-	-	.0251	1.26	1.77	2.05	1.77	.013	.00 .00 PIPE
1676.000	2772.580	1.766	2774.346	55.00	14.84	3.42	2777.76	.00	2.35	2.28	2.500	.000 .00 1 .0
25.516	.0251	-	-	-	-	.0251	.64	1.77	2.05	1.77	.013	.00 .00 PIPE

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Program Package Serial Number: 1704
WATER SURFACE PROFILE LISTING
SKYE CANYON INFRASTRUCTURE - PHASE 3A
BY OLYMPIA COMPANIES

Date:10- 8-2017 Time:10: 5:35

PARCEL 2.03 TO BASIN OFF12 - STORM DRAIN

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top	Height/ Base Wt	No Wth
L/Elem	Ch Slope											
1701.516	2773.219	1.766	2774.985	55.00	14.84	3.42	2778.40	.00	2.35	2.28	2.500	.000 .00 1 .0
174.484	.0251	-	-	-	-	.0242	4.23	1.77	2.05	1.77	.013	.00 .00 PIPE
1876.000	2777.590	1.813	2779.403	55.00	14.43	3.23	2782.63	.00	2.35	2.23	2.500	.000 .00 1 .0
70.000	.0250	-	-	-	-	.0224	1.57	1.81	1.95	1.77	.013	.00 .00 PIPE

1946.000	2779.340	1.886	2781.227	55.00	13.84	2.97	2784.20	.00	2.35	2.15	2.500	.000	.00	1	.0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
35.813	.0250					.0203	.73	1.89	1.79	1.77	.013	.00	.00	PIPE	
1981.813	2780.235	1.972	2782.208	55.00	13.24	2.72	2784.93	.00	2.35	2.04	2.500	.000	.00	1	.0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
22.082	.0250					.0185	.41	1.97	1.64	1.77	.013	.00	.00	PIPE	
2003.895	2780.787	2.076	2782.863	55.00	12.63	2.48	2785.34	.00	2.35	1.88	2.500	.000	.00	1	.0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
12.872	.0250					.0169	.22	2.08	1.46	1.77	.013	.00	.00	PIPE	
2016.767	2781.109	2.196	2783.305	55.00	12.04	2.25	2785.56	.00	2.35	1.63	2.500	.000	.00	1	.0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
5.233	.0250					.0159	.08	2.20	1.27	1.77	.013	.00	.00	PIPE	
2022.000	2781.240	2.354	2783.594	55.00	11.47	2.04	2785.64	.00	2.35	1.17	2.500	.000	.00	1	.0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

SKYE CANYON INFRASTRUCTURE - PHASE 3A

BY OLYMPIA COMPANIES

PARCEL 2.03 TO BASIN OFF12 - STORM DRAIN

1000.00	.I	CH	E												R
1020.86	.														
1041.71	.														
1062.57	.														
1083.43	.I	CH	W	E											JX
1104.29	.I	CH		W	E										R
1125.14	.														
1146.00	.														
1166.86	.														
1187.71	.														
1208.57	.														
1229.43	.														

P203

[illegible]

2760.190	2762.735	2765.279	2767.824	2770.369	2772.913	2775.458	2778.003	2780.547	2783.092	2785.638
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NOTES

1. GLOSSARY

GLOSSARY

I = INVERT ELEVATION
C = CRITICAL DEPTH
W = WATER SURFACE ELEVATION
S = SUPER-ELEVATION
H = HEIGHT OF CHANNEL
E = ENERGY GRADE LINE
X = CURVES CROSSING OVER
B = BRIDGE ENTRANCE OR EXIT
Y = WALL ENTRANCE OR EXIT

2. STATIONS FOR POINTS AT A JUMP MAY NOT BE PLOTTED EXACTLY

Model "U203"

Ultimate Condition WSPG Summary
Grand Canyon Drive - U203 Model

WSPG Station	Plan Station	Storm Drain Dimension	Invert Elevation (ft)	Q ₁₀₀ (cfs)	WSE (ft)	Velocity (ft/s)	FG Elevation	HGL Check ¹
1000.00	52+97.92	42" RCP	2760.19	118	2763.69	12.26	N/A	N/A
1076.00	53+20.33	42" RCP	2760.57	118	2765.38	12.26	2768.41	OK
1076.00	53+20.33	36" RCP	2761.07	65	2767.07	9.20	2768.41	OK
1276.00	55+21.83	36" RCP	2764.07	65	2769.06	9.20	2771.39	OK
1276.00	55+21.83	30" RCP	2764.57	55	2768.86	11.20	2771.39	OK
1476.00	57+23.33	30" RCP	2767.58	55	2772.60	11.20	2774.60	OK
1676.00	59+24.82	30" RCP	2772.58	55	2776.33	11.20	2779.54	OK
1876.00	61+26.32	30" RCP	2777.59	55	2779.48	13.78	2785.04	OK
1946.00	61+96.73	30" RCP	2779.34	55	2781.60	11.78	2786.96	OK
1946.00	61+96.73	30" RCP	2779.34	52	2781.15	13.63	2786.96	OK
2022.00	62+37.18	30" RCP	2781.24	52	2783.56	10.93	N/A	N/A
2022.00	62+37.18	30" RCP	2781.24	52	2783.56	10.93	N/A	N/A

1 - 'HGL Check' reflects the minimum 1-ft below finished grade.

U203

T1 SKYE CANYON INFRASTRUCTURE - PHASE 3A									
T2 BY OLYMPIA COMPANIES									
T3 PARCEL 2.03 TO BASIN OFF12 - STORM DRAIN									
SO	1000.0002760.190	42	.013		2763.69			69.00	1
R	1076.0002760.570	42	.013						
JX	1076.0002761.070	36	.013	53.0	2761.07			6.00	1
R	1276.0002764.070	36	.013						
JX	1276.0002764.570	30	18	013	5.0	2765.57	2765.57	48.0	48.0
R	1476.0002767.580	30	.013					6.00	1
R	1676.0002772.580	30	.013					6.00	1
R	1876.0002777.590	30	.013					4.00	1
R	1946.0002779.340	30	.013					60.00	1
JX	1946.0002779.340	30	18	.013	3.0	2780.34		90.0	
R	2022.0002781.240	30	.013						1
SH	2022.0002781.240	30	.013						
CD	1	2	0	.000	4.000	10.000	.000	.000	.00
CD	18	4	1	.000	.000	.000	.000	.000	.00
CD	24	4	1	.000	2.000	.000	.000	.000	.00
CD	30	4	1	.000	2.500	.000	.000	.000	.00
CD	36	4	1	.000	3.000	.000	.000	.000	.00
CD	42	4	1	.000	3.500	.000	.000	.000	.00
CD	48	4	1	.000	4.000	.000	.000	.000	.00
CD	54	4	1	.000	4.500	.000	.000	.000	.00
CD	60	4	1	.000	5.000	.000	.000	.000	.00
Q				52.000	.0				

CARD SECT CHN NO OF AVE PIER HEIGHT 1 BASE ZL INV Y(1) Y(2) Y(3) Y(4) Y(5) Y(6) Y(7) Y(8) Y(9) Y(10) PAGE 1

CARD NO	TYPE	PIER/PIP WIDTH	DIAMETER	WIDTH	DROP
CD 1	2	0	.000	4.000	10.000
CD 18	4	1	1.500		.00
CD 24	4	1	2.000		
CD 30	4	1	2.500		
CD 36	4	1	3.000		
CD 42	4	1	3.500		
CD 48	4	1	4.000		
CD 54	4	1	4.500		
CD 60	4	1	5.000		

W S P G W

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

SKYE CANYON INFRASTRUCTURE - PHASE 3A

BY OLYMPIA COMPANIES

PARCEL 2.03 TO BASIN OFF12 - STORM DRAIN

W S P G W

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET

U/S DATA STATION INVERT SECT

1000.000 2760.190 42

ELEMENT NO 2 IS A REACH

U/S DATA STATION INVERT SECT

1076.000 2760.570 42

ELEMENT NO 3 IS A JUNCTION

U/S DATA STATION INVERT SECT LAT-1 LAT-2

1076.000 2761.070 36 36 0 .013

ELEMENT NO 4 IS A REACH

U/S DATA STATION INVERT SECT

1276.000 2764.070 36

ELEMENT NO 5 IS A JUNCTION

U/S DATA STATION INVERT SECT LAT-1 LAT-2

1276.000 2764.570 30 18 18 .013

ELEMENT NO 6 IS A REACH

U/S DATA STATION INVERT SECT

1476.000 2767.580 30

ELEMENT NO 7 IS A REACH

U/S DATA STATION INVERT SECT

1676.000 2772.580 30

ELEMENT NO 8 IS A REACH

U/S DATA STATION INVERT SECT

1876.000 2777.590 30

ELEMENT NO 9 IS A REACH

U/S DATA STATION INVERT SECT

1946.000 2779.340 30

ELEMENT NO 10 IS A JUNCTION

U/S DATA STATION INVERT SECT LAT-1 LAT-2

1946.000 2779.340 30 18 0 .013

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

W S P G W

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 11 IS A REACH

U/S DATA STATION INVERT SECT

2022.000 2781.240 30

ELEMENT NO 12 IS A SYSTEM HEADWORKS

U/S DATA STATION INVERT SECT

U203
.000

2022.000 2781.240 30

PARCEL 2.03 TO BASIN OFF12 - STORM DRAIN																			
Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Head	Super Elev	Critical Depth	Flow Top	Height/ Base Wt	No Wth	Prs/Pip	ZL	Prs/Pip	ZL	Prs/Pip	ZL	Prs/Pip	ZL
L/Elem	Ch Slope																		
1000.000	2760.190	3.500	2763.690	118.00	12.26	2.34	2766.03	.00	3.24	.00	3.500	.000	.00	1	.0				
76.000	.0050																		
1076.000	2760.570	4.814	2765.384	118.00	12.26	2.34	2767.72	.00	3.24	.00	3.500	.000	.00	1	.0				
JUNCT STR	.00000																		
1076.000	2761.070	5.997	2767.067	65.00	9.20	1.31	2768.38	.00	2.59	.00	3.000	.000	.00	1	.0				
200.000	.0150																		
1276.000	2764.070	4.988	2769.058	65.00	9.20	1.31	2770.37	.00	2.59	.00	3.000	.000	.00	1	.0				
JUNCT STR	.00000																		
1276.000	2764.570	4.293	2768.864	55.00	11.20	1.95	2770.81	.00	2.35	.00	2.500	.000	.00	1	.0				
200.000	.0151																		
1476.000	2767.580	5.016	2772.596	55.00	11.20	1.95	2774.54	.00	2.35	.00	2.500	.000	.00	1	.0				
200.000	.0250																		
1676.000	2772.580	3.748	2776.328	55.00	11.20	1.95	2778.28	.00	2.35	.00	2.500	.000	.00	1	.0				
114.331	.0251																		
1790.331	2775.444	3.010	2778.455	55.00	11.20	1.95	2780.40	.00	2.35	.00	2.500	.000	.00	1	.0				
HYDRAULIC JUMP																			
1790.331	2775.444	1.809	2777.253	55.00	14.46	3.25	2780.50	.00	2.35	2.24	2.500	.000	.00	1	.0				
7.904	.0251																		

PARCEL 2.03 TO BASIN OFF12 - STORM DRAIN																			
Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Head	Super Elev	Critical Depth	Flow Top	Height/ Base Wt	No Wth	Prs/Pip	ZL	Prs/Pip	ZL	Prs/Pip	ZL	Prs/Pip	ZL
L/Elem	Ch Slope																		
1798.235	2775.642	1.809	2777.451	55.00	14.46	3.25	2780.70	.00	2.35	2.24	2.500	.000	.00	1	.0				
77.765	.0251																		

U203																											
Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Top Dia.	Height for I.D.	Base Wt	No Wth Prs/Pip	ZL	Prs/Pip	Type Ch										
1876.000	2777.590	-	1.894	2779.484	55.00	13.78	2.95	2782.43	.00	2.35	2.14	2.500	.000	.00	1	.0											
13.434	.0250	-	-	-	-	-	.0208	.28	1.89	1.78	1.77	.013	.00	.00	PIPE												
1889.434	2777.926	-	1.921	2779.847	55.00	13.59	2.87	2782.71	.00	2.35	2.11	2.500	.000	.00	1	.0											
29.714	.0250	-	-	-	-	-	.0195	.58	1.92	1.73	1.77	.013	.00	.00	PIPE												
1919.148	2778.669	-	2.018	2780.687	55.00	12.96	2.61	2783.29	.00	2.35	1.97	2.500	.000	.00	1	.0											
17.359	.0250	-	-	-	-	-	.0177	.31	2.02	1.56	1.77	.013	.00	.00	PIPE												
1936.567	2779.103	-	2.128	2781.231	55.00	12.35	2.37	2783.60	.00	2.35	1.78	2.500	.000	.00	1	.0											
9.493	.0250	-	-	-	-	-	.0163	.16	2.13	1.38	1.77	.013	.00	.00	PIPE												
1946.000	2779.340	-	2.261	2781.601	55.00	11.78	2.15	2783.76	.00	2.35	1.47	2.500	.000	.00	1	.0											
JUNCT STR	.0000	-	-	-	-	-	.0184	.00	2.26	1.16	-	.013	.00	.00	PIPE												
1946.000	2779.340	-	1.814	2781.154	52.00	13.63	2.89	2784.04	.00	2.32	2.23	2.500	.000	.00	1	.0											
24.002	.0250	-	-	-	-	-	.0202	.49	1.81	1.84	1.69	.013	.00	.00	PIPE												
1970.002	2779.940	-	1.866	2781.806	52.00	13.23	2.72	2784.53	.00	2.32	2.18	2.500	.000	.00	1	.0											
24.417	.0250	-	-	-	-	-	.0186	.45	1.87	1.74	1.69	.013	.00	.00	PIPE												
1994.418	2780.551	-	1.956	2782.507	52.00	12.62	2.47	2784.98	.00	2.32	2.06	2.500	.000	.00	1	.0											
15.031	.0250	-	-	-	-	-	.0168	.25	1.96	1.57	1.69	.013	.00	.00	PIPE												

W S P G W - CIVILDESIGN Version 14.07
 Program Package Serial Number: 1704
 WATER SURFACE PROFILE LISTING
 SKYE CANYON INFRASTRUCTURE - PHASE 3A
 BY OLYMPIA COMPANIES
 Date: 10-8-2017 Time: 10:56:12
 PAGE 3

PARCEL 2.03 TO BASIN OFF12 - STORM DRAIN																											
Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Top Dia.	Height for I.D.	Base Wt	No Wth Prs/Pip	ZL	Prs/Pip	Type Ch										
2009.450	2780.926	-	2.057	2782.984	52.00	12.03	2.25	2785.23	.00	2.32	1.91	2.500	.000	.00	1	.0											
9.006	.0250	-	-	-	-	-	.0153	.14	2.06	1.41	1.69	.013	.00	.00	PIPE												
2018.456	2781.151	-	2.174	2783.326	52.00	11.47	2.04	2785.37	.00	2.32	1.68	2.500	.000	.00	1	.0											
3.544	.0250	-	-	-	-	-	.0143	.05	2.17	1.23	1.69	.013	.00	.00	PIPE												
2022.000	2781.240	-	2.323	2783.563	52.00	10.93	1.86	2785.42	.00	2.32	1.28	2.500	.000	.00	1	.0											

SKYE CANYON INFRASTRUCTURE - PHASE 3A

BY OLYMPIA COMPANIES

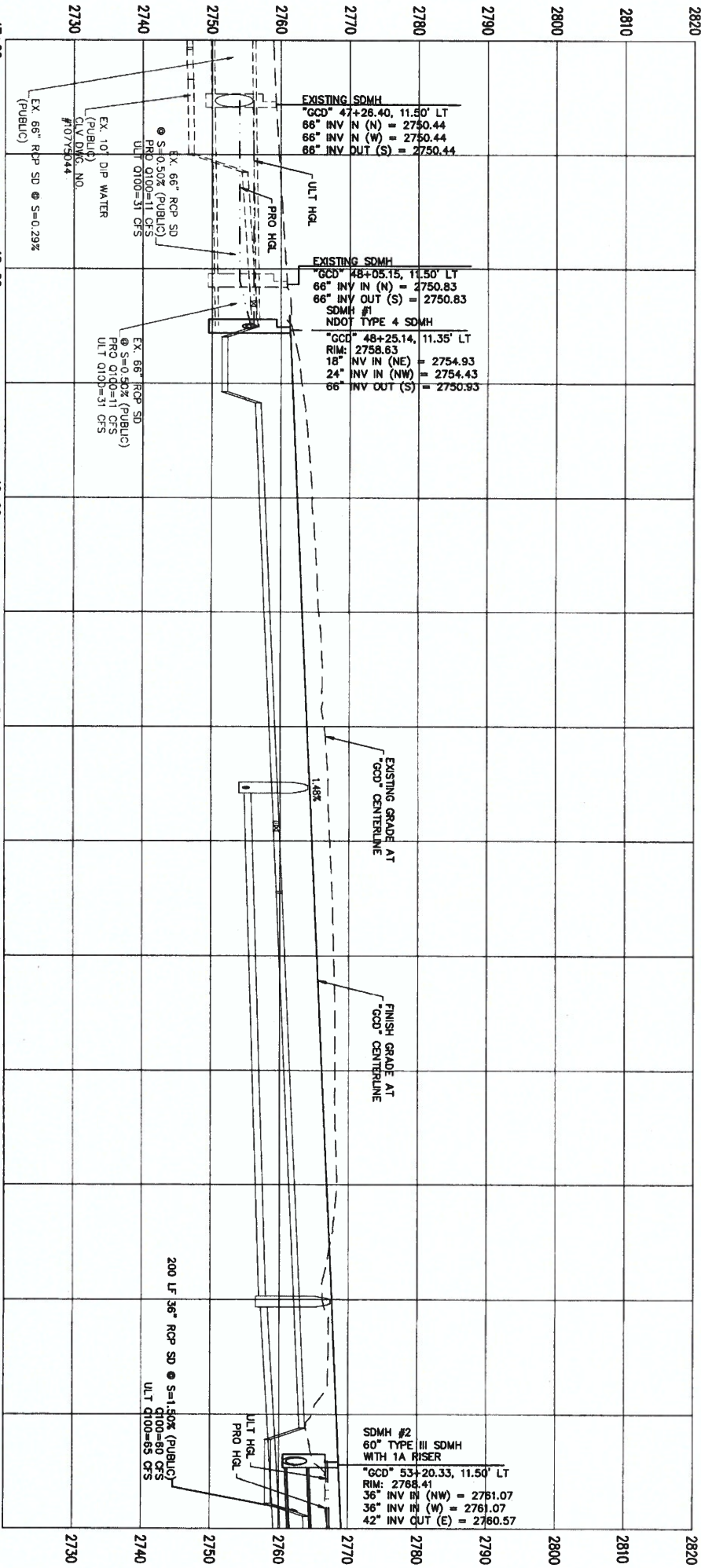
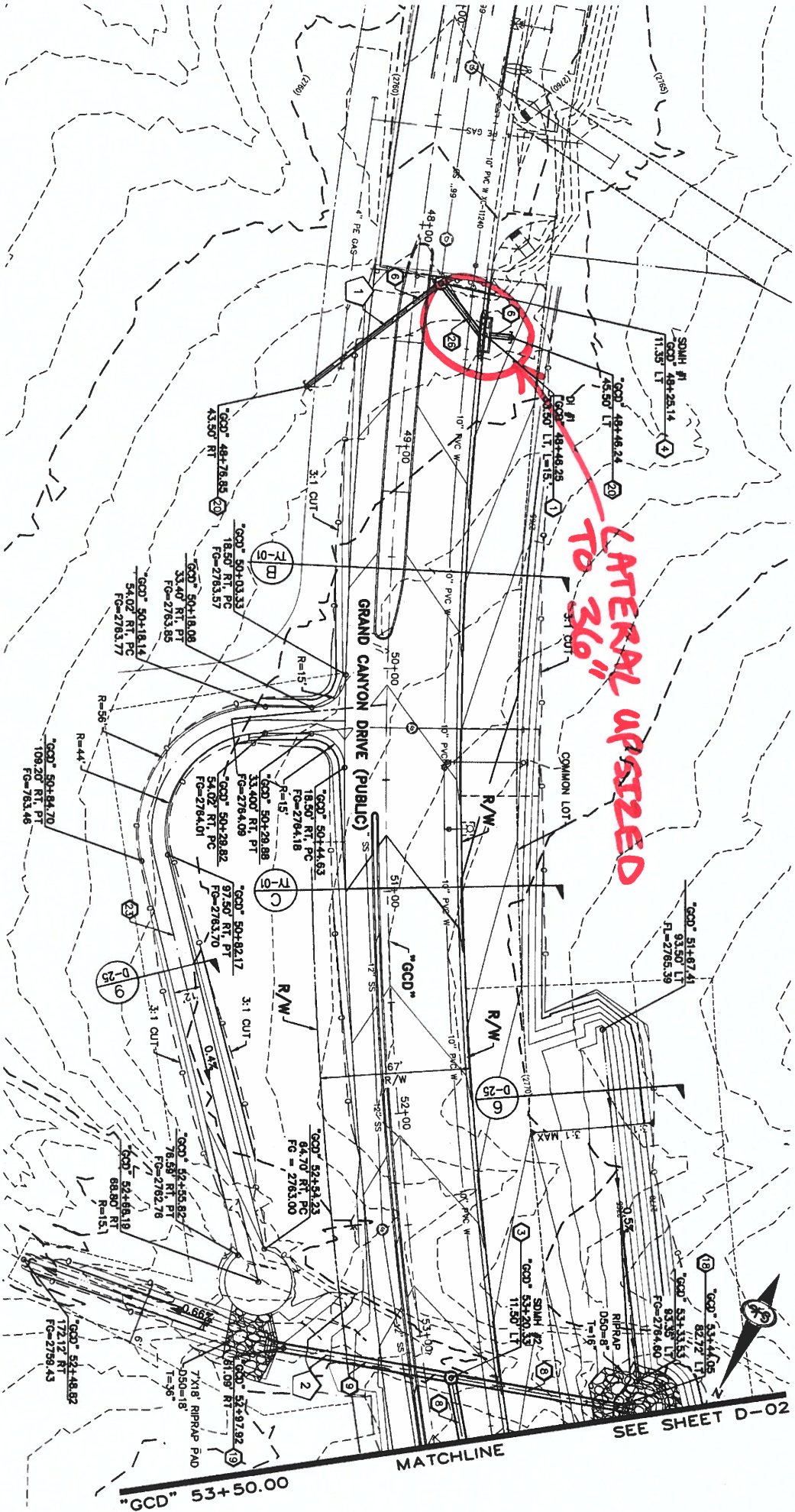
PARCEL 2.03 TO BASIN OFF12 - STORM DRAIN

1000.00	.I	CH	E		R
1020.86	.				.
1041.71	.				.
1062.57	.				.
1083.43	.I	CH	W	E	JX
1104.29	.I	CH	W	E	R
1125.14	.				.
1146.00	.				.
1166.86	.				.
1187.71	.				.
1208.57	.				.
1229.43	.				.
1250.29	.				.
1271.14	.				.
1292.00	.	I	CH	W	E
1312.86	.	I	CH	W	E
1333.71	.				.
1354.57	.				.
1375.43	.				.
1396.29	.				.

[illegible]

1. GLOSSARY

1. **LEGENDARY**
- I = INVERT ELEVATION
 - C = CRITICAL DEPTH
 - W = WATER SURFACE ELEVATION
 - S = SUPER-ELEVATION
 - H = HEIGHT OF CHANNEL
 - E = ENERGY GRADE LINE
 - X = CURVES CROSSING OVER
 - B = BRIDGE ENTRANCE OR EXIT
 - Y = WALL ENTRANCE OR EXIT
2. STATIONS FOR POINTS AT A JUMP MAY NOT BE PLOTTED EXACTLY



- ### STORM DRAIN NOTES
1. CONSTRUCT TYPE "C" DROP INLET (USDOCA STD. Dwg. NO. 412.1 & 421)
 2. CONSTRUCT 60" TYPE III MANHOLE (USDOCA STD. Dwg. NO. 404.1)
 3. CONSTRUCT 60" TYPE III MANHOLE WITH TYPE I/A RISER (USDOCA STD. Dwg. NO. 404.1 AND 406.1)
 4. CONSTRUCT 180" TYPE 4 MANHOLE (NOT STD. PLAN R-4.3.2)
 5. CONSTRUCT RCA ACCESS MANHOLE PER STRUCTURAL DETAIL
 6. INSTALL 18" RCP OR WATER QUALITY CSO AS SHOWN ON PROFILES (USDOCA STD. Dwg. NO. 503.2)
 7. INSTALL 36" RCP OR WATER QUALITY CSO AS SHOWN ON PROFILES (USDOCA STD. Dwg. NO. 503.2)
 8. INSTALL 36" RCP OR WATER QUALITY CSO AS SHOWN ON PROFILES (USDOCA STD. Dwg. NO. 503.2)
 9. INSTALL 42" RCP (USDOCA STD. Dwg. NO. 503.2)
 10. INSTALL 60" RCP (USDOCA STD. Dwg. NO. 503.2)
 11. INSTALL 72" RCP (USDOCA STD. Dwg. NO. 503.2)
 12. CONSTRUCT 48" TYPE II MANHOLE WITH TYPE I/A RISER (USDOCA STD. Dwg. NO. 404.1 AND 406.1)
 13. CONSTRUCT 6" X 6" RCP (NOT STD. PLAN B-20.1.2)
 14. CONSTRUCT 8" X 8" RCP (PER STRUCTURAL DETAIL)
 15. CONSTRUCT 10" X 8" RCP (PER STRUCTURAL DETAIL)
 16. INSTALL 30" RCP END SECTION (NOT STD. PLAN R-2.3.1)
 17. INSTALL 36" RCP END SECTION (NOT STD. PLAN R-2.3.1)
 18. INSTALL 42" RCP END SECTION (NOT STD. PLAN R-2.3.1)
 19. CONSTRUCT BRICK AND MORTAR PLUG (SEE DETAIL 3, DRAWING D-25)
 20. CONSTRUCT INTERIOR PLUG PER STRUCTURAL DETAIL
 21. INSTALL 54" RCP (USDOCA STD. Dwg. NO. 503.2)
 22. 12" WIDE X 6" THICK TYPE II MAINTENANCE ACCESS PATH
 23. CONSTRUCT CULVERT HEADWALL (NOT STD. PLAN R-2.3.2 & R-2.3.3)
 24. CONSTRUCT CONCRETE COLLAR (SEE DETAIL 1, DRAWING D-25)
 25. INSTALL 24" RCP OR WATER QUALITY CSO AS SHOWN ON PROFILES (USDOCA STD. Dwg. NO. 503.2)
 26. INSTALL 18" RCP END SECTION (NOT STD. PLAN R-2.3.1)
 27. CONSTRUCT DROP INLET PER STRUCTURAL DETAIL
 28. CONSTRUCT HEADWALL PER STRUCTURAL DETAIL
 29. INSTALL CHAIN LINK FENCE (USDOCA STD. Dwg. NO. 232)
 30. INSTALL CHAIN LINK GATES (USDOCA STD. Dwg. NO. 233)
 31. CONSTRUCT CONCRETE PAD WITH 3" CUTOFF WALL (SEE DETAIL 14, DRAWING D-25)
 32. CONSTRUCT 3" CUTOFF WALL (SEE DETAIL 15, DRAWING D-25)

- ### NOTES
1. ALL RCP SHALL BE CLASS III UNLESS OTHERWISE SHOWN.
 2. ALL PIPE LENGTHS ARE MEASURED ALONG PIPE CENTRELINE TO CENTER OF MANHOLE OR INSIDE EDGE OF DI OR RCP/RCA.
 3. ALL DROP INLETS SHALL INCLUDE STORM WATER MANAGEMENT STUDY AND DETAIL PER USDOCA STD. Dwg. NO. 421.
 4. SEE STRUCTURAL PLANS FOR ADDITIONAL STRUCTURAL DETAILS AND CONNECTIONS.
 5. ALL PIPES ARE PUBLICLY MAINTAINED.
 6. ADD SPECIAL INSPECTION REQUIRED FOR PIPE SEGMENTS WITH SHOROTAIL CONCRETE.

DROP INLET NOTE

WHERE 10 FEET PARALLEL SEPARATION IS NOT PRACTICABLE, CAST-IN-PLACE MONOLITHIC PIER WITH WATERSTOP BETWEEN SLAG AND WALLS, BASE, WALLS AND TOP TO BE CONSTRUCTED WITH WATERSTOPPED PRODUCTS OR APPROVED EQUAL.)

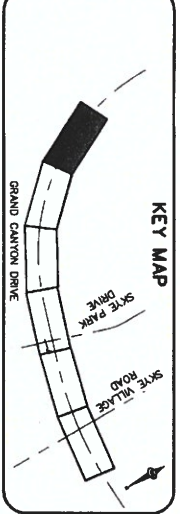
- ### LEGEND
1. STORM DRAIN LATERAL # (SEE SHEETS D-19 THRU D-24)

FLOOD ZONE

THE PROJECT SITE IS LOCATED WITHIN A FLOOD DESIGNATED ZONE X OUTSIDE THE 500-YEAR FLOOD PLAIN ON THE FLOOD INSURANCE RATE MAP (FIRM) PANEL 30000705E, DATED SEPTEMBER 27, 2002.

NOTE:

PROPERTY OWNER IS RESPONSIBLE TO MAINTAIN THE BEST MANAGEMENT PRACTICES, AND AS OF THE DATE OF THIS PLAN, TO THE REMOVAL OF ACCUMULATED SEDIMENT AND DEBRIS AND CARE OF VEGETATION.



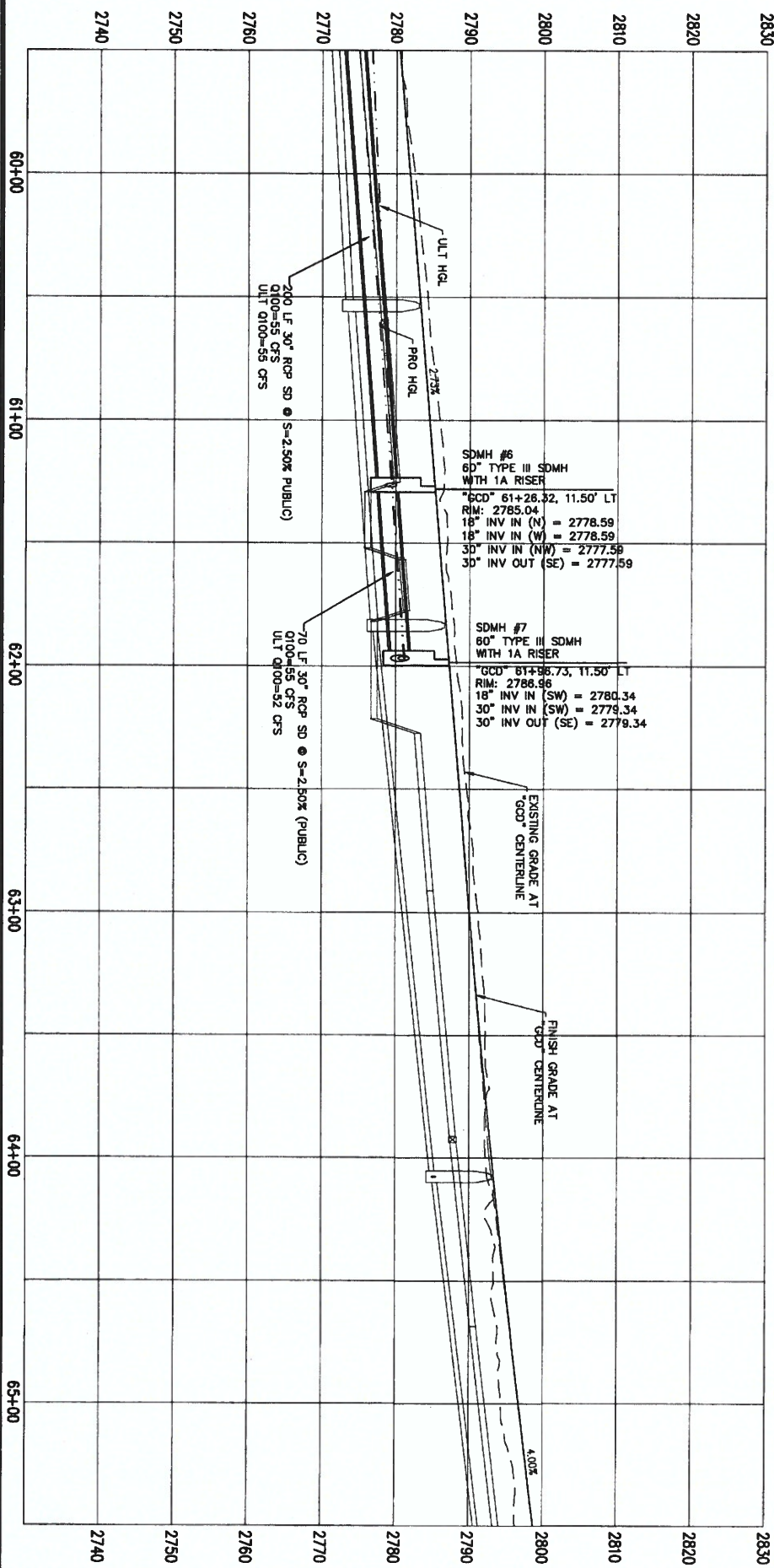
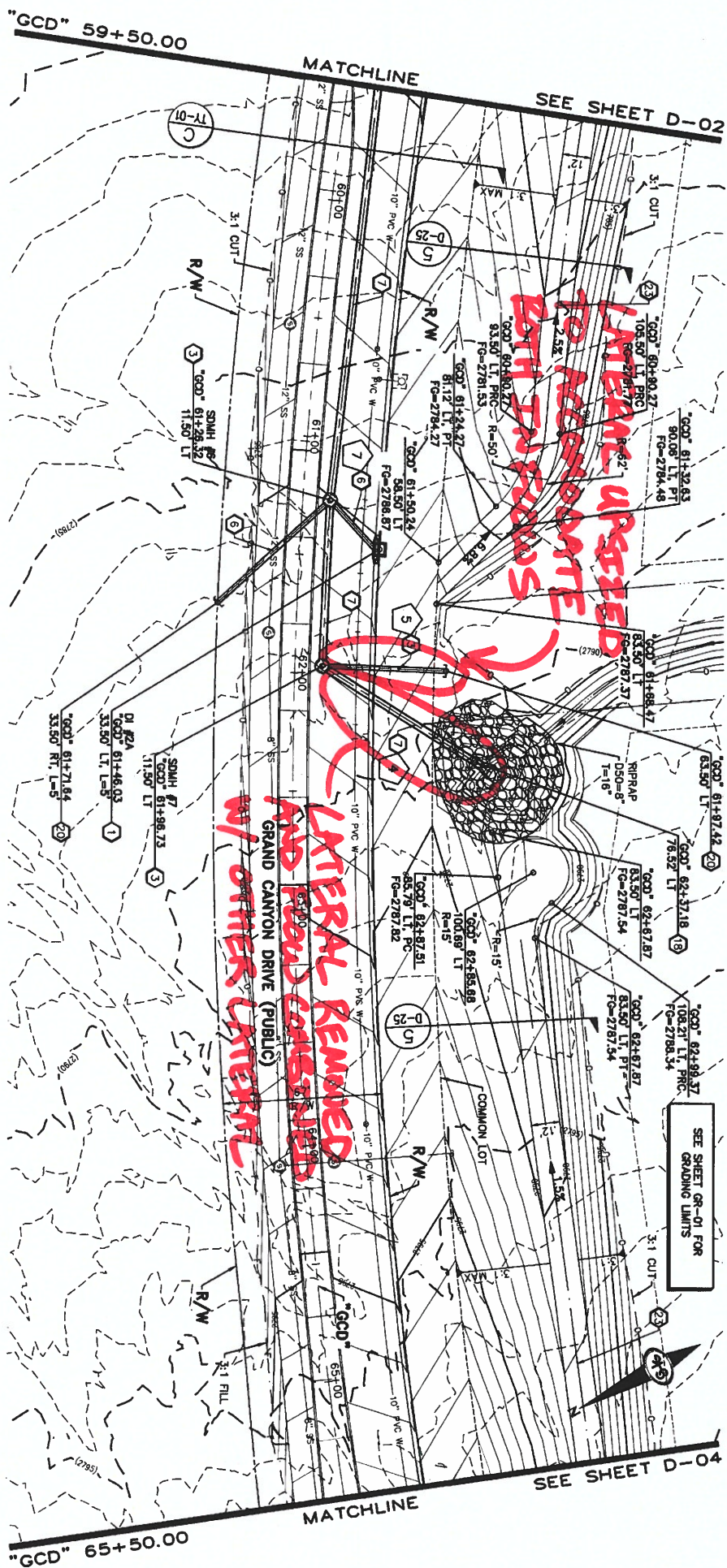
NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

S-I-G
SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
8740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5390 FAX (702) 284-5399

NINETY-FIVE MANAGEMENT LLC
SKYE CANYON II PHASE 3A
GRAND CANYON DRIVE
STORM DRAIN PLAN AND PROFILE - "GCD" 47+00.00 TO "GCD" 53+50.00

D-01
SHEET 5 OF 31

PROFESSIONAL ENGINEER
JERRY S. SLATER
STATE OF NEVADA
No. 41210
DATE: 4/5/18
DRAFTER: AJ
DESIGNER: DAW
CHECKED: JSR
PROJECT NO.: OLY1609-000



- | | STORM DRAIN NOTES |
|----|---|
| 1 | CONSTRUCT TYPE "C" DROP INLET (USDOCA STD. DWG. NO. 4121 & 421) |
| 2 | CONSTRUCT 60" TYPE II MANHOLE (USDOCA STD. DWG. NO. 4061) |
| 3 | CONSTRUCT 60" TYPE II MANHOLE WITH TYPE IA RISER (USDOCA STD. DWG. NO. 4041 AND 4061) |
| 4 | CONSTRUCT NOOT TYPE 4 MANHOLE (NOOT STD. PLAN R-4-3.2) |
| 5 | CONSTRUCT RGA ACCESS MANHOLE PER STRUCTURAL DETAIL |
| 6 | INSTALL 18" RCP OR WATER QUALITY CROD AS SHOWN ON PROFILES |
| 7 | INSTALL 30" RCP OR WATER QUALITY CROD AS SHOWN ON PROFILES |
| 8 | INSTALL 42" RCP OR WATER QUALITY CROD AS SHOWN ON PROFILES (USDOCA STD. DWG. NO. 503.2) |
| 9 | INSTALL 42" RCP (USDOCA STD. DWG. NO. 503.2) |
| 10 | INSTALL 60" RCP (USDOCA STD. DWG. NO. 503.2) |
| 11 | INSTALL 72" RCP (USDOCA STD. DWG. NO. 503.2) |
| 12 | CONSTRUCT 48" TYPE II MANHOLE WITH TYPE IA RISER (USDOCA STD. DWG. NO. 4041 AND 4061) |
| 13 | CONSTRUCT 8" X 8" RCP (NOOT STD. PLAN R-20-1.2) |
| 14 | CONSTRUCT 7" X 5" RCP (NOOT STD. PLAN R-20-1.2) |
| 15 | CONSTRUCT 8" X 7" RCP (PER STRUCTURAL DETAIL) |
| 16 | CONSTRUCT TO 8" RGA (PER STRUCTURAL DETAIL) |
| 17 | INSTALL 30" RCP END SECTION (NOOT STD. PLAN R-3-3.1) |
| 18 | INSTALL 36" RCP END SECTION (NOOT STD. PLAN R-3-3.1) |
| 19 | INSTALL 42" RCP END SECTION (NOOT STD. PLAN R-3-3.1) |
| 20 | CONSTRUCT BRICK AND MORTAR PAV (SEE DETAIL 3, DRAWING D-25) |
| 21 | CONSTRUCT INTERIM PAV PER STRUCTURAL DETAIL |
| 22 | INSTALL 54" RCP (USDOCA STD. DWG. NO. 503.2) |
| 23 | 12" WIDE X 6" THICK TYPE II MAINTENANCE ACCESS PATH |
| 24 | CONSTRUCT CURB/RET HEADWALL (NOOT STD. PLAN R-23.2 & R-23.2.1) |
| 25 | CONSTRUCT CONCRETE CULVERT (SEE DETAIL 1, DRAWING D-25) |
| 26 | INSTALL 24" RCP OR WATER QUALITY CROD AS SHOWN ON PROFILES (USDOCA STD. DWG. NO. 503.2) |
| 27 | INSTALL 18" RCP END SECTION (NOOT STD. PLAN R-2-3.1) |
| 28 | CONSTRUCT DROP INLET PER STRUCTURAL DETAIL |
| 29 | CONSTRUCT HEADWALL PER STRUCTURAL DETAIL |
| 30 | INSTALL CHAIN LINK FENCE (USDOCA STD. DWG. NO. 232) |
| 31 | INSTALL CHAIN LINK FENCE (USDOCA STD. DWG. NO. 232) |
| 32 | CONSTRUCT CONCRETE PAD WITH 3" CUTOFF WALL (SEE DETAIL 1, DRAWING D-25) |
| 33 | CONSTRUCT 3' CUTOFF WALL (SEE DETAIL 15, DRAWING D-25) |

NOTES

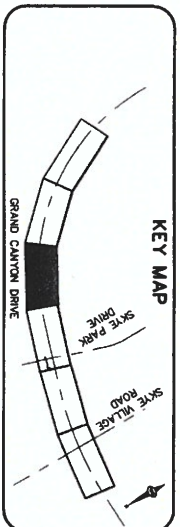
WHERE JOINTS ARE NOT PRACTICABLE, CAST-IN-PLACE MONOLITHIC POUR WITH WATERSTOP BETWEEN SLAB AND WALLS, BASE, WALLS AND TOP TO BE CONSTRUCTED WITH WATERSTOPS, CENTER BULB, OR FLAT STRIP (WYNILEX, GREENSTREAK PLASTIC PRODUCTS OR APPROVED EQUAL).

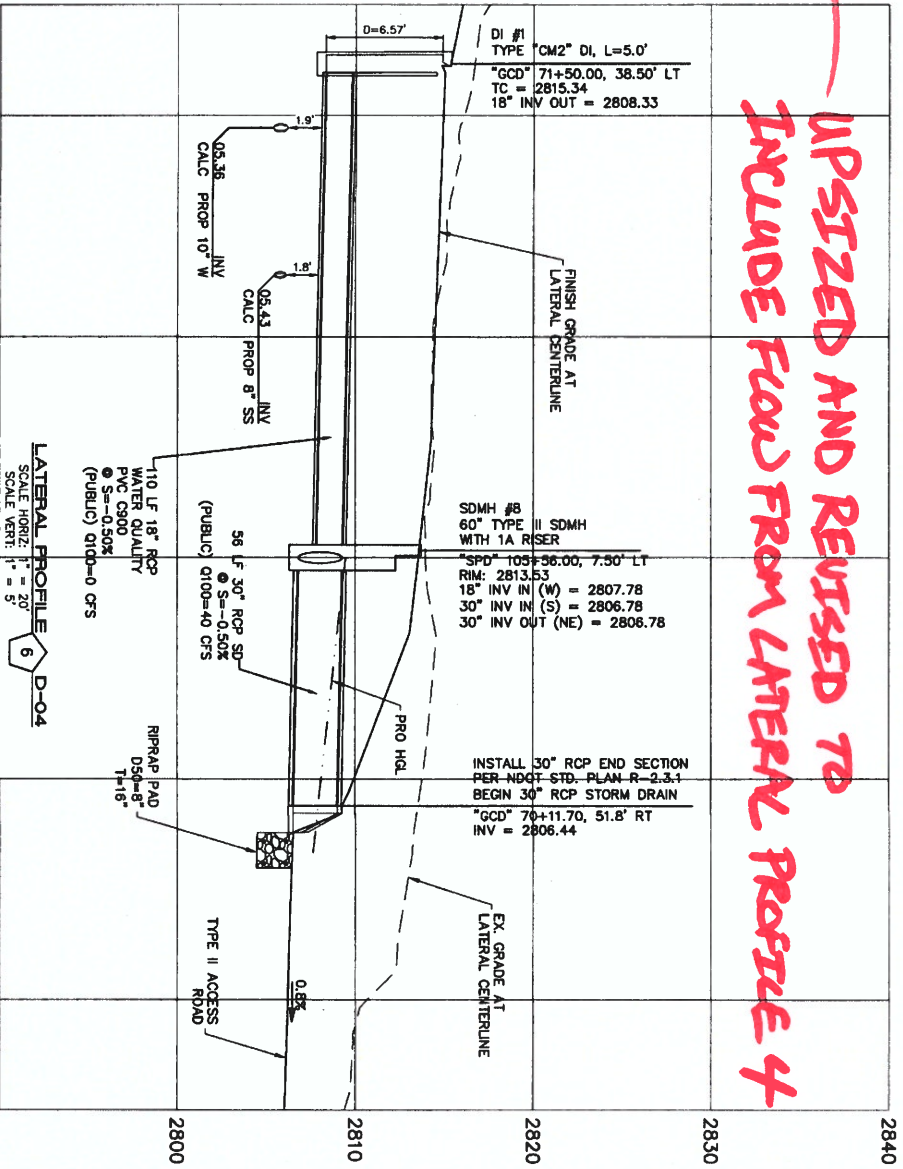
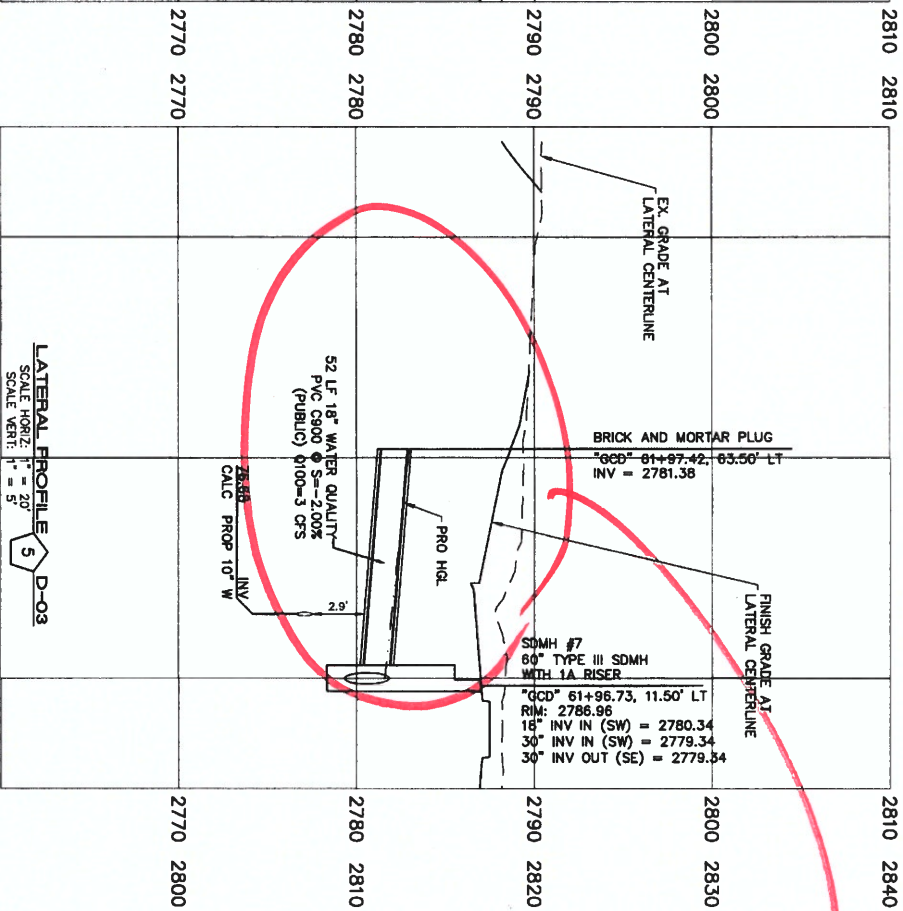
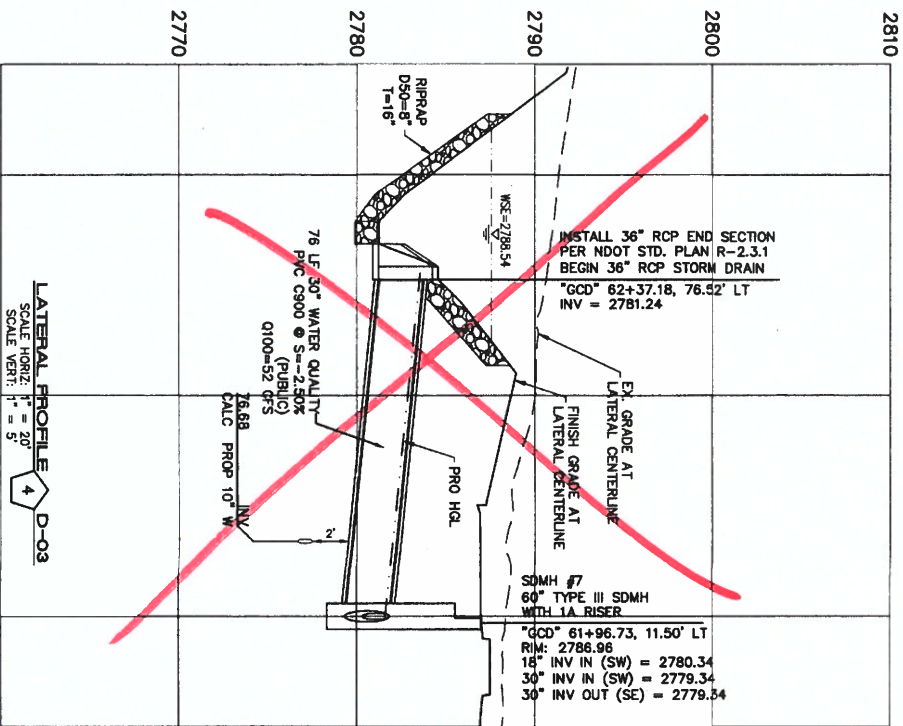
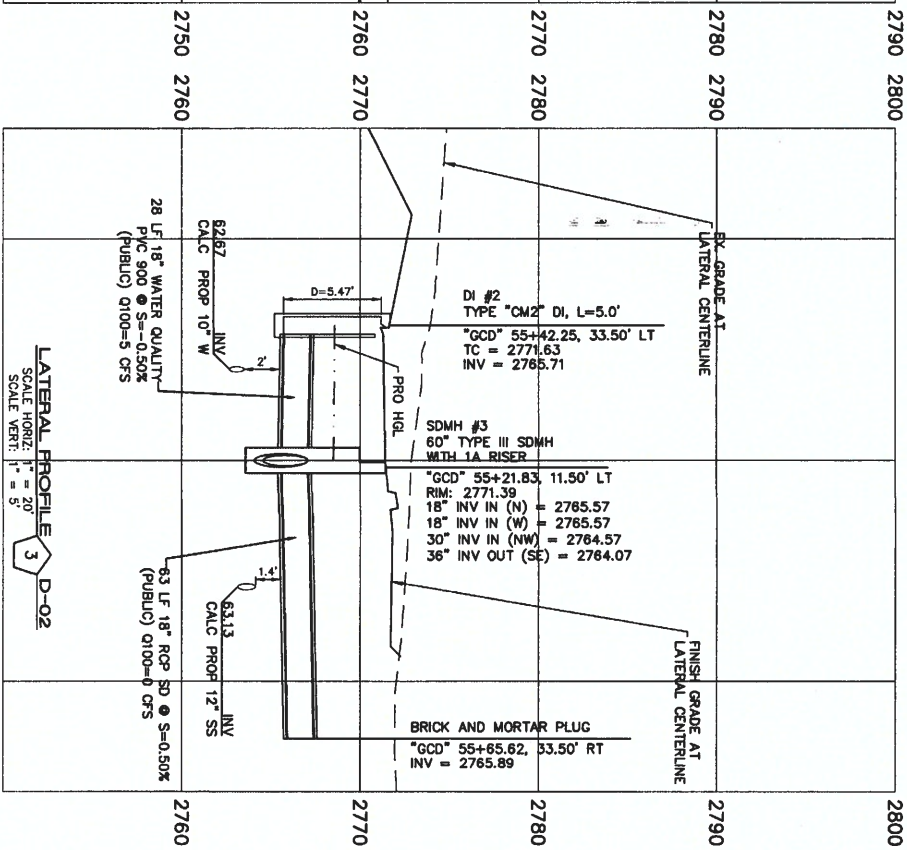
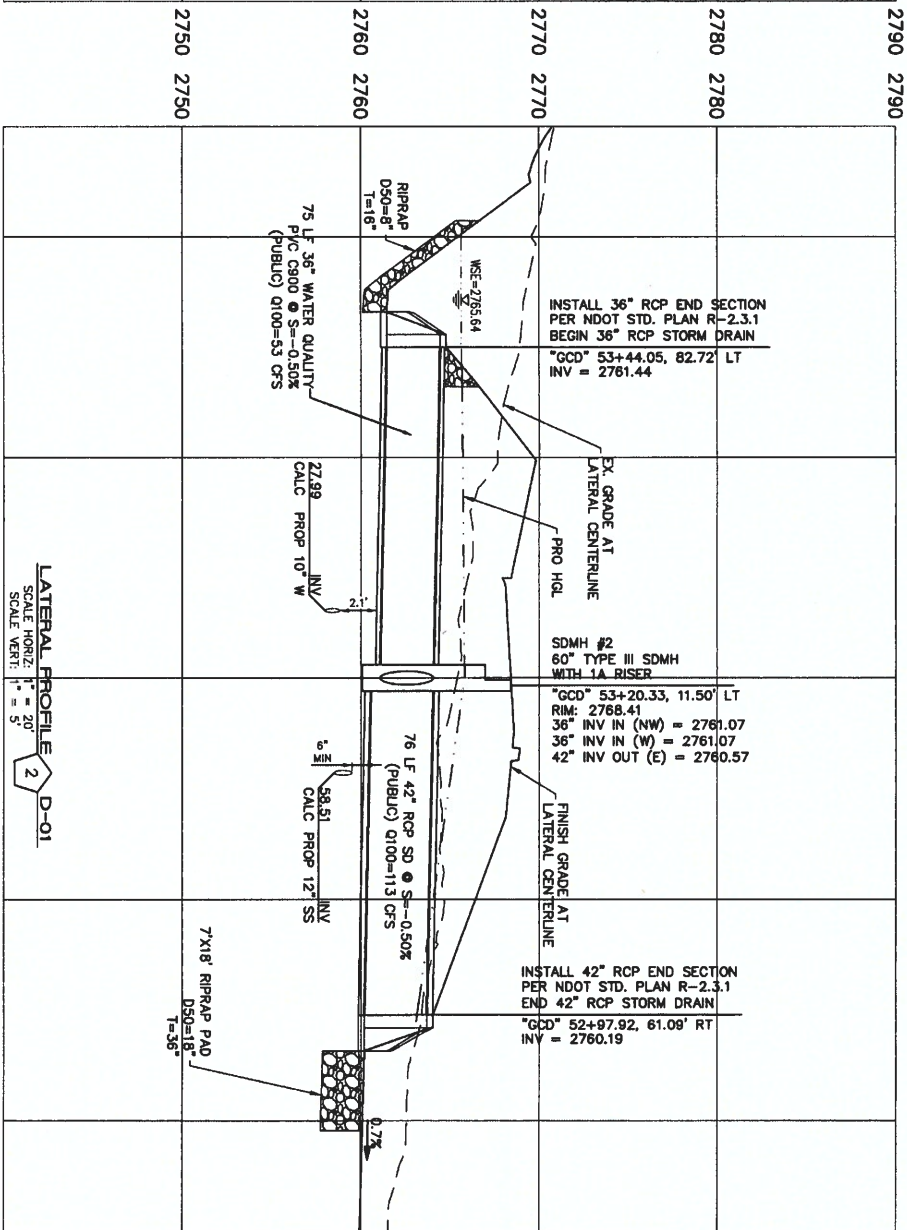
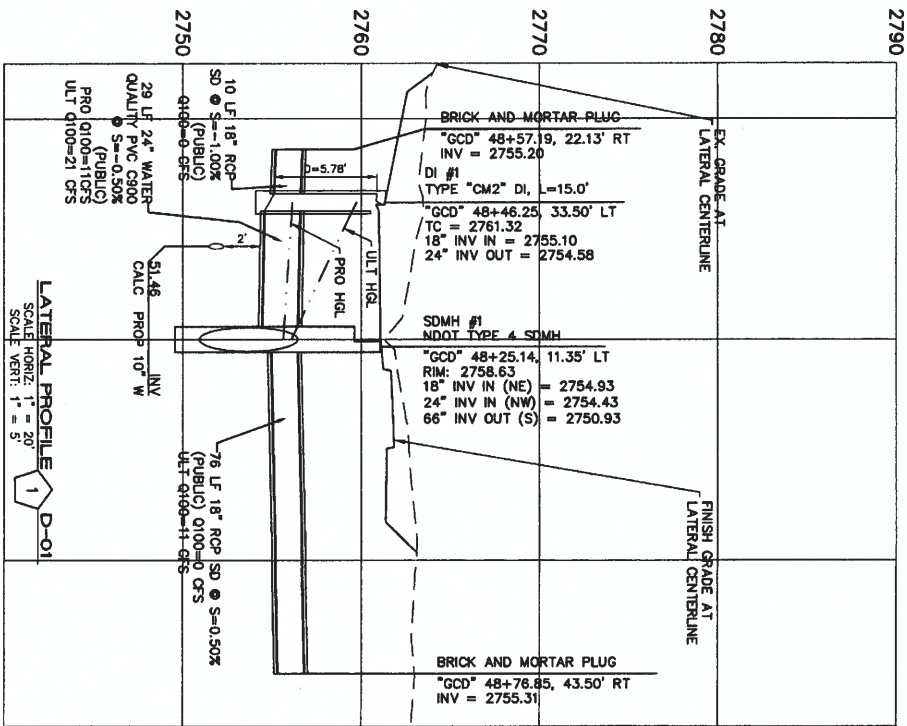
LEGEND

- 1
STORM DRAIN LATERAL # (SEE SHEETS D-19 THRU D-24,

FLOOD ZONE

FLOOD ZONE

[illegible]



UPSIZED AND REVISED TO
INCLUDE FLOW FROM LATERAL PROFILE 4

NINETY-FIVE MANAGEMENT LLC
SKYE CANYON II PHASE 3A
STORM DRAIN LATERAL PROFILE

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399



DATE: 4/5/18
DRAFTER: DAM
DESIGNER: DAM
CHECKED: JSR
PROJECT NO. OLY1609-000

APPENDIX D

CD of Electronic Files