DS #: 4952.1

APN: 126.12.101.002

PROJECT: Sheep Mountain Parkway at Skye Canyon

SUBMITTAL: 4th

SCANNED BY/DATE:

CHECKED BY/DATE:



CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: December 19, 2018
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: **Sheep Mountain Parkway at Skye Canyon – Update #1**			**COPIES TO:** Slater Hanifan Group
Cross Streets:	Grand Teton Boulevard at Puli to Iron Mountain Road			M F Land LLC / Ninety-Five Management LLC
File Number:	F:\Depot\DSMemos\DS4952E.doc			Bart Anderson, P.E., DevCo
Parcel Number:	126-12-101-002			CCRFCD
Zoning Action:	N/A			
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	2/8/2018	2/26/2018	Not Approved	$400.00	493316: $400
2nd Submittal	6/5/2018	6/19/ 2018	Not Approved	$400.00	496458: $400
3rd Submittal	7/19/2018	7/31/2018	Conditional Approval	$400.00	497601: $400
CCRFCD	8/23/2018	9/5/2018	Concurrence Recv'd	N/C	N/C
4th Submittal	12/5/2018	12/19/2018	See Comments Below	$100.00	501510: $100
			TOTAL FEES (LDDRS):	**$1,200.00**	**----**

REMARKS:

4th Submittal: Update #1 to extend a culvert at Station TRL 67+00 with minor grading revision

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.

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

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

END OF REMARKS

ays

T/R/S: T19S/R59E/12

AREA F-12

TECHNICAL DRAINAGE STUDY
UPDATE No. 1
Sheep Mountain Parkway
at Skye Canyon

City of Las Vegas, Nevada

Job No.: OLY1720.000
Date: December 2018

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 – Sheep Mountain Parkway Date: December 2018

Location of Development: a) Descriptive (Cross Streets): North/South: Sheep Mountain Parkway

East/West: Grand Teton Drive to Iron Mountain Road

b) Section: 12 Township: 19 South Range: 59 East

c) APN: 126-12-101-002

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

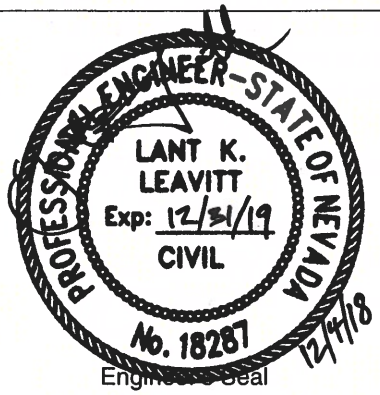
4. Proposed type of development (Residential, Commercial, Etc.): Roadway & Storm Drain Infrastructure

5. Approximate upstream land area which drains to the subject site: 1300 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 Canyon Detention Basin 1 Outfall, Existing Wash near Brent Lane alignment, and Skye Canyon Detention Basin 2 Outfall.

8. Briefly describe your proposed schedule for the subject project: ASAP Upon Substantial Completion of Detention Basin 2 Facilities.



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

Revision	Date

Local Entity File No.

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

STANDARD FORM 1

Updated 05/01/2008

OLY1720.000

December 4, 2018

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 Sheep Mountain Parkway at Skye Canyon

Mr. Sung:

Submitted for your review is this *Technical Drainage Study Update for Sheep Mountain Parkway at Skye Canyon* (hereinafter referred to as the Update Study). The original *Technical Drainage Study for Sheep Mountain Parkway at Skye Canyon* (hereinafter referred to as the Original Study) was prepared by Slater Hanifan Group (SHG) and approved on September 5, 2018. The City of Las Vegas (CLV) approval letter is provided in Appendix A. The original study addressed the development of roadway improvements for Sheep Mountain Parkway from Grand Teton Drive to Iron Mountain Road.

Since the approval of the Original Study, the Las Vegas Valley Water District (LVVWD) has required a grading revision adjacent to their facility alignment near Station "TRL" 67+00. The purpose of this grading revision is to reduce the cross slope within their access corridor to facilitate maintenance access. The grading revision requires extension of the proposed culvert at this location.

Purpose: The purpose of this Update Study is to provide supporting calculations for extending the previously proposed culvert at approximately Station "TRL" 67+00 LT an additional 21.84-ft to provide for maximum cross slope through the LVVWD facility corridor to be met. Due to the extension of the culvert, the upstream invert is raised. To prevent this raised invert from also raising the upstream water surface elevation, an improved inlet is proposed. The upstream culvert opening is now proposed to be 48-inch diameter and transitions down to the original 42-inch size over a length of 5-ft, see Lateral Profile 4 on sheet SD-01 of the included improvement plans. The transition is proposed per the standard precast detail shown on the included plan Sheet TY-07, Detail 2. The improved inlet results in a reduction in upstream 100-year water depth to 3.5-ft, or a water surface elevation of 2988.53-ft, see RCP Culvert Nomograph in Appendix B. The low point in the adjacent LVVWD corridor/trail is 2989.06-ft, and therefore the ponded water surface will not encroach on the trail or divert away from the culvert. Additionally, the riprap channel inflow slope is revised from 8.9% to 10.0% to tie into the new culvert entrance location. See revised Manning's Equation analysis and riprap sizing computation in Appendix B.

The revised improvement plans are included to support the drainage analysis in this study. An electronic copy of this submittal, and previous submittals, is included in Appendix C. If you have any questions or require additional information, please do not hesitate to 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

LIST OF APPENDICIES

Appendix A **Original Study Approval Letter**

Appendix B **Hydraulic Analyses**

- 48-Inch RCP Improved Inlet Nomograph
- Riprap Trapezoidal Channel Manning's Equation Analysis
- Riprap Trapezoidal Channel Riprap Sizing Computation

Appendix C **Electronic Copy of Study (CD)**

APPENDIX A

Original Study Approval Letter

CITY OF LAS VEGAS
INTER-OFFICE MEMORANDUM

DATE: September 5, 2018

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:
Sheep Mountain Parkway at Skye Canyon

COPIES TO:
Slater Hanifan Group
M F Land LLC / Ninety-Five Management LLC
Bart Anderson, P.E., DevCo
CCRFCD

Cross Streets:	Grand Teton Boulevard at Puli to Iron Mountain Road		
File Number:	F:\Depot\DSMemos\DS4952D.doc		
Parcel Number:	126-12-101-002		
Zoning Action:	N/A		
FEMA Flood Zone	YES	NO	X
Proposed Storm Drain	YES	NO	X

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
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			TOTAL FEES (LDDRS):	**$1,200.00**	----

REMARKS:

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

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END OF REMARKS
ays

T/R/S: T19S/R59E/12
AREA F-12

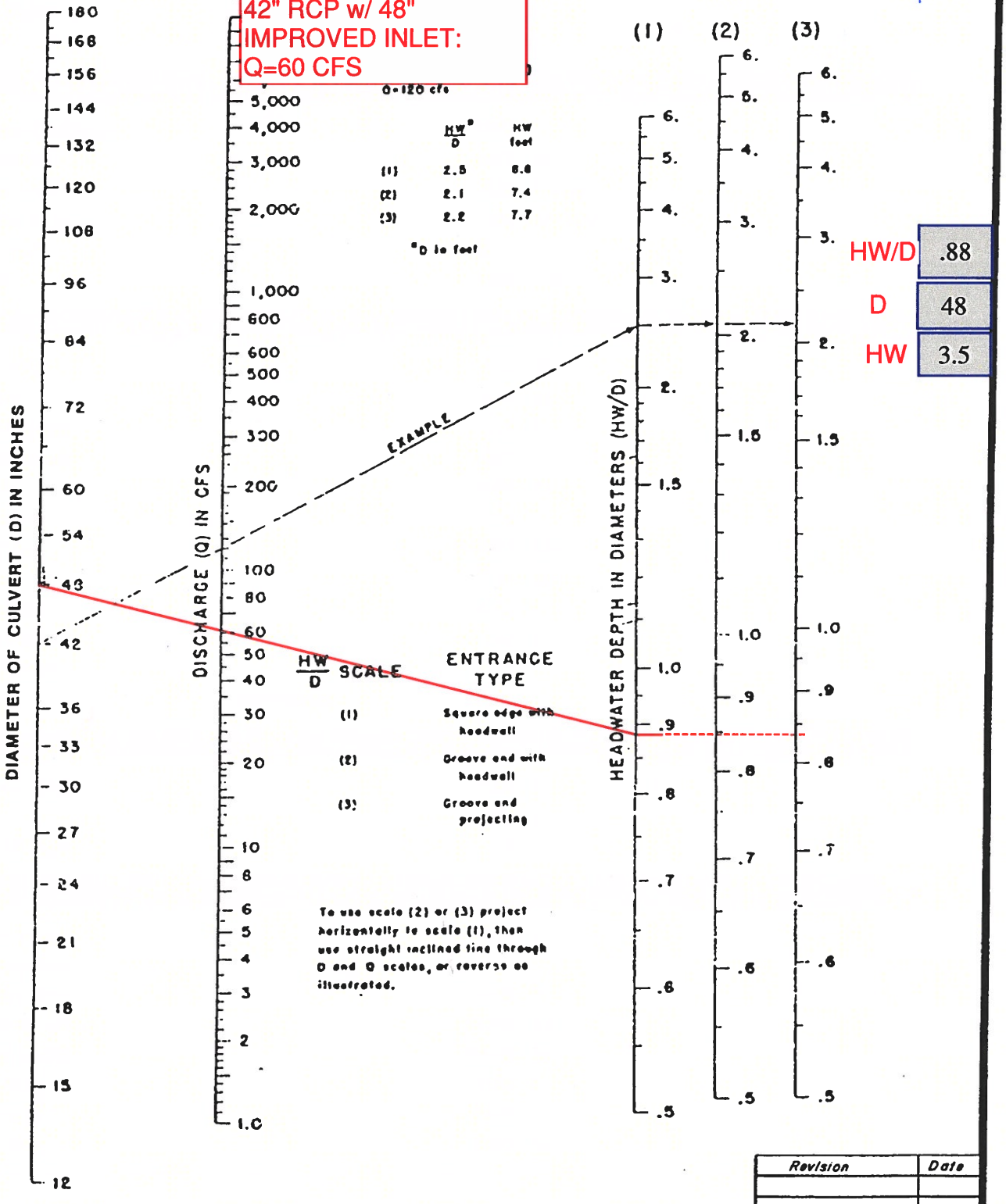
APPENDIX B

Hydraulic Analyses

- 48-Inch RCP Improved Inlet Nomograph
- Riprap Trapezoidal Channel Manning's Equation Analysis
- Riprap Trapezoidal Channel Riprap Sizing Computation

NOMOGRAPH – INLET CONTROL RCP

IRON MOUNTAIN RD
42" RCP w/ 48"
IMPROVED INLET:
Q=60 CFS



HW/D .88
D 48
HW 3.5

Revision	Date

WRC ENGINEERING

REFERENCE:
USDOT, FHWA, HDS, No. 5, 1985

FIGURE 1005

Riprap Trapezoidal Channel at 42" RCP w/ 48" Improved Inlet

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.042	
Channel Slope	10.00	%
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	12.00	ft
Discharge	60.00	ft^3/s

Results

Normal Depth	0.60	ft
Flow Area	8.26	ft^2
Wetted Perimeter	15.79	ft
Hydraulic Radius	0.52	ft
Top Width	15.59	ft
Critical Depth	0.85	ft
Critical Slope	0.02922	ft/ft
Velocity	7.26	ft/s
Velocity Head	0.82	ft
Specific Energy	1.42	ft
Froude Number	1.76	
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	0.60	ft
Critical Depth	0.85	ft
Channel Slope	10.00	%

Riprap Trapezoidal Channel at 42" RCP w/ 48" Improved Inlet

GVF Output Data

Critical Slope	0.02922	ft/ft

Riprap Trapezoidal Channel at 42" RCP w/ 48" Improved Inlet

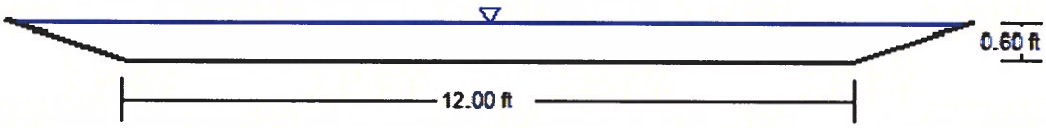
Project Description

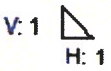
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.042	
Channel Slope	10.00	%
Normal Depth	0.60	ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	12.00	ft
Discharge	60.00	ft^3/s

Cross Section Image





SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

Rip Rap Sizing Computation

Project Name & Number: OLY1720.000
Date: 12/4/2018
By: LKL

Location: Riprap Ditch at 42" Culvert at Iron Mountain Road

Known Information:

Reference:

Rip Rap protection at

V = Velocity (fps)	7.26	WSPG Hydraulic / Flowmaster Calculations
S_g = Specific Gravity of Rock (typ=2.5)	2.5	Use Typical
s = Longitudinal Channel Slope (ft/ft)	0.10	Grading Plan

Solve For:

Minimum d_{50} = 1.19 ft - Average Rock Size

Use d_{50} = 18 in - Average Rock Size
Thickness = 36 in - Thickness of Rip Rap protection
Manning's 'n' = 0.042 - Roughness Coefficient

Equations:

Based upon a Stable Channel Lining

$d_{50} = ((vel*S^{0.17})/(3*(S_g-1)))^2$ Equation 734*

$n = 0.0395(d_{50})^{1/6}$ Equation 732*

Recommendations:

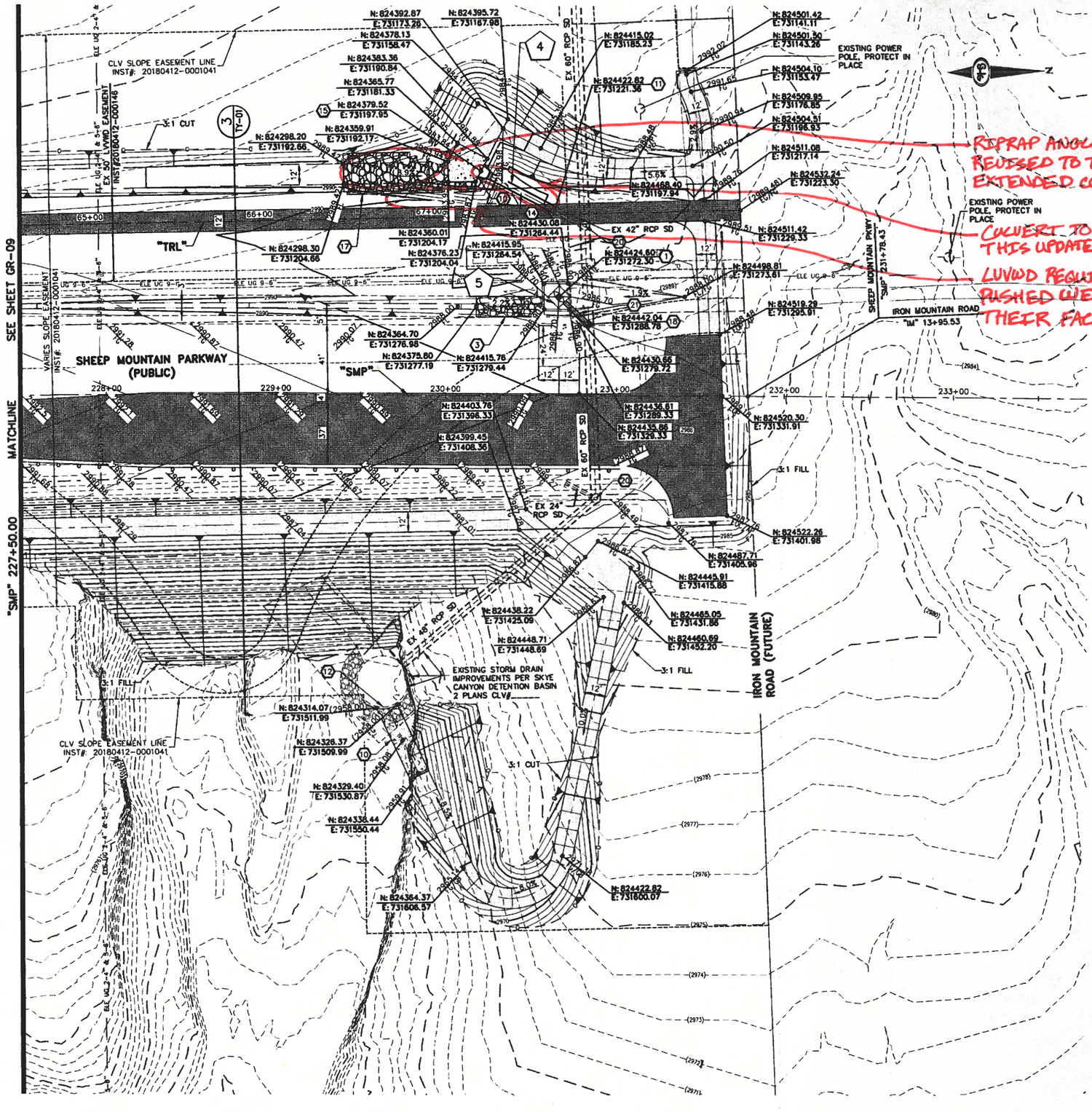
* Provide 18-in Riprap, Thickness = 36-in.

* Equations taken from the Clark County Regional Flood Control District - Hydrologic Criteria and Drainage Design Manual

5740 S. Arville St., Suite 216 - Las Vegas, NV 89118
Ph. 702-284-5300 - Fx. 702-284-5399

APPENDIX C

Electronic Copy of Study (CD)



RIPRAP ANGLED AND SLOPE REVISED TO TIE IN TO EXTENDED CULVERT.

CULVERT TO BE EXTENDED WITH THIS UPDATE TO FACILITATE GRADING

LUVWD REQUIRES GRADING BE PUSHED WEST OUTSIDE OF THEIR FACILITY CORRIDOR.

GRADING AND STORM DRAIN NOTES

1. INSTALL NDOT TYPE 2B STORM DRAIN DROP INLET WITH CONCRETE APRON (NDOT DETAIL R-4.2.2 AND R-4.2.7) (SEE SHEET TY-08)
2. ADJUST EXISTING STORM DRAIN DROP INLET TO FINISH GRADE (PER STRUCTURAL PLANS)
3. INSTALL RIPRAP (D50=3-INCH, T=12-INCH)
4. REMOVE EXISTING DROP INLET
5. INSTALL 36-INCH RCP STORM DRAIN (USDCCA STD. DWG. NO. 503.2)
6. INSTALL 48-INCH RCP STORM DRAIN (USDCCA STD. DWG. NO. 503.2)
7. ADJUST 72-INCH NDOT TYPE IV STORM DRAIN MANHOLE TO FINISH GRADE (NDOT DETAIL R-4.3.2) (SEE SHEET TY-08)
8. CONSTRUCT HEADWALL (PER STRUCTURAL DETAIL)
9. CONSTRUCT 8-INCH THICK CONCRETE PAD OVER 8-INCH TYPE II AGGREGATE BASE WITH 3-FOOT DEEP CUTOFF WALL (DETAIL 1, TY-04)
10. CONSTRUCT 6-INCH THICK CONCRETE PAD OVER 6-INCH TYPE II AGGREGATE BASE
11. CONNECT TO EXISTING RCP STORM DRAIN WITH CONCRETE COLLAR (DETAIL 5, SHEET TY-02)
12. REMOVE 120 SF EXISTING RIPRAP FOR INSTALLATION OF CONCRETE ACCESS ROAD
13. INSTALL 3-FT DEEP CONCRETE CUTOFF WALL (SEE DETAIL 4 ON TY-02)
14. INSTALL 42-INCH RCP STORM DRAIN (USDCCA STD. DWG. NO. 503.2)
15. INSTALL RCP END SECTION (NDOT R-2.3.1) (SEE SHEET TY-08)
16. CONSTRUCT 6-INCH THICK CONCRETE PAD OVER 8-INCH TYPE II AGGREGATE BASE WITH 3-FOOT DEEP CUTOFF WALL (DETAIL 1, SHEET TY-03)
17. INSTALL RIPRAP (D50=18-INCH, T=36-INCH)
18. INSTALL 60-INCH TYPE III STORM DRAIN MANHOLE (USDCCA STD. DWG. NO. 406)
19. INSTALL 3-INCH MINUS, 6-INCH THICK GRAVEL OVER 6-INCH TYPE II AGGREGATE BASE
20. ADJUST 60-INCH TYPE III MANHOLE TO FINISH GRADE (CCAUSD NO. 406)
21. INSTALL 24-INCH RCP STORM DRAIN (USDCCA STD. DWG. NO. 503.2)

NOTES

1. SEE TY-SHEETS FOR TYPICAL SECTIONS.
2. SEE SD-SHEETS FOR STORM PROFILES.
3. SEE UT-SHEETS FOR WATER AND SEWER PLAN AND PROFILES.
4. ALL RCP SHALL BE CLASS III UNLESS OTHERWISE SHOWN IN PROFILE.
5. ALL PIPE LENGTHS ARE MEASURED ALONG PIPE CENTERLINE TO CENTER OF MANHOLE OR INSIDE EDGE OF DI OR RCB/RCA.
6. ALL DROP INLETS SHALL INCLUDE STORM WATER MANAGEMENT STAMP AND DETAIL PER USDCCA STD. DWG. NO. 421.
7. SEE STRUCTURAL PLANS FOR ADDITIONAL STRUCTURAL DETAILS AND CONNECTIONS.
8. ALL PIPES ARE PUBLICLY MAINTAINED.

LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH
- RIPRAP (SIZE PER PLAN)
- (1) STORM DRAIN LATERAL # (SEE SHEET GR-10)

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY DS-4952 ON FILE AT THE CITY OF LAS VEGAS FOR THE SUBJECT PROJECT

JERRY SLATER, P.E. 14167 — DATE 7.16.18

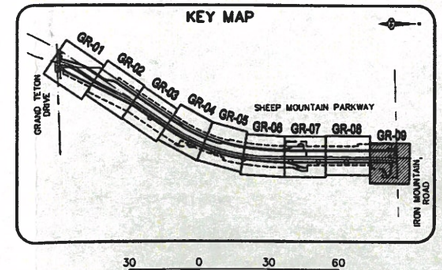
FLOOD ZONE

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE "X" (OUTSIDE THE 500-YEAR FLOOD PLAIN) ON THE FLOOD INSURANCE RATE MAP (FIRM) PANEL 32003C1735E, DATED SEPTEMBER 27, 2002

NOTE:

PROPERTY OWNER IS RESPONSIBLE TO MAINTAIN THE BEST MANAGEMENT PRACTICES, SUCH AS BUT NOT LIMITED TO, THE REMOVAL OF ACCUMULATED SEDIMENT AND DEBRIS AND CARE OF VEGETATION.

KEY MAP



30 0 30 60
SCALE FEET

Avoid buried power lines. It's easy. CALL BEFORE YOU DIG OVERHEAD 1-702-227-2929

FAST. Call Before you UnderGround. 1-702-433-8300 NEVADA811.COM

Call before you Dig Avoid buried power lines and pipelines. Call 811 or 1-800-227-2600

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

NO.	DESCRIPTION	DATE	BY	APP'D DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

GRADING PLAN - "SMP" 227+50.00 TO "SMP" 233+50.00

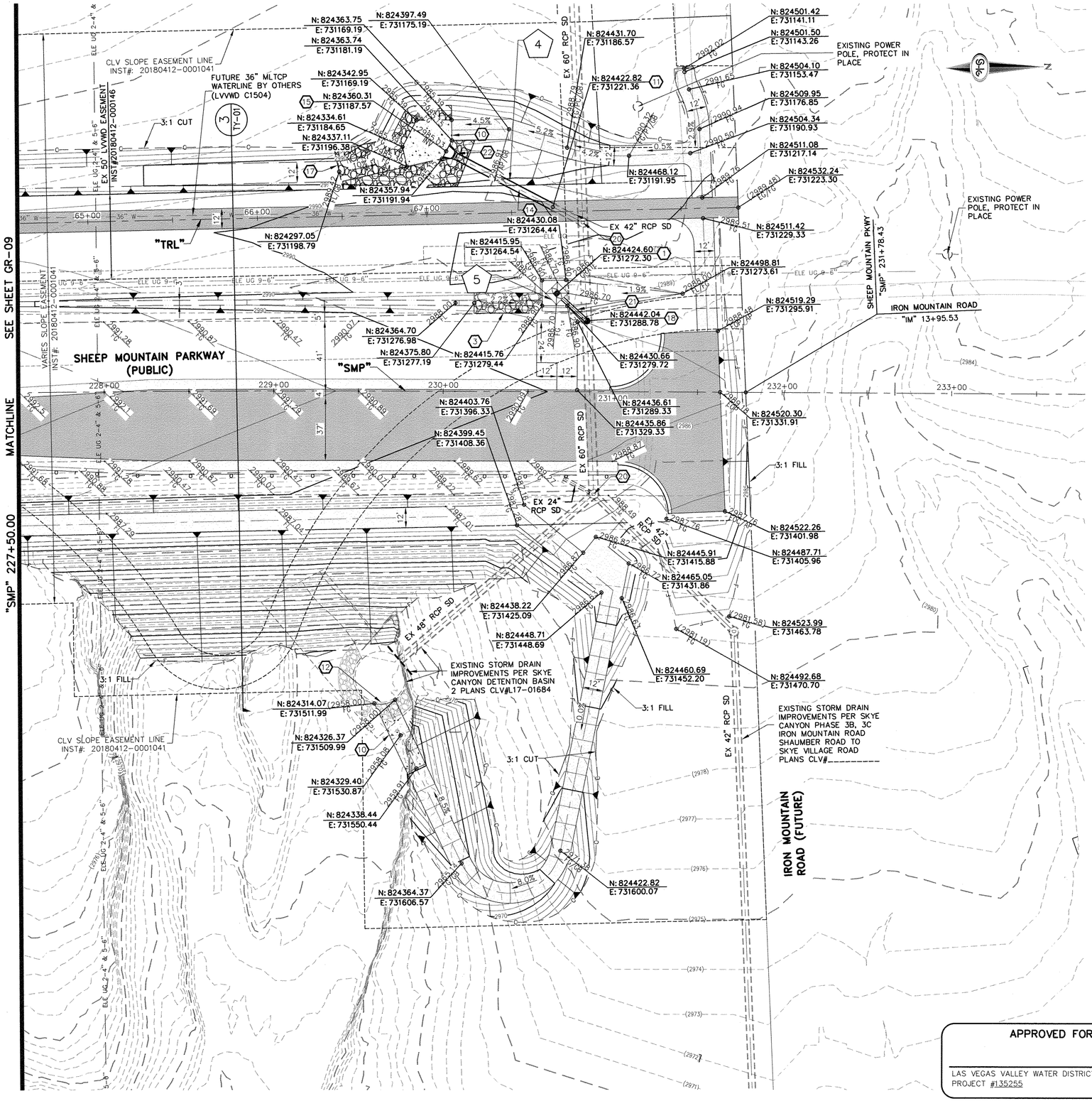
FROM ORIGINAL APPROVED STUDY

DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO. OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA - JERRY SLATER - Exp. 06/30/2020 - CIVIL - No. 14167 - 7/16/18

GR-09
SHEET 33 OF 50
DWG NO. ____

HANSEN NO. ____



GRADING AND STORM DRAIN NOTES

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21. INSTALL 24-INCH RCP STORM DRAIN (USDCCA STD. DWG. NO. 503.2)
22. INSTALL 5-LF STORM DRAIN REDUCER (SEE DETAIL 2 ON SHEET TY-07)

NOTES

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3. SEE UT-SHEETS FOR WATER AND SEWER PLAN AND PROFILES.
4. ALL RCP SHALL BE CLASS III UNLESS OTHERWISE SHOWN IN PROFILE.
5. ALL PIPE LENGTHS ARE MEASURED ALONG PIPE CENTERLINE TO CENTER OF MANHOLE OR INSIDE EDGE OF DI OR RCB/RCA.
6. ALL DROP INLETS SHALL INCLUDE STORM WATER MANAGEMENT STAMP AND DETAIL PER USDCCA STD. DWG. NO. 421.
7. SEE STRUCTURAL PLANS FOR ADDITIONAL STRUCTURAL DETAILS AND CONNECTIONS.
8. ALL PIPES ARE PUBLICLY MAINTAINED.

LEGEND

- PLANTMIX BITUMINOUS SURFACE
- TYPE II MAINTENANCE ACCESS PATH OR SHOULDER
- RIPRAP (SIZE PER PLAN)
- (#) STORM DRAIN LATERAL # (SEE SHEET GR-10)

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY DS-4952 ON FILE AT THE CITY OF LAS VEGAS FOR THE SUBJECT PROJECT

JERRY SLATER, P.E. 14167 — DATE 12.4.9

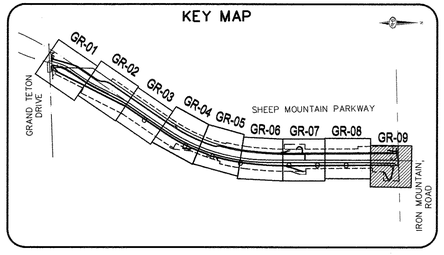
FLOOD ZONE

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE "X" (OUTSIDE THE 500-YEAR FLOOD PLAIN) ON THE FLOOD INSURANCE RATE MAP (FIRM) PANEL: 32003C1735E, DATED SEPTEMBER 27, 2002

NOTE:

PROPERTY OWNER IS RESPONSIBLE TO MAINTAIN THE BEST MANAGEMENT PRACTICES, SUCH AS BUT NOT LIMITED TO, THE REMOVAL OF ACCUMULATED SEDIMENT AND DEBRIS AND CARE OF VEGETATION.

KEY MAP



SCALE 30 0 30 60 FEET

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES
PROJECT #135255 FIRST APPROVED DATE:_____

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD 1-702-227-2929

FAST Call before you UnderGround. 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

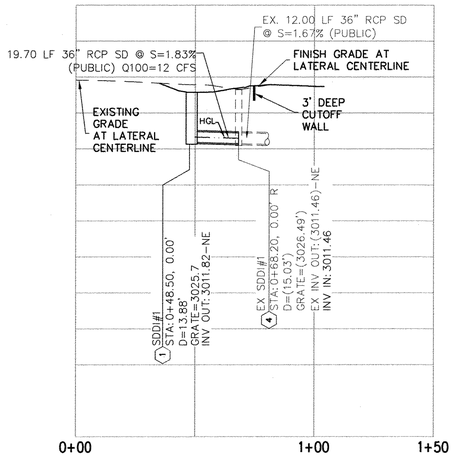
SHEEP MOUNTAIN PARKWAY

GRADING PLAN - "SMP" 227+50.00 TO "SMP" 233+50.00

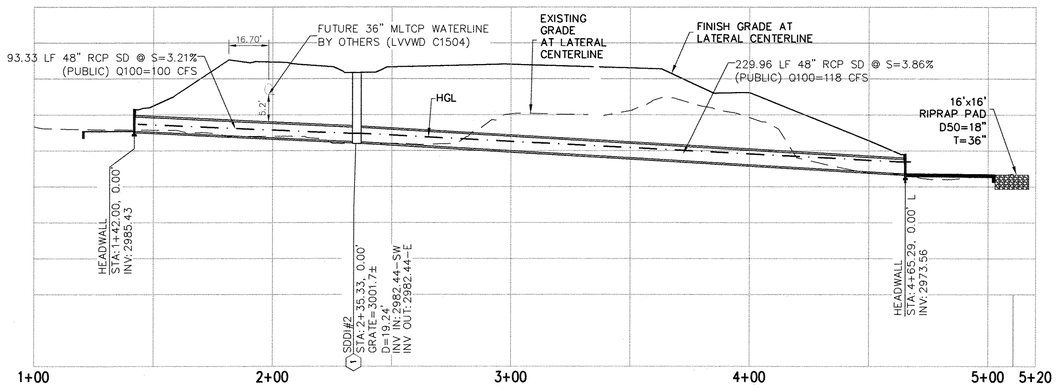
DATE: 09/07/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO. OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA - JERRY SLATER - Exp. 06/30/2020 - CIVIL - No. 14167 - 12.4.9

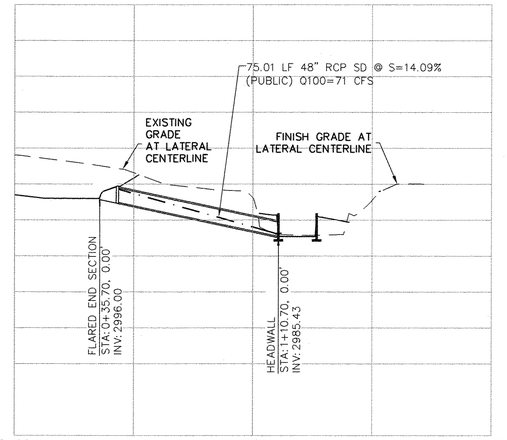
GR-09
SHEET 33 OF 53
DWG NO.



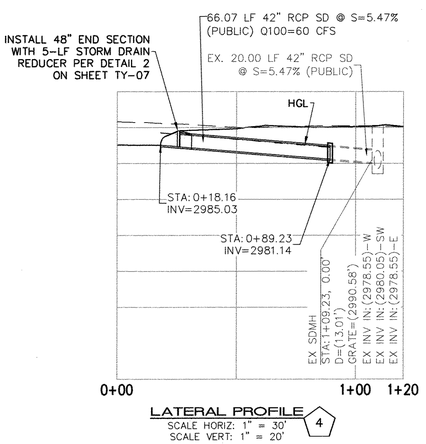
LATERAL PROFILE 1
SCALE HORIZ: 1" = 30'
SCALE VERT: 1" = 20'



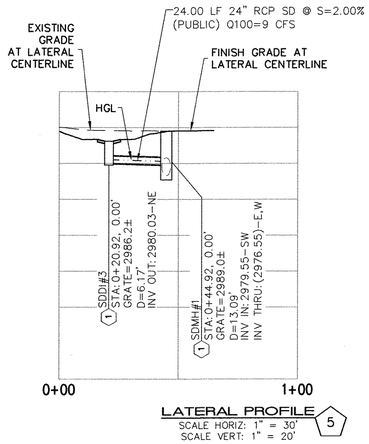
LATERAL PROFILE 2
SCALE HORIZ: 1" = 30'
SCALE VERT: 1" = 20'



LATERAL PROFILE 3
SCALE HORIZ: 1" = 30'
SCALE VERT: 1" = 20'



LATERAL PROFILE 4
SCALE HORIZ: 1" = 30'
SCALE VERT: 1" = 20'



LATERAL PROFILE 5
SCALE HORIZ: 1" = 30'
SCALE VERT: 1" = 20'

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES
PROJECT #135255 FIRST APPROVED DATE: _____

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC
SHEEP MOUNTAIN PARKWAY
STORM DRAIN LATERAL PROFILES

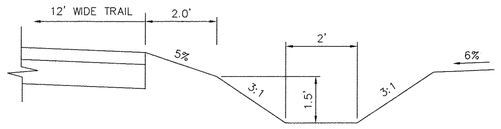
DATE: 09/07/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY J. SLATER
Exp. 06/30/2020
CIVIL
No. 14167
7.4.18

GR-10
SHEET 34 OF 53

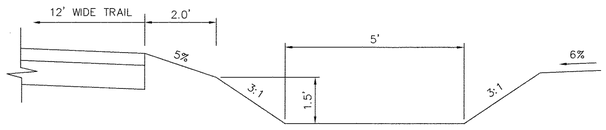
DWG NO.



"TRL" 22+40.35 TO "TRL" 28+00.00

SECTION (EAST SIDE OF TRAIL)

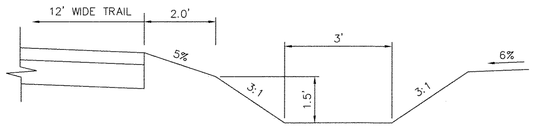
NOT TO SCALE



"TRL" 28+25.00 TO "TRL" 33+42.78

SECTION (EAST SIDE OF TRAIL)

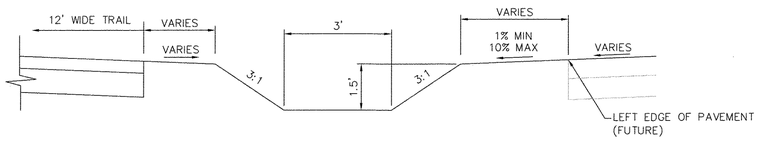
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"TRL" 34+00.00 TO "TRL" 36+75.01

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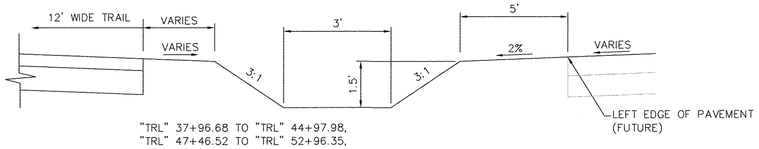
NOT TO SCALE



"TRL" 36+75.01 TO "TRL" 37+96.68

SECTION (EAST SIDE OF TRAIL)

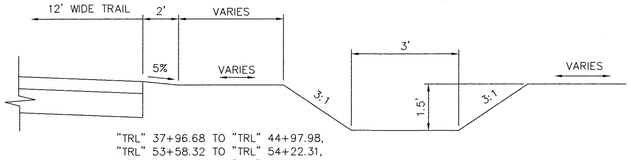
NOT TO SCALE



"TRL" 37+96.68 TO "TRL" 44+97.98,
"TRL" 47+46.52 TO "TRL" 52+96.35,
"TRL" 55+22.65 TO "TRL" 61+51.25,
"TRL" 63+02.44 TO "TRL" 67+26.76

SECTION (EAST SIDE OF TRAIL)

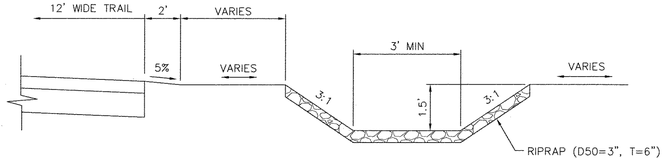
NOT TO SCALE



"TRL" 37+96.68 TO "TRL" 44+97.98,
"TRL" 53+58.32 TO "TRL" 54+22.31,
"TRL" 54+85.58 TO "TRL" 55+22.65,
"TRL" 61+51.25 TO "TRL" 63+02.44

SECTION (EAST SIDE OF TRAIL)

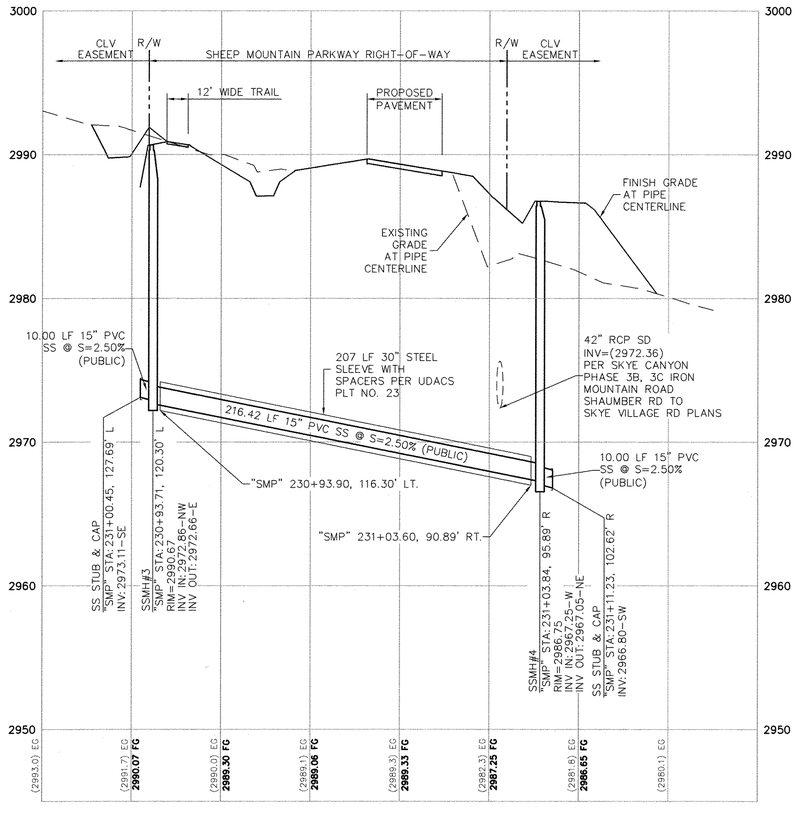
NOT TO SCALE



"TRL" 52+96.35 TO "TRL" 53+44.36

SECTION (EAST SIDE OF TRAIL)

NOT TO SCALE



SEWER CROSSING

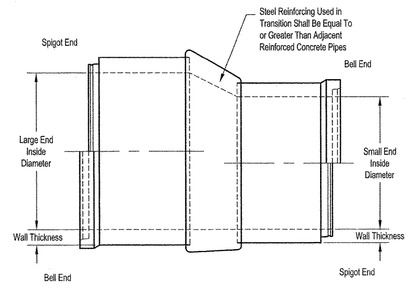
NOT TO SCALE

1
TY-07

Rinker MATERIALS

Concrete Pipe Division

Reinforced Concrete Eccentric Reducer



Notes:

1. Produced to meet ASTM specifications.
2. Contact a Concrete Pipe Division representative for details not listed on this sheet.

Rinker 01

STORM DRAIN REDUCER

NOT TO SCALE

2
TY-07

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY
DRAINAGE SWALE SECTIONS 2

DATE: 09/07/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY SLATER
Exp. 06/30/2020
CIVIL
No. 14167
12.4.18

TY-07

SHEET 41 OF 53

DWG NO.

TRANSMITTAL

To: **Albert Sung, P.E.**
City of Las Vegas
333 N. Rancho Drive
Las Vegas, NV 89106

Date: February 8, 2018
Project No.: OLY1720.000

From: **Lant Leavitt, P.E.**

Subject: **Technical Drainage Study for Skye Canyon – Sheep Mountain Parkway**

CC: Mark Failla, SHG
CC: Jerry Slater, SHG
CC: Chelsea Peltier, SHG
CC: Rhonda Miller, SHG
CC: Jerrod Ratcliffe, SHG
CC:

Transmitting Via:
☐ Mail
☒ Messenger / MDS
☐ Federal Express
☐ Pickup

For:
☒ Review & Comment
☐ Per your Request
☐ Information/File

Acknowledgement of Receipt:
☐ Not Required
☒ Acknowledgement Required
Received By: AMS
Date: 2/8/18 Time:

Copies	Description
1	Subject Study
1	Stamped and Signed Standard Form 1
1	24" x 36" Drainage and Grading Plans
1	Electronic Copy (CD)
1	Submittal Fee Check (Chk# 1431 from Ninety Five Management,LLC)

Comments:
Enclosed please find the above listed items in support of our application of the *Technical Drainage Study for Skye Canyon – Sheep Mountain Parkway.*

Please contact us if there are any questions at 702-284-5300. Thank you.

Signed:
Lant Leavitt
Flood Control Division

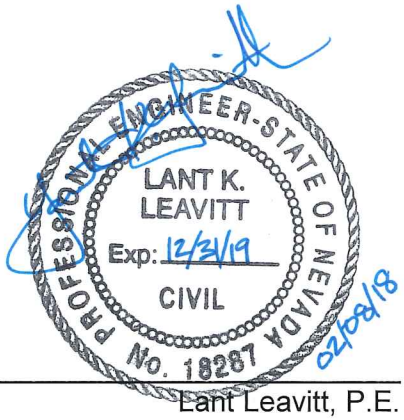
TECHNICAL DRAINAGE STUDY
Sheep Mountain Parkway

City of Las Vegas, Nevada

Job No.: OLY1720.000
Date: February 2018

Prepared By:
Slater Hanifan Group, Inc.
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, NV 89141
Phone: 702-220-6565 ▪ Fax: 702-220-6566



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

Assisted by: Nicholas Stafford, P.E. (AZ), CFM

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Skye Canyon – Sheep Mountain Parkway Date: February 2018

Location of Development: a) Descriptive (Cross Streets): North/South: Sheep Mountain Parkway

East/West: Grand Teton Drive to Iron Mountain Road

b) Section: 12 Township: 19 South Range: 59 East

c) APN: 126-12-101-002

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

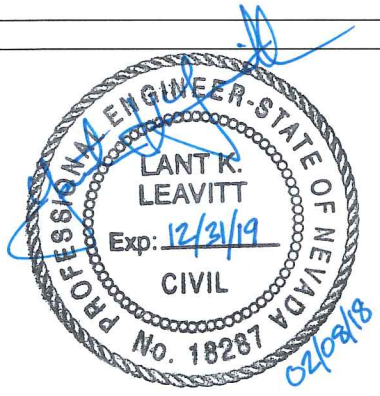
5. Approximate upstream land area which drains to the subject site: 1300 acre +/-

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 Canyon Detention Basin 1 Outfall, Existing Wash near Brent Lane alignment, and Skye Canyon Detention Basin 2 Outfall.

8. Briefly describe your proposed schedule for the subject project: ASAP Upon Substantial Completion of Detention Basin 2 Facilities.



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

Revision	Date

Local Entity File No.

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

STANDARD FORM 1

Updated 05/01/2008

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name: Skye Canyon – Sheep Mountain Parkway		Map ID:
Firm Name: Slater Hanifan Group (SHG)		
Address: 5740 S. Arville St., Suite 216		
City: Las Vegas	State: Nevada	Zip: 89118
Phone Number: 702-284-5300	Fax Number: 702-284-5399	
Property Owner/Developer: M F Land, LLC / Ninety-Five Management, LLC		
Address: 11411 Southern Highlands Parkway, Suite 300		
City: Las Vegas	State: NV	Zip: 89141
Reviewed By:	Date Received:	Date Accepted for Review:

The following checklist is intended as a guide for the engineer preparing a Technical Drainage Study to submit to the local entity and Clark County Regional Flood Control District (if necessary). The listed items are the minimum information required prior to the entity performing a review. The engineer will remain responsible to ensure the Technical Drainage Study is prepared within the guidelines as set forth in the Clark County Regional Flood Control District (CCRFCD) Hydrologic Criteria and Drainage Design Manual (MANUAL).

This document is intended as an aid in preparing Technical Drainage Studies. Each study submitted is reviewed for compliance with local and regional criteria. This form is not intended to be all inclusive and does not limit the extent of the information, calculations or exhibits which may be necessary to properly evaluate the intended land use.

If items are not applicable for the subject site, provide N/A.

I. GENERAL REQUIREMENT:

Yes	No	
X		Design Manual **Standard Form 1** with the engineer's seal and signature.
X		Design Manual **Standard Form 4**.
X		2 copies of the 24" x 36" Drainage Plan.
	N/A	A notarized letter from the adjacent property owner(s) allowing off-site grading or discharge.

Reference:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

II. MAPS AND EXHIBITS

Yes	No	
X		A copy of a current Flood Insurance Rate Map (FIRM) with the site delineated.
X		A copy of the current CCRFCD Master Plan Update Figure, (F-12), for Flood Control Facilities and Environmental areas with the site delineated.
X		On-site drainage basin maps for existing and proposed conditions showing the existing topography, basin boundaries, concentration points, and on-site and off-site flows in cfs.
X		Vicinity Map with local and major cross streets identified and a north arrow.
X		Off-site drainage basin maps for existing, interim and future conditions showing the existing topography, basin boundaries, concentration points, and flows in cfs.

III. DRAINAGE PLAN

Yes	No	
X		Sheet size: 24" x 36" sealed by a registered engineer in the State of Nevada.
X		Minimum scale: 1" = 60'.
X		Project name.
X		Vicinity Map with local and major cross streets.
X		Revision box.
X		North arrow and bar scale.
X		Engineer's/consultant's address and phone number.
X		Elevation datum and benchmark.
X		Legend for symbols and abbreviations.
X		Cut/fill scarps, where applicable.
X		Street names, grades, widths.
X		Proposed future and existing spot grades for top of curbs and street crowns at lot lines, grade breaks, and along curb returns on both sides of the street.

REFERENCE:	STANDARD FORM 2

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
X		Existing contours encompassing the site and 100 feet beyond with spot elevations for important locations, where appropriate.
	N/A	Minimum finish floor elevations with top-of-curb elevations at upstream end of lot.
X		Proposed typical street sections.
	N/A	Streets with off-set crowns.
X		Proposed contours or spot elevations in sufficient detail to exhibit intended drainage patterns and slopes.
X		Property lines.
X		Right-of-way lines and widths, existing and proposed.
X		Existing improvements and their elevations.
X		Delineation of proposed on-site drainage basins indicating area and 10-year and 100-year storm peak flows at basin concentration points.
	N/A	Concentration points and drainage flow direction with Q_{100} and V_{100} and D_{100} in streets.
X		Cumulative flows, velocity, and direction of flow at upstream and downstream ends of site for the 10-year and 100-year flows.
X		Location and cross-section of street capacity calculations.
X		Cross-sectional detail for channels, including cutoff wall locations.
X		Existing and proposed drainage facilities, appurtenances, and connections (i.e., sidewalk, ditches, swales, storm drain systems, unimproved and improved channels, and culverts, etc.) stating size, material, shape, and slope with plan and profile and HGL calculations.
	N/A	Existing and proposed drainage easements and widths shown with sufficient detail. A cross sectional detail must be provided that shows appropriate lining and reinforcement.
	N/A	Location and detail of existing, proposed, and future block wall openings. Minimum size is16"x48". Wrought iron gate is required for flows > 10 cfs.
	N/A	Location and detail of flood walls illustrating depth of flow, proposed grouting height, etc.

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
	N/A	Perimeter retaining wall locations. All existing and proposed walls (retaining screen and flood) must be shown with adjacent ground elevations. Flood Walls with 8-inch concrete masonry unit.
	N/A	Building and/or lot numbers.
X		Alignment of all existing, proposed, or future Regional Facilities adjacent to the site.
	N/A	Limits of existing floodplain based on current FIRM or best available information; limits of proposed floodplains based on best available information.
	N/A	For areas in Zone A, AE, AH, and AO, base flood elevations (BFEs) must be shown for each lot; BFEs may be listed on each lot, or in a table. Finish floor elevations must be a minimum of 18 inches above BFE.
	N/A	Appropriately elevated "humps" 6 inches above the 100-year water surface elevation at site accesses where the intent is to protect the site from the Q_{100} flows.
X		Street slopes for perimeter and interior streets. The minimum slope is 0.4 percent.

IV. HYDROLOGIC ANALYSIS

Yes	No	
X		Appropriate soil information and Soils Map for existing and future conditions with subbasins and property delineated.
X		Input and output information for existing conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models.
X		Input and output information for future conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models.
X		Use of correct precipitation values in and around the McCarran Airport Rainfall Area.
X		A discussion in the text of the hydrologic analysis justifying subbasin boundaries and cutoffs, supporting assumptions, and calculations.
X		A summary table of storm water flows showing basin area, Q_{10} and Q_{100} for both individual basins and combined basin flows, where acceptable.
X		Copies of supporting technical information referenced from a previously approved study and a statement accepting these results.
X		On-site facilities must perpetuate flows through or around the site without significantly impacting adjacent property owners in accordance with current Nevada Drainage Law.

REFERENCE:	STANDARD FORM 2

DRAINAGE SUBMITTAL CHECKLIST

V. HYDRAULIC ANALYSIS

Yes	No	
	N/A	Flow split calculations and supporting documentation or reference for the method of flow split calculations used.
	N/A	Normal depth street flow calculations and cross section diagrams for all interior and perimeter streets. Provide "d x v" products for the Q_{100} and Q_{10} flows representing the worst case for interior and all perimeter streets. Q_{100} d x v ≤ 8. Q_{10} d x v ≤ 6 and 12 foot dry lane for rights-of-way ≥ 80 feet. Calculations must be labeled by street name as indicated on the Grading Plan.
	N/A	A summary table of interior and exterior street capacity calculations showing the street name, Q_{100} flow, slope, depth of flow, velocity and depth times velocity product and streets needing to meet 12 foot dry lane criteria.
	N/A	Appropriate hydraulic calculations for block wall openings assuming a 50 percent vertical clogging factor. (Assume the lower half of the opening is plugged.)
	N/A	Appropriate hydraulic calculations at drainage easement entrance and discharge locations to set finish floor elevations. Hydraulic calculations must include submerged weir, superelevation and tee intersection losses, where appropriate.
	N/A	Provide necessary freeboard requirements to set the finished floor elevations of all proposed buildings, 2 x depth of flow or depth of flow plus 18 inches of freeboard, whichever is less. The minimum requirement is 6 inches above adjacent upstream top of curb. Buildings adjacent to drainage easements must always be provided with 18 inches of freeboard above the Q_{100} weir height or flow depth, which ever is greater.
	N/A	A complete water surface profile analysis (HEC-2, HEC-RAS, etc.) for channel flows and FEMA Zone A flood zones. • Field survey data. • Input and output information. • Plotted cross-sections based on survey with proper encroachments. • A map showing the location of the cross-sections. • Analysis of both sub- and super-critical flow segments. • A summary table and a discussion of the results in the text of the report.
X		Provide a 50 percent clogging factor in the capacity calculation for drop inlets.
X		Hydraulic calculations for culverts and storm drains. D-Load calculations must be provided for storm drain pipes in public rights-of-way, including headwater pool inundation.
X		The mitigation of nuisance water, both during construction and in the fully developed condition, must be addressed.

REFERENCE:	STANDARD FORM 2

CITY OF LAS VEGAS

MINIMUM DRAINAGE STUDY CRITERIA
STANDARD FORM 2 CHECKLIST SUPPLEMENT

(Revised 5/18/11)

The following checklist is intended as a supplemental guide for the engineer preparing a Technical Drainage Study submittal to the City of Las Vegas. This supplement focuses on requirements specific to the City of Las Vegas. The requirements presented are in addition to the Clark County Regional Flood Control District (CCRFCD) Manual Standard Form 2. The listed items are the minimum information required prior to the City performing a review. The engineer will remain responsible to ensure the Technical Drainage Study is prepared within the guidelines as set forth in the CCRFCD Hydrologic Criteria and Drainage Design Manual (Design Manual).

An appointment must be made to preview this checklist in conjunction with CCRFCD Standard Form 2 prior to the City accepting a new drainage study for review. The engineer must contact the Flood Control Section at (702) 229-6541 to schedule a submittal appointment.

If items are not applicable for the subject site, provide N/A.

I. GENERAL REQUIREMENT		
Yes	No	
-	N/A	A notarized letter from the adjacent property owner(s) allowing off-site grading. (A copy of the letter must be received prior to final acceptance of the drainage study.)
-	X	Copies of all conditions of approval for development related to this property. (e.g. zoning, use permit, tentative map, etc.) Verify compliance with conditions. **Tentative Map currently being processed.
X	-	An electronic copy of the complete submittal is required to be submitted with one original hard copy of the study. Electronic documents should be on a universal computer-readable digital output device replicating your submittal. An Indexed Portable Document Format (PDF) or Print Ready CAD file formats with a minimum of 300dpi are the desired formats. If figures are in color, they must be scanned in color and saved as a separate file. _____ by initial here, the engineer on record acknowledges that the electronic copy is an identical replicate of the original hard copy submitted to the City of Las Vegas.

II. GRADING PLAN INFORMATION		
Yes	No	
X	-	(1) 24" X 36" copy of the Grading Plan, (including all Detail Sheets) sealed by the engineer.
X	-	Proposed future and existing spot grades for top of curbs and street crowns at lot lines, grade breaks, and along curb returns on both sides of the street. Note: Proposed top of curb elevations must be provided for both sides of roadways even if only half street construction is required.
X	-	Label existing topography at a minimum 5 foot elevation interval including adjacent developments, finished floor elevations of existing buildings and top of existing curbs extending 100 feet* around the perimeter of the site. (*Measured from the centerline of the adjacent roadway.)

II. GRADING PLAN INFORMATION		
Yes	No	
X	-	Proposed on-site and off-site storm drains and other flood control facilities with plan and profile sheets for public storm drains showing the class of pipe, (Class III, IV, V, etc.), design hydraulic grade line, (HGL) and 100 year storm flow. A public drainage easement must be provided over on-site storm drains conveying off-site flows. An overflow path must be provided over all storm drains.
-	N/A	All existing and "to be constructed" walls with cross-sections showing wall type, (e.g. block wall, retaining wall, flood wall, etc.), with limits clearly defined, adjacent ground elevations. Wall heights must meet current ordinances and in no case exceed 14 feet above the adjacent property.
X	-	Street slopes for both interior and perimeter streets. Note: The minimum slope for a roadway is 0.4 percent, a minimum 18-inch storm drain must be provided where minimum slopes cannot be met.
-	N/A	Back of lot elevations and lot drainage pattern for all lots including common lots.
-	N/A	Sites with a grade difference two feet above or below existing ground are required to have approval from City of Las Vegas Current Planning. Current Planning approval is required prior to final approval of the drainage study.
-	N/A	On-site facilities must perpetuate flows through or around the site without significantly impacting adjacent property owners. (The project must pass flows through the site every 600 feet where the project is blocking flow paths.)
-	N/A	This project uses a solid grouted stem wall (or approved alternate) at the back of sidewalk to provide erosion protection for landscaped areas where the depth of flow in the roadway exceeds the back of walk elevation. A corresponding cross-section detail is included.
-	N/A	Commercial and Common Lot Landscape areas are not allowed to drain over the sidewalk. The grading plans show flow lines with grades and sidewalk under drains for all landscape areas draining to the public ROW.

III. Local Entity Criteria - City of Las Vegas – Manual Section 1600		
Yes	No	
-	N/A	Concrete valley gutters are required in parking lots with slopes less than 1 percent. Slopes through cul-de-sac must be at a 1 percent minimum where flow is drained through the cul-de-sac.
-	N/A	Ten-foot wide public drainage easements to be privately maintained are allowed for flow less than 20 cfs. The depth of flow entering the easement must be checked using the submerged weir calculation.
-	N/A	The limits of the flood zones and the base flood elevations (BFE) must be shown on all grading plans for all developments within a Special Flood Hazard Zone A, AO, AE, etc.
-	N/A	Minimum finish floor elevation is 6 inches above highest adjacent top of curb. Finish floor calculations must include allowances for super elevations on curves and velocity head for tee intersections.
-	N/A	Finished floor elevations for buildings adjacent to public drainage easements must be a minimum of 18 inches above the Q100 weir of submerged weir elevation, whichever is greater.

III. Local Entity Criteria - City of Las Vegas – Manual Section 1600		
Yes	No	
-	N/A	Lots with "B and C Type Drainage" that drain from one lot to another through a drainage easement shall be required to install an underground nuisance drainage system or a 2-foot valley gutter. 16" x 24" minimum block wall openings are required for both options.
-	N/A	Bubblers are required across 80 foot and greater ROW streets. When flows exceed 10 cfs, bubblers larger than 18 inches will be required up to a maximum of 36". Inlets must be sized to match the pipe size provided.

- Contact the Flood Control Section regarding the drainage study review fee. These fees are payable at the time of submittal.
- The Drainage Study must be conditionally approved prior to submitting improvement plans to the Civil and Planning Development of the Department of Building and Safety for review.

This document is intended as an **aid** in preparing Technical Drainage Studies for the City of Las Vegas. Each study submitted is reviewed for compliance with local and regional criteria. This form is not intended to be all-inclusive and does not limit the extent of the information, calculations or exhibits which may be necessary to properly evaluate the intended land use.

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- Approval Letter
- Ultimate Condition Drainage Map & HEC-1

Appendix F Reference Material
Technical Drainage Study for Skye Canyon Detention Basin 1, by Slater Hanifan Group
- Approval Letter
- Referenced Basins (HEC-1)
- Drainage Exhibits

Appendix G Reference Material
Technical Drainage Study for Skye Canyon Detention Basin 2, by Slater Hanifan Group
- Approval Letter
- Referenced Basins (HEC-1)
- Drainage Exhibits

Appendix H CD of Electronic Files, Grading Plan, Storm Drain Profiles and Detail Sheets

1 INTRODUCTION

1.1 Project Overview & Study Purpose

Ninety-Five Management, LLC is proposing to construct roadway and drainage infrastructure improvements for the Sheep Mountain Parkway corridor within the Skye Canyon Master Planned Community. The roadway construction will include a 32-foot wide paved access road and paved trail along approximately 5,600 linear feet of the Sheep Mountain Parkway alignment from Grand Teton Drive to Iron Mountain Road. The corridor addressed by this technical study is bounded by the existing Grand Teton Drive to the south, undeveloped desert shrub to the north and east, and two detention basins to the west. In ultimate conditions, the Skye Canyon Master Planned Community will be developed to the east, and the existing Iron Mountain Road alignment will be constructed at the northern extent of the study corridor. The overall Skye Canyon property boundary encompasses approximately 1,662 acres and spans both sides of U.S. Highway 95 within the corporate limits of the City of Las Vegas, Nevada.

The Skye Canyon property has been master planned and a *Master Drainage Study for Kyle Canyon (DS4420)* has been approved by the City of Las Vegas. In addition, four (4) updates to the master drainage study have been processed:

- Skye Canyon Master Drainage Study - Update #1 to Kyle Canyon Master Drainage Study addressed changes in land use plan for the Phase 1, Phase 2 and detention basin areas of the site and was approved by the City of Las Vegas on March 05, 2015.
- Skye Canyon Master Drainage Study - Update #2 addressed downstream drainage impacts resulting from the changes in land use plan for the Phase 1, Phase 2 and detention basin areas and was approved by the City of Las Vegas on November 23, 2015.
- Skye Canyon Master Drainage Study - Update #3 addressed changes in the land use plan, re-alignment of Sheep Mountain Parkway, introduction of the Kyle Canyon Interchange Project, and relocation of the Skye Canyon downstream MPU facility to Log Cabin Way. This study was approved by the City of Las Vegas on August 15, 2016.
- Skye Canyon Master Drainage Study - Update #4 addressed a change in the Skye Canyon downstream MPU facility alignment from Log Cabin Way to Moccasin Road. This study was conditionally approved by the City of Las Vegas on October 10, 2017.

The portion of the site identified as Sheep Mountain Parkway has been proposed within the framework set forth by the Master Drainage Study Updates. Therefore, it is the objective of this technical study to show conformance to the drainage patterns set forth in the Master Updates, specifically the Master Update #4.

Utilizing the conceptual analyses presented in the Master Update #4, this study provides a detailed hydrologic and hydraulic analysis for the proposed improvements. Drainage facilities have been proposed to protect the property from onsite and offsite runoff in accordance with local storm water criteria. Existing storm water facilities are identified, and this study intends to show conformance to each existing facility's design.

1.2 Description of Project

The project is located within Township 19 South, Range 59 East and Section 12, on APN 126-12-101-002. A location map identifying the site in relation to the surrounding major streets has been prepared as Exhibit A, included in Appendix A.

A vacation has been prepared for the right-of-way corridor for Sheep Mountain Parkway in two phases. The first phase has recorded and the second phase is currently being processed. The right-of-way linework from these documents is shown on the Sheep Mountain Parkway plans and is consistent with the corridor presented in the Skye Canyon Master Drainage Study (MDS.) Note that the roadway alignments and sections proposed with this project follow the currently approved land plan for the property as presented in the approved MDS.

The roadway and drainage improvements proposed by this study are those necessary for the proposed paved access road along the Sheep Mountain Parkway corridor. A future technical drainage study will follow to address the construction of Sheep Mountain Parkway in its ultimate condition, and is expected to follow drainage patterns that route storm runoff to the drainage infrastructure proposed by this study.

1.3 Summary of Prior Relevant Drainage Studies

Various drainage studies for the Skye Canyon master planned property with direct impact to the subject Sheep Mountain Parkway have been prepared. Some of the studies have been approved and different stages of reviews are on-going for others. The relevant drainage studies and their impacts to the Sheep Mountain Parkway improvements have been identified below.

- *Skye Canyon Master Drainage Study – Update #4*, prepared by Slater Hanifan Group was conditionally approved by the City of Las Vegas on October 10, 2017. This study addressed the developed condition hydrologic analysis of the Phase 3A area based on the most current master land use plan.

- *Technical Drainage Study for Skye Canyon Detention Basin 1 – Update #3,* prepared by Slater Hanifan Group was approved by the City of Las Vegas on January 12, 2017. This study addressed the upstream detention basin facility that provides flood protection to the southern portion of Skye Canyon and Sheep Mountain Parkway. Skye Canyon Detention Basin 1 was deemed substantially complete by City of Las Vegas on September 12, 2017. The Skye Canyon Detention Basin 1 outfall pipe construction extended across Sheep Mountain Parkway and included drop inlets designed to collected runoff from the roadway.

- *Technical Drainage Study for Skye Canyon Detention Basin 2 – Addendum #2*, prepared by Slater Hanifan Group was conditionally approved by the City of Las Vegas on January 11, 2018. This study addresses the upstream detention basin facility that provides flood protection to the northern portion of Skye Canyon and Sheep Mountain Parkway. The Detention Basin 2 outfall extends across Sheep Mountain Parkway in the Iron Mountain Road alignment.

1.4 FEMA Flood Zone Designation

The Sheep Mountain Parkway corridor boundary has been delineated on current FEMA FIRM Panel Map 32003C1750E, dated September 27, 2002, as Exhibit B included in Appendix A. Per the FIRM Panel, the project site is located within a FEMA designated unshaded Zone 'X' (unshaded). A Zone 'X' (unshaded) is described as areas located outside the 0.2% annual chance floodplain.

1.5 CCRFCD Facility Information

The project site has been delineated on the current 2013 Clark County Regional Flood Control District (CCRFCD) Las Vegas Valley Flood Control Master Plan Update (2013 MPU, Reference 1) facility figures as Exhibit C1, included in Appendix A. Per the 2013 MPU, several CCRFCD regional facility alignments cross Sheep Mountain Parkway. Although the 2013 CCRFCD MPU is the effective flood control master plan for the project area, a draft Skye Canyon MPA was coordinated and presented to CLV and CCRFCD (formal submittal is pending). MPA Facility Map (Exhibit C2) and MPA Facility Summary (Exhibit C3) are included in Appendix A. In general, the regional facility alignments crossing Sheep Mountain Parkway are the same between the 2013 MPU and the Skye Canyon MPA, with the exception of one facility. The 2013 MPU proposed three detention basins along the Puli Drive alignment from Grand Teton Drive to Iron Mountain Road. The MPA proposes interception and detention of flows from the same offsite watershed, but accomplishes this with two detention basins, instead of three. The subject study has designed for the two detention basin outfalls to cross the Sheep Mountain Parkway alignment, per the MPA. Flow rates for these facilities are referenced from the approved Skye Canyon Master Drainage Study (MDS.) The MDS follows the same concept as the MPA and is a conservative source for flow rates, given that it utilizes smaller subbasins and ignores losses from routing. For more information on ultimate condition hydrology, see MDS reference material in Appendix E. The following is a summary of the pertinent regional facility alignments, per the 2013 MPU, addressed by this study:

- MOHU 0184 – 30" RCP outlet. This facility was constructed with the Skye Canyon Detention Basin 1 project as a 60" RCP per the MDS. The facility was constructed across Sheep Mountain Parkway and includes existing field inlets.

- MOSR 0035 – Natural Wash. The reduction of proposed upstream detention basins in the MDS from three to two eliminated this detention basin outfall. This wash is no longer considered a regional facility.

- MOIR 0052 – 42" RCP. This facility will be constructed with the Skye Canyon Detention Basin 2 project as a 60" RCP per the MDS. The Detention Basin 2 project will be constructed prior to Sheep Mountain Parkway, and therefore will be an existing facility.

CCRFCD concurrence of this study will be obtained upon conditional approval from City of Las Vegas.

1.6 Referenced Documents

The following documents have been utilized as reference materials in preparation of this drainage study. The referenced documents have been reviewed and portions determined acceptable for reference have been included in the appropriate appendix. Slater Hanifan Group generally concurs with all referenced and adopted hydrologic and hydraulic analysis from the studies and the results established therein.

- *Skye Canyon Master Drainage Study - Update #4 to the Skye Canyon Master Drainage Study*, prepared by Slater Hanifan Group (hereinafter referred to as the Master Update Study; Reference 4), incorporates the most updated master land use plan for the site including Sheep Mountain Parkway. The Master Update Study established the developed ultimate condition peak flow rates for the subject study area and utilized the flows generated by each basin to conceptually evaluate the design of the proposed master planned drainage facilities. Relevant reference material from the Master Update Study has been included in Appendix E.

- *Technical Drainage Study for Skye Canyon Detention Basin 1,* prepared by Slater Hanifan Group (hereinafter referred to as the DB1 Study; Reference 5), proposed the development of the upstream southern detention basin. Drainage basins from the study have been referenced to account for flow impacting the Sheep Mountain Parkway Study. Relevant reference material from the DB1 Study has been included in Appendix F.

- *Technical Drainage Study for Skye Canyon Detention Basin 2,* prepared by Slater Hanifan Group (hereinafter referred to as the DB2 Study; Reference 6), proposed the development of the upstream northern detention basin. Drainage basins from the study have been referenced to account for flow impacting the Sheep Mountain Parkway Study. Relevant reference material from the DB2 Study has been included in Appendix G.

2 METHODOLOGY

2.1 Compliance

The methodologies utilized in the preparation of this study are in compliance with the Clark County Regional Flood Control District's Hydrologic Criteria and Drainage Design Manual (CCRFCD Manual, Reference 2).

2.2 Hydrologic Modeling

Modeling: The SCS Unit Hydrograph Method (SCS Method) was utilized to determine peak flow rates. The SCS Method utilizes precipitation, drainage area, curve number and lag time parameters to determine peak flow rates. The SCS Method routine within the U.S. Army Corp of Engineers HEC-1 Flood Hydrograph Package program was utilized to model the drainage basins analyzed by this study.

Precipitation: The site is located outside of the McCarran Rainfall Area. The precipitation values utilized in this study's HEC-1 models have been analyzed to be 3.00 and 1.61 inches for the 100-year and 10-year storm event, respectively.

Curve Number: The SCS curve number loss rate methodology was utilized to approximate infiltration for the drainage basins. The soils information within the watershed was obtained from the NRCS Natural Resources Conservation Service of the Las Vegas Valley Area, Nevada, Part of Clark County (Soil Survey, Reference 3), this study's drainage basins lie within the following soil types delineated on Exhibit D – included in Appendix A.

- Soil 155 – Cave gravelly fine sandy loam, 4 to 15 percent slopes. This soil is composed of 100% HSG 'D'.
- Soil 191 – Dalian very cobbly fine sandy loam, 2 to 8 percent slopes. This soil is composed of 100% HSG 'A'.
- Soil 400 – Tencee very gravelly fine sandy loam, 2 to 8 percent slopes. This soil is composed of 100% HSG 'D'.

A composite curve number for each land use utilized in this study's hydrologic analysis has been obtained utilizing the percentages identified above, and the computations are included in Appendix B.

Note the following regarding the land uses analyzed in this study, and the associated CCRFCD Manual curve number tables have been included in Appendix B.

- Undeveloped areas have been analyzed with a land use corresponding to "desert shrub – poor condition".

- The proposed infrastructure access roadway has been analyzed with a land use corresponding to "roadway".

Lag Time: The lag time is defined as the time measured from the center of mass of excess rainfall to the time to peak of the outflow hydrograph. The lag time is related to the time of concentration as 0.6 times the time of concentration. The time of concentration is defined as the time required for runoff to flow from the hydraulically most distant point of a basin to the outlet point of the basin. Standard Form 4, as outlined in the CCRFCD Manual, was utilized to determine the lag times for basins modeled. The lag time computations have been included in Appendix B.

2.3 Hydraulic Modeling & Criteria

Street Flow: Per the CCRFCD Manual, street flow criteria must be met for proposed roadways. These criteria include depth times velocity (D x V), dry lane, and maximum depth criteria. The current Sheep Mountain Parkway proposed improvements are elevated above surrounding ground and do not include any curb/gutter or concrete barrier rail. Onsite drainage will sheet flow off the roadway and down the embankment. Therefore, no runoff will be concentrated or conveyed in roadway and all street flow criteria is met.

Ditch Flow: The proposed Sheep Mountain Parkway improvements include the roadway section and a separate pedestrian trail on the west side of the roadway. Offsite flows from the west will be collected in a proposed ditch on the west side of the trail. Onsite runoff

between the trail and the roadway will be collected by a ditch between the trail and roadway. Onsite runoff draining east from the roadway section will drain down the roadway embankment and sheet flow east. Ditch flows have been analyzed utilizing the Flowmaster Version 8.0 software by Bentley. All ditches have been sized to convey the 100-Year flow and maintain velocities of approximately 5 fps or less to minimize erosion potential.

Drop Inlets: Drop inlets have been assessed using an in-house computation spreadsheet which utilizes the equations outlined in Section 805 of the CCRFCD Manual. The computations include a 50% clogging factor in determining the inlet sizes.

Storm Drains: The hydraulic analysis for the proposed storm drain has been performed utilizing the Water Surface and Pressure Gradient (WSPG) Hydraulic Analysis System software by the Los Angeles County Department of Public Works. As outlined in the CCRFCD Manual, storm drain facilities are designed to maintain its hydraulic gradient line (HGL) minimum 1-ft below above finished grade and limit the flow velocities in the facility to less than 25 ft/s.

3 EXISTING DRAINAGE CONDITION

3.1 Discussion of Existing Condition

The existing condition for Sheep Mountain Parkway includes two upstream detention basins in place (Skye Canyon Detention Basin 1 and 2.) These facilities cut off large offsite flows and reduce flow rates passing through the Sheep Mountain Parkway alignment. Due to this reduction in upstream flow, the controlling condition for discharging flow from the site is the Skye Canyon Master Drainage Study (MDS.) The MDS takes these upstream facilities into account and provides for the associated planned downstream flow patterns. Relevant reference material from the Master Update Study is included in Appendix E. The Sheep Mountain Parkway project is not proposing infrastructure for development of parcels, and therefore large increases in runoff from proposed improvements are not anticipated. Due to these factors, the MDS is considered the document to reference for matching planned downstream flow patterns.

4 PROPOSED DRAINAGE CONDITION

4.1 Definition of Proposed Condition

The proposed condition is defined as the proposed roadway and infrastructure improvements inclusive of ditch grading constructed on parcels, prior to the development of the future residential subdivisions. Interim ditch grading has been designed to route runoff and protect the roadway and pedestrian trail. Ditch conveyance is designed to follow ultimate flow patterns per the approved Skye Canyon Master Drainage Study (MDS.)

4.2 Discussion of Proposed Condition

Refer to Exhibit E, included in Appendix A, for a detailed illustration of the proposed condition drainage patterns.

Two Skye Canyon detention basins west of Sheep Mountain Parkway are considered as existing for this project and intercept offsite flows upstream of the Puli Drive alignment. Detention Basin 1 is constructed and currently functioning. Detention Basin 2 is in design and will be constructed prior to construction of Sheep Mountain Parkway. The outfalls from these basins cross Sheep Mountain Parkway at a point approximately 2000-ft north of Grand Teton Drive and at Iron Mountain Road. Offsite runoff impacting the project comes from the area between the detention basins and Sheep Mountain Parkway and is conveyed along the west side of the project in proposed ditches. The facilities proposed to convey flow through the site are discussed in greater detail in Section 3.4.

4.3 Summary of Proposed Condition Flows

A summary of all proposed condition flow rates determined by the HEC-1 analysis, as well as the concentrated flows at critical locations have been provided on the Proposed Condition Drainage Map (Exhibit E) in Appendix A. The applicable HEC-1 analysis is provided in Appendix C.

A comparison of flow rates at downstream discharge points is provided in the following table:

Table 1: Flow Comparison of Concentration Points
Proposed vs Ultimate Condition

Location	Conc. Point ID	Proposed Condition Q_{100} (cfs)	Conc. Point ID	Ultimate Condition Q_{100} (cfs)
Detention Basin 1 Outfall	CPSMPS	80	WC19	94
Ex. Wash near Brent Lane Alignment	CPSMPC	118	WC28	113
Offsite Ditch Flow at Iron Mt Rd	XOF1	60	WL1A	81
Detention Basin 2 Outfall	CPSMPN	124	WC39	157

Review of Table 1 above indicates that the proposed condition flows are lower than the ultimate condition at the detention basin outfalls. Therefore, the proposed discharge of flows from Sheep Mountain Parkway will not adversely impact those existing facilities. The proposed condition flow at the existing wash near the Brent Lane alignment is slightly higher than the ultimate condition. Therefore, the proposed condition flow has been used for hydraulic analysis of the proposed culvert at this location.

4.4 Summary of Drainage Facilities – Proposed Condition

Refer to Sheep Mountain Parkway plans for locations and sizes of all proposed drainage facilities designed to be utilized during the proposed condition. The following discussion summarizes the design considerations for each storm drain facility proposed by this study.

Skye Canyon Detention Basin 1 Outfall (60" RCP): The 60" RCP outfall constructed with Detention Basin 1 was constructed concurrently with a portion of the Sheep Mountain

Parkway embankment mass grading. The construction included drop inlets west of the pedestrian trail, between the trail and roadway, and at the toe of the east roadway embankment. The drop inlet west of the pedestrian trail is proposed to be relocated further away from the trail to provide room for grading. The ponding elevation (see Appendix D) required to intercept flows necessitates the drop inlets be located below the elevation of the trail, and pedestrian safety requires additional horizontal spacing to provide a safe slope from the trail down to the drop inlet. The original hydraulic analysis for these facilities still controls as the proposed condition flow rates are less than the ultimate condition, see Table 1 for flow comparison, and Appendix F for Detention Basin 1 reference material.

Station "SMP" 216+60 - 48" RCP Culvert: The Skye Canyon Master Drainage Study (MDS) proposed a 100-Year culvert crossing of Sheep Mountain Parkway at this existing wash. Due to the depth of the existing wash, flow conveyed along the pedestrian trail from the south reaches this location at an elevation approximately 11-ft above the culvert invert. Erosion and high velocities were a concern in providing for this flow to be conveyed down the slope to the culvert invert. Also, west side ditches are interim solutions until development of adjacent parcels occurs. Due to these factors, a 54" corrugated metal pipe is proposed to convey flow from the top of slope down to the 48" RCP invert. In addition to being cost-effective for interim use, the CMP pipe also helps minimize velocity due to the corrugations in the pipe. The pipe is proposed to discharge onto a concrete pad with 3-ft cutoff wall at the 48" RCP culvert upstream end. Culvert hydraulics are modeled using HY-8, see Appendix D. Outlet erosion protection analysis for the 48" RCP is also included in Appendix D.

Skye Canyon Detention Basin 2 Outfall (60" RCP): The Skye Canyon Detention Basin 2 project is constructing a 60" RCP outfall pipe through the Sheep Mountain Parkway alignment. The outfall facility will include a 42" RCP stub approximately in line with the proposed Sheep Mountain Parkway pedestrian trail. This stub was designed for a flow rate of 81 cfs, per the MDS. In the proposed condition, the offsite ditch west of the trail and the onsite ditch between the trail and roadway are both conveyed to this stub. This combined flow of 69 cfs (60 cfs offsite + 9 cfs onsite) is less than the ultimate condition and does not adversely impact existing facility hydraulics. An inlet control nomograph calculation for the 42" RCP stub is included in Appendix D.

Offsite Ditch: A ditch is proposed along the west side of the proposed pedestrian trail to protect proposed improvements from offsite flows. The ditch conveys flow north and is discharged east at three locations: the DB1 outfall, the existing wash at Station "SMP" 216+60, and the DB2 outfall. These discharge points to the east match the flow patterns proposed with the MDS. With the exception of a short reach upstream of the Station "SMP" 216+60 culvert, the majority of offsite ditch has been designed at a slope and width that minimizes flow velocity and enables an earthen lining. See Exhibit E in Appendix A for section locations, and Appendix D for ditch hydraulic summary and supporting calculations. For the reach requiring riprap lining, sizing calculations are included in Appendix D. Future improvements to upstream parcels will likely collect runoff within streets and convey it to the appropriate crossing facility in a storm drain pipe, reducing or eliminating the need for an offsite ditch.

Onsite Ditch: An onsite ditch is proposed between the pedestrian trail and the roadway to convey onsite flows. At the DB1 outfall and 48" RCP culvert crossing locations, the onsite ditch flow is collected by drop inlets, see calculations in Appendix D. At the DB2 outfall, the

proposed pedestrian trail ends and the onsite ditch is graded around to combine in with the offsite ditch.

Access Road: An access road is proposed at the toe of embankment slope on the east side of the proposed roadway. This access road is sloped back toward the roadway and will convey nuisance water north in the proposed condition. The capacity of the access road to convey flow in the proposed condition is minimal, and larger runoff flow rates will sheet flow east similar to existing conditions. When parcels adjacent to the east side of Sheep Mountain Parkway are developed, runoff from Sheep Mountain Parkway will be required to match the flow patterns proposed in the MDS, conveying flow north along Sheep Mountain Parkway to the appropriate discharge point to the east (DB1 outfall, Wash on Brent Ln alignment, or DB2 outfall.) It is proposed with this study that future development follow these required flow patterns by increasing the capacity of the access road to convey flow by providing a block wall at the right-of-way boundary and grouting courses as necessary.

5 ULTIMATE DRAINAGE CONDITION

5.1 Discussion of Ultimate Condition

The ultimate condition for Sheep Mountain Parkway is referenced from the Skye Canyon Master Drainage Study (MDS.) Relevant reference material from the Master Update Study is included in Appendix E.

6 CONCLUSIONS & RECOMMENDATIONS

1. This project is in compliance with the applicable drainage laws as recognized by the state of Nevada. This project is in compliance with the CCRFCD "*Hydrologic Criteria and Drainage Design Manual*" (Reference 1).

2. This project is in compliance with the proposed Skye Canyon amendment to the CCRFCD "Master Plan Update." Existing regional facilities cross Sheep Mountain Parkway in the alignments of the Skye Canyon Detention Basin 1 outfall, and Skye Canyon Detention Basin 2 outfall.

3. The project site is not located within a FEMA designated Special Flood Hazard Area (SFHA). The site and the proposed improvements are located within a FEMA flood Zone "X" (unshaded). Therefore, FEMA notification will not be required.

4. The design of this project and the proposed drainage patterns are in compliance with the approved Master Drainage Study Update. The storm flows discharging from Sheep Mountain Parkway are in conformance with the master planned drainage patterns. Therefore, there are no adverse impacts to downstream property and facilities as a result of the proposed improvements.

5. Storm drain infrastructure required for the protection of Sheep Mountain Parkway from onsite and offsite runoff is generally in conformance to the conceptual master plan established in the Master Update Study. The drainage facilities are designed to control

and convey onsite and offsite runoff from the 100-year storm event safely through the site and perpetuate flow in accordance to the master plan.

6. The design of Sheep Mountain Parkway has been planned in such a way that flows from the site are generally kept away from the roadway. The proposed roadway is elevated above natural ground, and no curb, gutter or barrier rail is proposed. Due to these factors, no flow is conveyed within the proposed roadway, and street flow criteria is satisfied as stipulated in the CCRFCD HCDDM.

7. No buildings, finished floors and/or pad elevations are being proposed with this project. Future individual Technical Drainage Studies for the respective residential subdivisions will be provided to support compliance with finished floor requirements of any proposed building pads.

8. The grading plan, storm drain profile and detail sheets for this project have been included with this study in Appendix H. These plans support the drainage patterns and conclusions detailed in this study.

7 REFERENCES

1. *Las Vegas Valley Flood Control Master Plan Update*. Clark County Regional Flood Control District, 2013.

2. *Hydrologic Criteria and Drainage Design Manual.* Clark County Regional Flood Control District, 1999.

3. *Soil Survey of Las Vegas Valley Area, Nevada. U.S. Department of Agriculture, Natural Resources Conservation Service, August 2016.*

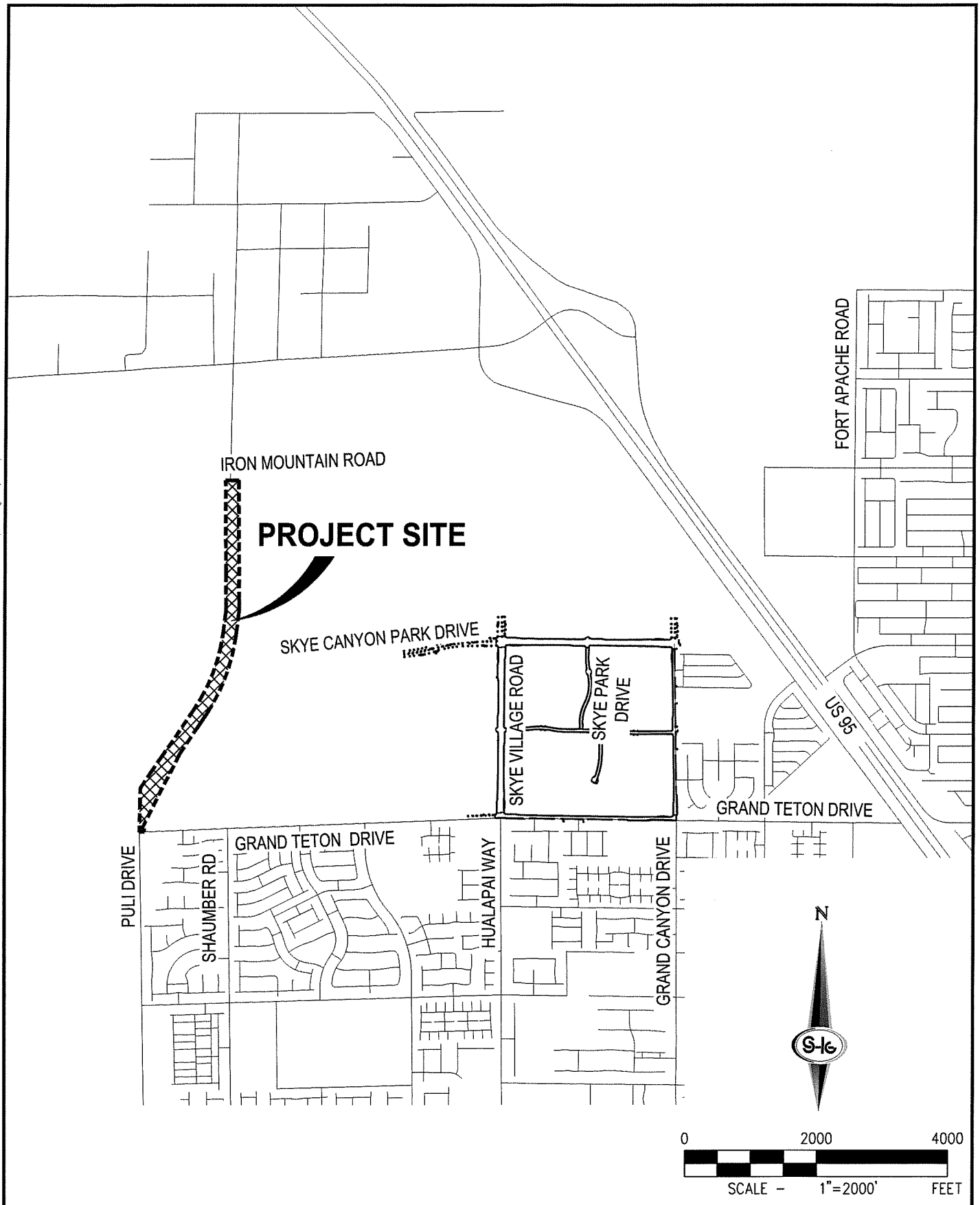
4. *Skye Canyon Master Drainage Study – Update #4 to the Kyle Canyon Master Drainage Study;* Slater Hanifan Group, October 2017.

5. *Technical Drainage Study for Detention Basin 1;* Slater Hanifan Group, January 2017.

6. *Technical Drainage Study for Skye Canyon Detention Basin 2;* Slater Hanifan Group.

APPENDIX A

Drainage Exhibits



j:\oly1720.000 sheep mountain parkway access road\drainage\technical study\figures\oly1720 tds exhibit a location map.dwg 1/23/2018 9:00 AM Nick Stafford

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

NINETY-FIVE MANAGEMENT, LLC.

SKYE CANYON SHEEP MOUNTAIN PARKWAY
LOCATION MAP

DATE: JAN 2018	PROJECT NO. OLY1720.000
DRAFTER: NAS	
DESIGNER: NAS	EXHIBIT A
CHECKED: LKL	SHEET 1 OF 1

j:\oly1720.000 sheep mountain parkway access road\drainage\technical study\figures\oly1720 tds exhibit b firm map.dwg 1/23/2018 9:22 AM Nick Stafford

TOWNSHIP 19 SOUTH, RANGE 60 EAST.

ZONE X

35

36

31

32

CLARK COUNTY UNINCORPORATED AREAS 320003

GR1156

T18S
T19S

95

5

MATCHLINE

CLARK COUNTY
CITY OF LAS VEGAS

CORPORATE LIMITS

CITY OF LAS VEGAS 325276

6

5

GR1155

JAMES

PLACE

LONE

ROAD

2

1

39

ROAD

CANYON

CITY OF LAS VEGAS
CLARK COUNTY

CLARK COUNTY UNINCORPORATED AREAS 320003

ZONE X

CORPORATE LIMITS

HOMESTEAD

6

SHEEP MOUNTAIN PARKWAY

7

8

NORTH FORT APACHE ROAD

HORSE

DRIVE

MATCHLINE

MEGENHEIMER AVENUE

RACEL STREET

ACKERMAN AVENUE

11

12

CORPORATE LIMITS

CITY OF LAS VEGAS 325276

GRAND TETON DRIVE

JO MARCY DRIVE

14

Detention Basin

ZONE A

ZONE X

13

18

17

DURANGO DRIVE

OSO BLANCA ROAD

TULE SPRINGS ROAD

JENSEN STREET

SOLAR AVENUE

THIS AREA

N

0 2000 4000

SCALE – 1"=2000' FEET

NFIP	PANEL 1735 E
NFIP	PANEL 1745 E
NFIP	PANEL 1750 E

FIRM
FLOOD INSURANCE RATE MAP
CLARK COUNTY, NEVADA AND INCORPORATED AREAS

PANEL 1750 OF 4090

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
LAS VEGAS, CITY OF	325276	1750	E
CLARK COUNTY UNINCORPORATED AREAS	320003	1750	E

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

MAP NUMBER 32003C1750 E

MAP REVISED: SEPTEMBER 27, 2002

Federal Emergency Management Agency

SLATER HANIFAN GROUP
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT, LLC.

SKYE CANYON - SHEEP MOUNTAIN PARKWAY

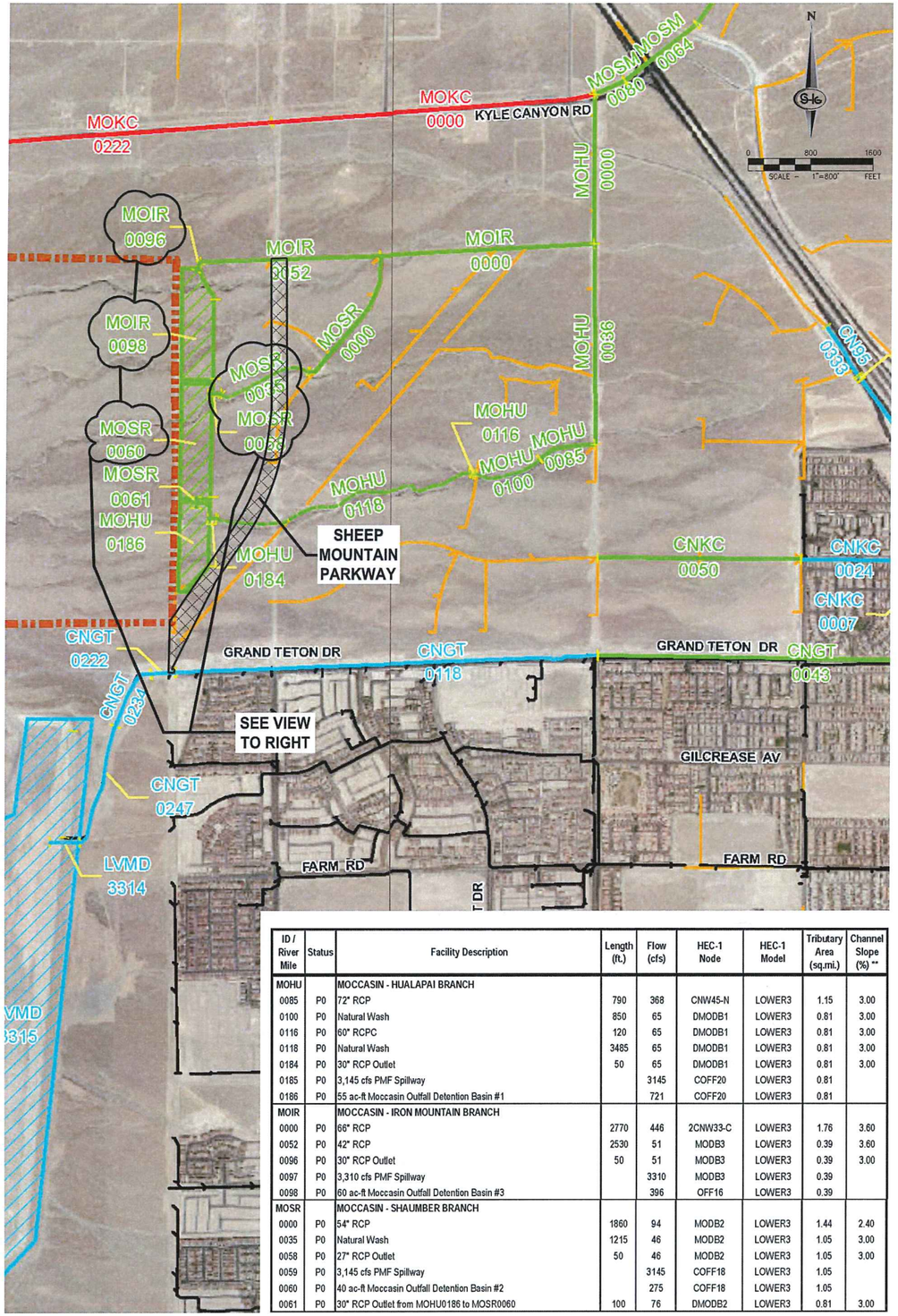
FEMA FIRM MAP

DATE:	JAN 2018
DRAFTER:	NAS
DESIGNER:	NAS
CHECKED:	LKL
PROJECT NO.	OLY1720.000

EXHIBIT B

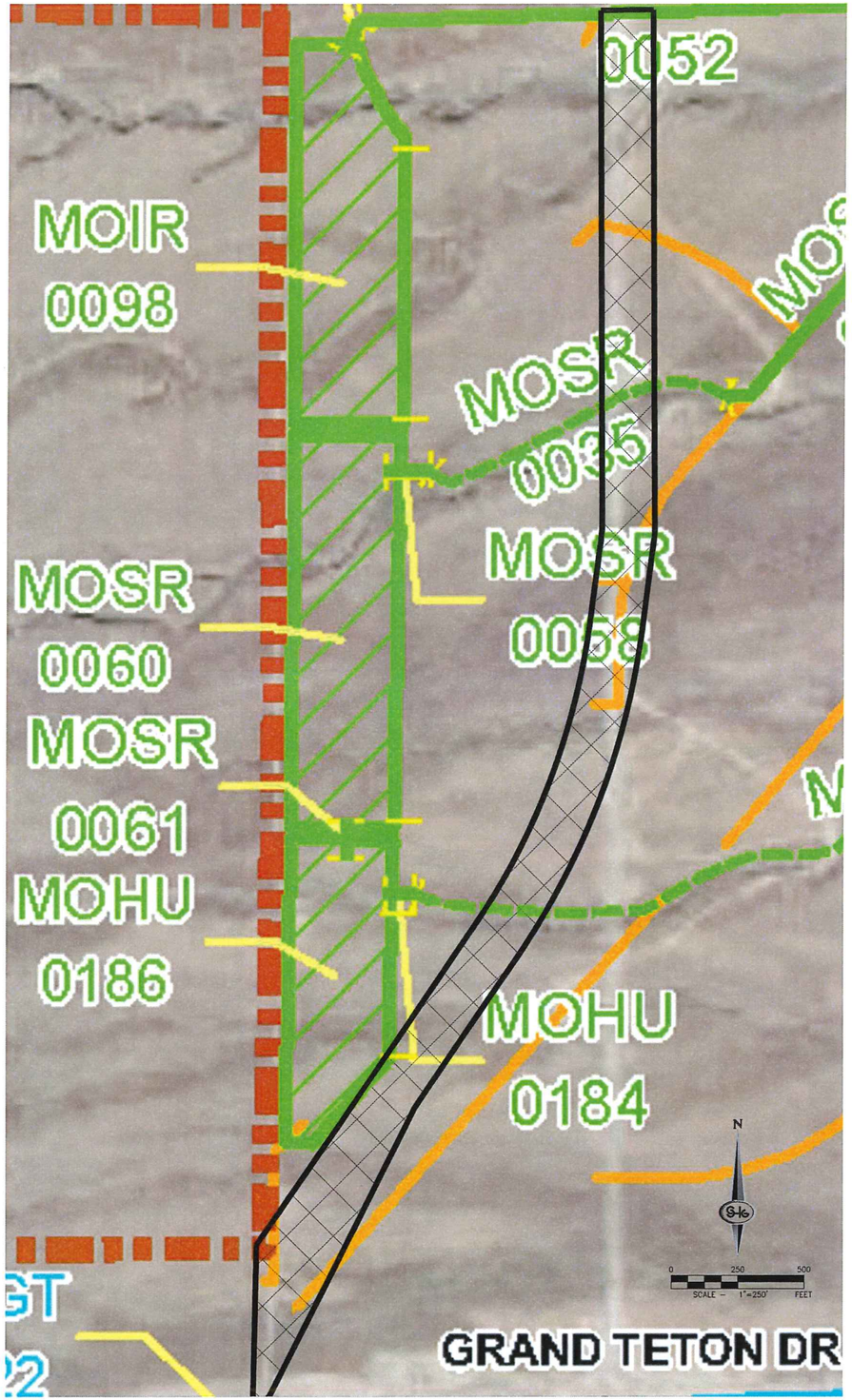
SHEET 1 OF 1

2013 MPU FACILITIES MAP



ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
MOHU		MOCCASIN - HUALAPAI BRANCH						
0085	P0	72" RCP	790	368	CNW45-N	LOWER3	1.15	3.00
0100	P0	Natural Wash	850	65	DMODB1	LOWER3	0.81	3.00
0116	P0	60" RCPC	120	65	DMODB1	LOWER3	0.81	3.00
0118	P0	Natural Wash	3485	65	DMODB1	LOWER3	0.81	3.00
0184	P0	30" RCP Outlet	50	65	DMODB1	LOWER3	0.81	3.00
0185	P0	3,145 cfs PMF Spillway		3145	COFF20	LOWER3	0.81	
0186	P0	55 ac-ft Moccasin Outfall Detention Basin #1		721	COFF20	LOWER3	0.81	
MOIR		MOCCASIN - IRON MOUNTAIN BRANCH						
0000	P0	66" RCP	2770	446	2CNW33-C	LOWER3	1.76	3.60
0052	P0	42" RCP	2530	51	MODB3	LOWER3	0.39	3.60
0096	P0	30" RCP Outlet	50	51	MODB3	LOWER3	0.39	3.00
0097	P0	3,310 cfs PMF Spillway		3310	MODB3	LOWER3	0.39	
0098	P0	60 ac-ft Moccasin Outfall Detention Basin #3		396	OFF16	LOWER3	0.39	
MOSR		MOCCASIN - SHAUMBER BRANCH						
0000	P0	54" RCP	1860	94	MODB2	LOWER3	1.44	2.40
0035	P0	Natural Wash	1215	46	MODB2	LOWER3	1.05	3.00
0058	P0	27" RCP Outlet	50	46	MODB2	LOWER3	1.05	3.00
0059	P0	3,145 cfs PMF Spillway		3145	COFF18	LOWER3	1.05	
0060	P0	40 ac-ft Moccasin Outfall Detention Basin #2		275	COFF18	LOWER3	1.05	
0061	P0	30" RCP Outlet from MOHU0186 to MOSR0060	100	76	DMODB2	LOWER3	0.81	3.00

PROPOSED ALIGNMENT OVER FACILITIES



REGIONAL FLOOD CONTROL DISTRICT

2013
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE F- 12
FLOOD CONTROL FACILITIES

LEGEND

- Ultimate Development Boundary
- Existing Facilities
- Category A Proposed Facilities
- Category B Proposed Facilities
- Local Existing Facilities
- Local Proposed Facilities
- Stormdrain
- Lined Channel
- Unlined Channel
- Levee/Dike
- Natural Wash/Floodway
- ID-Mile Separator

Remove & Replace/Parallel Facilities

Category A	Category B
Channel	Channel
Stormdrain	Stormdrain

LEGEND	
	OLD PROPOSED BASIN BOUNDRY
	NEW PROPOSED BASIN BOUNDRY
	OVERLAPPING AREA

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT, LLC.

SKYE CANYON - SHEEP MOUNTAIN PARKWAY
CCRFCD 2013 MPU FACILITIES MAP

DATE: JAN 2018
DRAFTER: NAS
DESIGNER: NAS
CHECKED: LKL

PROJECT NO.
OLY1720.000

EXHIBIT C1
SHEET 1 OF 1

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j:\oly1720.000 sheep mountain parkway access road\drainage\technical study\figures\oly1720 tds exhibit c ccrfcd 2013 mpu facilities map.dwg 2/7/2018 2:01 PM Lant Leavitt

MOCCASIN RD

KYLE CANYON RD

GRAND TETON DR

GILCREASE AV

FARM RD

SEVERENCE LA

LOG CABIN WY

IRON MOUNTAIN RD

SKYE CANYON PARK DR

EL CAPITAN WY

DURANGO DR

95

PROJECT SITE

OVERALL SKYE CANYON BOUNDARY

OVERALL SKYE CANYON BOUNDARY

LVMO 0396 | LVMO 0346 | LVMO 0280 | LVMO 0276 | LVMO 0226 | LVMO 0184 | LVMO 0144 | LVMO 0000

MORC 0000

MOLC 0072 | MOLC 0149 | MOLC 0157

MOKC 0166 | MOKC 0116 | MOKC 0000 | MOKC 0173

MOIR 0096 | MOIR 0098 | MOIR 0000 | MOIR 0099

MOHU 0179 | MOHU 0180 | MOHU 0191 | MOHU 0167 | MOHU 0111 | MOHU 0095 | MOHU 0116 | MOHU 0151 | MOHU 0160 | MOHU 0076 | MOHU 0026

CNGT 0118 | CNGT 0222 | CNGT 0224 | CNGT 0247 | CNGT 0043 | CNGT 0000

CNKC 0024 | CNKC 0007 | CNKC 0000 | CNKC 0030

CN95 0333 | CN95 0318 | CN95 0313 | CN95 0250 | CN95 0257 | CN95 0218 | CN95 0199 | CN95 0167 | CN95 0102

BRDB 0157 | BRDB 0107

RACO 0064

LVMD 3314

REGIONAL FLOOD CONTROL DISTRICT

2017
SKYE CANYON AMENDMENT TO
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE F-
FLOOD CONTROL FACILITIES

LEGEND

- Facility Revised by Amendment
- Ultimate Development Boundary
- Existing Facilities
- Category A Proposed Facilities
- Category B Proposed Facilities
- Local Existing Facilities
- Local Proposed Facilities
- Detention Basin
- Stormdrain
- Lined Channel
- Unlined Channel
- Levee/Dike
- Natural Wash/Floodway
- ID-Mile Separator

Remove & Replace/Parallel Facilities

Category A	Category B
Channel	Channel
Stormdrain	Stormdrain

N

0 1,000 2,000 4,000 6,000
Feet

Scale: 1 inch = 2,000 feet

US95 | I-15 | I-215

SLATER HANIFAN GROUP

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT, LLC.

SKYE CANYON - SHEEP MOUNTAIN PARKWAY
CCRFCD MPU AMENDMENT FACILITIES MAP

DATE:	JANUARY 2018
DRAFTER:	ETM
DESIGNER:	ETM
CHECKED:	LKL
PROJECT NO.	OLY1609.000

EXHIBIT C2
SHEET 2 OF 3

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
BCHU		**BELTWAY CHANNEL - HUALAPAI**						
0000	E	12' X 5' RCAP	653	501	CBA3-C	WEST3	0.84	1.11
0017	E	8' X 5' RCAP	1216	501	CBA3-C	WEST3	0.84	1.33
0040	E	66" RCP	60	222	DNW26-C	WEST3	0.51	1.04
0042	E	60" RCP	615	222	DNW26-C	WEST3	0.51	1.42
0054	E	54" RCP	770	222	DNW26-C	WEST3	0.51	1.23
BRDB		**BRENT DRAINAGE SYSTEM**						
0000	E	36" RCP with 18" Orifice Plate	2170	37	BRDB	WEST3	2.48	0.40
0031	E	45,080 cfs PMF Spillway		45080	CBRDB	WEST3	2.48	
0032	E	450 ac-ft South Environmental Enhancement Area		1902	CBRDB	WEST3	2.48	
0033	E	Energy Dissipator	100	922	CNW113-C	WEST3	1.47	
0043	P1	8' X 7' RCB	2920	922	CNW113-C	WEST3	1.47	2.10
0107	P1	8' X 7' RCB	2660	922	CNW113-C	WEST3	1.47	2.40
0157	P1	12' X 7' RCB	1260	609	CNW96-C	WEST3	0.84	0.25
CN95		**CENTENNIAL PKWY CHANNEL WEST / U.S 95 BRANCH**						
0000	P1	Conc Chnl 22'W 10'D 0:1 SS	2990	3340	CNW8B3-C	WEST3	3.36	2.17
0068	P1	3: 8' X 7' RCB	3380	3216	CNW103-C	WEST3	3.05	2.12
0102	P1	3: 8' X 6' RCB	1710	2663	2CNW89-C	WEST3	2.63	2.09
0167	P1	2: 10' X 6' RCB	1580	1867	2CNW71-E	WEST3	1.61	1.50
0199	E	2: 10' X 6' RCB	320	1313	2CNW72-C	WEST3	1.13	0.82
0218	E	15' X 9' RCB	1127	1313	2CNW72-C	WEST3	1.13	0.82
0257	E	Transition Structure	59	1313	2CNW72-C	WEST3	1.13	0.77
0259	E	15' X 9' RCB	290	524	CNW74-C	WEST3	0.40	0.77
0313	E	10' X 6' RCB	2680	524	CNW74-C	WEST3	0.40	2.50
0318	E	Transition Structure	60	524	CNW74-C	WEST3	0.40	1.50
0333	E	5' X 5' RCB	670	265	NW62-S	WEST3	0.16	1.60
CNGT		**CENTENNIAL PKWY CHANNEL WEST / GRAND TETON BRANCH**						
0000	E	10' X 5' RCB	2376	600	CNW71-E	WEST3	0.47	2.58
0043	P0	6' X 6' RCB	3980	600	CNW71-E	WEST3	0.47	3.00
0118	E	6' X 5' RCAP	5472	363	KYLEDET*	KYLEDB	57.73	3.72
CNKC		**CENTENNIAL PKWY CHANNEL WEST / KYLE CANYON BRANCH**						
0000	E	12' X 4' RCB	377	999	CNW72-C	WEST3	0.71	4.58
0007	E	10' X 5' RCB	874	999	CNW72-C	WEST3	0.71	3.28
0024	E	8' X 5' RCB	1385	999	CNW72-C	WEST3	0.71	2.40
0050	E	72" RCP	388	2795	NW45-S	WEST3	0.31	3.60
CNWE		**CENTENNIAL PKWY CHANNEL WEST**						
0150	E	Conc Chnl 40'W 9.5'D 0:1 SS	2279	4233	CNW3B3-C	WEST3	5.64	0.42
0173	E	3: 18' X 8' RCBC @ Torrey Pines	200	4233	CNW3B3-C	WEST3	5.64	0.42
0176	E	Conc Chnl 40'W 9'D 0:1 SS	150	4233	CNW3B3-C	WEST3	5.64	0.41
0189	E	Conc Chnl 35'W 10'D 0:1 SS	1200	4067	CNW2D4-C	WEST3	5.15	0.42
0200	E	Conc Chnl 36'W 9'D 0:1 SS	2470	4067	CNW2D4-C	WEST3	5.15	1.00
0226	E	2: 18' X 8.5' RCBC @ Rio Vista	100	4067	CNW2D4-C	WEST3	5.15	0.51
0241	E	Conc Chnl 35'W 9.5'D 0:1 SS	405	3951	CNW2D3-C	WEST3	4.65	0.51
0251	E	Conc Chnl 35'W 9'D 0:1 SS	575	3951	CNW2D3-C	WEST3	4.65	0.51
0271	E	Conc Chnl 32'W 10'D 0:1 SS	229	3951	CNW2D3-C	WEST3	4.65	0.51
0274	E	32' X 10' RCBC @ Tansya	142	3951	CNW2D3-C	WEST3	4.65	0.51
0277	E	Conc Chnl 32'W 9'D 0:1 SS	578	3951	CNW2D3-C	WEST3	4.65	0.64
0287	E	Conc Chnl 13'W 10'D 2:1 SS	605	3593	CNW2B2-C	WEST3	3.84	1.19
0301	P2	Conc Chnl 32'W 10'D 0:1 SS	235	3593	CNW2B2-C	WEST3	3.84	1.19
0304	P2	32' X 10' RCB	3269	3593	CNW2B2-C	WEST3	3.84	1.79
0314	E	22' X 7' RCB	785	3593	CNW2B2-C	WEST3	3.84	1.79
0325	P1	32' X 10' RCB	2280	3593	CNW2B2-C	WEST3	3.84	1.75
EKBU		**ELKHORN SPRINGS AND BUFFALO**						
0000	E	60" RCP	1046	375	NW134-C	WEST3	0.46	1.00
EKDB		**ELKHORN SPRINGS DETENTION BASIN**						
0000	E	Grass Chnl 15'W 5.8'D 3.5:1 SS	2575	238	CNW150-C	WEST3	1.41	0.39
0025	E	4' X 3' RCB	160	120	ELKBASIN	WEST3	0.84	0.50
0026	E	48" RCP	1270	120	ELKBASIN	WEST3	0.84	1.23
0049	E	60" RCP	1095	120	ELKBASIN	WEST3	0.84	0.13
0070	E	48 ac-ft Elkhorn Springs Detention Basin		629	CNW133-C	WEST3	0.84	

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
EKHU		**ELKHORN AND HUALAPAI**						
0000	E	6' X 5' RCB Overflow Structure	48	638	CNW26-C	WEST3	0.51	0.91
0001	E	6' X 5' RCAP	72	638	CNW26-C	WEST3	0.51	0.91
0003	E	6' X 4' RCAP	980	638	CNW26-C	WEST3	0.51	3.61
0020	E	6' X 5' RCAP	150	638	CNW26-C	WEST3	0.51	3.61
0023	E	6' X 5' RCAP	1200	638	CNW26-C	WEST3	0.51	0.90
GOEC		**GOWAN NORTH - EL CAPITAN BRANCH**						
0176	P1	78" RCP	1320	383	CCPFR-C	ALLGOW3	0.46	1.15
GONO		**GOWAN NORTH SYSTEM**						
0511	P1	7' X 6' RCB	1320	546	CCPHW-C	ALLGOW3	0.60	1.14
LVMD		**LAS VEGAS WASH - MIDDLE**						
2490	E	2: 13' X 7' RCB	2555	2276	CNW168-C	CWEST3	4.69	0.40
2507	E	2: 13' X 9' RCB	2831	2276	CNW168-C	CWEST3	4.69	0.36
2525	E	24' X 8' RCB	1140	1913	CNW159-C	CWEST3	3.91	0.40
2550	E	24' X 8' RCB	1445	1664	CD161-C	CWEST3	3.41	0.40
2574	E	24' X 8' RCB	1430	1664	CD161-C	CWEST3	3.41	0.40
2599	E	Conc Chnl 24'W 7'D 2:1 SS	1577	1585	CNW162-C	CWEST3	3.08	0.50
2632	E	18' X 5' RCB	1580	968	CNW138-C	WEST3	1.16	0.46
2661	E	18' X 5' RCB	2640	968	CNW138-C	WEST3	1.16	0.46
2711	E	10' X 5' RCB	1320	968	CNW138-C	WEST3	1.16	1.54
2737	E	10' X 5' RCB	1320	818	CNW139-C	WEST3	0.93	2.22
2763	E	6' X 5' RCB	1320	818	CNW139-C	WEST3	0.93	1.79
2789	E	6' X 5' RCB	1470	818	CNW139-C	WEST3	0.93	2.17
MOHU		**MOCCASIN - HUALAPAI BRANCH**						
0000	P0	10' X 8' RCB	1380	876	2CNW33-C	LOWER3	2.08	0.50
0026	P0	9' X 6' RCB	2645	544	CNW45-N	LOWER3	1.25	0.50
0076	P0	60" RCP	1000	281	CNW45-C	LOWER3	1.03	3.00
0095	P0	Natural Wash	665	281	CNW45-C	LOWER3	1.03	3.00
0111	P0	78" RCPC	225	281	CNW45-C	LOWER3	1.03	3.00
0116	P0	Natural Wash	1855	281	CNW45-C	LOWER3	1.03	3.00
MOIR		**MOCCASIN - IRON MOUNTAIN BRANCH**						
0000	P0	60" RCP	5300	373	CNW33-C	LOWER3	0.83	3.60
MOKC		**MOCCASIN AND KYLE CANYON**						
0000	P0	9' X 6' RCB	6140	1326	CNW35-C	LOWER3	2.69	3.40
MOLC		**MOCCASIN AND LOG CABIN BRANCH**						
0000	P1	14' X 9' RCB	3790	3083	CNW102-C	LOWER3	6.26	1.60
0072	P1	13' X 6' RCB	4050	2895	2CNW64	LOWER3	6.06	2.50
0149	P1	13' X 6' RCB	520	2086	CNW62-N	LOWER3	4.88	2.00
0157	P1	10' X 6' RCB	1080	2088	CNW62-N	LOWER3	4.88	3.00
MSNV		**MOUNTAIN SPAVISTA RANCH**						
0000	E	6: 12' X 5' RCBC @ Grand Teton	273	679	CNW163-C	CWEST3	1.67	0.40
0005	E	Grass Chnl 100'W 4.5'D 10:1 SS	6325	679	CNW163-C	CWEST3	1.67	0.40
0125	E	Grass Chnl 100'W 4.5'D 10:1 SS	1300	116	CNW147E	WEST3	1.54	0.40
RACO		**RACEL STREET COLLECTOR**						
0000	E	96" RCP Baffled Energy Dissipator	54	428	CNW111S	WEST3	0.55	4.20
0001	E	78" RCP	3245	428	CNW111S	WEST3	0.55	2.46
0064	E	78" RCP	2650	349	CNW111S	WEST3	0.44	2.09
RCBC		**RANCHO ROAD SYSTEM - BELTWAY CHANNEL**						
0000	E	5' X 5' RCB	1062	222	FADB	WEST3	1.60	1.04
0002	E	54" RCP Outlet with 41" Orifice	503	222	FADB	WEST3	1.60	2.38
0003	E	2,341 cfs PMF Spillway		2341	FADBIN	WEST3	1.60	
0004	E	76 ac-ft Fort Apache Detention Basin		1255	FADBIN	WEST3	1.60	
0007	E	Energy Dissipator	100	1255	FADBIN	WEST3	1.60	
0009	E	12' X 6' RCBC @ Fort Apache Detention Basin	133	1255	FADBIN	WEST3	1.60	1.79
0012	E	Conc Chnl 12'W 5'-7'D 0:1 SS	1937	1255	FADBIN	WEST3	1.60	3.15
0048	E	12' X 6' RCBC @ Grand Canyon	140	1040	CMNA1	WEST3	1.32	3.15
0051	E	Conc Chnl 12'W 6'-8'D 0:1 SS	2660	1040	CMNA1	WEST3	1.32	3.44
0096	E	1: 10' X 6' and 1: 6' X 6' RCBC @ Hualapai Way	190	1040	CMNA1	WEST3	1.32	1.93
0100	E	Conc Chnl 12'W 5.5'D 0:1 SS	2685	598	CDMNA1	WEST3	0.48	2.88
0140	E	Conc Chnl 10'W 5'D 0:1 SS	2155	598	CDMNA1	WEST3	0.48	1.65

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
RCHB		**RANCHO ROAD SYSTEM - BELTWAY**						
0034	E	Conc Chnl 21'W 8'D 0:1 SS	1000	2631	CNW1C-W	WEST3	4.66	1.19
0053	E	2: 12' X 8' RCBC @ South Ramp Connector	65	2304	CDW1C1	WEST3	4.31	1.40
0054	E	Conc Chnl 21'W 8'D 0:1 SS	432	2304	CDW1C1	WEST3	4.31	1.51
0062	E	Transition Structure	130	2304	CDW1C1	WEST3	4.31	1.51
0065	E	24' X 7' RCB	480	2304	CDW1C1	WEST3	4.31	0.30
0074	E	24' X 6' RCB	50	2226	CNWBC6-C	WEST3	4.17	0.30
0075	E	20' X 6' RCBC @ Beltway	428	2226	CNWBC6-C	WEST3	4.17	2.81
0083	P1	20' X 6' RCB	950	2226	CNWBC6-C	WEST3	4.17	2.49
0101	P1	Conc Chnl 20'W 7'D 0:1 SS	980	2226	CNWBC6-C	WEST3	4.17	2.38
0120	E	20' X 6' RCBC @ Grand Montecito	120	2226	CNWBC6-C	WEST3	4.17	1.00
0122	P1	Conc Chnl 16'-20'W 6'D 0:1 SS	350	2226	CNWBC6-C	WEST3	4.17	1.84
0130	P1	Conc Chnl 16'W 6'D 0:1 SS	1012	2226	CNWBC6-C	WEST3	4.17	2.67
0149	P1	Conc Chnl 16'W 6'-7'D 0:1 SS	87	1888	CNWBC3	WEST3	3.75	2.27
0151	P1	Conc Chnl 16'W 7'D 0:1 SS	1255	1888	CNWBC3	WEST3	3.75	2.65
0171	E	16' X 6' RCBC @ El Capitan Way	234	1888	CNWBC3	WEST3	3.75	1.75
0175	E	Conc Chnl 14'W 7'D 0:1 SS	1220	1888	CNWBC3	WEST3	3.75	2.93
0198	E	Conc Chnl 14'W 7'D 0:1 SS	225	1402	CNWBA6-C	WEST3	3.61	2.93
0227	E	12' X 6' RCB	1885	1402	CNWBA6-C	WEST3	3.61	1.02
0250	E	12' X 6' RCB	3200	1402	CNWBA6-C	WEST3	3.61	1.00
0275	P1	7' X 6' RCB	2650	973	CNW66-C	WEST3	1.75	3.30
0295	P1	7' X 6' RCB	2875	973	CNW66-C	WEST3	1.75	3.30
TSDB		**TULE SPRINGS DRAINAGE SYSTEM**						
0000	E	2: 10' X 4' RCBC @ Echo Grande	100	26	TULEDB	WEST3	1.35	1.04
0002	E	36" RCP with 22" Orifice Plate	320	26	TULEDB	WEST3	1.35	0.33
0010	E	14,013 cfs PMF Spillway		14013	CTULEDB	WEST3	1.35	
0011	E	117 ac-ft North Environmental Enhancement Area		804	CTULEDB	WEST3	1.35	
0012	E	Energy Dissipator	260	376	CNW148-C	WEST3	0.52	
0023	P1	84" RCP	1320	376	CNW148-C	WEST3	0.52	0.80
0059	P1	78" RCP	2640	376	CNW148-C	WEST3	0.52	1.03

** The HEC-1 node shown identifies the controlling concentration point for the associated facility and is located upstream of this facility due to decreasing peak flow with increasing tributary area caused by storm distribution transitions, depth area reduction factors, or attenuation of flow from routing.*

*** As-built or design slopes were used when available. All other slopes are based on existing topography. The user should verify the facility slope listed prior to performing any facility specific analysis.*

^ For parallel facilities, the existing facility flow equals its normal depth capacity, and the proposed parallel facility flow equals the remaining flow (i.e., HEC-1 Node flow = existing facility normal depth capacity + proposed parallel facility flow).

REGIONAL FLOOD CONTROL DISTRICT

2013 LAS VEGAS VALLEY FLOOD CONTROL MASTER PLAN UPDATE

FACILITY INVENTORY FIGURE F - 13

SLATER HANIFAN GROUP

LEGEND

ID (Facility Identifier) AABB
- Parent Stream Name
- Stream Name

River Mile 0000
- Distance Above Confluence with Parent Stream (Miles)
- Miles in Hundredths

Existing Facility..... E
Proposed or Modified Facility..... P
Contingency Level
- Category B..... P0
- Master Plan..... P1
- Preliminary Design..... P2
- Design..... P3

Bottom Width..... W

Depth..... D

Side Slope, H:V..... SS

Construction Features

Cast in Place Concrete Pipe	CIPCP	Reinforced Concrete Arch Culvert	RCAC
Corrugated Metal Arch Pipe Culvert	CMAP	Reinforced Concrete Box	RCB
Corrugated Metal Pipe Culvert	CMPC	Reinforced Concrete Box Culvert	RCBC
High Density Polyethylene	HDPE	Reinforced Concrete Pipe	RCP
Horizontal Elliptical Reinforced Concrete Pipe	HERCP	Reinforced Concrete Pipe Culvert	RCPC
Reinforced Concrete Arch Pipe	RCAP	Storm Sewer Pipe	SSP

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
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PHONE (702) 284-5300
FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT, LLC.

SKYE CANYON - SHEEP MOUNTAIN PARKWAY
CCRFCD MPU AMENDMENT FACILITIES SUMMARY

DATE: JANUARY 2018
DRAFTER: ETM
DESIGNER: ETM
CHECKED: LKL
PROJECT NO. OLY1609.000

EXHIBIT C3
SHEET 3 OF 3

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NOTE:
* INDICATES SUBBASIN WAS DERIVED FROM THE TECHNICAL DRAINAGE STUDY FOR SKYE CANYON DETENTION BASIN 2
** INDICATES SUBBASIN WAS DERIVED FROM THE TECHNICAL DRAINAGE STUDY FOR SKYE CANYON DETENTION BASIN 1

N

0 1000 2000

SCALE – 1"=1000' FEET

KYLE CANYON ROAD

"400"

"155"

"155"

"400"

"155"

"400"

"155"

"400"

"191"

"155"

*OFF10
*ON2
*OFF9
*OFF8
*OFF7
**OFF6
**OFF5
**OFF4
**OFF3
**OFF2
**OFF1
**ON1
XOF1
XOF2
XOF3
XOF4
PON1
PON2
PON3
PON4
PON5
PON6

SHEEP MOUNTAIN PARKWAY

GRAND TETON DRIVE

HUALAPAI WAY

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT, LLC.

SKYE CANYON - SHEEP MOUNTAIN PARKWAY
SOILS MAP - PROPOSED CONDITION

DATE:	JAN 2018
DRAFTER:	NAS
DESIGNER:	NAS
CHECKED:	LKL
PROJECT NO.	OLY1720.000

EXHIBIT D
SHEET 1 OF 1

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LEGEND

- BASIN BOUNDARY
- ID — BASIN ID
- PRORATE BOUNDARY
- 000 — PRORATE ID
- ID — CONCENTRATION POINT ID
- FLOW DIRECTION
- C — CROSS SECTION CUT LINE

N

0 300 600

SCALE – 1"=300' FEET

Prorated Flow Summary

Basin ID	Area (ac)	Q_{100} (cfs)	Unit Q (cfs/ac)
Basins			
XOF2	28.8	73	2.5
Prorate Basin ID	**Area (ac)**	**Q_{100} (cfs)**	**Unit Q (cfs/ac)**
XOF2A	11.9	30	2.5
XOF2B	16.9	43	2.5
TOTAL	**28.8**	**73**	

Proposed Condition Flow Rate Summary

Basin/Concentration Point ID	Area (ac)	Q_{100} (cfs)	Q_{10} (cfs)
Basins			
XOF1	26	60	23
PON1	3	9	4
CPSMPN	-	124	73
XOF2	29	73	28
XOF3	11	28	10
PON2	6	18	9
CPSMPC	-	118	46
XOF4	5	12	5
PON3	5	15	7
CPSMPS	-	80	62
PON4	3	8	4
PON5	2	7	3
PON6	4	11	4
Referenced Basins			
*OFF7	6	9	4
*OFF8	134	244	93
*CP2	-	249	95
*OFF9	70	153	58
*CP2a	-	395	148
*OFF10	416	508	191
*ON2	19	66	31
*DB2	-	774	290
*RDB2	-	86	264
**OFF1	275	399	143
**OFF2	26	49	14
**OFF3	19	41	16
**CP1	-	441	158
**OFF4	38	90	35
**OFF5	166	252	94
**OFF6	26	62	24
**ON1	19	49	23
**DB1	-	785	288
**RBD1	-	71	57

* Referenced from "Detention Basin 2 Study"

** Referenced from "Detention Basin 1 Study"

IRON MOUNTAIN ROAD

SHAUMBER ROAD

GRAND TETON DRIVE

PULI DRIVE

SKYE CANYON PHASE 2
INFRASTRUCTURE
SHG OLY1501.001
CLV# DS4739

PON4 PON5 PON1 PON2 PON6 PON3

CPSMPN CPSMPC CPSMPS

XOF1 XOF2 XOF3 XOF4

XOF2A XOF2B

*RDB2 **RDB1

*DB2 **DB1

*ON2 **ON1

SKYE CANYON "DB2"
SHG OLY1505.000
CLV# DS4813

SKYE CANYON "DB1"
SHG OLY1401.004
CLV# DS4698

*OFF10 *OFF9 *OFF8 *OFF7 **OFF6 **OFF5 **OFF4 **OFF3 **OFF2 **OFF1

REFER TO "DB1 and DB2 TECHNICAL DRAINAGE STUDIES FOR LIMITS OF OFFSITE DRAINAGE BASINS WEST OF PULI ROAD

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT, LLC.

SKYE CANYON - SHEEP MOUNTAIN PARKWAY

PROPOSED CONDITIONS DRAINAGE MAP

DATE: FEB 2018
DRAFTER: NAS
DESIGNER: NAS
CHECKED: LKL
PROJECT NO. OLY1720.000

EXHIBIT E

SHEET 1 OF 1

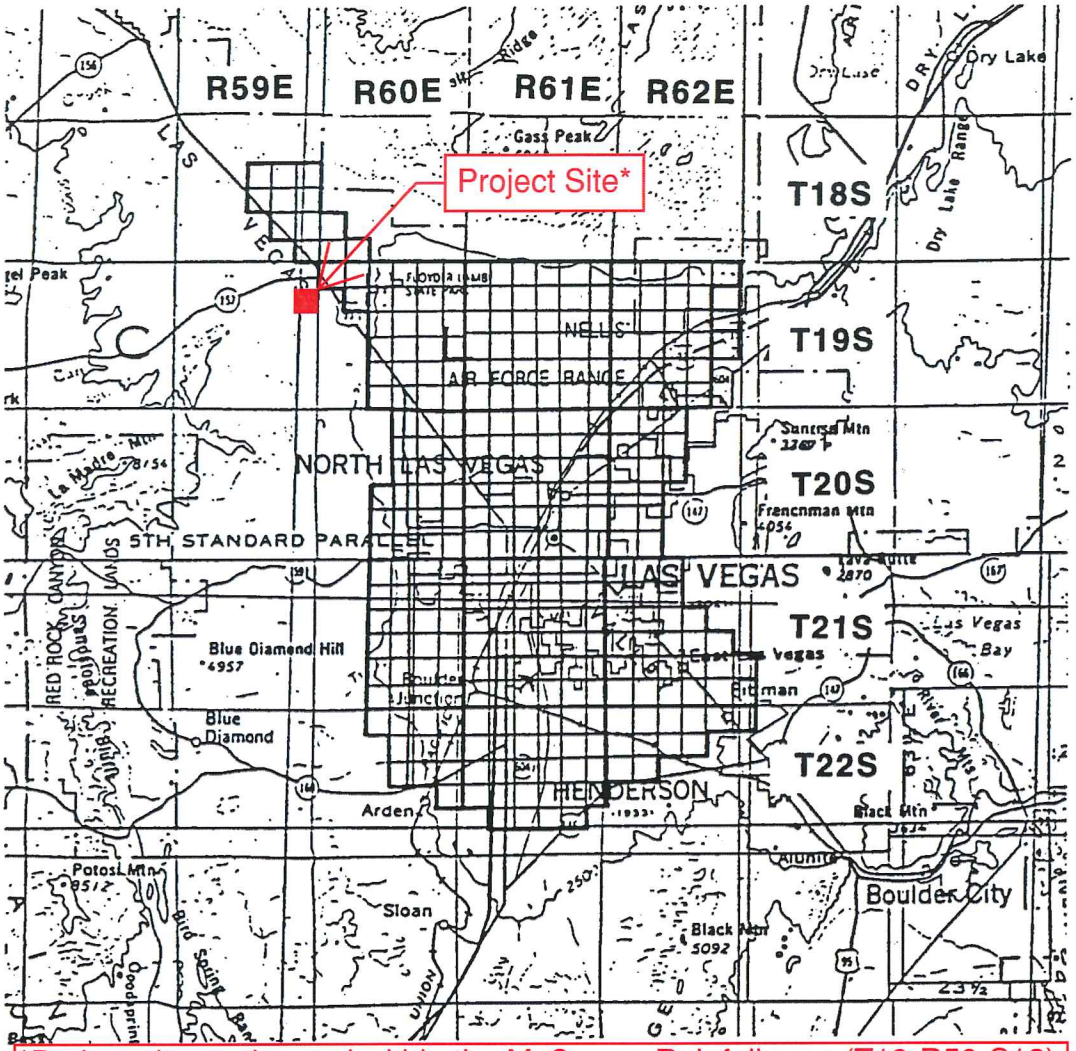
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APPENDIX B

Hydrologic Data

Precipitation

McCARRAN AIRPORT RAINFALL AREA



*Project site not located within the McCarran Rainfall area (T19-R59-S12)

TOWNSHIP	RANGE	SECTIONS	TOWNSHIP	RANGE	SECTIONS
18 South	59 East	13-15,22-26,36	20 South	62 East	4-9,16-20,29-32
18 South	60 East	30-32	21 South	60 East	1-4,9-16,21-28,33-36
19 South	60 East	1-6,8-16,21-28,33-36	21 South	61 East	ALL SECTIONS
19 South	61 East	ALL SECTIONS	21 South	62 East	4-9,15-23, 25-36
19 South	62 East	2-11,14-23,27-34	22 South	60 East	1-4,10-15,24
20 South	60 East	1-3,10-15,21-28,33-36	22 South	61 East	1-24,26-29
20 South	61 East	ALL SECTIONS	22 South	62 East	1-10,17-18

Notes:
1. Refer to Table 505 and Figure 516 Depth-Duration- Frequency values in the McCarran Airport Rainfall Area.
2. Refer to Table 506 and Figure 517 for Time-Intensity-Frequency values on the McCarran Airport Rainfall Area.

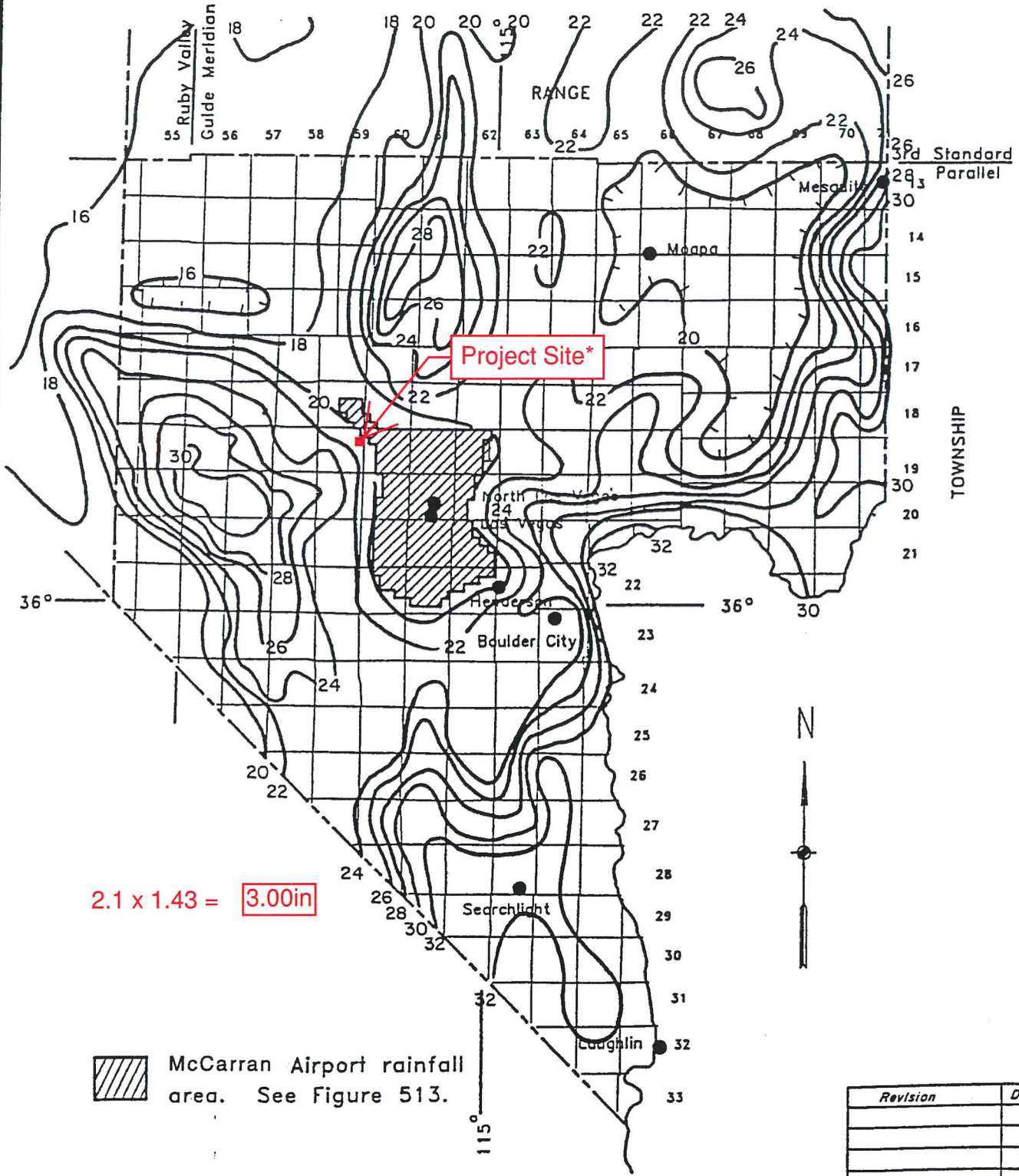
Revision	Date

WRC ENGINEERING

REFERENCE:
USACE, Los Angeles District, 1988

FIGURE 513

RAINFALL DEPTH-DURATION-FREQUENCY
100-YEAR, 6-HOUR
(DEPTHS IN TENTHS OF INCHES)



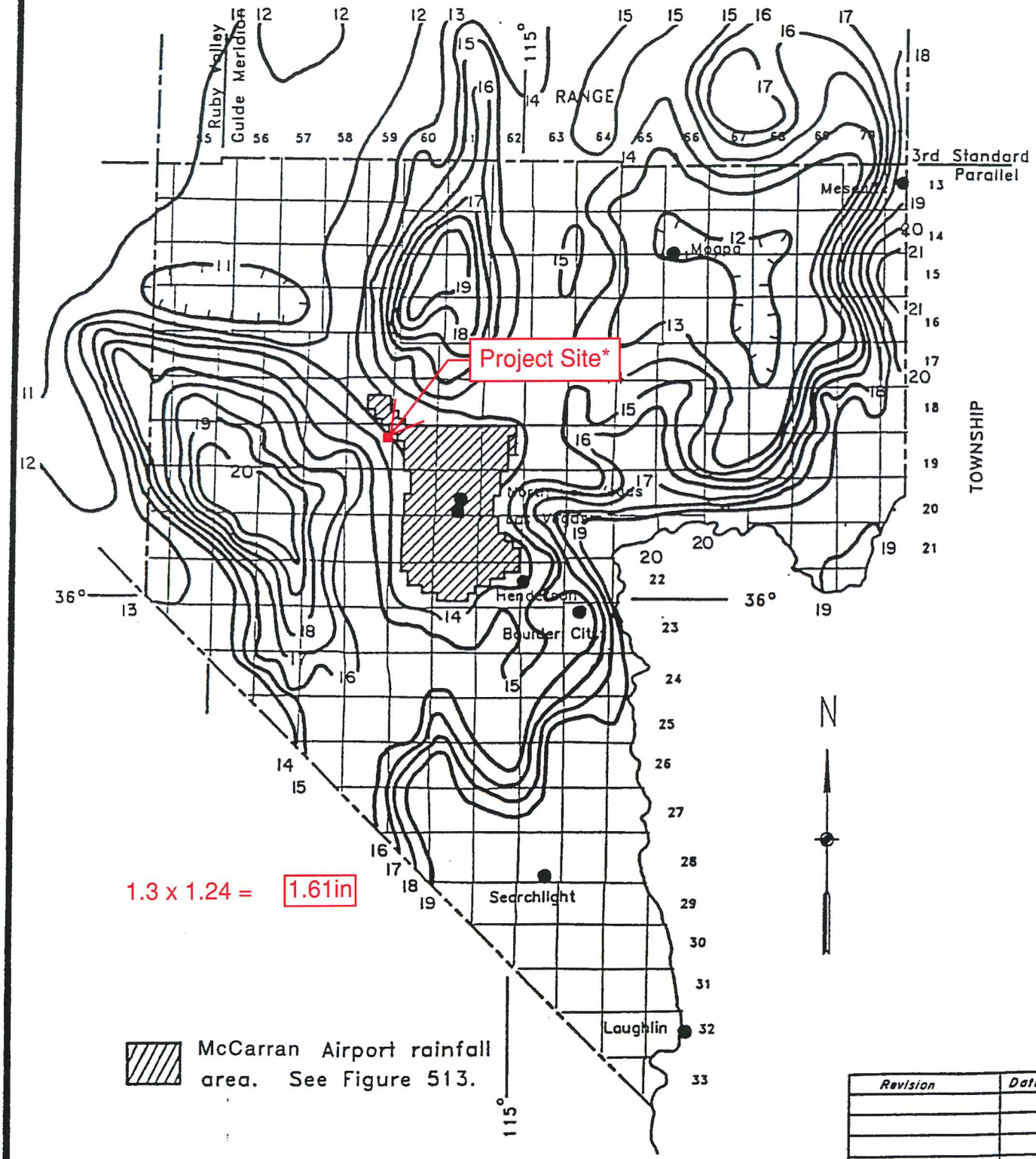
Revision	Date

WRC ENGINEERING

REFERENCE:
NOAA ATLAS 2, VOLUME VII NEVADA, 1973

FIGURE 506

RAINFALL DEPTH-DURATION-FREQUENCY
10-YEAR, 6-HOUR
(DEPTHS IN TENTHS OF INCHES)



Revision	Date

WRC ENGINEERING

REFERENCE:
NOAA ATLAS 2, VOLUME VII NEVADA, 1973

FIGURE 503

PRECIPITATION ADJUSTMENT RATIOS

Recurrence Interval	Ratio to NOAA Atlas 2
2-year	1.00
5-year	1.16
10-year	1.24
25-year	1.33
50-year	1.39
100-year	1.43

NOTE:
1. Multiply the values obtained from the NOAA Atlas 2 by the above ratios to obtain the adjusted precipitation values.
2. NOAA Atlas 2 values for use with TR-55 shall not be adjusted by the above ratios.
3. Tables 505 and 506 require no adjustments.

Revision	Date

SIX HOUR DEPTH-AREA REDUCTION FACTORS

Drainage Area (Square Miles)	Six-Hour Depth-Area Reduction Factor
0.0	1.00
0.5	0.98
1.0	0.97
2.0	0.93
4.0	0.91
6.0	0.90
8.0	0.88
10.0	0.86
20.0	0.79
30.0	0.74
50.0	0.68
100.0	0.60
150.0	0.55
200.0	0.51
300.0	0.46
400.0	0.42
500.0	0.39

NOTES: 1. A graphical representation of these factors is presented in Figure 514.

2. Consult with the local entity and/or the CCRFCD for guidance in using the Depth-Area Reduction Factors for drainage areas greater than 200 square miles.

Revision	Date

SIX-HOUR STORM DISTRIBUTIONS

Storm Time (In Minutes)	Percent of Total Storm Depth SDN3	SDN4	SDN5	Storm Time (In Minutes)	Percent of Total Storm Depth SDN3	SDN4	SDN5
0	0.0	0.0	0.0	185	32.2	37.6	43.0
5	2.0	2.0	2.0	190	35.2	41.5	47.7
10	5.7	5.8	5.9	195	40.9	46.2	51.4
15	7.0	7.5	8.0	200	49.9	53.0	56.1
20	8.7	9.9	11.0	205	59.0	61.0	63.0
25	10.8	12.6	14.4	210	71.0	71.0	71.0
30	12.4	13.7	15.0	215	74.4	73.2	72.0
35	13.0	14.5	16.0	220	78.1	75.6	73.1
40	13.0	14.9	16.8	225	81.2	78.2	75.2
45	13.0	15.1	17.1	230	81.9	79.9	77.9
50	13.0	15.5	18.0	235	83.5	81.3	79.0
55	13.0	15.6	18.2	240	85.1	82.3	79.5
60	13.0	15.9	18.7	245	85.6	83.0	80.4
65	13.3	16.2	19.0	250	86.0	83.5	81.0
70	14.0	16.9	19.7	255	86.8	84.4	82.0
75	14.2	17.2	20.2	260	87.6	85.1	82.6
80	14.8	17.9	21.0	265	88.8	86.4	84.0
85	15.8	18.9	22.0	270	91.0	88.5	85.9
90	17.2	20.1	23.0	275	92.6	90.8	88.9
95	18.1	21.1	24.1	280	93.7	92.4	91.0
100	19.0	22.0	25.0	285	95.0	94.4	93.8
105	19.7	22.8	25.9	290	97.0	96.8	96.6
110	19.9	23.2	26.5	295	97.6	97.3	97.0
115	20.0	24.0	28.0	300	98.2	97.8	97.4
120	20.1	24.6	29.0	305	98.5	98.2	97.9
125	20.4	25.2	30.0	310	98.7	98.4	98.1
130	21.4	26.0	30.5	315	98.9	98.6	98.3
135	22.9	26.9	30.9	320	99.0	98.8	98.5
140	24.1	27.6	31.0	325	99.3	99.1	98.9
145	24.9	28.3	31.7	330	99.3	99.2	99.0
150	25.1	28.6	32.1	335	99.4	99.3	99.2
155	25.6	29.2	32.7	340	99.5	99.4	99.3
160	27.0	30.2	33.3	345	99.8	99.7	99.6
165	27.8	31.2	34.6	350	99.8	99.8	99.7
170	28.1	32.1	36.1	355	99.9	99.9	99.9
175	28.3	33.2	38.1	360	100.0	100.0	100.0
180	29.5	35.2	40.8				

Notes
1. For drainage areas less than 8 square miles in size, use SDN 3.
2. For drainage areas greater than or equal to 8 square miles and less than 12 square miles in size, use SDN 4.
3. For drainage areas greater than or equal to 12 square miles, use SDN 5.
4. A graphical representation of these values is presented on **Figure 515**.

Revision	Date

REFERENCE:

TABLE 503

Curve Number

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

Soil Data & Curve Number Computation

Project Name & Number: Skye Canyon - Sheep Mountain Parkway (OLY1720)
Date: 2/8/2018
By: NAS

Data:

Reference:
Exhibit D
NRCS Soil Data

Soil Type - Soil Survey Area & Version, Soil Description				A	B	C	D
LV	155	Las Vegas Valley 2016	Cave gravelly fine sandy loam, 4 to 15 percent slopes	0%	0%	0%	100%
LV	191	Las Vegas Valley 2016	Dalian very cobbly fine sandy loam, 2 to 8 percent slopes	100%	0%	0%	0%
LV	400	Las Vegas Valley 2016	Tencee very gravelly fine sandy loam, 2 to 8 percent slopes	0%	0%	0%	100%

Land Use	A	B	C	D
Residential (<6,000 sf)*	89	92	94	95
Commercial	89	92	94	95
Desert Shrub (poor)	63	77	85	88
Roadway	98	98	98	98
Open Space (fair)	49	69	79	84

*Commercial land use per Note 3

EXISTING CONDITION

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP A	B	C	D	LAND USE CN A	B	C	D	SUBAREA ACRES	CURVE NUMBER
XOF1	LV	155	83.7%	Desert Shrub (poor)	0%	0%	0%	100%	63	77	85	88	20.97	73.66
	LV	400	16.3%	Desert Shrub (poor)	0%	0%	0%	100%	63	77	85	88	4.08	14.34
	TOTAL PERCENT		100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:									25.05	**88.0**

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP A	B	C	D	LAND USE CN A	B	C	D	SUBAREA ACRES	CURVE NUMBER
XOF2	LV	155	100.0%	Desert Shrub (poor)	0%	0%	0%	100%	63	77	85	88	28.48	88.00
	TOTAL PERCENT		100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:									28.48	**88.0**

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP A	B	C	D	LAND USE CN A	B	C	D	SUBAREA ACRES	CURVE NUMBER
XOF3	LV	155	100.0%	Desert Shrub (poor)	0%	0%	0%	100%	63	77	85	88	10.13	88.00
	TOTAL PERCENT		100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:									10.13	**88.0**

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP A	B	C	D	LAND USE CN A	B	C	D	SUBAREA ACRES	CURVE NUMBER
XOF4	LV	155	100.0%	Desert Shrub (poor)	0%	0%	0%	100%	63	77	85	88	3.57	88.00
	TOTAL PERCENT		100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:									3.57	**88.0**

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP A	B	C	D	LAND USE CN A	B	C	D	SUBAREA ACRES	CURVE NUMBER
XON1	LV	155	94.9%	Desert Shrub (poor)	0%	0%	0%	100%	63	77	85	88	24.93	83.50
	LV	191	5.1%	Desert Shrub (poor)	100%	0%	0%	0%	63	77	85	88	1.34	3.22
	TOTAL PERCENT		100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:									26.28	**86.7**

PROPOSED CONDITION

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP A	B	C	D	LAND USE CN A	B	C	D	SUBAREA ACRES	CURVE NUMBER
XOF1	LV	155	84.1%	Desert Shrub (poor)	0%	0%	0%	100%	63	77	85	88	21.55	73.98
	LV	400	15.9%	Desert Shrub (poor)	0%	0%	0%	100%	63	77	85	88	4.08	14.02
	TOTAL PERCENT		100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:									25.63	**88.0**

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP A	B	C	D	LAND USE CN A	B	C	D	SUBAREA ACRES	CURVE NUMBER
XOF2	LV	155	100.0%	Desert Shrub (poor)	0%	0%	0%	100%	63	77	85	88	28.78	88.00
	TOTAL PERCENT		100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:									28.78	**88.0**

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP A	B	C	D	LAND USE CN A	B	C	D	SUBAREA ACRES	CURVE NUMBER
XOF3	LV	155	100.0%	Desert Shrub (poor)	0%	0%	0%	100%	63	77	85	88	10.89	88.00
	TOTAL PERCENT		100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:									10.89	**88.0**

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP A	B	C	D	LAND USE CN A	B	C	D	SUBAREA ACRES	CURVE NUMBER
XOF4	LV	155	100.0%	Desert Shrub (poor)	0%	0%	0%	100%	63	77	85	88	4.65	88.00
	TOTAL PERCENT		100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:									4.65	**88.0**

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP A	B	C	D	LAND USE CN A	B	C	D	SUBAREA ACRES	CURVE NUMBER
PON1	LV	155	87.8%	Newly Graded	0%	0%	0%	100%	77	86	91	94	2.76	82.49
	LV	155	12.2%	Roadway	0%	0%	0%	100%	98	98	98	98	0.38	12.00

TOTAL PERCENT	100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:		3.14	**94.5**

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CURVE NUMBER
					A	B	C	D	A	B	C	D		
PON2	LV	155	69.6%	Newly Graded	0%	0%	0%	100%	77	86	91	94	4.20	65.45
	LV	155	30.4%	Roadway	0%	0%	0%	100%	98	98	98	98	1.83	29.76
TOTAL PERCENT			100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:									6.02	**95.2**

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CURVE NUMBER
					A	B	C	D	A	B	C	D		
PON3	LV	155	77.0%	Newly Graded	0%	0%	0%	100%	77	86	91	94	3.72	72.38
	LV	155	18.0%	Roadway	0%	0%	0%	100%	98	98	98	98	0.87	17.65
	LV	191	3.4%	Newly Graded	100%	0%	0%	0%	77	86	91	94	0.17	2.63
	LV	191	1.6%	Roadway	100%	0%	0%	0%	98	98	98	98	0.08	1.54
TOTAL PERCENT			100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:									4.83	**94.2**

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CURVE NUMBER
					A	B	C	D	A	B	C	D		
PON4	LV	155	63.0%	Newly Graded	0%	0%	0%	100%	77	86	91	94	1.79	59.20
	LV	155	37.0%	Roadway	0%	0%	0%	100%	98	98	98	98	1.05	36.28
TOTAL PERCENT			100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:									2.84	**95.5**

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CURVE NUMBER
					A	B	C	D	A	B	C	D		
PON5	LV	155	88.1%	Newly Graded	0%	0%	0%	100%	77	86	91	94	2.10	82.81
	LV	155	11.9%	Roadway	0%	0%	0%	100%	98	98	98	98	0.28	11.67
TOTAL PERCENT			100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:									2.39	**94.5**

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CURVE NUMBER
					A	B	C	D	A	B	C	D		
PON6	LV	155	49.5%	Newly Graded	0%	0%	0%	100%	77	86	91	94	1.79	46.57
	LV	155	19.7%	Roadway	0%	0%	0%	100%	98	98	98	98	0.71	19.33
	LV	191	27.2%	Newly Graded	100%	0%	0%	0%	77	86	91	94	0.98	20.92
	LV	191	3.6%	Roadway	100%	0%	0%	0%	98	98	98	98	0.13	3.49
TOTAL PERCENT			100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:									3.61	**90.3**

RUNOFF CURVE NUMBERS
(URBAN AREAS[1])

Cover description		Curve numbers for hydrologic soil group—			
Cover type and hydrologic condition	Average percent impervious area[2]	A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.)[3]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only)[4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size: **See Table 602A**					
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation)[5]		77	86	91	94

1 Average runoff condition, and $I_a = 0.2S$.

2 The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system. Impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using Figure 603.

3 CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

4 Composite CN's for natural desert landscaping should be computed using Figure 603 based on the impervious area percentage (CN #98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

5 Composite CN's to use for the design of temporary measures during grading and construction should be computed using Figure 603 based on the degree of development impervious area percentage) and the CN's for the newly graded pervious areas.

Revision	Date

RUNOFF CURVE NUMBERS
(SEMIARID RANGELANDS[1])

Cover description		Curve numbers for hydrologic soil group—			
Cover type	Hydrologic condition[2]	A[3]	B	C	D
Herbaceous—mixture of grass, weeds, and low-growing brush, with brush the minor element.	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush.	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper—pinyon, juniper, or both; grass understory.	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory.	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus.	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

[1]Average runoff condition, and I_a = 0.2S.

[2]*Poor:* <30% ground cover (litter, grass, and brush overstory).
Fair: 30 to 70% ground cover.
Good: >70% ground cover.

[3]Curve numbers for group A have been developed only for desert shrub.

Revision	Date

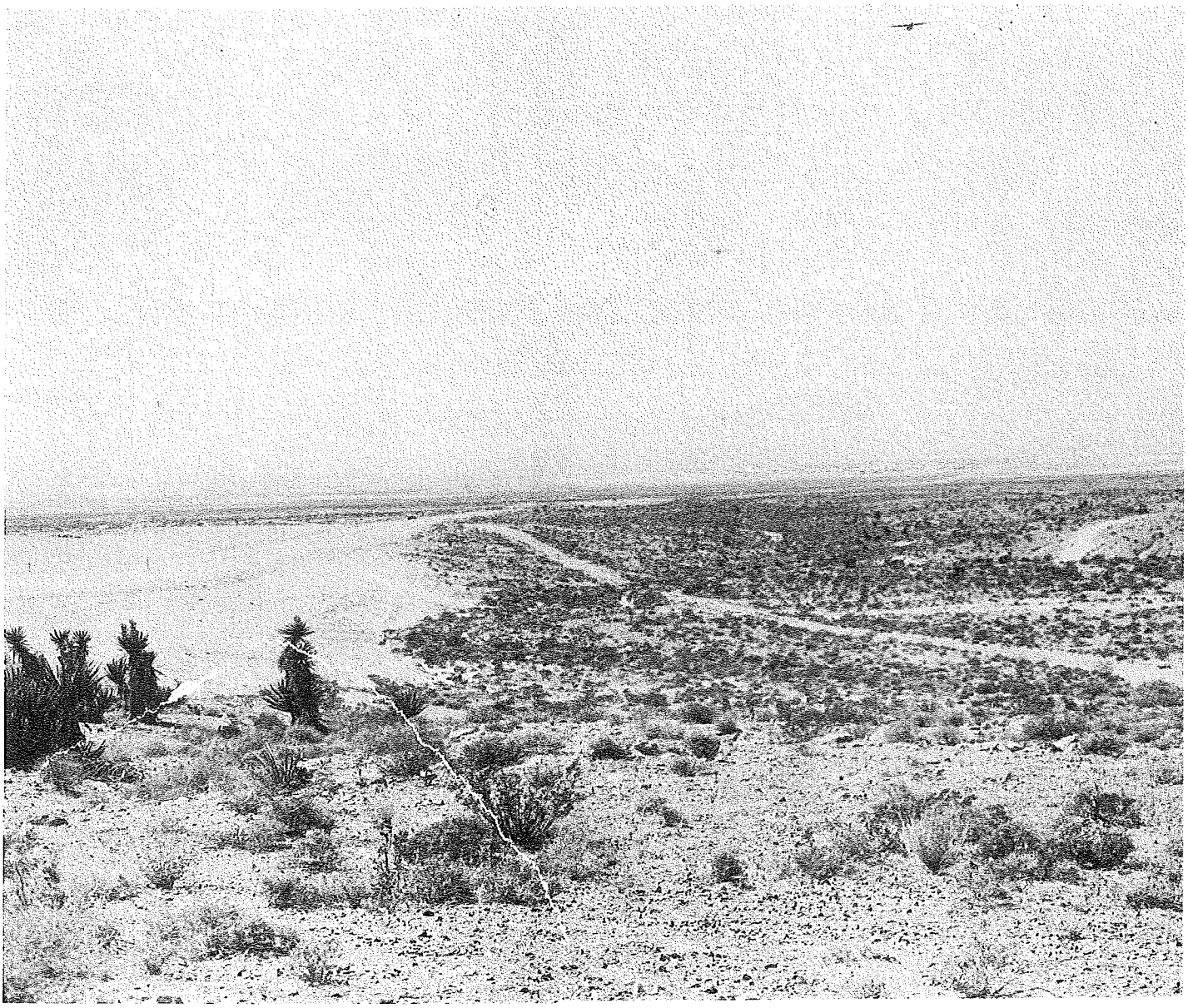
United States Department of Agriculture

Soil Conservation Service

In cooperation with United States Department of the Interior, Bureau of Land Management, and University of Nevada Agricultural Experiment Station

Soil Survey of Las Vegas Valley Area Nevada

Part of Clark County



defines many of the terms used in describing the soils or miscellaneous areas.

In the Las Vegas Valley Area, the mean annual temperature is about 66 degrees F, the mean annual precipitation is about 4 inches, and the frost-free season ranges from 220 to about 270 days. More detailed climatic data are available in the section "Climate" and in tables 1, 2, and 3. Because the climate is quite uniform throughout the survey area, climatic data are not given in the individual map unit descriptions.

Map Unit Descriptions

105—McCullough-Jean-Bluepoint complex, 0 to 4 percent slopes. This map unit is on fan piedmonts.

This unit is 40 percent McCullough fine sandy loam, 0 to 4 percent slopes, 30 percent Jean loamy fine sand, 0 to 4 percent slopes, and 20 percent Bluepoint loamy fine sand, 0 to 4 percent slopes. The McCullough soil is on fan skirts, the Jean soil is on inset fans crossing fan piedmonts, and the Bluepoint soil is on sand sheets on fan piedmonts. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Las Vegas soils and 5 percent McCarran soils on relict alluvial flats. Included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

The McCullough soil is very deep and well drained. It formed in alluvium derived from various kinds of rock. Typically, the surface layer is pink fine sandy loam about 2 inches thick. The subsoil is light brown and pink gravelly sandy loam and fine sandy loam about 24 inches thick. The upper 9 inches of the substratum is pink, weakly lime-cemented, stratified fine sandy loam and loam, and the lower part to a depth of 62 inches is pink fine sand.

Permeability of the McCullough soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

The Jean soil is very deep and excessively drained. It formed in alluvium derived dominantly from limestone, sandstone, and quartzite. Typically, the surface layer is pink loamy fine sand about 1 inch thick. The upper 17 inches of the substratum is light reddish brown and pink loamy fine sand, and the lower part to a depth of 60 inches or more is pink, stratified very gravelly loamy fine sand to extremely gravelly sand.

Permeability of the Jean soil is rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

The Bluepoint soil is very deep and somewhat excessively drained. It formed in eolian deposits derived dominantly from sandstone and quartzite. Typically, the surface layer is pink loamy fine sand 2 inches thick. The underlying material to a depth of 60 inches or more is pink fine sand or loamy fine sand.

Permeability of the Bluepoint soil is rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is high.

This unit is used mainly for urban development. It is also used as habitat for desert wildlife and for recreation.

The main limitation for construction of dwellings is the hazard of flooding on the McCullough and Jean soils. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Excavating in areas of the Jean and Bluepoint soils can expose material that is highly susceptible to soil blowing. Gypsum in the McCullough soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

The main limitation for septic tank absorption fields is the inadequate filtration of effluent in the Jean and Bluepoint soils. Because the substratum is rapidly permeable, special design may be needed to avoid polluting ground water and nearby water supplies. If the density of housing is moderate to high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage from onsite sewage disposal systems.

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads on the McCullough and Jean soils from flooding. The Bluepoint soil in this unit is flooded less frequently and is more suitable for use as sites for roads. When the Bluepoint soil is dry, roads are difficult to maintain because of the presence of loose sand. This results in poor traction and an increased risk of soil blowing.

The main limitation for lawns and landscaping is the very low available water capacity of the Jean soil. Frequent irrigation of lawns, gardens, and most other plantings is needed.

This map unit is in capability subclasses IVs, irrigated, and VIIs, nonirrigated. The McCullough soils are in horticultural group 2, and the Jean and Bluepoint soils are in horticultural group 3.

107—Arizo extremely stony loam, 0 to 4 percent slopes. This very deep, excessively drained soil is on inset fans. It formed in alluvium derived dominantly from basalt and andesite.

Typically, about 85 percent of the surface is covered with a desert pavement of stones, cobbles, and pebbles. A dark desert varnish is on the exposed surfaces of the rock fragments. The surface layer is pink extremely stony loam about 4 inches thick. The underlying material to a depth of 60 inches or more is pale brown, stratified material that averages very gravelly sand.

Included in this unit are about 5 percent Cave soils on erosional fan remnant shoulders and 5 percent Caliza soils on erosional fan remnant side slopes. Included areas make up about 10 percent of the total acreage.

Permeability of this Arizo soil is very rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The main limitations for construction of dwellings are the rare periods of flooding and the desert pavement. Dikes and channels that have outlets for floodwater can be used to protect buildings and onsite sewage disposal systems from flooding. The desert pavement interferes with the use of equipment.

The main limitations for septic tank absorption fields are inadequate filtration of effluent and the stones and cobbles in the soil. Because the substratum is highly permeable, special design may be needed to avoid polluting ground water and nearby water supplies. The presence of stones may hamper excavation.

This unit is limited for roads because of the desert pavement. Unless an adequate wearing surface is maintained, stones and cobbles in the soil create road hazards and increase maintenance costs.

The main limitations for lawns and landscaping are droughtiness, the content of pebbles throughout the soil, and the content of stones and cobbles in the surface layer. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the limited available water capacity of the soil. Topsoil is needed for best results when landscaping, particularly in areas used for lawns.

This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 3.

112—Arizo very gravelly loamy sand, flooded, 0 to 4 percent slopes. This very deep, excessively drained soil is in channels on fan piedmonts. It formed in alluvium derived dominantly from various kinds of rock.

Typically, 65 percent of the surface is covered with pebbles. The surface layer is pale brown very gravelly loamy sand about 2 inches thick. The underlying material to a depth of 60 inches or more is light brown, stratified very gravelly sandy loam to extremely gravelly loamy sand, averaging very gravelly loamy sand.

Included in this unit are about 5 percent Nickel soils on erosional fan remnants, 3 percent Aztec soils on nonburied fan remnants, 5 percent Cave soils on erosional fan remnants, and 2 percent McCarran soils on relict alluvial flats. Included areas make up about 15 percent of the total acreage.

Permeability of this Arizo soil is very rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. This soil is subject to occasional periods of very brief, high-velocity flooding from March through September.

Most areas of this unit are used as habitat for desert wildlife and for recreation. A few areas are used for urban development.

This unit is poorly suited to urban development. The main limitation for construction of dwellings is the hazard of flooding. Flooding can be controlled only by use of major flood control structures.

The main limitations for septic tank absorption fields are the hazard of flooding and inadequate filtration of effluent. Flooding can be controlled only by use of major flood control structures. Because the substratum is highly permeable, special design may be needed to avoid polluting ground water and nearby water supplies.

This unit is limited for roads because of the hazard of flooding. Flooding can be controlled only by use of major flood control structures.

The main limitations for lawns and landscaping are the content of cobbles and pebbles throughout the soil and the very low available water capacity. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the limited available water capacity of the soil.

This map unit is in capability subclasses IVw, irrigated, and VIIw, nonirrigated. It is in horticultural group 3.

113—Arizo very gravelly fine sandy loam, gypsiferous substratum, 2 to 8 percent slopes. This very deep, excessively drained soil is on inset fans on pediments underlain by weakly consolidated, gypsiferous sediment. It formed in alluvium derived dominantly from basalt and andesite overlying gypsiferous sediment.

Typically, 80 percent of the surface is covered with a desert pavement of rock fragments, mainly pebbles. The surface layer is light brown very gravelly fine sandy loam about 2 inches thick. The upper 38 inches of the underlying material is light brown very gravelly loamy sand, and the lower part to a depth of 60 inches or more is light brown, highly gypsiferous loamy sand. Rock fragments cover 70 to 90 percent of the surface. Depth to the gypsiferous layer ranges from 40 to 60 inches.

Included in this unit are about 5 percent Nickel soils on erosional fan remnants, 5 percent Rock outcrop as isolated low hills, and 5 percent Aztec soils on erosional

fan remnants. Included areas make up about 15 percent of the total acreage.

Permeability of this Arizo soil is very rapid to a depth of 40 inches and is moderately rapid below this depth. Available water capacity is very low. Effective rooting depth is 40 to 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

Most areas of this unit are used as habitat for desert wildlife and for recreation. A few areas are used for urban development.

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Gypsum in the soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion. Because of the high content of gypsum, the soil can settle if the gypsum dissolves and leaches from the soil when it is irrigated. The risk of settlement can be reduced by avoiding excessive irrigation. Protection for buildings can be provided in some areas by placing perforated drain tile around the foundation and using sewers as outlets. Subsidence in urban areas caused by the dissolution of gypsum in the soil can be prevented by using gutters and downspouts that discharge directly into the sewer system.

The main limitation for septic tank absorption fields is the inadequate filtration of effluent. Because the substratum is highly permeable, special design may be needed to avoid polluting ground water and nearby water supplies.

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding. Concentrated runoff in drainage ditches can dissolve gypsum in the subsurface layers and cause subsidence.

The main limitations for lawns and landscaping are the content of cobbles and pebbles throughout the soil and the very low available water capacity. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the very low available water capacity of the soil. Because of the high content of gypsum, the soil can settle if the gypsum dissolves and leaches from the soil when it is irrigated. The risk of settlement can be reduced by avoiding excessive irrigation.

This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 3.

117—Arizo very gravelly fine sandy loam, 2 to 8 percent slopes. This very deep, excessively drained soil is on alluvial fans and inset fans. It formed in alluvium derived from various kinds of rock.

Typically, about 60 percent of the surface is covered with a desert pavement of pebbles. The surface layer is pale brown very gravelly fine sandy loam 6 inches thick. The underlying material to a depth of 60 inches or more is pale brown, stratified very gravelly loamy sand and cobbly coarse sand.

Included in this unit are about 5 percent Aztec soils on erosional fan remnants, 5 percent Pittman soils on erosional fan remnants, and 5 percent Arizo soils, flooded, in channels. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Arizo soil is very rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

This unit is used mainly for urban development. It is also used as habitat for desert wildlife and for recreation.

Intermittent streams form the drainageways in this unit. These drainageways are subject to rare or occasional periods of high-velocity flooding. Care should be taken during urbanization to accommodate the runoff from the drainageways. If drains become plugged during a major flood, accelerated erosion and damage to roads, buildings, and other structures can occur. The presence of stones and cobbles interferes with the preparation of building sites.

The main limitation for septic tank absorption fields is inadequate filtration of effluent. Because the substratum is highly permeable, special design may be needed to avoid polluting ground water and nearby water supplies. If the density of housing is moderate to high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage from onsite sewage disposal systems.

Unless an adequate wearing surface is maintained, stones and cobbles in the soil create road hazards and increase maintenance costs.

The main limitations for lawns and landscaping are the content of pebbles throughout the soil and the very low available water capacity. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the limited available water capacity of the soil.

This map unit is in capability subclasses IVs, irrigated, and VIIs, nonirrigated. It is in horticultural group 3.

120—Bluepoint fine sandy loam, wet, 0 to 2 percent slopes. This very deep, somewhat excessively drained soil is on sand sheets on alluvial flats. The natural drainage has been altered because excess irrigation has raised the water table. The soils formed in sandy alluvium derived from various kinds of rock.

Typically, the surface layer is light brown fine sandy loam 4 inches thick. The underlying material to a depth of 60 inches or more is light brown, stratified loamy fine sand and fine sand.

Included in this unit are about 5 percent Arizo soils, flooded, in channels and 5 percent Glencarb soils and 5 percent Land soils on the flood plain. Included areas make up about 15 percent of the total acreage.

Permeability of this Bluepoint soil is rapid. Available water capacity is moderate. Effective rooting depth is limited by a seasonal high water table. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. The seasonal high water table is at a depth of 48 to 72 inches in June through September. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

This unit is used mainly as habitat for desert wildlife. It is also used for irrigated hay and urban development.

If this unit is used for hay and pasture, the main limitations are low fertility, the moderate available water capacity, and the moderately high water table. Annual applications of nitrogen and phosphorus are needed to maintain production of high quality irrigated pasture. The content of salts can be controlled by carefully applying irrigation water. Because the water intake rate is rapid, sprinkler irrigation is suited to the soil in this unit. Use of this method permits the even, controlled application of water, reduces runoff, and minimizes the risk of erosion. If furrow irrigation is used, water should be applied at frequent intervals and runs should be short. Because the soil is droughty, applications of irrigation water should be light and frequent. Irrigation water must be carefully applied to avoid raising the water table and increasing the concentration of salts in the soil. Tile drainage can be used to lower or maintain the level of the water table if a suitable outlet is available. Deep-rooted crops are suited to areas where the natural drainage is adequate or where a drainage system has been installed. Complete drainage is not desirable because the available water capacity is moderate. The average yield is 6 tons per acre for alfalfa hay grown under a high level of management.

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Excavation for houses and access roads can expose material that is highly susceptible to soil blowing.

The main limitation for septic tank absorption fields is inadequate filtration of effluent. Because the substratum is highly permeable, special design may be needed to avoid polluting ground water and nearby water supplies.

The risk of channeling and deposition can be reduced by protecting roads from flooding. During prolonged dry periods, roads are difficult to maintain. Loose sand on the roads results in poor traction and increases the risk of soil blowing.

Because the soil is moderately droughty, applications of irrigation water to lawns and gardens should be light and frequent.

This map unit is in capability subclasses IIIw, irrigated, and VIw, nonirrigated. It is in horticultural group 5.

127—Bluepoint loamy fine sand, 0 to 2 percent slopes. This very deep, somewhat excessively drained soil is on sand sheets on fan piedmonts. It formed in sandy alluvium derived dominantly from sandstone and quartzite.

Typically, about 15 percent of the surface is covered with a desert pavement of small pebbles. The surface layer is light yellowish brown loamy fine sand about 9 inches thick. The upper 15 inches of the underlying material is light brown, stratified fine sand to gravelly loamy fine sand, the next 17 inches is pink loamy fine sand, and the lower part to a depth of 60 inches or mor is pink, stratified loamy sand to very fine sandy loam. Pebbles cover 5 to 25 percent of the surface.

Included in this unit are about 5 percent Knob Hill soil and 5 percent Caliza soils on erosional fan remnants. Included areas make up about 10 percent of the total acreage.

Permeability of this Bluepoint soil is rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is high

This unit is used as habitat for desert wildlife and for recreation. It can be used for urban development.

This Bluepoint soil is well suited to the construction of dwellings. Excavation for houses and access roads can expose material that is highly susceptible to soil blowing

The main limitation for septic tank absorption fields is inadequate filtration of effluent. Because the substratum is highly permeable, special design may be needed to avoid polluting ground water and nearby water supplies.

Roads can easily be constructed and maintained on this unit. During prolonged dry periods, roads are difficul to maintain. Loose sand on the roads results in poor traction and increases the risk of soil blowing.

Because the soil is moderately droughty, applications of irrigation water to lawns and gardens should be light and frequent.

This map unit is in capability subclasses IIIs, irrigated, and VIIs, nonirrigated. It is in horticultural group 3.

128—Bluepoint gravelly loamy fine sand, 2 to 4 percent slopes. This very deep, somewhat excessively drained soil is on sand sheets on fan piedmonts. It formed in sandy alluvium derived from various kinds of rock.

Typically, about 25 percent of the surface is covered with a desert pavement of small pebbles. The surface layer is light yellowish brown gravelly loamy fine sand about 9 inches thick. The upper 15 inches of the underlying material is light brown, stratified fine sand to

avelly loamy fine sand, the next 17 inches is pink amy fine sand, and the lower part to a depth of 60 ches or more is pink, stratified loamy sand to very fine ndy loam.

Included in this unit are about 5 percent Knob Hill soils id 5 percent Caliza soils on erosional fan remnants. cluded areas make up about 10 percent of the total reage.

Permeability of this Bluepoint soil is rapid. Available ater capacity is low. Effective rooting depth is 60 ches or more. Runoff is very slow, and the hazard of ater erosion is slight. The hazard of soil blowing is high.

Most areas of this unit are used as habitat for desert ldlife and for recreation. A few areas are used for ban development.

This Bluepoint soil is well suited to the construction of vellings. Excavation for houses and access roads can pose material that is highly susceptible to soil blowing.

The main limitation for septic tank absorption fields is adequate filtration of effluent. Because the substratum highly permeable, special design may be needed to oid polluting ground water and nearby water supplies.

Roads can easily be constructed and maintained on is unit. During prolonged dry periods, roads are difficult maintain. Loose sand on the roads results in poor action and increases the risk of soil blowing.

Removing the desert pavement is necessary for best sults when landscaping, particularly in areas used for wns. Because the soil is moderately droughty, plications of irrigation water should be light and equent.

This map unit is in capability subclasses IIIs, irrigated, id VIIs, nonirrigated. It is in horticultural group 3.

129—Bluepoint loamy fine sand, 4 to 15 percent opes. This very deep, somewhat excessively drained il is on sand dunes on alluvial flats. It formed in eolian posits derived dominantly from sandstone and artzite. Areas are very irregular in shape and are 5 to 0 acres in size.

Typically, the surface layer is pink loamy fine sand 2 ches thick. The underlying material to a depth of 60 ches or more is pink fine sand.

Included in this unit are about 5 percent Land soils on cent alluvial flats and 5 percent Las Vegas soils and 5 rcent McCarran soils on relict alluvial flats. Included eas make up about 15 percent of the total acreage. e percentage varies from one area to another.

Permeability of this Bluepoint soil is rapid. Available ter capacity is low. Effective rooting depth is 60 hes or more. Runoff is very slow, and the hazard of ter erosion is slight. The hazard of soil blowing is high.

This unit is used mainly as habitat for desert wildlife d for recreation. It is also used for urban development.

Slope is a concern in designing and constructing ellings on this unit. This unit is easily leveled if proper uipment is used. Excavation for houses and access roads can expose material that is highly susceptible to soil blowing.

The main limitation for septic tank absorption fields is inadequate filtration of effluent. Because the substratum is highly permeable, special design may be needed to avoid polluting ground water and nearby water supplies. If the density of housing is moderate to high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage from onsite sewage disposal systems.

Roads can easily be constructed and maintained on this unit if the proper equipment is used for leveling. During prolonged dry periods, roads are difficult to maintain. Loose sand on the roads results in poor traction and increases the risk of soil blowing.

Lawns and landscaping can be established and maintained through proper fertilizing, seeding, mulching, and shaping of the slopes. Because the soil is moderately droughty, applications of irrigation water should be light and frequent.

This map unit is in capability subclasses IVs, irrigated, and VIIs, nonirrigated. It is in horticultural group 3.

130—Bracken-Destazo complex, 2 to 15 percent slopes. This map unit is on dissected pediments.

This unit is 65 percent Bracken very cobbly fine sandy loam, 2 to 8 percent slopes, and 25 percent Destazo cobbly fine sandy loam, 8 to 15 percent slopes. The Bracken soil is on the summits of dissected pediments, and the Destazo soil is on the side slopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Las Vegas soils on summits of basin floor remnants. The percentage varies from one area to another.

The Bracken soil is deep and somewhat excessively drained. It formed in gypsiferous residuum derived dominantly from gypsiferous sedimentary rock that has a component of limestone. Typically, about 80 percent of the surface is covered with a desert pavement of cobbles and pebbles. The surface layer is pink very cobbly fine sandy loam about 1 inch thick. The upper 4 inches of the underlying material is pink gravelly sandy loam, the next 48 inches is pink gravelly sandy loam with 75 percent gypsum crystals, and the lower part to a depth of 60 inches or more is weakly consolidated, gypsiferous sediment. Depth to the gypsiferous sediment ranges from 40 to 60 inches or more.

Permeability of the Bracken soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 40 to 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is high if the surface is disturbed.

The Destazo soil is very deep and well drained. It formed in alluvium derived dominantly from limestone and dolomite. Typically, about 50 percent of the surface

is covered with a desert pavement of cobbles and pebbles. The surface layer is pink cobbly fine sandy loam about 10 inches thick. The upper 21 inches of the underlying material is light brown very gravelly sandy clay loam, and the lower part to a depth of 60 inches or more is pink gravelly sandy loam that contains some gypsum. The pebbles and cobbles in the soil are mostly indurated lime nodules.

Permeability of the Destazo soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

Slope is a concern in designing and constructing dwellings on the Destazo soil. Application of excess water may dissolve enough gypsum in the Bracken soil to cause soil subsidence. Because of the high content of gypsum, the soil can settle if the gypsum dissolves and leaches from the soil when it is irrigated. The risk of settlement can be reduced by avoiding excessive irrigation. Protection for buildings can be provided in some areas by placing perforated drain tile around the foundation and using sewers as outlets. Subsidence in urban areas caused by the dissolution of gypsum in the soil can be prevented by using gutters and downspouts that discharge directly into the sewer system. Gypsum in the soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

The main limitation for septic tank absorption fields on the Bracken soil is inadequate filtration of effluent. Because the substratum is highly permeable, special design may be needed to avoid polluting ground water and nearby water supplies. The main limitation for septic tank absorption fields on the Destazo soil is restricted permeability. The operation of septic tank absorption fields can be improved in some areas by placing the absorption lines below the less permeable subsoil.

Cutting and filling can be reduced by building roads in the less sloping areas of the unit. Runoff concentrated in drainage ditches can dissolve enough gypsum in the Bracken soil to cause soil subsidence.

The main limitation for lawns and landscaping is the large stones on the surface. The Bracken soil also has a very low available water capacity and a high content of gypsum. The desert pavement limits the use of most equipment. Removing the desert pavement is necessary for best results in landscaping. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the very low available water capacity of the Bracken soil. Application of excess water can dissolve enough gypsum in the soil to cause soil subsidence. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclass VIIs, nonirrigated. The Bracken soil is in horticultural group 3, and the Destazo soil is in horticultural group 2.

132—Bracken very gravelly fine sandy loam, 2 to 8 percent slopes. This deep, somewhat excessively drained soil is on pediments and alluvial flats. It formed in gypsiferous alluvium derived from various kinds of rock high in gypsum.

Typically, about 90 percent of the surface is covered with a desert pavement of pebbles and cobbles. The surface layer is pink very gravelly fine sandy loam about 5 inches thick. The upper 12 inches of the underlying material is pink gravelly sandy loam, the next 32 inches is white gravelly sandy loam and gypsum crystals, and the lower part to a depth of about 60 inches or more is weakly consolidated, gypsiferous sediment. Depth to the gypsiferous sediment ranges from 40 to 60 inches or more.

Included in this unit are about 5 percent Grapevine soils and 5 percent McCarran soils on relict alluvial flats. Included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Bracken soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 40 to 60 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is high if the surface is disturbed.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

Because of the high content of gypsum, the soil can settle if the gypsum dissolves and leaches from the soil when it is irrigated. The risk of settlement can be reduced by avoiding excessive irrigation. Protection for buildings can be provided in some areas by placing perforated drain tile around the foundation and using sewers as outlets. Subsidence in urban areas caused by the dissolution of gypsum in the soil can be prevented by using gutters and downspouts that discharge directly into the sewer system. Gypsum in the soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

The main limitation for septic tank absorption fields is inadequate filtration of effluent. Because the substratum is highly permeable, special design may be needed to avoid polluting ground water and nearby water supplies.

Roads can easily be constructed and maintained on this unit. Concentrated runoff in drainage ditches can dissolve gypsum in the subsurface layers and cause subsidence.

The main limitation for lawns and landscaping is the very low available water capacity. Frequent irrigation of lawns, gardens, and most other plantings is needed.

emoval of pebbles and cobbles from the surface is eeded for best results when landscaping. Applying cess water can dissolve enough gypsum in the soil to use soil subsidence. Lawn grasses, shrubs, and trees at are not sensitive to lime-induced chlorosis are well ited to use in landscaping. Annual applications of iron elates reduce the effects of chlorosis.

This map unit is in capability subclasses IVs, irrigated, d VIIs, nonirrigated. It is in horticultural group 3.

133—Bracken-Rock outcrop complex, 8 to 30 ercent slopes. This map unit is on dissected ediments.

This unit is 65 percent Bracken very gravelly sandy am, 8 to 30 percent slopes, eroded, and 20 percent ock outcrop. The Bracken soil is on dissected ediments, and Rock outcrop is on side slopes of ssected pediments. The components of this unit are so tricately intermingled that it was not practical to map em separately at the scale used.

Included in this unit are about 10 percent Aztec soils, to 8 percent slopes, on erosional fan remnants and 5 ercent Arizo soils, flooded, in channels. Included areas ake up about 15 percent of the total acreage.

The Bracken soil is deep and somewhat excessively ained. It formed in residuum derived dominantly from eakly consolidated, gypsiferous sediment. Typically, 95 ercent of the surface is covered with pebbles. The rface layer is pink very gravelly sandy loam about 1 ch thick. The upper 40 inches of the underlying aterial is pink sandy loam and gravelly sandy loam, veraging sandy loam and containing about 75 percent psum crystals, and the lower part to a depth of 60 ches or more is weakly consolidated, gypsiferous diment. Depth to the gypsiferous sediment ranges om 40 to 60 inches or more.

Permeability of the Bracken soil is moderately rapid. vailable water capacity is very low. Effective rooting epth is 40 to 60 inches or more. Runoff is medium, and e hazard of water erosion is slight. The hazard of soil owing is high if the surface is disturbed.

Rock outcrop consists of exposed areas of igneous d metamorphic rock.

This unit is used as habitat for desert wildlife and for creation.

This unit is limited for roads because of slope in some eas and Rock outcrop. Cutting and filling can be duced by building roads in the less sloping areas. oads should be provided with adequate surface ainage. Channeling and deposition can be controlled d maintenance costs reduced by stabilizing areas that ave been disturbed. Gypsum in the soil can induce ectrochemical action that corrodes concrete. This nitation can be overcome by using cement that is sistant to sulfate corrosion. Concentrated runoff in ainage ditches can dissolve gypsum in the subsurface yers and cause subsidence.

This map unit is in capability subclass VIIs, nonirrigated. The Bracken soil is in horticultural group 3.

134—Bracken very gravelly fine sandy loam, 4 to 30 percent slopes. This deep, somewhat excessively drained soil is on dissected pediments. It formed in residuum derived dominantly from weakly consolidated, gypsiferous sediment.

Typically, 95 percent of the surface is covered with pebbles. The surface layer is pink very gravelly fine sandy loam about 1 inch thick. The upper 52 inches of the underlying material is pink sandy loam and gravelly sandy loam that averages sandy loam and contains about 75 percent gypsum crystals, and the lower part to a depth of 60 inches or more is weakly consolidated, gypsiferous sediment. Depth to the gypsiferous sediment ranges from 40 to 60 inches or more.

Included in this unit is about 5 percent Aztec soils, 2 to 8 percent slopes, on erosional fan remnants. The percentage varies from one area to another.

Permeability of the Bracken soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 40 to 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is high if the surface is disturbed.

This unit is used as habitat for desert wildlife and for recreation.

This unit is limited for roads because of steepness of slope in some areas. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should have adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed. Gypsum in the soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion. Concentrated runoff in drainage ditches can dissolve gypsum in the subsurface layers and cause subsidence.

This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 3.

140—Casaga very gravelly sandy clay loam, 0 to 8 percent slopes. This very deep, well drained soil is on erosional fan remnants. It formed in mixed alluvium derived dominantly from limestone and gypsiferous sediment.

Typically, 85 percent of the surface is covered with a desert pavement of pebbles and cobbles. A dark desert varnish is on the exposed surfaces of the rock fragments. The surface layer is white very gravelly sandy clay loam about 1 inch thick. The subsoil is very pale brown and brown clay loam about 20 inches thick. The upper 20 inches of the underlying material is light brown very gravelly clay loam, and the lower part to a depth of 60 inches or more is pinkish white, stratified very gravelly and gravelly sandy loam.

Included in this unit are about 10 percent Bracken soils on dissected pediments and 5 percent Weiser soils on erosional fan remnants. Included areas make up about 15 percent of the total acreage.

Permeability of the Casaga soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high if the desert pavement is disturbed. This soil is moderately affected by salts to a depth of 1 inch, slightly affected to a depth of 41 inches, and moderately affected below this depth.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The effects of shrinking and swelling on dwellings can be minimized by using an appropriate engineering design and by backfilling with material that has a low shrink-swell potential. Gypsum in the soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

The main limitation for septic tank absorption fields is the restricted permeability. Using long absorption lines and backfilling the trench with sandy material help to compensate for the restricted permeability. The operation of septic tank absorption fields can be improved in some areas by placing the absorption lines below the less permeable subsoil.

Trafficability of roads can be improved by providing a stable base and an adequate wearing surface.

The main limitations for lawns and landscaping are the presence of pebbles and excess salts throughout the soil. Removing the desert pavement is necessary for best results when landscaping, particularly in areas used for lawns. Because of the content of gypsum and other salts in the soil, salt-tolerant plants should be selected.

This map unit is in capability subclasses IVe, irrigated, and VIIc, nonirrigated. It is in horticultural group 4.

150—Cave very stony sandy loam, 0 to 4 percent slopes. This very shallow, well drained soil is on erosional fan remnants. It formed in alluvium derived from various kinds of rock.

Typically, about 70 percent of the surface is covered with a desert pavement of rock fragments and pan fragments. The surface layer is very pale brown very stony sandy loam about 3 inches thick. The underlying material to a depth of 6 inches is very pale brown gravelly sandy loam. The next layer to a depth of 60 inches or more is an indurated, lime-cemented hardpan. Depth to the hardpan ranges from 4 to 20 inches.

Included in this unit are about 5 percent Arizo soils, flooded, 0 to 4 percent slopes, in channels and 5 percent Caliza very stony fine sandy loam, 2 to 8 percent slopes, on erosional fan remnants. Included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

Permeability of the Cave soil is moderate above the hardpan. Available water capacity is very low. Effective rooting depth is 4 to 20 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high if the surface is disturbed.

Most areas of this unit are used as habitat for desert wildlife and for recreation. A few areas are used for urban development.

If this unit is used for urban development, the main limitation is the shallow depth to the lime-cemented hardpan. Heavy equipment is needed for excavation of building sites. Special design of septic tank absorption fields is needed.

Roads should be designed to minimize cuts because of the limited depth to the hardpan.

Removing the desert pavement is necessary for best results when landscaping, particularly in areas used for lawns. It is difficult to establish plants in areas where the pan is exposed. Mulching and fertilizing cut areas help to establish plants. Selection of adapted vegetation is critical for the establishment of lawns, shrubs, trees, and vegetable gardens. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

Intermittent streams form the drainageways in this unit. These drainageways are subject to rare or occasional periods of high-velocity flooding. Care should be taken during urbanization to accommodate the runoff from the drainageways. If drains become plugged during a major flood, accelerated erosion and damage to roads, buildings, and other structures can occur.

This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 6.

151—Cave loamy fine sand, 2 to 8 percent slopes. This shallow, well drained soil is on erosional fan remnants. It formed in alluvium derived from various kinds of rock.

Typically, the surface layer is light brown loamy fine sand about 5 inches thick. The underlying material to a depth of 11 inches is pink gravelly fine sandy loam. The next layer to a depth of 60 inches or more is an indurated, lime-cemented hardpan. Depth to the hardpan ranges from 10 to 20 inches.

Included in this unit is small areas of Arizo soils, flooded, in channels. Included areas make up about 5 percent of the total acreage.

Permeability of the Cave soil is moderate above the hardpan. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high.

This unit is used as habitat for desert wildlife and for recreation.

This unit is limited for roads because of the depth to e indurated hardpan. Roads should be designed to inimize cuts.

This map unit is in capability subclass VIIs, ɔnirrigated, and in horticultural group 6.

152—Cave gravelly fine sandy loam, 0 to 4 percent opes. This shallow, well drained soil is on erosional fan ɨmnants. It formed in alluvium derived from various nds of rock.

Typically, about 80 percent of the surface is covered ith a desert pavement of pebbles and cobbles. The ɹrface layer is pale brown gravelly fine sandy loam ɔout 12 inches thick. The next layer to a depth of 36 ches is an indurated, lime-cemented hardpan. The ɪderlying material to a depth of 60 inches or more is ght brown very gravelly sandy loam. Depth to the ardpan ranges from 4 to 20 inches.

Included in this unit are about 5 percent Arizo soils, ɔoded, in channels, 5 percent Canutio soils on inset .ns, and 5 percent Grapevine soils on side slopes of ·osional fan remnants. Included areas make up about 5 percent of the total acreage. The percentage varies om one area to another.

Permeability of the Cave soil is moderate above the ardpan. Available water capacity is very low. Effective ɔoting depth is 4 to 20 inches. Runoff is slow, and the azard of water erosion is slight. The hazard of soil owing is high if the surface is disturbed.

This unit is used mainly for urban development. It is so used as habitat for desert wildlife and for recreation.

This unit is poorly suited to urban development. The ain limitation is the shallow depth to the hardpan. xcavation for building sites is limited by the hardpan, ɪd heavy equipment is needed. Special design of septic .nk absorption fields is needed.

Roads should be designed to minimize cuts because the limited depth to the hardpan.

It is difficult to establish plants in areas where the pan exposed. Mulching and fertilizing cut areas help to stablish plants. Lawn grasses, shrubs, and trees that ·e not sensitive to lime-induced chlorosis are well suited use in landscaping. Annual applications of iron ɪelates reduce the effects of chlorosis.

Intermittent streams form the drainageways in this unit. ɪese drainageways are subject to rare or occasional eriods of high-velocity flooding. Care should be taken ɹring urbanization to accommodate the runoff from the ·ainageways. If drains become plugged during a major ɔod, accelerated erosion and damage to roads, ɹildings, and other structures can occur.

This map unit is in capability subclass VIIs, ɔnirrigated, and in horticultural group 6.

155—Cave gravelly fine sandy loam, 4 to 15 ercent slopes. This shallow, well drained soil is on erosional fan remnants. It formed in alluvium derived from various kinds of rock.

Typically, about 70 percent of the surface is covered with a desert pavement of rock fragments and pan fragments. The surface layer is light brown gravelly fine sandy loam about 5 inches thick. The underlying material to a depth of 15 inches is light brown gravelly fine sandy loam. The next layer to a depth of 60 inches or more is an indurated, lime-cemented hardpan. Depth to the hardpan ranges from 4 to 20 inches.

Included in this unit are about 5 percent Arizo soils, flooded, in channels and 5 percent Caliza soils on side slopes of erosional fan remnants. Included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

Permeability of the Cave soil is moderate above the hardpan. Available water capacity is very low. Effective rooting depth is 4 to 20 inches. Runoff is moderate, and the hazard of water erosion is slight. The hazard of soil blowing is high if the surface is disturbed.

This unit is used as habitat for desert wildlife and for recreation.

This unit is limited for roads because of the depth to the indurated hardpan. Roads should be designed to minimize cuts. Cutting and filling can be reduced by building roads in the less sloping areas.

This map unit is in capability subclass VIIs, nonirrigated and in horticultural group 6.

160—Destazo cobbly fine sandy loam, 0 to 2 percent slopes. This very deep, well drained soil is on relict alluvial flats. It formed in alluvium derived dominantly from limestone and dolomite.

Typically, about 60 percent of the surface is covered with a desert pavement of pebbles and cobbles. The surface layer is pink cobbly fine sandy loam about 11 inches thick. The upper 29 inches of the underlying material is light brown very gravelly sandy clay loam, and the lower part to a depth of 60 inches or more is pinkish white gravelly sandy loam containing some crystalline gypsum.

Included in this unit are about 5 percent Bracken very cobbly fine sandy loam, 2 to 8 percent slopes, on side slopes of slightly higher remnants of relict alluvial flats and 10 percent Las Vegas soils on summits of slightly higher remnants of alluvial flats. Included areas make up about 15 percent of the total acreage.

Permeability of this Destazo soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

This unit is well suited to the construction of dwellings.

The main limitation for septic tank absorption fields is restricted permeability. The operation of septic tank

absorption fields can be improved in some areas by placing the absorption lines below the less permeable subsoil. Using long absorption lines and backfilling the trench with sandy material help to compensate for the restricted permeability.

Roads can easily be constructed and maintained on this unit.

The main limitation for lawns and landscaping is the desert pavement. The desert pavement interferes with the use of equipment. Removal of pebbles and cobbles from the surface is needed for best results when landscaping. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclasses IVs, irrigated, and VIIs, nonirrigated. It is in horticultural group 2.

181—Caliza-Pittman extremely stony fine sandy loams, 2 to 8 percent slopes. This map unit is on fan remnants.

This unit is 50 percent Caliza extremely stony fine sandy loam, 2 to 8 percent slopes, and 40 percent Pittman extremely stony fine sandy loam, 2 to 8 percent slopes. The Caliza soil is on erosional fan remnants, and the Pittman soil is on nonburied fan remnants. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Arizo soils, flooded, in channels.

The Caliza soil is very deep and well drained. It formed in alluvium derived from various kinds of rock. Typically, about 75 percent of the surface is covered with a desert pavement of stones, cobbles, and pebbles. The surface layer is light brown extremely stony fine sandy loam about 2 inches thick. The upper 12 inches of the underlying material is pink very gravelly sandy loam, and the lower part to a depth of 60 inches or more is light brown and pink, stratified very gravelly loamy sand to very gravelly coarse sand.

Permeability of the Caliza soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate if the surface is disturbed.

The Pittman soil is moderately deep and well drained. It formed in alluvium derived from various kinds of rock. Typically, about 75 percent of the surface is covered with a desert pavement of stones, cobbles, and pebbles. The surface layer is pale brown extremely stony fine sandy loam about 2 inches thick. The upper 21 inches of the underlying material is light brown, stratified gravelly loam to extremely gravelly coarse sand, the next 9 inches is an indurated, lime-cemented hardpan, and the lower part to a depth of 50 inches or more is a strongly lime-cemented hardpan. The next layer to a depth of 60 inches or more is light brown very gravelly sand. Depth to the hardpan ranges from 20 to 30 inches.

Permeability of the Pittman soil is rapid above the hardpan. Available water capacity is very low. Effective rooting depth is 20 to 30 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate if the surface is disturbed.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The presence of stones and cobbles throughout the soil interferes with the preparation of building sites. Deep cutting should be avoided because of the limited depth to the underlying hardpan in the Pittman soil.

The main limitation for septic tank absorption fields on the Pittman soil is the limited depth to the hardpan, and deep cutting should be avoided.

In areas of the Pittman soil, stones and cobbles in the soil create road hazards and increase maintenance cost unless an adequate wearing surface is maintained.

The main limitations for lawns and landscaping are the desert pavement and the very low available water capacity of the Pittman soil. The desert pavement interferes with the use of equipment. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the very low available water capacity of the Pittman soil.

Intermittent streams form the drainageways in this unit. These drainageways are subject to rare or occasional periods of high-velocity flooding. Care should be exercised during urbanization to accommodate the runoff from drainageways. If drains become plugged during a major flood, accelerated erosion and damage to roads, buildings, and other structures can occur.

This map unit is in capability subclass VIIs, nonirrigated. The Caliza soil is in horticultural group 2, and the Pittman soil is in horticultural group 6.

182—Caliza-Pittman-Arizo complex, 0 to 8 percent slopes. This map unit is on fan piedmonts.

This unit is 60 percent Caliza extremely cobbly fine sandy loam, 2 to 8 percent slopes; 20 percent Pittman extremely cobbly fine sandy loam, 2 to 8 percent slopes; and 15 percent Arizo very gravelly loamy sand, flooded, 0 to 4 percent slopes. The Caliza soil is on erosional fan remnants, the Pittman soil is on nonburied fan remnants, and the Arizo soil is in channels. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 5 percent Nickel soils on side slopes of erosional fan remnants.

The Caliza soil is very deep and well drained. It formed in alluvium derived from various kinds of rock. Typically, about 75 percent of the surface is covered with a desert pavement of cobbles and pebbles. The surface layer is light brown extremely cobbly fine sandy loam about 2 inches thick. The upper 12 inches of the underlying

material is pink very gravelly sandy loam, and the lower part to a depth of 60 inches or more is light brown and pink, stratified very gravelly loamy sand to very gravelly coarse sand.

Permeability of the Caliza soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate if the surface is disturbed.

The Pittman soil is moderately deep and well drained. It formed in alluvium derived from various kinds of rock. Typically, about 75 percent of the surface is covered with a desert pavement of cobbles and pebbles. The surface layer is pale brown extremely cobbly fine sandy loam about 2 inches thick. The upper 21 inches of the underlying material is light brown, stratified gravelly loam to extremely gravelly coarse sand, the next 9 inches is a pinkish white and pink indurated, lime-cemented hardpan, and the lower part to a depth of 50 inches or more is a light brown, stratified, weakly cemented to indurated, lime-cemented hardpan. The next layer to a depth of 60 inches or more is a light brown very gravelly sand. Depth to the hardpan ranges from 20 to 30 inches.

Permeability of the Pittman soil is rapid above the hardpan. Available water capacity is very low. Effective rooting depth is 20 to 30 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate if the surface is disturbed.

The Arizo soil is very deep and excessively drained. It formed in alluvium derived from various kinds of rock. Typically, about 80 percent of the surface is covered with a desert pavement of pebbles and a few cobbles. The surface layer is light brown very gravelly loamy sand about 8 inches thick. The underlying material to a depth of 60 inches or more is light brownish gray, stratified cobbly coarse sand to very gravelly loamy sand.

Permeability of the Arizo soil is very rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high if the surface is disturbed. This soil is subject to occasional periods of very brief, high-velocity flooding from March through September.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The main limitation for construction of dwellings is the hazard of flooding on the Arizo soil. Construction is moderately limited in areas of the Pittman soil by the depth to the hardpan and the content of cobbles throughout the soil. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Deep cutting should be avoided because of the limited depth to the underlying hardpan in the Pittman soil. Stones and cobbles interfere with the preparation of building sites.

The main limitations for septic tank absorption fields are the limited depth to the hardpan in areas of the Pittman soil and the hazard of flooding and inadequate filtration of effluent in areas of the Arizo soil. Excavation is limited by the hardpan. Special design of septic tank absorption fields is needed. Dikes and channels that have outlets for floodwater can be used to protect onsite sewage disposal systems from flooding. Because the substratum is highly permeable, special design may be needed to avoid polluting ground water and nearby water supplies. If the density of housing is moderate to high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage from onsite sewage disposal systems.

This unit is limited for roads because of the hazard of flooding on the Arizo soil. Construction of roads is moderately limited in areas of the Pittman soil by the depth to the hardpan and the content of cobbles. Flooding can be controlled only by use of major flood control structures. The Caliza and Pittman soils in this unit are flooded less frequently and are more suitable for use as sites for roads. Roads should be designed to minimize cuts on the Pittman soil. The desert pavement interferes with the use of equipment.

The main limitations for lawns and landscaping are the very low available water capacity of the Pittman and Arizo soils and the content of cobbles and pebbles in the soils. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the very low available water capacity of the soil. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclass VIIs, nonirrigated. The Caliza soil is in horticultural group 2, the Pittman is in horticultural group 6, and the Arizo soil is in horticultural group 3.

183—Caliza very cobbly loamy sand, 4 to 8 percent slopes. This very deep, well drained soil is on erosional fan remnants. It formed in alluvium derived from various kinds of rock.

Typically, the surface layer is light brown very cobbly loamy sand about 3 inches thick. The underlying material to a depth of 60 inches or more is light brown, stratified very gravelly loamy sand to very gravelly coarse sand. There are layers of weakly lime-cemented material in the upper part of the underlying material.

Included in this unit are about 10 percent Aztec soils on erosional fan remnants. The percentage varies from one area to another.

Permeability of the Caliza soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

This unit is well suited to the construction of dwellings.

Unless the density of housing is too high, septic tank absorption fields normally function well on this unit.

Roads can easily be constructed and maintained on this unit.

The main limitations for lawns and landscaping are the cobbles and pebbles throughout the soil. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 2.

184—Caliza very gravelly sandy loam, 2 to 8 percent slopes. This very deep, well drained soil is on erosional fan remnants. It formed in alluvium derived from various kinds of rock.

Typically, the surface layer is light brown very gravelly sandy loam about 3 inches thick. The upper 13 inches of the underlying material is light brown very gravelly sandy loam, and the lower part to a depth of 60 inches or more is light brown, stratified very gravelly coarse sand to very gravelly loamy sand.

Included in this unit is about 5 percent Aztec soils on erosional fan remnants. The percentage varies from one area to another.

Permeability of the Caliza soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The main limitation for construction of dwellings is the hazard of flooding.

Dikes and channels that have outlets for floodwater can be used to protect onsite sewage disposal systems from flooding.

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding.

The main limitation for lawns and landscaping is the content of pebbles in the soil. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclasses IVs, irrigated, and VIIs, nonirrigated. It is in horticultural group 2.

187—Caliza extremely cobbly fine sandy loam, 2 t 8 percent slopes. This very deep, well drained soil is o inset fan remnants. It formed in alluvium derived from various kinds of rock.

Typically, about 85 percent of the surface is covered with a desert pavement of cobbles, stones, and pebbles The surface layer is a light brown extremely cobbly fine sandy loam about 2 inches thick. The upper 12 inches o the underlying material is light brown and pink very gravelly sandy loam, and the lower part to a depth of 60 inches or more is light brown and pink, stratified materia that averages very gravelly loamy coarse sand. In some areas of similar included soils, the surface layer is extremely stony fine sandy loam.

Included in this unit are about 5 percent Arizo soils, flooded, in channels; 5 percent Pittman soils on erosional fan remnants; and 5 percent Aztec soils on erosional fan remnants. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Caliza soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate if the surface is disturbed.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development

This unit is well suited to the construction of dwellings.

Unless the density of housing is too high, septic tank absorption fields normally function well on this unit.

Roads can easily be constructed and maintained on this unit.

The main limitation for lawns and landscaping is the stones, cobbles, and pebbles on the surface and throughout the soil. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

Intermittent streams form the drainageways in this unit. These drainageways are subject to rare or occasional periods of high-velocity flooding. Care should be taken during urbanization to accommodate the runoff from the drainageways. If drains become plugged during a major flood, accelerated erosion and damage to roads, buildings, and other structures can occur.

This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 2.

190—Dalian very gravelly fine sandy loam, 2 to 4 percent slopes. This very deep, well drained soil is on fan skirts. It formed in alluvium derived dominantly from limestone and dolomite.

Typically, 65 percent of the surface is covered with a weakly developed desert pavement of pebbles. The surface layer is light yellowish brown very gravelly fine

ındy loam about 4 inches thick. The upper 7 inches of e underlying material is light yellowish brown extremely avelly fine sandy loam, the next 6 inches is light ellowish brown very gravelly sandy loam, and the lower art to a depth of 61 inches is light yellowish brown tremely gravelly fine sandy loam. Pebbles cover 50 to 5 percent of the surface.

Included in this unit are about 5 percent Tencee soils n erosional fan remnants and 10 percent Arizo soils, ooded, in channels. Included areas make up about 15 ercent of the total acreage. The percentage varies from ne area to another.

Permeability of this Dalian soil is moderately rapid. vailable water capacity is low. Effective rooting depth is 0 inches or more. Runoff is slow, and the hazard of ater erosion is slight. The hazard of soil blowing is oderate.

This unit is used mainly as habitat for desert wildlife nd for recreation. It is also used for urban development. This unit is well suited to the construction of dwellings. Septic tank absorption fields generally function well nless the density of housing is too high.

Roads are easily constructed and maintained.

The main limitation for lawns and landscaping is the ebbles on the surface and throughout the soil. Topsoil needed for best results when landscaping, particularly areas used for lawns. Lawn grasses, shrubs, and trees at are not sensitive to lime-induced chlorosis are well ited to use in landscaping. Annual applications of iron nelates reduce the effects of chlorosis.

Intermittent streams form the drainageways in this unit. nese drainageways are subject to rare or occasional eriods of high-velocity flooding. Care should be taken uring urbanization to accommodate the runoff from the ainageways. If drains become plugged during a major ood, accelerated erosion and damage to roads, uildings, and other structures can occur.

This map unit is in capability subclasses IVs, irrigated, nd VIIs, nonirrigated. It is in horticultural group 2.

191—Dalian very cobbly fine sandy loam, 2 to 8 ercent slopes. This very deep, well drained soil is on n skirts. It formed in alluvium derived dominantly from nestone and dolomite.

Typically, about 85 percent of the surface is covered ith a desert pavement of rock fragments. The surface yer is light yellowish brown very cobbly fine sandy loam out 5 inches thick. The underlying material to a depth 60 inches or more is light yellowish brown very avelly sandy loam to extremely gravelly fine sandy am.

Included in this unit are about 10 percent Tencee soils n erosional fan remnants and 5 percent Arizo soils, ooded, in channels. Included areas make up about 15 ercent of the total acreage. The percentage varies from ne area to another.

Permeability of this Dalian soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate if the surface is disturbed. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

Most areas of this unit are used as habitat for desert wildlife and for recreation. A few areas are used for urban development.

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding.

Dikes and channels that have outlets for floodwater can be used to protect onsite sewage disposal systems from flooding.

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding.

The main limitations for lawns and landscaping are the cobbles and pebbles on the surface and throughout the soil. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 2.

192—Dalian-McCullough complex, 0 to 4 percent slopes. This map unit is on fan skirts.

This unit is 55 percent Dalian very gravelly fine sandy loam, 0 to 4 percent slopes, and 35 percent McCullough very gravelly very fine sandy loam, gravelly substratum, 0 to 4 percent slopes. Both the Dalian and McCullough soils are on alluvial fan skirts. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Las Vegas soils on basin floor remnants and 5 percent Tencee soils on erosional fan remnants. Included areas make up about 10 percent of the total acreage.

The Dalian soil is very deep and well drained. It formed in alluvium derived from various kinds of rock. Typically, about 75 percent of the surface is covered with a desert pavement of pebbles. The surface layer is light yellowish brown very gravelly fine sandy loam about 5 inches thick. The underlying material to a depth of 60 inches or more is light yellowish brown very gravelly sandy loam.

Permeability of the Dalian soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is

moderate if the surface is disturbed. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

The McCullough soil is very deep and well drained. It formed in alluvium derived from various kinds of rock. Typically, about 75 percent of the surface is covered with a desert pavement of pebbles. The surface layer is pale brown very gravelly very fine sandy loam about 5 inches thick. The subsoil and upper part of the substratum to a depth of 30 inches are light yellowish brown, stratified loam to sandy loam, the next 10 inches or more is light yellowish brown, stratified coarse sand to loamy fine sand, and the lower part to a depth of 60 inches or more is light yellowish brown extremely gravelly loamy sand.

Permeability of the McCullough soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high if the surface is disturbed. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding.

If the McCullough soil is used for septic tank absorption fields, the limitation of restricted permeability can be overcome by increasing the size of the absorption field.

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding.

The main limitation for lawns and landscaping in areas of the Dalian soil is the pebbles on the surface and throughout the soil. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclasses IVs, irrigated, and VIIs, nonirrigated. It is in horticultural group 2.

200—Glencarb silt loam. This very deep, well drained soil is on recent alluvial flats. It formed in alluvium derived from various kinds of rock. Slope is 0 to 2 percent.

Typically, the surface layer is pale brown silt loam about 6 inches thick. The upper 10 inches of the underlying material is very pale brown clay loam, and the next 35 inches is very pale brown silty clay loam. The next layer to a depth of 54 inches is very pale brown very fine sandy loam. The lower part to a depth of 60 inches or more is a very pale brown silty clay loam.

Included in this unit are about 3 percent Bluepoint soils on sand sheets, 9 percent Land soils intermingled with the Glencarb soils on recent alluvial flats, and 3 percent McCarran soils on relict alluvial flats. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Glencarb soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks. This soil is slightly affected by salts below a depth of 6 inches.

This unit is used as habitat for desert wildlife and for recreation and urban development.

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding.

The main limitation for septic tank absorption fields is restricted permeability of the soil. Poor permeability increases the possibility of failure of septic tank absorption fields. Using long absorption lines and backfilling the trench with sandy material help to compensate for the restricted permeability.

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface.

Most climatically adapted plants can be used for lawns and landscaping in this unit.

This map unit is in capability subclasses IIs, irrigated, and VIIc, nonirrigated. It is in horticultural group 1.

206—Glencarb silt loam, flooded. This very deep, well drained soil is on flood plains. The drainage has been altered by seepage. The soil formed in alluvium derived from various kinds of rock. Slope is 0 to 2 percent.

Typically, the surface layer is very pale brown silt loam about 8 inches thick. The underlying material to a depth of 60 inches or more is pink silt loam and silty clay loam.

Included in this unit are about 5 percent Aztec soils on erosional fan remnants and 5 percent Land soils on the flood plains. Included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Glencarb soil is moderately slow. Available water capacity is high. Effective rooting depth is limited by a seasonal high water table that is at a depth of 3 to 5 feet from July through June. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to

ıccasional periods of brief, high velocity flooding from uly through September. This soil is slightly affected by ıalts to a depth of 8 inches, and it is moderately affected ıelow this depth.

This unit is used mainly as habitat for desert wildlife ınd for recreation. It is also used for urban development.

The main limitations for construction of dwellings is the ıazard of flooding. Flooding can be controlled only by ıse of major flood control structures.

The main limitations for septic tank absorption fields ıre the hazard of flooding, the high water table, and the estricted permeability. Flooding can be controlled only ıy use of major flood control structures. Restricted ıermeability and the high water table increase the ıossibility of failure of septic tank absorption fields.

This unit is limited for roads because of low soil ıtrength and the hazard of flooding. Roads and streets ıhould be designed to compensate for the instability of he soil. Flooding can be controlled only by use of major lood control structures.

The main limitation for lawns and landscaping is the ıxcess salts in the soil. Because of the content of ıypsum and other salts in the soil, salt-tolerant plants ıhould be selected. Lawn grasses, shrubs, and trees that ıre not sensitive to lime-induced chlorosis are well suited ɔ use in landscaping. Annual applications of iron ıhelates reduce the effects of chlorosis.

This map unit is in capability subclasses IIIw, irrigated, ınd VIw, nonirrigated. It is in horticultural group 5.

222—Glencarb silty clay loam, wet. This very deep, ıell drained soil is on recent alluvial flats. The drainage ıas been altered by seepage. The soil formed in .lluvium derived from various kinds of rock. Slope is 0 to ! percent.

Typically, the surface layer is very pale brown silty clay ɔam about 6 inches thick. The underlying material to a epth of 60 inches or more is pink silt loam and silty clay ɔam.

Included in this unit are about 5 percent Bluepoint oils on sand sheets and 5 percent Land soils on recent lluvial flats. Included areas make up about 10 percent f the total acreage. The percentage varies from one rea to another.

Permeability of this Glencarb soil is moderately slow. ıvailable water capacity is high. Effective rooting depth ı limited by a seasonal high water table that is at a epth of 3 to 5 feet from July through June. Runoff is low, and the hazard of water erosion is slight. The azard of soil blowing is high. This soil is subject to rare eriods of flooding during prolonged, high-intensity torms. Channeling and deposition are common along treambanks. This soil is slightly affected by salts to a epth of 8 inches, and it is moderately affected below ıis depth.

This unit is used mainly as habitat for desert wildlife nd for recreation. It is also used for urban development.

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding.

The main limitation for septic tank absorption fields is the high water table and the restricted permeability. Restricted permeability and the high water table increase the possibility of failure of septic tank absorption fields.

This unit is limited for roads because of low soil strength. Roads and streets should be designed to compensate for the instability of the soil.

The main limitation for lawns and landscaping is the excess salts in the soil. Because of the content of gypsum and other salts in the soil, salt-tolerant plants should be selected. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclasses IIIw, irrigated, and VIw, nonirrigated. It is in horticultural group 5.

236—Glencarb very fine sandy loam, saline. This very deep, well drained soil is on recent alluvial flats. It formed in alluvium derived from various kinds of rock. Slope is 0 to 2 percent.

Typically, the surface layer is light brownish gray very fine sandy loam about 6 inches thick. The underlying material to a depth of 60 inches or more is grayish brown, stratified clay loam to very fine sandy loam and contains some crystalline gypsum. In some areas of similar included soils, the surface layer is silty clay loam.

Included in this unit on relict alluvial flats are about 5 percent McCarran soils and on recent alluvial flats 10 percent Land soils that are affected by sodium sulfate.

Permeability of this Glencarb soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks. This soil is slightly affected by salts to a depth of 6 inches, and it is moderately affected by salts below this depth.

Most areas of this unit are used for urban development. A few areas are used for irrigated cropland, desert wildlife habitat, or recreation.

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Gypsum and other sulfates in the soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

The main limitation for septic tank absorption fields is the restricted permeability of the soil. Poor permeability increases the possibility of failure of septic tank absorption fields. Using long absorption lines and

backfilling the trench with sandy material help to compensate for the restricted permeability.

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface.

The main limitation for lawns and landscaping is the excess salts in the soil. Because of the content of gypsum and other salts in the soil, salt-tolerant plants should be selected. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

If this unit is used for irrigated crops, the main limitations are excess salts and low fertility of the soil. The content of toxic salts can be reduced by leaching and returning crop residue to the soil. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility and tilth. Crops respond to nitrogen and phosphorus. The average yield is 6 tons per acre for alfalfa hay grown under a high level of management.

This map unit is in capability subclasses IIIs, irrigated, and VIIs, nonirrigated. It is in horticultural group 4.

237—Glencarb very fine sandy loam, hardpan substratum. This deep, well drained soil is on recent alluvial flats. It formed in alluvium derived from various kinds of rock. Slope is 0 to 2 percent.

Typically, the surface layer is pale brown very fine sandy loam about 6 inches thick. The upper 36 inches of the underlying material is very pale brown, stratified silty clay loam to silt loam, and the lower part to a depth of 60 inches or more is a strongly lime-cemented hardpan. Depth to the hardpan ranges from 40 to 60 inches or more.

Permeability of the Glencarb soil is moderately slow above the hardpan. Available water capacity is moderate. Effective rooting depth is 40 to 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is moderately affected by salts below a depth of 6 inches. It is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

Most areas of this unit are used as habitat for desert wildlife and for recreation and cropland. A few areas are used for urban development.

If this unit is used for irrigated crops, the main limitations are the hazard of soil blowing, excess salts, and low fertility of the soil. Maintaining crop residue on or near the surface reduces runoff, reduces soil blowing, and helps to maintain soil tilth and organic matter content. Content of toxic salts can be reduced by leaching and returning crop residue to the soil. Crops respond to nitrogen and phosphorus. The average yield is 6 tons per acre for alfalfa hay grown under a high level of management.

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding.

The main limitation for septic tank absorption fields is the restricted permeability of the soil. Poor permeability increases the possibility of failure of septic tank absorption fields. Using long absorption lines and backfilling the trench with sandy material help to compensate for the restricted permeability.

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface.

Most climatically adapted plants can be used for lawns and landscaping.

This map unit is in capability subclasses IIIs, irrigated, and VIIs, nonirrigated. It is in horticultural group 1.

240—Goodsprings gravelly fine sandy loam, 2 to 4 percent slopes. This shallow, well drained soil is on erosional fan remnants. It formed in mixed alluvium derived mainly from limestone and sandstone.

Typically, about 90 percent of the surface is covered with a well developed desert pavement of pebbles. There is a dark desert varnish on the exposed surfaces of the rock fragments. The surface layer is light brown gravelly fine sandy loam about 5 inches thick. The upper 10 inches of the underlying material is pink gravelly fine sandy loam, the next 37 inches is a reddish brown and pinkish white, strongly lime-cemented hardpan, and the lower part to a depth of 60 inches or more is pink extremely gravelly loamy fine sand. Depth to the hardpan ranges from 9 to 20 inches.

Included in this unit is about 5 percent Jean soils, flooded, in channels.

Permeability of the Goodsprings soil is moderate above the hardpan. Available water capacity is very low. Effective rooting depth is 9 to 20 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is high if the desert pavement is disturbed.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The main limitation for construction of dwellings is the limited depth to the hardpan. Heavy equipment is needed for excavation.

The main limitation for septic tank absorption fields is the limited depth to the hardpan. Excavation is limited by the hardpan. Special design of septic tank absorption fields is needed.

This unit is limited for roads because of the limited depth to the hardpan. Roads should be designed to

inimize cuts. Heavy equipment is needed for xcavation.

The main limitation for lawns and landscaping is the mited depth to the hardpan. It is difficult to establish lants in areas where the pan is exposed. Mulching and ertilizing cut areas help to establish plants. Lawn rasses, shrubs, and trees that are not sensitive to lime-nduced chlorosis are well suited to use in landscaping. nnual applications of iron chelates reduce the effects of hlorosis.

Intermittent streams form the drainageways in this unit. hese drainageways are subject to rare or occasional eriods of high-velocity flooding. Care should be xercised during urbanization to accommodate runoff rom the drainageways. if drains become plugged during major flood, accelerated erosion and damage to roads, uildings, and other structures can occur.

This map unit is in capability subclass VIIs, onirrigated. It is in horticultural group 6.

252—Grapevine very fine sandy loam, 0 to 2 ercent slopes. This very deep, well drained soil is on elict alluvial flats. It formed in alluvium derived from arious kinds of rock.

Typically, about 10 percent of the surface is covered vith a desert pavement of pebbles. The surface layer is ink very fine sandy loam about 1 inch thick. The upper 9 inches of the underlying material is pink and pinkish vhite fine sandy loam, the next 20 inches or more is pink ery fine sandy loam, and the lower part to a depth of 54 nches is stratified, pink very fine sandy loam and reddish ellow fine sandy loam and has a few gypsum masses. he next layer to a depth of 69 inches or more is pink oam that has common gypsum masses. About 90 acres f this unit, 1 mile west of McCarran Airport, is strongly issected and has a slope of 4 to 8 percent.

Included in this unit is about 5 percent Las Vegas soils n slightly higher relict alluvial flats.

Permeability of this Grapevine soil is moderate. vailable water capacity is high. Effective rooting depth s 60 inches or more. Runoff is slow, and the hazard of vater erosion is slight. The hazard of soil blowing is high. his soil is subject to rare periods of flooding during rolonged, high-intensity storms. Channeling and eposition are common along streambanks. The soil is lightly affected by salts below a depth of 5 inches.

This unit is used mainly as habitat for desert wildlife nd for recreation. It is also used for urban development.

The main limitation for construction of dwellings is the azard of flooding. Dikes and channels that have outlets or floodwater can be used to protect buildings from ooding. Gypsum in the soil can induce electrochemical ction that corrodes concrete. This limitation can be vercome by using cement that is resistant to sulfate orrosion.

Dikes and channels that have outlets for floodwater an be used to protect onsite sewage disposal systems from flooding. If the Grapevine soil is used for septic tank absorption fields, the limitation of restricted permeability can be overcome by increasing the size of the absorption field.

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding.

The main limitation for lawns and landscaping is the excess salts in the soil. Salts can be flushed out by using heavy periodic applications of water. Because of the content of gypsum and other salts in the soil, salt-tolerant plants should be selected. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclasses IIs, irrigated, and VIIc, nonirrigated. It is in horticultural group 2.

255—Grapevine loamy fine sand, 2 to 4 percent slopes. This very deep, well drained soil is on relict alluvial flats and basin floor remnants. It formed in alluvium derived from various kinds of rock.

Typically, about 50 percent of the surface is covered with a desert pavement of small pebbles and hardpan fragments. The surface layer is reddish yellow loamy fine sand about 10 inches thick. The underlying material to a depth of 60 inches or more is pink, stratified fine sandy loam to clay loam.

Included in this unit are about 5 percent Las Vegas soils on the slightly higher basin floor remnants and 5 percent McCarran soils on the relict alluvial flats. Included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Grapevine soil is moderate. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks. The soil is slightly affected by salts below a depth of 10 inches.

This unit is used mainly for urban development. It is also used as habitat for desert wildlife and for recreation.

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Gypsum in the soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

Dikes and channels that have outlets for floodwater can be used to protect onsite sewage disposal systems from flooding. If the Grapevine soil is used for septic tank absorption fields, the limitation of restricted

permeability can be overcome by increasing the size of the absorption field.

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding.

The main limitation for lawns and landscaping is the excess salts in the soil. Salts can be flushed out by using heavy periodic applications of water. Because of the content of gypsum and other salts in the soil, salt-tolerant plants should be selected. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclasses IIs, irrigated, and VIIs, nonirrigated. It is in horticultural group 2.

260—Jean gravelly loamy fine sand, 2 to 4 percent slopes. This very deep, excessively drained soil is on inset fans. It formed in alluvium derived from various kinds of rock.

Typically, about 40 percent of the surface is covered with a desert pavement of pebbles and a few cobbles. There is a dark desert varnish on the exposed surfaces of the rock fragments. The surface layer is pink gravelly loamy fine sand about 1 inch thick. The upper part of the underlying material is light reddish brown loamy fine sand about 7 inches thick, the next 10 inches or more is pink loamy fine sand, and the lower part to a depth of 60 inches or more is pink, stratified very gravelly loamy fine sand to extremely gravelly sand.

Included in this unit is about 5 percent Goodsprings soils on erosional fan remnants. The percentage varies from one area to another.

Permeability of this Jean soil is rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Excavating in areas of the Jean soil can expose material that is highly susceptible to soil blowing.

The main limitation for septic tank absorption fields is inadequate filtration of effluent. Because the substratum is highly permeable, special design may be needed to avoid polluting ground water and nearby water supplies. If the density of housing is moderate to high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage from onsite sewage disposal systems.

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding. Unless an adequate wearing surface is maintained, stones and cobbles in the soil create road hazards and increase maintenance costs.

The main limitation for lawns and landscaping is the very low available water capacity of the soil. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the limited available water capacity of the soil.

This map unit is in capability subclasses IVs, irrigated, and VIIs, nonirrigated. It is in horticultural group 3.

262—Jean-Goodsprings complex, 2 to 4 percent slopes. This map unit is on fan piedmonts.

This unit is 50 percent Jean gravelly loamy fine sand, 2 to 4 percent slopes, 25 percent Jean very gravelly loamy fine sand, flooded, 2 to 4 percent slopes, and 25 percent Goodsprings gravelly fine sandy loam, 2 to 4 percent slopes. The Jean gravelly loamy fine sand is on inset fans; the Jean, flooded, soil is in channels; and the Goodsprings soil is on erosional fan remnants. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

The Jean gravelly loamy fine sand is very deep and excessively drained. It formed in alluvium derived from various kinds of rock. Typically, about 75 percent of the surface is covered with a desert pavement of pebbles and cobbles. There is a dark desert varnish on the exposed surfaces of the rock fragments. The surface layer is pink gravelly loamy fine sand about 2 inches thick. The upper 10 inches of the underlying material is light reddish brown loamy fine sand, and the lower part to a depth of 60 inches or more is pink, stratified extremely gravelly sand to very gravelly loamy fine sand.

Permeability of this Jean soil is rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high if the surface is disturbed. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

The Jean very gravelly loamy fine sand, flooded, is very deep and excessively drained. It formed in alluvium derived from various kinds of rock. Typically, about 60 percent of the surface is covered with a desert pavement of pebbles and cobbles. The surface layer is pink very gravelly loamy fine sand about 1 inch thick. The upper 10 inches of the underlying material is light reddish brown loamy fine sand, and the lower part to a depth of 60 inches or more is pink, stratified gravelly fine sand to very gravelly loamy fine sand.

Permeability of this Jean soil is rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion

; slight. The hazard of soil blowing is high if the surface ; disturbed. This soil is subject to occasional periods of ery brief, high-velocity floods from June through ieptember.

The Goodsprings soil is shallow and well drained. It ɔrmed in mixed alluvium derived dominantly from mestone and sandstone. Typically, about 80 percent of ıe surface is covered with a desert pavement of ebbles and cobbles. There is a dark desert varnish on ıe exposed surfaces of the rock fragments. The surface ıyer is pink gravelly fine sandy loam about 5 inches ıick. The upper 10 inches of the underlying material is ink gravelly fine sandy loam, the next 37 inches is a inkish white, strongly lime-cemented hardpan, and the ɔwer part to a depth of 60 inches or more is pink xtremely gravelly loamy fine sand. Depth to the hardpan ıanges from 9 to 20 inches.

Permeability of the Goodsprings soil is moderate bove the hardpan. Available water capacity is very low. ffective rooting depth is 9 to 20 inches. Runoff is slow, nd the hazard of water erosion is slight. The hazard of oil blowing is high if the surface is disturbed. This soil is ubject to rare periods of flooding during prolonged, igh-intensity storms. Channeling and deposition are ommon along streambanks.

This unit is used mainly as habitat for desert wildlife nd for recreation. It is also used for urban development.

The main limitations for construction of dwellings are ıe hazard of flooding and the depth to the hardpan in reas of the Goodsprings soil. Flooding can be ontrolled only by use of major flood control structures. xcavation for building sites is limited by the hardpan. leavy equipment is needed. Excavating in areas of the ean soils can expose material that is highly susceptible ɔ soil blowing.

The main limitations for septic tank absorption fields re inadequate filtration of effluent, the hazard of ɔooding in areas of the Jean very gravelly loamy fine and, and the limited depth to the hardpan in areas of ıe Goodsprings soil. Because the substratum is highly ermeable, special design may be needed to avoid ɔlluting ground water and nearby water supplies. If the ensity of housing is moderate to high, community ewage systems are needed to prevent contamination of ater supplies as a result of seepage from onsite ewage disposal systems. Dikes and channels that have ıtlets for floodwater can be used to protect onsite ewage disposal systems from flooding. Excavation is nited by the hardpan. Heavy equipment is needed.

This unit is limited for roads because of the hazard of ɔoding in areas of the Jean very gravelly loamy fine ınd and the limited depth to the hardpan in areas of e Goodsprings soil. Flooding can be controlled only by se of major flood control structures. Roads should be esigned to minimize cuts.

The main limitations for lawns and landscaping are the ıry low available water capacity of the Jean soils, the desert pavement on the Jean very gravelly loamy fine sand, and the limited depth to the hardpan in areas of the Goodsprings soil. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the limited available water capacity. Removing the desert pavement is necessary for best results when landscaping, particularly in areas used for lawns. It is difficult to establish plants in areas where the pan is exposed. Mulching and fertilizing cut areas help to establish plants. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclasses IVs, irrigated, and VIIs, nonirrigated. The Jean soils are in horticultural group 3, and the Goodsprings soil is in horticultural group 6.

263—Jean complex, 2 to 4 percent slopes. This map unit is on inset fans.

This unit is 55 percent Jean gravelly loamy fine sand, 2 to 4 percent slopes, and 40 percent Jean very gravelly loamy fine sand, flooded, 2 to 4 percent slopes. The Jean gravelly loamy fine sand is on inset fans, and the Jean, flooded, soil is in channels. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 5 percent Goodsprings soils on erosional fan remnants.

The Jean gravelly loamy fine sand is very deep and excessively drained. It formed in mixed alluvium derived dominantly from limestone, quartzite, and sandstone. Typically, about 50 percent of the surface is covered with a desert pavement of pebbles and cobbles. There is a dark desert varnish on the exposed surfaces of the rock fragments. The surface layer is pink gravelly loamy fine sand about 1 inch thick. The upper 10 inches of the underlying material is light reddish brown loamy fine sand, and the lower part to a depth of 60 inches or more is pink, stratified extremely gravelly sand to very gravelly loamy fine sand.

Permeability of this Jean soil is rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high if the surface is disturbed. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

The Jean very gravelly loamy fine sand, flooded, is very deep and excessively drained. It formed in mixed alluvium derived dominantly from limestone, quartzite, and sandstone. Typically, about 60 percent of the surface is covered with a desert pavement of pebbles and cobbles. The surface layer is pink very gravelly loamy fine sand about 1 inch thick. The upper 10 inches of the underlying material is light reddish brown loamy

fine sand, and the lower part to a depth of 60 inches or more is pink, stratified extremely gravelly fine sand to very gravelly loamy fine sand.

Permeability of this Jean soil is rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high if the surface is disturbed. This soil is subject to occasional periods of very brief, high-velocity flooding from June through September.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The main limitation for construction of dwellings is the hazard of flooding. Flooding can be controlled only by use of major flood control structures. Excavating in areas of the Jean soils can expose material that is highly susceptible to soil blowing.

The main limitations for septic tank absorption fields are inadequate filtration of effluent and the hazard of flooding in areas of the Jean, flooded, soil. Because the substratum is highly permeable, special design may be needed to avoid polluting ground water and nearby water supplies. If the density of housing is moderate to high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage from onsite sewage disposal systems. Dikes and channels that have outlets for floodwater can be used to protect onsite sewage disposal systems from flooding.

The Jean, flooded, soil is limited for roads because of the hazard of flooding. Flooding can be controlled only by use of major flood control structures.

The main limitations for lawns and landscaping are the very low available water capacity and the desert pavement on the Jean, flooded, soil. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the limited available water capacity of the soil. Removing the desert pavement is necessary for best results when landscaping, particularly in areas used for lawns.

This map unit is in capability subclasses IVw, irrigated, and VIIw, nonirrigated. It is in horticultural group 3.

264—Jean very gravelly loamy fine sand, 2 to 4 percent slopes. This very deep, excessively drained soil is on inset fans. It formed in alluvium derived from various kinds of rock.

Typically, about 60 percent of the surface is covered with a desert pavement of pebbles. The surface layer is pink very gravelly loamy fine sand about 1 inch thick. The upper 17 inches of the underlying material is light reddish brown loamy fine sand, and the lower part to a depth of 60 inches or more is pink, stratified extremely gravelly sand to very gravelly loamy fine sand.

Permeability of this Jean soil is rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high if the surface is disturbed. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Excavating in areas of the Jean soil can expose material that is highly susceptible to soil blowing.

The main limitation for septic tank absorption fields is inadequate filtration of effluent. Because the substratum is highly permeable, special design may be needed to avoid polluting ground water and nearby water supplies. If the density of housing is moderate to high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage from onsite sewage disposal systems.

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding. Unless an adequate wearing surface is maintained, stones and cobbles in the soil create road hazards and increase maintenance costs.

The main limitations for lawns and landscaping are the desert pavement and the very low available water capacity. Removing the desert pavement is necessary for best results when landscaping, particularly in areas used for lawns. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the limited available water capacity of the soil.

This map unit is in capability subclasses IVs, irrigated, and VIIs, nonirrigated. It is in horticultural group 3.

270—Land silt loam, drained. This very deep, somewhat poorly drained soil is on recent alluvial flats. The drainage has been artificially altered. The soil formed in alluvium derived from various kinds of rock. Slope is 0 to 2 percent.

Typically, the surface layer is pink silt loam that is high in soluble salts and is about 6 inches thick. The underlying material to a depth of 60 inches or more is pink, stratified silty clay to silt loam and is high in soluble salts.

Included in this unit are about 5 percent Glencarb soils on recent alluvial flats and 5 percent McCarran soils on relict alluvial flats. Included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Land soil is moderately slow. Available water capacity is high. Effective rooting depth is limited by a seasonal high water table that is at a depth of 3.5 to 6.0 feet from March through September. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are

mmon along streambanks. This soil is strongly
ected by salts.
This unit is used mainly as habitat for desert wildlife
d for recreation. It is also used for urban development
d irrigated hay.
Some areas of this unit may be subject to salt heaving
cause of the expansion of sodium sulfate salts. This
tion may cause concrete slab floors, driveways, and
lewalks to crack. Removal of the sodium sulfate salts
mechanical means, deep leaching, or chemical
atment can alleviate this problem.
The main limitation for construction of dwellings is the
zard of flooding. Dikes and channels that have outlets
floodwater can be used to protect buildings from
oding. Sodium sulfate in the soil can induce
ctrochemical action that corrodes concrete. This
itation can be overcome by using cement that is
sistant to sulfate corrosion.
The main limitation for septic tank absorption fields is
restricted permeability of the soil. Using long
sorption lines and backfilling the trench with sandy
terial help to compensate for the restricted
rmeability.
This unit is limited for roads because of the limited
ility of the soil to support a load and the presence of
dium sulfate salts. Roads and streets should be
signed to compensate for the instability of the soil.
cal roads and streets may require a special base to
oid damage from the expansion of sodium sulfate
lts.
The main limitation for lawns and landscaping is
cessive salts in the soil. Because of the content of
dium sulfate and other salts in the soil, salt-tolerant
nts should be selected.
f this unit is used for irrigated hay, pasture, or other
ps, the main limitations are excessive salts in the soil
d low soil fertility. Intensive management is required to
luce the salinity and maintain soil productivity.
turning all crop residue to the soil and using a
pping system that includes grasses, legumes, or
ss-legume mixtures help to maintain fertility and tilth.
ntent of toxic salts is reduced by leaching and
urning crop residue to the soil. Tile drainage can be
ed to maintain or lower the level of the water table if a
table outlet is available. Crops respond to nitrogen
d phosphorus. The average yield is 5 tons per acre for
alfa hay grown under a high level of management.
This map unit is in capability subclasses VIw, irrigated,
d VIIw, nonirrigated. It is in horticultural group 5.

278—Land very fine sandy loam, wet. This very
ep, somewhat poorly drained soil is on recent alluvial
s. The drainage has been altered by seepage in the
a. The soil formed in mixed alluvium derived
minantly from limestone, gypsum, quartzite, and
dstone and undifferentiated volcanic and sedimentary
k. Slope is 0 to 2 percent.

Typically, the surface layer is light yellowish brown very fine sandy loam about 2 inches thick. The upper 8 inches of the underlying material is pinkish gray gravelly sandy loam, and the lower part to a depth of 60 inches or more is light brown or brown silt loam and silty clay loam and is high in soluble salts.

Included in this unit is about 5 percent Glencarb soils on the recent alluvial flats.

Permeability of this Land soil is moderately slow. Available water capacity is high. Effective rooting depth is limited by a seasonal high water table that is at a depth of I.5 to 3 feet from January through December. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks. This soil is moderately affected by salts to a depth of 2 inches, and it is strongly affected by salts below this depth.

This unit is used as habitat for desert wildlife and for recreation.

This unit is limited for roads because of the limited ability of the soil to support a load and because of the content of sodium sulfate salts. Roads and streets should be designed to compensate for the instability of the soil. Local roads and streets may require a special base to avoid damage from the expansion of sodium sulfate salts. Sodium sulfate in the soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

This map unit is in capability subclasses VIw, irrigated, and VIIw, nonirrigated. It is in horticultural group 5.

282—Land silty clay loam. This very deep, somewhat poorly drained soil is on recent alluvial flats. It formed in alluvium derived from various kinds of rock. Slope is 0 to 2 percent.

Typically, the surface layer is very pale brown silty clay loam about 2 inches thick. The upper 5 inches of the underlying material is pale brown silt loam, the next 3 inches is pale brown loam, and the lower part to a depth of 64 inches is pale brown to light yellowish brown silty clay loam that is high in soluble salts. In some areas of similar included soils, the surface layer is silt loam.

Included in this unit are about 5 percent Glencarb soils, slightly wet, saline, 5 percent McCarran soils, and 5 percent Spring soils on alluvial flats. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Land soil is moderately slow. Available water capacity is high. Effective rooting depth is limited by a seasonal high water table that is at a depth of 3 to 5 feet from January through December. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged,

high-intensity storms. Channeling and deposition are common along streambanks. This soil is strongly affected by salts.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Some areas of this unit may be subject to salt heaving because of the expansion of sodium sulfate salts. This action may cause concrete slab floors, driveways, and sidewalks to crack. Removal of the sodium sulfate salts by mechanical means, deep leaching, or chemical treatment can alleviate this problem. Sodium sulfate in the soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

The main limitation for septic tank absorption fields is restricted permeability of the soil. Using long absorption lines and backfilling the trench with sandy material help to compensate for the restricted permeability.

This unit is limited for roads because of limited ability of the soil to support a load and because of the presence of sodium sulfate salts. Roads and streets should be designed to compensate for the instability of the soil. Local roads and streets may require a special base to avoid damage from the expansion of sodium sulfate salts.

The main limitations for lawns and landscaping are excessive soluble salts in the soil. Because of the content of sodium sulfate and other salts in the soil, salt-tolerant plants should be selected. Content of toxic salts can be reduced by leaching, applying proper amounts of soil amendments, and returning crop residue to the soil.

This map unit is in capability subclasses VIw, irrigated, and VIIw, nonirrigated. It is in horticultural group 5.

300—Las Vegas gravelly fine sandy loam, 0 to 2 percent slopes. This shallow, well drained soil is on basin floor remnants. It formed in alluvium derived dominantly from limestone and dolomite.

Typically, about 25 percent of the surface is covered with a desert pavement of hardpan fragments and pebbles. The surface layer is very pale brown gravelly fine sandy loam about 1 inch thick. The upper 6 inches of the underlying material is very pale brown fine sandy loam, and the next 4 inches is very pale brown gravelly sandy clay loam. A white, indurated, lime-cemented hardpan is at a depth of about 11 inches. Depth to the hardpan ranges from 3 to 14 inches.

Included in this unit are about 5 percent Destazo soils, 0 to 4 percent slopes, and 5 percent Grapevine soils, 0 to 4 percent slopes, on erosional fan remnants. Included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

Permeability of the Las Vegas soil is moderately slow above the hardpan. Available water capacity is very low. Effective rooting depth is 3 to 14 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The main limitations for construction of dwellings are the hazard of flooding and the limited depth to the hardpan. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Excavation for building sites is limited by the hardpan. Heavy equipment is needed for excavation.

The main limitation for septic tank absorption fields is the limited depth to the hardpan. Special design of septic tank absorption fields is needed. Excavation is limited by the hardpan. Heavy equipment is needed for excavation.

This unit is limited for roads because of the limited depth to the hardpan. Roads should be designed to minimize cuts. Heavy equipment is needed for excavation.

The main limitation for lawns and landscaping is the limited depth to the hardpan. It is difficult to establish plants in areas where the pan is exposed. Mulching and fertilizing cut areas help to establish plants. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 6.

301—Las Vegas gravelly fine sandy loam, 2 to 4 percent slopes. This shallow, well drained soil is on deeply dissected basin floor remnants. It formed in alluvium derived dominantly from limestone and dolomite.

Typically, about 30 percent of the surface is covered with a desert pavement of hardpan fragments and pebbles. The surface layer is very pale brown gravelly fine sandy loam about 1 inch thick. The upper 6 inches of the underlying material is very pale brown fine sandy loam, and the next 4 inches is very pale brown gravelly sandy clay loam. A white, indurated, lime-cemented hardpan is at a depth of about 11 inches. Depth to the hardpan ranges from 3 to 14 inches.

Included in this unit is about 5 percent Destazo soils, 8 to 15 percent slopes, on side slopes of erosional fan remnants.

Permeability of the Las Vegas soil is moderately slow above the hardpan. Available water capacity is very low. Effective rooting depth is 3 to 14 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of

ooding during prolonged, high-intensity storms. ;hanneling and deposition are common along treambanks.

This unit is used as habitat for desert wildlife and for ecreation.

This unit is limited for roads because of the depth to n indurated hardpan and the dendritic pattern of traight-walled channels that are 5 to 20 feet deep. loads should be designed to minimize cuts. Heavy quipment is needed for excavation. Roads that cross ne deep channels require bridging or deep cuts and fills nd large culverts.

This map unit is in capability subclass VIIs, onirrigated, and in horticultural group 6.

302—Las Vegas-McCarran-Grapevine complex, 0 to percent slopes. This map unit is on basin floor emnants.

This unit is 40 percent Las Vegas gravelly fine sandy oam, 0 to 4 percent slopes; 25 percent McCarran fine andy loam, 0 to 4 percent slopes, eroded; and 20 ercent Grapevine very fine sandy loam, 0 to 4 percent lopes. The Las Vegas soil is on summits, the McCarran oil is on foot slopes, and the Grapevine soil is on houlders of basin floor remnants. The components of his unit are so intricately intermingled that it was not ractical to map them separately at the scale used.

Included in this unit are about 5 percent areas of adland; 5 percent Bluepoint soils on small sand sheets; nd 5 percent Bracken soils on pediment remnants. ncluded areas make up about 15 percent of the total creage. The percentage varies from one area to nother.

The Las Vegas soil is shallow and well drained. It rmed in alluvium derived from limestone and lacustrine ediment. Typically, the surface layer is very pale brown avelly fine sandy loam about 1 inch thick. The upper 6 ches of the underlying material is very pale brown fine andy loam, and the next 4 inches is very pale brown avelly sandy clay loam. A white, indurated, lime-emented hardpan is at a depth of about 11 inches. epth to the hardpan ranges from 3 to 14 inches.

Permeability of the Las Vegas soil is moderately slow ove the hardpan. Available water capacity is very low. ffective rooting depth is 3 to 14 inches. Runoff is slow, nd the hazard of water erosion is slight. The hazard of oil blowing is high. This soil is subject to rare periods of ooding during prolonged, high-intensity storms. hanneling and deposition are common along reambanks.

The McCarran soil is very deep and well drained. It rmed in alluvium derived from limestone, sandstone, nd gypsiferous sediment. Typically, the surface layer is nk fine sandy loam about 5 inches thick. The nderlying material is pink sandy loam and loam to a pth of 60 inches. Most of the subsurface layers are eakly cemented with lime and gypsum.

Permeability of the McCarran soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks. This soil is slightly affected by salts to a depth of 5 inches, and it is moderately affected by salts below this depth.

The Grapevine soil is very deep and well drained. It formed in alluvium derived from various kinds of rock that have a high content of gypsiferous material. Typically, the surface layer is pink very fine sandy loam about 10 inches thick. The underlying material to a depth of 60 inches or more is pink, stratified fine sandy loam to clay loam.

Permeability of the Grapevine soil is moderate. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks. The soil is slightly affected by salts below a depth of 10 inches.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The main limitations for construction of dwellings are the hazard of flooding on all soils and the depth to the hardpan in the Las Vegas soil. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Excavation for building sites is limited by the hardpan. Heavy equipment is needed for excavation. Gypsum in the McCarran and Grapevine soils can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion. Subsidence caused by the dissolution of gypsum in the McCarran soil can be prevented by using foundation drains, gutters, and downspouts that discharge directly into the sewer system.

The main limitations for septic tank absorption fields are depth to the hardpan in the Las Vegas soil and the restricted permeability of the McCarran soil. Excavation is limited by the hardpan. Special design of septic tank absorption fields is needed. Using long absorption lines and backfilling the trench with sandy material help to compensate for the restricted permeability.

The Las Vegas soil is limited for roads because of the depth to the hardpan. Roads should be designed to minimize cuts. Heavy equipment is needed for excavation.

The main limitations for lawns and landscaping are depth to the hardpan in the Las Vegas soil and excess soluble salts in the McCarran soil. It is difficult to establish plants in areas where the pan is exposed. Mulching and fertilizing cut areas help to establish

plants. Because of the content of gypsum and other salts in the soil, salt-tolerant plants should be selected. Excessive irrigation can dissolve gypsum in the soil and cause subsidence. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclass VIIs, nonirrigated. The Las Vegas soil is in horticultural group 6, the McCarran soil is in horticultural group 4, and the Grapevine soil is in horticultural group 2.

305—Las Vegas-Destazo complex, 0 to 2 percent slopes. This map unit is on relict alluvial flats.

This unit is 60 percent Las Vegas gravelly fine sandy loam, 0 to 2 percent slopes, and 25 percent Destazo fine sandy loam, 0 to 2 percent slopes. These soils are in a random pattern on a relict surface and are topographically indistinguishable. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Bluepoint soils on small sand sheets, 5 percent Glencarb soils on recent alluvial flats, and 5 percent Skyhaven soils on the relict alluvial flats. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Las Vegas soil is shallow and well drained. It formed in alluvium derived dominantly from limestone, dolomite, and some lacustrine sediment that has a high content of lime. Typically, about 25 percent of the surface is covered with a desert pavement of hardpan fragments and pebbles. The surface layer is very pale brown gravelly fine sandy loam about 2 inches thick. The upper 6 inches of the underlying material is very pale brown fine sandy loam, and the next 4 inches is very pale brown gravelly sandy clay loam and gravelly loam. An indurated, lime-cemented hardpan is at a depth of about 12 inches. Depth to the hardpan ranges from 3 to 14 inches.

Permeability of the Las Vegas soil is moderately slow above the hardpan. Available water capacity is very low. Effective rooting depth is 3 to 14 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

The Destazo soil is very deep and well drained. It formed in alluvium derived dominantly from limestone, dolomite, and sediment that has a high content of lime. Typically, about 25 percent of the surface is covered with a desert pavement of pebbles and lime nodules. The surface layer is very pale brown fine sandy loam about 11 inches thick. The upper 40 inches of the underlying material is stratified very pale brown to white very gravelly to extremely gravelly sandy clay loam, averaging very gravelly sandy clay loam, and the lower part to a depth of 62 inches is light brown sandy loam.

Permeability of the Destazo soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban developmen

The main limitations for construction of dwellings are the hazard of flooding and the limited depth to the hardpan in the Las Vegas soil. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Excavation for building sites is limited by the hardpan. Heavy equipment is needed for excavation.

The main limitations for septic tank absorption fields are the limited depth to the hardpan in the Las Vegas soil and the restricted permeability of the Destazo soil. Special design of septic tank absorption fields is needec Heavy equipment is needed for excavation. Using long absorption lines and backfilling the trench with sandy material help to compensate for the restricted permeability.

This unit is limited for roads because of the limited depth to the hardpan in the Las Vegas soil. Roads should be designed to minimize cuts. Heavy equipment is needed for excavation.

The main limitations for lawns and landscaping are th limited depth to the hardpan in the Las Vegas soil and the moderate available water capacity of the Destazo soil. It is difficult to establish plants in areas where the pan is exposed. Mulching and fertilizing cut areas help t establish plants. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the limited available water capacity of the soil. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects c chlorosis.

This map unit is in capability subclass VIIs, nonirrigated. The Las Vegas soil is in horticultural group 6, and the Destazo soil is in horticultural group 2.

307—Las Vegas-Skyhaven complex, 0 to 4 percent slopes. This map unit is on relict alluvial flats.

This unit is 60 percent Las Vegas gravelly fine sandy loam, 0 to 4 percent slopes, and 30 percent Skyhaven very fine sandy loam, 0 to 4 percent slopes. The Las Vegas and Skyhaven soils are in a random pattern on relict alluvial flats and are topographically indistinguishable. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 10 percent Weiser soils, to 8 percent slopes, on erosional fan remnants.

The Las Vegas soil is shallow and well drained. It rmed in alluvium derived dominantly from limestone, olomite, and lacustrine sediment that has a high ontent of lime. Typically, about 25 percent of the rface is covered with a desert pavement of pebbles d hardpan fragments. The surface layer is very pale own gravelly fine sandy loam about 1 inch thick. The per 6 inches of the underlying material is very pale own fine sandy loam, and the next 4 inches is very ale brown gravelly sandy clay loam. A white, indurated, ne-cemented hardpan is at a depth of about 11 inches. epth to the hardpan ranges from 3 to 14 inches.

Permeability of the Las Vegas soil is moderately slow ove the hardpan. Available water capacity is very low. ffective rooting depth is 3 to 14 inches. Runoff is slow, d the hazard of water erosion is slight. The hazard of il blowing is high. This soil is subject to rare periods of oding during prolonged, high-intensity storms. hanneling and deposition are common along reambanks.

The Skyhaven soil is moderately deep and well ained. It formed in alluvium derived dominantly from nestone, dolomite, and other rock that has a high ntent of lime. Typically, about 20 percent of the rface is covered with a desert pavement of pebbles d hardpan fragments. The surface layer is pink very e sandy loam about 1 inch thick. The subsoil is light own clay loam about 7 inches thick. The upper 29 ches of the underlying material is white gravelly loam d gravelly clay loam, and the lower part to a depth of) inches or more is an indurated, lime-cemented rdpan. Depth to the hardpan ranges from 24 to 40 ches.

Permeability of this Skyhaven soil is moderately slow ove the hardpan. Available water capacity is oderate. Effective rooting depth is 24 to 40 inches. unoff is slow, and the hazard of water erosion is slight. e hazard of soil blowing is high. This soil is subject to re periods of flooding during prolonged, high-intensity orms. Channeling and deposition are common along eambanks. This soil is slightly affected by salts to a pth of 8 inches, and it is moderately affected by salts low this depth.

This unit is used as habitat for desert wildlife and for creation.

This unit is limited for roads because of the depth to indurated hardpan in the Las Vegas soil. Roads ould be designed to minimize cuts. Heavy equipment needed for excavation. Gypsum in the Skyhaven soil n induce electrochemical action that corrodes ncrete. This limitation can be overcome by using ment that is resistant to sulfate corrosion.

This map unit is in capability subclass VIIs, nirrigated, and in horticultural group 6.

325—McCarran fine sandy loam, 0 to 4 percent slopes. This very deep, well drained soil is on relict alluvial flats. It formed in alluvium derived dominantly from limestone and lacustrine sediment that has a high content of gypsum.

Typically, about 20 percent of the surface is covered with a desert pavement of pebbles. The upper 4 inches of the soil is very pale brown and pink fine sandy loam. The next 5 inches is pink gravelly fine sandy loam. The average texture of the top 9 inches is fine sandy loam. The next layer to a depth of 48 inches is pinkish white or pink sandy loam. The lower part to a depth of 62 inches or more is pinkish white gravelly loam that is weakly cemented with gypsum and lime. In some areas of similar included soils, the surface layer is clay loam.

Included in this unit are about 5 percent Bluepoint soils on small sand sheets, 5 percent Bracken soils on pediment remnants, and 5 percent Las Vegas soils on relict alluvial flats. Also included are small areas of McCarran soils that have a hardpan at a depth of 40 to 60 inches or more. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of this McCarran soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks. This soil is slightly affected by salts to a depth of 9 inches, and it is moderately affected below this depth.

Most areas of this unit are used for urban development, desert wildlife habitat, and recreation. A few areas are used for irrigated agriculture.

The main limitations for construction of dwellings are the hazard of flooding and the gypsum in the soil. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Application of excess water may dissolve enough gypsum in the soil to cause subsidence. Subsidence caused by the dissolution of gypsum in the McCarran soil can be prevented by using foundation drains, gutters, and downspouts that discharge directly into the sewer system. Gypsum in the soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

The main limitation for septic tank absorption fields is restricted permeability of the soil. Using long absorption lines and backfilling the trench with sandy material help to compensate for the restricted permeability.

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding. Concentrated runoff in drainage ditches can dissolve gypsum in the subsurface layers and cause subsidence.

Because of the content of gypsum and other salts in the soil, salt-tolerant plants should be selected for lawns and landscaping. Application of excess water may dissolve enough gypsum in the soil to cause soil subsidence. Excessive irrigation can dissolve gypsum in the soil and cause subsidence.

Irrigation water for other crops and pasture should be applied at a rate that insures optimum production without increasing deep percolation, runoff, and erosion. Maintaining crop residue on or near the surface reduces runoff, reduces soil blowing, and helps to maintain soil tilth and organic matter content. Crops respond to nitrogen and phosphorus. Content of toxic salts is reduced by leaching, applying proper amounts of soil amendments, and returning crop residue to the soil. The average yield is 6 tons per acre for alfalfa hay grown under a high level of management.

This map unit is in capability subclasses IIIs, irrigated, and VIIs, nonirrigated. It is in horticultural group 4.

326—McCarran very cobbly fine sandy loam, 2 to 8 percent slopes. This very deep, well drained soil is on relict alluvial flats. It formed in alluvium derived dominantly from limestone and lacustrine sediment that has a high content of gypsum.

Typically, about 60 percent of the surface is covered with a desert pavement of cobbles and pebbles. The surface layer is pink very cobbly fine sandy loam about 9 inches thick. The upper 39 inches of the underlying material is pinkish white sandy loam that generally is weakly cemented with gypsum and lime. The lower part to a depth of 62 inches is pinkish white gravelly loam that is weakly cemented with gypsum and lime.

Included in this unit are about 5 percent Bracken soils on pediment remnants, 5 percent Glencarb soils on recent alluvial flats, and 5 percent Caliza soils on erosional fan remnants. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of this McCarran soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is high if the surface is disturbed. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks. This soil is slightly affected by salts to a depth of 9 inches, and it is moderately affected by salts below this depth.

This unit is used as habitat for desert wildlife and for recreation. It can be used for urban development.

The main limitations for construction of dwellings are the hazard of flooding and the gypsum in the soil. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Subsidence caused by the dissolution of gypsum in the McCarran soil can be prevented by using foundation drains, gutters, and downspouts that discharge directly into the sewer system. Gypsum in the soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

The main limitation for septic tank absorption fields is the restricted permeability of the soil. Using long absorption lines and backfilling the trench with sandy material help to compensate for the restricted permeability.

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding.

The main limitation for lawns and landscaping is the desert pavement. The desert pavement interferes with the use of equipment. Because of the content of gypsur and other salts in the soil, salt-tolerant plants should be selected. Excessive irrigation can dissolve gypsum in th soil and cause subsidence.

This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 4.

341—Paradise silt loam. This very deep, poorly drained soil is on recent alluvial flats. The drainage has been altered through pumping. The soil formed in alluvium derived from various kinds of rock that has a high content of lime. Slope is 0 to 2 percent.

Typically, the surface layer is gray silt loam and loam, averaging silt loam, about 10 inches thick. The upper 29 inches of the underlying material is light gray and gray sandy loam, fine sandy loam, and loam, averaging loam, and the lower part to a depth of 61 inches is white and light gray silt loam.

Permeability of the Paradise soil is moderate. Availabl water capacity is high. Effective rooting depth is limited by a seasonal high water table that is at a depth of 3 to 5 feet from December through March. The water table provides supplemental moisture for plants. Runoff is ver slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks. This soil is moderately affected by salts to a depth of 10 inches, and it is not affected by salts below this depth.

This unit is used mainly for urban development. It is also used as habitat for desert wildlife and for recreation

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding.

The main limitation for septic tank absorption fields is depth to the water table. The seasonal high water table increases the possibility of failure of septic tank absorption fields. Special design of septic tank absorption fields is needed.

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding.

The main limitations for lawns and landscaping are excess soluble salts in the soil. Irrigation water must be carefully applied to avoid raising the water table and increasing the concentration of salts in the soil. Because of the content of gypsum and other salts in the soil, salt-tolerant plants should be selected. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclasses IVw, irrigated, and VIw, nonirrigated. It is in horticultural group 5.

360—Rock outcrop-St. Thomas complex, 15 to 30 percent slopes. This map unit is on hills and low mountains.

This unit is 50 percent Rock outcrop and 35 percent St. Thomas extremely cobbly fine sandy loam, 15 to 30 percent slopes. The Rock outcrop is on ridges, crests, and side slopes, and the St. Thomas soil is on side slopes of hills and low mountains. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Bracken soils on pediment remnants and 10 percent Weiser soils on erosional fan remnants. Included areas make up about 15 percent of the total acreage.

Rock outcrop consists of exposures of barren limestone and other mixed types of bedrock.

The St. Thomas soil is shallow and well drained. It formed in residuum derived dominantly from limestone and dolomite. Typically, 90 percent of the surface is covered with a desert pavement of rock fragments. The surface layer is light yellowish brown extremely cobbly fine sandy loam about 7 inches thick. Bedrock is at a depth of about 7 inches. Depth to bedrock ranges from 4 to 20 inches.

Permeability of the St. Thomas soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 4 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used as habitat for desert wildlife and for recreation.

This unit is limited for roads because of the areas of Rock outcrop, steepness of slope, and the shallow depth to bedrock. Roads should be designed to minimize cuts because of the limited depth to bedrock. Cutting and filling can be reduced by building roads in the less sloping areas of the unit. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This map unit is in capability subclass VIIs, nonirrigated. The St. Thomas soil is in horticultural group 6.

380—Skyhaven very fine sandy loam, 0 to 4 percent slopes. This moderately deep, well drained soil is on relict alluvial flats. It formed in alluvium derived from various kinds of rock that has a high content of lime.

Typically, the surface layer is pink very fine sandy loam about 1 inch thick. The subsoil is light brown clay loam and gravelly clay loam about 7 inches thick. It averages clay loam. The underlying material to a depth of 37 inches is pinkish white and white gravelly silty clay loam and very gravelly loam. The next layer to a depth of 60 inches or more is a white, indurated, lime-cemented hardpan. Depth to the hardpan ranges from 24 to 40 inches.

Included in this unit are about 5 percent Destazo soils on relict alluvial flats, 5 percent Glencarb soils on recent alluvial flats, and 5 percent Las Vegas soils on relict alluvial flats. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of the Skyhaven soil is moderately slow above the hardpan. Available water capacity is moderate. Effective rooting depth is 24 to 40 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks. This soil is slightly affected by salts to a depth of 8 inches, and it is moderately affected below this depth.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Gypsum in the soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

The main limitations for septic tank absorption fields are depth to the hardpan and restricted permeability. Special design of septic tank absorption fields is needed. Excavation is limited by the hardpan. Using long absorption lines and backfilling the trench with sandy material help to compensate for the restricted permeability.

Roads should be designed to minimize cuts. Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding. The effects of shrinking and swelling can be minimized by using an appropriate engineering design and by backfilling with material that has a low shrink-swell potential.

Because of the content of gypsum and other salts in the soil, salt-tolerant plants should be selected for lawns and landscaping. Because of the underlying hardpan, deep cuts should be avoided on this soil. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclasses IIIs, irrigated, and VIIs, nonirrigated. It is in horticultural group 6.

390—Spring clay loam. This very deep, moderately well drained soil is on alluvial flats. It formed in gypsiferous lacustrine sediment. Slope is 0 to 2 percent.

Typically, the surface layer is pale brown clay loam about 5 inches thick. The underlying material to a depth of 60 inches or more is stratified, light brown to pink silt loam to silty clay, averaging silty clay loam, and contains many gypsum crystals.

Included in this unit are about 10 percent Land soils on alluvial flats and 5 percent Las Vegas soils on relict alluvial flats. Included areas make up about 15 percent of the total acreage.

Permeability of the Spring soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks. This soil is strongly affected by salts to a depth of 5 inches, and it is moderately affected below this depth.

This unit is used mainly for urban development. It is also used as habitat for desert wildlife and for recreation.

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Gypsum in the soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

The main limitation for septic tank absorption fields is restricted permeability. Special design of septic tank absorption fields is needed. Using long absorption lines and backfilling the trench with sandy material help to compensate for the restricted permeability.

The Spring soil is limited for roads because of limited ability to support a load. Roads and streets should be designed to compensate for the instability of the soil.

The main limitation for lawns and landscaping is the excess soluble salts in the soil. Intensive management is required to reduce the salinity and maintain soil productivity. Excess salts in the soil can be flushed out by using heavy periodic applications of water. Because of the content of gypsum and other salts in the soil, salt-tolerant plants should be selected.

This map unit is in capability subclasses VIs, irrigated, and VIIs, nonirrigated. It is in horticultural group 4.

400—Tencee very gravelly fine sandy loam, 2 to 8 percent slopes. This shallow, well drained soil is on erosional fan remnants. It formed in alluvium derived dominantly from limestone and dolomite.

Typically, 75 percent of the surface is covered with a well developed desert pavement of pebbles. There is a dark desert varnish on the exposed surfaces of the rock fragments. The surface layer is light brown very gravelly fine sandy loam about 5 inches thick. The next layer is light brown very gravelly fine sandy loam and very gravelly sandy loam and is weakly cemented with lime t a depth of about 15 inches. An indurated, lime-cemente hardpan is at a depth of about 15 inches. Depth to the hardpan ranges from 7 to 20 inches.

Included in this unit are small areas of Dalian soils on side slopes of fan remnants and on inset fans. Included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

Permeability of the Tencee soil is moderate above the hardpan. Available water capacity is very low. Effective rooting depth is 7 to 20 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate if the surface is disturbed.

This unit is used as habitat for desert wildlife and for recreation.

This unit is limited for roads because of the depth to the indurated hardpan. Roads should be designed to minimize cuts. Heavy equipment is needed for excavation.

This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 6.

415—Aztec very gravelly sandy loam, 2 to 8 percent slopes. This very deep, well drained soil is on erosional fan remnants. It formed in alluvium derived from various kinds of rock.

Typically, 80 percent of the surface is covered with pebbles. The surface layer is light yellowish brown very gravelly sandy loam about 2 inches thick. The underlying material to a depth of 63 inches is stratified, light yellowish brown, light brown, and light reddish brown very gravelly sandy loam to extremely gravelly loamy coarse sand with weak, continuous gypsum cementation in some layers.

Included in this unit are about 5 percent Bracken soils on pediment remnants, 5 percent Rock outcrop on isolated ridges, and 5 percent Caliza soils on erosional fan remnants. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of the Aztec soil is moderately slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is high

f the surface is disturbed. The soil is slightly affected by salts and alkali below a depth of 2 inches.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for waste water disposal by means of crop irrigation south of the Advanced Wastewater Treatment Plant.

Because of the slope, sprinkler or drip irrigation is most suitable for row crops. Because the soil is droughty, applications of irrigation water should be light and frequent. To avoid overirrigating and leaching of plant nutrients, applications of irrigation water should be adjusted to the available water capacity, the water intake rate, and the crop needs. Maintaining crop residue on or near the surface reduces runoff, reduces soil blowing, and helps to maintain soil tilth and organic matter content. Crops respond to nitrogen and phosphorus. The average yield is 5 tons per acre for alfalfa hay grown under a high level of management.

Roads can easily be constructed and maintained on this unit. Gypsum in the soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

This map unit is in capability subclasses IVs, irrigated, and VIIs, nonirrigated. It is in horticultural group 2.

417—Aztec-Rock outcrop complex, 8 to 30 percent slopes. This map unit is on erosional fan remnants interspersed with rock outcroppings.

This unit is 55 percent Aztec very gravelly sandy loam, 8 to 30 percent slopes and 30 percent Rock outcrop. The Aztec soil is on erosional fan remnants, and Rock outcrop is on ridges, crests, and side slopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 10 percent Akela soils on hillsides and 5 percent Canutio soils on foot slopes. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Aztec soil is very deep and well drained. It formed in alluvium derived from various kinds of rock. Typically, the surface layer is light yellowish brown very gravelly sandy loam about 4 inches thick. The underlying material to a depth of 60 inches or more is stratified, light reddish brown very gravelly sandy loam to extremely gravelly loamy coarse sand with weak, continuous gypsum cementation in some layers. Depth to gypsum cementation ranges from 10 to 30 inches.

Permeability of the Aztec soil is moderately slow. Available water capacity is low. Effective rooting depth is 10 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate if the surface is disturbed. The Aztec soil is slightly affected by salts below a depth of 4 inches.

Rock outcrop consists of exposed areas of undifferentiated volcanic rock.

This unit is used for desert wildlife habitat and recreation.

This unit is limited for roads because of the areas of Rock outcrop. Cutting and filling can be reduced by building roads in the less sloping areas of the Aztec soil. Gypsum in the soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

This map unit is in capability subclass VIIs, nonirrigated. The Aztec soil is in horticultural group 2.

418—Aztec-Nickel-Knob Hill complex, 2 to 15 percent slopes. This map unit is on erosional fan remnants and pediments.

This unit is 40 percent Aztec gravelly fine sandy loam, 2 to 15 percent slopes; 35 percent Nickel gravelly fine sandy loam, bedrock substratum, 2 to 15 percent slopes; and 20 percent Knob Hill loamy sand, 2 to 8 percent slopes. The Aztec and Knob Hill soils are on erosional fan remnants, and the Nickel soil is on pediments. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 5 percent Rock outcrop on side slopes of erosional fan remnants and pediments. The percentage varies from one area to another.

The Aztec soil is very deep and well drained. It formed in alluvium derived from various kinds of rock. Typically, the surface layer is light yellowish brown gravelly fine sandy loam about 4 inches thick. The underlying material to a depth of 60 inches or more is stratified, light reddish brown very gravelly sandy loam to extremely gravelly loamy coarse sand with weak, continuous gypsum cementation in some layers.

Permeability of the Aztec soil is moderately slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is high. The Aztec soil is slightly affected by salts below a depth of 4 inches.

The Nickel soil is deep and well drained. It formed in alluvium derived from various kinds of rock. Typically, the surface layer is light brown and pink gravelly fine sandy loam about 9 inches thick. The upper 14 inches of the underlying material is pink very gravelly sandy loam that is weakly cemented with lime, and the lower part to a depth of 45 inches is pink and light brown, stratified very gravelly sandy loam to extremely gravelly loamy sand. Bedrock is at a depth of 45 inches. Depth to bedrock ranges from 40 to 60 inches or more.

Permeability of the Nickel soil is moderately slow. Available water capacity is very low. Effective rooting depth is 40 to 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is high.

The Knob Hill soil is very deep and somewhat excessively drained. It formed in alluvium derived from various kinds of rock. Typically, about 20 percent of the surface is covered with a desert pavement of scattered pebbles. The surface layer is light brown loamy sand about 7 inches thick. The upper 16 inches of the underlying material is light brown, stratified gravelly loamy sand to very gravelly loamy sand, the next 14 inches is pinkish gray gravelly fine sandy loam, and the lower part to a depth of 60 inches or more is light brown loamy fine sand.

Permeability of the Knob Hill soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high.

This unit is used as habitat for desert wildlife and for recreation.

Cutting and filling can be reduced by building roads in the less sloping areas of the unit. Gypsum in the Aztec soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

This map unit is in capability subclasses IVe, irrigated, and VIIc, nonirrigated. The Aztec soil is in horticultural group 2, the Nickel soil is in horticultural group 2, and the Knob Hill soil is in horticultural group 3.

419—Aztec-Bracken complex, 4 to 30 percent slopes. This map unit is on dissected pediments that have erosional fan remnants on the toe slopes.

This unit is 55 percent Aztec gravelly fine sandy loam, 4 to 15 percent slopes, and 30 percent Bracken very gravelly fine sandy loam, 8 to 30 percent slopes. The Aztec soil is on erosional fan remnants on toe slopes of dissected pediments, and the Bracken soil is on dissected pediments. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Arizo soils, flooded, in channels and 10 percent Goodsprings soils on erosional fan remnants. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Aztec soil is very deep and well drained. It formed in alluvium derived from various kinds of rock. Typically, the surface layer is light yellowish brown gravelly fine sandy loam about 4 inches thick. The underlying material to a depth of 60 inches or more is stratified, light reddish brown very gravelly sandy loam to extremely gravelly loamy coarse sand with weak, continuous gypsum cementation in some horizons.

Permeability of the Aztec soil is moderately slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is high. The Aztec soil is slightly affected by salts below a depth of 4 inches.

The Bracken soil is deep and somewhat excessively drained. It formed in residuum derived dominantly from gypsiferous sediment. Typically, 95 percent of the surface is covered with a desert pavement of pebbles. The surface layer is pink very gravelly fine sandy loam about 1 inch thick. The upper 52 inches of the underlyin material is pink sandy loam and gravelly sandy loam tha averages sandy loam and contains about 75 percent gypsum crystals, and the lower part to a depth of 60 inches or more is weakly consolidated, gypsiferous sediment. Depth to the gypsiferous sediment ranges from 40 to 60 inches or more.

Permeability of the Bracken soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 40 to 60 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is high if the desert pavement is disturbed.

This unit is used as habitat for desert wildlife and for recreation.

This unit is limited for roads because of steepness of slope in some areas. Cutting and filling can be reduced by building roads in the less sloping areas of the unit. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed. Gypsum in the soils can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion. Concentrated runoff in drainage ditches can dissolve gypsum in the subsurface layers and cause subsidence.

This map unit is in capability subclass VIIs, nonirrigated. The Aztec soil is in horticultural group 2, and the Bracken soil is in horticultural group 3.

430—Knob Hill loamy sand, 0 to 4 percent slopes. This very deep, somewhat excessively drained soil is on relict sand sheets. It formed in sandy alluvium and eolia deposits derived from various kinds of rock.

Typically, about 20 percent of the surface is covered with a desert pavement of scattered pebbles. The surface layer is light brown loamy sand about 7 inches thick. The upper 16 inches of the underlying material is light brown, stratified gravelly loamy sand and very gravelly loamy sand, the next 14 inches is pinkish gray gravelly fine sandy loam, and the lower part to a depth of 60 inches or more is light brown loamy fine sand.

Included in this unit are about 5 percent Aztec soils or erosional fan remnants and 10 percent Nickel, bedrock substratum, soils on pediments. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of the Knob Hill soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high

This unit is used mainly as habitat for desert wildlife nd for recreation. It is also used for urban development.
This unit is well suited to the construction of dwellings. xcavating in areas of the Knob Hill soil can expose aterial that is highly susceptible to soil blowing.
The main limitation for septic tank absorption fields is adequate filtration of effluent. Because the substratum highly permeable, special design may be needed to void polluting ground water and nearby water supplies.
Roads can easily be constructed and maintained on is unit.
Because the soil is droughty, applications of irrigation ater to lawns and gardens should be light and frequent.
This map unit is in capability subclasses IIIs, irrigated, nd VIIs, nonirrigated. It is in horticultural group 3.

440—Nickel very gravelly fine sandy loam, bedrock ubstratum, 2 to 8 percent slopes. This deep, well rained soil is on pediments. It formed in alluvium erived from various kinds of rock.
Typically, 50 percent of the surface is covered with ebbles. The surface layer is light brown and pink very ravelly fine sandy loam about 9 inches thick. The upper 4 inches of the underlying material is pink very gravelly andy loam that is weakly cemented with lime, and the wer part to a depth of 45 inches is pink and light rown, stratified very gravelly sandy loam to extremely ravelly loamy sand. Bedrock is at a depth of about 45 ches. Depth to bedrock ranges from 40 to 60 inches or ore.
Included in this unit are about 5 percent Arizo, flooded, oils in channels and 10 percent Aztec soils on erosional an remnants. Included areas make up about 15 percent f the total acreage. The percentage varies from one rea to another.
Permeability of the Nickel soil is moderately slow bove the bedrock. Available water capacity is very low. ffective rooting depth is 40 to 60 inches or more. unoff is slow, and the hazard of water erosion is slight. he hazard of soil blowing is moderate.
This unit is used mainly for urban development. It is lso used as habitat for desert wildlife and for recreation.
This unit is well suited to the construction of dwellings. he design of the septic tank absorption fields should ompensate for the limited depth to bedrock. Roads can asily be constructed and maintained on this unit.
The main limitations for lawns and landscaping are mall stones throughout the soil and the very low vailable water capacity. Topsoil is needed for best sults when landscaping, particularly in areas used for wns. Frequent irrigation of lawns, gardens, and most ther plantings is needed because of the limited vailable water capacity of the soil.
Intermittent streams form the drainageways in this unit. hese drainageways are subject to rare or occasional eriods of high-velocity flooding. Care should be taken uring urbanization to accommodate the runoff from the drainageways. If drains become plugged during a major flood, accelerated erosion and damage to roads, buildings, and other structures can occur.
This map unit is in capability subclasses IVs, irrigated, and VIIs, nonirrigated. It is in horticultural group 2.

450—Cave Variant very cobbly very fine sandy loam, 4 to 30 percent slopes. This shallow, well drained soil is on side slopes of dissected pediments. It formed in local alluvium derived from various kinds of rock.
Typically, 95 percent of the surface is covered with a desert pavement of pebbles, cobbles, and stones. The surface layer is light yellowish brown very cobbly very fine sandy loam about 2 inches thick. The next layer to a depth of 11 inches or more is a pink gravelly very fine sandy loam and pinkish gray extremely gravelly very fine sandy loam and averages very gravelly very fine sandy loam. The upper 18 inches of the underlying material is a white, indurated, lime-cemented hardpan, the next 11 inches is pinkish gray gravelly clay loam, and the lower part to a depth of 60 inches or more is light reddish brown very cobbly coarse sandy loam. Depth to the hardpan ranges from 5 to 18 inches.
Included in this unit are about 5 percent Nickel, bedrock substratum, soils on pediments and 5 percent Rock outcrop on side slopes of pediments. Also included are small areas of soils that have a slope of less than 4 percent. Included areas make up about 10 percent of the total acreage.
Permeability of the Cave Variant soil is moderately rapid above the hardpan. Available water capacity is very low. Effective rooting depth is 5 to 18 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate if the desert pavement is disturbed.
This unit is used as habitat for desert wildlife and for recreation.
This unit is limited for roads because of the depth to the indurated hardpan. Roads should be designed to minimize cuts. Heavy equipment is needed for excavation.
This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 6.

481—Hobog loamy fine sand, 15 to 50 percent slopes. This shallow, well drained soil is on low hills. It formed in residuum derived dominantly from igneous and metamorphic rock.
Typically, the surface layer is pale brown loamy fine sand about 4 inches thick. The underlying material to a depth of 13 inches is pink very gravelly sandy loam. Bedrock is at a depth of about 13 inches. Depth to bedrock ranges from 8 to 20 inches.
Included in this unit are about 5 percent Nickel soils, bedrock substratum, on pediments and 5 percent Bluepoint soils on sand sheets. Included areas make up

about 10 percent of the total acreage. The percentage varies from one area to another. Also included are areas that have slopes of less than 15 percent.

Permeability of the Hobog soil is moderate above the bedrock. Available water capacity is very low. Effective rooting depth is 8 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

This unit is used mainly for urban development. It is also used as habitat for desert wildlife and for recreation.

The main limitations for construction of dwellings are steepness of slope and the limited depth to bedrock. Buildings should be designed to accommodate the slope. Erosion is a hazard in the steeper areas. Only the part of the site that is used for construction should be disturbed. Cuts needed to provide essentially level building sites can expose bedrock. Heavy equipment is needed for excavation.

The main limitations for septic tank absorption fields are steepness of slope and the limited depth to bedrock. Special design of septic tank absorption fields is needed.

This unit is limited for roads because of steepness of slope and the limited depth to bedrock. Cutting and filling can be reduced by building roads in the less sloping areas of the unit. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed. Heavy equipment is needed for excavation. Steepness of slope interferes with the use of equipment. Roads should be designed to minimize cuts because of the limited depth to bedrock.

The main limitations for lawns and landscaping are steepness of slope and the limited depth to bedrock. It is difficult to establish plants in areas where bedrock is exposed. Mulching and fertilizing cut areas help to establish plants. Steepness of slope interferes with the use of equipment.

This map unit is in capability subclass VIIe, nonirrigated, and in horticultural group 6.

484—Hobog very cobbly fine sandy loam, 15 to 50 percent slopes. This shallow, well drained soil is on hills. It formed in residuum and eolian deposits derived from various kinds of rock.

Typically, 85 percent of the surface is covered with rock fragments. The surface layer is pale brown and pink very cobbly fine sandy loam about 9 inches thick. The underlying material to a depth of 15 inches is pink very gravelly sandy loam. Bedrock is at a depth of about 15 inches. Depth to bedrock ranges from 8 to 20 inches.

Included in this unit are about 5 percent Arizo, flooded, soils in channels and 10 percent Rock outcrop on side slopes and ridges. Included areas make up about 15 percent of the total acreage. Also included are areas of soils that have slopes of less than 15 percent. The percentage of included areas varies from one mapped area to another.

Permeability of the Hobog soil is moderate above the bedrock. Available water capacity is very low. Effective rooting depth is 8 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soi blowing is moderate.

This unit is used mainly for urban development. It is also used as habitat for desert wildlife and for recreatic

If this unit is used for urban development, the main limitations are steepness of slope, the limited depth to bedrock, and the presence of stones and cobbles. Buildings should be designed to accommodate the slope. Erosion is a hazard in the steeper areas. Only th part of the site that is used for construction should be disturbed. Heavy equipment is needed for excavation. Steepness of slope and the desert pavement interfere with the use of equipment.

Special design of septic tank absorption fields is needed.

The desert pavement makes the construction of roac difficult. Roads should be designed to minimize cuts because of the limited depth to bedrock. Cutting and filling can be reduced by building roads in the less sloping areas of the unit. Roads should be provided wit adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas tha have been disturbed.

It is difficult to establish plants in areas where bedroc is exposed. Mulching and fertilizing cut areas help to establish plants.

Intermittent streams form the drainageways in this ur These drainageways are subject to rare or occasional periods of high-velocity flooding. Care should be taken during urbanization to accommodate the runoff from th drainageways. If drains become plugged during a majoi flood, accelerated erosion and damage to roads, buildings, and other structures can occur.

This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 6.

500—Canutio-Akela complex, 2 to 15 percent slopes. This map unit is on low hills.

This unit is 50 percent Canutio very cobbly sandy loam, 8 to 15 percent slopes, and 35 percent Akela vei cobbly fine sandy loam, 2 to 8 percent slopes. The Canutio soil is on foot slopes, and the Akela soil is on summits, shoulders, and back slopes. The components of this unit are so intricately intermingled that it was no practical to map them separately at the scale used.

Included in this unit are about 10 percent Bracken soils on pediment remnants and 5 percent Rock outcro on side slopes and ridges. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Canutio soil is deep and well drained. It formed i alluvium derived from various kinds of rock. Typically, th surface layer is light brown very cobbly sandy loam about 4 inches thick. The underlying material to a depth

of 43 inches is stratified, light brown very cobbly sandy loam, brown very gravelly sandy loam, and brown extremely gravelly sandy loam, averaging extremely gravelly sandy loam. Bedrock is at a depth of about 43 inches. Depth to bedrock ranges from 40 to 60 inches or more.

Permeability of the Canutio soil is moderately rapid above the bedrock. Available water capacity is very low. Effective rooting depth is 40 to 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

The Akela soil is shallow and well drained. It formed in residuum derived dominantly from basalt and andesite. Typically, about 92 percent of the surface is covered with a desert pavement of pebbles, cobbles, and stones. The surface layer is pale brown very cobbly fine sandy loam about 3 inches thick. The underlying material to a depth of 11 inches is light brown very gravelly fine sandy loam. Basalt is at a depth of about 11 inches. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Akela soil is moderate above the bedrock. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate if the surface is disturbed.

This unit is used as habitat for desert wildlife and for recreation.

This unit is limited for roads because of the depth to bedrock in the Akela soil. Roads should be designed to minimize cuts because of the limited depth to bedrock. Heavy equipment is needed for excavation.

This map unit is in capability subclass VIIs, nonirrigated. The Canutio soil is in horticultural group 1, and the Akela soil is in horticultural group 6.

501—Canutio gravelly fine sandy loam, 0 to 2 percent slopes. This very deep, well drained soil is on inset fans. It formed in mixed alluvium derived dominantly from limestone, quartzite, and sandstone.

Typically, about 60 percent of the surface is covered with a desert pavement of pebbles and cobbles. The surface layer is light brown gravelly fine sandy loam about 11 inches thick. The underlying material to a depth of 60 inches or more is light brown, stratified very gravelly sandy loam to very gravelly loam.

Included in this unit are about 5 percent Cave soils on erosional fan remnants and 5 percent Arizo soils, flooded, in channels. Included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Canutio soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is high if the surface is disturbed.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

This unit is well suited to the construction of dwellings.

Unless the density of housing is too high, septic tank absorption fields normally function well on this unit.

Roads can easily be constructed and maintained on this unit.

The main limitations for lawns and landscaping are the desert pavement and the low available water capacity. Removing the desert pavement is necessary for best results when landscaping, particularly in areas used for lawns. Because the soil is droughty, applications of irrigation water should be light and frequent.

Intermittent streams form the drainageways in this unit. These drainageways are subject to rare or occasional periods of high-velocity flooding. Care should be taken during urbanization to accommodate the runoff from the drainageways. During major floods, plugging of the drains is likely to result in accelerated erosion and possible damage to roads, homesites, and structures.

This map unit is in capability subclasses IIIs, irrigated, and VIIc, nonirrigated. It is in horticultural group 1.

502—Canutio-Cave gravelly fine sandy loams, 2 to 8 percent slopes. This map unit is on inset fans.

This unit is 55 percent Canutio gravelly fine sandy loam, 2 to 8 percent slopes, and 40 percent Cave gravelly fine sandy loam, 2 to 8 percent slopes. The Canutio soil is on inset fans, and the Cave soil is on nonburied fan remnants. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Arizo soils, flooded, in channels. The percentage varies from one area to another.

The Canutio soil is very deep and well drained. It formed in mixed alluvium derived dominantly from limestone, quartzite, and sandstone. Typically, about 35 percent of the surface is covered with pebbles and 5 percent is covered with cobbles. The surface layer is light brown gravelly fine sandy loam about 9 inches thick. The underlying material to a depth of 60 inches or more is light brown, stratified very gravelly sandy loam to very gravelly loam.

Permeability of the Canutio soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high.

The Cave soil is shallow and well drained. It formed in mixed alluvium derived dominantly from limestone, quartzite, and sandstone. Typically, about 30 percent of the surface is covered with pebbles and 5 percent is covered with cobbles. The surface layer is pale brown gravelly fine sandy loam about 16 inches thick. The upper 14 inches of the underlying material is an indurated, lime-cemented hardpan, and the lower part to a depth of 60 inches or more is light brown very gravelly sandy loam. Depth to the hardpan ranges from 4 to 20 inches.

Permeability of the Cave soil is moderate to the hardpan. Available water capacity is very low. Effective rooting depth is 4 to 20 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is high.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The main limitation for construction of dwellings is the shallow depth to the hardpan in areas of the Cave soil. Excavation for building sites is limited by the hardpan.

The main limitation for septic tank absorption fields is the shallow depth to the hardpan in areas of the Cave soil. Excavation is limited by the hardpan. Special design of septic tank absorption fields is needed.

The Cave soil is limited for roads because of the shallow depth to the hardpan. Roads should be designed to minimize cuts. Heavy equipment is needed for excavation.

The main limitation for lawns and landscaping is the shallow depth to the hardpan in areas of the Cave soil. The Cave soil is also moderately limited by the desert pavement and the low available water capacity of the Canutio soil. It is difficult to establish plants in areas where the pan is exposed. Mulching and fertilizing cut areas help to establish plants. Removing the desert pavement is necessary for best results when landscaping, particularly in areas used for lawns. Because the soils are droughty, applications of irrigation water should be light and frequent. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

Intermittent streams form the drainageways in this unit. These drainageways are subject to rare or occasional periods of high-velocity flooding. Care should be taken during urbanization to accommodate the runoff from the drainageways. If drains become plugged during a major flood, accelerated erosion and damage to roads, buildings, and other structures can occur.

This map unit is in capability subclass VIIs, nonirrigated. The Canutio soil is in horticultural group 1, and the Cave soil is in horticultural group 6.

505—Canutio-Akela complex, 15 to 50 percent slopes. This map unit is on hills.

This unit is 50 percent Canutio very cobbly sandy loam, 15 to 30 percent slopes, and 40 percent Akela very cobbly fine sandy loam, 15 to 50 percent slopes. The Canutio soil is on foot slopes, and the Akela soil is on upper back slopes and shoulders. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Bracken soils, 4 to 15 percent slopes, on pediment remnants and 5 percent Rock outcrop on side slopes and ridges. Included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

The Canutio soil is deep and well drained. It formed in alluvium derived from various kinds of rock. Typically, 50 percent of the surface is covered with pebbles and 25 percent is covered with cobbles. The surface layer is light brown very cobbly sandy loam about 10 inches thick. The underlying material to a depth of 43 inches is brown very gravelly sandy loam and extremely gravelly sandy loam, averaging extremely gravelly sandy loam. Bedrock is at a depth of about 43 inches. Depth to bedrock ranges from 40 to 60 inches or more.

Permeability of the Canutio soil is moderately rapid above the bedrock. Available water capacity is very low. Effective rooting depth is 40 to 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

The Akela soil is shallow and well drained. It formed in residuum derived dominantly from basalt and andesite. Typically, about 92 percent of the surface is covered with a desert pavement of pebbles, cobbles, and stones. The surface layer is pale brown very cobbly fine sandy loam about 3 inches thick. The underlying material to a depth of 11 inches is light brown very gravelly fine sandy loam. Basalt is at a depth of about 11 inches. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Akela soil is moderate above the bedrock. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate if the surface is disturbed.

This unit is used as habitat for desert wildlife and for recreation.

This unit is limited for roads because of the steepness of slope and the limited depth to bedrock in areas of the Akela soil. Roads should be designed to minimize cuts because of the limited depth to the bedrock. Cutting and filling can be reduced by building roads in the less sloping areas of the unit. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This map unit is in capability subclass VIIs, nonirrigated. The Canutio soil is in horticultural group 1, and the Akela soil is in horticultural group 6.

510—Akela-Rock outcrop complex, 15 to 50 percent slopes. This map unit is on mountains.

This unit is 55 percent Akela very cobbly fine sandy loam, 15 to 50 percent slopes, and 35 percent Rock outcrop. The Akela soil is on side slopes, and Rock outcrop is exposed on ridges and side slopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Canutio soils, 8 to 30 percent slopes, on side slopes. The percentage

aries from one area to another. About 500 acres, east f Henderson, is mostly an Akela soil that has slopes of to 15 percent. About 40 acres of Rock outcrop, ypsum, shown by symbols, is in an area in the ortheastern corner of sec. 33, T. 21 S., R. 63 E.

The Akela soil is shallow and well drained. It formed in esiduum derived dominantly from basalt and andesite. ypically, about 92 percent of the surface is covered ith a desert pavement of pebbles, cobbles, and stones. he surface layer is pale brown very cobbly fine sandy oam about 3 inches thick. The underlying material to a epth of 11 inches is light brown very gravelly fine sandy oam. Basalt is at a depth of about 11 inches. Depth to edrock ranges from 10 to 20 inches.

Permeability of the Akela soil is moderate above the edrock. Available water capacity is very low. Effective ooting depth is 10 to 20 inches. Runoff is rapid, and the azard of water erosion is moderate. The hazard of soil lowing is moderate if the surface is disturbed.

Rock outcrop consists of exposed areas of ndifferentiated volcanic rock.

This unit is used as habitat for desert wildlife and for ecreation.

This unit is limited for roads because of the areas of lock outcrop, steepness of slopes, and shallow depth to edrock. Roads should be designed to minimize cuts. utting and filling can be reduced by building roads in ne less sloping areas of the unit. Roads should be rovided with adequate surface drainage. Erosion can be ontrolled and maintenance costs reduced by stabilizing reas that have been disturbed.

This map unit is in capability subclass VIIs, onirrigated. The Akela soil is in horticultural group 6.

540—Weiser extremely gravelly fine sandy loam, 2 o 8 percent slopes. This very deep, well drained soil is n summits and side slopes of erosional fan remnants ig. 1). It formed in alluvium derived from various kinds f rock that have a high content of lime.

Typically, 80 percent of the surface is covered with a esert pavement of pebbles. There is a dark desert arnish on the exposed surfaces of the rock fragments. he surface layer is light yellowish brown extremely avelly fine sandy loam about 1 inch thick. The nderlying material to a depth of 63 inches is light brown xtremely gravelly fine sandy loam and very gravelly fine andy loam, averaging extremely gravelly fine sandy am.

Included in this unit are about 5 percent Arizo soils, ooded, in channels and 10 percent Goodsprings soils n erosional fan remnants. Included areas make up out 15 percent of the total acreage. The percentage aries from one area to another.

Permeability of the Weiser soil is moderately rapid. vailable water capacity is very low. Effective rooting epth is 60 inches or more. Runoff is medium, and the azard of water erosion is slight. The hazard of soil blowing is moderate if the desert pavement is disturbed. Some pedons have an indurated, lime-cemented hardpan at a depth of 40 to 60 inches or more.

Most areas of this unit are used as habitat for desert wildlife and for recreation. A few areas are used for urban development.

This unit is well suited to the construction of dwellings.

Unless the density of housing is too high, septic tank absorption fields generally function well in this unit.

Roads can easily be constructed and maintained on this unit.

The main limitations for lawns and landscaping are the presence of pebbles throughout the soil and the very low available water capacity. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the limited available water capacity of the soil. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

Intermittent streams form the drainageways in this unit. These drainageways are subject to rare or occasional periods of high-velocity flooding. Care should be taken during urbanization to accommodate the runoff from the drainageways. If drains become plugged during a major flood, accelerated erosion and damage to roads, buildings, and other structures can occur.

This map unit is in capability subclasses IVs, irrigated, and VIIs, nonirrigated. It is in horticultural group 2.

542—Weiser-Aztec complex, 2 to 8 percent slopes. This map unit is on erosional fan remnants.

This unit is 55 percent Weiser extremely gravelly fine sandy loam, 2 to 8 percent slopes, and 30 percent Aztec very gravelly fine sandy loam, 2 to 8 percent slopes. The Weiser soil is on summits and side slopes of the fan remnants, and the Aztec soil is on side slopes of the fan remnants. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Arizo soils, flooded, in channels and 10 percent Goodsprings soils on erosional fan remnants. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Weiser soil is very deep and well drained. It formed in alluvium derived dominantly from limestone and dolomite. Typically, 95 percent of the surface is covered with a desert pavement of pebbles. There is a dark desert varnish on the exposed surfaces of the rock fragments. The surface layer is light yellowish brown extremely gravelly fine sandy loam about 1 inch thick. The underlying material to a depth of 63 inches is light brown extremely gravelly fine sandy loam and very

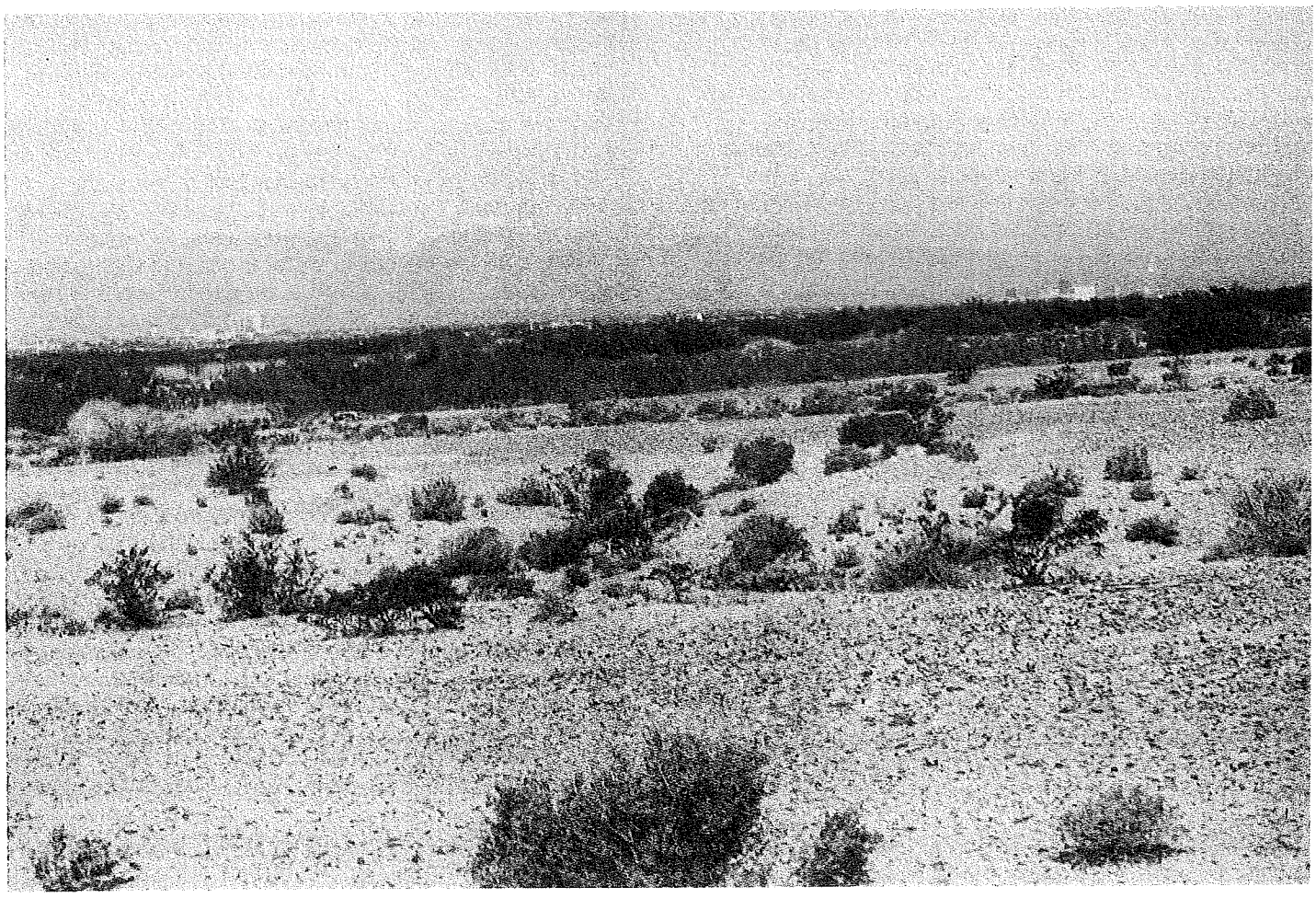


Figure 1.—An area of Weiser extremely gravelly fine sandy loam, 2 to 8 percent slopes, on erosional fan remnants southeast of Las Vegas

gravelly fine sandy loam, averaging gravelly fine sandy loam.

Permeability of the Weiser soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate if the desert pavement is disturbed.

The Aztec soil is very deep and well drained. It formed in alluvium derived from various kinds of rock. Typically, the surface layer is very pale brown very gravelly fine sandy loam about 4 inches thick. The underlying material to a depth of 60 inches or more is stratified pale brown very gravelly sandy loam to extremely gravelly loamy coarse sand with weak, continuous gypsum cementation in some layers.

Permeability of the Aztec soil is moderately slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. The soil is slightly affected by salts below a depth of 4 inches.

This unit is used mainly for urban development. It is also used as habitat for desert wildlife and for recreation

This unit is well suited to the construction of dwellings Gypsum in the Aztec soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

The main limitation for septic tank absorption fields is the restricted permeability of the Aztec soil. Using long absorption lines and backfilling the trench with sandy material help to compensate for the restricted permeability.

Roads can easily be constructed and maintained on this unit.

The main limitations for lawns and landscaping are the presence of pebbles throughout the soil and the very low available water capacity of the Weiser soil. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the limited available water capacity of the soil. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

Intermittent streams form the drainageways in this unit. These drainageways are subject to rare or occasional periods of high-velocity flooding. Care should be taken during urbanization to accommodate the runoff from the drainageways. If drains become plugged during a major flood, accelerated erosion and damage to roads, buildings, and other structures can occur.

This map unit is in capability subclasses IVs, irrigated, and VIIs, nonirrigated. It is in horticultural group 2.

545—Weiser-Goodsprings complex, 2 to 4 percent slopes. This map unit is on erosional fan remnants.

This unit is 60 percent Weiser extremely gravelly fine sandy loam, 2 to 4 percent slopes, and 25 percent Goodsprings very gravelly fine sandy loam, 2 to 4 percent slopes. The Weiser and Goodsprings soils are on summits and shoulders of the fan remnants. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Las Vegas soils and 10 percent Skyhaven soils on relict alluvial flats. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Weiser soil is very deep and well drained. It formed in alluvium derived dominantly from limestone and dolomite. Typically, 90 percent of the surface layer is covered with a desert pavement of pebbles. There is a dark desert varnish on the exposed surfaces of the rock fragments. The surface layer is light yellowish brown extremely gravelly fine sandy loam about 1 inch thick. The underlying material to a depth of 63 inches is light brown extremely gravelly fine sandy loam and very gravelly fine sandy loam, averaging extremely gravelly fine sandy loam.

Permeability of the Weiser soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate if the desert pavement is disturbed.

The Goodsprings soil is shallow and well drained. It formed in alluvium derived from various kinds of rock. Typically, 90 percent of the surface is covered with a desert pavement of pebbles. The surface layer is light brown very gravelly fine sandy loam about 5 inches thick. The upper 10 inches of the underlying material is pink gravelly fine sandy loam, the next 37 inches is pinkish white, strongly lime-cemented hardpan, and the lower part to a depth of 60 inches or more is pink extremely gravelly loamy fine sand. Depth to the hardpan ranges from 9 to 20 inches.

Permeability of the Goodsprings soil is moderate above the hardpan. Available water capacity is very low. Effective rooting depth is 9 to 20 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is high if the desert pavement is disturbed.

This unit is used as habitat for desert wildlife and for recreation.

This unit is limited for roads because of the depth to the hardpan in areas of the Goodsprings soil. Roads should be designed to minimize cuts. Heavy equipment is needed for excavation.

This map unit is in capability subclass VIIs, nonirrigated. The Weiser soil is in horticultural group 2, and the Goodsprings soil is in horticultural group 6.

600—Slickens. Slickens consists of accumulations of fine-textured material such as that separated in ore-mill operations. It is largely freshly ground rock that commonly has undergone chemical treatment during the milling process. Slickens is commonly confined in specially constructed basins.

This map unit is in capability subclass VIIIs, nonirrigated.

605—Dumps. Dumps consists of areas of smoothed or uneven accumulations of waste rock and general refuse.

This map unit is in capability subclass VIIIs, nonirrigated.

610—Pits, gravel. Pits, gravel, consists of open excavations from which soil material and gravel have been removed, exposing rock, a hardpan, or other material.

This map unit is in capability subclass VIIIs, nonirrigated.

615—Urban land. Urban land consists of areas covered by asphalt, concrete, and buildings or other urban structures.

This map unit is in capability subclass VIIIs, nonirrigated.

630—Badland. Badland is moderately steep to very steep barren land dissected by many intermittent drainage channels that have cut into soft geologic material. The areas ordinarily are not stony. Local relief generally ranges from 25 to 100 feet. Potential runoff is very high, and erosion is active. Some small included areas of identifiable soils support vegetation.

This map unit is in capability subclass VIIIe, nonirrigated.

635—Rock outcrop, limestone. Rock outcrop, limestone, consists of exposed limestone, dolomite, and other kinds of bedrock that are high in content of lime.

This map unit is in capability subclass VIIIs, nonirrigated.

640—Rock outcrop, sandstone. Rock outcrop, sandstone, consists of exposed sandstone bedrock.

This map unit is in capability subclass VIIIs, nonirrigated.

645—Pits, quarry. Pits, quarry, consists of open excavations from which rock has been removed, exposing bedrock on the sides and floor.

Included in this unit are about 5 percent dumps of overburden material and 5 percent fill areas for haul roads. Included areas make up about 10 percent of the total acreage.

This map unit is in capability subclass VIIIs, nonirrigated.

TABLE 15.--SOIL AND WATER FEATURES

Flooding" and "water table" and terms such as "rare" and "occasional" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydrologic group	Flooding		High water table		Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Months	Depth	Months	Depth	Thickness	Depth	Hardness	Uncoated steel	Concrete
				Ft		In		In			
5*:											
cCullough	B	Rare	---	>6.0	---	>60	---	---	---	High	High.
ean	A	Rare	---	>6.0	---	>60	---	---	---	High	Low.
luepoint	A	None	---	>6.0	---	>60	---	---	---	High	Low.
7 rizo	A	Rare	---	>6.0	---	>60	---	---	---	High	Low.
2 rizo	A	Occasional	Mar-Sep	>6.0	---	>60	---	---	---	High	Low.
3 rizo	A	Rare	---	>6.0	---	>60	---	---	---	High	High.
7 rizo	A	None	---	>6.0	---	>60	---	---	---	High	Low.
0 luepoint	A	Rare	---	4.0-6.0	Jun-Sep	>60	---	---	---	High	Moderate.
7, 128, 129 luepoint	A	None	---	>6.0	---	>60	---	---	---	High	Low.
3*:											
racken	B	None	---	>6.0	---	40-60	Soft	---	---	High	High.
estazo	B	None	---	>6.0	---	>60	---	---	---	High	High.
2 racken	B	None	---	>6.0	---	40-60	Soft	---	---	High	High.
3*:											
racken	B	None	---	>6.0	---	40-60	Soft	---	---	High	High.
ock outcrop.											
4 racken	B	None	---	>6.0	---	40-60	Soft	---	---	High	High.
3 asaga	C	None	---	>6.0	---	>60	---	---	---	High	High.
3 ave	D	None	---	>6.0	---	>60	---	4-20	Thick	High	Low.
1 ave	D	None	---	>6.0	---	>60	---	10-20	Thick	High	Low.
2, 155 ave	D	None	---	>6.0	---	>60	---	4-20	Thick	High	Low.
3 estazo	B	None	---	>6.0	---	>60	---	---	---	High	High.
1*:											
aliza	B	None	---	>6.0	---	>60	---	---	---	High	Low.
ittman	C	None	---	>6.0	---	>60	---	20-30	Thick	High	Low.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding		High water table		Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Months	Depth	Months	Depth	Thickness	Depth	Hardness	Uncoated steel	Concrete
				Ft		In		In			
182*: Caliza	B	None	---	>6.0	---	>60	---	---	---	High	Low.
Pittman	C	None	---	>6.0	---	>60	---	20-30	Thick	High	Low.
Arizo	A	Occasional	Mar-Sep	>6.0	---	>60	---	---	---	High	Low.
183--- Caliza	B	None	---	>6.0	---	>60	---	---	---	High	Low.
184--- Caliza	B	Rare	---	>6.0	---	>60	---	---	---	High	Low.
187--- Caliza	B	None	---	>6.0	---	>60	---	---	---	High	Low.
190--- Dalian	B	None	---	>6.0	---	>60	---	---	---	High	Low.
191--- Dalian	B	Rare	---	>6.0	---	>60	---	---	---	High	Low.
192*: Dalian	B	Rare	---	>6.0	---	>60	---	---	---	High	Low.
McCullough	B	Rare	---	>6.0	---	>60	---	---	---	High	Low.
200--- Glencarb	B	Rare	---	>6.0	---	>60	---	---	---	High	Moderate.
206--- Glencarb	C	Occasional	Jul-Sep	3.0-5.0	Jul-Jun	>60	---	---	---	High	High.
222--- Glencarb	C	Rare	---	3.0-5.0	Jul-Jun	>60	---	---	---	High	High.
236--- Glencarb	B	Rare	---	>6.0	---	>60	---	---	---	High	High.
237--- Glencarb	B	Rare	---	>6.0	---	>60	---	40-60	Thick	High	Low.
240--- Goodsprings	D	None	---	>6.0	---	>60	---	9-20	Thick	High	Low.
252, 255--- Grapevine	B	Rare	---	>6.0	---	>60	---	---	---	High	High.
260--- Jean	A	Rare	---	>6.0	---	>60	---	---	---	High	Low.
262*: Jean	A	Rare	---	>6.0	---	>60	---	---	---	High	Low.
Jean	A	Occasional	Jun-Sep	>6.0	---	>60	---	---	---	High	Low.
Goodsprings	D	Rare	---	>6.0	---	>60	---	9-20	Thick	High	Low.
263*: Jean	A	Rare	---	>6.0	---	>60	---	---	---	High	Low.
Jean	A	Occasional	Jun-Sep	>6.0	---	>60	---	---	---	High	Low.
264--- Jean	A	Rare	---	>6.0	---	>60	---	---	---	High	Low.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding		High water table		Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Months	Depth	Months	Depth	Thickness	Depth	Hardness	Uncoated steel	Concrete
				Ft		In		In			
70---------- Land	B	Rare--------	---	3.5-6.0	Mar-Sep	>60	---	---	---	High------	High.
78---------- Land	D	Rare--------	---	1.5-3.0	Jan-Dec	>60	---	---	---	High------	High.
82---------- Land	C	Rare--------	---	3.0-3.5	Jan-Dec	>60	---	---	---	High------	High.
00, 301---------- Las Vegas	D	Rare--------	---	>6.0	---	>60	---	3-14	Thick	High------	High.
02*:											
Las Vegas--------	D	Rare--------	---	>6.0	---	>60	---	3-14	Thick	High------	High.
McCarran---------	B	Rare--------	---	>6.0	---	>60	---	---	---	High------	High.
Grapevine--------	B	Rare--------	---	>6.0	---	>60	---	---	---	High------	High.
05*:											
Las Vegas--------	D	Rare--------	---	>6.0	---	>60	---	3-14	Thick	High------	High.
Destazo----------	B	Rare--------	---	>6.0	---	>60	---	---	---	High------	High.
07*:											
Las Vegas--------	D	Rare--------	---	>6.0	---	>60	---	3-14	Thick	High------	High.
Skyhaven---------	C	Rare--------	---	>6.0	---	>60	---	24-40	Thick	High------	High.
25, 326---------- McCarran	B	Rare--------	---	>6.0	---	>60	---	---	---	High------	High.
41---------- Paradise	C	Rare--------	---	3.0-5.0	Dec-Mar	>60	---	---	---	High------	Low.
60*:											
Rock outcrop.											
St. Thomas-------	D	None--------	---	>6.0	---	4-20	Hard	---	---	High------	Low.
80---------- Skyhaven	C	Rare--------	---	>6.0	---	>60	---	24-40	Thick	High------	High.
90---------- Spring	C	Rare--------	---	>6.0	---	>60	---	---	---	High------	High.
00---------- Tencee	D	None--------	---	>6.0	---	>60	---	7-20	Thick	High------	Low.
15---------- Aztec	B	None--------	---	>6.0	---	>60	---	---	---	High------	High.
17*:											
Aztec----------	B	None--------	---	>6.0	---	>60	---	---	---	High------	High.
Rock outcrop.											
18*:											
Aztec----------	B	None--------	---	>6.0	---	>60	---	---	---	High------	High.
Nickel----------	B	None--------	---	>6.0	---	40-60	Hard	---	---	High------	Low.
Knob Hill--------	B	None--------	---	>6.0	---	>60	---	---	---	High------	Low.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding		High water table		Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Months	Depth	Months	Depth	Thickness	Depth	Hardness	Uncoated steel	Concrete
				Ft		In		In			
419*:											
Aztec	B	None	---	>6.0	---	>60	---	---	---	High	High.
Bracken	B	None	---	>6.0	---	40-60	Soft	---	---	High	High.
430 Knob Hill	B	None	---	>6.0	---	>60	---	---	---	High	Low.
440 Nickel	B	None	---	>6.0	---	40-60	Hard	---	---	High	Low.
450 Cave Variant	D	None	---	>6.0	---	>60	---	5-18	Thick	High	High.
481, 484 Hobog	D	None	---	>6.0	---	8-20	Hard	---	---	High	Low.
500*											
Canutio	B	None	---	>6.0	---	40-60	Hard	---	---	High	Low.
Akela	D	None	---	>6.0	---	10-20	Hard	---	---	High	Low.
501 Canutio	B	None	---	>6.0	---	>60	---	---	---	High	Low.
502*:											
Canutio	B	None	---	>6.0	---	>60	---	---	---	High	Low.
Cave	D	None	---	>6.0	---	>60	---	4-20	Thick	High	Low.
505*											
Canutio	B	None	---	>6.0	---	40-60	Hard	---	---	High	Low.
Akela	D	None	---	>6.0	---	10-20	Hard	---	---	High	Low.
510*:											
Akela	D	None	---	>6.0	---	10-20	Hard	---	---	High	Low.
Rock outcrop.											
540 Weiser	B	None	---	>6.0	---	>60	---	---	---	High	Low.
542*:											
Weiser	B	None	---	>6.0	---	>60	---	---	---	High	Low.
Aztec	B	None	---	>6.0	---	>60	---	---	---	High	High.
545*:											
Weiser	B	None	---	>6.0	---	>60	---	---	---	High	Low.
Goodsprings	D	None	---	>6.0	---	>60	---	9-20	Thick	High	Low.
600*. Slickens											
605*. Dumps											
610*. Pits											
615*. Urban land											
630*. Badlands											
635*, 640*. Rock outcrop											
645*. Pits											

* See description of the map unit for composition and behavior characteristics of the map unit.

Lag Time - Standard Form 4 Computations

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL
TIME OF CONCENTRATION

Project Name & Number: Skye Canyon - Sheep Mountain Parkway
Description: Access Road and Trail Construction
By: NAS
Date: 2/8/2018

SUB-BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc Check Urbanized Basins		Tlag
DESIG:	DEV./EX. (D or E)	CN	K [1]	AREA Ac	AREA Mi^2 [2]	INITIAL LENGTH Feet	SLOPE %	Ti Min [3]	TRAVEL LENGTH Feet	SLOPE %	V1 VELOCITY FPS [4]	V2 VELOCITY FPS [5]	Tt Min [6]	Tc Calc. [7]	Total Length Feet [8]	Tc Check [9]	Tlag Hours [10]
PROPOSED CONDITION																	
XOF1	E	88.0	0.772	25.6	0.0400	260.04	5.6	5.38	1174.41	0.9	1.36	2.71	10.25	15.64			0.156
XOF2	E	88.0	0.772	28.8	0.0450	25.96	19.3	1.12	1275.42	3.9	2.93	5.82	5.06	6.19			0.100
XOF3	E	88.0	0.772	10.9	0.0170	114	4.4	3.86	594.95	4.2	3.03	6.03	3.01	6.87			0.100
XOF4	E	88.0	0.772	4.7	0.0073	63	21.5	1.69	922	3.8	2.89	5.73	4.12	5.80			0.100
PON1	D	94.5	0.857	3.1	0.0049	102	1.5	3.88	1308	1.2	2.17	3.28	7.95	11.83	1410	17.833	0.118
PON2	D	95.2	0.867	6.0	0.0094	161	6.3	2.89	1916	1.1	2.12	3.21	11.29	14.18	2077	21.539	0.142
PON3	D	94.2	0.853	4.8	0.0075	41	8.5	1.39	1832	2.1	2.95	4.47	7.80	9.19	1873	20.406	0.092
PON4	D	95.5	0.871	2.8	0.0044	95	12.6	1.73	1370	0.6	1.56	2.37	11.44	13.17	1465	18.139	0.132
PON5	D	94.5	0.857	2.4	0.0037	19.4	20.0	0.71	2054	1.7	2.63	3.99	9.66	10.36	2073.4	21.519	0.104
PON6	D	90.3	0.802	3.6	0.0056	211.9	4.7	4.66	832	2.6	3.26	4.93	3.68	8.34	1043.9	15.799	0.083

[1] K = 0.0132 (CN) - 0.39
[2] A = Area/640
[3] Ti = (1.8 (1.1-K) L^0.5)/S^0.33
[4] For Existing Conditions: V1 = 14.8 * (S/100)^0.5
For Developed Conditions: V1 = 20.2 * (S/100)^0.5
[5] For Existing Conditions: V2 = 29.4 * (S/100)^0.5
For Developed Conditions: V2 = 30.6 * (S/100)^0.5
[6] Tt = L/(60*V)
[7] Tc = Ti + Tt
[8] Total L = Initial L + Travel L
[9] Tc = (L/180) + 10
[10] Tlag = (0.6*Tc)/60
[11] Min Tlag =0.05

Note: For Travel Time Calcs: V1 applies to first 500 feet and V2 applies to remaining distance.

REFERENCE :

STANDARD FORM 4

APPENDIX C

HEC-1 Analyses

Proposed Condition

```
1****************************************
 *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
 *               JUN   1998             *
 *            VERSION 4.1               *
 *                                      *
 *  RUN DATE   16JAN18  TIME  12:40:44  *
 *                                      *
 ****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*            (916) 756-1104            *
*                                      *
****************************************
```

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
         LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

*** FREE ***
                   *DIAGRAM
               1   ID     SLATER HANIFAN GROUP
               2   ID     NINETY-FIVE MANAGEMENT, LLC.
               3   ID     SKYE CANYON - SHEEP MOUNTAIN PARKWAY
               4   ID     TECHNICAL DRAINAGE STUDY
               5   ID
               6   ID     DRAINAGE CONDITION -- PROPOSED CONDITION
               7   ID     RETURN PERIOD ------- 100 & 10-YEAR
               8   ID     DISTRIBUTION -------- 6-HOUR SDN3
               9   ID     PROJECT NO. --------- OLY1720.000
              10   ID     FILENAME ------------ PRO.H1
              11   ID     DATE ---------------- DECEMBER 2017
              12   ID     MODELED BY ---------- NAS
              13   ID
              14   ID        RETURN PERIOD           RATIO
              15   ID        100-YR                  1.00
              16   ID        10-YR                   0.54
              17   ID
              18   ID        SIX HOUR DEPTH-AREA REDUCTION FACTORS
              19   ID        DRAINAGE AREA (MI^2)    DARF
              20   ID        0.00-0.49               0.990
              21   ID        0.50-0.99               0.975
              22   ID        1.00-1.99               0.950
              23   ID
              24   ID
              25   IT       5       0       0     300
              26   IO       5       0       0
              27   IN       5       0       0
              28   JR    PREC    1.00    0.99   0.975    0.95    0.54
                   *
              29   KK   *OFF7
              30   KM   REFERENCED FROM THE "DB2" STUDY
              31   KM   DISCHARGES INTO DETENTION BASIN "DB2"
              32   PB    3.00
              33   PC       0   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
              34   PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
              35   PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
              36   PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
              37   PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
              38   PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
              39   PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
              40   PC   0.998   0.999       1
              41   BA   .0058
              42   LS       0    88.0
              43   UD   0.100
                   *
```

```
          44          KK   *OFF8
          45          KM   REFERENCED FROM THE "DB2" STUDY
          46          KM   DISCHARGES INTO DETENTION BASIN "DB2"
                      * KO     5
          47          BA   .2122
          48          LS       0    88.0
1                                        HEC-1 INPUT                                                    PAGE  2

        LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

          49          UD   0.299
                      *

          50          KK    *CP2
          51          KM   REFERENCED FROM THE "DB2" STUDY
          52          KM   COMBINE OFF7, AND OFF8
          53          HC       2
                      *

          54          KK   *OFF9
          55          KM   REFERENCED FROM THE "DB2" STUDY
          56          KM   DISCHARGES INTO DETENTION BASIN "DB2"
                      * KO     5
          57          BA   .1137
          58          LS       0    88.0
          59          UD   0.200
                      *

          60          KK   *CP2a
          61          KM   REFERENCED FROM THE "DB2" STUDY
          62          KM   COMBINE CP2, AND OFF9
          63          HC       2
                      *

          64          KK  *OFF10
          65          KM   REFERENCED FROM THE "DB2" STUDY
          66          KM   DISCHARGES INTO DETENTION BASIN "DB2"
                      * KO     5
          67          BA   .6502
          68          LS       0    88.0
          69          UD   0.613
                      *

          70          KK    *ON2
          71          KM   REFERENCED FROM THE "DB2" STUDY
          72          KM   DB2 BASIN
          73          BA   .0315
          74          LS       0    94.0
          75          UD   0.083
                      *

          76          KK    *DB2
          77          KM   REFERENCED FROM THE "DB2" STUDY
          78          KM   COMBINE CP2a, OFF10 AND ON2
                      * KO     5
          79          HC       3
                      *

          80          KK   *RDB2
          81          KM   REFERENCED FROM THE "DB2" STUDY
          82          KM   OUTLET = 25" ORIFICE @ INVERT ELEVATION = 2984.21-FT
                      * KO     5
          83          RS       1    ELEV  2992.0
          84          SV    0.00    2.34    7.60   24.30   46.28   73.78  107.11  146.75  193.03
          85          SE  2992.0  2993.0  2995.0  3000.0  3005.0  3010.0  3015.0  3020.0  3025.0
1                                        HEC-1 INPUT                                                    PAGE  3

        LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

          86          SQ    0.00   44.44   51.05   64.70   83.84   99.36   520.9  3465.5  7888.4
          87          SE  2992.0  2993.0  2995.0  3000.0  3009.0  3018.0  3019.0  3022.0  3025.0
                      *

          88          KK    XOF1
          89          KM   OFFSITE BASIN
          90          BA   .0400
          91          LS       0    88.0
          92          UD   0.156
                      *

          93          KK    PON1
          94          KM   ONSITE BASIN, NORTH HALF-STREET GRADING OF SHEEP MOUNTAIN PARKWAY
          95          BA   .0049
          96          LS       0    94.5
          97          UD   0.118
```

```
                *
 98             KK  CPSMPN
 99             KM   COMBINES *RDB2, XOF1, AND PON1 AT SHEEP MOUNTAIN PARKWAY (NORTH)
100             HC       3
                *
101             KK    XOF2
102             KM   OFFSITE BASIN
103             BA   .0450
104             LS       0    88.0
105             UD   0.100
                *
106             KK    XOF3
107             KM   OFFSITE BASIN
108             BA   .0170
109             LS       0    88.0
110             UD   0.100
                *
111             KK    PON2
112             KM   ONSITE BASIN, CENTRAL PORTION OF SHEEP MOUNTAIN PARKWAY CORRIDOR
113             BA   .0094
114             LS       0    95.2
115             UD   0.142
                *
116             KK  CPSMPC
117             KM   COMBINES XOF2, XOF3, AND PON2 AT SHEEP MOUNTAIN PARKWAY (CENTRAL)
118             HC       3
                *
119             KK  **OFF1
120             KM   REFERENCED FROM THE "DB1" STUDY
121             KM   DISCHARGES INTO DETENTION BASIN "DB1"
                * KO     5
122             BA   .4291
123             LS       0    86.8
1                                       HEC-1 INPUT                                    PAGE  4

LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

124             UD   0.419
                *
125             KK  **OFF2
126             KM   REFERENCED FROM THE "DB1" STUDY
127             KM   DISCHARGES INTO DETENTION BASIN "DB1"
                * KO     5
128             BA   .0419
129             LS       0    81.8
130             UD   0.154
                *
131             KK  **OFF3
132             KM   REFERENCED FROM THE "DB1" STUDY
133             KM   DISCHARGES INTO DETENTION BASIN "DB1"
                * KO     5
134             BA   .0259
135             LS       0    88.0
136             UD   0.110
                *
137             KK   **CP1
138             KM   COMBINE OFF1, OFF2, AND OFF3
139             HC       3
                *
140             KK  **OFF4
141             KM   REFERENCED FROM THE "DB1" STUDY
142             KM   DISCHARGES INTO DETENTION BASIN "DB1"
                * KO     5
143             BA   .0581
144             LS       0    88.0
145             UD   0.134
                *
146             KK  **OFF5
147             KM   REFERENCED FROM THE "DB1" STUDY
148             KM   DISCHARGES INTO DETENTION BASIN "DB1"
                * KO     5
149             BA   .2569
150             LS       0    88.0
151             UD   0.416
                *
```

```
          152          KK  **OFF6
          153          KM   REFERENCED FROM THE "DB1" STUDY
          154          KM   DISCHARGES INTO DETENTION BASIN "DB1"
                       * KO     5
          155          BA   .0399
          156          LS       0    88.0
          157          UD   0.118
                       *
1                                                HEC-1 INPUT                                                PAGE  5

        LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


          158          KK   **ON1
          159          KM   REFERENCED FROM THE "DB1" STUDY
          160          KM   DB1 BASIN
          161          BA   .0261
          162          LS       0    94.0
          163          UD   0.115
                       *

          164          KK   **DB1
          165          KM   REFERENCED FROM THE "DB1" STUDY
          166          KM   COMBINE DUMMY, OFF4, OFF5, OFF6 AND ON1
          167          HC       5
                       *

          168          KK  **RDB1
          169          KM   REFERENCED FROM THE "DB1" STUDY
          170          KM   OUTLET = 24" ORIFICE @ INVERT ELEVATION = 3013.8-FT
          171          RS       1    ELEV  3025.5
          172          SA    4.58    5.63    5.81    6.00    6.19    7.17    7.61    8.31    9.00    9.69
          173          SE  3025.5    3027    3028    3029    3030    3035    3037    3040    3043    3046
          174          SQ    49.7    60.6    70.8    74.5  1436.0  3920.5  7136.3
          175          SE  3025.5    3030    3035    3037    3040    3043    3046
                       *

          176          KK    XOF4
          177          KM   OFFSITE BASIN
          178          BA   .0073
          179          LS       0    88.0
          180          UD   0.100
                       *

          181          KK    PON3
          182          KM   ONSITE BASIN, SOUTHERN PORTION OF SHEEP MOUNTAIN PARKWAY CORRIDOR
          183          BA   .0075
          184          LS       0    94.2
          185          UD   0.092
                       *

          186          KK  CPSMPS
          187          KM   COMBINE **RDB1, XOF4, AND PON3 AT SHEEP MOUNTAIN PARKWAY (SOUTH)
          188          HC       3
                       *

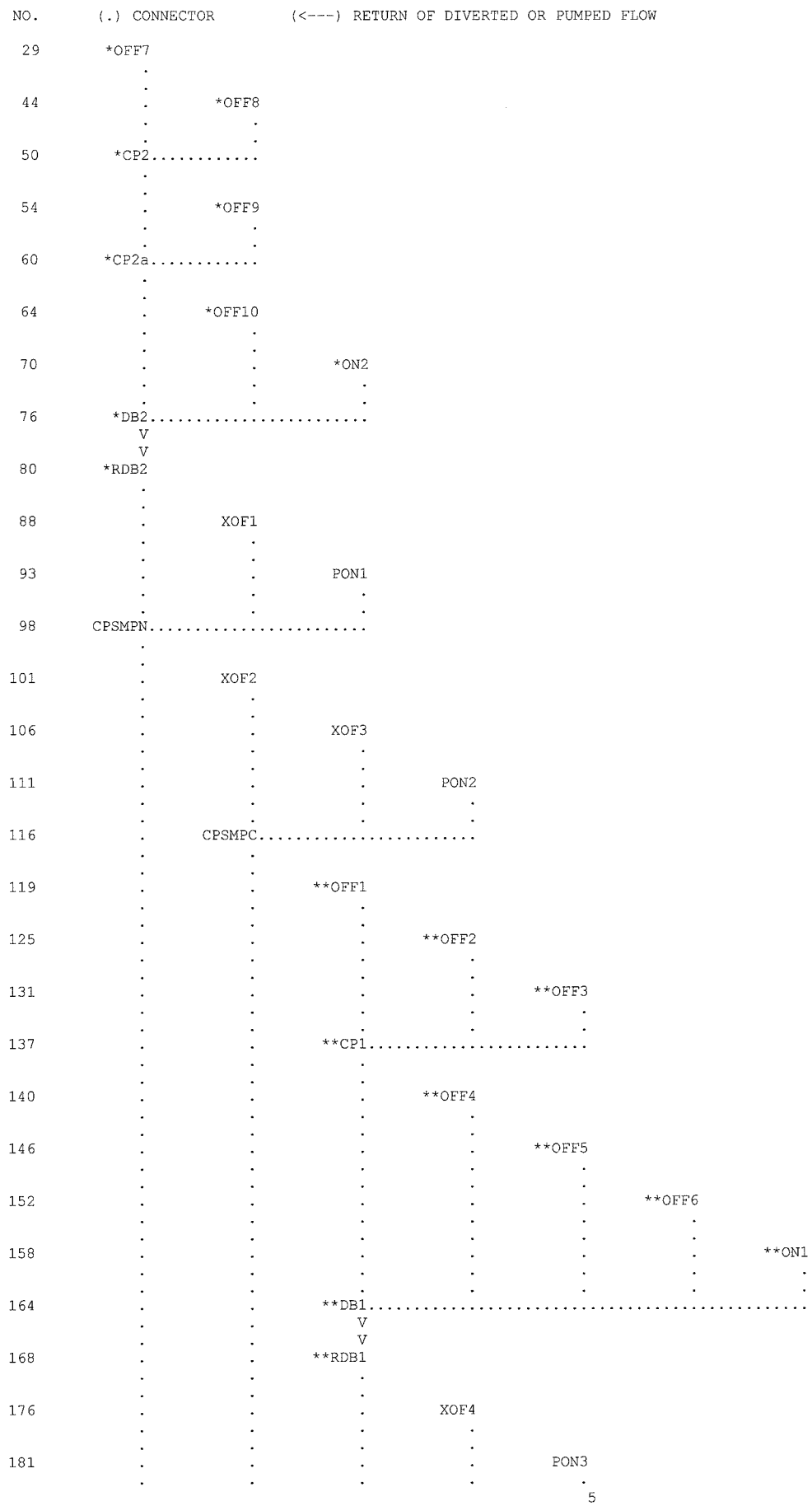
          189          KK    PON4
          190          KM   ONSITE BASIN, SHEEP MOUNTAIN PARKWAY HALF-STREET AT NORTH EXTENT
          191          BA   .0044
          192          LS       0    95.5
          193          UD   0.132
                       *
1                                                HEC-1 INPUT                                                PAGE  6

        LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


          194          KK    PON5
          195          KM   ONSITE BASIN, SHEEP MOUNTAIN PARKWAY HALD-STREET SECTION IN CENTRAL PORTION
          196          BA   .0037
          197          LS       0    94.5
          198          UD   0.104
                       *

          199          KK    PON6
          200          KM   ONSITE BASIN, SHEEP MOUNTAIN PARKWAY ON-RAMP SECTION AT SOUTH EXTENT
          201          BA   .0056
          202          LS       0    90.3
          203          UD   0.083
                       *
          204          ZZ
1
               SCHEMATIC DIAGRAM OF STREAM NETWORK

 INPUT
  LINE      (V) ROUTING          (---->) DIVERSION OR PUMP FLOW
```


NO.
(.) CONNECTOR
(<---) RETURN OF DIVERTED OR PUMPED FLOW
29
*OFF7
44
*OFF8
50
*CP2
54
*OFF9
60
*CP2a
64
*OFF10
70
*ON2
76
*DB2
80
*RDB2
88
XOF1
93
PON1
98
CPSMPN
101
XOF2
106
XOF3
111
PON2
116
CPSMPC
119
**OFF1
125
**OFF2
131
**OFF3
137
**CP1
140
**OFF4
146
**OFF5
152
**OFF6
158
**ON1
164
**DB1
168
**RDB1
176
XOF4
181
PON3

```
                .           .           .           .           .
   186          .           .      CPSMPS.....................
                .           .           .
                .           .           .
   189          .           .           .       PON4
                .           .           .         .
                .           .           .         .
   194          .           .           .         .       PON5
                .           .           .         .         .
                .           .           .         .         .
   199          .           .           .         .         .       PON6

  (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************                                  ****************************************
 *                                       *                                  *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                  *    U.S. ARMY CORPS OF ENGINEERS      *
 *               JUN   1998              *                                  *    HYDROLOGIC ENGINEERING CENTER     *
 *            VERSION 4.1                *                                  *         609 SECOND STREET            *
 *                                       *                                  *       DAVIS, CALIFORNIA 95616        *
 *  RUN DATE   16JAN18  TIME  12:40:44   *                                  *           (916) 756-1104             *
 *                                       *                                  *                                      *
 *****************************************                                  ****************************************
```

SLATER HANIFAN GROUP
NINETY-FIVE MANAGEMENT, LLC.
SKYE CANYON - SHEEP MOUNTAIN PARKWAY
TECHNICAL DRAINAGE STUDY

DRAINAGE CONDITION -- PROPOSED CONDITION
RETURN PERIOD ------- 100 & 10-YEAR
DISTRIBUTION -------- 6-HOUR SDN3
PROJECT NO. --------- OLY1720.000
FILENAME ------------ PRO.H1
DATE ---------------- DECEMBER 2017
MODELED BY ---------- NAS

RETURN PERIOD	RATIO
100-YR	1.00
10-YR	0.54

SIX HOUR DEPTH-AREA REDUCTION FACTORS

DRAINAGE AREA (MI^2)	DARF
0.00-0.49	0.990
0.50-0.99	0.975
1.00-1.99	0.950

```
  26 IO          OUTPUT CONTROL VARIABLES
                      IPRNT           5  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

     IT          HYDROGRAPH TIME DATA
                      NMIN           5  MINUTES IN COMPUTATION INTERVAL
                     IDATE      1    0  STARTING DATE
                     ITIME        0000  STARTING TIME
                        NQ         300  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      2    0  ENDING DATE
                    NDTIME        0055  ENDING TIME
                     ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL     .08 HOURS
                       TOTAL TIME BASE   24.92 HOURS

          ENGLISH UNITS
               DRAINAGE AREA         SQUARE MILES
               PRECIPITATION DEPTH   INCHES
               LENGTH, ELEVATION     FEET
               FLOW                  CUBIC FEET PER SECOND
               STORAGE VOLUME        ACRE-FEET
               SURFACE AREA          ACRES
               TEMPERATURE           DEGREES FAHRENHEIT

     JP          MULTI-PLAN OPTION
                      NPLAN           1  NUMBER OF PLANS

     JR          MULTI-RATIO OPTION
                     RATIOS OF PRECIPITATION
                   1.00       .99       .98       .95       .54
1
```

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 1.00	RATIO 2 .99	RATIO 3 .98	RATIO 4 .95	RATIO 5 .54
HYDROGRAPH AT									
+	*OFF7	.01	1	FLOW	9.	9.	9.	9.	4.
				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT									
+	*OFF8	.21	1	FLOW	244.	241.	236.	227.	93.
				TIME	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT									
+	*CP2	.22	1	FLOW	249.	245.	240.	232.	95.
				TIME	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT									
+	*OFF9	.11	1	FLOW	153.	151.	148.	142.	58.
				TIME	3.58	3.58	3.58	3.58	3.67
2 COMBINED AT									
+	*CP2a	.33	1	FLOW	395.	390.	382.	368.	148.
				TIME	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT									
+	*OFF10	.65	1	FLOW	508.	501.	490.	472.	191.
				TIME	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT									
+	*ON2	.03	1	FLOW	66.	65.	64.	62.	31.
				TIME	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT									
+	*DB2	1.01	1	FLOW	774.	763.	746.	719.	290.
				TIME	3.83	3.83	3.83	3.83	3.83
ROUTED TO									
+	*RDB2	1.01	1	FLOW	86.	86.	85.	84.	64.
				TIME	5.83	5.83	5.83	5.83	5.58
			** PEAK STAGES IN FEET **						
			1	STAGE	3010.16	3009.97	3009.63	3009.08	2999.64
				TIME	5.83	5.83	5.83	5.83	5.58
HYDROGRAPH AT									
+	XOF1	.04	1	FLOW	60.	59.	58.	56.	23.
				TIME	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT									
+	PON1	.00	1	FLOW	9.	9.	9.	9.	4.
				TIME	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT									
+	CPSMPN	1.06	1	FLOW	124.	123.	122.	119.	73.
				TIME	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT									
+	XOF2	.05	1	FLOW	73.	72.	71.	68.	28.
				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT									
+	XOF3	.02	1	FLOW	28.	27.	27.	26.	10.
				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT									
+	PON2	.01	1	FLOW	18.	18.	17.	17.	9.
				TIME	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT									
+	CPSMPC	.07	1	FLOW	118.	116.	114.	110.	46.
				TIME	3.50	3.50	3.50	3.50	3.58
HYDROGRAPH AT									
+	**OFF1	.43	1	FLOW	399.	393.	385.	370.	143.
				TIME	3.83	3.83	3.83	3.83	3.92
HYDROGRAPH AT									
+	**OFF2	.04	1	FLOW	49.	48.	47.	45.	14.
				TIME	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT									

+	**OFF3	.03	1	FLOW	41.	40.	39.	38.	16.
				TIME	3.50	3.50	3.50	3.58	3.58
3 COMBINED AT									
+	**CP1	.50	1	FLOW	441.	435.	425.	409.	158.
				TIME	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT									
+	**OFF4	.06	1	FLOW	90.	89.	87.	84.	35.
				TIME	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT									
+	**OFF5	.26	1	FLOW	252.	248.	243.	234.	94.
				TIME	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT									
+	**OFF6	.04	1	FLOW	62.	62.	60.	58.	24.
				TIME	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT									
+	**ON1	.03	1	FLOW	49.	49.	48.	46.	23.
				TIME	3.50	3.50	3.50	3.50	3.58
5 COMBINED AT									
+	**DB1	.88	1	FLOW	785.	774.	757.	729.	288.
				TIME	3.75	3.75	3.75	3.75	3.83
ROUTED TO									
+	**RDB1	.88	1	FLOW	71.	71.	71.	70.	57.
				TIME	5.58	5.58	5.58	5.58	5.42
			** PEAK STAGES IN FEET **						
			1	STAGE	3035.28	3035.13	3034.91	3034.53	3028.62
				TIME	5.67	5.58	5.58	5.58	5.42
HYDROGRAPH AT									
+	XOF4	.01	1	FLOW	12.	12.	11.	11.	5.
				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT									
+	PON3	.01	1	FLOW	15.	15.	15.	14.	7.
				TIME	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT									
+	CPSMPS	.89	1	FLOW	80.	80.	79.	78.	62.
				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT									
+	PON4	.00	1	FLOW	8.	8.	8.	8.	4.
				TIME	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT									
+	PON5	.00	1	FLOW	7.	7.	7.	7.	3.
				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT									
+	PON6	.01	1	FLOW	11.	10.	10.	10.	4.
				TIME	3.50	3.50	3.50	3.50	3.50

*** NORMAL END OF HEC-1 ***

APPENDIX D

Hydraulic Computations

Culverts

HY-8 Culvert Analysis Report

48-Inch RCP Culvert at "SMP" Station 216+60

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

Design Flow: 118 cfs

Maximum Flow: 200 cfs

Table 1 - Summary of Culvert Flows at Crossing: Sheep Mountain Parkway - Center

Headwater Elevation (ft)	Total Discharge (cfs)	CPSMPC Crossing Discharge (cfs)	Roadway Discharge (cfs)	Iterations
2984.11	0.00	0.00	0.00	1
2985.88	20.00	20.00	0.00	1
2986.80	40.00	40.00	0.00	1
2987.58	60.00	60.00	0.00	1
2988.36	80.00	80.00	0.00	1
2989.25	100.00	100.00	0.00	1
2990.21	118.00	118.00	0.00	1
2991.62	140.00	140.00	0.00	1
2993.14	160.00	160.00	0.00	1
2994.87	180.00	180.00	0.00	1
2996.83	200.00	200.00	0.00	1
3004.11	259.17	259.17	0.00	Overtopping

Rating Curve Plot for Crossing: Sheep Mountain Parkway - Center

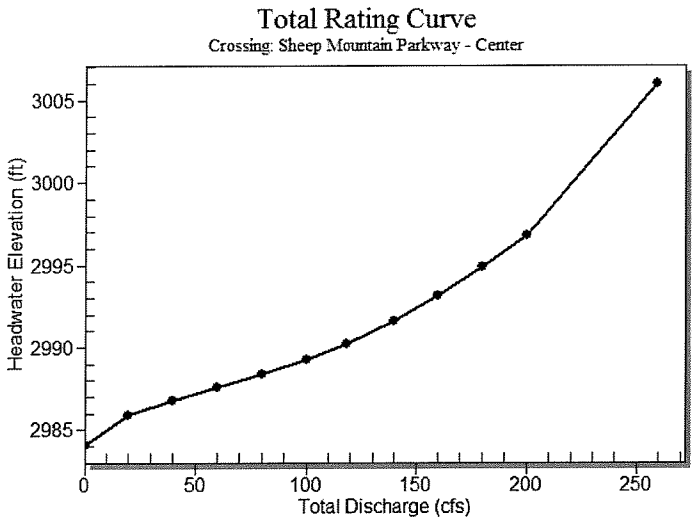


Table 2 - Culvert Summary Table: CPSMPC Crossing

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	2984.11	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
20.00	20.00	2985.88	1.766	0.0*	1-S2n	0.725	1.312	0.725	0.250	12.411	2.660
40.00	40.00	2986.80	2.692	0.0*	1-S2n	1.025	1.888	1.070	0.379	14.302	3.498
60.00	60.00	2987.58	3.475	0.0*	1-S2n	1.262	2.328	1.324	0.484	15.946	4.101
80.00	80.00	2988.36	4.249	0.0*	5-S2n	1.470	2.707	1.545	0.576	17.250	4.589
100.00	100.00	2989.25	5.137	0.0*	5-S2n	1.661	3.026	1.753	0.659	18.248	5.005
118.00	118.00	2990.21	6.095	0.0*	5-S2n	1.824	3.271	1.930	0.728	19.011	5.338
140.00	140.00	2991.62	7.507	0.088	5-S2n	2.016	3.510	2.147	0.807	19.735	5.703
160.00	160.00	2993.14	9.026	1.833	5-S2n	2.188	3.668	2.337	0.875	20.342	6.004
180.00	180.00	2994.87	10.757	3.773	5-S2n	2.359	3.772	2.523	0.940	20.915	6.283
200.00	200.00	2996.83	12.719	5.827	5-S2n	2.534	3.658	2.711	1.002	21.425	6.542

* Full Flow Headwater elevation is below inlet invert.

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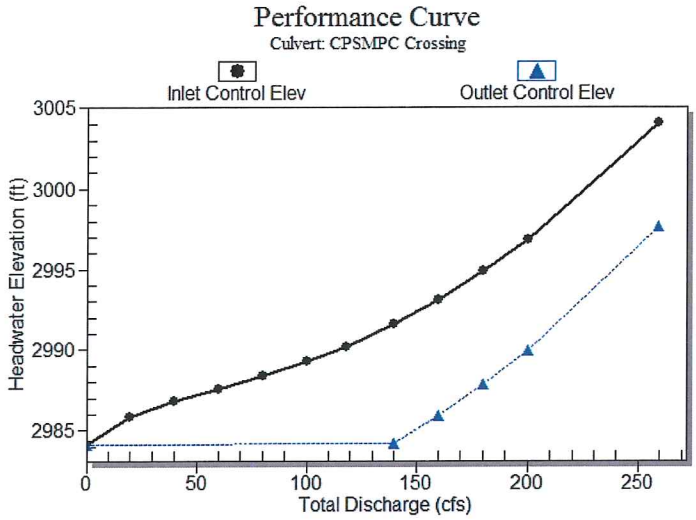
Straight Culvert

Inlet Elevation (invert): 2984.11 ft, Outlet Elevation (invert): 2975.00 ft

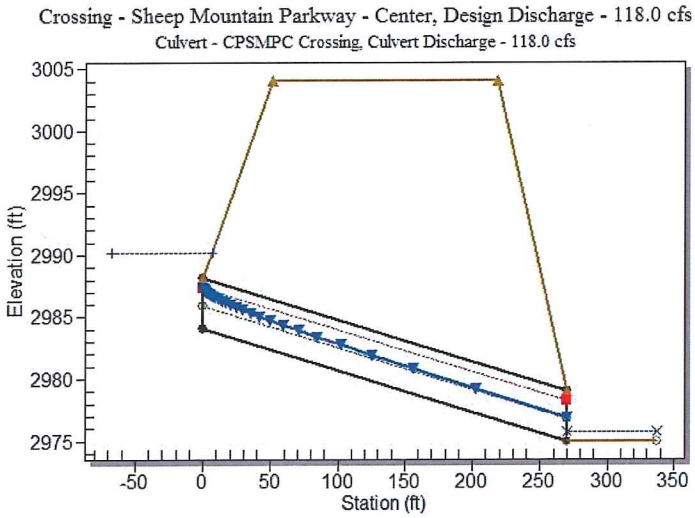
Culvert Length: 270.15 ft, Culvert Slope: 0.0337

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Culvert Performance Curve Plot: CPSMPC Crossing



Water Surface Profile Plot for Culvert: CPSMPC Crossing



S

Inlet Station: 0.00 ft
Inlet Elevation: 2984.11 ft
Outlet Station: 270.00 ft
Outlet Elevation: 2975.00 ft
Number of Barrels: 1

Culvert Data Summary - CPSMPC Crossing

Barrel Shape: Circular
Barrel Diameter: 4.00 ft
Barrel Material: Concrete
Embedment: 0.00 in
Barrel Manning's n: 0.0130
Culvert Type: Straight
Inlet Configuration: Square Edge with Headwall
Inlet Depression: None

Table 3 - Downstream Channel Rating Curve (Crossing: Sheep Mountain Parkway - Center)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	2975.00	0.00	0.00	0.00	0.00
20.00	2975.25	0.25	2.66	0.20	0.94
40.00	2975.38	0.38	3.50	0.31	1.00
60.00	2975.48	0.48	4.10	0.39	1.04
80.00	2975.58	0.58	4.59	0.47	1.07
100.00	2975.66	0.66	5.01	0.53	1.09
118.00	2975.73	0.73	5.34	0.59	1.11
140.00	2975.81	0.81	5.70	0.65	1.13
160.00	2975.88	0.88	6.00	0.71	1.14
180.00	2975.94	0.94	6.28	0.76	1.15
200.00	2976.00	1.00	6.54	0.81	1.16

Tailwater Channel Data - Sheep Mountain Parkway - Center

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 30.00 ft

Side Slope (H:V): 0.50 (_:1)

Channel Slope: 0.0130

Channel Manning's n: 0.0250

Channel Invert Elevation: 2975.00 ft

Roadway Data for Crossing: Sheep Mountain Parkway - Center

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 3004.11 ft

Roadway Surface: Paved

Roadway Top Width: 168.00 ft

HY-8 Culvert Analysis Report

54 Inch CMP Culvert

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

Design Flow: 71 cfs

Maximum Flow: 100 cfs

Table 1 - Summary of Culvert Flows at Crossing: CMP to Culvert Headwall

Headwater Elevation (ft)	Total Discharge (cfs)	Culvert Discharge (cfs)	Roadway Discharge (cfs)	Iterations
2997.00	0.00	0.00	0.00	1
2998.54	10.00	10.00	0.00	1
2999.23	20.00	20.00	0.00	1
2999.70	30.00	30.00	0.00	1
3000.10	40.00	40.00	0.00	1
3000.46	50.00	50.00	0.00	1
3000.79	60.00	60.00	0.00	1
3001.11	70.00	70.00	0.00	1
3001.15	71.00	71.00	0.00	1
3001.80	90.00	90.00	0.00	1
3002.18	100.00	100.00	0.00	1
3003.00	118.62	118.62	0.00	Overtopping

Rating Curve Plot for Crossing: CMP to Culvert Headwall

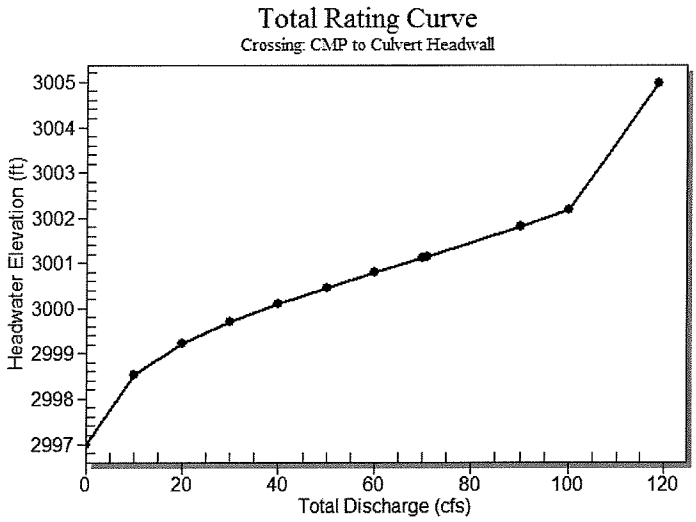


Table 2 - Culvert Summary Table: Culvert

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	2997.00	0.000	0.000	0-NF	0.000	0.000	4.500	5.210	0.000	0.000
10.00	10.00	2998.54	1.542	0.0*	1-JS1f	0.472	0.889	4.500	5.210	0.629	0.000
20.00	20.00	2999.23	2.227	0.0*	1-JS1f	0.658	1.269	4.500	5.210	1.258	0.000
30.00	30.00	2999.70	2.704	0.0*	1-JS1f	0.804	1.565	4.500	5.210	1.886	0.000
40.00	40.00	3000.10	3.104	0.0*	1-S2n	0.927	1.818	0.927	5.210	16.325	0.000
50.00	50.00	3000.46	3.459	0.0*	1-S2n	1.036	2.046	1.087	5.210	16.291	0.000
60.00	60.00	3000.79	3.789	0.0*	1-S2n	1.135	2.250	1.191	5.210	17.186	0.000
70.00	70.00	3001.11	4.113	0.0*	1-S2n	1.227	2.437	1.227	5.210	19.200	0.000
71.00	71.00	3001.15	4.146	0.0*	1-S2n	1.237	2.455	1.298	5.210	18.024	0.000
90.00	90.00	3001.80	4.801	0.0*	5-S2n	1.398	2.778	1.470	5.210	19.232	0.000
100.00	100.00	3002.18	5.185	0.0*	5-S2n	1.478	2.936	1.554	5.210	19.808	0.000

* Full Flow Headwater elevation is below inlet invert.

****

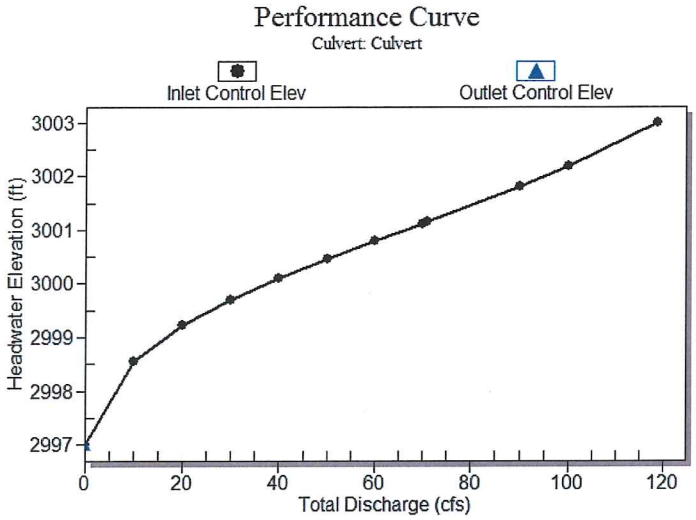
Straight Culvert

Inlet Elevation (invert): 2997.00 ft, Outlet Elevation (invert): 2985.00 ft

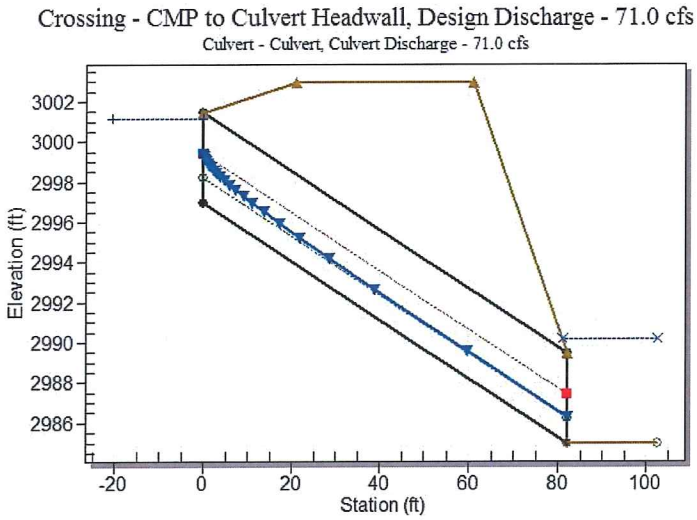
Culvert Length: 82.87 ft, Culvert Slope: 0.1463

****

Culvert Performance Curve Plot: Culvert



Water Surface Profile Plot for Culvert: Culvert



S

Inlet Station: 0.00 ft
Inlet Elevation: 2997.00 ft
Outlet Station: 82.00 ft
Outlet Elevation: 2985.00 ft
Number of Barrels: 1

Culvert Data Summary - Culvert

Barrel Shape: Circular
Barrel Diameter: 4.50 ft
Barrel Material: Corrugated Steel
Embedment: 0.00 in
Barrel Manning's n: 0.0240
Culvert Type: Straight
Inlet Configuration: Mitered to Conform to Slope
Inlet Depression: None

Table 3 - Downstream Channel Rating Curve (Crossing: CMP to Culvert Headwall)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
0.00	2990.21	5.21
10.00	2990.21	5.21
20.00	2990.21	5.21
30.00	2990.21	5.21
40.00	2990.21	5.21
50.00	2990.21	5.21
60.00	2990.21	5.21
70.00	2990.21	5.21
71.00	2990.21	5.21
90.00	2990.21	5.21
100.00	2990.21	5.21

Tailwater Channel Data - CMP to Culvert Headwall

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 2990.21 ft

Roadway Data for Crossing: CMP to Culvert Headwall

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 20.00 ft

Crest Elevation: 3003.00 ft

Roadway Surface: Gravel

Roadway Top Width: 40.00 ft

Drop Inlets

Grate Inlet Sizing Computation

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

Project Name & Number: Sheep Mountain Parkway Access Road - OLY1720.000
Date: 1/22/2018
By: NAS

Notes:

Facility ID:	SDDI#1
Drainage Condition:	Proposed
Source of Flow:	Q100= Basin XOF4
Inlet Type:	Grated Drop Inlet
Inlet Size:	4'x2'

Known Information:

Q =	Flow (cfs)	12.0
W =	Width of Grate (ft)	4.00
L =	Length of Grate (ft)	2.00
D =	Diameter of Circle (in)	
Cf =	Clogging Factor (%)	50

Weir Conditions:

$$HW = (Q/(Cw*Pc))^{2/3}$$

Cw =	Weir Coefficient	3.30
P =	Perimeter of grate (ft)	12.0
Pc =	Perimeter (w/clogging) (ft)	6.0
HW =	Headwater depth (ft)	0.72

Orifice Conditions:

$$HW = (Q/(Co*Ac))^2/2*g$$

Co =	Orifice Coefficient	0.67
Ag =	Grate Area (ft^2)	8.00
Gf =	Grate Opening Factor	0.67
Ac =	Grate Open Area (w/ clogging) (ft^2)	2.68
g =	Gravity (fps)	32.20
HW =	Headwater depth (ft)	0.69

Output:

Worst Case Scenario Occurs Under Weir Conditions

Headwater Depth = 0.72 ft with grate

Grate Inlet Sizing Computation

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

Project Name & Number:	**Sheep Mountain Parkway Access Road - OLY1720.000**
Date:	**1/22/2018**
By:	**NAS**

Notes:

Facility ID:	EX SDDI at "SMP" STA 195+85.83, 71.04' LT
Drainage Condition:	Proposed
Source of Flow:	Q100= Basin PON3
Inlet Type:	Grated Drop Inlet
Inlet Size:	4'x2'

Known Information:

Q =	Flow (cfs)	15.0
W =	Width of Grate (ft)	4.00
L =	Length of Grate (ft)	2.00
D =	Diameter of Circle (in)	
Cf =	Clogging Factor (%)	50

Weir Conditions:

$$HW = (Q/(Cw*Pc))^{2/3}$$

Cw =	Weir Coefficient	3.30
P =	Perimeter of grate (ft)	12.0
Pc =	Perimeter (w/clogging) (ft)	6.0
HW =	Headwater depth (ft)	0.83

Orifice Conditions:

$$HW = (Q/(Co*Ac))^2/2*g$$

Co =	Orifice Coefficient	0.67
Ag =	Grate Area (ft^2)	8.00
Gf =	Grate Opening Factor	0.67
Ac =	Grate Open Area (w/ clogging) (ft^2)	2.68
g =	Gravity (fps)	32.20
HW =	Headwater depth (ft)	1.08

Output:

Worst Case Scenario Occurs Under Orifice Conditions

Headwater Depth = 1.08 ft with grate

Grate Inlet Sizing Computation

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

Project Name & Number:	**Sheep Mountain Parkway Access Road - OLY1720.000**
Date:	**1/22/2018**
By:	**NAS**

Notes:

Facility ID:	SDDI#2
Drainage Condition:	Proposed
Source of Flow:	Q100= Basin PON2
Inlet Type:	Grated Drop Inlet
Inlet Size:	3'x3'

Known Information:

Q =	Flow (cfs)	18.0
W =	Width of Grate (ft)	3.00
L =	Length of Grate (ft)	3.00
D =	Diameter of Circle (in)	
Cf =	Clogging Factor (%)	50

Weir Conditions:

$$HW = (Q/(Cw*Pc))^{2/3}$$

Cw =	Weir Coefficient	3.30
P =	Perimeter of grate (ft)	12.0
Pc =	Perimeter (w/clogging) (ft)	6.0
HW =	Headwater depth (ft)	0.94

Orifice Conditions:

$$HW = (Q/(Co*Ac))^2/2*g$$

Co =	Orifice Coefficient	0.67
Ag =	Grate Area (ft^2)	9.00
Gf =	Grate Opening Factor	0.67
Ac =	Grate Open Area (w/ clogging) (ft^2)	3.02
g =	Gravity (fps)	32.20
HW =	Headwater depth (ft)	1.23

Output:

Worst Case Scenario Occurs Under Orifice Conditions

Headwater Depth = 1.23 ft with grate

Ditches

Sheep Mountain Parkway
Ditch Summary Table

Section *[-]*	Flow *[cfs]*	Width *[ft]*	Left SS *[H:V]*	Right SS *[H:V]*	Chl Slope *[ft/ft]*	Flow Depth *[ft]*	Velocity *[ft/s]*
A - Onsite (Vel)	7.5	2	3	3	0.0328	0.45	4.95
A - Onsite (Depth)	7.5	0	3	3	0.0051	0.72	2.51
A - Offsite (Vel)	6	0	3	3	0.0328	0.76	4.87
A - Offsite (Depth)	6	0	3	3	0.0051	0.91	2.42
B - Onsite (Vel)	15	5	3	3	0.0326	0.44	5.40
B - Onsite (Depth)	15	5	3	3	0.0183	0.52	4.43
B - Offsite (Vel)	12	6	3	3	0.0326	0.35	4.83
B - Offsite (Depth)	12	6	3	3	0.0183	0.42	3.99
C - Onsite (Vel)	9	0	3	3	0.0214	0.81	4.59
C - Onsite (Depth)	9	0	3	3	0.0045	1.08	2.56
C - Offsite (Vel)	28	10	3	3	0.0214	0.49	4.96
C - Offsite (Depth)	28	10	3	3	0.0045	0.77	2.95
D - Onsite (Vel/Dep	18	0	3	3	0.0144	1.13	4.70
D - Offsite (Vel/Dep	65	12	3	3	0.0100	0.9	4.90
E - Onsite (Vel)	9	3	3	3	0.0298	0.43	4.84
E - Onsite (Depth)	9	3	3	3	0.0061	0.66	2.75
E - Offsite (Vel)	60	10	3	3	0.0100	0.94	4.95
E - Offsite (Depths)	60	10	3	3	0.0061	1.08	4.17

Worksheet
Worksheet for Triangular Channel

Project Description	
Worksheet	Section A - Offsites (De
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.025	
Channel Slope	005100	ft/ft
Left Side Slope	3.00	H : V
Right Side Slope	3.00	H : V
Discharge	6.00	cfs

Results		
Depth	0.91	ft
Flow Area	2.5	ft²
Wetted Perim	5.75	ft
Top Width	5.45	ft
Critical Depth	0.76	ft
Critical Slope	0.013508	ft/ft
Velocity	2.42	ft/s
Velocity Head	0.09	ft
Specific Energ	1.00	ft
Froude Numb	0.63	
Flow Type	Subcritical	

Worksheet
Worksheet for Triangular Channel

Project Description	
Worksheet	Section A - Offsites (Veloc
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.025	
Channel Slope	032800	ft/ft
Left Side Slope	3.00	H : V
Right Side Slope	3.00	H : V
Discharge	6.00	cfs

Results		
Depth	0.64	ft
Flow Area	1.2	ft²
Wetted Perim	4.05	ft
Top Width	3.85	ft
Critical Depth	0.76	ft
Critical Slope	0.013521	ft/ft
Velocity	4.87	ft/s
Velocity Head	0.37	ft
Specific Energ	1.01	ft
Froude Numb	1.52	
Flow Type	Supercritical	

Worksheet
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Section A Trap - Onsite (E
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.025	
Channel Slope	005100	ft/ft
Left Side Slope	3.00	H : V
Right Side Slope	3.00	H : V
Bottom Width	2.00	ft
Discharge	7.50	cfs

Results		
Depth	0.72	ft
Flow Area	3.0	ft²
Wetted Perim	6.54	ft
Top Width	6.31	ft
Critical Depth	0.57	ft
Critical Slope	0.013033	ft/ft
Velocity	2.51	ft/s
Velocity Head	0.10	ft
Specific Energ	0.82	ft
Froude Numb	0.64	
Flow Type	Subcritical	

Worksheet
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Section A Trap - Onsite (Vel
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.025	
Channel Slope	032800	ft/ft
Left Side Slope	3.00	H : V
Right Side Slope	3.00	H : V
Bottom Width	2.00	ft
Discharge	7.50	cfs

Results		
Depth	0.45	ft
Flow Area	1.5	ft²
Wetted Perim	4.86	ft
Top Width	4.71	ft
Critical Depth	0.57	ft
Critical Slope	0.013033	ft/ft
Velocity	4.95	ft/s
Velocity Head	0.38	ft
Specific Energ	0.83	ft
Froude Numb	1.54	
Flow Type	Supercritical	

Worksheet
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Section B Trap - Offsite (D
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.025	
Channel Slope	018300	ft/ft
Left Side Slope	3.00	H : V
Right Side Slope	3.00	H : V
Bottom Width	6.00	ft
Discharge	12.00	cfs

Results		
Depth	0.42	ft
Flow Area	3.0	ft²
Wetted Perim	8.63	ft
Top Width	8.49	ft
Critical Depth	0.46	ft
Critical Slope	0.012774	ft/ft
Velocity	3.99	ft/s
Velocity Head	0.25	ft
Specific Energ	0.66	ft
Froude Numb	1.18	
Flow Type	Supercritical	

Worksheet
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Section B Trap - Offsite (Velo
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.025	
Channel Slope	032600	ft/ft
Left Side Slope	3.00	H : V
Right Side Slope	3.00	H : V
Bottom Width	6.00	ft
Discharge	12.00	cfs

Results		
Depth	0.35	ft
Flow Area	2.5	ft²
Wetted Perim	8.23	ft
Top Width	8.11	ft
Critical Depth	0.46	ft
Critical Slope	0.012778	ft/ft
Velocity	4.83	ft/s
Velocity Head	0.36	ft
Specific Energ	0.71	ft
Froude Numb	1.54	
Flow Type	Supercritical	

Worksheet
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Section B Trap - Onsite (D
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.025	
Channel Slope	018300	ft/ft
Left Side Slope	3.00	H : V
Right Side Slope	3.00	H : V
Bottom Width	5.00	ft
Discharge	15.00	cfs

Results		
Depth	0.52	ft
Flow Area	3.4	ft²
Wetted Perim	8.27	ft
Top Width	8.10	ft
Critical Depth	0.58	ft
Critical Slope	0.012160	ft/ft
Velocity	4.43	ft/s
Velocity Head	0.31	ft
Specific Energ	0.82	ft
Froude Numb	1.21	
Flow Type	Supercritical	

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Worksheet
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Section B Trap - Onsite (Vel
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.025	
Channel Slope	032600	ft/ft
Left Side Slope	3.00	H : V
Right Side Slope	3.00	H : V
Bottom Width	5.00	ft
Discharge	15.00	cfs

Results		
Depth	0.44	ft
Flow Area	2.8	ft²
Wetted Perim	7.78	ft
Top Width	7.64	ft
Critical Depth	0.58	ft
Critical Slope	0.012153	ft/ft
Velocity	5.40	ft/s
Velocity Head	0.45	ft
Specific Energ	0.89	ft
Froude Numb	1.58	
Flow Type	Supercritical	

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Worksheet
Worksheet for Triangular Channel

Project Description	
Worksheet	Section C - Onsites (D
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.025	
Channel Slope	004500	ft/ft
Left Side Slope	3.00	H : V
Right Side Slope	3.00	H : V
Discharge	9.00	cfs

Results		
Depth	1.08	ft
Flow Area	3.5	ft²
Wetted Perim	6.85	ft
Top Width	6.50	ft
Critical Depth	0.89	ft
Critical Slope	0.012788	ft/ft
Velocity	2.56	ft/s
Velocity Head	0.10	ft
Specific Energ	1.18	ft
Froude Numb	0.61	
Flow Type	Subcritical	

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Worksheet
Worksheet for Triangular Channel

Project Description	
Worksheet	Section C - Onsites (Velo
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.025	
Channel Slope	021400	ft/ft
Left Side Slope	3.00	H : V
Right Side Slope	3.00	H : V
Discharge	9.00	cfs

Results		
Depth	0.81	ft
Flow Area	2.0	ft²
Wetted Perim	5.11	ft
Top Width	4.85	ft
Critical Depth	0.89	ft
Critical Slope	0.012796	ft/ft
Velocity	4.59	ft/s
Velocity Head	0.33	ft
Specific Energ	1.14	ft
Froude Numb	1.27	
Flow Type	Supercritical	

Worksheet
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Section C Trap - Offsite (D
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.025	
Channel Slope	004500	ft/ft
Left Side Slope	3.00	H : V
Right Side Slope	3.00	H : V
Bottom Width	10.00	ft
Discharge	28.00	cfs

Results		
Depth	0.77	ft
Flow Area	9.5	ft²
Wetted Perim	14.87	ft
Top Width	14.62	ft
Critical Depth	0.59	ft
Critical Slope	0.011591	ft/ft
Velocity	2.95	ft/s
Velocity Head	0.14	ft
Specific Ener	0.91	ft
Froude Numb	0.65	
Flow Type	Subcritical	

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Worksheet
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Section C Trap - Offsite (Velc
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.025	
Channel Slope	021400	ft/ft
Left Side Slope	3.00	H : V
Right Side Slope	3.00	H : V
Bottom Width	0.00	ft
Discharge	15.00	cfs

Results		
Depth	0.98	ft
Flow Area	2.9	ft²
Wetted Perim	6.19	ft
Top Width	5.87	ft
Critical Depth	1.09	ft
Critical Slope	0.011952	ft/ft
Velocity	5.22	ft/s
Velocity Head	0.42	ft
Specific Energ	1.40	ft
Froude Numb	1.31	
Flow Type	Supercritical	

Worksheet
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Section D - Offsites (Depth
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.025	
Channel Slope	010000	ft/ft
Left Side Slope	3.00	H : V
Right Side Slope	3.00	H : V
Bottom Width	12.00	ft
Discharge	65.00	cfs

Results		
Depth	0.90	ft
Flow Area	13.3	ft²
Wetted Perim	17.70	ft
Top Width	17.41	ft
Critical Depth	0.90	ft
Critical Slope	0.010214	ft/ft
Velocity	4.90	ft/s
Velocity Head	0.37	ft
Specific Energ	1.28	ft
Froude Numb	0.99	
Flow Type	Subcritical	

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Worksheet
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Section D - Onsite (Deptl
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.025	
Channel Slope	014400	ft/ft
Left Side Slope	3.00	H : V
Right Side Slope	3.00	H : V
Bottom Width	0.00	ft
Discharge	18.00	cfs

Results		
Depth	1.13	ft
Flow Area	3.8	ft²
Wetted Perim	7.14	ft
Top Width	6.78	ft
Critical Depth	1.17	ft
Critical Slope	0.011667	ft/ft
Velocity	4.70	ft/s
Velocity Head	0.34	ft
Specific Energ	1.47	ft
Froude Numb	1.10	
Flow Type	Supercritical	

Worksheet
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Section E Trap - Offsites (D
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.025	
Channel Slope	006100	ft/ft
Left Side Slope	3.00	H : V
Right Side Slope	3.00	H : V
Bottom Width	10.00	ft
Discharge	60.00	cfs

Results		
Depth	1.08	ft
Flow Area	14.4	ft²
Wetted Perim	16.86	ft
Top Width	16.51	ft
Critical Depth	0.94	ft
Critical Slope	0.010192	ft/ft
Velocity	4.17	ft/s
Velocity Head	0.27	ft
Specific Energ	1.36	ft
Froude Numb	0.79	
Flow Type	Subcritical	

Worksheet
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Section E Trap - Offsites (Velc
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.025	
Channel Slope	010000	ft/ft
Left Side Slope	3.00	H : V
Right Side Slope	3.00	H : V
Bottom Width	0.00	ft
Discharge	30.00	cfs

Results		
Depth	1.46	ft
Flow Area	6.4	ft²
Wetted Perim	9.26	ft
Top Width	8.79	ft
Critical Depth	1.44	ft
Critical Slope	0.010899	ft/ft
Velocity	4.66	ft/s
Velocity Head	0.34	ft
Specific Energ	1.80	ft
Froude Numb	0.96	
Flow Type	Subcritical	

Worksheet
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Section E Trap - Onsite (E
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.025	
Channel Slope	006100	ft/ft
Left Side Slope	3.00	H : V
Right Side Slope	3.00	H : V
Bottom Width	3.00	ft
Discharge	9.00	cfs

Results		
Depth	0.66	ft
Flow Area	3.3	ft²
Wetted Perim	7.16	ft
Top Width	6.94	ft
Critical Depth	0.54	ft
Critical Slope	0.012813	ft/ft
Velocity	2.75	ft/s
Velocity Head	0.12	ft
Specific Energ	0.78	ft
Froude Numb	0.71	
Flow Type	Subcritical	

Worksheet
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Section E Trap - Onsite (Vel
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.025	
Channel Slope	029800	ft/ft
Left Side Slope	3.00	H : V
Right Side Slope	3.00	H : V
Bottom Width	3.00	ft
Discharge	9.00	cfs

Results		
Depth	0.43	ft
Flow Area	1.9	ft²
Wetted Perim	5.74	ft
Top Width	5.60	ft
Critical Depth	0.54	ft
Critical Slope	0.012817	ft/ft
Velocity	4.84	ft/s
Velocity Head	0.36	ft
Specific Energ	0.80	ft
Froude Numb	1.48	
Flow Type	Supercritical	

Worksheet for Trapezoidal Riprap Ditch at 54-Inch Culvert

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.035	
Channel Slope	0.05000	ft/ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	5.00	ft
Discharge	71.00	ft^3/s

Results

Normal Depth	1.09	ft
Flow Area	9.00	ft^2
Wetted Perimeter	11.89	ft
Hydraulic Radius	0.76	ft
Top Width	11.53	ft
Critical Depth	1.39	ft
Critical Slope	0.01893	ft/ft
Velocity	7.89	ft/s
Velocity Head	0.97	ft
Specific Energy	2.06	ft
Froude Number	1.57	
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	1.09	ft
Critical Depth	1.39	ft
Channel Slope	0.05000	ft/ft

Worksheet for Trapezoidal Riprap Ditch at 54-Inch Culvert

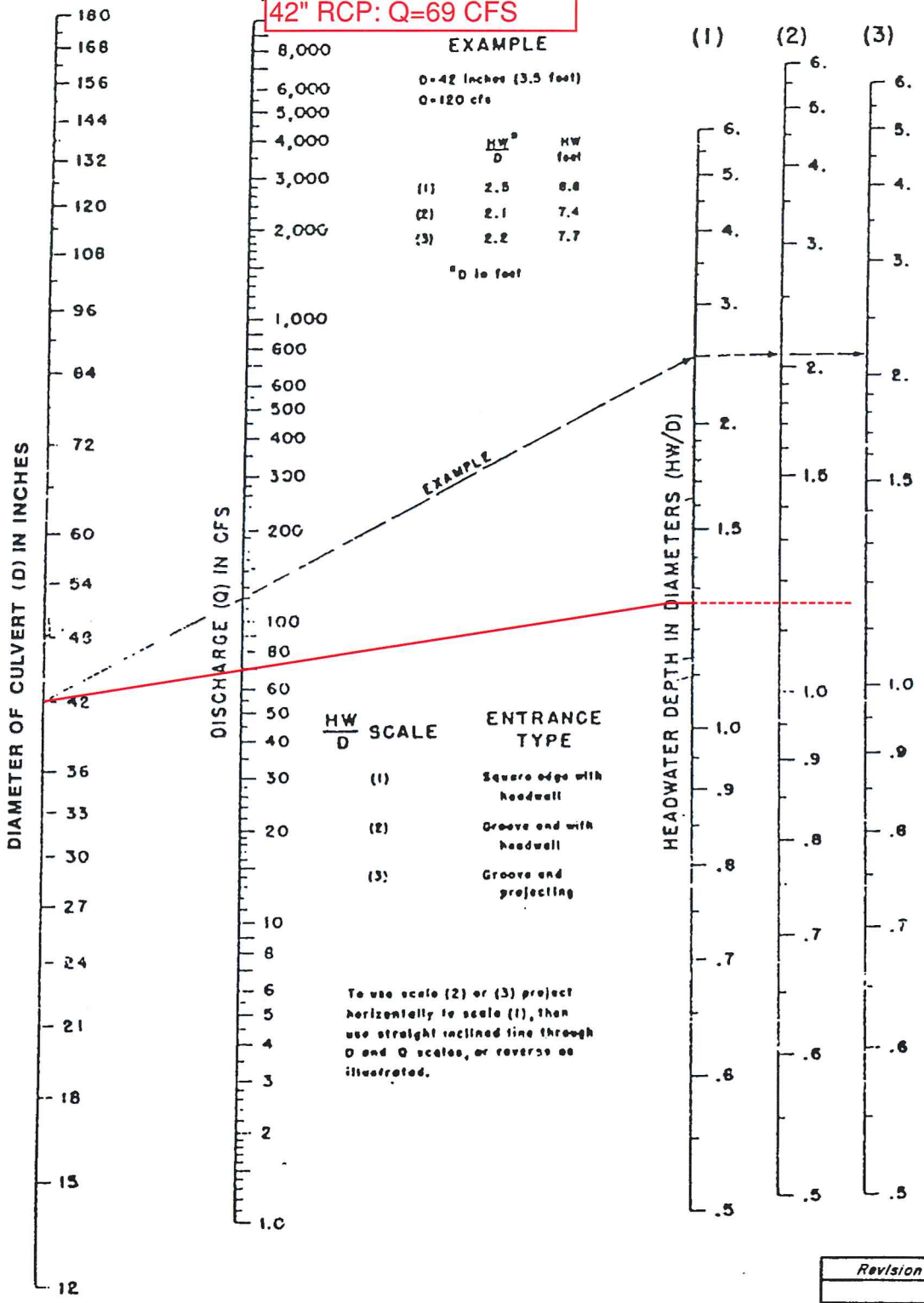
GVF Output Data

Critical Slope	0.01893	ft/ft

Inlet Control Nomographs

NOMOGRAPH – INLET CONTROL RCP

IRON MOUNTAIN RD
42" RCP: Q=69 CFS



HW/D	1.27
D	42
HW	4.4

Revision	Date

WRC ENGINEERING

REFERENCE:
USDOT, FHWA, HDS, No. 5, 1985

FIGURE 1005

Riprap Computations

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

Pipe Culvert Outlet Protection Computation

48-Inch RCP Culvert Outlet

Project Name: Sheep Mountain Pkwy
Project Number: OLY1720-000
Date: 1/23/2018
By: LKL

Equations:

$(d_{50}/D)*(Y_t/D)^{1.2}/(Q/D^{2.5}) = 0.023$ — Equation 760*
$D_a = 1/2(D+Y_n)$ (used in place of D if Fr>1) — Equation 762*
$L = (1/(2 \tan q))(A_t/Y_t-W)$ — Equation 764*
$A_t = Q/V$ — Equation 765*

Known Information:

Q =	118	Flow (cfs)
D =	4.0	Diameter of Pipe (ft)
q =	20	Expansion angle of the culvert flow (typ=20°)
V =	5	Allowable downstream velocity (typ=5 ft/s)
Fr =	3.1	Froude Number (0 if full)
Y_n =	1.9	Normal Depth of flow in Pipe Culvert (ft)*
		* Not necessary if Fr<1 (Enter 0 if unknown)
Y_t =	1.7	Tailwater Depth (Enter 0.4D if unknown)

Riprap Erosion Protection Check (Figure 712):

Applicable only if $Q/D^{2.5} \leq 6$

$Q/D^{2.5}$ = ***3.69*** ← ***See Figure 712 for Recommended Riprap Type***
$Q/D^{1.5}$ = 14.75
Y_t/D 0.58

Solve For:

D_{50} = 1.51	**Average Size Riprap (ft)**
D_{50} = 18	**Average Size Riprap (in)**

A_t = 23.6	Req'd Area of flow at allowable velocity (ft2)
Y_t = 1.70	Tailwater Depth (ft)
D_a = 2.9	only used if Fr>=1
L = 13.6	**Length of Protection (ft)**
***L = 16.0**	***For: D<3.5-ft, L_{min}=3D. For: D>=3.5-ft, L_{min}>= 4D. $L_{max(required)}$=10D**

Notes:

Provide D_{50} = 18-inch riprap for a length of 16-ft

* Equations taken from the Clark County Regional Flood Control District - Hydrologic Criteria and Drainage Design Manual

5740 S. Arville St., Suite 216 - Las Vegas, NV 89118
Ph. 702-284-5300 - Fx. 702-284-5399

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

Rip Rap Sizing Computation

Project Name & Number: OLY1720.000
Date: 2/8/2018
By: LKL

Location: Riprap Ditch at 54" Culvert

Known Information:

Reference:

Rip Rap protection at

V =	Velocity (fps)	7.9	WSPG Hydraulic / Flowmaster Calculations
S_g =	Specific Gravity of Rock (typ=2.5)	2.5	Use Typical
s =	Longitudinal Channel Slope (ft/ft)	0.05	Grading Plan

Solve For:

d_{50} = 1.11 ft - Average Rock Size

d_{50} =	**13**	**in**	**- Average Rock Size**
Thickness =	**26**	**in**	**- Thickness of Rip Rap protection**
Manning's 'n' =	**0.040**		**- Roughness Coefficient**

Equations:

Based upon a Stable Channel Lining

$d_{50} = ((vel*S^{0.17})/(3*(S_q-1)))^2$ Equation 734*

$n = 0.0395(d_{50})^{1/6}$ Equation 732*

Recommendations:

* Provide 18-in Riprap, Thickness = 36-in.

* Equations taken from the Clark County Regional Flood Control District - Hydrologic Criteria and Drainage Design Manual

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APPENDIX E

Reference Material

Master Drainage Study for Skye Canyon Update #4, by SHG

Approval Letter

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: October 12, 2017
TO: **Land Development Services** Department of Public Works				FROM: Oh Sang Kwon, P.E. Flood Control Section Department of Public Works
SUBJECT:	Drainage Study for:			**COPIES TO:**
Skye Canyon Master Drainage Study – Update #4				Slater Hanifan Group
Cross Streets:	Fort Apache Road & Moccasin Road			KAG Development South, LLC
File Number:	F:\Depot\DSMemos\DS4420O.doc			Bart Anderson, P.E., DevCo
Parcel Number:	125-06-001-001			CCRFCD
Zoning Action:				CCPW
FEMA Flood Zone	YES	NO X		NDOT; NV Energy
Proposed Storm Drain	YES X	NO		PB America, Inc.

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Transaction #
1st Submittal	6/22/2010	7/13/2010	Not Approved	$1,000.00	147216: $1000
2nd Submittal	9/17/2010	10/4/2010	Not Approved	$400.00	153788: $400
3rd Submittal	10/15/2011	11/14/2011	Not Approved	$400.00	153788: $400
4th Submittal	2/13/2012	3/1/2012	Conditional Approval	$400.00	274196: $400
CCRFCD	5/23/2012	5/24/2012	Concurrence Recv'd	N/C	N/C
5th Submittal NDOT Comments	9/10/2012	9/19/2012	Conditional Approval	N/C	N/C
6th Submittal	12/4/2014	12/30/2014	Conditional Approval	$400.00	378889: $400
7th Submittal	2/17/2015	3/3/2015	Conditional Approval	$400.00	385987: $400
8th Submittal	3/16/2015	4/6/2015	See Comments Below	$400.00	388961: $400
CCRFCD	4/2/2015	4/6/2015	Concurrence Recv'd	N/C	N/C
9th Submittal	6/23/2015	7/21/2015	See Comments Below	$400.00	403025: $400
Revised Memo	8/12/2015	8/12/2015	See Comments Below	N/A	N/A
10th Submittal	10/19/2015	11/23/2015	Conditional Approval	$400.00	N/A
11th Submittal	4/19/2016	5/16/2016 & 8/15/2016	See Comments Below	$400.00	440941: $400
12th Submittal	7/25/2017	9/7/2017 & 10/11/2017	See Comments Below	$400.00	488746: $400
			TOTAL FEES (LDDRS):	**$4,600.00**	----

REMARKS: 12th Submittal: Update # 4 – Overall Master Plan Revision of Skye Canyon development. A new MPA must be submitted to *City of Las Vegas* and *CCRFCD* for approval and shall be adopted by the *City of Las Vegas City Council* prior to the final approval of the subject Overall Master Study.

The City of Las Vegas will not allow further residential development outside of the limits of Phase 2 at this time until the New Master Plan is approved.

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

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

1. The overall concept presented in the Master Plan Update #4 for Skye Canyon appears to satisfy the intent of providing regional connectivity of proposed Master Planned facilities without impacting the National Monument. Specific Technical Drainage Studies shall be required to address the specific impacts of each proposed Master Planned facility and the interaction with proposed facilities needed for each phase of development.
2. The Master Plan Update #4 includes a revised Concept for the Regional Flood Control Master Plan Facilities that are identified to be constructed by the Master Developer. Generally these MPU Facilities are shown on Exhibit J, dated July 24, 2017 and include the following general alignments; Skye Village Road - from W. Skye Canyon Park Dr. to Oso Blanca Rd., Iron Mountain Rd. - from the DB #2 outfall to Skye Village Rd., Oso Blanco Rd. – from Skye Village Rd. through the Kyle Canyon/US-95 Interchange to Log Cabin Way., Log Cabin Way – from east of US-95 to N. Skye Canyon Park Dr., and N. Skye Canyon Park Dr. – from Log Cabin Way to Moccasin Rd. The proposed MPU Facility within the Moccasin Rd. alignment – from N. Skye Canyon Park Dr. to the existing Upper Las Vegas Wash MPU Facility is identified to be constructed by the City.
3. Update #4 discussed that *due to the updated plan of constructing the ultimate MPU facilities with the infrastructure improvements, there are no longer interim facilities proposed in place of ultimate facilities.* Based upon that premise, Flood Control requests that Exhibit J be revised to show that flows west of US-95 are routed south to connect into the existing MPU facility that was extended with the Horse Interchange project. This flow connection matches the CCRFCD Master Plan and basin routing. The facilities between CHD02B and CHD06B along the west side of US-95 are local facilities that shall be constructed by the Master Developer and identified as such on a Revised Exhibit J. The result will reduce the impacts to the east side of US-95. Review and revise the flows for facilities 26 thru 26-3 and 17 thru 17-2.
4. The provided Phasing Plan (Exhibit O) has identified the schematic facilities necessary within each Phase. Flood Control concurs that the construction of Phase 3 & 4 MPU infrastructure is critical to the success of the Phased developments. Changes and timing of the Phases and the corresponding infrastructure improvements shall require Updated Phasing Plans that are approved by the City of Las Vegas and Regional Flood Control prior to the approval of future Master Drainage Study updates.
5. The implementation of the CCRFCD Master Plan is being progressed with the recent bid opening of the NDOT US-95 facilities from the CC-215 interchange north to the Kyle Canyon interchange. Construction of the associated CCRFCD MPU facilities allows for the utilization of the existing MPU facilities constructed with the Horse Interchange. Phased development west of US-95 shall maximize the flow collection into this facility prior to allowing flows to cross US-95 using the existing culvert system. The Ultimate Condition will have the west side of these culvert systems removed, no longer having flows cross US-95 as per the CCRFCD Master Plan.
6. The premise of the Master Plan Update #4 for Skye Canyon is to continue to show a new CCRFCD Master Plan Detention Basin that is located outside of the Skye Canyon development. The City of Las Vegas is in the process of applying for BLM grants for this detention basin site located along Kyle

Canyon Road west of the Skye Canyon Development. This ultimate facility shall be included in the MPA as a CCRFCD facility. The intent of the Detention Basin (157DB) is to reduce developed flows to maintain the existing condition flow rate in the ultimate condition and reduce the size of the downstream regional facilities. The concept for the addition of this detention basin to the CCRFCD Master Plan is acceptable to the City and will require the submittal of technical studies to refine the facility parameters.

7. The ultimate condition Exhibit J shows that a portion of the developed flows will drain north of Moccasin into the BLM land and the National Monument to mimic existing drainage patterns. Concentrated flow discharges at EC19 and EC20 to the north shall still require BLM and National Park Service concurrence. Detailed drainage studies that specifically address the impacts of development and storm discharge along the Moccasin corridor west of Skye Canyon Park Dr. shall be provided prior to the City considering the removal of BLM and National Park Service concurrence.

8. The ***Master Land Use Plan*** has been provided however, any further changes to the adopted Master Land Use Plan shall require a complete update to the Master Drainage Study.

9. A copy of the approved 404 Permit from the Army Corps of Engineers has been provided.

10. Flood Control requires an interim condition drainage analysis in support of the Phasing Plan that clearly shows the impacts to each Phase, existing washes, upstream concentration points and the downstream concentration points. Flood Control needs to make sure that each Phase of Development is protected during the interim and full build-out of this overall project.

11. The interim conditions of the detention basin outfall impacts are being addressed with the technical drainage studies for each basin. This discharge impact must be accounted for in the interim condition without negatively impacting the existing downstream neighborhoods.

12. CCRFCD concurrence has previously been provided. A new concurrence for Update #4 shall be provided from CCRFCD after Conditional Approval by the City of Las Vegas.

13. CCPW concurrence has previously been provided. A new concurrence for Update #4 shall be provided from CCPW after Conditional Approval by the City of Las Vegas.

14. NDOT concurrence has previously been provided. A new concurrence for Update #4 shall be provided from NDOT after Conditional Approval by the City of Las Vegas.

<u>The following comments are repeated until they are complete:</u>

1. Please note that the Traffic Study must be approved prior to final approval of the Master Drainage Study. If the street layout does not match the Master Drainage Study, an update to the Master Drainage Study must be submitted to address the changes.

2. Per a meeting held in August 18, 2011 between the developer and the *City of Las Vegas*, it was agreed that NV Energy's approval of any proposed drainage facilities within their access easements (such as the proposed detention basins) must be obtained prior to the final approval of the Master Drainage Study. Please provide documentation for such approval or acknowledgment.

3. Please note that any future technical drainage study submittals that differ from the Master Drainage Study (ie. Changes in pods, infrastructure, flows etc.) will require an update to the Master Drainage Study and this update must be approved by the *City of Las Vegas Flood Control Section* prior to final approval of technical drainage study.

4. The proposed detention basins will require coordination with the State of Nevada, Division of Water Resources Dam Safety and will require the State's approval prior to permitting.

5. Please note that the proposed 100-year flood protection facilities identified on Exhibit J must be constructed by the Master Developer as a part of the master planned infrastructure. Technical drainage studies are required for each phase of the master planned infrastructure improvements. The technical drainage studies for the infrastructure improvements may be submitted with conditional approval of this Master Drainage Study. However, final approval for the Master Drainage Study must be obtained prior to conditional approval of the infrastructure drainage studies.
6. Technical drainage studies are required for each of the Pod's. The technical drainage studies for the Pod's may not be submitted until the conditional approval of the pertinent infrastructure drainage study is obtained. Final approval for the infrastructure drainage study must be obtained prior to conditional approval of the impacted Pod drainage studies.
7. Building permits for the homes within the individual Pod's will not be issued until construction of the street and flood control infrastructure around the Pod is substantially complete or interim protection is provided per the approved technical drainage study.
8. The design of debris basins at all major culvert entrances to limit the amount of sediment and debris entering the storm drain facilities will be required in a future infrastructure study.
9. Please note that all detention basins must be designed per CCRFCD criteria including a low flow facility around the detention basin.
10. Please note that all proposed interim facilities must be maintained by the master developer.
11. Provide a legal description of the proposed detention basins prior to recordation of the parent final map.
12. Continue to coordinate the proposed drainage facilities with *Sheep Mountain Parkway* project. Please contact Greg McDermott, P.E., at (702)-229-2143 to coordinate the proposed drainage facilities. The detention basin outfall facilities need to account for the future *Sheep Mountain Parkway* improvements.

NOTE: Any future changes to the proposed design (or design assumptions) as outlined in the approved master drainage study and attached preliminary grading plan which affect drainage must be addressed in a Drainage Study Amendment 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
Osk/pbj

T/R/S: T19S/R60E/6 & 7
AREA G-6, 7, & F-12

Ultimate Condition Drainage Map & Pertinent HEC-1 Excerpts

MOCCASIN REGIONAL STORMDRAIN PROPOSED AS PARALLEL FACILITIES. SKYE CANYON DISCHARGE CONVEYED IN SOUTH FACILITY. FUTURE FLOW CONVEYED IN NORTH FACILITY.

SEE EXHIBIT G ULTIMATE OFFSITE WEST HYDROLOGIC MAP

SEE EXHIBIT F ULTIMATE OFFSITE EAST HYDROLOGIC MAP

NW21-C | NW51-C | NW50-C | NW35-C | NW29-C | NW71-W | NW71-E

SHEEP MT PKWY | MOCCASIN ROAD | SKYE CANYON PARK DR | IRON MOUNTAIN ROAD | EAGLE CANYON AVENUE | GRAND TETON DRIVE | LOG CABIN WAY | FORT APACHE ROAD | OHARE ROAD | JEFFREYS STREET | GRANDTOWN AVENUE | SHAMBER RD | EDNA CREEK DR | US-95

OFFICER IGOR SOLDO MEMORIAL PARK | EXISTING WILLIAM & MARY SCHAUMBURG ELEMENTARY SCHOOL | EXISTING JAMES BILBY ELEMENTARY SCHOOL | ALYN BECK MEMORIAL PARK

ESKV1 | OFFZ | ETP1A | EAA1A | EAA2 | ETP1B | EAA1B | EPF1 | ESKY1 | ETP2 | ELOG2 | ELOG3 | EFA1 | EFA2 | EPRK1 | 3039 cfs | 2960 cfs | 2685 cfs | 187 cfs (LOGCAB) | WGC1 | EMLA1 | ELOG1 | EUS95 | 95-4B | EPRK2 | ETP3 | EL1 | EL5A | EFA3 | 254 cfs (RFTLC) | WUS95 | 95-4A | EGC1 | EOHR2 | EOHR1 | EL2 | EL5B | WOSO1 | WSKV1A | WGC2 | 95-5B | 95-5A | EL3 | EPRK3 | EL6 | 47 cfs (OHARE) | EFA4 | WGED1A | OFFW | 95-6B | EL4 | 0 cfs (FTNOR) | WRPK10 | WRPK1 | WIRN1 | WIRN2 | WIRN3 | WIRN4 | WGED1B | WIRN5 | 95-6A | 140 cfs (IREAST) | EIRN1 | WSCH1 | WSHA1 | WML3 | WSPD1 | WMLA1A | WMLA3 | 95-7B | EML3A | ETP4 | ES1 | WOFF10 | WSHP1 | WL1A | WL2 | WPRK2 | WRGC2 | 95-7A | EML3B | ETP5 | ES2 | WPF1A | WARR3 | WL3 | WSKV1B | WSPD2 | WMLA1B | WMLA2 | 95-8B | EBRT1 | WOFF9 | WARR2 | WPRK7 | 95-8A | OFF14 | EMLA2 | 161 cfs (BRENT) | WARR1 | WPRK3 | WML5 | WML15B | WML16 | WGC3 | 95-9B | EFA6A | 70 cfs (SOUTH) | WOFF8 | WSHP2 | WML1 | WSHA2 | WML6 | WML7 | WSPD3 | OFF15 | EML3C | EPF2 | WL1B | WSCP1 | WSCP2 | WSCP3 | WSKV2 | WSCP4 | WGRC1A | 95-9A | EFA5 | WOFF7 | WPF3 | WSCH2 | WPF6 | WPF7 | WML8 | WEGN1 | WARR6 | EFA6B | EGC2 | 37cfs (HORSE) | WOFF6 | WARR4 | WPRK4 | WSHA3B | WSHA3A | WL6A | WL9A | WL10A | WSPD4 | OFF17B | OFF17A | 114 cfs (RACEL) | WPF1B | WARR5 | WL6B | WL9B | WEGL3 | WPRK8 | WOFF5 | WPF2 | WL4A | WL5A | WEGN2 | WL7 | WSKV3 | WL10B | WGRC1B | OFF21B | WOFF4 | WL4B | WL5B | WSHA4 | WML10 | WEGN3 | WEGL2 | WSKV4 | 787 cfs | CENGCA | WOFF3 | WPF4 | WEGL1 | WPRK5 | WL8 | WMTL1 | WL12 | OFF23 | WSHA5 | WML9 | WOFF2 | WSHP3 | WML2 | WML13 | WML14 | WL11 | WPRK9 | OFFU | WPF5 | WOFF11 | WML11 | WGRT1

NOTE:

- 5-FT TOPOGRAPHIC CONTOURS SHOWN ON EXHIBIT
- REFER TO MDS UPDATE #3 EXHIBIT O – ULTIMATE CONDITION US-95 HYDRAULICS FOR DETAILED DRAINAGE PATTERNS IN OFFSITE US-95 RIGHT OF WAY.

WL2AC 81 cfs | WC28 113 cfs | WC39 157 cfs | WC19 94 cfs

Ultimate Condition Flow Rate Summary Skye Canyon West Basins

Basin/Concentration Point ID	Area (ac)	Q_{100} (cfs)	Q_{10} (cfs)
WARR1	3.6	9	4
WARR2	2.8	7	3
WARR3	7.1	17	7
WARR4	1.3	3	1
WARR5	8.0	18	8
WARR6	2.4	6	2
WGC1	8.3	24	11
WGC2	8.3	23	10
WGC3	20.4	55	47
WGED1A	24.4	77	35
WGED1B	11.5	33	16
WL1-5A	17.1	46	21
WL1-5B	18.3	49	22
WL1A	36.7	94	45
WL1B	31.4	85	38
WL2A	29.8	81	38
WL2B	24.0	66	30
WL3	15.7	45	21
WL4	24.7	69	32
WL4A	9.0	23	10
WL4B	8.9	27	12
WL5A	10.9	32	15
WL5B	3.8	12	5
WL6A	6.2	19	9
WL6B	10.6	30	14
WL7	11.6	34	16
WL8	17.4	48	22
WL9A	18.2	49	22
WL9B	14.4	39	18
WL10-1	18.5	52	24
WL10-10	11.5	38	19
WL10-11	16.0	48	23
WL10-12	15.1	44	20
WL10-13	16.4	49	23
WL10-14	19.2	59	29
WL10-15A	12.3	40	20
WL10-15B	11.2	34	17
WL10-16	22.2	64	32
WL10-2	27.4	78	38
WL10-3	17.3	56	28
WL10-4	25.1	77	38
WL10-5	27.3	82	41
WL10-6	20.5	64	32
WL10-7	18.6	49	24
WL10-8	19.3	56	27
WL10-9	16.4	48	23
WWL1-1A	6.1	20	10
WWL1-1B	12.0	37	18
WWL4-2	20.4	58	44
WWL4-3	11.5	33	25
WPF1A	20.2	59	29
WPF1B	18.9	53	31
WPF2	3.1	10	5
WPF3	4.6	17	8
WPF4	8.7	19	9
WPF5	0.4	1	0
WPF6	1.0	4	2
WPF7	4.8	14	7
WPRK1	2.4	6	2
WPRK10	10.0	19	8
WPRK2	3.2	7	2
WPRK3	1.8	4	2
WPRK4	1.0	3	1
WPRK5	2.0	5	2
WPRK6	13.2	37	10
WPRK7	0.4	1	0
WPRK8	5.2	13	2
WPRK9	0.0	0	0
WSCH1	29.4	106	49
WSCH2	11.8	37	16
WEST ROADWAY BASINS			
WEGL1	3.4	12	5
WEGL2	3.3	12	7
WEGL3	6.5	25	14
WEGN1	0.5	2	1
WEGN2	2.1	8	4
WEGN3	3.3	10	6
WGRC1A	1.3	4	2
WGRC1B	3.5	10	5
WGRC2	2.7	8	5
WGRT1	11.7	16	7
WIRN1	0.6	1	1
WIRN2	0.2	1	0
WIRN3	1.3	3	1
WIRN4	0.7	3	1
WIRN5	0.7	3	2
WMTL1	1.3	3	2
WOSO1	4.2	11	6
WSHA1	0.7	3	1
WSHA2	1.5	5	2
WSHA3A	0.7	3	1
WSHA3B	1.8	5	3
WSHA4	1.4	6	3
WSHA5	2.4	8	5
WSHP1	6.4	19	9
WSHP2	9.3	27	13
WSHP3	10.4	31	15
WSKV1A	1.6	5	3
WSKV1B	3.5	11	6
WSKV2	2.0	19	8
WSKV3	4.2	14	7
WSKV4	4.5	13	8
WSPD1	0.7	3	1
WSPD2	2.1	3	2
WSPD3	0.8	3	2
WSPD4	2.3	8	4
WWL8B6	8.5	28	15

Ultimate Condition Flow Rate Summary Skye Canyon East Basins

Basin/Concentration Point ID	Area (ac)	Q_{100} (cfs)	Q_{10} (cfs)
EAA1A	103.1	231	107
EAA1B	40.0	106	48
EAA2	177.6	347	160
EL1	35.0	81	20
EL2	21.7	46	18
EL3	26.4	51	20
EL4	21.4	44	18
EL5A	18.1	32	13
EL5B	8.5	18	7
EL6	36.9	68	28
EML3A	17.5	50	25
EML3B	11.8	34	17
EML3C	9.1	27	13
EMLA1	18.9	49	23
EMLA2	16.7	53	26
EGC1	26.4	65	30
EGC2	3.2	11	6
EPRK1	1.0	1	0
EPRK2	1.6	1	0
EPRK3	2.0	5	0
EPF1	4.3	9	3
EPF2	1.0	2	1
EAST ROADWAY BASINS			
EBRT1	1.8	7	4
EFA1	1.8	5	3
EFA2	1.1	3	2
EFA3	1.6	5	3
EFA4	1.9	6	3
EFA5	1.1	4	2
EFA6A	2.5	9	5
EFA6B	4.5	17	9
EIRN1	1.1	4	2
ELOG1	3.4	11	6
ELOG2	3.6	12	6
ELOG3	1.7	6	3
EOHR1	1.8	6	4
EOHR2	0.6	2	1
ESKV1	1.1	3	2
ESKY1	3.4	10	5
ETP1A	2.9	9	5
ETP1B	0.9	3	2
ETP2	1.2	4	2
ETP3	0.8	16	7
ETP4	0.8	3	2
ETP5	0.9	3	2
EML6B	8.5	31	17

Ultimate Condition Flow Rate Summary Skye Canyon West Concentration Points

Basin/Concentration Point ID	Area (sq. mi)	Q_{100} (cfs)	Q_{10} (cfs)
WC1 Q = WWL1A + WSPD1	0.02	43	21
WC2 Q = WC1 + WPRK4 + WWL1A	0.03	73	37
WC3 Q = WC2 + WGED1B + WWN5	0.05	109	54
WC4 Q = WPRK7 + WWL4-1B + WWL4-2 + SWGRC2	0.08	135	67
WC5 Q = WC4 + WGL4A5	0.09	170	83
WC6 Q = WWL1B + WSPD3	0.04	68	33
WC7 Q = WC6 + WL9A + WWL10A + WSCP4	0.10	186	89
WC8 Q = WWL10B + WSPD2	0.02	37	19
WC9 Q = WC7 + WGC3 + WGED1A + WC8	0.17	322	155
WC10A Q = WWL9 + WPRK5	0.03	60	30
WC10B Q = WC10A + WWL5 + WWL6	0.05	99	48
WC11 Q = WWL13 + WEGN2	0.07	127	61
WC12 Q = WC10B + WC11	0.11	226	109
WC13 Q = WC12 + WL4B + WL7 + WWL13 + WEGL3	0.17	352	170
WC14 Q = WC13 + WWL14 + WL8 + WGC2 + WSKV4	0.24	465	236
WC15 Q = WL4B + WSPD4	0.03	49	21
WC16 Q = WL8 + WSPD5 + WWL15	0.06	106	48
WC17 Q = WC14 + WWL15 + WC15 + WEGL2 + WL10B	0.37	695	331
WC18 Q = WSKV1B + WSKV1A + WGC1	0.42	783	372
WC19 Q = WSR1 + WSHP3 + WSP7	0.90	94	70
WC20 Q = WSHP3 + WWL2 + WSHA5	0.05	92	42
WC21 Q = WC19 + WC20 + WARR4 + WPF4 + WSHA4	0.96	201	121
WC22A Q = WSHA3A + WWL4A,5B	0.05	67	43
WC22 Q = WC21 + WC22A + WPRK4 + WARR5	1.01	382	169
WC23 Q = WC22 + WWL6 + WPF5 + WEGR1 + WEGR2	1.03	322	199
WC24 Q = WC23 + WARR6 + WPF7 + WWL8A	1.05	359	194
WC25 Q = WSCP2 + WPRK3	0.01	16	8
WC26 Q = WC24 + WC25 + WPRK6 WSCP3	1.09	412	217
WC27 Q = WC26 + WWL7 + WSKV2	1.12	466	253
WC28 Q = WC27 + WWL8B + WSHA3B	0.06	113	53
WC29 Q = WPF4 + WSHA3A	0.01	19	10
WC30 Q = WC29 + WSCH2 + WSHA2B	0.04	62	29
WC31 Q = WC30 + WSCP1	0.04	68	33
WC32 Q = WC31 + WWL1 + WSHA2	0.07	124	58
WC33 Q = WC28 + WC32 + WARR7	0.14	244	113
WC34 Q = WC33 + WWL4 + WWL5 + WWL6	0.23	404	191
WC35 Q = WC7 + WC34	1.34	876	436
WC36 Q = WL1 + WPRK1	0.03	51	23
WC37 Q = WC18 + WC35 + WWL4,5B + WL3	1.41	1000	492
WC38 Q = WC19 + WPRK1 + WWL1 + WC18A	0.62	136	84
WC39 Q = WC28 + WC36 + WSHP1	0.63	157	93
WC40 Q = WC38 + WSHP1 + WWL1	0.07	112	50
WC41 Q = WC38 + WC39 + WPRK2 + WC40 + WWL3	0.72	321	170
WC42 Q = WC41 + WWL2 + WWL4	0.77	388	209
WC43 Q = WC42 + WC40A	2.18	1325	648
WC44A Q = WC43 + WSKV1A	2.19	1530	650
WC44B Q = CN9,29C + WC44A + WC42 + WC50 + WSKV1A	4.95	2110	904
WC44C Q = WWL6-C + WSK1	0.18	200	97

Ultimate Condition Flow Rate Summary Skye Canyon East Concentration Points

Basin/Concentration Point ID	Area (sq. mi)	Q_{100} (cfs)	Q_{10} (cfs)
EC1 Q = WC44B + WSH4C + WSCP1B + EGC2B + EFA4 + 95-4B	5.16	2386	1016
EC2 Q = EC1 + EGC1 + EPRK2	5.16	2395	1021
EC3 Q = EAA1B + ETP1B	0.06	109	49
EC4 Q = EC4C1 + EPF1	0.01	19	9
EC5 Q = EC3 + EC4 + ETP2 + EMLA1	0.11	177	82
EC6 Q = EC2 + EC5	5.27	2552	1092
EC7 Q = EC5 + EL1 + ELOG2	5.33	2605	1113
EC8 Q = EC7 + ELOG3 + ELOG3 + EPRK1	5.36	2637	1129
EC9 Q = 4ETC2B + EGA + 3658 + 95-6A + 95-6B	0.03	57	27
EC9B Q = EC9A + EMLM + ETP4	0.04	108	52
EC10 Q = EC9B + EPRK + ES1	0.06	140	68
EC11 Q = FTNOR + EL6 + EFA4	0.14	73	29
EC12 Q = EGC1 + ETP3	0.05	80	37
EC13 Q = EC12 + EL3 + EOHR2 + EPRK3	0.10	134	58
EC14 Q = EC13 + EL4 + EL2 + EOHR1	0.17	228	96
EC15 Q = EC11 + EC14	0.31	301	125
EC16 Q = FTLC + EFA3 + EL5B	0.32	276	88
EC17 Q = EC6+ETP4,5 + EAA2	0.28	2980	1249
EC18 Q = EC8 + EC16 + EC17	5.67	2685	1126
EC19 Q = OFFZ + EZ6V1	0.05	72	29
EC20 Q = EC19 - SAAA + ETP1A	0.22	312	141
EC21 Q = EC17 + EC20 + EFA1	6.17	3239	1227
EC22 Q = CN9,8B + ESK,3B + ETP5	0.04	85	43
EC23 Q = EC22 + EBRT1 + ES2	0.09	168	85
EC24 Q = EML3C + EFA6S + 95-9B	0.03	64	32
EC25 Q = EC18A3 + EFA6A	0.12	231	116
EC26 Q = SOUTH + EPF2 + EFA5 + EGC2	0.17	151	110

Ultimate Condition Flow Rate Summary Skye Canyon East Diversions

Diversion ID	Q_{100} (cfs)	Q_{10} (cfs)	Diverted From	Diverted To
LOGCAB	187	88	EC16	LOG CABIN WAY
RFTLC	254	78	EC15	FORT APACHE ROAD
OHARE	47	47	EC15	OHARE ROAD
FTNOR	0	0	EC10	FORT APACHE ROAD
IREAST	140	68	EC10	IRON MOUNTAIN EAST
BRENT	161	46	EC25	BRENT LANE
SOUTH	70	70	EC25	RACEL STREET
HORSE	37	0	EC26	HORSE DRIVE
RACEL	114	110	EC26	RACEL STREET

Ultimate Condition Flow Rate Summary Skye Canyon Offsite Basins

Basin/Concentration Point ID	Area (sq. mi)	Q_{100} (cfs)	Q_{10} (cfs)
WEST BASINS			
CENGCA	0.08	152	71
ES1	0.02	29	14
ES2	0.05	84	43
NW1-C	0.29	527	107
NW7-C	0.49	592	152
NW21-C	0.10	242	110
NW29-C	0.13	260	99
NW35-C	0.34	423	191
NW50-C	0.17	226	87
NW71-E	0.74	259	106
NW71-W	0.10	156	74
OFF4-1	0.30	397	128
OFF4-2	0.42	572	214
OFF5-1	0.30	375	115
OFF5-2	0.40	467	163
OFF14	0.01	25	13
OFF15	0.03	62	32
OFF17A	0.05	91	24
OFF17B	0.01	15	7
OFF21B	0.04	75	39
OFF23	0.01	17	9
OFFJ	0.04	74	37
OFFW	0.01	22	10
OFFZ	0.05	69	27
WOFF1	0.41	403	153
WOFF10	0.25	292	110
WOFF11	0.03	55	29
WOFF2	0.04	48	17
WOFF3	0.03	38	15
WOFF4	0.05	84	32
WOFF5	0.28	238	89
WOFF6	0.04	59	23
WOFF7	0.01	10	4
WOFF8	0.17	186	74
WOFF9	0.13	144	56
LWSE BASINS			
95-4A	0.01	14	7
95-4B	0.01	13	6
95-5A	0.01	12	6
95-5B	0.01	11	5
95-6A	0.01	19	9
95-6B	0.01	12	5
95-7A	0.01	14	7
95-7B	0.01	18	8
95-8A	0.01	11	6
95-8B	<0.01	7	4
95-9A	0.01	21	10
95-9B	0.01	22	10
EAST BASINS			
NW102-C	0.70	262	133
NW157	0.25	178	56

Ultimate Condition Flow Rate Summary Skye Canyon Offsite Concentration Points

Basin/Concentration Point ID	Area (sq. mi)	Q_{100} (cfs)	Q_{10} (cfs)
WEST CONCENTRATION POINTS			
15CB Q = R2XWH	2.19	1080	398
CP1 Q = WOFF1 + WOFF2 + WOFF3 + WOFF11	0.90	471	178
CP2 Q = WOFF4 + WOFF5	0.17	204	77
CP4 Q = CENGCA + WOFF6	0.51	817	431
CNW1-C Q = RCPF2 + NW1-C	0.99	757	255
2CHW1C Q = RCOFF6 + CW51-C	1.70	1486	562
CHW7 Q = R2XWH + NW7-C	2.19	2213	600
CNW21C Q = R2XWH75 + NW21-C	2.35	1139	347
CNW35C Q = R2XWH3 + NW35-C + WPRK13	2.71	1324	410
CNW71E Q = R2XWH7 + NW71-E	0.24	610	106
CNW71W Q = R2XWH5 + NW71W	0.24	354	167
COFF17 Q = OFF17A + OFF17B	0.04	66	31
COF21B Q = COF4 + COF21B	0.56	680	469
COF23 Q = ROFF3A + OFF23	0.01	19	9
COFF42 Q = ROFF42 + OFF4-2	0.72	871	245
COFF51 Q = RCOFF4 + OFF5-1	1.02	1162	362
CP1 Q = CP1 + WOFF4 + WOFF6 + WOFF8 + ENF1B	0.66	795	313
HEB1 (FROM DB1)	0.69	71	57
DB2 Q = EP2 + WOFF9 + WOFF10 + WPF1A	0.57	667	254
RDB2 (FROM DB2)	0.57	70	53
EAST CONCENTRATION POINTS			
EC27 Q = EC9 + NW102-C	6.27	3239	1324
EC28 Q = EC27 + NW157	6.52	3312	1342
LWSE CONCENTRATION POINTS			
C=CW66 Q = CHW2B + CW3 + OFFW	0.06	130	64
C=CW68 Q = 2CHW4 + WSCE	0.17	301	147
C=CW69 Q = CHW5B + CW7A + OFF1A	0.36	648	315
C=CW70 Q = C=CW66 + 95-9A	0.37	669	325
C=CW70-D Q = CW70 + OFF1E	0.40	731	367
CW5-9E Q = 95-7A + 95-7B + 95-8A + 95-8B	0.02	47	24
CPCULV Q = CHW7B2 + CCFF17 + COF21B + COFF23 + OFFU	1.25	1836	677
95DTH Q = CPCULV + CW47E	1.54	2285	1070



LEGEND

- BASIN BOUNDARY
- MATCHLINE SEE EXHIBIT FOR MAP EXTENSION
- ID — BASIN ID
- NW ID — MPA BASIN ID
- ID — CONCENTRATION POINT ID
- FLOW DIRECTION
- ID — FLOW SPLIT

NO.	DESCRIPTION	DATE	BY	APP.	APP. DATE

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OLYMPIA COMPANIES

SKYE CANYON - MASTER DRAINAGE STUDY

ULTIMATE CONDITION ONSITE HYDROLOGIC MAP

DATE: JULY 2017
DRAFTER: JSR
DESIGNER: JSR
CHECKED: LKL
PROJECT NO. OLY1603.000

PROFESSIONAL ENGINEER – STATE OF NEVADA – LANT K. LEAVITT – Exp. 12/31/2017 – CIVIL – No. 18287

EXHIBIT E
SHEET 1 OF 1

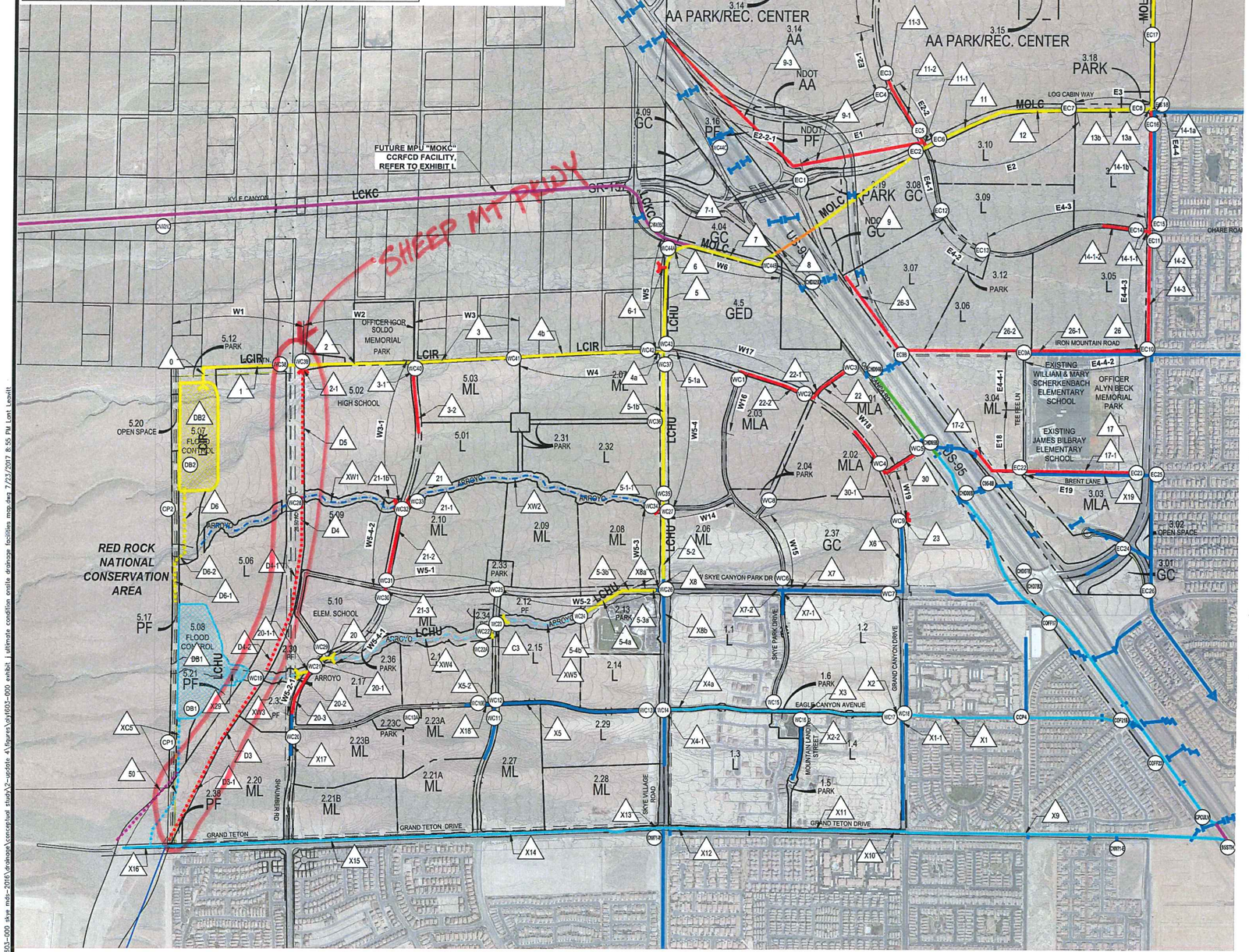
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FACILITY HYDRAULICS SUMMARY TABLE

NETWORK	STREET ID	FACILITY ID	FACILITY TYPE	DESIGN FLOWRATE	PROPOSED FLOWRATE	COMMENTS
EX. SD	EAGLE CANYON	X1	6' x 8' RCB	800 CFS	787 CFS	
EX. SD	GRAND CANYON	X1-1	48" RCP	100 CFS	84 CFS	
EX. SD	EAGLE CANYON	X2	8' x 8' RCB	729 CFS	695 CFS	
EX. SD	MOUNTAIN LAUREL	X2-2	48" RCP	110 CFS	106 CFS	
EX. SD	EAGLE CANYON	X3	72" RCP	729 CFS	695 CFS	
EX. SD	SKYE VILLAGE	X4-1	42" RCP	117 CFS	140 CFS	
EX. SD	EAGLE CANYON	X4a	72" RCP	477 CFS	483 CFS	
EX. SD	EAGLE CANYON	X5	48" RCP	218 CFS	226 CFS	
EX. SD	EAGLE CREST	X5-2	42" RCP	90 CFS	90 CFS	
EX. SD	GRAND CANYON DRIVE	X6	6' x 5' RCB	197 CFS	197 CFS	
EX. SD	HORSE	X7	42" RCP	92 CFS	92 CFS	
EX. SD	SKYE PARK	X7-1	36" RCP	47 CFS	47 CFS	
EX. SD	HORSE	X7-2	24" RCP	6 CFS	6 CFS	
EX. SD	SKY VILLAGE RD	X8	8' x 5' RCB	367 CFS	412 CFS	
EX. SD	SKY VILLAGE RD	X8a	60" RCP	334 CFS	412 CFS	
EX. SD	SKYE VILLAGE	X8b	30" RCP	42 CFS	42 CFS	
EX. SD	GRAND TETON	X9	10' x 5' RCB	690 CFS	690 CFS	MPU FACILITY CNGT-0043
EX. SD	GRAND TETON	X10	10' x 5' RCB	690 CFS	690 CFS	MPU FACILITY CNGT-0043
EX. SD	GRAND TETON	X11	8' x 6' RCB	646 CFS	646 CFS	MPU FACILITY CNGT-0043
EX. SD	GRAND TETON	X12	8' x 6' RCB	594 CFS	594 CFS	MPU FACILITY CNGT-0043
EX. SD	GRAND TETON	X13	6' x 5' RCB	494 CFS	494 CFS	MPU FACILITY CNGT-0116
EX. SD	GRAND TETON	X14	6' x 5' RCB	494 CFS	494 CFS	MPU FACILITY CNGT-0116
EX. SD	GRAND TETON	X15	6' x 5' RCB	488 CFS	488 CFS	MPU FACILITY CNGT-0116
EX. SD	GRAND TETON	X16	6' x 6' RCB	363 CFS	363 CFS	MPU FACILITY CNGT-0116
EX. SD	SHUMMER	X17	36" RCP	91 CFS	84 CFS	
EX. SD	EAGLE CANYON	X18	48" RCP	126 CFS	59 CFS	
EX. SD	DB1 DISCHARGE	X29	60" RCP	71 CFS	71 CFS	
EX. SD	DB1 COLLECTOR	X25	CONC TRAP CHNL	471 CFS	471 CFS	TO BE CONSTRUCTED WITH DB1
ARROYO WASH	EX. ARROYO WASH	XW1	NATURAL WASH	120 CFS	120 CFS	
ARROYO WASH	EX. ARROYO WASH	XW2	NATURAL WASH	404 CFS	404 CFS	
ARROYO WASH	EX. ARROYO WASH	XW3	NATURAL WASH	94 CFS	94 CFS	
ARROYO WASH	EX. ARROYO WASH	XW4	NATURAL WASH	308 CFS	308 CFS	
ARROYO WASH	EX. ARROYO WASH	XW5	NATURAL WASH	385 CFS	385 CFS	

DETENTION BASIN HYDRAULIC SUMMARY TABLE

FACILITY ID	INFLOW	OUTFLOW	100-YR STORAGE	DEBRIS STORAGE	TOTAL STORAGE	PMF FLOW	COMMENTS
DB1	784 CFS	71 CFS	57 AC-FT	6 AC-FT	63 AC-FT	6744 CFS	EXISTING DETENTION BASIN 1
DB2	708 CFS	70 CFS	72 AC-FT	6 AC-FT	78 AC-FT	5899 CFS	PROPOSED DETENTION BASIN 2



NOTES:

- REFER TO EXHIBIT M - ULTIMATE CONDITION US-95 HYDRAULICS SUMMARY MAP FOR DETAILED FLOW THRU EXISTING US-95 CULVERTS & RCB FACILITIES
- REFER TO EXHIBIT K - ULTIMATE CONDITION OFFSITE EAST FACILITIES MAP FOR EXTENSION OF FACILITIES REQUIRED IN MPU ALIGNMENT EAST OF SKYE CANYON.
- 5-FT TOPOGRAPHIC CONTOURS SHOWN ON EXHIBIT

FACILITY HYDRAULICS SUMMARY TABLE

NETWORK	STREET ID	FACILITY ID	FACILITY TYPE	LENGTH	SLOPE	FLOW	COMMENTS
WEST SD	DB2 OUTLET	0	60" RCP	80'	0.40%	70 CFS	
WEST SD	W1	1	60" RCP	1099'	0.40%	78 CFS	
WEST SD	W2	2	42" RCP	1236'	5.00%	157 CFS	
WEST SD	INFLOW FROM SHEEP MOUNTAIN CHNL	2-1	24" RCP	68'	4.40%	19 CFS	
WEST SD	W3	3	54" RCP	1181'	3.20%	266 CFS	
WEST SD	W3-1	3-1	42" RCP	191'	3.00%	112 CFS	
WEST SD	W3-1	3-2	30" RCP	569'	1.70%	40 CFS	
WEST SD	W4	4a	60" RCP	107'	4.80%	398 CFS	
WEST SD	W4	4b	60" RCP	1500'	4.50%	321 CFS	
WEST SD	W5	5	13' x 6' RCB	933'	1.80%	1330 CFS	PER KYLE INTERCHANGE HYDRAULIC SUPPLEMENT
WEST SD	ARROYO WASH INFLOW	5-1-1	6'x6' RCB	51'	14.60%	494 CFS	
WEST SD	W5-4	5-1a	13' x 6' RCB	102'	2.10%	1000 CFS	PER KYLE INTERCHANGE HYDRAULIC SUPPLEMENT
WEST SD	W5-4	5-1b	11' x 6' RCB	1654'	0.50%	816 CFS	PER KYLE INTERCHANGE HYDRAULIC SUPPLEMENT
WEST SD	W5-3	5-2	8' x 6' RCB	773'	0.50%	412 CFS	PER KYLE INTERCHANGE HYDRAULIC SUPPLEMENT
WEST SD	W5-2	5-3a	60" RCP	79'	3.00%	412 CFS	
WEST SD	W5-2	5-3b	60" RCP	301'	0.03	359 CFS	
WEST SD	CONVEYS FLOW TO SD 5-3a	5-4a	60" RCP	491'	3.00%	359 CFS	
WEST SD	INFLOW FROM ARROYO WASH	5-4b	6' x 6' RCB	50'	2.80%	359 CFS	
WEST SD	W5	6	13' x 6' RCB	445'	1.80%	1330 CFS	PER KYLE INTERCHANGE HYDRAULIC SUPPLEMENT
WEST SD	N/A	6-1	(6) 10' X 4' RCB	62'	N/A	N/A	INTERIM COLLECTOR PRIOR TO COMPLETION OF FACILITY 7-1, CAPPED/PLUGGED IN ULTIMATE CONDITION
WEST SD	W6	7	13' X6' RCB	723'	1.80%	2110 CFS	PER KYLE INTERCHANGE HYDRAULIC SUPPLEMENT
WEST SD	MPU FACILITY	7-1	9' X 6' RCB	303'	5.00%	1324 CFS	MOKC-0000 MPU FACILITY PER KYLE INTERCHANGE HYDRAULIC SUPPLEMENT
WEST SD	DISCHARGE TO ARROYO WASH	20	60" RCP	103'	2.00%	201 CFS	
WEST SD	W5-2-1	20-1	48" RCP	164'	2.00%	182 CFS	
WEST SD	INFLOW FROM DB1	20-1-1	48" RCP	135'	2.20%	94 CFS	
WEST SD	W5-2-1	20-2	36" RCP	347'	3.00%	84 CFS	
WEST SD	W5-2-1	20-3	36" RCP	183'	3.50%	84 CFS	
WEST SD	DISCHARGE TO ARROYO WASH	21	54" RCP	42'	4.00%	244 CFS	
WEST SD	W5-4-2	21-1	42" RCP	103'	2.50%	124 CFS	
WEST SD	INFLOW FROM ARROYO WASH	21-1b	54" RCP	68'	3.40%	120 CFS	
WEST SD	W5-4-2	21-2	36" RCP	663'	3.40%	62 CFS	
WEST SD	W5-4-1	21-3	36" RCP	105'	0.013	62 CFS	
WEST SD	N/A	22	7' X 6' RCB	429'	2.50%	73 CFS	
WEST SD	N/A	22-1	7' X 6' RCB	149'	2.20%	73 CFS	
WEST SD	W17	22-2	6' x 6' RCB	339'	2.00%	73 CFS	COMPLETION OF CCRFCD REGIONAL FACILITIES MAY ELIMINATE NEED FOR STORM DRAIN
WEST SD	W19 OUTLET TO WASH	23	36" RCP	59'	3.40%	266 CFS	
WEST SD	N/A	30	42" RCP	470'	2.50%	170 CFS	
WEST SD	W18	30-1	72" RCP	257'	1.20%	135 CFS	COMPLETION OF CCRFCD REGIONAL FACILITIES MAY ELIMINATE NEED FOR STORM DRAIN
WEST SD	DISCHARGE FROM SB	50	CONC TRAP CHNL	1017'	1.50%	471 CFS	12' BOTTOM WIDTH, 5' DEEP (TO BE CONSTRUCTED BY GRAND TETON/SHEEP MTN INTERCHANGE, REPLACES FACILITY XC5)
WEST SD	ARROYO WASH CULVERT	C3	6' X 5' RCB	164'	6.10%	308 CFS	
WEST SD	SHEEP MOUNTAIN CHNL	D3	EARTHEN TRAP CHNL	815'	3.60%	31 CFS	20' BOTTOM WIDTH, 3:1 SIDE SLOPES, 3' DEEP
WEST SD	SHEEP MOUNTAIN CHNL	D3-1	EARTHEN TRAP CHNL	1239'	1.70%	31 CFS	8' BOTTOM WIDTH, 3:1 SIDE SLOPES, 3' DEEP
WEST SD	SHEEP MOUNTAIN CHNL	D4	EARTHEN TRAP CHNL	534'	4.50%	11 CFS	5' BOTTOM WIDTH, 3:1 SIDE SLOPES, 3' DEEP
WEST SD	SHEEP MOUNTAIN CHNL	D4-1	EARTHEN TRAP CHNL	757'	1.50%	11 CFS	5' BOTTOM WIDTH, 3:1 SIDE SLOPES, 3' DEEP
WEST SD	SHEEP MOUNTAIN CHNL	D4-2	EARTHEN TRAP CHNL	691'	1.00%	11 CFS	5' BOTTOM WIDTH, 3:1 SIDE SLOPES, 3' DEEP
WEST SD	SHEEP MOUNTAIN CHNL	D5	EARTHEN TRAP CHNL	1252'	0.012	6 CFS	5' BOTTOM WIDTH, 3:1 SIDE SLOPES, 3' DEEP
WEST SD	CHANNEL TO DB2	D6	CONCRETE TRAP CHNL	723'	3.00%	235 CFS	12' BOTTOM WIDTH, 3:1 SIDE SLOPES, 3' DEEP TO BE CONSTRUCTED WITH DB2
WEST SD	CHANNEL TO DB2	D6-1	EARTHEN TRAP CHNL	451'	0.90%	10 CFS	5' BOTTOM WIDTH, 3:1 SIDE SLOPES, 3' DEEP TO BE CONSTRUCTED WITH DB2
WEST SD	CHANNEL TO DB2	D6-2	EARTHEN TRAP CHNL	145'	1.40%	10 CFS	5' BOTTOM WIDTH, 3:1 SIDE SLOPES, 3' DEEP TO BE CONSTRUCTED WITH DB2

FACILITY HYDRAULICS SUMMARY TABLE

NETWORK	STREET ID	FACILITY ID	FACILITY TYPE	LENGTH	SLOPE	FLOW	COMMENTS
EAST SD	US 95 SD CROSSING	6	13' x 9' RCB	605'	2.90%	2110 CFS	TO BE CONSTRUCTED BY SEPARATE CLV KYLE INTERCHANGE PROJECT
EAST SD	RCB	9	13' x 6' RCB	1724'	2.50%	2110 CFS	PER KYLE INTERCHANGE HYDRAULIC SUPPLEMENT
EAST SD	US-95	9-1	72" RCP	1462'	1.40%	250 CFS	
EAST SD	US-95	9-3	72" RCP	1587'	1.50%	259 CFS	
EAST SD	E2	11	13' X 7' RCB	913'	2.90%	2832 CFS	PER KYLE INTERCHANGE HYDRAULIC SUPPLEMENT
EAST SD	E2-2	11-1	72" RCP	63'	3.00%	452 CFS	PER KYLE INTERCHANGE HYDRAULIC SUPPLEMENT
EAST SD	E2-2	11-2	42" RCP	682'	1.20%	73 CFS	
EAST SD	E2-1	11-3	30" RCP	238'	1.70%	39 CFS	
EAST SD	E2	12	13' X 7' RCB	764'	2.90%	2502 CFS	
EAST SD	E3	13a	13' X 7' RCB	50'	2.90%	2637 CFS	
EAST SD	E3	13b	13' X 7' RCB	807'	2.90%	2563 CFS	
EAST SD	E4-3	14-1-1	42" RCP	50'	5.00%	181 CFS	
EAST SD	E4-3	14-1-2	24" RCP	461'	5.00%	36 CFS	
EAST SD	E4-4	14-1a	72" RCP	51'	0.70%	276 CFS	
EAST SD	E4-4	14-1b	72" RCP	1303'	0.007	254 CFS	
EAST SD	E4-4-3	14-2	60" RCP	50'	0.40%	73 CFS	
EAST SD	E 4-4-3	14-3	54" RCP	1299'	0.40%	0 CFS	
EAST SD	E15	15	20' x 9' RCB	2620'	0.50%	2992 CFS	
EAST SD	MOCCASIN RD	16	20' x 9' RCB	667'	0.50%	3030 CFS	SEE EXHIBIT K FOR CONTINUATION
EAST SD	E19	17	36" RCP	56'	3.00%	70 CFS	
EAST SD	E19	17-1	6' x 6' RCB	1632'	3.50%	63 CFS	
EAST SD	PARCEL 3.04	17-2	48" RCP	266'	2.30%	220 CFS	
EAST SD	E4-4-2	26	60" RCP	202'	2.60%	57 CFS	
EAST SD	E4-4-2	26-1	60" RCP	1180'	2.60%	57 CFS	
EAST SD	PARCEL 3.06	26-2	60" RCP	1305'	2.60%	23 CFS	
EAST SD	PARCEL 3.07	26-3	60" RCP	1018'	2.50%	23 CFS	
EAST SD	MPU FACILITY	28	N/A	N/A	N/A	N/A	LVMO-0144 MPU FACILITY, REPLACES PROP. CONDITION FACILITY D1
EAST SD	E16	28-1	60" RCP	50'	0.80%	199 CFS	
EAST SD	E16	28-2	42" RCP	663'	0.80%	81 CFS	
EAST SD	MPU FACILITY	29	N/A	N/A	N/A	N/A	LVMO-0184 MPU FACILITY, REPLACES PROP. CONDITION FACILITY D2
EAST SD	E17	29-1	66" RCP	50'	4.00%	72 CFS	
EAST SD	E17	29-2	66" RCP	647'	0.60%	25 CFS	

LEGEND

- PROPOSED LOCAL FACILITIES
- EXISTING LOCAL FACILITIES
- FUTURE LOCAL FACILITIES
- PROP CCRFCD REGIONAL FACILITIES (BY DEVELOPER)
- PROP CCRFCD REGIONAL FACILITIES (BY CLV)
- FUTURE CCRFCD REGIONAL FACILITIES (BY OTHERS)
- EXISTING CCRFCD REGIONAL FACILITIES
- LCHU — MPU AMENDMENT FACILITY ALIGNMENT
- ID — STREET SEGMENT ID

N

0 600 1200
SCALE – 1"=600' FEET

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

OLYMPIA COMPANIES

SKYE CANYON - MASTER DRAINAGE STUDY

ULTIMATE CONDITIONS ONSITE DRAINAGE FACILITIES MAP

DATE: JULY 2017
DRAFTER: CWB
DESIGNER: SMJ
CHECKED: LKL
PROJECT NO. OLY1603.000

PROFESSIONAL ENGINEER – STATE OF NEVADA
LANT K. LEAVITT
Exp. 12/31/2017
CIVIL
No. 18287

EXHIBIT J
SHEET 1 OF 1

J:\Oly\1603-009 skye mds-2016\drawing\concept\cad study\2-update 4\figures\Oly1603-009 exhibit j ultimate condition onsite drainage facilities map.dwg 7/23/2017 8:55 PM Lant Leavitt

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 *              JUN   1998              *                 *    HYDROLOGIC ENGINEERING CENTER     *
 *           VERSION 4.1                *                 *          609 SECOND STREET           *
 *                                      *                 *       DAVIS, CALIFORNIA 95616        *
 *  RUN DATE   21JUL17  TIME  09:09:44  *                 *           (916) 756-1104             *
 *                                      *                 *                                      *
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                                X     X  XXXXXXX   XXXXX          XXX


          THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

          THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
          THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
          NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
          DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
          KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

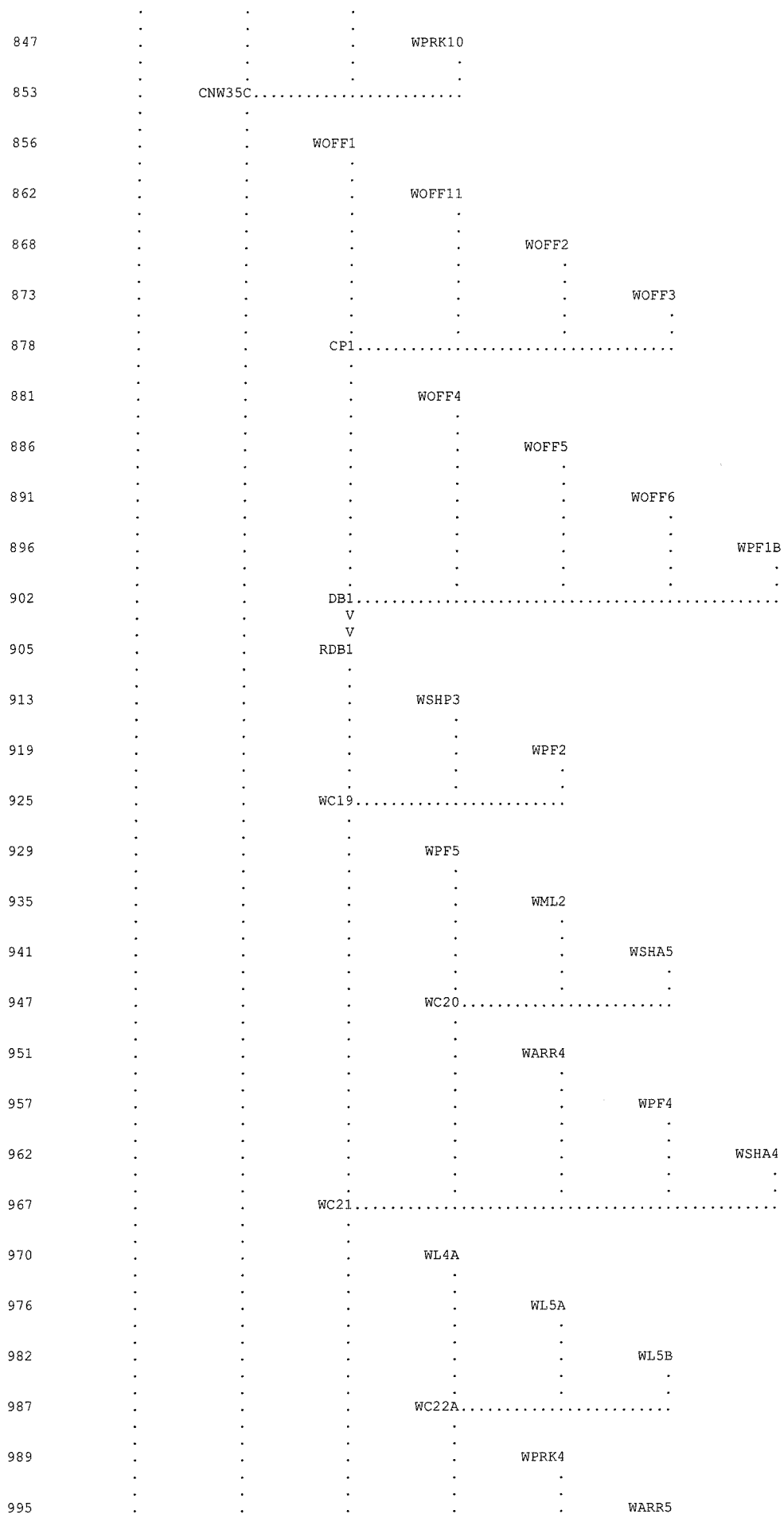
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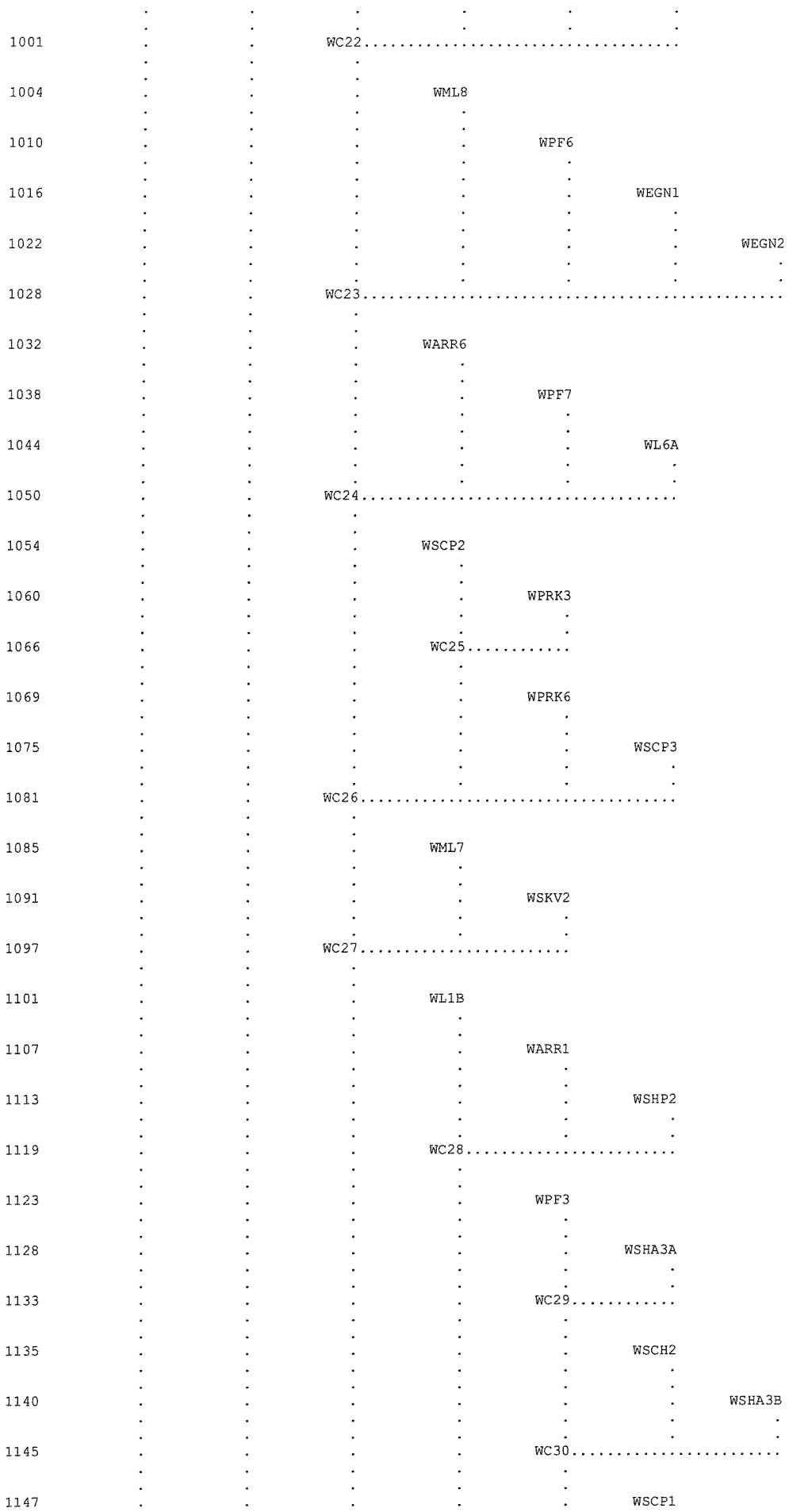
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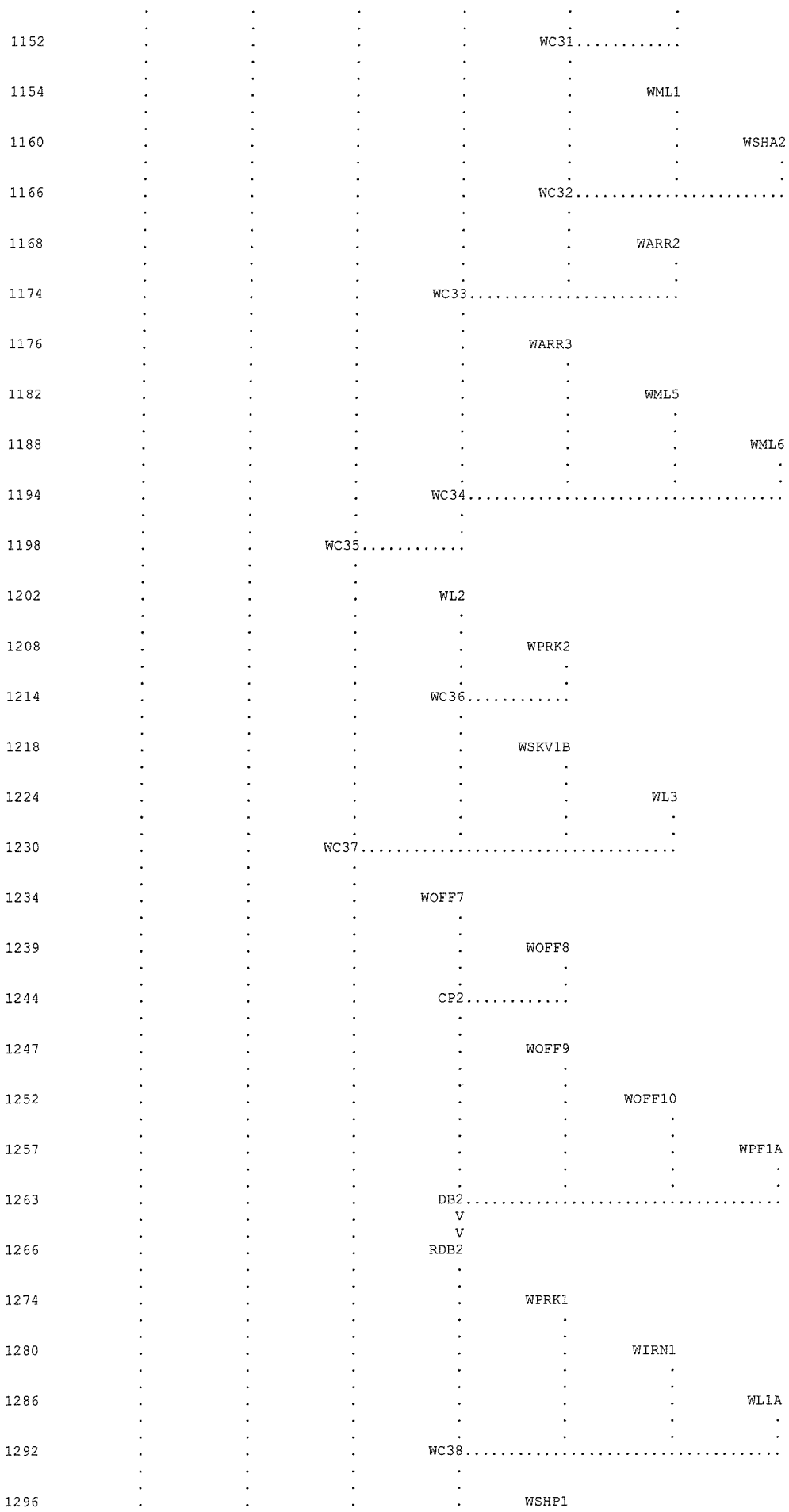
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            2           ID     OLYMPIA COMPANIES
            3           ID     SKYE CANYON
            4           ID     MASTER DRAINAGE STUDY - UPDATE #4
            5           ID     ULTIMATE DRAINAGE CONDITION - REVISED TO ROUTE REGIONAL FLOW TO MOCCASIN RD
            6           ID     INCLUDES FULL WATERSHED WITH AREA UPSTREAM OF DB1, DB2 AND 157DB
            7           ID
            8           ID     RETURN PERIOD ------- 100-YEAR
            9           ID     DISTRIBUTION -------- 6-HOUR SDN3
           10           ID     PROJECT NO. --------- OLY1603.000
           11           ID     FILENAME ------------ ULT3.H1
           12           ID     DATE ---------------- July 2017
           13           ID     MODELED BY ---------- SMJ, updated by LKL
           14           ID
           15           ID        SIX HOUR DEPTH-AREA REDUCTION FACTORS
           16           ID        DRAINAGE AREA (MI^2)    DARF
           17           ID        0.0-0.49                1.00
           18           ID        0.5-0.99                0.98
           19           ID        1.0-1.99                0.97
           20           ID        2.0-3.99                0.93
           21           ID        4.0-5.99                0.91
           22           ID        6.0-7.99                0.90
           23           ID
           24           IT       5       0       0    2000
           25           IO       5       0       0
           26           IN       5       0       0
           27           JR    PREC    1.00    0.98    0.97    0.93    0.91    0.90
                        *

           28           KK   WUS95
           29           KM   KYLE CANYON INTERCHANGE - WEST HALF
           30           BA   .0133
           31           PB    2.77
           32           PC       0   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
           33           PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
           34           PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
           35           PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
           36           PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
           37           PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
           38           PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
           39           PC   0.998   0.999   1.000
           40           LS       0    98.0
           41           UD   0.082
                        *

           42           KK  DHD01B
           43           KM   FACILITY E-9
           44           KM   FLOW SPLIT AT VTN CULVERT 1
           45           KM   FLOW SPLITS TO BETWEEN NB AND SB ROADS OF US-95
           46           KM   REFERENCED FROM GCW MASTER DRAINAGE STUDY
           47           DT  DCHD1B
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847
WPRK10
853
CNW35C
856
WOFF1
862
WOFF11
868
WOFF2
873
WOFF3
878
CP1
881
WOFF4
886
WOFF5
891
WOFF6
896
WPF1B
902
DB1
905
RDB1
913
WSHP3
919
WPF2
925
WC19
929
WPF5
935
WML2
941
WSHA5
947
WC20
951
WARR4
957
WPF4
962
WSHA4
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WL5A
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WL5B
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WC22A
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WPRK4
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WARR5

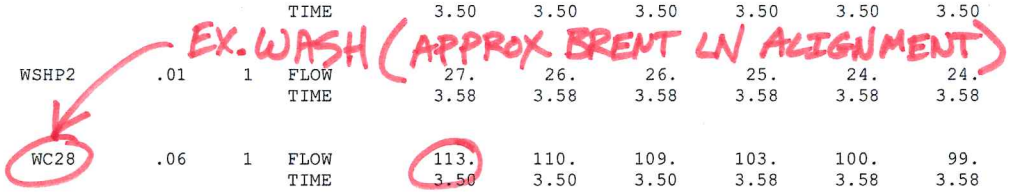

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WC22
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WML8
1010
WPF6
1016
WEGN1
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WEGN2
1028
WC23
1032
WARR6
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1044
WL6A
1050
WC24
1054
WSCP2
1060
WPRK3
1066
WC25
1069
WPRK6
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WC28
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1128
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WC29
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WSCH2
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1145
WC30
1147
WSCP1


1152
WC31
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WML1
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WC32
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1263
DB2
1266
RDB2
1274
WPRK1
1280
WIRN1
1286
WL1A
1292
WC38
1296
WSHP1

				TIME	4.17	4.17	4.17	4.17	4.17	4.17
ROUTED TO										
+	RCNW7C	2.19	1	FLOW	1188.	1159.	1146.	1090.	1058.	1042.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT										
+	NW21-C	.16	1	FLOW	242.	236.	233.	221.	215.	212.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	CNW21C	2.35	1	FLOW	1242.	1212.	1197.	1139.	1106.	1089.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17
ROUTED TO										
+	RCNW21	2.35	1	FLOW	1241.	1211.	1198.	1139.	1107.	1087.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT										
+	NW35-C	.34	1	FLOW	423.	413.	407.	385.	374.	369.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT										
+	WPRK10	.02	1	FLOW	19.	18.	18.	17.	16.	16.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	CNW35C	2.71	1	FLOW	1461.	1422.	1407.	1324.	1284.	1261.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT										
+	WOFF1	.41	1	FLOW	403.	391.	385.	361.	349.	343.
				TIME	3.75	3.75	3.75	3.75	3.83	3.83
HYDROGRAPH AT										
+	WOFF11	.03	1	FLOW	55.	54.	53.	51.	50.	49.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	WOFF2	.04	1	FLOW	48.	47.	46.	43.	42.	41.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	WOFF3	.03	1	FLOW	38.	37.	36.	34.	33.	33.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
4 COMBINED AT										
+	CP1	.50	1	FLOW	485.	471.	464.	435.	421.	415.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT										
+	WOFF4	.06	1	FLOW	84.	82.	81.	76.	73.	72.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	WOFF5	.26	1	FLOW	236.	229.	226.	212.	205.	201.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT										
+	WOFF6	.04	1	FLOW	59.	57.	56.	53.	51.	50.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	WPF1B	.03	1	FLOW	63.	62.	61.	58.	57.	56.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
5 COMBINED AT										
+	DB1	.88	1	FLOW	817.	793.	781.	734.	710.	699.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO										
+	RDB1	.88	1	FLOW	71.	71.	71.	69.	69.	68.
				TIME	5.58	5.58	5.58	5.50	5.50	5.50
			**	PEAK STAGES IN FEET **						
			1	STAGE	3035.31	3035.02	3034.86	3034.24	3033.93	3033.78
				TIME	5.58	5.58	5.58	5.50	5.50	5.50
HYDROGRAPH AT										
+	WSHP3	.02	1	FLOW	31.	30.	30.	29.	28.	28.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	WPF2	.00	1	FLOW	10.	10.	10.	10.	9.	9.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	WC19	.90	1	FLOW	95.	94.	93.	91.	90.	89.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50

DB1 OUTFALL

				TIME	3.50	3.50	3.50	3.50	3.50	3.50
4 COMBINED AT										
+	WC24	1.05	1	FLOW	371.	363.	359.	344.	336.	332.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	WSCP2	.00	1	FLOW	11.	11.	11.	11.	10.	10.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	WPRK3	.00	1	FLOW	4.	4.	4.	4.	4.	4.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	WC25	.01	1	FLOW	16.	15.	15.	15.	14.	14.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	WPRK6	.02	1	FLOW	28.	27.	27.	25.	24.	24.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	WSCP3	.01	1	FLOW	13.	13.	12.	12.	12.	12.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
4 COMBINED AT										
+	WC26	1.08	1	FLOW	425.	416.	412.	393.	384.	379.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	WML7	.03	1	FLOW	59.	58.	57.	55.	53.	53.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	WSKV2	.01	1	FLOW	19.	18.	18.	17.	17.	16.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	WC27	1.12	1	FLOW	503.	492.	487.	465.	454.	448.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	WL1B	.04	1	FLOW	79.	77.	76.	72.	70.	69.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	WARR1	.01	1	FLOW	9.	9.	9.	8.	8.	8.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	WSHP2	.01	1	FLOW	27.	26.	26.	25.	24.	24.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	WC28	.06	1	FLOW	113.	110.	109.	103.	100.	99.
				TIME	3.50	3.50	3.50	3.58	3.58	3.58
HYDROGRAPH AT										
+	WPF3	.01	1	FLOW	17.	17.	16.	16.	15.	15.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	WSHA3A	.00	1	FLOW	3.	2.	2.	2.	2.	2.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	WC29	.01	1	FLOW	19.	19.	19.	18.	18.	17.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	WSCH2	.02	1	FLOW	37.	36.	35.	33.	32.	32.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	WSHA3B	.00	1	FLOW	6.	6.	6.	5.	5.	5.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	WC30	.03	1	FLOW	62.	60.	60.	57.	55.	55.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	WSCP1	.00	1	FLOW	6.	6.	6.	5.	5.	5.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	WC31	.03	1	FLOW	68.	66.	65.	62.	60.	60.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50



				TIME	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO										
+	RDB2	.57	1	FLOW	71.	70.	70.	68.	68.	68.
				TIME	5.25	5.25	5.25	5.25	5.25	5.25
			** PEAK STAGES IN FEET **							
			1	STAGE	3002.75	3002.46	3002.32	3001.75	3001.46	3001.32
				TIME	5.25	5.25	5.25	5.25	5.25	5.25
HYDROGRAPH AT										
+	WPRK1	.00	1	FLOW	6.	6.	6.	5.	5.	5.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	WIRN1	.00	1	FLOW	2.	2.	2.	2.	2.	2.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	WL1A	.05	1	FLOW	81.	80.	79.	75.	73.	72.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
4 COMBINED AT										
+	WC38	.62	1	FLOW	141.	139.	137.	132.	130.	129.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	WSHP1	.01	1	FLOW	19.	18.	18.	17.	17.	17.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	WC39	.63	1	FLOW	160.	157.	155.	150.	147.	145.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	WIRN2	.00	1	FLOW	7.	7.	7.	7.	7.	7.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	WSCH1	.06	1	FLOW	106.	103.	102.	97.	94.	93.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	WSHA1	.00	1	FLOW	6.	6.	6.	5.	5.	5.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	WC40	.07	1	FLOW	112.	109.	107.	102.	99.	98.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	WML3	.03	1	FLOW	56.	54.	54.	51.	50.	49.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
4 COMBINED AT										
+	WC41	.72	1	FLOW	328.	321.	318.	304.	297.	293.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	WIRN3	.00	1	FLOW	5.	5.	5.	4.	4.	4.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	WML4	.04	1	FLOW	77.	75.	74.	71.	69.	68.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	WC42	.77	1	FLOW	406.	398.	393.	376.	367.	363.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	WC43	2.18	1	FLOW	1440.	1407.	1391.	1325.	1293.	1276.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	WSKV1A	.00	1	FLOW	5.	5.	4.	4.	4.	4.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	WC44A	2.18	1	FLOW	1444.	1412.	1395.	1330.	1297.	1281.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	WGC2	.01	1	FLOW	23.	22.	22.	21.	20.	20.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	WOSO1	.00	1	FLOW	8.	8.	8.	7.	7.	7.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50

OFFSITE FLOW ADDED AT IRON MT RD

DB2 OUTFALL

APPENDIX F

Reference Material

Technical Drainage Study for Skye Canyon Detention Basin 1, by Slater Hanifan Group

Approval Letter

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: REVISED January 12, 2017 REVISED December 19, 2016 November 23, 2016
TO: Land Development Services Department of Building & Safety				FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for: Skye Canyon – Detention Basin 1 Update #3 – Supplemental Final DB Plans			COPIES TO: Slater Hanifan Group
Cross Streets:	NEC of Grand Teton Boulevard & Puli Road			Section 12 LLC/Ninety-Five Manag.
File Number:	F:\Depot\DSMemos\DS4698l- Revised.doc			Bart Anderson, P.E., DevCo
Parcel Number:	126-12-000-001			CCRFCD
Zoning Action:	Development Agreement			CCPW
FEMA Flood Zone	YES	NO X		NV Energy
Proposed Storm Drain	YES X	NO		Eddy Quaglieri, P.E., State of Nevada, Division of Water Resources - Dam Safety

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1st Submittal	9/16/2014	10/23/2014	Not Approved	$400.00	370355: $400
2nd Submittal	12/24/2014	2/12/2015	Not Approved	$400.00	380976: $400
3rd Submittal	5/7/2015 & 6/01/2015	6/24/2015	Not Approved	$400.00	396675: $400
4th Submittal	10/28/201, 12/17/2015 & 1/11/2016	1/13/2016	Conditional Approval	$400.00	420475: $400
CCPW & CCRFCD	2/17/2016 & 3/1/2016	3/15/2016	Concurrence Recv'd	N/C	N/C
State of Nevada – DWR and NV Energy	5/16/2016 & 6/1/2016	6/1/2016	Approval	N/C	N/C
5th Submittal – UPDATE #1	8/8/2016	8/17/2016	Approval	$100.00	453987: $100
6th Submittal – UPDATE #2	8/16/2016, 10/10/2016 & 10/17/2016	10/19/2016	Conditional Approval	$400.00	455060: $100
7th Submittal – UPDATE #3	11/14/2016	11/23/2016	Conditional Approval	$100.00	465214: $100
7th Submittal – UPDATE #3 Revised & Supplemental	12/19/2016 & 1/05/2017	01/12/2016	Approval Concurrence from CCRFCD & State of Nevada – DWR Recv'd	N/C	N/C
			TOTAL FEES (LDDRS):	**$2,100.00**	----

REMARKS: State Dam Safety & CCRFCD approvals with Updated Plans.

7th Submittal is Update #3 and includes Supplemental Final Plans.

7th Submittal Revised Mass Grading Plans, No Protection for Phase 2. Mass Grading Excavation Only as per the Developers' request.

A Flood Control Master Plan Amendment (MPA) shall be updated to reflect the latest Master Plan for the Skye Canyon Development and approved by the City prior to submitting residential development plans outside of the shadow of protection from Detention Basin #1 and outside of the limits of the Phase 2 pods.

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. Provide updated concurrence.
	is conditionally approved subject to State of Nevada, Division of Water Resources, Dam Safety concurrence.
	is conditionally approved subject to US Army Corps of Engineers, 404 Permit concurrence.

Detention Basin #1 is required to be substantially complete prior to the final inspection of the first Unit in Phase 2. No Certificate of Occupancy on the houses will be issued until after the detention basin has been accepted for Substantial Completion by the City.

The Detention Basin has been redesigned to eliminate the stepped spillway structure and increase the amount of fill placement downstream of the spillway to accommodate the Sheep Mountain Parkway (SMP) alignment and associated grading impacts. Portions of the Detention Basin have been regraded to reduce slope impacts. The outfall facility has been extended to the east past the SMP and discharges into a natural arroyo. The overall intent of the Detention Basin has been maintained and should function as intended.

1. Approval of the revised design of the Detention Basin has been provided by the *State of Nevada, Division of Water Resources Dam Safety (DWR)* dated January 5, 2017. The revised plans and specifications shall comply with all DWR requirements.

2. The Building Department has approved the updated structural plans as required prior to final approval of the drainage study and improvement plans.

3. The current design has identified the limits of the Proposed Drainage Easement and Future Detention Basin Dedication as Flood Control Right-of-Way. With the revised design impacts, the updated drainage easement exhibit is approved by Flood Control. The new easement has been submitted to the City as required, prior to permit approval. A copy of the Recorded Drainage Easement necessary for the Detention Basin and channel construction shall be provided. The Detention Basin shall be dedicated to the City of Las Vegas as Drainage Right-of-Way prior to acceptance of the facility for City Maintenance.

4. Updated concurrence from *NV Energy* has been provided based upon the revised design impacts of the proposed drainage facilities for *Detention Basin 1* within their existing 48-foot easements. Provide copies of the access easements necessary to replace access lost due to the revised plans prior to substantial completion of the Detention Basin.

5. The revised Detention Basin includes modifying a portion of the basin's slopes from 3:1 to a flatter 4:1 slope. All slopes steeper than 4:1 shall include the soil cement lining.

6. Provide a complete set of the revised *Plans and Project Specifications* for approval by the *City of Las Vegas*. Provide a copy of the updated Geotechnical Report for the detention basin that addresses the revised 4:1 slopes and the extended embankment fill downstream toward the proposed Sheep Mountain Parkway. Update the Structural Plans and Details to reflect the revised plans. The Structural Plans and Details shall be a part of the Civil Improvement Plan set. This project is considered as a *Capital Improvement Project* (CIP) with developer funding.

7. The revised channel improvements included increasing the channel depth to mitigate super-elevation and freeboard requirements. The revised channel depth is 5.50 feet.

8. The ***Skye Canyon Master Drainage Study*** must be fully approved and shall include the location of the Ultimate Facility conveyance to the downstream MPU facilities prior to the substantial completion of the *Skye Canyon Detention Basin 1*.

9. The connectivity of the outfall from Skye Canyon DB1 to a downstream Regional facility shall be addressed for the Ultimate Condition based upon the Overall Skye Canyon Master Plan. The City understands the concept of the proposed interim solution with the included storm drain plans for

Brent Lane that collect and route the long term discharge from DB1 into the existing storm drain at Brent & Skye Canyon; however the overall Master Plan facility connectivity needs to be finalized with the overall ***Skye Canyon Master Drainage Study*** and approved by the City of Las Vegas and CCRFCD prior to the substantial completion of the DB1 improvements.

10. The Clark County Regional Flood Control District's concurrence of the Update #2 for Skye Canyon Master Drainage Study included conditions that required modifications to the interim outfall facility. The interim outfall facility was extended west to US 95 and incorporated a sediment basin. The proposed interim outfall facility shows a storm drain extension at Brent Lane west to US 95 to convey the 70 cfs discharge from DB1, this is an acceptable concept. The Brent Lane storm drain extension has been included as a part of the Skye Canyon Detention Basin #1 Improvement Plan package and an updated estimate has been provided to include this storm drain and sediment basin as a part of the improvement bond.

11. The included Dam Failure Hazard Evaluation shall be expanded as a part of the required Emergency Action Plan (EAP) submittal. The flows used in Section 3 shall match the Dam Safety Permit # J-728 flow rate of 6,052 cfs. Review and revise accordingly. Flood Control recommends a review meeting to go over the EAP requirements and format prior to moving forward with the EAP process.

12. The subject ***Skye Canyon Detention Basin #1*** is a facility proposed in the approved MPA that covers the Skye Canyon Development. Future changes to the identified Master Plan facilities shall require further review and/or the submittal of an MPA based upon CCRFCD requirements.

13. A copy of the approved 404 Permit from the Army Corps of Engineers has been provided.

14. This proposed Detention Basin identifies a 10-foot buffer adjacent to the Red Rock Canyon National Conservation Area (RRCA), a critical area of no disturbance. No grading impacts are allowed to the RRCA and an appropriate buffer with block and cable fencing has been provided.

15. The intent of the Master Developer is to construct the Detention Basins with associated collection facilities as CCRFCD Master Plan facilities and to then dedicate them to the City of Las Vegas. The Detention Basins shall be dedicated to the City as *Flood Control Right-of-Way.* The proposed dedication should exclude the City's existing BLM Grant N-77772 area. The total area of the dedication shall be of sufficient size to meet the public operational needs and address expansion of the facility. The dedication needs to include the entire impact area of the dam construction as well as incorporate access and maintenance activities. The maintenance activities include staging for equipment and a temporary storage area for sediment removal.

16. The City understands that the limits of the Detention Basin Easement/Dedication may be reduced by a future Vacation request based upon future development grading impacts. The actual limits of any future vacation request shall be set based upon the City's approval of a Technical Drainage Study that addresses the impacts to the Detention Basin.

17. The westerly 76-feet of the site is encumbered with existing Nevada Power Grants and fiber optic Grants (N-57071, N-78122, and N-75351). This project proposes a 10-foot buffer from the Red Rock Canyon National Conservation Area boundary and provides for a new access road within the existing Power and fiber optic Grants.

18. The westerly access is being provided to service the existing Grants and is not the Flood Control access road. This area is however proposed to be included within the future dedication of the regional basin and therefore the responsibility for this maintenance by *NV Energy* and the owner of the fiber optic shall be provided.

19. All proposed improvements associated with *Detention Basin 1* shall be bonded and inspected. This project shall require Special Inspection. Coordinate the requirements of and the Agreements needed for Special Inspection with the Building Department.

20. The project proposes to build a temporary drainage facility. Prior to final plan approval the developer must complete a maintenance and liability agreement for the interim drainage improvements and post a minimum maintenance bond of $100,000 or 50-percent of the construction cost for the improvements, whichever is greater. The engineer must submit an estimate of the quantities for constructing the facility and an 8.5-inch by 11-inch exhibit that adequately shows the location and limit of the drainage facility to Flood Control for approval. Once the drainage study is conditionally approved, the engineer should contact the *City's Land Development Section* (229-6371) to begin the agreement process.

21. Prior to the adoption and acceptance of the detention basin as a regional facility by the *City of Las Vegas, Department of Public Works*, the proposed *Detention Basin 1* shall remain a private facility owned and maintained by the master developer.

22. Provide the legal description with an exhibit of the proposed detention basin to *City Right-of-Way Section* for the dedication as Flood Control Right-of-Way to the *City of Las Vegas* after final acceptance of the basin by the *City of Las Vegas, Department of Public Works.*

23. The detention basin will require the submittal and approval of an *Emergency Action Plan* (EAP) for this regional facility. The EAP format shall meet the City of Las Vegas submittal requirements for inclusion with our overall EAP. Contact Flood Control for sample format requirements. The EAP must be approved by the *City of Las Vegas* and then submitted and approved by the *State of Nevada, Division of Water Resources - Dam Safety* prior to the release of any improvement bonds for the related detention basin improvements. The bonded improvements shall include a line item for the EAP in the amount of $50,000.

24. The approved plans shall include the complete Specifications approved by DWR and the Building Department.

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

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

END OF REMARKS
AYS/PBJ

T/R/S: T19S/R59E/12
AREA F-12

Referenced Basins (HEC-1)

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   07OCT16  TIME  08:39:49   *
*                                       *
*****************************************
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*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
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X    X XXXXXXX  XXXX          X
X    X X       X    X        XX
X    X X       X             X
XXXXXX XXXX    X        XXXX  X
X    X X       X             X
X    X X       X    X        X
X    X XXXXXXX  XXXX          XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM


```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

          *DIAGRAM
    1     ID    SLATER HANIFAN GROUP
    2     ID    NINETY-FIVE MANAGEMENT, LLC.
    3     ID    SKYE CANYON - DETENTION BASIN #1
    4     ID    UPDATE (SHEEP MOUNTAIN) - SUPPLEMENT
    5     ID    ULTIMATE DRAINAGE CONDITION
    6     ID
    7     ID    RETURN PERIOD -------- 100-YEAR
    8     ID    DISTRIBUTION -------- 6-HOUR SDN3
    9     ID    PROJECT NO. --------- OLY1401.004
   10     ID    FILENAME ------------ ULT1.H1
   11     ID    DATE ---------------- 10/7/2016
   12     ID    MODELED BY ---------- SHJ
   13     ID
   14     ID       SIX HOUR DEPTH-AREA REDUCTION FACTORS
   15     ID       DRAINAGE AREA (MIA2)     RATIO
   16     ID       0.0-0.49                 1.00
   17     ID       0.5-0.98                 0.98
   18     ID
   19     IT      5       0       0     500
   20     IO      5       0       0
   21     IN      5       0       0
   22     JR   PREC    1.00    0.98
          *

   23     KK    OFF1
   24     KM    EXISTING OFFSITE DRAINAGE BASIN
   25     KM    DISCHARGES INTO DETENTION BASIN "DB1"
   26     PB    3.00
   27     PC       0   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
   28     PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
   29     PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
   30     PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
   31     PC   0.499   0.590   0.710   0.744   0.781   0.817   0.819   0.835   0.851   0.856
   32     PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
   33     PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
   34     PC   0.998   0.999   1.000
   35     BA   .4072
   36     LS      0    87.6
   37     UD   0.354
          *

   38     KK    OFF7
   39     KM    FUTURE DEVELOPED OFFSITE DRAINAGE BASIN
   40     KM    DISCHARGES INTO DETENTION BASIN "DB1"
   41     BA   .0281
   42     LS      0    96.0
   43     UD   0.118
          *
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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

   44     KK     CP2
   45     KM    COMBINE OFF1, OFF7
   46     HC       2
          *

   47     KK    OFF2
   48     KM    EXISTING OFFSITE DRAINAGE BASIN
   49     KM    DISCHARGES INTO DETENTION BASIN "DB1"
   50     BA   .0355
   51     LS      0    84.5
   52     UD   0.149
          *

   53     KK    OFF3
   54     KM    EXISTING OFFSITE DRAINAGE BASIN
   55     KM    DISCHARGES INTO DETENTION BASIN "DB1"
   56     BA   .0259
   57     LS      0    88.0
   58     UD   0.110
          *

   59     KK     CP1
   60     KM    COMBINE CP2, OFF2, AND OFF3
   61     HC       3
          *

   62     KK    OFF4
   63     KM    EXISTING OFFSITE DRAINAGE BASIN
   64     KM    DISCHARGES INTO DETENTION BASIN "DB1"
   65     BA   .0581
   66     LS      0    88.0
   67     UD   0.134
          *

   68     KK    OFF5
   69     KM    EXISTING OFFSITE DRAINAGE BASIN
   70     KM    DISCHARGES INTO DETENTION BASIN "DB1"
```

```
          71          BA   .2569
          72          LS      0    88.0
          73          UD  0.416
                      *

          74          KK    OFF6
          75          KM   EXISTING OFFSITE DRAINAGE BASIN
          76          KM   DISCHARGES INTO DETENTION BASIN "DB1"
          77          BA   .0399
          78          LS      0    88.0
          79          UD  0.118
                      *
```



```
1                                        HEC-1 INPUT

        LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

          80          KK    ON1
          81          KM   PROPOSED ONSITE DRAINAGE BASIN
          82          BA   .0261
          83          LS      0    94.0
          84          UD  0.115
                      *

          85          KK    DB1
          86          KM   COMBINE CP1, OFF4, OFF5, OFF6 AND ON1
          87          KO      1
          88          HC      5
                      *

          89          KK    RD31
          90          KM   OUTLET = 24" ORIFICE @ INVERT ELEVATION = 3013.8-FT
          91          KO      1
          92          RS      1   ELEV  3025.5
          93          SA   4.58   5.63   5.81   6.00   6.19   6.77   7.17   7.37   7.61   8.31
          94          SE 3025.5   3027   3028   3029   3030   3033   3035   3036   3037   3040
          95          SQ   49.7   60.6   70.8   74.5 1436.0 3920.5 7136.3
          96          SE 3025.5   3030   3035   3037   3040   3043   3046
                      *

          97          ZZ
```

```
1            SCHEMATIC DIAGRAM OF STREAM NETWORK

 INPUT
  LINE      (V) ROUTING          (---->) DIVERSION OR PUMP FLOW
   NO.      (.) CONNECTOR        (<----) RETURN OF DIVERTED OR PUMPED FLOW

    23       OFF1
               .
               .
    38         .        OFF7
               .          .
               .          .
    44       CP2..........
               .
               .
    47         .        OFF2
               .          .
               .          .
    53         .          .       OFF3
               .          .         .
               .          .         .
    59       CP1.........................
               .
               .
    62         .        OFF4
               .          .
               .          .
    68         .          .       OFF5
               .          .         .
               .          .         .
    74         .          .       OFF6
               .          .         .
               .          .         .          ON1
    80         .          .         .           .
               .          .         .           .
    85       DB1.....................................
               V
               V
    89       RDB1

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*             JUN  1998                *
*           VERSION 4.1                *
*                                      *
*  RUN DATE   07OCT16  TIME  08:39:49  *
*                                      *
****************************************

****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*        DAVIS, CALIFORNIA 95616       *
*           (916) 756-1104             *
*                                      *
****************************************

                        SLATER HANIFAN GROUP
                        NINETY-FIVE MANAGEMENT, LLC.
                        SKYE CANYON - DETENTION BASIN #1
                        UPDATE (SHEEP MOUNTAIN) - SUPPLEMENT
                        ULTIMATE DRAINAGE CONDITION

                        RETURN PERIOD -------- 100-YEAR
                        DISTRIBUTION -------- 6-HOUR SDN3
                        PROJECT NO. --------- OLY1401.004
                        FILENAME ------------ ULT1.H1
                        DATE ---------------- 10/7/2016
                        MODELED BY ---------- SMJ

                           SIX HOUR DEPTH-AREA REDUCTION FACTORS
                           DRAINAGE AREA (MI^2)     RATIO
                           0.0-0.49                 1.00
                           0.5-0.99                 0.98

  20 IO          OUTPUT CONTROL VARIABLES
                       IPRNT          5  PRINT CONTROL
                       IPLOT          0  PLOT CONTROL
                       QSCAL         0.  HYDROGRAPH PLOT SCALE

     IT          HYDROGRAPH TIME DATA
                       NMIN           5  MINUTES IN COMPUTATION INTERVAL
                       IDATE      1   0  STARTING DATE
                       ITIME        0000 STARTING TIME
                         NQ          500 NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE      2   0  ENDING DATE
                      NDTIME       1735  ENDING TIME
                      ICENT          19  CENTURY MARK
```

```
              COMPUTATION INTERVAL      .08 HOURS
                 TOTAL TIME BASE    41.58 HOURS

        ENGLISH UNITS
             DRAINAGE AREA          SQUARE MILES
             PRECIPITATION DEPTH    INCHES
             LENGTH, ELEVATION      FEET
             FLOW                   CUBIC FEET PER SECOND
             STORAGE VOLUME         ACRE-FEET
             SURFACE AREA           ACRES
             TEMPERATURE            DEGREES FAHRENHEIT

    JP       MULTI-PLAN OPTION
                 NPLAN          1  NUMBER OF PLANS

    JR       MULTI-RATIO OPTION
               RATIOS OF PRECIPITATION
                1.00      .98

*** *** *** *
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DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1	0830	79	7.	*	1	1655	204	0.	*	2	0320	329	0.	*	2	1345	454	0.	
1	0835	80	5.	*	1	1700	205	0.	*	2	0325	330	0.	*	2	1350	455	0.	
1	0840	81	4.	*	1	1705	206	0.	*	2	0330	331	0.	*	2	1355	456	0.	
1	0845	82	3.	*	1	1710	207	0.	*	2	0335	332	0.	*	2	1400	457	0.	
1	0850	83	2.	*	1	1715	208	0.	*	2	0340	333	0.	*	2	1405	458	0.	
1	0855	84	1.	*	1	1720	209	0.	*	2	0345	334	0.	*	2	1410	459	0.	
1	0700	85	1.	*	1	1725	210	0.	*	2	0350	335	0.	*	2	1415	460	0.	
1	0705	86	1.	*	1	1730	211	0.	*	2	0355	336	0.	*	2	1420	461	0.	
1	0710	87	0.	*	1	1735	212	0.	*	2	0400	337	0.	*	2	1425	462	0.	
1	0715	88	0.	*	1	1740	213	0.	*	2	0405	338	0.	*	2	1430	463	0.	
1	0720	89	0.	*	1	1745	214	0.	*	2	0410	339	0.	*	2	1435	464	0.	
1	0725	90	0.	*	1	1750	215	0.	*	2	0415	340	0.	*	2	1440	465	0.	
1	0730	91	0.	*	1	1755	216	0.	*	2	0420	341	0.	*	2	1445	466	0.	
1	0735	92	0.	*	1	1800	217	0.	*	2	0425	342	0.	*	2	1450	467	0.	
1	0740	93	0.	*	1	1805	218	0.	*	2	0430	343	0.	*	2	1455	468	0.	
1	0745	94	0.	*	1	1810	219	0.	*	2	0435	344	0.	*	2	1500	469	0.	
1	0750	95	0.	*	1	1815	220	0.	*	2	0440	345	0.	*	2	1505	470	0.	
1	0755	96	0.	*	1	1820	221	0.	*	2	0445	346	0.	*	2	1510	471	0.	
1	0800	97	0.	*	1	1825	222	0.	*	2	0450	347	0.	*	2	1515	472	0.	
1	0805	98	0.	*	1	1830	223	0.	*	2	0455	348	0.	*	2	1520	473	0.	
1	0810	99	0.	*	1	1835	224	0.	*	2	0500	349	0.	*	2	1525	474	0.	
1	0815	100	0.	*	1	1840	225	0.	*	2	0505	350	0.	*	2	1530	475	0.	
1	0820	101	0.	*	1	1845	226	0.	*	2	0510	351	0.	*	2	1535	476	0.	
1	0825	102	0.	*	1	1850	227	0.	*	2	0515	352	0.	*	2	1540	477	0.	
1	0830	103	0.	*	1	1855	228	0.	*	2	0520	353	0.	*	2	1545	478	0.	
1	0835	104	0.	*	1	1900	229	0.	*	2	0525	354	0.	*	2	1550	479	0.	
1	0840	105	0.	*	1	1905	230	0.	*	2	0530	355	0.	*	2	1555	480	0.	
1	0845	106	0.	*	1	1910	231	0.	*	2	0535	356	0.	*	2	1600	481	0.	
1	0850	107	0.	*	1	1915	232	0.	*	2	0540	357	0.	*	2	1605	482	0.	
1	0855	108	0.	*	1	1920	233	0.	*	2	0545	358	0.	*	2	1610	483	0.	
1	0900	109	0.	*	1	1925	234	0.	*	2	0550	359	0.	*	2	1615	484	0.	
1	0905	110	0.	*	1	1930	235	0.	*	2	0555	360	0.	*	2	1620	485	0.	
1	0910	111	0.	*	1	1935	236	0.	*	2	0600	361	0.	*	2	1625	486	0.	
1	0915	112	0.	*	1	1940	237	0.	*	2	0605	362	0.	*	2	1630	487	0.	
1	0920	113	0.	*	1	1945	238	0.	*	2	0610	363	0.	*	2	1635	488	0.	
1	0925	114	0.	*	1	1950	239	0.	*	2	0615	364	0.	*	2	1640	489	0.	
1	0930	115	0.	*	1	1955	240	0.	*	2	0620	365	0.	*	2	1645	490	0.	
1	0935	116	0.	*	1	2000	241	0.	*	2	0625	366	0.	*	2	1650	491	0.	
1	0940	117	0.	*	1	2005	242	0.	*	2	0630	367	0.	*	2	1655	492	0.	
1	0945	118	0.	*	1	2010	243	0.	*	2	0635	368	0.	*	2	1700	493	0.	
1	0950	119	0.	*	1	2015	244	0.	*	2	0640	369	0.	*	2	1705	494	0.	
1	0955	120	0.	*	1	2020	245	0.	*	2	0645	370	0.	*	2	1710	495	0.	
1	1000	121	0.	*	1	2025	246	0.	*	2	0650	371	0.	*	2	1715	496	0.	
1	1005	122	0.	*	1	2030	247	0.	*	2	0655	372	0.	*	2	1720	497	0.	
1	1010	123	0.	*	1	2035	248	0.	*	2	0700	373	0.	*	2	1725	498	0.	
1	1015	124	0.	*	1	2040	249	0.	*	2	0705	374	0.	*	2	1730	499	0.	
1	1020	125	0.	*	1	2045	250	0.	*	2	0710	375	0.	*	2	1735	500	0.	

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	41.58-HR
(CFS)	(HR)	(CFS)			
861.	3.75	172.	43.	25.	25.
		(INCHES) 1.826	1.832	1.832	1.832
		(AC-FT) 85.	86.	86.	86.

CUMULATIVE AREA = .88 SQ MI

HYDROGRAPH AT STATION DB1
SUM OF 5 HYDROGRAPHS
PLAN 1, RATIO = .98

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1	0000	1	0.	*	1	1025	126	0.	*	1	2050	251	0.	*	2	0715	376	0.	
1	0005	2	0.	*	1	1030	127	0.	*	1	2055	252	0.	*	2	0720	377	0.	
1	0010	3	1.	*	1	1035	128	0.	*	1	2100	253	0.	*	2	0725	378	0.	
1	0015	4	2.	*	1	1040	129	0.	*	1	2105	254	0.	*	2	0730	379	0.	
1	0020	5	4.	*	1	1045	130	0.	*	1	2110	255	0.	*	2	0735	380	0.	
1	0025	6	7.	*	1	1050	131	0.	*	1	2115	256	0.	*	2	0740	381	0.	
1	0030	7	11.	*	1	1055	132	0.	*	1	2120	257	0.	*	2	0745	382	0.	
1	0035	8	13.	*	1	1100	133	0.	*	1	2125	258	0.	*	2	0750	383	0.	
1	0040	9	11.	*	1	1105	134	0.	*	1	2130	259	0.	*	2	0755	384	0.	
1	0045	10	8.	*	1	1110	135	0.	*	1	2135	260	0.	*	2	0800	385	0.	
1	0050	11	7.	*	1	1115	136	0.	*	1	2140	261	0.	*	2	0805	386	0.	
1	0055	12	6.	*	1	1120	137	0.	*	1	2145	262	0.	*	2	0810	387	0.	
1	0100	13	5.	*	1	1125	138	0.	*	1	2150	263	0.	*	2	0815	388	0.	
1	0105	14	4.	*	1	1130	139	0.	*	1	2155	264	0.	*	2	0820	389	0.	
1	0110	15	6.	*	1	1135	140	0.	*	1	2200	265	0.	*	2	0825	390	0.	
1	0115	16	8.	*	1	1140	141	0.	*	1	2205	266	0.	*	2	0830	391	0.	
1	0120	17	9.	*	1	1145	142	0.	*	1	2210	267	0.	*	2	0835	392	0.	
1	0125	18	13.	*	1	1150	143	0.	*	1	2215	268	0.	*	2	0840	393	0.	
1	0130	19	21.	*	1	1155	144	0.	*	1	2220	269	0.	*	2	0845	394	0.	
1	0135	20	29.	*	1	1200	145	0.	*	1	2225	270	0.	*	2	0850	395	0.	
1	0140	21	34.	*	1	1205	146	0.	*	1	2230	271	0.	*	2	0855	396	0.	
1	0145	22	39.	*	1	1210	147	0.	*	1	2235	272	0.	*	2	0900	397	0.	
1	0150	23	39.	*	1	1215	148	0.	*	1	2240	273	0.	*	2	0905	398	0.	
1	0155	24	36.	*	1	1220	149	0.	*	1	2245	274	0.	*	2	0910	399	0.	
1	0200	25	32.	*	1	1225	150	0.	*	1	2250	275	0.	*	2	0915	400	0.	
1	0205	26	29.	*	1	1230	151	0.	*	1	2255	276	0.	*	2	0920	401	0.	
1	0210	27	30.	*	1	1235	152	0.	*	1	2300	277	0.	*	2	0925	402	0.	
1	0215	28	38.	*	1	1240	153	0.	*	1	2305	278	0.	*	2	0930	403	0.	
1	0220	29	49.	*	1	1245	154	0.	*	1	2310	279	0.	*	2	0935	404	0.	
1	0225	30	56.	*	1	1250	155	0.	*	1	2315	280	0.	*	2	0940	405	0.	
1	0230	31	58.	*	1	1255	156	0.	*	1	2320	281	0.	*	2	0945	406	0.	
1	0235	32	57.	*	1	1300	157	0.	*	1	2325	282	0.	*	2	0950	407	0.	
1	0240	33	62.	*	1	1305	158	0.	*	1	2330	283	0.	*	2	0955	408	0.	
1	0245	34	69.	*	1	1310	159	0.	*	1	2335	284	0.	*	2	1000	409	0.	
1	0250	35	68.	*	1	1315	160	0.	*	1	2340	285	0.	*	2	1005	410	0.	
1	0255	36	62.	*	1	1320	161	0.	*	1	2345	286	0.	*	2	1010	411	0.	
1	0300	37	62.	*	1	1325	162	0.	*	1	2350	287	0.	*	2	1015	412	0.	
1	0305	38	81.	*	1	1330	163	0.	*	1	2355	288	0.	*	2	1020	413	0.	
1	0310	39	115.	*	1	1335	164	0.	*	2	0000	289	0.	*	2	1025	414	0.	
1	0315	40	173.	*	1	1340	165	0.	*	2	0005	290	0.	*	2	1030	415	0.	
1	0320	41	288.	*	1	1345	166	0.	*	2	0010	291	0.	*	2	1035	416	0.	
1	0325	42	446.	*	1	1350	167	0.	*	2	0015	292	0.	*	2	1040	417	0.	
1	0330	43	640.	*	1	1355	168	0.	*	2	0020	293	0.	*	2	1045	418	0.	
1	0335	44	787.	*	1	1400	169	0.	*	2	0025	294	0.	*	2	1050	419	0.	
1	0340	45	828.	*	1	1405	170	0.	*	2	0030	295	0.	*	2	1055	420	0.	
1	0345	46	837.	*	1	1410	171	0.	*	2	0035	296	0.	*	2	1100	421	0.	
1	0350	47	796.	*	1	1415	172	0.	*	2	0040	297	0.	*	2	1105	422	0.	
1	0355	48	709.	*	1	1420	173	0.	*	2	0045	298	0.	*	2	1110	423	0.	
1	0400	49	621.	*	1	1425	174	0.	*	2	0050	299	0.	*	2	1115	424	0.	
1	0405	50	525.	*	1	1430	175	0.	*	2	0055	300	0.	*	2	1120	425	0.	
1	0410	51	429.	*	1	1435	176	0.	*	2	0100	301	0.	*	2	1125	426	0.	
1	0415	52	351.	*	1	1440	177	0.	*	2	0105	302	0.	*	2	1130	427	0.	
1	0420	53	294.	*	1	1445	178	0.	*	2	0110	303	0.	*	2	1135	428	0.	
1	0425	54	255.	*	1	1450	179	0.	*	2	0115	304	0.	*	2	1140	429	0.	
1	0430	55	240.	*	1	1455	180	0.	*	2	0120	305	0.	*	2	1145	430	0.	
1	0435	56	242.	*	1	1500	181	0.	*	2	0125	306	0.	*	2	1150	431	0.	
1	0440	57	241.	*	1	1505	182	0.	*	2	0130	307	0.	*	2	1155	432	0.	
1	0445	58	238.	*	1	1510	183	0.	*	2	0135	308	0.	*	2	1200	433	0.	

1	0450	59	246.	*	1	1515	184	0.	*	2	0140	309	0.	*	2	1205	434	0.
1	0455	60	248.	*	1	1520	185	0.	*	2	0145	310	0.	*	2	1210	435	0.
1	0500	61	232.	*	1	1525	186	0.	*	2	0150	311	0.	*	2	1215	436	0.
1	0505	62	209.	*	1	1530	187	0.	*	2	0155	312	0.	*	2	1220	437	0.
1	0510	63	182.	*	1	1535	188	0.	*	2	0200	313	0.	*	2	1225	438	0.
1	0515	64	154.	*	1	1540	189	0.	*	2	0205	314	0.	*	2	1230	439	0.
1	0520	65	127.	*	1	1545	190	0.	*	2	0210	315	0.	*	2	1235	440	0.
1	0525	66	103.	*	1	1550	191	0.	*	2	0215	316	0.	*	2	1240	441	0.
1	0530	67	84.	*	1	1555	192	0.	*	2	0220	317	0.	*	2	1245	442	0.
1	0535	68	66.	*	1	1600	193	0.	*	2	0225	318	0.	*	2	1250	443	0.
1	0540	69	54.	*	1	1605	194	0.	*	2	0230	319	0.	*	2	1255	444	0.
1	0545	70	46.	*	1	1610	195	0.	*	2	0235	320	0.	*	2	1300	445	0.
1	0550	71	41.	*	1	1615	196	0.	*	2	0240	321	0.	*	2	1305	446	0.
1	0555	72	34.	*	1	1620	197	0.	*	2	0245	322	0.	*	2	1310	447	0.
1	0600	73	30.	*	1	1625	198	0.	*	2	0250	323	0.	*	2	1315	448	0.
1	0605	74	26.	*	1	1630	199	0.	*	2	0255	324	0.	*	2	1320	449	0.
1	0610	75	21.	*	1	1635	200	0.	*	2	0300	325	0.	*	2	1325	450	0.
1	0615	76	17.	*	1	1640	201	0.	*	2	0305	326	0.	*	2	1330	451	0.
1	0620	77	13.	*	1	1645	202	0.	*	2	0310	327	0.	*	2	1335	452	0.
1	0625	78	10.	*	1	1650	203	0.	*	2	0315	328	0.	*	2	1340	453	0.
1	0630	79	7.	*	1	1655	204	0.	*	2	0320	329	0.	*	2	1345	454	0.
1	0635	80	5.	*	1	1700	205	0.	*	2	0325	330	0.	*	2	1350	455	0.
1	0640	81	4.	*	1	1705	206	0.	*	2	0330	331	0.	*	2	1355	456	0.
1	0645	82	3.	*	1	1710	207	0.	*	2	0335	332	0.	*	2	1400	457	0.
1	0650	83	2.	*	1	1715	208	0.	*	2	0340	333	0.	*	2	1405	458	0.
1	0655	84	1.	*	1	1720	209	0.	*	2	0345	334	0.	*	2	1410	459	0.
1	0700	85	1.	*	1	1725	210	0.	*	2	0350	335	0.	*	2	1415	460	0.
1	0705	86	1.	*	1	1730	211	0.	*	2	0355	336	0.	*	2	1420	461	0.
1	0710	87	0.	*	1	1735	212	0.	*	2	0400	337	0.	*	2	1425	462	0.
1	0715	88	0.	*	1	1740	213	0.	*	2	0405	338	0.	*	2	1430	463	0.
1	0720	89	0.	*	1	1745	214	0.	*	2	0410	339	0.	*	2	1435	464	0.
1	0725	90	0.	*	1	1750	215	0.	*	2	0415	340	0.	*	2	1440	465	0.
1	0730	91	0.	*	1	1755	216	0.	*	2	0420	341	0.	*	2	1445	466	0.
1	0735	92	0.	*	1	1800	217	0.	*	2	0425	342	0.	*	2	1450	467	0.
1	0740	93	0.	*	1	1805	218	0.	*	2	0430	343	0.	*	2	1455	468	0.
1	0745	94	0.	*	1	1810	219	0.	*	2	0435	344	0.	*	2	1500	469	0.
1	0750	95	0.	*	1	1815	220	0.	*	2	0440	345	0.	*	2	1505	470	0.
1	0755	96	0.	*	1	1820	221	0.	*	2	0445	346	0.	*	2	1510	471	0.
1	0800	97	0.	*	1	1825	222	0.	*	2	0450	347	0.	*	2	1515	472	0.
1	0805	98	0.	*	1	1830	223	0.	*	2	0455	348	0.	*	2	1520	473	0.
1	0810	99	0.	*	1	1835	224	0.	*	2	0500	349	0.	*	2	1525	474	0.
1	0815	100	0.	*	1	1840	225	0.	*	2	0505	350	0.	*	2	1530	475	0.
1	0820	101	0.	*	1	1845	226	0.	*	2	0510	351	0.	*	2	1535	476	0.
1	0825	102	0.	*	1	1850	227	0.	*	2	0515	352	0.	*	2	1540	477	0.
1	0830	103	0.	*	1	1855	228	0.	*	2	0520	353	0.	*	2	1545	478	0.
1	0835	104	0.	*	1	1900	229	0.	*	2	0525	354	0.	*	2	1550	479	0.
1	0840	105	0.	*	1	1905	230	0.	*	2	0530	355	0.	*	2	1555	480	0.
1	0845	106	0.	*	1	1910	231	0.	*	2	0535	356	0.	*	2	1600	481	0.
1	0850	107	0.	*	1	1915	232	0.	*	2	0540	357	0.	*	2	1605	482	0.
1	0855	108	0.	*	1	1920	233	0.	*	2	0545	358	0.	*	2	1610	483	0.
1	0900	109	0.	*	1	1925	234	0.	*	2	0550	359	0.	*	2	1615	484	0.
1	0905	110	0.	*	1	1930	235	0.	*	2	0555	360	0.	*	2	1620	485	0.
1	0910	111	0.	*	1	1935	236	0.	*	2	0600	361	0.	*	2	1625	486	0.
1	0915	112	0.	*	1	1940	237	0.	*	2	0605	362	0.	*	2	1630	487	0.
1	0920	113	0.	*	1	1945	238	0.	*	2	0610	363	0.	*	2	1635	488	0.
1	0925	114	0.	*	1	1950	239	0.	*	2	0615	364	0.	*	2	1640	489	0.
1	0930	115	0.	*	1	1955	240	0.	*	2	0620	365	0.	*	2	1645	490	0.
1	0935	116	0.	*	1	2000	241	0.	*	2	0625	366	0.	*	2	1650	491	0.
1	0940	117	0.	*	1	2005	242	0.	*	2	0630	367	0.	*	2	1655	492	0.
1	0945	118	0.	*	1	2010	243	0.	*	2	0635	368	0.	*	2	1700	493	0.
1	0950	119	0.	*	1	2015	244	0.	*	2	0640	369	0.	*	2	1705	494	0.
1	0955	120	0.	*	1	2020	245	0.	*	2	0645	370	0.	*	2	1710	495	0.
1	1000	121	0.	*	1	2025	246	0.	*	2	0650	371	0.	*	2	1715	496	0.
1	1005	122	0.	*	1	2030	247	0.	*	2	0655	372	0.	*	2	1720	497	0.
1	1010	123	0.	*	1	2035	248	0.	*	2	0700	373	0.	*	2	1725	498	0.
1	1015	124	0.	*	1	2040	249	0.	*	2	0705	374	0.	*	2	1730	499	0.
1	1020	125	0.	*	1	2045	250	0.	*	2	0710	375	0.	*	2	1735	500	0.

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	41.58-HR
+ (CFS)	(HR)	(CFS)				
+ 837.	3.75		167.	42.	24.	24.
		(INCHES)	1.773	1.779	1.779	1.779
		(AC-FT)	83.	83.	83.	83.

CUMULATIVE AREA = .88 SQ MI

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STORAGE	123.39	151.64
OUTFLOW	3920.50	7136.30
ELEVATION	3043.00	3046.00

HYDROGRAPH AT STATION RDB1
PLAN 1, RATIO = 1.00

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	50.	.0	3025.5	1		1355	168	59.	20.4	3029.2	2		0350	335	50.	-.2	3025.5
1		0005	2	50.	-.2	3025.5	1		1400	169	58.	20.0	3029.1	2		0355	336	50.	-.2	3025.5
1		0010	3	50.	-.2	3025.5	1		1405	170	58.	19.6	3029.1	2		0400	337	50.	-.2	3025.5
1		0015	4	50.	-.2	3025.5	1		1410	171	58.	19.2	3029.0	2		0405	338	50.	-.2	3025.5
1		0020	5	50.	-.2	3025.5	1		1415	172	58.	18.8	3028.9	2		0410	339	50.	-.2	3025.5
1		0025	6	50.	-.2	3025.5	1		1420	173	58.	18.4	3028.9	2		0415	340	50.	-.2	3025.5
1		0030	7	50.	-.2	3025.5	1		1425	174	58.	18.0	3028.8	2		0420	341	50.	-.2	3025.5
1		0035	8	50.	-.2	3025.5	1		1430	175	58.	17.6	3028.7	2		0425	342	50.	-.2	3025.5
1		0040	9	50.	-.2	3025.5	1		1435	176	57.	17.2	3028.7	2		0430	343	50.	-.2	3025.5
1		0045	10	50.	-.2	3025.5	1		1440	177	57.	16.8	3028.6	2		0435	344	50.	-.2	3025.5
1		0050	11	50.	-.2	3025.5	1		1445	178	57.	16.4	3028.5	2		0440	345	50.	-.2	3025.5
1		0055	12	50.	-.2	3025.5	1		1450	179	57.	16.1	3028.5	2		0445	346	50.	-.2	3025.5
1		0100	13	50.	-.2	3025.5	1		1455	180	57.	15.7	3028.4	2		0450	347	50.	-.2	3025.5
1		0105	14	50.	-.2	3025.5	1		1500	181	57.	15.3	3028.3	2		0455	348	50.	-.2	3025.5
1		0110	15	50.	-.2	3025.5	1		1505	182	56.	14.9	3028.3	2		0500	349	50.	-.2	3025.5
1		0115	16	50.	-.2	3025.5	1		1510	183	56.	14.5	3028.2	2		0505	350	50.	-.2	3025.5
1		0120	17	50.	-.2	3025.5	1		1515	184	56.	14.1	3028.1	2		0510	351	50.	-.2	3025.5
1		0125	18	50.	-.2	3025.5	1		1520	185	56.	13.7	3028.1	2		0515	352	50.	-.2	3025.5
1		0130	19	50.	-.2	3025.5	1		1525	186	56.	13.3	3028.0	2		0520	353	50.	-.2	3025.5
1		0135	20	50.	-.2	3025.5	1		1530	187	56.	13.0	3027.9	2		0525	354	50.	-.2	3025.5
1		0140	21	50.	-.2	3025.5	1		1535	188	55.	12.6	3027.9	2		0530	355	50.	-.2	3025.5
1		0145	22	50.	-.2	3025.5	1		1540	189	55.	12.2	3027.8	2		0535	356	50.	-.2	3025.5
1		0150	23	50.	-.2	3025.5	1		1545	190	55.	11.8	3027.7	2		0540	357	50.	-.2	3025.5
1		0155	24	50.	-.2	3025.5	1		1550	191	55.	11.4	3027.7	2		0545	358	50.	-.2	3025.5
1		0200	25	50.	-.2	3025.5	1		1555	192	55.	11.1	3027.6	2		0550	359	50.	-.2	3025.5
1		0205	26	50.	-.2	3025.5	1		1600	193	55.	10.7	3027.5	2		0555	360	50.	-.2	3025.5
1		0210	27	50.	-.2	3025.5	1		1605	194	54.	10.3	3027.5	2		0600	361	50.	-.2	3025.5
1		0215	28	50.	-.2	3025.5	1		1610	195	54.	9.9	3027.4	2		0605	362	50.	-.2	3025.5
1		0220	29	50.	-.2	3025.5	1		1615	196	54.	9.6	3027.3	2		0610	363	50.	-.2	3025.5
1		0225	30	50.	-.1	3025.5	1		1620	197	54.	9.2	3027.3	2		0615	364	50.	-.2	3025.5
1		0230	31	50.	-.1	3025.5	1		1625	198	54.	8.8	3027.2	2		0620	365	50.	-.2	3025.5
1		0235	32	50.	.0	3025.5	1		1630	199	54.	8.4	3027.1	2		0625	366	50.	-.2	3025.5
1		0240	33	50.	.1	3025.5	1		1635	200	54.	8.1	3027.1	2		0630	367	50.	-.2	3025.5
1		0245	34	50.	.2	3025.5	1		1640	201	53.	7.7	3027.0	2		0635	368	50.	-.2	3025.5
1		0250	35	50.	.4	3025.6	1		1645	202	53.	7.3	3026.9	2		0640	369	50.	-.2	3025.5
1		0255	36	50.	.5	3025.6	1		1650	203	53.	7.0	3026.9	2		0645	370	50.	-.2	3025.5
1		0300	37	50.	.6	3025.6	1		1655	204	53.	6.6	3026.8	2		0650	371	50.	-.2	3025.5
1		0305	38	50.	.8	3025.6	1		1700	205	53.	6.2	3026.7	2		0655	372	50.	-.2	3025.5
1		0310	39	50.	1.1	3025.7	1		1705	206	52.	5.9	3026.7	2		0700	373	50.	-.2	3025.5
1		0315	40	51.	1.8	3025.9	1		1710	207	52.	5.5	3026.6	2		0705	374	50.	-.2	3025.5
1		0320	41	51.	3.1	3026.1	1		1715	208	52.	5.2	3026.5	2		0710	375	50.	-.2	3025.5
1		0325	42	52.	5.3	3026.5	1		1720	209	52.	4.8	3026.4	2		0715	376	50.	-.2	3025.5
1		0330	43	54.	8.8	3027.2	1		1725	210	52.	4.4	3026.4	2		0720	377	50.	-.2	3025.5
1		0335	44	56.	13.5	3028.0	1		1730	211	52.	4.1	3026.3	2		0725	378	50.	-.2	3025.5
1		0340	45	58.	18.8	3028.9	1		1735	212	51.	3.7	3026.2	2		0730	379	50.	-.2	3025.5
1		0345	46	60.	24.3	3029.8	1		1740	213	51.	3.4	3026.2	2		0735	380	50.	-.2	3025.5
1		0350	47	62.	29.7	3030.7	1		1745	214	51.	3.0	3026.1	2		0740	381	50.	-.2	3025.5
1		0355	48	64.	34.6	3031.4	1		1750	215	51.	2.7	3026.0	2		0745	382	50.	-.2	3025.5
1		0400	49	65.	38.9	3032.1	1		1755	216	51.	2.3	3026.0	2		0750	383	50.	-.2	3025.5
1		0405	50	66.	42.5	3032.6	1		1800	217	51.	2.0	3025.9	2		0755	384	50.	-.2	3025.5
1		0410	51	67.	45.4	3033.1	1		1805	218	50.	1.6	3025.8	2		0800	385	50.	-.2	3025.5
1		0415	52	68.	47.7	3033.4	1		1810	219	50.	1.3	3025.8	2		0805	386	50.	-.2	3025.5
1		0420	53	68.	49.5	3033.7	1		1815	220	50.	.9	3025.7	2		0810	387	50.	-.2	3025.5
1		0425	54	69.	51.0	3033.9	1		1820	221	50.	.6	3025.6	2		0815	388	50.	-.2	3025.5
1		0430	55	69.	52.2	3034.1	1		1825	222	50.	.2	3025.5	2		0820	389	50.	-.2	3025.5
1		0435	56	69.	53.1	3034.2	1		1830	223	50.	-.1	3025.5	2		0825	390	50.	-.2	3025.5
1		0440	57	70.	54.7	3034.4	1		1835	224	50.	-.2	3025.5	2		0830	391	50.	-.2	3025.5
1		0445	58	70.	55.9	3034.6	1		1840	225	50.	-.2	3025.5	2		0835	392	50.	-.2	3025.5
1		0450	59	70.	57.1	3034.8	1		1845	226	50.	-.2	3025.5	2		0840	393	50.	-.2	3025.5
1		0455	60	71.	58.4	3034.9	1		1850	227	50.	-.2	3025.5	2		0845	394	50.	-.2	3025.5
1		0500	61	71.	59.6	3035.1	1		1855	228	50.	-.2	3025.5	2		0850	395	50.	-.2	3025.5
1		0505	62	71.	60.7	3035.3	1		1900	229	50.	-.2	3025.5	2		0855	396	50.	-.2	3025.5
1		0510	63	72.	61.5	3035.4	1		1905	230	50.	-.2	3025.5	2		0900	397	50.	-.2	3025.5
1		0515	64	72.	62.2	3035.5	1		1910	231	50.	-.2	3025.5	2		0905	398	50.	-.2	3025.5
1		0520	65	72.	62.7	3035.5	1		1915	232	50.	-.2	3025.5	2		0910	399	50.	-.2	3025.5
1		0525	66	72.	63.0	3035.6	1		1920	233	50.	-.2	3025.5	2		0915	400	50.	-.2	3025.5
1		0530	67	72.	63.2	3035.6	1		1925	234	50.	-.2	3025.5	2		0920	401	50.	-.2	3025.5
1		0535	68	72.	63.2	3035.6	1		1930	235	50.	-.2	3025.5	2		0925	402	50.	-.2	3025.5
1		0540	69	72.	63.2	3035.6	1		1935	236	50.	-.2	3025.5	2		0930	403	50.	-.2	3025.5
1		0545	70	72.	63.0	3035.6	1		1940	237	50.	-.2	3025.5	2		0935	404	50.	-.2	3025.5
1		0550	71	72.	62.8	3035.6	1		1945	238	50.	-.2	3025.5	2		0940	405	50.	-.2	3025.5
1		0555	72	72.	62.6	3035.5	1		1950	239	50.	-.2	3025.5	2		0945	406	50.	-.2	3025.5
1		0600	73	72.	62.3	3035.5	1		1955	240	50.	-.2	3025.5	2		0950	407	50.	-.2	3025.5
1		0605	74	72.	62.0	3035.5	1		2000	241	50.	-.2	3025.5	2		0955	408	50.	-.2	3025.5
1		0610	75	72.	61.7	3035.4	1		2005	242	50.	-.2	3025.5	2		1000	409	50.	-.2	3025.5
1		0615	76	71.	61.4	3035.4	1		2010	243	50.	-.2	3025.5	2		1005	410	50.	-.2	3025.5
1		0620	77	71.	61.0	3035.3	1		2015	244	50.	-.2	3025.5	2		1010	411	50.	-.2	3025.5
1		0625	78	71.	60.6	3035.3	1		2020	245	50.	-.2	3025.5	2		1015	412	50.	-.2	3025.5
1		0630	79	71.	60.1	3035.2	1		2025	246	50.	-.2	3025.5	2		1020	413	50.	-.2	3025.5
1		0635	80	71.	59.7	3035.1	1		2030	247	50.	-.2	3025.5	2		1025	414	50.	-.2	3025.5
1		0640	81	71.	59.2	3035.1	1		2035	248	50.	-.2	3025.5	2		1030	415	50.	-.2	3025.5
1		0645	82	71.	58.8	3035.0	1		2040	249	50.	-.2	3025.5	2		1035	416	50.	-.2	3025.5
1		0650	83	71.	58.3	3034.9	1		2045	250	50.	-.2	3025.5	2		1040	417	50.	-.2	3025.5
1		0655	84	71.	57.8	3034.9	1		2050	251	50.	-.2	3025.5	2		1045	418	50.	-.2	3025.5
1		0700	85	70.	57.3	3034.8	1		2055	252	50.	-.2	3025.5	2		1050	419	50.	-.2	3025.5
1		0705	86	70.	56.9	3034.7	1		2100	253	50.	-.2	3025.5	2		1055	420	50.	-.2	3025.5
1		0710	87	70.	56.4	3034.7	1		2105	254	50.	-.2	3025.5	2		1100	421	50.	-.2	3025.5
1		0715	88	70.	55.9	3034.6	1		2110	255	50.	-.2	3025.5	2		1105	422	50.	-.2	3025.5
1		0720	89	70.	55.4	3034.5	1		2115	256	50.	-.2	3025.5	2		1110	423	50.	-.2	3025.5
1		0725	90	70.	54.9	3034.5	1		2120	257	50.	-.2	3025.5	2		1115	424	50.	-.2	3025.5
1		0730	91	70.	54.5	3034.4	1		2125	258	50.	-.2	3025.5	2		1120	425	50.	-.2	3025.5
1		0735	92	69.	54.0	3034.3	1		2130	259	50.	-.2	3025.5	2		1125	426	50.	-.2	3025.5
1		0740	93	69.	53.5	3034.3	1		2135	260	50.	-.2	3025.5	2		1130	427	50.	-.2	3025.5
1		0745	94	69.	53.0	3034.2	1		2140	261	50.	-.2	3025.5	2		1135	428	50.	-.2	3025.5
1		0750	95	69.	52.6	3034.1	1		2145	262	50.	-.2	3025.5	2		1140	429	50.	-.2	3025.5
1		0755	96	69.	52.1	3034.0	1		2150	263	50.	-.2	3025.5	2		1145	430	50.	-.2	3025.5
1		0800	97	69.	51.6	3034.0	1		2155	264	50.	-.2	3025.5	2		1150	431	50.	-.2	3025.5
1		0805	98	69.	51.1	3033.9	1		2200	265	50.	-.2	3025.5	2		1155	432	50.	-.2	3025.5
1		0810	99	68.	50.7	3033.8	1		2205	266	50.	-.2	3025.5	2		1200	433	50.	-.2	3025.5
1		0815	100	68.	50.2	3033.8	1		2210	267	50.	-.2	3025.5	2		1205	434	50.	-.2	3025.5
1		0820	101	68.	49.7	3033.7	1		2215	268	50.	-.2	3025.5	2		1210	435	50.	-.2	3025.5
1		0825	102	68.	49.3	3033.6	1		2220	269	50.	-.2	3025.5	2		1215	436	50.	-.2	3025.5
1		0830	103	68.	48.8	3033.6	1		2225	270	50.	-.2	3025.5	2		1220	437	50.	-.2	3025.5
1		0835	104	68.	48.3	3033.5	1		2230	271	50.	-.2	3025.5	2		1225	438	50.	-.2	3025.5
1		0840	105	68.	47.9	3033.4	1		2235	272	50.	-.2	3025.5	2		1230	439	50.	-.2	3025.5
1		0845	106	67.	47.4	3033.4	1		2240	273	50.	-.2	3025.5	2		1235	440	50.	-.2	3025.5
1		0850	107	67.	46.9	3033.3	1		2245	274	50.	-.2	3025.5	2		1240	441	50.	-.2	3025.5
1		0855	108	67.	46.5	3033.2	1		2250	275	50.	-.2	3025.5	2		1245	442	50.	-.2	3025.5
1		0900	109	67.	46.0	3033.2	1		2255	276	50.	-.2	3025.5	2		1250	443	50.	-.2	3025.5
1		0905	110	67.	45.5	3033.1	1		2300	277	50.	-.2	3025.5	2		1255	444	50.	-.2	3025.5
1		0910	111	67.	45.1	3033.0	1		2305	278	50.	-.2	3025.5	2		1300	445	50.	-.2	3025.5
1		0915	112	67.	44.6	3033.0	1		2310	279	50.	-.2	3025.5	2		1305	446	50.	-.2	3025.5
1		0920	113	67.	44.2	3032.9	1		2315	280	50.	-.2	3025.5	2		1310	447	50.	-.2	3025.5
1		0925	114	66.	43.7	3032.8	1		2320	281	50.	-.2	3025.5	2		1315	448	50.	-.2	3025.5
1		0930	115	66.	43.3	3032.8	1		2325	282	50.	-.2	3025.5	2		1320	449	50.	-.2	3025.5
1		0935	116	66.	42.8	3032.7	1		2330	283	50.	-.2	3025.5	2		1325	450	50.	-.2	3025.5

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1	0940	117		66.	42.3	3032.6	1	2335	284		50.	-.2	3025.5	2	1330	451		50.	-.2	3025.5
1	0945	118		66.	41.9	3032.6	1	2340	285		50.	-.2	3025.5	2	1335	452		50.	-.2	3025.5
1	0950	119		66.	41.4	3032.5	1	2345	286		50.	-.2	3025.5	2	1340	453		50.	-.2	3025.5
1	0955	120		66.	41.0	3032.4	1	2350	287		50.	-.2	3025.5	2	1345	454		50.	-.2	3025.5
1	1000	121		65.	40.5	3032.3	1	2355	288		50.	-.2	3025.5	2	1350	455		50.	-.2	3025.5
1	1005	122		65.	40.1	3032.3	2	0000	289		50.	-.2	3025.5	2	1355	456		50.	-.2	3025.5
1	1010	123		65.	39.6	3032.2	2	0005	290		50.	-.2	3025.5	2	1400	457		50.	-.2	3025.5
1	1015	124		65.	39.2	3032.1	2	0010	291		50.	-.2	3025.5	2	1405	458		50.	-.2	3025.5
1	1020	125		65.	38.7	3032.1	2	0015	292		50.	-.2	3025.5	2	1410	459		50.	-.2	3025.5
1	1025	126		65.	38.3	3032.0	2	0020	293		50.	-.2	3025.5	2	1415	460		50.	-.2	3025.5
1	1030	127		65.	37.8	3031.9	2	0025	294		50.	-.2	3025.5	2	1420	461		50.	-.2	3025.5
1	1035	128		64.	37.4	3031.9	2	0030	295		50.	-.2	3025.5	2	1425	462		50.	-.2	3025.5
1	1040	129		64.	37.0	3031.8	2	0035	296		50.	-.2	3025.5	2	1430	463		50.	-.2	3025.5
1	1045	130		64.	36.5	3031.7	2	0040	297		50.	-.2	3025.5	2	1435	464		50.	-.2	3025.5
1	1050	131		64.	36.1	3031.7	2	0045	298		50.	-.2	3025.5	2	1440	465		50.	-.2	3025.5
1	1055	132		64.	35.6	3031.6	2	0050	299		50.	-.2	3025.5	2	1445	466		50.	-.2	3025.5
1	1100	133		64.	35.2	3031.5	2	0055	300		50.	-.2	3025.5	2	1450	467		50.	-.2	3025.5
1	1105	134		64.	34.8	3031.5	2	0100	301		50.	-.2	3025.5	2	1455	468		50.	-.2	3025.5
1	1110	135		63.	34.3	3031.4	2	0105	302		50.	-.2	3025.5	2	1500	469		50.	-.2	3025.5
1	1115	136		63.	33.9	3031.3	2	0110	303		50.	-.2	3025.5	2	1505	470		50.	-.2	3025.5
1	1120	137		63.	33.5	3031.2	2	0115	304		50.	-.2	3025.5	2	1510	471		50.	-.2	3025.5
1	1125	138		63.	33.0	3031.2	2	0120	305		50.	-.2	3025.5	2	1515	472		50.	-.2	3025.5
1	1130	139		63.	32.6	3031.1	2	0125	306		50.	-.2	3025.5	2	1520	473		50.	-.2	3025.5
1	1135	140		63.	32.2	3031.0	2	0130	307		50.	-.2	3025.5	2	1525	474		50.	-.2	3025.5
1	1140	141		63.	31.7	3031.0	2	0135	308		50.	-.2	3025.5	2	1530	475		50.	-.2	3025.5
1	1145	142		62.	31.3	3030.9	2	0140	309		50.	-.2	3025.5	2	1535	476		50.	-.2	3025.5
1	1150	143		62.	30.9	3030.8	2	0145	310		50.	-.2	3025.5	2	1540	477		50.	-.2	3025.5
1	1155	144		62.	30.4	3030.8	2	0150	311		50.	-.2	3025.5	2	1545	478		50.	-.2	3025.5
1	1200	145		62.	30.0	3030.7	2	0155	312		50.	-.2	3025.5	2	1550	479		50.	-.2	3025.5
1	1205	146		62.	29.6	3030.7	2	0200	313		50.	-.2	3025.5	2	1555	480		50.	-.2	3025.5
1	1210	147		62.	29.1	3030.6	2	0205	314		50.	-.2	3025.5	2	1600	481		50.	-.2	3025.5
1	1215	148		62.	28.7	3030.5	2	0210	315		50.	-.2	3025.5	2	1605	482		50.	-.2	3025.5
1	1220	149		62.	28.3	3030.5	2	0215	316		50.	-.2	3025.5	2	1610	483		50.	-.2	3025.5
1	1225	150		61.	27.9	3030.4	2	0220	317		50.	-.2	3025.5	2	1615	484		50.	-.2	3025.5
1	1230	151		61.	27.5	3030.3	2	0225	318		50.	-.2	3025.5	2	1620	485		50.	-.2	3025.5
1	1235	152		61.	27.0	3030.3	2	0230	319		50.	-.2	3025.5	2	1625	486		50.	-.2	3025.5
1	1240	153		61.	26.6	3030.2	2	0235	320		50.	-.2	3025.5	2	1630	487		50.	-.2	3025.5
1	1245	154		61.	26.2	3030.1	2	0240	321		50.	-.2	3025.5	2	1635	488		50.	-.2	3025.5
1	1250	155		61.	25.8	3030.1	2	0245	322		50.	-.2	3025.5	2	1640	489		50.	-.2	3025.5
1	1255	156		61.	25.4	3030.0	2	0250	323		50.	-.2	3025.5	2	1645	490		50.	-.2	3025.5
1	1300	157		60.	24.9	3029.9	2	0255	324		50.	-.2	3025.5	2	1650	491		50.	-.2	3025.5
1	1305	158		60.	24.5	3029.9	2	0300	325		50.	-.2	3025.5	2	1655	492		50.	-.2	3025.5
1	1310	159		60.	24.1	3029.8	2	0305	326		50.	-.2	3025.5	2	1700	493		50.	-.2	3025.5
1	1315	160		60.	23.7	3029.7	2	0310	327		50.	-.2	3025.5	2	1705	494		50.	-.2	3025.5
1	1320	161		60.	23.3	3029.7	2	0315	328		50.	-.2	3025.5	2	1710	495		50.	-.2	3025.5
1	1325	162		60.	22.9	3029.6	2	0320	329		50.	-.2	3025.5	2	1715	496		50.	-.2	3025.5
1	1330	163		59.	22.5	3029.5	2	0325	330		50.	-.2	3025.5	2	1720	497		50.	-.2	3025.5
1	1335	164		59.	22.1	3029.5	2	0330	331		50.	-.2	3025.5	2	1725	498		50.	-.2	3025.5
1	1340	165		59.	21.6	3029.4	2	0335	332		50.	-.2	3025.5	2	1730	499		50.	-.2	3025.5
1	1345	166		59.	21.2	3029.3	2	0340	333		50.	-.2	3025.5	2	1735	500		50.	-.2	3025.5
1	1350	167		59.	20.8	3029.3	2	0345	334		50.	-.2	3025.5							

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	41.58-HR
(CFS)	(HR)	(CFS)				
72.	5.58		69.	58.	54.	54.
		(INCHES)	.733	2.445	3.988	3.988
		(AC-FT)	34.	114.	187.	187.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	41.58-HR
(AC-FT)	(HR)				
63.	5.58	53.	21.	12.	12.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	41.58-HR
(FEET)	(HR)				
3035.62	5.58	3034.23	3028.99	3027.52	3027.52

CUMULATIVE AREA = .88 SQ MI

HYDROGRAPH AT STATION ROB1
PLAN 1, RATIO = .98

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1	0000		1	50.	.0	3025.5	1	1355		168	58.	18.7	3028.9	2	0350		335	50.	-.2	3025.5
1	0005		2	50.	-.2	3025.5	1	1400		169	58.	18.3	3028.8	2	0355		336	50.	-.2	3025.5
1	0010		3	50.	-.2	3025.5	1	1405		170	58.	17.9	3028.8	2	0400		337	50.	-.2	3025.5
1	0015		4	50.	-.2	3025.5	1	1410		171	57.	17.5	3028.7	2	0405		338	50.	-.2	3025.5
1	0020		5	50.	-.2	3025.5	1	1415		172	57.	17.1	3028.6	2	0410		339	50.	-.2	3025.5
1	0025		6	50.	-.2	3025.5	1	1420		173	57.	16.7	3028.6	2	0415		340	50.	-.2	3025.5
1	0030		7	50.	-.2	3025.5	1	1425		174	57.	16.3	3028.5	2	0420		341	50.	-.2	3025.5
1	0035		8	50.	-.2	3025.5	1	1430		175	57.	15.9	3028.4	2	0425		342	50.	-.2	3025.5
1	0040		9	50.	-.2	3025.5	1	1435		176	57.	15.5	3028.4	2	0430		343	50.	-.2	3025.5
1	0045		10	50.	-.2	3025.5	1	1440		177	56.	15.1	3028.3	2	0435		344	50.	-.2	3025.5
1	0050		11	50.	-.2	3025.5	1	1445		178	56.	14.7	3028.2	2	0440		345	50.	-.2	3025.5
1	0055		12	50.	-.2	3025.5	1	1450		179	56.	14.3	3028.2	2	0445		346	50.	-.2	3025.5
1	0100		13	50.	-.2	3025.5	1	1455		180	56.	13.9	3028.1	2	0450		347	50.	-.2	3025.5
1	0105		14	50.	-.2	3025.5	1	1500		181	56.	13.6	3028.0	2	0455		348	50.	-.2	3025.5
1	0110		15	50.	-.2	3025.5	1	1505		182	56.	13.2	3028.0	2	0500		349	50.	-.2	3025.5
1	0115		16	50.	-.2	3025.5	1	1510		183	56.	12.8	3027.9	2	0505		350	50.	-.2	3025.5
1	0120		17	50.	-.2	3025.5	1	1515		184	55.	12.4	3027.8	2	0510		351	50.	-.2	3025.5
1	0125		18	50.	-.2	3025.5	1	1520		185	55.	12.0	3027.8	2	0515		352	50.	-.2	3025.5
1	0130		19	50.	-.2	3025.5	1	1525		186	55.	11.7	3027.7	2	0520		353	50.	-.2	3025.5
1	0135		20	50.	-.2	3025.5	1	1530		187	55.	11.3	3027.6	2	0525		354	50.	-.2	3025.5
1	0140		21	50.	-.2	3025.5	1	1535		188	55.	10.9	3027.6	2	0530		355	50.	-.2	3025.5
1	0145		22	50.	-.2	3025.5	1	1540		189	55.	10.5	3027.5	2	0535		356	50.	-.2	3025.5
1	0150		23	50.	-.2	3025.5	1	1545		190	54.	10.1	3027.4	2	0540		357	50.	-.2	3025.5
1	0155		24	50.	-.2	3025.5	1	1550		191	54.	9.8	3027.4	2	0545		358	50.	-.2	3025.5
1	0200		25	50.	-.2	3025.5	1	1555		192	54.	9.4	3027.3	2	0550		359	50.	-.2	3025.5
1	0205		26	50.	-.2	3025.5	1	1600		193	54.	9.0	3027.2	2	0555		360	50.	-.2	3025.5
1	0210		27	50.	-.2	3025.5	1	1605		194	54.	8.7	3027.2	2	0600		361	50.	-.2	3025.5
1	0215		28	50.	-.2	3025.5	1	1610		195	54.	8.3	3027.1	2	0605		362	50.	-.2	3025.5
1	0220		29	50.	-.2	3025.5	1	1615		196	53.	7.9	3027.0	2	0610		363	50.	-.2	3025.5
1	0225		30	50.	-.2	3025.5	1	1620		197	53.	7.5	3027.0	2	0615		364	50.	-.2	3025.5
1	0230		31	50.	-.1	3025.5	1	1625		198	53.	7.2	3026.9	2	0620		365	50.	-.2	3025.5
1	0235		32	50.	.0	3025.5	1	1630		199	53.	6.8	3026.8	2	0625		366	50.	-.2	3025.5
1	0240		33	50.	.0	3025.5	1	1635		200	53.	6.5	3026.8	2	0630		367	50.	-.2	3025.5
1	0245		34	50.	.1	3025.5	1	1640		201	53.	6.1	3026.7	2	0635		368	50.	-.2	3025.5
1	0250		35	50.	.3	3025.6	1	1645		202	52.	5.7	3026.6	2	0640		369	50.	-.2	3025.5
1	0255		36	50.	.4	3025.6	1	1650		203	52.	5.4	3026.6	2	0645		370	50.	-.2	3025.5
1	0300		37	50.	.4	3025.6	1	1655		204	52.	5.0	3026.5	2	0650		371	50.	-.2	3025.5
1	0305		38	50.	.6	3025.6	1	1700		205	52.	4.7	3026.4	2	0655		372	50.	-.2	3025.5
1	0310		39	50.	.9	3025.7	1	1705		206	52.	4.3	3026.3	2	0700		373	50.	-.2	3025.5
1	0315		40	50.	1.6	3025.8	1	1710		207	52.	3.9	3026.3	2	0705		374	50.	-.2	3025.5
1	0320		41	51.	2.8	3026.1	1	1715		208	51.	3.6	3026.2	2	0710		375	50.	-.2	3025.5
1	0325		42	52.	5.0	3026.5	1	1720		209	51.	3.2	3026.1	2	0715		376	50.	-.2	3025.5
1	0330		43	54.	8.4	3027.1	1	1725		210	51.	2.9	3026.1	2	0720		377	50.	-.2	3025.5
1	0335		44	56.	12.9	3027.9	1	1730		211	51.	2.5	3026.0	2	0725		378	50.	-.2	3025.5
1	0340		45	58.	18.1	3028.8	1	1735		212	51.	2.2	3025.9	2	0730		379	50.	-.2	3025.5

1	0345	46	60.	23.4	3029.7	*	1	1740	213	51.	1.8	3025.9	*	2	0735	380	50.	-.2	3025.5
1	0350	47	62.	28.6	3030.5	*	1	1745	214	50.	1.5	3025.8	*	2	0740	381	50.	-.2	3025.5
1	0355	48	63.	33.4	3031.2	*	1	1750	215	50.	1.1	3025.7	*	2	0745	382	50.	-.2	3025.5
1	0400	49	64.	37.5	3031.9	*	1	1755	216	50.	.8	3025.7	*	2	0750	383	50.	-.2	3025.5
1	0405	50	66.	41.0	3032.4	*	1	1800	217	50.	.4	3025.6	*	2	0755	384	50.	-.2	3025.5
1	0410	51	66.	43.8	3032.8	*	1	1805	218	50.	.1	3025.5	*	2	0800	385	50.	-.2	3025.5
1	0415	52	67.	46.0	3033.2	*	1	1810	219	50.	-.2	3025.5	*	2	0805	386	50.	-.2	3025.5
1	0420	53	68.	47.8	3033.4	*	1	1815	220	50.	-.2	3025.5	*	2	0810	387	50.	-.2	3025.5
1	0425	54	68.	49.2	3033.6	*	1	1820	221	50.	-.2	3025.5	*	2	0815	388	50.	-.2	3025.5
1	0430	55	68.	50.5	3033.8	*	1	1825	222	50.	-.2	3025.5	*	2	0820	389	50.	-.2	3025.5
1	0435	56	69.	51.7	3034.0	*	1	1830	223	50.	-.2	3025.5	*	2	0825	390	50.	-.2	3025.5
1	0440	57	69.	52.8	3034.2	*	1	1835	224	50.	-.2	3025.5	*	2	0830	391	50.	-.2	3025.5
1	0445	58	69.	54.0	3034.3	*	1	1840	225	50.	-.2	3025.5	*	2	0835	392	50.	-.2	3025.5
1	0450	59	70.	55.2	3034.5	*	1	1845	226	50.	-.2	3025.5	*	2	0840	393	50.	-.2	3025.5
1	0455	60	70.	56.4	3034.7	*	1	1850	227	50.	-.2	3025.5	*	2	0845	394	50.	-.2	3025.5
1	0500	61	70.	57.6	3034.8	*	1	1855	228	50.	-.2	3025.5	*	2	0850	395	50.	-.2	3025.5
1	0505	62	71.	58.6	3035.0	*	1	1900	229	50.	-.2	3025.5	*	2	0855	396	50.	-.2	3025.5
1	0510	63	71.	59.5	3035.1	*	1	1905	230	50.	-.2	3025.5	*	2	0900	397	50.	-.2	3025.5
1	0515	64	71.	60.1	3035.2	*	1	1910	231	50.	-.2	3025.5	*	2	0905	398	50.	-.2	3025.5
1	0520	65	71.	60.6	3035.3	*	1	1915	232	50.	-.2	3025.5	*	2	0910	399	50.	-.2	3025.5
1	0525	66	71.	60.9	3035.3	*	1	1920	233	50.	-.2	3025.5	*	2	0915	400	50.	-.2	3025.5
1	0530	67	71.	61.1	3035.3	*	1	1925	234	50.	-.2	3025.5	*	2	0920	401	50.	-.2	3025.5
1	0535	68	71.	61.1	3035.3	*	1	1930	235	50.	-.2	3025.5	*	2	0925	402	50.	-.2	3025.5
1	0540	69	71.	61.0	3035.3	*	1	1935	236	50.	-.2	3025.5	*	2	0930	403	50.	-.2	3025.5
1	0545	70	71.	60.9	3035.3	*	1	1940	237	50.	-.2	3025.5	*	2	0935	404	50.	-.2	3025.5
1	0550	71	71.	60.7	3035.3	*	1	1945	238	50.	-.2	3025.5	*	2	0940	405	50.	-.2	3025.5
1	0555	72	71.	60.5	3035.2	*	1	1950	239	50.	-.2	3025.5	*	2	0945	406	50.	-.2	3025.5
1	0600	73	71.	60.2	3035.2	*	1	1955	240	50.	-.2	3025.5	*	2	0950	407	50.	-.2	3025.5
1	0605	74	71.	59.9	3035.2	*	1	2000	241	50.	-.2	3025.5	*	2	0955	408	50.	-.2	3025.5
1	0610	75	71.	59.6	3035.1	*	1	2005	242	50.	-.2	3025.5	*	2	1000	409	50.	-.2	3025.5
1	0615	76	71.	59.2	3035.1	*	1	2010	243	50.	-.2	3025.5	*	2	1005	410	50.	-.2	3025.5
1	0620	77	71.	58.8	3035.0	*	1	2015	244	50.	-.2	3025.5	*	2	1010	411	50.	-.2	3025.5
1	0625	78	71.	58.4	3035.0	*	1	2020	245	50.	-.2	3025.5	*	2	1015	412	50.	-.2	3025.5
1	0630	79	71.	58.0	3034.9	*	1	2025	246	50.	-.2	3025.5	*	2	1020	413	50.	-.2	3025.5
1	0635	80	70.	57.5	3034.8	*	1	2030	247	50.	-.2	3025.5	*	2	1025	414	50.	-.2	3025.5
1	0640	81	70.	57.1	3034.8	*	1	2035	248	50.	-.2	3025.5	*	2	1030	415	50.	-.2	3025.5
1	0645	82	70.	56.6	3034.7	*	1	2040	249	50.	-.2	3025.5	*	2	1035	416	50.	-.2	3025.5
1	0650	83	70.	56.2	3034.6	*	1	2045	250	50.	-.2	3025.5	*	2	1040	417	50.	-.2	3025.5
1	0655	84	70.	55.7	3034.6	*	1	2050	251	50.	-.2	3025.5	*	2	1045	418	50.	-.2	3025.5
1	0700	85	70.	55.2	3034.5	*	1	2055	252	50.	-.2	3025.5	*	2	1050	419	50.	-.2	3025.5
1	0705	86	70.	54.7	3034.4	*	1	2100	253	50.	-.2	3025.5	*	2	1055	420	50.	-.2	3025.5
1	0710	87	69.	54.3	3034.4	*	1	2105	254	50.	-.2	3025.5	*	2	1100	421	50.	-.2	3025.5
1	0715	88	69.	53.8	3034.3	*	1	2110	255	50.	-.2	3025.5	*	2	1105	422	50.	-.2	3025.5
1	0720	89	69.	53.3	3034.2	*	1	2115	256	50.	-.2	3025.5	*	2	1110	423	50.	-.2	3025.5
1	0725	90	69.	52.8	3034.2	*	1	2120	257	50.	-.2	3025.5	*	2	1115	424	50.	-.2	3025.5
1	0730	91	69.	52.4	3034.1	*	1	2125	258	50.	-.2	3025.5	*	2	1120	425	50.	-.2	3025.5
1	0735	92	69.	51.9	3034.0	*	1	2130	259	50.	-.2	3025.5	*	2	1125	426	50.	-.2	3025.5
1	0740	93	69.	51.4	3033.9	*	1	2135	260	50.	-.2	3025.5	*	2	1130	427	50.	-.2	3025.5
1	0745	94	69.	50.9	3033.9	*	1	2140	261	50.	-.2	3025.5	*	2	1135	428	50.	-.2	3025.5
1	0750	95	68.	50.5	3033.8	*	1	2145	262	50.	-.2	3025.5	*	2	1140	429	50.	-.2	3025.5
1	0755	96	68.	50.0	3033.7	*	1	2150	263	50.	-.2	3025.5	*	2	1145	430	50.	-.2	3025.5
1	0800	97	68.	49.5	3033.7	*	1	2155	264	50.	-.2	3025.5	*	2	1150	431	50.	-.2	3025.5
1	0805	98	68.	49.1	3033.6	*	1	2200	265	50.	-.2	3025.5	*	2	1155	432	50.	-.2	3025.5
1	0810	99	68.	48.6	3033.5	*	1	2205	266	50.	-.2	3025.5	*	2	1200	433	50.	-.2	3025.5
1	0815	100	68.	48.1	3033.5	*	1	2210	267	50.	-.2	3025.5	*	2	1205	434	50.	-.2	3025.5
1	0820	101	68.	47.7	3033.4	*	1	2215	268	50.	-.2	3025.5	*	2	1210	435	50.	-.2	3025.5
1	0825	102	67.	47.2	3033.3	*	1	2220	269	50.	-.2	3025.5	*	2	1215	436	50.	-.2	3025.5
1	0830	103	67.	46.7	3033.3	*	1	2225	270	50.	-.2	3025.5	*	2	1220	437	50.	-.2	3025.5
1	0835	104	67.	46.3	3033.2	*	1	2230	271	50.	-.2	3025.5	*	2	1225	438	50.	-.2	3025.5
1	0840	105	67.	45.8	3033.1	*	1	2235	272	50.	-.2	3025.5	*	2	1230	439	50.	-.2	3025.5
1	0845	106	67.	45.3	3033.1	*	1	2240	273	50.	-.2	3025.5	*	2	1235	440	50.	-.2	3025.5
1	0850	107	67.	44.9	3033.0	*	1	2245	274	50.	-.2	3025.5	*	2	1240	441	50.	-.2	3025.5
1	0855	108	67.	44.4	3032.9	*	1	2250	275	50.	-.2	3025.5	*	2	1245	442	50.	-.2	3025.5
1	0900	109	66.	44.0	3032.9	*	1	2255	276	50.	-.2	3025.5	*	2	1250	443	50.	-.2	3025.5
1	0905	110	66.	43.5	3032.8	*	1	2300	277	50.	-.2	3025.5	*	2	1255	444	50.	-.2	3025.5
1	0910	111	66.	43.1	3032.7	*	1	2305	278	50.	-.2	3025.5	*	2	1300	445	50.	-.2	3025.5
1	0915	112	66.	42.6	3032.7	*	1	2310	279	50.	-.2	3025.5	*	2	1305	446	50.	-.2	3025.5
1	0920	113	66.	42.1	3032.6	*	1	2315	280	50.	-.2	3025.5	*	2	1310	447	50.	-.2	3025.5
1	0925	114	66.	41.7	3032.5	*	1	2320	281	50.	-.2	3025.5	*	2	1315	448	50.	-.2	3025.5
1	0930	115	66.	41.2	3032.5	*	1	2325	282	50.	-.2	3025.5	*	2	1320	449	50.	-.2	3025.5
1	0935	116	65.	40.8	3032.4	*	1	2330	283	50.	-.2	3025.5	*	2	1325	450	50.	-.2	3025.5
1	0940	117	65.	40.3	3032.3	*	1	2335	284	50.	-.2	3025.5	*	2	1330	451	50.	-.2	3025.5
1	0945	118	65.	39.9	3032.2	*	1	2340	285	50.	-.2	3025.5	*	2	1335	452	50.	-.2	3025.5
1	0950	119	65.	39.4	3032.2	*	1	2345	286	50.	-.2	3025.5	*	2	1340	453	50.	-.2	3025.5
1	0955	120	65.	39.0	3032.1	*	1	2350	287	50.	-.2	3025.5	*	2	1345	454	50.	-.2	3025.5
1	1000	121	65.	38.5	3032.0	*	1	2355	288	50.	-.2	3025.5	*	2	1350	455	50.	-.2	3025.5
1	1005	122	65.	38.1	3032.0	*	2	0000	289	50.	-.2	3025.5	*	2	1355	456	50.	-.2	3025.5
1	1010	123	64.	37.7	3031.9	*	2	0005	290	50.	-.2	3025.5	*	2	1400	457	50.	-.2	3025.5
1	1015	124	64.	37.2	3031.8	*	2	0010	291	50.	-.2	3025.5	*	2	1405	458	50.	-.2	3025.5
1	1020	125	64.	36.8	3031.8	*	2	0015	292	50.	-.2	3025.5	*	2	1410	459	50.	-.2	3025.5
1	1025	126	64.	36.3	3031.7	*	2	0020	293	50.	-.2	3025.5	*	2	1415	460	50.	-.2	3025.5
1	1030	127	64.	35.9	3031.6	*	2	0025	294	50.	-.2	3025.5	*	2	1420	461	50.	-.2	3025.5
1	1035	128	64.	35.5	3031.6	*	2	0030	295	50.	-.2	3025.5	*	2	1425	462	50.	-.2	3025.5
1	1040	129	64.	35.0	3031.5	*	2	0035	296	50.	-.2	3025.5	*	2	1430	463	50.	-.2	3025.5
1	1045	130	64.	34.6	3031.4	*	2	0040	297	50.	-.2	3025.5	*	2	1435	464	50.	-.2	3025.5
1	1050	131	63.	34.1	3031.4	*	2	0045	298	50.	-.2	3025.5	*	2	1440	465	50.	-.2	3025.5
1	1055	132	63.	33.7	3031.3	*	2	0050	299	50.	-.2	3025.5	*	2	1445	466	50.	-.2	3025.5
1	1100	133	63.	33.3	3031.2	*	2	0055	300	50.	-.2	3025.5	*	2	1450	467	50.	-.2	3025.5
1	1105	134	63.	32.8	3031.2	*	2	0100	301	50.	-.2	3025.5	*	2	1455	468	50.	-.2	3025.5
1	1110	135	63.	32.4	3031.1	*	2	0105	302	50.	-.2	3025.5	*	2	1500	469	50.	-.2	3025.5
1	1115	136	63.	32.0	3031.0	*	2	0110	303	50.	-.2	3025.5	*	2	1505	470	50.	-.2	3025.5
1	1120	137	63.	31.5	3031.0	*	2	0115	304	50.	-.2	3025.5	*	2	1510	471	50.	-.2	3025.5
1	1125	138	62.	31.1	3030.9	*	2	0120	305	50.	-.2	3025.5	*	2	1515	472	50.	-.2	3025.5
1	1130	139	62.	30.7	3030.8	*	2	0125	306	50.	-.2	3025.5	*	2	1520	473	50.	-.2	3025.5
1	1135	140	62.	30.2	3030.8	*	2	0130	307	50.	-.2	3025.5	*	2	1525	474	50.	-.2	3025.5
1	1140	141	62.	29.8	3030.7	*	2	0135	308	50.	-.2	3025.5	*	2	1530	475	50.	-.2	3025.5
1	1145	142	62.	29.4	3030.6	*	2	0140	309	50.	-.2	3025.5	*	2	1535	476	50.	-.2	3025.5
1	1150	143	62.	29.0	3030.6	*	2	0145	310	50.	-.2	3025.5	*	2	1540	477	50.	-.2	3025.5
1	1155	144	62.	28.5	3030.5	*	2	0150	311	50.	-.2	3025.5	*	2	1545	478	50.	-.2	3025.5
1	1200	145	61.	28.1	3030.4	*	2	0155	312	50.	-.2	3025.5	*	2	1550	479	50.	-.2	3025.5
1	1205	146	61.	27.7	3030.4	*	2	0200	313	50.	-.2	3025.5	*	2	1555	480	50.	-.2	3025.5
1	1210	147	61.	27.3	3030.3	*	2	0205	314	50.	-.2	3025.5	*	2	1600	481	50.	-.2	3025.5
1	1215	148	61.	26.9	3030.2	*	2	0210	315	50.	-.2	3025.5	*	2	1605	482	50.	-.2	3025.5
1	1220	149	61.	26.4	3030.2	*	2	0215	316	50.	-.2	3025.5	*	2	1610	483	50.	-.2	3025.5
1	1225	150	61.	26.0	3030.1	*	2	0220	317	50.	-.2	3025.5	*	2	1615	484	50.	-.2	3025.5
1	1230	151	61.	25.6	3030.0	*	2	0225	318	50.	-.2	3025.5	*	2	1620	485	50.	-.2	3025.5
1	1235	152	61.	25.2	3030.0	*	2	0230	319	50.	-.2	3025.5	*	2	1625	486	50.	-.2	3025.5
1	1240	153	60.	24.8	3029.9	*	2	0235	320	50.	-.2	3025.5	*	2	1630	487	50.	-.2	3025.5
1	1245	154	60.	24.3	3029.8	*	2	0240	321	50.	-.2	3025.5	*	2	1635	488	50.	-.2	3025.5
1	1250	155	60.	23.9	3029.8	*	2	0245	322	50.	-.2	3025.5	*	2	1640	489	50.	-.2	3025.5
1	1255	156	60.	23.5	3029.7	*	2	0250	323	50.	-.2	3025.5	*	2	1645	490	50.	-.2	3025.5
1	1300	157	60.	23.1	3029.6	*	2	0255	324	50.	-.2	3025.5	*	2	1650	491	50.	-.2	3025.5
1	1305	158	60.	22.7	3029.6	*	2	0300	325	50.	-.2	3025.5	*	2	1655	492	50.	-.2	3025.5
1	1310	159	59.	22.3	3029.5	*	2	0305	326	50.	-.2	3025.5	*	2	1700	493	50.	-.2	3025.5
1	1315	160	59.	21.9	3029.4	*	2	0310	327	50.	-.2	3025.5	*	2	1705	494	50.	-.2	3025.5
1	1320	161	59.	21.5	3029.4	*	2	0315	328	50.	-.2	3025.5	*	2	1710	495	50.	-.2	3025.5
1	1325	162	59.	21.1	3029.3	*	2	0320	329	50.	-.2	3025.5	*	2	1715	496	50.	-.2	3025.5
1	1330	163	59.	20.7	3029.2	*	2	0325	330	50.	-.2	3025.5	*	2	1720	497	50.	-.2	3025.5
1	1335	164	59.	20.3	3029.2	*	2	0330	331	50.	-.2	3025.5	*	2	1725	498	50.	-.2	3025.5
1	1340	165	58.	19.9	3029.1	*	2	0335	332	50.	-.2	3025.5	*	2	1730	499	50.	-.2	3025.5
1	1345	166	58.	19.5	3029.0	*	2	0340	333	50.	-.2	3025.5	*	2	1735	500	50.	-.2	3025.5
1	1350	167	58.	19.1	3029.0	*	2	0345	334	50.	-.2	3025.5	*	2					

****

+	PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW 6-HR (CFS)	24-HR	72-HR	41.58-HR

+	71.	5.58		69.	57.	54.	54.
			(INCHES)	.727	2.428	3.971	3.971
			(AC-FT)	34.	114.	186.	186.

	PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
			6-HR	24-HR	72-HR	41.58-HR	
+	(AC-FT)	(HR)					
	61.	5.58	51.	20.	11.	11.	

	PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE		
			6-HR	24-HR	72-HR	41.58-HR
+	(FEET)	(HR)				
	3035.33	5.58	3033.93	3028.81	3027.41	3027.41

CUMULATIVE AREA = .88 SQ MI

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

					RATIOS APPLIED TO PRECIPITATION	
OPERATION	STATION	AREA	PLAN		RATIO 1	RATIO 2
					1.00	.98
HYDROGRAPH AT						
+	OFF1	.41	1	FLOW	425.	413.
				TIME	3.75	3.75
HYDROGRAPH AT						
+	OFF7	.03	1	FLOW	55.	54.
				TIME	3.50	3.50
2 COMBINED AT						
+	CP2	.44	1	FLOW	454.	441.
				TIME	3.75	3.75
HYDROGRAPH AT						
+	OFF2	.04	1	FLOW	47.	46.
				TIME	3.58	3.58
HYDROGRAPH AT						
+	OFF3	.03	1	FLOW	41.	39.
				TIME	3.50	3.50
3 COMBINED AT						
+	CP1	.50	1	FLOW	507.	493.
				TIME	3.75	3.75
HYDROGRAPH AT						
+	OFF4	.06	1	FLOW	90.	88.
				TIME	3.58	3.58
HYDROGRAPH AT						
+	OFF5	.26	1	FLOW	252.	245.
				TIME	3.83	3.83
HYDROGRAPH AT						
+	OFF6	.04	1	FLOW	62.	61.
				TIME	3.58	3.58
HYDROGRAPH AT						
+	ON1	.03	1	FLOW	49.	48.
				TIME	3.50	3.50
5 COMBINED AT						
+	DB1	.88	1	FLOW	861.	837.
				TIME	3.75	3.75
ROUTED TO						
+	RDB1	.88	1	FLOW	72.	71.
				TIME	5.58	5.58

** PEAK STAGES IN FEET **

1	STAGE	3035.62	3035.33
	TIME	5.58	5.58

*** NORMAL END OF HEC-1 ***

Drainage Exhibits

OVERALL SKYE CANYON BOUNDARY

OFF6

OFF5

OFF4

OFF3

OFF2

OFF1

RDB1

DB1

CP1

ON1

CNGT 0118
6' X 5' RCAP

CNGT 0234
6' X 4' RCAP

GRAND TETON DRIVE

CNGT 0222
6' X 6' RCAP

CNGT 0247
6' X 5' RCAP

POLE LINE ROAD

EXISTING PROVIDENCE

LVMD 3315
3,200 AC-FT KYLE CANYON
DETENTION BASIN

LVMD 3314
78" RCP OUTLET

100-Year Basin Flow Rate Summary (Proposed Condition)		
Basin ID	Area (ac)	Q_{100} (cfs)
OFF1	274.6	399
OFF2	26.8	49
OFF3	16.6	41
OFF4	37.2	90
OFF5	164.4	252
OFF6	25.5	62
ON1	16.7	49

Concentration Points Summary (Proposed Condition)		
Basin/Concentration Point ID	Area (sq-mi)	Q_{100} (cfs)
CP1 (OFF1 + OFF2 + OFF3)	0.50	428
DB1 (CP1 + OFF4 + OFF5 + OFF6 + ON1)	0.88	763
RDB1 (Detention Basin Outflow)	0.88	71

REFERENCED FLOW

LEGEND
- BASIN BOUNDARY
- OFF1 BASIN ID
- FLOW DIRECTION
- ID CONCENTRATION POINT
- EXISTING FACILITY
- OVERALL SKYE CANYON BOUNDARY
- CROSS SECTION

N

0 400 800

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

SLATER HANIFAN GROUP
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5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
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NINETY-FIVE MANAGEMENT, LLC.

SKYE CANYON - DETENTION BASIN 1

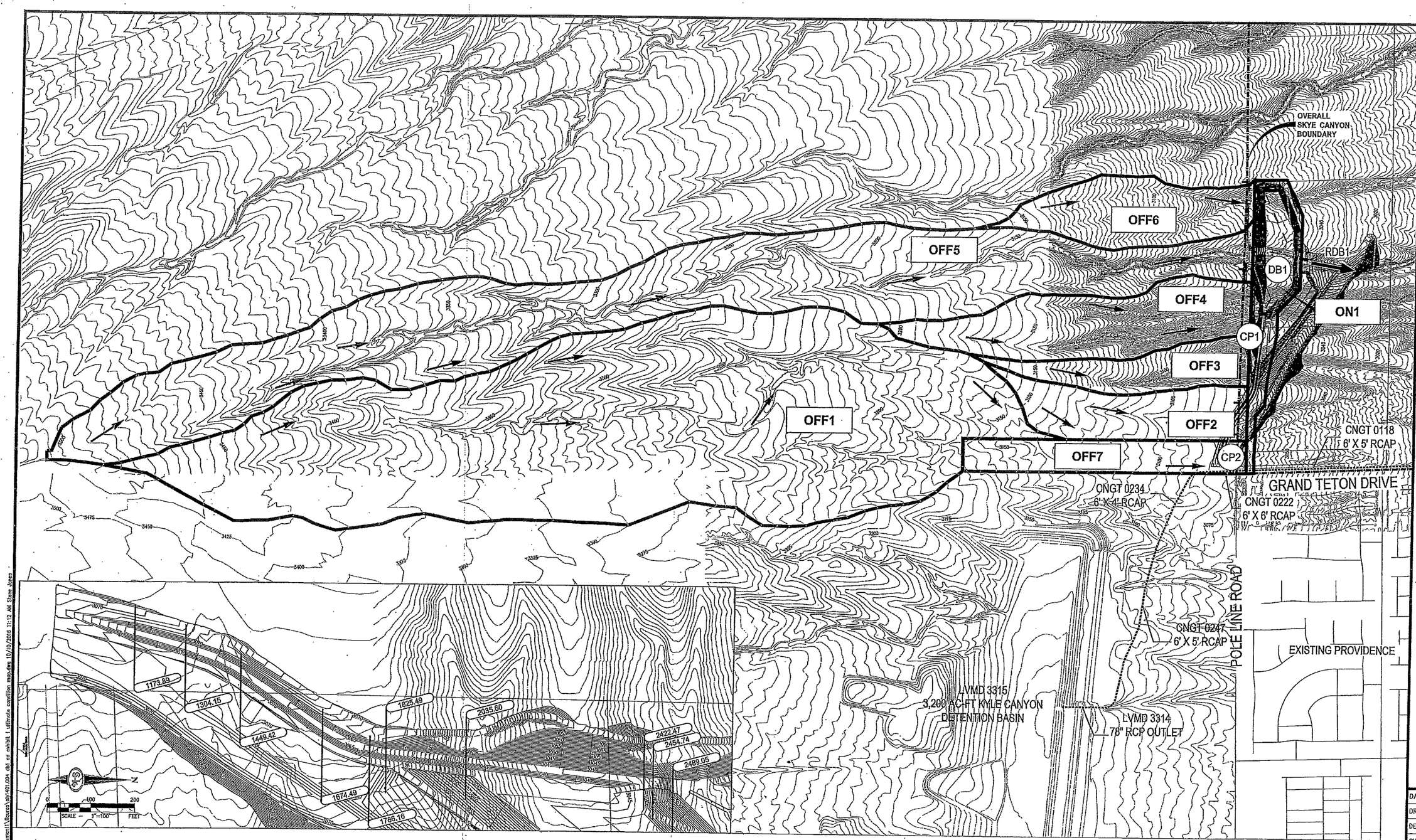
PROPOSED CONDITION DRAINAGE MAP

DATE: JUNE 2016
DRAFTER: JSR
DESIGNER: JSR
CHECKED: SMJ

PROJECT NO.
OLY1401.004

EXHIBIT E
SHEET 1 OF 1

J:\1401-004 ds\1 archive\update studs\chasp_maintain\supplement\1\Xturrs\1xlyt-101-004 ds1 sa exhibit e proposed condition map.dwg 10/10/2016 10:57 AM Steve Jones



Summary of Collector Channel Hydraulic Characteristics

Station	Flow Rate (cfs)	Flow Depth (ft)	Flow Velocity (fps)	Froude Number	Hydraulic Freeboard (ft)[1]	Sedimentation Freeboard (ft)	Required Channel Depth (ft)	Proposed Channel Depth (ft)
2489.05	493	0.71	27.84	5.83	1.62	1.0	3.3	4.5
2454.74	493	1.49	13.28	1.92	1.38	1.0	3.9	4.0
2422.47	493	2.17	12.24	1.70	1.40	1.0	4.6	5.0
2035.60	493	1.13	28.29	5.18	1.74	1.0	3.9	5.0
1825.49	493	1.54	19.27	3.09	1.56	1.0	4.1	5.0
1786.16	493	2.49	10.18	1.34	1.34	1.0	4.8	5.0
1674.49	493	2.49	10.18	1.34	1.34	1.0	4.8	5.0
1449.42	493	2.50	10.14	1.33	1.34	1.0	4.8	5.0
1304.15	493	2.64	9.91	1.29	1.34	1.0	4.9	5.0
1173.89	493	2.92	8.13	1.06	1.29	0.8	5.0	5.0

1 – Hydraulic Freeboard obtained from CCRFCD Manual Equations. If Froude Number <1, Equation 741; If Froude Number >1, Equation 747.

100-Year Basin Flow Rate Summary
(Ultimate Condition)

Basin ID	Area (ac)	Q_{100} (cfs)
OFF1	260.6	425
OFF2	22.7	47
OFF3	16.6	41
OFF4	37.2	90
OFF5	164.4	252
OFF6	25.5	62
OFF7	18.0	55
ON1	16.7	49

Concentration Points Summary
(Ultimate Condition)

Basin/Concentration Point ID	Area (sq-mi)	Q_{100} (cfs)
CP1 (OFF1 + OFF2 + OFF3 + OFF4)	0.50	493
CP2 (OFF1 + OFF7)	0.44	454
DB1	0.88	837
RDB1 (Detention Basin Outflow)	0.88	71

LEGEND
- BASIN BOUNDARY
- OFF1 BASIN ID
- FLOW DIRECTION
- ID CONCENTRATION POINT
- EXISTING FACILITY
- OVERALL SKYE CANYON BOUNDARY
- WSPG STATION

N

SCALE – 1"=400' FEET

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT, LLC.

SKYE CANYON - DETENTION BASIN 1

ULTIMATE CONDITION DRAINAGE MAP

DATE: JUNE 2016
DRAFTER: JSR
DESIGNER: JSR
CHECKED: SMJ

PROJECT NO.
OLY1401.004

EXHIBIT F
SHEET 1 OF 1

I:\OLY1401-004 dh\Civil\drainage\Update study\Skye mountain\supplement\Drawing\OLY1401.004 dsh rpt exhibit f ultimate condition mdp.dwg 10/10/2016 11:12 AM Steve Jones

TECHNICAL DRAINAGE STUDY
UPDATE #1
(Sheep Mountain Parkway Design Considerations)

Skye Canyon
Detention Basin 1
City of Las Vegas, Nevada

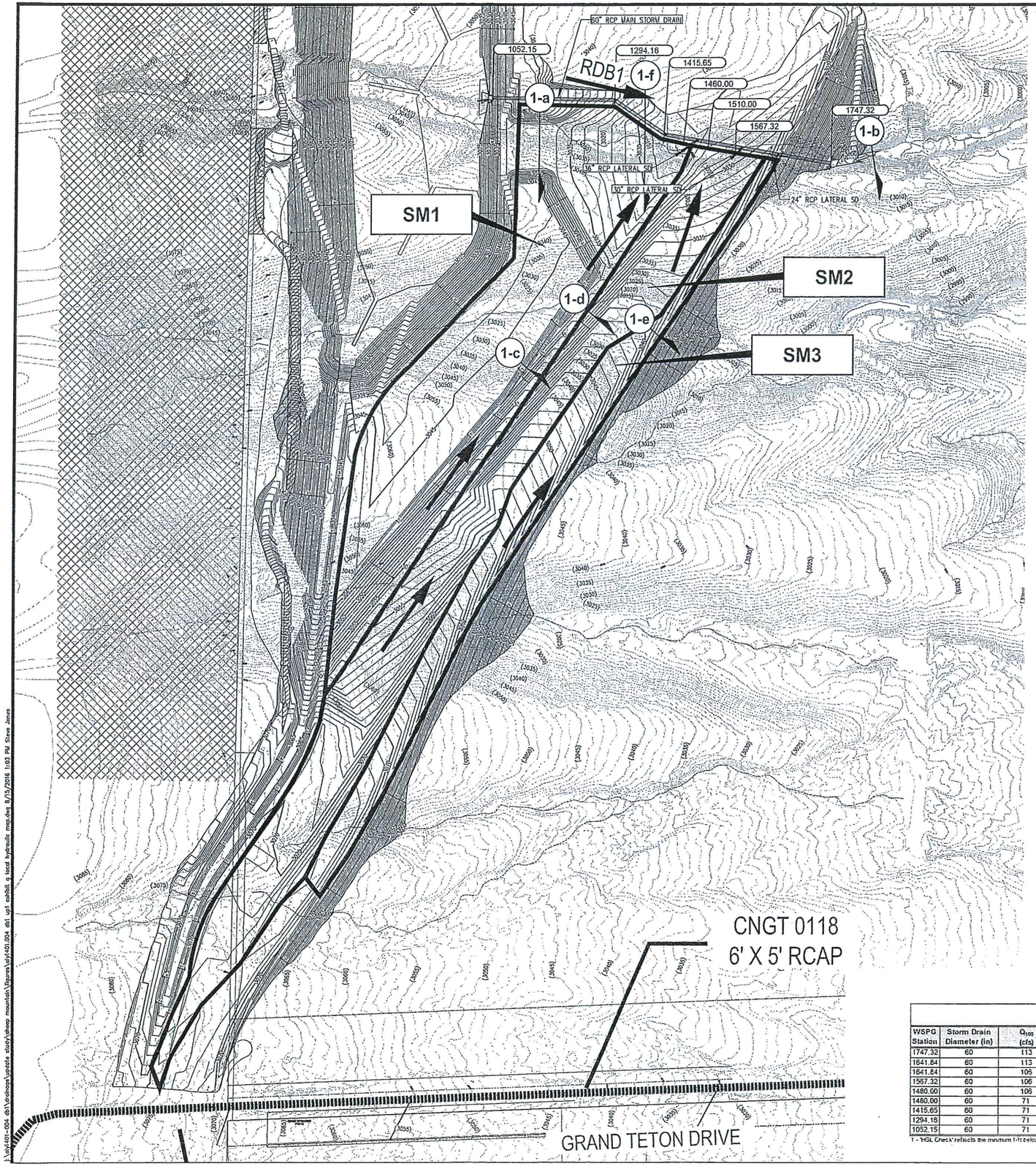
Job No.: OLY1401.004
Date: August 2016

Prepared By:
Slater Hanifan Group, Inc.
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, NV 89141
Phone: 702-220-6565 ▪ Fax: 702-220-6566



Steve Jones, P.E.
NV Professional Engineer No. 19638



DESIGN FLOWS FOR EXISTING DROP INLETS IN SHEEP MT PKWY CONSTRUCTED W/ DB1 PROJECT

100-Year Basin Flow Rate Summary
(Proposed Conditions)

Basin ID	Area (ac)	Q_{100} (cfs)
SM1	5.8	20
SM2	4.9	15
SM3	2.1	7

Cross Section Summary
(Proposed Condition)

Cross Section ID	Contributing Source	Q_{100} (cfs)	Slope (%)	Depth (ft)	Velocity (ft/s)
1-a	RDB1 (PMF Flow)	6025	1.0	3.15	19.86
1-b	RDB1 (PRO1 Flow)	113	4.0	1.49	9.15
1-c	Basin SM1	20	1.6	1.03	4.73
1-d	Basin SM2	15	3.0	0.82	5.57
1-e	Basin SM3	7	3.3	0.58	4.62
1-f	RDB1 (PMF Flow)	6025	3.2	1.90	11.50

WSPG Summary
Outlet Storm Drain

WSPG Station	Storm Drain Diameter (in)	Q_{100} (cfs)	Invert Elevation (ft)	WSE (ft)	Velocity (ft/s)	FG Elevation	Description	HGL Check[1]
1747.32	60	113	2995.40	2997.0	21.73	3001.4	End Model	OK
1641.84	60	113	3000.79	3002.5	19.24	3028.2	SDMH#5	OK
1641.84	60	105	3000.79	3002.3	20.79	3028.2	SM3 24" RCP Lateral	OK
1567.32	60	106	3004.60	3006.3	18.59	3028.8	SDMH#4	OK
1480.00	60	106	3009.06	3011.7	10.13	3027.4	SDMH#3	OK
1480.00	60	71	3009.06	3010.4	16.26	3027.4	SM1 & SM2 36" RCP Lateral	OK
1415.65	60	71	3012.35	3014.7	8.04	3028.0	SDMH#2	OK
1294.16	60	71	3012.83	3015.1	8.08	3035.5	SDMH#1	OK
1052.15	60	71	3013.80	3016.2	7.71	3025.5	Detention Basin Outlet Structure	OK

1 - "HGL Check" reflects the minimum 1-ft below finished grade

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PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT, LLC.

SKYE CANYON - DETENTION BASIN 1

SHEEP MOUNTAIN HYDRAULIC SUMMARY MAP

DATE: AUGUST 2016
DRAFTER: JSR
DESIGNER: JSR
CHECKED: SMJ
PROJECT NO. OLY1401.004

EXHIBIT G
SHEET 1 OF 1

J:\oly1401-004 db1\drafting\update study\sheep mountain\figures\oly1401.004 db1 up1 exhibit g local hydraulic map.dwg 8/15/2016 1:03 PM Steve Jones

APPENDIX G

Reference Material

Technical Drainage Study for Skye Canyon Detention Basin 2, by Slater Hanifan Group

Approval Letter

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: January 11, 2018
TO: **Land Development Services** Department of Building & Safety				FROM: Oh-Sang Kwon, P.E. Flood Control Project Manager Department of Public Works
SUBJECT:	Drainage Study for: **Skye Canyon – Detention Basin # 2**			**COPIES TO:** Slater Hanifan Group
Cross Streets:	SEC of Iron Mountain Road & Puli Road			Section 12 LLC/Ninety-Five Manag.
File Number:	F:\Depot\DSMemos\DS4813C.doc			Bart Anderson, P.E., DevCo
Parcel Number:	126-12-000-001			CCRFCD
Zoning Action:	Development Agreement			CCPW
FEMA Flood Zone	YES	NO **X**		NV Energy
Proposed Storm Drain	YES **X**	NO		Eddy Quaglieri, P.E., State of Nevada, Division of Water Resources - Dam Safety

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1st Submittal	7/7/2016	10/24/2016	Not Approved	$400.00	370355: $400
2nd Submittal	6/22/2017	10/09/2017	Not Approved	$400.00	488303: $400
3rd Submittal & Supplemental	12/6/2017 & 12/20/2017	1/11/2018	Conditionally Approved	$400.00	491970: $400
			TOTAL FEES (LDDRS):	**$1,200.00**	**----**

REMARKS: A Flood Control Master Plan Amendment (MPA) is required for the Skye Canyon Master Plan Development prior to submitting residential development plans outside of the shadow of protection from Detention Basin #1 and outside of the limits of the Phase 2 pods.
The Drainage Study for the subject project has been reviewed and:

	is approved subject to conformance to all City standards and the following conditions:
	must be resubmitted or supplemented including the following:
X	is conditionally approved subject to Clark County Regional Flood Control District concurrence.
X	is conditionally approved subject to Clark County Public Works Department concurrence. Provide updated concurrence.
X	is conditionally approved subject to State of Nevada, Division of Water Resources, Dam Safety concurrence.

1. The detention basin outfall has been extended within the Iron Mountain alignment to east of the future Sheep Mountain Parkway. The interim Sheep Mountain Parkway Grading Plans by SHG dated 11/20/2017 shows grading encroachment that eliminates the access to the storm drain outfall. Provide a new maintenance access road for the outlet structure and include the dedication with the storm drain facilities.

2. The Phasing of the overall Master Plan connectivity to the Moccasin MPU facility alignment is shown to be constructed with Phase 3B/3C per the provided Phasing Exhibit. The connectivity of the outfall from Skye Canyon DB # 2 to a downstream Regional facility has been conceptually shown for the Ultimate Condition based upon the Overall Skye Canyon Master Plan. The interim DB #2 outfall is no longer intended to discharge flow east of US 95 toward the Iron Mountain alignment. The City understands the concept of the proposed interim solution is to collect the flow west of US95 and discharge into the existing MPU Facilities constructed with the Horse Interchange (CLV Plan # 107V3759). This connection to the existing MPU facility meets the intent of providing interim Master

Plan connectivity for the Detention Basin #2 outfall until the Overall Skye Canyon MPU facilities are constructed.

3. The concept of the detention basin outfall being located outside of the Iron Mountain Road Right-of-Way is acceptable provided the roadway shift is approved by the City and the appropriate half-street improvements are provided by the Developer per the Approved Street Plan. Coordinate roadway approvals with the Transportation Engineering.

4. The proposed sedimentation basin, pipe & channel system is shown within a Public Drainage Easement. As an interim facility, this shall be privately maintained by the Master Developer and needs to be reflected as such on the plans and easements.

5. The ability to access Detention Basin # 2 from the Iron Mountain and Shaumber alignments is of critical concern to the City. This Addendum #2 specifies that the access will be provided with the interim Sheep Mountain Parkway improvements. This access is shown on the interim Sheep Mountain Parkway Grading Plans by SHG dated 11/20/2017.

6. Flood Control understands that the developer may request an early grading permit, similar to DB # 1. Coordinate the early grading permit process with the Building Department and verify the Bonding requirements and the required Special Inspection requirements. Flood Control requires that a hold be placed on **any** early grading permit approval for Detention Basin # 2 until the State of Nevada, Division of Water Resources, Dam Safety approval has been provided to Flood Control.

7. The proposed *Skye Canyon Detention Basin # 2* must be approved by the *State of Nevada, Division of Water Resources Dam Safety (DWR)* prior to the issuance of **any** construction permits, including any request for early grading.

8. The subject ***Skye Canyon Detention Basin #2*** is a facility proposed in the new MPA that covers the Skye Canyon Development. These changes to the identified Master Plan facilities require the submittal and approval of an MPA based upon CCRFCD requirements before final completion of the basin.

9. No further Building Permits will be issued for the downstream residential developments within ***Skye Canyon*** beyond ***Phase 2***. The permits will be released upon substantial completion of these drainage facilities.

10. The ***Skye Canyon Master Drainage Study*** must be fully approved prior to the final approval of the subject drainage study.

11. *NV Energy*'s concurrence or approval of any proposed drainage facilities (such as *DB # 2 grading, access and the storm drain outfall*) within their existing easements shall be obtained prior to the final approval of the subject drainage study. The proposed NVE access goes through the bottom of the detention basin and may not provide adequate access post storm events as the basin will be wet and not accessible by NVE equipment. Provide letter of concurrence prior to the final approval of the subject drainage study.

12. The site is proposed as a *Clark County Regional Flood Control District (CCRFCD)* master planned facility and is also adjacent to or crosses an existing or proposed *Clark County Regional Flood Control District (CCRFCD)* master planned facility. Therefore, *CCRFCD* concurrence is required prior to final approval of the drainage study.

13. The proposed detention basin is adjacent to the jurisdiction of *Clark County* to the west. *Clark County Public Works Department* concurrence must be obtained prior to the final approval of the drainage study.

14. This proposed Detention Basin identifies a 10-foot buffer adjacent to the Red Rock Canyon National Conservation Area (RRCA), a critical area of no disturbance. No grading impacts are allowed to the RRCA and an appropriate buffer with block and cable fencing has been provided.

15. The intent of the Master Developer is to construct the Detention Basin #2 with the associated collection facilities as CCRFCD Master Plan facilities and to then dedicate them to the City of Las Vegas in the future. Detention Basin # 2 shall be dedicated to the City as *Flood Control Right-of-Way*. The total area of the dedication shall be of sufficient size to meet the public operational needs and address expansion of the facility. The dedication needs to include the entire impact area of the dam construction as well as incorporate access and maintenance activities. The maintenance activities include staging for equipment and a temporary storage area for sediment removal. A 1.0 acre staging area has been provided.

16. The current design has identified the limits of the Proposed Drainage Easement and Future Detention Basin Dedication as Flood Control Right-of-Way. The provided plans show a 25-foot buffer past the Toe of Embankment and Top of Cut projections to provide for the proper long term Maintenance and Safety of the Detention Basin. Provide an exhibit of the proposed drainage easement with the easement documents that incorporates this 25-foot buffer upon approval of the Technical Drainage Study.

17. The City understands that the limits of the Detention Basin Easement/Dedication may be reduced by a future Vacation request based upon future development grading impacts. The actual limits of any future vacation request shall be set based upon the City's approval of a Technical Drainage Study that addresses the impacts to the Detention Basin.

18. The westerly 76-feet and the northerly 102-feet of the site is encumbered with existing Nevada Power Grants and fiber optic Grants (N-57071, N-78122, and N-75351). This project proposes a 10-foot buffer from the Red Rock Canyon National Conservation Area boundary and provides for a new access road within the existing Power and fiber optic Grants. Provide *NV Energy* approval of the new access road prior to final approval of the drainage study.

19. Sheet SD-4 & SB-1: The provided energy dissipation and erosion protection at the 48" outfall requires the rip-rap be extended 16-feet downstream of the outlets. Revise the plans accordingly.

20. Deep manholes are shown as 60-inch and are required to be 72-inch diameter.

21. Access roads shown for City use shall be dedicated access easements. Review and verify access locations for Flood review prior to submittal of easements. The easements shall be dedicated prior to acceptance of the facilities by the City.

22. The westerly access is being provided to service the existing Grants and is not the Flood Control access road. This area is however proposed to be included within the future dedication of the regional basin and therefore the responsibility for this maintenance by *NV Energy* shall be provided prior to final approval of the drainage study.

23. The Detention Basin # 2 design includes 4:1 slopes and the soil cement lining of the proposed 3:1 slopes.

24. Provide complete *Plans and Project Specifications* for approval by the *City of Las Vegas*. Provide a copy of the Geotechnical Report for the detention basin. The Structural Plans and Details shall be a part of the Civil Improvement Plan set. This project is considered as a *Capital Improvement Project* (CIP) with developer funding.

25. Structural plans for the proposed storm drain improvements and pertinent flood control facilities must be submitted for review. Provide a soils report, structural calculations and specifications, two wet stamped structural sets, and a grading plan to the *Building Department* for processing. The engineer

must provide a copy of *Building Department* approval of the structures to CCRFCD before they will issue concurrence.

26. All proposed improvements associated with *Detention Basin 2* shall be bonded and inspected. This project, as a MPU facility, shall require that the inspection personnel by approved by the City. The project shall also require Special Inspection. Coordinate the requirements of and the Agreements needed for Special Inspection with the Building Department.

27. The project proposes to build a temporary drainage facility. Prior to final plan approval the developer must complete a maintenance and liability agreement for the interim drainage improvements and post a minimum maintenance bond of $100,000 or 50-percent of the construction cost for the improvements, whichever is greater. The engineer must submit an estimate of the quantities for constructing the facility and an 8.5-inch by 11-inch exhibit that adequately shows the location and limit of the drainage facility to Flood Control for approval. Once the drainage study is conditionally approved, the engineer should contact the *City's Land Development Section* (229-6371) to begin the agreement process.

28. Once this drainage study is approved, provide a legal description and exhibit for the easement dedication of the detention basin and collection facilities. This easement shall be recorded and would be subsequently replaced with the dedication of the facilities as Flood Control Right-of-Way. Coordinate the easement submittal with Flood Control. The easement shall record prior to issuance of the permits for the construction of the detention basin.

29. Prior to the adoption of the detention basin as a regional facility by the *City of Las Vegas City Council* and the final inspection and acceptance by the *City of Las Vegas Public Works Department*, the proposed *Detention Basin 2* shall remain a private facility owned and maintained by the master developer.

30. Provide the legal description with an exhibit of the proposed detention basin to *City Right-of-Way Section* for the dedication as Flood Control Right-of-Way to the *City of Las Vegas* after final acceptance of the basin by the *City Public Works Department.*

31. The proposed improvements show drainage facilities of a size that must be reviewed for access and maintenance concerns in the future after the *City* takes over the detention basin. The engineer must submit an extra set of improvement plans to the *City Streets & Sanitation Department* for their review and comments. *Streets & Sanitation Department's* approval must be secured prior to the subject drainage study approval.

32. The detention basin will require the submittal and approval of an *Emergency Action Plan* (EAP) for this regional facility. The EAP format shall meet the City of Las Vegas submittal requirements for inclusion with our overall EAP. Contact Flood Control for sample format requirements. The EAP must be approved by the *City of Las Vegas* and then submitted and approved by the *State of Nevada, Division of Water Resources - Dam Safety* prior to the release of any improvement bonds for the related detention basin improvements. The bonded improvements shall include a line item for the EAP in the amount of $50,000.

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
PBJ

T/R/S: T19S/R59E/12
AREA F-12

Referenced Basins (HEC-1)

TECHNICAL DRAINAGE STUDY
ADDENDUM NO. 1

Skye Canyon
Detention Basin 2

City of Las Vegas, Nevada

Job No.: OLY1505.000
Date: June 2017

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

Prepared For:
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11411 Southern Highlands Parkway, Suite 300
Las Vegas, NV 89141
Phone: 702-220-6565 • Fax: 702-220-6566



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

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1*****************************************
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 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *               JUN  1998               *
 *            VERSION 4.1                *
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 *  RUN DATE   18JUN17  TIME  15:05:36   *
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*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*         609 SECOND STREET         *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM


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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

          *DIAGRAM
    1     ID     SLATER HANIFAN GROUP
    2     ID     NINETY-FIVE MANAGEMENT, LLC.
    3     ID     SKYE CANYON - DETENTION BASIN 2
    4     ID     TECHNICAL DRAINAGE STUDY
    5     ID     PROPOSED DRAINAGE CONDITION
    6     ID
    7     ID     RETURN PERIOD -------- 100-YEAR
    8     ID     DISTRIBUTION --------- 6-HOUR SDN3
    9     ID     PROJECT NO. ---------- OLY1505.000
   10     ID     FILENAME ------------- PRO2.H1
   11     ID     DATE ----------------- 5/23/2016
   12     ID     MODELED BY ----------- EM/SJ/CB
   13     ID
   14     ID        SIX HOUR DEPTH-AREA REDUCTION FACTORS
   15     ID        DRAINAGE AREA (MI^2)    RATIO
   16     ID        0.0-0.49                1.00
   17     ID        0.5-0.99                0.98
   18     ID        1.0-1.99                0.97
   19     ID
   20     IT       5       0       0     300
   21     IO       5       0       0
   22     IN       5       0       0
   23     JR    PREC    1.00    0.98    0.97
          *

   24     KK    OFF7
   25     KM   EXISTING OFFSITE DRAINAGE BASIN
   26     KM   DISCHARGES INTO DETENTION BASIN "DB2"
   27     PB    3.00
   28     PC       0   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
   29     PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
   30     PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
   31     PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
   32     PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
   33     PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
   34     PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
   35     PC   0.998   0.999       1
   36     BA   .0058
   37     LS       0    88.0
   38     UD   0.100
          *

   39     KK    OFF8
   40     KM   EXISTING OFFSITE DRAINAGE BASIN
   41     KM   DISCHARGES INTO DETENTION BASIN "DB2"
   42     KO       3
   43     BA   .2122
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                44          LS       0    88.0
                45          UD   0.299
                            *
1                                                                                                                    PAGE   2
                                                                HEC-1 INPUT

           LINE             ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


                46          KK     CP2
                47          KM   COMBINE OFF7, AND OFF8
                48          HC       2
                            *

                49          KK    OFF9
                50          KM   EXISTING OFFSITE DRAINAGE BASIN
                51          KM   DISCHARGES INTO DETENTION BASIN "DB2"
                52          KO       3
                53          BA   .1137
                54          LS       0    88.0
                55          UD   0.200
                            *

                56          KK    CP2a
                57          KM   COMBINE CP2, AND OFF9
                58          HC       2
                            *

                59          KK   OFF10
                60          KM   EXISTING OFFSITE DRAINAGE BASIN
                61          KM   DISCHARGES INTO DETENTION BASIN "DB2"
                62          KO       3
                63          BA   .6502
                64          LS       0    88.0
                65          UD   0.613
                            *

                66          KK     ON2
                67          KM   PROPOSED ONSITE DRAINAGE BASIN
                68          BA   .0315
                69          LS       0    94.0
                70          UD   0.083
                            *

                71          KK     DB2
                72          KM   COMBINE CP2a, OFF10 AND ON2
                73          KO       1
                74          HC       3
                            *

                75          KK    RDB2
                76          KM   OUTLET = 25" ORIFICE @ INVERT ELEVATION = 2984.21-FT
                77          KO       1
                78          RS       1    ELEV  2992.0
                79          SV    0.00    2.34    7.60   24.30   46.28   73.78  107.11  146.75  193.03
                80          SE  2992.0  2993.0  2995.0  3000.0  3005.0  3010.0  3015.0  3020.0  3025.0
                81          SQ    0.00   44.44   51.05   64.70   83.84   99.36   520.9  3465.5  7888.4
                82          SE  2992.0  2993.0  2995.0  3000.0  3009.0  3018.0  3019.0  3022.0  3025.0
                            *
                83          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK

 INPUT
  LINE      (V) ROUTING           (---->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR         (<----) RETURN OF DIVERTED OR PUMPED FLOW

    24       OFF7
                .
                .
    39          .         OFF8
                .            .
                .            .
    46        CP2............
                .
                .
    49          .         OFF9
                .            .
                .            .
    56       CP2a............
                .
                .
    59          .       OFF10
                .            .
                .            .
    66          .            .         ON2
                .            .           .
```

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                .          .          .
   71        DB2.........................
               V
               V
   75        RDB2

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*               JUN   1998              *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   18JUN17  TIME  15:05:36   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*            (916) 756-1104             *
*                                       *
*****************************************
```

SLATER HANIFAN GROUP
NINETY-FIVE MANAGEMENT, LLC.
SKYE CANYON - DETENTION BASIN 2
TECHNICAL DRAINAGE STUDY
PROPOSED DRAINAGE CONDITION

RETURN PERIOD -------- 100-YEAR
DISTRIBUTION --------- 6-HOUR SDN3
PROJECT NO. ---------- OLY1505.000
FILENAME ------------- PRO2.H1
DATE ----------------- 5/23/2016
MODELED BY ----------- EM/SJ/CB

SIX HOUR DEPTH-AREA REDUCTION FACTORS

DRAINAGE AREA (MI^2)	RATIO
0.0-0.49	1.00
0.5-0.99	0.98
1.0-1.99	0.97

```
 21 IO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                      NMIN          5  MINUTES IN COMPUTATION INTERVAL
                     IDATE      1   0  STARTING DATE
                     ITIME         0000  STARTING TIME
                        NQ         300  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      2   0  ENDING DATE
                    NDTIME         0055  ENDING TIME
                     ICENT           19  CENTURY MARK

                  COMPUTATION INTERVAL      .08 HOURS
                      TOTAL TIME BASE    24.92 HOURS

        ENGLISH UNITS
             DRAINAGE AREA          SQUARE MILES
             PRECIPITATION DEPTH    INCHES
             LENGTH, ELEVATION      FEET
             FLOW                   CUBIC FEET PER SECOND
             STORAGE VOLUME         ACRE-FEET
             SURFACE AREA           ACRES
             TEMPERATURE            DEGREES FAHRENHEIT

    JP          MULTI-PLAN OPTION
                      NPLAN          1  NUMBER OF PLANS

    JR          MULTI-RATIO OPTION
                    RATIOS OF PRECIPITATION
                  1.00       .98       .97

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
 39 KK    *      OFF8  *
          *            *
          **************

 42 KO          OUTPUT CONTROL VARIABLES
```

```
                IPRNT          3  PRINT CONTROL
                IPLOT          0  PLOT CONTROL
                QSCAL          0.  HYDROGRAPH PLOT SCALE

          SUBBASIN RUNOFF DATA

 43 BA      SUBBASIN CHARACTERISTICS
                TAREA        .21  SUBBASIN AREA

          PRECIPITATION DATA

 27 PB          STORM       3.00  BASIN TOTAL PRECIPITATION

 28 PI        INCREMENTAL PRECIPITATION PATTERN
              .02   .04   .01   .02   .02   .02   .01   .00   .00   .00
              .00   .00   .00   .01   .00   .01   .01   .01   .01   .01
              .01   .00   .00   .00   .00   .01   .02   .01   .01   .00
              .01   .01   .01   .00   .00   .01   .03   .03   .06   .09
              .09   .12   .03   .04   .03   .01   .02   .02   .00   .00
              .01   .01   .01   .02   .02   .01   .01   .02   .01   .01
              .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
              .00   .00

 44 LS      SCS LOSS RATE
                STRTL      .27  INITIAL ABSTRACTION
               CRVNBR    88.00  CURVE NUMBER
                RTIMP      .00  PERCENT IMPERVIOUS AREA

 45 UD      SCS DIMENSIONLESS UNITGRAPH
                TLAG      .30  LAG

                                                  ***

                                          UNIT HYDROGRAPH
                                    20 END-OF-PERIOD ORDINATES
              42.   137.   259.   301.   276.   215.   136.    91.    62.    42.
              28.    19.    13.     8.     6.     4.     3.     2.     1.     0.

    TOTAL RAINFALL =   3.00, TOTAL LOSS =   1.18, TOTAL EXCESS =   1.82

  PEAK FLOW     TIME                    MAXIMUM AVERAGE FLOW
                              6-HR        24-HR        72-HR      24.92-HR
+   (CFS)       (HR)
                 (CFS)
+    244.       3.75          41.          10.          10.          10.
                (INCHES)     1.816        1.818        1.818        1.818
                (AC-FT)        21.          21.          21.          21.

                CUMULATIVE AREA =     .21 SQ MI

     ***           ***          ***          ***          ***

                HYDROGRAPH AT STATION     OFF8
                  FOR PLAN 1, RATIO = 1.00

    TOTAL RAINFALL =   3.00, TOTAL LOSS =   1.18, TOTAL EXCESS =   1.82

  PEAK FLOW     TIME                    MAXIMUM AVERAGE FLOW
                              6-HR        24-HR        72-HR      24.92-HR
+   (CFS)       (HR)
                 (CFS)
+    244.       3.75          41.          10.          10.          10.
                (INCHES)     1.816        1.818        1.818        1.818
                (AC-FT)        21.          21.          21.          21.

                CUMULATIVE AREA =     .21 SQ MI

     ***           ***          ***          ***          ***

                HYDROGRAPH AT STATION     OFF8
                  FOR PLAN 1, RATIO =  .98

    TOTAL RAINFALL =   2.94, TOTAL LOSS =   1.18, TOTAL EXCESS =   1.76

  PEAK FLOW     TIME                    MAXIMUM AVERAGE FLOW
                              6-HR        24-HR        72-HR      24.92-HR
+   (CFS)       (HR)
                 (CFS)
+    237.       3.75          40.          10.          10.          10.
                (INCHES)     1.763        1.765        1.765        1.765
                (AC-FT)        20.          20.          20.          20.

                CUMULATIVE AREA =     .21 SQ MI
```

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      ***            ***            ***            ***            ***

                        HYDROGRAPH AT STATION      OFF8
                          FOR PLAN 1, RATIO =  .97

     TOTAL RAINFALL =    2.91, TOTAL LOSS =    1.17, TOTAL EXCESS =    1.74

  PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                        6-HR         24-HR         72-HR       24.92-HR
+   (CFS)       (HR)
                                (CFS)
+     234.      3.75                   40.           10.           10.           10.
                                (INCHES)          1.737         1.738         1.738         1.738
                                (AC-FT)            20.           20.           20.           20.

                        CUMULATIVE AREA =     .21 SQ MI


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
   49 KK  *     OFF9   *
          *            *
          **************

   52 KO          OUTPUT CONTROL VARIABLES
                       IPRNT          3  PRINT CONTROL
                       IPLOT          0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE

              SUBBASIN RUNOFF DATA

   53 BA          SUBBASIN CHARACTERISTICS
                       TAREA        .11  SUBBASIN AREA

                  PRECIPITATION DATA

   27 PB                STORM       3.00  BASIN TOTAL PRECIPITATION

   28 PI            INCREMENTAL PRECIPITATION PATTERN
                      .02       .04       .01       .02       .02       .02       .01       .00       .00       .00
                      .00       .00       .00       .01       .00       .01       .01       .01       .01       .01
                      .01       .00       .00       .00       .00       .01       .02       .01       .01       .00
                      .01       .01       .01       .00       .00       .01       .03       .03       .06       .09
                      .09       .12       .03       .04       .03       .01       .02       .02       .00       .00
                      .01       .01       .01       .02       .02       .01       .01       .02       .01       .01
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00

   54 LS          SCS LOSS RATE
                       STRTL        .27  INITIAL ABSTRACTION
                      CRVNBR      88.00  CURVE NUMBER
                       RTIMP        .00  PERCENT IMPERVIOUS AREA

   55 UD          SCS DIMENSIONLESS UNITGRAPH
                       TLAG        .20  LAG

                                                  ***

                                                UNIT HYDROGRAPH
                                            14 END-OF-PERIOD ORDINATES
                      55.       183.      227.      181.      101.       58.       33.       19.       11.        6.
                       3.         2.        1.        0.

     TOTAL RAINFALL =    3.00, TOTAL LOSS =    1.18, TOTAL EXCESS =    1.82

  PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                        6-HR         24-HR         72-HR       24.92-HR
+   (CFS)       (HR)
                                (CFS)
+     153.      3.58                   22.            6.            5.            5.
                                (INCHES)          1.817         1.818         1.818         1.818
                                (AC-FT)            11.           11.           11.           11.

                        CUMULATIVE AREA =     .11 SQ MI

      ***            ***            ***            ***            ***

                        HYDROGRAPH AT STATION      OFF9
                          FOR PLAN 1, RATIO = 1.00
```

TOTAL RAINFALL = 3.00, TOTAL LOSS = 1.18, TOTAL EXCESS = 1.82

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
		(CFS)			
+ 153.	3.58	22.	6.	5.	5.
		(INCHES) 1.817	1.818	1.818	1.818
		(AC-FT) 11.	11.	11.	11.

CUMULATIVE AREA = .11 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION OFF9
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 2.94, TOTAL LOSS = 1.18, TOTAL EXCESS = 1.76

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
		(CFS)			
+ 149.	3.58	22.	5.	5.	5.
		(INCHES) 1.764	1.765	1.765	1.765
		(AC-FT) 11.	11.	11.	11.

CUMULATIVE AREA = .11 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION OFF9
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 2.91, TOTAL LOSS = 1.17, TOTAL EXCESS = 1.74

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
		(CFS)			
+ 147.	3.58	21.	5.	5.	5.
		(INCHES) 1.738	1.738	1.738	1.738
		(AC-FT) 11.	11.	11.	11.

CUMULATIVE AREA = .11 SQ MI

*** *** *** *

STRTL .27 INITIAL ABSTRACTION
CRVNBR 88.00 CURVE NUMBER
RTIMP .00 PERCENT IMPERVIOUS AREA

65 UD SCS DIMENSIONLESS UNITGRAPH
TLAG .61 LAG

***

UNIT HYDROGRAPH
39 END-OF-PERIOD ORDINATES

24.	72.	138.	234.	345.	427.	473.	479.	462.	422.
374.	311.	242.	193.	156.	128.	106.	86.	69.	57.
46.	37.	30.	24.	20.	16.	13.	11.	9.	7.
6.	5.	4.	3.	3.	2.	1.	1.	0.	

TOTAL RAINFALL = 3.00, TOTAL LOSS = 1.18, TOTAL EXCESS = 1.82

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)	(CFS)			
+ 508.	4.08	127.	32.	31.	31.
		(INCHES) 1.810	1.818	1.818	1.818
		(AC-FT) 63.	63.	63.	63.

CUMULATIVE AREA = .65 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION OFF10
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 3.00, TOTAL LOSS = 1.18, TOTAL EXCESS = 1.82

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)	(CFS)			
+ 508.	4.08	127.	32.	31.	31.
		(INCHES) 1.810	1.818	1.818	1.818
		(AC-FT) 63.	63.	63.	63.

CUMULATIVE AREA = .65 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION OFF10
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 2.94, TOTAL LOSS = 1.18, TOTAL EXCESS = 1.76

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)	(CFS)			
+ 494.	4.08	123.	31.	30.	30.
		(INCHES) 1.757	1.765	1.765	1.765
		(AC-FT) 61.	61.	61.	61.

CUMULATIVE AREA = .65 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION OFF10
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 2.91, TOTAL LOSS = 1.17, TOTAL EXCESS = 1.74

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)	(CFS)			
+ 486.	4.08	121.	30.	29.	29.
		(INCHES) 1.731	1.738	1.738	1.738
		(AC-FT) 60.	60.	60.	60.

CUMULATIVE AREA = .65 SQ MI

*** *** *** *

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          **************
          *            *
71 KK     *      DB2   *
          *            *
          **************

73 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          1  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE

74 HC          HYDROGRAPH COMBINATION
                    ICOMP          3  NUMBER OF HYDROGRAPHS TO COMBINE

                                                  ***
```

HYDROGRAPH AT STATION DB2
SUM OF 3 HYDROGRAPHS
PLAN 1, RATIO = 1.00

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0615	76	43.	1		1230	151	0.	1		1845	226	0.
1		0005	2	0.	1		0620	77	36.	1		1235	152	0.	1		1850	227	0.
1		0010	3	0.	1		0625	78	30.	1		1240	153	0.	1		1855	228	0.
1		0015	4	1.	1		0630	79	25.	1		1245	154	0.	1		1900	229	0.
1		0020	5	2.	1		0635	80	20.	1		1250	155	0.	1		1905	230	0.
1		0025	6	4.	1		0640	81	17.	1		1255	156	0.	1		1910	231	0.
1		0030	7	6.	1		0645	82	13.	1		1300	157	0.	1		1915	232	0.
1		0035	8	7.	1		0650	83	11.	1		1305	158	0.	1		1920	233	0.
1		0040	9	7.	1		0655	84	9.	1		1310	159	0.	1		1925	234	0.
1		0045	10	7.	1		0700	85	7.	1		1315	160	0.	1		1930	235	0.
1		0050	11	7.	1		0705	86	6.	1		1320	161	0.	1		1935	236	0.
1		0055	12	7.	1		0710	87	4.	1		1325	162	0.	1		1940	237	0.
1		0100	13	6.	1		0715	88	4.	1		1330	163	0.	1		1945	238	0.
1		0105	14	6.	1		0720	89	3.	1		1335	164	0.	1		1950	239	0.
1		0110	15	8.	1		0725	90	2.	1		1340	165	0.	1		1955	240	0.
1		0115	16	8.	1		0730	91	2.	1		1345	166	0.	1		2000	241	0.
1		0120	17	10.	1		0735	92	1.	1		1350	167	0.	1		2005	242	0.
1		0125	18	13.	1		0740	93	1.	1		1355	168	0.	1		2010	243	0.
1		0130	19	18.	1		0745	94	1.	1		1400	169	0.	1		2015	244	0.
1		0135	20	23.	1		0750	95	1.	1		1405	170	0.	1		2020	245	0.
1		0140	21	29.	1		0755	96	0.	1		1410	171	0.	1		2025	246	0.
1		0145	22	34.	1		0800	97	0.	1		1415	172	0.	1		2030	247	0.
1		0150	23	36.	1		0805	98	0.	1		1420	173	0.	1		2035	248	0.
1		0155	24	36.	1		0810	99	0.	1		1425	174	0.	1		2040	249	0.
1		0200	25	35.	1		0815	100	0.	1		1430	175	0.	1		2045	250	0.
1		0205	26	34.	1		0820	101	0.	1		1435	176	0.	1		2050	251	0.
1		0210	27	36.	1		0825	102	0.	1		1440	177	0.	1		2055	252	0.
1		0215	28	42.	1		0830	103	0.	1		1445	178	0.	1		2100	253	0.
1		0220	29	49.	1		0835	104	0.	1		1450	179	0.	1		2105	254	0.
1		0225	30	56.	1		0840	105	0.	1		1455	180	0.	1		2110	255	0.
1		0230	31	58.	1		0845	106	0.	1		1500	181	0.	1		2115	256	0.
1		0235	32	59.	1		0850	107	0.	1		1505	182	0.	1		2120	257	0.
1		0240	33	64.	1		0855	108	0.	1		1510	183	0.	1		2125	258	0.
1		0245	34	69.	1		0900	109	0.	1		1515	184	0.	1		2130	259	0.
1		0250	35	71.	1		0905	110	0.	1		1520	185	0.	1		2135	260	0.
1		0255	36	71.	1		0910	111	0.	1		1525	186	0.	1		2140	261	0.
1		0300	37	73.	1		0915	112	0.	1		1530	187	0.	1		2145	262	0.
1		0305	38	85.	1		0920	113	0.	1		1535	188	0.	1		2150	263	0.
1		0310	39	107.	1		0925	114	0.	1		1540	189	0.	1		2155	264	0.
1		0315	40	149.	1		0930	115	0.	1		1545	190	0.	1		2200	265	0.
1		0320	41	229.	1		0935	116	0.	1		1550	191	0.	1		2205	266	0.
1		0325	42	343.	1		0940	117	0.	1		1555	192	0.	1		2210	267	0.
1		0330	43	494.	1		0945	118	0.	1		1600	193	0.	1		2215	268	0.
1		0335	44	625.	1		0950	119	0.	1		1605	194	0.	1		2220	269	0.
1		0340	45	710.	1		0955	120	0.	1		1610	195	0.	1		2225	270	0.
1		0345	46	762.	1		1000	121	0.	1		1615	196	0.	1		2230	271	0.
1		0350	47	774.	1		1005	122	0.	1		1620	197	0.	1		2235	272	0.
1		0355	48	760.	1		1010	123	0.	1		1625	198	0.	1		2240	273	0.
1		0400	49	731.	1		1015	124	0.	1		1630	199	0.	1		2245	274	0.
1		0405	50	690.	1		1020	125	0.	1		1635	200	0.	1		2250	275	0.
1		0410	51	636.	1		1025	126	0.	1		1640	201	0.	1		2255	276	0.
1		0415	52	574.	1		1030	127	0.	1		1645	202	0.	1		2300	277	0.
1		0420	53	512.	1		1035	128	0.	1		1650	203	0.	1		2305	278	0.
1		0425	54	454.	1		1040	129	0.	1		1655	204	0.	1		2310	279	0.
1		0430	55	411.	1		1045	130	0.	1		1700	205	0.	1		2315	280	0.
1		0435	56	383.	1		1050	131	0.	1		1705	206	0.	1		2320	281	0.
1		0440	57	361.	1		1055	132	0.	1		1710	207	0.	1		2325	282	0.
1		0445	58	342.	1		1100	133	0.	1		1715	208	0.	1		2330	283	0.

1	0450	59	332.	*	1	1105	134	0.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	321.	*	1	1110	135	0.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	305.	*	1	1115	136	0.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	286.	*	1	1120	137	0.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	263.	*	1	1125	138	0.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	239.	*	1	1130	139	0.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	213.	*	1	1135	140	0.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	189.	*	1	1140	141	0.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	166.	*	1	1145	142	0.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	143.	*	1	1150	143	0.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	123.	*	1	1155	144	0.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	107.	*	1	1200	145	0.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	92.	*	1	1205	146	0.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	79.	*	1	1210	147	0.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	68.	*	1	1215	148	0.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	59.	*	1	1220	149	0.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	51.	*	1	1225	150	0.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 774.	3.83		199.	50.	48.	48.
		(INCHES)	1.824	1.835	1.835	1.835
		(AC-FT)	99.	99.	99.	99.

CUMULATIVE AREA = 1.01 SQ MI

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HYDROGRAPH AT STATION DB2
SUM OF 3 HYDROGRAPHS
PLAN 1, RATIO = .98

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
					*						*						*					
1		0000	1	0.	*	1		0615	76	42.	*	1		1230	151	0.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	35.	*	1		1235	152	0.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	29.	*	1		1240	153	0.	*	1		1855	228	0.
1		0015	4	1.	*	1		0630	79	24.	*	1		1245	154	0.	*	1		1900	229	0.
1		0020	5	2.	*	1		0635	80	20.	*	1		1250	155	0.	*	1		1905	230	0.
1		0025	6	4.	*	1		0640	81	16.	*	1		1255	156	0.	*	1		1910	231	0.
1		0030	7	6.	*	1		0645	82	13.	*	1		1300	157	0.	*	1		1915	232	0.
1		0035	8	7.	*	1		0650	83	10.	*	1		1305	158	0.	*	1		1920	233	0.
1		0040	9	7.	*	1		0655	84	8.	*	1		1310	159	0.	*	1		1925	234	0.
1		0045	10	6.	*	1		0700	85	7.	*	1		1315	160	0.	*	1		1930	235	0.
1		0050	11	6.	*	1		0705	86	5.	*	1		1320	161	0.	*	1		1935	236	0.
1		0055	12	6.	*	1		0710	87	4.	*	1		1325	162	0.	*	1		1940	237	0.
1		0100	13	5.	*	1		0715	88	4.	*	1		1330	163	0.	*	1		1945	238	0.
1		0105	14	5.	*	1		0720	89	3.	*	1		1335	164	0.	*	1		1950	239	0.
1		0110	15	7.	*	1		0725	90	2.	*	1		1340	165	0.	*	1		1955	240	0.
1		0115	16	8.	*	1		0730	91	2.	*	1		1345	166	0.	*	1		2000	241	0.
1		0120	17	9.	*	1		0735	92	1.	*	1		1350	167	0.	*	1		2005	242	0.
1		0125	18	12.	*	1		0740	93	1.	*	1		1355	168	0.	*	1		2010	243	0.
1		0130	19	17.	*	1		0745	94	1.	*	1		1400	169	0.	*	1		2015	244	0.
1		0135	20	22.	*	1		0750	95	1.	*	1		1405	170	0.	*	1		2020	245	0.
1		0140	21	27.	*	1		0755	96	0.	*	1		1410	171	0.	*	1		2025	246	0.
1		0145	22	32.	*	1		0800	97	0.	*	1		1415	172	0.	*	1		2030	247	0.
1		0150	23	34.	*	1		0805	98	0.	*	1		1420	173	0.	*	1		2035	248	0.
1		0155	24	34.	*	1		0810	99	0.	*	1		1425	174	0.	*	1		2040	249	0.
1		0200	25	34.	*	1		0815	100	0.	*	1		1430	175	0.	*	1		2045	250	0.
1		0205	26	33.	*	1		0820	101	0.	*	1		1435	176	0.	*	1		2050	251	0.
1		0210	27	34.	*	1		0825	102	0.	*	1		1440	177	0.	*	1		2055	252	0.
1		0215	28	40.	*	1		0830	103	0.	*	1		1445	178	0.	*	1		2100	253	0.
1		0220	29	47.	*	1		0835	104	0.	*	1		1450	179	0.	*	1		2105	254	0.
1		0225	30	53.	*	1		0840	105	0.	*	1		1455	180	0.	*	1		2110	255	0.
1		0230	31	56.	*	1		0845	106	0.	*	1		1500	181	0.	*	1		2115	256	0.
1		0235	32	57.	*	1		0850	107	0.	*	1		1505	182	0.	*	1		2120	257	0.
1		0240	33	61.	*	1		0855	108	0.	*	1		1510	183	0.	*	1		2125	258	0.
1		0245	34	66.	*	1		0900	109	0.	*	1		1515	184	0.	*	1		2130	259	0.
1		0250	35	68.	*	1		0905	110	0.	*	1		1520	185	0.	*	1		2135	260	0.
1		0255	36	68.	*	1		0910	111	0.	*	1		1525	186	0.	*	1		2140	261	0.
1		0300	37	70.	*	1		0915	112	0.	*	1		1530	187	0.	*	1		2145	262	0.
1		0305	38	82.	*	1		0920	113	0.	*	1		1535	188	0.	*	1		2150	263	0.
1		0310	39	103.	*	1		0925	114	0.	*	1		1540	189	0.	*	1		2155	264	0.
1		0315	40	144.	*	1		0930	115	0.	*	1		1545	190	0.	*	1		2200	265	0.
1		0320	41	222.	*	1		0935	116	0.	*	1		1550	191	0.	*	1		2205	266	0.
1		0325	42	332.	*	1		0940	117	0.	*	1		1555	192	0.	*	1		2210	267	0.
1		0330	43	479.	*	1		0945	118	0.	*	1		1600	193	0.	*	1		2215	268	0.
1		0335	44	607.	*	1		0950	119	0.	*	1		1605	194	0.	*	1		2220	269	0.
1		0340	45	689.	*	1		0955	120	0.	*	1		1610	195	0.	*	1		2225	270	0.

1	0345	46	740.	*	1	1000	121	0.	*	1	1615	196	0.	*	1	2230	271	0.
1	0350	47	752.	*	1	1005	122	0.	*	1	1620	197	0.	*	1	2235	272	0.
1	0355	48	739.	*	1	1010	123	0.	*	1	1625	198	0.	*	1	2240	273	0.
1	0400	49	711.	*	1	1015	124	0.	*	1	1630	199	0.	*	1	2245	274	0.
1	0405	50	671.	*	1	1020	125	0.	*	1	1635	200	0.	*	1	2250	275	0.
1	0410	51	619.	*	1	1025	126	0.	*	1	1640	201	0.	*	1	2255	276	0.
1	0415	52	558.	*	1	1030	127	0.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	498.	*	1	1035	128	0.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	441.	*	1	1040	129	0.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	400.	*	1	1045	130	0.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	373.	*	1	1050	131	0.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	352.	*	1	1055	132	0.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	333.	*	1	1100	133	0.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	324.	*	1	1105	134	0.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	313.	*	1	1110	135	0.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	297.	*	1	1115	136	0.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	279.	*	1	1120	137	0.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	257.	*	1	1125	138	0.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	233.	*	1	1130	139	0.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	208.	*	1	1135	140	0.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	185.	*	1	1140	141	0.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	162.	*	1	1145	142	0.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	140.	*	1	1150	143	0.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	120.	*	1	1155	144	0.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	104.	*	1	1200	145	0.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	90.	*	1	1205	146	0.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	77.	*	1	1210	147	0.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	67.	*	1	1215	148	0.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	58.	*	1	1220	149	0.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	49.	*	1	1225	150	0.	*	1	1840	225	0.	*	2	0055	300	0.

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 752.	3.83		193.	49.	47.	47.
		(INCHES)	1.772	1.781	1.781	1.781
		(AC-FT)	96.	96.	96.	96.

CUMULATIVE AREA = 1.01 SQ MI

HYDROGRAPH AT STATION DB2
SUM OF 3 HYDROGRAPHS
PLAN 1, RATIO = .97

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0615	76	41.	1		1230	151	0.	1		1845	226	0.
1		0005	2	0.	1		0620	77	35.	1		1235	152	0.	1		1850	227	0.
1		0010	3	0.	1		0625	78	29.	1		1240	153	0.	1		1855	228	0.
1		0015	4	1.	1		0630	79	24.	1		1245	154	0.	1		1900	229	0.
1		0020	5	2.	1		0635	80	20.	1		1250	155	0.	1		1905	230	0.
1		0025	6	4.	1		0640	81	16.	1		1255	156	0.	1		1910	231	0.
1		0030	7	6.	1		0645	82	13.	1		1300	157	0.	1		1915	232	0.
1		0035	8	6.	1		0650	83	10.	1		1305	158	0.	1		1920	233	0.
1		0040	9	6.	1		0655	84	8.	1		1310	159	0.	1		1925	234	0.
1		0045	10	6.	1		0700	85	7.	1		1315	160	0.	1		1930	235	0.
1		0050	11	6.	1		0705	86	5.	1		1320	161	0.	1		1935	236	0.
1		0055	12	5.	1		0710	87	4.	1		1325	162	0.	1		1940	237	0.
1		0100	13	5.	1		0715	88	4.	1		1330	163	0.	1		1945	238	0.
1		0105	14	5.	1		0720	89	3.	1		1335	164	0.	1		1950	239	0.
1		0110	15	6.	1		0725	90	2.	1		1340	165	0.	1		1955	240	0.
1		0115	16	7.	1		0730	91	2.	1		1345	166	0.	1		2000	241	0.
1		0120	17	9.	1		0735	92	1.	1		1350	167	0.	1		2005	242	0.
1		0125	18	11.	1		0740	93	1.	1		1355	168	0.	1		2010	243	0.
1		0130	19	16.	1		0745	94	1.	1		1400	169	0.	1		2015	244	0.
1		0135	20	21.	1		0750	95	1.	1		1405	170	0.	1		2020	245	0.
1		0140	21	26.	1		0755	96	0.	1		1410	171	0.	1		2025	246	0.
1		0145	22	31.	1		0800	97	0.	1		1415	172	0.	1		2030	247	0.
1		0150	23	33.	1		0805	98	0.	1		1420	173	0.	1		2035	248	0.
1		0155	24	33.	1		0810	99	0.	1		1425	174	0.	1		2040	249	0.
1		0200	25	33.	1		0815	100	0.	1		1430	175	0.	1		2045	250	0.
1		0205	26	32.	1		0820	101	0.	1		1435	176	0.	1		2050	251	0.
1		0210	27	33.	1		0825	102	0.	1		1440	177	0.	1		2055	252	0.
1		0215	28	39.	1		0830	103	0.	1		1445	178	0.	1		2100	253	0.
1		0220	29	46.	1		0835	104	0.	1		1450	179	0.	1		2105	254	0.
1		0225	30	52.	1		0840	105	0.	1		1455	180	0.	1		2110	255	0.
1		0230	31	54.	1		0845	106	0.	1		1500	181	0.	1		2115	256	0.
1		0235	32	55.	1		0850	107	0.	1		1505	182	0.	1		2120	257	0.

1	0240	33	59.	*	1	0855	108	0.	*	1	1510	183	0.	*	1	2125	258	0.
1	0245	34	65.	*	1	0900	109	0.	*	1	1515	184	0.	*	1	2130	259	0.
1	0250	35	67.	*	1	0905	110	0.	*	1	1520	185	0.	*	1	2135	260	0.
1	0255	36	67.	*	1	0910	111	0.	*	1	1525	186	0.	*	1	2140	261	0.
1	0300	37	69.	*	1	0915	112	0.	*	1	1530	187	0.	*	1	2145	262	0.
1	0305	38	80.	*	1	0920	113	0.	*	1	1535	188	0.	*	1	2150	263	0.
1	0310	39	101.	*	1	0925	114	0.	*	1	1540	189	0.	*	1	2155	264	0.
1	0315	40	141.	*	1	0930	115	0.	*	1	1545	190	0.	*	1	2200	265	0.
1	0320	41	218.	*	1	0935	116	0.	*	1	1550	191	0.	*	1	2205	266	0.
1	0325	42	327.	*	1	0940	117	0.	*	1	1555	192	0.	*	1	2210	267	0.
1	0330	43	472.	*	1	0945	118	0.	*	1	1600	193	0.	*	1	2215	268	0.
1	0335	44	597.	*	1	0950	119	0.	*	1	1605	194	0.	*	1	2220	269	0.
1	0340	45	679.	*	1	0955	120	0.	*	1	1610	195	0.	*	1	2225	270	0.
1	0345	46	729.	*	1	1000	121	0.	*	1	1615	196	0.	*	1	2230	271	0.
1	0350	47	741.	*	1	1005	122	0.	*	1	1620	197	0.	*	1	2235	272	0.
1	0355	48	728.	*	1	1010	123	0.	*	1	1625	198	0.	*	1	2240	273	0.
1	0400	49	701.	*	1	1015	124	0.	*	1	1630	199	0.	*	1	2245	274	0.
1	0405	50	662.	*	1	1020	125	0.	*	1	1635	200	0.	*	1	2250	275	0.
1	0410	51	610.	*	1	1025	126	0.	*	1	1640	201	0.	*	1	2255	276	0.
1	0415	52	550.	*	1	1030	127	0.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	491.	*	1	1035	128	0.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	435.	*	1	1040	129	0.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	394.	*	1	1045	130	0.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	368.	*	1	1050	131	0.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	347.	*	1	1055	132	0.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	329.	*	1	1100	133	0.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	319.	*	1	1105	134	0.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	309.	*	1	1110	135	0.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	294.	*	1	1115	136	0.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	275.	*	1	1120	137	0.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	253.	*	1	1125	138	0.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	230.	*	1	1130	139	0.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	205.	*	1	1135	140	0.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	182.	*	1	1140	141	0.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	160.	*	1	1145	142	0.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	138.	*	1	1150	143	0.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	119.	*	1	1155	144	0.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	103.	*	1	1200	145	0.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	89.	*	1	1205	146	0.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	76.	*	1	1210	147	0.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	66.	*	1	1215	148	0.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	57.	*	1	1220	149	0.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	49.	*	1	1225	150	0.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 741.	3.83		190.	48.	46.	46.
		(INCHES)	1.745	1.755	1.755	1.755
		(AC-FT)	94.	95.	95.	95.

CUMULATIVE AREA = 1.01 SQ MI

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          **************
          *            *
75 KK     *     RDB2   *
          *            *
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77 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

HYDROGRAPH ROUTING DATA

78 RS STORAGE ROUTING

NSTPS	1	NUMBER OF SUBREACHES
ITYP	ELEV	TYPE OF INITIAL CONDITION
RSVRIC	2992.00	INITIAL CONDITION
X	.00	WORKING R AND D COEFFICIENT

79 SV	STORAGE	.0	2.3	7.6	24.3	46.3	73.8	107.1	146.8	193.0
80 SE	ELEVATION	2992.00	2993.00	2995.00	3000.00	3005.00	3010.00	3015.00	3020.00	3025.00
81 SQ	DISCHARGE	0.	44.	51.	65.	84.	99.	521.	3466.	7888.

82 SE	ELEVATION	2992.00	2993.00	2995.00	3000.00	3009.00	3018.00	3019.00	3022.00	3025.00

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COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	2.34	7.60	24.30	46.28	68.28	73.78	107.11	130.89	138.82
OUTFLOW	.00	44.44	51.05	64.70	75.33	83.84	85.56	94.19	99.36	520.90
ELEVATION	2992.00	2993.00	2995.00	3000.00	3005.00	3009.00	3010.00	3015.00	3018.00	3019.00

STORAGE	146.75	165.26	193.03
OUTFLOW	1502.43	3465.50	7888.40
ELEVATION	3020.00	3022.00	3025.00

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HYDROGRAPH AT STATION RDB2
PLAN 1, RATIO = 1.00

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.0	2992.0	1		0820	101	81.	61.2	3007.7	1		1640	201	56.	13.3	2996.7
1		0005	2	0.	.0	2992.0	1		0825	102	81.	60.6	3007.6	1		1645	202	55.	12.9	2996.6
1		0010	3	0.	.0	2992.0	1		0830	103	81.	60.1	3007.5	1		1650	203	55.	12.5	2996.5
1		0015	4	0.	.0	2992.0	1		0835	104	80.	59.5	3007.4	1		1655	204	55.	12.1	2996.4
1		0020	5	0.	.0	2992.0	1		0840	105	80.	59.0	3007.3	1		1700	205	54.	11.8	2996.2
1		0025	6	1.	.0	2992.0	1		0845	106	80.	58.4	3007.2	1		1705	206	54.	11.4	2996.1
1		0030	7	1.	.1	2992.0	1		0850	107	80.	57.9	3007.1	1		1710	207	54.	11.0	2996.0
1		0035	8	2.	.1	2992.0	1		0855	108	80.	57.3	3007.0	1		1715	208	54.	10.7	2995.9
1		0040	9	3.	.1	2992.1	1		0900	109	79.	56.8	3006.9	1		1720	209	53.	10.3	2995.8
1		0045	10	3.	.2	2992.1	1		0905	110	79.	56.2	3006.8	1		1725	210	53.	9.9	2995.7
1		0050	11	4.	.2	2992.1	1		0910	111	79.	55.7	3006.7	1		1730	211	53.	9.6	2995.6
1		0055	12	4.	.2	2992.1	1		0915	112	79.	55.1	3006.6	1		1735	212	52.	9.2	2995.5
1		0100	13	4.	.2	2992.1	1		0920	113	79.	54.6	3006.5	1		1740	213	52.	8.8	2995.4
1		0105	14	4.	.2	2992.1	1		0925	114	78.	54.1	3006.4	1		1745	214	52.	8.5	2995.3
1		0110	15	5.	.3	2992.1	1		0930	115	78.	53.5	3006.3	1		1750	215	51.	8.1	2995.2
1		0115	16	5.	.3	2992.1	1		0935	116	78.	53.0	3006.2	1		1755	216	51.	7.8	2995.0
1		0120	17	6.	.3	2992.1	1		0940	117	78.	52.5	3006.1	1		1800	217	51.	7.4	2994.9
1		0125	18	6.	.3	2992.1	1		0945	118	78.	51.9	3006.0	1		1805	218	50.	7.1	2994.8
1		0130	19	7.	.4	2992.2	1		0950	119	77.	51.4	3005.9	1		1810	219	50.	6.7	2994.7
1		0135	20	9.	.5	2992.2	1		0955	120	77.	50.9	3005.8	1		1815	220	50.	6.4	2994.5
1		0140	21	11.	.6	2992.3	1		1000	121	77.	50.3	3005.7	1		1820	221	49.	6.0	2994.4
1		0145	22	14.	.7	2992.3	1		1005	122	77.	49.8	3005.6	1		1825	222	49.	5.7	2994.3
1		0150	23	16.	.9	2992.4	1		1010	123	76.	49.3	3005.5	1		1830	223	48.	5.4	2994.2
1		0155	24	19.	1.0	2992.4	1		1015	124	76.	48.7	3005.4	1		1835	224	48.	5.0	2994.0
1		0200	25	21.	1.1	2992.5	1		1020	125	76.	48.2	3005.4	1		1840	225	47.	4.7	2993.9
1		0205	26	23.	1.2	2992.5	1		1025	126	76.	47.7	3005.3	1		1845	226	47.	4.4	2993.8
1		0210	27	24.	1.3	2992.5	1		1030	127	76.	47.2	3005.2	1		1850	227	47.	4.1	2993.7
1		0215	28	26.	1.4	2992.6	1		1035	128	75.	46.6	3005.1	1		1855	228	46.	3.7	2993.5
1		0220	29	28.	1.5	2992.6	1		1040	129	75.	46.1	3005.0	1		1900	229	46.	3.4	2993.4
1		0225	30	31.	1.6	2992.7	1		1045	130	75.	45.6	3004.8	1		1905	230	45.	3.1	2993.3
1		0230	31	34.	1.8	2992.8	1		1050	131	75.	45.1	3004.7	1		1910	231	45.	2.8	2993.2
1		0235	32	37.	2.0	2992.8	1		1055	132	75.	44.6	3004.6	1		1915	232	45.	2.5	2993.1
1		0240	33	40.	2.1	2992.9	1		1100	133	74.	44.1	3004.5	1		1920	233	42.	2.2	2992.9
1		0245	34	44.	2.3	2993.0	1		1105	134	74.	43.6	3004.4	1		1925	234	37.	1.9	2992.8
1		0250	35	45.	2.5	2993.0	1		1110	135	74.	43.1	3004.3	1		1930	235	32.	1.7	2992.7
1		0255	36	45.	2.7	2993.1	1		1115	136	74.	42.5	3004.1	1		1935	236	28.	1.5	2992.6
1		0300	37	45.	2.8	2993.2	1		1120	137	73.	42.0	3004.0	1		1940	237	25.	1.3	2992.6
1		0305	38	45.	3.1	2993.3	1		1125	138	73.	41.5	3003.9	1		1945	238	22.	1.1	2992.5
1		0310	39	46.	3.4	2993.4	1		1130	139	73.	41.0	3003.8	1		1950	239	19.	1.0	2992.4
1		0315	40	47.	4.0	2993.6	1		1135	140	73.	40.5	3003.7	1		1955	240	17.	.9	2992.4
1		0320	41	48.	5.0	2994.0	1		1140	141	72.	40.0	3003.6	1		2000	241	15.	.8	2992.3
1		0325	42	50.	6.6	2994.6	1		1145	142	72.	39.5	3003.5	1		2005	242	13.	.7	2992.3
1		0330	43	52.	9.1	2995.5	1		1150	143	72.	39.0	3003.4	1		2010	243	11.	.6	2992.3
1		0335	44	55.	12.6	2996.5	1		1155	144	72.	38.5	3003.2	1		2015	244	10.	.5	2992.2
1		0340	45	59.	16.8	2997.8	1		1200	145	71.	38.1	3003.1	1		2020	245	9.	.5	2992.2
1		0345	46	62.	21.5	2999.2	1		1205	146	71.	37.6	3003.0	1		2025	246	8.	.4	2992.2
1		0350	47	66.	26.3	3000.5	1		1210	147	71.	37.1	3002.9	1		2030	247	7.	.4	2992.1
1		0355	48	68.	31.1	3001.6	1		1215	148	71.	36.6	3002.8	1		2035	248	6.	.3	2992.1
1		0400	49	70.	35.8	3002.6	1		1220	149	70.	36.1	3002.7	1		2040	249	5.	.3	2992.1
1		0405	50	72.	40.2	3003.6	1		1225	150	70.	35.6	3002.6	1		2045	250	4.	.2	2992.1
1		0410	51	74.	44.3	3004.5	1		1230	151	70.	35.1	3002.5	1		2050	251	4.	.2	2992.1
1		0415	52	76.	47.9	3005.3	1		1235	152	70.	34.7	3002.4	1		2055	252	3.	.2	2992.1
1		0420	53	77.	51.1	3005.9	1		1240	153	69.	34.2	3002.2	1		2100	253	3.	.2	2992.1
1		0425	54	78.	53.9	3006.4	1		1245	154	69.	33.7	3002.1	1		2105	254	3.	.1	2992.1
1		0430	55	79.	56.3	3006.8	1		1250	155	69.	33.2	3002.0	1		2110	255	2.	.1	2992.1
1		0435	56	80.	58.5	3007.2	1		1255	156	69.	32.7	3001.9	1		2115	256	2.	.1	2992.0
1		0440	57	81.	60.5	3007.6	1		1300	157	69.	32.3	3001.8	1		2120	257	2.	.1	2992.0
1		0445	58	82.	62.4	3007.9	1		1305	158	68.	31.8	3001.7	1		2125	258	2.	.1	2992.0
1		0450	59	82.	64.2	3008.2	1		1310	159	68.	31.3	3001.6	1		2130	259	1.	.1	2992.0
1		0455	60	83.	65.8	3008.6	1		1315	160	68.	30.9	3001.5	1		2135	260	1.	.1	2992.0
1		0500	61	84.	67.4	3008.8	1		1320	161	68.	30.4	3001.4	1		2140	261	1.	.1	2992.0
1		0505	62	84.	68.9	3009.1	1		1325	162	67.	29.9	3001.3	1		2145	262	1.	.0	2992.0

1	0510	63	84.	70.2	3009.3	*	1	1330	163	67.	29.5	3001.2	*	1	2150	263	1.	.0	2992.0
1	0515	64	85.	71.3	3009.6	*	1	1335	164	67.	29.0	3001.1	*	1	2155	264	1.	.0	2992.0
1	0520	65	85.	72.3	3009.7	*	1	1340	165	67.	28.5	3001.0	*	1	2200	265	1.	.0	2992.0
1	0525	66	85.	73.1	3009.9	*	1	1345	166	67.	28.1	3000.9	*	1	2205	266	1.	.0	2992.0
1	0530	67	86.	73.7	3010.0	*	1	1350	167	66.	27.6	3000.8	*	1	2210	267	0.	.0	2992.0
1	0535	68	86.	74.2	3010.1	*	1	1355	168	66.	27.2	3000.7	*	1	2215	268	0.	.0	2992.0
1	0540	69	86.	74.5	3010.1	*	1	1400	169	66.	26.7	3000.6	*	1	2220	269	0.	.0	2992.0
1	0545	70	86.	74.7	3010.1	*	1	1405	170	66.	26.3	3000.4	*	1	2225	270	0.	.0	2992.0
1	0550	71	86.	74.8	3010.2	*	1	1410	171	65.	25.8	3000.3	*	1	2230	271	0.	.0	2992.0
1	0555	72	86.	74.8	3010.2	*	1	1415	172	65.	25.4	3000.2	*	1	2235	272	0.	.0	2992.0
1	0600	73	86.	74.7	3010.1	*	1	1420	173	65.	24.9	3000.1	*	1	2240	273	0.	.0	2992.0
1	0605	74	86.	74.6	3010.1	*	1	1425	174	65.	24.5	3000.0	*	1	2245	274	0.	.0	2992.0
1	0610	75	86.	74.4	3010.1	*	1	1430	175	64.	24.0	2999.9	*	1	2250	275	0.	.0	2992.0
1	0615	76	86.	74.1	3010.1	*	1	1435	176	64.	23.6	2999.8	*	1	2255	276	0.	.0	2992.0
1	0620	77	86.	73.8	3010.0	*	1	1440	177	64.	23.1	2999.7	*	1	2300	277	0.	.0	2992.0
1	0625	78	85.	73.4	3009.9	*	1	1445	178	63.	22.7	2999.5	*	1	2305	278	0.	.0	2992.0
1	0630	79	85.	73.0	3009.9	*	1	1450	179	63.	22.3	2999.4	*	1	2310	279	0.	.0	2992.0
1	0635	80	85.	72.6	3009.8	*	1	1455	180	63.	21.8	2999.3	*	1	2315	280	0.	.0	2992.0
1	0640	81	85.	72.1	3009.7	*	1	1500	181	62.	21.4	2999.1	*	1	2320	281	0.	.0	2992.0
1	0645	82	85.	71.7	3009.6	*	1	1505	182	62.	21.0	2999.0	*	1	2325	282	0.	.0	2992.0
1	0650	83	85.	71.2	3009.5	*	1	1510	183	62.	20.6	2998.9	*	1	2330	283	0.	.0	2992.0
1	0655	84	85.	70.6	3009.4	*	1	1515	184	61.	20.1	2998.8	*	1	2335	284	0.	.0	2992.0
1	0700	85	84.	70.1	3009.3	*	1	1520	185	61.	19.7	2998.6	*	1	2340	285	0.	.0	2992.0
1	0705	86	84.	69.6	3009.2	*	1	1525	186	61.	19.3	2998.5	*	1	2345	286	0.	.0	2992.0
1	0710	87	84.	69.0	3009.1	*	1	1530	187	60.	18.9	2998.4	*	1	2350	287	0.	.0	2992.0
1	0715	88	84.	68.5	3009.0	*	1	1535	188	60.	18.5	2998.3	*	1	2355	288	0.	.0	2992.0
1	0720	89	84.	67.9	3008.9	*	1	1540	189	60.	18.0	2998.1	*	2	0000	289	0.	.0	2992.0
1	0725	90	83.	67.4	3008.8	*	1	1545	190	59.	17.6	2998.0	*	2	0005	290	0.	.0	2992.0
1	0730	91	83.	66.8	3008.7	*	1	1550	191	59.	17.2	2997.9	*	2	0010	291	0.	.0	2992.0
1	0735	92	83.	66.3	3008.6	*	1	1555	192	59.	16.8	2997.8	*	2	0015	292	0.	.0	2992.0
1	0740	93	83.	65.7	3008.5	*	1	1600	193	58.	16.4	2997.6	*	2	0020	293	0.	.0	2992.0
1	0745	94	83.	65.1	3008.4	*	1	1605	194	58.	16.0	2997.5	*	2	0025	294	0.	.0	2992.0
1	0750	95	82.	64.6	3008.3	*	1	1610	195	58.	15.6	2997.4	*	2	0030	295	0.	.0	2992.0
1	0755	96	82.	64.0	3008.2	*	1	1615	196	57.	15.2	2997.3	*	2	0035	296	0.	.0	2992.0
1	0800	97	82.	63.4	3008.1	*	1	1620	197	57.	14.8	2997.2	*	2	0040	297	0.	.0	2992.0
1	0805	98	82.	62.9	3008.0	*	1	1625	198	57.	14.4	2997.0	*	2	0045	298	0.	.0	2992.0
1	0810	99	82.	62.3	3007.9	*	1	1630	199	56.	14.1	2996.9	*	2	0050	299	0.	.0	2992.0
1	0815	100	81.	61.8	3007.8	*	1	1635	200	56.	13.7	2996.8	*	2	0055	300	0.	.0	2992.0
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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 86.	5.83		82.	50.	48.	48.
		(INCHES)	.752	1.835	1.835	1.835
		(AC-FT)	41.	99.	99.	99.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)				
75.	5.83	64.	26.	25.	25.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)				
3010.16	5.83	3008.18	2999.20	2998.93	2998.93

CUMULATIVE AREA = 1.01 SQ MI

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HYDROGRAPH AT STATION RDB2
PLAN 1, RATIO = .98

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.0	2992.0	*	1		0820	101	80.	58.8	3007.3	*	1		1640	201	54.	11.7	2996.2
1		0005	2	0.	.0	2992.0	*	1		0825	102	80.	58.3	3007.2	*	1		1645	202	54.	11.3	2996.1
1		0010	3	0.	.0	2992.0	*	1		0830	103	80.	57.7	3007.1	*	1		1650	203	54.	10.9	2996.0
1		0015	4	0.	.0	2992.0	*	1		0835	104	80.	57.2	3007.0	*	1		1655	204	53.	10.5	2995.9
1		0020	5	0.	.0	2992.0	*	1		0840	105	79.	56.6	3006.9	*	1		1700	205	53.	10.2	2995.8
1		0025	6	1.	.0	2992.0	*	1		0845	106	79.	56.1	3006.8	*	1		1705	206	53.	9.8	2995.7
1		0030	7	1.	.1	2992.0	*	1		0850	107	79.	55.5	3006.7	*	1		1710	207	53.	9.5	2995.6
1		0035	8	2.	.1	2992.0	*	1		0855	108	79.	55.0	3006.6	*	1		1715	208	52.	9.1	2995.4
1		0040	9	2.	.1	2992.1	*	1		0900	109	78.	54.5	3006.5	*	1		1720	209	52.	8.7	2995.3
1		0045	10	3.	.1	2992.1	*	1		0905	110	78.	53.9	3006.4	*	1		1725	210	52.	8.4	2995.2
1		0050	11	3.	.2	2992.1	*	1		0910	111	78.	53.4	3006.3	*	1		1730	211	51.	8.0	2995.1
1		0055	12	4.	.2	2992.1	*	1		0915	112	78.	52.8	3006.2	*	1		1735	212	51.	7.7	2995.0
1		0100	13	4.	.2	2992.1	*	1		0920	113	78.	52.3	3006.1	*	1		1740	213	51.	7.3	2994.9
1		0105	14	4.	.2	2992.1	*	1		0925	114	77.	51.8	3006.0	*	1		1745	214	50.	7.0	2994.8
1		0110	15	4.	.2	2992.1	*	1		0930	115	77.	51.2	3005.9	*	1		1750	215	50.	6.6	2994.6

1	0115	16	5.	.2	2992.1	*	1	0935	116	77.	50.7	3005.8	*	1	1755	216	49.	6.3	2994.5
1	0120	17	5.	.3	2992.1	*	1	0940	117	77.	50.2	3005.7	*	1	1800	217	49.	5.9	2994.4
1	0125	18	6.	.3	2992.1	*	1	0945	118	77.	49.6	3005.6	*	1	1805	218	49.	5.6	2994.2
1	0130	19	7.	.4	2992.2	*	1	0950	119	76.	49.1	3005.5	*	1	1810	219	48.	5.3	2994.1
1	0135	20	8.	.4	2992.2	*	1	0955	120	76.	48.6	3005.4	*	1	1815	220	48.	4.9	2994.0
1	0140	21	10.	.5	2992.2	*	1	1000	121	76.	48.1	3005.3	*	1	1820	221	47.	4.6	2993.9
1	0145	22	13.	.7	2992.3	*	1	1005	122	76.	47.5	3005.2	*	1	1825	222	47.	4.3	2993.7
1	0150	23	15.	.8	2992.3	*	1	1010	123	76.	47.0	3005.1	*	1	1830	223	46.	4.0	2993.6
1	0155	24	17.	.9	2992.4	*	1	1015	124	75.	46.5	3005.0	*	1	1835	224	46.	3.7	2993.5
1	0200	25	20.	1.0	2992.4	*	1	1020	125	75.	46.0	3004.9	*	1	1840	225	46.	3.3	2993.4
1	0205	26	21.	1.1	2992.5	*	1	1025	126	75.	45.5	3004.8	*	1	1845	226	45.	3.0	2993.3
1	0210	27	23.	1.2	2992.5	*	1	1030	127	75.	45.0	3004.7	*	1	1850	227	45.	2.7	2993.1
1	0215	28	24.	1.3	2992.5	*	1	1035	128	74.	44.4	3004.6	*	1	1855	228	45.	2.4	2993.0
1	0220	29	27.	1.4	2992.6	*	1	1040	129	74.	43.9	3004.5	*	1	1900	229	40.	2.1	2992.9
1	0225	30	30.	1.6	2992.7	*	1	1045	130	74.	43.4	3004.3	*	1	1905	230	35.	1.9	2992.8
1	0230	31	33.	1.7	2992.7	*	1	1050	131	74.	42.9	3004.2	*	1	1910	231	31.	1.6	2992.7
1	0235	32	35.	1.9	2992.8	*	1	1055	132	73.	42.4	3004.1	*	1	1915	232	27.	1.4	2992.6
1	0240	33	38.	2.0	2992.9	*	1	1100	133	73.	41.9	3004.0	*	1	1920	233	24.	1.3	2992.5
1	0245	34	41.	2.2	2992.9	*	1	1105	134	73.	41.4	3003.9	*	1	1925	234	21.	1.1	2992.5
1	0250	35	44.	2.3	2993.0	*	1	1110	135	73.	40.9	3003.8	*	1	1930	235	18.	1.0	2992.4
1	0255	36	45.	2.5	2993.1	*	1	1115	136	72.	40.4	3003.7	*	1	1935	236	16.	.8	2992.4
1	0300	37	45.	2.7	2993.1	*	1	1120	137	72.	39.9	3003.5	*	1	1940	237	14.	.7	2992.3
1	0305	38	45.	2.9	2993.2	*	1	1125	138	72.	39.4	3003.4	*	1	1945	238	12.	.7	2992.3
1	0310	39	46.	3.2	2993.3	*	1	1130	139	72.	38.9	3003.3	*	1	1950	239	11.	.6	2992.2
1	0315	40	46.	3.7	2993.5	*	1	1135	140	72.	38.4	3003.2	*	1	1955	240	10.	.5	2992.2
1	0320	41	47.	4.7	2993.9	*	1	1140	141	71.	37.9	3003.1	*	1	2000	241	8.	.4	2992.2
1	0325	42	49.	6.3	2994.5	*	1	1145	142	71.	37.4	3003.0	*	1	2005	242	7.	.4	2992.2
1	0330	43	52.	8.7	2995.3	*	1	1150	143	71.	36.9	3002.9	*	1	2010	243	6.	.3	2992.1
1	0335	44	55.	12.1	2996.3	*	1	1155	144	71.	36.5	3002.8	*	1	2015	244	6.	.3	2992.1
1	0340	45	58.	16.1	2997.6	*	1	1200	145	70.	36.0	3002.7	*	1	2020	245	5.	.3	2992.1
1	0345	46	62.	20.7	2998.9	*	1	1205	146	70.	35.5	3002.5	*	1	2025	246	4.	.2	2992.1
1	0350	47	65.	25.4	3000.2	*	1	1210	147	70.	35.0	3002.4	*	1	2030	247	4.	.2	2992.1
1	0355	48	67.	30.0	3001.3	*	1	1215	148	70.	34.5	3002.3	*	1	2035	248	3.	.2	2992.1
1	0400	49	70.	34.6	3002.3	*	1	1220	149	69.	34.0	3002.2	*	1	2040	249	3.	.2	2992.1
1	0405	50	72.	38.8	3003.3	*	1	1225	150	69.	33.6	3002.1	*	1	2045	250	3.	.1	2992.1
1	0410	51	74.	42.8	3004.2	*	1	1230	151	69.	33.1	3002.0	*	1	2050	251	2.	.1	2992.1
1	0415	52	75.	46.3	3005.0	*	1	1235	152	69.	32.6	3001.9	*	1	2055	252	2.	.1	2992.0
1	0420	53	77.	49.4	3005.6	*	1	1240	153	68.	32.1	3001.8	*	1	2100	253	2.	.1	2992.0
1	0425	54	78.	52.1	3006.1	*	1	1245	154	68.	31.7	3001.7	*	1	2105	254	2.	.1	2992.0
1	0430	55	79.	54.5	3006.5	*	1	1250	155	68.	31.2	3001.6	*	1	2110	255	1.	.1	2992.0
1	0435	56	79.	56.6	3006.9	*	1	1255	156	68.	30.7	3001.5	*	1	2115	256	1.	.1	2992.0
1	0440	57	80.	58.6	3007.2	*	1	1300	157	68.	30.3	3001.4	*	1	2120	257	1.	.1	2992.0
1	0445	58	81.	60.4	3007.6	*	1	1305	158	67.	29.8	3001.3	*	1	2125	258	1.	.0	2992.0
1	0450	59	81.	62.1	3007.9	*	1	1310	159	67.	29.3	3001.1	*	1	2130	259	1.	.0	2992.0
1	0455	60	82.	63.7	3008.2	*	1	1315	160	67.	28.9	3001.0	*	1	2135	260	1.	.0	2992.0
1	0500	61	83.	65.2	3008.4	*	1	1320	161	67.	28.4	3000.9	*	1	2140	261	1.	.0	2992.0
1	0505	62	83.	66.6	3008.7	*	1	1325	162	66.	28.0	3000.8	*	1	2145	262	1.	.0	2992.0
1	0510	63	84.	67.9	3008.9	*	1	1330	163	66.	27.5	3000.7	*	1	2150	263	0.	.0	2992.0
1	0515	64	84.	69.0	3009.1	*	1	1335	164	66.	27.0	3000.6	*	1	2155	264	0.	.0	2992.0
1	0520	65	84.	70.0	3009.3	*	1	1340	165	66.	26.6	3000.5	*	1	2200	265	0.	.0	2992.0
1	0525	66	85.	70.7	3009.4	*	1	1345	166	66.	26.1	3000.4	*	1	2205	266	0.	.0	2992.0
1	0530	67	85.	71.3	3009.6	*	1	1350	167	65.	25.7	3000.3	*	1	2210	267	0.	.0	2992.0
1	0535	68	85.	71.8	3009.6	*	1	1355	168	65.	25.2	3000.2	*	1	2215	268	0.	.0	2992.0
1	0540	69	85.	72.1	3009.7	*	1	1400	169	65.	24.8	3000.1	*	1	2220	269	0.	.0	2992.0
1	0545	70	85.	72.3	3009.7	*	1	1405	170	65.	24.3	3000.0	*	1	2225	270	0.	.0	2992.0
1	0550	71	85.	72.4	3009.7	*	1	1410	171	64.	23.9	2999.9	*	1	2230	271	0.	.0	2992.0
1	0555	72	85.	72.4	3009.7	*	1	1415	172	64.	23.5	2999.7	*	1	2235	272	0.	.0	2992.0
1	0600	73	85.	72.3	3009.7	*	1	1420	173	64.	23.0	2999.6	*	1	2240	273	0.	.0	2992.0
1	0605	74	85.	72.1	3009.7	*	1	1425	174	63.	22.6	2999.5	*	1	2245	274	0.	.0	2992.0
1	0610	75	85.	71.9	3009.7	*	1	1430	175	63.	22.1	2999.4	*	1	2250	275	0.	.0	2992.0
1	0615	76	85.	71.6	3009.6	*	1	1435	176	63.	21.7	2999.2	*	1	2255	276	0.	.0	2992.0
1	0620	77	85.	71.3	3009.6	*	1	1440	177	62.	21.3	2999.1	*	1	2300	277	0.	.0	2992.0
1	0625	78	85.	70.9	3009.5	*	1	1445	178	62.	20.9	2999.0	*	1	2305	278	0.	.0	2992.0
1	0630	79	85.	70.5	3009.4	*	1	1450	179	62.	20.4	2998.8	*	1	2310	279	0.	.0	2992.0
1	0635	80	84.	70.1	3009.3	*	1	1455	180	61.	20.0	2998.7	*	1	2315	280	0.	.0	2992.0
1	0640	81	84.	69.7	3009.3	*	1	1500	181	61.	19.6	2998.6	*	1	2320	281	0.	.0	2992.0
1	0645	82	84.	69.2	3009.2	*	1	1505	182	61.	19.2	2998.5	*	1	2325	282	0.	.0	2992.0
1	0650	83	84.	68.7	3009.1	*	1	1510	183	60.	18.8	2998.3	*	1	2330	283	0.	.0	2992.0
1	0655	84	84.	68.2	3009.0	*	1	1515	184	60.	18.3	2998.2	*	1	2335	284	0.	.0	2992.0
1	0700	85	84.	67.6	3008.9	*	1	1520	185	59.	17.9	2998.1	*	1	2340	285	0.	.0	2992.0
1	0705	86	83.	67.1	3008.8	*	1	1525	186	59.	17.5	2998.0	*	1	2345	286	0.	.0	2992.0
1	0710	87	83.	66.6	3008.7	*	1	1530	187	59.	17.1	2997.8	*	1	2350	287	0.	.0	2992.0
1	0715	88	83.	66.0	3008.6	*	1	1535	188	58.	16.7	2997.7	*	1	2355	288	0.	.0	2992.0
1	0720	89	83.	65.5	3008.5	*	1	1540	189	58.	16.3	2997.6	*	2	0000	289	0.	.0	2992.0
1	0725	90	83.	64.9	3008.4	*	1	1545	190	58.	15.9	2997.5	*	2	0005	290	0.	.0	2992.0
1	0730	91	82.	64.4	3008.3	*	1	1550	191	58.	15.5	2997.4	*	2	0010	291	0.	.0	2992.0
1	0735	92	82.	63.8	3008.2	*	1	1555	192	57.	15.1	2997.3	*	2	0015	292	0.	.0	2992.0
1	0740	93	82.	63.3	3008.1	*	1	1600	193	57.	14.7	2997.1	*	2	0020	293	0.	.0	2992.0
1	0745	94	82.	62.7	3008.0	*	1	1605	194	57.	14.3	2997.0	*	2	0025	294	0.	.0	2992.0
1	0750	95	81.	62.1	3007.9	*	1	1610	195	56.	13.9	2996.9	*	2	0030	295	0.	.0	2992.0
1	0755	96	81.	61.6	3007.8	*	1	1615	196	56.	13.6	2996.8	*	2	0035	296	0.	.0	2992.0
1	0800	97	81.	61.0	3007.7	*	1	1620	197	56.	13.2	2996.7	*	2	0040	297	0.	.0	2992.0
1	0805	98	81.	60.5	3007.6	*	1	1625	198	55.	12.8	2996.6	*	2	0045	298	0.	.0	2992.0
1	0810	99	81.	59.9	3007.5	*	1	1630	199	55.	12.4	2996.4	*	2	0050	299	0.	.0	2992.0
1	0815	100	80.	59.4	3007.4	*	1	1635	200	55.	12.0	2996.3	*	2	0055	300	0.	.0	2992.0
						*							*						

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 85.	5.83		81.	49.	47.	47.
		(INCHES)	.744	1.781	1.781	1.781
		(AC-FT)	40.	96.	96.	96.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)				
72.	5.83	61.	25.	24.	24.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)				
3009.74	5.83	3007.76	2998.88	2998.63	2998.63

CUMULATIVE AREA = 1.01 SQ MI

HYDROGRAPH AT STATION RDB2
PLAN 1, RATIO = .97

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.0	2992.0	1		0820	101	80.	57.6	3007.1	1		1640	201	54.	10.9	2996.0
1		0005	2	0.	.0	2992.0	1		0825	102	80.	57.1	3007.0	1		1645	202	53.	10.5	2995.9
1		0010	3	0.	.0	2992.0	1		0830	103	79.	56.5	3006.9	1		1650	203	53.	10.1	2995.8
1		0015	4	0.	.0	2992.0	1		0835	104	79.	56.0	3006.8	1		1655	204	53.	9.8	2995.6
1		0020	5	0.	.0	2992.0	1		0840	105	79.	55.5	3006.7	1		1700	205	53.	9.4	2995.5
1		0025	6	1.	.0	2992.0	1		0845	106	79.	54.9	3006.6	1		1705	206	52.	9.0	2995.4
1		0030	7	1.	.1	2992.0	1		0850	107	78.	54.4	3006.5	1		1710	207	52.	8.7	2995.3
1		0035	8	2.	.1	2992.0	1		0855	108	78.	53.8	3006.4	1		1715	208	52.	8.3	2995.2
1		0040	9	2.	.1	2992.1	1		0900	109	78.	53.3	3006.3	1		1720	209	51.	8.0	2995.1
1		0045	10	3.	.1	2992.1	1		0905	110	78.	52.8	3006.2	1		1725	210	51.	7.6	2995.0
1		0050	11	3.	.2	2992.1	1		0910	111	78.	52.2	3006.1	1		1730	211	51.	7.3	2994.9
1		0055	12	3.	.2	2992.1	1		0915	112	77.	51.7	3006.0	1		1735	212	50.	6.9	2994.7
1		0100	13	4.	.2	2992.1	1		0920	113	77.	51.2	3005.9	1		1740	213	50.	6.6	2994.6
1		0105	14	4.	.2	2992.1	1		0925	114	77.	50.6	3005.8	1		1745	214	49.	6.2	2994.5
1		0110	15	4.	.2	2992.1	1		0930	115	77.	50.1	3005.7	1		1750	215	49.	5.9	2994.4
1		0115	16	4.	.2	2992.1	1		0935	116	77.	49.6	3005.6	1		1755	216	48.	5.6	2994.2
1		0120	17	5.	.3	2992.1	1		0940	117	76.	49.0	3005.5	1		1800	217	48.	5.2	2994.1
1		0125	18	5.	.3	2992.1	1		0945	118	76.	48.5	3005.4	1		1805	218	48.	4.9	2994.0
1		0130	19	6.	.3	2992.1	1		0950	119	76.	48.0	3005.3	1		1810	219	47.	4.6	2993.8
1		0135	20	8.	.4	2992.2	1		0955	120	76.	47.5	3005.2	1		1815	220	47.	4.2	2993.7
1		0140	21	10.	.5	2992.2	1		1000	121	76.	47.0	3005.1	1		1820	221	46.	3.9	2993.6
1		0145	22	12.	.6	2992.3	1		1005	122	75.	46.4	3005.0	1		1825	222	46.	3.6	2993.5
1		0150	23	15.	.8	2992.3	1		1010	123	75.	45.9	3004.9	1		1830	223	46.	3.3	2993.4
1		0155	24	17.	.9	2992.4	1		1015	124	75.	45.4	3004.8	1		1835	224	45.	3.0	2993.2
1		0200	25	19.	1.0	2992.4	1		1020	125	75.	44.9	3004.7	1		1840	225	45.	2.7	2993.1
1		0205	26	20.	1.1	2992.5	1		1025	126	74.	44.4	3004.6	1		1845	226	44.	2.4	2993.0
1		0210	27	22.	1.2	2992.5	1		1030	127	74.	43.9	3004.4	1		1850	227	39.	2.1	2992.9
1		0215	28	24.	1.2	2992.5	1		1035	128	74.	43.3	3004.3	1		1855	228	35.	1.8	2992.8
1		0220	29	26.	1.4	2992.6	1		1040	129	74.	42.8	3004.2	1		1900	229	30.	1.6	2992.7
1		0225	30	29.	1.5	2992.6	1		1045	130	73.	42.3	3004.1	1		1905	230	27.	1.4	2992.6
1		0230	31	32.	1.7	2992.7	1		1050	131	73.	41.8	3004.0	1		1910	231	23.	1.2	2992.5
1		0235	32	35.	1.8	2992.8	1		1055	132	73.	41.3	3003.9	1		1915	232	20.	1.1	2992.5
1		0240	33	37.	2.0	2992.8	1		1100	133	73.	40.8	3003.8	1		1920	233	18.	.9	2992.4
1		0245	34	40.	2.1	2992.9	1		1105	134	72.	40.3	3003.6	1		1925	234	16.	.8	2992.4
1		0250	35	44.	2.3	2993.0	1		1110	135	72.	39.8	3003.5	1		1930	235	14.	.7	2992.3
1		0255	36	45.	2.4	2993.0	1		1115	136	72.	39.3	3003.4	1		1935	236	12.	.6	2992.3
1		0300	37	45.	2.6	2993.1	1		1120	137	72.	38.8	3003.3	1		1940	237	11.	.6	2992.2
1		0305	38	45.	2.8	2993.2	1		1125	138	71.	38.3	3003.2	1		1945	238	9.	.5	2992.2
1		0310	39	45.	3.1	2993.3	1		1130	139	71.	37.8	3003.1	1		1950	239	8.	.4	2992.2
1		0315	40	46.	3.6	2993.5	1		1135	140	71.	37.4	3003.0	1		1955	240	7.	.4	2992.2
1		0320	41	47.	4.6	2993.8	1		1140	141	71.	36.9	3002.9	1		2000	241	6.	.3	2992.1
1		0325	42	49.	6.1	2994.4	1		1145	142	71.	36.4	3002.7	1		2005	242	6.	.3	2992.1
1		0330	43	52.	8.5	2995.3	1		1150	143	70.	35.9	3002.6	1		2010	243	5.	.3	2992.1
1		0335	44	54.	11.8	2996.3	1		1155	144	70.	35.4	3002.5	1		2015	244	4.	.2	2992.1
1		0340	45	58.	15.8	2997.5	1		1200	145	70.	34.9	3002.4	1		2020	245	4.	.2	2992.1
1		0345	46	61.	20.3	2998.8	1		1205	146	70.	34.5	3002.3	1		2025	246	3.	.2	2992.1
1		0350	47	65.	24.9	3000.1	1		1210	147	69.	34.0	3002.2	1		2030	247	3.	.2	2992.1
1		0355	48	67.	29.5	3001.2	1		1215	148	69.	33.5	3002.1	1		2035	248	3.	.1	2992.1
1		0400	49	69.	33.9	3002.2	1		1220	149	69.	33.0	3002.0	1		2040	249	2.	.1	2992.0
1		0405	50	71.	38.2	3003.2	1		1225	150	69.	32.5	3001.9	1		2045	250	2.	.1	2992.0
1		0410	51	73.	42.0	3004.0	1		1230	151	68.	32.1	3001.8	1		2050	251	2.	.1	2992.0
1		0415	52	75.	45.5	3004.8	1		1235	152	68.	31.6	3001.7	1		2055	252	1.	.1	2992.0
1		0420	53	76.	48.6	3005.4	1		1240	153	68.	31.1	3001.6	1		2100	253	1.	.1	2992.0
1		0425	54	77.	51.2	3005.9	1		1245	154	68.	30.7	3001.4	1		2105	254	1.	.1	2992.0

1	0430	55	78.	53.6	3006.3	*	1	1250	155	68.	30.2	3001.3	*	1	2110	255	1.	.1	2992.0
1	0435	56	79.	55.7	3006.7	*	1	1255	156	67.	29.7	3001.2	*	1	2115	256	1.	.0	2992.0
1	0440	57	80.	57.6	3007.1	*	1	1300	157	67.	29.3	3001.1	*	1	2120	257	1.	.0	2992.0
1	0445	58	80.	59.3	3007.4	*	1	1305	158	67.	28.8	3001.0	*	1	2125	258	1.	.0	2992.0
1	0450	59	81.	61.0	3007.7	*	1	1310	159	67.	28.4	3000.9	*	1	2130	259	1.	.0	2992.0
1	0455	60	82.	62.6	3008.0	*	1	1315	160	66.	27.9	3000.8	*	1	2135	260	1.	.0	2992.0
1	0500	61	82.	64.1	3008.2	*	1	1320	161	66.	27.4	3000.7	*	1	2140	261	0.	.0	2992.0
1	0505	62	83.	65.5	3008.5	*	1	1325	162	66.	27.0	3000.6	*	1	2145	262	0.	.0	2992.0
1	0510	63	83.	66.8	3008.7	*	1	1330	163	66.	26.5	3000.5	*	1	2150	263	0.	.0	2992.0
1	0515	64	84.	67.9	3008.9	*	1	1335	164	66.	26.1	3000.4	*	1	2155	264	0.	.0	2992.0
1	0520	65	84.	68.8	3009.1	*	1	1340	165	65.	25.6	3000.3	*	1	2200	265	0.	.0	2992.0
1	0525	66	84.	69.5	3009.2	*	1	1345	166	65.	25.2	3000.2	*	1	2205	266	0.	.0	2992.0
1	0530	67	84.	70.1	3009.3	*	1	1350	167	65.	24.7	3000.1	*	1	2210	267	0.	.0	2992.0
1	0535	68	85.	70.6	3009.4	*	1	1355	168	65.	24.3	3000.0	*	1	2215	268	0.	.0	2992.0
1	0540	69	85.	70.9	3009.5	*	1	1400	169	64.	23.8	2999.9	*	1	2220	269	0.	.0	2992.0
1	0545	70	85.	71.1	3009.5	*	1	1405	170	64.	23.4	2999.7	*	1	2225	270	0.	.0	2992.0
1	0550	71	85.	71.1	3009.5	*	1	1410	171	64.	23.0	2999.6	*	1	2230	271	0.	.0	2992.0
1	0555	72	85.	71.1	3009.5	*	1	1415	172	63.	22.5	2999.5	*	1	2235	272	0.	.0	2992.0
1	0600	73	85.	71.0	3009.5	*	1	1420	173	63.	22.1	2999.3	*	1	2240	273	0.	.0	2992.0
1	0605	74	85.	70.9	3009.5	*	1	1425	174	63.	21.7	2999.2	*	1	2245	274	0.	.0	2992.0
1	0610	75	85.	70.7	3009.4	*	1	1430	175	62.	21.2	2999.1	*	1	2250	275	0.	.0	2992.0
1	0615	76	85.	70.4	3009.4	*	1	1435	176	62.	20.8	2999.0	*	1	2255	276	0.	.0	2992.0
1	0620	77	84.	70.1	3009.3	*	1	1440	177	61.	20.4	2998.8	*	1	2300	277	0.	.0	2992.0
1	0625	78	84.	69.7	3009.3	*	1	1445	178	61.	20.0	2998.7	*	1	2305	278	0.	.0	2992.0
1	0630	79	84.	69.3	3009.2	*	1	1450	179	61.	19.5	2998.6	*	1	2310	279	0.	.0	2992.0
1	0635	80	84.	68.9	3009.1	*	1	1455	180	60.	19.1	2998.4	*	1	2315	280	0.	.0	2992.0
1	0640	81	84.	68.4	3009.0	*	1	1500	181	60.	18.7	2998.3	*	1	2320	281	0.	.0	2992.0
1	0645	82	84.	67.9	3008.9	*	1	1505	182	60.	18.3	2998.2	*	1	2325	282	0.	.0	2992.0
1	0650	83	84.	67.4	3008.8	*	1	1510	183	59.	17.9	2998.1	*	1	2330	283	0.	.0	2992.0
1	0655	84	83.	66.9	3008.8	*	1	1515	184	59.	17.5	2998.0	*	1	2335	284	0.	.0	2992.0
1	0700	85	83.	66.4	3008.7	*	1	1520	185	59.	17.1	2997.8	*	1	2340	285	0.	.0	2992.0
1	0705	86	83.	65.9	3008.6	*	1	1525	186	58.	16.7	2997.7	*	1	2345	286	0.	.0	2992.0
1	0710	87	83.	65.3	3008.5	*	1	1530	187	58.	16.3	2997.6	*	1	2350	287	0.	.0	2992.0
1	0715	88	82.	64.8	3008.4	*	1	1535	188	58.	15.9	2997.5	*	1	2355	288	0.	.0	2992.0
1	0720	89	82.	64.3	3008.3	*	1	1540	189	57.	15.5	2997.4	*	2	0000	289	0.	.0	2992.0
1	0725	90	82.	63.7	3008.2	*	1	1545	190	57.	15.1	2997.2	*	2	0005	290	0.	.0	2992.0
1	0730	91	82.	63.2	3008.1	*	1	1550	191	57.	14.7	2997.1	*	2	0010	291	0.	.0	2992.0
1	0735	92	82.	62.6	3008.0	*	1	1555	192	57.	14.3	2997.0	*	2	0015	292	0.	.0	2992.0
1	0740	93	81.	62.1	3007.9	*	1	1600	193	56.	13.9	2996.9	*	2	0020	293	0.	.0	2992.0
1	0745	94	81.	61.5	3007.8	*	1	1605	194	56.	13.5	2996.8	*	2	0025	294	0.	.0	2992.0
1	0750	95	81.	61.0	3007.7	*	1	1610	195	56.	13.1	2996.7	*	2	0030	295	0.	.0	2992.0
1	0755	96	81.	60.4	3007.6	*	1	1615	196	55.	12.7	2996.5	*	2	0035	296	0.	.0	2992.0
1	0800	97	81.	59.8	3007.5	*	1	1620	197	55.	12.4	2996.4	*	2	0040	297	0.	.0	2992.0
1	0805	98	80.	59.3	3007.4	*	1	1625	198	55.	12.0	2996.3	*	2	0045	298	0.	.0	2992.0
1	0810	99	80.	58.7	3007.3	*	1	1630	199	54.	11.6	2996.2	*	2	0050	299	0.	.0	2992.0
1	0815	100	80.	58.2	3007.2	*	1	1635	200	54.	11.2	2996.1	*	2	0055	300	0.	.0	2992.0
						*							*						

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)	(CFS)				
+ 85.	5.83		81.	48.	46.	46.
		(INCHES)	.741	1.755	1.755	1.755
		(AC-FT)	40.	95.	95.	95.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)				
71.	5.83	60.	24.	23.	23.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)				
3009.52	5.83	3007.55	2998.73	2998.48	2998.48

CUMULATIVE AREA = 1.01 SQ MI

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1	RATIO 2	RATIO 3
					1.00	.98	.97
HYDROGRAPH AT							
+	OFF7	.01	1	FLOW	9.	9.	9.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT							
+	OFF8	.21	1	FLOW	244.	237.	234.

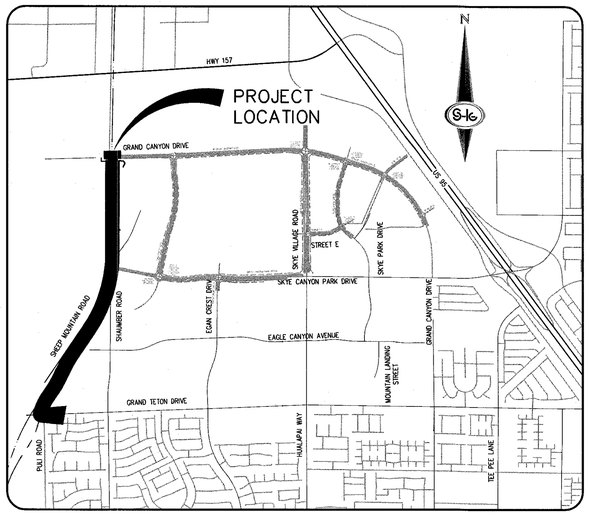
				TIME	3.75	3.75	3.75
2 COMBINED AT							
+	CP2	.22	1	FLOW	249.	242.	238.
				TIME	3.75	3.75	3.75
HYDROGRAPH AT							
+	OFF9	.11	1	FLOW	153.	149.	147.
				TIME	3.58	3.58	3.58
2 COMBINED AT							
+	CP2a	.33	1	FLOW	395.	384.	379.
				TIME	3.67	3.67	3.67
HYDROGRAPH AT							
+	OFF10	.65	1	FLOW	508.	494.	486.
				TIME	4.08	4.08	4.08
HYDROGRAPH AT							
+	ON2	.03	1	FLOW	66.	65.	64.
				TIME	3.50	3.50	3.50
3 COMBINED AT							
+	DB2	1.01	1	FLOW	774.	752.	741.
				TIME	3.83	3.83	3.83
ROUTED TO							
+	RDB2	1.01	1	FLOW	86.	85.	85.
				TIME	5.83	5.83	5.83
				** PEAK STAGES IN FEET **			
			1	STAGE	3010.16	3009.74	3009.52
				TIME	5.83	5.83	5.83

REFERENCED FLOW

*** NORMAL END OF HEC-1 ***

APPENDIX H

CD of Electronic Files, Grading Plan, Storm Drain Profiles and Detail Sheets



VICINITY MAP

IMPROVEMENT PLANS
FOR
SHEEP MOUNTAIN PARKWAY

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METERS
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK – 2008 ADJUSTMENT (UPDATED 05/24/2010)

BASIS OF BEARING

NORTH 89°16'30" WEST, BEING THE BEARING OF THE SOUTH LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 7, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 147, PAGE 71 OF PLATS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

OWNER

M F LAND LLC
% OLYMPIA COMPANIES LLC
11411 SOUTHERN HIGHLANDS
PARKWAY, SUITE 300
LAS VEGAS, NV 89141

DEVELOPER

NINETY–FIVE MANAGEMENT LLC
% OLYMPIA COMPANIES LLC
11411 SOUTHERN HIGHLANDS
PARKWAY, SUITE 300
LAS VEGAS, NV 89141
PH (702) 220–6565
FX (702) 220–6566

ENGINEER

SLATER HANIFAN GROUP
5740 S. ARVILLE STREET #216
LAS VEGAS, NV 89118
(702) 284–5300

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY
CALL BEFORE YOU DO OVERHEAD
1-702-227-2929

FAST
Call before you UnderGround.
1-702-432-5300
OF FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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

DRY UTILITY SUPPLEMENTAL INDEX

SOUTHWEST GAS	

INDEX OF DRAWINGS (STRUCTURAL)

SHT. NO.	DWG. NO.	DESCRIPTION

APPROVALS

CITY ENGINEER–ALLEN E. PAVELKA PE #9029 DATE

APPROVAL OF THESE PLANS BY THE CITY ENGINEER IS LIMITED TO THOSE IMPROVEMENTS CONSTRUCTED IN THE DEDICATED OF RIGHT–OF–WAY, AND/OR DEDICATED EASEMENTS. THIS APPROVAL DOES NOT AUTHORIZE CONSTRUCTION OF ANY IMPROVEMENTS THAT DEVIATE FROM ADOPTED STANDARDS AND/OR SPECIFICATIONS EXCEPT THOSE SPECIALLY LISTED UNDER DEVIATIONS FORM STANDARDS. THE ENGINEER SHALL RESOLVE ANY DEVIATION OTHER THAN THOSE LISTED IN DEVIATIONS FROM STANDARDS IN FAVOR OF THE UNIFORM STANDARD DRAWINGS AND SPECIFICATIONS, CLARK COUNTY AREA, NEVADA.

CHRIS KNIGHT DATE
DIRECTOR, BUILDING AND SAFETY

THIS PLAN MEETS THE APPLICABLE STANDARDS OF THE PLANNING DEPARTMENT.

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES
PROJECT NO. _____ DATE:_____
SHEETS:

APPROVAL BY THE FIRE DEPARTMENT HAVING JURISDICTION IS REQUIRED PRIOR TO OBTAINING FINAL APPROVAL FROM THE LAS VEGAS VALLEY WATER DISTRICT.

LAS VEGAS FIRE AND RESCUE DATE

NV ENERGY DATE

NV ENERGY ACKNOWLEDGES THAT WE HAVE RECEIVED YOUR PLANS AND WILL PROVIDE SERVICE TO ALL ELECTRICAL NEEDS ASSOCIATED WITH THIS PROJECT. NV ENERGY RESERVES THE RIGHT TO ADDRESS ANY EXISTING OR FUTURE CONFLICTS ONCE THE FINAL DESIGN IS COMPLETED. THE NEW SERVICE AND THE RESOLUTION OF ANY CONFLICTS WILL BE ACCOMPLISHED PURSUANT TO THE NEVADA PUBLIC UTILITY COMMISSION'S RULES AND REGULATIONS.

CENTRAL TELEPHONE CO, DBA CENTURYLINK DATE

THE AFFIXED CENTRAL TELEPHONE CO, DBA CENTURYLINK APPROVAL DOES NOT ASSUME OR GUARANTEE LIABILITY FOR KNOWN OR UNKNOWN CONFLICTS WITH EXISTING OR PROPOSED IMPROVEMENTS. RESOLUTION OF ANY CONFLICT WILL BE ACCOMPLISHED PURSUANT TO LOCAL ORDINANCES, NEVADA REVISED STATUES AND/OR PUBLIC UTILITY COMMISSION RULES AND REGULATIONS.

SOUTHWEST GAS CORPORATION DATE

COX COMMUNICATIONS LAS VEGAS, INC. DATE

INDEX OF DRAWINGS

SHT. NO.	DWG. NO.	DESCRIPTION
1	G–01	COVER SHEET
2	G–02	GENERAL NOTES
3	G–03	ABBREVIATIONS, KEY MAP, LEGEND AND QUANTITIES
4	H–01	HORIZONTAL CONTROL PLAN 1
5	H–02	HORIZONTAL CONTROL PLAN 2
6	H–03	HORIZONTAL CONTROL PLAN 3
7	C–01	CONSTRUCTION PLAN – "GTD" 17+00.00 TO "GTD" 23+50.00
8	C–02	CONSTRUCTION PLAN – "GTRB" 0+00.00 TO "GTRB" 6+50.00
9	C–03	CONSTRUCTION PLAN – "GTRB" 6+50.00 TO "GTRB" 10+34.64
10	C–04	CONSTRUCTION PLAN – "SMP" 184+84.15 TO "SMP" 188+00.00
11	C–05	CONSTRUCTION PLAN – "SMP" 188+00.00 TO "SMP" 194+50.00
12	C–06	CONSTRUCTION PLAN – "SMP" 194+50.00 TO "SMP" 201+00.00
13	C–07	CONSTRUCTION PLAN – "SMP" 201+00.00 TO "SMP" 207+50.00
14	C–08	CONSTRUCTION PLAN – "SMP" 207+50.00 TO "SMP" 214+00.00
15	C–09	CONSTRUCTION PLAN – "SMP" 214+00.00 TO "SMP" 220+50.00
16	C–10	CONSTRUCTION PLAN – "SMP" 220+50.00 TO "SMP" 227+50.00
17	C–11	CONSTRUCTION PLAN – "SMP" 227+50.00 TO "SMP" 233+50.00
18	C–12	CONSTRUCTION PLAN – "TRL" 10+00.00 TO "TRL" 12+00.00
19	C–13	CONSTRUCTION PLAN – "TRL" 12+00.00 TO "TRL" 18+00.00
20	C–14	CONSTRUCTION PLAN – "TRL" 18+00.00 TO "TRL" 24+50.00
21	C–15	CONSTRUCTION PLAN – "TRL" 24+50.00 TO "TRL" 31+00.00
22	C–16	CONSTRUCTION PLAN – "TRL" 31+00.00 TO "TRL" 37+50.00
23	C–17	CONSTRUCTION PLAN – "TRL" 37+50.00 TO "TRL" 44+00.00
24	C–18	CONSTRUCTION PLAN – "TRL" 44+00.00 TO "TRL" 50+50.00
25	C–19	CONSTRUCTION PLAN – "TRL" 50+50.00 TO "TRL" 57+00.00
26	C–20	CONSTRUCTION PLAN – "TRL" 57+00.00 TO "TRL" 63+50.00
27	C–21	CONSTRUCTION PLAN – "TRL" 63+50.00 TO "TRL" 70+00.00
28	GR–01	GRADING PLAN – "GTRB" 0+00.00 TO "GTRB" 6+50.00
29	GR–02	GRADING PLAN – "GTRB" 6+50.00 TO "GTRB" 12+00.00
30	GR–03	GRADING PLAN – "SMP" 188+00.00 TO "SMP" 194+50.00
31	GR–04	GRADING PLAN – "SMP" 194+50.00 TO "SMP" 201+00.00
32	GR–05	GRADING PLAN – "SMP" 201+00.00 TO "SMP" 207+50.00
33	GR–06	GRADING PLAN – "SMP" 207+50.00 TO "SMP" 214+00.00
34	GR–07	GRADING PLAN – "SMP" 214+00.00 TO "SMP" 220+50.00
35	GR–08	GRADING PLAN – "SMP" 220+50.00 TO "SMP" 227+50.00
36	GR–09	GRADING PLAN – "SMP" 227+50.00 TO "SMP" 233+50.00
37	GR–10	STORM DRAIN LATERAL PROFILES
38	TY–01	TYPICAL SECTIONS 1
39	TY–02	TYPICAL SECTIONS 2
40	ST–01	SIGNING AND STRIPING – "GTD" 19+85.67 TO "GTD" 21+78.14 & "GTRB" –0+01.44 TO "GTRB" 2+00.00
41	ST–02	SIGNING AND STRIPING – "GTRB" 2+00.00 TO "SMP" 188+00.00
42	ST–03	SIGNING AND STRIPING – "SMP" 188+00.00 TO "SMP" 201+00.00
43	ST–04	SIGNING AND STRIPING – "SMP" 201+00.00 TO "SMP" 214+00.00
44	ST–05	SIGNING AND STRIPING – "SMP" 214+00.00 TO "SMP" 227+50.00
45	ST–06	SIGNING AND STRIPING – "SMP" 227+50.00 TO "SMP" 231+18.05

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

COVER SHEET

DATE: 01/19/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER – STATE OF NEVADA – JERRY J. SLATER – Exp. 06/30/2018 – CIVIL – No. 14167
2-9-18

G-01
SHEET 1 OF 46

DWG NO. _____

HANSEN NO. _____

CITY OF LAS VEGAS SEWER NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS AND THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, AS AMENDED. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO BE AWARE OF THE CONTENTS OF THE ABOVE SPECIFICATIONS.
2. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PERFORM CONSTRUCTION AS PER PLANS. ANY ADDITIONS, DELETIONS, OR CHANGES SHALL FIRST MEET WITH THE APPROVAL OF THE CITY ENGINEER.
3. CHISEL "S" OR "G" IN CURBS WHERE SEWER OR GAS LATERALS PASS UNDER THE CURB.
4. POLYVINYL (PVC) SEWER PIPE SHALL MEET ASTM D-3034 SDR 35 SPECIFICATIONS, INSTALLED WITH SAND BEDDING AND BACKFILL OF TYPE II AGGREGATE BASE.
5. ALL MANHOLES PAVED IN STREETS EIGHTY (80') FOOT R/W AND LARGER SHALL HAVE CONCRETE COLLARS. STREETS LESS THAN EIGHTY (80') FOOT R/W WILL REQUIRE RETROFIT IF PAVING DOES NOT CONFORM TO CITY STANDARDS AT THE MANHOLE.
6. TEE SADDLES SHALL BE USED TO CONNECT SEWER LATERALS TO EXISTING MAIN LINES UP TO TWELVE INCH (12") DIAMETER. CONNECTIONS TO FIFTEEN INCH (15") OR LARGER MAINS SHALL REQUIRE SPECIAL PROCEDURES. IN LINE "Y" 'S SHALL BE USED ON LINES TWELVE INCHES (12") OR ABOVE.
7. WATER MAINS SHALL BE PROTECTED IN ACCORDANCE WITH LVVWD STANDARDS WHENEVER A SEWER MAIN CROSSES OVER A WATER MAIN OR THE SEWER IS LESS THAN EIGHTEEN INCH (18") UNDER A WATER MAIN.
8. ALL CONTRACTORS INSTALLING SEWER MAINS THAT WILL BE UNDER THE JURISDICTION OF THE CITY OF LAS VEGAS MUST BE STATE OF NEVADA CLASS "A" CONTRACTORS.
9. THE CITY OF LAS VEGAS WILL NOT ACCEPT ANY SEWER MAINS WHICH HAVE A VERTICAL DEFLECTION OF MORE THAN ONE TENTH (0.1) OF A FOOT FROM THE APPROVED CONSTRUCTION PLANS AT ANY LOCATION. SEWER MAINS FOUND TO EXCEED THIS TOLERANCE WILL HAVE TO BE REPAIRED OR REMOVED OR REPLACED TO THE SATISFACTION OF THE CITY ENGINEER PRIOR TO ACCEPTANCE BY THE CITY OF LAS VEGAS.
10. INSTALLATION OF CURVED SEWER REQUIRES THE USE OF C-900 PIPE WHICH ALLOWS FOR PIPE DEFLECTION AT THE JOINTS.

REVISED 04/15/10

STORMWATER MANAGEMENT NOTES

1. THE OWNER, SITE DEVELOPER, CONTRACTOR, AND/OR THEIR AUTHORIZED AGENTS SHALL EACH DAY REMOVE ALL SEDIMENT, MUD, CONSTRUCTION DEBRIS, OR OTHER POTENTIAL POLLUTANTS THAT MAY HAVE BEEN DISCHARGED TO, OR ACCUMULATED IN, THE PUBLIC RIGHTS OF WAY OF CLARK COUNTY AS A RESULT OF CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS SITE DEVELOPMENT OR CONSTRUCTION PROJECT. SUCH MATERIALS SHALL BE PREVENTED FROM ENTERING THE STORM SEWER SYSTEM.
2. ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT PRACTICES MAY BE REQUIRED OF THE OWNER AND HIS OR HER AGENTS DUE TO UNFORESEEN EROSION PROBLEMS IF THE SUBMITTED PLAN DOES NOT MEET THE PERFORMANCE STANDARD IN THE USDCCA AND THE LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDANCE MANUAL.
3. TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE AND NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. SOME EXCEPTIONS MAY APPLY; REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.5.
4. AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL INSPECT ALL DISTURBED AREAS, AREAS USED FOR STORAGE OF MATERIALS AND EQUIPMENT THAT ARE EXPOSED TO PRECIPITATION, VEHICLE ENTRANCE AND EXIT LOCATIONS, AND ALL BMPs WEEKLY, AND WITHIN 24 HOURS AFTER ANY RAIN EVENT OF 0.5 INCHES OR MORE. THE CONTRACTOR OR HIS AGENT SHALL UPDATE OR MODIFY THE STORMWATER POLLUTION PREVENTION PLAN AS NECESSARY. SOME EXCEPTIONS TO WEEKLY INSPECTIONS MAY APPLY, SUCH AS SUSPENSION OF OF LAND DISTURBANCE ACTIVITIES. REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR 100000, SECTION III.A.12.
5. THE DEVELOPER SHALL BE RESPONSIBLE TO PROVIDE AND INSTALL ALL PERMANENT SIGNS SHOWN ON THE PLANS. STREET NAME SIGNS SHALL CONFORM IN THEIR ENTIRETY TO CLARK COUNTY AREA STANDARDS. ALL OTHER SIGNS SHALL BE STANDARD SIZE UNLESS OTHERWISE SPECIFIED ON THE PLANS. ALL SIGN POSTS SHALL BE INSTALLED IN ACCORDANCE WITH CLARK COUNTY AREA STANDARDS. ALL SIGNS SHALL USE TYPE III SHEETING.

LAS VEGAS VALLEY WATER DISTRICT (LVVWD) STANDARD NOTES

LVVWD PROJECT #XXXXXX

1. NO WORK SHALL BEGIN UNTIL THE WATER PLANS HAVE BEEN APPROVED FOR CONSTRUCTION BY THE LVVWD. FOLLOWING WATER PLAN APPROVAL, NOTICE SHALL BE GIVEN TO THE LVVWD COMMUNICATION SUPPORT CENTER (258-7171) TWO (2) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION. FOR FUTURE INSPECTIONS, NOTICE MUST BE GIVEN BY 2:00 P.M. THE BUSINESS DAY PRIOR TO THE REQUESTED LVVWD INSPECTION. **WHEN REQUESTING INSPECTIONS, PLEASE REFER TO THE PROJECT # IDENTIFIED ABOVE.**
2. ALL WORK SHALL CONFORM TO LVVWD STANDARD PLATES, DRAWINGS, AND SPECIFICATIONS, AND TO THE **2010** EDITION OF THE UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR POTABLE WATER SYSTEMS (UDACS). **THE LATEST EDITION OF UDACS SHALL SUPERSEDE ANY CONFLICTS CONTAINED IN THE APPROVED DRAWINGS AND/OR SPECIFICATIONS.**
3. ALL WORK, EXCEPT AS MODIFIED BY THESE PLANS OR BY NOTE 2 ABOVE, SHALL BE DONE IN ACCORDANCE WITH THE MOST RECENT DRAFT OR EDITION OF THE UNIFORM SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFFSITE IMPROVEMENT, CLARK COUNTY AREA.
4. A SINGLE PIPE MATERIAL SHALL BE USED THROUGHOUT THE PROJECT UNLESS OTHERWISE APPROVED BY THE LVVWD.
5. ALL SERVICE LATERALS TWO (2) INCHES IN DIAMETER AND SMALLER SHALL BE TYPE K COPPER TUBING WITH LVVWD APPROVED SERVICE SADDLES.
6. ALL WATER METER BOXES SHALL BE LOCATED OUTSIDE OF DRIVEWAY AREAS.
7. ALL VALVES SHALL BE LOCATED OUTSIDE OF DRIVEWAYS, VALLEY AND CURB GUTTERS.
8. ALL WATER AND STORM DRAIN OR SANITARY SEWER CROSSINGS SHALL CONFORM TO SECTION 2.22 OF THE **2010** EDITION OF THE UDACS
9. ALL WATER FACILITIES SHALL BE FILLED, DISINFECTED, PRESSURE TESTED, FLUSHED, FILLED, AND AN ACCEPTABLE WATER SAMPLE OBTAINED, PRIOR TO CONNECTION TO THE LVVWD DISTRIBUTION SYSTEM.
10. THE CONTRACTOR MUST OBTAIN ALL METERS TWO (2) INCHES AND SMALLER FROM LVVWD CENTRAL STORES. TELEPHONE 258-3152 OR 258-3802, TWO (2) WORKING DAYS PRIOR TO METER PICKUP.
11. ANY INTERRUPTION OF SERVICE MUST BE PERFORMED IN ACCORDANCE WITH UDACS SECTION 3.14.01, AND APPROVED BY THE LVVWD INSPECTION DIVISION PRIOR TO SHUTDOWN. PROPER WRITTEN NOTIFICATION MUST BE GIVEN TO ALL AFFECTED CUSTOMERS.
12. ALL WATER FACILITY CONSTRUCTION MATERIALS USED MUST BE LISTED ON THE LVVWD PRE-APPROVED MATERIALS AND MANUFACTURER'S LISTING FOR NEW FACILITIES, LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS.
13. TELEPHONE "CALL BEFORE YOU DIG" AT "811" OR 1-800-227-2600.
14. THE INSTALLATION OF LAS VEGAS VALLEY WATER DISTRICT (LVVWD) MUNICIPAL WATER FACILITIES WITHIN ALL STREETS IS ASSUMED TO BE IN COMPLIANCE WITH THE UNIFORM STANDARDS, INCLUDING THE PLACEMENT OF ASPHALT PAVING STREET SURFACES. ANY REPAIR WORK DONE BY THE LVVWD TO THE MUNICIPAL WATER FACILITIES WILL INCLUDE THE PLACEMENT OF AN APPROPRIATELY SIZED ASPHALT REPAIR PATCH ON THE STREET SURFACE. ANY DECORATIVE PAVING SURFACE WITHIN THE STREET IS THE RESPONSIBILITY OF THE OWNER'S ASSOCIATION, OR THE INDIVIDUAL PROPERTY OWNERS IF NO OWNER'S ASSOCIATION IS IN EXISTENCE, OR THE AGENCY HAVING JURISDICTION DECORATIVE SURFACE MATERIALS PLACED WITHIN THE TEN FOOT EASEMENT ABUTTING A PUBLIC OF PRIVATE STREET, IF DISTURBED BY THE LVVWD DURING THE REPAIR OR OPERATION OF ITS FACILITIES, WILL BE REPLACED BY LVVWD WITH AN APPROPRIATELY SIZED PLAIN FINISH CONCRETE PATCH. THE LVVWD WILL NOT RESTORE, AND WILL NOT BE RESPONSIBLE FOR THE RESTORATION OF ANY DECORATIVE PAVING SURFACE WITH THE STREET. THE LVVWD WILL NOT ATTEMPT TO MATCH COLOR OR FINISH OF ANY ADJACENT MATERIALS.

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES

DATE_____ LVVWD PROJECT # XXXXXX

CITY OF LAS VEGAS GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA NEVADA", LATEST ISSUE; THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION, CLARK COUNTY AREA NEVADA", LATEST REVISED EDITION; THE "SUMMERLIN IMPROVEMENT STANDARDS" FOR WORK IN THE SUMMERLIN AREA; AND OTHER APPLICABLE APPROVED STANDARDS ISSUED BY THE CONTROLLING AGENCY; THE UNIFORM BUILDING CODE; AND ALL LOCAL CITY CODES AND ORDINANCES APPLICABLE, EXCEPT AS NOTED ON THIS SHEET AS "DEVIATIONS FROM STANDARDS".
2. THE EXISTENCE AND LOCATION OF ANY OVERHEAD OR UNDERGROUND UTILITY LINES, PIPES, OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A RESEARCH OF THE AVAILABLE RECORDS. EXISTING UTILITIES AS SHOWN FROM CLV PLANS LIBRARY ARE APPROXIMATE AND FOR RECORD PURPOSES. EXISTING UTILITIES ARE LOCATED ON PLANS ONLY FOR THE CONVENIENCE OF THE CONTRACTOR. EXISTING UTILITY SERVICE LATERALS MAY NOT BE SHOWN ON THE PLANS. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, LOCATE ALL UNDERGROUND AND OVERHEAD INTERFERENCES WHICH MAY AFFECT HIS OPERATION DURING CONSTRUCTION AND SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID DAMAGE TO SAME. THE CONTRACTOR SHALL USE EXTREME CAUTION WHEN WORKING NEAR OVERHEAD UTILITIES SO AS TO SAFELY PROTECT ALL PERSONNEL AND EQUIPMENT, AND SHALL BE RESPONSIBLE FOR ALL COST AND LIABILITY IN CONNECTION THEREWITH.
3. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT EXISTING UTILITY LINES, STRUCTURES AND STREET IMPROVEMENTS WHICH ARE TO REMAIN IN PLACE, FROM DAMAGE, AND ALL SUCH IMPROVEMENTS OR STRUCTURES DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR REPLACED SATISFACTORY TO THE CITY ENGINEER AND OWNING UTILITY COMPANY AT THE EXPENSE OF THE CONTRACTOR.
4. ALL CONSTRUCTION SHALL BE AS SHOWN ON THESE PLANS, ANY REVISIONS SHALL HAVE THE PRIOR WRITTEN APPROVAL OF THE CITY ENGINEER.
5. TYPE V CEMENT SHALL BE USED IN ALL OFF-SITE CONCRETE WORK. CONCRETE TO BE 3000 P.S.I. MINIMUM @ 28 DAYS. MIX DESIGNS TO BE APPROVED BY THE CITY, PRIOR TO THE USE ON THE PROJECT.
6. PERMITS ARE REQUIRED FOR ANY WORK IN THE PUBLIC RIGHT-OF-WAY. THE CONTRACTOR SHALL SECURE ALL PERMITS AND INSPECTIONS REQUIRED FOR THIS CONSTRUCTION.
7. EXPANSION JOINTS REQUIRED, MAXIMUM EVERY 300' IN EXTRUDED-TYPE CURB.
8. AC PAVEMENT TO BE ONE-HALF INCH (½") ABOVE LIP OF ALL GUTTERS AFTER COMPACTION, EXCEPT AT SIDEWALK RAMPS AND CROSS GUTTERS.
9. CURB AND GUTTER FOUND TO BE UNACCEPTABLE TO THE CITY OF LAS VEGAS SHALL BE REMOVED AND REPLACED PER STANDARD DRAWING 216.
10. SIDEWALK RAMPS SHALL BE CONSTRUCTED IN EACH QUADRANT OF AN INTERSECTION PER STANDARD DRAWING 235. EXACT LOCATION OF RAMPS MAY BE ADJUSTED IN THE FIELD BY A CITY INSPECTOR.
11. CONTRACTOR SHALL PROVIDE ALL NECESSARY HORIZONTAL AND VERTICAL TRANSITIONS BETWEEN NEW CONSTRUCTION AND EXISTING SURFACES TO PROVIDE FOR PROPER DRAINAGE AND FOR INGRESS AND EGRESS TO NEW CONSTRUCTION. THE EXTENT OF THE TRANSITIONS TO BE AS SHOWN ON PLANS.
12. ALL GRADING WORK SHALL CONFORM TO THE SOILS REPORT AS PREPARED BY WRIGHT ENGINEERS, REPORT #160165, MAY 20, 2016 APPROVED BY THE CITY ENGINEER, AND AS SHOWN ON THESE PLANS.
13. EXACT LOCATION OF ALL SAWCUT LINES MAY BE ADJUSTED OR DETERMINED IN THE FIELD BY A CITY OF LAS VEGAS ENGINEER IF LOCATION ON PLANS IS NOT CLEARLY SHOWN, OR EXISTING PAVEMENT CONDITION REQUIRES RELOCATIONS.
14. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PROTECT EXISTING PERMANENT SURVEY MONUMENTS. ANY MONUMENTS DISTURBED SHALL BE REPLACED AND ADJUSTED PER AVAILABLE RECORDS IN ACCORDANCE WITH N.R.S. STATUTE NO. 625.380 & CITY OF LAS VEGAS TITLE 18, APPENDIX D.
15. UTILITY COMPANY METER BOXES, MANHOLE LIDS, VALVE COVERS, ETC., SHALL BE LOCATED OUT OF DRIVEWAYS, DRIVEWAY APRONS, FLOWLINES, AND CROSS GUTTERS UNLESS WRITTEN APPROVAL IS GRANTED BY THE UTILITY COMPANY AND THE CITY ENGINEER. ALL ABOVE GROUND UTILITY APPERTANANCES SHALL CONFORM TO THE REQUIREMENTS OF 19.12.040.

WALL NOTES:

16. ALL WALLS, NEW OR EXISTING, ARE ONLY SHOWN ON CIVIL PLANS FOR THE PURPOSE OF REVIEWING GRADING RELATIONSHIPS; FLOOD CONTROL AND SIGHT DISTANCE AT INTERSECTIONS. NEW WALLS REQUIRE A SEPARATE PERMIT AND INSPECTION BY THE BUILDING DEPARTMENT.
17. ASPHALT MIX DESIGN MUST BE SUBMITTED AND APPROVED BY THE CITY ENGINEER PRIOR TO THE PLACEMENT OF ASPHALT WITHIN CITY RIGHT OF WAY.
18. CONTRACTOR SHALL ADJUST ALL NEW AND EXISTING INLETS, VALVE BOXES, MANHOLE RIMS, AND SEWER CLEAN OUTS, ETC. TO FINISH GRADE AS APPLICABLE WHETHER OR NOT THEY ARE SHOWN ON THE PLANS.
19. MATERIALS, HANDLING AND PLACEMENT OF PORTLAND CEMENT CONCRETE SHALL BE IN ACCORDANCE WITH APPLICABLE SECTIONS OF NDOT OR THE CLARK COUNTY AREA SPECIFICATIONS (AS APPLICABLE) AND THE PLANS AND DETAILS SHOWN HEREON.
20. WHEN INSTALLING UNDERGROUND FACILITIES THAT REQUIRE UNDERGROUND LOCATING DEVICES SUCH AS MARKER BALLS, LOCATING RIBBON, ETC, THE CONTRACTOR SHALL PROVIDE WRITTEN DOCUMENTATION TO OFFSITE INSPECTION AND TESTING CERTIFYING THAT ALL DEVICES HAVE BEEN PLACED AND VERIFIED TO BE IN GOOD WORKING CONDITION PRIOR TO THE CONSTRUCTION OF ANY ROAD BASE.
21. SANITARY SEWER AND STORM DRAIN FINAL LOCATION MAP(S) SHALL BE PROVIDED TO THE CITY AND APPROVED PRIOR TO ACCEPTANCE OF FACILITY VIDEO INSPECTION. THE MAP(S) SHALL INCLUDE THE HORIZONTAL AND VERTICAL (INVERT) LOCATION OF PUBLIC SEWER MANHOLES, STORM DRAIN MANHOLES AND TRANSITION STRUCTURES, STORM DRAIN LATERALS AT THE CONNECTION TO THE STORM DRAIN MAIN AND AT THE CONNECTION TO A STORM DRY WELL, THE CONNECTION OF SEWER SERVICE LATERALS TO THE SEWER MAIN AND WHERE THE SEWER SERVICE LATERALS EXIT THE PUBLIC RIGHT-OF-WAY, AND STORM DRAIN MAIN ALIGNMENT, INCLUDING DEFLECTION POINTS. THE LOCATION SHALL BE DESCRIBED BY COORDINATES WHICH SHALL BE BASED ON THE OFFICIAL HORIZONTAL AND VERTICAL CONTROL FOR THE CITY OF LAS VEGAS. FINAL LOCATION MAPS MUST BE SEALED AND CERTIFIED BE A NEVADA PROFESSIONAL LAND SURVEYOR TO HAVE POSITIONAL CERTAINTIES OF ±0.09 METERS (±0.3 FEET) HORIZONTALLY AND VERTICALLY. A SEPARATE ELECTRONIC COMMA DELIMITED FILE FOR THE SANITARY SEWER AND STORM DRAIN COORDINATES SHALL ALSO ACCOMPANY THE SANITARY SEWER AND STORM DRAIN FINAL LOCATION MAP(S).

OR

~~SANITARY SEWER AND STORM DRAIN FACILITIES SHOWN ON THESE PLANS SHALL BE USED TO MEET THE REQUIREMENTS OF NRS 455 AND SHALL SHOW AT A MINIMUM THE HORIZONTAL AND VERTICAL (INVERT) LOCATION OF PUBLIC MANHOLES, STORM DRAIN MANHOLES, STORM DRAIN LATERALS, AND THE CONNECTION OF SEWER SERVICE LATERALS TO THE SEWER MAIN AND WHERE THE SEWER SERVICE LATERALS EXIT THE PUBLIC RIGHT-OF-WAY. ANY DEVIATIONS FROM THE INFORMATION SHOWN SHALL BE NOTED AND SUBMITTED AS A REVISION TO THE PLANS AND APPROVED PRIOR TO ACCEPTANCE OF FACILITY VIDEO INSPECTION.~~

22. CCTV VIDEO INSPECTION IS REQUIRED FOR ALL SEWER AND STORM DRAINS. THE CCTV VIDEO INSPECTIONS NEED TO BE PERFORMED PER THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS LATEST ADDITION.
23. A SEPARATE BORING PERMIT IS REQUIRED FOR ALL BORING ACTIVITIES.

REVISED 02/03/15

CITY OF LAS VEGAS STREETLIGHT NOTES

1. ALL STREET LIGHTING INSTALLATIONS SHALL BE IN ACCORDANCE WITH THE STREET LIGHTING PLANS, THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA", LATEST REVISION, AND THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA", LATEST REVISION, AND ANY ADOPTED SPECIAL AREA STANDARDS.
2. NO DEVIATION OF STREET LIGHT, PULL BOX, CONDUITS (ETC.) LOCATIONS SHALL BE PERMITTED WITHOUT WRITTEN APPROVAL OF TRAFFIC ENGINEERING AND THE CITY ENGINEER.
3. ALL EXISTING STREET LIGHTING SHALL REMAIN OPERATIONAL DURING CONSTRUCTION.
4. ALL STREET LIGHTING CONDUITS STUB SHALL HAVE AT LEAST ONE GREEN #8 THW WIRE INSTALLED, AS TRACER WIRE. WHEN "EMPTY" CONDUIT IS COMPLETELY INSTALLED FROM PB TO PB, IT SHALL HAVE MINIMUM OF 2 #4 AND 1 #8 THW WIRE WITH THE ENDS TAPED OR "SAFE OFF" PRIOR TO FINAL INSPECTION.
5. ANY STRUCTURE SUCH AS BLOCK WALLS, CHAIN LINK FENCES, RETAINING WALLS, ETC., SHALL LEAVE A MINIMUM CLEARANCE IN ACCORDANCE WITH THE USD NO. 320A.
6. AS-BUILT DRAWINGS SHALL BE SUPPLIED TO THE TEFO PRIOR TO ANY PRE-FINAL INSPECTION. THE AS-BUILT DRAWING NEEDS TO BE STAMPED AS-BUILT AND SIGNED BY THE PREPARER.
7. SERVICE POINT SHALL BE COORDINATED WITH NV ENERGY COMPANY, AND WHEREVER POSSIBLE, BE LOCATED NEAR THE CENTER OF THE CIRCUIT. SERVICE POINTS SHALL BE SHOWN ON THE CIVIL PLANS.
8. IT SHALL BE ASSUMED THAT IN THE ABSENCE OF AN EXISTING, WORKABLE CIRCUIT TO ATTACH TO, ALL INSTALLATIONS SHALL REQUIRE A NEW SERVICE FOR OPERATION OF THE CIRCUIT.
9. WHEREVER THERE IS AN OVERHEAD UTILITY THAT MAY CONFLICT WITH THE INSTALLATION OF STREET LIGHTING CIRCUITS AND/OR POLES, THESE CONFLICTS MUST BE RESOLVED BETWEEN THE DEVELOPER AND THE UTILITIES INVOLVED, AT NO EXPENSE TO THE CITY OF LAS VEGAS, BEFORE STREETLIGHT BASES ARE INSTALLED.
10. THE CONTRACTOR SHALL FURNISH COMPLETE SERVICE TO TRANSFORMERS AND CONTROL SYSTEMS IF REQUIRED ON PLANS.
11. THE DEVELOPER/OWNER WILL BE REQUIRED TO SUPPLY POWER TO ALL NEW PUBLIC STREET LIGHTS INSTALLED UNDER THIS DESIGN PRIOR TO BOND RELEASE OR PROJECT COMPLETION. THE DEVELOPER/OWNER WILL BE RESPONSIBLE FOR ALL ITEMS ASSOCIATED WITH THE INSTALLATION, CONSTRUCTION, ENERGIZING, MAINTENANCE AND OPERATIONAL COST OF SAID STREET LIGHTS PRIOR TO PROJECT COMPLETION. REFER TO THE PLAN FOR ANY NEW SERVICE REQUIREMENTS. THE TRANSFER OF OWNERSHIP FROM THE DEVELOPER/OWNER TO THE CITY OF LAS VEGAS FOR ALL NEW PUBLIC STREET LIGHT/S AND/OR SERVICE/S INSTALLED UNDER THIS PLAN DESIGN WILL BE IN CONJUNCTION WITH THIS PROJECT COMPLETION. COORDINATE ALL MAINTENANCE AND OPERATIONAL TRANSFERS WITH THE CITY OF LAS VEGAS TRAFFIC ENGINEERING DEPARTMENT (TEFO) AT (702) 229-6331.

REVISED 04/15/10

LAS VEGAS FIRE AND RESCUE GENERAL NOTES

1. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE LAS VEGAS FIRE AND RESCUE ADOPTED FIRE CODE ORDINANCE # 6325 FOR HYDRANT SPECIFICATIONS AND HYDRANT INSTALLATION SPECIFICATIONS.
2. ONLY FIRE HYDRANTS THAT ARE ON THE LAS VEGAS VALLEY WATER DISTRICT'S-APPROVED PRODUCTS LIST ARE ALLOWED TO BE INSTALLED.
3. A PERMIT IS REQUIRED FROM LAS VEGAS FIRE AND RESCUE FOR THE INSTALLATION OF ON-SITE WATER LINES AND FIRE HYDRANTS. THE PERMIT AND CONTRACTORS MATERIAL TEST CERTIFICATE FOR UNDERGROUND PIPING FORM SHALL BE OBTAINED FROM THE FIRE PROTECTION ENGINEER BEFORE COMMENCEMENT OF WORK. [IFC § 105.7.12]
4. ON ANY RESIDENTIAL OR COMMERCIAL INSTALLATIONS, FIRE HYDRANTS SHALL BE INSTALLED AND FIRE APPARATUS ACCESS ROADS SHALL BE MAINTAINED BEFORE COMMENCEMENT OF ANY COMBUSTIBLE CONSTRUCTION. ALL FIRE HYDRANTS SHALL BE IN GOOD WORKING ORDERAND SHALL BE CAPABLE OF DELIVERING THE REQUIRED FIRE FLOW. [IFC § 3310, § 3312]
5. TO IDENTIFY THE FIRE HYDRANT LOCATIONS, THE CONTRACTOR SHALL PLACE A BLUE REFLECTIVE MARKER AT THE CENTER LINE OF THE STREET ADJACENT TO THE FIRE HYDRANTS. [IFC § 507.5.7.3]
6. ALL UNDERGROUND INSPECTIONS, PRESSURE AND FLUSH VERIFICATIONS OF ALL FIRE HYDRANTS AND FIRE LINES, SHALL BE CONDUCTED BEFORE COVERING THE LINES. CENTER LOADING IS ACCEPTABLE FOR THE HYDRO TESTS WITH PRIOR FIRE PREVENTION APPROVAL. [IFC § 106.3]
7. ALL ON-SITE UNDERGROUND WATER MAINS AND MATERIALS SHALL BE U.L. LISTED, A.W.W.A APPROVED AND SHALL BE RATED FOR THE APPROPRIATE WORKING PRESSURE. [IFC § 507.2.1, NFPA 24]
8. PAINTING OF CURBS, FIRE HYDRANTS, PADS, PROTECTION OF FIRE HYDRANTS FROM PHYSICAL DAMAGE, AND ALL OTHER WORK NECESSARYPER PLANS SHALL BE COMPLETED BEFORE APPROVAL BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION. [IFC § 507]
9. PRIVATE HYDRANTS SHALL BE PAINTED RED. [IFC § 507.5.7.1]
10. PRIOR TO THE FINAL OCCUPANCY, A FIRE FLOW TEST SHALL BE WITNESSED BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION TO VERIFY AVAILABILITY OF THE REQUIRED FIRE FLOW. [IFC § 507]
11. FIRE HYDRANT SPACING SHALL BE AS FOLLOWS; [IFC § C102]
    - ·RESIDENTIAL -500 FT UNSPRINKLERED; 600 FT SPRINKLERED.
    - ·COMMERCIAL -300 FT UNSPRINKLERED; 400 FT SPRINKLERED.
12. WHERE THE WATER MAINS ARE EXTENDED ALONG STREETS OR NEW STREETS ARE INSTALLED WHERE FIRE HYDRANTS ARE NOT NEEDED FOR PROTECTION OF THE STRUCTURES, FIRE HYDRANTS SHALL BE INSTALLED AT A MAXIMUM OF 1000 FT SPACING, TO PROVIDE FOR TRANSPORTATION HAZARDS. WHERE STREETS ARE PROVIDED WITH MEDIAN DIVIDERS OR HAVE FOUR (4) OR MORE TRAFFIC LANES AND HAVE A TRAFFIC COUNT OF MORE THAN 30,000 PER DAY, HYDRANTS ARE REQUIRED ON EACH SIDE OF THE STREET SPACED AT 500 FT ON AN ALTERNATING BASIS. [IFC § C102.8]
13. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN THE RADIUS OF A CUL-DE-SAC OR WITHIN 20 FT OF THE PERIMETER OF THE RADIUS OF THE CUL-DE-SAC.
14. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN 6 FT OF ANY CURB RETURN, DRIVEWAY, POWER POLE, STREETLIGHT OR ANY OTHER OBSTRUCTION. [IFC § C102.12]
15. A MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A ONE-TWO FAMILY DWELLING SHALL NOT EXCEED 300 FT, AS MEASURED BY AN APPROVED ROUTE. [IFC § C102.4]
16. THE MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A FIRE DEPARTMENT CONNECTION (FDC) SHALL NOT EXCEED 100 FT, AS MEASURED BY AN APPROVED ROUTE. [IFC § C102.7]
17. THE MAXIMUM DISTANCE FROM A HYDRANT TO THE END OF A DEAD-END STREET SHALL NOT EXCEED 200 FT. [IFC § C102.6]
18. TWO (2) SOURCES OF SUPPLY ARE REQUIRED WHENEVER THERE IS 4 OR MORE FIRE HYDRANTS/SPRINKLER LEAD-INS ARE INSTALLED ON A SINGLE SYSTEM. SECTIONAL CONTROL VALVES SHALL BE INSTALLED SO THAT NO MORE THAN 2 FIRE HYDRANTS CAN BE OUT OF SERVICE DUE TO A BREAK IN A WATER MAIN. [IFC § C104]
19. ALL FIRE APPARATUS ACCESS ROADS SHALL BE PAVED TO PROVIDE ALL-WEATHER DRIVING CAPABILITIES, AND SHALL BE DESIGNED AND MAINTAINED TO SUPPORT THE IMPOSED LOADS OF THE FIRE APPARATUS. [IFC § 503.2.3]
20. THE GRADIENT FOR THE FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 12% ANGLES OF APPROACH AND ANGLES OF DEPARTURE SHALL NOT EXCEED 6% FOR 25 FT PRIOR TO OR AFTER THE GRADE CHANGE. ADJACENT TO THE STRUCTURES GRADIENT SHALL NOT EXCEED 6% [IFC § 503.2.7, § 503.2.8]
21. THE TURNING RADIUS OF THE FIRE APPARATUS ACCESS ROADS SHALL BE NO LESS THAN 52 FT OUTSIDE AND 28 FT INSIDE TURNING RADIUS. [IFC § 503.2.4]
22. VERTICAL CLEARANCE OF ALL FIRE APPARATUS ACCESS ROADS SHALL NOT BE LESS THAN 13FT 6 INS. [IFC § 503.2.1]
23. FIRE DEPARTMENT ACCESS ROADS SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF NOT LESS THAN 40 FT FLOW LINE TO FLOW LINE WITH PARALLEL PARKING PERMITTED ON BOTH SIDES. NOT LESS THAN 32 FT WIDE, FLOW-LINE TO FLOW-LINE, WHERE PARKING IS PERMITTED ONLY ON ONE SIDE OF THE FIRE APPARATUS ACCESS ROAD. NOT LESS THAN 24 FT WIDE, FLOW-LINE TO FLOW-LINE, WHERE NO PARKING IS PERMITTED ON EITHER SIDE. FIRE LANES THROUGH PARKING LOTS SHALL BE NOT LESS THAN 24 FT. [IFC § 503.2.1.1]
24. A FIRE APPARATUS ACCESS ROAD SHALL BE REQUIRED WHEN ANY PORTION OF AN EXTERIOR WALL OF THE FIRST STORY IS LOCATED MORE THAN 150 FT FROM A FIRE DEPARTMENT VEHICLE ACCESS. THIS DISTANCE COULD BE INCREASED TO 250 FT IF THE BUILDING IS SPRINKLERED. [IFC § 503.1.1]
25. APPROVED SECONDARY FIRE APPARATUS ACCESS SHALL BE PROVIDED FOR 100 OR MORE DWELLING UNITS, ROAD(S) WITH DEAD-ENDS OR WITH A SINGLE POINT OF ACCESS IN EXCESS OF 600 FT. COMMERCIAL AND INDUSTRIAL DEVELOPMENTS WHERE BUILDINGS EXCEED 2 STORIES OR 30 FEET IN HEIGHT, OR EXCEEDING 62,000 SQUARE FEET IN AREA. [IFC § 503.1.2]
26. ALL DEAD-END FIRE APPARATUS ROADS AND/OR FIRE LANES, PUBLIC OR PRIVATE, IN EXCESS OF 150 FT IN LENGTH SHALL BE PROVIDED WITH AN APPROVED TURN AROUND HAVING A MINIMUM DIAMETER OF 81 FT. [IFC § 503.2.5]
27. ALL FIRE APPARATUS ACCESS ROADS SHALL BE MARKED BY PLACING APPROVED SIGNS AT THE START OF THE DESIGNATED FIRE LANE, ONE SIGN AT THE END OF THE FIRE LANE AND WITH SIGNS AT INTERVALS OF 100 FT ALONG THE DESIGNATED FIRE LANES. SIGNS TO BE PLACED ON BOTH SIDES OF AN ACCESS ROADWAY IF NEEDED TO PREVENT PARKING ON EITHER SIDE. SIGNS TO BE INSTALLED NO HIGHER THAN 10 FT OR LESS THAN 6 FT FROM THE ROAD

LEGEND

TEL 5-4"	EXISTING TELEPHONE CABLE
12" SS	EXISTING SANITARY SEWER LINE
12" W	EXISTING WATER LINE
18" SD	EXISTING STORM DRAIN LINE
ELE UG 1-4"	EXISTING UNDERGROUND ELECTRICAL LINE
OHP	EXISTING OVERHEAD POWER LINE
OHP/TEL	EXISTING OVERHEAD POWER AND TELEPHONE LINE
4" PE GAS	EXISTING GAS LINE
CATV	EXISTING CABLE TELEVISION LINE
	EXISTING CURB & GUTTER
	EXISTING RIGHT-OF-WAY LINE
	EXISTING PROPERTY LINE
X X X	EXISTING CHAIN-LINK FENCE
SL	EXISTING STREET LIGHT CONDUIT
MH	EXISTING MANHOLE OR VAULT
	EXISTING VALVE (GAS OR WATER)
FH	EXISTING FIRE HYDRANT
PP	EXISTING POWER OR TELEPHONE POLE
	EXISTING PADMOUNTED SERVICE PEDESTAL
	EXISTING NV ENERGY TRANSFORMER
	EXISTING SWING GATE
	CENTERLINE
	EASEMENT LINE
	AEP
	PROPOSED SIGN
	MAINTENANCE ACCESS PATH
	CONCRETE OR PAVED SURFACE
	FLOWLINE
	SAWCUT LINE
1875	CONTOUR LINE
123 TC	ELEVATION
D	STORM DRAIN MANHOLE
S	SANITARY SEWER MANHOLE
	100 WATT STREET LIGHT
	250 WATT STREET LIGHT
4" ITS	FAST ITS CONDUIT
	FAST P30 PULLBOX
	FAST TYPE 200 SPLICE VAULT
	EXISTING STREET LIGHT
	EXISTING ON-SITE LIGHT

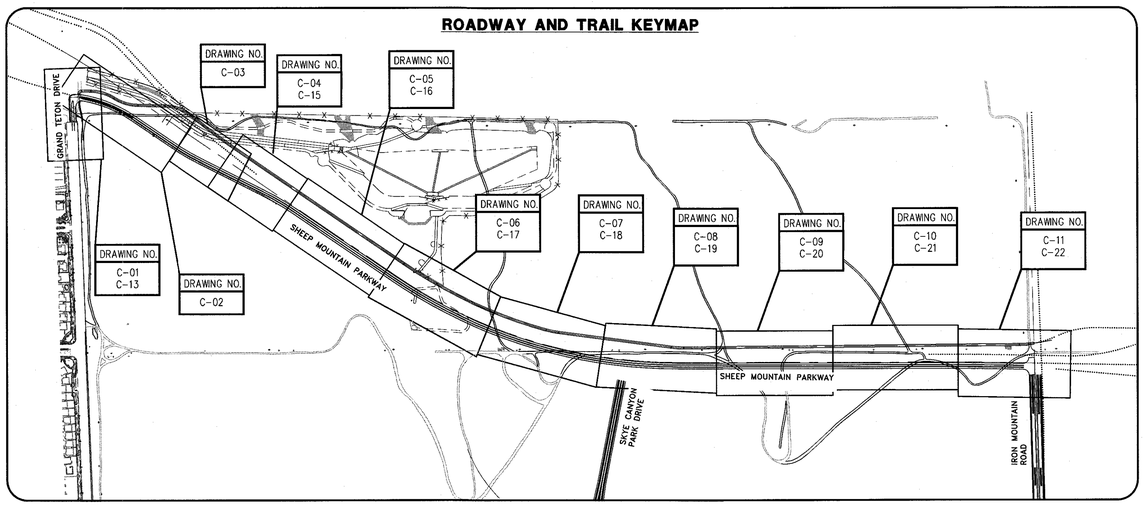
QUANTITIES

DESCRIPTION	UNIT	TOTAL QUANTITY
8" SEWER	LF	" "
SEWER MANHOLE 6 TO 18 FEET	EA	" "
SEWER MANHOLE > 18'	EA	" "
8" PVC WATER MAIN	LF	" "
8" PVC WATER LATERAL	LF	" "
8" DIP WATER LATERAL	LF	" "
10" PVC WATER MAIN	LF	" "
10" DIP WATER MAIN	LF	" "
10" DIP WATER LATERAL	LF	" "
8" GATE VALVE	EA	" "
10" GATE VALVE	EA	" "
8" 45° BEND	EA	" "
8" 5° BEND	EA	" "
8" X 8" TEE	EA	" "
10" 45° BEND	EA	" "
10" 5° BEND	EA	" "
10" X 10" TEE	EA	" "
CAP WITH 2" BLOW-OFF ASSEMBLY	EA	" "
FIRE HYDRANT	EA	" "
16" X 8" REDUCER	EA	" "
10" X 8" REDUCER	EA	" "
CURB & GUTTER (TYPE "L" & "A")	LF	" "
CROSS GUTTER	SF	" "
SIDEWALK 4"	LF	" "
SIDEWALK RAMP	EA	" "
TYPE II GRAVEL BASE	CY	" "
3" ASPHALTIC CONCRETE PAVING	SY	" "
4" ASPHALTIC CONCRETE PAVING	SY	" "
5" ASPHALTIC CONCRETE PAVING	SY	" "

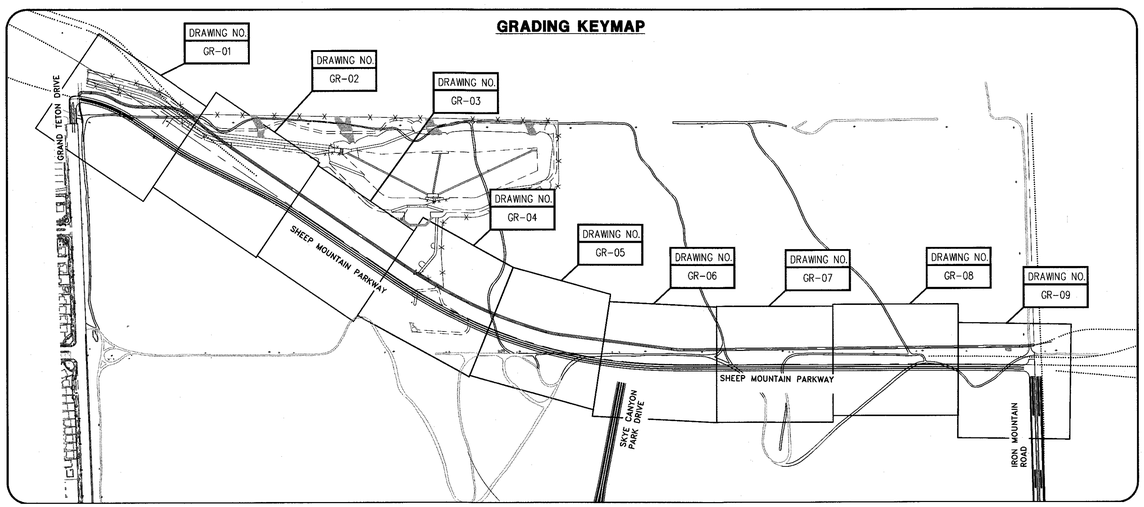
QUANTITIES

DESCRIPTION	UNIT	TOTAL QUANTITY
36" STORM DRAIN	LF	56
48" STORM DRAIN	LF	270
54" STORM DRAIN	LF	82
HEADWALL (STRUCTURAL)	EA	2
STORM DRAIN DROP INLET (STRUCTURAL)	EA	2
METAL FLARED END SECTION	EA	1
RIPRAP (D50=18", T=36")	SF	210
CONCRETE PAD WITH 3-FT DEEP CUTOFF WALL (STRUCTURAL)	SF	58
3-FT DEEP CUTOFF WALL	LF	321

ROADWAY AND TRAIL KEYMAP



GRADING KEYMAP



ABBREVIATIONS

ABUT	ABUTMENT
AC	ALUMINUM CAP/ASPHALTIC CONCRETE
AEP	AUTHORIZATION TO ENTER PROPERTY
AP	ANGLE POINT
APN	ASSESSORS PARCEL NUMBER
AVE	AVENUE
BC	BEGIN CURVE/BRASS CAP/BACK OF CURB
BCR	BEGIN CURB RETURN
BLVD	BOULEVARD
BM	BENCHMARK
BOT	BOTTOM
BRG	BEARING
BSW	BACK OF SIDEWALK
BVCE	BEGIN VERTICAL CURVE ELEVATION
BVCS	BEGIN VERTICAL CURVE STATION
CATV	UNDERGROUND CABLE TV
CG	CURB AND GUTTER
CCSD	DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS
CKT	CIRCUIT
CLR	CLEAR/CLEARANCE
CLBM	CITY OF LAS VEGAS BENCHMARK
CLV	CITY OF LAS VEGAS
CMU	CONCRETE MASONRY UNIT
CONC	CONCRETE
℄, C/L	CENTERLINE
COB	CENTER OF BOLLARD
COL	COLUMN
CONST	CONSTRUCT/CONSTRUCTION
COORD	COORDINATE
COR	CORNER
CY	CUBIC YARD(S)
Δ	DELTA
DB	DIRECT BURY
DBL	DOUBLE
DI	DROP INLET
DIA	DIAMETER
DIST	DISTANCE
DR	DRIVE
DW	DRIVEWAY
DWG	DRAWING
ECR	END CURB RETURN
E	EAST
EA	EACH
ESMT	EASEMENT
ECR	END CURB RETURN
ELEC	ELECTRICAL
ELEV/EL	ELEVATION
EP/EOP	EDGE OF PAVEMENT
EQ	EQUAL
EST	ESTIMATED
EVC	END VERTICAL CURVE
EX./EXIST	EXISTING
EXP	EXPANSION JOINT
EW	EACH WAY
FC	FACE OF CURB
FG	FINISH GRADE
FH	FIRE HYDRANT
FL	FLOW LINE
FO	FIBER OPTIC
FS	FINISH SURFACE
FT	FOOT/FEET
FTG	FOOTING
FW	FACE OF WALL
FYA	FLASHING YELLOW ARROW
G	GAS
GA	GAUGE
GB	GRADE BREAK
GND	GROUND
H	HEIGHT
HGL	HYDRAULIC GRADE LINE
HORIZ	HORIZONTAL
HWY	HIGHWAY
INV	INVERT
ITS	INTELLIGENT TRANSPORTATION SYSTEM
JT	JOINT
LF	LINEAR (LINEAL) FEET
LIP	LIP OF GUTTER
LT	LEFT
LUM	LUMINAIRE
LVVWD	LAS VEGAS VALLEY WATER DISTRICT
MAX	MAXIMUM
MH	MANHOLE
MIN	MINIMUM
MLCP	MULTI-LAYERED COMPOSITE PIPE
MOD	MODIFY/MODIFIED
MON	MONUMENT
MPH	MILES PER HOUR
N	NORTH
NDOT	NEVADA DEPARTMENT OF TRANSPORTATION
NO	NUMBER
NVE	NV ENERGY
NTS	NOT TO SCALE
OC	ON CENTER
OHP	OVERHEAD POWER LINE
PAT	PATENT
PB	PULL BOX
PBS	PLANTMIX BITUMINOUS SURFACE
PC	POINT OF CURVE, PHOTO CELL
PCC	POINT OF COMPOUND CURVE
PD	PONDING DEPTH
PE	PROJECT ENGINEER/POLYETHYLENE
PED	PEDESTRIAN
PG	PROFILE GRADE (FG ON CONTROL LINE)
PGL	PROFILE GRADE LINE
PH	POTHOLE
PI	POINT OF INTERSECTION
PKWY	PARKWAY
PL	PROPERTY LINE
PMF	PAVEMENT MARKING FILM
POB	POINT OF BEGINNING
POC	POINT ON CURVE
POE	POINT OF ENDING
POT	POINT ON TANGENT
PP	POWER POLE
PPCBR	PORTABLE PRECAST CONCRETE BARRIER RAIL
PPM	POLYUREA PAVEMENT MARKINGS
PR	PAIR
PROP	PROPOSED
PRC	POINT OF REVERSE CURVE
PRVC	POINT REVERSE VERTICAL CURVE
PSI	POUNDS PER SQUARE INCH
PT	POINT OF TANGENCY
PVI	POINT OF VERTICAL INTERSECTION
PVMT	PAVEMENT
R	RADIUS
RCB	REINFORCED CONCRETE BOX
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
RDWY	ROADWAY
REC	RECTANGULAR
REINF	REINFORCED
REQD	REQUIRED
RND	ROUND
RP	RADIUS POINT
RPM	RAISED PAVEMENT MARKERS
R/W	RIGHT-OF-WAY
RT	RIGHT
S	SOUTH
SCH	SCHEDULE
SD	STORM DRAIN
SDMH	STORM DRAIN MANHOLE
SECT	SECTION
SF	SQUARE FOOT/FEET
SHLDR	SHOULDER
SHT	SHEET
SIM	SIMILAR
SP	SERVICE POINT
SPA	SPACING
SQ	SQUARE
SS	SANITARY SEWER
SSMH	SANITARY SEWER MANHOLE
STA	STATION
STD	STANDARD
ST	STREET
STL	STEEL
SL	STREET LIGHT
STRUCT	STRUCTURE
SW	SIDEWALK
SNBORS	SOUTHERN NEVADA BUILDING OFFICIALS REGIONAL STANDARDS
SWG	SOUTHWEST GAS
T	TELEPHONE/TOP
TAN	TANGENT
TC	TOP OF CURB
TEMP	TEMPORARY
TF	TOP OF FOOTING
TG	TOP OF GRATE
TMH	TOP OF MANHOLE
TRANS	TRANSITION STRUCTURE
THW	TOP OF HEADWALL
TRW	TOP OF RETAINING WALL
TW	TOP OF WALL
TS	TRAFFIC SIGNAL
TYP	TYPICAL
UDACS	UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR WATER DISTRIBUTION SYSTEMS
USDCCA	UNIFORM STD. DRAWINGS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS CLARK COUNTY AREA, NEVADA
UT	UNDERGROUND TELEPHONE
VAR	VARIABLE/VARIES
VC	VERTICAL CURVE
VERT	VERTICAL
VG	VALLEY GUTTER
W	WEST
WY	WAY
WT	WEIGHT
XING	CROSSING

ALIGNMENT ABBREVIATIONS

"GTD"	GRAND CANYON DRIVE
"GTRB"	GRAND TETON RAMP B
"SMP"	SHEEP MOUNTAIN PARKWAY
"TRL"	TRAIL
"IM"	IRON MOUNTAIN ROAD

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

ABBREVIATIONS, KEY MAP, LEGEND AND QUANTITIES

DATE: 01/19/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER STATE OF NEVADA JERRY J. SLATER Exp. 06/30/2018 CIVIL No. 14167

G-03
SHEET 3 OF 46

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NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

HORIZONTAL CONTROL PLAN 1

DATE: 01/19/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER STATE OF NEVADA
JERRY J. SLATER
Exp. 06/30/2018
CIVIL
No. 14167

H-01
SHEET 4 OF 46

DWG NO. _____

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NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

HORIZONTAL CONTROL PLAN 2

DATE: 01/19/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER STATE OF NEVADA
JERRY SLATER
Exp. 06/30/2018
CIVIL
No. 14167

H-02
SHEET 5 OF 46
DWG NO. _____

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NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY
HORIZONTAL CONTROL PLAN 3

DATE: 01/19/18
DRAFTER: BCC
DESIGNER: BCC
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PROJECT NO.
OLY1720.000

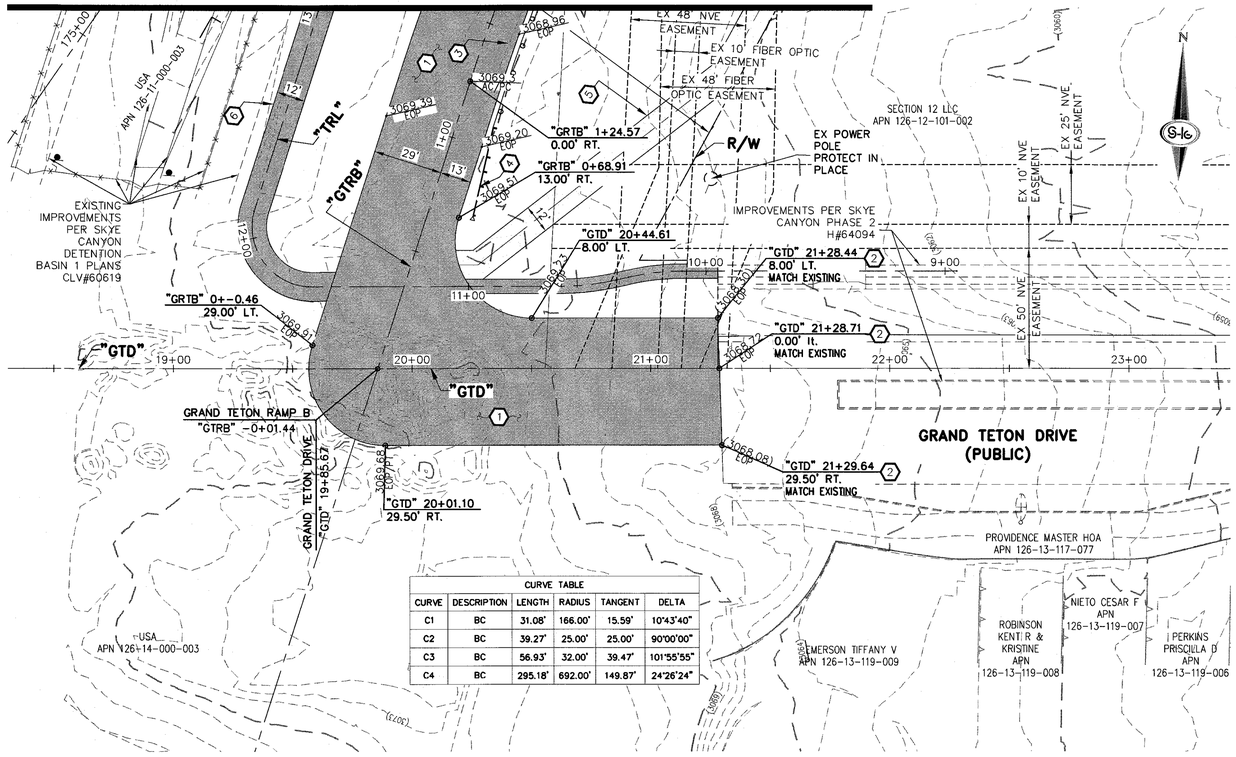
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Exp. 06/30/2018
CIVIL
No. 14167

H-03
SHEET 6 OF 46

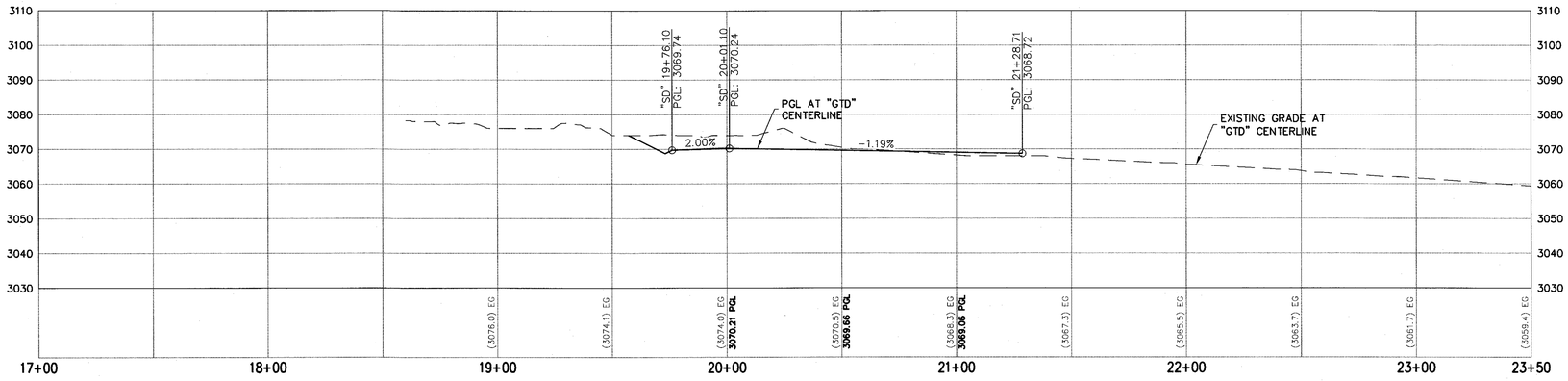
DWG NO. _____

HANSEN NO. _____

SEE SHEET C-02



CURVE TABLE					
CURVE	DESCRIPTION	LENGTH	RADIUS	TANGENT	DELTA
C1	BC	31.08'	166.00'	15.59'	10°43'40"
C2	BC	39.27'	25.00'	25.00'	90°00'00"
C3	BC	56.93'	32.00'	39.47'	101°55'55"
C4	BC	295.18'	692.00'	149.87'	24°26'24"



CONSTRUCTION NOTES

1. CONSTRUCT OVER 4.5" PBS OVER 4" TYPE II AGGREGATE BASE (SEE TY-SHEETS)
2. SAWCUT AND MATCH EXISTING
3. INSTALL GUARDRAIL (TRIPLE CORRUGATION) (NDOT STD. PLAN R-8.4.1)
4. INSTALL TANGENT END TERMINAL (NDOT STD. PLAN R-8.1.1)
5. CONSTRUCT 12-FT WIDE (MIN) MAINTENANCE ACCESS PATH
6. CONSTRUCT 2" OVER 4" TYPE II AGGREGATE BASE TRAIL (SEE SHEETS C-13 THROUGH C-22 FOR PLAN AND PROFILE)
7. EXISTING POWER POLE (PROTECT IN PLACE)
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15. CONSTRUCT 3-FT DEEP CONCRETE CUTOFF WALL

NOTES

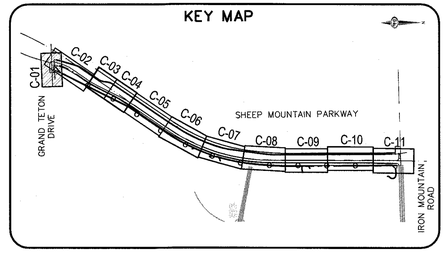
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2. SEE SD-SHEETS FOR STORM PROFILES.
3. SEE UT-SHEETS FOR WATER AND SEWER PLAN AND PROFILES.
4. SEE GR-SHEETS FOR GRADING AND STORM DRAIN PLAN.

LEGEND

PLANTMIX BITUMINOUS SURFACE

MAINTENANCE ACCESS PATH

KEY MAP



SCALE 30 0 30 60 FEET

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD 1-702-227-2929

FAST Call before you UnderGround. 1-702-432-5300 NEVADA'S AND AMERICA'S SYSTEM OF TRANSPORTATION

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

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY
CONSTRUCTION PLAN - "GTD" 17+00.00 TO "GTD" 23+50.00

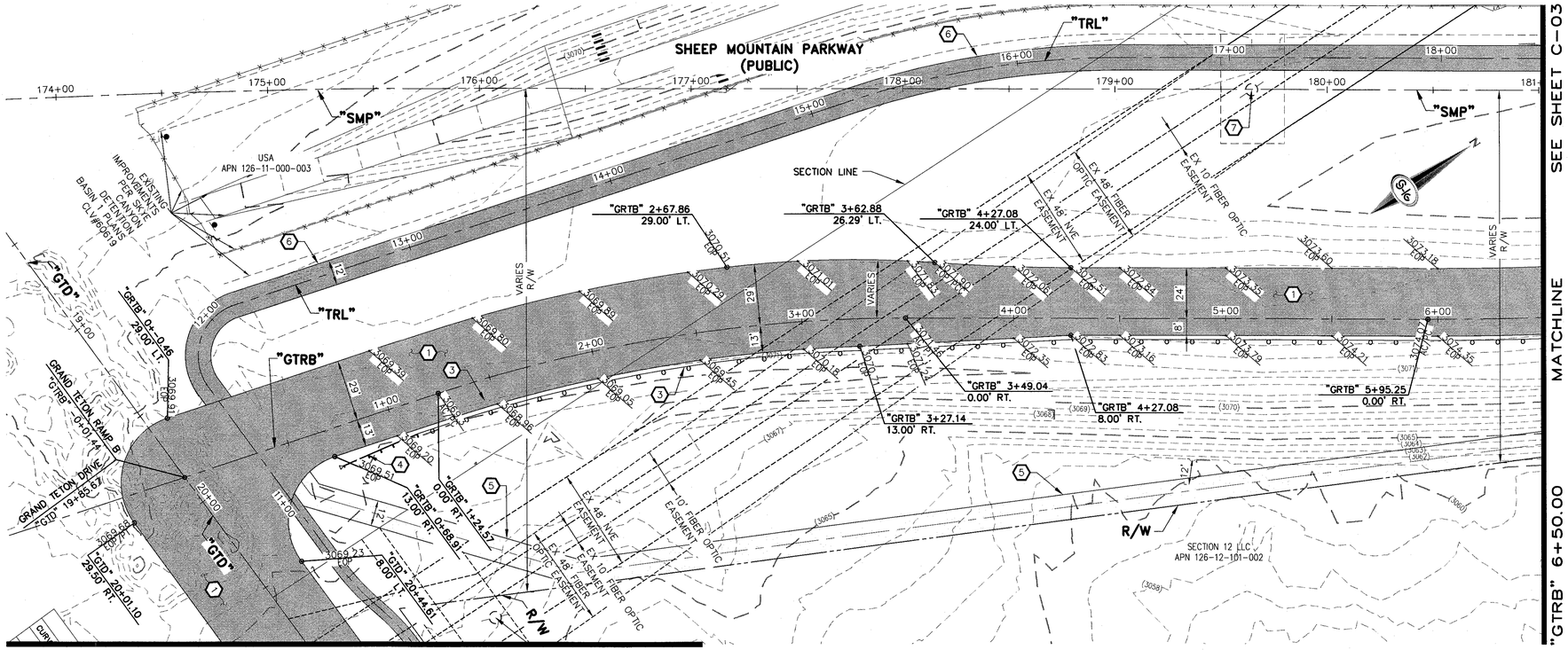
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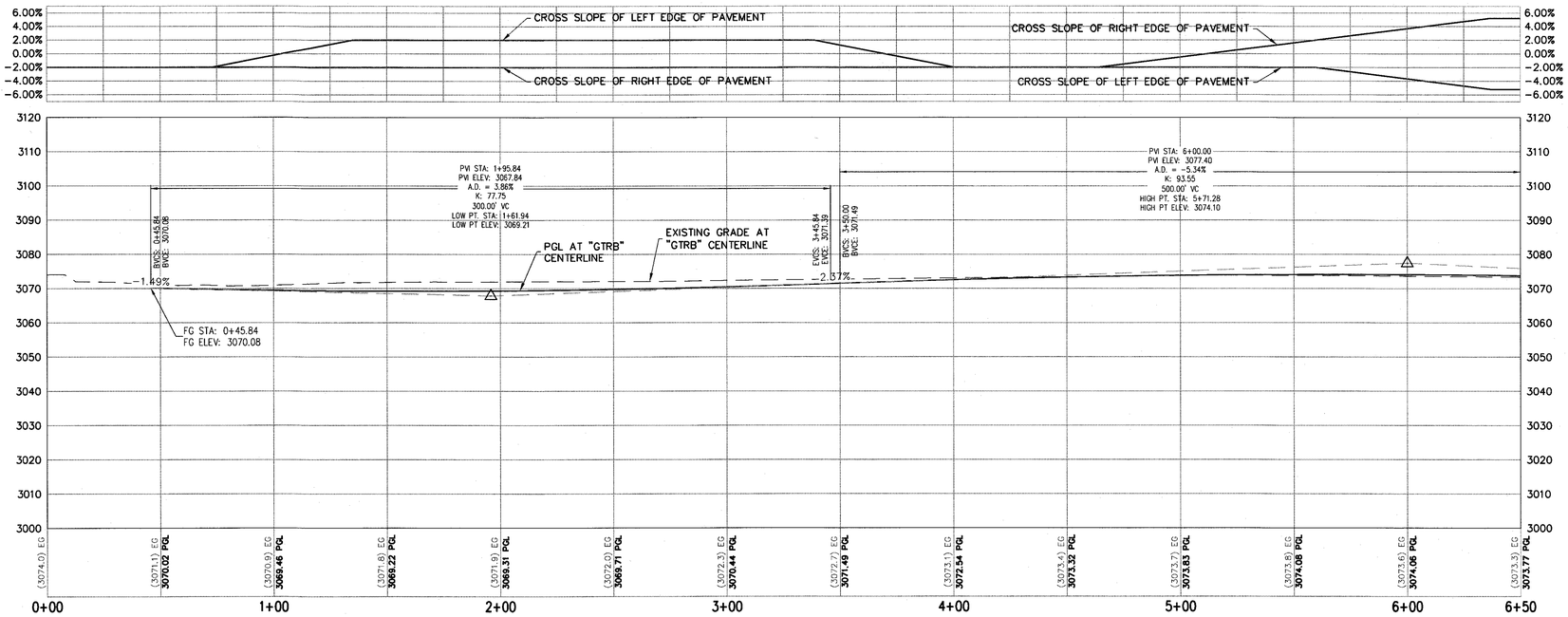
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C-01
SHEET 7 OF 46

DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

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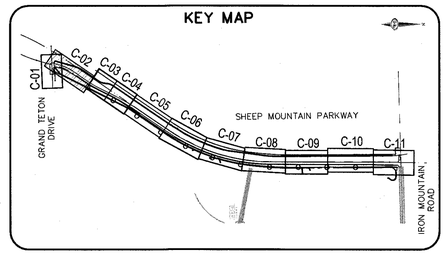
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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "GTRB" 0+00.00 TO "GTRB" 6+50.00

DATE: 01/19/18
DRAFTER: BCC
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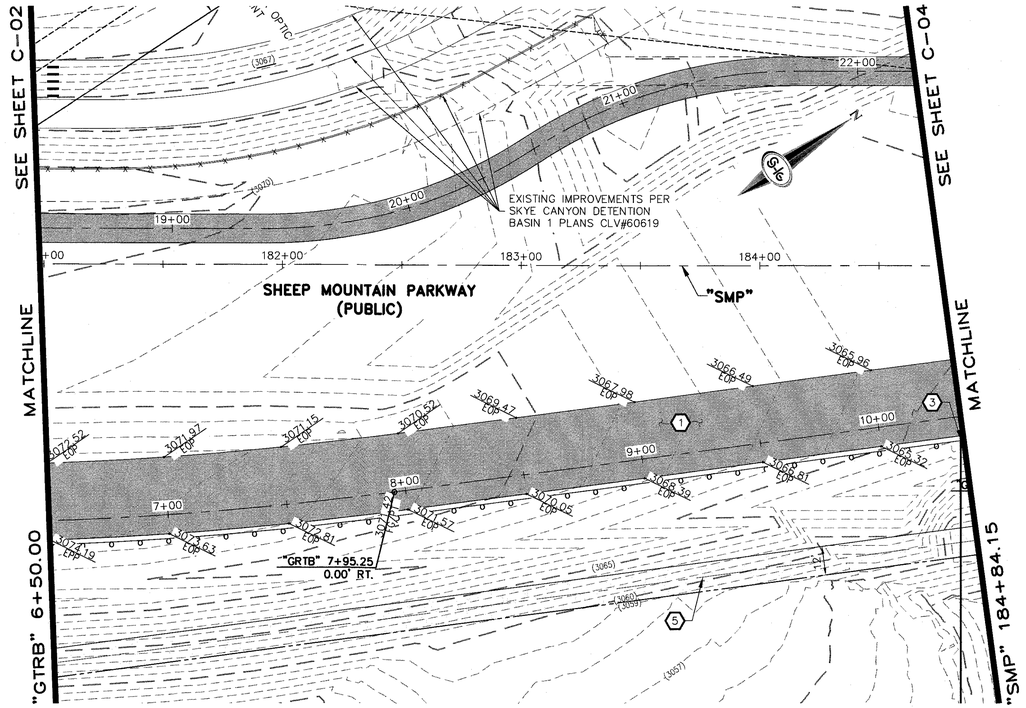
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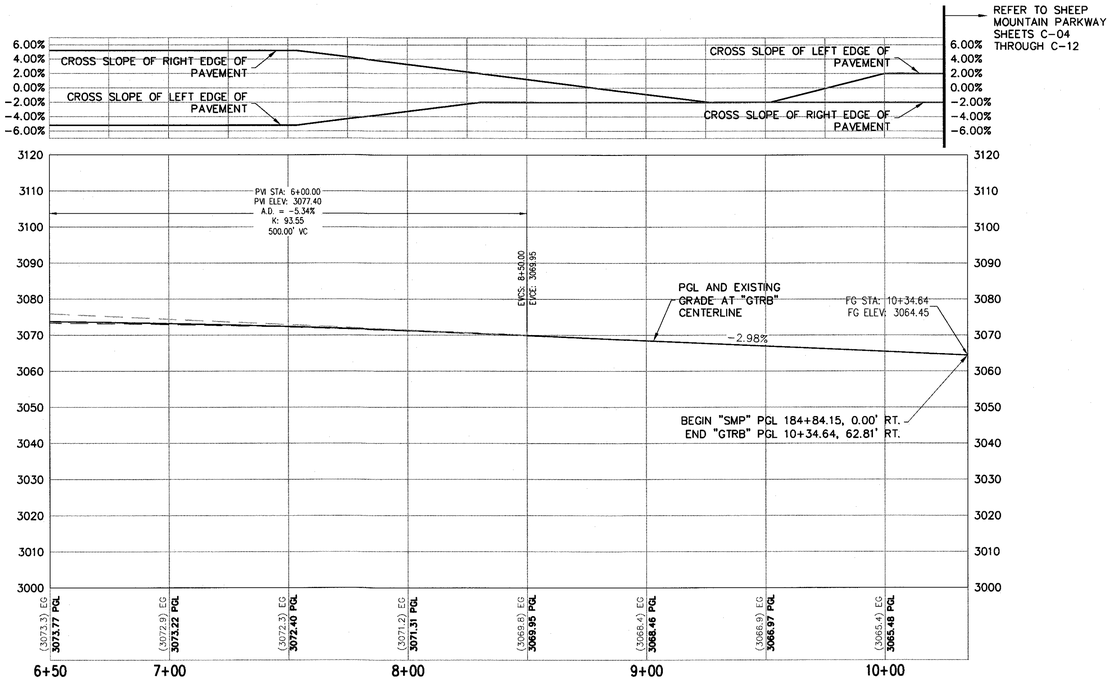
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JERRY J. SLATER
Exp. 06/30/2018
CIVIL
NO. 14167
2-6-18

C-02
SHEET 8 OF 46

DWG NO. _____

HANSEN NO. _____





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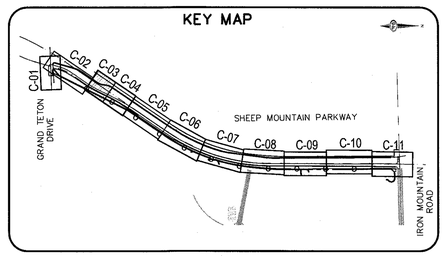
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SHEEP MOUNTAIN PARKWAY

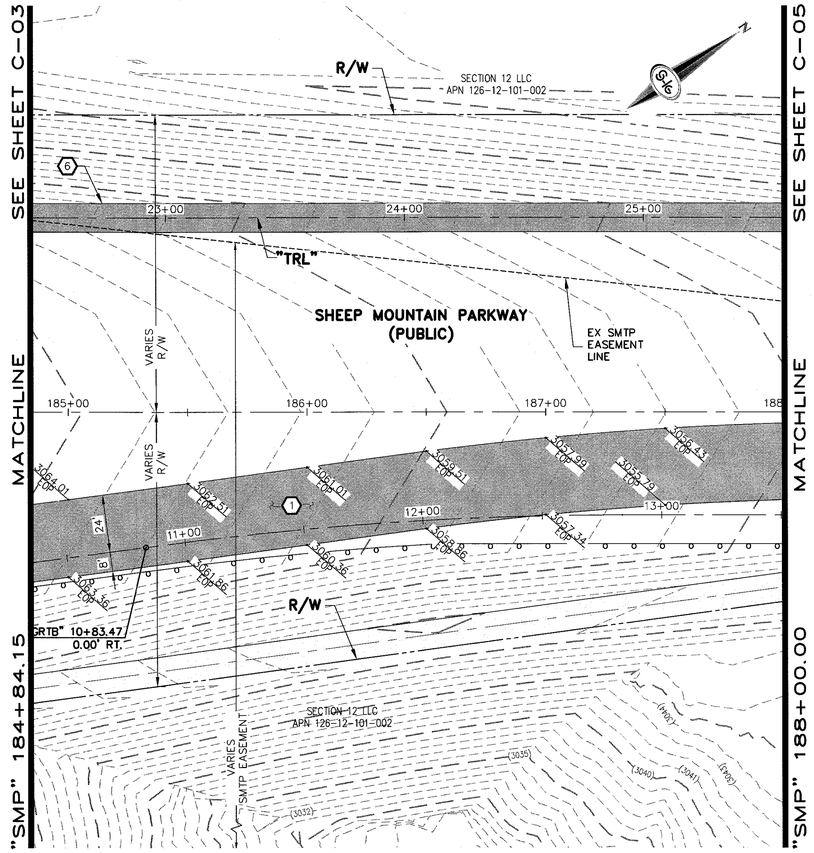
CONSTRUCTION PLAN - "GTRB" 6+50.00 TO "GTRB" 10+34.64

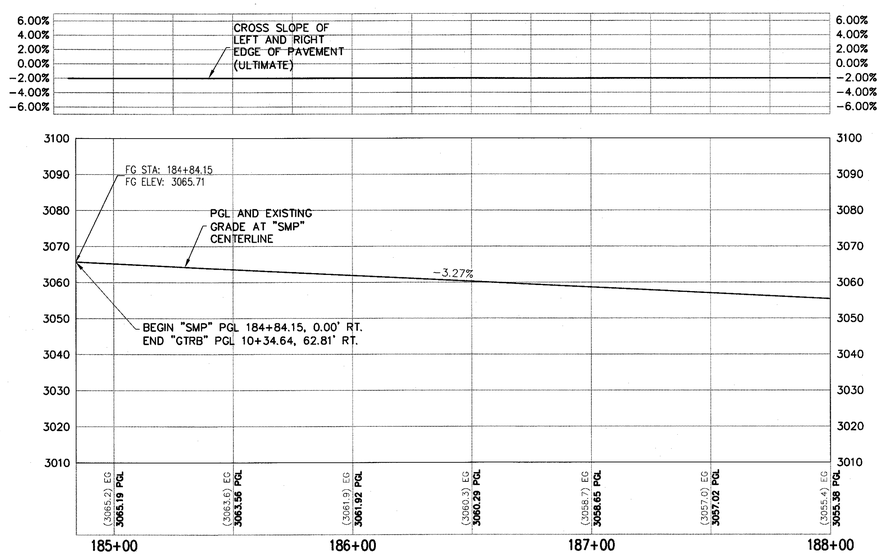
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C-03
SHEET 9 OF 46
DWG NO. _____

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6. CONSTRUCT 2" OVER 4" TYPE II AGGREGATE BASE TRAIL (SEE SHEETS C-13 THROUGH C-22 FOR PLAN AND PROFILE)
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8. EXISTING CABLE VAULT (ADJUST TO FINISH GRADE)
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12. SAWCUT AND MATCH EXISTING ACCESS ROAD
13. REMOVE EXISTING CONCRETE CUTOFF WALL
14. REMOVE AND REPLACE EXISTING FENCE AND GATE FOR CONSTRUCTION OF TRAIL
15. CONSTRUCT 3-FT DEEP CONCRETE CUTOFF WALL

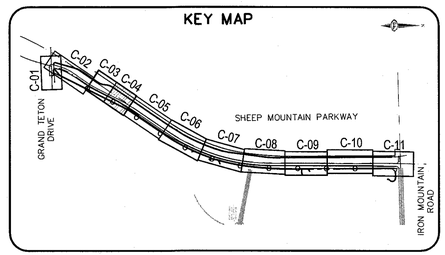
NOTES

1. SEE TY-SHEETS FOR TYPICAL SECTIONS.
2. SEE SD-SHEETS FOR STORM PROFILES.
3. SEE UT-SHEETS FOR WATER AND SEWER PLAN AND PROFILES.
4. SEE GR-SHEETS FOR GRADING AND STORM DRAIN PLAN.

LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



30 0 30 60
SCALE FEET

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY.
CALL BEFORE YOU DO OVERHEAD
1-702-227-2929

FAST
Call before you UnderGround.
1-702-432-5300
FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

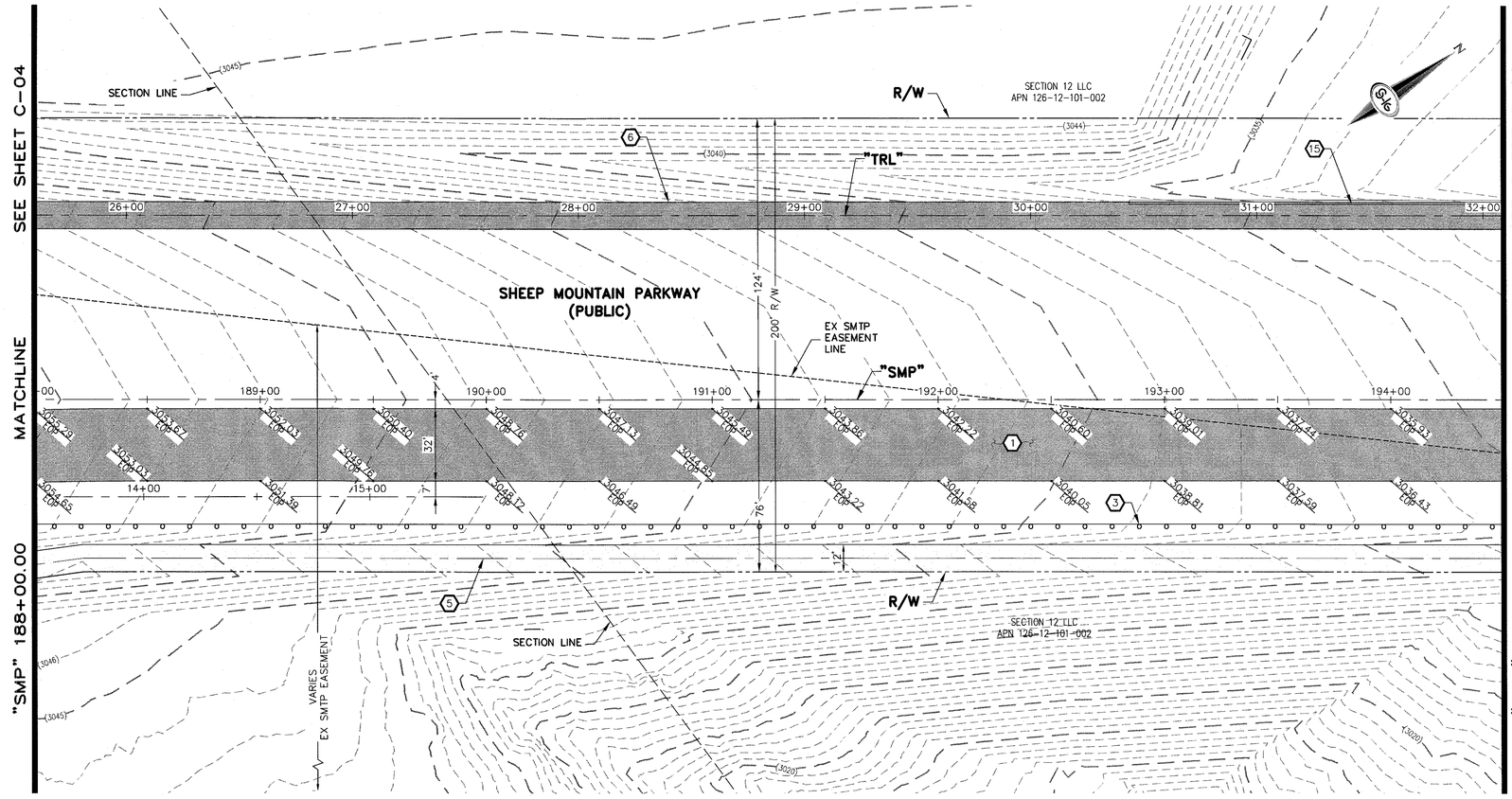
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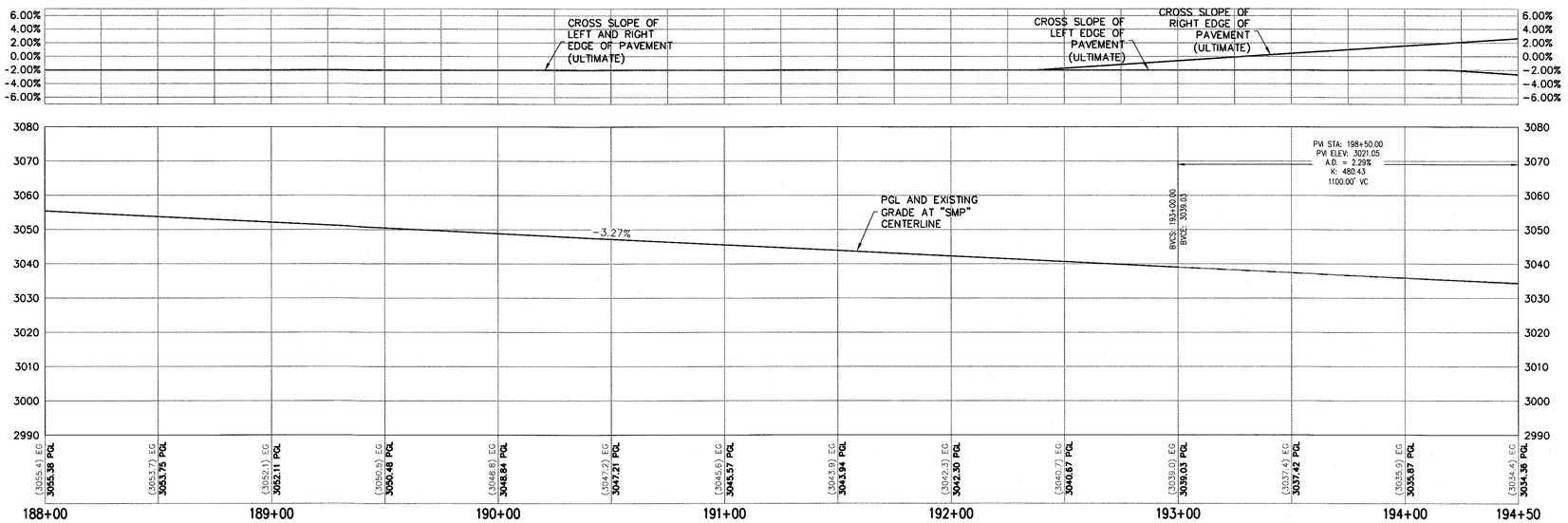
DATE: 01/19/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO.
OLY1720.000

JERRY D. SLATER
Exp. 06/30/2018
CIVIL
No. 14167
STATE OF NEVADA
PROFESSIONAL ENGINEER

C-04
SHEET 10 OF 46
DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

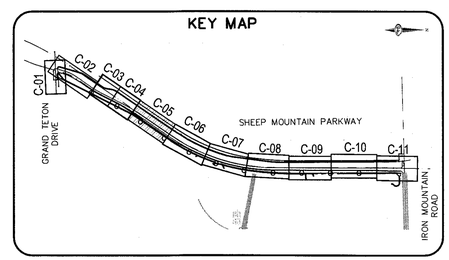
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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH



30 0 30 60
SCALE FEET







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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

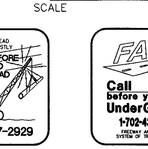
NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "SMP" 188+00.00 TO "SMP" 194+50.00

DATE: 01/19/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

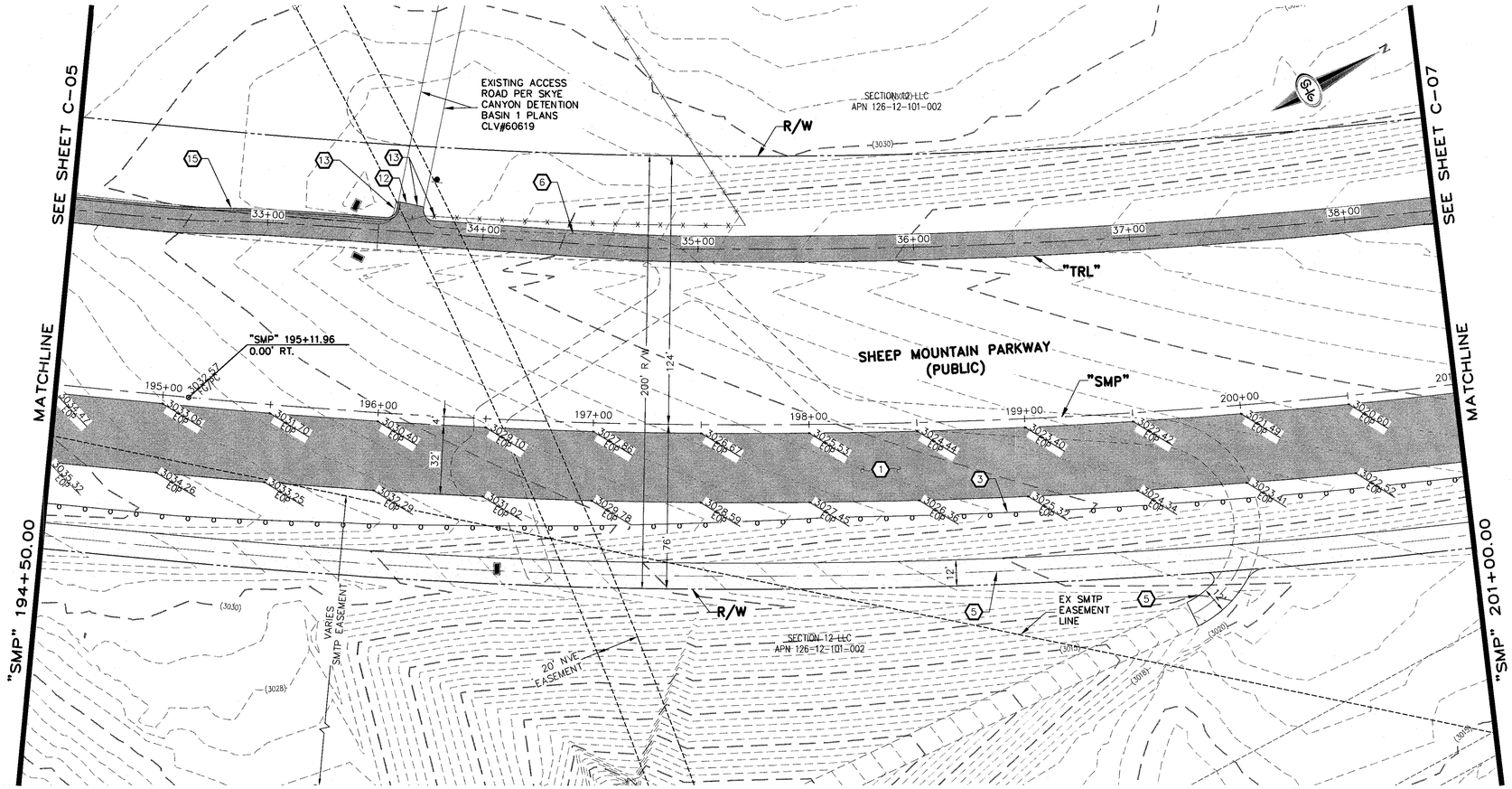
PROJECT NO.
OLY1720.000

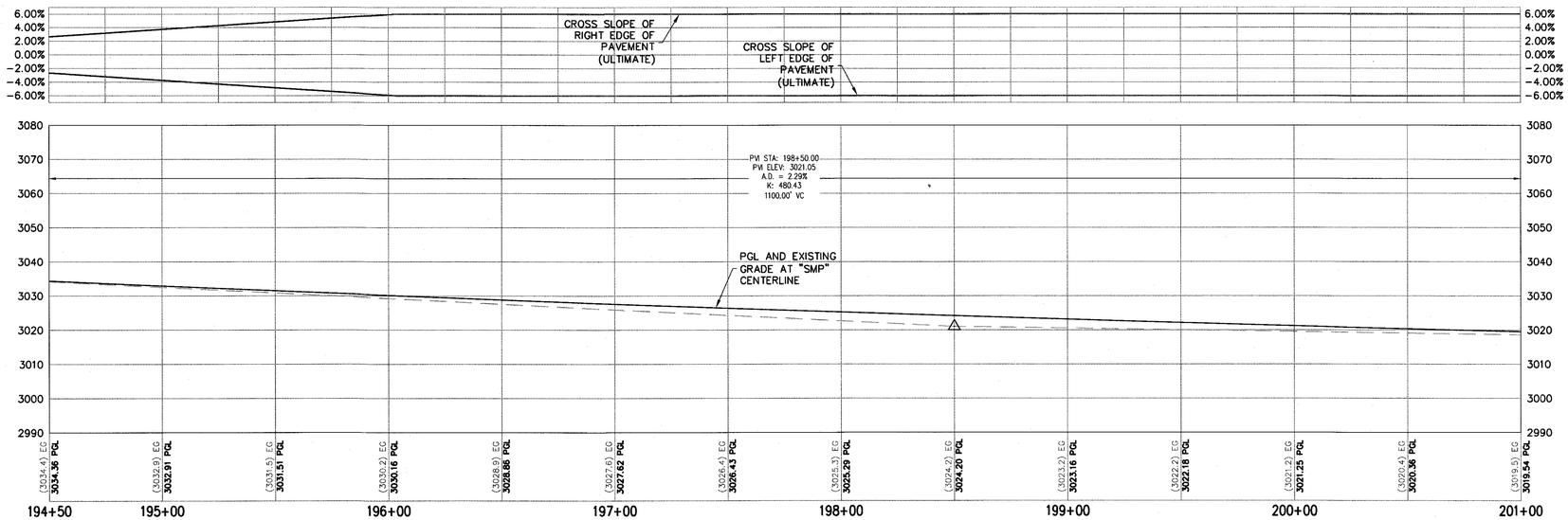


C-06
SHEET 11 OF 46

DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

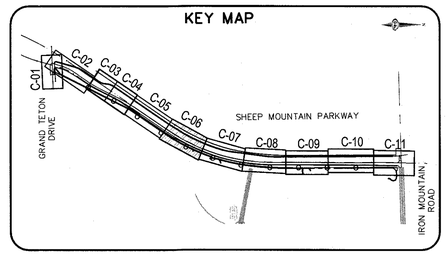
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LEGEND

- PLANTMIX BITUMINOUS SURFACE
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NO.	DESCRIPTION	DATE	BY	APP DATE	APP

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "SMP" 188+00.00 TO "SMP" 194+50.00

DATE: 01/19/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

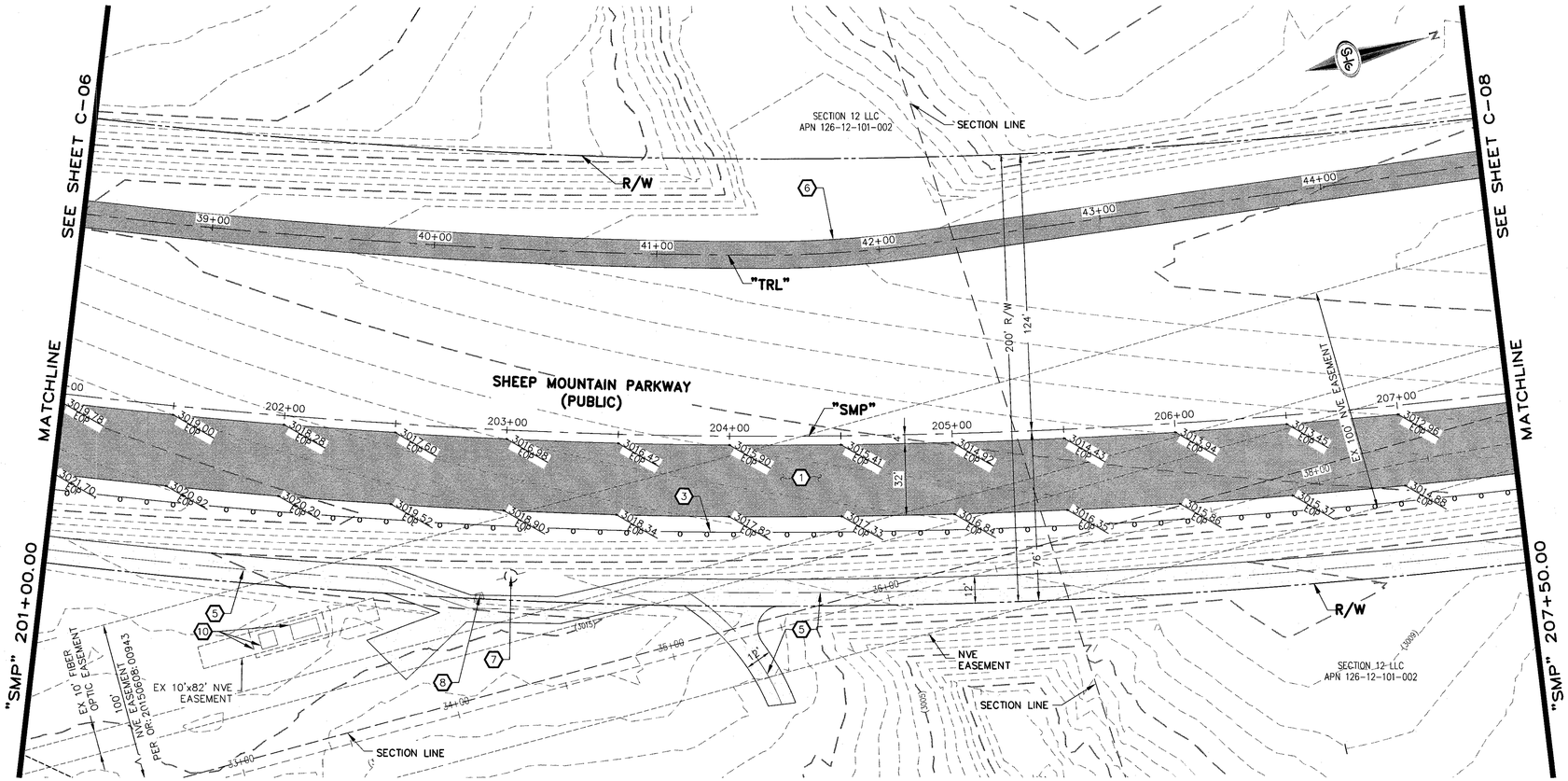
PROJECT NO.
OLY1720.000

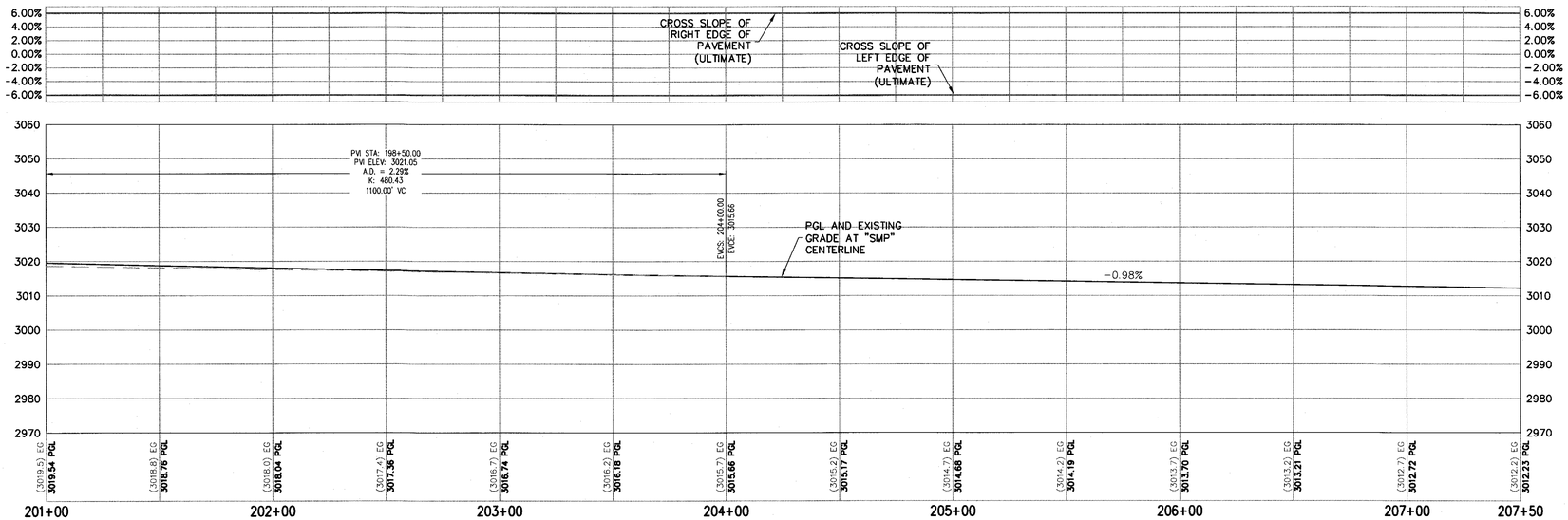
PROFESSIONAL ENGINEER STATE OF NEVADA JERRY J. SLATER Exp. 06/30/2018 CIVIL No. 14167

C-06
SHEET 11 OF 46

DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

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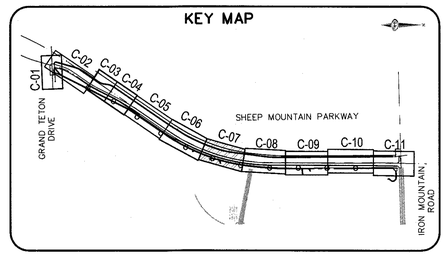
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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



SCALE 30 0 30 60 FEET

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NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

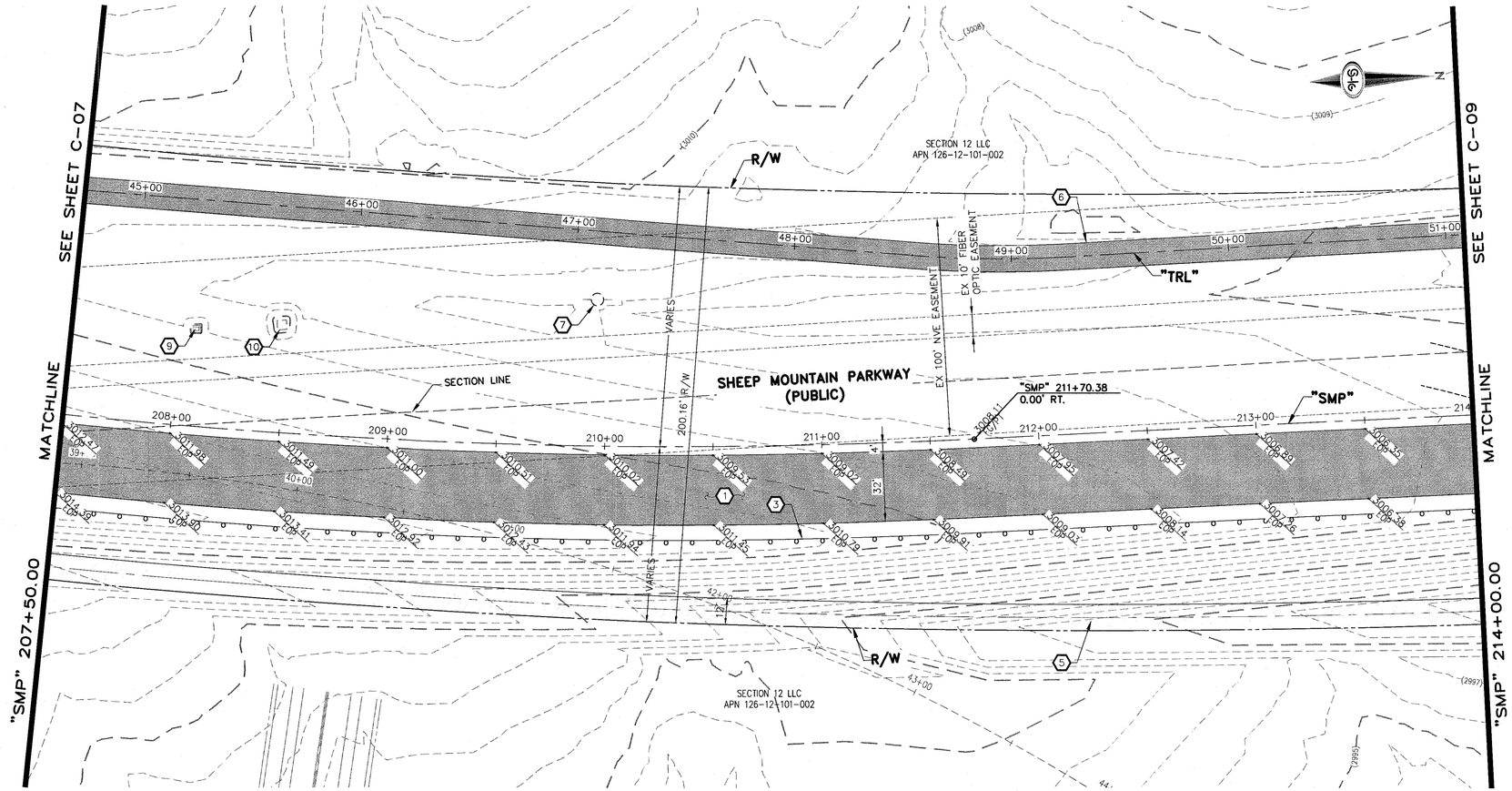
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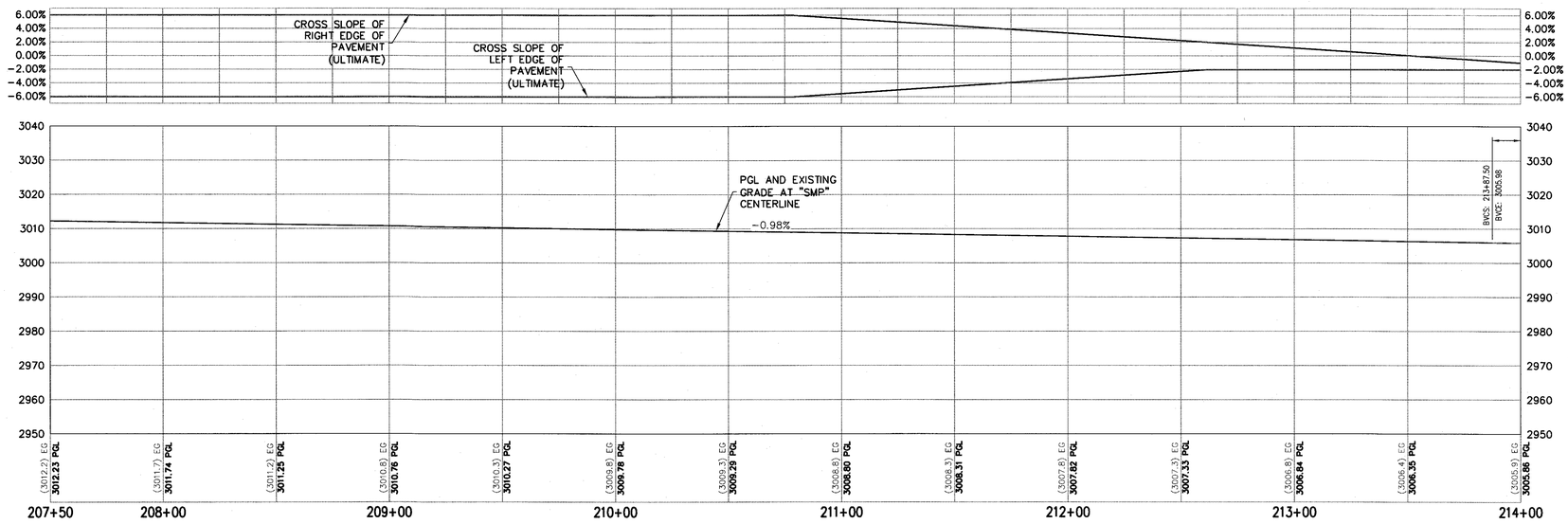
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DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER STATE OF NEVADA
JERRY J. SLATER
Exp. 06/30/2018
No. 14167

C-07
SHEET 12 OF 46
DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

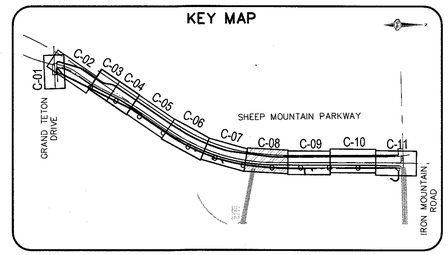
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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH



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NO.	DESCRIPTION	DATE	BY	APP DATE	APP

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

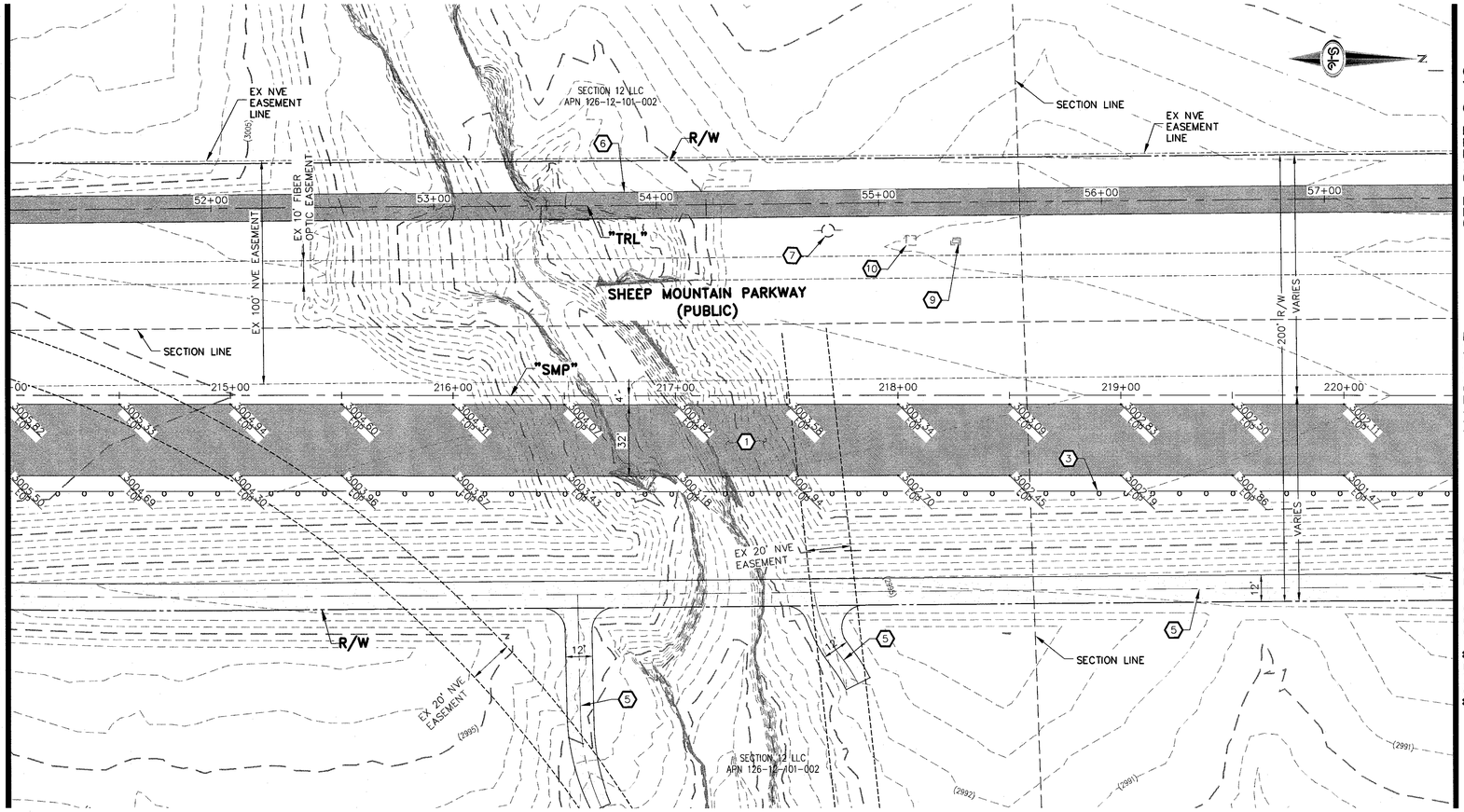
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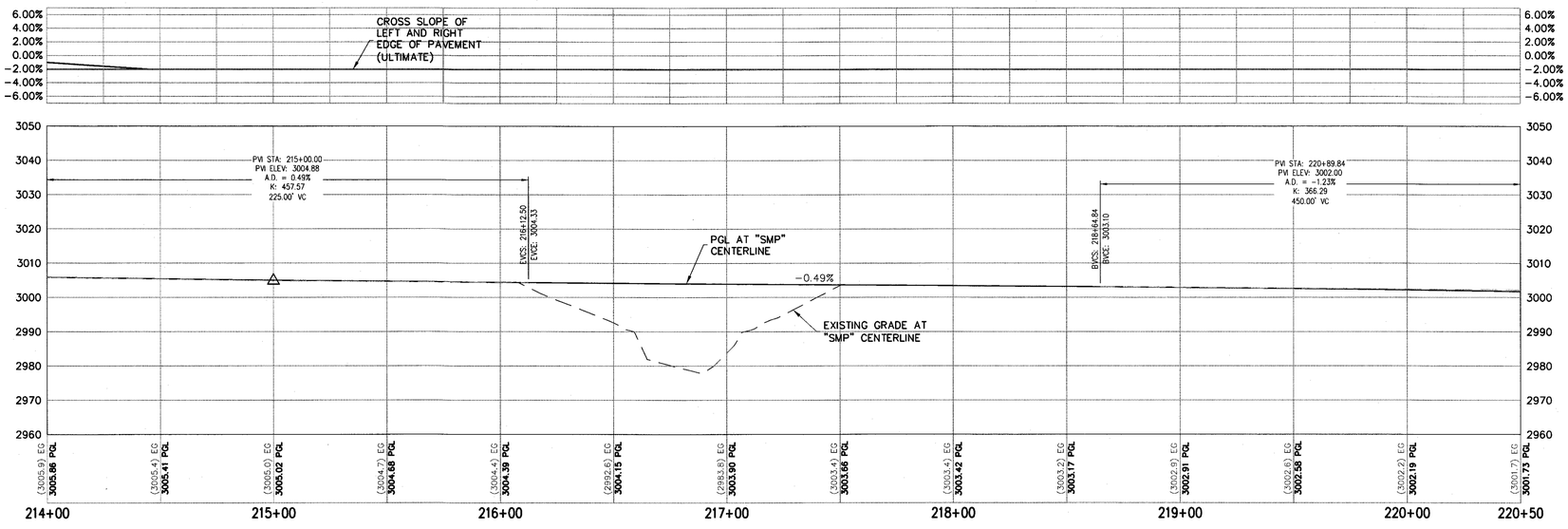
DATE: 01/19/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO. OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA - JERRY V. SLATER - No. 14167 - Exp. 06/30/2018 - CIVIL

C-08
SHEET 13 OF 46
DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

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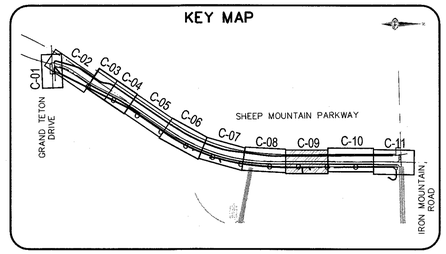
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LEGEND

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- MAINTENANCE ACCESS PATH

KEY MAP



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NO.	DESCRIPTION	DATE	BY	APP DATE	APP

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

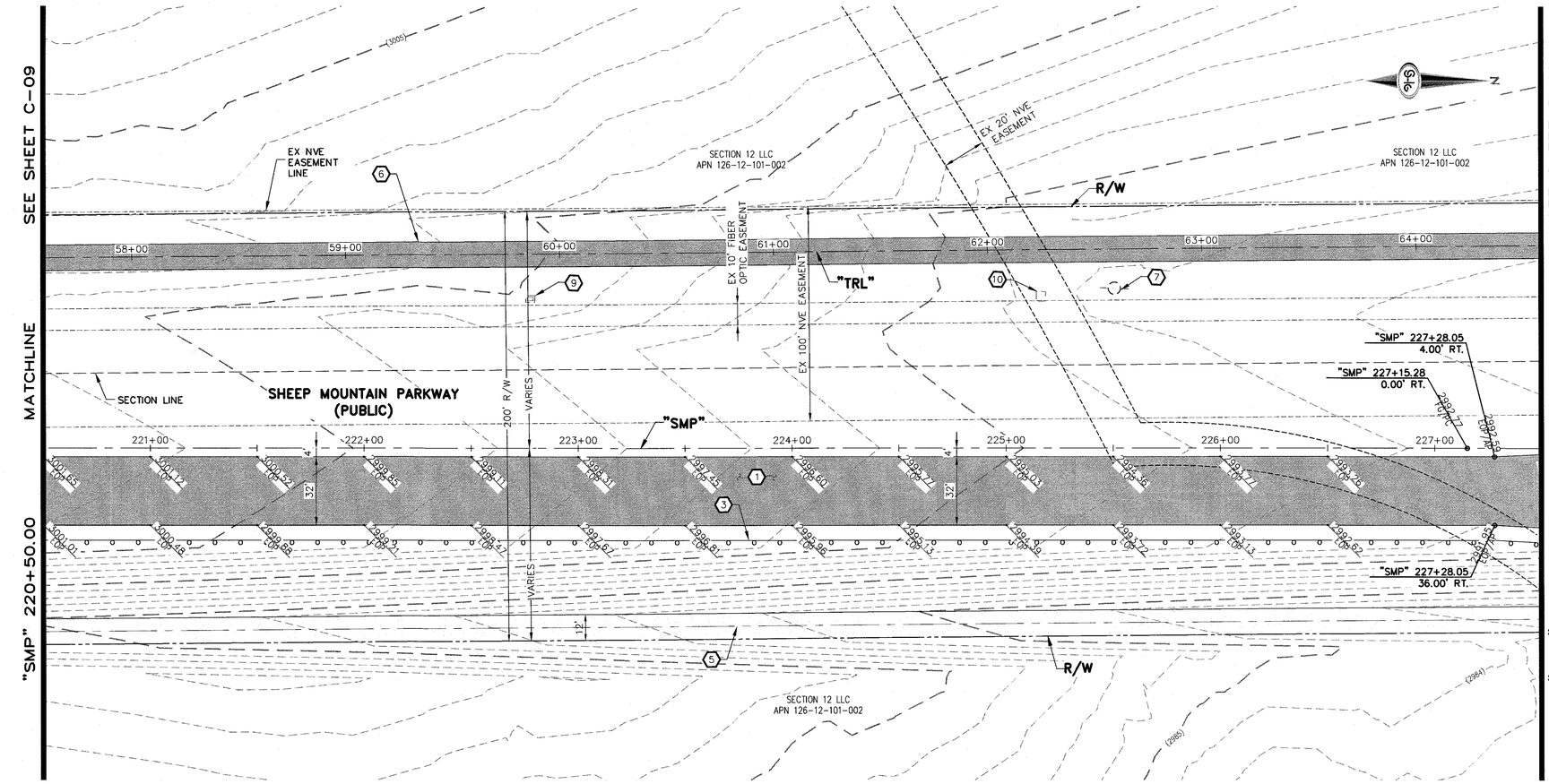
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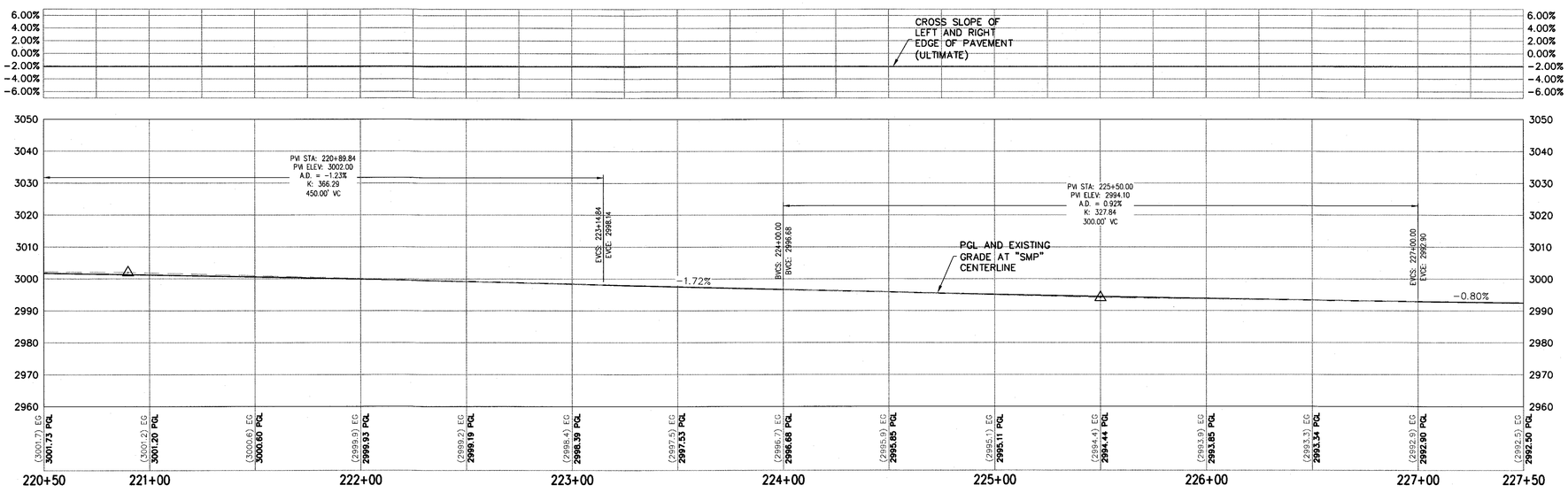
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CHECKED: JSR
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OLY1720.000

PROFESSIONAL ENGINEER STATE OF NEVADA
JERRY J. SLATER
Exp. 06/30/2018
CIVIL
No. 14167

C-09
SHEET 15 OF 46
DWG NO. _____

HANSEN NO. _____





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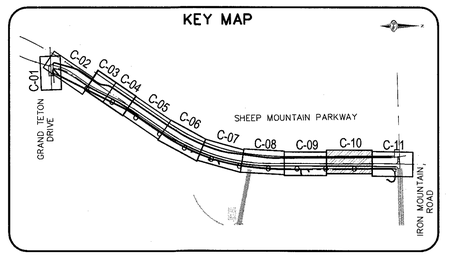
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SCALE 30 0 30 60 FEET

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FAST Call before you UnderGround. 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

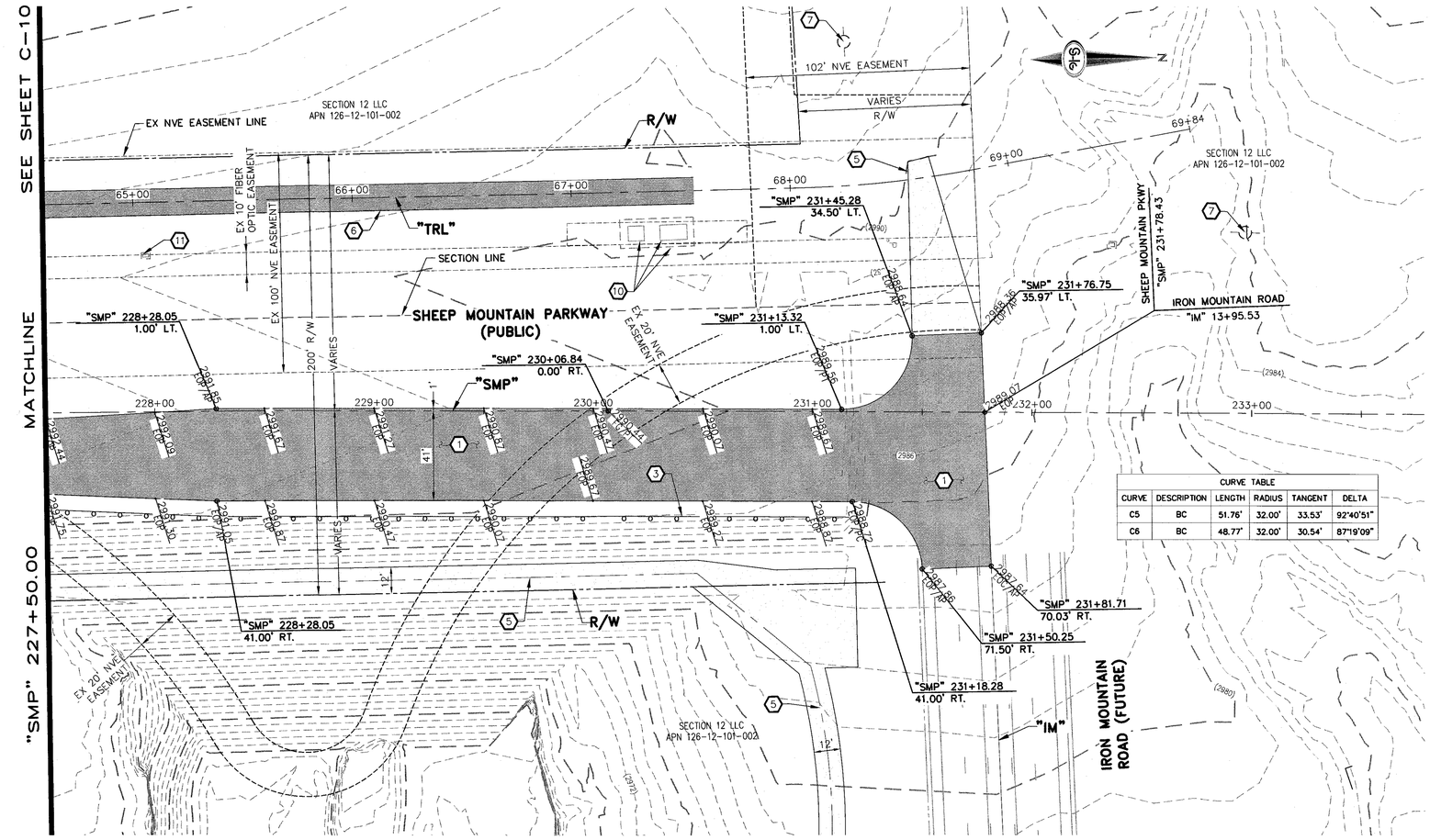
CONSTRUCTION PLAN - "SMP" 214+00.00 TO "SMP" 220+50.00

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DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO. OLY1720.000

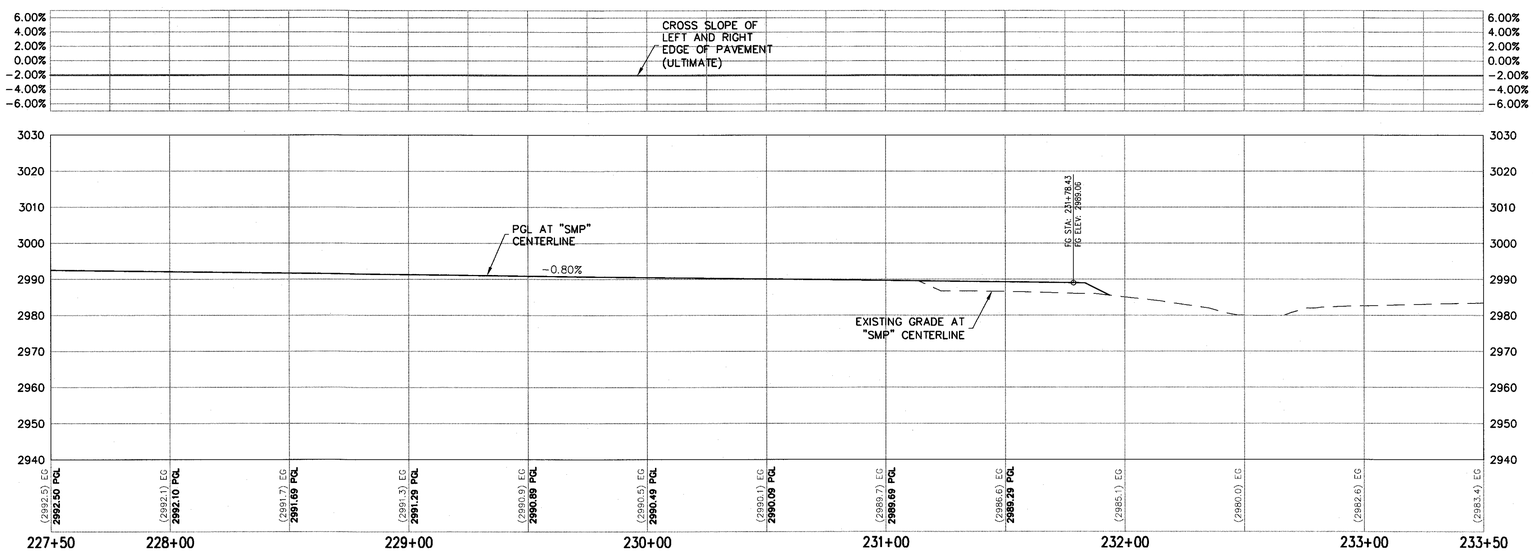
PROFESSIONAL ENGINEER STATE OF NEVADA JERRY J. SLATER Exp. 06/30/2018 CIVIL No. 14167

C-10
SHEET 15 OF 46
DWG NO. _____

HANSEN NO. _____



CURVE TABLE					
CURVE	DESCRIPTION	LENGTH	RADIUS	TANGENT	DELTA
C5	BC	51.76'	32.00'	33.53'	92°40'51"
C6	BC	48.77'	32.00'	30.54'	87°19'09"



CONSTRUCTION NOTES

1. CONSTRUCT OVER 4.5" PBS OVER 4" TYPE II AGGREGATE BASE (SEE TY-SHEETS)
2. SAWCUT AND MATCH EXISTING
3. INSTALL GUARDRAIL (TRIPLE CORRUGATION) (NDOT STD. PLAN R-8.4.1)
4. INSTALL TANGENT END TERMINAL (NDOT STD. PLAN R-8.1.1)
5. CONSTRUCT 12-FT WIDE (MIN) MAINTENANCE ACCESS PATH
6. CONSTRUCT 2" OVER 4" TYPE II AGGREGATE BASE TRAIL (SEE SHEETS C-13 THROUGH C-22 FOR PLAN AND PROFILE)
7. EXISTING POWER POLE (PROTECT IN PLACE)
8. EXISTING CABLE VAULT (ADJUST TO FINISH GRADE)
9. EXISTING CABLE VAULT (PROTECT IN PLACE)
10. EXISTING POWER AND CONCRETE PAD (PROTECT IN PLACE)
11. EXISTING UTILITY (ADJUST TO FINISH GRADE)
12. SAWCUT AND MATCH EXISTING ACCESS ROAD
13. REMOVE EXISTING CONCRETE CUTOFF WALL
14. REMOVE AND REPLACE EXISTING FENCE AND GATE FOR CONSTRUCTION OF TRAIL
15. CONSTRUCT 3-FT DEEP CONCRETE CUTOFF WALL

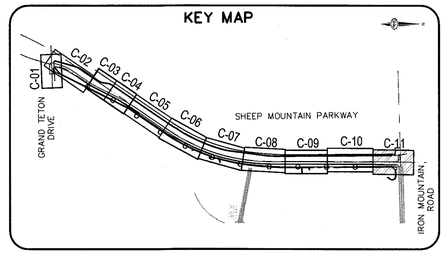
NOTES

1. SEE TY-SHEETS FOR TYPICAL SECTIONS.
2. SEE SD-SHEETS FOR STORM PROFILES.
3. SEE UT-SHEETS FOR WATER AND SEWER PLAN AND PROFILES.
4. SEE GR-SHEETS FOR GRADING AND STORM DRAIN PLAN.

LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



30 0 30 60
SCALE FEET

AVOID HITTING OVERHEAD POWER LINES. IT'S CRUCIAL!
I CALL BEFORE YOU DIG OVERHEAD
1-702-227-2929

FAST
Call before you UnderGround.
1-702-432-5300
FREWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Dig
Avoid hurting someone or cutting utility lines. It's simple.
Call 811
OR
1-800-227-2600

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PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "SMP" 220+50.00 TO "SMP" 227+50.00

DATE: 01/19/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

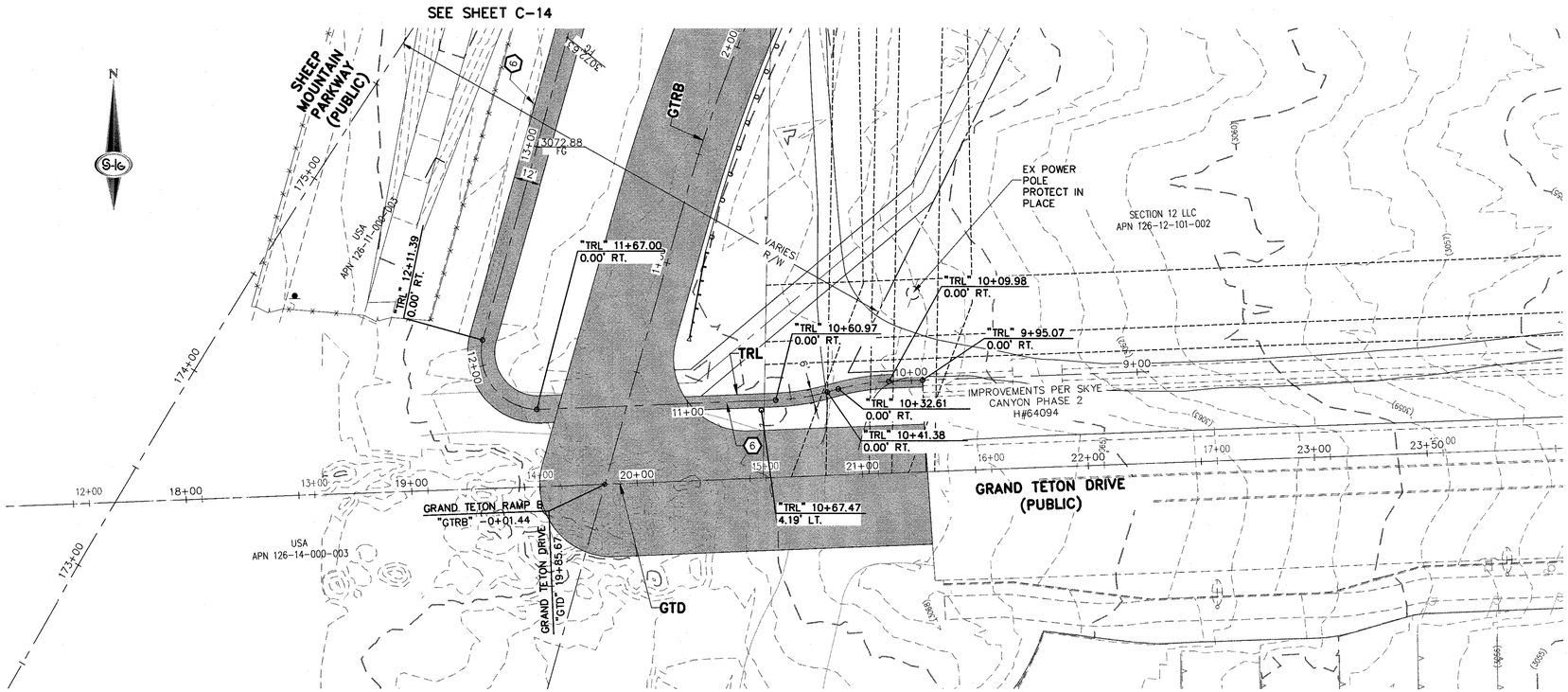
PROJECT NO.
OLY1720.000

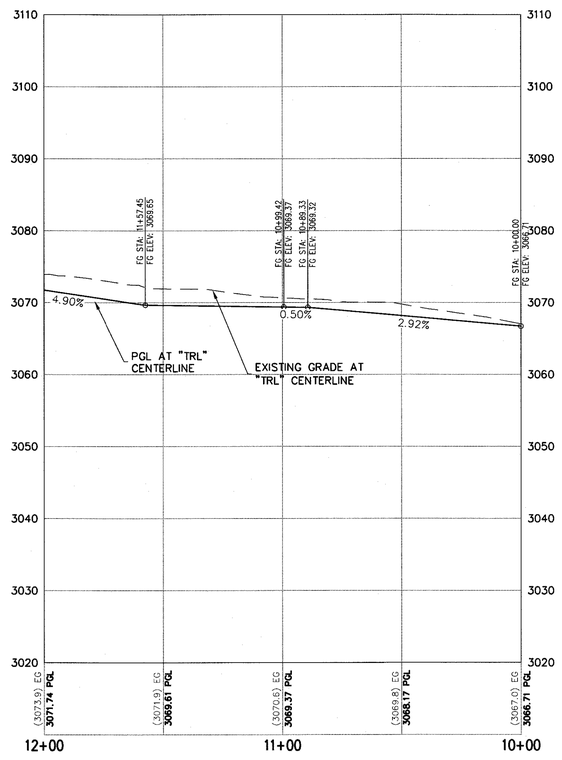
PROFESSIONAL ENGINEER STATE OF NEVADA
JERRY J. SLATER
Exp. 06/30/2018
CIVIL
No. 14167

C-11
SHEET 16 OF 46

DWG NO. _____

HANSEN NO. _____





PROFILE VIEW
HORIZ: 1" = 30'
VERT: 1" = 10'

CONSTRUCTION NOTES

1. CONSTRUCT OVER 4.5" PBS OVER 4" TYPE II AGGREGATE BASE (SEE TY-SHEETS)
2. SAWCUT AND MATCH EXISTING
3. INSTALL GUARDRAIL (TRIPLE CORRUGATION) (NDOT STD. PLAN R-8.4.1)
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14. REMOVE AND REPLACE EXISTING FENCE AND GATE FOR CONSTRUCTION OF TRAIL
15. CONSTRUCT 3-FT DEEP CONCRETE CUTOFF WALL

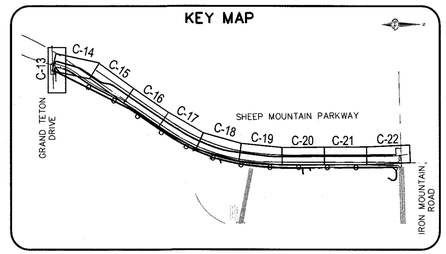
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4. SEE GR-SHEETS FOR GRADING AND STORM DRAIN PLAN.

LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



30 0 30 60
SCALE FEET

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD
1-702-227-2929

FAST. Call before you UnderGround. 1-702-432-5300 PREPARE AND DEFEND SYSTEM OF TRANSPORTATION

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "TRL" 10+00.00 TO "TRL" 12+00.00

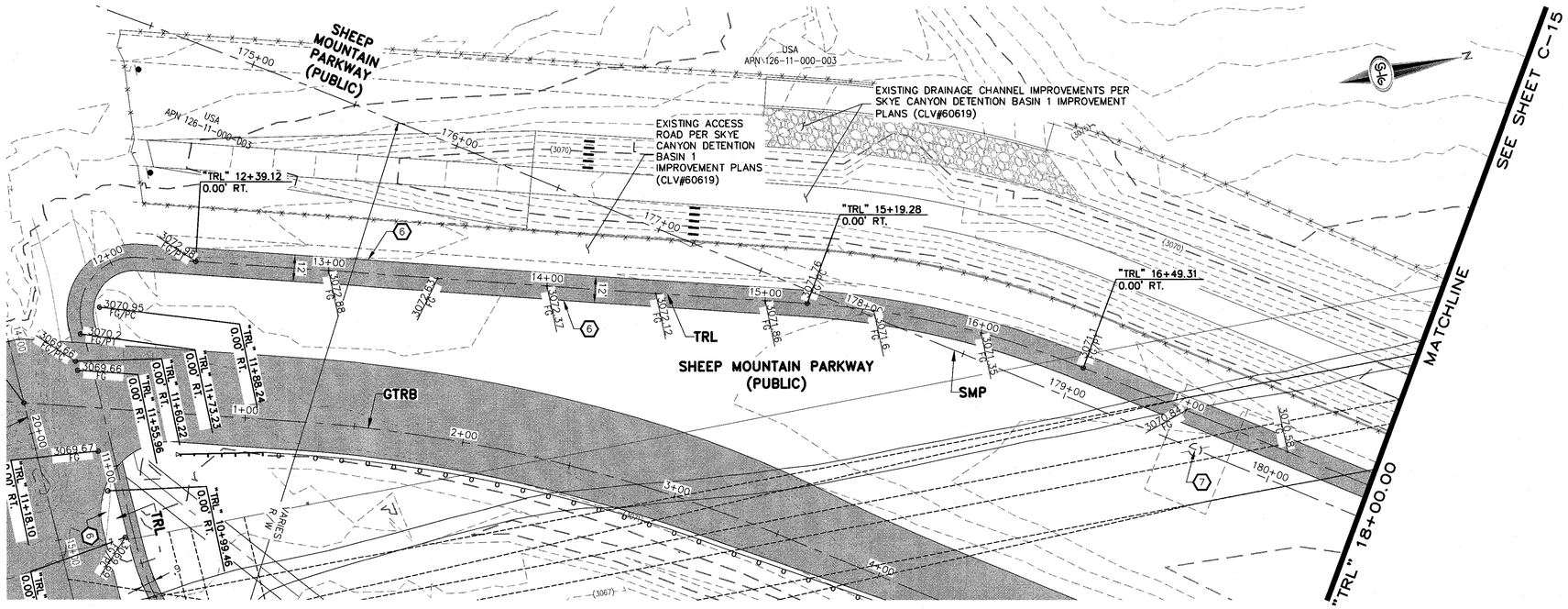
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PROJECT NO. OLY1720.000

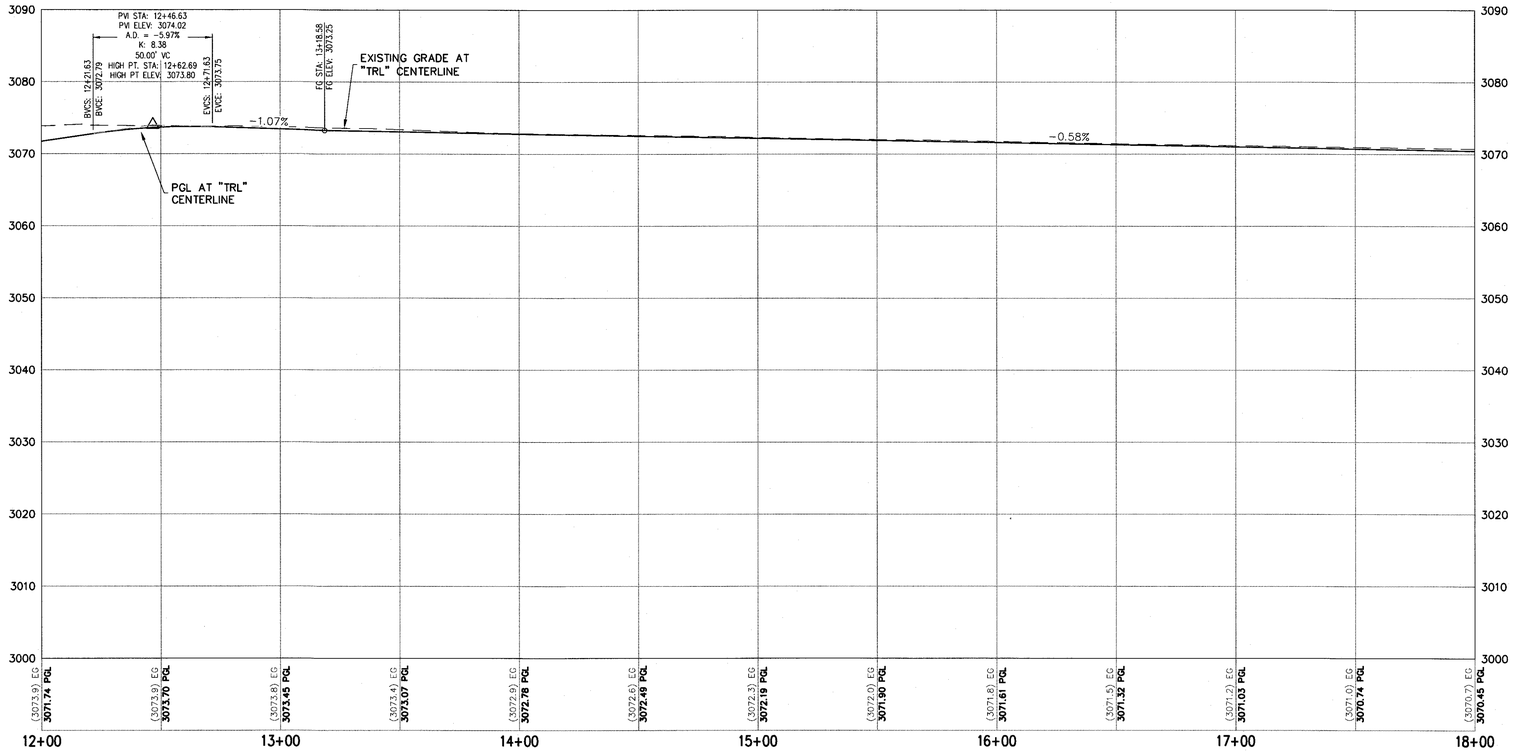
PROFESSIONAL ENGINEER - STATE OF NEVADA - JERRY SLATER - Exp. 06/30/2018 - CIVIL - No. 14167

C-13
SHEET 18 OF 46

DWG NO. _____

HANSEN NO. _____





PROFILE VIEW
HORIZ: 1" = 30'
VERT: 1" = 10'

CONSTRUCTION NOTES

1. CONSTRUCT OVER 4.5" PBS OVER 4" TYPE II AGGREGATE BASE (SEE TY-SHEETS)
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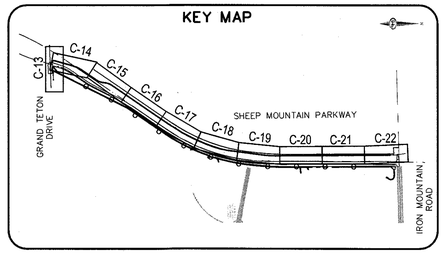
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4. SEE GR-SHEETS FOR GRADING AND STORM DRAIN PLAN.

LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



SCALE: 30 0 30 60 FEET

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD 1-702-227-2929

FAST Call before you UnderGround. 1-702-432-5500 NEVADA 811 NOTIFICATION SYSTEM OF TRANSPORTATION

Call before you Dig Avoid cutting underground utility lines. Call 811 or 1-800-227-2600

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

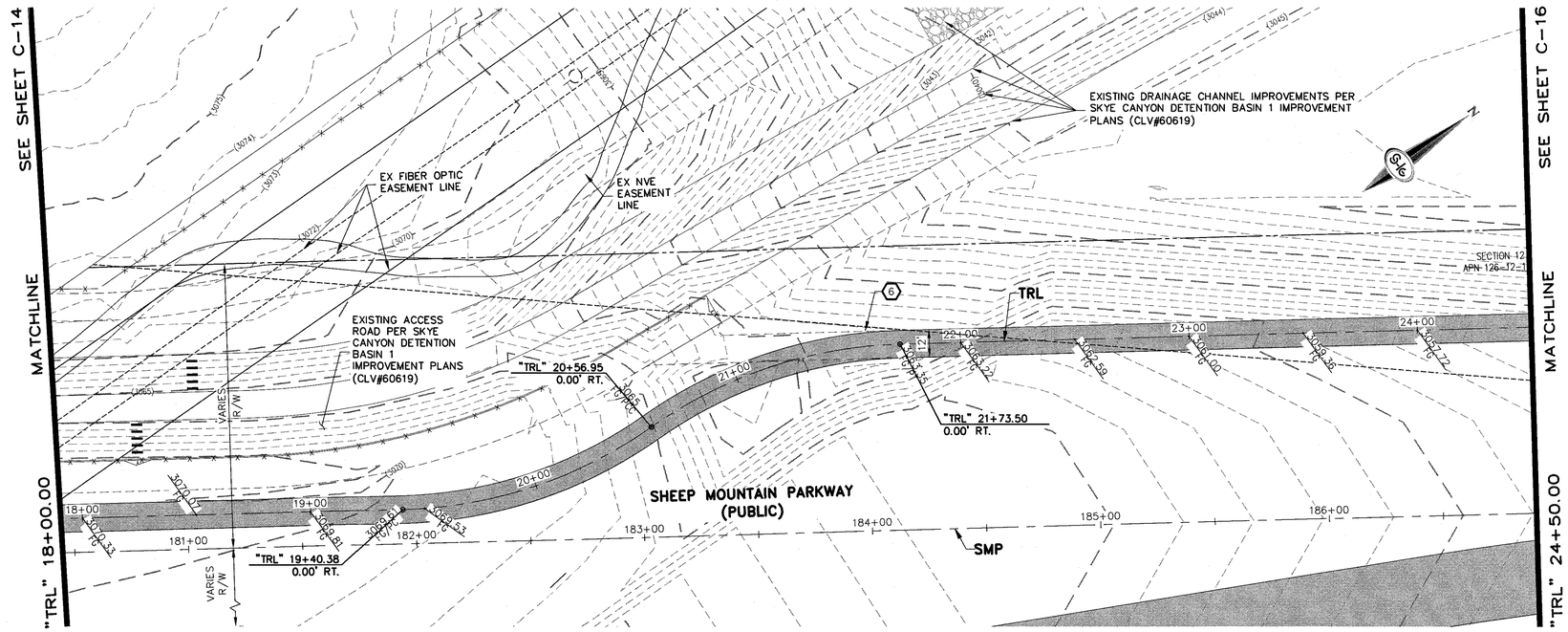
CONSTRUCTION PLAN - "TRL" 12+00.00 TO "TRL" 18+00.00

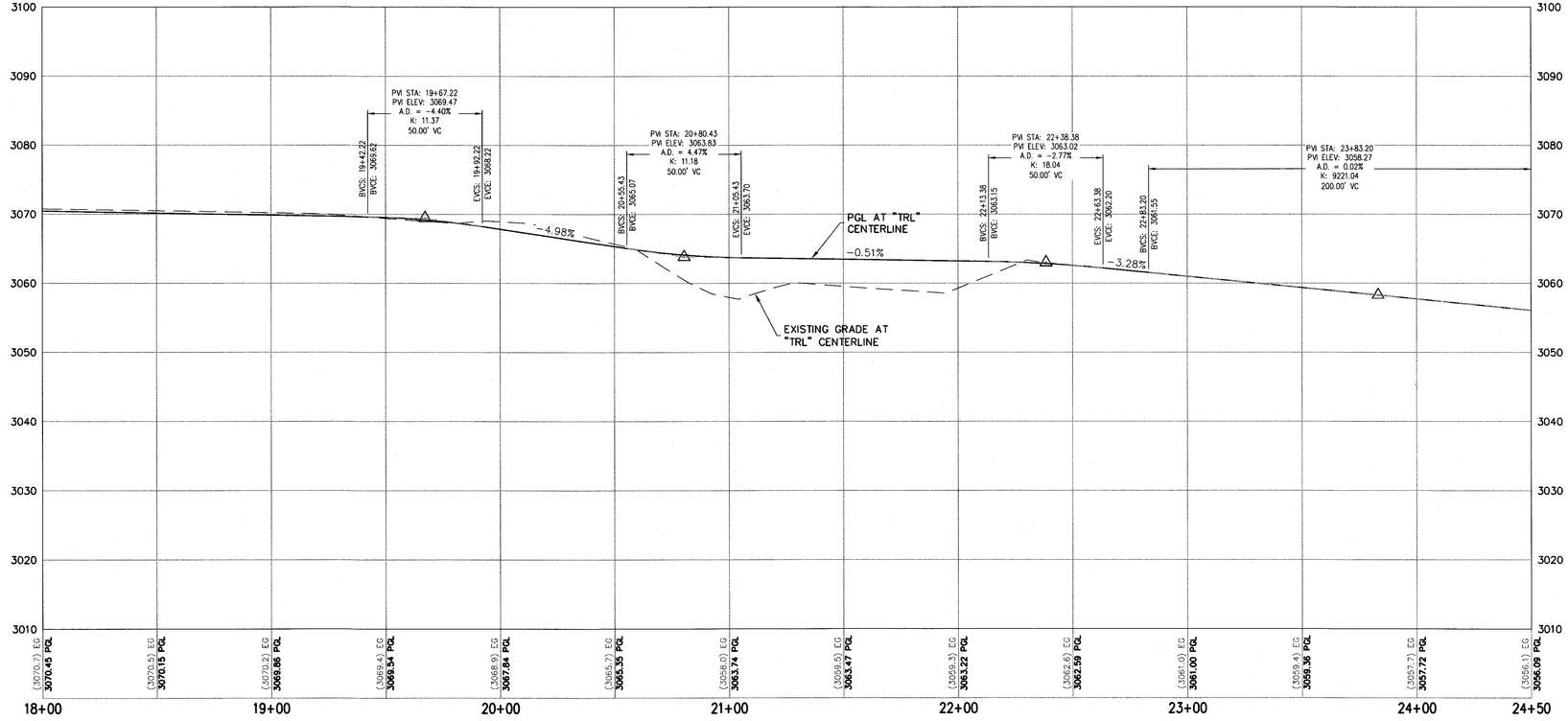
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CHECKED: JSR
PROJECT NO. OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA - JERRY J. SLATER - Exp. 06/30/2018 - CIVIL - No. 14167

C-14
SHEET 19 OF 46
DWG NO. _____

HANSEN NO. _____





PROFILE VIEW
HORIZ: 1" = 30'
VERT: 1" = 10'

CONSTRUCTION NOTES

1. CONSTRUCT OVER 4.5" PBS OVER 4" TYPE II AGGREGATE BASE (SEE TY-SHEETS)
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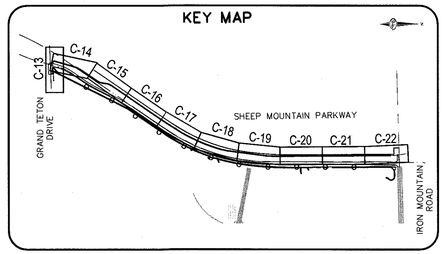
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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



30 0 30 60
SCALE FEET

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

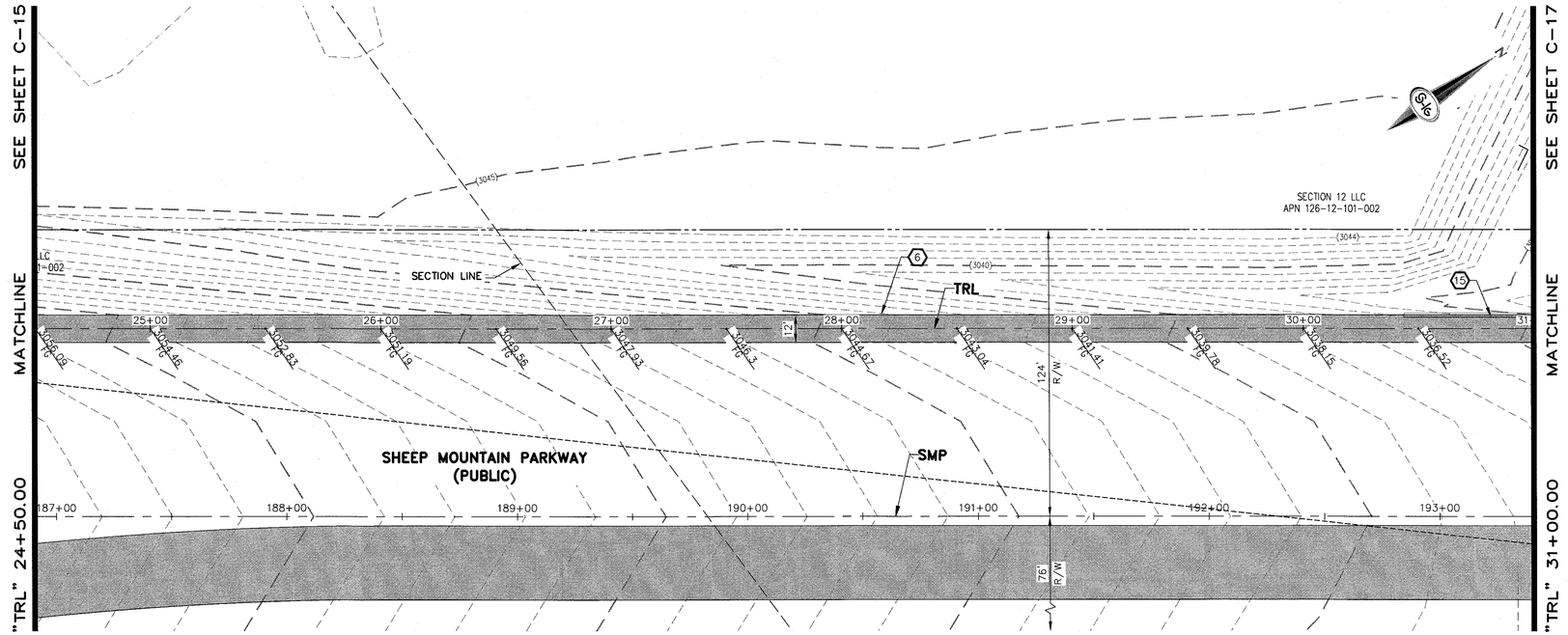
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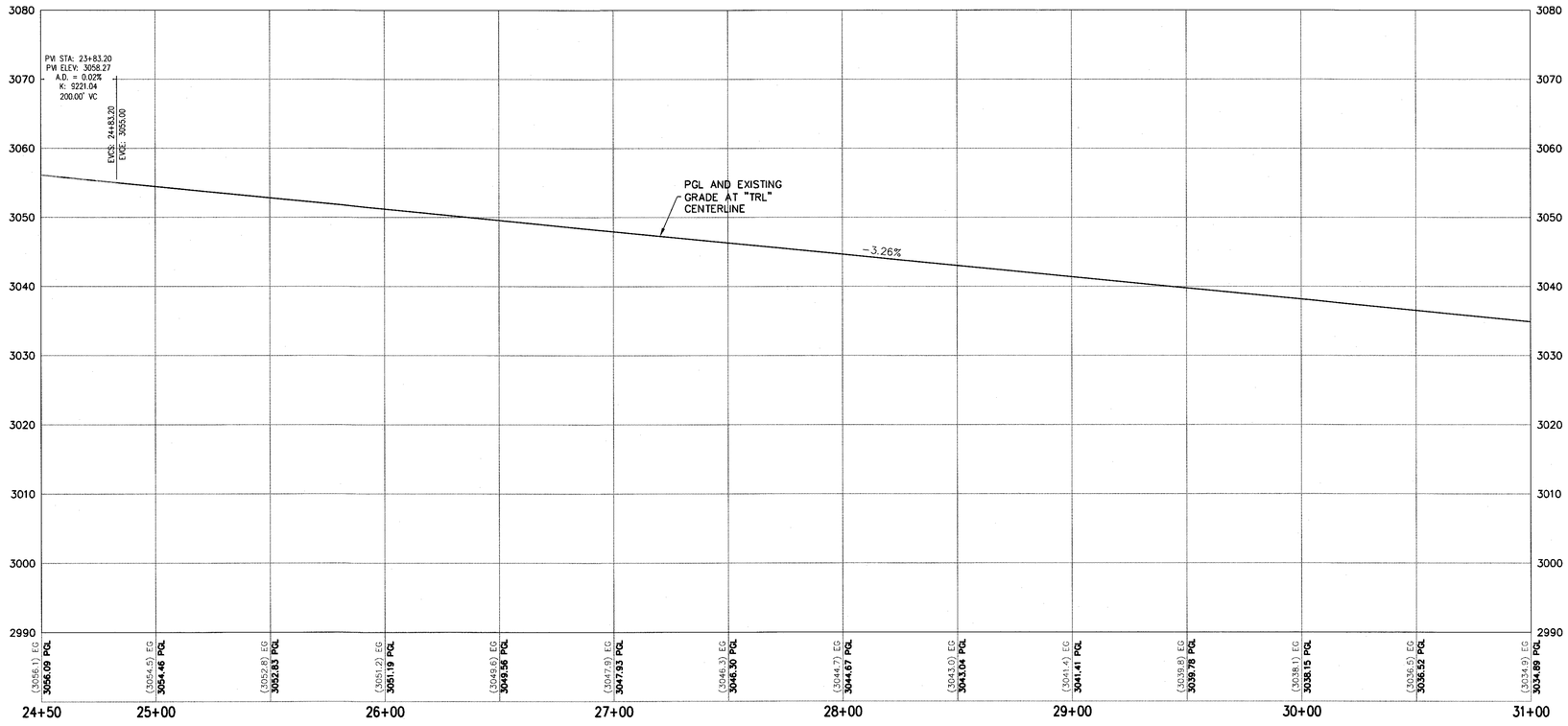
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PROJECT NO. OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA - JERRY J. SLATER - Exp. 06/30/2018 - CIVIL - No. 14167 - 2-9-18

C-15
SHEET 20 OF 46
DWG NO. ____

HANSEN NO. ____





PROFILE VIEW
HORIZ: 1" = 30'
VERT: 1" = 10'

CONSTRUCTION NOTES

1. CONSTRUCT OVER 4.5" PBS OVER 4" TYPE II AGGREGATE BASE (SEE TY-SHEETS)
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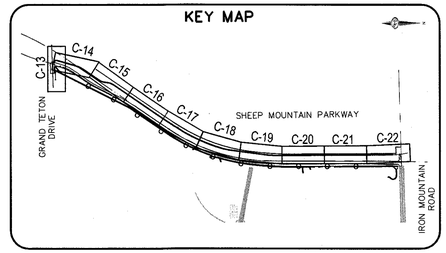
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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



30 0 30 60
SCALE FEET

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

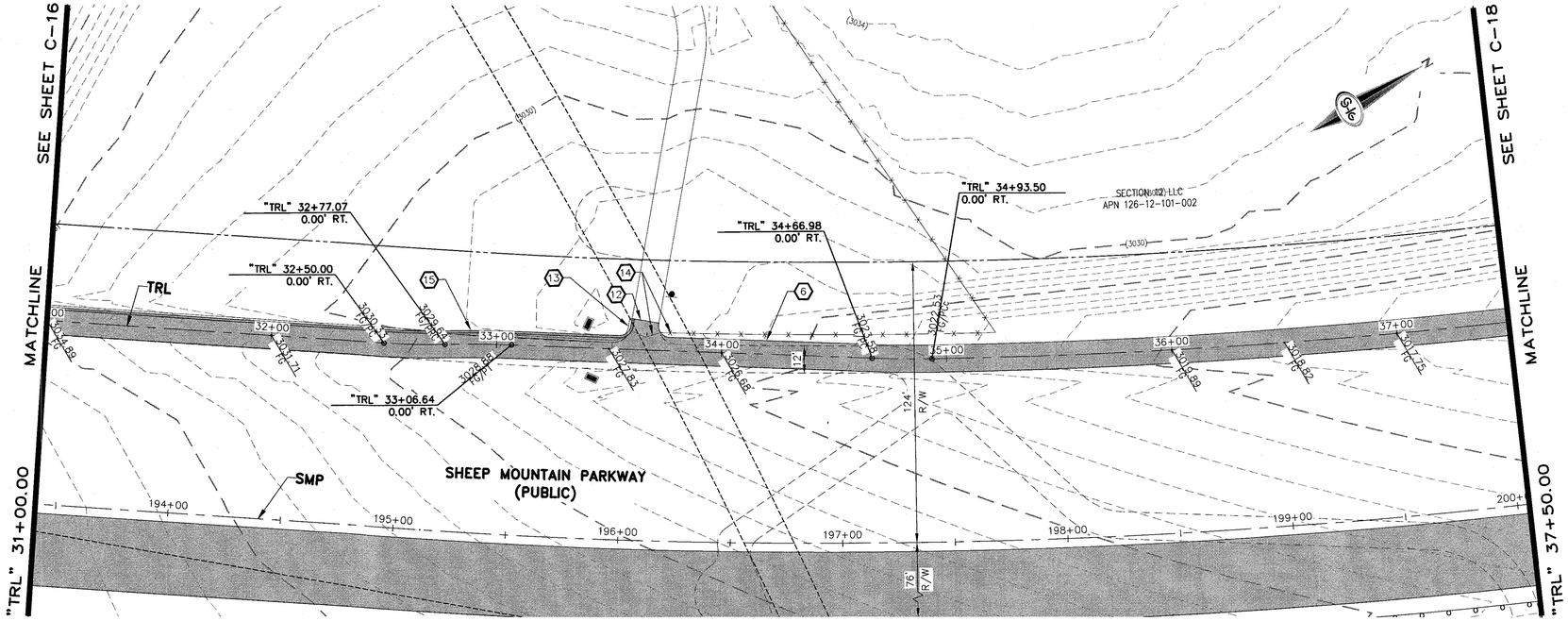
SHEEP MOUNTAIN PARKWAY
CONSTRUCTION PLAN - "TRL" 24+50.00 TO "TRL" 31+00.00

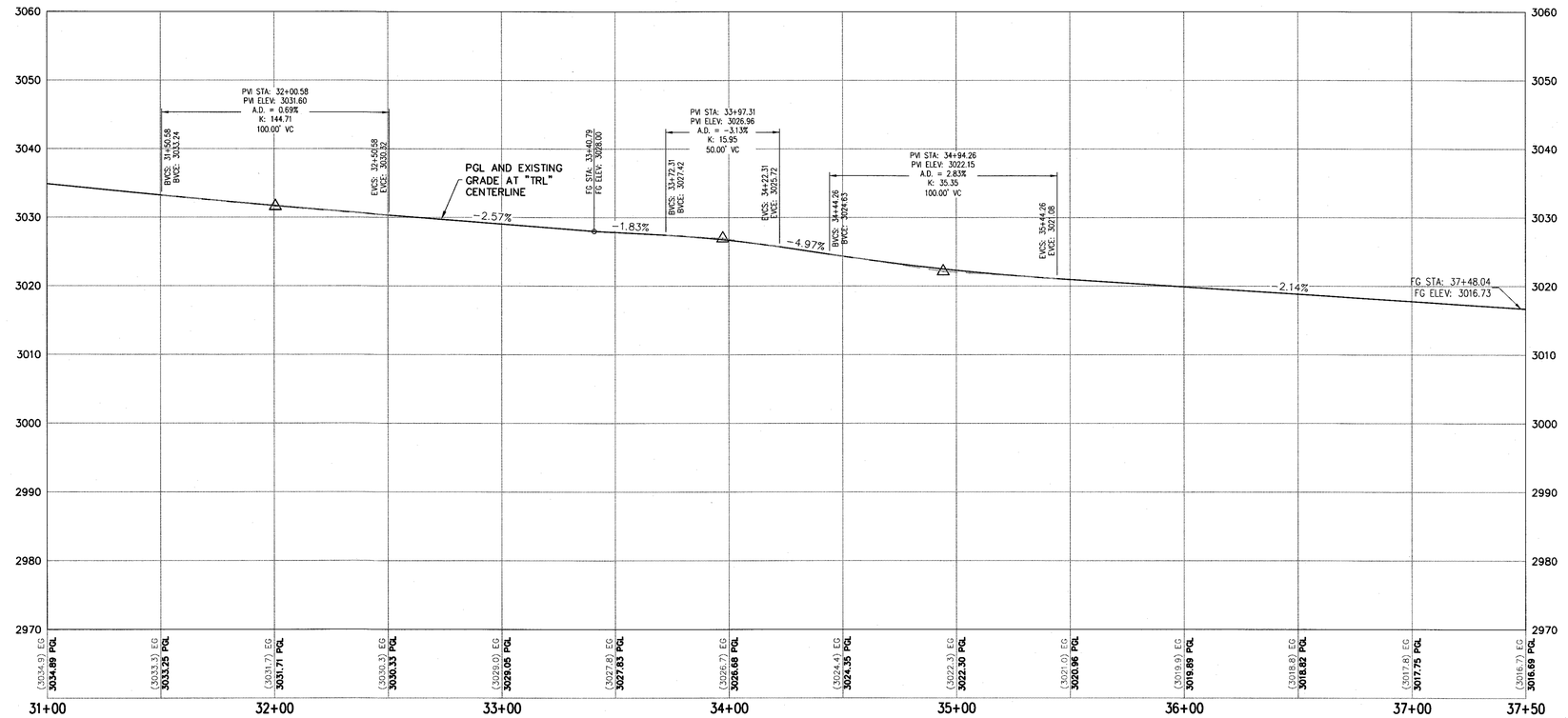
DATE: 01/19/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER STATE OF NEVADA
JERRY J. SLATER
Exp. 06/30/2018
CIVIL
No. 14167

C-16
SHEET 21 OF 46
DWG NO. _____

HANSEN NO. _____





PROFILE VIEW
HORIZ: 1" = 30'
VERT: 1" = 10'

CONSTRUCTION NOTES

1. CONSTRUCT OVER 4.5" PBS OVER 4" TYPE II AGGREGATE BASE (SEE TY-SHEETS)
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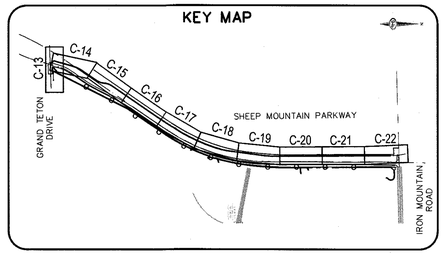
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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



30 0 30 60
SCALE FEET

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY
CONSTRUCTION PLAN - "TRL" 31+00.00 TO "TRL" 37+50.00

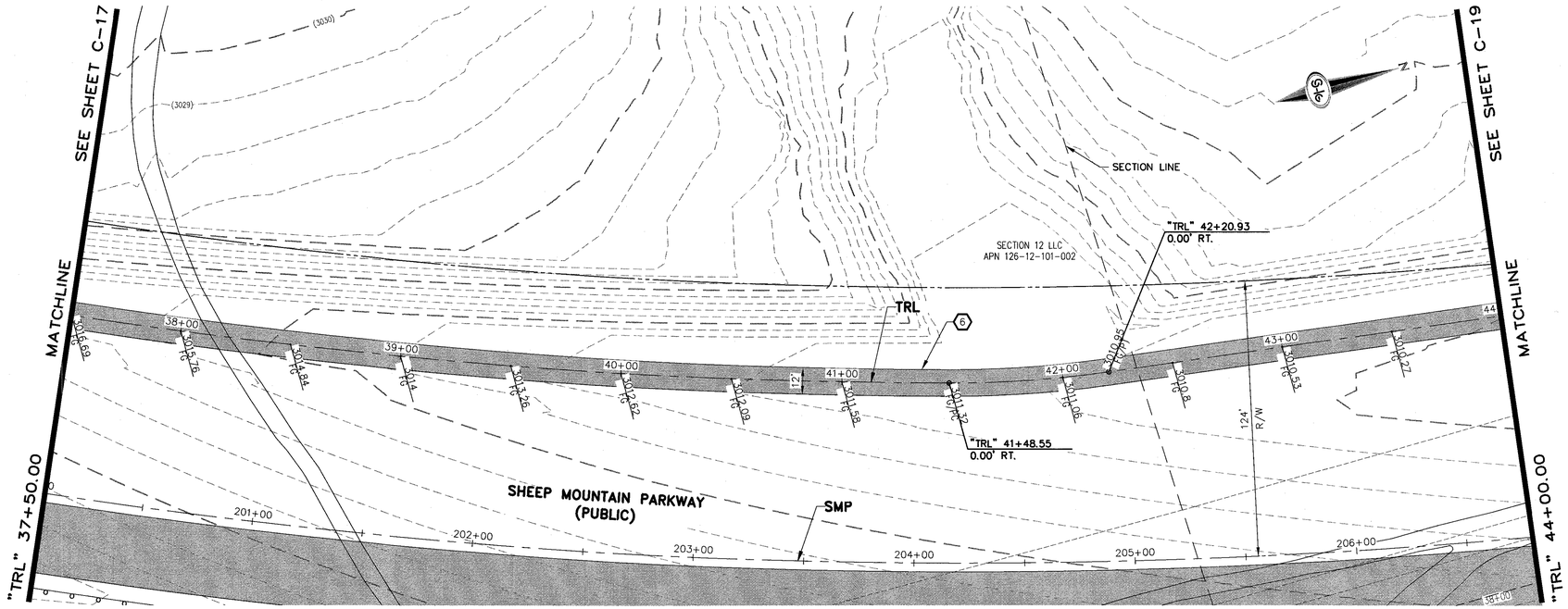
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CHECKED: JSR
PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY J. SLATER
Exp. 06/30/2018
CIVIL
No. 14167

C-17
SHEET 22 OF 46

DWG NO. _____

HANSEN NO. _____



PROFILE VIEW
HORIZ: 1" = 30'
VERT: 1" = 10'

CONSTRUCTION NOTES

1. CONSTRUCT OVER 4.5" PBS OVER 4" TYPE II AGGREGATE BASE (SEE TY-SHEETS)
2. SAWCUT AND MATCH EXISTING
3. INSTALL GUARDRAIL (TRIPLE CORRUGATION) (NDOT STD. PLAN R-8.4.1)
4. INSTALL TANGENT END TERMINAL (NDOT STD. PLAN R-8.1.1)
5. CONSTRUCT 12-FT WIDE (MIN) MAINTENANCE ACCESS PATH
6. CONSTRUCT 2" OVER 4" TYPE II AGGREGATE BASE TRAIL (SEE SHEETS C-13 THROUGH C-22 FOR PLAN AND PROFILE)
7. EXISTING POWER POLE (PROTECT IN PLACE)
8. EXISTING CABLE VAULT (ADJUST TO FINISH GRADE)
9. EXISTING CABLE VAULT (PROTECT IN PLACE)
10. EXISTING POWER AND CONCRETE PAD (PROTECT IN PLACE)
11. EXISTING UTILITY (ADJUST TO FINISH GRADE)
12. SAWCUT AND MATCH EXISTING ACCESS ROAD
13. REMOVE EXISTING CONCRETE CUTOFF WALL
14. REMOVE AND REPLACE EXISTING FENCE AND GATE FOR CONSTRUCTION OF TRAIL
15. CONSTRUCT 3-FT DEEP CONCRETE CUTOFF WALL

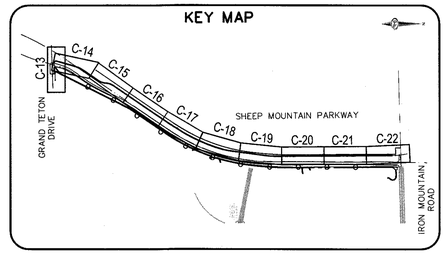
NOTES

1. SEE TY-SHEETS FOR TYPICAL SECTIONS.
2. SEE SD-SHEETS FOR STORM PROFILES.
3. SEE UT-SHEETS FOR WATER AND SEWER PLAN AND PROFILES.
4. SEE GR-SHEETS FOR GRADING AND STORM DRAIN PLAN.

LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



SCALE: 30 0 30 60 FEET

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD. 1-702-227-2929

FAST. Call before you UnderGround. 1-702-432-5300. FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Dig. Avoid cutting underground utility lines. Call 811 or 1-800-227-2600

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

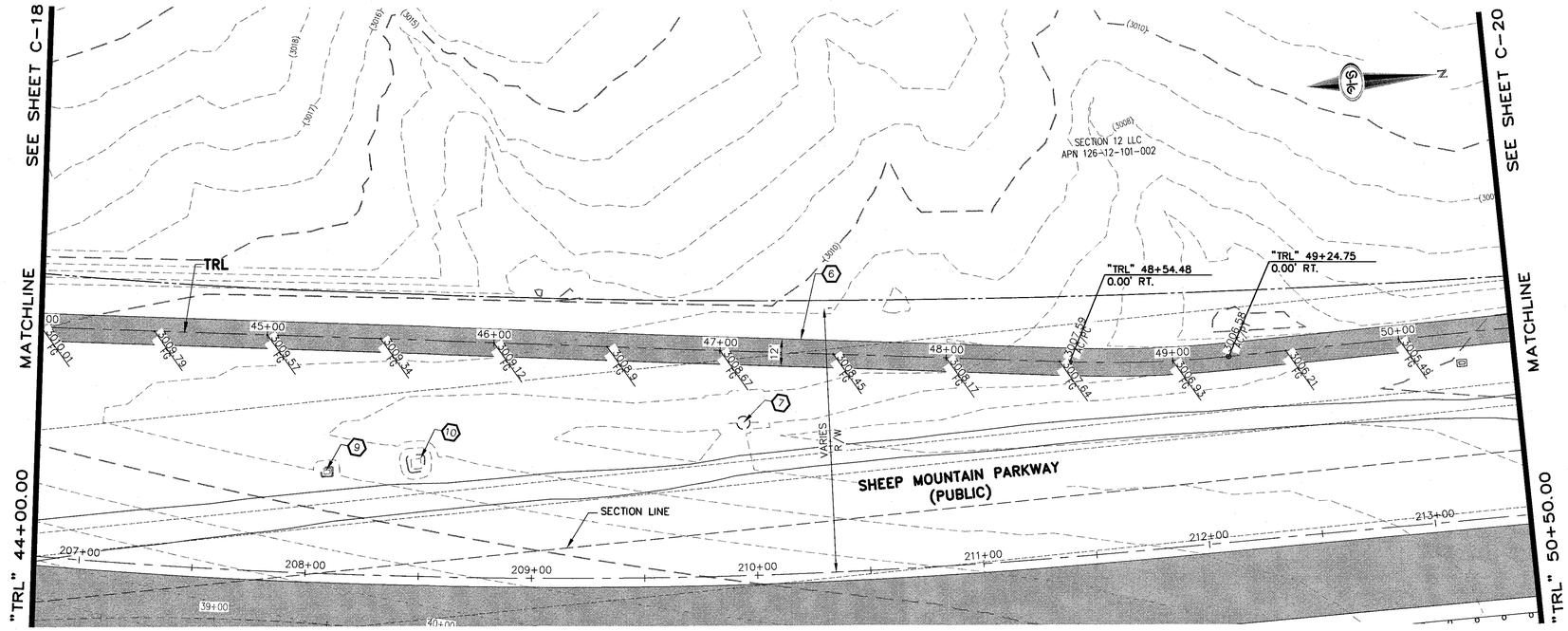
SHEEP MOUNTAIN PARKWAY

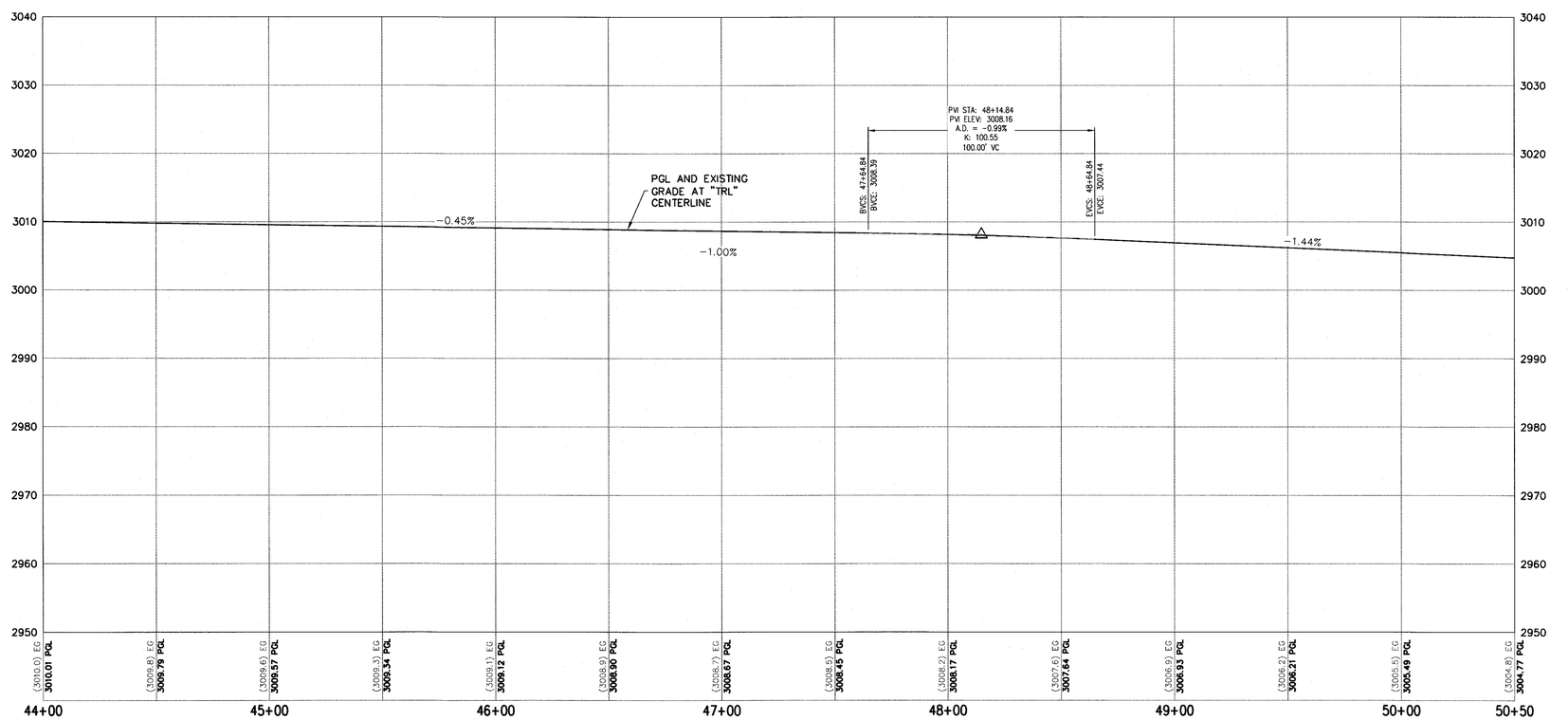
CONSTRUCTION PLAN - "TRL" 37+50.00 TO "TRL" 44+00.00

DATE: 01/19/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO. OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA - JERRY J. SLATER - Exp. 06/30/2018 - CIVIL - No. 14167 - 12-29-17

C-18
SHEET 23 OF 46
DWG NO. _____
HANSEN NO. _____





PROFILE VIEW
HORIZ: 1" = 30'
VERT: 1" = 10'

CONSTRUCTION NOTES

1. CONSTRUCT OVER 4.5" PBS OVER 4" TYPE II AGGREGATE BASE (SEE TY-SHEETS)
2. SAWCUT AND MATCH EXISTING
3. INSTALL GUARDRAIL (TRIPLE CORRUGATION) (NDOT STD. PLAN R-8.4.1)
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12. SAWCUT AND MATCH EXISTING ACCESS ROAD
13. REMOVE EXISTING CONCRETE CUTOFF WALL
14. REMOVE AND REPLACE EXISTING FENCE AND GATE FOR CONSTRUCTION OF TRAIL
15. CONSTRUCT 3-FT DEEP CONCRETE CUTOFF WALL

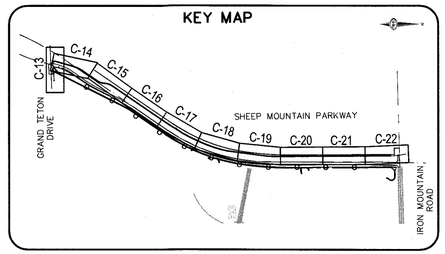
NOTES

1. SEE TY-SHEETS FOR TYPICAL SECTIONS.
2. SEE SD-SHEETS FOR STORM PROFILES.
3. SEE UT-SHEETS FOR WATER AND SEWER PLAN AND PROFILES.
4. SEE GR-SHEETS FOR GRADING AND STORM DRAIN PLAN.

LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



30 0 30 60
SCALE FEET

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FAST
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FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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or
1-800-227-2600

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

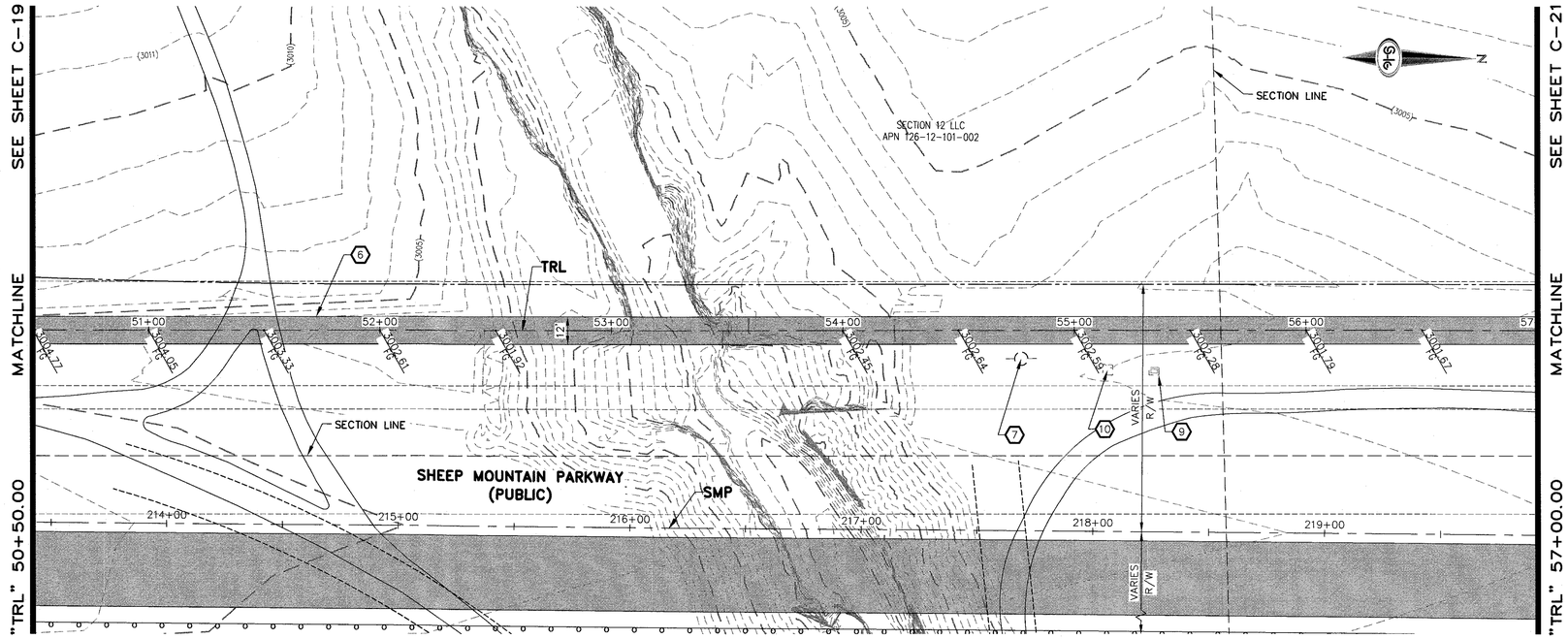
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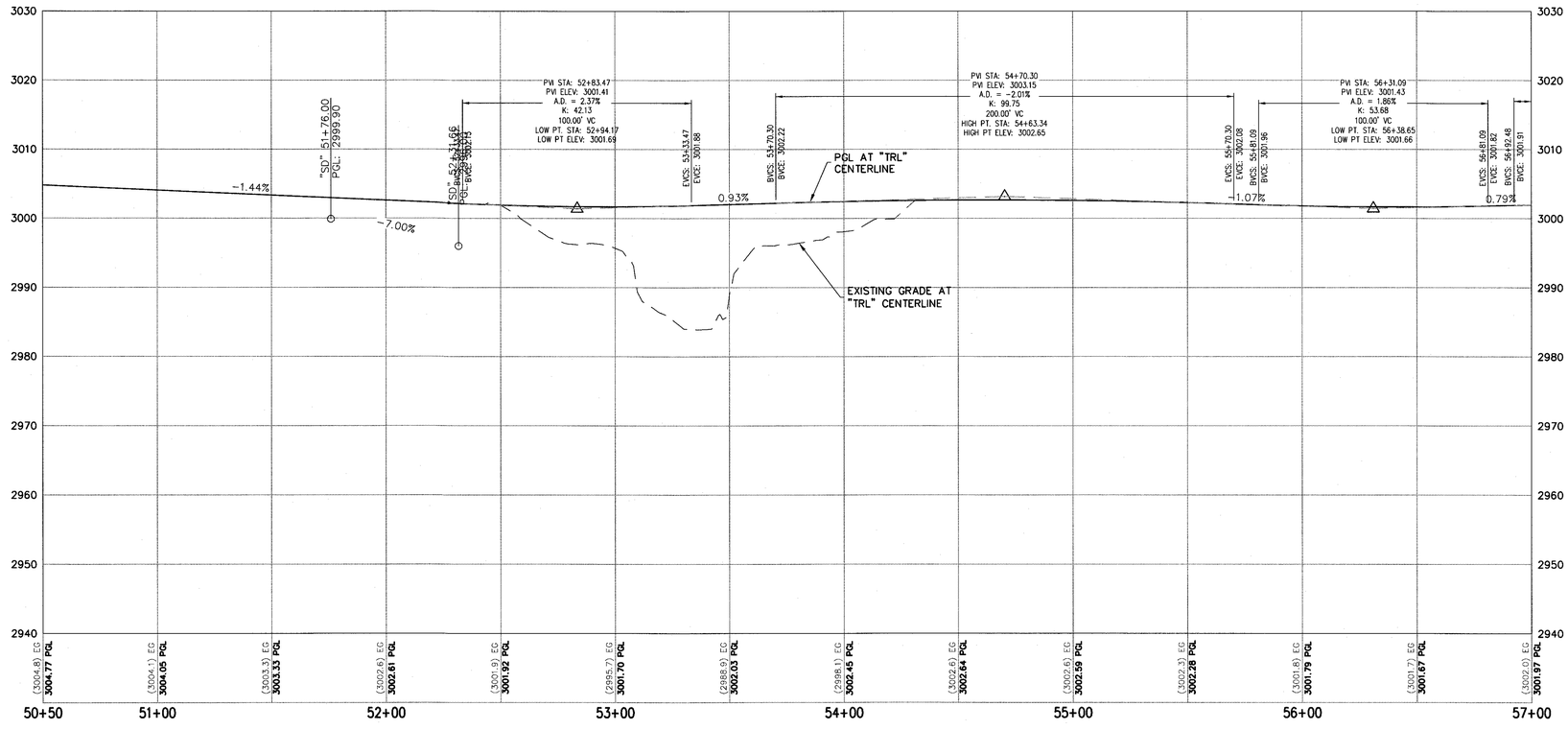
DATE: 01/19/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO. OLY1720.000

PROFESSIONAL ENGINEER STATE OF NEVADA
JERRY V. SLATER
Exp. 06/30/2018
CIVIL
No. 14167
2-9-18

C-19
SHEET 24 OF 46
DWG NO. _____

HANSEN NO. _____





PROFILE VIEW
HORIZ: 1" = 30'
VERT: 1" = 10'

CONSTRUCTION NOTES

1. CONSTRUCT OVER 4.5" PBS OVER 4" TYPE II AGGREGATE BASE (SEE TY-SHEETS)
2. SAWCUT AND MATCH EXISTING
3. INSTALL GUARDRAIL (TRIPLE CORRUGATION) (NDOT STD. PLAN R-8.4.1)
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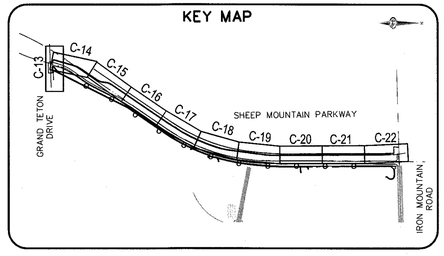
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4. SEE GR-SHEETS FOR GRADING AND STORM DRAIN PLAN.

LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



SCALE 30 0 30 60 FEET

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

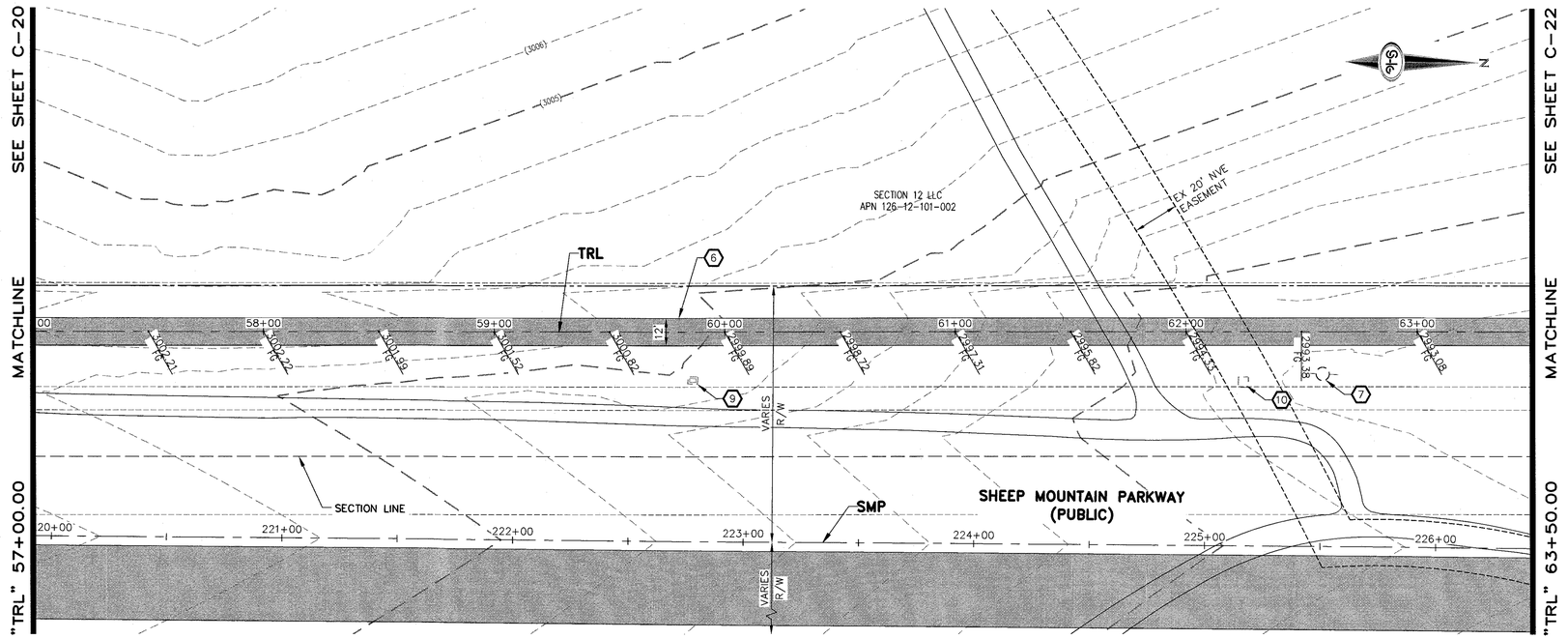
CONSTRUCTION PLAN - "TRL" 50+50.00 TO "TRL" 57+00.00

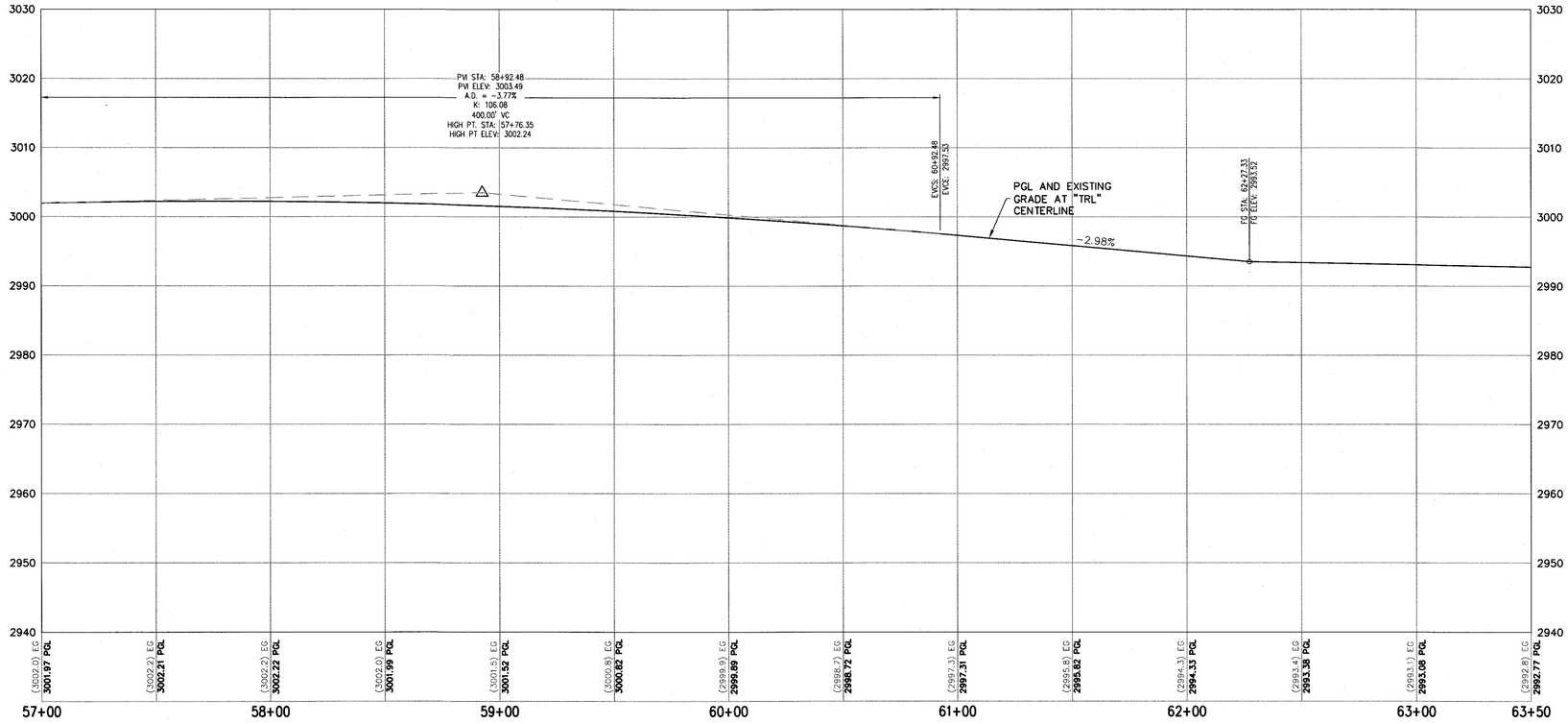
DATE: 01/19/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO. OLY1720.000

PROFESSIONAL ENGINEER STATE OF NEVADA JERRY J. SLATER Exp. 06/30/2018 CIVIL No. 14167 1-9-18

C-20
SHEET 25 OF 46
DWG NO. _____

HANSEN NO. _____





PROFILE VIEW
HORIZ: 1" = 30'
VERT: 1" = 10'

CONSTRUCTION NOTES

1. CONSTRUCT OVER 4.5" PBS OVER 4" TYPE II AGGREGATE BASE (SEE TY-SHEETS)
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15. CONSTRUCT 3-FT DEEP CONCRETE CUTOFF WALL

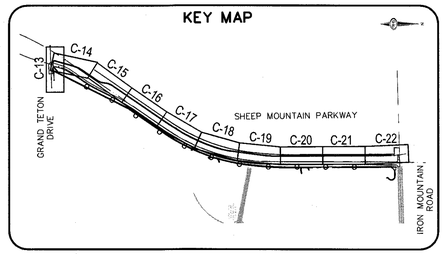
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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



SCALE 30 0 30 60 FEET

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

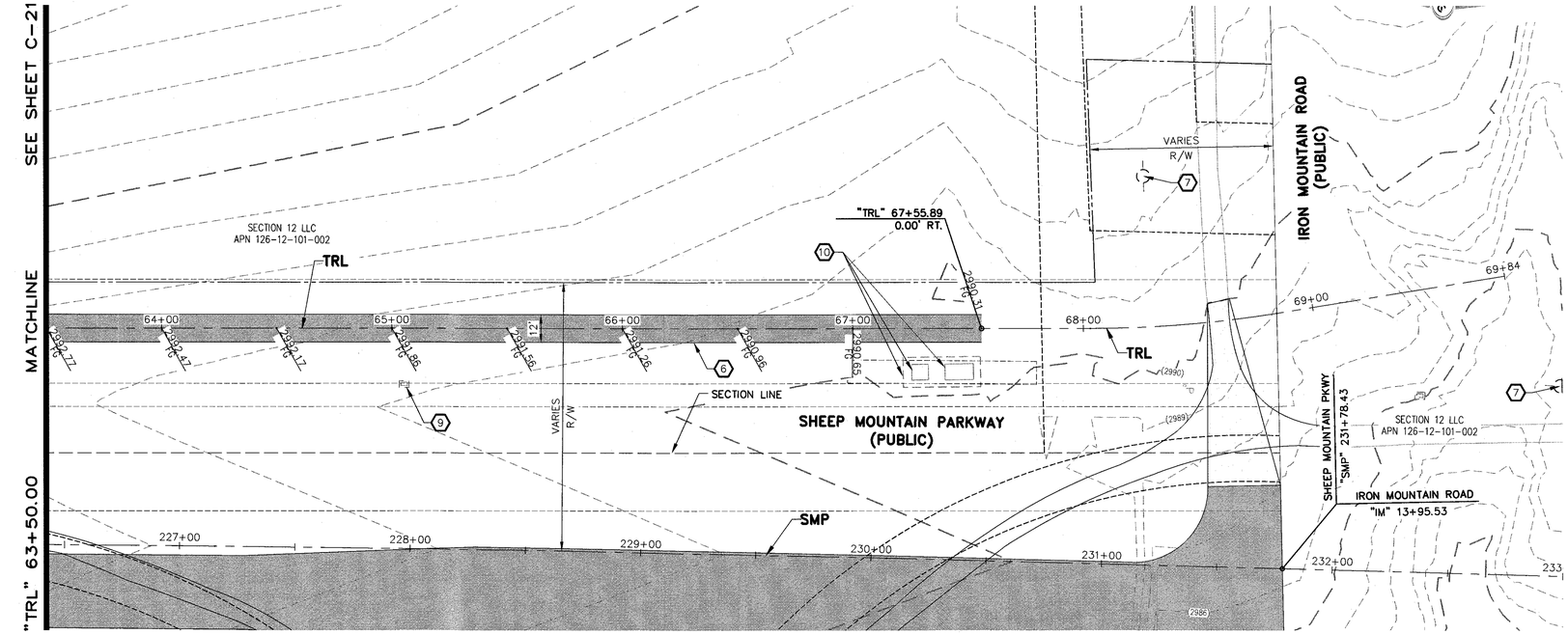
CONSTRUCTION PLAN - "TRL" 57+00.00 TO "TRL" 63+50.00

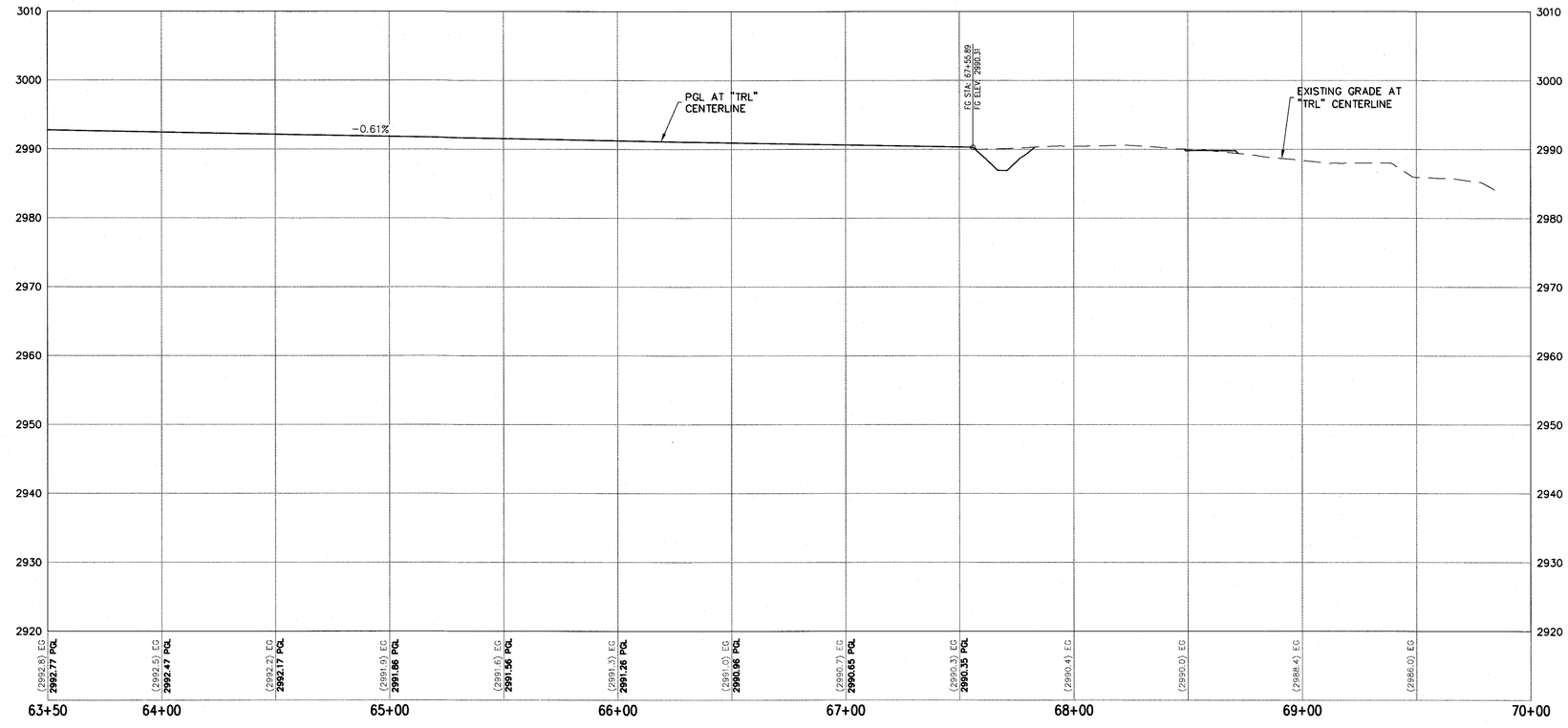
DATE: 01/19/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO. OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA - JERRY C. SLATER - Exp. 06/30/2018 - CIVIL - No. 14167

C-21
SHEET 26 OF 46
DWG NO. _____

HANSEN NO. _____





PROFILE VIEW
HORIZ: 1" = 30'
VERT: 1" = 10'

CONSTRUCTION NOTES

1. CONSTRUCT OVER 4.5" PBS OVER 4" TYPE II AGGREGATE BASE (SEE TY-SHEETS)
2. SAWCUT AND MATCH EXISTING
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14. REMOVE AND REPLACE EXISTING FENCE AND GATE FOR CONSTRUCTION OF TRAIL
15. CONSTRUCT 3-FT DEEP CONCRETE CUTOFF WALL

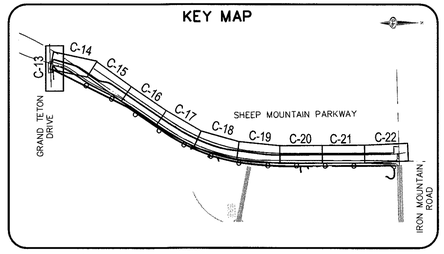
NOTES

1. SEE TY-SHEETS FOR TYPICAL SECTIONS.
2. SEE SD-SHEETS FOR STORM PROFILES.
3. SEE UT-SHEETS FOR WATER AND SEWER PLAN AND PROFILES.
4. SEE GR-SHEETS FOR GRADING AND STORM DRAIN PLAN.

LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



SCALE 30 0 30 60 FEET

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NO.	DESCRIPTION	DATE	BY	APP DATE	APP

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "TRL" 63+50.00 TO "TRL" 70+00.00

DATE: 01/19/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

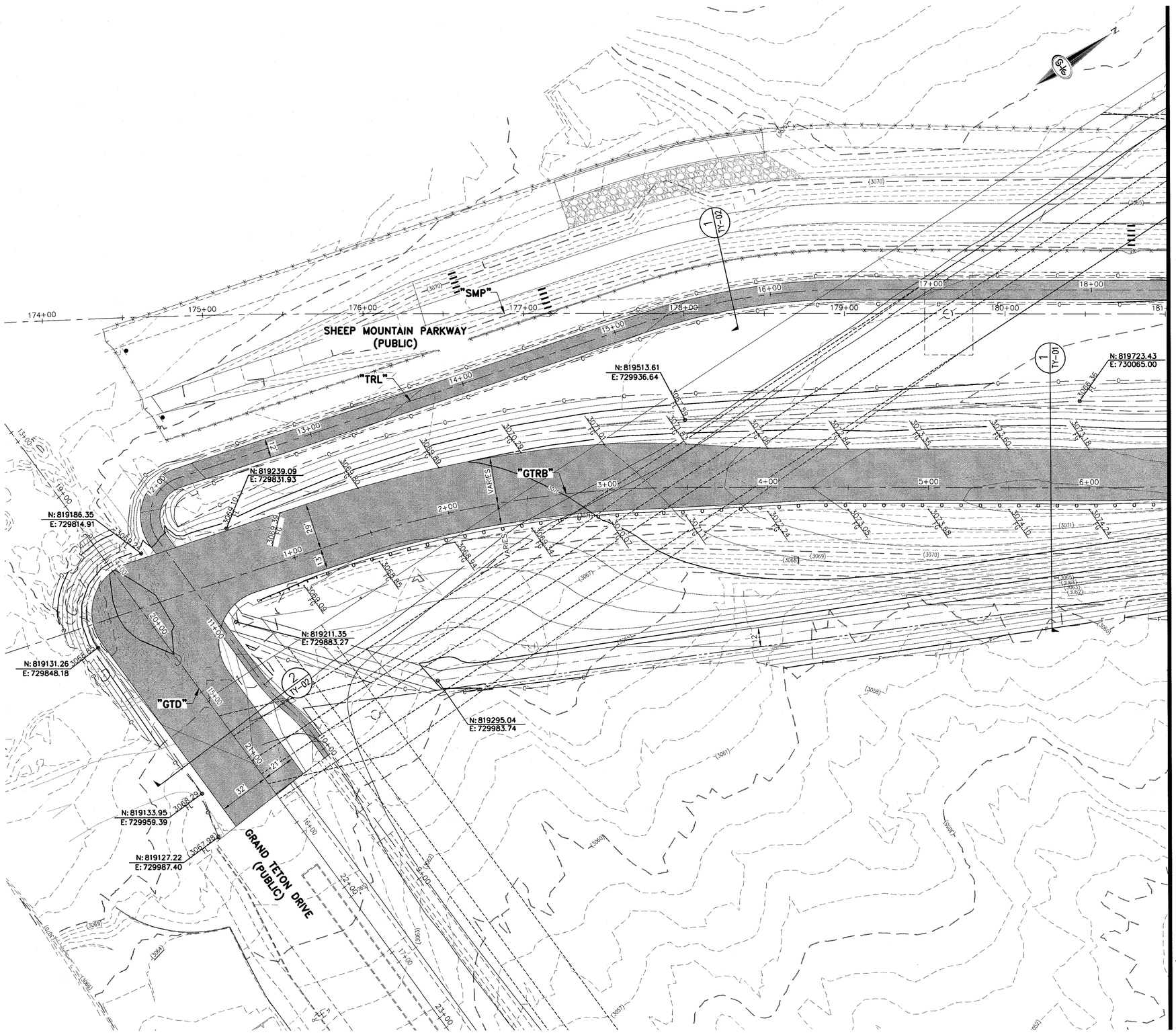
PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY J. SLATER
Exp. 06/30/2018
CIVIL
No. 14167
12-21-17

C-22
SHEET 27 OF 46

DWG NO. _____

HANSEN NO. _____



STORM DRAIN NOTES

1. INSTALL STORM DRAIN DROP INLET (PER STRUCTURAL PLANS)
2. ADJUST EXISTING STORM DRAIN DROP INLET TO FINISH GRADE (PER STRUCTURAL PLANS)
3. REMOVE EXISTING DROP INLET
4. REMOVE EXISTING DROP INLET AND CONNECT TO EXISTING 36" CLASS IV RCP STORM DRAIN
5. INSTALL 36" CLASS V RCP STORM DRAIN (USDCCA STD. DWG. NO. 503.2)
6. INSTALL 48" CLASS V RCP STORM DRAIN (USDCCA STD. DWG. NO. 503.2)
7. ADJUST EXISTING STORM DRAIN MANHOLE TO FINISH GRADE
8. CONSTRUCT HEADWALL PER STRUCTURAL DETAIL
9. EXISTING STORM DRAIN DROP INLET (PROTECT IN PLACE)
10. REMOVE EXISTING 3-FT DEEP CONCRETE CUTOFF WALL
11. EXISTING STORM DRAIN MANHOLE (PROTECT IN PLACE)
12. EXISTING STORM DRAIN (PROTECT IN PLACE)
13. INSTALL 3-FT DEEP CONCRETE CUTOFF WALL (SEE DETAIL 4 ON DT-02)
14. INSTALL 54" CMP STORM DRAIN
15. INSTALL METAL FLARED END SECTION (NDOT R2.2.1 AND R2.2.1.1)
16. CONSTRUCT CONCRETE PAD WITH 3' DEEP CUTOFF WALL (PER STRUCTURAL PLANS)
17. INSTALL RIPRAP (D50=18", T=36")

NOTES

1. SEE TY-SHEETS FOR TYPICAL SECTIONS.
2. SEE SD-SHEETS FOR STORM PROFILES.
3. SEE UT-SHEETS FOR WATER AND SEWER PLAN AND PROFILES.
4. ALL RCP SHALL BE CLASS III UNLESS OTHERWISE SHOWN.
5. ALL PIPE LENGTHS ARE MEASURED ALONG PIPE CENTERLINE TO CENTER OF MANHOLE OR INSIDE EDGE OF DI OR RCB/RCA.
6. ALL DROP INLETS SHALL INCLUDE STORM WATER MANAGEMENT STAMP AND DETAIL PER USDCCA STD. DWG. NO. 421.
7. SEE STRUCTURAL PLANS FOR ADDITIONAL STRUCTURAL DETAILS AND CONNECTIONS.
8. ALL PIPES ARE PUBLICLY MAINTAINED.

LEGEND

PLANTMIX BITUMINOUS SURFACE

MAINTENANCE ACCESS PATH

LEGEND

(1) STORM DRAIN LATERAL # (SEE SHEET GR-10)

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY XX-XXXX ON FILE AT THE CITY OF LAS VEGAS FOR THE SUBJECT PROJECT

JERRY SLATER, P.E. 14167 — DATE

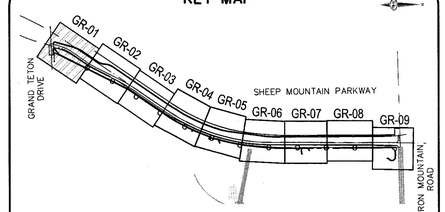
FLOOD ZONE

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE "X" (OUTSIDE THE 500-YEAR FLOOD PLAIN) ON THE FLOOD INSURANCE RATE MAP (FIRM) PANEL: 32003C1735E, DATED SEPTEMBER 27, 2002

NOTE:

PROPERTY OWNER IS RESPONSIBLE TO MAINTAIN THE BEST MANAGEMENT PRACTICES, SUCH AS BUT NOT LIMITED TO, THE REMOVAL OF ACCUMULATED SEDIMENT AND DEBRIS AND CARE OF VEGETATION.

KEY MAP



30 0 30 60
SCALE FEET

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

GRADING PLAN - "GTRB" 0+00.00 TO "GTRB" 6+50.00

DATE: 01/19/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

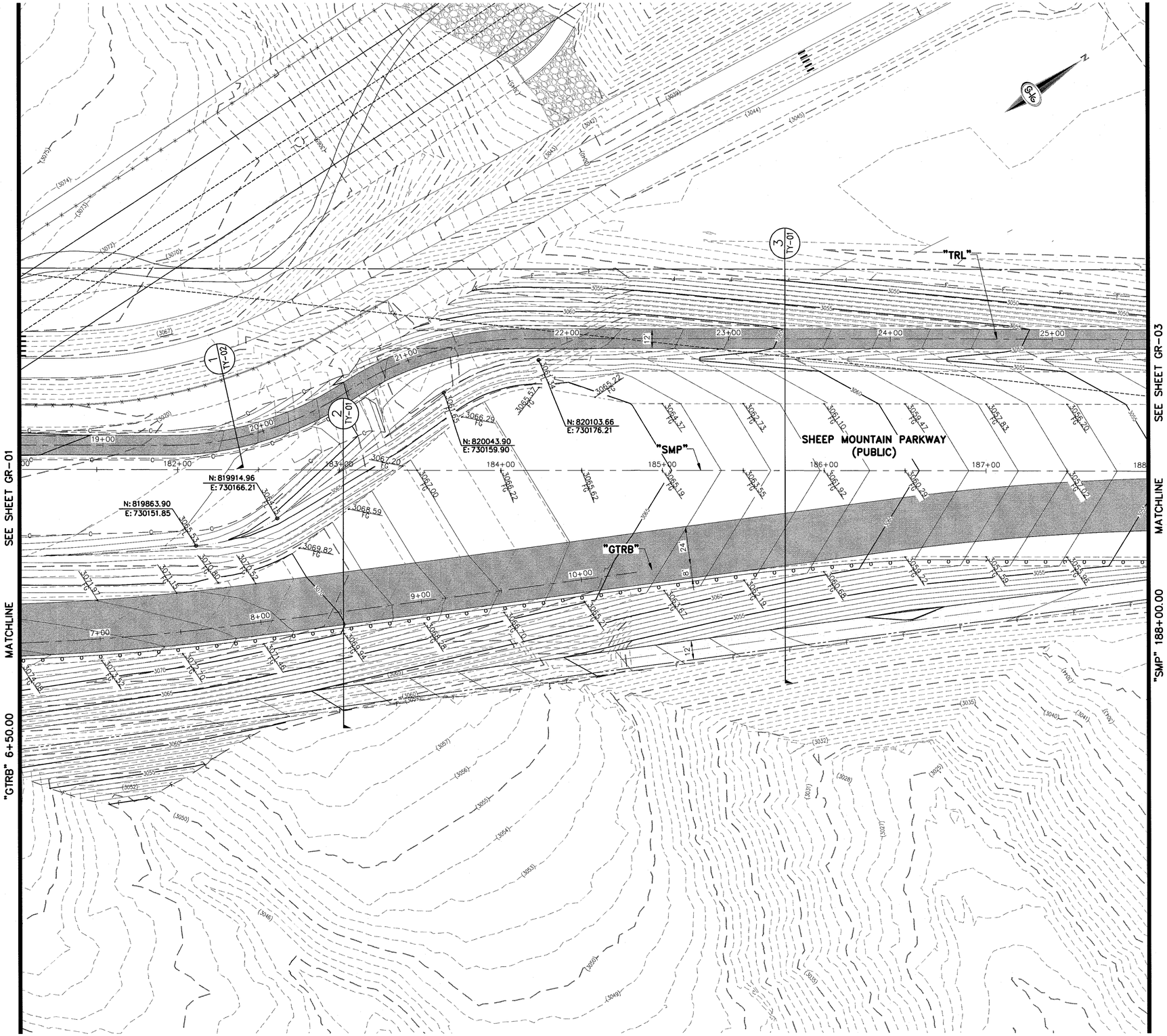
PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER STATE OF NEVADA
JERRY J. SLATER
Exp. 06/30/2018
CIVIL
No. 14167

GR-01
SHEET 28 OF 46

DWG NO. _____

HANSEN NO. _____



STORM DRAIN NOTES

1. INSTALL STORM DRAIN DROP INLET (PER STRUCTURAL PLANS)
2. ADJUST EXISTING STORM DRAIN DROP INLET TO FINISH GRADE (PER STRUCTURAL PLANS)
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10. REMOVE EXISTING 3-FT DEEP CONCRETE CUTOFF WALL
11. EXISTING STORM DRAIN MANHOLE (PROTECT IN PLACE)
12. EXISTING STORM DRAIN (PROTECT IN PLACE)
13. INSTALL 3-FT DEEP CONCRETE CUTOFF WALL (SEE DETAIL 4 ON DT-02)
14. INSTALL 54" CMP STORM DRAIN
15. INSTALL METAL FLARED END SECTION (NDOT R2.2.1 AND R2.2.1.1)
16. CONSTRUCT CONCRETE PAD WITH 3' DEEP CUTOFF WALL (PER STRUCTURAL PLANS)
17. INSTALL RIPRAP (D50=18", T=36")

NOTES

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6. ALL DROP INLETS SHALL INCLUDE STORM WATER MANAGEMENT STAMP AND DETAIL PER USDCCA STD. DWG. NO. 421.
7. SEE STRUCTURAL PLANS FOR ADDITIONAL STRUCTURAL DETAILS AND CONNECTIONS.
8. ALL PIPES ARE PUBLICLY MAINTAINED.

LEGEND

PLANTMIX BITUMINOUS SURFACE

MAINTENANCE ACCESS PATH

LEGEND

1 STORM DRAIN LATERAL # (SEE SHEET GR-10)

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY XX-XXXX ON FILE AT THE CITY OF LAS VEGAS FOR THE SUBJECT PROJECT

JERRY SLATER, P.E. 14167 DATE

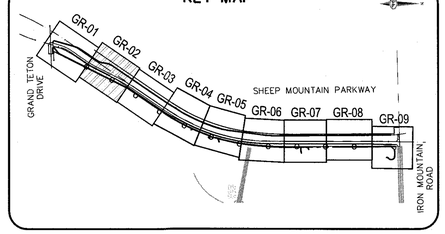
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NOTE:

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KEY MAP



30 0 30 60
SCALE FEET

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD 1-702-227-2929

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CONSULTING ENGINEERS & PLANNERS
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PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

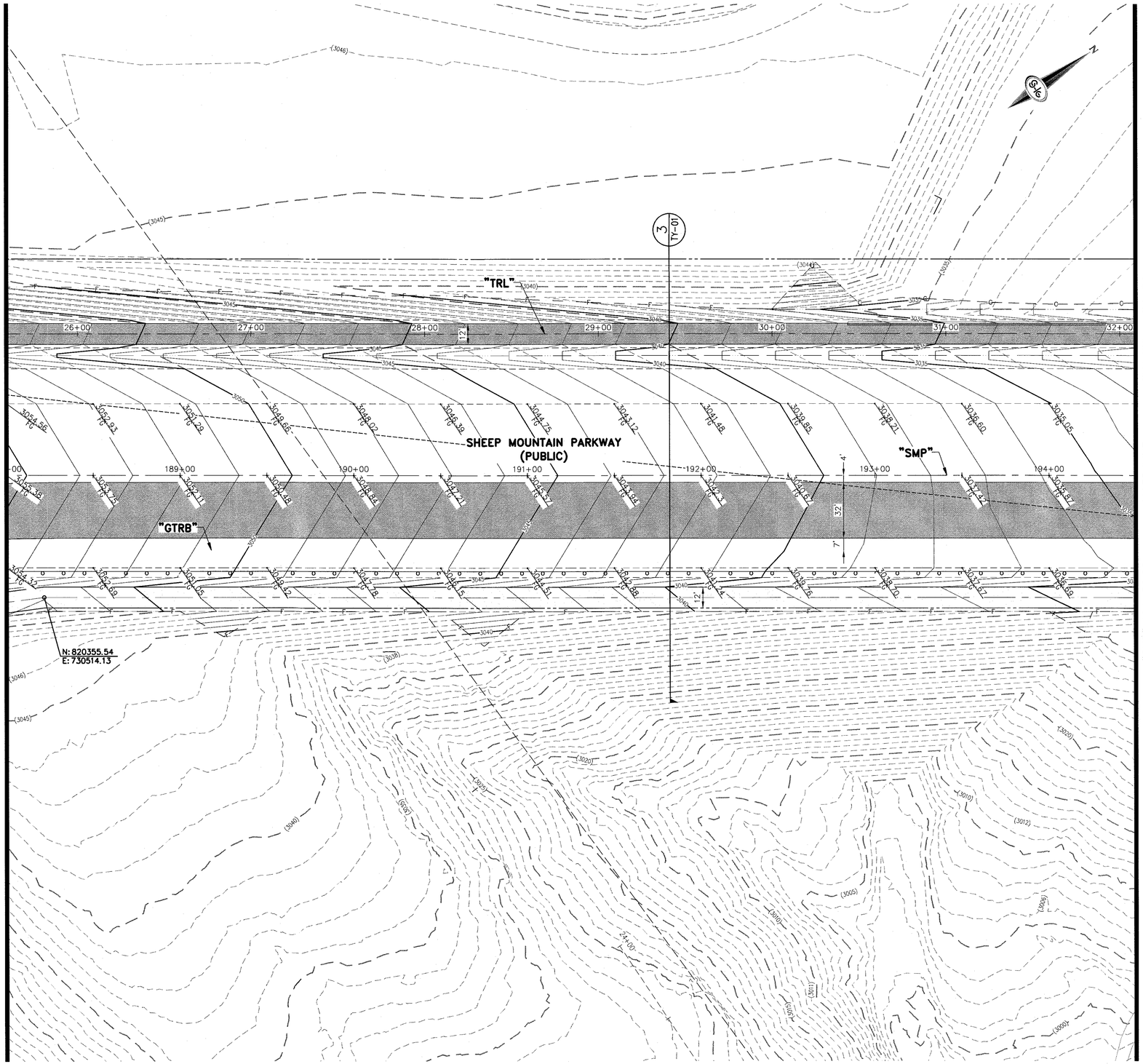
GRADING PLAN - "GTRB" 6+50.00 TO "GTRB" 12+00.00

DATE: 01/19/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA - JERRY D. SLATER - Exp. 06/30/2018 - CIVIL - No. 14167

GR-02
SHEET 29 OF 46
DWG NO. _____

HANSEN NO. _____



STORM DRAIN NOTES

1. INSTALL STORM DRAIN DROP INLET (PER STRUCTURAL PLANS)
2. ADJUST EXISTING STORM DRAIN DROP INLET TO FINISH GRADE (PER STRUCTURAL PLANS)
3. REMOVE EXISTING DROP INLET
4. REMOVE EXISTING DROP INLET AND CONNECT TO EXISTING 36" CLASS IV RCP STORM DRAIN
5. INSTALL 36" CLASS V RCP STORM DRAIN (USDCCA STD. DWG. NO. 503.2)
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LEGEND

PLANTMIX BITUMINOUS SURFACE

MAINTENANCE ACCESS PATH

LEGEND

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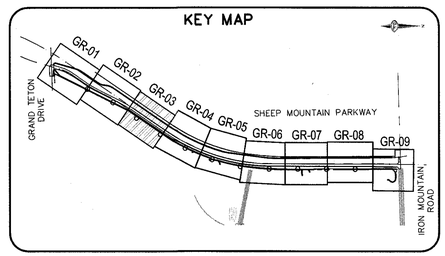
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KEY MAP



SCALE 30 0 30 60 FEET

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

GRADING PLAN - "SMP" 188+00.00 TO "SMP" 194+50.00

DATE: 01/19/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

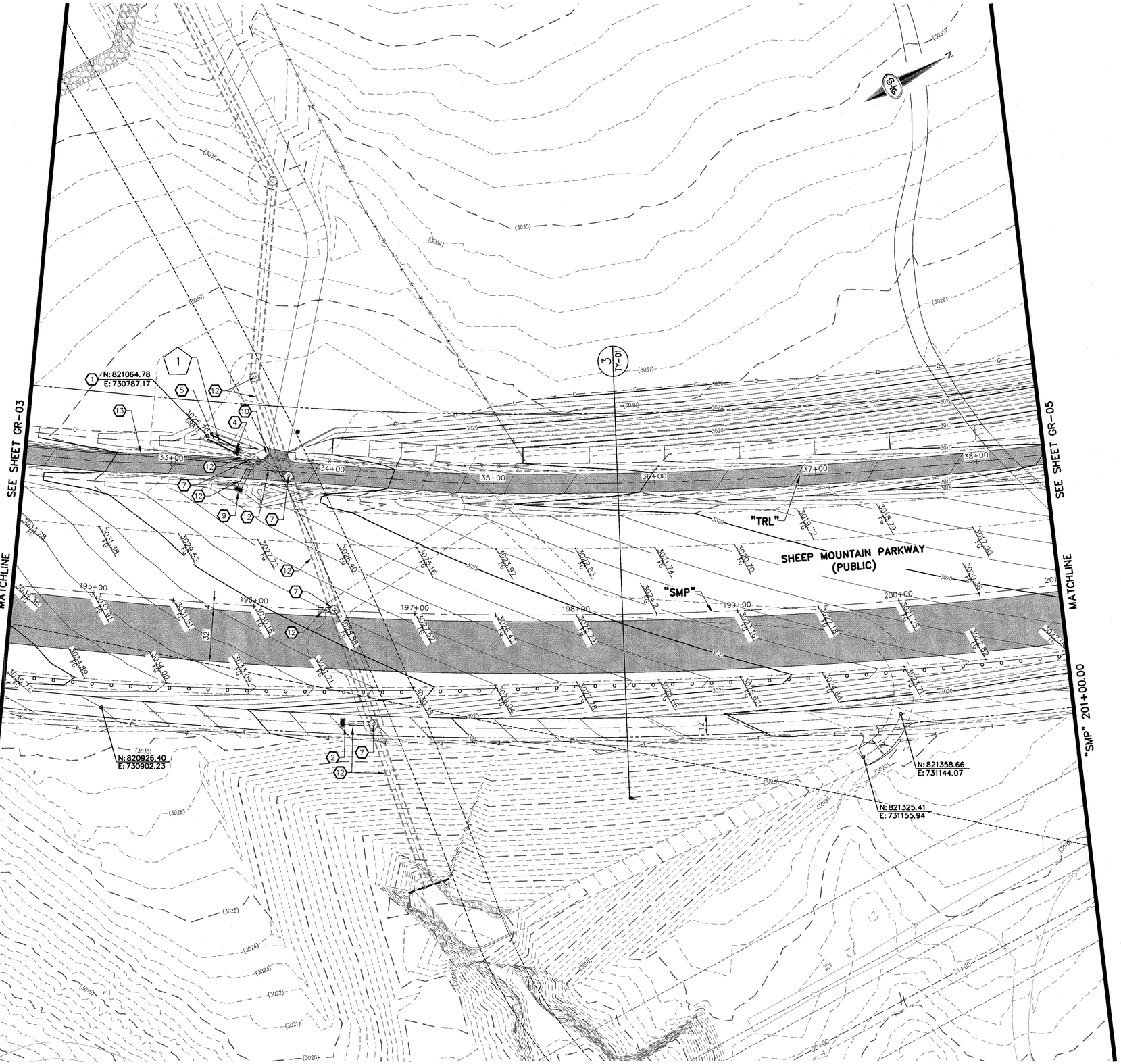
PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA - JERRY A. SLATER - Exp. 06/30/2018 - CIVIL - No. 14167

GR-03
SHEET 30 OF 46

DWG NO. _____

HANSEN NO. _____



STORM DRAIN NOTES

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2. ADJUST EXISTING STORM DRAIN DROP INLET TO FINISH GRADE (PER STRUCTURAL PLANS)
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LEGEND

PLANTMIX BITUMINOUS SURFACE

MAINTENANCE ACCESS PATH

LEGEND

(1) STORM DRAIN LATERAL # (SEE SHEET GR-10)

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JERRY SLATER, P.E. 14167 — DATE

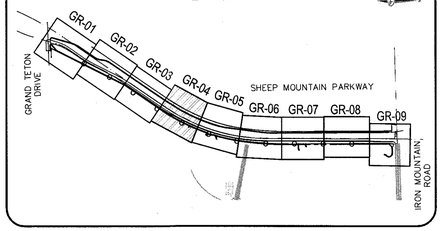
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

GRADING PLAN - "SMP" 194+50.00 TO "SMP" 201+00.00

DATE: 01/19/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

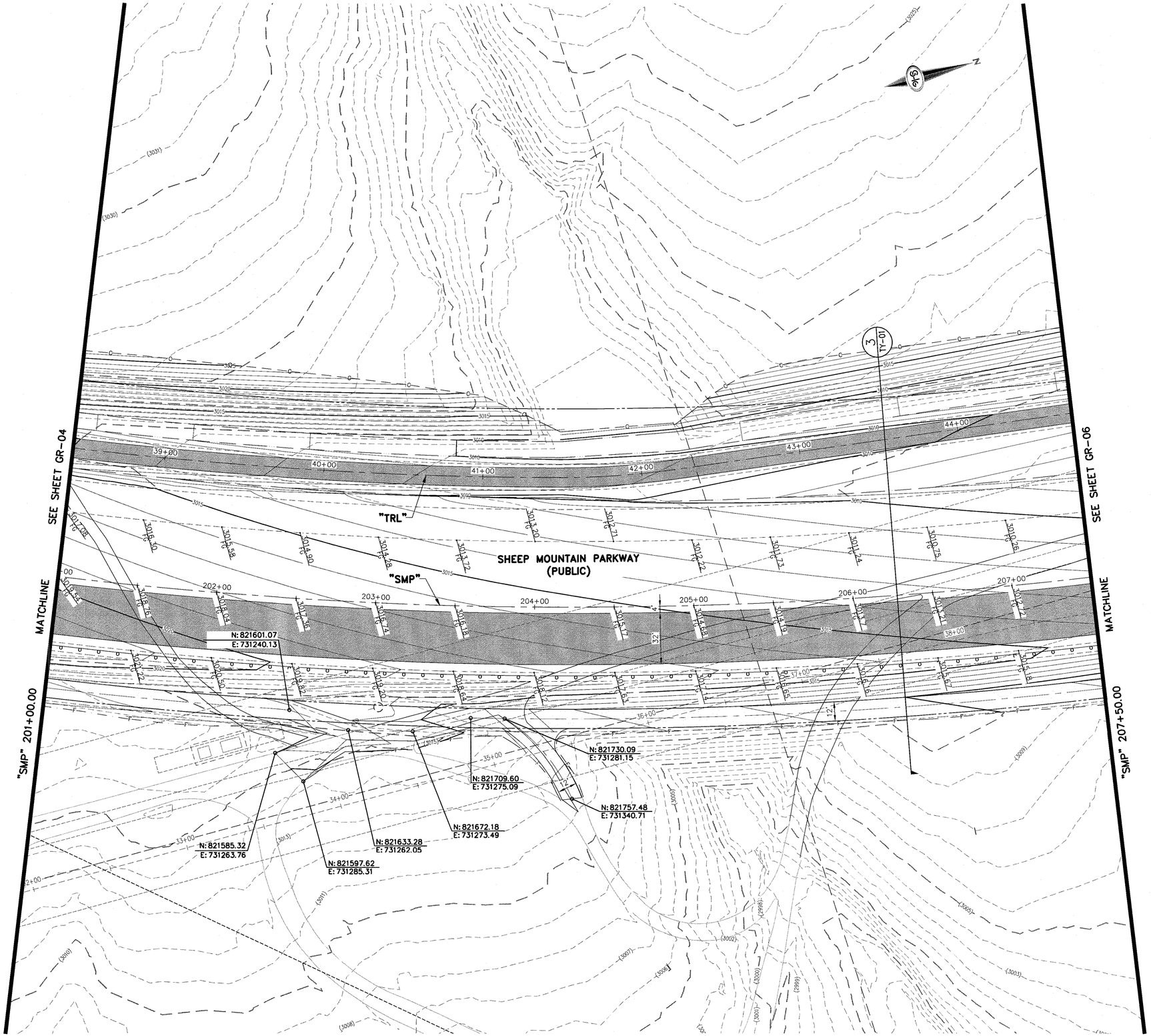
PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER — STATE OF NEVADA — JERRY J. SLATER — Exp. 06/30/2018 — CIVIL — No. 14167 — 12-21-17

GR-04
SHEET 31 OF 46

DWG NO. _____

HANSEN NO. _____



STORM DRAIN NOTES

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2. ADJUST EXISTING STORM DRAIN DROP INLET TO FINISH GRADE (PER STRUCTURAL PLANS)
3. REMOVE EXISTING DROP INLET
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LEGEND

PLANTMIX BITUMINOUS SURFACE

MAINTENANCE ACCESS PATH

LEGEND

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JERRY SLATER, P.E. 14167 DATE

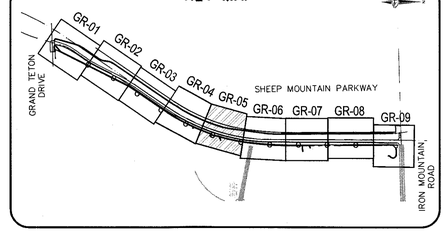
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NO.	DESCRIPTION	DATE	BY	APP DATE	APP

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

GRADING PLAN - "SMP" 201+00.00 TO "SMP" 207+50.00

DATE: 01/19/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

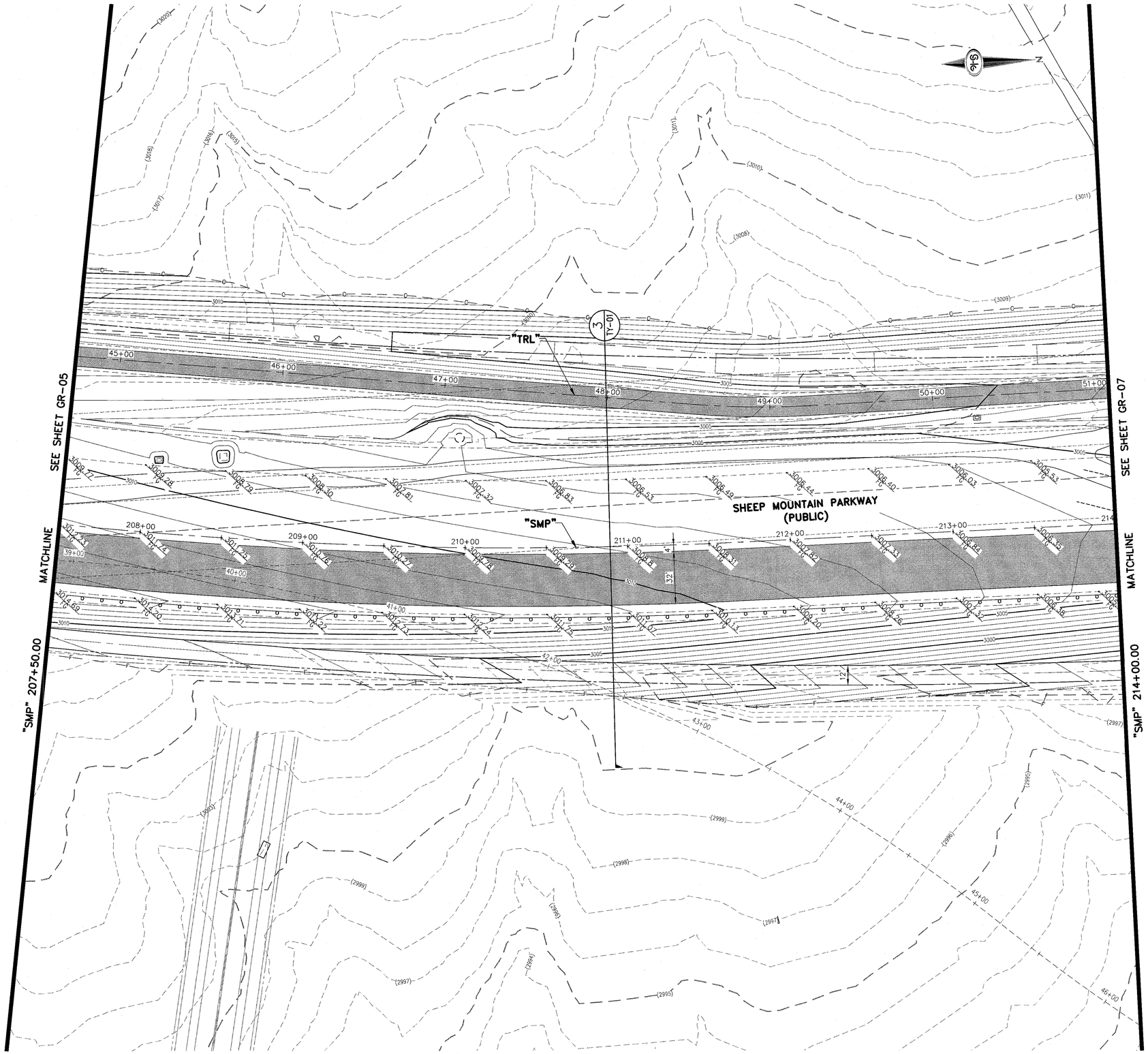
PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER STATE OF NEVADA
JERRY SLATER
Exp. 06/30/2018
CIVIL
No. 14167

GR-05
SHEET 32 OF 46

DWG NO. _____

HANSEN NO. _____



STORM DRAIN NOTES

1. INSTALL STORM DRAIN DROP INLET (PER STRUCTURAL PLANS)
2. ADJUST EXISTING STORM DRAIN DROP INLET TO FINISH GRADE (PER STRUCTURAL PLANS)
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LEGEND

PLANTMIX BITUMINOUS SURFACE

MAINTENANCE ACCESS PATH

LEGEND

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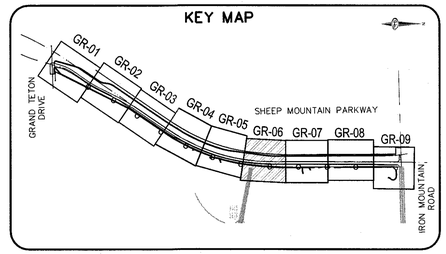
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

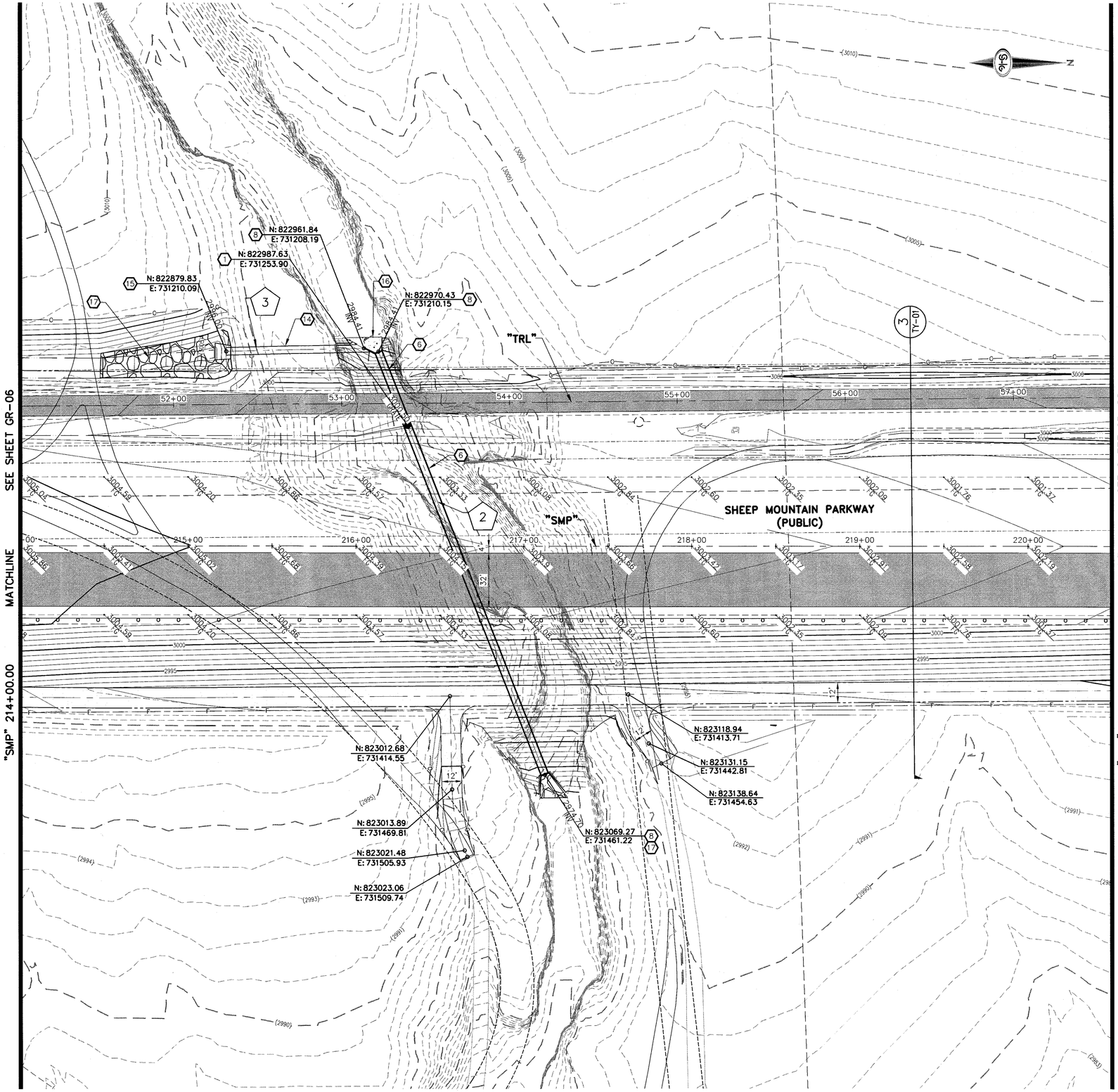
GRADING PLAN - "SMP" 207+50.00 TO "SMP" 214+00.00

DATE: 01/19/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO. OLY1720.000

PROFESSIONAL ENGINEER STATE OF NEVADA JERRY SLATER Exp. 06/30/2018 CIVIL No. 14167

GR-06
SHEET 33 OF 46
DWG NO. _____

HANSEN NO. _____



STORM DRAIN NOTES

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2. ADJUST EXISTING STORM DRAIN DROP INLET TO FINISH GRADE (PER STRUCTURAL PLANS)
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LEGEND

PLANTMIX BITUMINOUS SURFACE

MAINTENANCE ACCESS PATH

LEGEND

1 STORM DRAIN LATERAL # (SEE SHEET GR-10)

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY XX-XXXX ON FILE AT THE CITY OF LAS VEGAS FOR THE SUBJECT PROJECT

JERRY SLATER, P.E. 14167 DATE

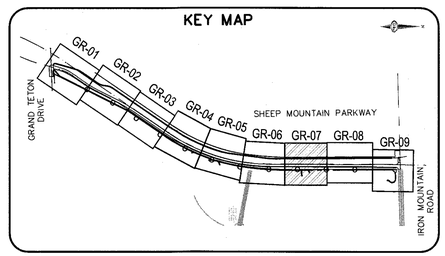
FLOOD ZONE

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE "X" (OUTSIDE THE 500-YEAR FLOOD PLAIN) ON THE FLOOD INSURANCE RATE MAP (FIRM) PANEL: 32003C1735E, DATED SEPTEMBER 27, 2002

NOTE:

PROPERTY OWNER IS RESPONSIBLE TO MAINTAIN THE BEST MANAGEMENT PRACTICES, SUCH AS BUT NOT LIMITED TO, THE REMOVAL OF ACCUMULATED SEDIMENT AND DEBRIS AND CARE OF VEGETATION.

KEY MAP



30 0 30 60
SCALE FEET

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD 1-702-227-2929

FAST Call before you Dig Underground. 1-702-486-9300 NEVADA AND ARIZONA SYSTEM OF RANGE

Call before you Dig Avoid striking underground utility lines. Call 811 1-800-227-2800

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

GRADING PLAN - "SMP" 214+00.00 TO "SMP" 220+50.00

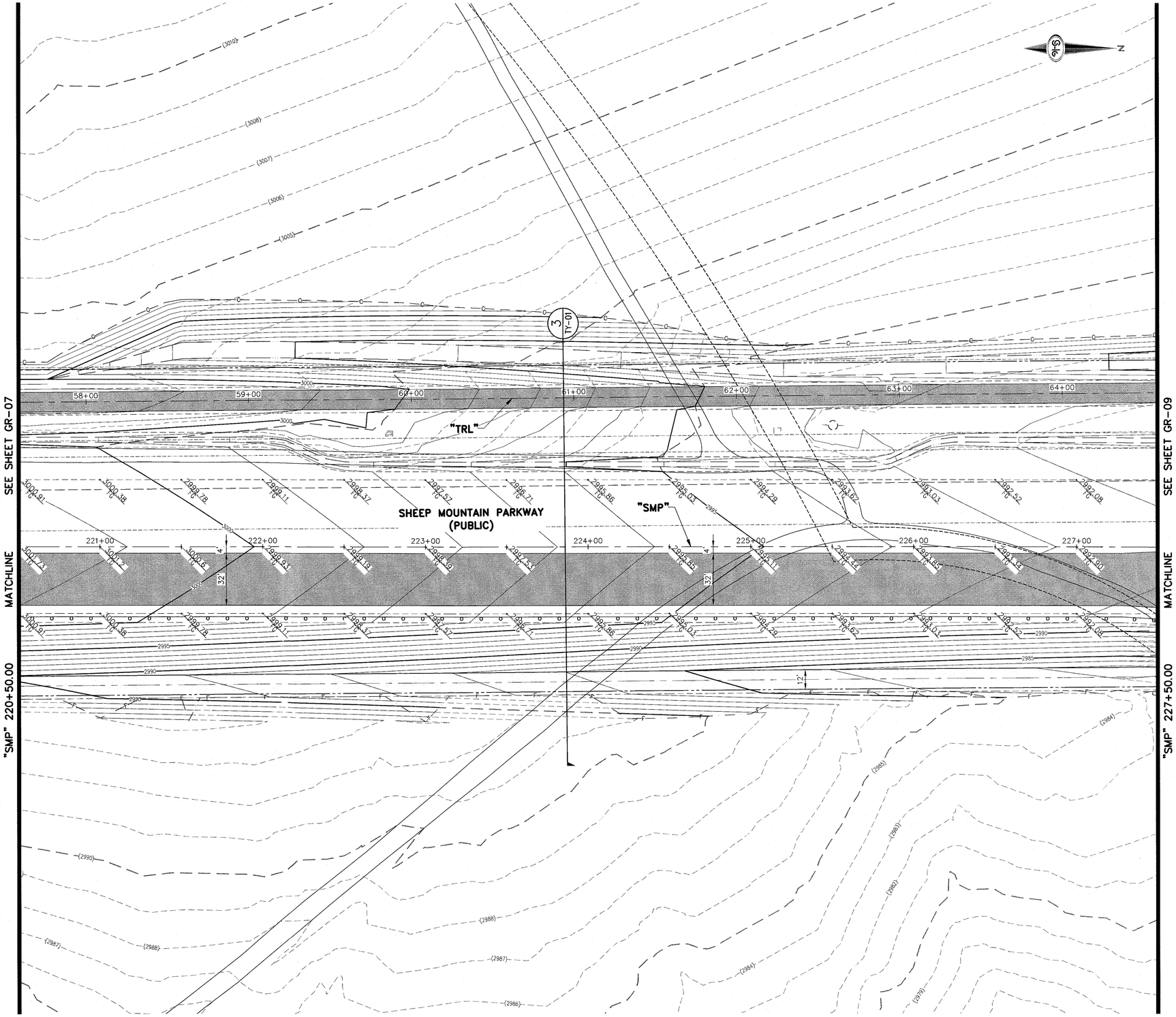
DATE: 01/19/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA - JERRY J. SLATER - Exp. 06/30/2018 - CIVIL - No. 14167 - 2-8-18

GR-07
SHEET 34 OF 46
DWG NO. ____

HANSEN NO. ____

GRADING PLAN - "SMP" 220+50.00 TO "SMP" 227+50.00



BCC
BCC
JSR

STORM DRAIN NOTES

1. INSTALL STORM DRAIN DROP INLET (PER STRUCTURAL PLANS)
2. ADJUST EXISTING STORM DRAIN DROP INLET TO FINISH GRADE (PER STRUCTURAL PLANS)
3. REMOVE EXISTING DROP INLET
4. REMOVE EXISTING DROP INLET AND CONNECT TO EXISTING 36" CLASS IV RCP STORM DRAIN
5. INSTALL 36" CLASS V RCP STORM DRAIN (USDCCA STD. DWG. NO. 503.2)
6. INSTALL 48" CLASS V RCP STORM DRAIN (USDCCA STD. DWG. NO. 503.2)
7. ADJUST EXISTING STORM DRAIN MANHOLE TO FINISH GRADE
8. CONSTRUCT HEADWALL PER STRUCTURAL DETAIL
9. EXISTING STORM DRAIN DROP INLET (PROTECT IN PLACE)
10. REMOVE EXISTING 3-FT DEEP CONCRETE CUTOFF WALL
11. EXISTING STORM DRAIN MANHOLE (PROTECT IN PLACE)
12. EXISTING STORM DRAIN (PROTECT IN PLACE)
13. INSTALL 3-FT DEEP CONCRETE CUTOFF WALL (SEE DETAIL 4 ON DT-02)
14. INSTALL 54" CMP STORM DRAIN
15. INSTALL METAL FLARED END SECTION (NDOT R2.2.1 AND R2.2.1.1)
16. CONSTRUCT CONCRETE PAD WITH 3' DEEP CUTOFF WALL (PER STRUCTURAL PLANS)
17. INSTALL RIPRAP (D50=18", T=36")

NOTES

1. SEE TY-SHEETS FOR TYPICAL SECTIONS.
2. SEE SD-SHEETS FOR STORM PROFILES.
3. SEE UT-SHEETS FOR WATER AND SEWER PLAN AND PROFILES.
4. ALL RCP SHALL BE CLASS III UNLESS OTHERWISE SHOWN.
5. ALL PIPE LENGTHS ARE MEASURED ALONG PIPE CENTERLINE TO CENTER OF MANHOLE OR INSIDE EDGE OF DI OR RCB/RCA.
6. ALL DROP INLETS SHALL INCLUDE STORM WATER MANAGEMENT STAMP AND DETAIL PER USDCCA STD. DWG. NO. 421.
7. SEE STRUCTURAL PLANS FOR ADDITIONAL STRUCTURAL DETAILS AND CONNECTIONS.
8. ALL PIPES ARE PUBLICLY MAINTAINED.

LEGEND

PLANTMIX BITUMINOUS SURFACE

MAINTENANCE ACCESS PATH

LEGEND

(1) STORM DRAIN LATERAL # (SEE SHEET GR-10)

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JERRY SLATER, P.E. 14167 DATE

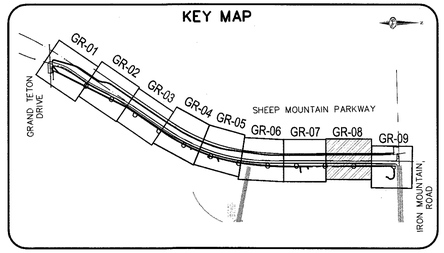
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SLATER HANIFAN GROUP
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

GRADING PLAN - "SMP" 220+50.00 TO "SMP" 227+50.00

DATE: 01/19/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

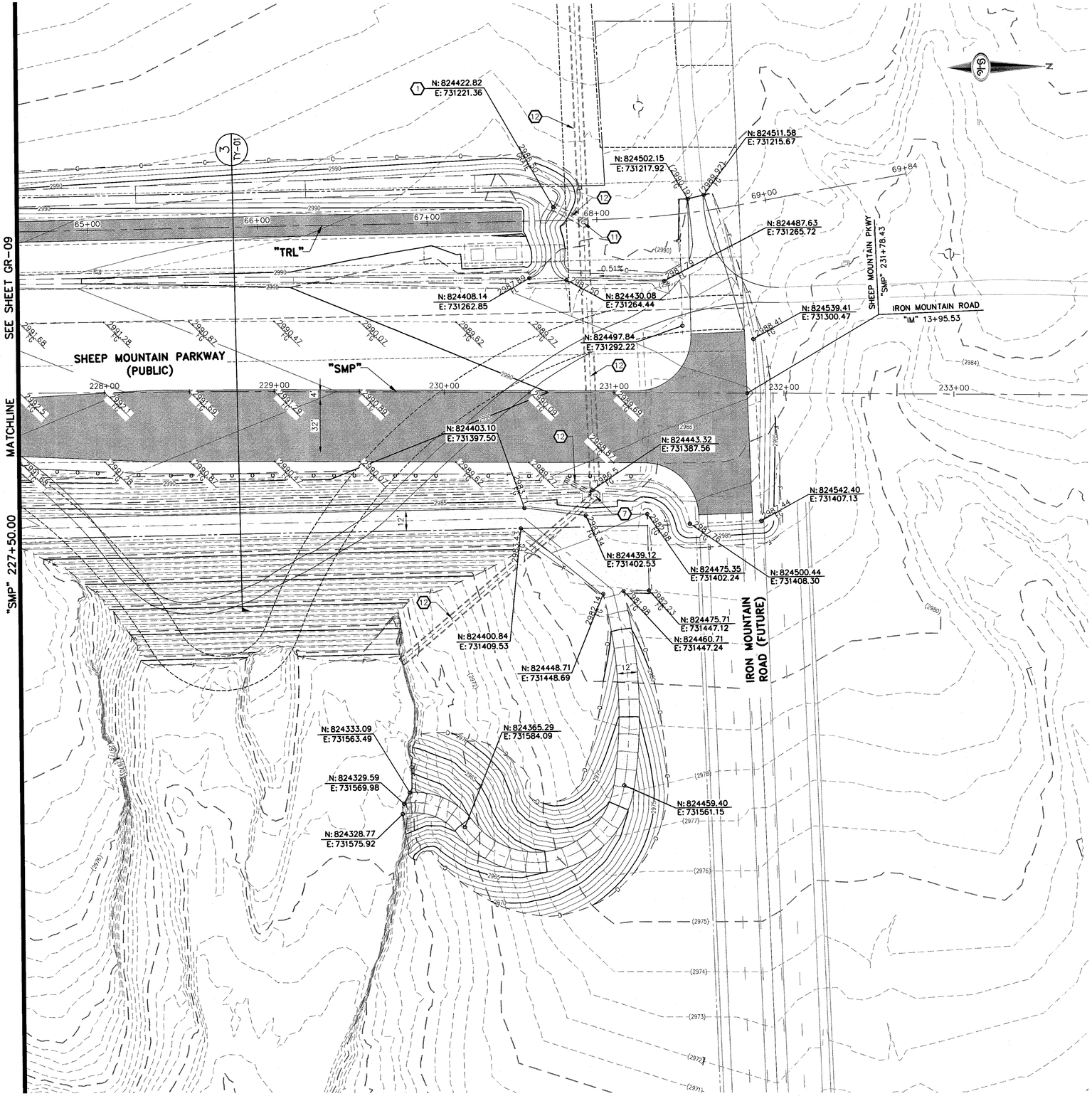
PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER STATE OF NEVADA
JERRY J. SLATER
Exp. 06/30/2018
CIVIL
No. 14167

GR-08
SHEET 35 OF 46

DWG NO. _____

HANSEN NO. _____



STORM DRAIN NOTES

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JERRY SLATER, P.E. 14167 — DATE

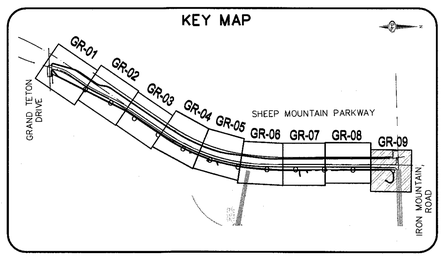
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

GRADING PLAN - "SMP" 227+50.00 TO "SMP" 233+50.00

DATE: 01/19/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

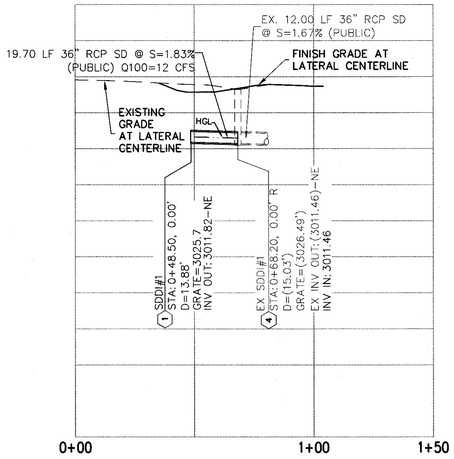
PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER STATE OF NEVADA JERRY J. SLATER Exp. 06/30/2018 CIVIL No. 14167

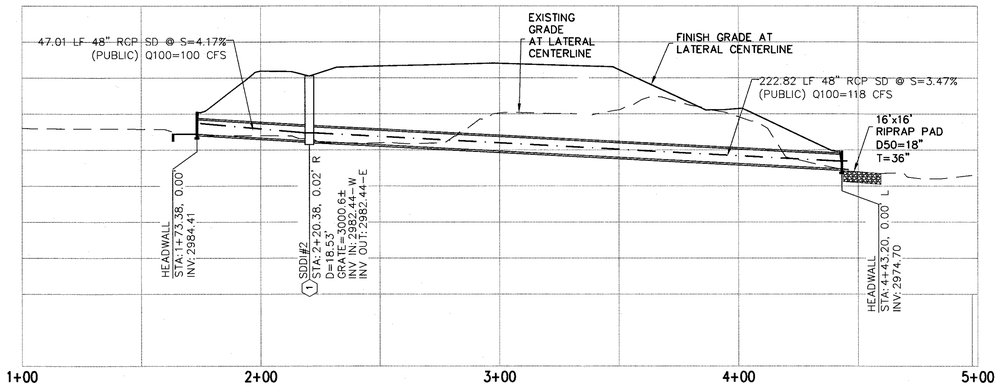
GR-09
SHEET 36 OF 46

DWG NO. _____

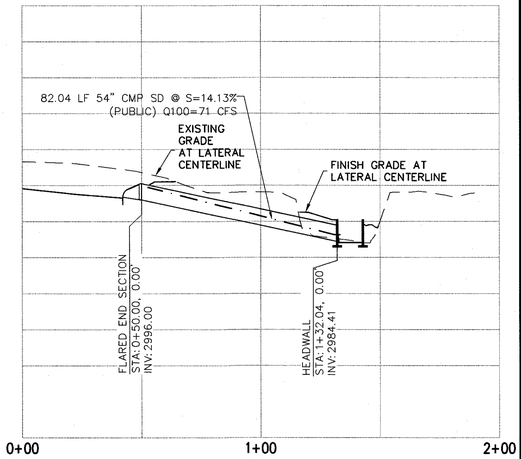
HANSEN NO. _____



LATERAL PROFILE 1
SCALE HORIZ: 1" = 30'
SCALE VERT: 1" = 20'



LATERAL PROFILE 2
SCALE HORIZ: 1" = 30'
SCALE VERT: 1" = 20'



LATERAL PROFILE 3
SCALE HORIZ: 1" = 30'
SCALE VERT: 1" = 20'

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

STORM DRAIN LATERAL PROFILES

DATE: 01/19/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

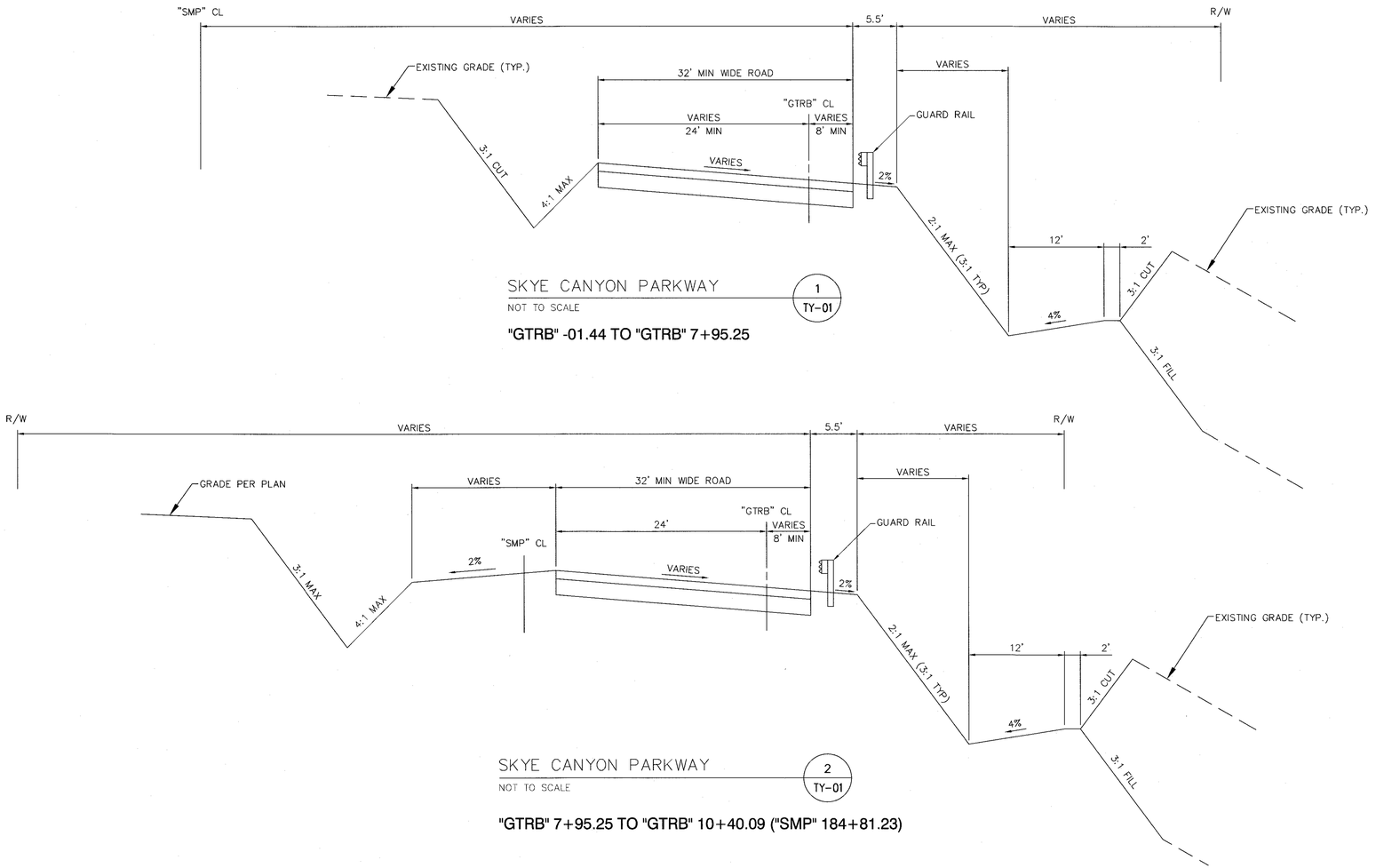
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PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY C. SLATER
Exp. 06/30/2018
CIVIL
No. 14167

GR-10
SHEET 37 OF 46

DWG NO. _____

HANSEN NO. _____



SKYE CANYON PARKWAY — 1 / TY-01

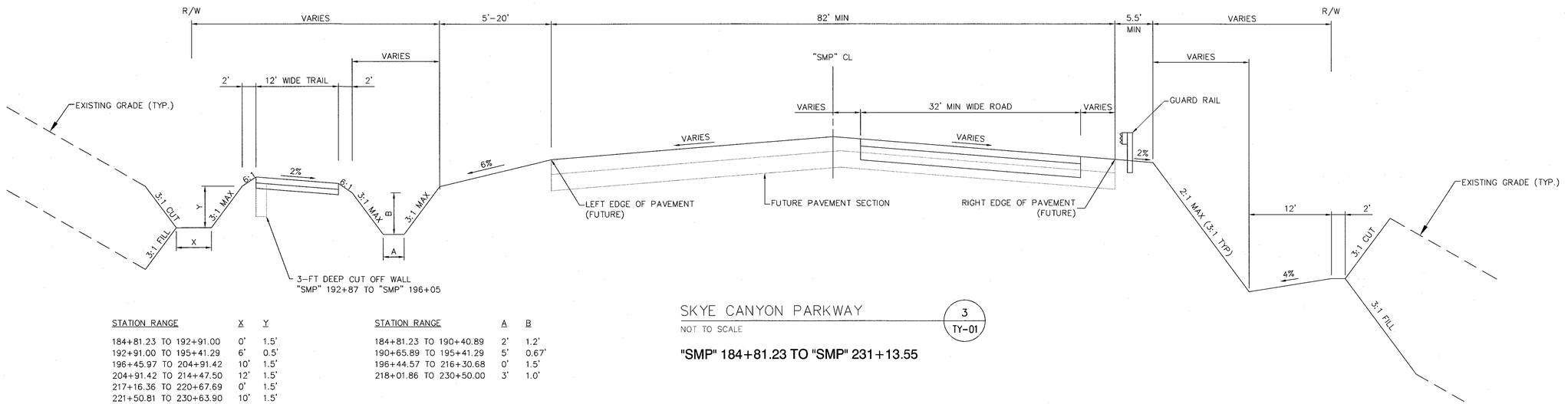
NOT TO SCALE

"GTRB" -01.44 TO "GTRB" 7+95.25

SKYE CANYON PARKWAY — 2 / TY-01

NOT TO SCALE

"GTRB" 7+95.25 TO "GTRB" 10+40.09 ("SMP" 184+81.23)



SKYE CANYON PARKWAY — 3 / TY-01

NOT TO SCALE

"SMP" 184+81.23 TO "SMP" 231+13.55

STATION RANGE	X	Y
184+81.23 TO 192+91.00	0'	1.5'
192+91.00 TO 195+41.29	6'	0.5'
196+45.97 TO 204+91.42	10'	1.5'
204+91.42 TO 214+47.50	12'	1.5'
217+16.36 TO 220+67.69	0'	1.5'
221+50.81 TO 230+63.90	10'	1.5'

STATION RANGE	A	B
184+81.23 TO 190+40.89	2'	1.2'
190+65.89 TO 195+41.29	5'	0.67'
196+44.57 TO 216+30.68	0'	1.5'
218+01.86 TO 230+50.00	3'	1.0'

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

TYPICAL SECTIONS 1

DATE: 01/19/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

PROJECT NO.
OLY1720.000

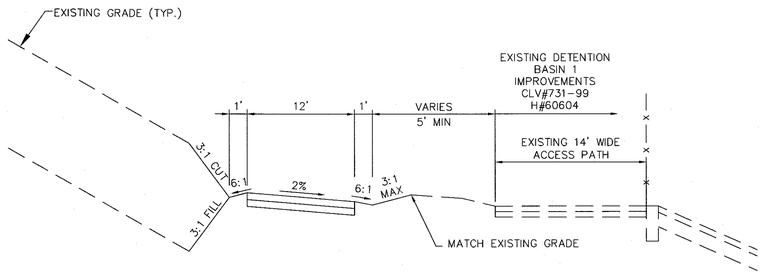
PROFESSIONAL ENGINEER — JERRY J. SLATER — Exp. 06/30/2018 — CIVIL — NO. 14167 — STATE OF NEVADA

TY-01

SHEET 38 OF 46

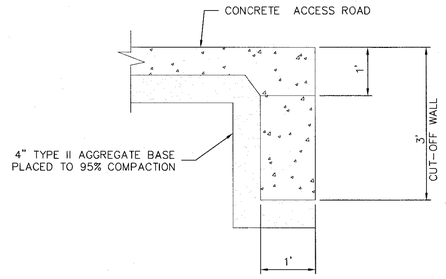
DWG NO. _____

HANSEN NO. _____

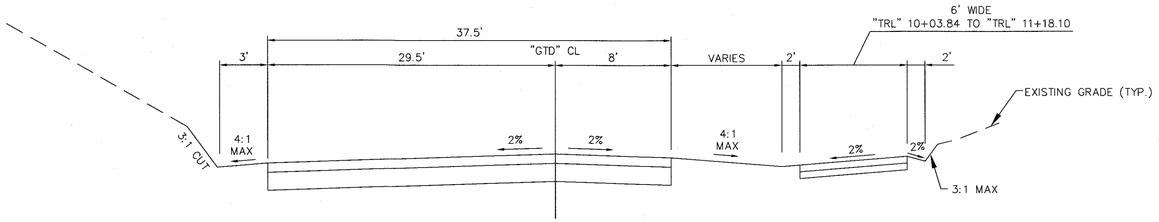


TRAIL SECTION — NOT TO SCALE — 1 / TY-02

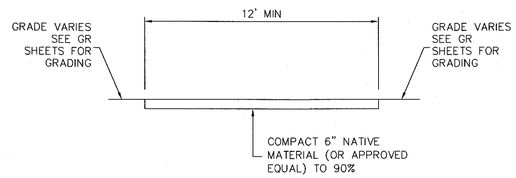
"TRL" 11+55.96 TO "TRL" 21+73.5D



CUTOFF WALL — NOT TO SCALE — 4 / TY-02



GRAND TETON DRIVE — NOT TO SCALE — 2 / TY-02



MAINTENANCE ACCESS PATH — NOT TO SCALE — 3 / TY-02

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

TYPICAL SECTIONS 2

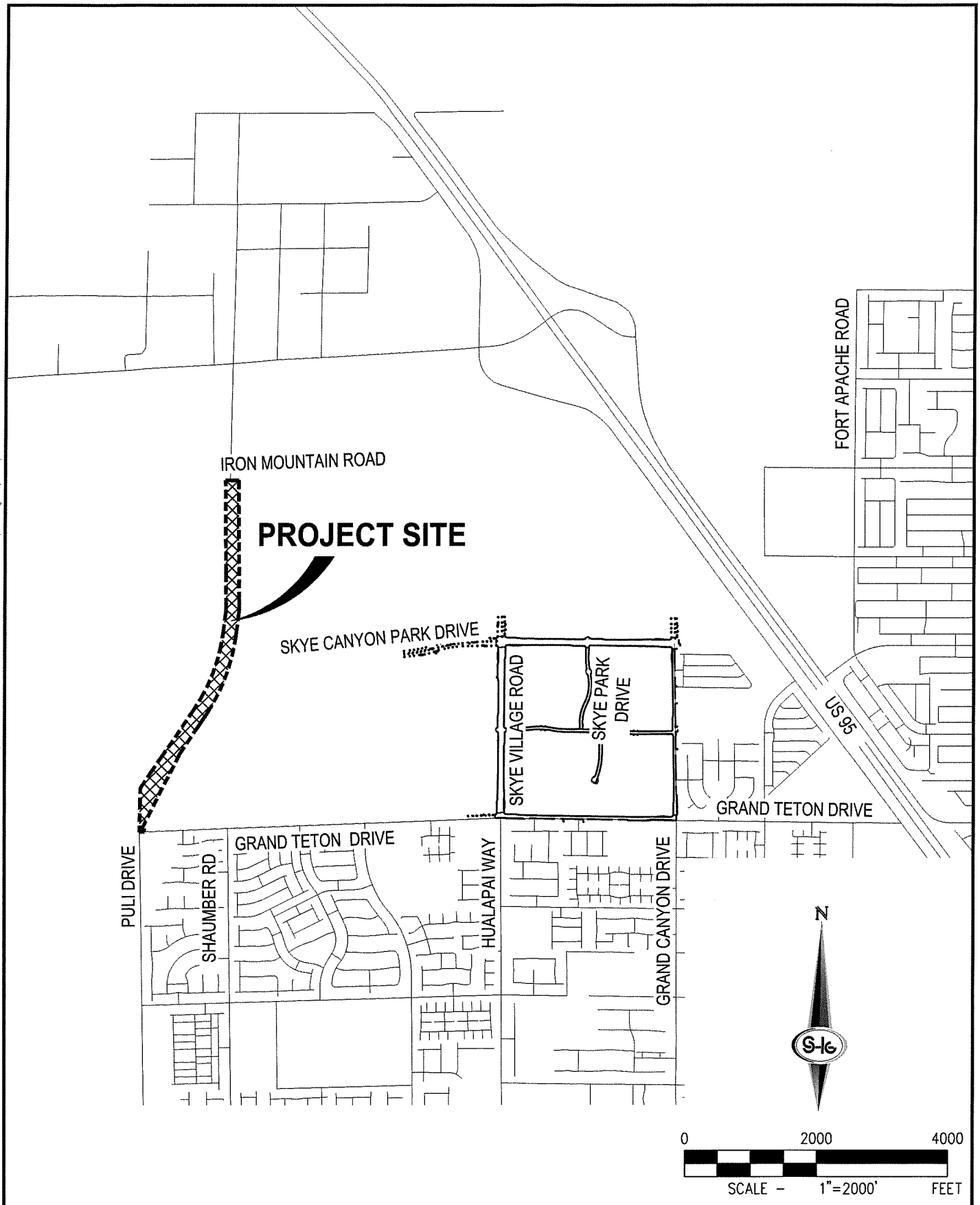
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DRAFTER: BCC
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CHECKED: JSR
PROJECT NO. **OLY1720.000**

PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY J. SLATER
Exp. 06/30/2018
CIVIL
No. 14167
2-9-18

TY-02
SHEET 39 OF 46

DWG NO. _____

HANSEN NO. _____



j:\oly1720.000 sheep mountain parkway access road\drainage\technical study\figures\oly1720 tds exhibit a location map.dwg 1/23/2018 9:00 AM Nick Stafford

SLATER HANIFAN GROUP
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NINETY-FIVE MANAGEMENT, LLC.

SKYE CANYON SHEEP MOUNTAIN PARKWAY
LOCATION MAP

DATE: JAN 2018	PROJECT NO. OLY1720.000
DRAFTER: NAS	
DESIGNER: NAS	EXHIBIT A
CHECKED: LKL	SHEET 1 OF 1

j:\oly1720.000 sheep mountain parkway access road\drainage\technical study\figures\oly1720 tds exhibit b firm map.dwg 1/23/2018 9:22 AM Nick Stafford

TOWNSHIP 19 SOUTH, RANGE 60 EAST.

ZONE X

35

36

31

32

CLARK COUNTY UNINCORPORATED AREAS 320003

GR1156

T18S
T19S

95

5

MATCHLINE

CLARK COUNTY
CITY OF LAS VEGAS

CORPORATE LIMITS

CITY OF LAS VEGAS 325276

6

5

GR1155

JAMES

PLACE

LONE

ROAD

2

1

39

ROAD

CANYON

CITY OF LAS VEGAS
CLARK COUNTY

CLARK COUNTY UNINCORPORATED AREAS 320003

ZONE X

CORPORATE LIMITS

HOMESTEAD

6

SHEEP MOUNTAIN PARKWAY

7

8

NORTH FORT APACHE ROAD

HORSE

DRIVE

MATCHLINE

MEGENHEIMER AVENUE

RACEL STREET

ACKERMAN AVENUE

11

12

CORPORATE LIMITS

CITY OF LAS VEGAS 325276

GRAND TETON DRIVE

JO MARCY DRIVE

14

Detention Basin

ZONE A

ZONE X

13

18

17

DURANGO DRIVE

OSO BLANCA ROAD

TUCKY SPRINGS ROAD

JENSEN STREET

SOLAR AVENUE

THIS AREA

N

0 2000 4000

SCALE – 1"=2000' FEET

PANEL 1735 E

PANEL 1745 E

PANEL 1750 E

FIRM
FLOOD INSURANCE RATE MAP
CLARK COUNTY, NEVADA AND INCORPORATED AREAS

PANEL 1750 OF 4090

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
LAS VEGAS, CITY OF	325276	1750	E
CLARK COUNTY UNINCORPORATED AREAS	320003	1750	E

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

MAP NUMBER 32003C1750 E

MAP REVISED: SEPTEMBER 27, 2002

Federal Emergency Management Agency

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
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NINETY-FIVE MANAGEMENT, LLC.

SKYE CANYON - SHEEP MOUNTAIN PARKWAY

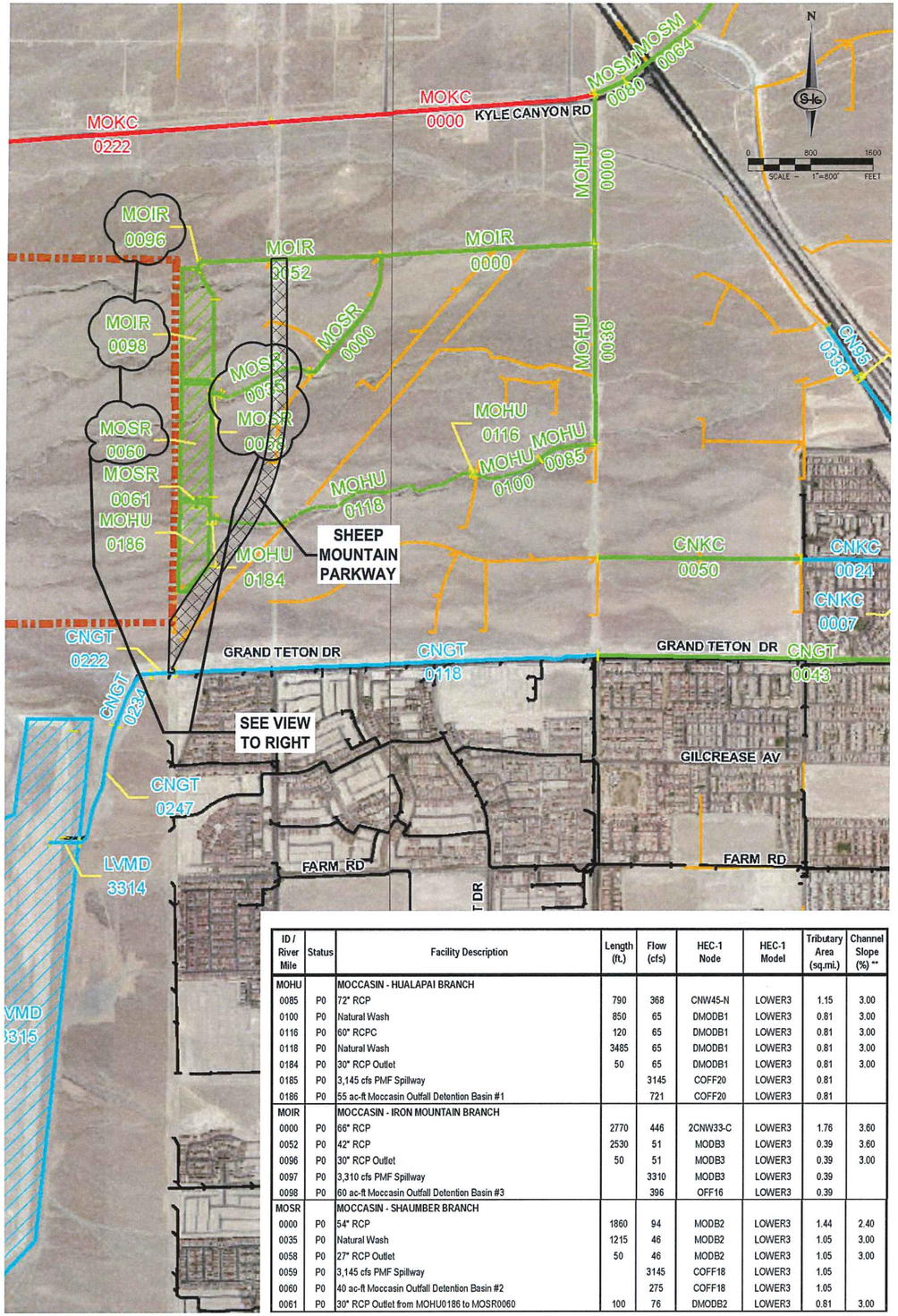
FEMA FIRM MAP

DATE:	JAN 2018
DRAFTER:	NAS
DESIGNER:	NAS
CHECKED:	LKL
PROJECT NO.	OLY1720.000

EXHIBIT B

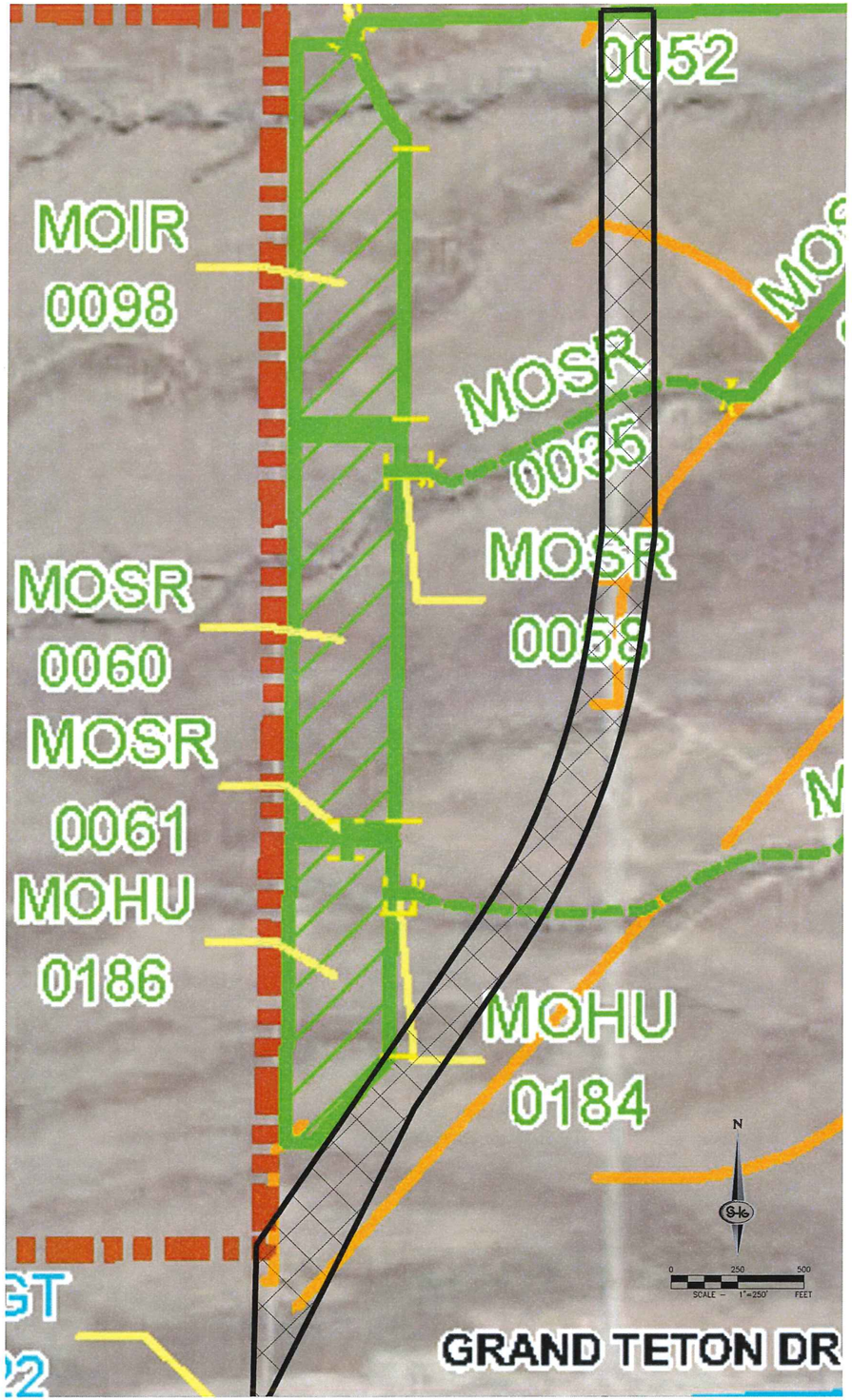
SHEET 1 OF 1

2013 MPU FACILITIES MAP



ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
MOHU		MOCCASIN - HUALAPAI BRANCH						
0085	P0	72" RCP	790	368	CNW45-N	LOWER3	1.15	3.00
0100	P0	Natural Wash	850	65	DMODB1	LOWER3	0.81	3.00
0116	P0	60" RCPC	120	65	DMODB1	LOWER3	0.81	3.00
0118	P0	Natural Wash	3485	65	DMODB1	LOWER3	0.81	3.00
0184	P0	30" RCP Outlet	50	65	DMODB1	LOWER3	0.81	3.00
0185	P0	3,145 cfs PMF Spillway		3145	COFF20	LOWER3	0.81	
0186	P0	55 ac-ft Moccasin Outfall Detention Basin #1		721	COFF20	LOWER3	0.81	
MOIR		MOCCASIN - IRON MOUNTAIN BRANCH						
0000	P0	66" RCP	2770	446	2CNW33-C	LOWER3	1.76	3.60
0052	P0	42" RCP	2530	51	MODB3	LOWER3	0.39	3.60
0096	P0	30" RCP Outlet	50	51	MODB3	LOWER3	0.39	3.00
0097	P0	3,310 cfs PMF Spillway		3310	MODB3	LOWER3	0.39	
0098	P0	60 ac-ft Moccasin Outfall Detention Basin #3		396	OFF16	LOWER3	0.39	
MOSR		MOCCASIN - SHAUMBER BRANCH						
0000	P0	54" RCP	1860	94	MODB2	LOWER3	1.44	2.40
0035	P0	Natural Wash	1215	46	MODB2	LOWER3	1.05	3.00
0058	P0	27" RCP Outlet	50	46	MODB2	LOWER3	1.05	3.00
0059	P0	3,145 cfs PMF Spillway		3145	COFF18	LOWER3	1.05	
0060	P0	40 ac-ft Moccasin Outfall Detention Basin #2		275	COFF18	LOWER3	1.05	
0061	P0	30" RCP Outlet from MOHU0186 to MOSR0060	100	76	DMODB2	LOWER3	0.81	3.00

PROPOSED ALIGNMENT OVER FACILITIES



REGIONAL FLOOD CONTROL DISTRICT

2013
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE F- 12
FLOOD CONTROL FACILITIES

LEGEND

- Ultimate Development Boundary
- Existing Facilities
- Category A Proposed Facilities
- Category B Proposed Facilities
- Local Existing Facilities
- Local Proposed Facilities
- Stormdrain
- Lined Channel
- Unlined Channel
- Levee/Dike
- Natural Wash/Floodway
- ID-Mile Separator

Remove & Replace/Parallel Facilities

Category A	Category B
Channel	Channel
Stormdrain	Stormdrain

LEGEND	
	OLD PROPOSED BASIN BOUNDRY
	NEW PROPOSED BASIN BOUNDRY
	OVERLAPPING AREA

SLATER HANIFAN GROUP
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT, LLC.

SKYE CANYON - SHEEP MOUNTAIN PARKWAY
CCRFCD 2013 MPU FACILITIES MAP

DATE: JAN 2018
DRAFTER: NAS
DESIGNER: NAS
CHECKED: LKL

PROJECT NO.
OLY1720.000

EXHIBIT C1
SHEET 1 OF 1

J:\Oly1720.000 sheep_mountain_parkway_access_road\Drainage\Hydrology\Figures\Hydrology Maps\1720_fig_exhibit_c_ccrfcd_2013_mpu_facilities_map.dwg 2/7/2018, 1:56 PM, Lori Leavitt

j:\oly1720.000 sheep mountain parkway access road\drainage\technical study\figures\oly1720 tds exhibit c ccrfcd 2013 mpu facilities map.dwg 2/7/2018 2:01 PM Lant Leavitt

MOCCASIN RD

KYLE CANYON RD

GRAND TETON DR

GILCREASE AV

FARM RD

SEVERENCE LA

LOG CABIN WY

IRON MOUNTAIN RD

SKYE CANYON PARK DR

EL CAPITAN WY

DURANGO DR

95

PROJECT SITE

OVERALL SKYE CANYON BOUNDARY

OVERALL SKYE CANYON BOUNDARY

LVMO 0396 | LVMO 0346 | LVMO 0280 | LVMO 0276 | LVMO 0226 | LVMO 0184 | LVMO 0144 | LVMO 0000

MORC 0000

MOLC 0072 | MOLC 0149 | MOLC 0157

MOKC 0166 | MOKC 0116 | MOKC 0000 | MOKC 0173

MOIR 0096 | MOIR 0098 | MOIR 0000 | MOIR 0099

MOHU 0179 | MOHU 0180 | MOHU 0191 | MOHU 0167 | MOHU 0111 | MOHU 0095 | MOHU 0116 | MOHU 0151 | MOHU 0160 | MOHU 0076 | MOHU 0026

CNGT 0118 | CNGT 0222 | CNGT 0224 | CNGT 0247 | CNGT 0043 | CNGT 0000

CNKC 0024 | CNKC 0007 | CNKC 0000 | CNKC 0030

CN95 0333 | CN95 0318 | CN95 0313 | CN95 0250 | CN95 0257 | CN95 0218 | CN95 0199 | CN95 0167 | CN95 0102

BRDB 0157 | BRDB 0107

RACO 0064

LVMD 3314

REGIONAL FLOOD CONTROL DISTRICT

2017
SKYE CANYON AMENDMENT TO
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE F-
FLOOD CONTROL FACILITIES

LEGEND

- Facility Revised by Amendment
- Ultimate Development Boundary
- Existing Facilities
- Category A Proposed Facilities
- Category B Proposed Facilities
- Local Existing Facilities
- Local Proposed Facilities
- Detention Basin
- Stormdrain
- Lined Channel
- Unlined Channel
- Levee/Dike
- Natural Wash/Floodway
- ID-Mile Separator

Remove & Replace/Parallel Facilities

Category A	Category B
Channel	Channel
Stormdrain	Stormdrain

N

0 1,000 2,000 4,000 6,000
Feet

Scale: 1 inch = 2,000 feet

US95 | I-15 | I-215

SLATER HANIFAN GROUP

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT, LLC.

SKYE CANYON - SHEEP MOUNTAIN PARKWAY
CCRFCD MPU AMENDMENT FACILITIES MAP

DATE:	JANUARY 2018
DRAFTER:	ETM
DESIGNER:	ETM
CHECKED:	LKL
PROJECT NO.	OLY1609.000

EXHIBIT C2
SHEET 2 OF 3

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
BCHU		**BELTWAY CHANNEL - HUALAPAI**						
0000	E	12' X 5' RCAP	653	501	CBA3-C	WEST3	0.84	1.11
0017	E	8' X 5' RCAP	1216	501	CBA3-C	WEST3	0.84	1.33
0040	E	66" RCP	60	222	DNW26-C	WEST3	0.51	1.04
0042	E	60" RCP	615	222	DNW26-C	WEST3	0.51	1.42
0054	E	54" RCP	770	222	DNW26-C	WEST3	0.51	1.23
BRDB		**BRENT DRAINAGE SYSTEM**						
0000	E	36" RCP with 18" Orifice Plate	2170	37	BRDB	WEST3	2.48	0.40
0031	E	45,080 cfs PMF Spillway		45080	CBRDB	WEST3	2.48	
0032	E	450 ac-ft South Environmental Enhancement Area		1902	CBRDB	WEST3	2.48	
0033	E	Energy Dissipator	100	922	CNW113-C	WEST3	1.47	
0043	P1	8' X 7' RCB	2920	922	CNW113-C	WEST3	1.47	2.10
0107	P1	8' X 7' RCB	2660	922	CNW113-C	WEST3	1.47	2.40
0157	P1	12' X 7' RCB	1260	609	CNW96-C	WEST3	0.84	0.25
CN95		**CENTENNIAL PKWY CHANNEL WEST / U.S 95 BRANCH**						
0000	P1	Conc Chnl 22'W 10'D 0:1 SS	2990	3340	CNW8B3-C	WEST3	3.36	2.17
0068	P1	3: 8' X 7' RCB	3380	3216	CNW103-C	WEST3	3.05	2.12
0102	P1	3: 8' X 6' RCB	1710	2663	2CNW89-C	WEST3	2.63	2.09
0167	P1	2: 10' X 6' RCB	1580	1867	2CNW71-E	WEST3	1.61	1.50
0199	E	2: 10' X 6' RCB	320	1313	2CNW72-C	WEST3	1.13	0.82
0218	E	15' X 9' RCB	1127	1313	2CNW72-C	WEST3	1.13	0.82
0257	E	Transition Structure	59	1313	2CNW72-C	WEST3	1.13	0.77
0259	E	15' X 9' RCB	290	524	CNW74-C	WEST3	0.40	0.77
0313	E	10' X 6' RCB	2680	524	CNW74-C	WEST3	0.40	2.50
0318	E	Transition Structure	60	524	CNW74-C	WEST3	0.40	1.50
0333	E	5' X 5' RCB	670	265	NW62-S	WEST3	0.16	1.60
CNGT		**CENTENNIAL PKWY CHANNEL WEST / GRAND TETON BRANCH**						
0000	E	10' X 5' RCB	2376	600	CNW71-E	WEST3	0.47	2.58
0043	P0	6' X 6' RCB	3980	600	CNW71-E	WEST3	0.47	3.00
0118	E	6' X 5' RCAP	5472	363	KYLEDET*	KYLEDB	57.73	3.72
CNKC		**CENTENNIAL PKWY CHANNEL WEST / KYLE CANYON BRANCH**						
0000	E	12' X 4' RCB	377	999	CNW72-C	WEST3	0.71	4.58
0007	E	10' X 5' RCB	874	999	CNW72-C	WEST3	0.71	3.28
0024	E	8' X 5' RCB	1385	999	CNW72-C	WEST3	0.71	2.40
0050	E	72" RCP	388	2795	NW45-S	WEST3	0.31	3.60
CNWE		**CENTENNIAL PKWY CHANNEL WEST**						
0150	E	Conc Chnl 40'W 9.5'D 0:1 SS	2279	4233	CNW3B3-C	WEST3	5.64	0.42
0173	E	3: 18' X 8' RCBC @ Torrey Pines	200	4233	CNW3B3-C	WEST3	5.64	0.42
0176	E	Conc Chnl 40'W 9'D 0:1 SS	150	4233	CNW3B3-C	WEST3	5.64	0.41
0189	E	Conc Chnl 35'W 10'D 0:1 SS	1200	4067	CNW2D4-C	WEST3	5.15	0.42
0200	E	Conc Chnl 36'W 9'D 0:1 SS	2470	4067	CNW2D4-C	WEST3	5.15	1.00
0226	E	2: 18' X 8.5' RCBC @ Rio Vista	100	4067	CNW2D4-C	WEST3	5.15	0.51
0241	E	Conc Chnl 35'W 9.5'D 0:1 SS	405	3951	CNW2D3-C	WEST3	4.65	0.51
0251	E	Conc Chnl 35'W 9'D 0:1 SS	575	3951	CNW2D3-C	WEST3	4.65	0.51
0271	E	Conc Chnl 32'W 10'D 0:1 SS	229	3951	CNW2D3-C	WEST3	4.65	0.51
0274	E	32' X 10' RCBC @ Tansya	142	3951	CNW2D3-C	WEST3	4.65	0.51
0277	E	Conc Chnl 32'W 9'D 0:1 SS	578	3951	CNW2D3-C	WEST3	4.65	0.64
0287	E	Conc Chnl 13'W 10'D 2:1 SS	605	3593	CNW2B2-C	WEST3	3.84	1.19
0301	P2	Conc Chnl 32'W 10'D 0:1 SS	235	3593	CNW2B2-C	WEST3	3.84	1.19
0304	P2	32' X 10' RCB	3269	3593	CNW2B2-C	WEST3	3.84	1.79
0314	E	22' X 7' RCB	785	3593	CNW2B2-C	WEST3	3.84	1.79
0325	P1	32' X 10' RCB	2280	3593	CNW2B2-C	WEST3	3.84	1.75
EKBU		**ELKHORN SPRINGS AND BUFFALO**						
0000	E	60" RCP	1046	375	NW134-C	WEST3	0.46	1.00
EKDB		**ELKHORN SPRINGS DETENTION BASIN**						
0000	E	Grass Chnl 15'W 5.8'D 3.5:1 SS	2575	238	CNW150-C	WEST3	1.41	0.39
0025	E	4' X 3' RCB	160	120	ELKBASIN	WEST3	0.84	0.50
0026	E	48" RCP	1270	120	ELKBASIN	WEST3	0.84	1.23
0049	E	60" RCP	1095	120	ELKBASIN	WEST3	0.84	0.13
0070	E	48 ac-ft Elkhorn Springs Detention Basin		629	CNW133-C	WEST3	0.84	

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
EKHU		**ELKHORN AND HUALAPAI**						
0000	E	6' X 5' RCB Overflow Structure	48	638	CNW26-C	WEST3	0.51	0.91
0001	E	6' X 5' RCAP	72	638	CNW26-C	WEST3	0.51	0.91
0003	E	6' X 4' RCAP	980	638	CNW26-C	WEST3	0.51	3.61
0020	E	6' X 5' RCAP	150	638	CNW26-C	WEST3	0.51	3.61
0023	E	6' X 5' RCAP	1200	638	CNW26-C	WEST3	0.51	0.90
GOEC		**GOWAN NORTH - EL CAPITAN BRANCH**						
0176	P1	78" RCP	1320	383	CCPFR-C	ALLGOW3	0.46	1.15
GONO		**GOWAN NORTH SYSTEM**						
0511	P1	7' X 6' RCB	1320	546	CCPHW-C	ALLGOW3	0.60	1.14
LVMD		**LAS VEGAS WASH - MIDDLE**						
2490	E	2: 13' X 7' RCB	2555	2276	CNW168-C	CWEST3	4.69	0.40
2507	E	2: 13' X 9' RCB	2831	2276	CNW168-C	CWEST3	4.69	0.36
2525	E	24' X 8' RCB	1140	1913	CNW159-C	CWEST3	3.91	0.40
2550	E	24' X 8' RCB	1445	1664	CD161-C	CWEST3	3.41	0.40
2574	E	24' X 8' RCB	1430	1664	CD161-C	CWEST3	3.41	0.40
2599	E	Conc Chnl 24'W 7'D 2:1 SS	1577	1585	CNW162-C	CWEST3	3.08	0.50
2632	E	18' X 5' RCB	1580	968	CNW138-C	WEST3	1.16	0.46
2661	E	18' X 5' RCB	2640	968	CNW138-C	WEST3	1.16	0.46
2711	E	10' X 5' RCB	1320	968	CNW138-C	WEST3	1.16	1.54
2737	E	10' X 5' RCB	1320	818	CNW139-C	WEST3	0.93	2.22
2763	E	6' X 5' RCB	1320	818	CNW139-C	WEST3	0.93	1.79
2789	E	6' X 5' RCB	1470	818	CNW139-C	WEST3	0.93	2.17
MOHU		**MOCCASIN - HUALAPAI BRANCH**						
0000	P0	10' X 8' RCB	1380	876	2CNW33-C	LOWER3	2.08	0.50
0026	P0	9' X 6' RCB	2645	544	CNW45-N	LOWER3	1.25	0.50
0076	P0	60" RCP	1000	281	CNW45-C	LOWER3	1.03	3.00
0095	P0	Natural Wash	665	281	CNW45-C	LOWER3	1.03	3.00
0111	P0	78" RCPC	225	281	CNW45-C	LOWER3	1.03	3.00
0116	P0	Natural Wash	1855	281	CNW45-C	LOWER3	1.03	3.00
MOIR		**MOCCASIN - IRON MOUNTAIN BRANCH**						
0000	P0	60" RCP	5300	373	CNW33-C	LOWER3	0.83	3.60
MOKC		**MOCCASIN AND KYLE CANYON**						
0000	P0	9' X 6' RCB	6140	1326	CNW35-C	LOWER3	2.69	3.40
MOLC		**MOCCASIN AND LOG CABIN BRANCH**						
0000	P1	14' X 9' RCB	3790	3083	CNW102-C	LOWER3	6.26	1.60
0072	P1	13' X 6' RCB	4050	2895	2CNW64	LOWER3	6.06	2.50
0149	P1	13' X 6' RCB	520	2086	CNW62-N	LOWER3	4.88	2.00
0157	P1	10' X 6' RCB	1080	2088	CNW62-N	LOWER3	4.88	3.00
MSNV		**MOUNTAIN SPAVISTA RANCH**						
0000	E	6: 12' X 5' RCBC @ Grand Teton	273	679	CNW163-C	CWEST3	1.67	0.40
0005	E	Grass Chnl 100'W 4.5'D 10:1 SS	6325	679	CNW163-C	CWEST3	1.67	0.40
0125	E	Grass Chnl 100'W 4.5'D 10:1 SS	1300	116	CNW147E	WEST3	1.54	0.40
RACO		**RACEL STREET COLLECTOR**						
0000	E	96" RCP Baffled Energy Dissipator	54	428	CNW111S	WEST3	0.55	4.20
0001	E	78" RCP	3245	428	CNW111S	WEST3	0.55	2.46
0064	E	78" RCP	2650	349	CNW111S	WEST3	0.44	2.09
RCBC		**RANCHO ROAD SYSTEM - BELTWAY CHANNEL**						
0000	E	5' X 5' RCB	1062	222	FADB	WEST3	1.60	1.04
0002	E	54" RCP Outlet with 41" Orifice	503	222	FADB	WEST3	1.60	2.38
0003	E	2,341 cfs PMF Spillway		2341	FADBIN	WEST3	1.60	
0004	E	76 ac-ft Fort Apache Detention Basin		1255	FADBIN	WEST3	1.60	
0007	E	Energy Dissipator	100	1255	FADBIN	WEST3	1.60	
0009	E	12' X 6' RCBC @ Fort Apache Detention Basin	133	1255	FADBIN	WEST3	1.60	1.79
0012	E	Conc Chnl 12'W 5'-7'D 0:1 SS	1937	1255	FADBIN	WEST3	1.60	3.15
0048	E	12' X 6' RCBC @ Grand Canyon	140	1040	CMNA1	WEST3	1.32	3.15
0051	E	Conc Chnl 12'W 6'-8'D 0:1 SS	2660	1040	CMNA1	WEST3	1.32	3.44
0096	E	1: 10' X 6' and 1: 6' X 6' RCBC @ Hualapai Way	190	1040	CMNA1	WEST3	1.32	1.93
0100	E	Conc Chnl 12'W 5.5'D 0:1 SS	2685	598	CDMNA1	WEST3	0.48	2.88
0140	E	Conc Chnl 10'W 5'D 0:1 SS	2155	598	CDMNA1	WEST3	0.48	1.65

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
RCHB		**RANCHO ROAD SYSTEM - BELTWAY**						
0034	E	Conc Chnl 21'W 8'D 0:1 SS	1000	2631	CNW1C-W	WEST3	4.66	1.19
0053	E	2: 12' X 8' RCBC @ South Ramp Connector	65	2304	CDW1C1	WEST3	4.31	1.40
0054	E	Conc Chnl 21'W 8'D 0:1 SS	432	2304	CDW1C1	WEST3	4.31	1.51
0062	E	Transition Structure	130	2304	CDW1C1	WEST3	4.31	1.51
0065	E	24' X 7' RCB	480	2304	CDW1C1	WEST3	4.31	0.30
0074	E	24' X 6' RCB	50	2226	CNWBC6-C	WEST3	4.17	0.30
0075	E	20' X 6' RCBC @ Beltway	428	2226	CNWBC6-C	WEST3	4.17	2.81
0083	P1	20' X 6' RCB	950	2226	CNWBC6-C	WEST3	4.17	2.49
0101	P1	Conc Chnl 20'W 7'D 0:1 SS	980	2226	CNWBC6-C	WEST3	4.17	2.38
0120	E	20' X 6' RCBC @ Grand Montecito	120	2226	CNWBC6-C	WEST3	4.17	1.00
0122	P1	Conc Chnl 16'-20'W 6'D 0:1 SS	350	2226	CNWBC6-C	WEST3	4.17	1.84
0130	P1	Conc Chnl 16'W 6'D 0:1 SS	1012	2226	CNWBC6-C	WEST3	4.17	2.67
0149	P1	Conc Chnl 16'W 6'-7'D 0:1 SS	87	1888	CNWBC3	WEST3	3.75	2.27
0151	P1	Conc Chnl 16'W 7'D 0:1 SS	1255	1888	CNWBC3	WEST3	3.75	2.65
0171	E	16' X 6' RCBC @ El Capitan Way	234	1888	CNWBC3	WEST3	3.75	1.75
0175	E	Conc Chnl 14'W 7'D 0:1 SS	1220	1888	CNWBC3	WEST3	3.75	2.93
0198	E	Conc Chnl 14'W 7'D 0:1 SS	225	1402	CNWBA6-C	WEST3	3.61	2.93
0227	E	12' X 6' RCB	1885	1402	CNWBA6-C	WEST3	3.61	1.02
0250	E	12' X 6' RCB	3200	1402	CNWBA6-C	WEST3	3.61	1.00
0275	P1	7' X 6' RCB	2650	973	CNW66-C	WEST3	1.75	3.30
0295	P1	7' X 6' RCB	2875	973	CNW66-C	WEST3	1.75	3.30
TSDB		**TULE SPRINGS DRAINAGE SYSTEM**						
0000	E	2: 10' X 4' RCBC @ Echo Grande	100	26	TULEDB	WEST3	1.35	1.04
0002	E	36" RCP with 22" Orifice Plate	320	26	TULEDB	WEST3	1.35	0.33
0010	E	14,013 cfs PMF Spillway		14013	CTULEDB	WEST3	1.35	
0011	E	117 ac-ft North Environmental Enhancement Area		804	CTULEDB	WEST3	1.35	
0012	E	Energy Dissipator	260	376	CNW148-C	WEST3	0.52	
0023	P1	84" RCP	1320	376	CNW148-C	WEST3	0.52	0.80
0059	P1	78" RCP	2640	376	CNW148-C	WEST3	0.52	1.03

** The HEC-1 node shown identifies the controlling concentration point for the associated facility and is located upstream of this facility due to decreasing peak flow with increasing tributary area caused by storm distribution transitions, depth area reduction factors, or attenuation of flow from routing.*

*** As-built or design slopes were used when available. All other slopes are based on existing topography. The user should verify the facility slope listed prior to performing any facility specific analysis.*

^ For parallel facilities, the existing facility flow equals its normal depth capacity, and the proposed parallel facility flow equals the remaining flow (i.e., HEC-1 Node flow = existing facility normal depth capacity + proposed parallel facility flow).

REGIONAL FLOOD CONTROL DISTRICT

2013 LAS VEGAS VALLEY FLOOD CONTROL MASTER PLAN UPDATE

FACILITY INVENTORY FIGURE F - 13

SLATER HANIFAN GROUP

LEGEND

ID (Facility Identifier) AABB
- Parent Stream Name
- Stream Name

River Mile 0000
- Distance Above Confluence with Parent Stream (Miles)
- Miles in Hundredths

Existing Facility..... E
Proposed or Modified Facility..... P
Contingency Level
- Category B..... P0
- Master Plan..... P1
- Preliminary Design..... P2
- Design..... P3

Bottom Width..... W

Depth..... D

Side Slope, H:V..... SS

Construction Features

Cast in Place Concrete Pipe	CIPCP	Reinforced Concrete Arch Culvert	RCAC
Corrugated Metal Arch Pipe Culvert	CMAP	Reinforced Concrete Box	RCB
Corrugated Metal Pipe Culvert	CMPC	Reinforced Concrete Box Culvert	RCBC
High Density Polyethylene	HDPE	Reinforced Concrete Pipe	RCP
Horizontal Elliptical Reinforced Concrete Pipe	HERCP	Reinforced Concrete Pipe Culvert	RCPC
Reinforced Concrete Arch Pipe	RCAP	Storm Sewer Pipe	SSP

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT, LLC.

SKYE CANYON - SHEEP MOUNTAIN PARKWAY
CCRFCD MPU AMENDMENT FACILITIES SUMMARY

DATE: JANUARY 2018
DRAFTER: ETM
DESIGNER: ETM
CHECKED: LKL
PROJECT NO. OLY1609.000

EXHIBIT C3
SHEET 3 OF 3

j:\oly1720.000 sheep mountain parkway access road\drainage\technical study\figures\oly1720 tds exhibit c ccrfcd 2013 mpu facilities map.dwg 2/7/2018 2:01 PM Lant Leavitt

NOTE:
* INDICATES SUBBASIN WAS DERIVED FROM THE TECHNICAL DRAINAGE STUDY FOR SKYE CANYON DETENTION BASIN 2
** INDICATES SUBBASIN WAS DERIVED FROM THE TECHNICAL DRAINAGE STUDY FOR SKYE CANYON DETENTION BASIN 1

N

0 1000 2000

SCALE – 1"=1000' FEET

KYLE CANYON ROAD

"400"

"155"

"155"

"400"

"155"

"400"

"155"

"400"

"191"

"155"

*OFF10
*ON2
*OFF9
*OFF8
*OFF7
**OFF6
**OFF5
**OFF4
**OFF3
**OFF2
**OFF1
**ON1
XOF1
XOF2
XOF3
XOF4
PON1
PON2
PON3
PON4
PON5
PON6

SHEEP MOUNTAIN PARKWAY

GRAND TETON DRIVE

HUALAPAI WAY

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT, LLC.

SKYE CANYON - SHEEP MOUNTAIN PARKWAY
SOILS MAP - PROPOSED CONDITION

DATE:	JAN 2018
DRAFTER:	NAS
DESIGNER:	NAS
CHECKED:	LKL
PROJECT NO.	OLY1720.000

EXHIBIT D
SHEET 1 OF 1

j:\oly1720.000 sheep mountain parkway access road\drainage\technical study\figures\oly1720 tds exhibit d soils map.dwg 1/23/2018 12:27 PM Nick Stafford

LEGEND

- BASIN BOUNDARY
- ID — BASIN ID
- PRORATE BOUNDARY
- 000 — PRORATE ID
- ID — CONCENTRATION POINT ID
- FLOW DIRECTION
- C — CROSS SECTION CUT LINE

N

0 300 600

SCALE – 1"=300' FEET

Prorated Flow Summary

Basin ID	Area (ac)	Q_{100} (cfs)	Unit Q (cfs/ac)
Basins			
XOF2	28.8	73	2.5
Prorate Basin ID	**Area (ac)**	**Q_{100} (cfs)**	**Unit Q (cfs/ac)**
XOF2A	11.9	30	2.5
XOF2B	16.9	43	2.5
TOTAL	**28.8**	**73**	

Proposed Condition Flow Rate Summary

Basin/Concentration Point ID	Area (ac)	Q_{100} (cfs)	Q_{10} (cfs)
Basins			
XOF1	26	60	23
PON1	3	9	4
CPSMPN	-	124	73
XOF2	29	73	28
XOF3	11	28	10
PON2	6	18	9
CPSMPC	-	118	46
XOF4	5	12	5
PON3	5	15	7
CPSMPS	-	80	62
PON4	3	8	4
PON5	2	7	3
PON6	4	11	4
Referenced Basins			
*OFF7	6	9	4
*OFF8	134	244	93
*CP2	-	249	95
*OFF9	70	153	58
*CP2a	-	395	148
*OFF10	416	508	191
*ON2	19	66	31
*DB2	-	774	290
*RDB2	-	86	264
**OFF1	275	399	143
**OFF2	26	49	14
**OFF3	19	41	16
**CP1	-	441	158
**OFF4	38	90	35
**OFF5	166	252	94
**OFF6	26	62	24
**ON1	19	49	23
**DB1	-	785	288
**RBD1	-	71	57

* Referenced from "Detention Basin 2 Study"

** Referenced from "Detention Basin 1 Study"

IRON MOUNTAIN ROAD

SHAUMBER ROAD

GRAND TETON DRIVE

PULI DRIVE

SKYE CANYON PHASE 2
INFRASTRUCTURE
SHG OLY1501.001
CLV# DS4739

PON4 PON5 PON1 PON2 PON6 PON3

CPSMPN CPSMPC CPSMPS

XOF1 XOF2 XOF3 XOF4

XOF2A XOF2B

*RDB2 **RDB1

*DB2 **DB1

*ON2 **ON1

SKYE CANYON "DB2"
SHG OLY1505.000
CLV# DS4813

SKYE CANYON "DB1"
SHG OLY1401.004
CLV# DS4698

*OFF10 *OFF9 *OFF8 *OFF7 **OFF6 **OFF5 **OFF4 **OFF3 **OFF2 **OFF1

REFER TO "DB1 and DB2 TECHNICAL DRAINAGE STUDIES FOR LIMITS OF OFFSITE DRAINAGE BASINS WEST OF PULI ROAD

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT, LLC.

SKYE CANYON - SHEEP MOUNTAIN PARKWAY

PROPOSED CONDITIONS DRAINAGE MAP

DATE: FEB 2018
DRAFTER: NAS
DESIGNER: NAS
CHECKED: LKL
PROJECT NO. OLY1720.000

EXHIBIT E

SHEET 1 OF 1

J:\oly\1720.000 sheep mountain parkway access road\drainage\technical study\figures\oly1720 hds exhibit - proposed condition drainage map.dwg 2/9/2018 8:59 AM Nick Stafford

TRANSMITTAL

To: Albert Sung, P.E.
City of Las Vegas
333 N. Rancho Drive
Las Vegas, NV 89106

Date: June 5, 2018
Project No.: OLY1720.000

From: Lant Leavitt, P.E.

Subject: TDS Addendum No. 1 for Sheep Mountain Parkway at Skye Canyon

CC: Mark Failla, SHG
CC: Chelsea Peltier, SHG
CC: Jerrod Ratcliffe, SHG
CC: Jerry Slater, SHG
CC: Rhonda Miller, SHG
CC:

Transmitting Via:
- ☐ Mail
- ☒ Messenger / MDS
- ☐ Federal Express
- ☐ Pickup

For:
- ☒ Review & Comment
- ☐ Per your Request
- ☐ Information/File

Acknowledgement of Receipt:
- ☐ Not Required
- ☒ Acknowledgement Required

Received By: A'YS
Date: 6/5/18 Time:

Copies	Description
1	Subject Study
1	Stamped and Signed Standard Form 1
1	24" x 36" Drainage and Grading Plans
1	Electronic Copy (CD)
1	Submittal Fee Check

Comments:
Enclosed please find the above listed items in support of our application of the *Technical Drainage Study for Skye Canyon – Sheep Mountain Parkway.*

Please contact us if there are any questions at 702-284-5300. Thank you.

Signed: _____
Lant Leavitt
Flood Control Division

TECHNICAL DRAINAGE STUDY
ADDENDUM No. 1

Sheep Mountain Parkway at Skye Canyon

City of Las Vegas, Nevada
Job No.: OLY1720.000
Date: June 2018

Prepared By:
Slater Hanifan Group, Inc.
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, NV 89141
Phone: 702-220-6565 ▪ Fax: 702-220-6566



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

Assisted by: Nicholas Stafford, P.E. (AZ), CFM

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Skye Canyon – Sheep Mountain Parkway Date: June 2018

Location of Development: a) Descriptive (Cross Streets): North/South: Sheep Mountain Parkway

East/West: Grand Teton Drive to Iron Mountain Road

b) Section: 12 Township: 19 South Range: 59 East

c) APN: 126-12-101-002

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

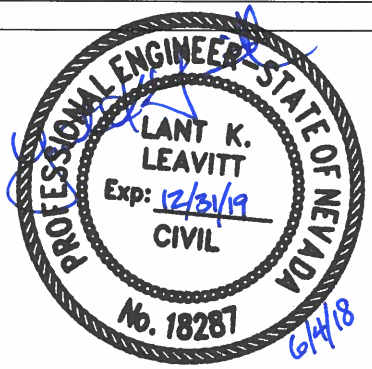
4. Proposed type of development (Residential, Commercial, Etc.): Roadway & Storm Drain Infrastructure

5. Approximate upstream land area which drains to the subject site: 1300 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 Canyon Detention Basin 1 Outfall, Existing Wash near Brent Lane alignment, and Skye Canyon Detention Basin 2 Outfall.

8. Briefly describe your proposed schedule for the subject project: ASAP Upon Substantial Completion of Detention Basin 2 Facilities.



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

OLY1720.000

June 4, 2018

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: Addendum No.1 to the Technical Drainage Study for Sheep Mountain Parkway at Skye Canyon (CLV DS4952)

Dear Mr. Sung:

This letter is submitted in response to comments contained in the March 4, 2018 review memorandum, regarding the above referenced project. A copy of the City of Las Vegas (CLV) Department of Public Works comment letter has been provided in Appendix A.

The comments in the review memorandum have been individually addressed as follows:

1. **Comment:** *The site is adjacent to or crosses an existing or proposed Clark County Regional Flood Control District (CCRFCD) master planned facility. Therefore, CCRFCD concurrence is required prior to final approval of the drainage study.*

   Response: Noted.

2. **Comment:** *The proposed improvement plans show drainage facilities that must be reviewed for maintenance and access concerns. The engineer must submit an extra set of improvement plans to City of Las Vegas Operations and Maintenance Department (Contact Mr. Matthew Meyer, Street & Sanitation Manager at 702-229-1688) for review and their acceptance must be obtained prior to the subject drainage study approval.*

   Response: Noted. Improvement plans are being submitted to CLV Operations and Maintenance Department concurrently with this TDS addendum.

3. **Comment:** *Provide an exhibit to show the overall right-of-way (ROW) lines (east and west) and the centerline of **Sheep Mountain Parkway**. Identify the proposed ramp and interim pavement location.*

   Response: Right-of-way exhibit included in Appendix B.

4. **Comment:** *Provide a Best Management Plan (BMP) to address the permanent erosion protection and dust control aspects of the subject site.*

   Response: The guidelines from Section 1503 of the CCRFCD Manual for non-residential sites larger than 1 acre have been used to prepare a BMP for Sheep Mountain Parkway. The

plan is based on Section 1503.4 which provides design criteria for swales to treat urban runoff from parking lots. The Manual recommends a rock lined swale with a minimum 40-ft length to settle out sediment and urban pollutants. Based on this, a 40-ft rock-lined swale is proposed at the discharge point of each earthen ditch. This will provide for sediment and pollutants to drop out prior to discharging to conveyance facilities and leaving the roadway corridor. The subarea delineations and recommended BMP solution for each area are included on the BMP Exhibit in Appendix B. Although the paved roadway surface is the only anticipated source of pollutants, rock swales have been provided for all ditches approaching a storm drain facility, regardless of whether there is paved roadway in its tributary area.
To address dust control, graded areas of the project will be treated with a dust palliative, see note added to typical sections.

5. **Comment:** *The improvement plans show super-elevation slope of 6% and short transition distance from superelevation to normal crown. Coordinate with City Traffic, Mr. Victor Bolanos for acceptable design. Obtain approval from Traffic prior to the final acceptance of the drainage study.*

   Response: Overall concept plans were prepared by Horrocks for the Sheep Mountain Parkway corridor from south of Grand Teton Drive to north of Kyle Canyon Road in February 2016 (included on CD in Appendix D.) The roadway geometries planned with that project have been followed so that the subject project conforms to the overall roadway design. This will be coordinated with City Traffic during the improvement plan review process.

6. **Comment:** *Sheet C-01: Identify an existing gate for Kyle Canyon Detention Basin at the west end of Grand Teton Boulevard. Protect the gate in place and provide an access to the gate. Provide "End of Road" markers at the end of Grand Teton Boulevard. Provide access to Skye Canyon Detention Basin 1.*

   Response: The existing gate to Kyle Canyon Detention Basin is located within the proposed roadway and is therefore proposed to be relocated. Grading is proposed to provide access to this existing maintenance road. “End of Road” markers have been provided at the end of Grand Teton Boulevard. Access to Skye Canyon Detention Basin 1 is being perpetuated.

7. **Comment:** *It appears that in general the proposed grading designs outside of the Sheep Mountain Parkway are shown on the "GR-xx" grading plans. Show the grading design and finished contours also on the "C-xx" sheets in the next submittal. The grading or finished contours shall clearly provide roadside swales for drainage purposes.*

   Response: Proposed grading information is now shown on “C” and “GR” sheets.

8. **Comment:** *Same comment applies to the trail improvement plans. Show grading design on the trail plan and profile sheets, C-13 to C-22. Clearly show proposed swales adjacent to the trail path for drainage purposes.*

   Response: Proposed grading information is also shown on trail improvement plans.

9. **Comment:** *Sheet C-06: Show and identify an existing Skye Canyon DB1 outfall facility on the plan.*

   Response: Existing Skye Canyon DB1 outfall facility is shown and identified on Sheet C-06.

10. **Comment:** *Sheet C-09: Show and identify proposed storm drain facilities crossing the trail and **Sheep Mountain Parkway** on the plan.*

    Response: Proposed storm drain facilities crossing the trail and Sheep Mountain Parkway are shown and identified on Sheet C-09.

11. **Comment:** *Sheet C-11: Show and identify an existing Skye Canyon DB2 outfall facility on the plan.*

    Response: Existing Skye Canyon DB2 outfall facility is shown and identified on Sheet C-11.

12. **Comment:** *Sheet C-17: Show and identify an existing Skye Canyon DB1 outfall facility on the plan.*

    Response: Sheets have been renumbered and Sheet C-17 is now C-16. Existing Skye Canyon DB1 outfall facility is shown and identified on Sheet C-16.

13. **Comment:** *Sheet C-20: Show and identify proposed storm drain facilities crossing the trail on the plan.*

    Response: Sheets have been renumbered and Sheet C-20 is now C-19. Proposed storm drain facilities crossing the trail are shown and identified on Sheet C-19.

14. **Comment:** *Sheet C-22: Show and identify an existing Skye Canyon DB2 outfall facility on the plan.*

    Response: Sheets have been renumbered and Sheet C-22 is now C-21. Existing Skye Canyon DB2 outfall facility is shown and identified on Sheet C-21.

15. **Comment:** *Sheet GR-01: Detail Section 1/TY-01 shows swales on both sides of the paved **Sheep Mountain Parkway**. The plan shows flow line elevations at regular intervals on the west side of **Sheep Mountain Parkway**. However, there is no information of the swale on the east side of the roadway. Show flow line elevations accordingly in the next submittal.*

    Also, the cross slope of the access path along the east ROW shall be 2% maximum. Revise the detail section accordingly.

    The same comment shall apply for Sheet GR-01 through Sheet GR-09 wherever it is applicable.

    Response: Flow line elevations have been added to the east side of the roadway as well.

Access path cross slope has been revised on detail sheet to 2% max.

Flow line elevations added to flow lines on east side of roadway for all grading sheets.

16. *Sheet GR-01: Detail Section 1/TY-02 shows ditches on both sides of the proposed trail. Show flow line elevations at regular intervals on both sides of the trail on the plan.*

    The same comment shall apply for Sheet GR-01 through Sheet GR-09 wherever it is applicable.

    Response: In locations where ditches are parallel to adjacent trail/roadway at the same slope, ditches will be constructed by grading per typical section. In locations where ditch alignment or slope is not uniform, more information is needed to construct the ditches. In these instances, elevations tags have been added to the ditch flow lines.

17. **Comment:** *Sheet GR-02: A notation line "----F is shown along the east ROW line which presumably means "fill" to the reviewer. However, a simple "fill" to the contractor without any grading design such as finished contours is not acceptable. Provide grading design in the next submittal. Note that the fill slope must not be greater than 2:1 or per the approved geotechnical report. Revise the plan and pertinent detail sections accordingly.*

    Response: Grading design has been provided in locations previously notated with a fill line.

18. **Comment:** *Sheet GR-04: Construction Note #13 proposes a 3'-concrete cutoff wall to the west side of the trail. Provide cross section to reflect the wall and the related drainage facilities.*

    The roadway section shown on this sheet is super-elevated. However, Detail Section 3/TY-01 shows normal crown. Review and revise accordingly.

    Identify the existing DB1 outfall pipe with City of Las Vegas recorded drawing number on the plan.

    Response: A 3-ft concrete cutoff wall was constructed in this location with the Skye Canyon Detention Basin 1 project to provide protection against a PMF spillway overtopping event. This alignment is being altered with the subject project, and although a trail facility would not typically be protected against a PMF overtopping event, this cutoff wall is being reconstructed to perpetuate the level of protection provided with the detention basin project. The cutoff wall has been shown on Lateral Profile 1 on Sheet GR-10, and the limits are called out on Sheet C-15 and C-16.

    Detail Section 3/TY-01 has been revised to show the appropriate cross slope.

    The existing DB1 outfall pipe has been shown and identified on Sheet GR-04.

19. **Comment:** *Sheet GR-05 and Sheet GR-06: Same as in Comment #18, the roadway section on both sheets is super-elevated and not matching Detail Section 3/TY-01. Review and revise accordingly.*

    Response: Detail Section 3/TY-01 has been revised to show the appropriate cross slope.

20. **Comment:** *Sheet GR-07: Construction Note #14 proposes CMP pipe which is not acceptable. Use RCP.*

    Provide maintenance paths to the three access points of the proposed storm drain facility.

    Response: The 54-inch CMP culvert proposed on Sheet GR-07 has been revised to RCP. Due to the decrease in interior roughness in changing from corrugated metal to concrete, the hydraulic performance of the culvert has increased, and the size was able to be reduced to 48-inch. See Appendix C for revised HY-8 calculation.

    Maintenance paths have been provided to the three access points of the proposed storm drain facility. The upstream-most culvert entrance is accessed through the 12-ft wide ditch upstream of it. The 40-ft long rock-lined BMP swale approaching this facility has been proposed as 3-inch minus rock to provide for pollutants to drop out while still enabling maintenance vehicles to cross it.

21. **Comment:** *Sheet GR-09: It appears that the proposed intersection of Sheep Mountain Parkway and Iron Mountain Road is at an elevation, ie, not matching the existing grade. Revise to match existing grade as possible.*

    Label the size of existing Skye Canyon DB2 outfall pipes on the plan.

    Provide concrete pad connecting the outfall pipe and the access ramp.

    The trail stops at Station 67+55 at a 3:1 scarp which is not acceptable. Extend the trail to the future Iron Mountain Road for future connection.

    Provide maintenance access to a proposed drop inlet adjacent to the northern end of the trail.

    Identify all existing power poles.

    Response: The proposed intersection of Sheep Mountain Parkway and Iron Mountain Road is at the elevation provided with the overall concept plans prepared by Horrocks in February 2016. Those plans set the planned profile of Sheep Mountain Parkway beyond the extents of the subject project, and therefore are the appropriate document to ensure the geometry for the subject project works together with surrounding reaches of Sheep Mountain Parkway. Additionally, the concept plans show the future Iron Mountain Road alignment crossing under Sheep Mountain Parkway, which may have been a factor in setting the Sheep Mountain Parkway elevation above existing grade at this location.

Skye Canyon DB2 outfall pipe sizes are now labeled on this sheet.

Concrete pad connecting DB2 outfall with proposed access road is provided.

Proposed trail alignment has been extended north to Iron Mountain Road centerline. To accommodate extension of the trail, the drop inlet proposed at this location has been extended west out of the trail alignment and revised to be a culvert entrance. Due to the lower invert of the culvert, the slope of the ditch approaching this facility was revised, and riprap lining was required (see riprap calculation, Appendix C.) Also, the ditch between the roadway and trail was previously graded west around the end of the trail to be collected by the drop inlet. Now that the trail has been extended, this ditch requires its own collection facility. A drop inlet is proposed to collect this flow and discharge it to the existing 60-inch storm drain in Iron Mountain Road (see drop inlet calculation, Appendix C.)
Maintenance access to the proposed facility at the northern end of the trail (now a culvert instead of a drop inlet) has been provided.

Existing power poles have been identified and called out to be protected in place.

22. **Comment:** *Detail Section Sheets: Address permanent dust control measures at the roadside ditches. Use rock mulch same size per the Beltway sections as an acceptable solution.*

    Response: Per discussion with Greg McDermott, dust mitigation will be accomplished by applying a dust palliative to graded surfaces.

23. **Comment:** *Provide structural detail or standard drawings of all proposed headwall and culvert structures.*

    Response: Structural details will be provided with improvement plan submittal.

24. **Comment:** *Provide enough bench width to install sound walls on both sides of Sheep Mountain Parkway. It appears that a minimum bench width of 15' will be required. Coordinate with Mr. Greg McDermott, P.E. at (702) 229-2143 for the exact locations and guidelines for the installation of sound walls.*

    Response: After discussion with Greg McDermott, it was agreed that a 20-ft bench would be provided on both sides of the future soundwall alignment. The east side of the corridor previously had a daylight slope adjacent to the east side of the future soundwall location. This has been revised to provide the 20-ft bench.

25. **Comment:** *Add a note in all pertinent sheets for the construction of all storm drain drop inlets per a newly adopted USDCCA Drawing No. 421 (Stormwater Quality Management Stamp and Sign Detail).*

    Response: Stormwater Quality Management Stamp and Sign Detail note provided on grading sheets.

The revised plan, profile and detail sheets adopting the revisions addressed in this letter are included with this submittal, and electronic copies are included on the CD in Appendix D. If you have any questions or require additional information, please do not hesitate to contact us at 702-284-5300.

Respectfully Submitted,

SLATER HANIFAN GROUP

Lant Leavitt, P.E.
Flood Control Division

cc: Mark Failla, P.E., CFM – SHG
Jerry Slater, P.E. – SHG
Jerrod Ratcliffe – SHG

APPENDIX

Appendix A CLV Comment Letter

Appendix B Exhibits
- Right-of-Way Exhibit
- BMP Exhibit

Appendix C Hydraulics
- HY8 Calculation - 48" RCP at Sta "SMP" 215+10
- HY8 Calculation - 42" RCP at Iron Mountain Rd
- Drop Inlet Calculation - Iron Mountain Rd
- Riprap Calculation - Iron Mountain Rd

Appendix D Electronic Files CD
- TDS Addendum #1
- Improvement Plans
- Horrocks Sheep Mountain Parkway Concept Plans

APPENDIX A

CLV Comment Letter

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: March 4, 2018
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: **Sheep Mountain Parkway at Skye Canyon**			**COPIES TO:** Slater Hanifan Group
Cross Streets:	Grand Teton Boulevard from Puli to Iron Mountain Road			M F Land LLC / Ninety-Five Management LLC
File Number:	F:\Depot\DSMemos\DS4952A.doc			Bart Anderson, P.E., DevCo
Parcel Number:	126-12-101-002			CCRFCD
Zoning Action:				
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	2/8/2018	2/26/2018	See Comments Below	$400.00	493316: $400
			TOTAL FEES (LDDRS):	**$400.00**	**----**

REMARKS:

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 Clark County Public Works Department concurrence.

1. The site is adjacent to or crosses an existing or proposed *Clark County Regional Flood Control District* (CCRFCD) master planned facility. Therefore, CCRFCD concurrence is required prior to final approval of the drainage study.

2. The proposed improvement plans show drainage facilities that must be reviewed for maintenance and access concerns. The engineer must submit an extra set of improvement plans to City of Las Vegas Operations and Maintenance Department (Contact Mr. Matthew Meyer, Streets & Sanitation Manager at 702-229-1688) for review and their acceptance must be obtained prior to the subject drainage study approval.

3. Provide an exhibit to show the overall right-of-way (ROW) lines (east and west) and the centerline of ***Sheep Mountain Parkway***. Identify the proposed ramp and interim pavement location.

4. Provide a Best Management Plan (BMP) to address the permanent erosion protection and dust control aspects of the subject site.

5. The improvement plans show super-elevation slope of 6% and short transition distance from super-elevation to normal crown. Coordinate with City Traffic, Mr. Victor Bolanos for acceptable design. Obtain approval from Traffic prior to the final acceptance of the drainage study.

6. Sheet C-01: Identify an existing gate for *Kyle Canyon Detention Basin* at the west end of *Grand Teton Boulevard*. Protect the gate in place and provide an access to the gate. Provide "End of Road" markers at the end of *Grand Teton Boulevard*. Provide access to *Skye Canyon Detention Basin 1*.

7. It appears that in general the proposed grading designs outside of the ***Sheep Mountain Parkway*** are shown on the "GR-xx" grading plans. Show the grading design and finished contours also on the "C-xx" sheets in the next submittal. The grading or finished contours shall clearly provide roadside swales for drainage purposes.

8. Same comment applies to the trail improvement plans. Show grading design on the trail plan and profile sheets, C-13 to C-22. Clearly show proposed swales adjacent to the trail path for drainage purposes.

9. Sheet C-06: Show and identify an existing *Skye Canyon DB1* outfall facility on the plan.

10. Sheet C-09: Show and identify proposed storm drain facilities crossing the trail and ***Sheep Mountain Parkway*** on the plan.

11. Sheet C-11: Show and identify an existing *Skye Canyon DB2* outfall facility on the plan.

12. Sheet C-17: Show and identify an existing *Skye Canyon DB1* outfall facility on the plan.

13. Sheet C-20: Show and identify proposed storm drain facilities crossing the trail on the plan.

14. Sheet C-22: Show and identify an existing *Skye Canyon DB2* outfall facility on the plan.

15. Sheet GR-01: *Detail Section 1/TY-01* shows swales on both sides of the paved ***Sheep Mountain Parkway***. The plan shows flow line elevations at regular intervals on the west side of ***Sheep Mountain Parkway***. However, there is no information of the swale on the east side of the roadway. Show flow line elevations accordingly in the next submittal.

    Also, the cross slope of the access path along the east ROW shall be 2% maximum. Revise the detail section accordingly.

    The same comment shall apply for Sheet GR-01 through Sheet GR-09 wherever it is applicable.

16. Sheet GR-01: *Detail Section 1/TY-02* shows ditches on both sides of the proposed trail. Show flow line elevations at regular intervals on both sides of the trail on the plan.

    The same comment shall apply for Sheet GR-01 through Sheet GR-09 wherever it is applicable.

17. Sheet GR-02: A notation line "----F-----F----" is shown along the east ROW line which presumably means "fill" to the reviewer. However, a simple "fill" to the contractor without any grading design such as finished contours is not acceptable. Provide grading design in the next submittal. Note that the fill slope must not be greater than 2:1 or per the approved geotechnical report. Revise the plan and pertinent detail sections accordingly.

18. Sheet GR-04: Construction Note #13 proposes a 3'-concrete cutoff wall to the west side of the trail. Provide cross section to reflect the wall and the related drainage facilities.

    The roadway section shown on this sheet is super-elevated. However, *Detail Section 3/TY-01* shows normal crown. Review and revise accordingly.

    Identify the existing DB1 outfall pipe with *City of Las Vegas* recorded drawing number on the plan.

19. Sheet GR-05 and Sheet GR-06: Same as in Comment #18, the roadway section on both sheets is super-elevated and not matching *Detail Section 3/TY-01*. Review and revise accordingly.

20. Sheet GR-07: Construction Note #14 proposes CMP pipe which is not acceptable. Use RCP.

    Provide maintenance paths to the three access points of the proposed storm drain facility.

21. Sheet GR-09: It appears that the proposed intersection of *Sheep Mountain Parkway* and *Iron Mountain Road* is at an elevation, ie, not matching the existing grade. Revise to match existing grade as possible.

    Label the size of existing *Skye Canyon DB2* outfall pipes on the plan.

    Provide concrete pad connecting the outfall pipe and the access ramp.

    The trail stops at Station 67+55 at a 3:1 scarp which is not acceptable. Extend the trail to the future *Iron Mountain Road* for future connection.

    Provide maintenance access to a proposed drop inlet adjacent to the northern end of the trail.

    Identify all existing power poles.

22. Detail Section Sheets: Address permanent dust control measures at the roadside ditches. Use rock mulch same size per the Beltway sections as an acceptable solution.

23. Provide structural detail or standard drawings of all proposed headwall and culvert structures.

24. Provide enough bench width to install sound walls on both sides of ***Sheep Mountain Parkway***. It appears that a minimum bench width of 15' will be required. Coordinate with Mr. Greg McDermott, P.E. at (702) 229-2143 for the exact locations and guidelines for the installation of sound walls.

25. Add a note in all pertinent sheets for the construction of all storm drain drop inlets per a newly adopted USDCCA Drawing No. 421 (*Stormwater Quality Management Stamp and Sign Detail*).

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

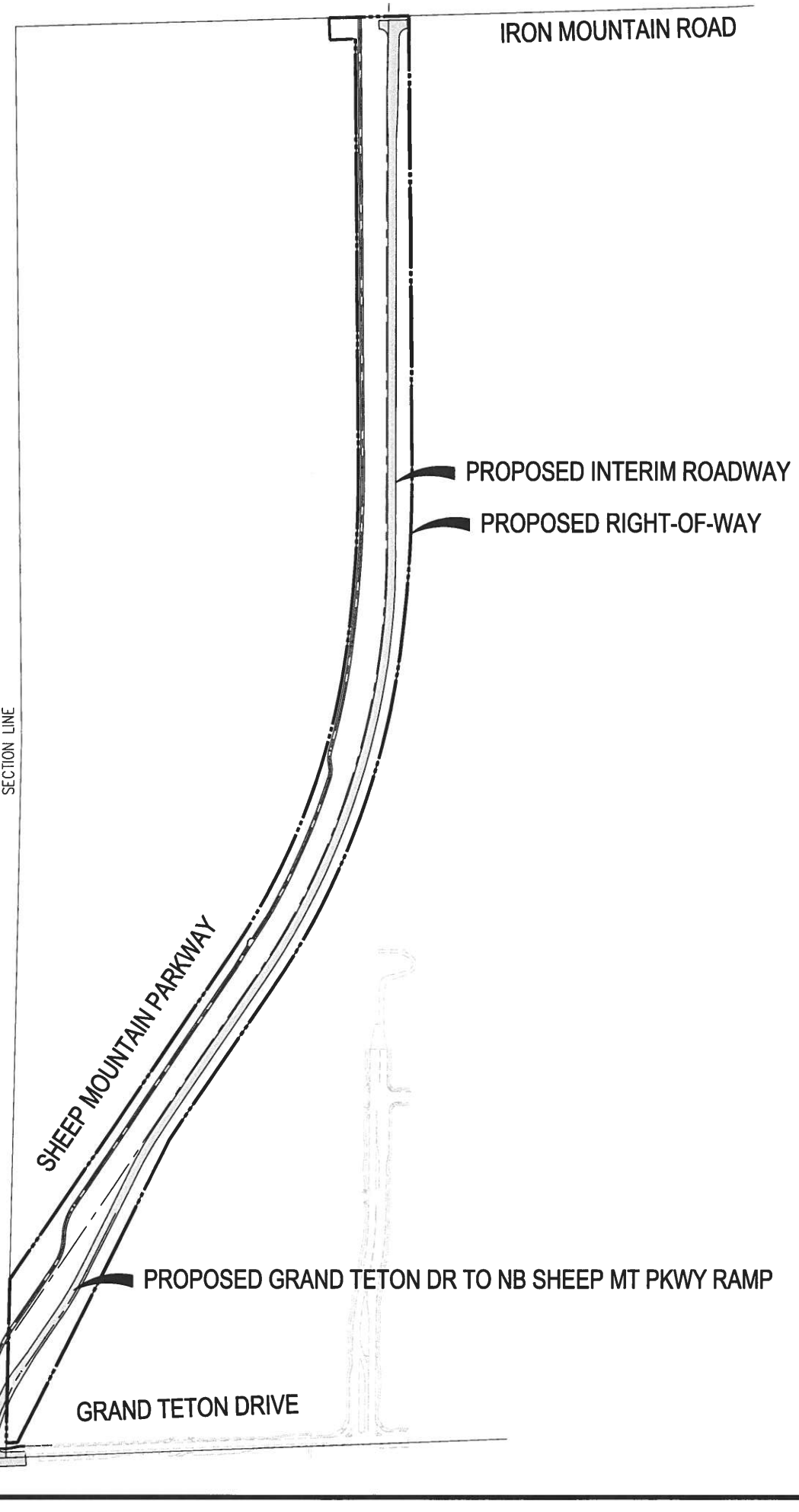
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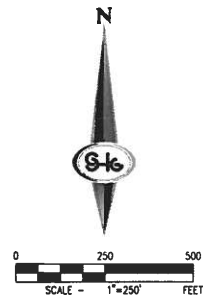
T/R/S: T19S/R59E/12

AREA F-12

APPENDIX B

Exhibits





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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY
RIGHT-OF-WAY EXHIBIT

DATE: 05/30/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED:
PROJECT NO.
OLY1720.000

SHEET 1 OF 1

LEGEND

- PAVED ROADWAY AREA BOUNDARY
- ID — PAVED AREA ID
- FLOW DIRECTION

PAVED ROADWAY AREAS

Area ID	Area (sqft)	Area (ac)	BMP Solution
BMP1	16080	0.37	Area sheet flows across pervious ground to the east.
BMP2	16605	0.38	Area drains to roadside ditch. 40' length of rock swale provided to settle out pollutants.
BMP3	28603	0.66	Area sheet flows across pervious ground to the east.
BMP4	66064	1.52	Area drains to roadside ditch. 40' length of rock swale provided to settle out pollutants.
BMP5	64525	1.48	Area sheet flows across pervious ground to the east.

N

NTS

IRON MOUNTAIN ROAD

SHEEP MOUNTAIN PARKWAY

SHAUMBER ROAD

GRAND TETON DRIVE

BMP5

BMP4

BMP3

BMP2

BMP1

40-FT ROCK SWALE

40-FT ROCK SWALE

40-FT ROCK SWALE

40-FT ROCK SWALE

40-FT ROCK SWALE

40-FT ROCK SWALE

SKYE CANYON DETENTION BASIN 2

SKYE CANYON DETENTION BASIN 1

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT, LLC.

SKYE CANYON - SHEEP MOUNTAIN PARKWAY

BEST MANAGEMENT PLAN EXHIBIT

DATE: MAY 2018
DRAFTER:
DESIGNER: LKL
CHECKED:
PROJECT NO.
OLY1720.000

I:\olv1720.000 sheep mountain parkway access roads\drainage\technical study\addendum\figures\bmp.dwg 5/1/2018 9:46 AM Lori Lazar

APPENDIX C

Hydraulic Computations

48" RCP HY-8 Calculation - Sta "SMP" 215+10

HY-8 Analysis Results

Crossing Summary Table

Culvert Crossing: Lateral Profile #3 at SMP Sta 215+10

Headwater Elevation (ft)	Total Discharge (cfs)	48 inch RCP Discharge (cfs)	Roadway Discharge (cfs)	Iterations
2996.00	0.00	0.00	0.00	1
2997.13	10.00	10.00	0.00	1
2997.63	20.00	20.00	0.00	1
2998.03	30.00	30.00	0.00	1
2998.48	40.00	40.00	0.00	1
2998.88	50.00	50.00	0.00	1
2999.26	60.00	60.00	0.00	1
2999.64	70.00	70.00	0.00	1
2999.68	71.00	71.00	0.00	1
3000.46	90.00	90.00	0.00	1
3000.92	100.00	100.00	0.00	1
3003.00	135.76	135.76	0.00	Overtopping

HY-8 Analysis Results

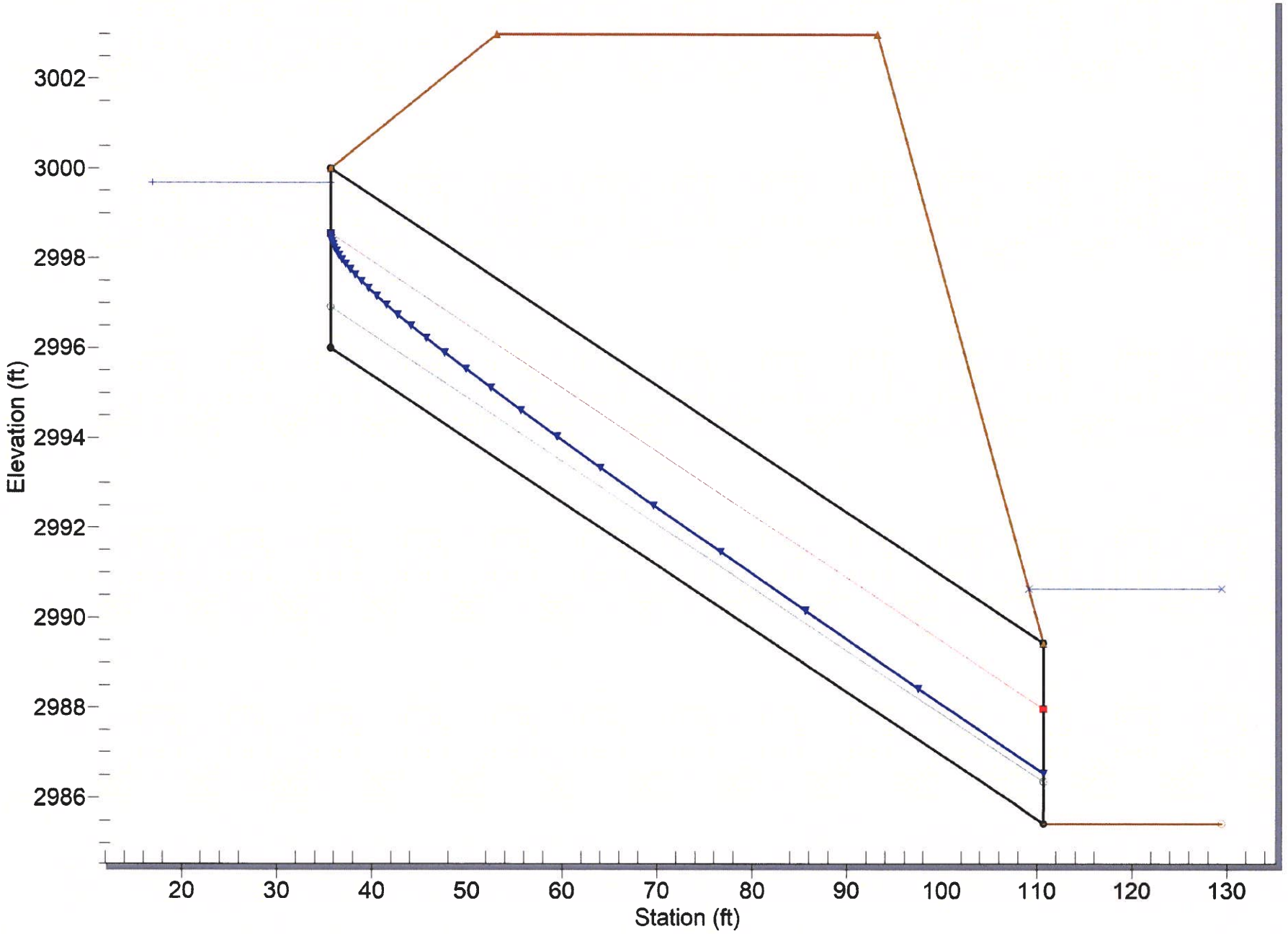
Culvert Summary Table - 48 inch RCP

Culvert Crossing: Lateral Profile #3 at SMP Sta 215+10

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth(ft)	Outlet Control Depth(ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	2996.00	0.00	0.0	0-NF	0.00	0.00	4.00	5.21	0.00	0.00
10.00	10.00	2997.13	1.13	0.0*	1-JS1f	0.35	0.92	4.00	5.21	0.80	0.00
20.00	20.00	2997.63	1.63	0.0*	1-JS1f	0.49	1.31	4.00	5.21	1.59	0.00
30.00	30.00	2998.03	2.03	0.0*	1-S2n	0.60	1.62	0.67	5.21	20.95	0.00
40.00	40.00	2998.48	2.48	0.0*	1-S2n	0.69	1.89	0.78	5.21	22.17	0.00
50.00	50.00	2998.88	2.88	0.0*	1-S2n	0.77	2.12	0.89	5.21	22.95	0.00
60.00	60.00	2999.26	3.26	0.0*	1-S2n	0.84	2.33	1.00	5.21	23.64	0.00
70.00	70.00	2999.64	3.64	0.0*	1-S2n	0.91	2.52	1.09	5.21	24.20	0.00
71.00	71.00	2999.68	3.68	0.0*	1-S2n	0.92	2.54	1.10	5.21	24.28	0.00
90.00	90.00	3000.46	4.46	0.0*	5-S2n	1.03	2.87	1.28	5.21	25.17	0.00
100.00	100.00	3000.92	4.92	0.0*	5-S2n	1.09	3.03	1.36	5.21	25.52	0.00

Crossing - Lateral Profile #3 at SMP Sta 215+10, Design Discharge - 71.0 cfs

Culvert - 48 inch RCP, Culvert Discharge - 71.0 cfs



42" RCP HY-8 Calculation - Iron Mountain Rd

HY-8 Analysis Results

Crossing Summary Table

Culvert Crossing: Lateral Profile #4 at Iron Mt Rd

Headwater Elevation (ft)	Total Discharge (cfs)	42 inch RCP Discharge (cfs)	Roadway Discharge (cfs)	Iterations
2983.38	0.00	0.00	0.00	1
2983.42	10.00	10.00	0.00	1
2983.56	20.00	20.00	0.00	1
2983.78	30.00	30.00	0.00	1
2984.09	40.00	40.00	0.00	1
2984.52	50.00	50.00	0.00	1
2984.83	60.00	60.00	0.00	1
2985.37	70.00	70.00	0.00	1
2986.00	80.00	80.00	0.00	1
2986.71	90.00	90.00	0.00	1
2987.52	100.00	100.00	0.00	1
2990.00	125.40	125.40	0.00	Overtopping

HY-8 Analysis Results

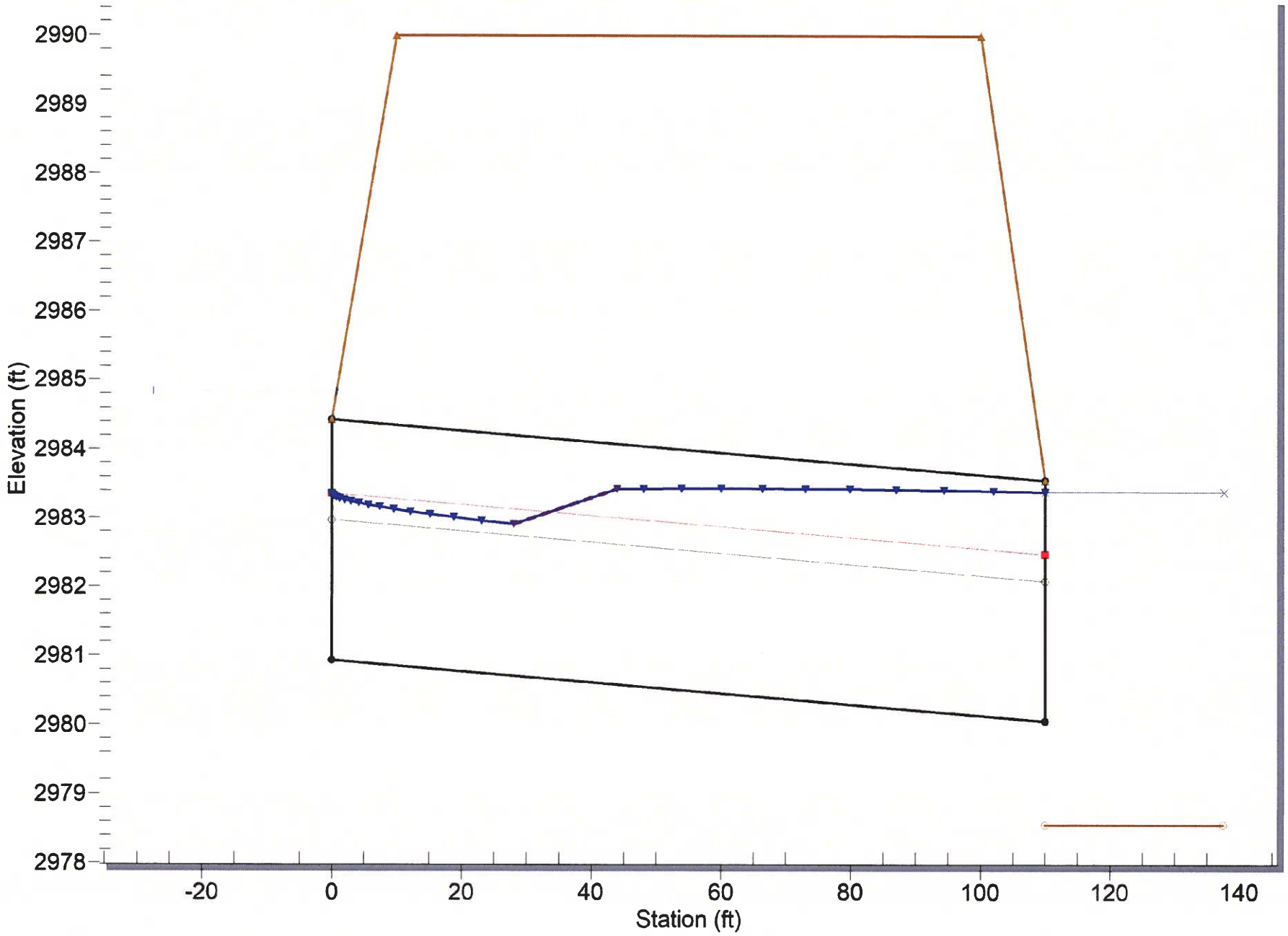
Culvert Summary Table - 42 inch RCP

Culvert Crossing: Lateral Profile #4 at Iron Mt Rd

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth(ft)	Outlet Control Depth(ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	2983.38	0.00	2.45	0-NF	0.00	0.00	3.33	4.83	0.00	0.00
10.00	10.00	2983.42	1.30	2.49	1-S1t	0.77	0.95	3.33	4.83	1.05	0.00
20.00	20.00	2983.56	1.92	2.63	1-S1t	1.09	1.37	3.33	4.83	2.09	0.00
30.00	30.00	2983.78	2.47	2.85	1-S1t	1.35	1.69	3.33	4.83	3.14	0.00
40.00	40.00	2984.09	2.95	3.16	1-S1t	1.59	1.96	3.33	4.83	4.18	0.00
50.00	50.00	2984.52	3.41	3.59	1-S1t	1.81	2.21	3.33	4.83	5.23	0.00
60.00	60.00	2984.83	3.90	2.45	5-JS1t	2.03	2.42	3.33	4.83	6.27	0.00
70.00	70.00	2985.37	4.44	4.21	5-JS1t	2.26	2.62	3.33	4.83	7.32	0.00
80.00	80.00	2986.00	5.07	4.75	5-JS1t	2.50	2.79	3.33	4.83	8.36	0.00
90.00	90.00	2986.71	5.78	5.45	5-S1t	2.79	2.94	3.33	4.83	9.41	0.00
100.00	100.00	2987.52	6.59~	5.99	3-M2t	3.50	3.07	3.33	4.83	10.58	0.00

Crossing - Lateral Profile #4 at Iron Mt Rd, Design Discharge - 60.0 cfs

Culvert - 42 inch RCP, Culvert Discharge - 60.0 cfs



Drop Inlet Calculation - Iron Mountain Rd

Grate Inlet Sizing Computation

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

Project Name & Number: Sheep Mountain Parkway Access Road - OLY1720.000
Date: 5/25/2018
By: LKL

Notes:

Facility ID:	SDDI#3
Drainage Condition:	Proposed
Source of Flow:	Q100= Basin PON01
Inlet Type:	Grated Drop Inlet
Inlet Size:	3'x2'

Known Information:

Q =	Flow (cfs)	9.0
W =	Width of Grate (ft)	3.00
L =	Length of Grate (ft)	2.00
D =	Diameter of Circle (in)	
Cf =	Clogging Factor (%)	50

Weir Conditions:

$$HW = (Q/(Cw*Pc))^{2/3}$$

Cw =	Weir Coefficient	3.30
P =	Perimeter of grate (ft)	10.0
Pc =	Perimeter (w/clogging) (ft)	5.0
HW =	Headwater depth (ft)	0.67

Orifice Conditions:

$$HW = (Q/(Co*Ac))^2/2*g$$

Co =	Orifice Coefficient	0.67
Ag =	Grate Area (ft^2)	6.00
Gf =	Grate Opening Factor	0.67
Ac =	Grate Open Area (w/ clogging) (ft^2)	2.01
g =	Gravity (fps)	32.20
HW =	Headwater depth (ft)	0.69

Output:

Worst Case Scenario Occurs Under Orifice Conditions

Headwater Depth = 0.69 ft with grate

Riprap Ditch Calculation - Iron Mountain Rd

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

Rip Rap Sizing Computation

Project Name & Number: OLY1720.000
Date: 5/31/2018
By: LKL

Location: Riprap Ditch at 42" Culvert at Iron Mountain Road

Known Information:

Reference:

Rip Rap protection at

V =	Velocity (fps)	7.2	WSPG Hydraulic / Flowmaster Calculations
S_g =	Specific Gravity of Rock (typ=2.5)	2.5	Use Typical
s =	Longitudinal Channel Slope (ft/ft)	0.089	Grading Plan

Solve For:

d_{50} = 1.12 ft - Average Rock Size

d_{50} = 13 in - Average Rock Size
Thickness = 26 in - Thickness of Rip Rap protection
Manning's 'n' = 0.040 - Roughness Coefficient

Equations:

Based upon a Stable Channel Lining

$d_{50} = ((vel*S^{0.17})/(3*(S_g-1)))^2$ Equation 734*

$n = 0.0395(d_{50})^{1/6}$ Equation 732*

Recommendations:

* Provide 18-in Riprap, Thickness = 36-in.

* Equations taken from the Clark County Regional Flood Control District - Hydrologic Criteria and Drainage Design Manual

5740 S. Arville St., Suite 216 - Las Vegas, NV 89118
Ph. 702-284-5300 - Fx. 702-284-5399

Ditch at 42in RCP at Iron Mt Rd

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.040	
Channel Slope	8.90	%
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	12.00	ft
Discharge	60.00	ft^3/s

Results

Normal Depth	0.60	ft
Flow Area	8.31	ft^2
Wetted Perimeter	15.81	ft
Hydraulic Radius	0.53	ft
Top Width	15.61	ft
Critical Depth	0.85	ft
Critical Slope	0.02651	ft/ft
Velocity	7.22	ft/s
Velocity Head	0.81	ft
Specific Energy	1.41	ft
Froude Number	1.74	
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	0.60	ft
Critical Depth	0.85	ft
Channel Slope	8.90	%

Ditch at 42in RCP at Iron Mt Rd

GVF Output Data

Critical Slope	0.02651	ft/ft

APPENDIX D

Electronic Files CD

DEPARTMENT OF PUBLIC WORKS

Mayor:
CAROLYN G. GOODMAN

City Council:
STEVEN D. ROSS (Mayor Pro-Tem)
LOIS TARKANIAN
RICKI Y. BARLOW
STAVROS S. ANTHONY
BOB COFFIN
BOB BEERS

City Manager:
ELIZABETH N. FRETWELL

Director of Public Works:
DAVID N. BOWERS, P.E., P.T.O.E.

City Engineer:
ALLEN E. PAVELKA, P.E.

Funded By:
CITY OF LAS VEGAS

SHEEP MOUNTAIN PARKWAY
PROOF OF CONCEPT PLANS

PREPARED BY
HORROCKS ENGINEERS
1349 Galleria Drive, Suite 110
Henderson, NV 89014
(702) 966-4063

NO.	DATE	SHEET	REVISIONS

PREPARED FOR
CITY OF LAS VEGAS

H# XXXXX | BID# XX.XXXX
DATE: 02/03/16 | DESIGNED BY: XXX
SUBMITTAL STAGE: **00% - PRELIMINARY** | DRAWN BY: XXX | CHECKED BY: XXX

TITLE
SHEEP MOUNTAIN IMPROVEMENT

SHEET
COVER SHEET

PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

SHEET
G1.01
1 OF 42
DRAWING NO.
XXX-XXXX

PRELIMINARY NOT FOR CONSTRUCTION

SHEET INDEX

1	G1.01	COVER SHEET
2	G1.02	LEGEND, KEY MAP AND INDEX
3	G1.03	NOT USED
4	H1.01	GEOMETRIC CONTROL PLAN 1 OF 2
5	H1.02	GEOMETRIC CONTROL PLAN 2 OF 2
6	TY1.01	TYPICAL SECTIONS 1 OF 5
7	TY1.02	TYPICAL SECTIONS 2 OF 5
8	TY1.03	TYPICAL SECTIONS 3 OF 5
9	TY1.04	TYPICAL SECTIONS 4 OF 5
10	TY1.05	TYPICAL SECTIONS 5 OF 5
11	C1.01	SHEEP MTN. PLAN AND PROFILE-STA. 150+00 TO 163+00
12	C1.02	SHEEP MTN. PLAN AND PROFILE-STA.163+00 TO 176+00
13	C1.03	SHEEP MTN. PLAN AND PROFILE-STA.176+00 TO 189+00
14	C1.04	SHEEP MTN. PLAN AND PROFILE-STA.189+00 TO 202+00
15	C1.05	SHEEP MTN. PLAN AND PROFILE-STA.202+00 TO 215+00
16	C1.06	SHEEP MTN. PLAN AND PROFILE-STA.215+00 TO 228+00
17	C1.07	SHEEP MTN. PLAN AND PROFILE-STA.228+00 TO 241+00
18	C1.08	SHEEP MTN. PLAN AND PROFILE-STA.241+00 TO 254+00
19	C1.09	SHEEP MTN. PLAN AND PROFILE-STA.254+00 TO 266+00
20	C1.10	SHEEP MTN. PLAN AND PROFILE-STA.266+00 TO 278+00
21	C1.11	GRAND TETON RAMP "A" PLAN AND PROFILE-STA.0+00 TO 13+00
22	C1.12	GRAND TETON RAMP "A" PLAN AND PROFILE-STA.13+00 TO 22+00
23	C1.13	GRAND TETON RAMP "B" PLAN AND PROFILE-STA.0+00 TO 13+00
24	C1.14	GRAND TETON RAMP "B" PLAN AND PROFILE-STA.13+00 TO 21+00
25	C1.15	GRAND TETON RAMP "C" PLAN AND PROFILE-STA.0+00 TO 13+00
26	C1.16	GRAND TETON RAMP "C" PLAN AND PROFILE-STA.13+00 TO 21+00
27	C1.17	GRAND TETON RAMP "D" PLAN AND PROFILE-STA.0+00 TO 15+00
28	C1.18	KYLE CANYON RAMP "A" PLAN AND PROFILE-STA.0+00 TO 8+00
29	C1.19	KYLE CANYON RAMP "A" PLAN AND PROFILE-STA.8+00 TO 17+00
30	C1.20	KYLE CANYON RAMP "B" PLAN AND PROFILE-STA.0+00 TO 11+00
31	C1.21	KYLE CANYON RAMP "B" PLAN AND PROFILE-STA.11+00 TO 19+00
32	C1.22	KYLE CANYON RAMP "C" PLAN AND PROFILE-STA.0+00 TO 13+00
33	C1.23	KYLE CANYON RAMP "C" PLAN AND PROFILE-STA.13+00 TO 23+00
34	C1.24	KYLE CANYON RAMP "D" PLAN AND PROFILE-STA.0+00 TO 13+00
35	C1.25	KYLE CANYON RAMP "D" PLAN AND PROFILE-STA.13+00 TO 23+00
36	C1.26	GRAND TETON ROAD-PLAN AND PROFILE STA.0+00 TO 13+00
37	C1.27	GRAND TETON ROAD-PLAN AND PROFILE STA.13+00 TO 26+00
38	C1.28	SKYE CANYON PLAN AND PROFILE-STA.0+00 TO 11+50
39	C1.29	SKYE CANYON PLAN AND PROFILE-STA.11+50 TO 25+00
40	C1.30	IRON MOUNTAIN PLAN AND PROFILE-STA.0+00 TO 12+00
41	C1.31	IRON MOUNTAIN PLAN AND PROFILE-STA.12+00 TO 25+00
42	C1.32	KYLE CANYON ROAD PLAN AND PROFILE-STA.26+00 TO 39+00

ALIGNMENT ABBREVIATIONS

"SM"	SHEEP MOUNTAIN
"KC"	KYLE CANYON
"SC"	SKYE CANYON PARK DRIVE
"IM"	IRON MOUNTAIN ROAD
"GT"	GRAND TETON
"GTRA"	GRAND TETON RAMP A
"GTRB"	GRAND TETON RAMP B
"GTRC"	GRAND TETON RAMP C
"GTRD"	GRAND TETON RAMP D
"KCRA"	KYLE CANYON RAMP A
"KCRB"	KYLE CANYON RAMP B
"KCRC"	KYLE CANYON RAMP C
"KCRD"	KYLE CANYON RAMP D

LEGEND

- NVE TRANSMISSION POLE MAINTENANCE AREA (20' X 40')
- PP — NVE TRANSMISSION POLE
- 5 FOOT CONTOURS
- 1 FOOT CONTOURS
- CUT — CUT — DAYLIGHT CUT LINE
- FILL — FILL — DAYLIGHT FILL LINE
- NVE EASEMENT
- PROPOSED R/W
- PARCEL LINES

BASIS OF BEARINGS

SOUTH 00°22'12" WEST, BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW 1/4) OF SECTION 6, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M, CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEROF IN FILE 151, PAGE 14 OF SURVEYS IN CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

MOMUMENT ID: (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METERS
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK -
2008 ADJUSTMENT (UPDATED 05/24/2010)

DESIGN CRITERIA

SHEEP MOUNTAIN
- 75 MPH DESIGN SPEED
- 6% MAX. SUPERELEVATION
- 6% MAX. PROFILE GRADE
- 30' CLEAR ZONE

RAMPS
- DESIGN SPEED
  - 65 MPH (EXIT RAMPS WITHIN 390' OF PAINTED GORE)
  - 50 MPH (ENTRANCE RAMPS WITHIN 300' OF PAINTED GORE)
  - 50 MPH (RAMP BODY)
  - 35 MPH (WITHIN 300' OF RAMP TERMINAL)
- 6% MAX. SUPERELEVATION
- 6% MAX. PROFILE GRADE
- CLEAR ZONE: SIDE SLOPES ARE 6:1 OR FLATTER WITHIN CLEAR ZONE; BARRIER PROTECTION ADDED WHEN CLEAR ZONE IS VIOLATED

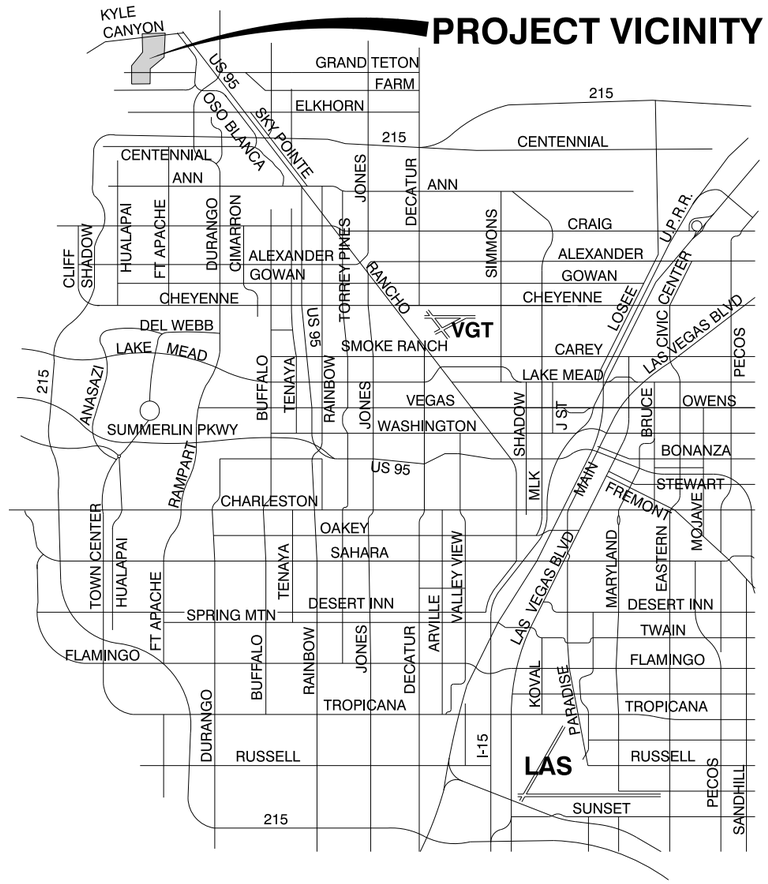
GRAND TETON
- 40 MPH DESIGN SPEED
- 6% MAX. PROFILE GRADE
- 16.5' MIN VERTICAL CLEARANCE AT SHEEP MOUNTAIN STRUCTURE

SKYE CANYON PARK
- 40 MPH DESIGN SPEED
- 8% MAX. PROFILE GRADE
- 16.5' MIN. VERTICAL CLEARANCE AT SHEEP MOUNTAIN STRUCTURE

IRON MOUNTAIN
- 40 MPH DESIGN SPEED
- 8% MAX. PROFILE GRADE
- 16.5' MIN. VERTICAL CLEARANCE AT SHEEP MOUNTAIN STRUCTURE

KYLE CANYON
- 50 MPH DESIGN SPEED (KYLE CANYON)
- 16.5' MIN. VERTICAL CLEARANCE AT SHEEP MOUNTAIN STRUCTURE
- MOMUMENT ID: (1934) 19

PROJECT VICINITY



VICINITY MAP

NOT TO SCALE

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Henderson, NV 89014
(702) 966-4063

NO.	DATE	SHEET	REVISIONS

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CITY OF LAS VEGAS

H# XXXXX | BID# XX.XXXXX | DESIGNED BY: XXX | DRAWN BY: XXX | CHECKED BY: XXX

DATE: 02/03/16

SUBMITTAL STAGE: **00% - PRELIMINARY**

TITLE: SHEEP MOUNTAIN IMPROVEMENT

SHEET: LEGENDS, KEYMAP AND INDEX

PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

SHEET
G1.02
2 OF 42

DRAWING NO.
XXX-XXXX

PRELIMINARY NOT FOR CONSTRUCTION

THIS SHEET INTENTIONALLY LEFT BLANK

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H# XXXXX | BID# XX.XXXX
DATE: 02/03/16 | DESIGNED BY: XXX
SUBMITTAL STAGE: | DRAWN BY: XXX
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NO.	DATE	REVISIONS

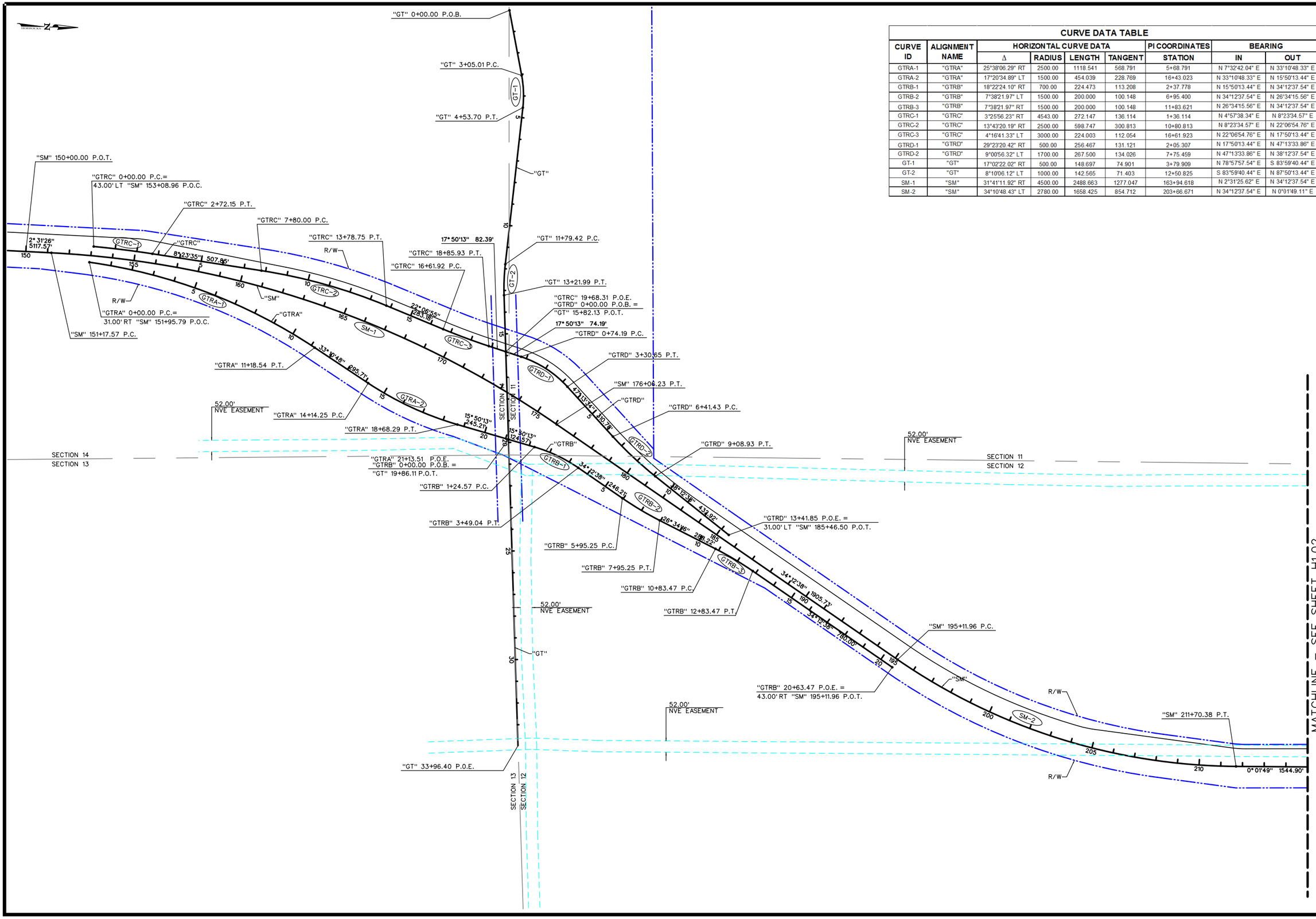
TITLE
SHEEP MOUNTAIN IMPROVEMENT

SHEET

PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

SHEET
G1.03
3 OF **42**
DRAWING NO.
XXX-XXXX

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CURVE DATA TABLE

CURVE ID	ALIGNMENT NAME	HORIZONTAL CURVE DATA				PI COORDINATES	BEARING	
		Δ	RADIUS	LENGTH	TANGENT	STATION	IN	OUT
GTRA-1	"GTRA"	25°38'06.29" RT	2500.00	1118.541	568.791	5+68.791	N 7°32'42.04" E	N 33°10'48.33" E
GTRA-2	"GTRA"	17°20'34.89" LT	1500.00	454.039	228.769	16+43.023	N 33°10'48.33" E	N 15°50'13.44" E
GTRB-1	"GTRB"	18°22'24.10" RT	700.00	224.473	113.208	2+37.778	N 15°50'13.44" E	N 34°12'37.54" E
GTRB-2	"GTRB"	7°38'21.97" LT	1500.00	200.000	100.148	6+95.400	N 34°12'37.54" E	N 26°34'15.56" E
GTRB-3	"GTRB"	7°38'21.97" RT	1500.00	200.000	100.148	11+83.621	N 26°34'15.56" E	N 34°12'37.54" E
GTRC-1	"GTRC"	3°25'56.23" RT	4543.00	272.147	136.114	1+36.114	N 4°57'38.34" E	N 8°23'34.57" E
GTRC-2	"GTRC"	13°43'20.19" RT	2500.00	598.747	300.813	10+80.813	N 8°23'34.57" E	N 22°06'54.76" E
GTRC-3	"GTRC"	4°16'41.33" LT	3000.00	224.003	112.054	16+61.923	N 22°06'54.76" E	N 17°50'13.44" E
GTRD-1	"GTRD"	29°23'20.42" RT	500.00	256.467	131.121	2+05.307	N 17°50'13.44" E	N 47°13'33.86" E
GTRD-2	"GTRD"	9°00'56.32" LT	1700.00	267.500	134.026	7+75.459	N 47°13'33.86" E	N 38°12'37.54" E
GT-1	"GT"	17°02'22.02" RT	500.00	148.697	74.901	3+79.909	N 78°57'57.54" E	S 83°59'40.44" E
GT-2	"GT"	8°10'06.12" LT	1000.00	142.565	71.403	12+50.825	S 83°59'40.44" E	N 87°50'13.44" E
SM-1	"SM"	31°41'11.92" RT	4500.00	2488.663	1277.047	163+94.618	N 2°31'25.62" E	N 34°12'37.54" E
SM-2	"SM"	34°10'48.43" LT	2780.00	1658.425	854.712	203+66.671	N 34°12'37.54" E	N 0°01'49.11" E

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DATE: 02/03/16

SUBMITTAL STAGE:
30% - PRELIMINARY

TITLE
SHEEP MOUNTAIN

SHEET
GEOMETRIC CONTROL PLAN
1 OF 2

PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

SHEET
H1.01
4 OF 42

DRAWING NO.
XXX-XXXX

NO.	DATE	SHEET	REVISIONS

PRELIMINARY NOT FOR CONSTRUCTION

MATCHLINE - SEE SHEET H1.01

CURVE DATA TABLE								
CURVE ID	ALIGNMENT NAME	HORIZONTAL CURVE DATA				PI COORDINATES	BEARING	
		Δ	RADIUS	LENGTH	TANGENT	STATION	IN	OUT
IM-1	"IM"	3°39'11.62" RT	5500.00	350.685	175.402	17+87.076	N 87°49'56.86" E	S 88°30'51.52" E
IM-2	"IM"	3°05'34.56" LT	5500.00	296.900	148.486	21+10.845	S 88°30'51.52" E	N 88°23'33.92" E
KCRA-1	"KCRA"	4°00'00.00" LT	3000.00	209.440	104.762	13+47.545	N 5°04'27.71" E	N 1°04'27.71" E
KCRB-1	"KCRB"	4°25'18.93" LT	2000.00	154.354	77.215	3+64.781	N 1°04'27.71" E	N 3°20'51.22" W
KCRB-2	"KCRB"	13°40'56.89" RT	3500.00	835.814	419.905	14+66.734	N 3°20'51.22" W	N 10°20'05.36" E
KCRC-1	"KCRC"	1°02'38.60" RT	16043.00	292.339	146.173	2+73.265	N 0°01'49.11" E	N 1°04'27.71" E
KCRC-2	"KCRC"	18°06'55.23" LT	1000.00	316.172	159.416	9+39.417	N 1°04'27.71" E	N 17°02'27.53" W
KCRC-3	"KCRC"	18°06'55.23" RT	850.00	268.747	135.504	15+33.612	N 17°02'27.53" W	N 1°04'27.71" E
KCRD-1	"KCRD"	18°52'57.54" RT	850.00	280.130	141.347	11+25.291	N 1°04'27.71" E	N 19°57'25.24" E
KCRD-2	"KCRD"	6°45'47.98" LT	8000.00	944.339	472.718	17+36.793	N 19°57'25.24" E	N 13°11'37.26" E
SM-3	"SM"	1°02'38.60" RT	16000.00	291.555	145.782	228+61.065	N 0°01'49.11" E	N 1°04'27.71" E
SM-4	"SM"	16°09'07.26" RT	5000.00	1409.529	709.469	267+26.626	N 1°04'27.71" E	N 17°13'34.96" E

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DATE: 02/03/16

SUBMITTAL STAGE:
30% - PRELIMINARY

NO.	DATE	SHEET	REVISIONS

TITLE
SHEEP MOUNTAIN

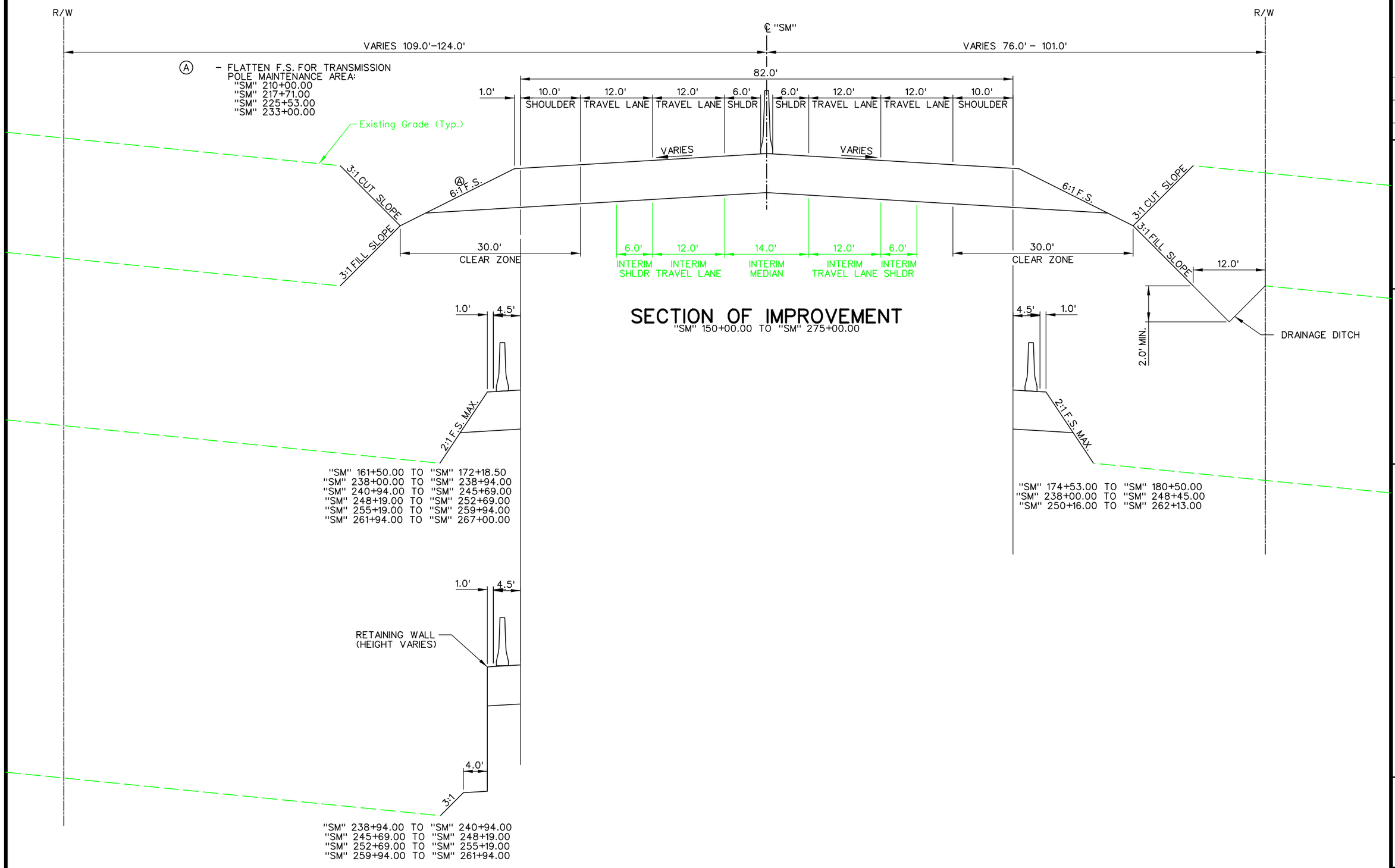
SHEET
GEOMETRIC CONTROL PLAN
2 OF 2

PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

SHEET
H1.02
5 OF 42

DRAWING NO.
XXX-XXXX

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SECTION OF IMPROVEMENT

"SM" 150+00.00 TO "SM" 275+00.00

NO.	DATE	SHEET	REVISIONS

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DATE: 02/03/16

SUBMITTAL STAGE: **30% - PRELIMINARY**

TITLE: SHEEP MOUNTAIN

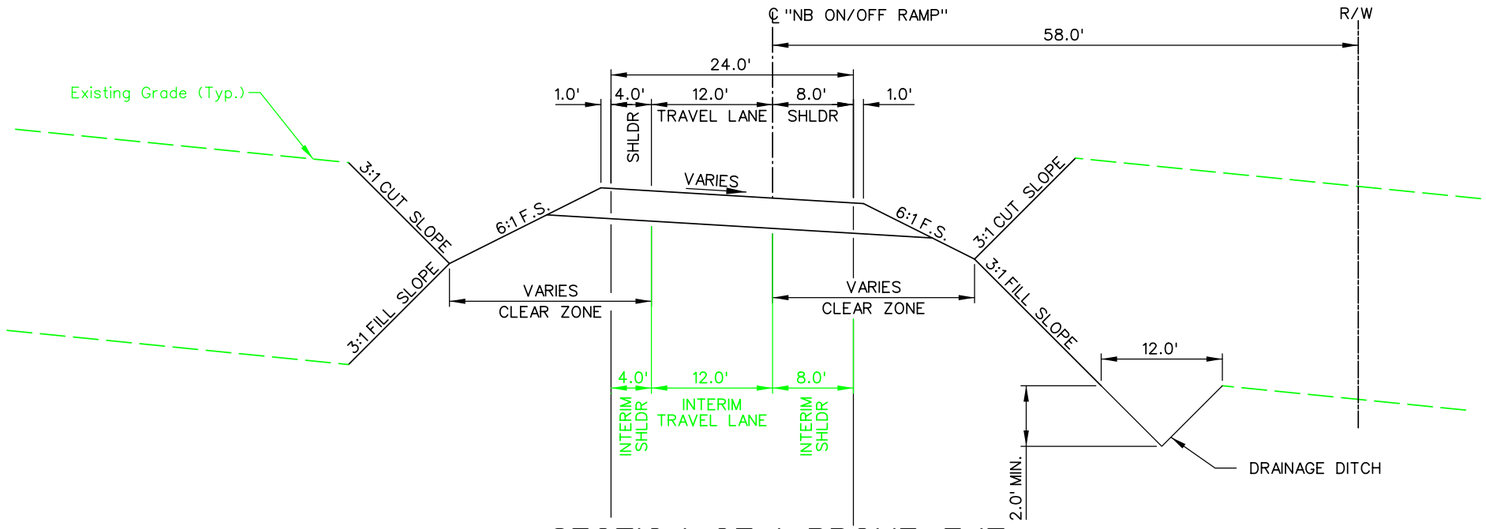
SHEET: TYPICAL SECTIONS 1 OF 5

PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

SHEET
TY1.01
6 OF 42

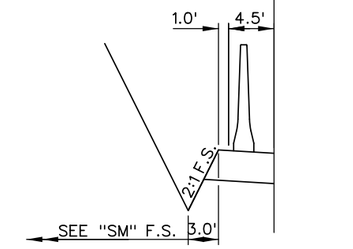
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XXX-XXXX

PRELIMINARY NOT FOR CONSTRUCTION

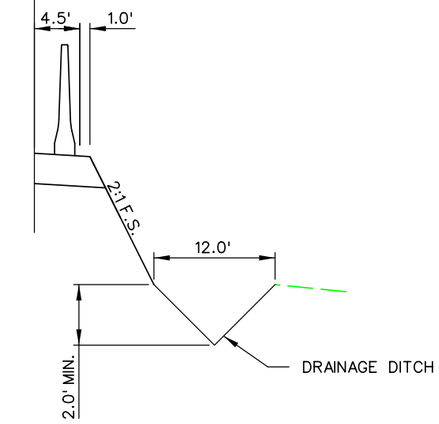


SECTION OF IMPROVEMENT

"GTRA" 3+87.82 TO "GTRA" 20+68.29
"GTRB" 0+45.21 TO "GTRB" 10+44.63
"KCRA" 5+00.00 TO "KCRA" 16+00.00
"KCRB" 0+67.00 TO "KCRB" 11+42.65



"GTRB" 0+60.35 TO "GTRB" 6+00.00
"KCRA" 5+00.00 TO "KCRA" 15+90.00
"KCRB" 0+67.00 TO "KCRB" 11+42.65



"GTRA" 8+50.00 TO "GTRA" 14+14.25
"KCRA" 6+50.00 TO "KCRA" 12+50.00
"KCRB" 3+75.00 TO "KCRB" 12+75.00

NO.	DATE	SHEET	REVISIONS

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SUBMITTAL STAGE:
30% - PRELIMINARY

SHEEP MOUNTAIN

TITLE

TYPICAL SECTIONS
2 OF 5

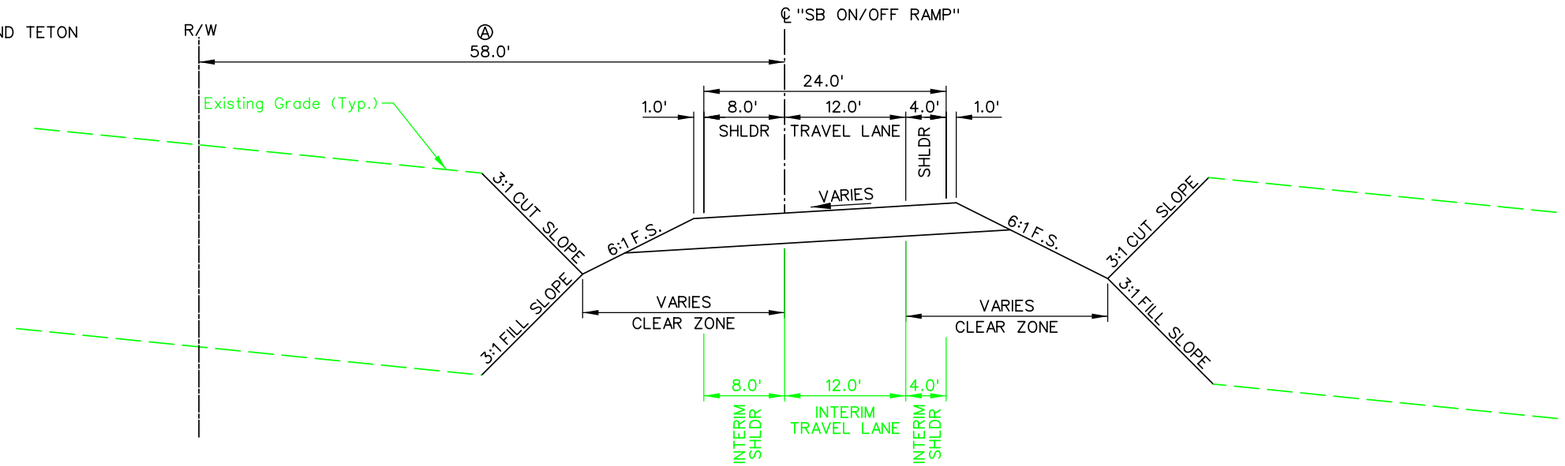
SHEET

PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

SHEET
TY1.02
7 OF 42
DRAWING NO.
XXX-XXXX

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Ⓐ – R/W FOR SB ON/OFF RAMPS AT GRAND TETON IS 100.0'



SECTION OF IMPROVEMENT

"GTRC" 6+97.87 TO "GTRC" 19+22.55
"GTRD" 0+45.36 TO "GTRD" 8+86.35
"KCRC" 9+78.16 TO "KCRC" 22+90.00
"KCRD" 0+74.00 TO "KCRD" 18+32.00

NO.	DATE	SHEET	REVISIONS

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H# XXXXX | BID# XX.XXXXX | DESIGNED BY: XXX | DRAWN BY: XXX | CHECKED BY: XXX

DATE: 02/03/16

SUBMITTAL STAGE: **30% - PRELIMINARY**

TITLE: **SHEEP MOUNTAIN**

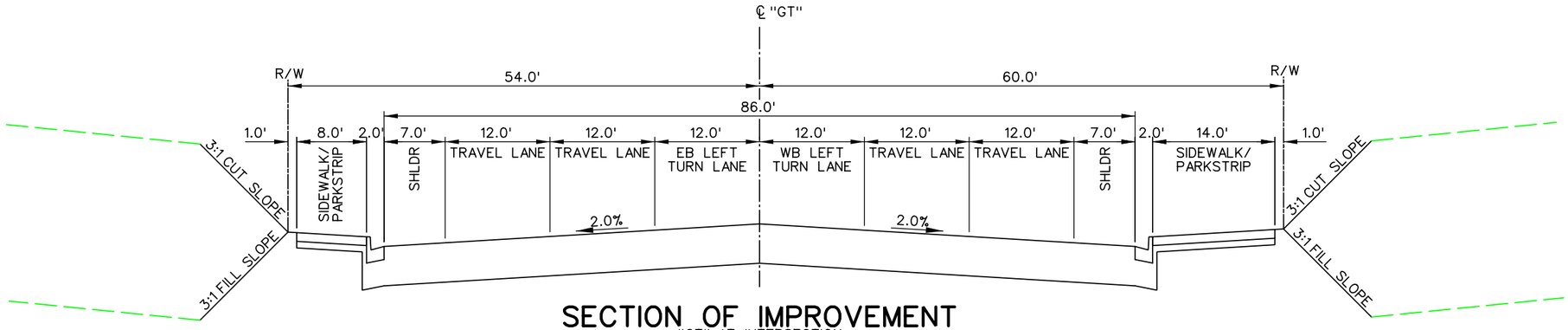
SHEET: **TYPICAL SECTIONS 3 OF 5**

PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

SHEET
TY1.03
8 OF 42

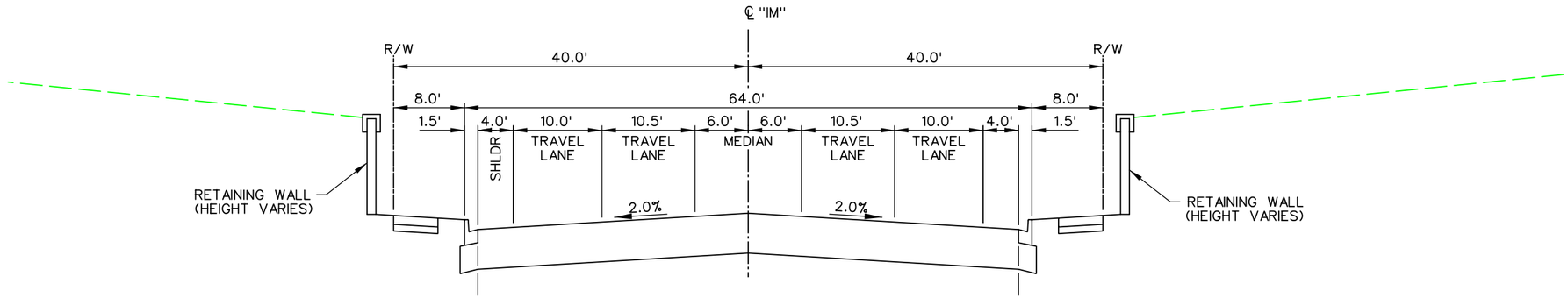
DRAWING NO.
XXX-XXXX

PRELIMINARY NOT FOR CONSTRUCTION



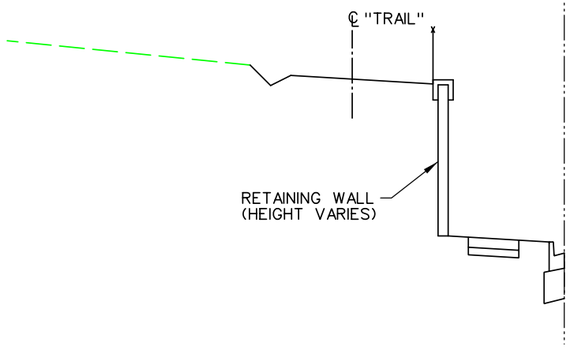
SECTION OF IMPROVEMENT

"GT" AT INTERSECTION
WITH SHEEP MOUNTAIN

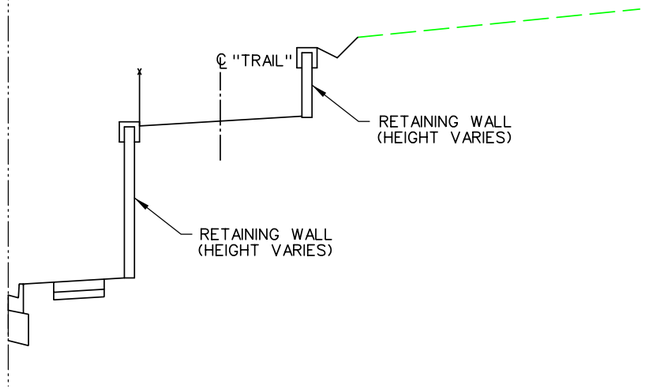


SECTION OF IMPROVEMENT

"IM" AT INTERSECTION
WITH SHEEP MOUNTAIN



"IM" 9+65.00 TO "IM" 12+25.00



"IM" 9+65.00 TO "IM" 12+90.00

NO.	DATE	SHEET	REVISIONS

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SUBMITTAL STAGE:
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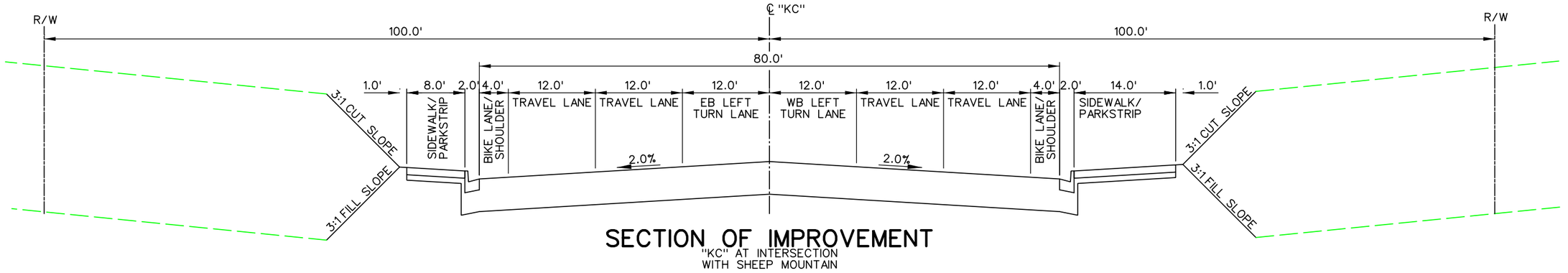
TITLE
SHEEP MOUNTAIN

SHEET
TYPICAL SECTIONS 4 OF 5

PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
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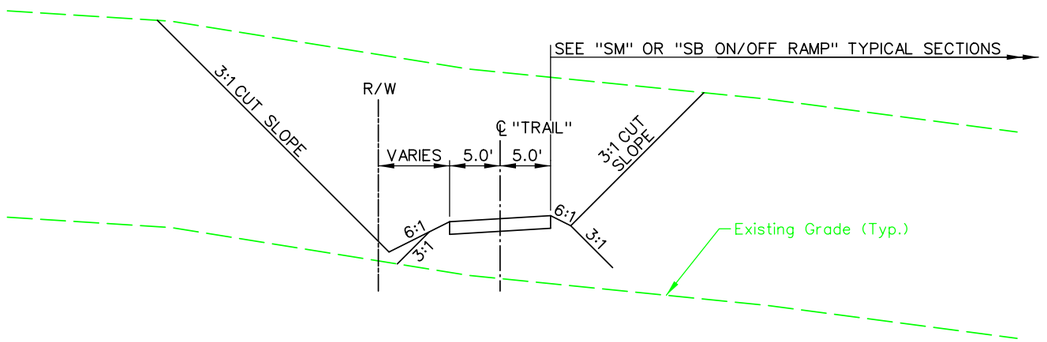
SHEET
TY1.04
9 OF **42**
DRAWING NO.
XXX-XXXX

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SECTION OF IMPROVEMENT

"KC" AT INTERSECTION
WITH SHEEP MOUNTAIN



SECTION OF IMPROVEMENT

"TRAIL"

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H# XXXXX | BID# XX.XXXXX | DESIGNED BY: XXX | DRAWN BY: XXX | CHECKED BY: XXX | DATE: 02/03/16 | SUBMITTAL STAGE: 30% - PRELIMINARY

TITLE
SHEEP MOUNTAIN

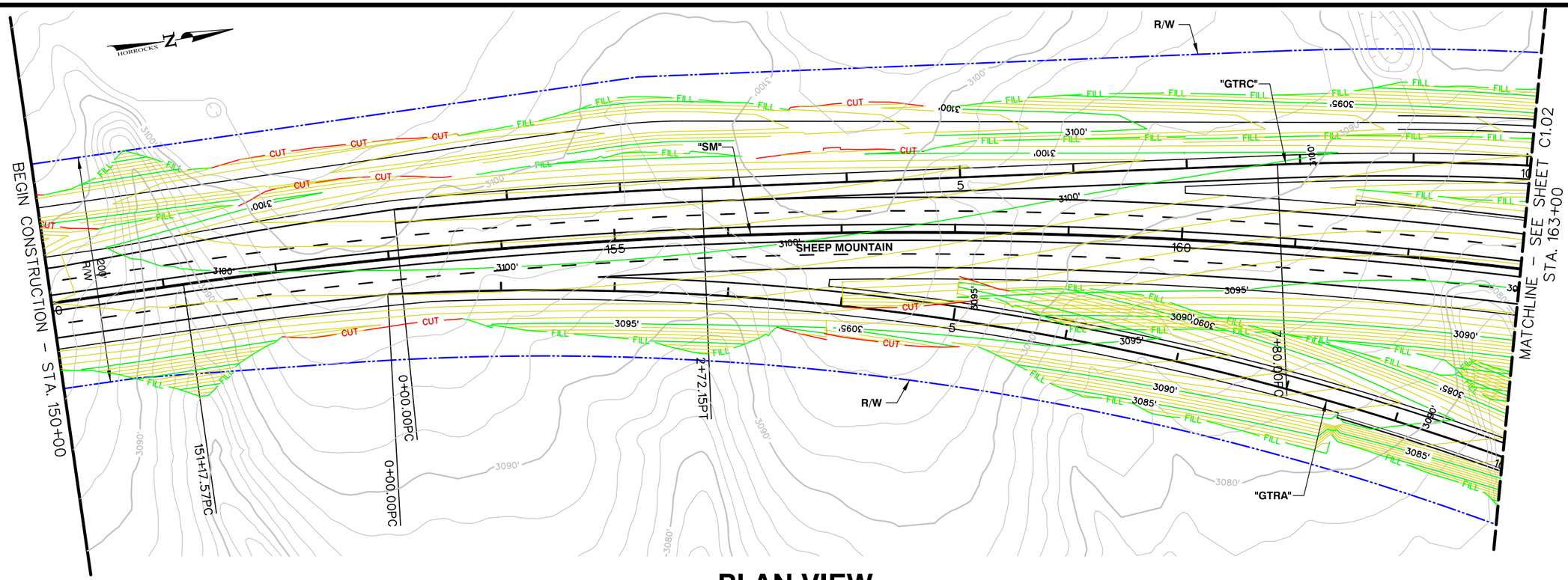
SHEET
TYPICAL SECTIONS
5 OF 5

PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

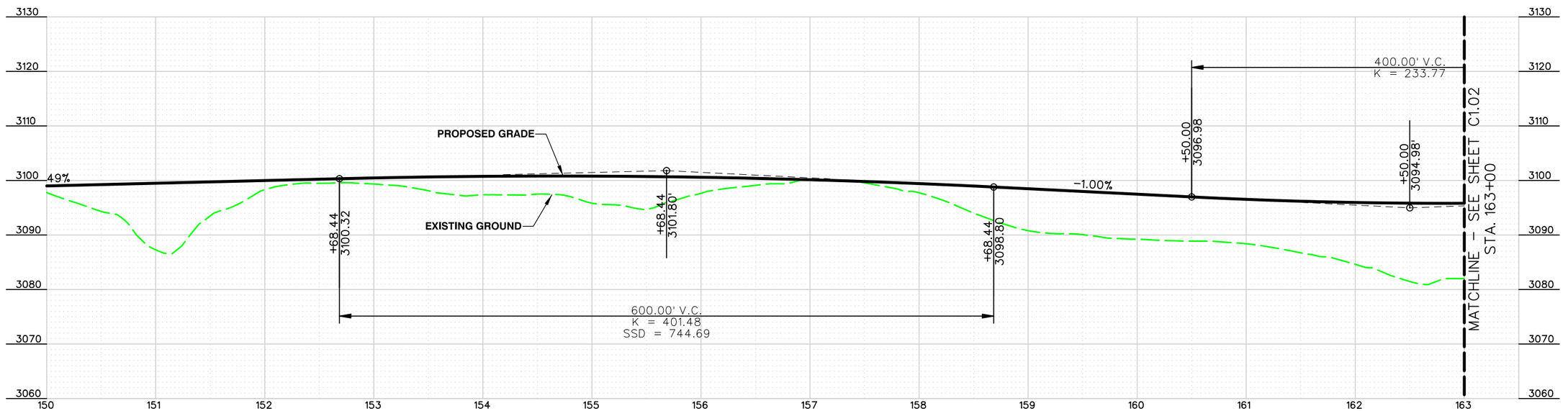
SHEET
TY1.05
10 OF 42

DRAWING NO.
XXX-XXXX

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PLAN VIEW



PROFILE VIEW

NO.	DATE	SHEET	REVISIONS

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H# XXXXX | BID# XX-XXXXX | DESIGNED BY: XXX | DRAWN BY: XXX | CHECKED BY: XXX | DATE: 02/03/16 | SUBMITTAL STAGE: 30% - PRELIMINARY

TITLE
SHEEP MOUNTAIN

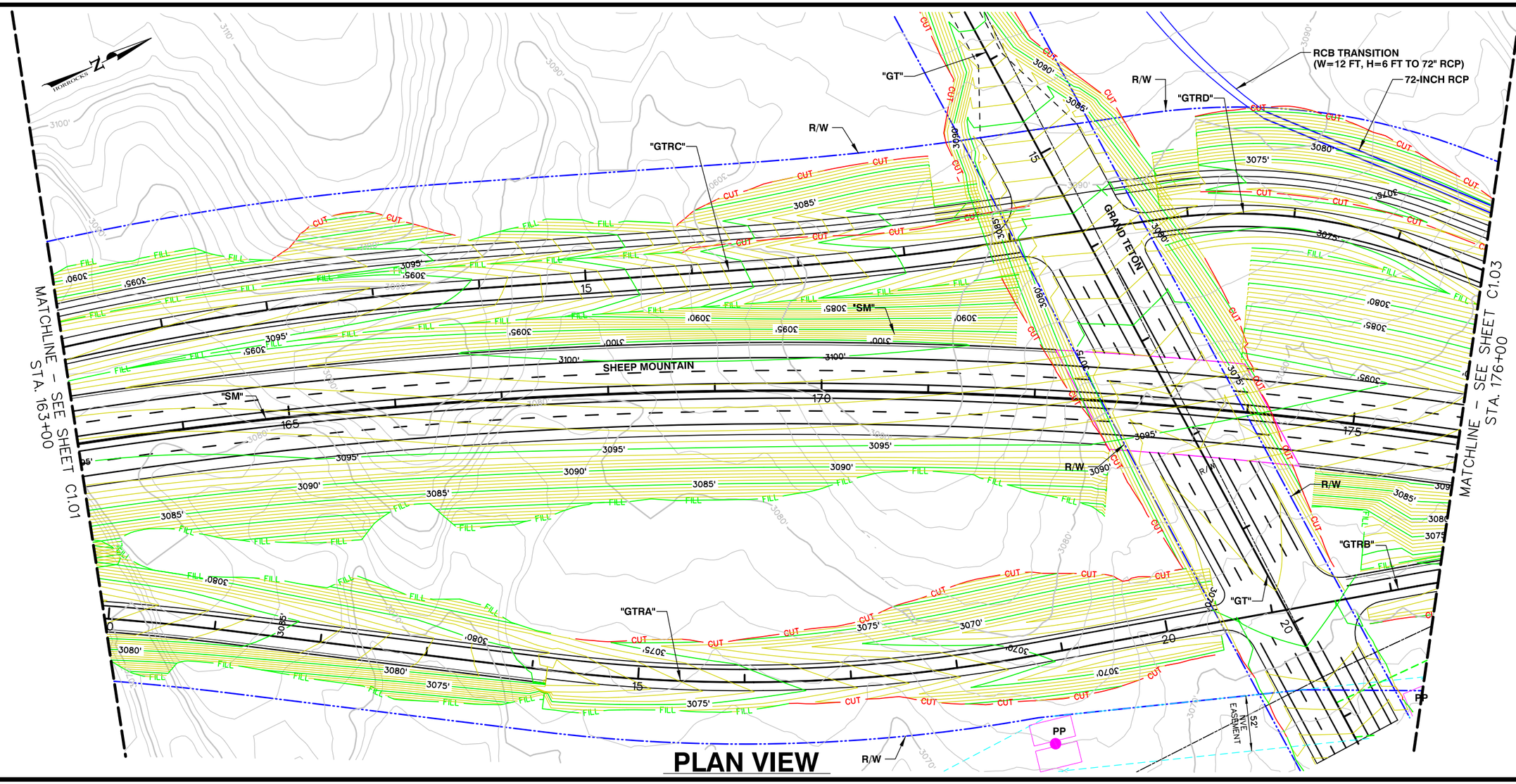
SHEET
SHEEP MOUNTAIN PLAN AND PROFILE
STA. 150+00 TO 163+00

PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

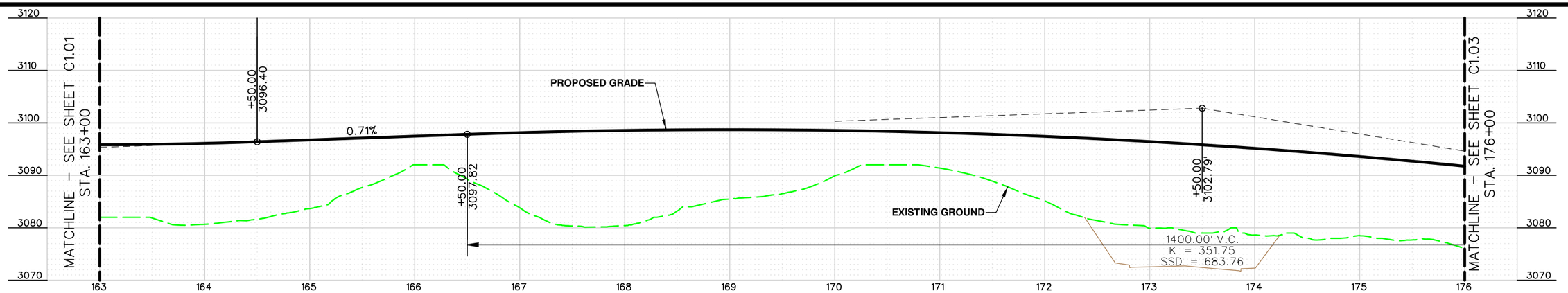
SHEET
C1.01
11 OF 42

DRAWING NO.
XXX-XXXX

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PLAN VIEW



PROFILE VIEW

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NO.	DATE	SHEET	REVISIONS

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TITLE
SHEEP MOUNTAIN

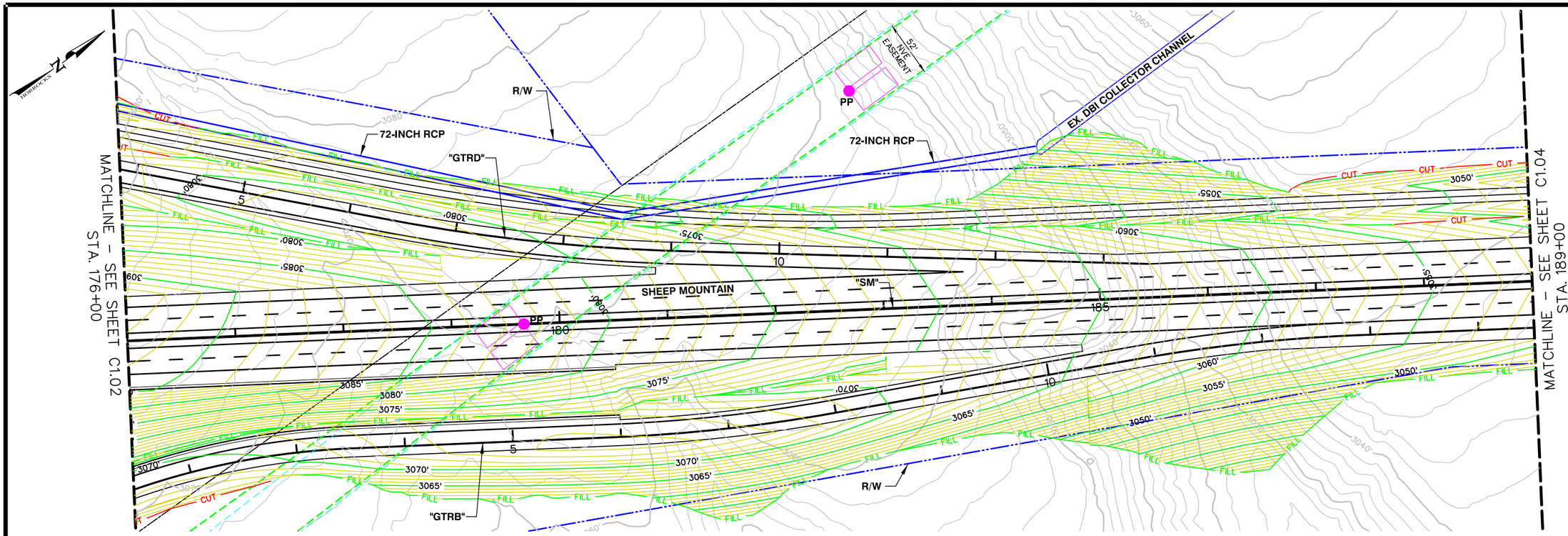
SHEET
SHEEP MOUNTAIN PLAN AND PROFILE
STA. 163+00 TO 176+00

PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

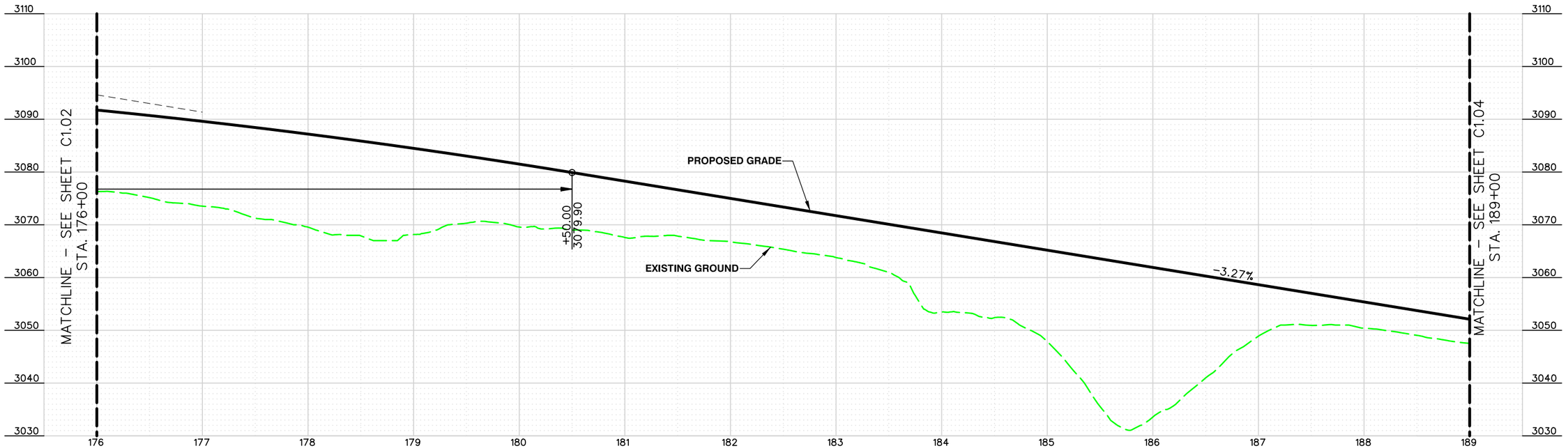
SHEET
C1.02
12 OF 42

DRAWING NO.
XXX-XXXX

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PLAN VIEW



PROFILE VIEW

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NO.	DATE	SHEET	REVISIONS

PREPARED FOR
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H# XXXXX | BID# XX-XXXXX | DESIGNED BY: XXX
DATE: 02/03/16 | DRAWN BY: XXX
SUBMITTAL STAGE: 30% - PRELIMINARY | CHECKED BY: XXX

TITLE
SHEEP MOUNTAIN

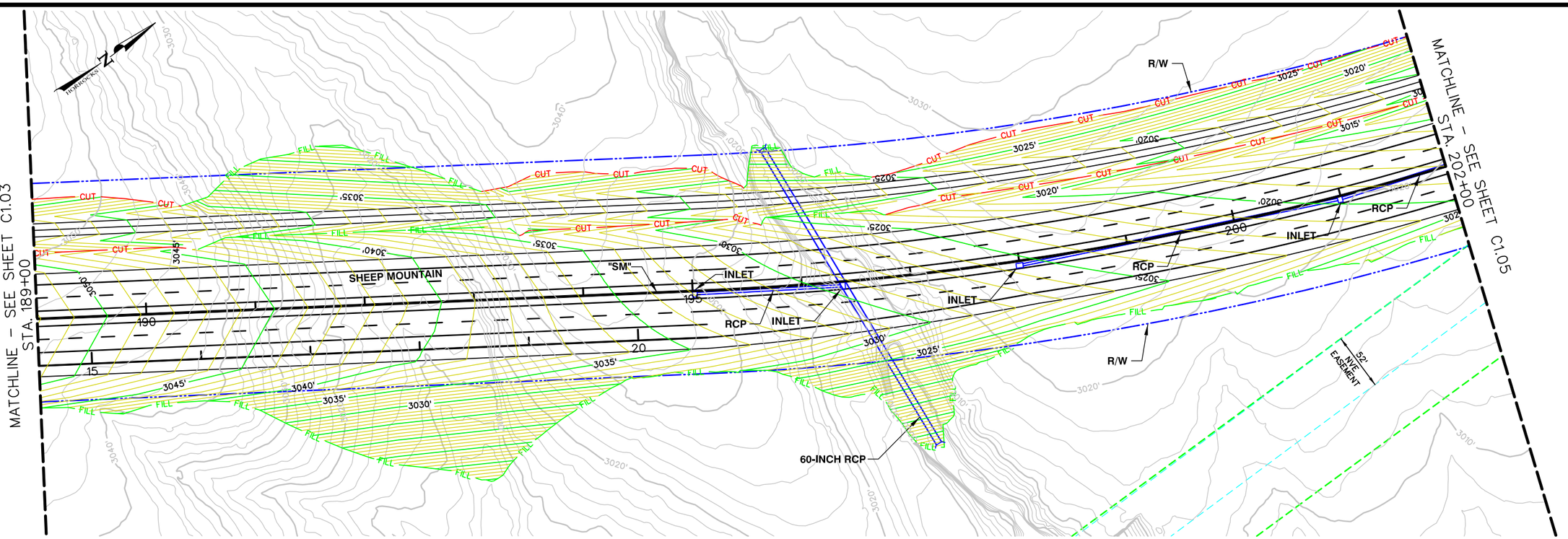
SHEET
SHEEP MOUNTAIN PLAN AND PROFILE
STA. 176+00 TO 189+00

PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

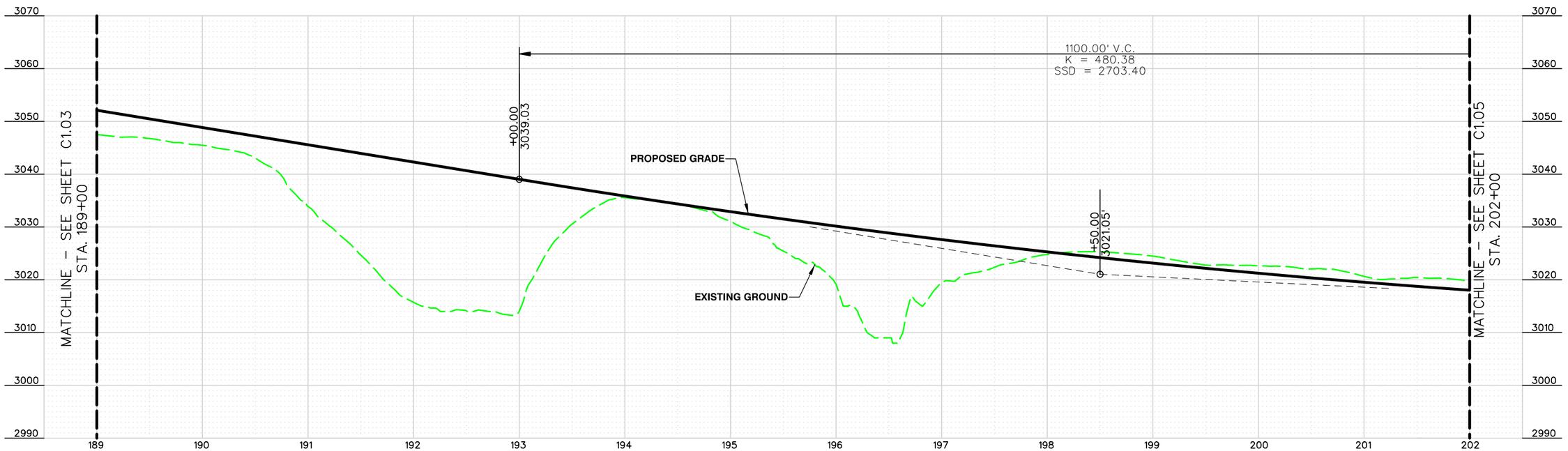
SHEET
C1.03
13 OF 42

DRAWING NO.
XXX-XXXX

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PLAN VIEW



PROFILE VIEW

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NO.	DATE	SHEET	REVISIONS

PREPARED FOR
CITY OF LAS VEGAS

H# XXXXX | BID# XX-XXXXX | DESIGNED BY: XXX | DRAWN BY: XXX | CHECKED BY: XXX | DATE: 02/03/16 | SUBMITTAL STAGE: 30% - PRELIMINARY

TITLE
SHEEP MOUNTAIN

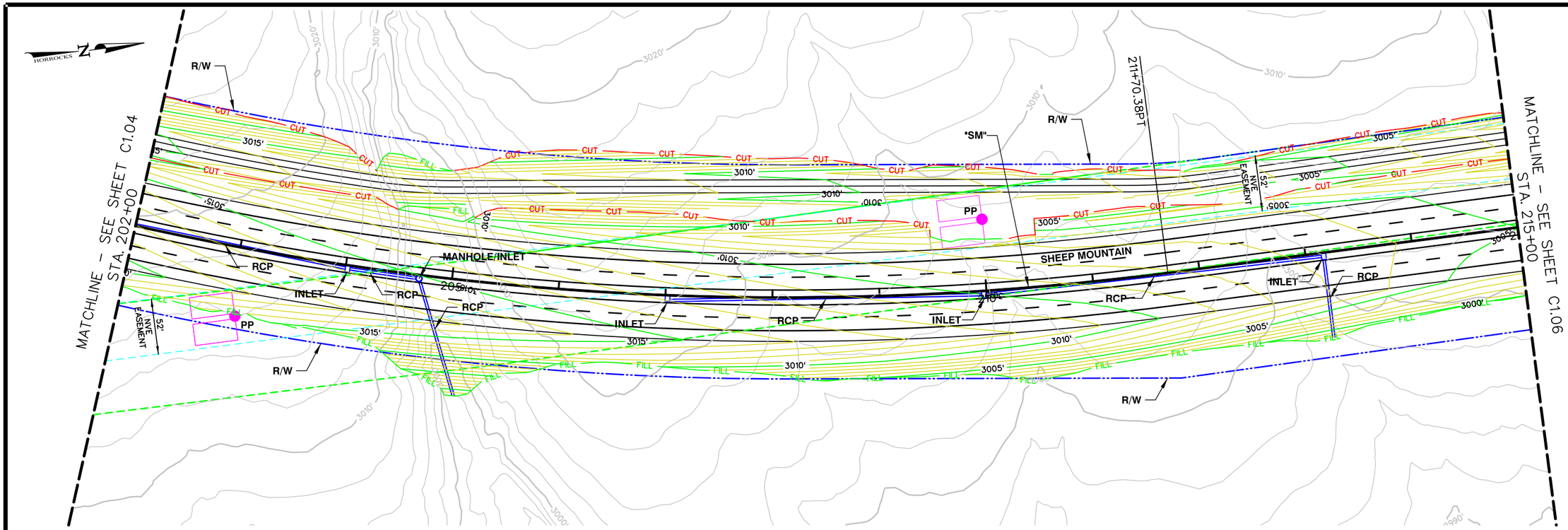
SHEET
SHEEP MOUNTAIN PLAN AND PROFILE
STA. 189+00 TO 202+00

PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

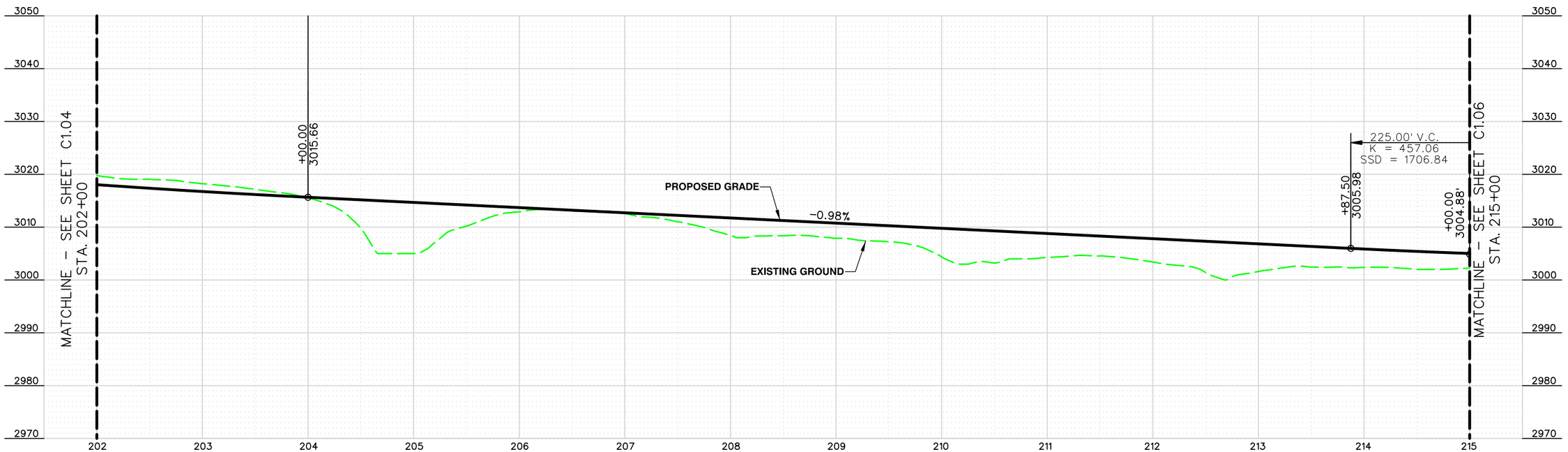
SHEET
C1.04
14 OF 42

DRAWING NO.
XXX-XXXX

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PLAN VIEW



PROFILE VIEW

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TITLE
SHEEP MOUNTAIN

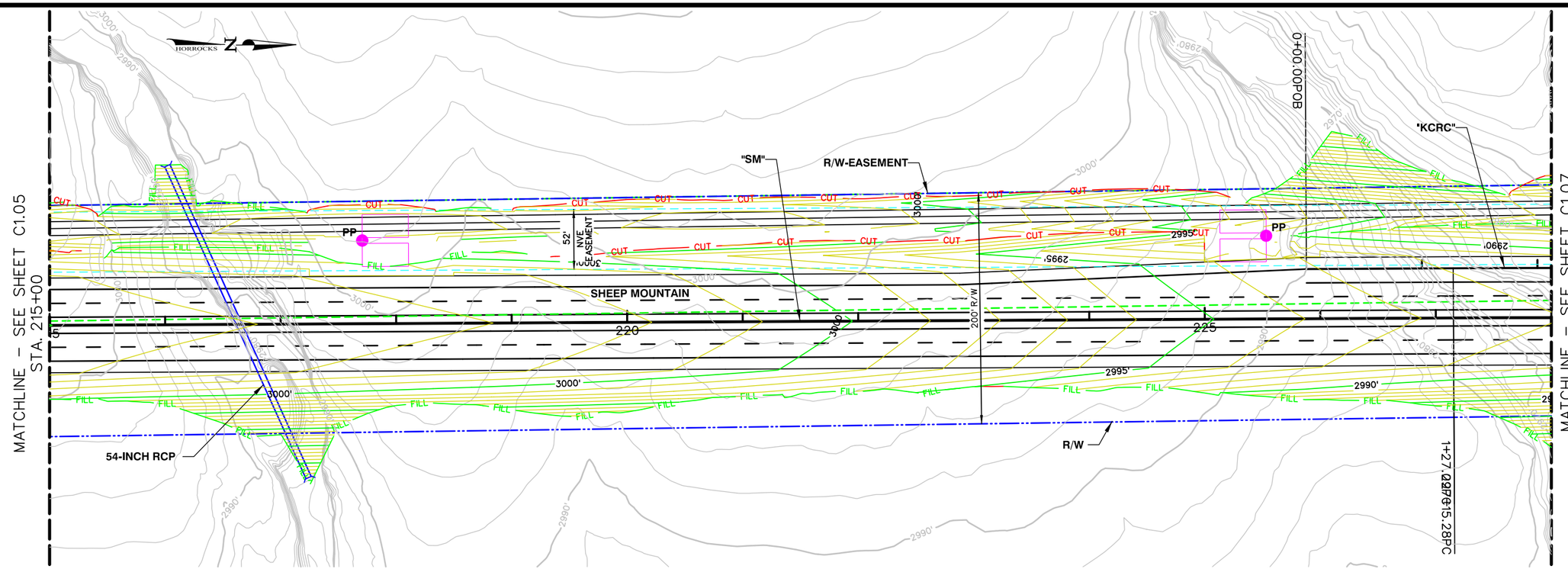
SHEET
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STA. 202+00 TO 215+00

PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

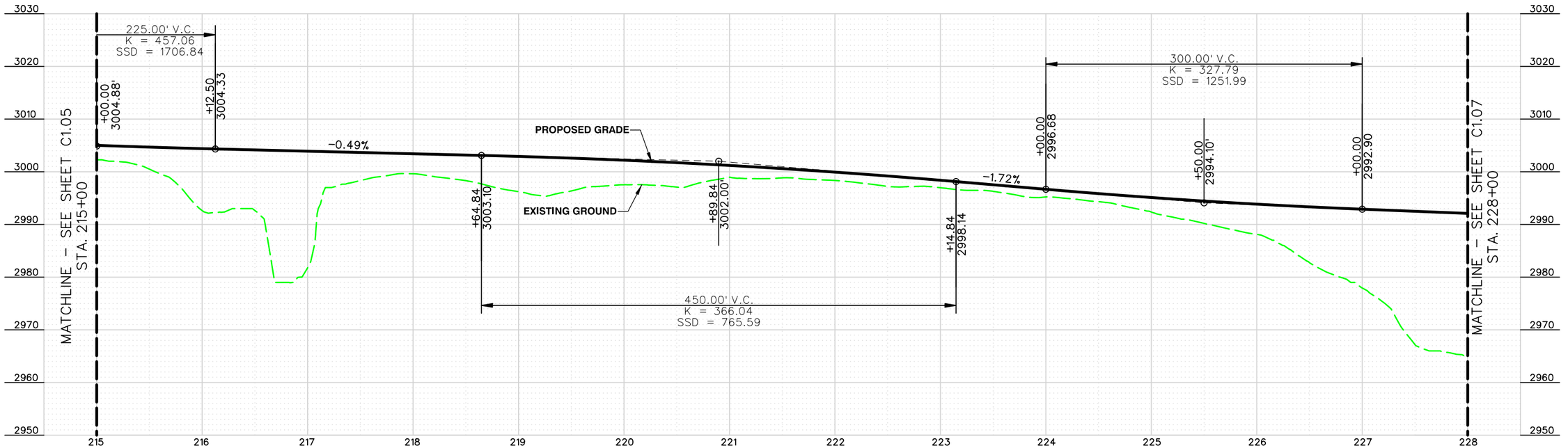
SHEET
C1.05
15 OF 42

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XXX-XXXX

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PLAN VIEW



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NO.	DATE	SHEET	REVISIONS

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H# XXXXX | BID# XX-XXXXX
DATE: 02/03/16 | DESIGNED BY: XXX
SUBMITTAL STAGE: 30% - PRELIMINARY | DRAWN BY: XXX
CHECKED BY: XXX

TITLE
SHEEP MOUNTAIN

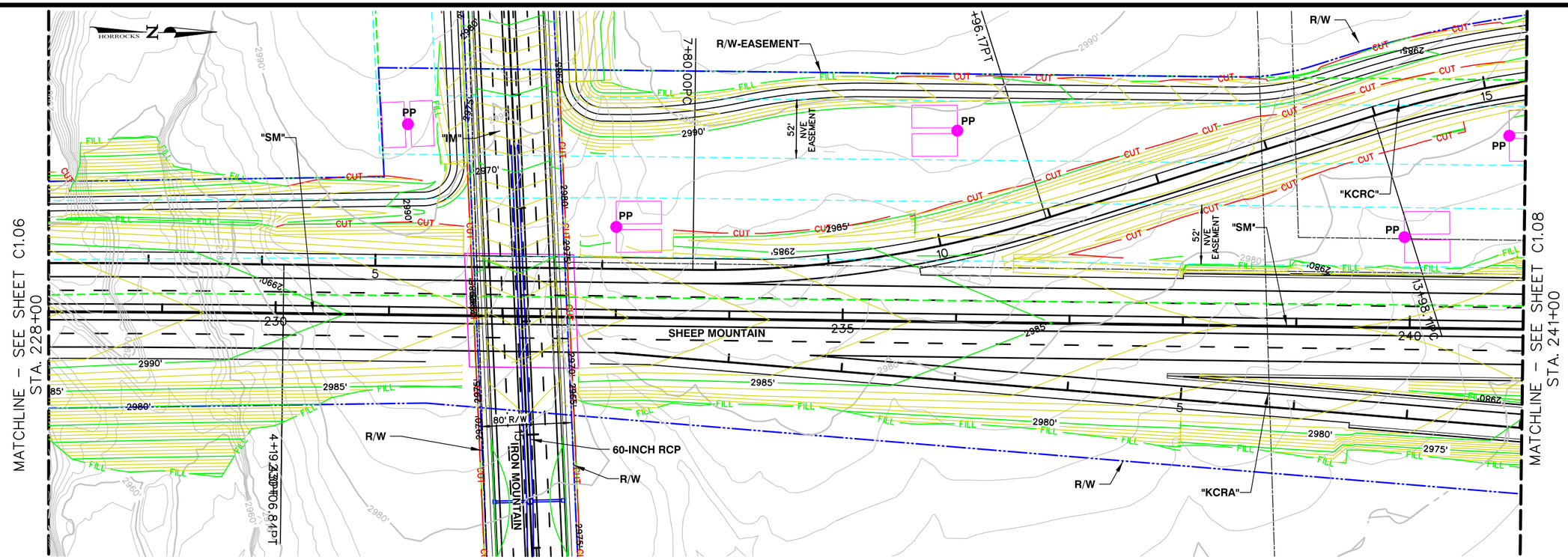
SHEET
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STA. 215+00 TO 228+00

PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

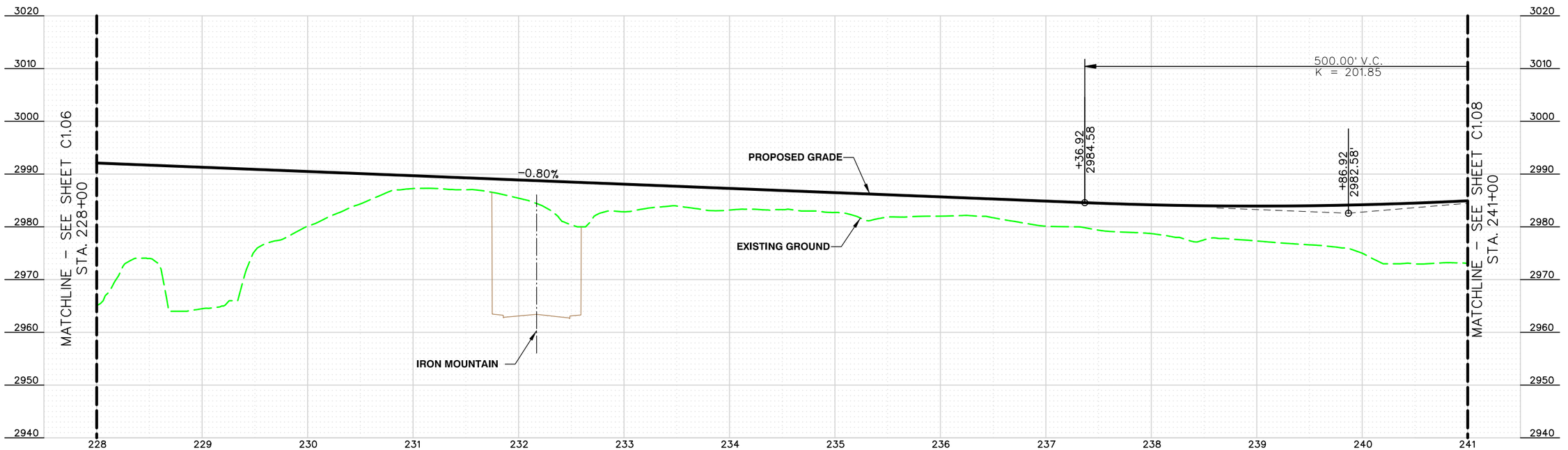
SHEET
C1.06
16 OF 42

DRAWING NO.
XXX-XXXX

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PLAN VIEW



PROFILE VIEW

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CITY OF LAS VEGAS

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DATE: 02/03/16 | DESIGNED BY: XXX
SUBMITTAL STAGE: 30% - PRELIMINARY | DRAWN BY: XXX
CHECKED BY: XXX

TITLE
SHEEP MOUNTAIN

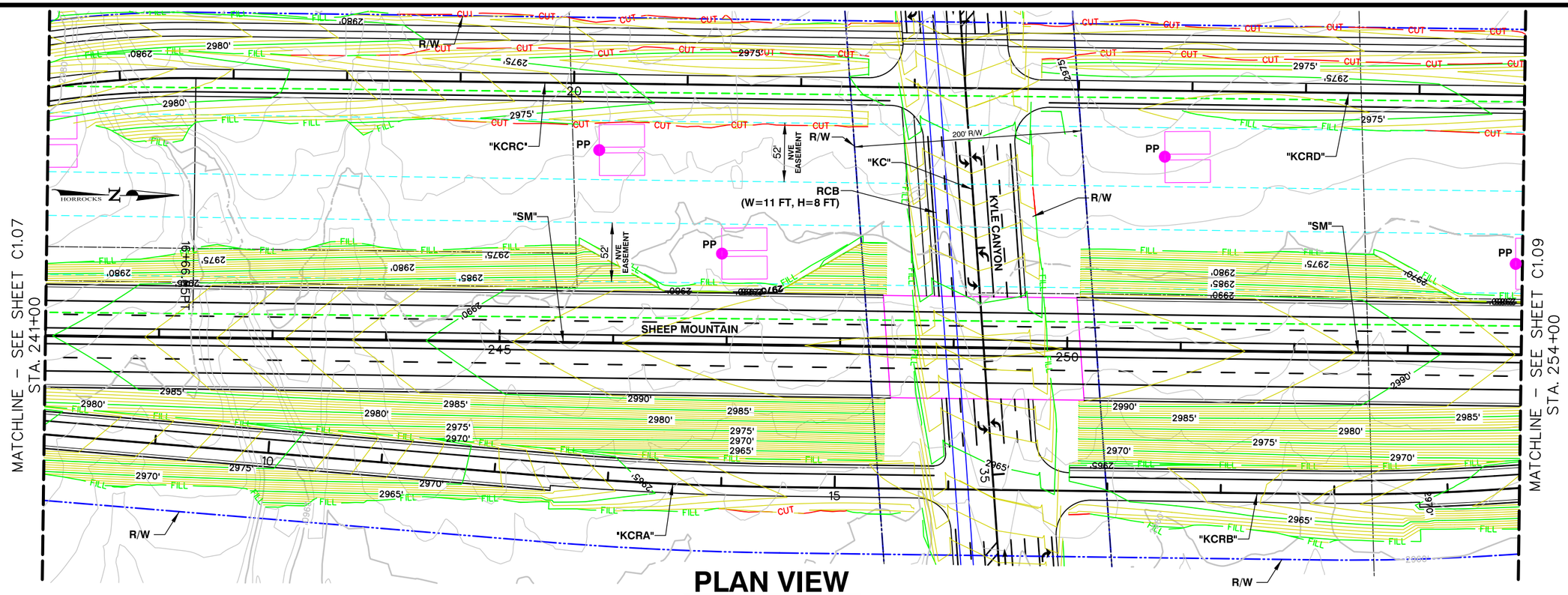
SHEET
SHEEP MOUNTAIN PLAN AND PROFILE
STA. 228+00 TO 241+00

PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

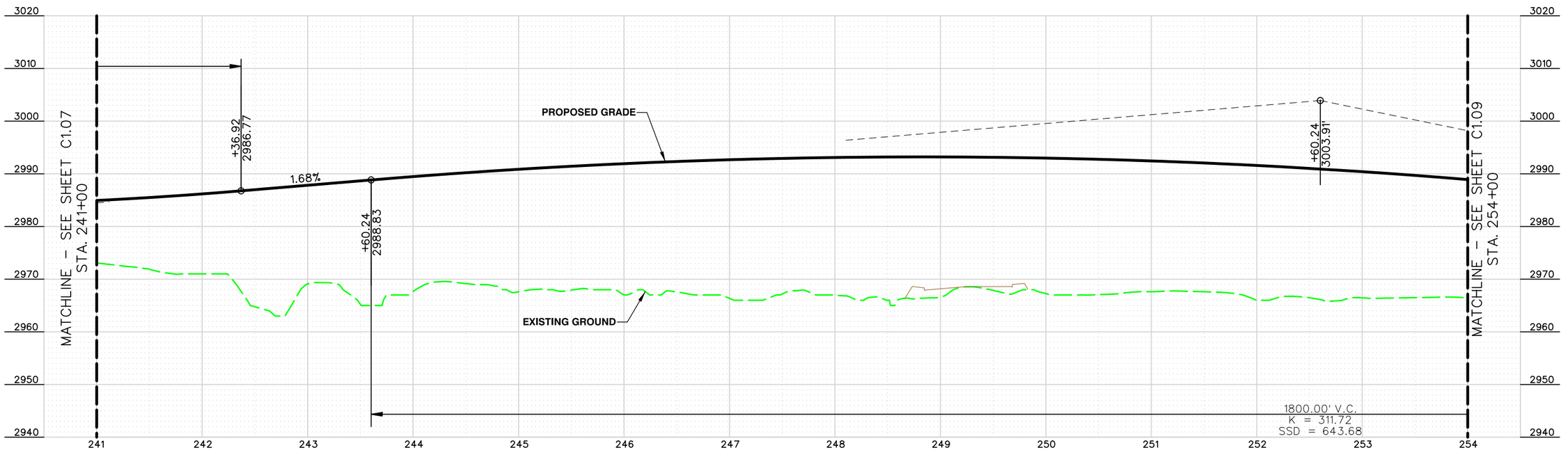
SHEET
C1.07
17 OF 42

DRAWING NO.
XXX-XXXX

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PLAN VIEW



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SUBMITTAL STAGE: 30% - PRELIMINARY | DRAWN BY: XXX
CHECKED BY: XXX

NO.	DATE	SHEET	REVISIONS

TITLE
SHEEP MOUNTAIN

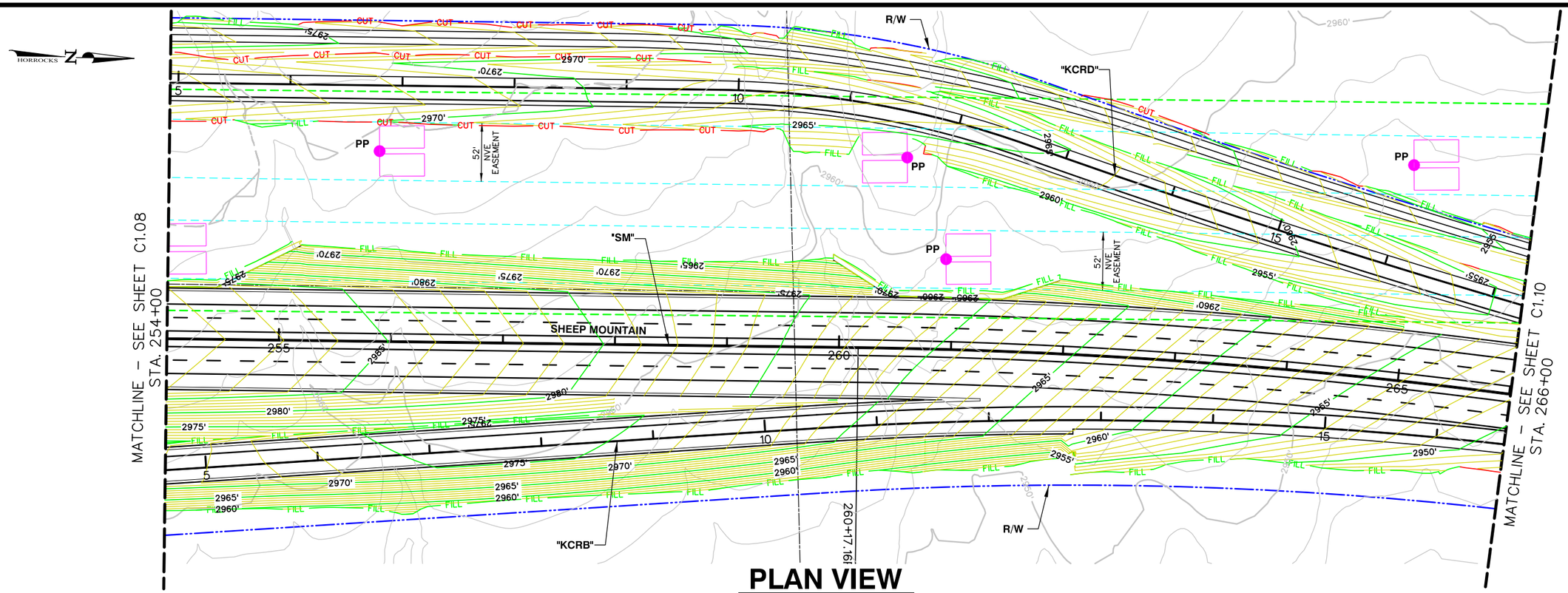
SHEET
SHEEP MOUNTAIN PLAN AND PROFILE
STA. 241+00 TO 254+00

PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

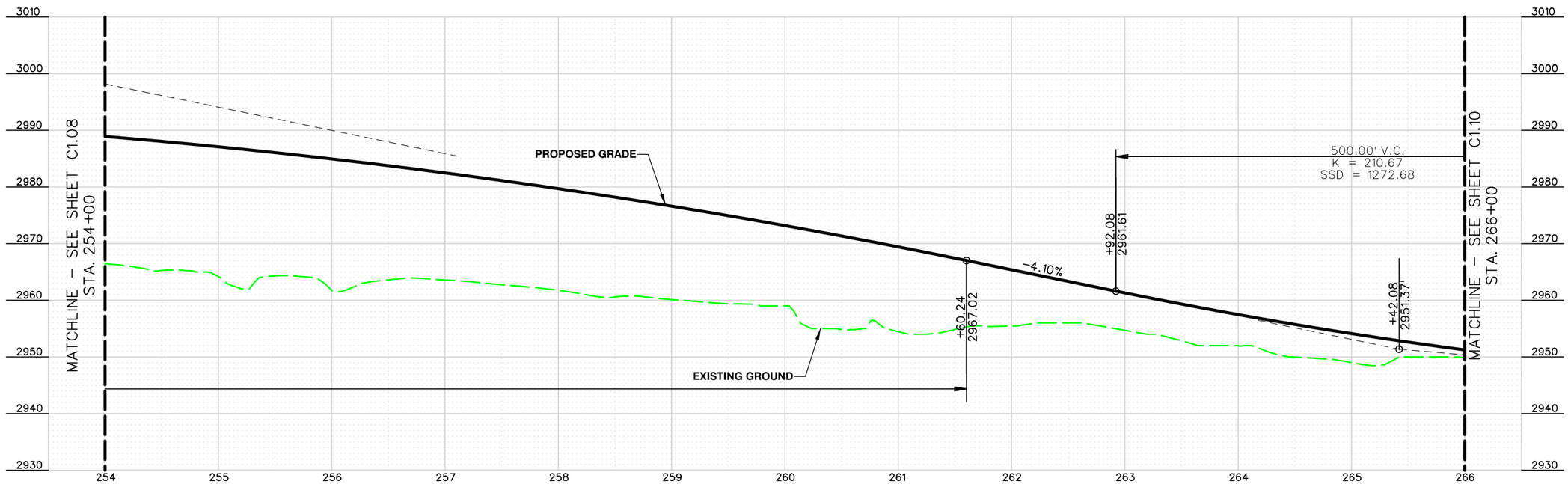
SHEET
C1.08
18 OF 42

DRAWING NO.
XXX-XXXX

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PLAN VIEW



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NO.	DATE	SHEET	REVISIONS

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H# XXXXX | BID# XX-XXXXX | DESIGNED BY: XXX | DRAWN BY: XXX | CHECKED BY: XXX | DATE: 02/03/16 | SUBMITTAL STAGE: 30% - PRELIMINARY

TITLE
SHEEP MOUNTAIN

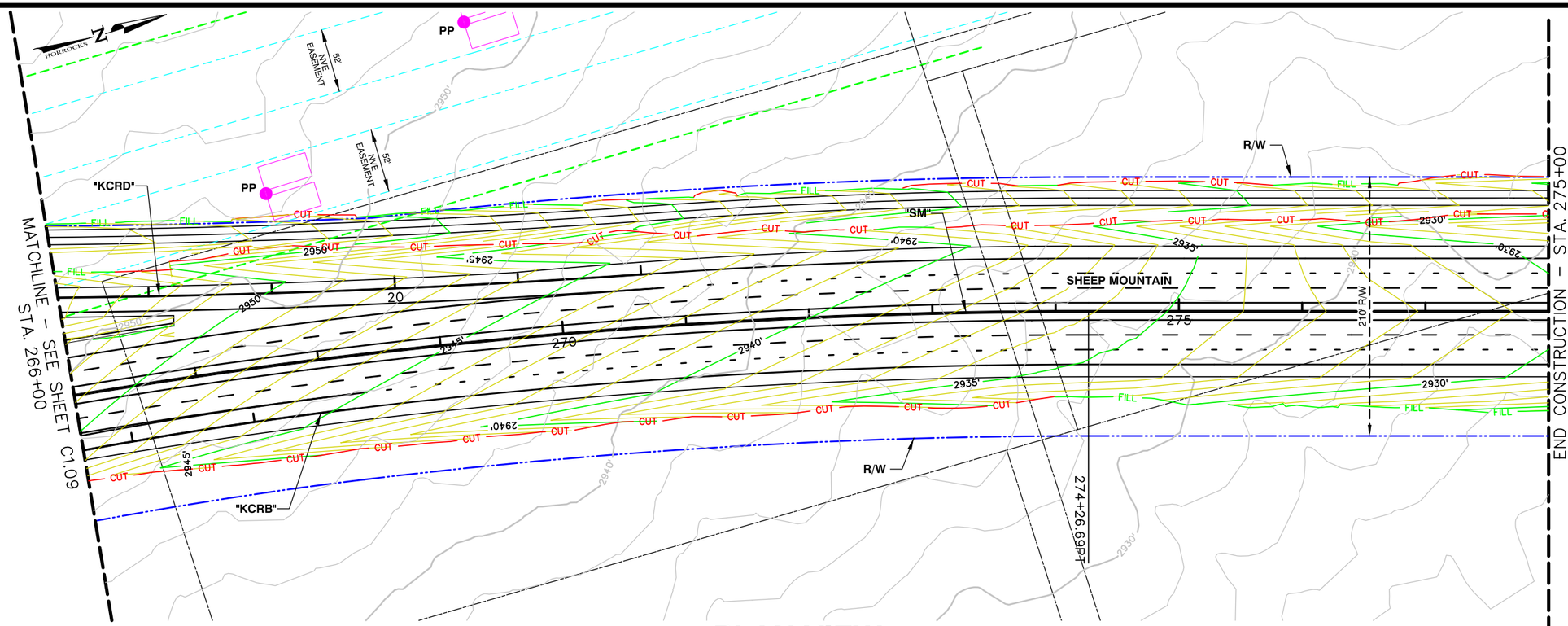
SHEET
SHEEP MOUNTAIN PLAN AND PROFILE
STA. 254+00 TO 266+00

PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

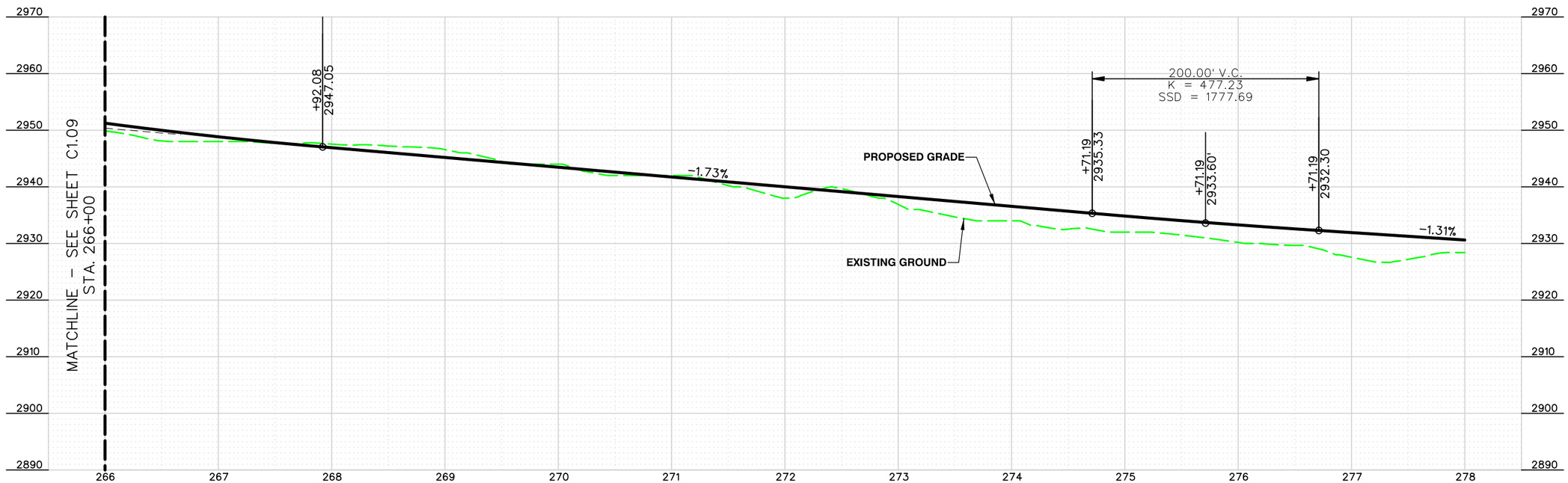
SHEET
C1.09
19 OF 42

DRAWING NO.
XXX-XXXX

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PLAN VIEW



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NO.	DATE	SHEET	REVISIONS

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H# XXXXX | BID# XX-XXXXX | DESIGNED BY: XXX | DRAWN BY: XXX | CHECKED BY: XXX | DATE: 02/03/16 | SUBMITTAL STAGE: 30% - PRELIMINARY

TITLE
SHEEP MOUNTAIN

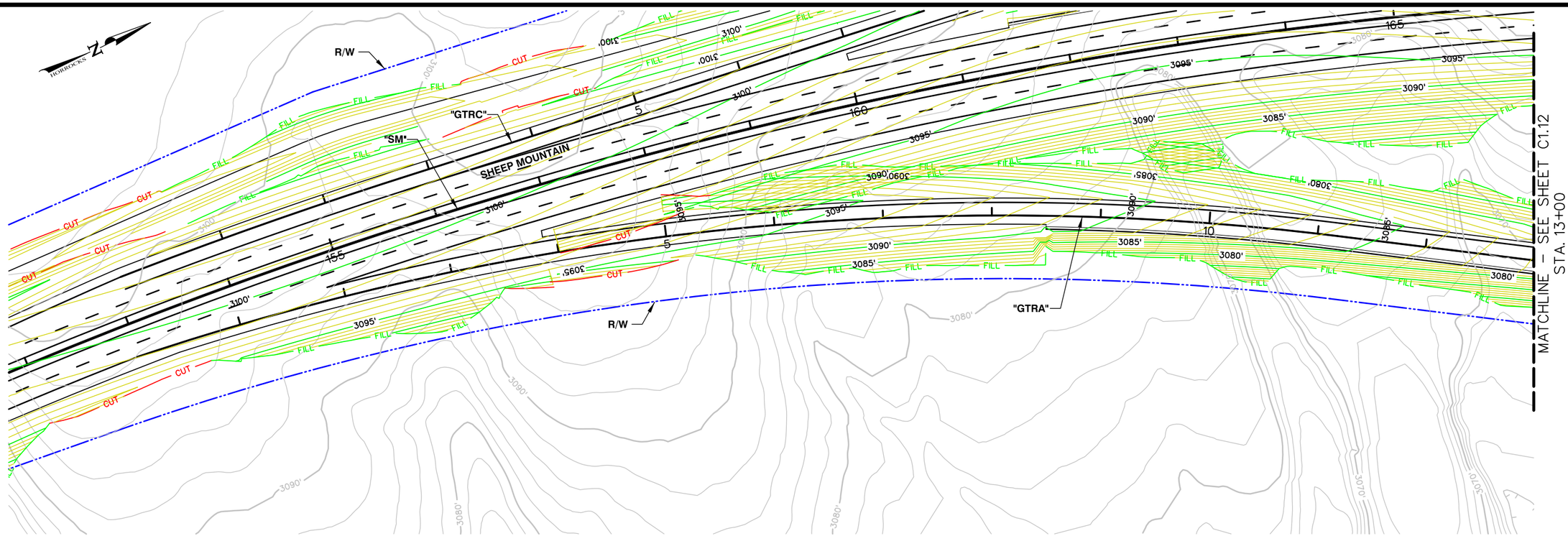
SHEET
SHEEP MOUNTAIN PLAN AND PROFILE
STA. 266+00 TO 278+00

PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

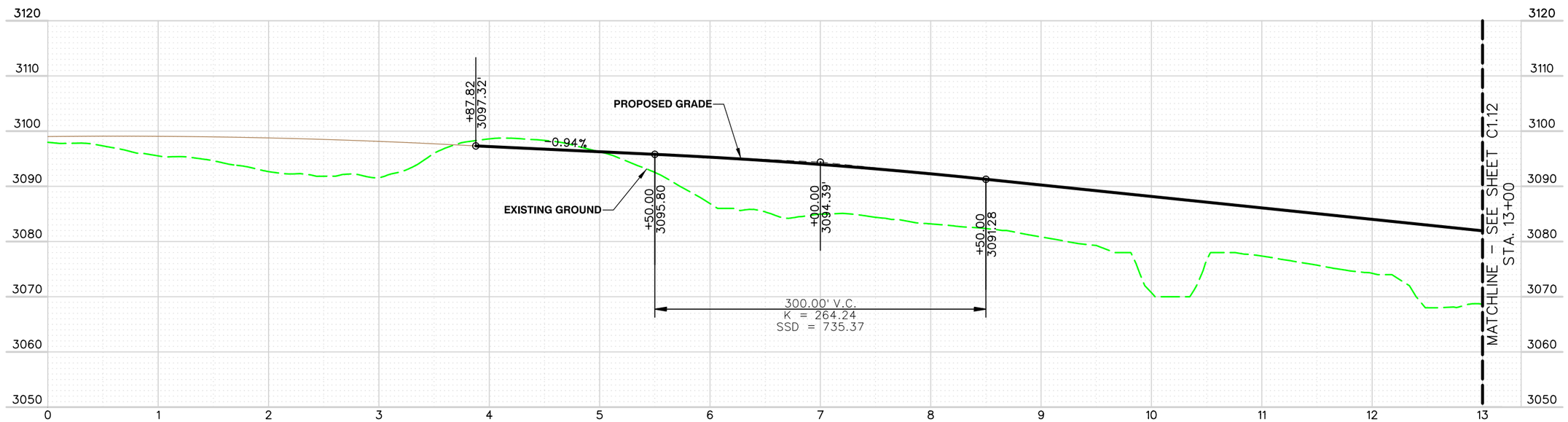
SHEET
C1.10
20 OF 42

DRAWING NO.
XXX-XXXX

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PLAN VIEW



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NO.	DATE	SHEET	REVISIONS

PREPARED FOR
CITY OF LAS VEGAS

H# XXXXX | BID# XX-XXXXX
DATE: 02/03/16 | DESIGNED BY: XXX
SUBMITTAL STAGE: 30% - PRELIMINARY | DRAWN BY: XXX | CHECKED BY: XXX

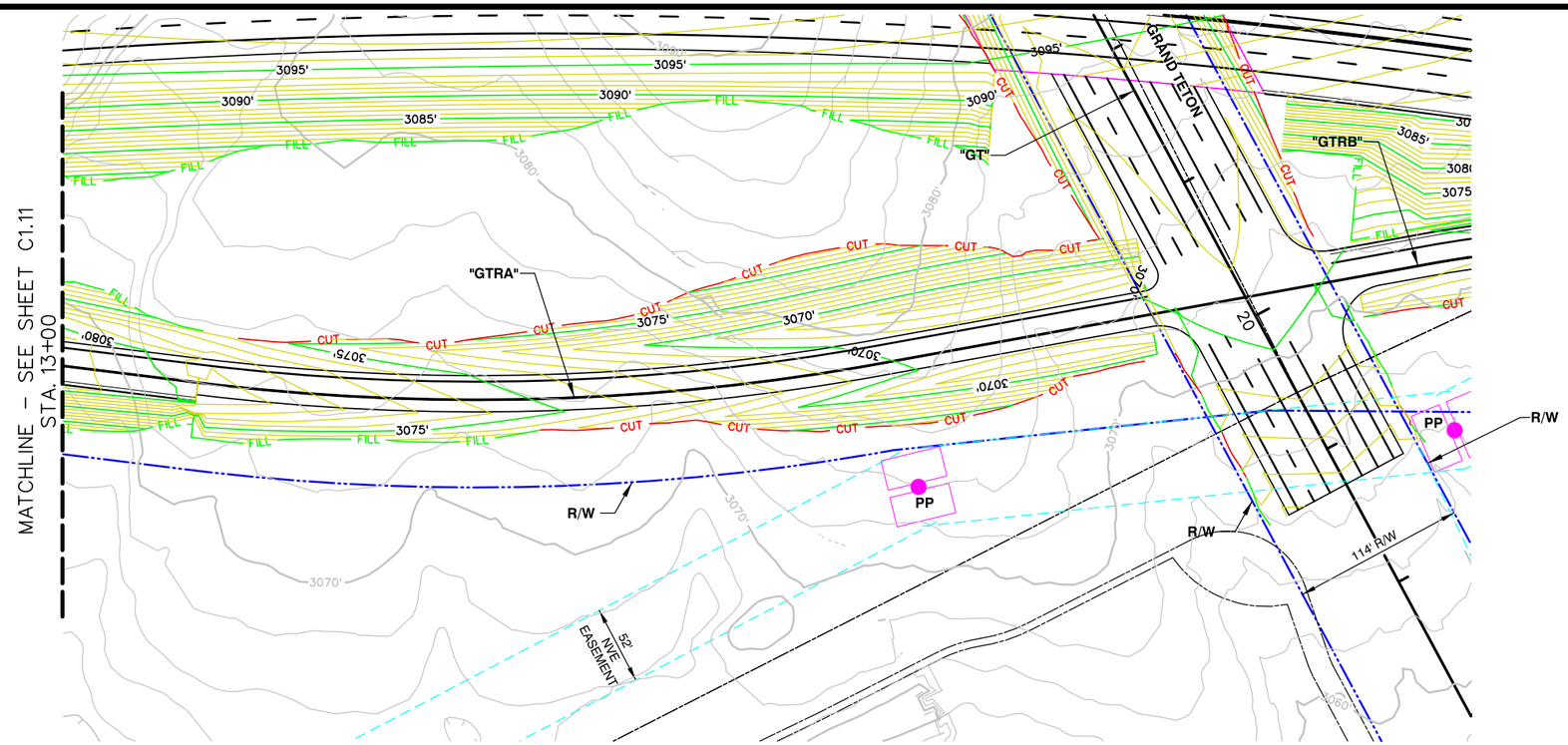
TITLE: SHEEP MOUNTAIN

SHEET: GRAND TETON RAMP "A"
PLAN AND PROFILE-STA. 0+00 TO 13+00

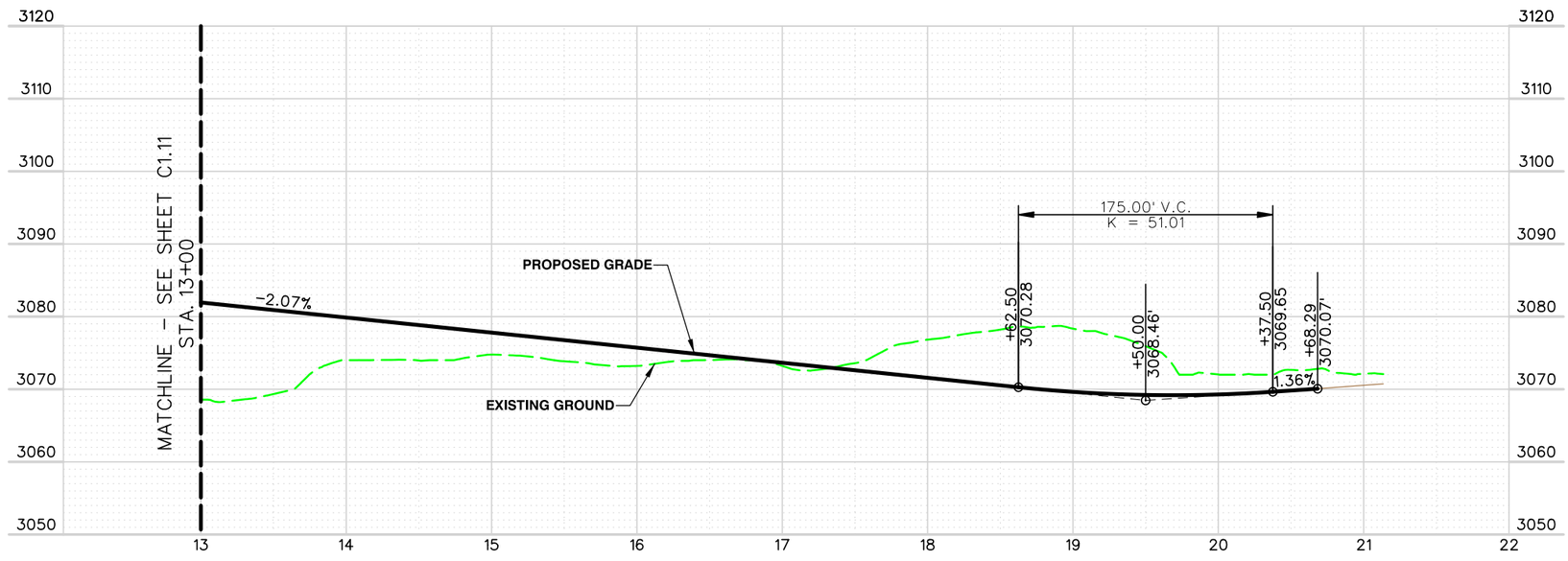
PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

SHEET
C1.11
21 OF 42
DRAWING NO.
XXX-XXXX

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PLAN VIEW



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NO.	DATE	SHEET	REVISIONS

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H# XXXXX | BID# XX.XXXXX | DESIGNED BY: XXX | DRAWN BY: XXX | CHECKED BY: XXX | DATE: 02/03/16 | SUBMITTAL STAGE: 30% - PRELIMINARY

TITLE: SHEEP MOUNTAIN

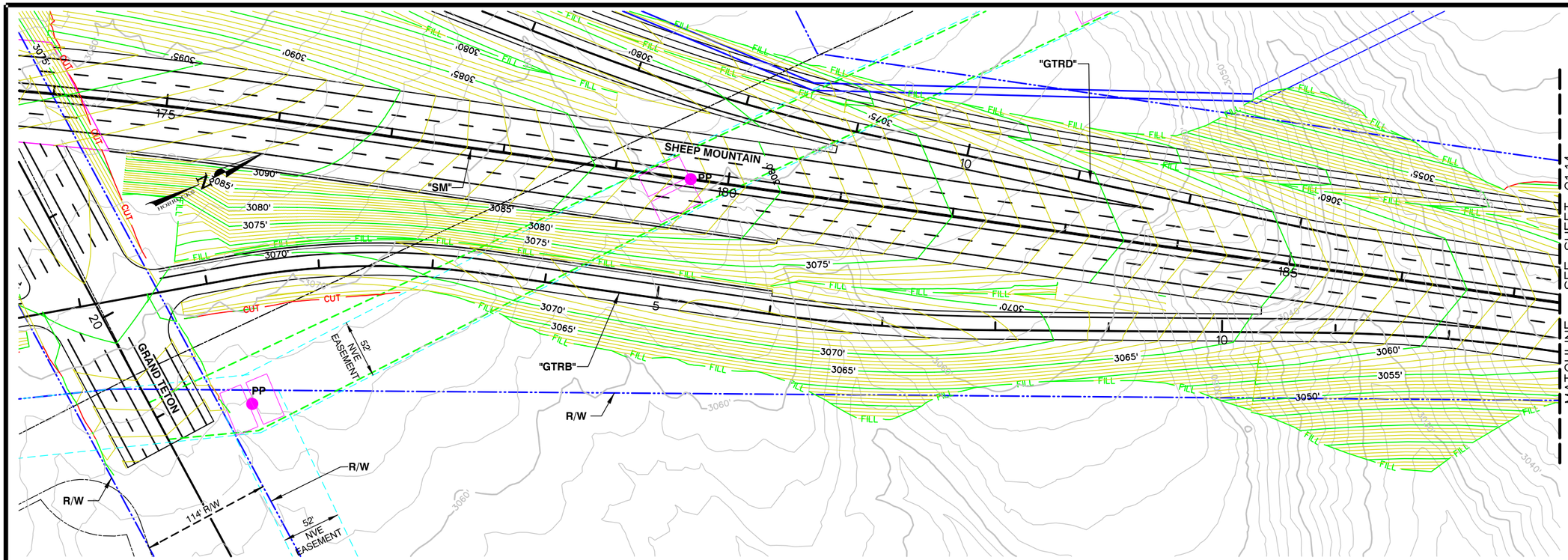
SHEET: GRAND TETON RAMP "A"
PLAN AND PROFILE-STA. 13+00 TO 22+00

PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

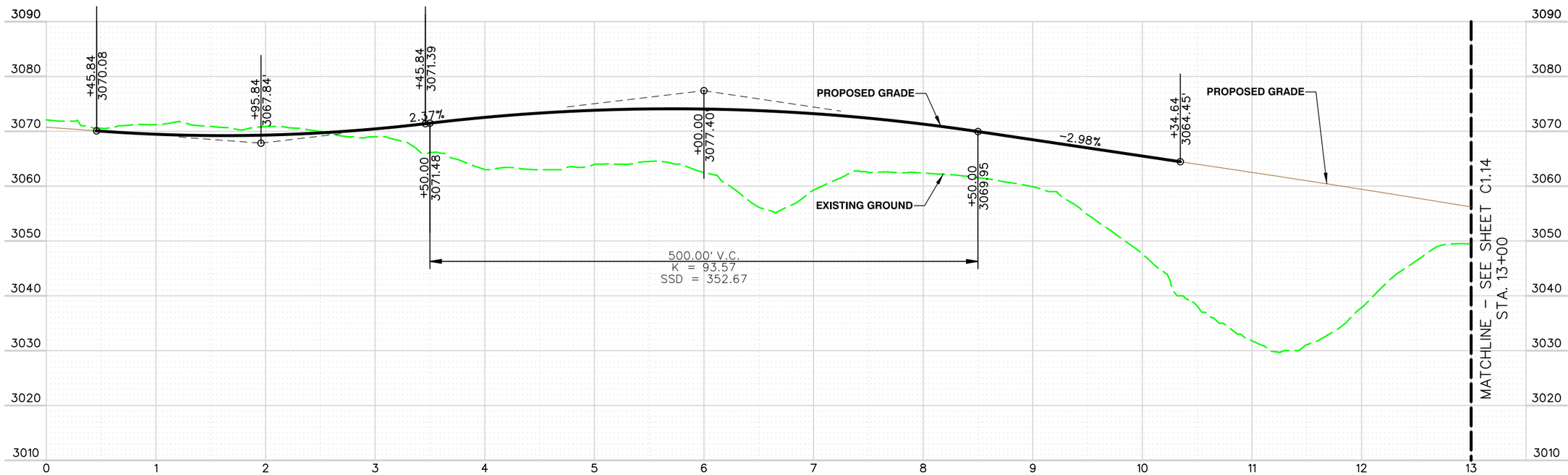
SHEET
C1.12
22 OF 42

DRAWING NO.
XXX-XXXX

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PLAN VIEW



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NO.	DATE	SHEET	REVISIONS

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CITY OF LAS VEGAS

H# XXXXX | BID# XX-XXXXX | DESIGNED BY: XXX | DRAWN BY: XXX | CHECKED BY: XXX | DATE: 02/03/16 | SUBMITTAL STAGE: 30% - PRELIMINARY

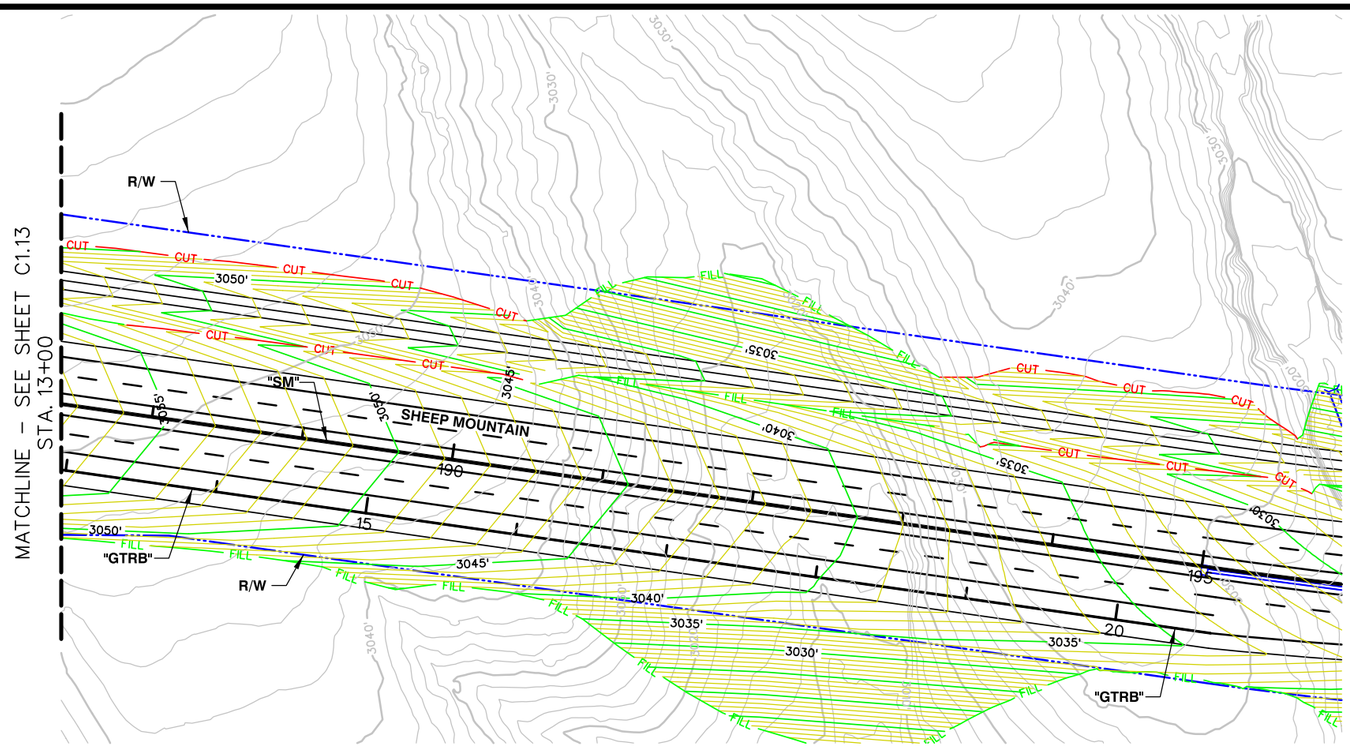
TITLE: SHEEP MOUNTAIN

SHEET: GRAND TETON RAMP "B"
PLAN AND PROFILE-STA. 0+00 TO 13+00

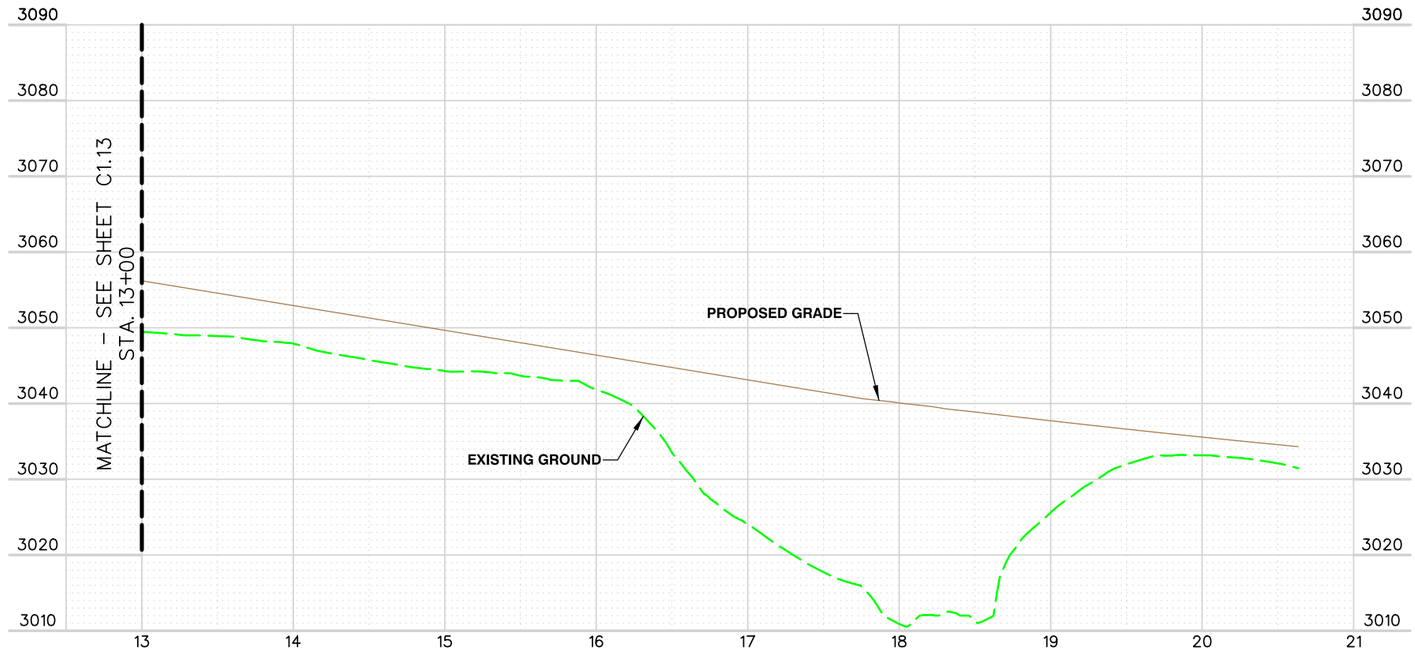
PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

SHEET C1.13
23 OF 42
DRAWING NO. XXX-XXXX

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PLAN VIEW



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NO.	DATE	SHEET	REVISIONS

PREPARED FOR
CITY OF LAS VEGAS

H# XXXXX | BID# XX-XXXXX
DATE: 02/03/16 | DESIGNED BY: XXX
SUBMITTAL STAGE: 30% - PRELIMINARY | DRAWN BY: XXX | CHECKED BY: XXX

TITLE: SHEEP MOUNTAIN

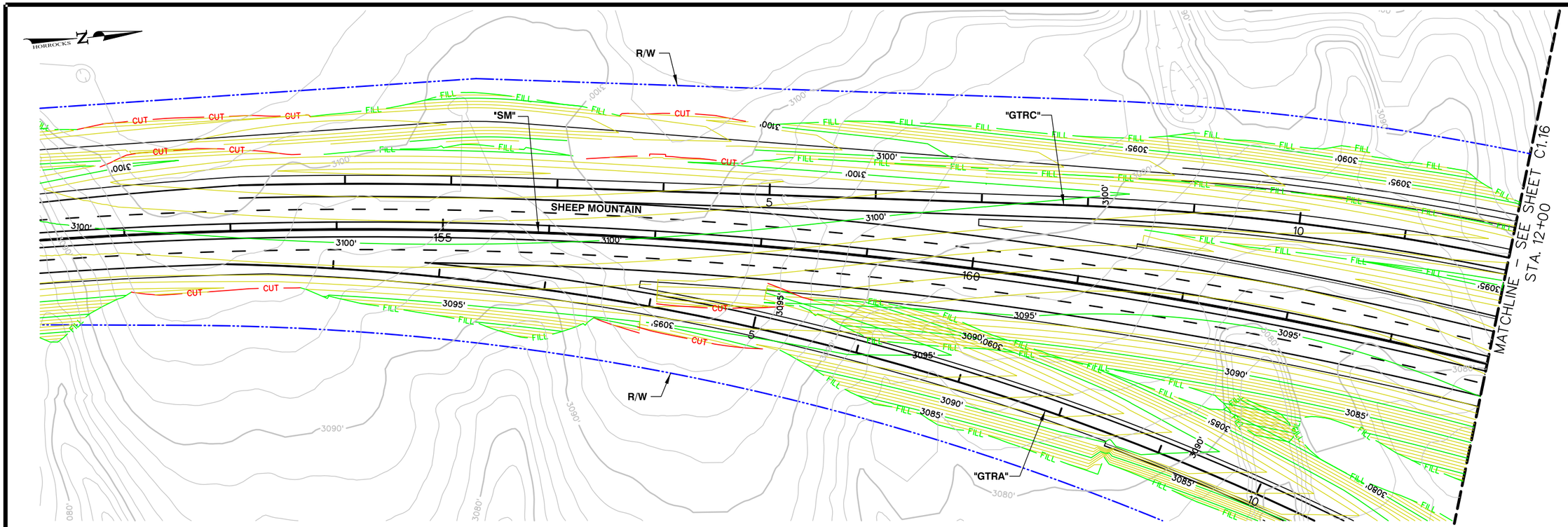
SHEET: GRAND TETON RAMP "B"
PLAN AND PROFILE-STA. 13+00 TO 21+00

PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

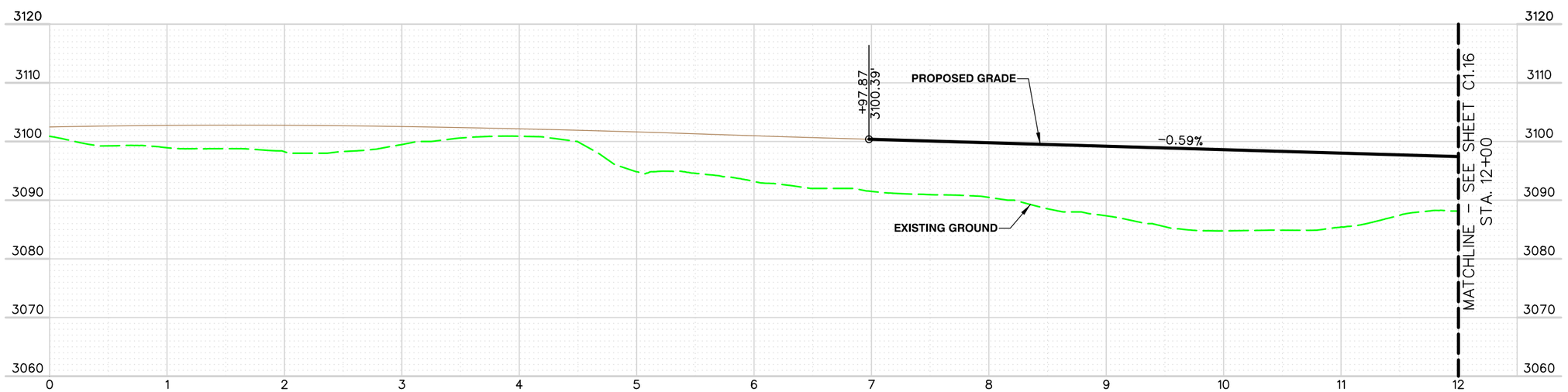
SHEET
C1.14
24 OF 42

DRAWING NO.
XXX-XXXX

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PLAN VIEW



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NO.	DATE	SHEET	REVISIONS

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H# XXXXX | BID# XX-XXXXX
DATE: 02/03/16 | DESIGNED BY: XXX
SUBMITTAL STAGE: 30% - PRELIMINARY | DRAWN BY: XXX
CHECKED BY: XXX

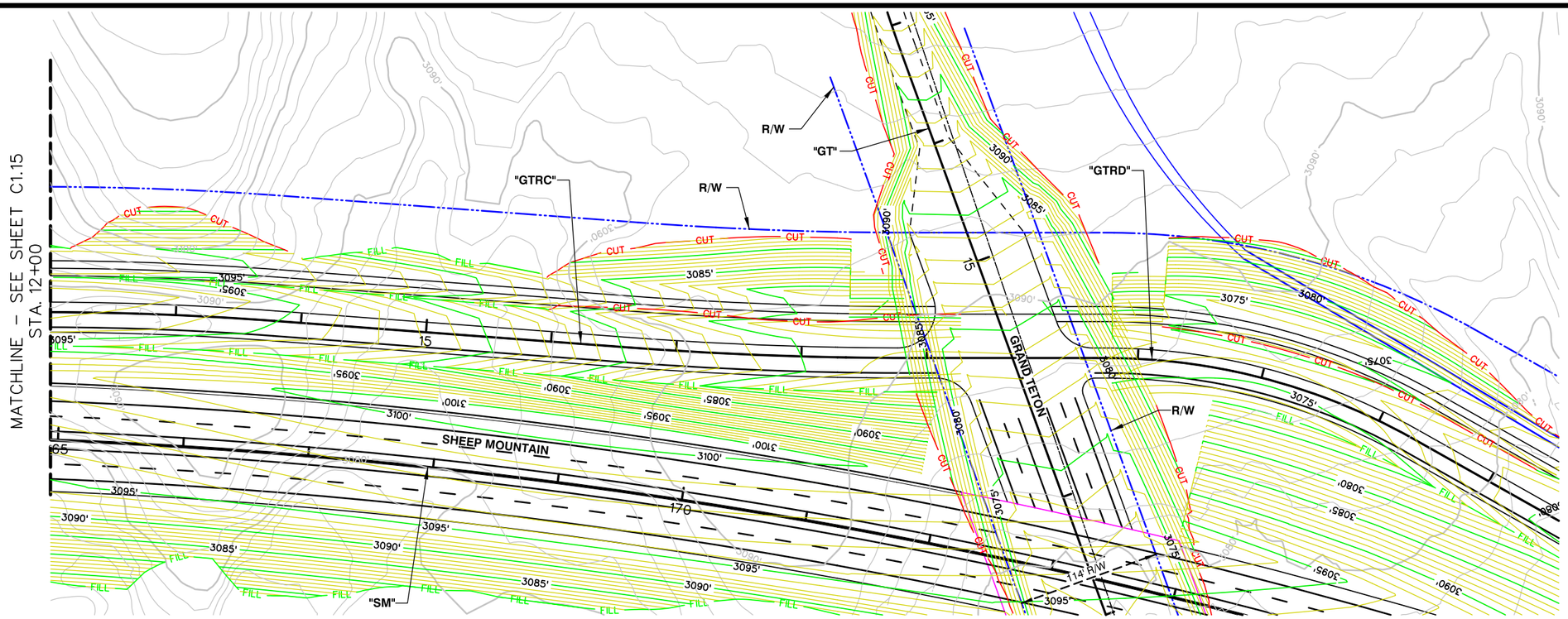
TITLE: SHEEP MOUNTAIN

SHEET: GRAND TETON RAMP "C"
PLAN AND PROFILE-STA. 0+00 TO 12+00

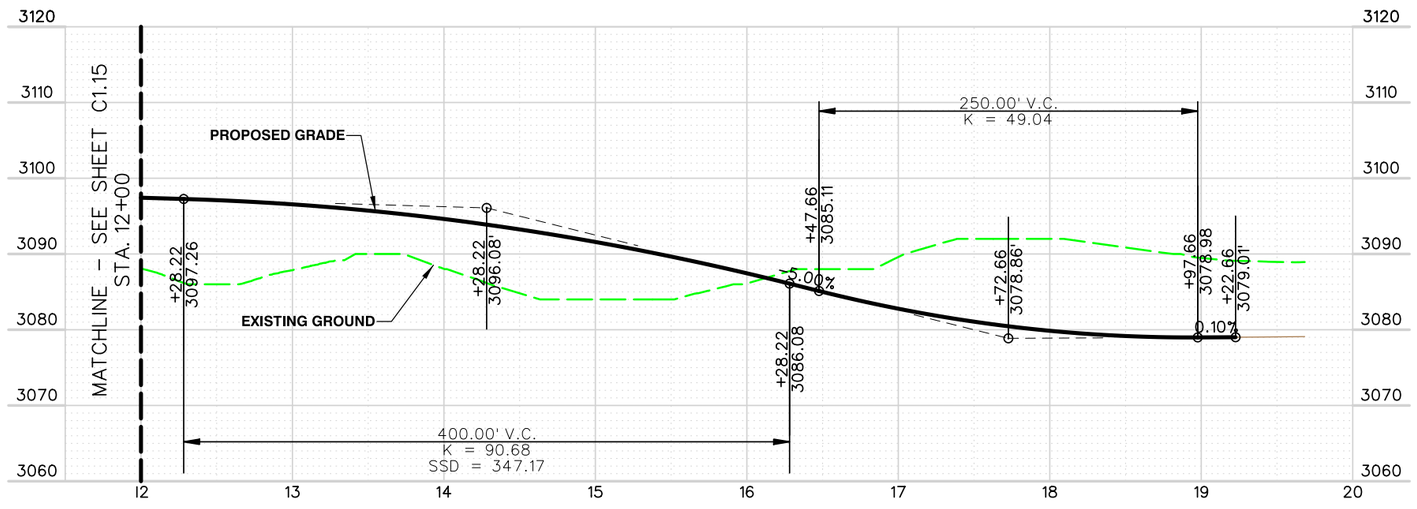
PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

SHEET
C1.15
25 OF 42
DRAWING NO.
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PLAN VIEW



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NO.	DATE	SHEET	REVISIONS

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CITY OF LAS VEGAS

H# XXXXX | BID# XX-XXXXX
DATE: 02/03/16 | DESIGNED BY: XXX
SUBMITTAL STAGE: 30% - PRELIMINARY | DRAWN BY: XXX | CHECKED BY: XXX

TITLE: SHEEP MOUNTAIN

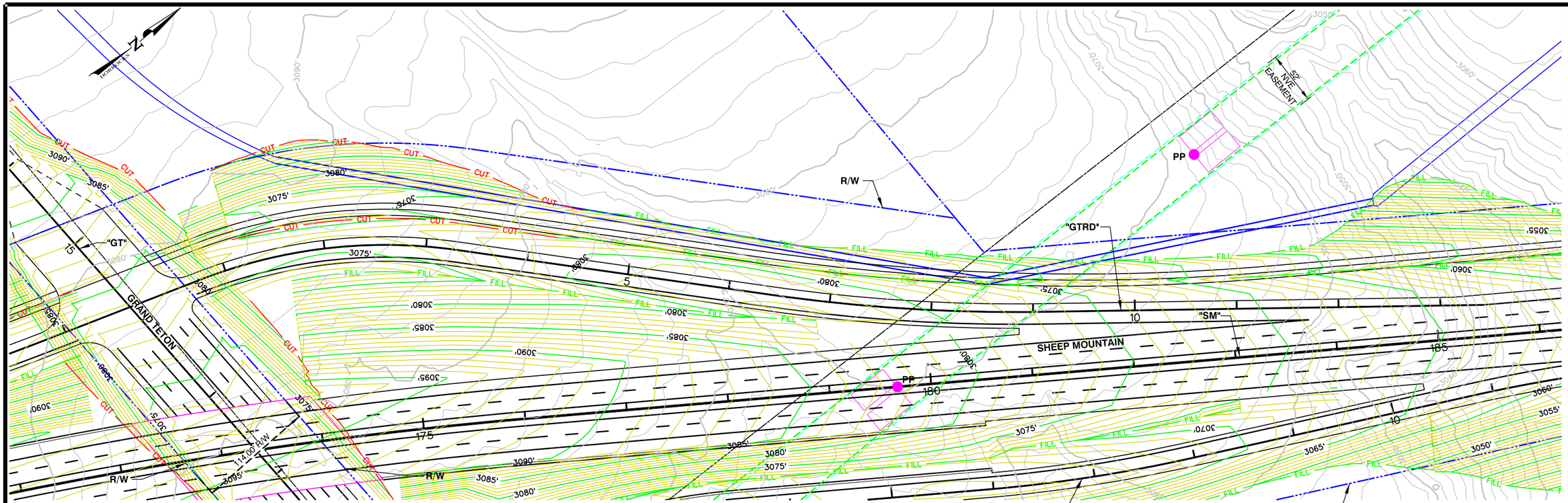
SHEET: GRAND TETON RAMP "C"
PLAN AND PROFILE-STA. 12+00 TO 21+00

PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

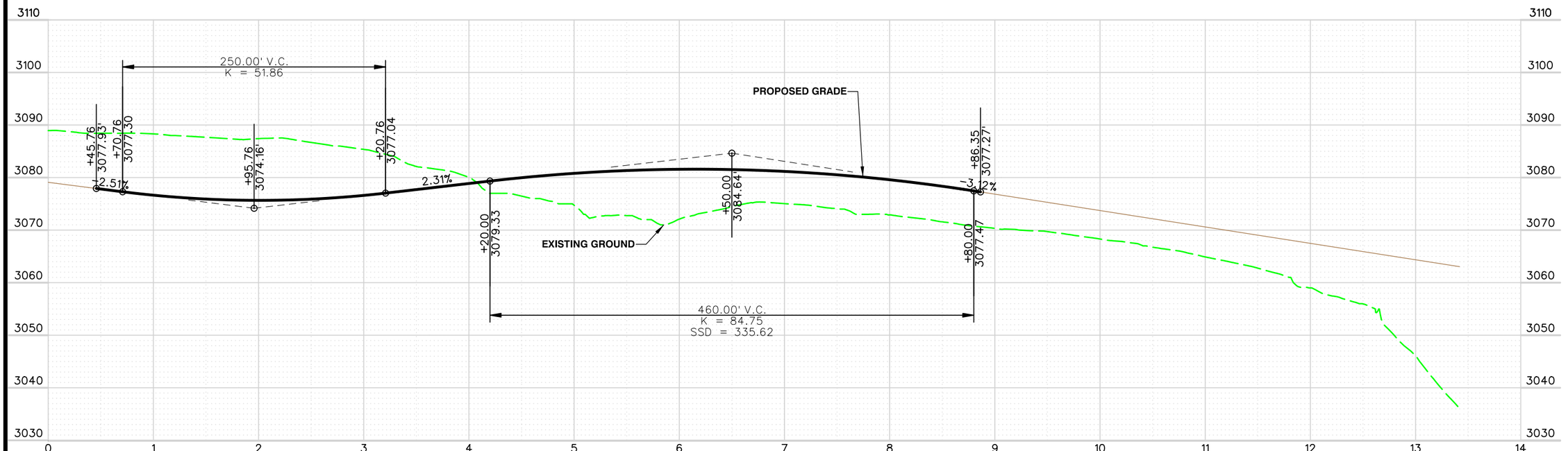
SHEET
C1.16
26 OF 42

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XXX-XXXX

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PLAN VIEW



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NO.	DATE	SHEET	REVISIONS

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CITY OF LAS VEGAS

H# XXXXX | BID# XX-XXXXX | DESIGNED BY: XXX | DRAWN BY: XXX | CHECKED BY: XXX | DATE: 02/03/16 | SUBMITTAL STAGE: 30% - PRELIMINARY

TITLE
SHEEP MOUNTAIN

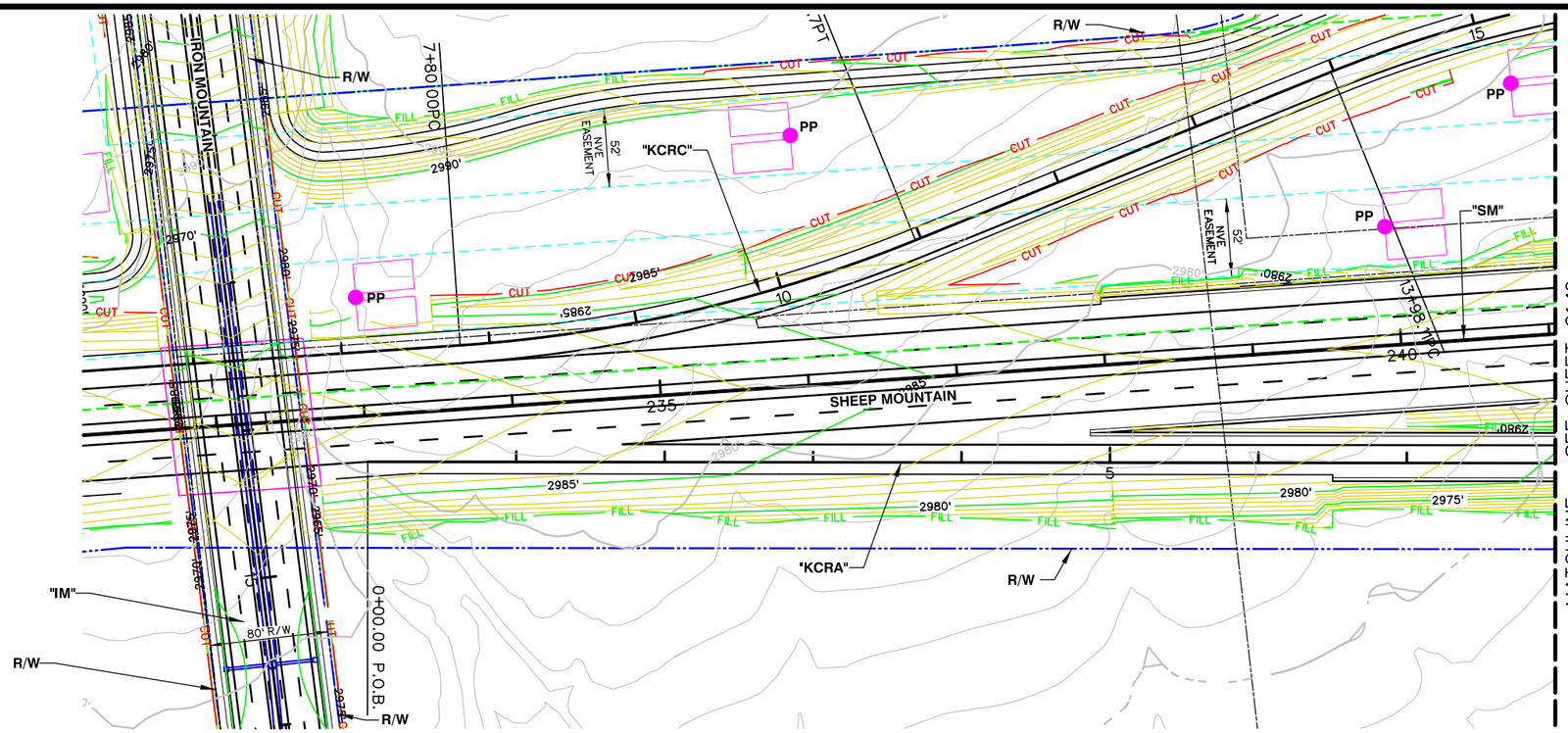
SHEET
GRAND TETON RAMP "D"
PLAN AND PROFILE-STA. 0+00 TO 15+00

PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

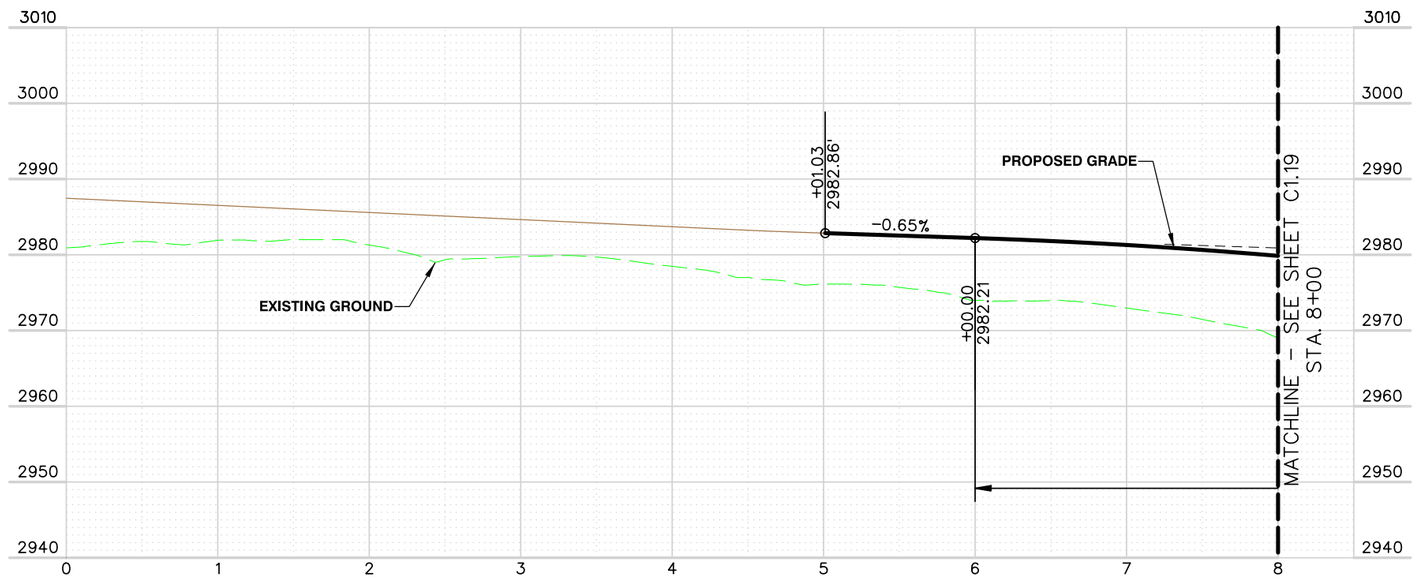
SHEET
C1.17
27 OF 42

DRAWING NO.
XXX-XXXX

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NO.	DATE	SHEET	REVISIONS

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CITY OF LAS VEGAS

H# XXXXX | BID# XX.XXXX | DESIGNED BY: XXX | DRAWN BY: XXX | CHECKED BY: XXX

DATE: 02/03/16 | SUBMITTAL STAGE: 30% - PRELIMINARY

TITLE
SHEEP MOUNTAIN

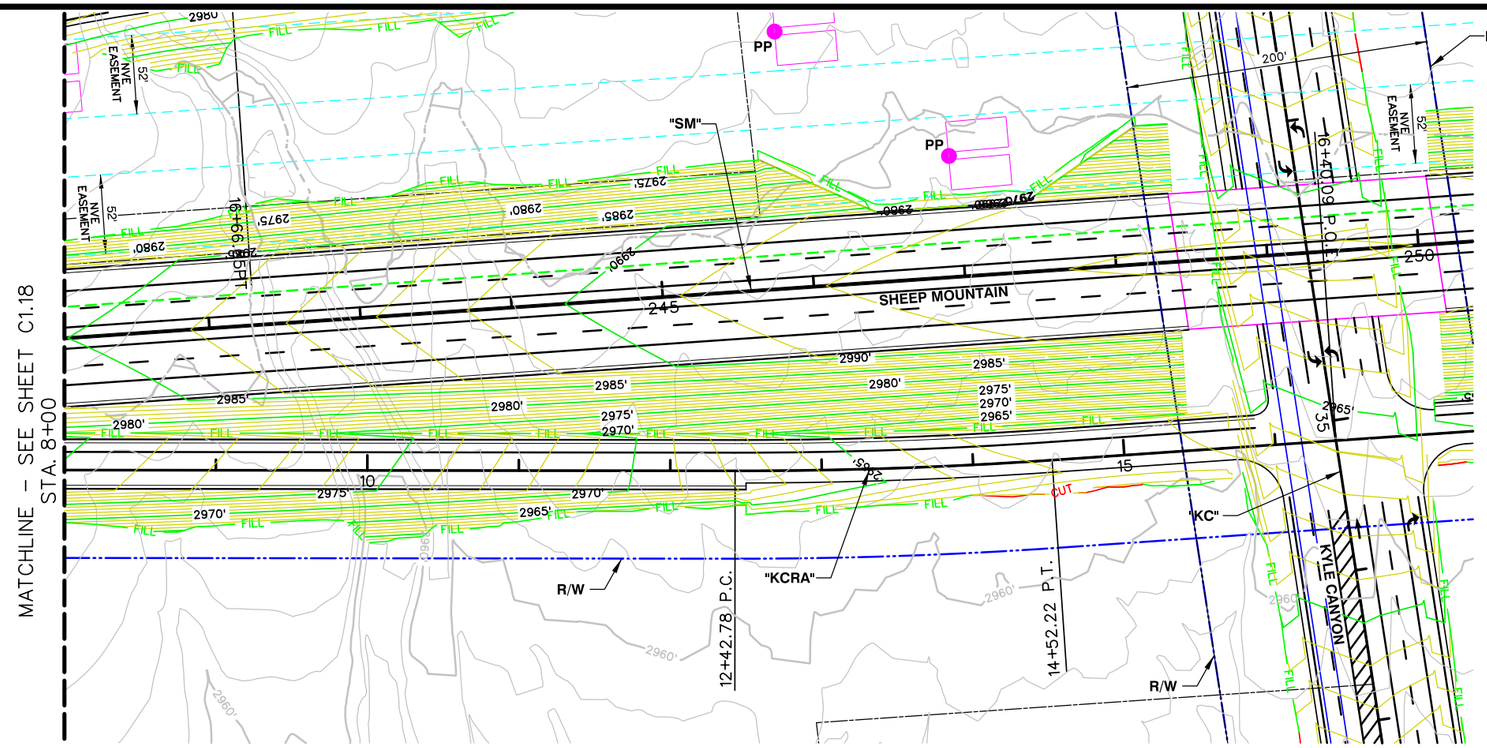
SHEET
KYLE CANYON RAMP "A"
PLAN AND PROFILE-STA. 0+00 TO 8+00

PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

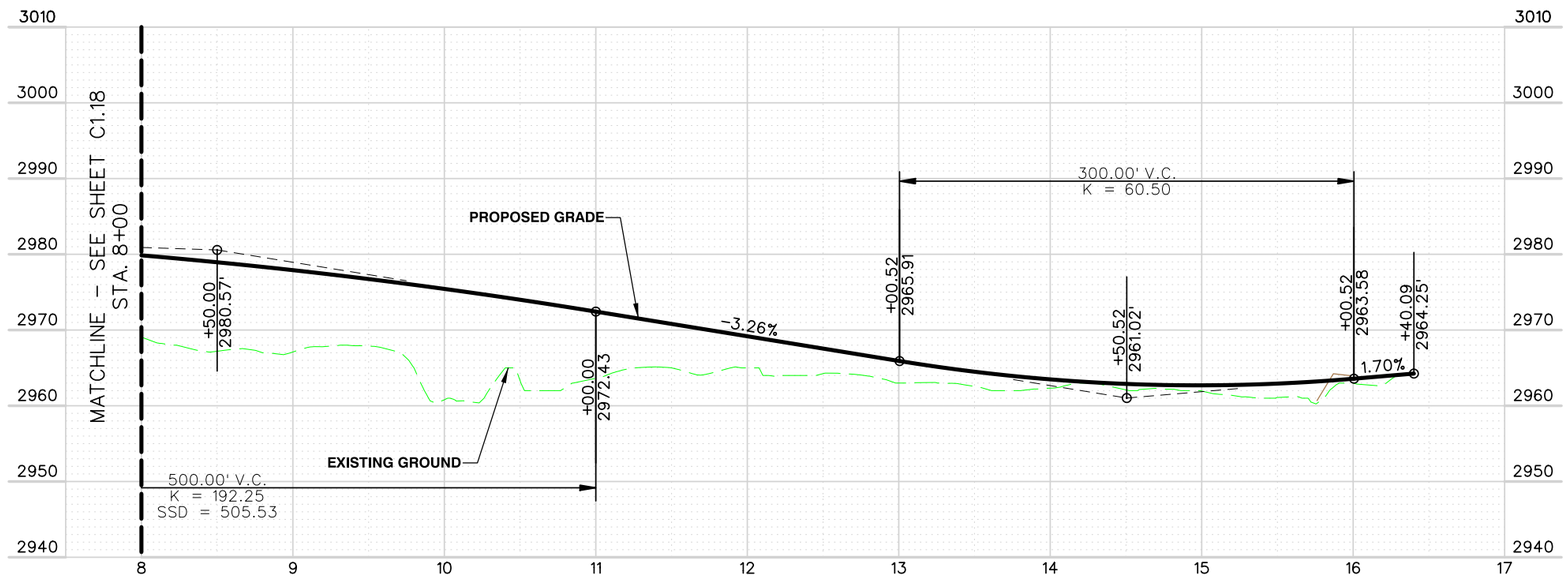
SHEET
C1.18
28 OF 42

DRAWING NO.
XXX-XXXX

PRELIMINARY NOT FOR CONSTRUCTION



PLAN VIEW



PROFILE VIEW

PREPARED BY
HORROCKS ENGINEERS
1349 Galleria Drive, Suite 110
Henderson, NV 89014
(702) 966-4063

NO.	DATE	SHEET	REVISIONS

PREPARED FOR
CITY OF LAS VEGAS

H# XXXXX | BID# XX-XXXXX
DATE: 02/03/16 | DESIGNED BY: XXX
SUBMITTAL STAGE: 30% - PRELIMINARY | DRAWN BY: XXX | CHECKED BY: XXX

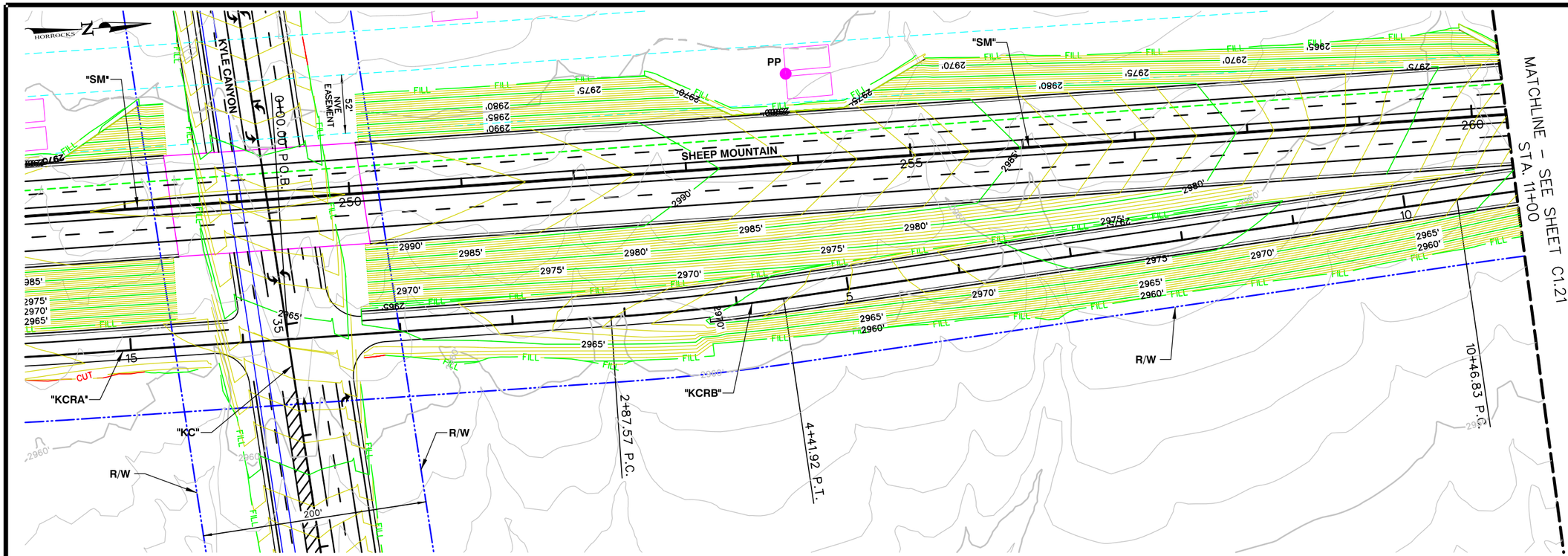
TITLE
SHEEP MOUNTAIN

SHEET
KYLE CANYON RAMP "A"
PLAN AND PROFILE-STA. 8+00 TO 17+00

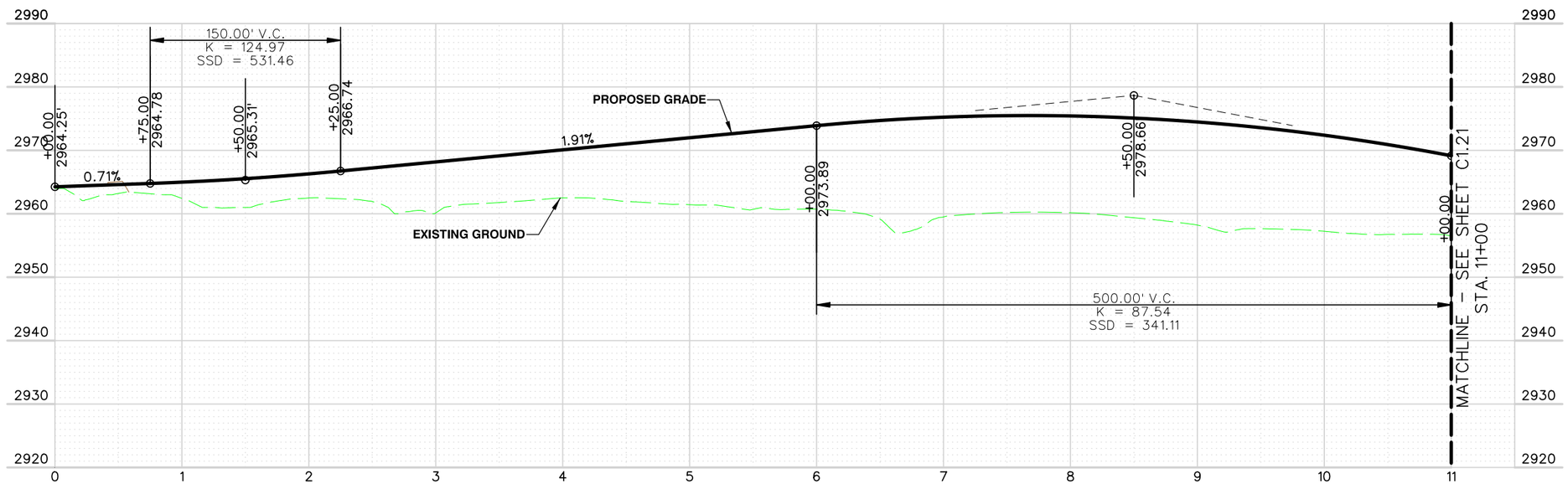
PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

SHEET
C1.19
29 OF 42
DRAWING NO.
XXX-XXXX

PRELIMINARY NOT FOR CONSTRUCTION



PLAN VIEW



PROFILE VIEW

PREPARED BY
HORROCKS ENGINEERS
1349 Galleria Drive, Suite 110
Henderson, NV 89014
(702) 966-4063

NO.	DATE	SHEET	REVISIONS

PREPARED FOR
CITY OF LAS VEGAS

H# XXXXX | BID# XX.XXXXX | DESIGNED BY: XXX | DRAWN BY: XXX | CHECKED BY: XXX | DATE: 02/03/16 | SUBMITTAL STAGE: 30% - PRELIMINARY

TITLE: SHEEP MOUNTAIN

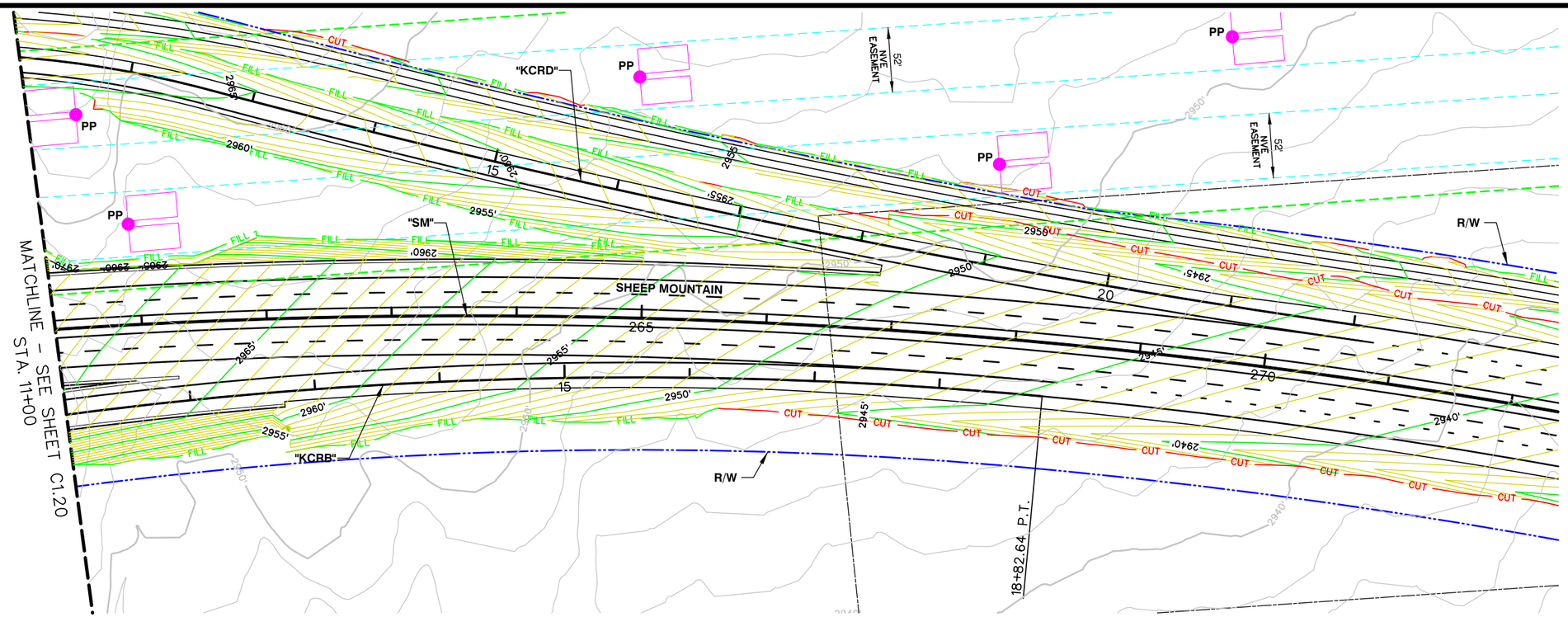
SHEET: KYLE CANYON RAMP "B"
PLAN AND PROFILE-STA. 0+00 TO 11+00

PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

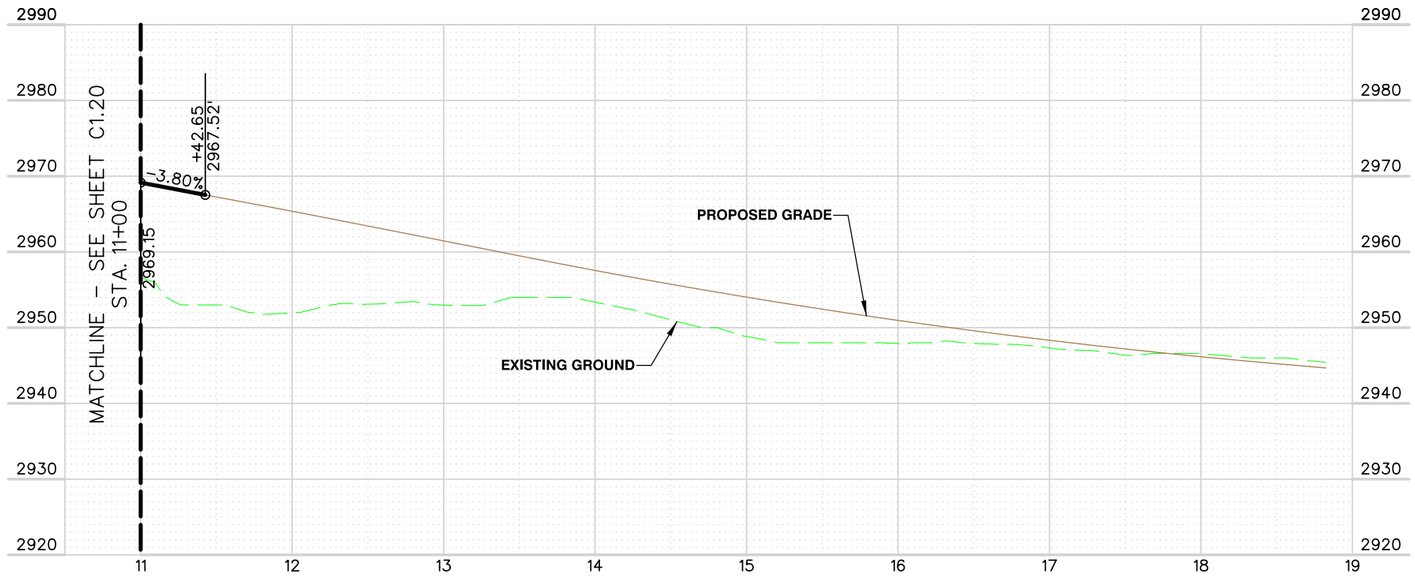
SHEET
C1.20
30 OF 42

DRAWING NO.
XXX-XXXX

PRELIMINARY NOT FOR CONSTRUCTION



PLAN VIEW



PROFILE VIEW

PREPARED BY
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Henderson, NV 89014
(702) 966-4063

PREPARED FOR
CITY OF LAS VEGAS

H# XXXXX | BID# XX-XXXXX
DATE: 02/03/16 | DESIGNED BY: XXX
SUBMITTAL STAGE: 30% - PRELIMINARY | DRAWN BY: XXX
CHECKED BY: XXX

NO.	DATE	SHEET	REVISIONS

TITLE: SHEEP MOUNTAIN

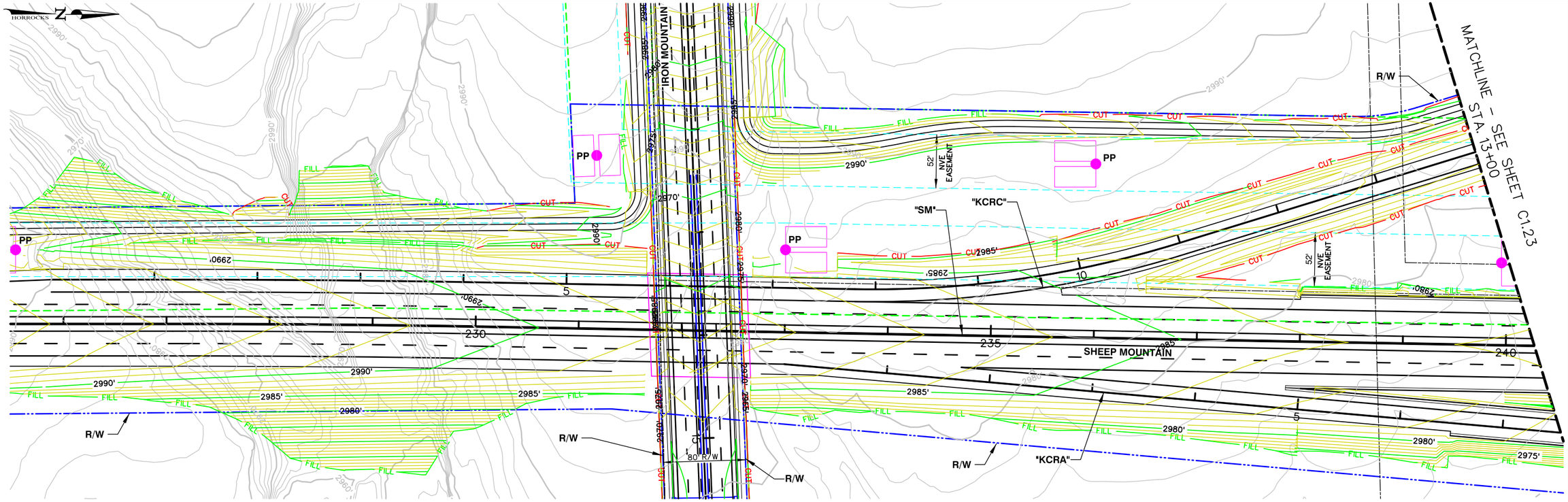
SHEET: KYLE CANYON RAMP "B"
PLAN AND PROFILE-STA. 11+00 TO 19+00

PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

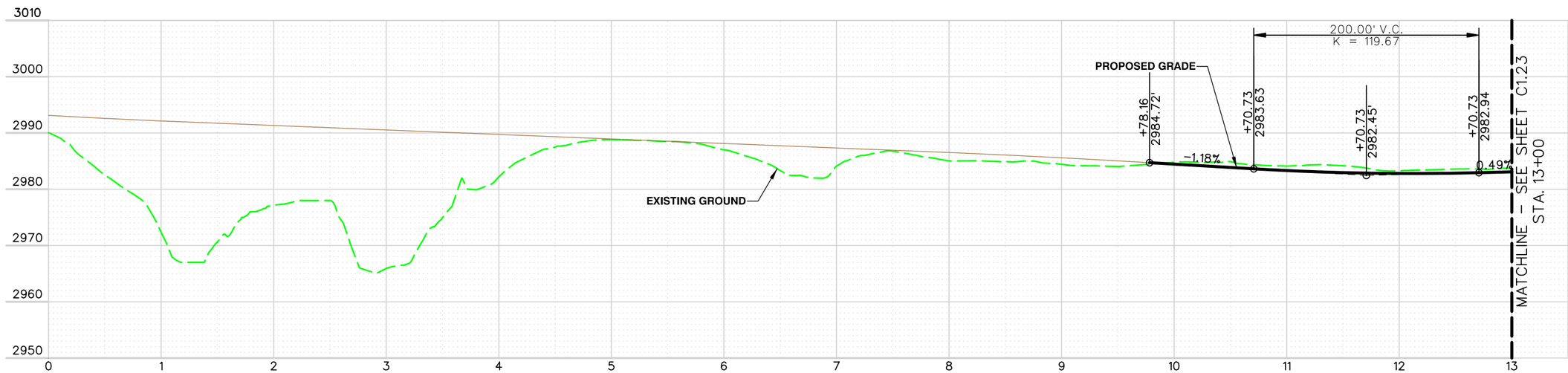
SHEET
C1.21
31 OF 42

DRAWING NO.
XXX-XXXX

PRELIMINARY NOT FOR CONSTRUCTION



PLAN VIEW



PROFILE VIEW

PREPARED BY
HORROCKS ENGINEERS
1349 Galleria Drive, Suite 110
Henderson, NV 89014
(702) 966-4063

NO.	DATE	SHEET	REVISIONS

PREPARED FOR
CITY OF LAS VEGAS

H# XXXXX | BID# XX-XXXXX | DESIGNED BY: XXX | DRAWN BY: XXX | CHECKED BY: XXX

DATE: 02/03/16

SUBMITTAL STAGE: 30% - PRELIMINARY

TITLE
SHEEP MOUNTAIN

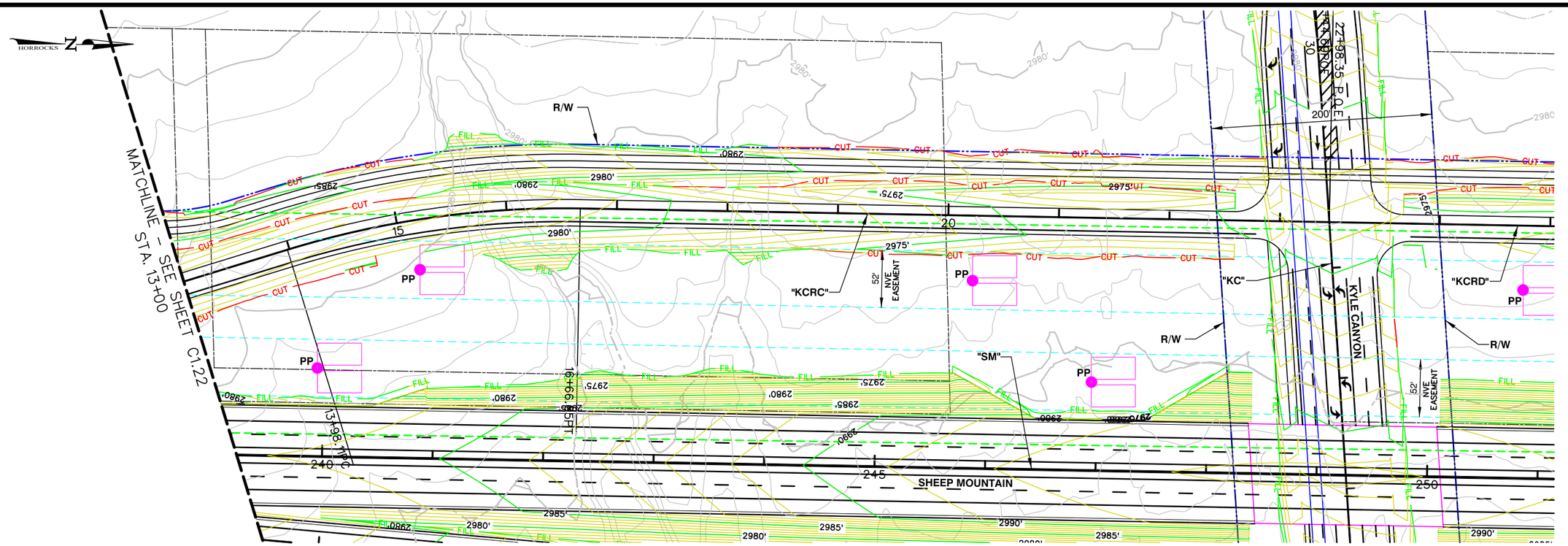
SHEET
KYLE CANYON RAMP "C"
PLAN AND PROFILE-STA. 0+00 TO 13+00

PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

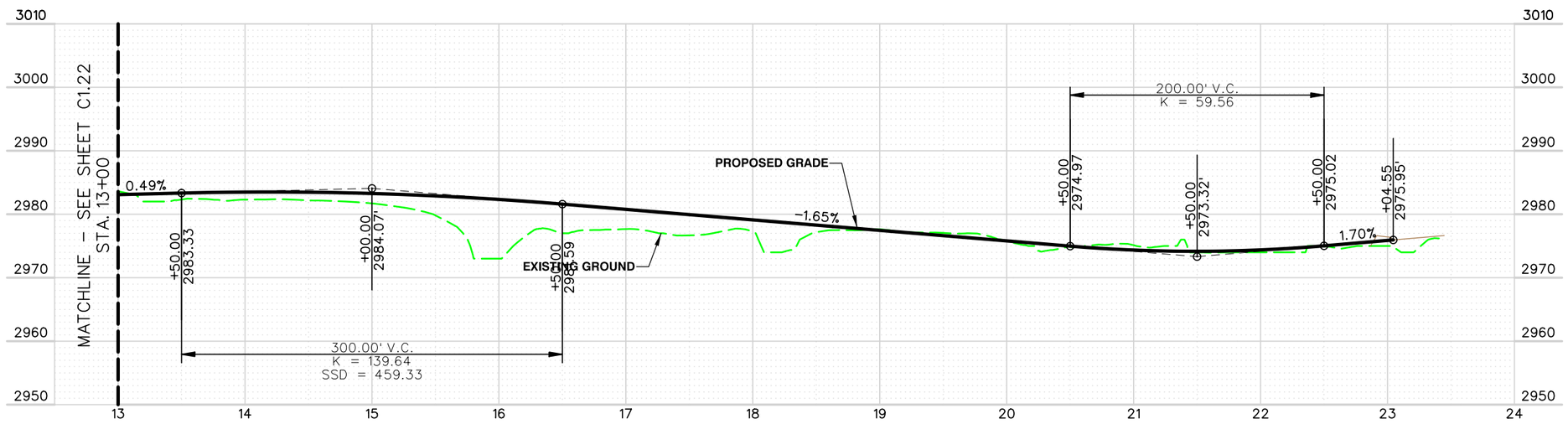
SHEET
C1.22
32 OF 42

DRAWING NO.
XXX-XXXX

PRELIMINARY NOT FOR CONSTRUCTION



PLAN VIEW



PROFILE VIEW

NO.	DATE	SHEET	REVISIONS

PREPARED BY
HORROCKS ENGINEERS
1349 Galleria Drive, Suite 110
Henderson, NV 89014
(702) 966-4063

PREPARED FOR
CITY OF LAS VEGAS

H# XXXXX | BID# XX-XXXXX | DESIGNED BY: XXX | DRAWN BY: XXX | CHECKED BY: XXX | DATE: 02/03/16 | SUBMITTAL STAGE: 30% - PRELIMINARY

TITLE: SHEEP MOUNTAIN

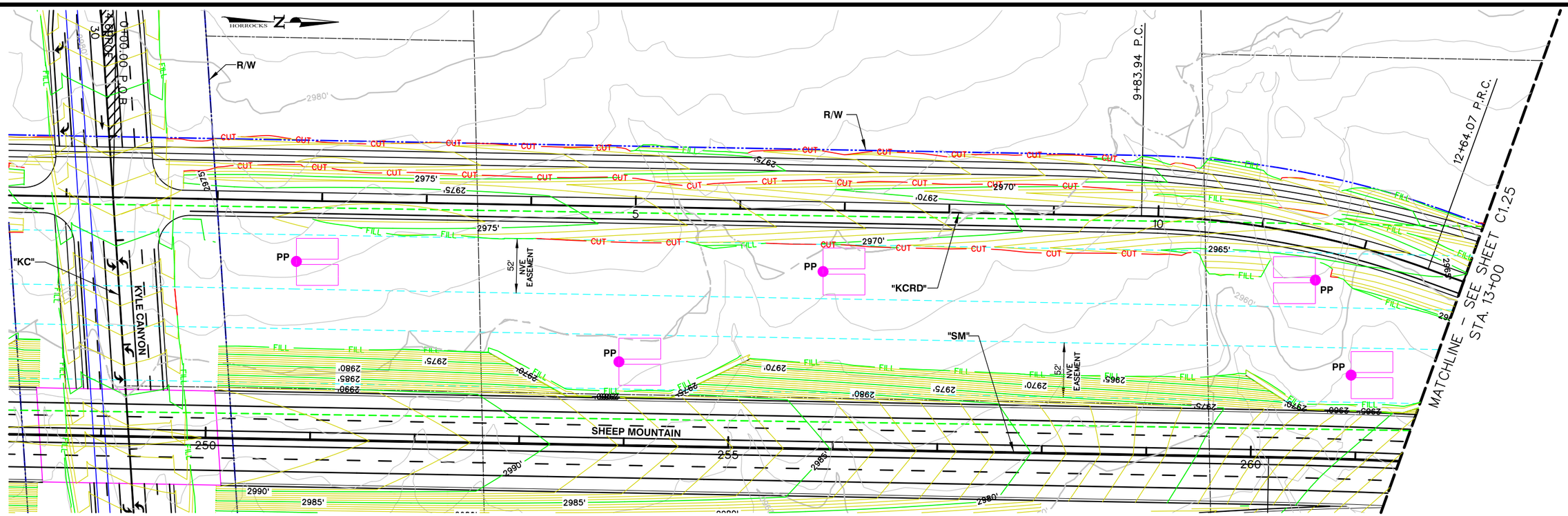
SHEET: KYLE CANYON RAMP "C" PLAN AND PROFILE-STA. 13+00 TO 23+00

PRELIMINARY NOT FOR CONSTRUCTION

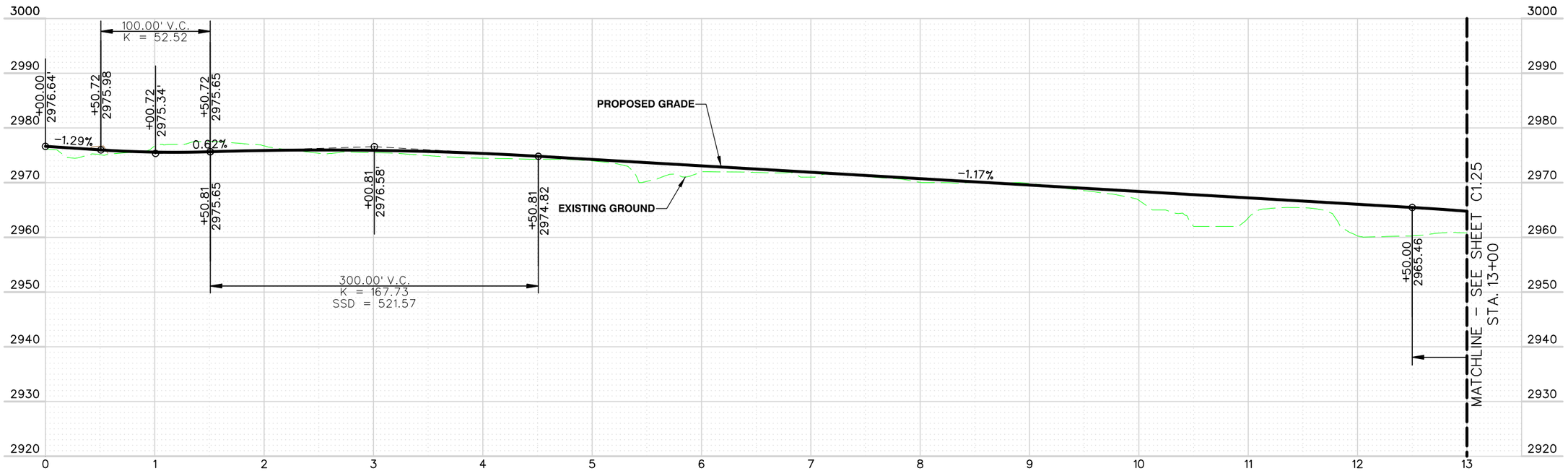
PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

SHEET
C1.23
33 OF 42

DRAWING NO.
XXX-XXXX



PLAN VIEW



PROFILE VIEW

PREPARED BY
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1349 Galleria Drive, Suite 110
Henderson, NV 89014
(702) 966-4063

NO.	DATE	SHEET	REVISIONS

PREPARED FOR
CITY OF LAS VEGAS

H# XXXXX | BID# XX-XXXXX | DESIGNED BY: XXX | DRAWN BY: XXX | CHECKED BY: XXX

DATE: 02/03/16

SUBMITTAL STAGE: 30% - PRELIMINARY

TITLE: SHEEP MOUNTAIN

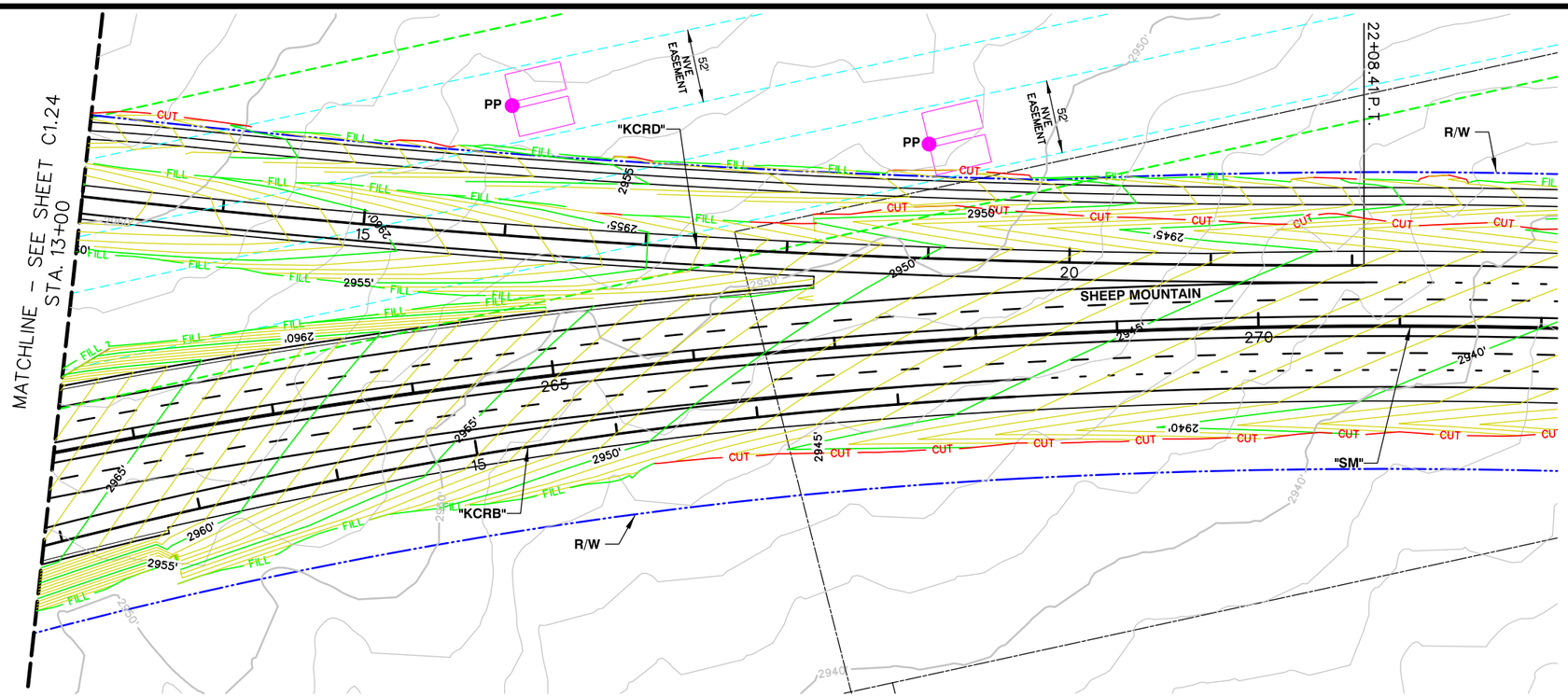
SHEET: KYLE CANYON RAMP "D"
PLAN AND PROFILE-STA. 0+00 TO 13+00

PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

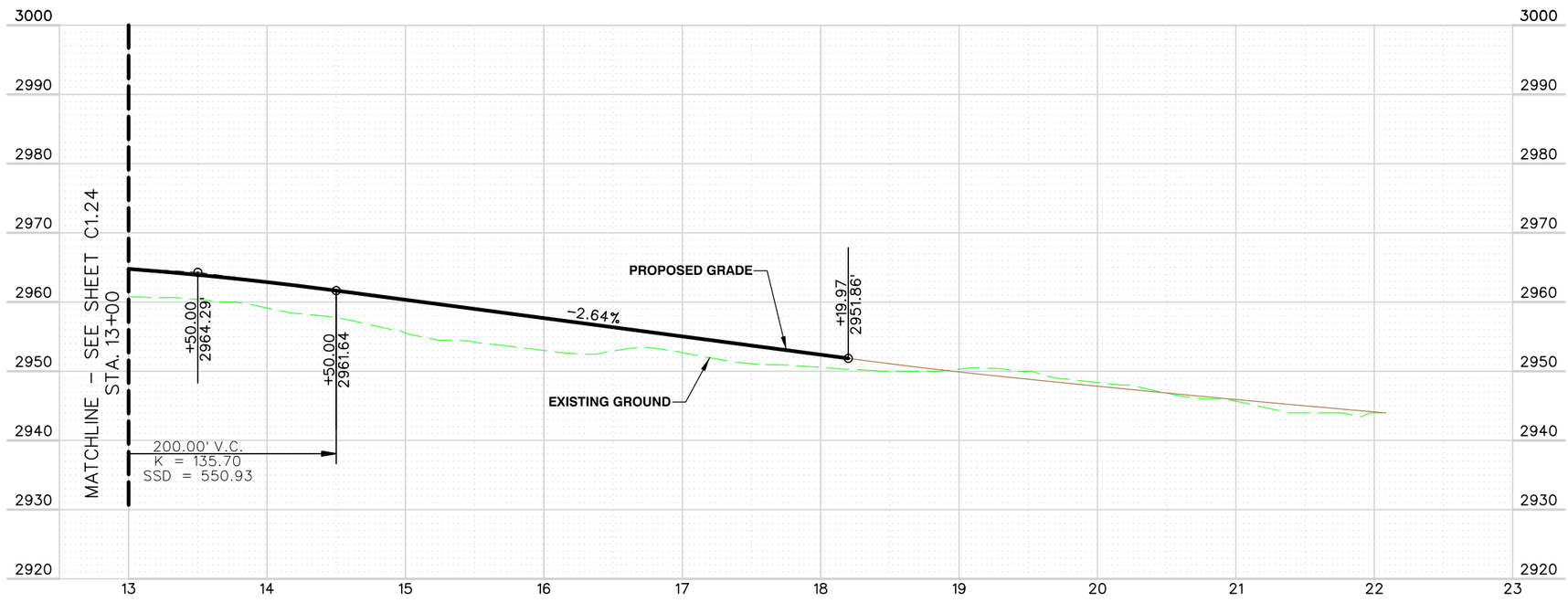
SHEET C1.24
34 OF 42

DRAWING NO. XXX-XXXX

PRELIMINARY NOT FOR CONSTRUCTION



PLAN VIEW



PROFILE VIEW

PREPARED BY
HORROCKS ENGINEERS
1349 Galleria Drive, Suite 110
Henderson, NV 89014
(702) 966-4063

NO.	DATE	SHEET	REVISIONS

PREPARED FOR
CITY OF LAS VEGAS

H# XXXXX | BID# XX.XXXXX | DESIGNED BY: XXX | DRAWN BY: XXX | CHECKED BY: XXX | DATE: 02/03/16 | SUBMITTAL STAGE: 30% - PRELIMINARY

TITLE: SHEEP MOUNTAIN

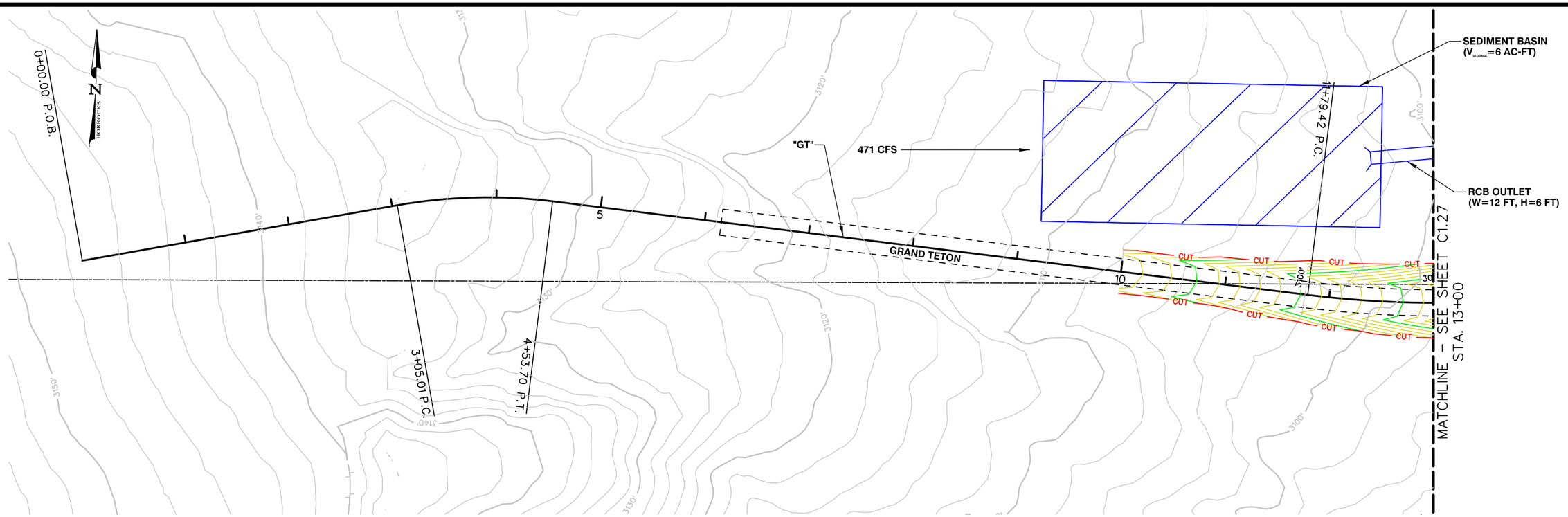
SHEET: KYLE CANYON RAMP "D"
PLAN AND PROFILE-STA. 13+00 TO 23+00

PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

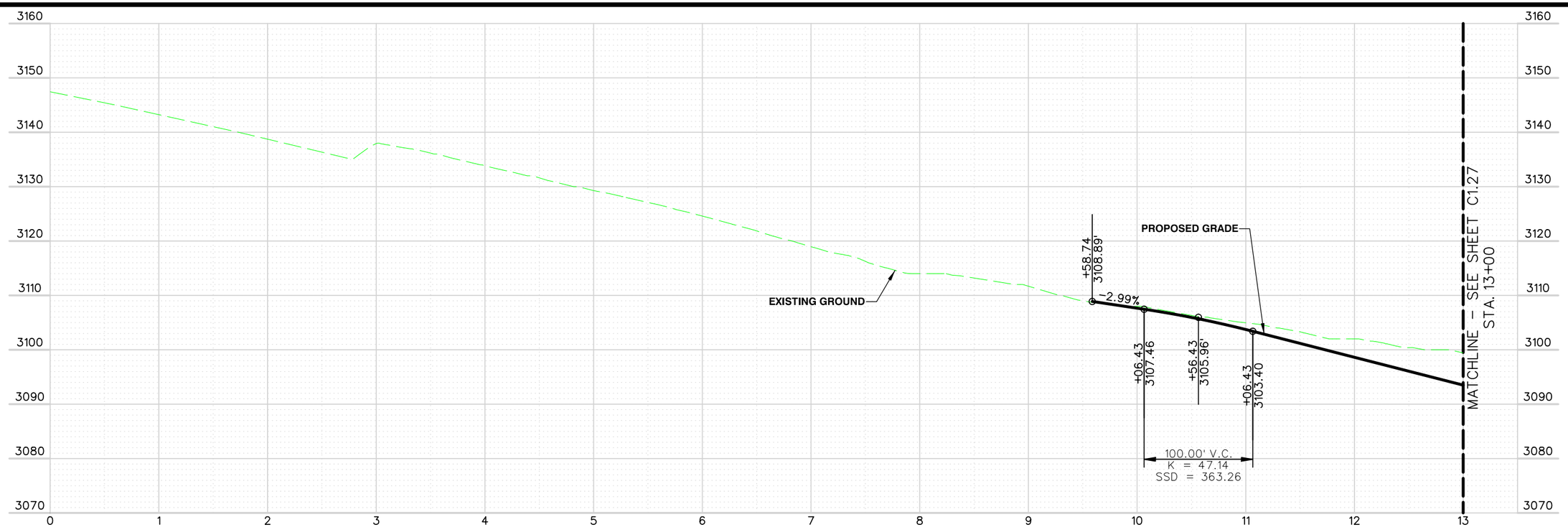
SHEET
C1.25
35 OF 42

DRAWING NO.
XXX-XXXX

PRELIMINARY NOT FOR CONSTRUCTION



PLAN VIEW



PROFILE VIEW

NO.	DATE	SHEET	REVISIONS

PREPARED BY
HORROCKS ENGINEERS
1349 Galleria Drive, Suite 110
Henderson, NV 89014
(702) 966-4063

PREPARED FOR
CITY OF LAS VEGAS

H# XXXXX | BID# XX-XXXXX | DESIGNED BY: XXX | DRAWN BY: XXX | CHECKED BY: XXX | DATE: 02/03/16 | SUBMITTAL STAGE: **30% - PRELIMINARY**

TITLE: **SHEEP MOUNTAIN**

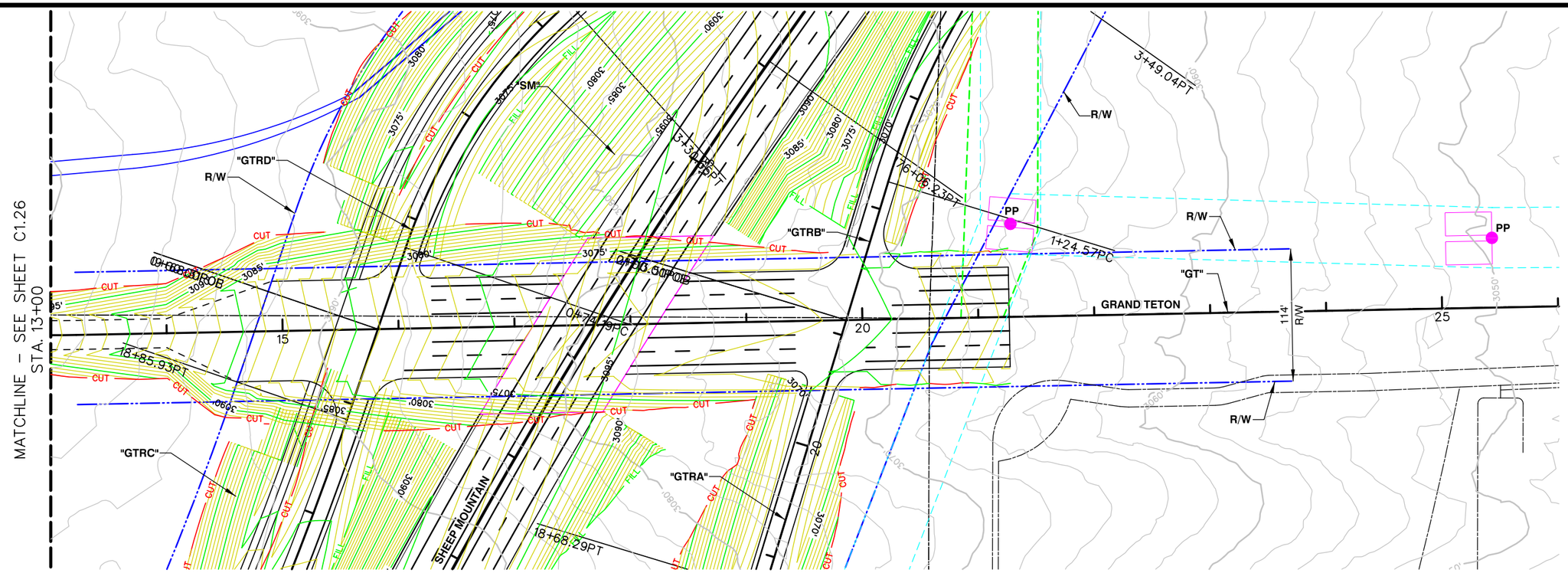
SHEET: **GRAND TETON ROAD**
PLAN AND PROFILE-STA. 0+00 TO 13+00

PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

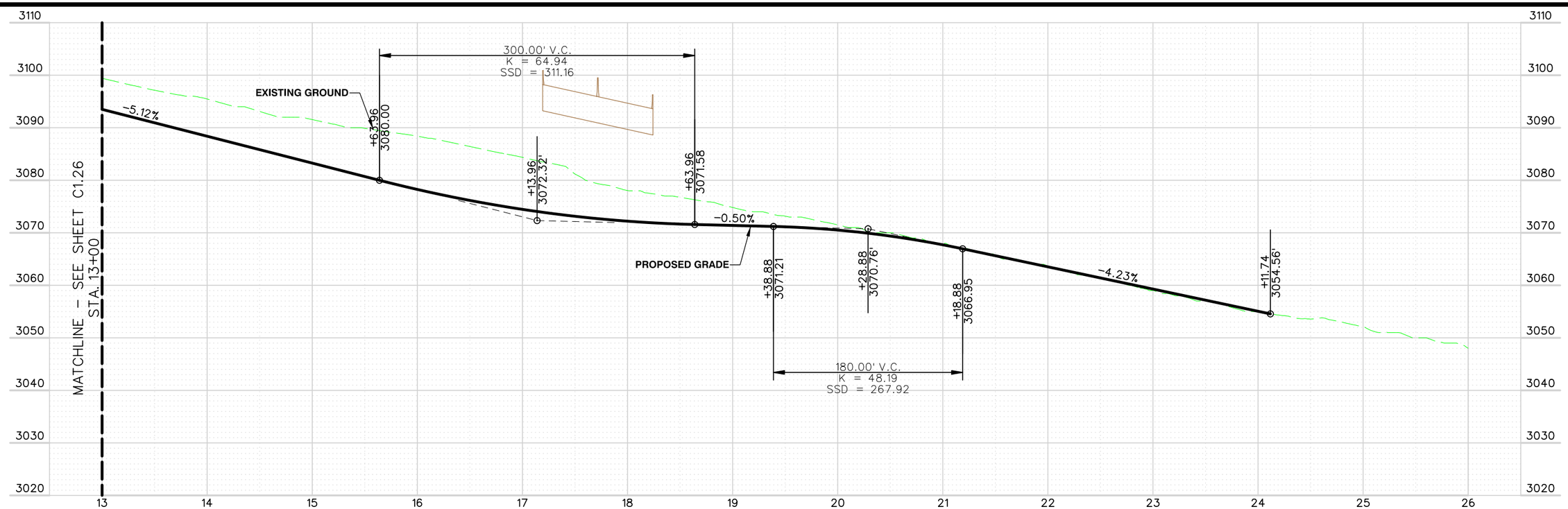
SHEET
C1.26
36 OF 42

DRAWING NO.
XXX-XXXX

PRELIMINARY NOT FOR CONSTRUCTION



PLAN VIEW



PROFILE VIEW

PREPARED BY
HORROCKS ENGINEERS
1349 Galleria Drive, Suite 110
Henderson, NV 89014
(702) 966-4063

NO.	DATE	SHEET	REVISIONS

PREPARED FOR
CITY OF LAS VEGAS

H# XXXXX | BID# XX.XXXXX
DATE: 02/03/16 | DESIGNED BY: XXX
SUBMITTAL STAGE: 30% - PRELIMINARY | DRAWN BY: XXX
CHECKED BY: XXX

TITLE: SHEEP MOUNTAIN

SHEET: GRAND TETON ROAD
PLAN AND PROFILE-STA. 13+00 TO 26+00

PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10759

SHEET
C1.27
37 OF 42
DRAWING NO.
XXX-XXXX

PRELIMINARY NOT FOR CONSTRUCTION

"SHEET INTENTIONALLY LEFT BLANK"

PREPARED FOR
CITY OF LAS VEGAS

H# XXXXX | BID# XX-XXXXX

DATE: 02/03/16 | DESIGNED BY: XXX

SUBMITTAL STAGE: **30% - PRELIMINARY** | DRAWN BY: XXX | CHECKED BY: XXX

PREPARED BY
HORROCKS ENGINEERS
1349 Galleria Drive, Suite 110
Henderson, NV 89014
(702) 966-4063

NO.	DATE	SHEET	REVISIONS

TITLE: **SHEEP MOUNTAIN**

SHEET

PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

SHEET
C1.28
38 OF **42**

DRAWING NO.
XXX-XXXX

PRELIMINARY NOT FOR CONSTRUCTION

"SHEET INTENTIONALLY LEFT BLANK"

PREPARED FOR
CITY OF LAS VEGAS

H# XXXXX | BID# XX-XXXXX

DATE: 02/03/16 | DESIGNED BY: XXX

SUBMITTAL STAGE: | DRAWN BY: XXX

30% - PRELIMINARY | CHECKED BY: XXX

PREPARED BY
HORROCKS ENGINEERS
1349 Galleria Drive, Suite 110
Henderson, NV 89014
(702) 966-4063

NO.	DATE	SHEET	REVISIONS

TITLE
SHEEP MOUNTAIN

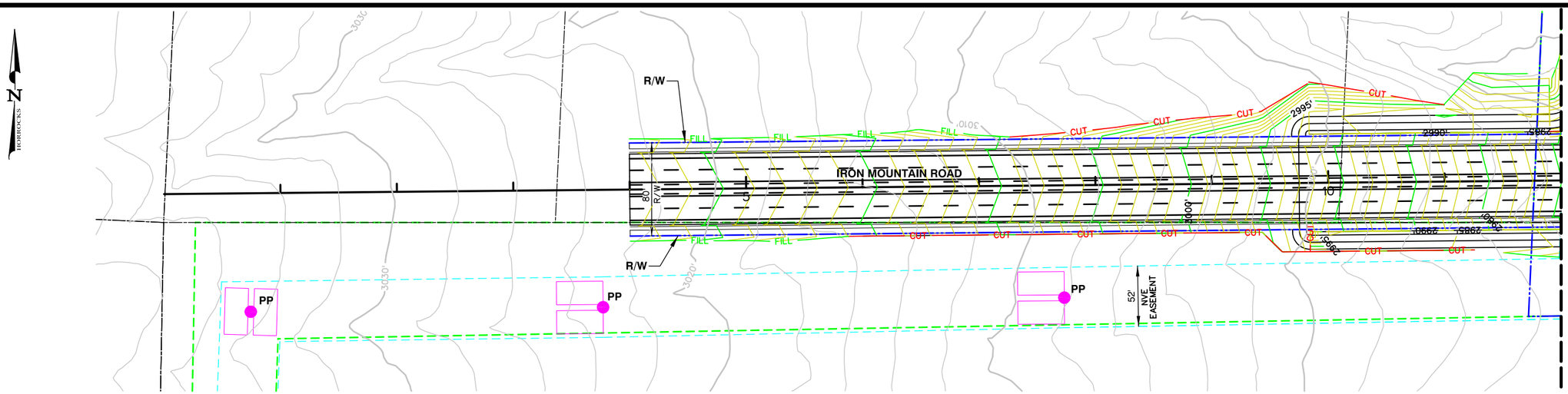
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PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

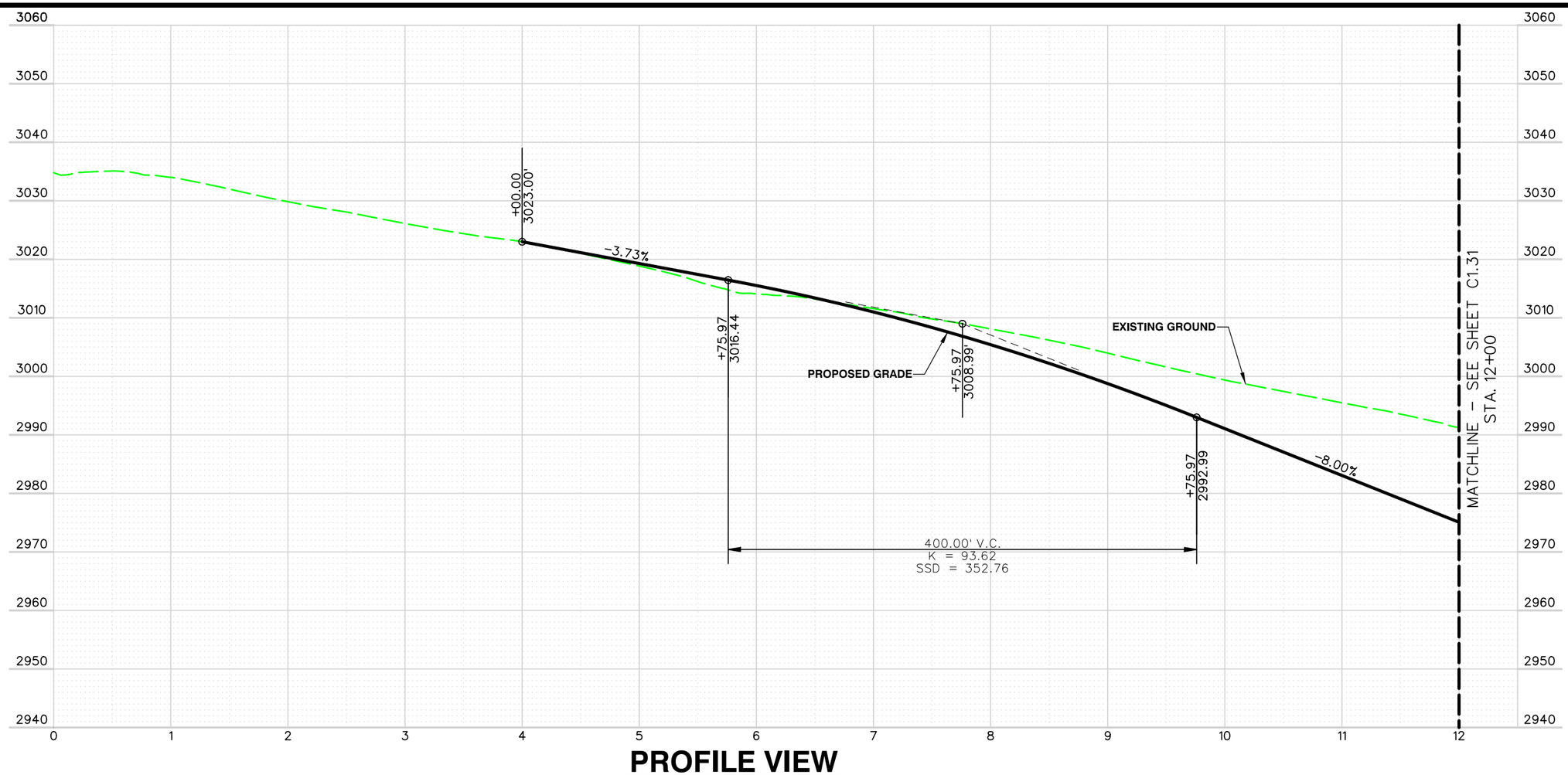
SHEET
C1.29
39 OF 42

DRAWING NO.
XXX-XXXX

PRELIMINARY NOT FOR CONSTRUCTION



PLAN VIEW



PROFILE VIEW

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Henderson, NV 89014
(702) 966-4063

NO.	DATE	SHEET	REVISIONS

PREPARED FOR
CITY OF LAS VEGAS

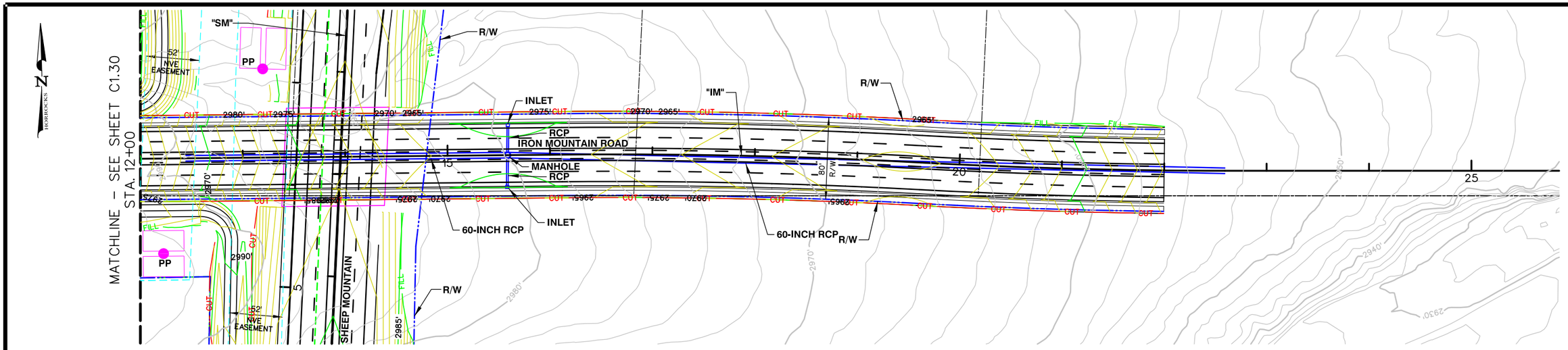
H# XXXXX | BID# XX-XXXXX | DESIGNED BY: XXX | DRAWN BY: XXX | CHECKED BY: XXX | DATE: 02/03/16 | SUBMITTAL STAGE: 30% - PRELIMINARY

TITLE
SHEET
IRON MOUNTAIN ROAD
PLAN AND PROFILE-STA. 0+00 TO 12+00
SHEET NAME
SHEEP MOUNTAIN

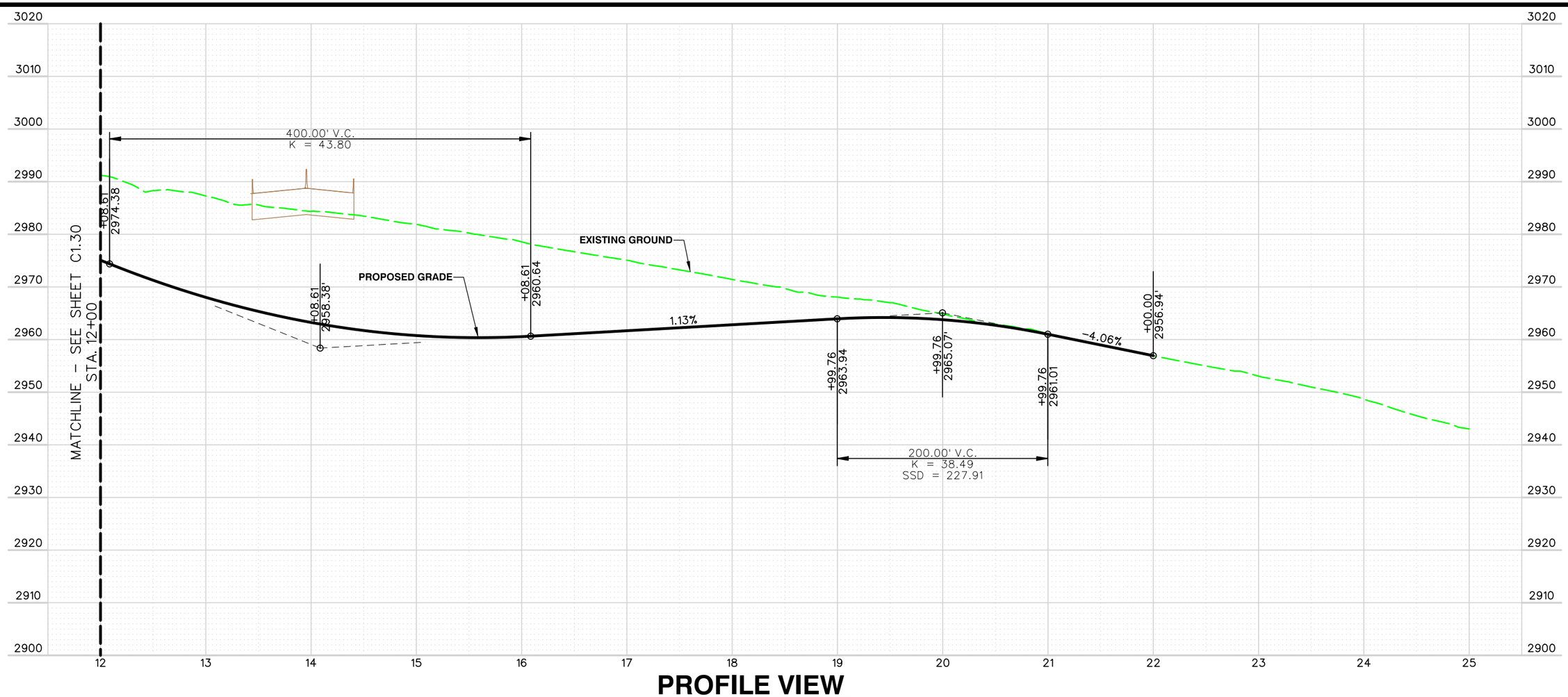
PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

SHEET
C1.30
40 OF 42
DRAWING NO.
XXX-XXXX

PRELIMINARY NOT FOR CONSTRUCTION



PLAN VIEW



PROFILE VIEW

NO.	DATE	SHEET	REVISIONS

PREPARED BY
HORROCKS ENGINEERS
1349 Galleria Drive, Suite 110
Henderson, NV 89014
(702) 966-4063

PREPARED FOR
CITY OF LAS VEGAS

BID# XX-XXXXX
DESIGNED BY: XXX
DRAWN BY: XXX
CHECKED BY: XXX

H# XXXXX
DATE: 02/03/16
SUBMITTAL STAGE: **30% - PRELIMINARY**

PRELIMINARY NOT FOR CONSTRUCTION

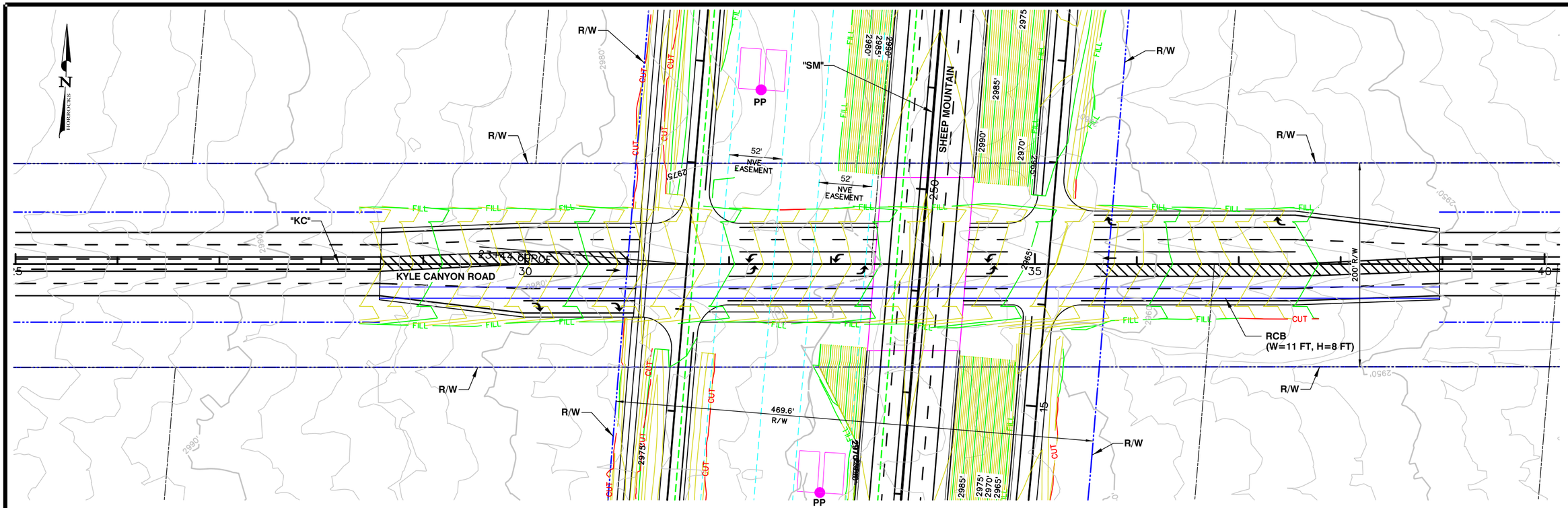
TITLE: **SHEEP MOUNTAIN**

SHEET: **IRON MOUNTAIN ROAD**
PLAN AND PROFILE-STA. 12+00 TO 25+00

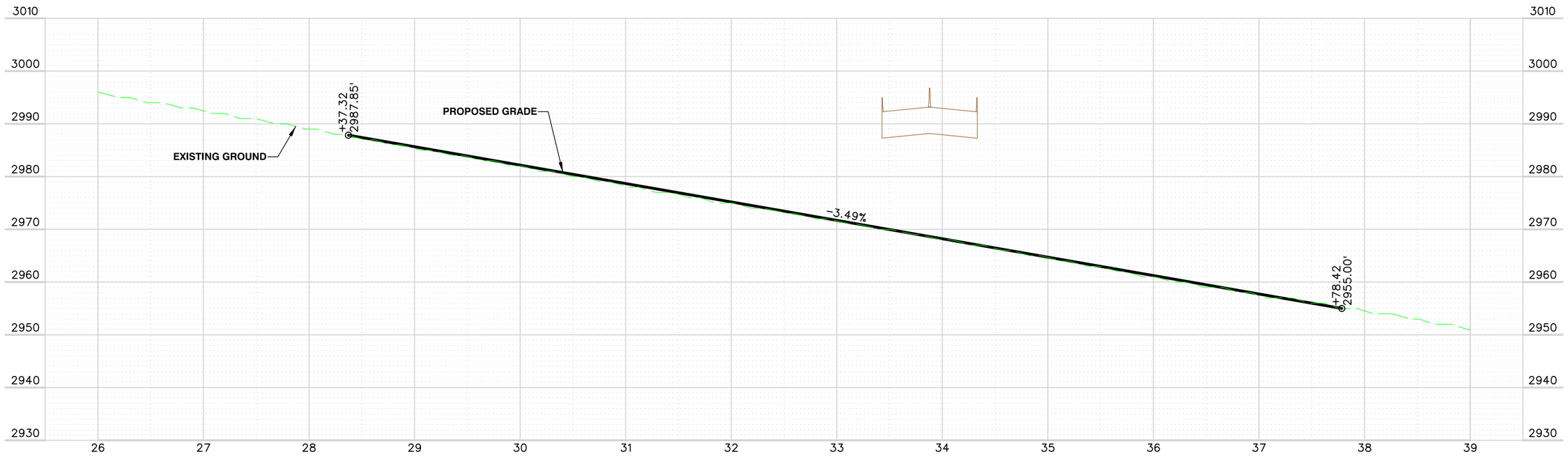
PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

SHEET
C1.31
41 OF 42

DRAWING NO.
XXX-XXXX



PLAN VIEW



PROFILE VIEW

NO.	DATE	SHEET	REVISIONS

PREPARED BY
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Henderson, NV 89014
(702) 966-4063

PREPARED FOR
CITY OF LAS VEGAS

H# XXXXX | BID# XX-XXXXX
DATE: 02/03/16 | DESIGNED BY: XXX
SUBMITTAL STAGE: 30% - PRELIMINARY | DRAWN BY: XXX
CHECKED BY: XXX

TITLE
SHEEP MOUNTAIN

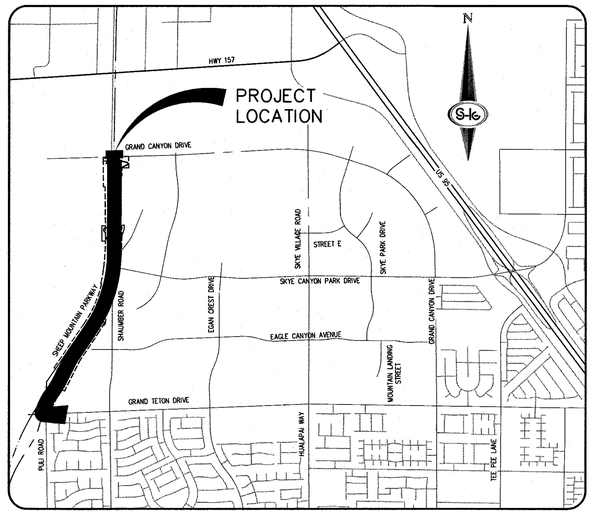
SHEET
KYLE CANYON ROAD
PLAN AND PROFILE-STA. 26+00 TO 39+00

PROFESSIONAL ENGINEER-STATE OF NEVADA
WAYNE HORLACHER
EXP. 06-30-17
CIVIL
No. 10739

SHEET
C1.32
42 OF 42

DRAWING NO.
XXX-XXXX

PRELIMINARY NOT FOR CONSTRUCTION



VICINITY MAP

IMPROVEMENT PLANS
FOR
SKYE CANYON PHASE II
SHEEP MOUNTAIN PARKWAY

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METERS
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK – 2008 ADJUSTMENT (UPDATED 05/24/2010)

BASIS OF BEARING

NORTH 89°16'30" WEST, BEING THE BEARING OF THE SOUTH LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 7, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 147, PAGE 71 OF PLATS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

OWNER

M F LAND LLC
% OLYMPIA COMPANIES LLC
11411 SOUTHERN HIGHLANDS
PARKWAY, SUITE 300
LAS VEGAS, NV 89141

DEVELOPER

NINETY–FIVE MANAGEMENT LLC
% OLYMPIA COMPANIES LLC
11411 SOUTHERN HIGHLANDS
PARKWAY, SUITE 300
LAS VEGAS, NV 89141
PH (702) 220–6565
FX (702) 220–6566

ENGINEER

SLATER HANIFAN GROUP
5740 S. ARVILLE STREET #216
LAS VEGAS, NV 89118
(702) 284–5300

APPROVALS

CITY ENGINEER–ALLEN E. PAVELKA PE #9029 DATE

APPROVAL OF THESE PLANS BY THE CITY ENGINEER IS LIMITED TO THOSE IMPROVEMENTS CONSTRUCTED IN THE DEDICATED OF RIGHT–OF–WAY, AND/OR DEDICATED EASEMENTS. THIS APPROVAL DOES NOT AUTHORIZE CONSTRUCTION OF ANY IMPROVEMENTS THAT DEVIATE FROM ADOPTED STANDARDS AND/OR SPECIFICATIONS EXCEPT THOSE SPECIALLY LISTED UNDER DEVIATIONS FORM STANDARDS. THE ENGINEER SHALL RESOLVE ANY DEVIATION OTHER THAN THOSE LISTED IN DEVIATIONS FROM STANDARDS IN FAVOR OF THE UNIFORM STANDARD DRAWINGS AND SPECIFICATIONS, CLARK COUNTY AREA, NEVADA.

CHRIS KNIGHT DATE
DIRECTOR, BUILDING AND SAFETY

THIS PLAN MEETS THE APPLICABLE STANDARDS OF THE PLANNING DEPARTMENT.

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES
PROJECT NO. _____ DATE:_____
SHEETS:

APPROVAL BY THE FIRE DEPARTMENT HAVING JURISDICTION IS REQUIRED PRIOR TO OBTAINING FINAL APPROVAL FROM THE LAS VEGAS VALLEY WATER DISTRICT.

LAS VEGAS FIRE AND RESCUE DATE

NV ENERGY – TRANSMISSION DATE

CENTRAL TELEPHONE CO, DBA CENTURYLINK DATE

THE AFFIXED CENTRAL TELEPHONE CO, DBA CENTURYLINK APPROVAL DOES NOT ASSUME OR GUARANTEE LIABILITY FOR KNOWN OR UNKNOWN CONFLICTS WITH EXISTING OR PROPOSED IMPROVEMENTS. RESOLUTION OF ANY CONFLICT WILL BE ACCOMPLISHED PURSUANT TO LOCAL ORDINANCES, NEVADA REVISED STATUES AND/OR PUBLIC UTILITY COMMISSION RULES AND REGULATIONS.

SOUTHWEST GAS CORPORATION DATE

COX COMMUNICATIONS LAS VEGAS, INC. DATE

DRY UTILITY SUPPLEMENTAL INDEX

SOUTHWEST GAS	

INDEX OF DRAWINGS (STRUCTURAL)

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INDEX OF DRAWINGS

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2	G–02	GENERAL NOTES
3	G–03	ABBREVIATIONS, KEY MAP, LEGEND AND QUANTITIES
4	H–01	HORIZONTAL CONTROL PLAN 1
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6	H–03	HORIZONTAL CONTROL PLAN 3
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14	C–08	CONSTRUCTION PLAN – "SMP" 207+50.00 TO "SMP" 214+00.00
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19	C–13	CONSTRUCTION PLAN – "TRL" 12+00.00 TO "TRL" 18+00.00
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29	GR–02	GRADING PLAN – "GTRB" 6+50.00 TO "GTRB" 12+00.00
30	GR–03	GRADING PLAN – "SMP" 188+00.00 TO "SMP" 194+50.00
31	GR–04	GRADING PLAN – "SMP" 194+50.00 TO "SMP" 201+00.00
32	GR–05	GRADING PLAN – "SMP" 201+00.00 TO "SMP" 207+50.00
33	GR–06	GRADING PLAN – "SMP" 207+50.00 TO "SMP" 214+00.00
34	GR–07	GRADING PLAN – "SMP" 214+00.00 TO "SMP" 220+50.00
35	GR–08	GRADING PLAN – "SMP" 220+50.00 TO "SMP" 227+50.00
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49	ST–04	SIGNING AND STRIPING – "SMP" 214+00.00 TO "SMP" 227+50.00
50	ST–05	SIGNING AND STRIPING – "SMP" 227+50.00 TO "SMP" 231+18.05

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD 1-702-227-2929

FAST Call before you UnderGround. 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY–FIVE MANAGEMENT LLC
SHEEP MOUNTAIN PARKWAY
COVER SHEET

DATE: 05/29/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER – STATE OF NEVADA – JERRY J. SLATER – Exp.06/30/2018 – CIVIL – No. 14167

G-01
SHEET 1 OF 50

DWG NO. _____

HANSEN NO. _____

CITY OF LAS VEGAS SEWER NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS AND THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, AS AMENDED. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO BE AWARE OF THE CONTENTS OF THE ABOVE SPECIFICATIONS.
2. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PERFORM CONSTRUCTION AS PER PLANS. ANY ADDITIONS, DELETIONS, OR CHANGES SHALL FIRST MEET WITH THE APPROVAL OF THE CITY ENGINEER.
3. CHISEL "S" OR "G" IN CURBS WHERE SEWER OR GAS LATERALS PASS UNDER THE CURB.
4. POLYVINYL (PVC) SEWER PIPE SHALL MEET ASTM D-3034 SDR 35 SPECIFICATIONS, INSTALLED WITH SAND BEDDING AND BACKFILL OF TYPE II AGGREGATE BASE.
5. ALL MANHOLES PAVED IN STREETS EIGHTY (80') FOOT R/W AND LARGER SHALL HAVE CONCRETE COLLARS. STREETS LESS THAN EIGHTY (80') FOOT R/W WILL REQUIRE RETROFIT IF PAVING DOES NOT CONFORM TO CITY STANDARDS AT THE MANHOLE.
6. TEE SADDLES SHALL BE USED TO CONNECT SEWER LATERALS TO EXISTING MAIN LINES UP TO TWELVE INCH (12") DIAMETER. CONNECTIONS TO FIFTEEN INCH (15") OR LARGER MAINS SHALL REQUIRE SPECIAL PROCEDURES. IN LINE "Y" 'S SHALL BE USED ON LINES TWELVE INCHES (12") OR ABOVE.
7. WATER MAINS SHALL BE PROTECTED IN ACCORDANCE WITH LVVWD STANDARDS WHENEVER A SEWER MAIN CROSSES OVER A WATER MAIN OR THE SEWER IS LESS THAN EIGHTEEN INCH (18") UNDER A WATER MAIN.
8. ALL CONTRACTORS INSTALLING SEWER MAINS THAT WILL BE UNDER THE JURISDICTION OF THE CITY OF LAS VEGAS MUST BE STATE OF NEVADA CLASS "A" CONTRACTORS.
9. THE CITY OF LAS VEGAS WILL NOT ACCEPT ANY SEWER MAINS WHICH HAVE A VERTICAL DEFLECTION OF MORE THAN ONE TENTH (0.1) OF A FOOT FROM THE APPROVED CONSTRUCTION PLANS AT ANY LOCATION. SEWER MAINS FOUND TO EXCEED THIS TOLERANCE WILL HAVE TO BE REPAIRED OR REMOVED OR REPLACED TO THE SATISFACTION OF THE CITY ENGINEER PRIOR TO ACCEPTANCE BY THE CITY OF LAS VEGAS.
10. INSTALLATION OF CURVED SEWER REQUIRES THE USE OF C-900 PIPE WHICH ALLOWS FOR PIPE DEFLECTION AT THE JOINTS.

REVISED 04/15/10

STORMWATER MANAGEMENT NOTES

1. THE OWNER, SITE DEVELOPER, CONTRACTOR, AND/OR THEIR AUTHORIZED AGENTS SHALL EACH DAY REMOVE ALL SEDIMENT, MUD, CONSTRUCTION DEBRIS, OR OTHER POTENTIAL POLLUTANTS THAT MAY HAVE BEEN DISCHARGED TO, OR ACCUMULATED IN, THE PUBLIC RIGHTS OF WAY OF CLARK COUNTY AS A RESULT OF CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS SITE DEVELOPMENT OR CONSTRUCTION PROJECT. SUCH MATERIALS SHALL BE PREVENTED FROM ENTERING THE STORM SEWER SYSTEM.
2. ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT PRACTICES MAY BE REQUIRED OF THE OWNER AND HIS OR HER AGENTS DUE TO UNFORESEEN EROSION PROBLEMS IF THE SUBMITTED PLAN DOES NOT MEET THE PERFORMANCE STANDARD IN THE USDCCA AND THE LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDANCE MANUAL.
3. TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE AND NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. SOME EXCEPTIONS MAY APPLY; REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.5.
4. AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL INSPECT ALL DISTURBED AREAS, AREAS USED FOR STORAGE OF MATERIALS AND EQUIPMENT THAT ARE EXPOSED TO PRECIPITATION, VEHICLE ENTRANCE AND EXIT LOCATIONS, AND ALL BMPs WEEKLY, AND WITHIN 24 HOURS AFTER ANY RAIN EVENT OF 0.5 INCHES OR MORE. THE CONTRACTOR OR HIS AGENT SHALL UPDATE OR MODIFY THE STORMWATER POLLUTION PREVENTION PLAN AS NECESSARY. SOME EXCEPTIONS TO WEEKLY INSPECTIONS MAY APPLY, SUCH AS SUSPENSION OF LAND DISTURBANCE ACTIVITIES. REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR 100000, SECTION III.A.12.
5. THE DEVELOPER SHALL BE RESPONSIBLE TO PROVIDE AND INSTALL ALL PERMANENT SIGNS SHOWN ON THE PLANS. STREET NAME SIGNS SHALL CONFORM IN THEIR ENTIRETY TO CLARK COUNTY AREA STANDARDS. ALL OTHER SIGNS SHALL BE STANDARD SIZE UNLESS OTHERWISE SPECIFIED ON THE PLANS. ALL SIGN POSTS SHALL BE INSTALLED IN ACCORDANCE WITH CLARK COUNTY AREA STANDARDS. ALL SIGNS SHALL USE TYPE III SHEETING.

LAS VEGAS VALLEY WATER DISTRICT (LVVWD) STANDARD NOTES

LVVWD PROJECT #_____

1. NO WORK SHALL BEGIN UNTIL THE WATER PLANS HAVE BEEN APPROVED FOR CONSTRUCTION BY THE LVVWD. FOLLOWING WATER PLAN APPROVAL, NOTICE SHALL BE GIVEN TO THE LVVWD COMMUNICATION SUPPORT CENTER (258-7171) TWO (2) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION. FOR FUTURE INSPECTIONS, NOTICE MUST BE GIVEN BY 2:00 P.M. THE BUSINESS DAY PRIOR TO THE REQUESTED LVVWD INSPECTION. **WHEN REQUESTING INSPECTIONS, PLEASE REFER TO THE PROJECT # IDENTIFIED ABOVE.**
2. ALL WORK SHALL CONFORM TO LVVWD STANDARD PLATES, DRAWINGS, AND SPECIFICATIONS, AND TO THE **2010** EDITION OF THE UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR POTABLE WATER SYSTEMS (UDACS). **THE LATEST EDITION OF UDACS SHALL SUPERSEDE ANY CONFLICTS CONTAINED IN THE APPROVED DRAWINGS AND/OR SPECIFICATIONS.**
3. ALL WORK, EXCEPT AS MODIFIED BY THESE PLANS OR BY NOTE 2 ABOVE, SHALL BE DONE IN ACCORDANCE WITH THE MOST RECENT DRAFT OR EDITION OF THE UNIFORM SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFFSITE IMPROVEMENT, CLARK COUNTY AREA.
4. A SINGLE PIPE MATERIAL SHALL BE USED THROUGHOUT THE PROJECT UNLESS OTHERWISE APPROVED BY THE LVVWD.
5. ALL SERVICE LATERALS TWO (2) INCHES IN DIAMETER AND SMALLER SHALL BE TYPE K COPPER TUBING WITH LVVWD APPROVED SERVICE SADDLES.
6. ALL WATER METER BOXES SHALL BE LOCATED OUTSIDE OF DRIVEWAY AREAS.
7. ALL VALVES SHALL BE LOCATED OUTSIDE OF DRIVEWAYS, VALLEY AND CURB GUTTERS.
8. ALL WATER AND STORM DRAIN OR SANITARY SEWER CROSSINGS SHALL CONFORM TO SECTION 2.22 OF THE **2010** EDITION OF THE UDACS
9. ALL WATER FACILITIES SHALL BE FILLED, DISINFECTED, PRESSURE TESTED, FLUSHED, FILLED, AND AN ACCEPTABLE WATER SAMPLE OBTAINED, PRIOR TO CONNECTION TO THE LVVWD DISTRIBUTION SYSTEM.
10. THE CONTRACTOR MUST OBTAIN ALL METERS TWO (2) INCHES AND SMALLER FROM LVVWD CENTRAL STORES. TELEPHONE 258-3152 OR 258-3802, TWO (2) WORKING DAYS PRIOR TO METER PICKUP.
11. ANY INTERRUPTION OF SERVICE MUST BE PERFORMED IN ACCORDANCE WITH UDACS SECTION 3.14.01, AND APPROVED BY THE LVVWD INSPECTION DIVISION PRIOR TO SHUTDOWN. PROPER WRITTEN NOTIFICATION MUST BE GIVEN TO ALL AFFECTED CUSTOMERS.
12. ALL WATER FACILITY CONSTRUCTION MATERIALS USED MUST BE LISTED ON THE LVVWD PRE-APPROVED MATERIALS AND MANUFACTURER'S LISTING FOR NEW FACILITIES, LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS.
13. TELEPHONE "CALL BEFORE YOU DIG" AT "811" OR 1-800-227-2600.
14. THE INSTALLATION OF LAS VEGAS VALLEY WATER DISTRICT (LVVWD) MUNICIPAL WATER FACILITIES WITHIN ALL STREETS IS ASSUMED TO BE IN COMPLIANCE WITH THE UNIFORM STANDARDS, INCLUDING THE PLACEMENT OF ASPHALT PAVING STREET SURFACES. ANY REPAIR WORK DONE BY THE LVVWD TO THE MUNICIPAL WATER FACILITIES WILL INCLUDE THE PLACEMENT OF AN APPROPRIATELY SIZED ASPHALT REPAIR PATCH ON THE STREET SURFACE. ANY DECORATIVE PAVING SURFACE WITHIN THE STREET IS THE RESPONSIBILITY OF THE OWNER'S ASSOCIATION, OR THE INDIVIDUAL PROPERTY OWNERS IF NO OWNER'S ASSOCIATION IS IN EXISTENCE, OR THE AGENCY HAVING JURISDICTION DECORATIVE SURFACE MATERIALS PLACED WITHIN THE TEN FOOT EASEMENT ABUTTING A PUBLIC OF PRIVATE STREET, IF DISTURBED BY THE LVVWD DURING THE REPAIR OR OPERATION OF ITS FACILITIES, WILL BE REPLACED BY LVVWD WITH AN APPROPRIATELY SIZED PLAIN FINISH CONCRETE PATCH. THE LVVWD WILL NOT RESTORE, AND WILL NOT BE RESPONSIBLE FOR THE RESTORATION OF ANY DECORATIVE PAVING SURFACE WITH THE STREET. THE LVVWD WILL NOT ATTEMPT TO MATCH COLOR OR FINISH OF ANY ADJACENT MATERIALS.

APPROVED FOR CONSTRUCTION

_____

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES

DATE_____ LVVWD PROJECT #_____

CITY OF LAS VEGAS GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA NEVADA", LATEST ISSUE; THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION, CLARK COUNTY AREA NEVADA", LATEST REVISED EDITION; THE "SUMMERLIN IMPROVEMENT STANDARDS" FOR WORK IN THE SUMMERLIN AREA; AND OTHER APPLICABLE APPROVED STANDARDS ISSUED BY THE CONTROLLING AGENCY; THE UNIFORM BUILDING CODE; AND ALL LOCAL CITY CODES AND ORDINANCES APPLICABLE, EXCEPT AS NOTED ON THIS SHEET AS "DEVIATIONS FROM STANDARDS".
2. THE EXISTENCE AND LOCATION OF ANY OVERHEAD OR UNDERGROUND UTILITY LINES, PIPES, OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A RESEARCH OF THE AVAILABLE RECORDS. EXISTING UTILITIES AS SHOWN FROM CLV PLANS LIBRARY ARE APPROXIMATE AND FOR RECORD PURPOSES. EXISTING UTILITIES ARE LOCATED ON PLANS ONLY FOR THE CONVENIENCE OF THE CONTRACTOR. EXISTING UTILITY SERVICE LATERALS MAY NOT BE SHOWN ON THE PLANS. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, LOCATE ALL UNDERGROUND AND OVERHEAD INTERFERENCES WHICH MAY AFFECT HIS OPERATION DURING CONSTRUCTION AND SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID DAMAGE TO SAME. THE CONTRACTOR SHALL USE EXTREME CAUTION WHEN WORKING NEAR OVERHEAD UTILITIES SO AS TO SAFELY PROTECT ALL PERSONNEL AND EQUIPMENT, AND SHALL BE RESPONSIBLE FOR ALL COST AND LIABILITY IN CONNECTION THEREWITH.
3. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT EXISTING UTILITY LINES, STRUCTURES AND STREET IMPROVEMENTS WHICH ARE TO REMAIN IN PLACE, FROM DAMAGE, AND ALL SUCH IMPROVEMENTS OR STRUCTURES DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR REPLACED SATISFACTORY TO THE CITY ENGINEER AND OWNING UTILITY COMPANY AT THE EXPENSE OF THE CONTRACTOR.
4. ALL CONSTRUCTION SHALL BE AS SHOWN ON THESE PLANS, ANY REVISIONS SHALL HAVE THE PRIOR WRITTEN APPROVAL OF THE CITY ENGINEER.
5. TYPE V CEMENT SHALL BE USED IN ALL OFF-SITE CONCRETE WORK. CONCRETE TO BE 3000 P.S.I. MINIMUM @ 28 DAYS. MIX DESIGNS TO BE APPROVED BY THE CITY, PRIOR TO THE USE ON THE PROJECT.
6. PERMITS ARE REQUIRED FOR ANY WORK IN THE PUBLIC RIGHT-OF-WAY. THE CONTRACTOR SHALL SECURE ALL PERMITS AND INSPECTIONS REQUIRED FOR THIS CONSTRUCTION.
7. EXPANSION JOINTS REQUIRED, MAXIMUM EVERY 300' IN EXTRUDED-TYPE CURB.
8. AC PAVEMENT TO BE ONE-HALF INCH (½") ABOVE LIP OF ALL GUTTERS AFTER COMPACTION, EXCEPT AT SIDEWALK RAMPS AND CROSS GUTTERS.
9. CURB AND GUTTER FOUND TO BE UNACCEPTABLE TO THE CITY OF LAS VEGAS SHALL BE REMOVED AND REPLACED PER STANDARD DRAWING 216.
10. SIDEWALK RAMPS SHALL BE CONSTRUCTED IN EACH QUADRANT OF AN INTERSECTION PER STANDARD DRAWING 235. EXACT LOCATION OF RAMPS MAY BE ADJUSTED IN THE FIELD BY A CITY INSPECTOR.
11. CONTRACTOR SHALL PROVIDE ALL NECESSARY HORIZONTAL AND VERTICAL TRANSITIONS BETWEEN NEW CONSTRUCTION AND EXISTING SURFACES TO PROVIDE FOR PROPER DRAINAGE AND FOR INGRESS AND EGRESS TO NEW CONSTRUCTION. THE EXTENT OF THE TRANSITIONS TO BE AS SHOWN ON PLANS.
12. ALL GRADING WORK SHALL CONFORM TO THE SOILS REPORT AS PREPARED BY WRIGHT ENGINEERS, REPORT #160165, MAY 20, 2016 APPROVED BY THE CITY ENGINEER, AND AS SHOWN ON THESE PLANS.
13. EXACT LOCATION OF ALL SAWCUT LINES MAY BE ADJUSTED OR DETERMINED IN THE FIELD BY A CITY OF LAS VEGAS ENGINEER IF LOCATION ON PLANS IS NOT CLEARLY SHOWN, OR EXISTING PAVEMENT CONDITION REQUIRES RELOCATIONS.
14. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PROTECT EXISTING PERMANENT SURVEY MONUMENTS. ANY MONUMENTS DISTURBED SHALL BE REPLACED AND ADJUSTED PER AVAILABLE RECORDS IN ACCORDANCE WITH N.R.S. STATUTE NO. 625.380 & CITY OF LAS VEGAS TITLE 18, APPENDIX D.
15. UTILITY COMPANY METER BOXES, MANHOLE LIDS, VALVE COVERS, ETC., SHALL BE LOCATED OUT OF DRIVEWAYS, DRIVEWAY APRONS, FLOWLINES, AND CROSS GUTTERS UNLESS WRITTEN APPROVAL IS GRANTED BY THE UTILITY COMPANY AND THE CITY ENGINEER. ALL ABOVE GROUND UTILITY APPERTANANCES SHALL CONFORM TO THE REQUIREMENTS OF 19.12.040.

WALL NOTES:

16. ALL WALLS, NEW OR EXISTING, ARE ONLY SHOWN ON CIVIL PLANS FOR THE PURPOSE OF REVIEWING GRADING RELATIONSHIPS; FLOOD CONTROL AND SIGHT DISTANCE AT INTERSECTIONS. NEW WALLS REQUIRE A SEPARATE PERMIT AND INSPECTION BY THE BUILDING DEPARTMENT.
17. ASPHALT MIX DESIGN MUST BE SUBMITTED AND APPROVED BY THE CITY ENGINEER PRIOR TO THE PLACEMENT OF ASPHALT WITHIN CITY RIGHT OF WAY.
18. CONTRACTOR SHALL ADJUST ALL NEW AND EXISTING INLETS, VALVE BOXES, MANHOLE RIMS, AND SEWER CLEAN OUTS, ETC. TO FINISH GRADE AS APPLICABLE WHETHER OR NOT THEY ARE SHOWN ON THE PLANS.
19. MATERIALS, HANDLING AND PLACEMENT OF PORTLAND CEMENT CONCRETE SHALL BE IN ACCORDANCE WITH APPLICABLE SECTIONS OF NDOT OR THE CLARK COUNTY AREA SPECIFICATIONS (AS APPLICABLE) AND THE PLANS AND DETAILS SHOWN HEREON.
20. WHEN INSTALLING UNDERGROUND FACILITIES THAT REQUIRE UNDERGROUND LOCATING DEVICES SUCH AS MARKER BALLS, LOCATING RIBBON, ETC, THE CONTRACTOR SHALL PROVIDE WRITTEN DOCUMENTATION TO OFFSITE INSPECTION AND TESTING CERTIFYING THAT ALL DEVICES HAVE BEEN PLACED AND VERIFIED TO BE IN GOOD WORKING CONDITION PRIOR TO THE CONSTRUCTION OF ANY ROAD BASE.
21. SANITARY SEWER AND STORM DRAIN FINAL LOCATION MAP(S) SHALL BE PROVIDED TO THE CITY AND APPROVED PRIOR TO ACCEPTANCE OF FACILITY VIDEO INSPECTION. THE MAP(S) SHALL INCLUDE THE HORIZONTAL AND VERTICAL (INVERT) LOCATION OF PUBLIC SEWER MANHOLES, STORM DRAIN MANHOLES AND TRANSITION STRUCTURES, STORM DRAIN LATERALS AT THE CONNECTION TO THE STORM DRAIN MAIN AND AT THE CONNECTION TO A DROP INLET, THE CONNECTION OF SEWER SERVICE LATERALS TO THE SEWER MAIN AND WHERE THE SEWER SERVICE LATERALS EXIT THE PUBLIC RIGHT-OF-WAY, AND STORM DRAIN MAIN ALIGNMENT, INCLUDING DEFLECTION POINTS. THE LOCATION SHALL BE DESCRIBED BY COORDINATES WHICH SHALL BE BASED ON THE OFFICIAL HORIZONTAL AND VERTICAL CONTROL NETWORKS OF THE CITY OF LAS VEGAS. FINAL DRAWINGS MUST BE SEALED AND CERTIFIED BY A NEVADA PROFESSIONAL LAND SURVEYOR TO HAVE POSITIONAL CERTAINTIES OF ±0.09 METERS (±0.3 FEET) HORIZONTALLY AND VERTICALLY. A SEPARATE ELECTRONIC COMMA DELIMITED FILE FOR THE SANITARY SEWER AND STORM DRAIN COORDINATES SHALL ALSO ACCOMPANY THE SANITARY SEWER AND STORM DRAIN FINAL LOCATION MAP(S).

OR

~~SANITARY SEWER AND STORM DRAIN FACILITIES SHOWN ON THESE PLANS SHALL BE USED TO MEET THE REQUIREMENTS OF NRS 455 AND SHALL SHOW AT A MINIMUM THE HORIZONTAL AND VERTICAL (INVERT) LOCATION OF PUBLIC MANHOLES, STORM DRAIN MANHOLES, STORM DRAIN LATERALS AND THE CONNECTION OF SEWER SERVICE LATERALS TO THE SEWER MAIN AND WHERE THE SEWER SERVICE LATERALS EXIT THE PUBLIC RIGHT-OF-WAY. ANY DEVIATIONS FROM THE INFORMATION SHOWN SHALL BE NOTED AND SUBMITTED AS A REVISION TO THE PLANS AND APPROVED PRIOR TO ACCEPTANCE OF FACILITY VIDEO INSPECTION.~~

22. CCTV VIDEO INSPECTION IS REQUIRED FOR ALL SEWER AND STORM DRAINS. THE CCTV VIDEO INSPECTIONS NEED TO BE PERFORMED PER THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS LATEST ADDITION.
23. A SEPARATE BORING PERMIT IS REQUIRED FOR ALL BORING ACTIVITIES.

REVISED 02/03/15

CITY OF LAS VEGAS STREETLIGHT NOTES

1. ALL STREET LIGHTING INSTALLATIONS SHALL BE IN ACCORDANCE WITH THE STREET LIGHTING PLANS, THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA", LATEST REVISION, AND THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA", LATEST REVISION, AND ANY ADOPTED SPECIAL AREA STANDARDS.
2. NO DEVIATION OF STREET LIGHT, PULL BOX, CONDUITS (ETC.) LOCATIONS SHALL BE PERMITTED WITHOUT WRITTEN APPROVAL OF TRAFFIC ENGINEERING AND THE CITY ENGINEER.
3. ALL EXISTING STREET LIGHTING SHALL REMAIN OPERATIONAL DURING CONSTRUCTION.
4. ALL STREET LIGHTING CONDUITS STUB SHALL HAVE AT LEAST ONE GREEN #8 THW WIRE INSTALLED, AS TRACER WIRE. WHEN "EMPTY" CONDUIT IS COMPLETELY INSTALLED FROM PB TO PB, IT SHALL HAVE MINIMUM OF 2 #4 AND 1 #8 THW WIRE WITH THE ENDS TAPED OR "SAFE OFF" PRIOR TO FINAL INSPECTION.
5. ANY STRUCTURE SUCH AS BLOCK WALLS, CHAIN LINK FENCES, RETAINING WALLS, ETC., SHALL LEAVE A MINIMUM CLEARANCE IN ACCORDANCE WITH THE USD NO. 320A.
6. AS-BUILT DRAWINGS SHALL BE SUPPLIED TO THE TEFO PRIOR TO ANY PRE-FINAL INSPECTION. THE AS-BUILT DRAWING NEEDS TO BE STAMPED AS-BUILT AND SIGNED BY THE PREPARER.
7. SERVICE POINT SHALL BE COORDINATED WITH NV ENERGY COMPANY, AND WHEREVER POSSIBLE, BE LOCATED NEAR THE CENTER OF THE CIRCUIT. SERVICE POINTS SHALL BE SHOWN ON THE CIVIL PLANS.
8. IT SHALL BE ASSUMED THAT IN THE ABSENCE OF AN EXISTING, WORKABLE CIRCUIT TO ATTACH TO, ALL INSTALLATIONS SHALL REQUIRE A NEW SERVICE FOR OPERATION OF THE CIRCUIT.
9. WHEREVER THERE IS AN OVERHEAD UTILITY THAT MAY CONFLICT WITH THE INSTALLATION OF STREET LIGHTING CIRCUITS AND/OR POLES, THESE CONFLICTS MUST BE RESOLVED BETWEEN THE DEVELOPER AND THE UTILITIES INVOLVED, AT NO EXPENSE TO THE CITY OF LAS VEGAS, BEFORE STREETLIGHT BASES ARE INSTALLED.
10. THE CONTRACTOR SHALL FURNISH COMPLETE SERVICE TO TRANSFORMERS AND CONTROL SYSTEMS IF REQUIRED ON PLANS.
11. THE DEVELOPER/OWNER WILL BE REQUIRED TO SUPPLY POWER TO ALL NEW PUBLIC STREET LIGHTS INSTALLED UNDER THIS DESIGN PRIOR TO BOND RELEASE OR PROJECT COMPLETION. THE DEVELOPER/OWNER WILL BE RESPONSIBLE FOR ALL ITEMS ASSOCIATED WITH THE INSTALLATION, CONSTRUCTION, ENERGIZING, MAINTENANCE AND OPERATIONAL COST OF SAID STREET LIGHTS PRIOR TO PROJECT COMPLETION. REFER TO THE PLAN FOR ANY NEW SERVICE REQUIREMENTS. THE TRANSFER OF OWNERSHIP FROM THE DEVELOPER/OWNER TO THE CITY OF LAS VEGAS FOR ALL NEW PUBLIC STREET LIGHT/S AND/OR SERVICE/S INSTALLED UNDER THIS PLAN DESIGN WILL BE IN CONJUNCTION WITH THIS PROJECT COMPLETION. COORDINATE ALL MAINTENANCE AND OPERATIONAL TRANSFERS WITH THE CITY OF LAS VEGAS TRAFFIC ENGINEERING DEPARTMENT (TEFO) AT (702) 229-6331.

REVISED 04/15/10

LAS VEGAS FIRE AND RESCUE GENERAL NOTES

1. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE LAS VEGAS FIRE AND RESCUE ADOPTED FIRE CODE ORDINANCE # 6325 FOR HYDRANT SPECIFICATIONS AND HYDRANT INSTALLATION SPECIFICATIONS.
2. ONLY FIRE HYDRANTS THAT ARE ON THE LAS VEGAS VALLEY WATER DISTRICT'S- APPROVED PRODUCTS LIST ARE ALLOWED TO BE INSTALLED.
3. A PERMIT IS REQUIRED FROM LAS VEGAS FIRE AND RESCUE FOR THE INSTALLATION OF ON-SITE WATER LINES AND FIRE HYDRANTS. THE PERMIT AND CONTRACTORS MATERIAL TEST CERTIFICATE FOR UNDERGROUND PIPING FORM SHALL BE OBTAINED FROM THE FIRE PROTECTION ENGINEER BEFORE COMMENCEMENT OF WORK. [IFC § 105.7.12]
4. ON ANY RESIDENTIAL OR COMMERCIAL INSTALLATIONS, FIRE HYDRANTS SHALL BE INSTALLED AND FIRE APPARATUS ACCESS ROADS SHALL BE MAINTAINED BEFORE COMMENCEMENT OF ANY COMBUSTIBLE CONSTRUCTION. ALL FIRE HYDRANTS SHALL BE IN GOOD WORKING ORDERAND SHALL BE CAPABLE OF DELIVERING THE REQUIRED FIRE FLOW. [IFC § 3310, § 3312]
5. TO IDENTIFY THE FIRE HYDRANT LOCATIONS, THE CONTRACTOR SHALL PLACE A BLUE REFLECTIVE MARKER AT THE CENTER LINE OF THE STREET ADJACENT TO THE FIRE HYDRANTS. [IFC § 507.5.7.3]
6. ALL UNDERGROUND INSPECTIONS, PRESSURE AND FLUSH VERIFICATIONS OF ALL FIRE HYDRANTS AND FIRE LINES, SHALL BE CONDUCTED BEFORE COVERING THE LINES. CENTER LOADING IS ACCEPTABLE FOR THE HYDRO TESTS WITH PRIOR FIRE PREVENTION APPROVAL. [IFC § 106.3]
7. ALL ON-SITE UNDERGROUND WATER MAINS AND MATERIALS SHALL BE U.L. LISTED, A.W.W.A APPROVED AND SHALL BE RATED FOR THE APPROPRIATE WORKING PRESSURE. [IFC § 507.2.1, NFPA 24]
8. PAINTING OF CURBS, FIRE HYDRANTS, PADS, PROTECTION OF FIRE HYDRANTS FROM PHYSICAL DAMAGE, AND ALL OTHER WORK NECESSARYPER PLANS SHALL BE COMPLETED BEFORE APPROVAL BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION. [IFC § 507]
9. PRIVATE HYDRANTS SHALL BE PAINTED RED. [IFC § 507.5.7.1]
10. PRIOR TO THE FINAL OCCUPANCY, A FIRE FLOW TEST SHALL BE WITNESSED BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION TO VERIFY AVAILABILITY OF THE REQUIRED FIRE FLOW. [IFC § 507]
11. FIRE HYDRANT SPACING SHALL BE AS FOLLOWS; [IFC § C102]
    - RESIDENTIAL -500 FT UNSPRINKLERED; 600 FT SPRINKLERED.
    - COMMERCIAL -300 FT UNSPRINKLERED; 400 FT SPRINKLERED.
12. WHERE THE WATER MAINS ARE EXTENDED ALONG STREETS OR NEW STREETS ARE INSTALLED WHERE FIRE HYDRANTS ARE NOT NEEDED FOR PROTECTION OF THE STRUCTURES, FIRE HYDRANTS SHALL BE INSTALLED AT A MAXIMUM OF 1000 FT SPACING, TO PROVIDE FOR TRANSPORTATION HAZARDS. WHERE STREETS ARE PROVIDED WITH MEDIAN DIVIDERS OR HAVE FOUR (4) OR MORE TRAFFIC LANES AND HAVE A TRAFFIC COUNT OF MORE THAN 30,000 PER DAY, HYDRANTS ARE REQUIRED ON EACH SIDE OF THE STREET SPACED AT 500 FT ON AN ALTERNATING BASIS. [IFC § C102.8]
13. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN THE RADIUS OF A CUL-DE-SAC OR WITHIN 20 FT OF THE PERIMETER OF THE RADIUS OF THE CUL-DE-SAC.
14. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN 6 FT OF ANY CURB RETURN, DRIVEWAY, POWER POLE, STREETLIGHT OR ANY OTHER OBSTRUCTION. [IFC § C102.12]
15. A MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A ONE-TWO FAMILY DWELLING SHALL NOT EXCEED 300 FT, AS MEASURED BY AN APPROVED ROUTE. [IFC § C102.4]
16. THE MAXIMUM DISTANCE FROM A FIRE DEPARTMENT CONNECTION (FDC) SHALL NOT EXCEED 100 FT, AS MEASURED BY AN APPROVED ROUTE. [IFC § C102.7]
17. THE MAXIMUM DISTANCE FROM A HYDRANT TO THE END OF A DEAD-END STREET SHALL NOT EXCEED 200 FT. [IFC § C102.6]
18. TWO (2) SOURCES OF SUPPLY ARE REQUIRED WHENEVER THERE IS 4 OR MORE FIRE HYDRANTS/SPRINKLER LEAD-INS ARE INSTALLED ON A SINGLE SYSTEM. SECTIONAL CONTROL VALVES SHALL BE INSTALLED SO THAT NO MORE THAN 2 FIRE HYDRANTS CAN BE OUT OF SERVICE DUE TO A BREAK IN A WATER MAIN. [IFC § C104]
19. ALL FIRE APPARATUS ACCESS ROADS SHALL BE PAVED TO PROVIDE ALL-WEATHER DRIVING CAPABILITIES, AND SHALL BE DESIGNED AND MAINTAINED TO SUPPORT THE IMPOSED LOADS OF THE FIRE APPARATUS. [IFC § 503.2.3]
20. THE GRADIENT FOR THE FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 12% ANGLES OF APPROACH AND ANGLES OF DEPARTURE SHALL NOT EXCEED 6% FOR 25 FT PRIOR TO OR AFTER THE GRADE CHANGE. ADJACENT TO THE STRUCTURES GRADIENT SHALL NOT EXCEED 6% [IFC § 503.2.7, § 503.2.8]
21. THE TURNING RADIUS OF THE FIRE APPARATUS ACCESS ROADS SHALL BE NO LESS THAN 52 FT OUTSIDE AND 28 FT INSIDE TURNING RADIUS. [IFC § 503.2.4]
22. VERTICAL CLEARANCE OF ALL FIRE APPARATUS ACCESS ROADS SHALL NOT BE LESS THAN 13FT 6 INS. [IFC § 503.2.1]
23. FIRE DEPARTMENT ACCESS ROADS SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF NOT LESS THAN 40 FT FLOW LINE TO FLOW LINE WITH PARALLEL PARKING PERMITTED ON BOTH SIDES. NOT LESS THAN 32 FT WIDE, FLOW-LINE TO FLOW-LINE, WHERE PARKING IS PERMITTED ONLY ON ONE SIDE OF THE FIRE APPARATUS ACCESS ROAD. NOT LESS THAN 24 FT WIDE, FLOW-LINE TO FLOW-LINE, WHERE NO PARKING IS PERMITTED ON EITHER SIDE. FIRE LANES THROUGH PARKING LOTS SHALL BE NOT LESS THAN 24 FT. [IFC § 503.2.1.1]
24. A FIRE APPARATUS ACCESS ROAD SHALL BE REQUIRED WHEN ANY PORTION OF AN EXTERIOR WALL OF THE FIRST STORY IS LOCATED MORE THAN 150 FT FROM A FIRE DEPARTMENT VEHICLE ACCESS. THIS DISTANCE COULD BE INCREASED TO 250 FT IF THE BUILDING IS SPRINKLERED. [IFC § 503.1.1]
25. APPROVED SECONDARY FIRE APPARATUS ACCESS SHALL BE PROVIDED FOR 100 OR MORE DWELLING UNITS, ROAD(S) WITH DEAD-ENDS OR WITH A SINGLE POINT OF ACCESS IN EXCESS OF 600 FT. COMMERCIAL AND INDUSTRIAL DEVELOPMENTS WHERE BUILDINGS EXCEED 2 STORIES OR 30 FEET IN HEIGHT, OR EXCEEDING 62,000 SQUARE FEET IN AREA. [IFC § 503.1.2]
26. ALL DEAD-END FIRE APPARATUS ROADS AND/OR FIRE LANES, PUBLIC OR PRIVATE, IN EXCESS OF 150 FT IN LENGTH SHALL BE PROVIDED WITH AN APPROVED TURN AROUND HAVING A MINIMUM DIAMETER OF 81 FT. [IFC § 503.2.5]
27. ALL FIRE APPARATUS ACCESS ROADS SHALL BE MARKED BY PLACING APPROVED SIGNS AT THE START OF THE DESIGNATED FIRE LANE, ONE SIGN AT THE END OF THE FIRE LANE AND WITH SIGNS AT INTERVALS OF 100 FT ALONG THE DESIGNATED FIRE LANES. SIGNS TO BE PLACED ON BOTH SIDES OF AN ACCESS ROADWAY IF NEEDED TO PREVENT PARKING ON EITHER SIDE. SIGNS TO BE INSTALLED NO HIGHER THAN 10 FT OR LESS THAN 6 FT FROM THE ROADWAY LEVEL. THE CURB ALONG OR ON THE P

LEGEND

— — —TEL 5-4"— — —	EXISTING TELEPHONE CABLE
— — —12" SS— — —	EXISTING SANITARY SEWER LINE
— — —12" W— — —	EXISTING WATER LINE
— — —18" SD— — —	EXISTING STORM DRAIN LINE
≡≡≡≡≡≡≡≡≡≡≡≡≡	EXISTING STORM DRAIN (SIZE PER PLAN)
— — —ELE UG 1-4"— — —	EXISTING UNDERGROUND ELECTRICAL LINE
— — — —OHP— — — —	EXISTING OVERHEAD POWER LINE
— — — —OHP/TEL— — — —	EXISTING OVERHEAD POWER AND TELEPHONE LINE
— — —4" PE GAS— — —	EXISTING GAS LINE
— — — —CATV— — — —	EXISTING CABLE TELEVISION LINE
≡≡≡≡≡≡≡≡≡≡≡≡≡	EXISTING CURB & GUTTER
——— - - - ———	EXISTING RIGHT-OF-WAY LINE
——— — — ———	EXISTING PROPERTY LINE
——x——x——x——	EXISTING CHAIN-LINK FENCE
····· SL ·····	EXISTING STREET LIGHT CONDUIT
MH	EXISTING MANHOLE OR VAULT
	EXISTING VALVE (GAS OR WATER)
FH	EXISTING FIRE HYDRANT
PP	EXISTING POWER OR TELEPHONE POLE
	EXISTING PADMOUNTED SERVICE PEDESTAL
	EXISTING NV ENERGY TRANSFORMER
	EXISTING SWING GATE
	CENTERLINE
	EASEMENT LINE
	AEP
	PROPOSED SIGN
	MAINTENANCE ACCESS PATH
	CONCRETE OR PAVED SURFACE
	RIPRAP
	FLOWLINE
	SAWCUT LINE
1875	CONTOUR LINE
12.3 TC	ELEVATION
D	STORM DRAIN MANHOLE
S	SANITARY SEWER MANHOLE
	100 WATT STREET LIGHT
	250 WATT STREET LIGHT
—— — —4" ITS— ——	FAST ITS CONDUIT
P30	FAST P30 PULLBOX
T200	FAST TYPE 200 SPLICE VAULT
	EXISTING STREET LIGHT
	EXISTING ON-SITE LIGHT

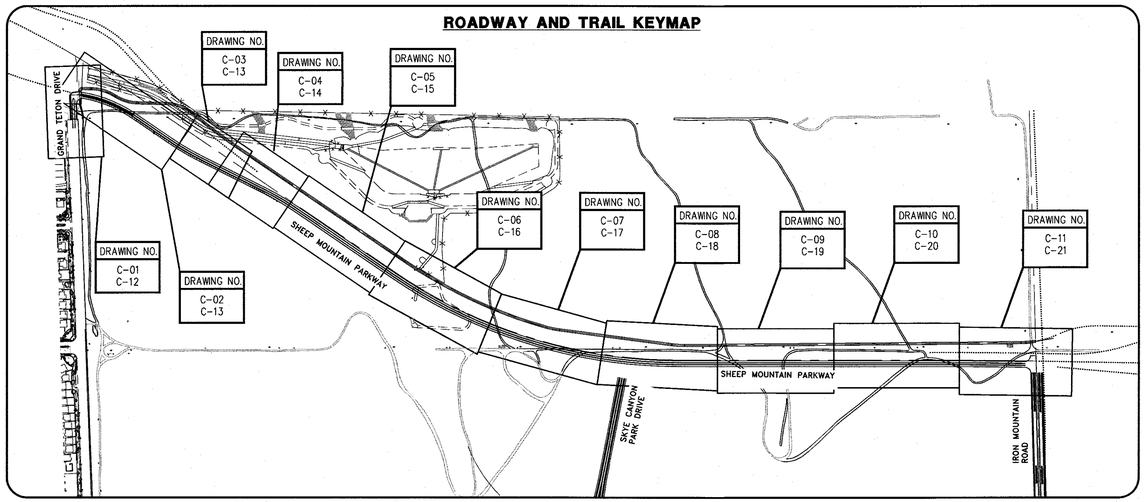
QUANTITIES

DESCRIPTION	UNIT	TOTAL QUANTITY
8" SEWER	LF	" "
SEWER MANHOLE 6 TO 18 FEET	EA	" "
SEWER MANHOLE > 18'	EA	" "
8" PVC WATER MAIN	LF	" "
8" PVC WATER LATERAL	LF	" "
8" DIP WATER LATERAL	LF	" "
10" PVC WATER MAIN	LF	" "
10" DIP WATER MAIN	LF	" "
10" DIP WATER LATERAL	LF	" "
8" GATE VALVE	EA	" "
10" GATE VALVE	EA	" "
8" 45° BEND	EA	" "
8" 5° BEND	EA	" "
8" X 8" TEE	EA	" "
10" 45° BEND	EA	" "
10" 5° BEND	EA	" "
10" X 10" TEE	EA	" "
CAP WITH 2" BLOW-OFF ASSEMBLY	EA	" "
FIRE HYDRANT	EA	" "
16" X 8" REDUCER	EA	" "
10" X 8" REDUCER	EA	" "
CURB & GUTTER (TYPE "L" & "A")	LF	" "
CROSS GUTTER	SF	" "
SIDEWALK 4"	LF	" "
SIDEWALK RAMP	EA	" "
TYPE II GRAVEL BASE	CY	" "
3" ASPHALTIC CONCRETE PAVING	SY	" "
4" ASPHALTIC CONCRETE PAVING	SY	" "
5" ASPHALTIC CONCRETE PAVING	SY	" "

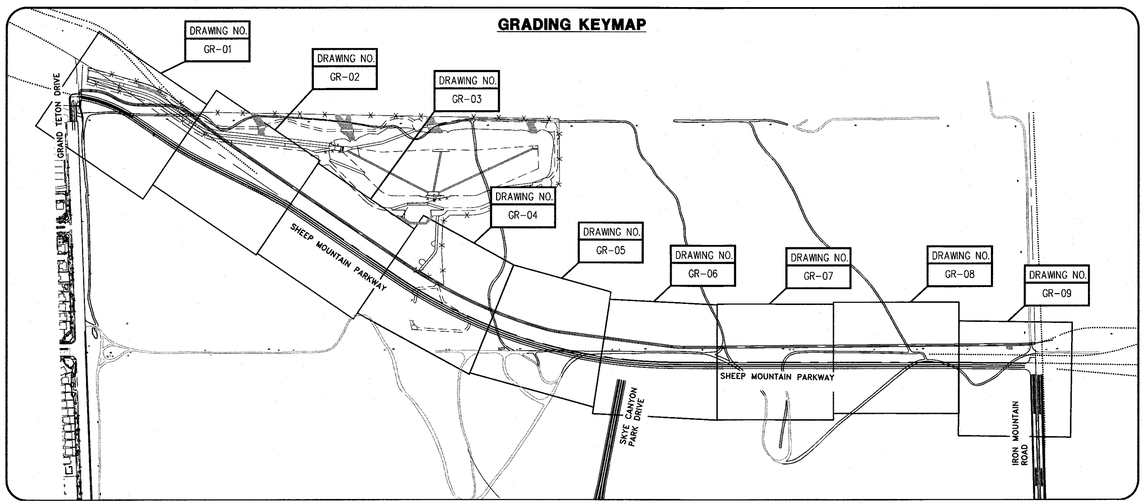
QUANTITIES

DESCRIPTION	UNIT	TOTAL QUANTITY
24" STORM DRAIN	LF	24'
36" STORM DRAIN	LF	56'
42" STORM DRAIN	LF	70'
48" STORM DRAIN	LF	398'
HEADWALL (STRUCTURAL)	EA	2
NDOT TYPE 2B STORM DRAIN DROP INLET WITH CONCRETE APRON	EA	3
NDOT RCP END SECTION	EA	2
RIPRAP (D50=3", T=6")	SF	1933
RIPRAP (D50=18", T=36")	SF	4000
3" MINUS GRAVEL ACCESS	SF	840
6" THICK CONCRETE MAINTENANCE ACCESS	SF	2865
6" THICK CONCRETE PAD WITH 3-FT DEEP CUTOFF WALL (STRUCTURAL)	SF	1163
3-FT DEEP CUTOFF WALL	LF	317
60" TYPE III STORM DRAIN MANHOLE	EA	1

ROADWAY AND TRAIL KEYMAP



GRADING KEYMAP



ABBREVIATIONS

ABUT	ABUTMENT
AC	ALUMINUM CAP/ASPHALTIC CONCRETE
AEP	AUTHORIZATION TO ENTER PROPERTY
AP	ANGLE POINT
APN	ASSESSORS PARCEL NUMBER
AVE	AVENUE
BC	BEGIN CURVE/BRASS CAP/BACK OF CURB
BCR	BEGIN CURB RETURN
BLVD	BOULEVARD
BM	BENCHMARK
BOT	BOTTOM
BRG	BEARING
BSW	BACK OF SIDEWALK
BVCE	BEGIN VERTICAL CURVE ELEVATION
BVCS	BEGIN VERTICAL CURVE STATION
CATV	UNDERGROUND CABLE TV
CG	CURB AND GUTTER
CCSD	DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS
CKT	CIRCUIT
CLR	CLEAR/CLEARANCE
CLBM	CITY OF LAS VEGAS BENCHMARK
CLV	CITY OF LAS VEGAS
CMU	CONCRETE MASONRY UNIT
CONC	CONCRETE
℄ C/L	CENTERLINE
COB	CENTER OF BOLLARD
COL	COLUMN
CONST	CONSTRUCT/CONSTRUCTION
COORD	COORDINATE
COR	CORNER
CY	CUBIC YARD(S)
Δ	DELTA
DB	DIRECT BURY
DBL	DOUBLE
DI	DROP INLET
DIA	DIAMETER
DIST	DISTANCE
DR	DRIVE
DW	DRIVEWAY
DWG	DRAWING
ECR	END CURB RETURN
E	EAST
EA	EACH
ESMT	EASEMENT
ECR	END CURB RETURN
ELEC	ELECTRICAL
ELEV/EL	ELEVATION
EP/EOP	EDGE OF PAVEMENT
EQ	EQUAL
EST	ESTIMATED
EVC	END VERTICAL CURVE
EX./EXIST	EXISTING
EXP	EXPANSION JOINT
EW	EACH WAY
FC	FACE OF CURB
FG	FINISH GRADE
FH	FIRE HYDRANT
FL	FLOW LINE
FO	FIBER OPTIC
FS	FINISH SURFACE
FT	FOOT/FEET
FTG	FOOTING
FW	FACE OF WALL
FYA	FLASHING YELLOW ARROW
G	GAS
GA	GAUGE
GB	GRADE BREAK
GND	GROUND
H	HEIGHT
HGL	HYDRAULIC GRADE LINE
HORIZ	HORIZONTAL
HWY	HIGHWAY
INV	INVERT
ITS	INTELLIGENT TRANSPORTATION SYSTEM
JT	JOINT
LF	LINEAR (LINEAL) FEET
LIP	LIP OF GUTTER
LT	LEFT
LUM	LUMINAIRE
LVVWD	LAS VEGAS VALLEY WATER DISTRICT
MAX	MAXIMUM
MH	MANHOLE
MIN	MINIMUM
MLCP	MULTI-LAYERED COMPOSITE PIPE
MOD	MODIFY/MODIFIED
MON	MONUMENT
MPH	MILES PER HOUR
N	NORTH
NDOT	NEVADA DEPARTMENT OF TRANSPORTATION
NO	NUMBER
NVE	NV ENERGY
NTS	NOT TO SCALE
OC	ON CENTER
OHP	OVERHEAD POWER LINE
PAT	PATENT
PB	PULL BOX
PBS	PLANTMIX BITUMINOUS SURFACE
PC	POINT OF CURVE, PHOTO CELL
PCC	POINT OF COMPOUND CURVE
PD	PONDING DEPTH
PE	PROJECT ENGINEER/POLYETHYLENE
PED	PEDESTRIAN
PG	PROFILE GRADE (FG ON CONTROL LINE)
PGL	PROFILE GRADE LINE
PH	POTHOLE
PI	POINT OF INTERSECTION
PKWY	PARKWAY
PL	PROPERTY LINE
PMF	PAVEMENT MARKING FILM
POB	POINT OF BEGINNING
POC	POINT ON CURVE
POE	POINT OF ENDING
POT	POINT ON TANGENT
PP	POWER POLE
PPCBR	PORTABLE PRECAST CONCRETE BARRIER RAIL
PPM	POLYUREA PAVEMENT MARKINGS
PR	PAIR
PROP	PROPOSED
PRC	POINT OF REVERSE CURVE
PRVC	POINT REVERSE VERTICAL CURVE
PSI	POUNDS PER SQUARE INCH
PT	POINT OF TANGENCY
PVI	POINT OF VERTICAL INTERSECTION
PVMT	PAVEMENT
R	RADIUS
RCB	REINFORCED CONCRETE BOX
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
RDWY	ROADWAY
REC	RECTANGULAR
REINF	REINFORCED
REQD	REQUIRED
RND	ROUND
RP	RADIUS POINT
RPM	RAISED PAVEMENT MARKERS
R/W	RIGHT-OF-WAY
RT	RIGHT
S	SOUTH
SCH	SCHEDULE
SD	STORM DRAIN
SDMH	STORM DRAIN MANHOLE
SECT	SECTION
SF	SQUARE FOOT/FEET
SHLDR	SHOULDER
SHT	SHEET
SIM	SIMILAR
SP	SERVICE POINT
SPA	SPACING
SQ	SQUARE
SS	SANITARY SEWER
SSMH	SANITARY SEWER MANHOLE
STA	STATION
STD	STANDARD
ST	STREET
STL	STEEL
SL	STREET LIGHT
STRUCT	STRUCTURE
SW	SIDEWALK
SNBORS	SOUTHERN NEVADA BUILDING OFFICIALS REGIONAL STANDARDS
SWG	SOUTHWEST GAS
T	TELEPHONE/TOP
TAN	TANGENT
TC	TOP OF CURB
TEMP	TEMPORARY
TF	TOP OF FOOTING
TG	TOP OF GRATE
TMH	TOP OF MANHOLE
TRANS	TRANSITION STRUCTURE
THW	TOP OF HEADWALL
TRW	TOP OF RETAINING WALL
TW	TOP OF WALL
TS	TRAFFIC SIGNAL
TYP	TYPICAL
UDACS	UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR WATER DISTRIBUTION SYSTEMS
USDCCA	UNIFORM STD. DRAWINGS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS CLARK COUNTY AREA, NEVADA
UT	UNDERGROUND TELEPHONE
VAR	VARIABLE/VARIES
VC	VERTICAL CURVE
VERT	VERTICAL
VG	VALLEY GUTTER
W	WEST
WY	WAY
WT	WEIGHT
XING	CROSSING

ALIGNMENT ABBREVIATIONS

"GTD"	GRAND CANYON DRIVE
"GTRB"	GRAND TETON RAMP B
"SMP"	SHEEP MOUNTAIN PARKWAY
"TRL"	TRAIL
"IM"	IRON MOUNTAIN ROAD

SLATER HANIFAN GROUP
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

ABBREVIATIONS, KEY MAP, LEGEND AND QUANTITIES

DATE: 05/29/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

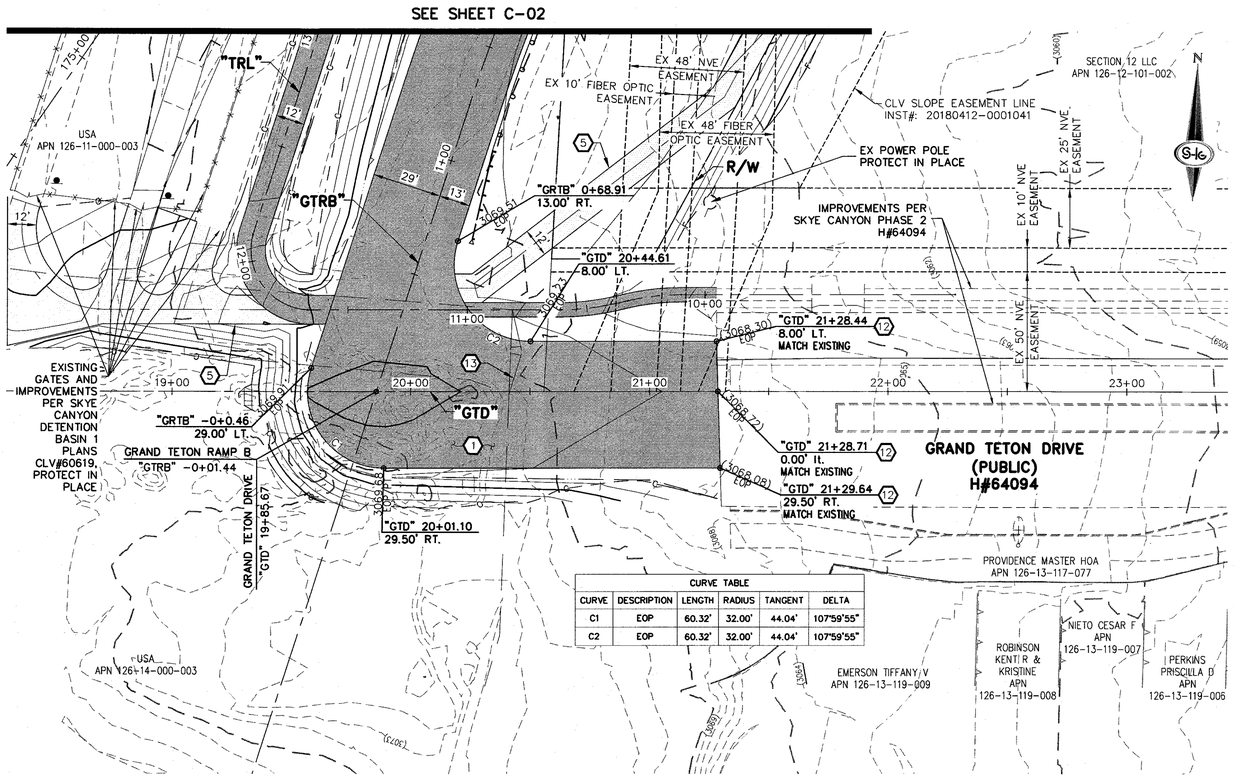
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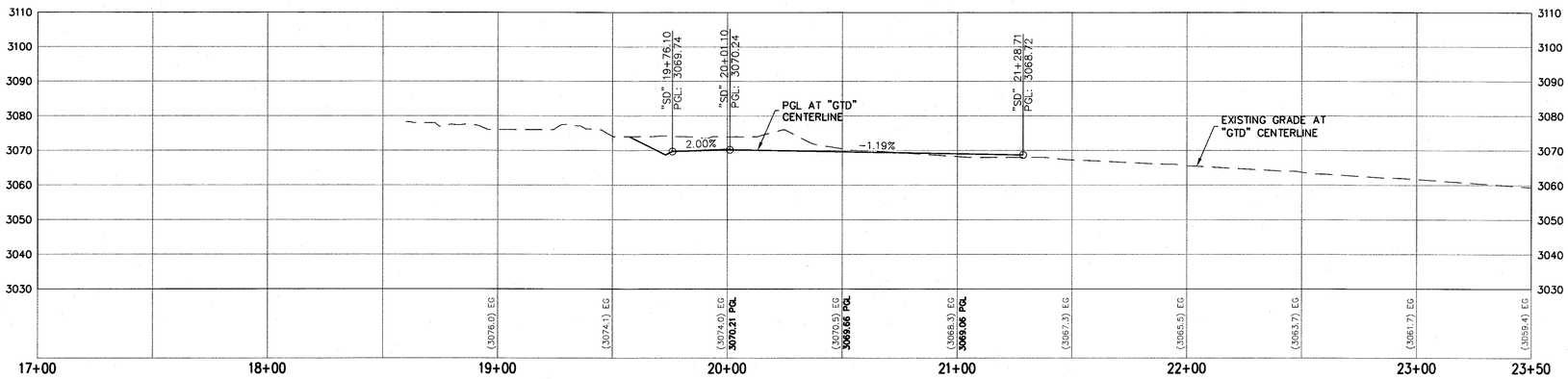
PROFESSIONAL ENGINEER STATE OF NEVADA JERRY C. SLATER CIVIL Exp. 06/30/2018 No. 14167

G-03
SHEET 3 OF 50

DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

1. CONSTRUCT OVER 3-INCH PBS OVER 4-INCH TYPE II AGGREGATE BASE (SEE TY-SHEETS FOR TYPICAL SECTIONS)
2. SAWCUT AND MATCH EXISTING CONCRETE ACCESS ROAD
3. INSTALL GUARDRAIL (TRIPLE CORRUGATION) (NDOT STD. PLAN R-8.4.1)
4. INSTALL TANGENT END TERMINAL FOR GUARDRAIL (NDOT STD. PLAN R-8.1.1)
5. CONSTRUCT 12-FOOT WIDE MINIMUM ACCESS ROAD (DETAIL 3, SHEET TY-02)
6. CONSTRUCT 2-INCH PBS SIDEWALK OVER 4-INCH TYPE II AGGREGATE BASE (SEE SHEETS C-12 THROUGH C-21 FOR PLAN AND PROFILE)
7. CONSTRUCT 3-FOOT DEEP CONCRETE CUTOFF WALL (DETAIL 4, SHEET TY-02)
8. INSTALL CHAINLINK FENCE (USDCCA STD. DWG. 252)
9. INSTALL 12-FOOT WIDE CHAINLINK GATE
10. ADJUST EXISTING CABLE VAULT TO FINISH GRADE
11. ADJUST EXISTING POWER VAULT TO FINISH GRADE
12. SAWCUT AND MATCH EXISTING PAVEMENT
13. RELOCATE AND RESET EXISTING GATE ON CONCRETE FOUNDATION (PER STRUCTURAL PLANS)

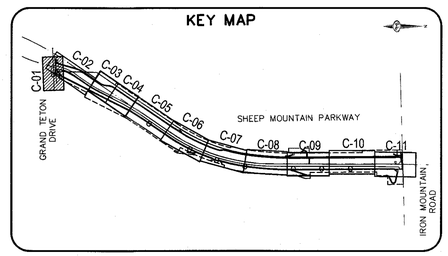
NOTES

1. SEE TY-SHEETS FOR TYPICAL SECTIONS.
2. SEE SD-SHEETS FOR STORM PROFILES.
3. SEE UT-SHEETS FOR WATER AND SEWER PLAN AND PROFILES.
4. SEE GR-SHEETS FOR GRADING AND STORM DRAIN PLAN.

LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



SCALE 30 0 30 60 FEET

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD. 1-702-227-2929

FAST. Call before you UnderGround. 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "GTD" 17+00.00 TO "GTD" 23+50.00

DATE: 05/29/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

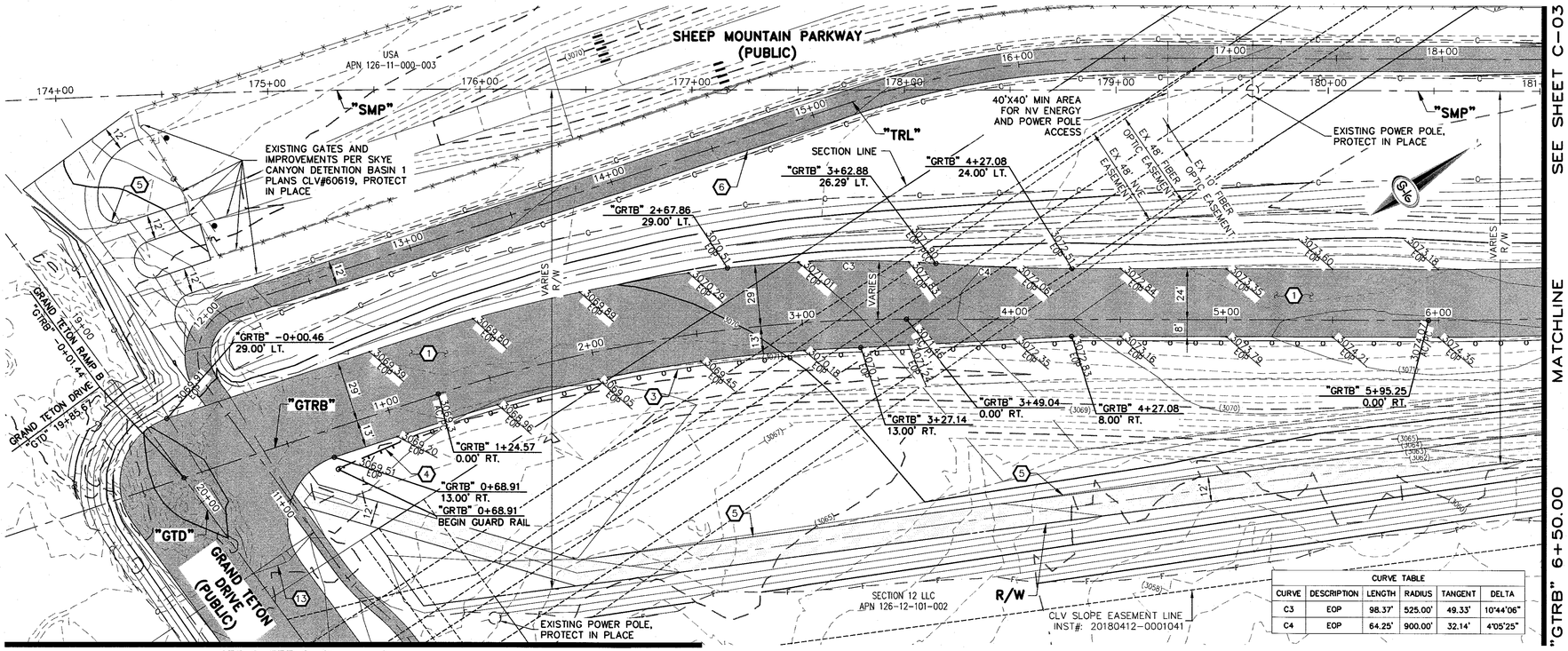
PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER STATE OF NEVADA JERRY SLATER Exp. 06/30/2018 CIVIL No. 14167

C-01
SHEET 7 OF 50

DWG NO. _____

HANSEN NO. _____



CURVE TABLE					
CURVE	DESCRIPTION	LENGTH	RADIUS	TANGENT	DELTA
C3	EOP	98.37'	525.00'	49.33'	10°44'06"
C4	EOP	64.25'	900.00'	32.14'	4°05'25"

CONSTRUCTION NOTES

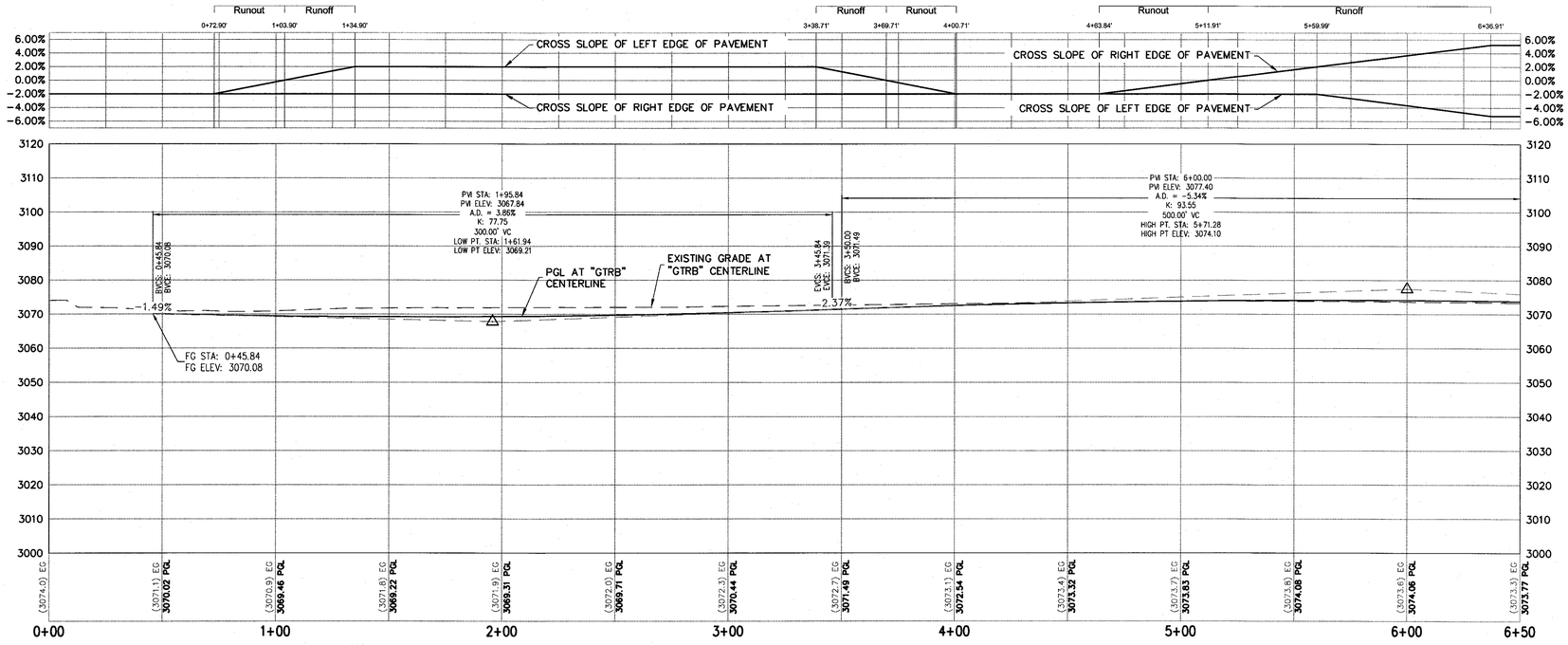
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7. CONSTRUCT 3-FOOT DEEP CONCRETE CUTOFF WALL (DETAIL 4, SHEET TY-02)
8. INSTALL CHAINLINK FENCE (USDCCA STD. DWG. 252)
9. INSTALL 12-FOOT WIDE CHAINLINK GATE
10. ADJUST EXISTING CABLE VAULT TO FINISH GRADE
11. ADJUST EXISTING POWER VAULT TO FINISH GRADE
12. SAWCUT AND MATCH EXISTING PAVEMENT
13. RELOCATE AND RESET EXISTING GATE ON CONCRETE FOUNDATION (PER STRUCTURAL PLANS)

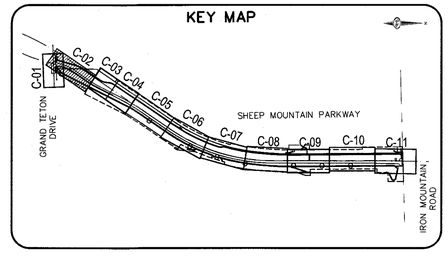
NOTES

1. SEE TY-SHEETS FOR TYPICAL SECTIONS.
2. SEE SD-SHEETS FOR STORM PROFILES.
3. SEE UT-SHEETS FOR WATER AND SEWER PLAN AND PROFILES.
4. SEE GR-SHEETS FOR GRADING AND STORM DRAIN PLAN.

LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH





SCALE 30 0 30 60 FEET

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD 1-702-227-2929

FAST Call before you UnderGround. 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "GTRB" 0+00.00 TO "GTRB" 6+50.00

DATE: 05/29/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

PROJECT NO.
OLY1720.000

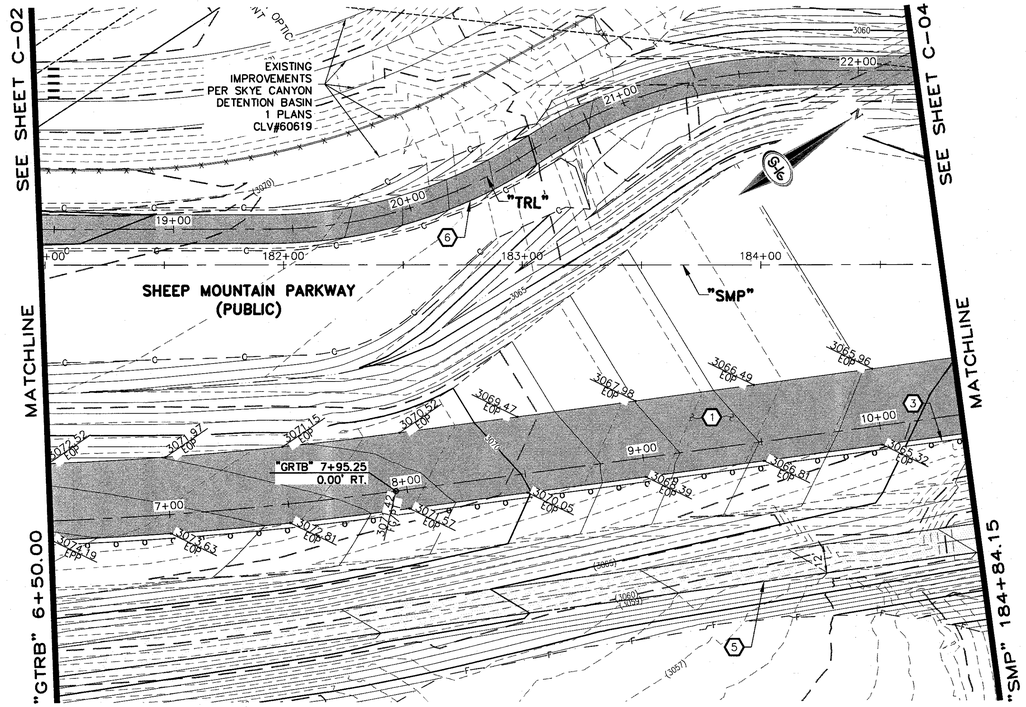
PROFESSIONAL ENGINEER - STATE OF NEVADA - JERRY A. SLATER - Exp. 06/30/2018 - CIVIL - No. 14167

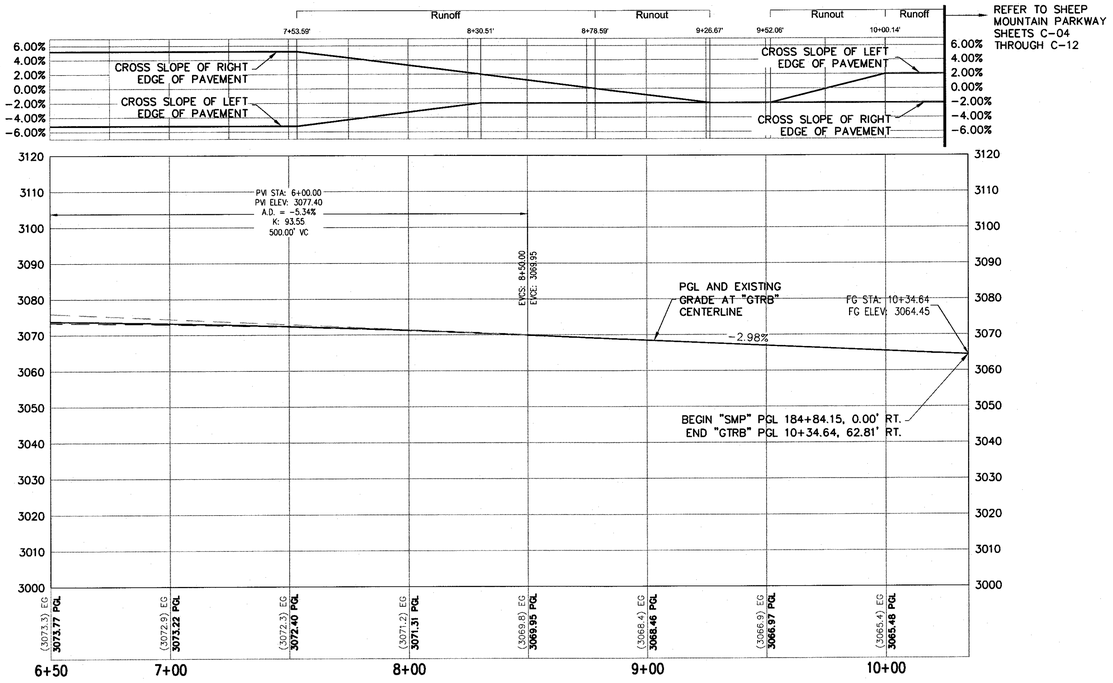
6.5.18

C-02
SHEET 8 OF 50

DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

1. CONSTRUCT OVER 3-INCH PBS OVER 4-INCH TYPE II AGGREGATE BASE (SEE TY-SHEETS FOR TYPICAL SECTIONS)
2. SAWCUT AND MATCH EXISTING CONCRETE ACCESS ROAD
3. INSTALL GUARDRAIL (TRIPLE CORRUGATION) (NDOT STD. PLAN R-8.4.1)
4. INSTALL TANGENT END TERMINAL FOR GUARDRAIL (NDOT STD. PLAN R-8.1.1)
5. CONSTRUCT 12-FOOT WIDE MINIMUM ACCESS ROAD (DETAIL 3, SHEET TY-02)
6. CONSTRUCT 2-INCH PBS SIDEWALK OVER 4-INCH TYPE II AGGREGATE BASE (SEE SHEETS C-12 THROUGH C-21 FOR PLAN AND PROFILE)
7. CONSTRUCT 3-FOOT DEEP CONCRETE CUTOFF WALL (DETAIL 4, SHEET TY-02)
8. INSTALL CHAINLINK FENCE (USDCCA STD. DWG. 252)
9. INSTALL 12-FOOT WIDE CHAINLINK GATE
10. ADJUST EXISTING CABLE VAULT TO FINISH GRADE
11. ADJUST EXISTING POWER VAULT TO FINISH GRADE
12. SAWCUT AND MATCH EXISTING PAVEMENT
13. RELOCATE AND RESET EXISTING GATE ON CONCRETE FOUNDATION (PER STRUCTURAL PLANS)

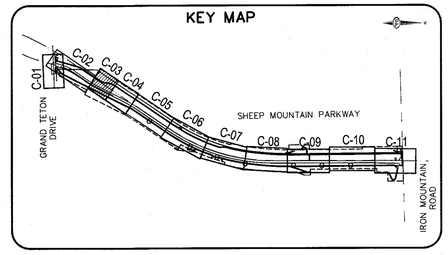
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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



30 0 30 60
SCALE FEET

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD 1-702-227-2929

FAST Call before you UnderGround. 1-702-432-5300 FRIDAY AND ARSENAL SYSTEM OF TRANSPORTATION

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

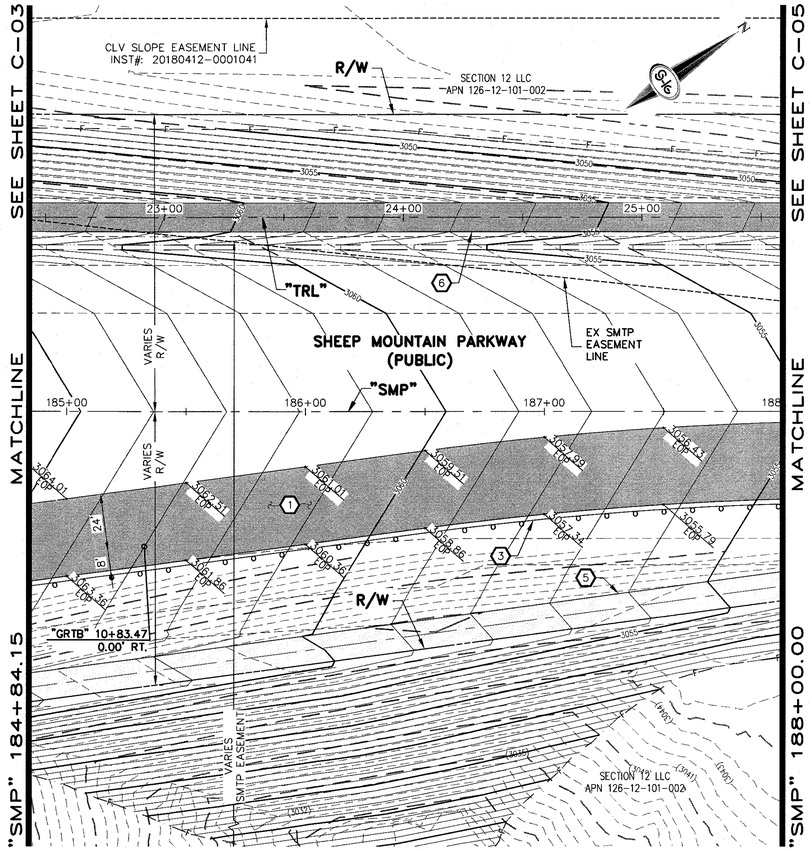
CONSTRUCTION PLAN - "GTRB" 6+50.00 TO "GTRB" 10+34.64

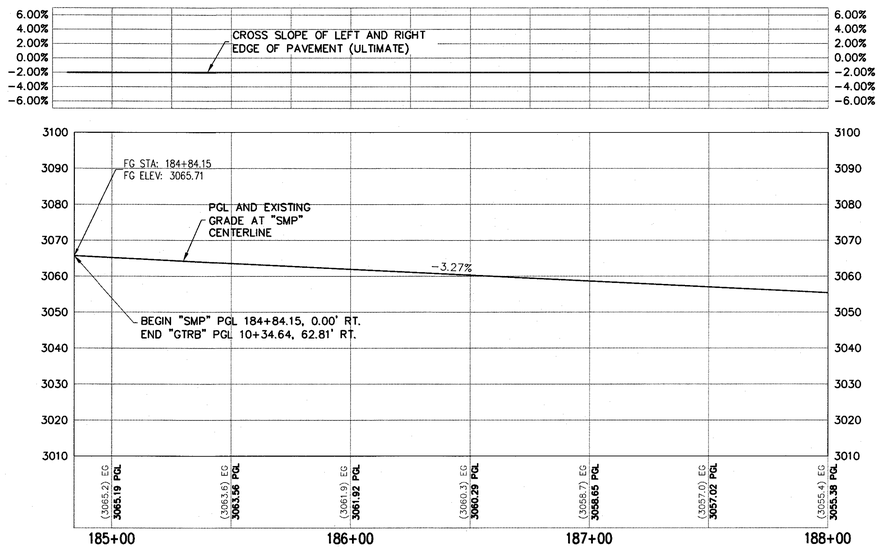
DATE: 05/29/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO. OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA - JERRY D. SLATER - Exp. 06/30/2018 - CIVIL - No. 14167

C-03
SHEET 9 OF 50
DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

1. CONSTRUCT OVER 3-INCH PBS OVER 4-INCH TYPE II AGGREGATE BASE (SEE TY-SHEETS FOR TYPICAL SECTIONS)
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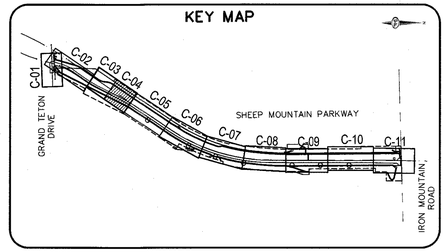
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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "SMP" 184+84.15 TO "SMP" 188+00.00

DATE: 05/29/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

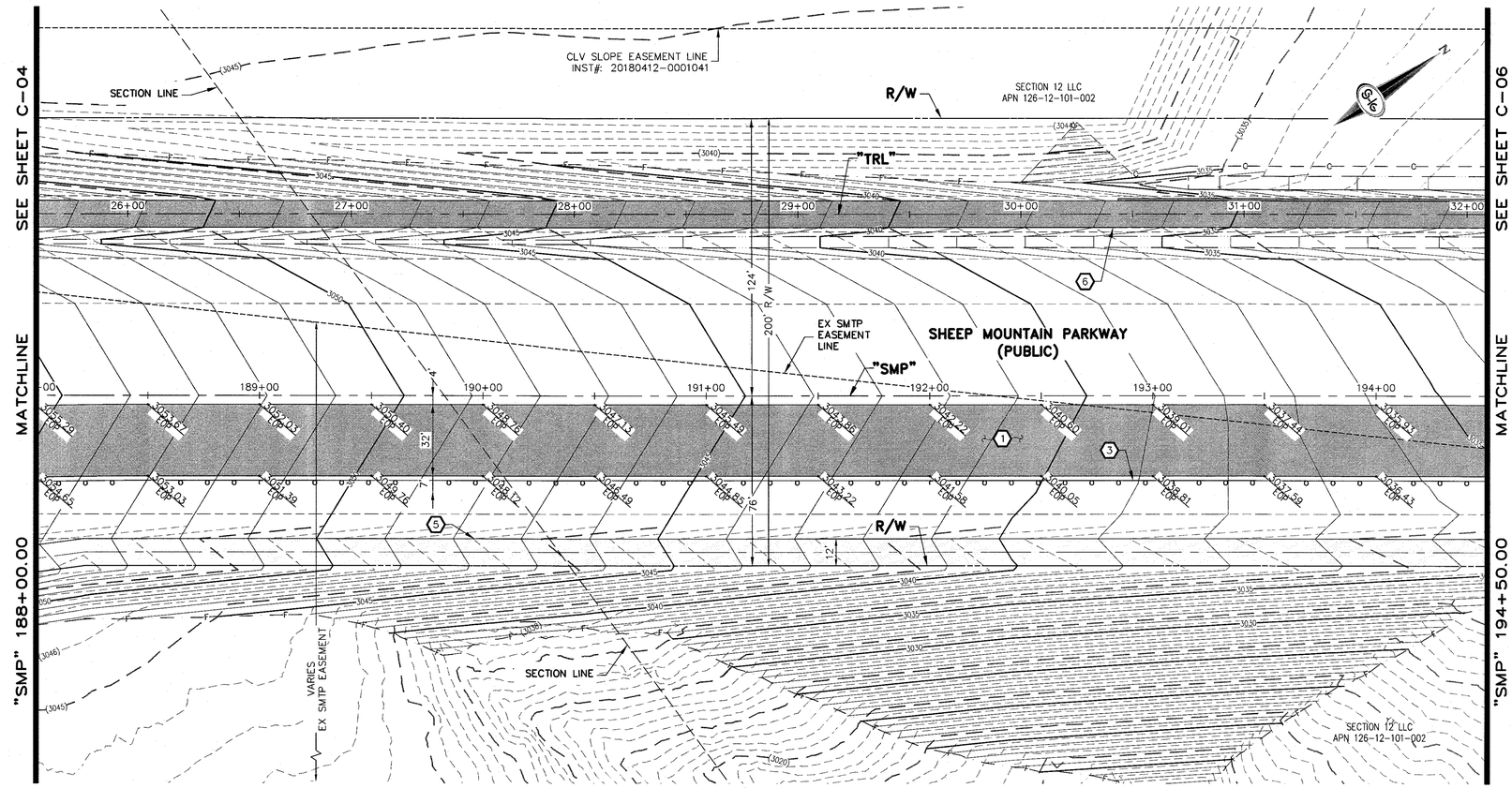
PROJECT NO.
OLY1720.000

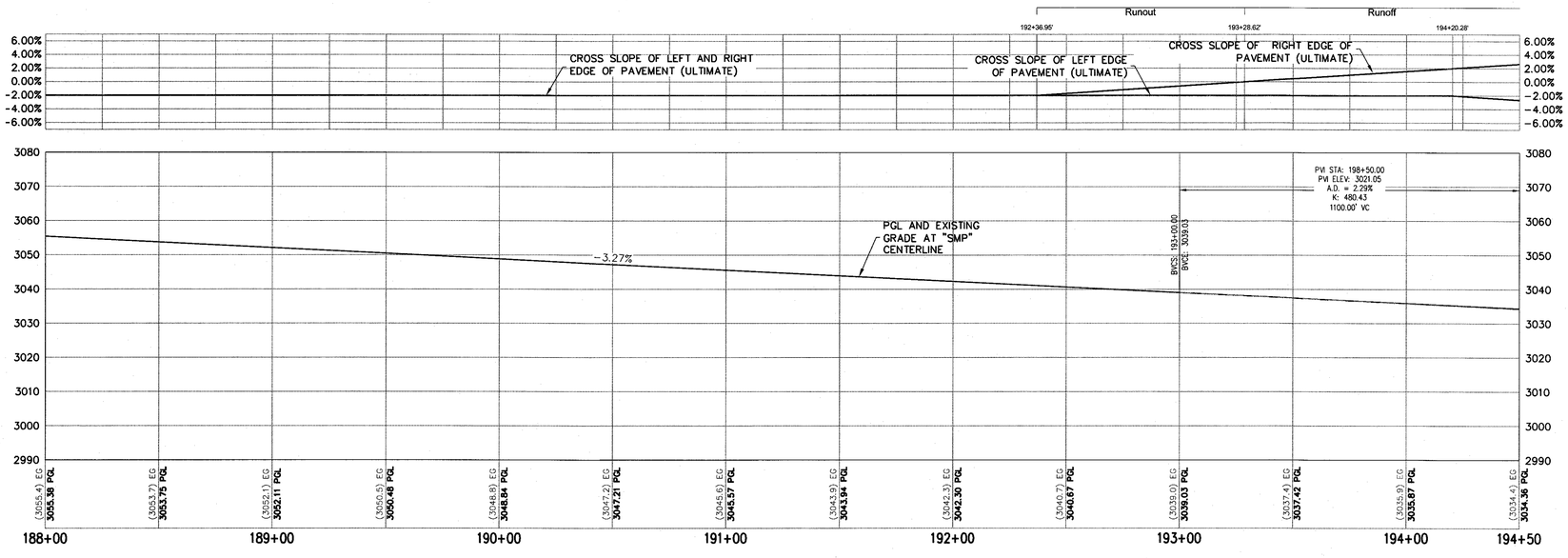
PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY C. SLATER
Exp. 06/30/2018
CIVIL
No. 14167

C-04
SHEET 10 OF 50

DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

1. CONSTRUCT OVER 3-INCH PBS OVER 4-INCH TYPE II AGGREGATE BASE (SEE TY-SHEETS FOR TYPICAL SECTIONS)
2. SAWCUT AND MATCH EXISTING CONCRETE ACCESS ROAD
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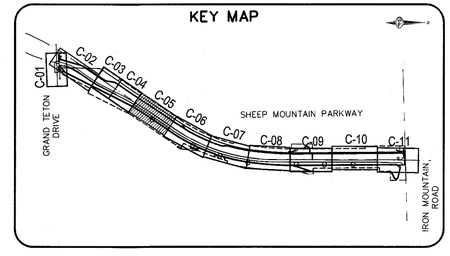
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LEGEND

PLANTMIX BITUMINOUS SURFACE

MAINTENANCE ACCESS PATH



30 0 30 60
SCALE FEET

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "SMP" 188+00.00 TO "SMP" 194+50.00

DATE: 05/29/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

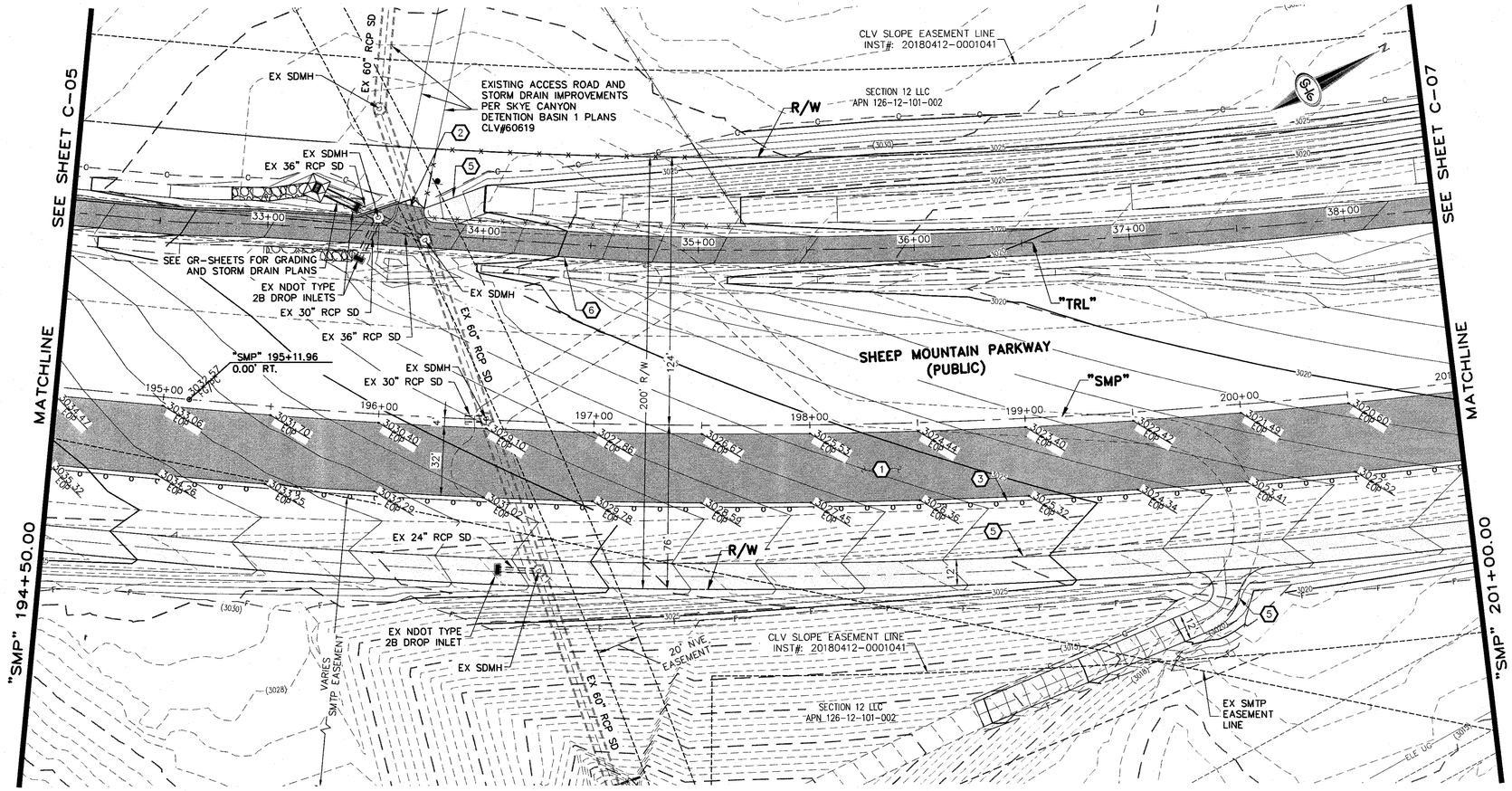
PROJECT NO.
OLY1720.000

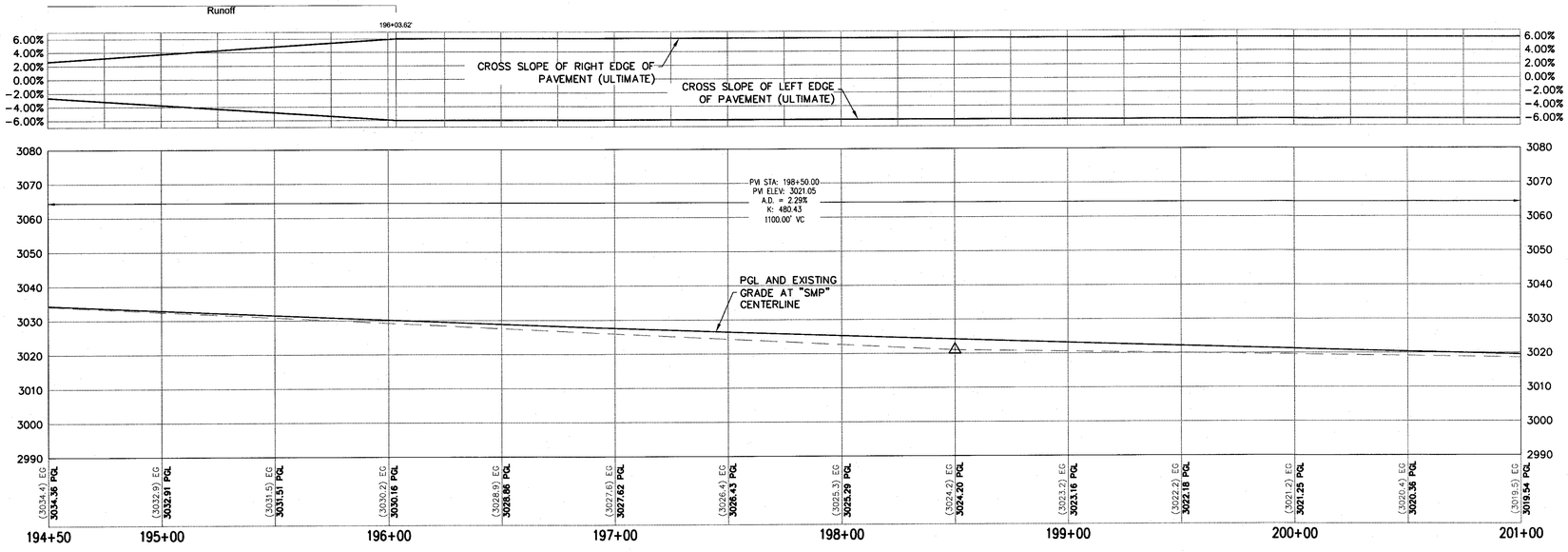
PROFESSIONAL ENGINEER STATE OF NEVADA
JERRY SLATER
Exp. 06/30/2018
CIVIL
No. 14167

C-05
SHEET 11 OF 50

DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

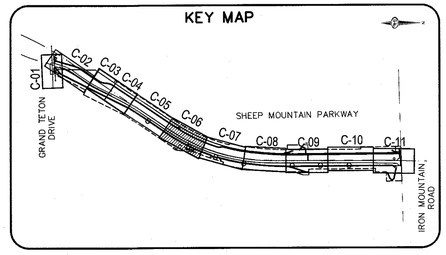
1. CONSTRUCT OVER 3-INCH PBS OVER 4-INCH TYPE II AGGREGATE BASE (SEE TY-SHEETS FOR TYPICAL SECTIONS)
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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH



SCALE: 30 0 30 60 FEET

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "SMP" 194+50.00 TO "SMP" 201+00.00

DATE: 05/29/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

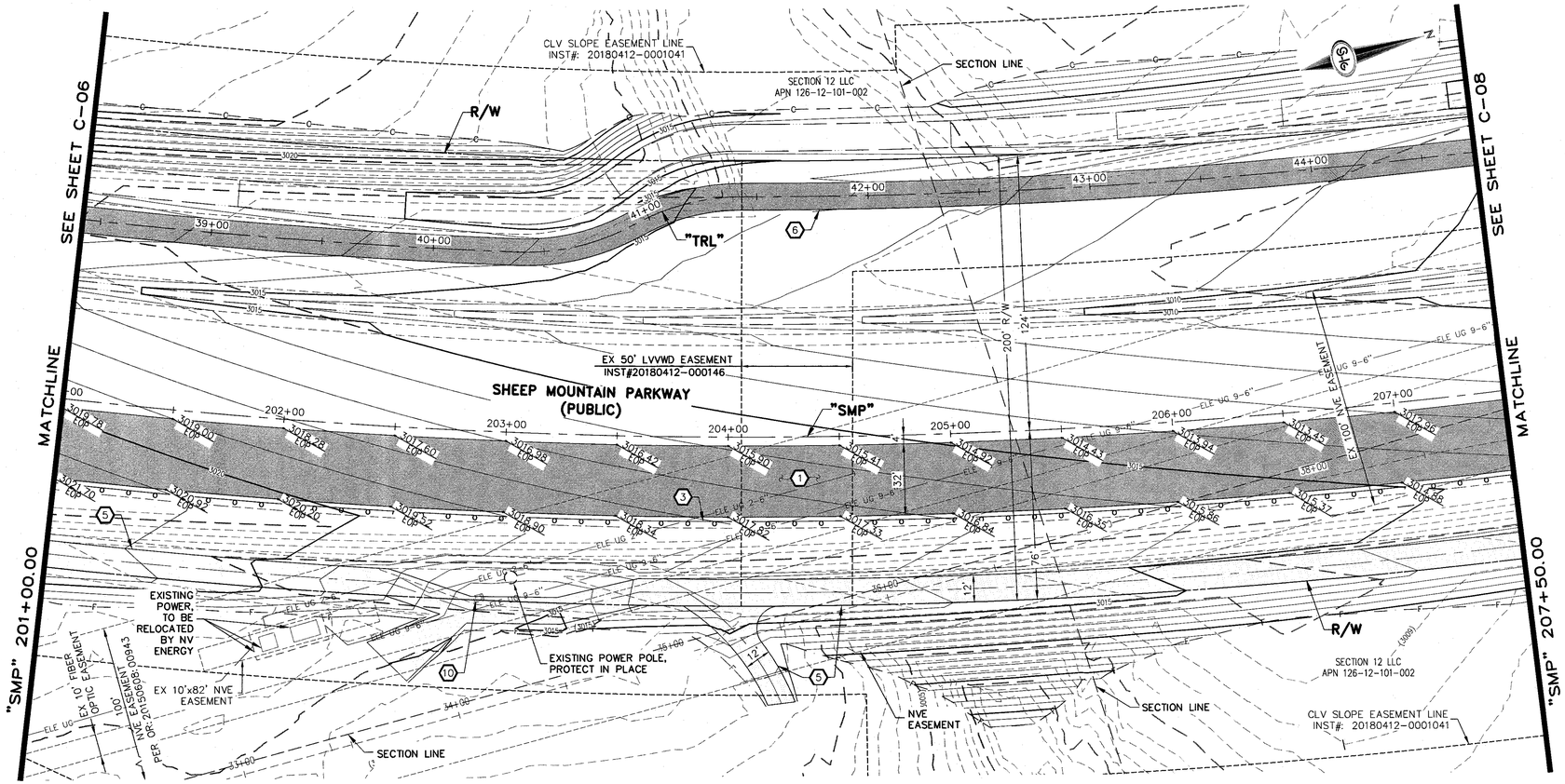
PROJECT NO.
OLY1720.000

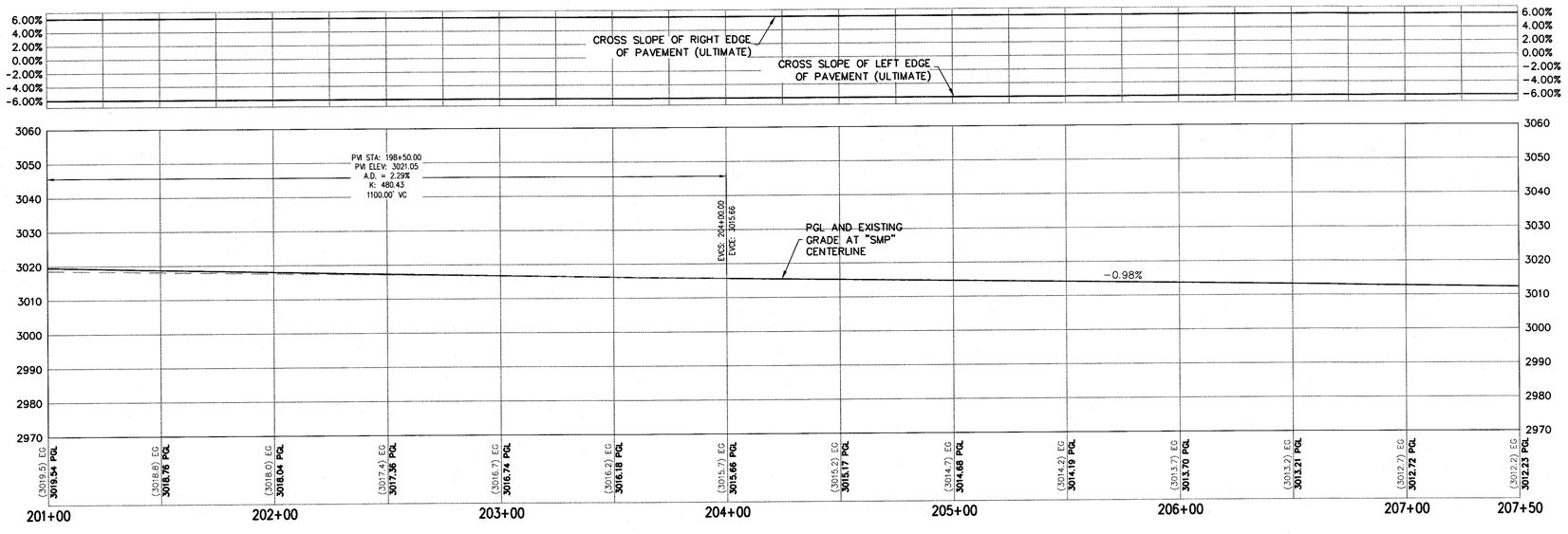
PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY C. SLATER
Exp. 06/30/2018
CIVIL
No. 14167

C-06
SHEET 12 OF 50

DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

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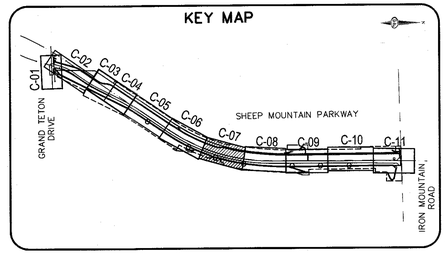
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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



SCALE 30 0 30 60 FEET

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "SMP" 201+00.00 TO "SMP" 207+50.00

DATE: 05/29/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

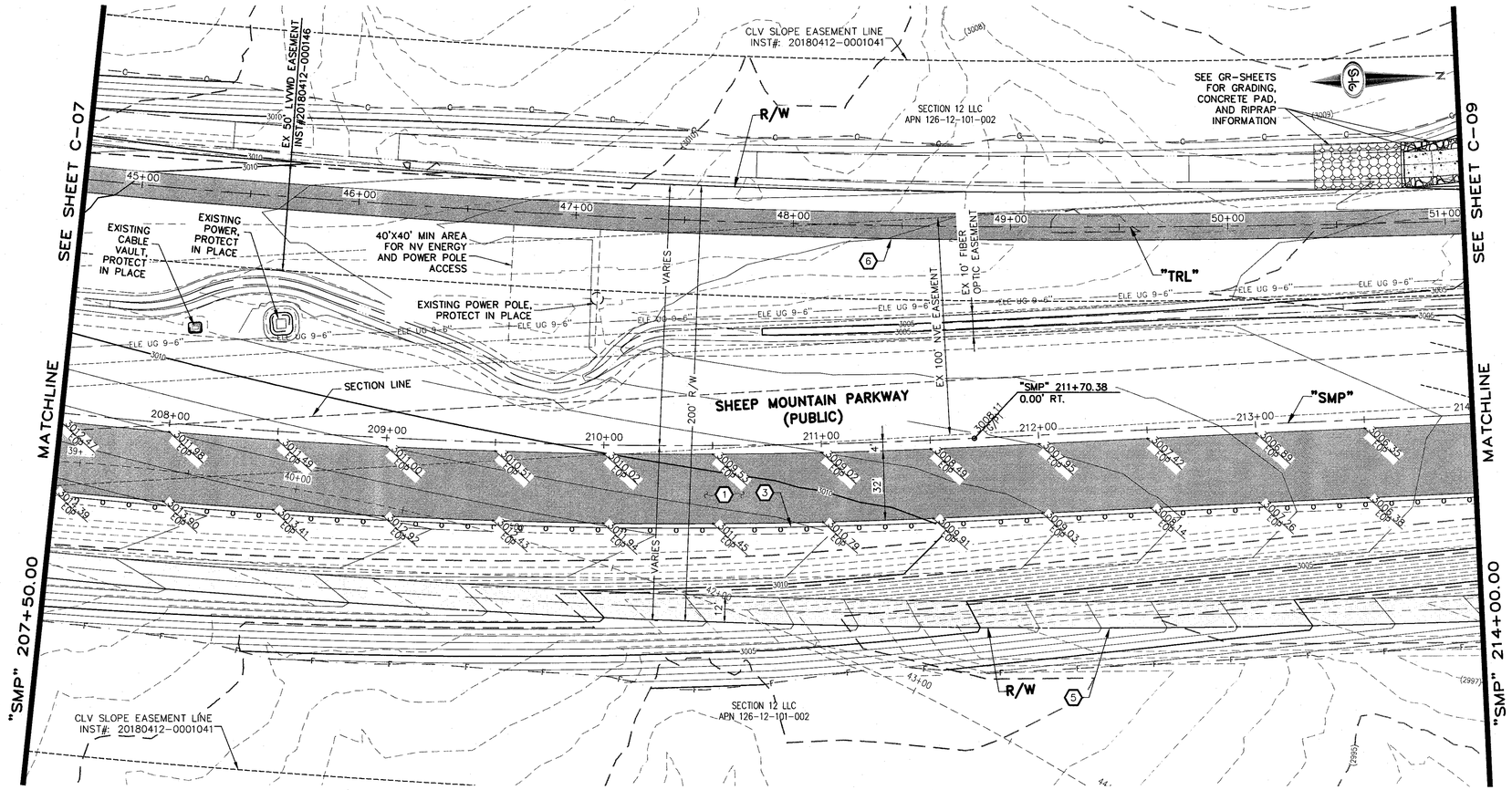
PROJECT NO.
OLY1720.000

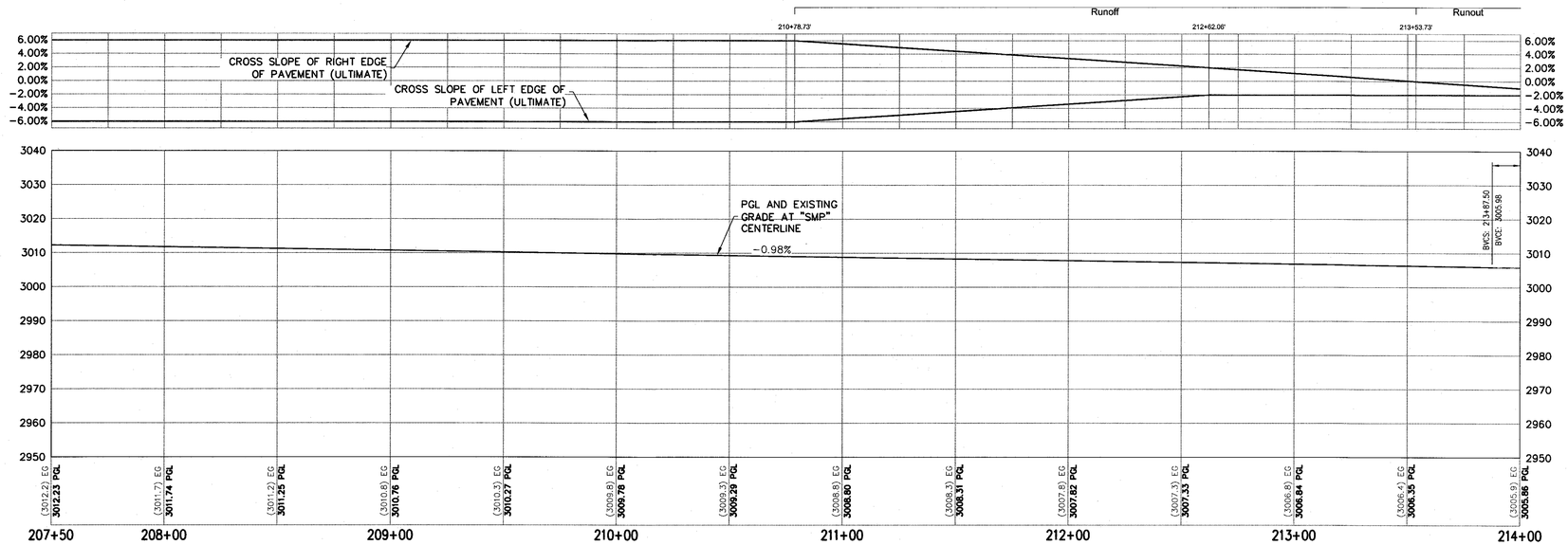
PROFESSIONAL ENGINEER STATE OF NEVADA
JERRY SLATER
Exp. 06/30/2018
CIVIL
No. 14167
6.5.18

C-07
SHEET 13 OF 50

DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

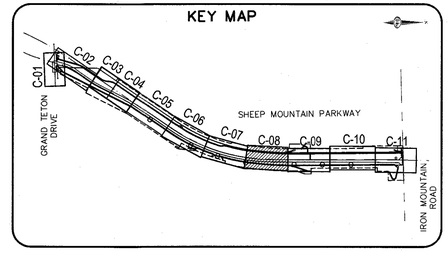
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LEGEND

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "SMP" 207+50.00 TO "SMP" 214+00.00

DATE: 05/29/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

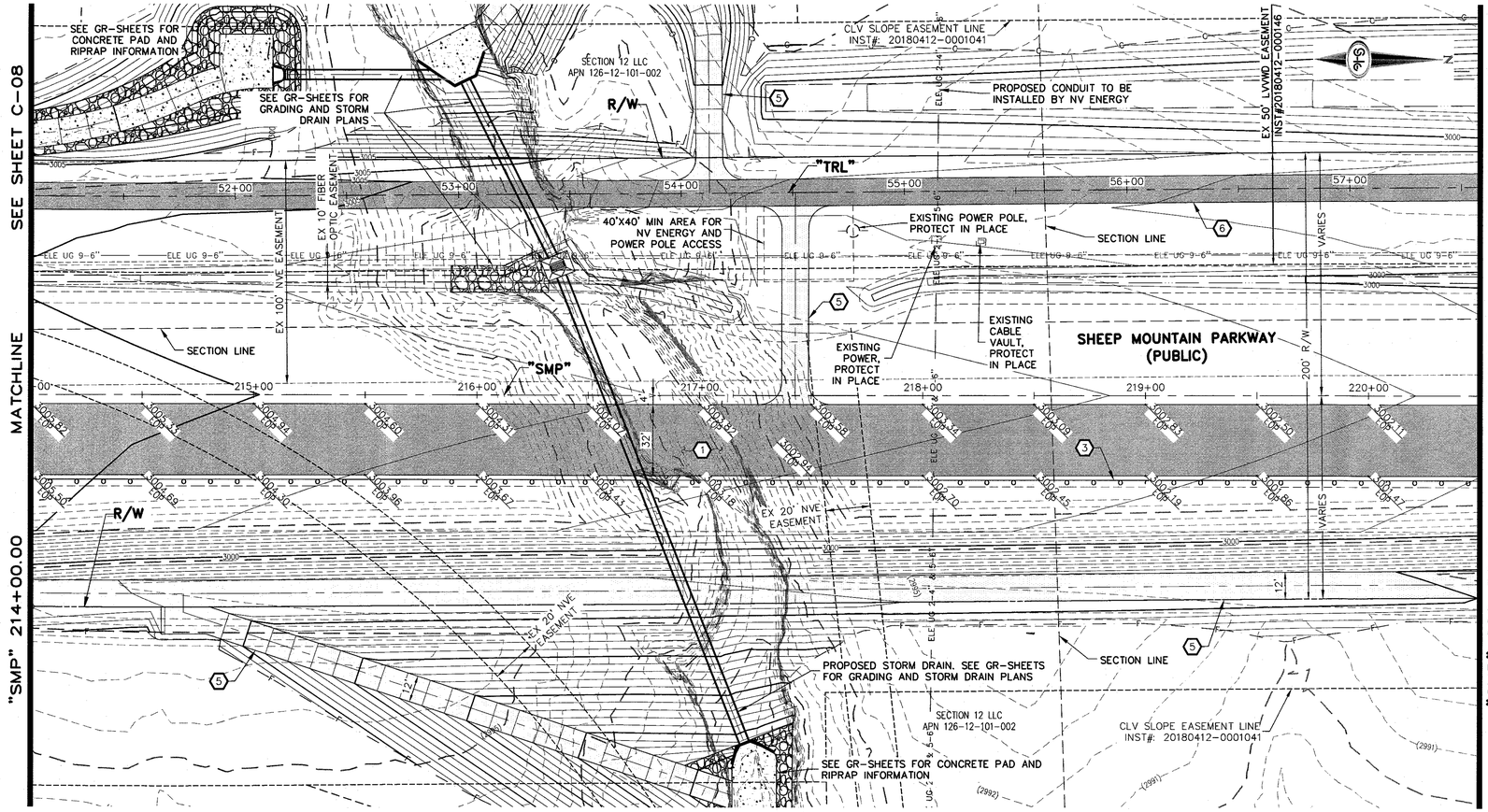
PROJECT NO. OLY1720.000

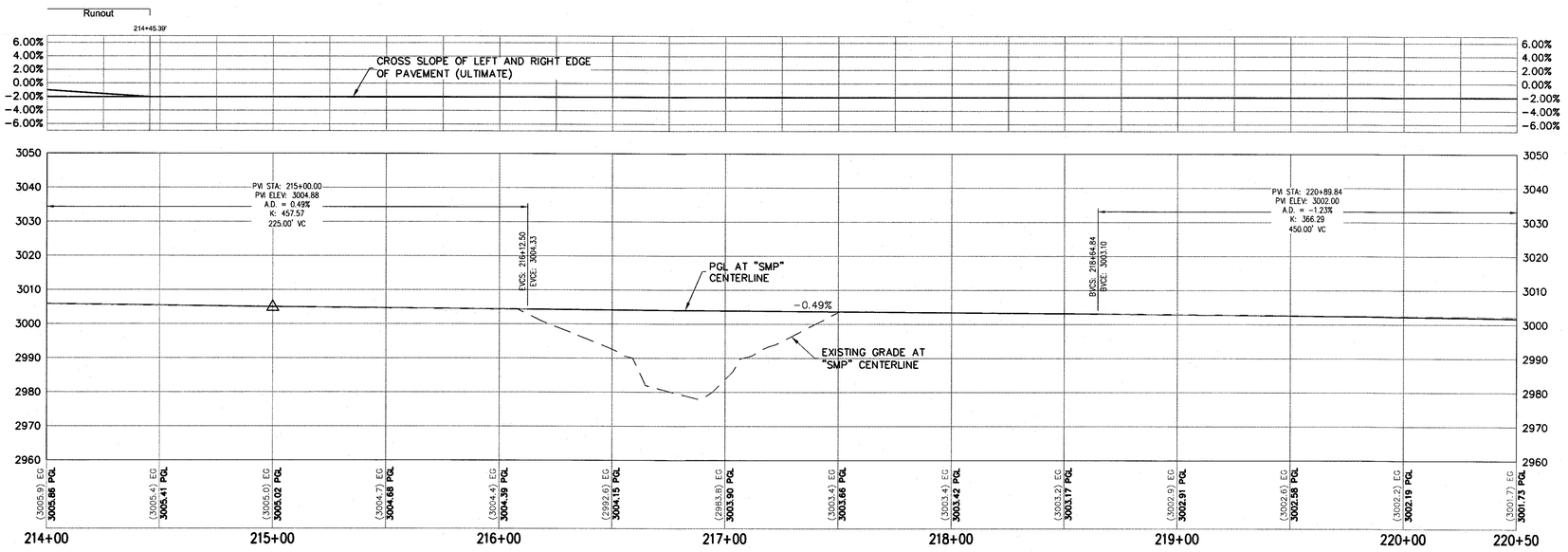
PROFESSIONAL ENGINEER STATE OF NEVADA JERRY SLATER Exp. 06/30/2018 CIVIL No. 14167

C-08
SHEET 14 OF 50

DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

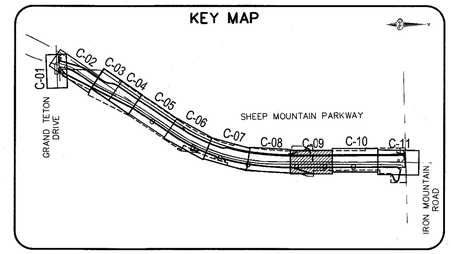
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2. SAWCUT AND MATCH EXISTING CONCRETE ACCESS ROAD
3. INSTALL GUARDRAIL (TRIPLE CORRUGATION) (NDOT STD. PLAN R-8.4.1)
4. INSTALL TANGENT END TERMINAL FOR GUARDRAIL (NDOT STD. PLAN R-8.1.1)
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8. INSTALL CHAINLINK FENCE (USDCCA STD. DWG. 252)
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11. ADJUST EXISTING POWER VAULT TO FINISH GRADE
12. SAWCUT AND MATCH EXISTING PAVEMENT
13. RELOCATE AND RESET EXISTING GATE ON CONCRETE FOUNDATION (PER STRUCTURAL PLANS)

NOTES

1. SEE TY-SHEETS FOR TYPICAL SECTIONS.
2. SEE SD-SHEETS FOR STORM PROFILES.
3. SEE UT-SHEETS FOR WATER AND SEWER PLAN AND PROFILES.
4. SEE GR-SHEETS FOR GRADING AND STORM DRAIN PLAN.

LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH



30 0 30 60
SCALE FEET

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD. 1-702-227-2929

FAST Call before you UnderGround. 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "SMP" 214+00.00 TO "SMP" 220+50.00

DATE: 05/29/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

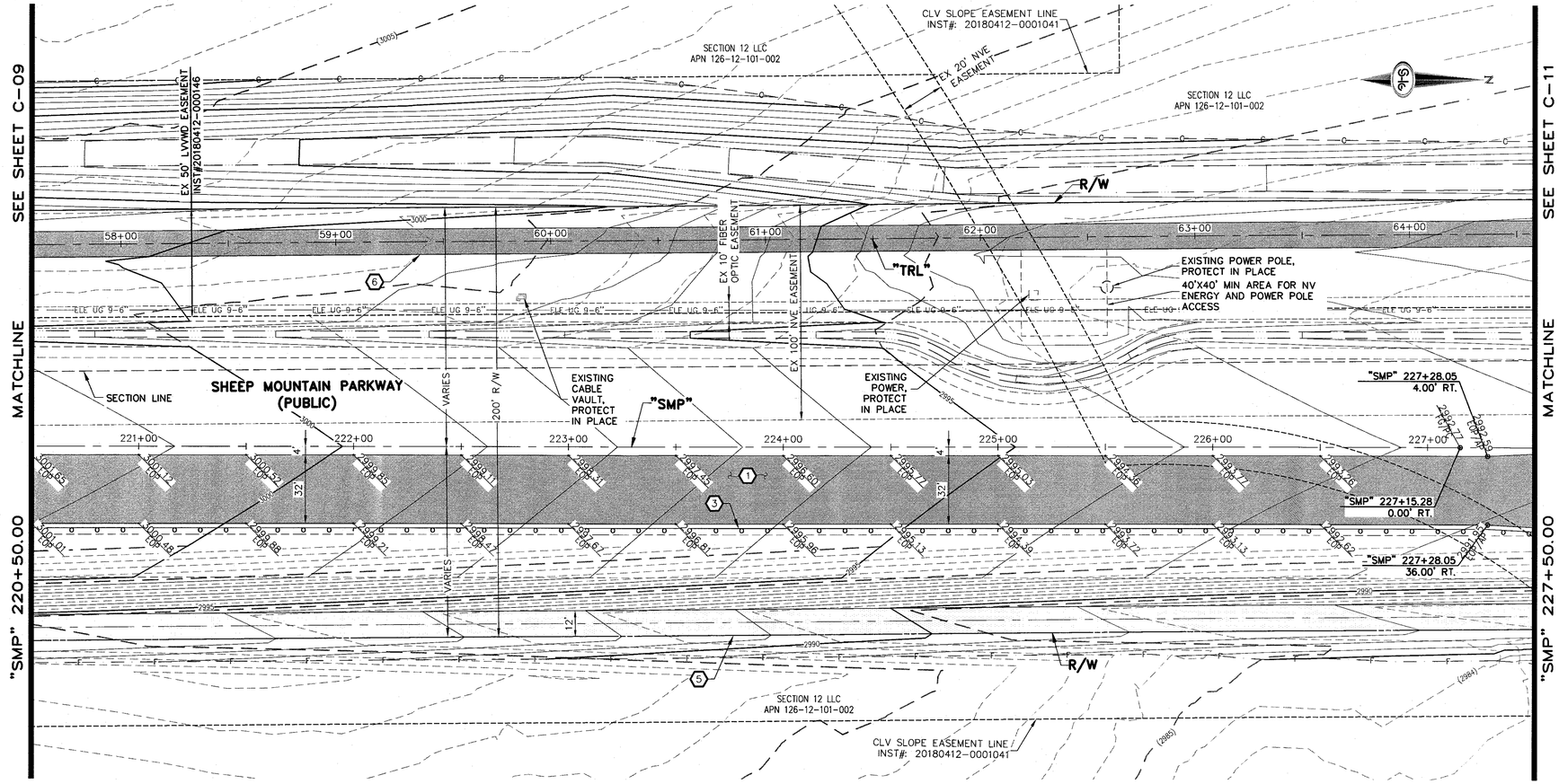
PROJECT NO.
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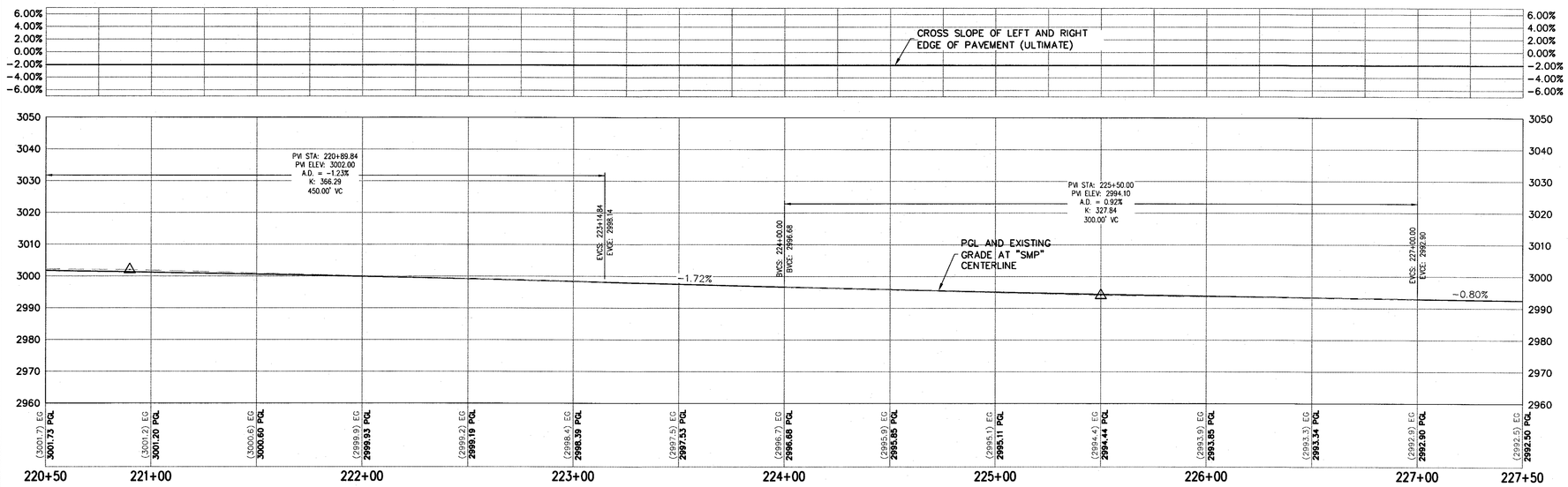
PROFESSIONAL ENGINEER STATE OF NEVADA JERRY A. SLATER Exp. 06/30/2018 CIVIL No. 14167

C-09
SHEET 15 OF 50

DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

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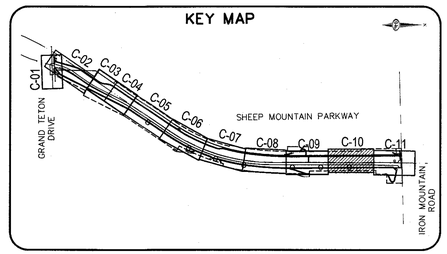
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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



SCALE 30 0 30 60 FEET

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "SMP" 220+50.00 TO "SMP" 227+50.00

DATE: 05/29/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

PROJECT NO.
OLY1720.000

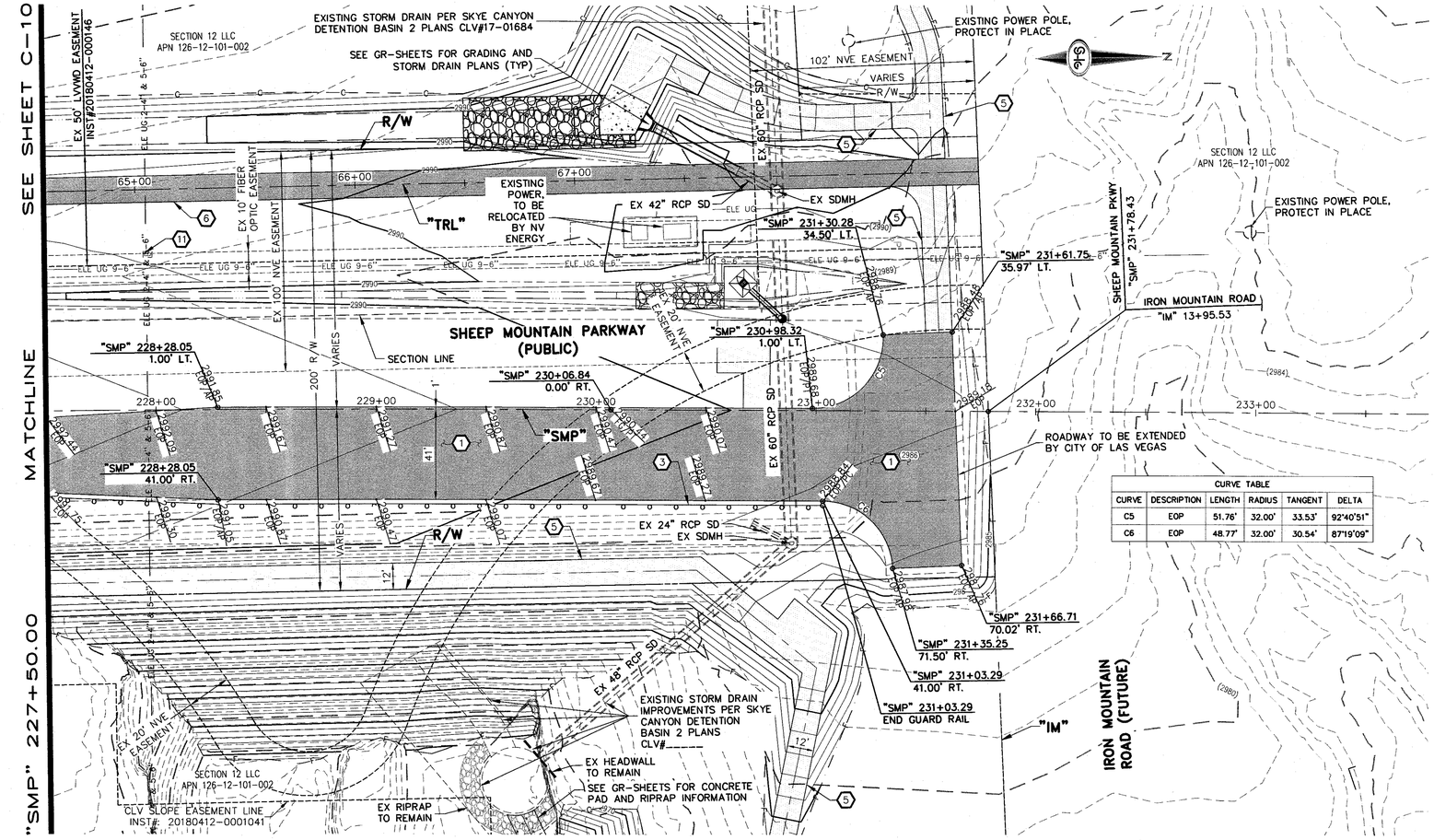
PROFESSIONAL ENGINEER STATE OF NEVADA JERRY SLATER Exp. 06/30/2018 CIVIL No. 14167

S-4

C-10
SHEET 16 OF 50

DWG NO. _____

HANSEN NO. _____



CURVE TABLE					
CURVE	DESCRIPTION	LENGTH	RADIUS	TANGENT	DELTA
C5	EOP	51.76'	32.00'	33.53'	92°40'51"
C6	EOP	48.77'	32.00'	30.54'	87°19'09"

CONSTRUCTION NOTES

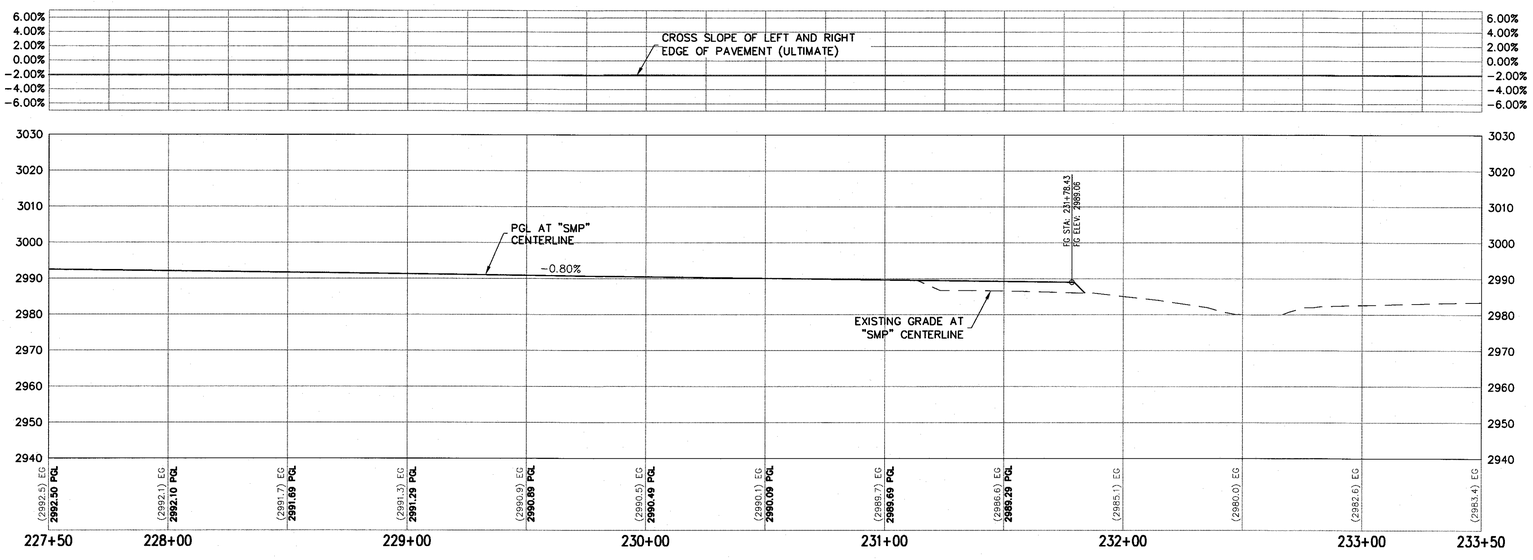
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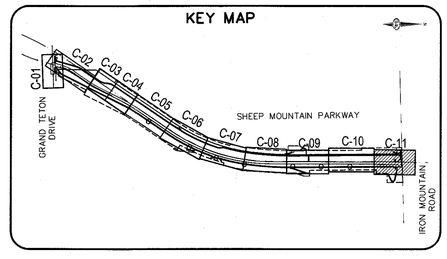
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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH





30 0 30 60
SCALE FEET

AVOID HITTING OVERHEAD POWER LINES. IT'S COOL! CALL BEFORE YOU DO OVERHEAD 1-702-227-2929

FAST. Call before you UnderGround. 1-702-432-5300 NEVADA AND ARIZONA SYSTEM OF TRANSPORTATION

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5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "SMP" 227+50.00 TO "SMP" 233+50.00

DATE: 05/29/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

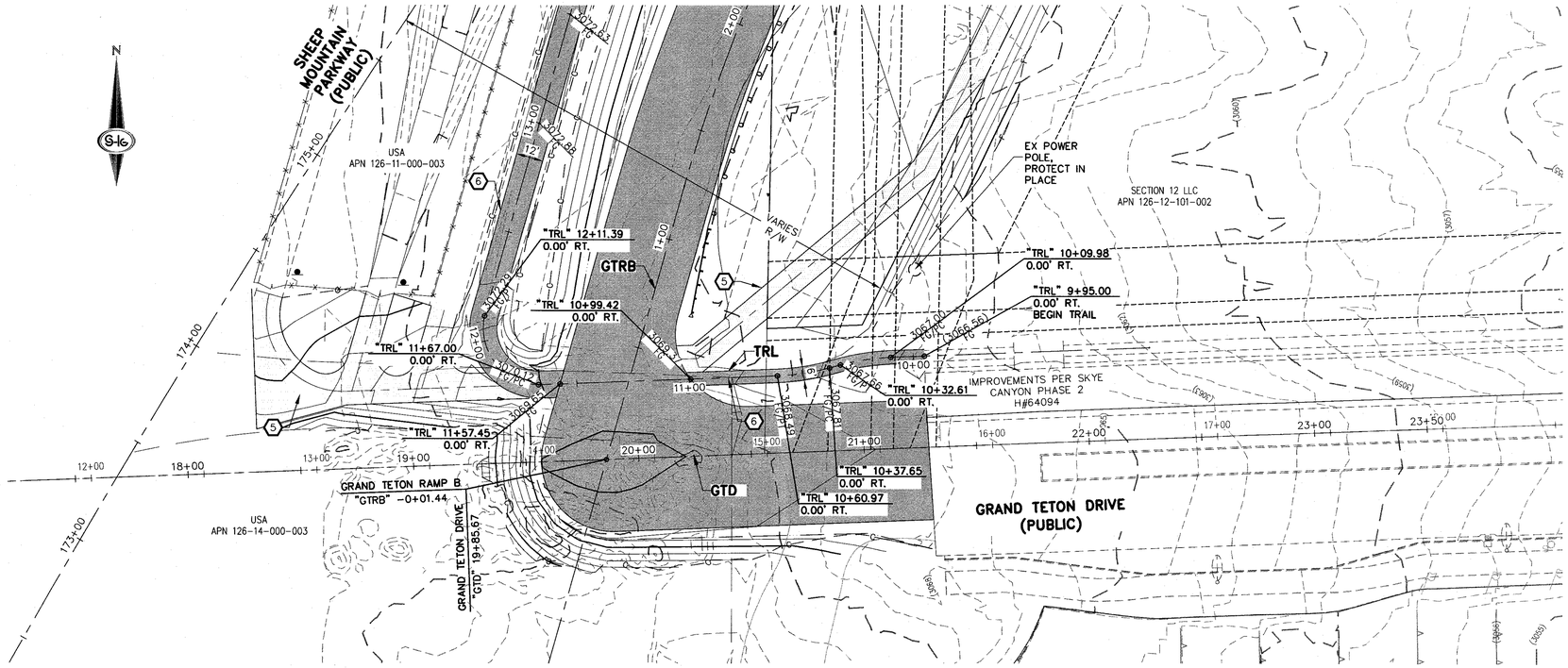
PROJECT NO. OLY1720.000

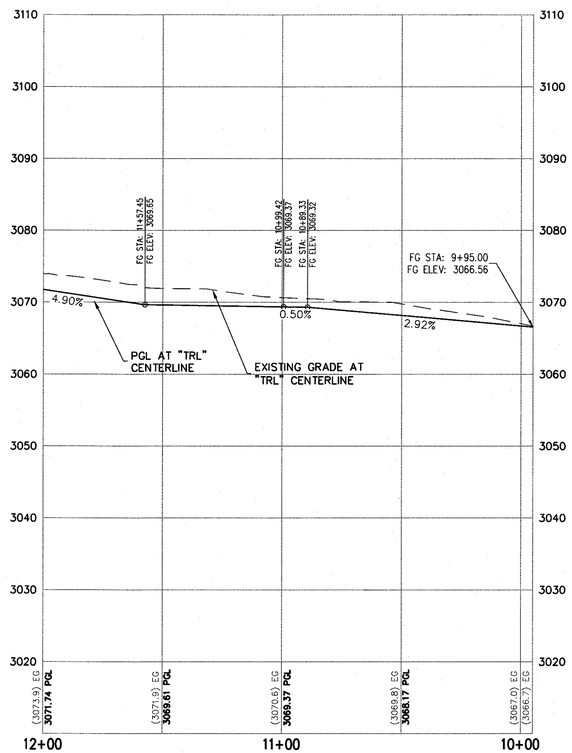
PROFESSIONAL ENGINEER STATE OF NEVADA JERRY SLATER Exp: 06/30/2018 CIVIL No. 14167

C-11
SHEET 17 OF 50

DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

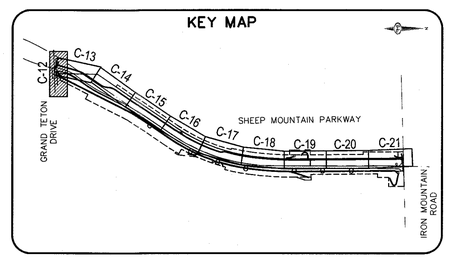
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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH



30 0 30 60
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5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY
CONSTRUCTION PLAN - "TRL" 10+00.00 TO "TRL" 12+00.00

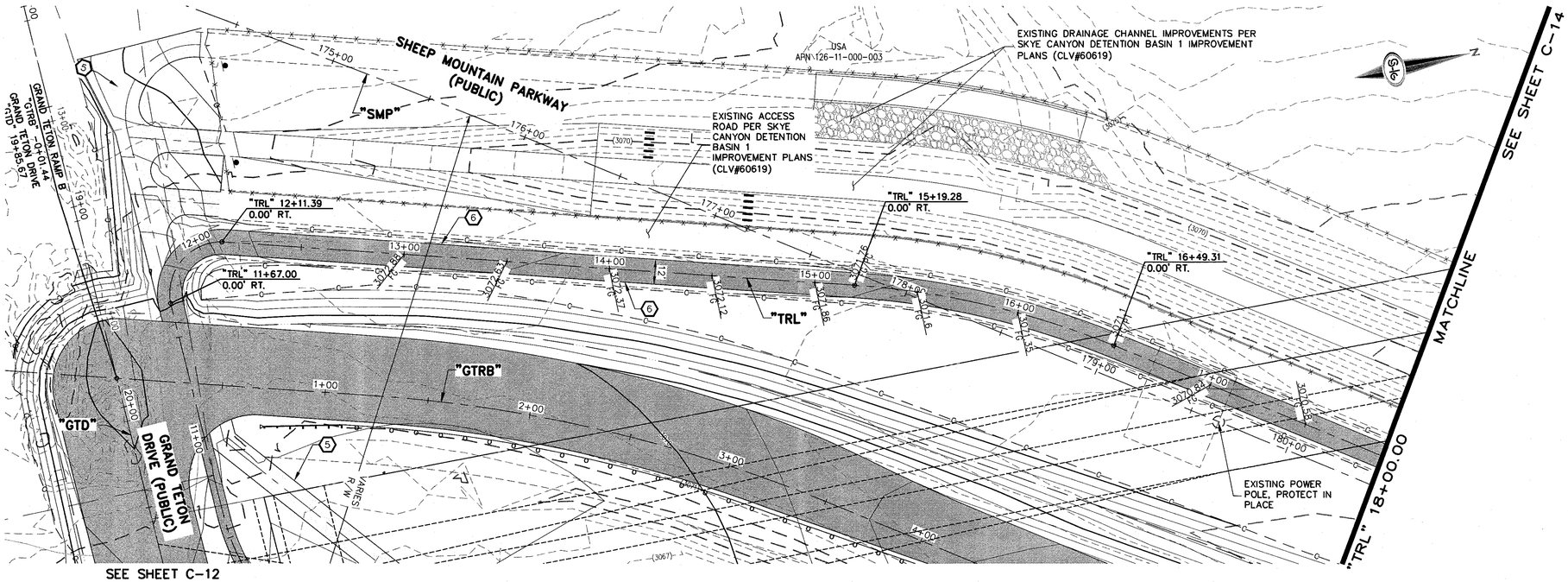
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DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO. OLY1720.000

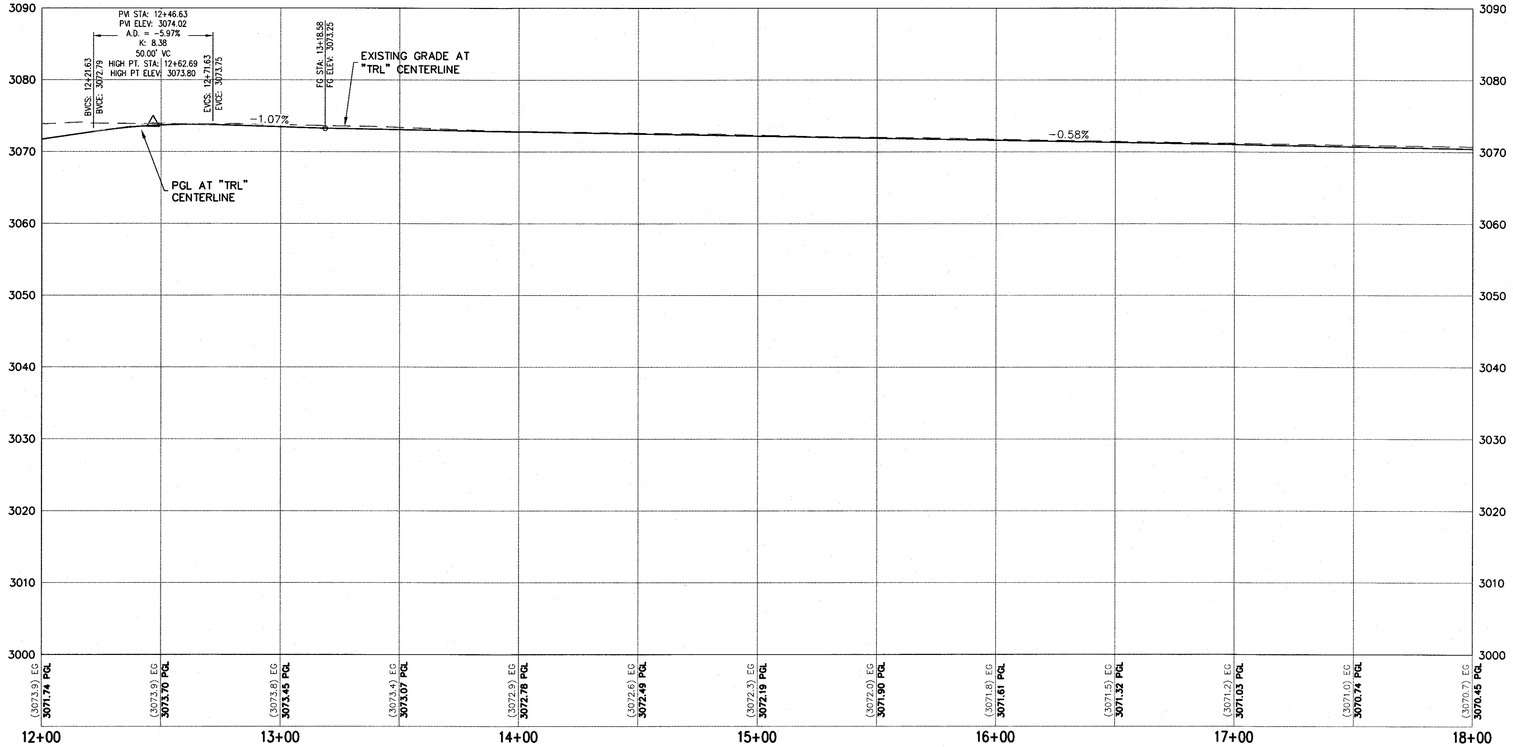
PROFESSIONAL ENGINEER - STATE OF NEVADA - JERRY A. SLATER - Exp. 06/30/2018 - CIVIL - No. 14167

C-12
SHEET 18 OF 50

DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

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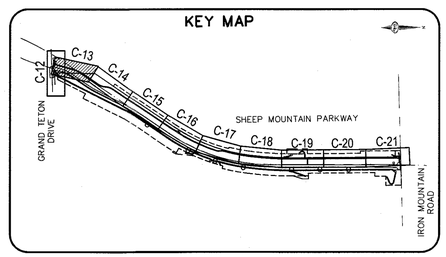
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LEGEND

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KEY MAP



SCALE 30 0 30 60 FEET

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "TRL" 12+00.00 TO "TRL" 18+00.00

DATE: 05/29/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

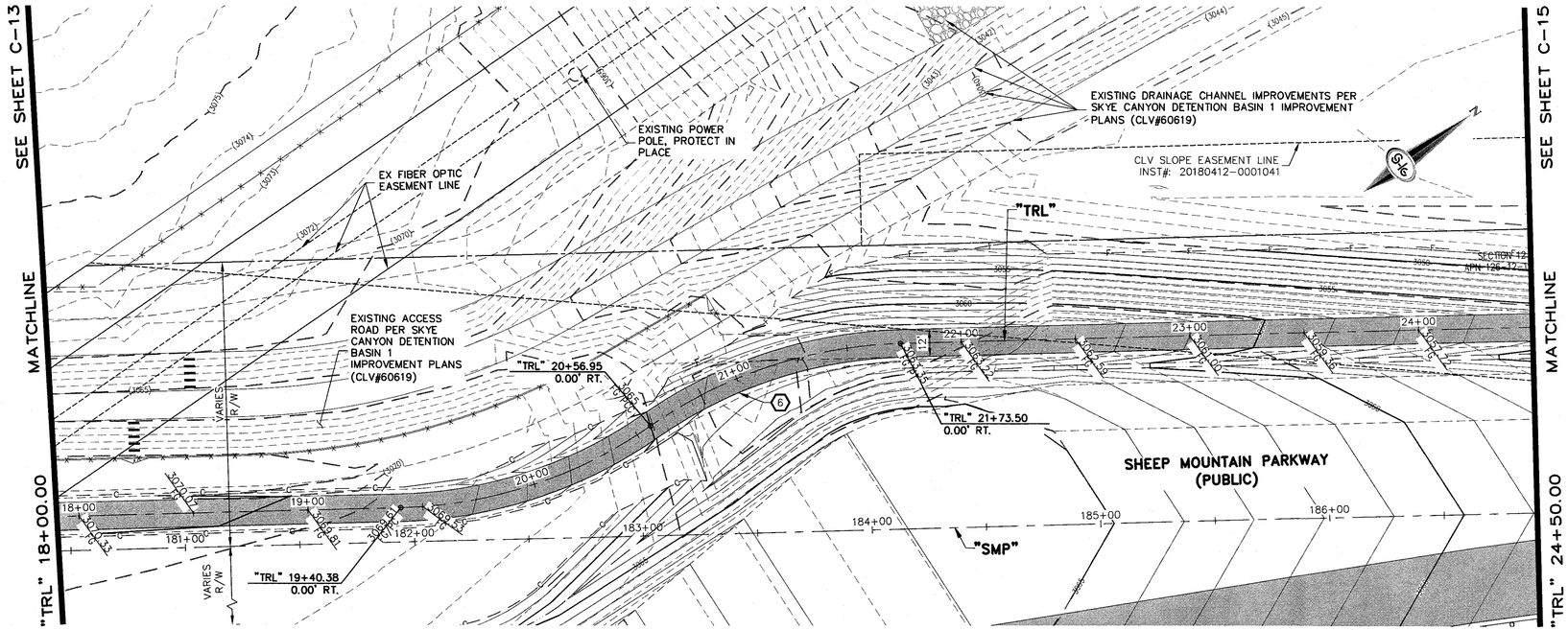
PROJECT NO.
OLY1720.000

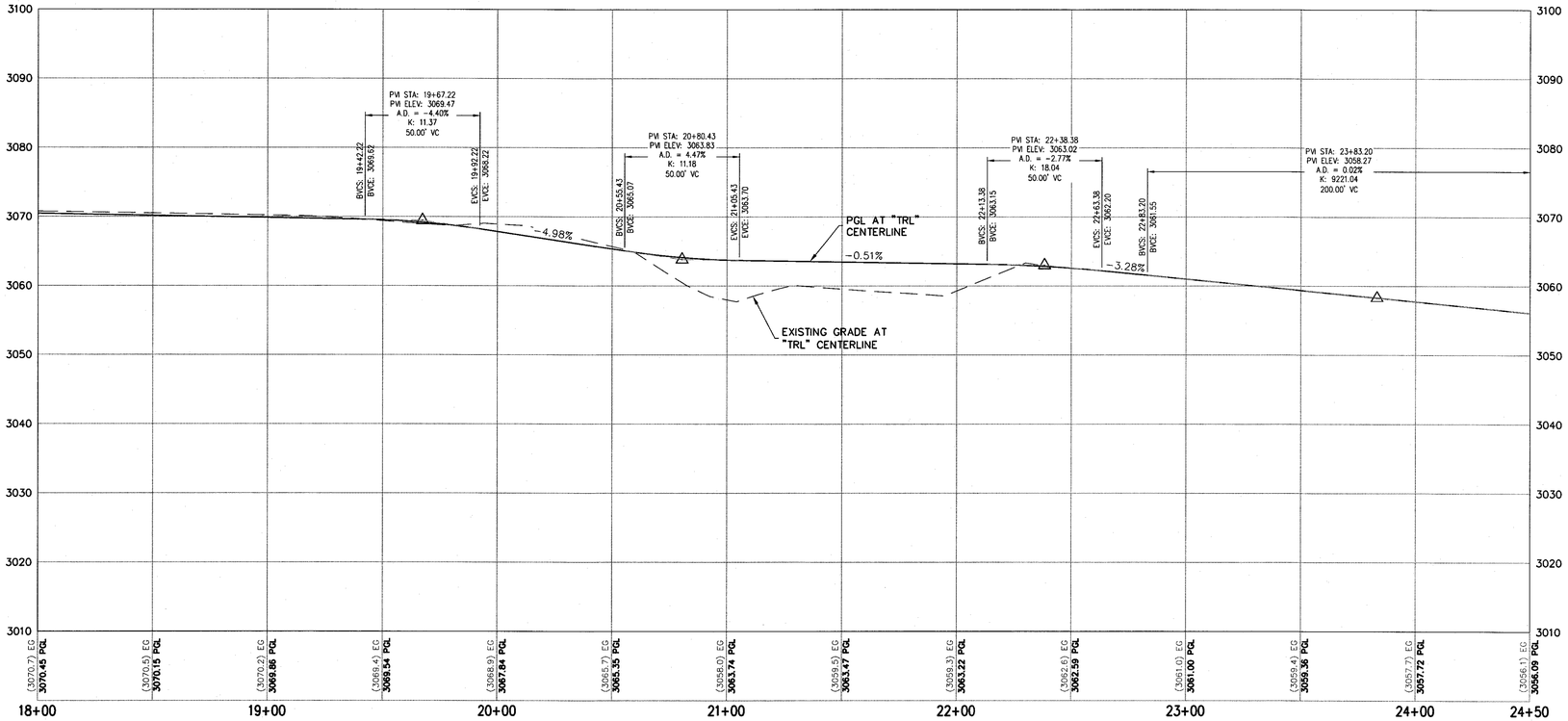
PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY A. SLATER
Exp. 06/30/2018
CIVIL
No. 14167

C-13
SHEET 19 OF 50

DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

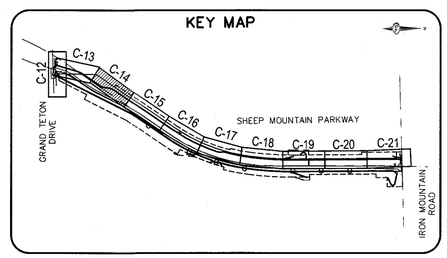
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PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP DATE	APP

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "TRL" 18+00.00 TO "TRL" 24+50.00

DATE: 05/29/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

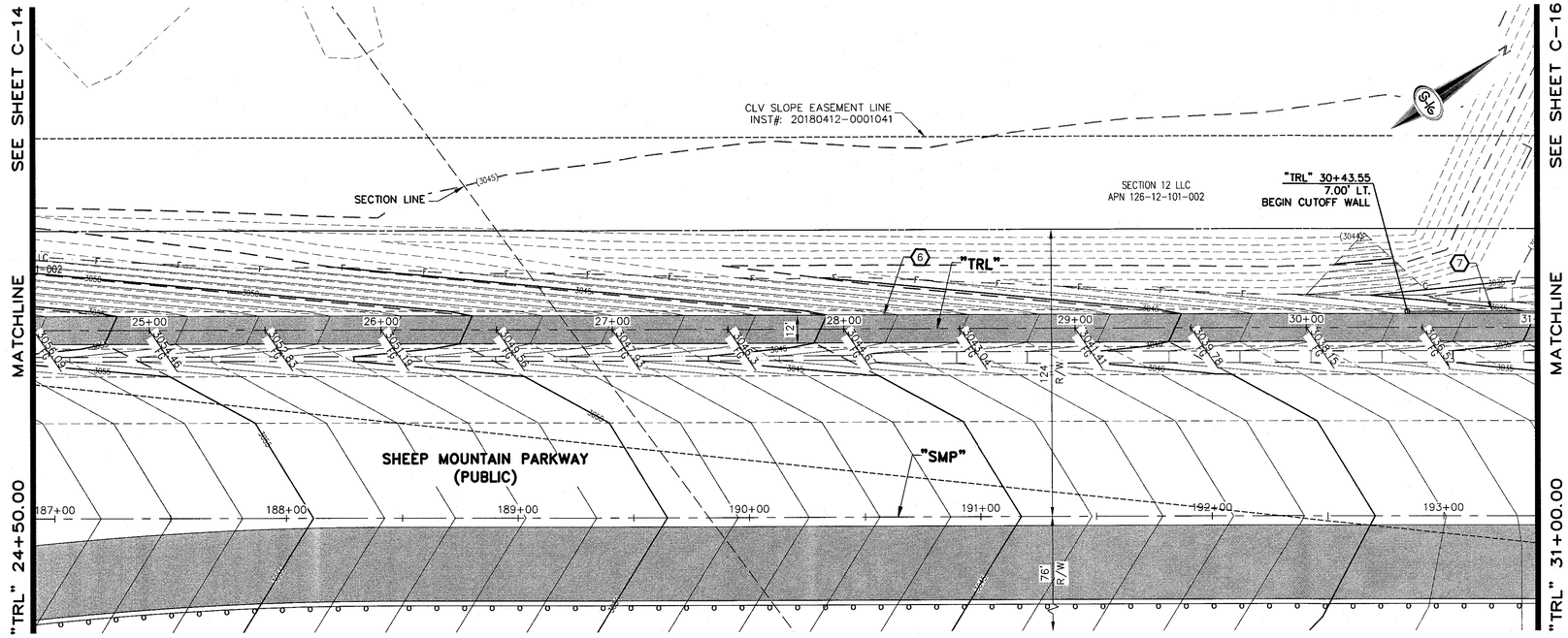
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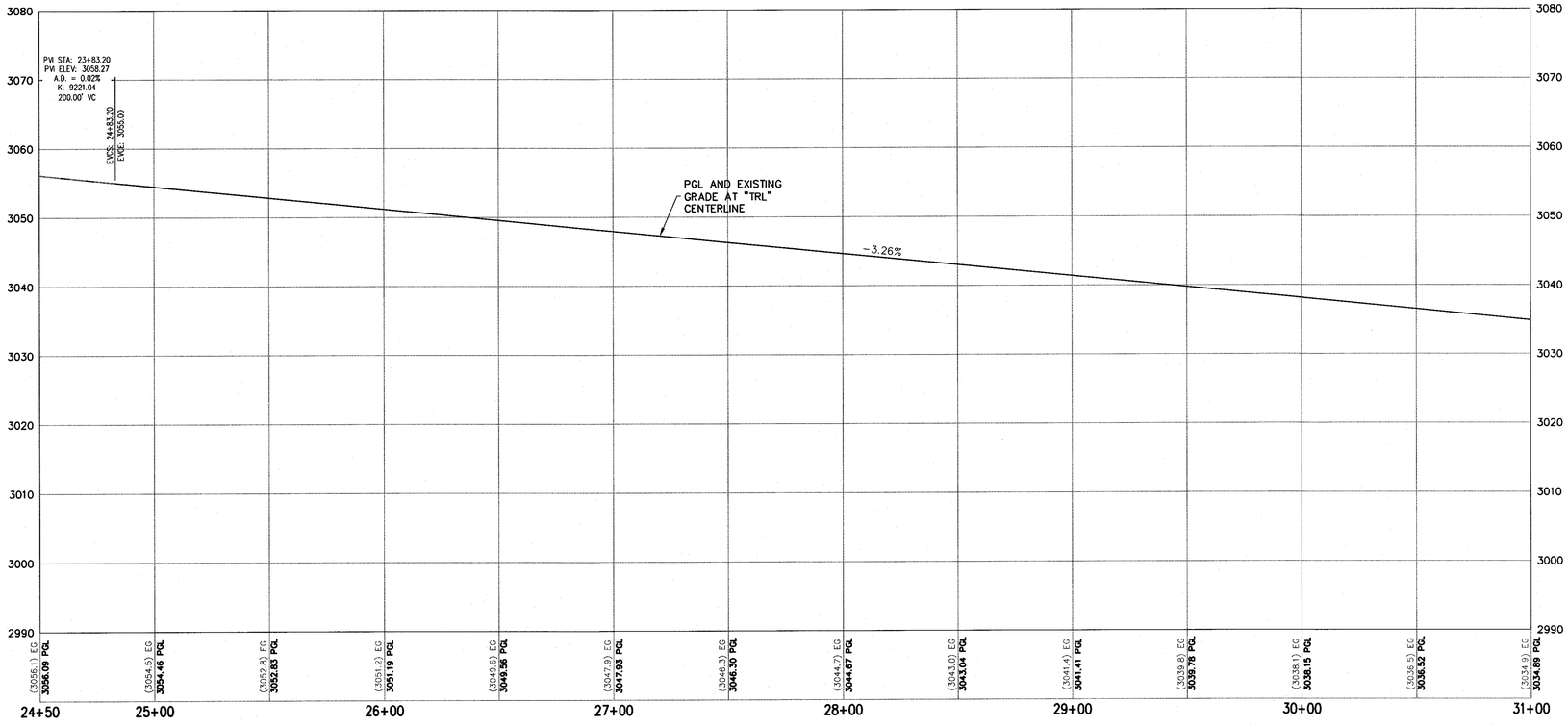
PROFESSIONAL ENGINEER STATE OF NEVADA JERRY C. SLATER Exp:06/30/2018 CIVIL No. 14167

C-14
SHEET 20 OF 50

DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

1. CONSTRUCT OVER 3-INCH PBS OVER 4-INCH TYPE II AGGREGATE BASE (SEE TY-SHEETS FOR TYPICAL SECTIONS)
2. SAWCUT AND MATCH EXISTING CONCRETE ACCESS ROAD
3. INSTALL GUARDRAIL (TRIPLE CORRUGATION) (NDOT STD. PLAN R-8.4.1)
4. INSTALL TANGENT END TERMINAL FOR GUARDRAIL (NDOT STD. PLAN R-8.1.1)
5. CONSTRUCT 12-FOOT WIDE MINIMUM ACCESS ROAD (DETAIL 3, SHEET TY-02)
6. CONSTRUCT 2-INCH PBS SIDEWALK OVER 4-INCH TYPE II AGGREGATE BASE (SEE SHEETS C-12 THROUGH C-21 FOR PLAN AND PROFILE)
7. CONSTRUCT 3-FOOT DEEP CONCRETE CUTOFF WALL (DETAIL 4, SHEET TY-02)
8. INSTALL CHAINLINK FENCE (USDCCA STD. DWG. 252)
9. INSTALL 12-FOOT WIDE CHAINLINK GATE
10. ADJUST EXISTING CABLE VAULT TO FINISH GRADE
11. ADJUST EXISTING POWER VAULT TO FINISH GRADE
12. SAWCUT AND MATCH EXISTING PAVEMENT
13. RELOCATE AND RESET EXISTING GATE ON CONCRETE FOUNDATION (PER STRUCTURAL PLANS)

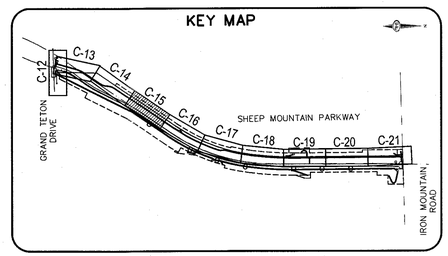
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1. SEE TY-SHEETS FOR TYPICAL SECTIONS.
2. SEE SD-SHEETS FOR STORM PROFILES.
3. SEE UT-SHEETS FOR WATER AND SEWER PLAN AND PROFILES.
4. SEE GR-SHEETS FOR GRADING AND STORM DRAIN PLAN.

LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



30 0 30 60
SCALE FEET

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD 1-702-227-2929

FAST Call before you UnderGround. 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "TRL" 24+50.00 TO "TRL" 31+00.00

DATE: 05/29/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

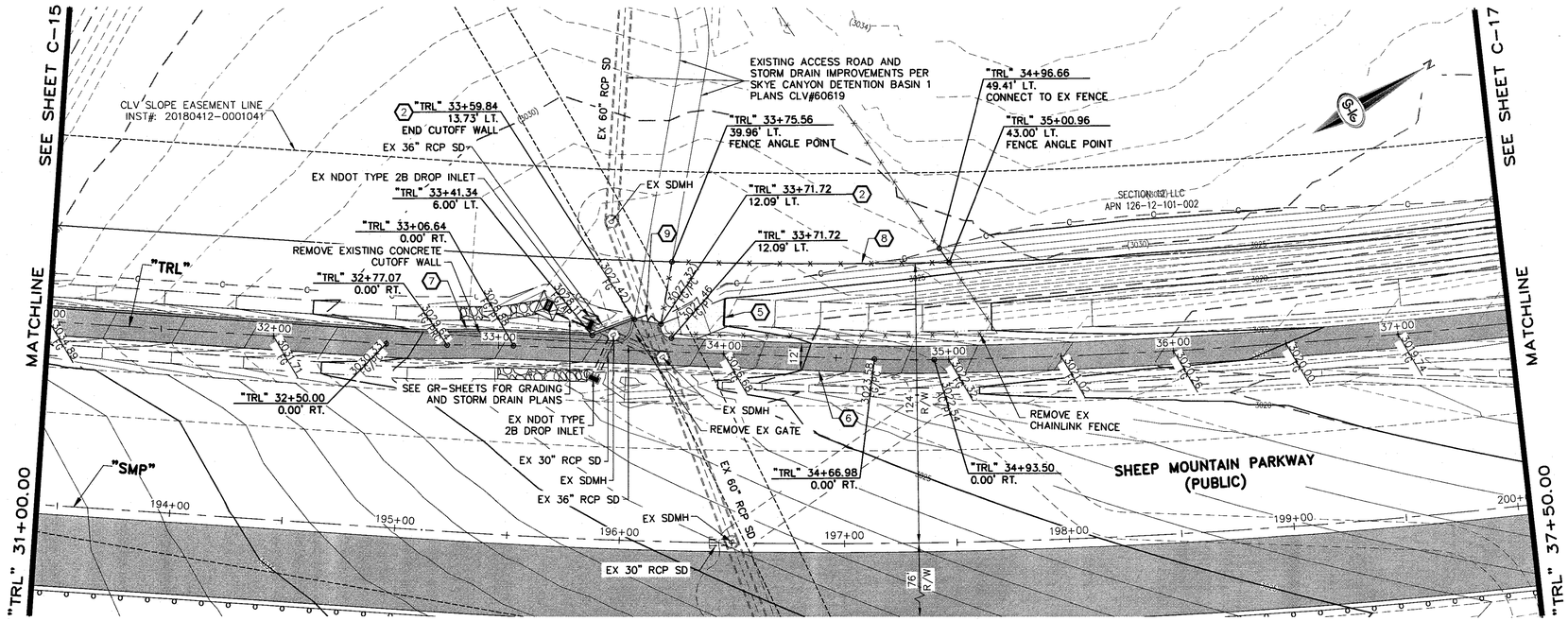
PROJECT NO.
OLY1720.000

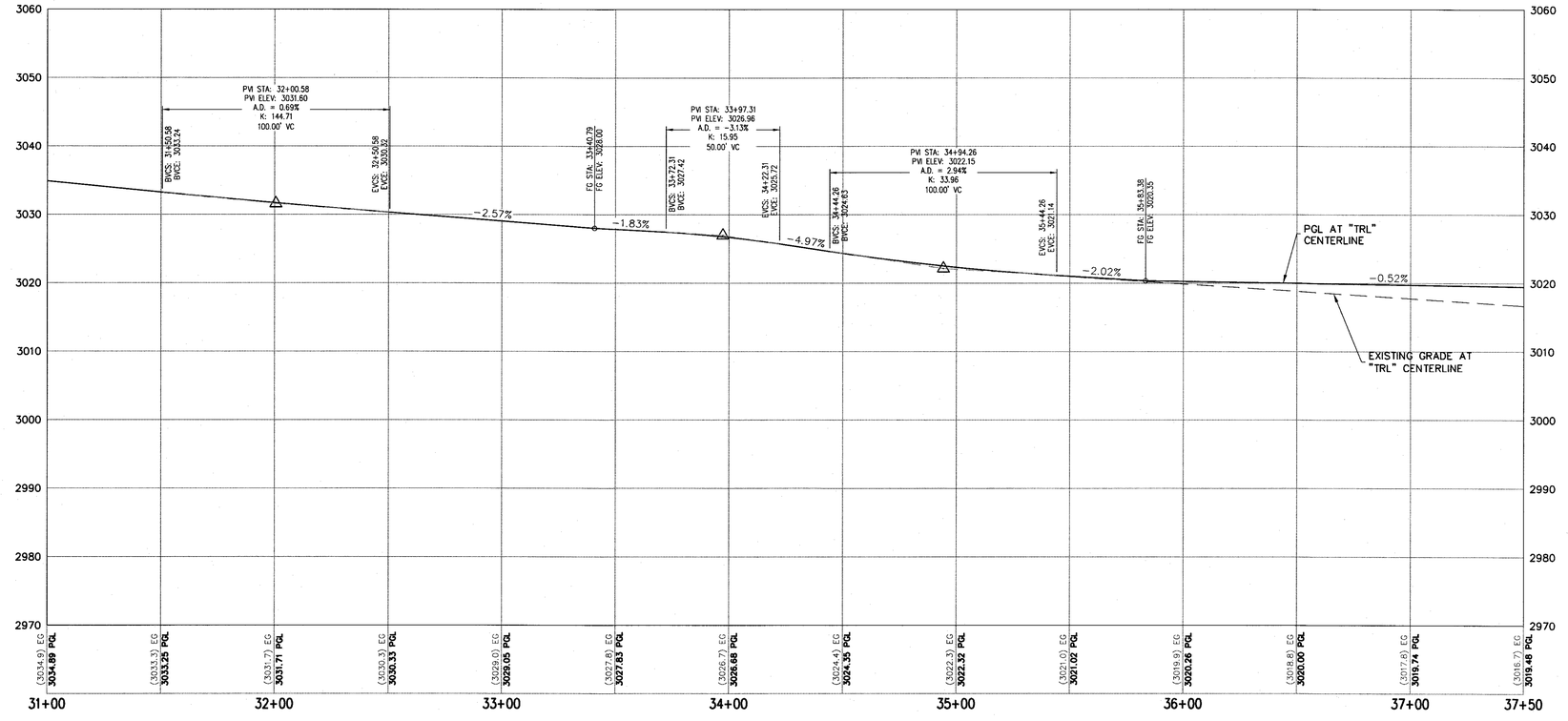
PROFESSIONAL ENGINEER - STATE OF NEVADA - JERRY S. SLATER - Exp. 08/30/2019 - CIVIL - No. 14167

C-15
SHEET 21 OF 50

DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

1. CONSTRUCT OVER 3-INCH PBS OVER 4-INCH TYPE II AGGREGATE BASE (SEE TY-SHEETS FOR TYPICAL SECTIONS)
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12. SAWCUT AND MATCH EXISTING PAVEMENT
13. RELOCATE AND RESET EXISTING GATE ON CONCRETE FOUNDATION (PER STRUCTURAL PLANS)

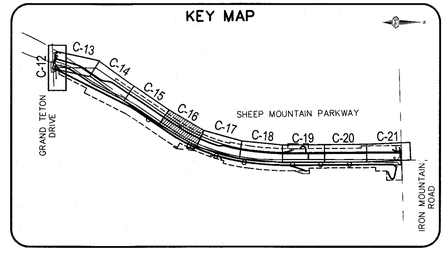
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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



30 0 30 60
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PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "TRL" 31+00.00 TO "TRL" 37+50.00

DATE: 05/29/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

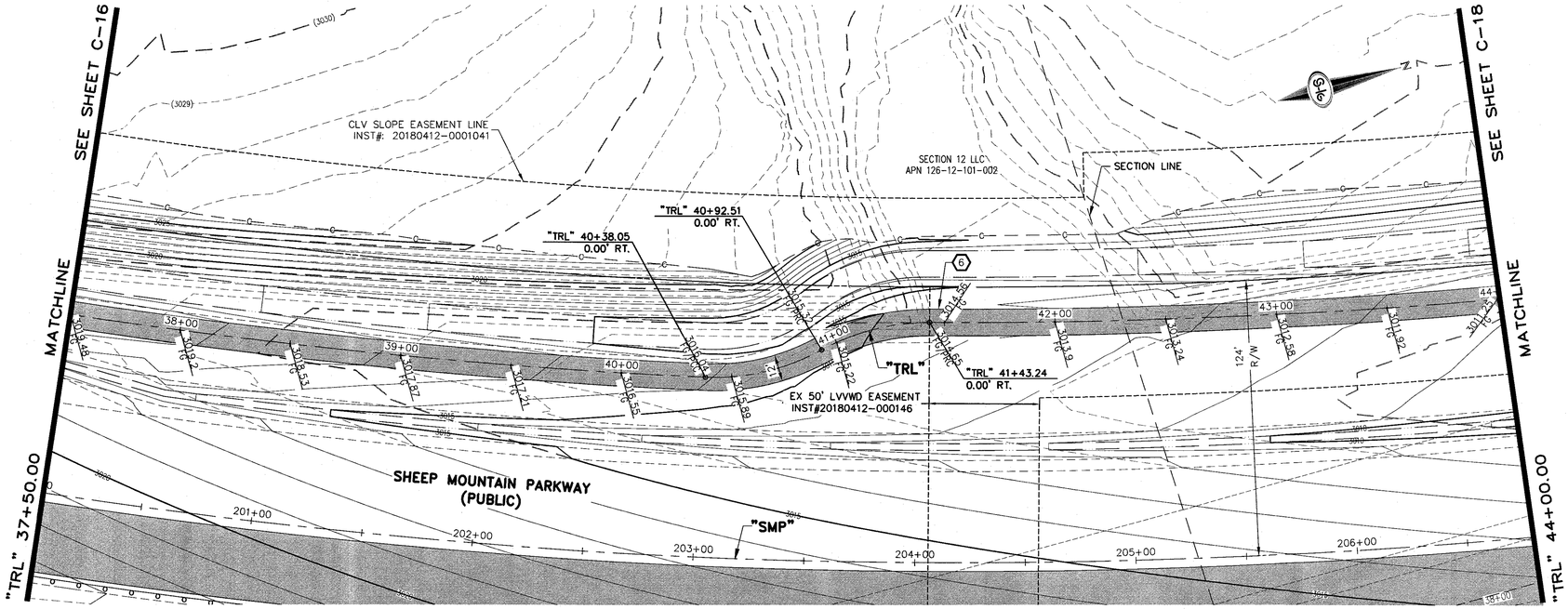
PROJECT NO.
OLY1720.000

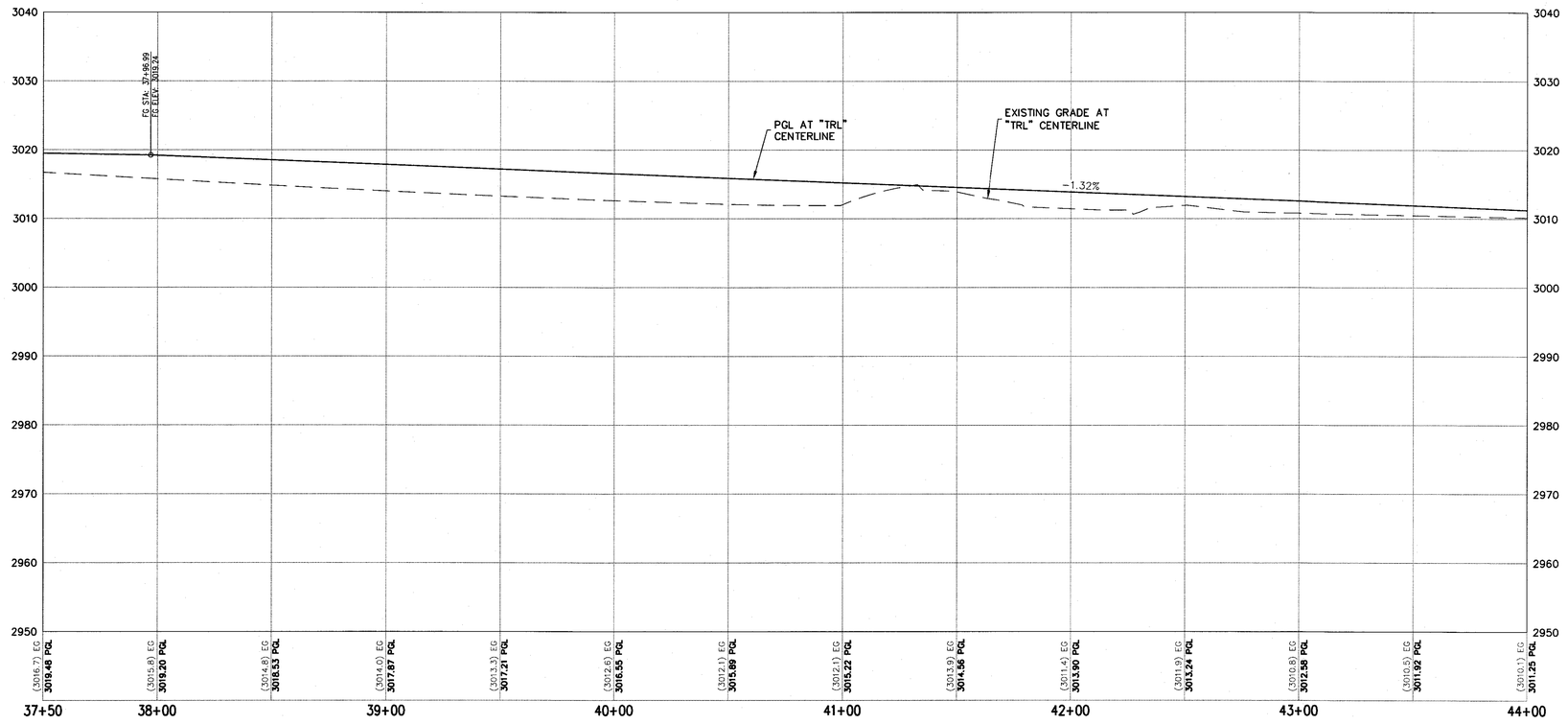
PROFESSIONAL ENGINEER STATE OF NEVADA
JERRY A. SLATER
Exp. 06/30/2018
CIVIL
No. 14167

C-16
SHEET 22 OF 50

DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

1. CONSTRUCT OVER 3-INCH PBS OVER 4-INCH TYPE II AGGREGATE BASE (SEE TY-SHEETS FOR TYPICAL SECTIONS)
2. SAWCUT AND MATCH EXISTING CONCRETE ACCESS ROAD
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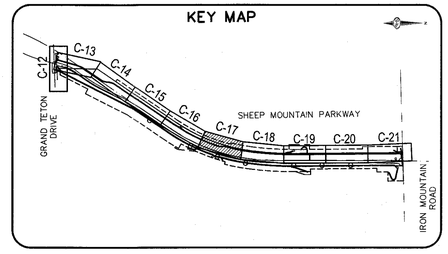
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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



30 0 30 60
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PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "TRL" 37+50.00 TO "TRL" 44+00.00

DATE: 05/29/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

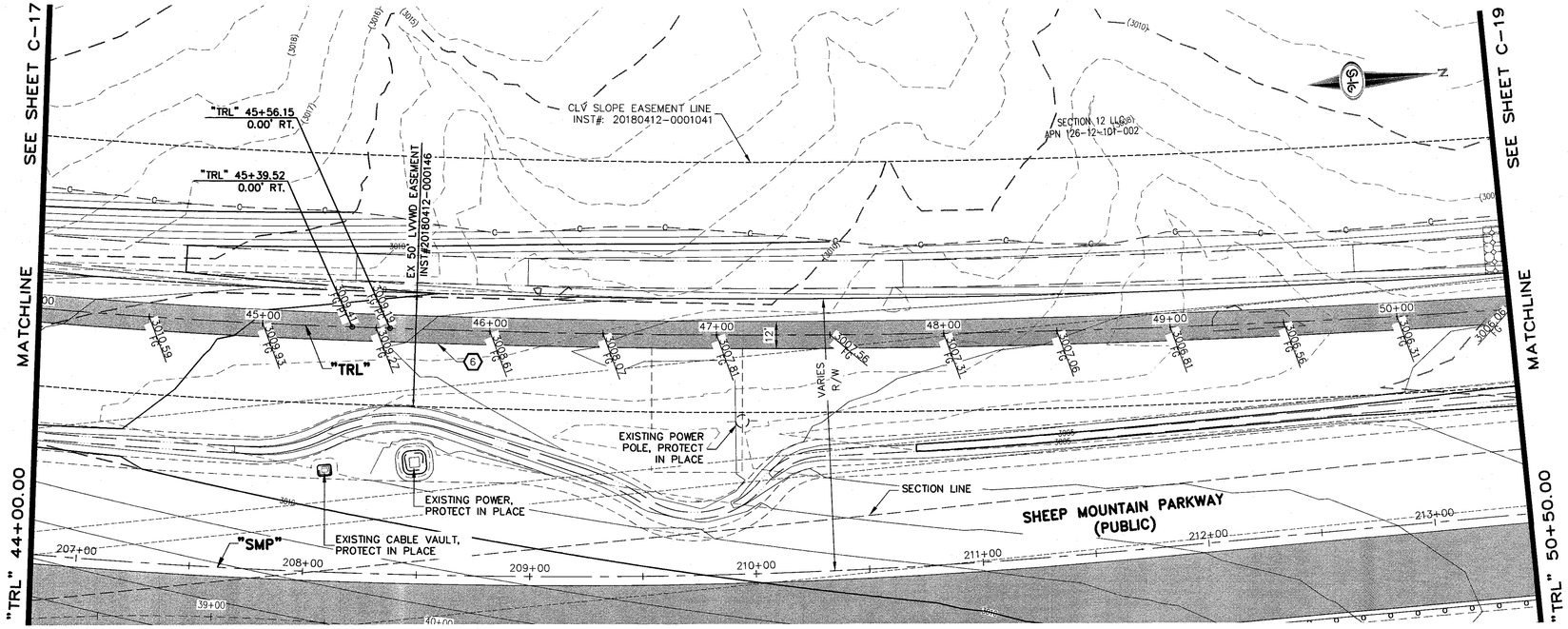
PROJECT NO.
OLY1720.000

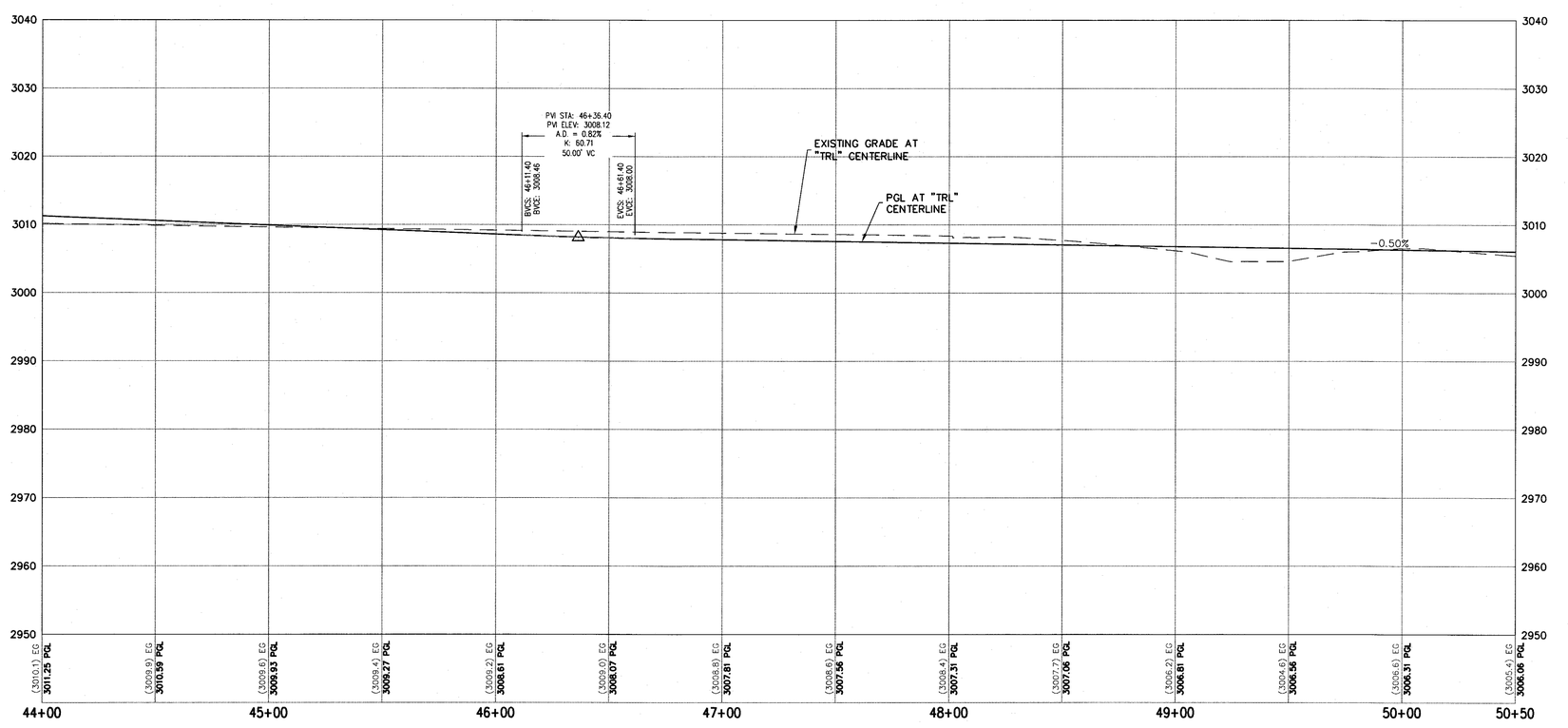
PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY SLATER
Exp 06/30/2018
CIVIL
No. 14167

C-17
SHEET 23 OF 50

DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

1. CONSTRUCT OVER 3-INCH PBS OVER 4-INCH TYPE II AGGREGATE BASE (SEE TY-SHEETS FOR TYPICAL SECTIONS)
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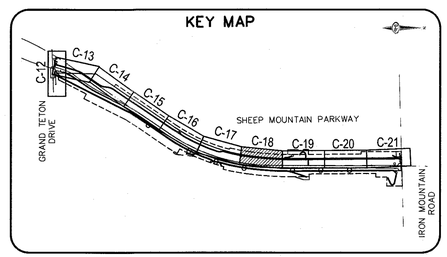
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LEGEND

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KEY MAP



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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "TRL" 44+00.00 TO "TRL" 50+50.00

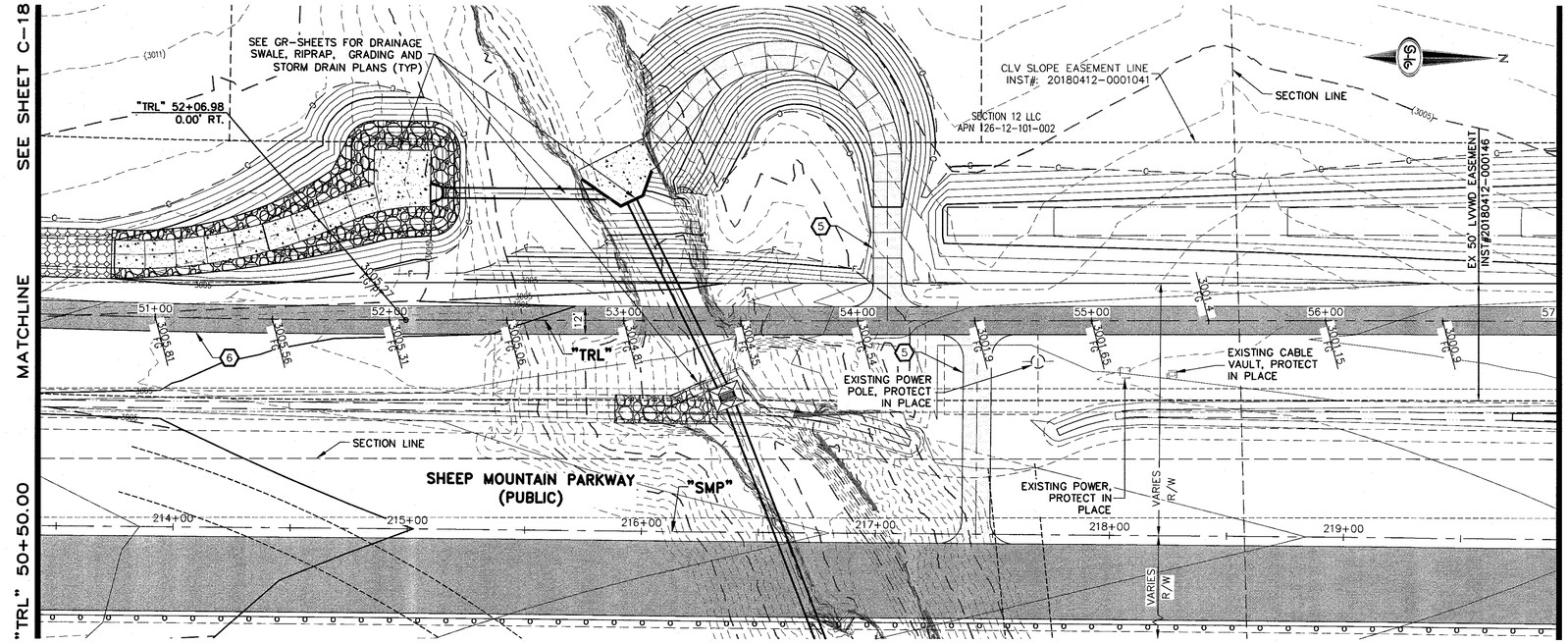
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DESIGNER: BCC
CHECKED: JSR
PROJECT NO.
OLY1720.000

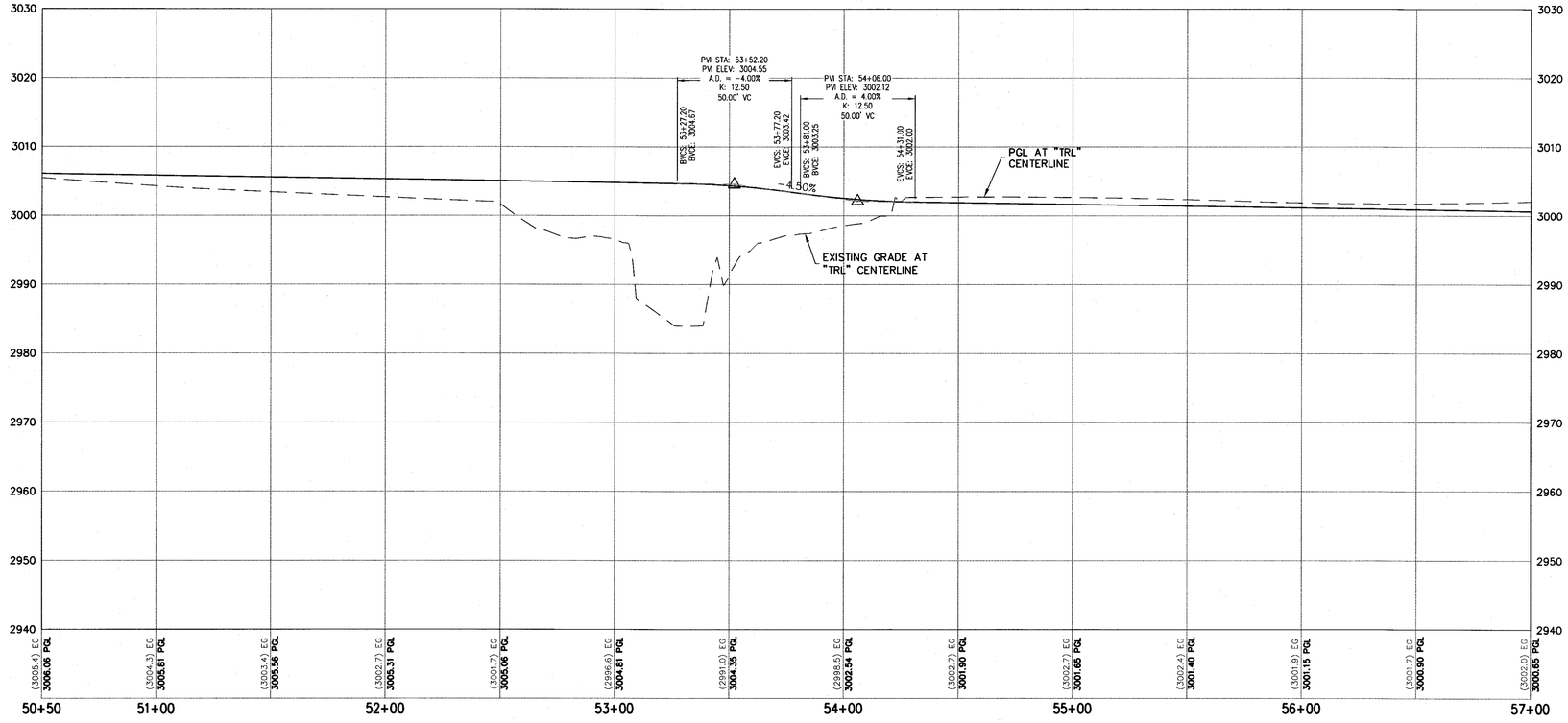
PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY A. SLATER
Exp. 06/30/2018
CIVIL
No. 14167

C-18
SHEET 24 OF 50

DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

1. CONSTRUCT OVER 3-INCH PBS OVER 4-INCH TYPE II AGGREGATE BASE (SEE TY-SHEETS FOR TYPICAL SECTIONS)
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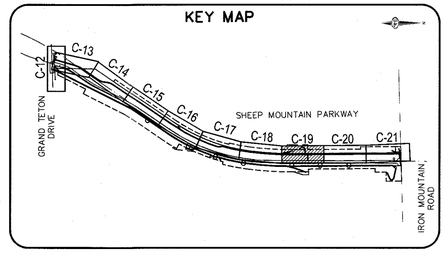
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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



SCALE: 30 0 30 60 FEET

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

NO.	DESCRIPTION	DATE	BY	APP DATE	APP

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "TRL" 50+50.00 TO "TRL" 57+00.00

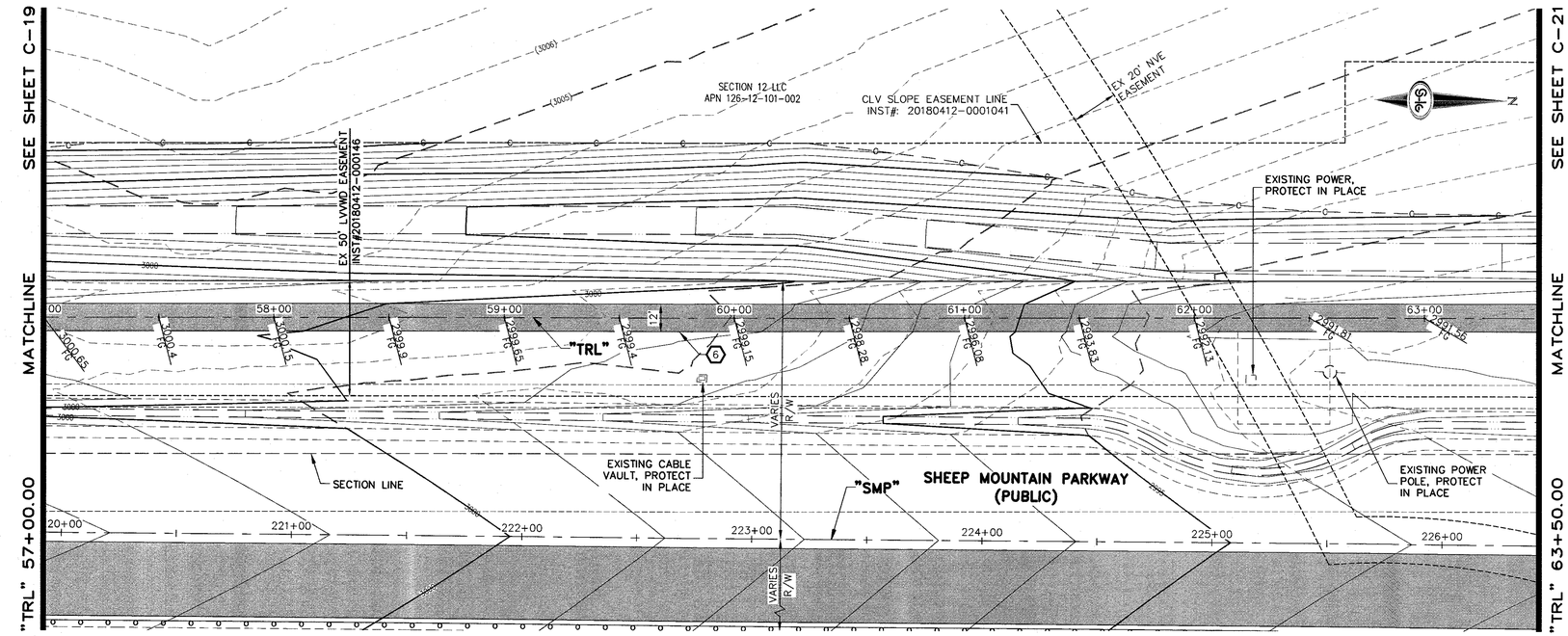
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PROJECT NO. OLY1720.000

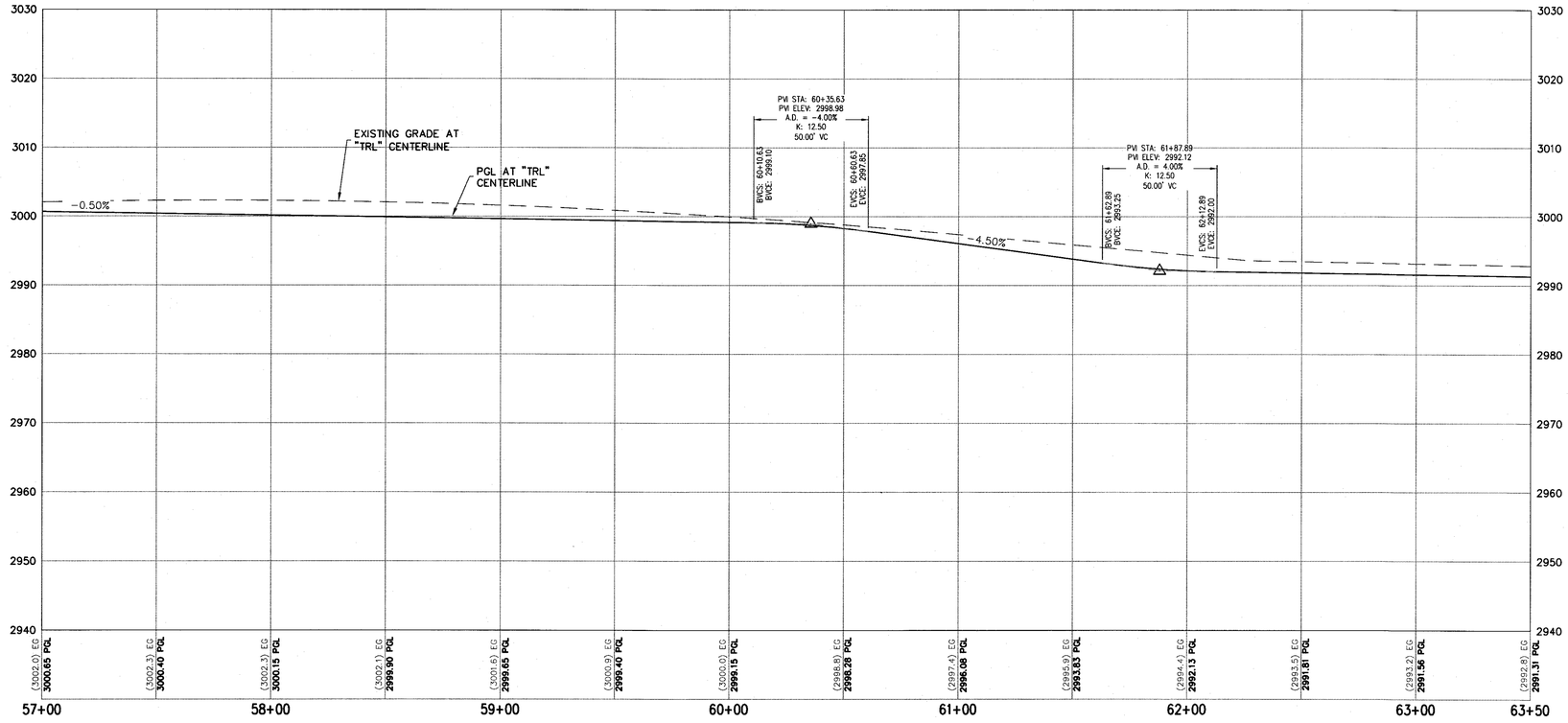
PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY A. SLATER
Exp. 06/30/2018
CIVIL
No. 14167

C-19
SHEET 25 OF 50

DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

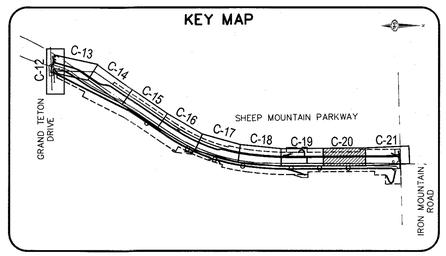
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PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "TRL" 57+00.00 TO "TRL" 63+50.00

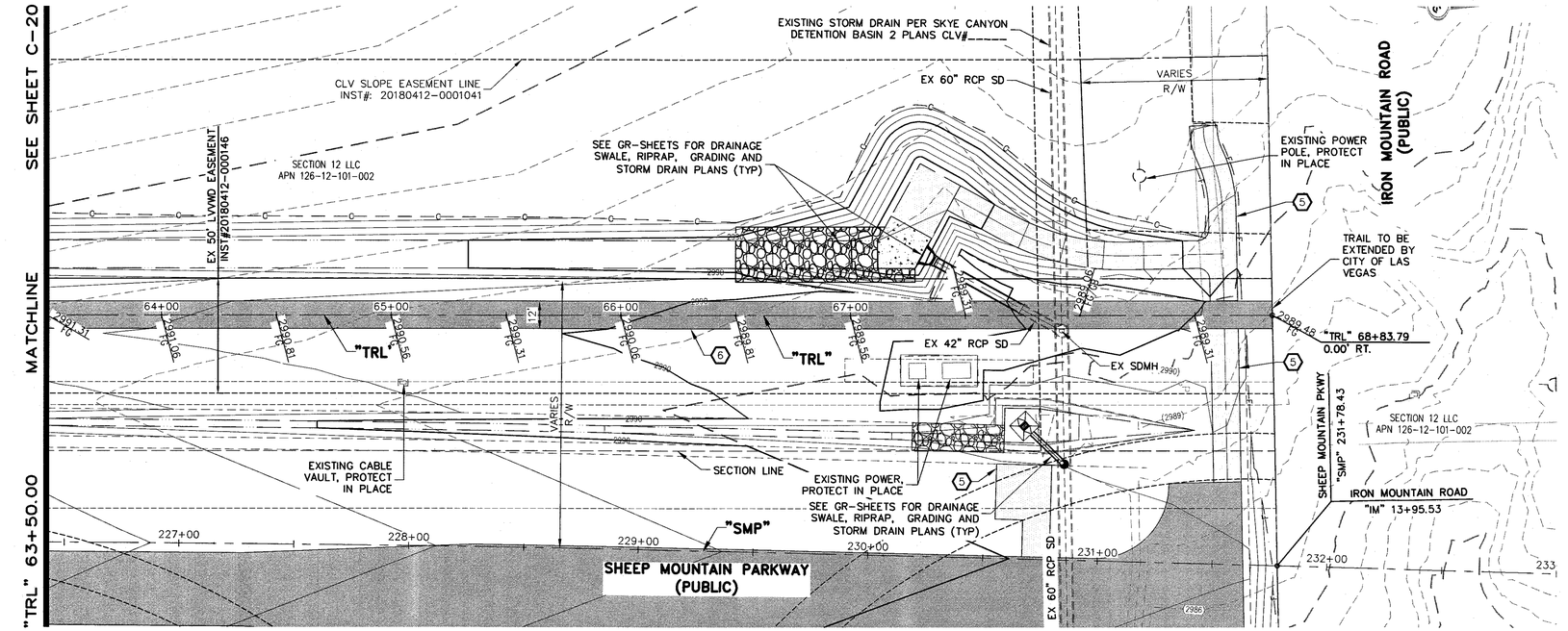
DATE: 05/29/18
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CHECKED: JSR
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OLY1720.000

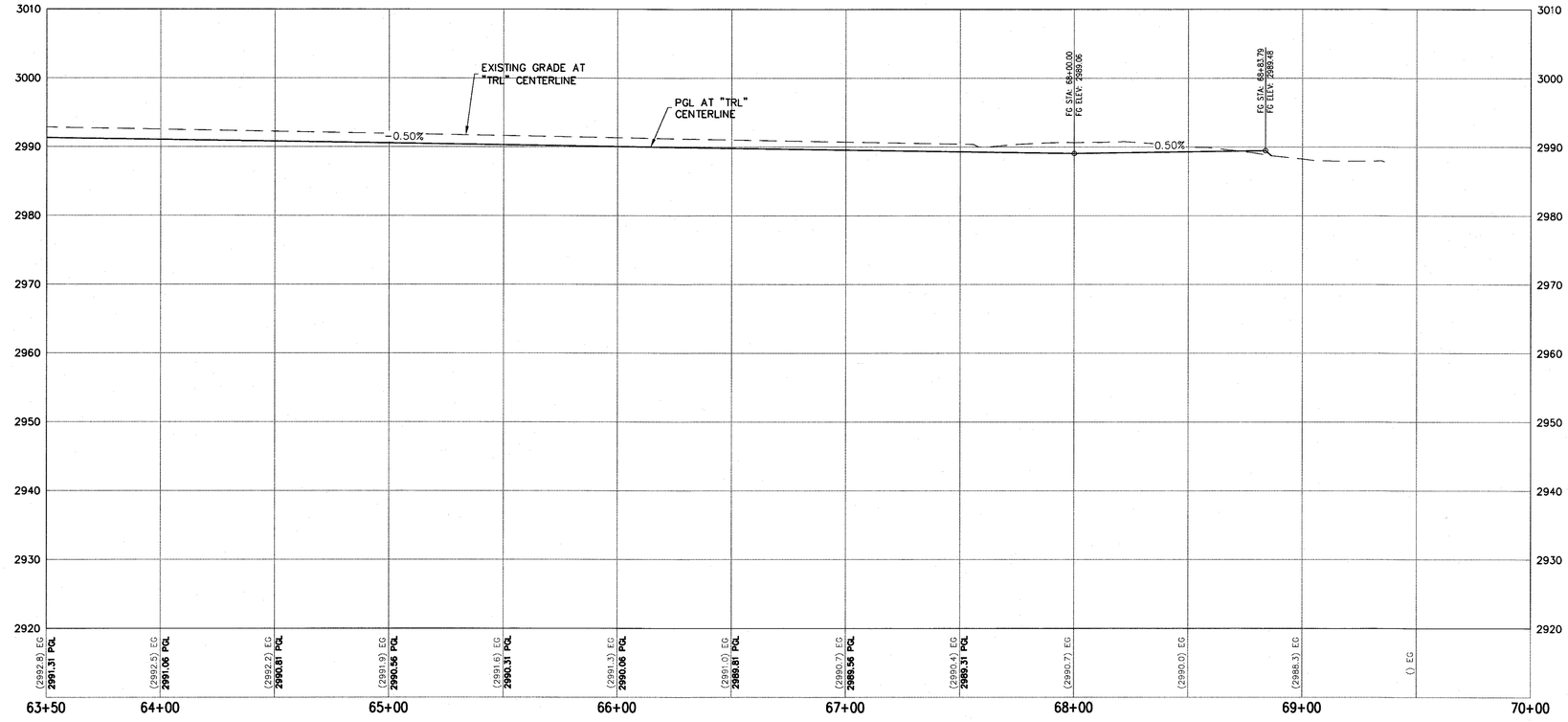
PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY C. SLATER
Exp. 06/30/2018
CIVIL
No. 14167
6-5-14

C-20
SHEET 26 OF 50

DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

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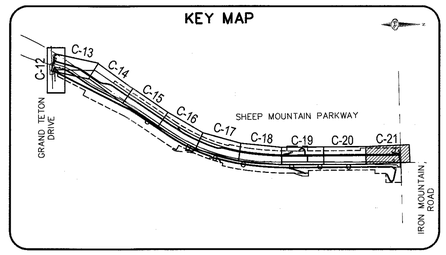
NOTES

1. SEE TY-SHEETS FOR TYPICAL SECTIONS.
2. SEE SD-SHEETS FOR STORM PROFILES.
3. SEE UT-SHEETS FOR WATER AND SEWER PLAN AND PROFILES.
4. SEE GR-SHEETS FOR GRADING AND STORM DRAIN PLAN.

LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



SCALE 30 0 30 60 FEET

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD. 1-702-227-2929

FAST. Call before you UnderGround. 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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

NO.	DESCRIPTION	DATE	BY	APP DATE	APP

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "TRL" 63+50.00 TO "TRL" 70+00.00

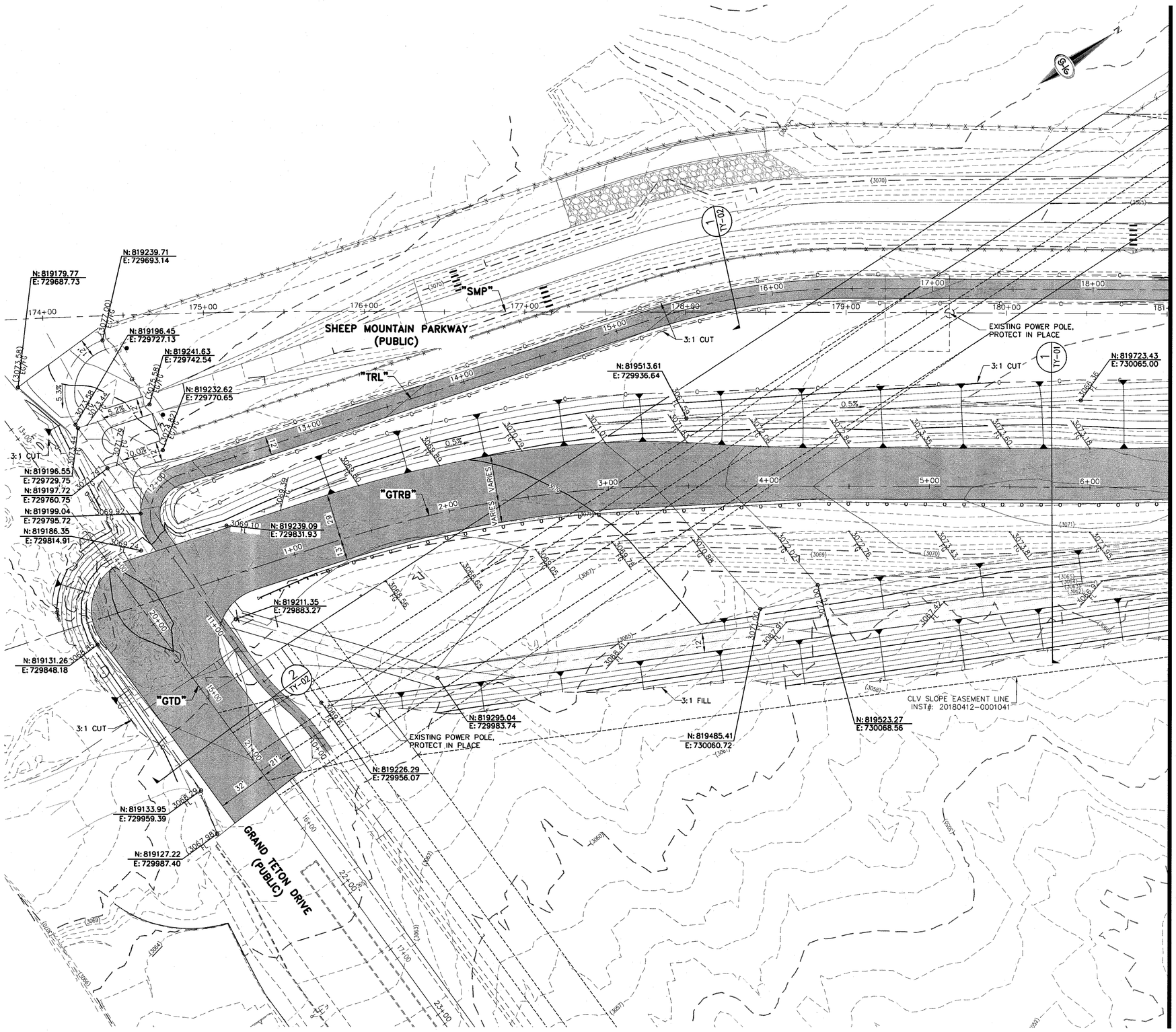
DATE: 05/29/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO. OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA - JERRY J. SLATER - EXP. 06/30/2018 - CIVIL - No. 14167

C-21
SHEET 27 OF 50

DWG NO. _____

HANSEN NO. _____



GRADING AND STORM DRAIN NOTES

1. INSTALL NDOT TYPE 2B STORM DRAIN DROP INLET WITH CONCRETE APRON (NDOT DETAIL R-4.2.2 AND R-4.2.7) (SEE SHEET TY-08)
2. ADJUST EXISTING STORM DRAIN DROP INLET TO FINISH GRADE (PER STRUCTURAL PLANS)
3. INSTALL RIPRAP (D50=3-INCH, T=12-INCH)
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7. ADJUST 72-INCH NDOT TYPE IV STORM DRAIN MANHOLE TO FINISH GRADE (NDOT DETAIL R-4.3.2) (SEE SHEET TY-08)
8. CONSTRUCT HEADWALL (PER STRUCTURAL DETAIL)
9. CONSTRUCT 6-INCH THICK CONCRETE PAD OVER 6-INCH TYPE II AGGREGATE BASE WITH 3-FOOT DEEP CUTOFF WALL (DETAIL 1, TY-04)
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11. CONNECT TO EXISTING RCP STORM DRAIN WITH CONCRETE COLLAR (DETAIL 5, SHEET TY-02)
12. REMOVE 120 SF EXISTING RIPRAP FOR INSTALLATION OF CONCRETE ACCESS ROAD
13. INSTALL 3-FT DEEP CONCRETE CUTOFF WALL (SEE DETAIL 4 ON TY-02)
14. INSTALL 42-INCH RCP STORM DRAIN (USDCCA STD. DWG. NO. 503.2)
15. INSTALL RCP END SECTION (NDOT R-2.3.1) (SEE SHEET TY-08)
16. CONSTRUCT 6-INCH THICK CONCRETE PAD OVER 6-INCH TYPE II AGGREGATE BASE WITH 3-FOOT DEEP CUTOFF WALL (DETAIL 1, SHEET TY-03)
17. INSTALL RIPRAP (D50=18-INCH, T=36-INCH)
18. INSTALL 60-INCH TYPE III STORM DRAIN MANHOLE (USDCCA STD. DWG. NO. 406)
19. INSTALL 3-INCH MINUS, 6-INCH THICK GRAVEL OVER 6-INCH TYPE II AGGREGATE BASE
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21. INSTALL 24-INCH RCP STORM DRAIN (USDCCA STD. DWG. NO. 503.2)

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6. ALL DROP INLETS SHALL INCLUDE STORM WATER MANAGEMENT STAMP AND DETAIL PER USDCCA STD. DWG. NO. 421.
7. SEE STRUCTURAL PLANS FOR ADDITIONAL STRUCTURAL DETAILS AND CONNECTIONS.
8. ALL PIPES ARE PUBLICLY MAINTAINED.

LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH
- RIPRAP (SIZE PER PLAN)
- (1) STORM DRAIN LATERAL # (SEE SHEET GR-10)

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY DS-4952 ON FILE AT THE CITY OF LAS VEGAS FOR THE SUBJECT PROJECT

JERRY SLATER, P.E. 14167 DATE

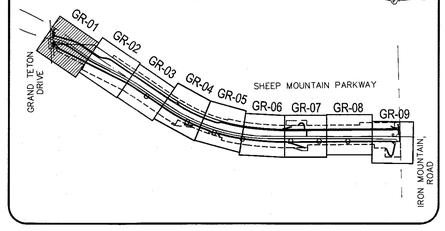
FLOOD ZONE

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE 'X' (OUTSIDE THE 500-YEAR FLOOD PLAIN) ON THE FLOOD INSURANCE RATE MAP (FIRM) PANEL: 32003C1735E, DATED SEPTEMBER 27, 2002

NOTE:

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KEY MAP



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SCALE FEET

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

GRADING PLAN - "GTRB" 0+00.00 TO "GTRB" 6+50.00

DATE: 05/29/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

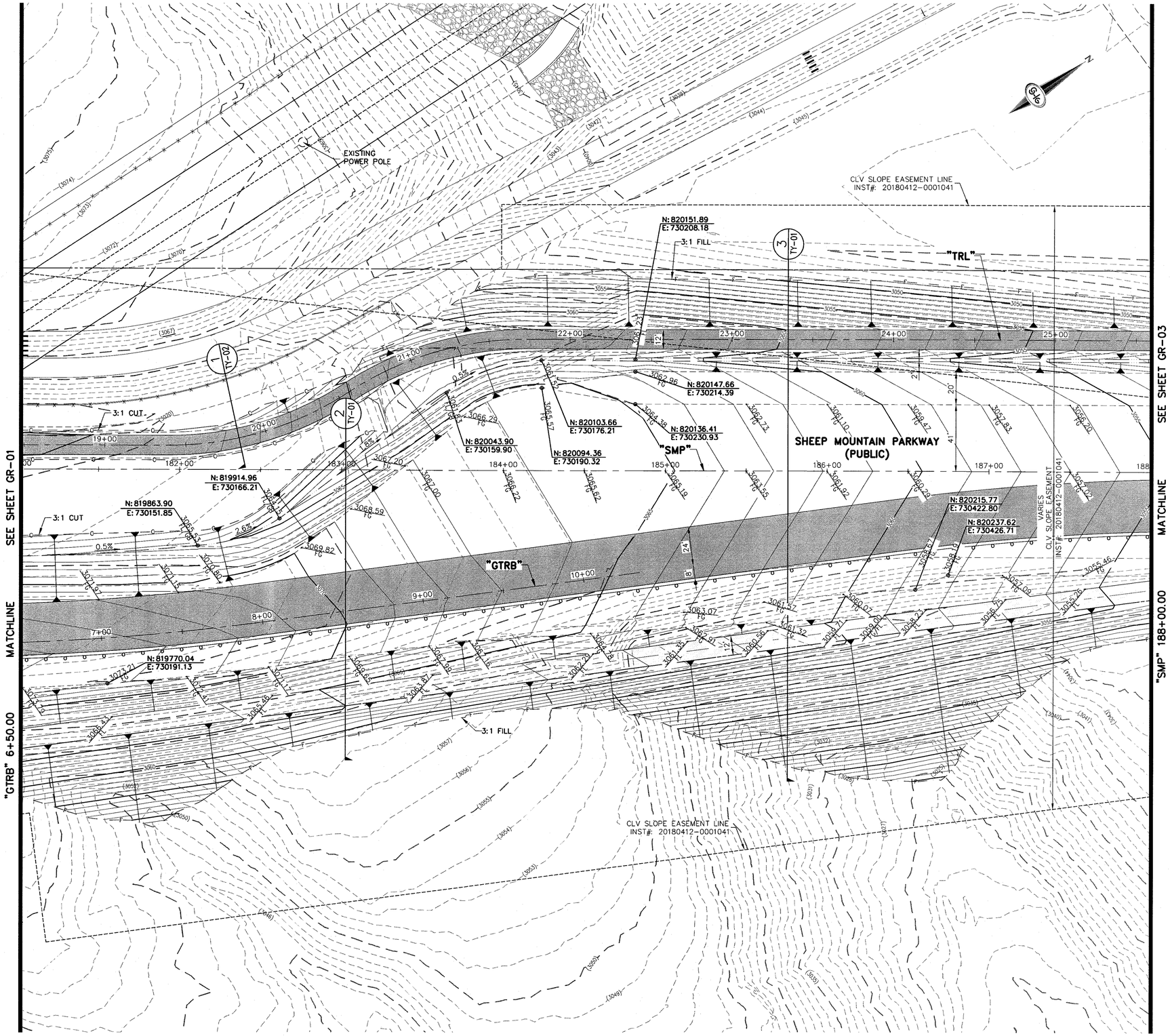
PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY J. SLATER
Exp. 06/30/2018
CIVIL
No. 14167
6-5-18

GR-01
SHEET 28 OF 50

DWG NO. _____

HANSEN NO. _____



GRADING AND STORM DRAIN NOTES

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LEGEND

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- MAINTENANCE ACCESS PATH
- RIPRAP (SIZE PER PLAN)
- (1) STORM DRAIN LATERAL # (SEE SHEET GR-10)

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY DS-4952 ON FILE AT THE CITY OF LAS VEGAS FOR THE SUBJECT PROJECT

JERRY SLATER, P.E. 14167 — DATE

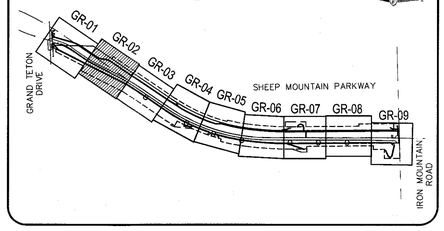
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

GRADING PLAN - "GTRB" 6+50.00 TO "GTRB" 12+00.00

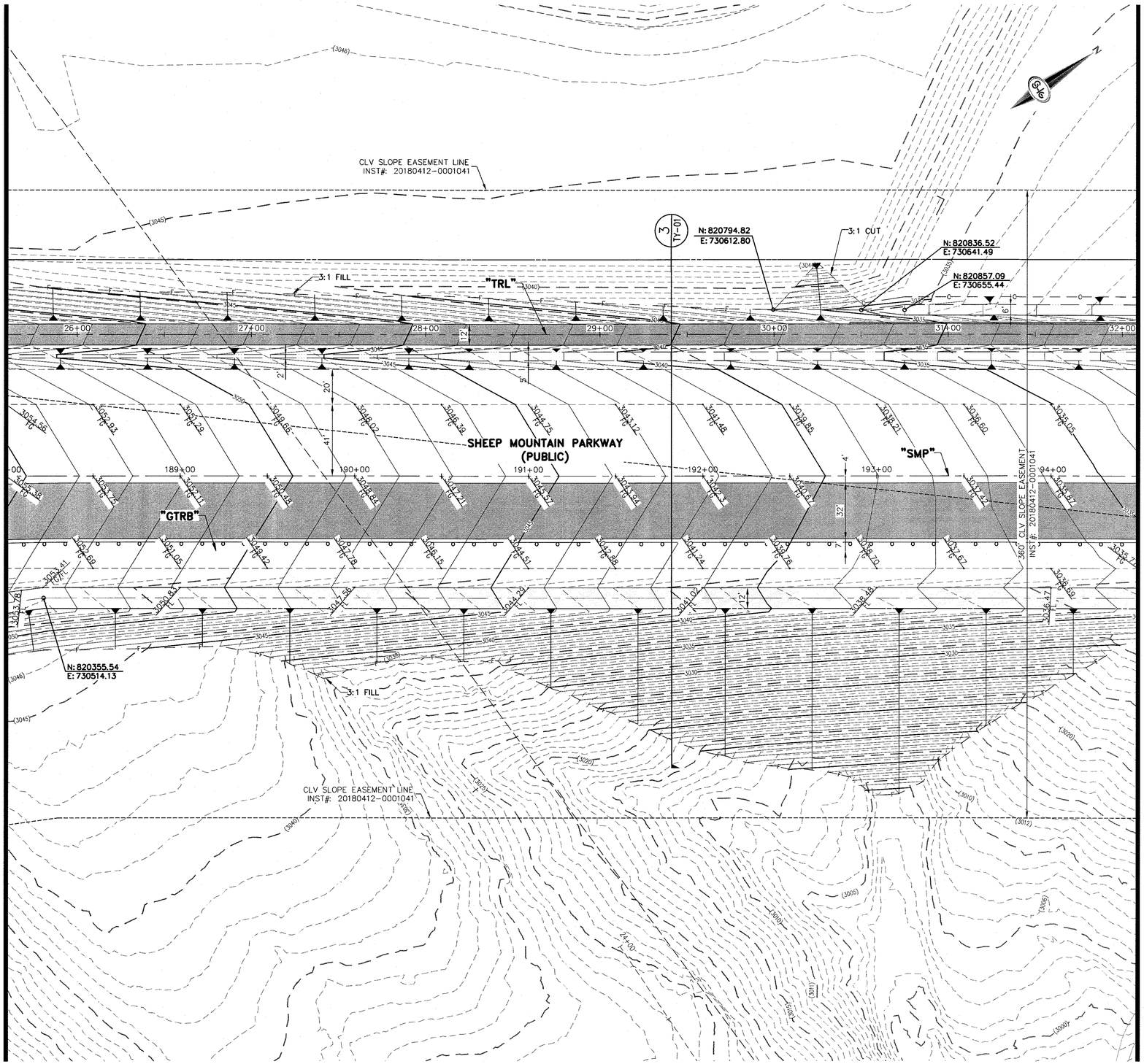
DATE: 05/29/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO. OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY SLATER
Exp. 06/30/2018
CIVIL
No. 14167

GR-02
SHEET 29 OF 50

DWG NO. _____

HANSEN NO. _____



GRADING AND STORM DRAIN NOTES

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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH
- RIPRAP (SIZE PER PLAN)
- (1) STORM DRAIN LATERAL # (SEE SHEET GR-10)

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY DS-4952 ON FILE AT THE CITY OF LAS VEGAS FOR THE SUBJECT PROJECT

JERRY SLATER, P.E. 14167 — DATE

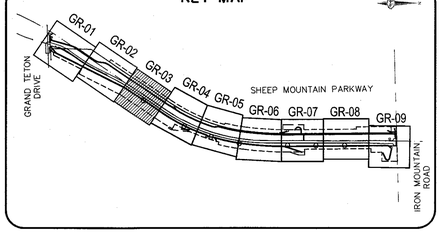
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KEY MAP



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NO.	DESCRIPTION	DATE	BY	APP DATE	APP

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

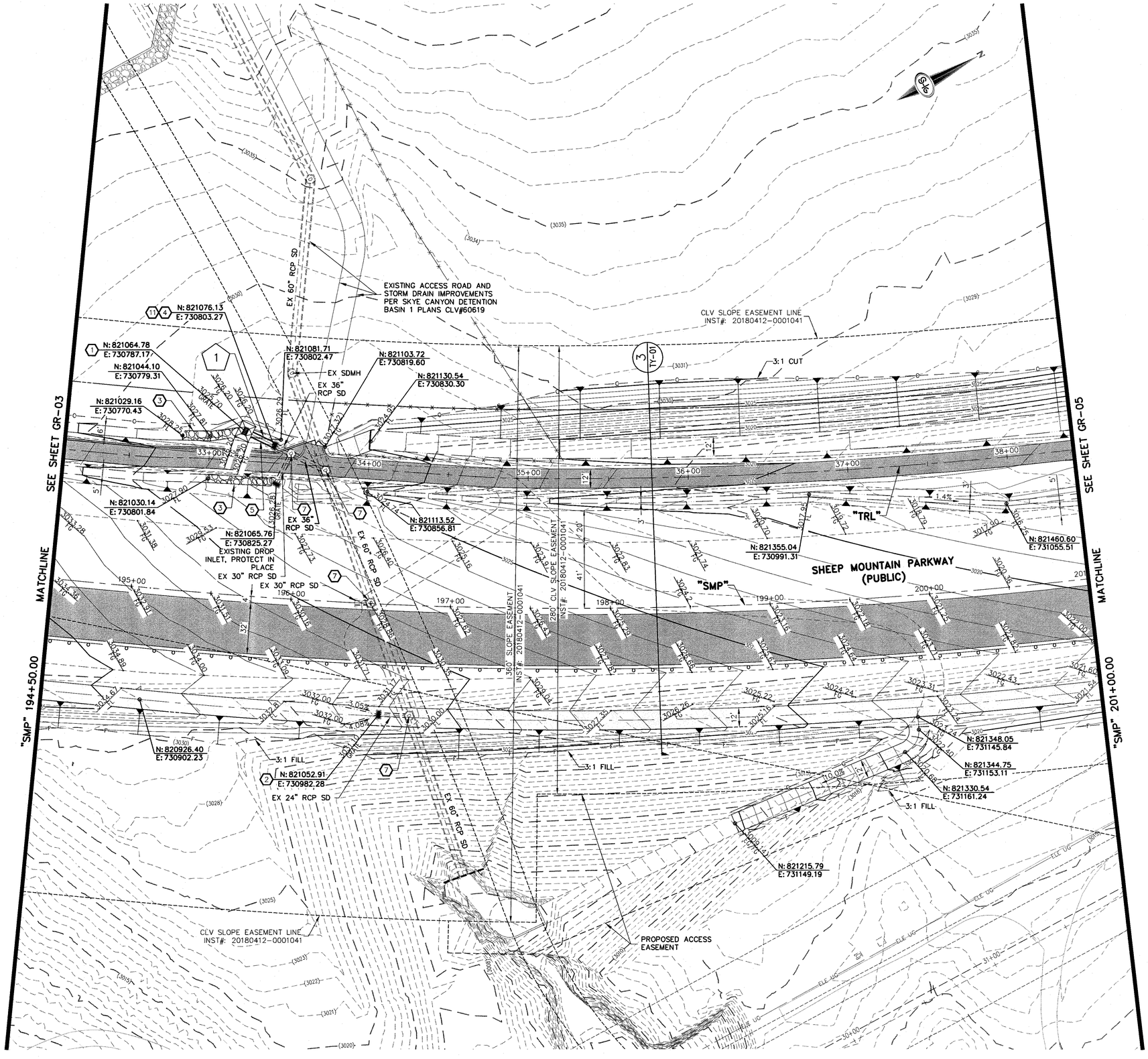
GRADING PLAN - "SMP" 188+00.00 TO "SMP" 194+50.00

DATE: 05/29/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA - JERRY SLATER - Exp: 06/30/2018 - CIVIL - No. 14167

GR-03
SHEET 30 OF 50
DWG NO. ———

HANSEN NO. ———



GRADING AND STORM DRAIN NOTES

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- RIPRAP (SIZE PER PLAN)
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JERRY SLATER, P.E. 14167 DATE

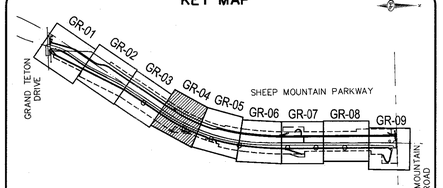
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NO.	DESCRIPTION	DATE	BY	APP DATE	APP

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

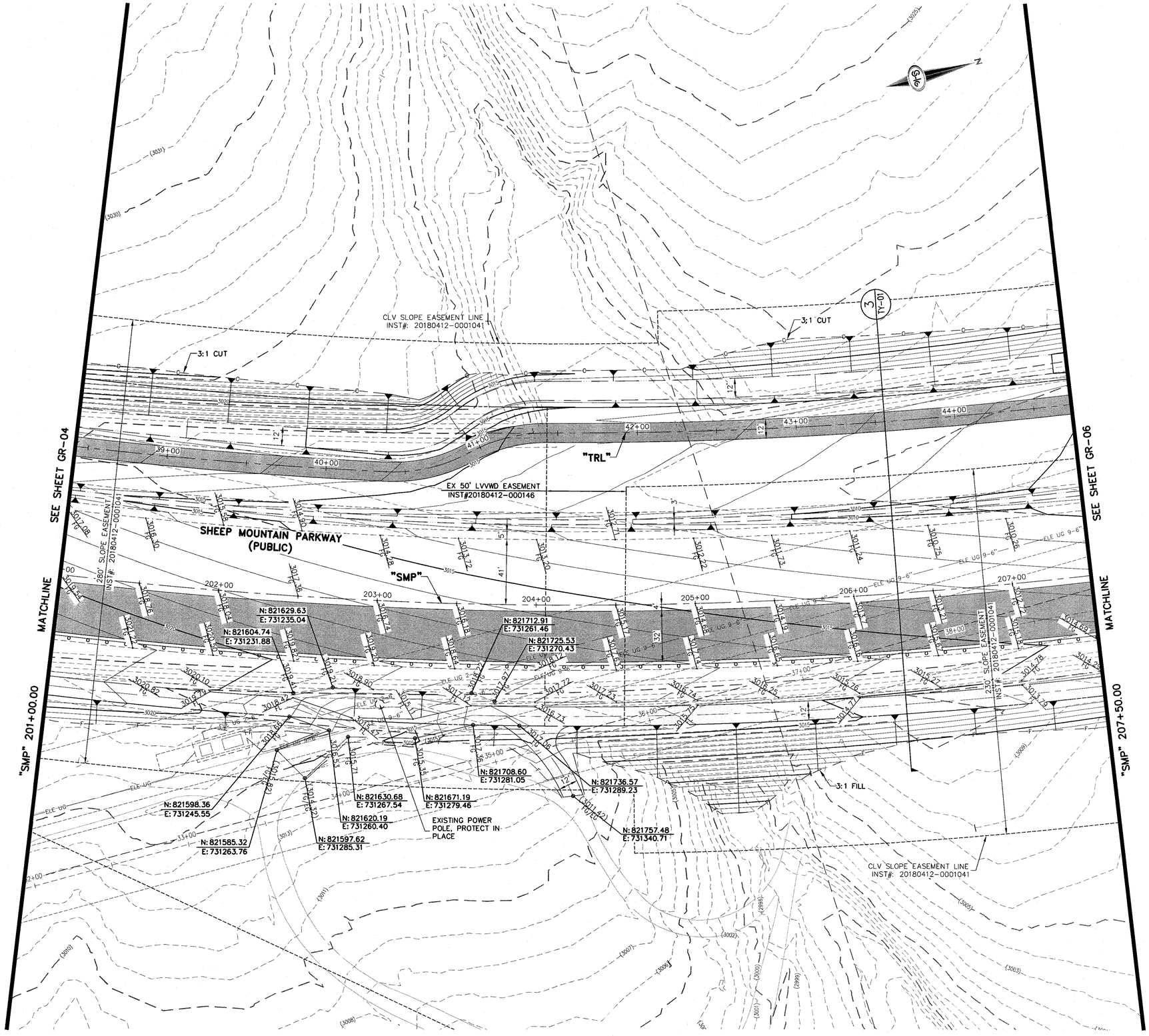
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DATE: 05/29/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO. OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA - JERRY SLATER - Exp. 06/30/2018 - CIVIL - No. 14167 - 6.5.18

GR-04
SHEET 31 OF 50
DWG NO. _____

HANSEN NO. _____



GRADING AND STORM DRAIN NOTES

1. INSTALL NDOT TYPE 2B STORM DRAIN DROP INLET WITH CONCRETE APRON (NDOT DETAIL R-4.2.2 AND R-4.2.7) (SEE SHEET TY-08)
2. ADJUST EXISTING STORM DRAIN DROP INLET TO FINISH GRADE (PER STRUCTURAL PLANS)
3. INSTALL RIPRAP (D50=3-INCH, T=12-INCH)
4. REMOVE EXISTING DROP INLET
5. INSTALL 36-INCH RCP STORM DRAIN (USDCCA STD. DWG. NO. 503.2)
6. INSTALL 48-INCH RCP STORM DRAIN (USDCCA STD. DWG. NO. 503.2)
7. ADJUST 72-INCH NDOT TYPE IV STORM DRAIN MANHOLE TO FINISH GRADE (NDOT DETAIL R-4.3.2) (SEE SHEET TY-08)
8. CONSTRUCT HEADWALL (PER STRUCTURAL DETAIL)
9. CONSTRUCT 6-INCH THICK CONCRETE PAD OVER 6-INCH TYPE II AGGREGATE BASE WITH 3-FOOT DEEP CUTOFF WALL (DETAIL 1, TY-04)
10. CONSTRUCT 6-INCH THICK CONCRETE PAD OVER 6-INCH TYPE II AGGREGATE BASE
11. CONNECT TO EXISTING RCP STORM DRAIN WITH CONCRETE COLLAR (DETAIL 5, SHEET TY-02)
12. REMOVE 120 SF EXISTING RIPRAP FOR INSTALLATION OF CONCRETE ACCESS ROAD
13. INSTALL 3-FT DEEP CONCRETE CUTOFF WALL (SEE DETAIL 4 ON TY-02)
14. INSTALL 42-INCH RCP STORM DRAIN (USDCCA STD. DWG. NO. 503.2)
15. INSTALL RCP END SECTION (NDOT R-2.3.1) (SEE SHEET TY-08)
16. CONSTRUCT 6-INCH THICK CONCRETE PAD OVER 6-INCH TYPE II AGGREGATE BASE WITH 3-FOOT DEEP CUTOFF WALL (DETAIL 1, SHEET TY-03)
17. INSTALL RIPRAP (D50=18-INCH, T=36-INCH)
18. INSTALL 60-INCH TYPE III STORM DRAIN MANHOLE (USDCCA STD. DWG. NO. 406)
19. INSTALL 3-INCH MINUS, 6-INCH THICK GRAVEL OVER 6-INCH TYPE II AGGREGATE BASE
20. ADJUST 60-INCH TYPE III MANHOLE TO FINISH GRADE (CCAUSD NO. 406)
21. INSTALL 24-INCH RCP STORM DRAIN (USDCCA STD. DWG. NO. 503.2)

NOTES

1. SEE TY-SHEETS FOR TYPICAL SECTIONS.
2. SEE SD-SHEETS FOR STORM PROFILES.
3. SEE UT-SHEETS FOR WATER AND SEWER PLAN AND PROFILES.
4. ALL RCP SHALL BE CLASS III UNLESS OTHERWISE SHOWN IN PROFILE.
5. ALL PIPE LENGTHS ARE MEASURED ALONG PIPE CENTERLINE TO CENTER OF MANHOLE OR INSIDE EDGE OF DI OR RCB/RCA.
6. ALL DROP INLETS SHALL INCLUDE STORM WATER MANAGEMENT STAMP AND DETAIL PER USDCCA STD. DWG. NO. 421.
7. SEE STRUCTURAL PLANS FOR ADDITIONAL STRUCTURAL DETAILS AND CONNECTIONS.
8. ALL PIPES ARE PUBLICLY MAINTAINED.

LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH
- RIPRAP (SIZE PER PLAN)
- (1) STORM DRAIN LATERAL # (SEE SHEET GR-10)

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY DS-4952 ON FILE AT THE CITY OF LAS VEGAS FOR THE SUBJECT PROJECT

JERRY SLATER, P.E. 14167 — DATE

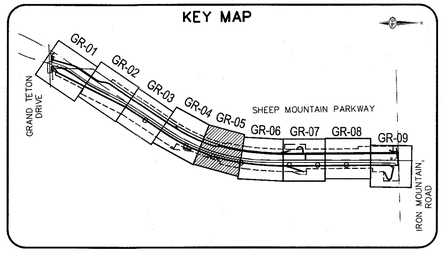
FLOOD ZONE

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE 'X' (OUTSIDE THE 500-YEAR FLOOD PLAIN) ON THE FLOOD INSURANCE RATE MAP (FIRM) PANEL: 32003C1735E, DATED SEPTEMBER 27, 2002

NOTE:

PROPERTY OWNER IS RESPONSIBLE TO MAINTAIN THE BEST MANAGEMENT PRACTICES, SUCH AS BUT NOT LIMITED TO, THE REMOVAL OF ACCUMULATED SEDIMENT AND DEBRIS AND CARE OF VEGETATION.

KEY MAP



30 0 30 60
SCALE FEET

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DIG OVERHEAD 1-702-227-2929

FAST Call before you UnderGround. 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

GRADING PLAN - "SMP" 201+00.00 TO "SMP" 207+50.00

DATE: 05/29/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

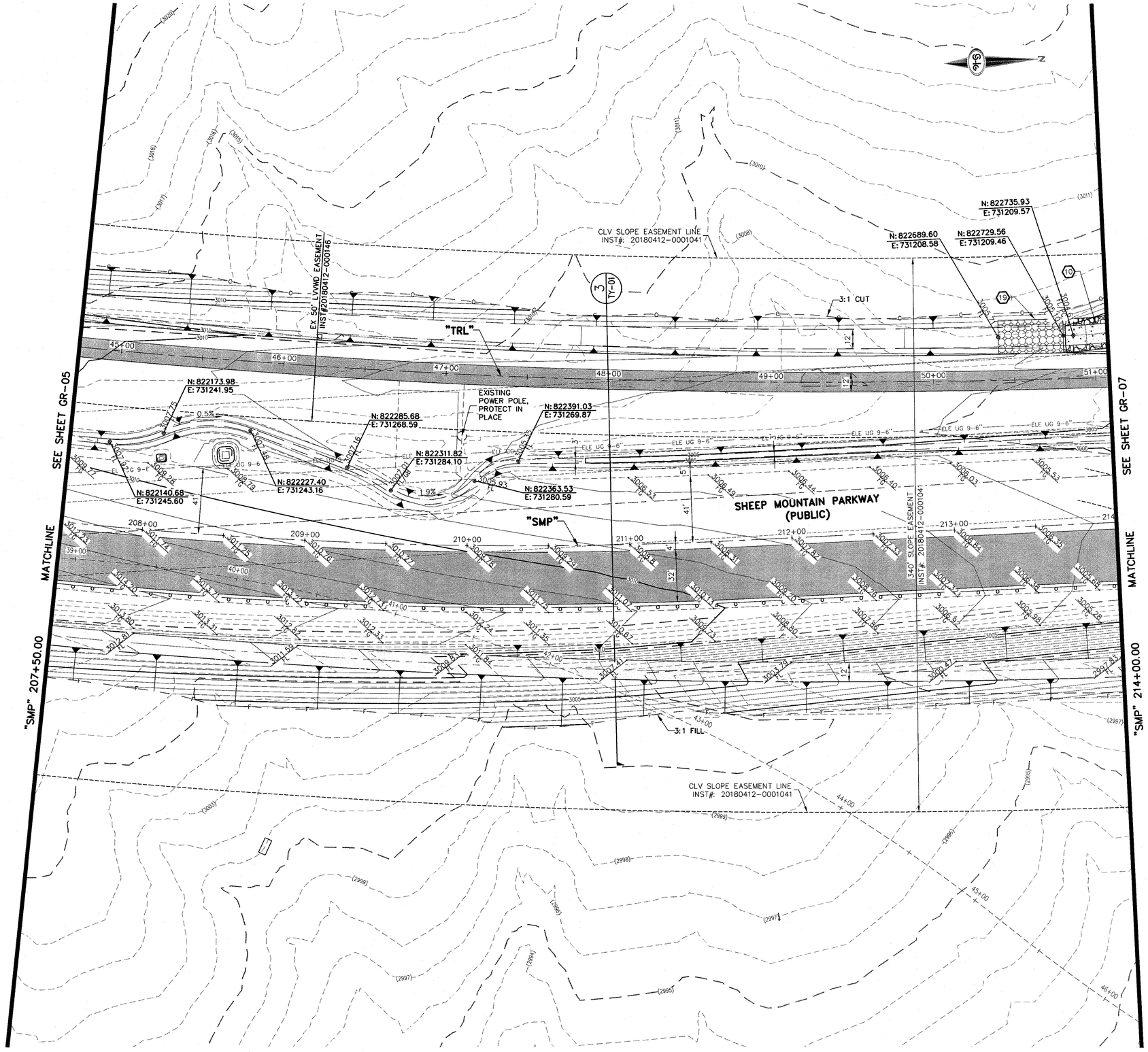
PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY J. SLATER
Exp. 06/30/2018
CIVIL
No. 14167

GR-05
SHEET 32 OF 50

DWG NO. _____

HANSEN NO. _____



GRADING AND STORM DRAIN NOTES

1. INSTALL NDOT TYPE 2B STORM DRAIN DROP INLET WITH CONCRETE APRON (NDOT DETAIL R-4.2.2 AND R-4.2.7) (SEE SHEET TY-08)
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NOTES

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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH
- RIPRAP (SIZE PER PLAN)
- (1) STORM DRAIN LATERAL # (SEE SHEET GR-10)

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY DS-4952 ON FILE AT THE CITY OF LAS VEGAS FOR THE SUBJECT PROJECT

JERRY SLATER, P.E. 14167 — DATE

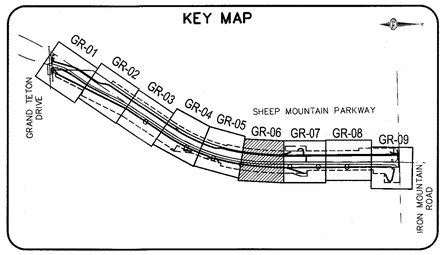
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KEY MAP



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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

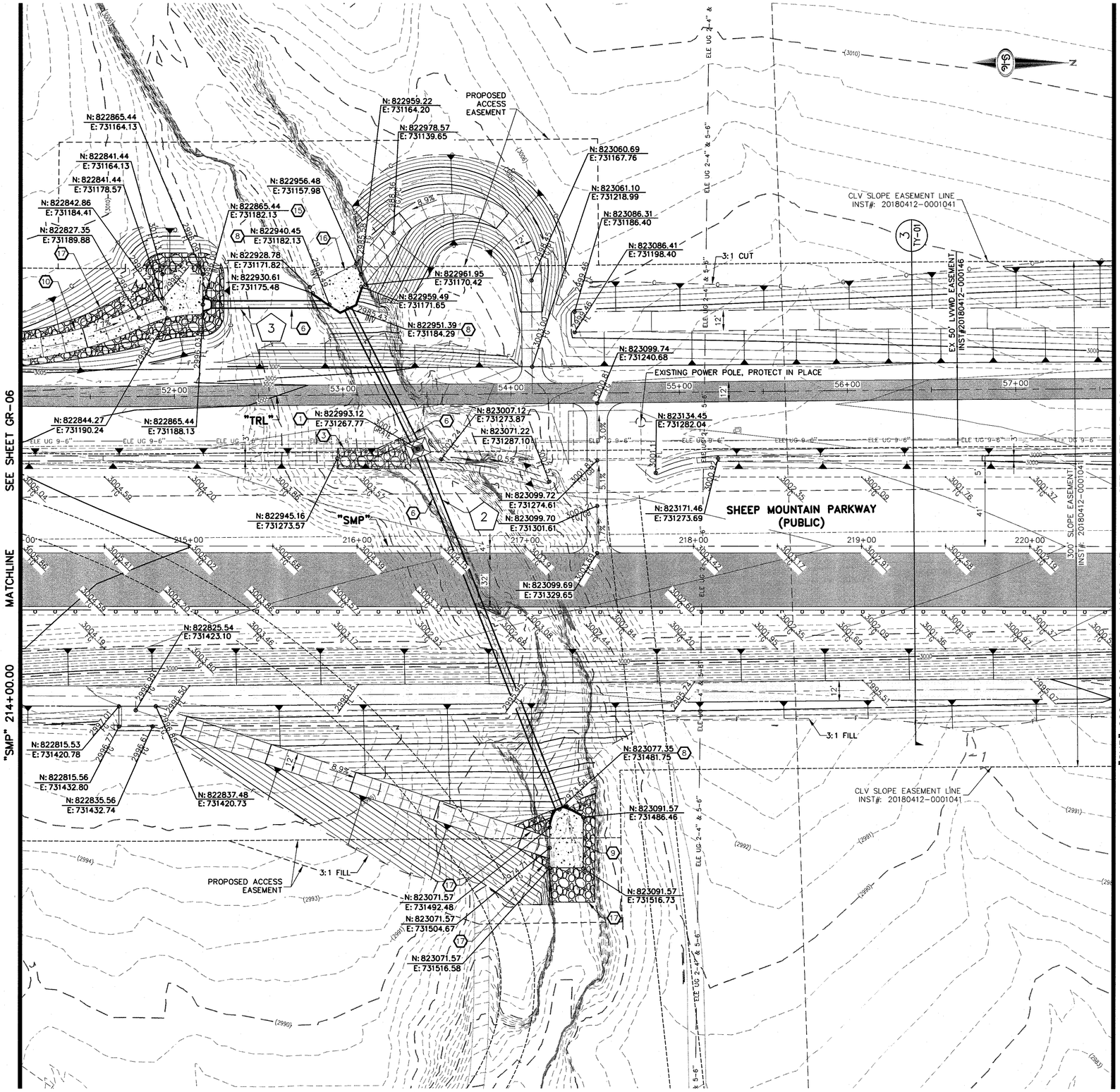
GRADING PLAN - "SMP" 207+50.00 TO "SMP" 214+00.00

DATE: 05/29/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO. OLY1720.000

PROFESSIONAL ENGINEER STATE OF NEVADA JERRY SLATER Exp. 06/30/2018 CIVIL No. 14167

GR-06
SHEET 33 OF 50
DWG NO. _____

HANSEN NO. _____



GRADING AND STORM DRAIN NOTES

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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH
- RIPRAP (SIZE PER PLAN)
- (1) STORM DRAIN LATERAL # (SEE SHEET GR-10)

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY DS-4952 ON FILE AT THE CITY OF LAS VEGAS FOR THE SUBJECT PROJECT

JERRY SLATER, P.E. 14167 — DATE

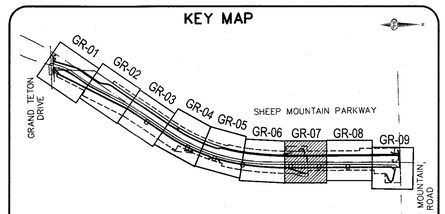
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KEY MAP



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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

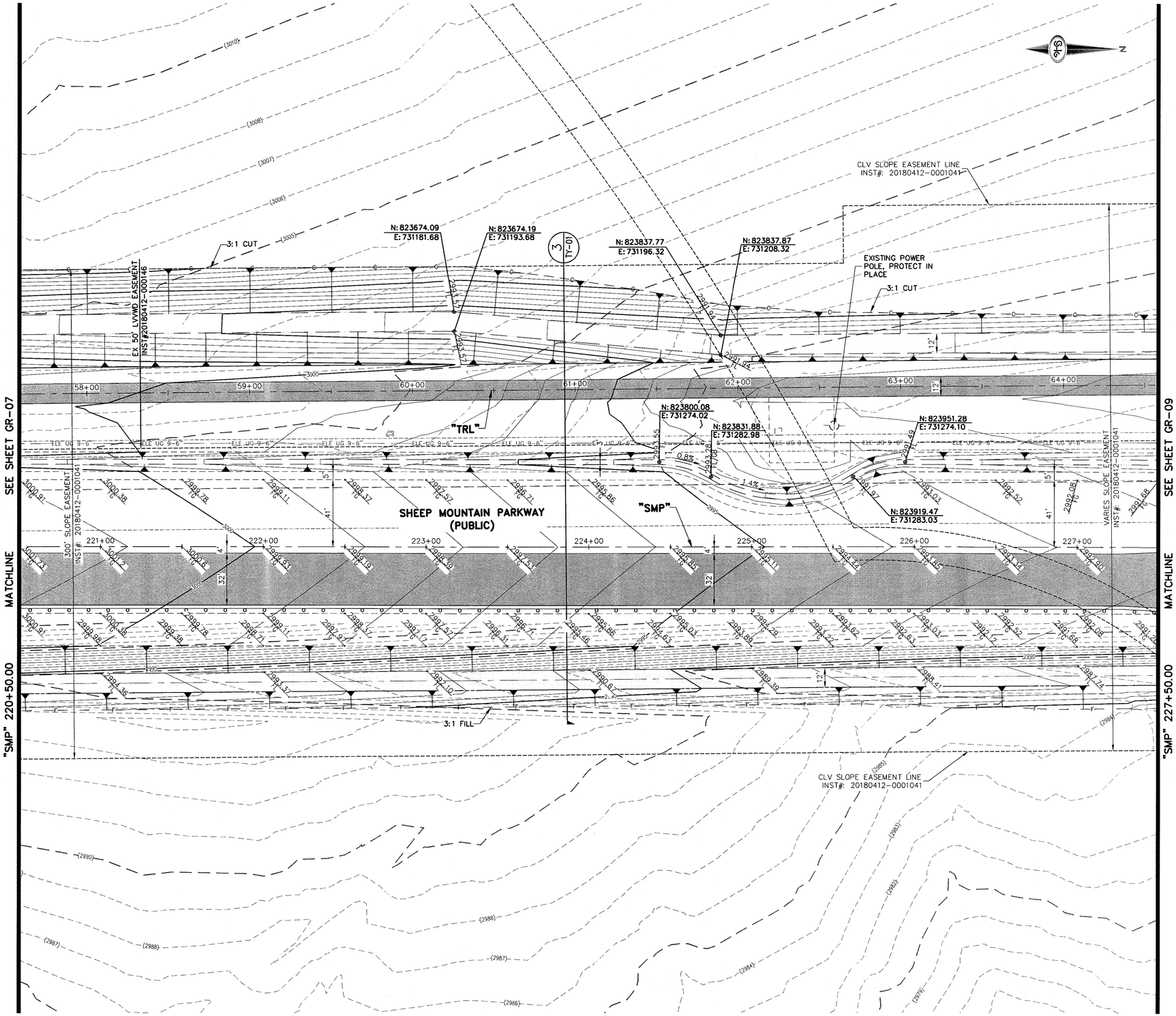
GRADING PLAN - "SMP" 214+00.00 TO "SMP" 220+50.00

DATE: 05/29/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO. OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA - JERRY SLATER - Exp. 06/30/2018 - CIVIL - No. 14167

GR-07
SHEET 34 OF 50
DWG NO. _____

HANSEN NO. _____



GRADING AND STORM DRAIN NOTES

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LEGEND

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- MAINTENANCE ACCESS PATH
- RIPRAP (SIZE PER PLAN)
- (1) STORM DRAIN LATERAL # (SEE SHEET GR-10)

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JERRY SLATER, P.E. 14167 DATE

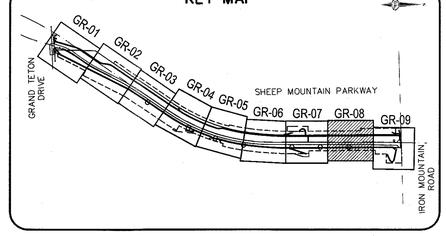
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

GRADING PLAN - "SMP" 220+50.00 TO "SMP" 227+50.00

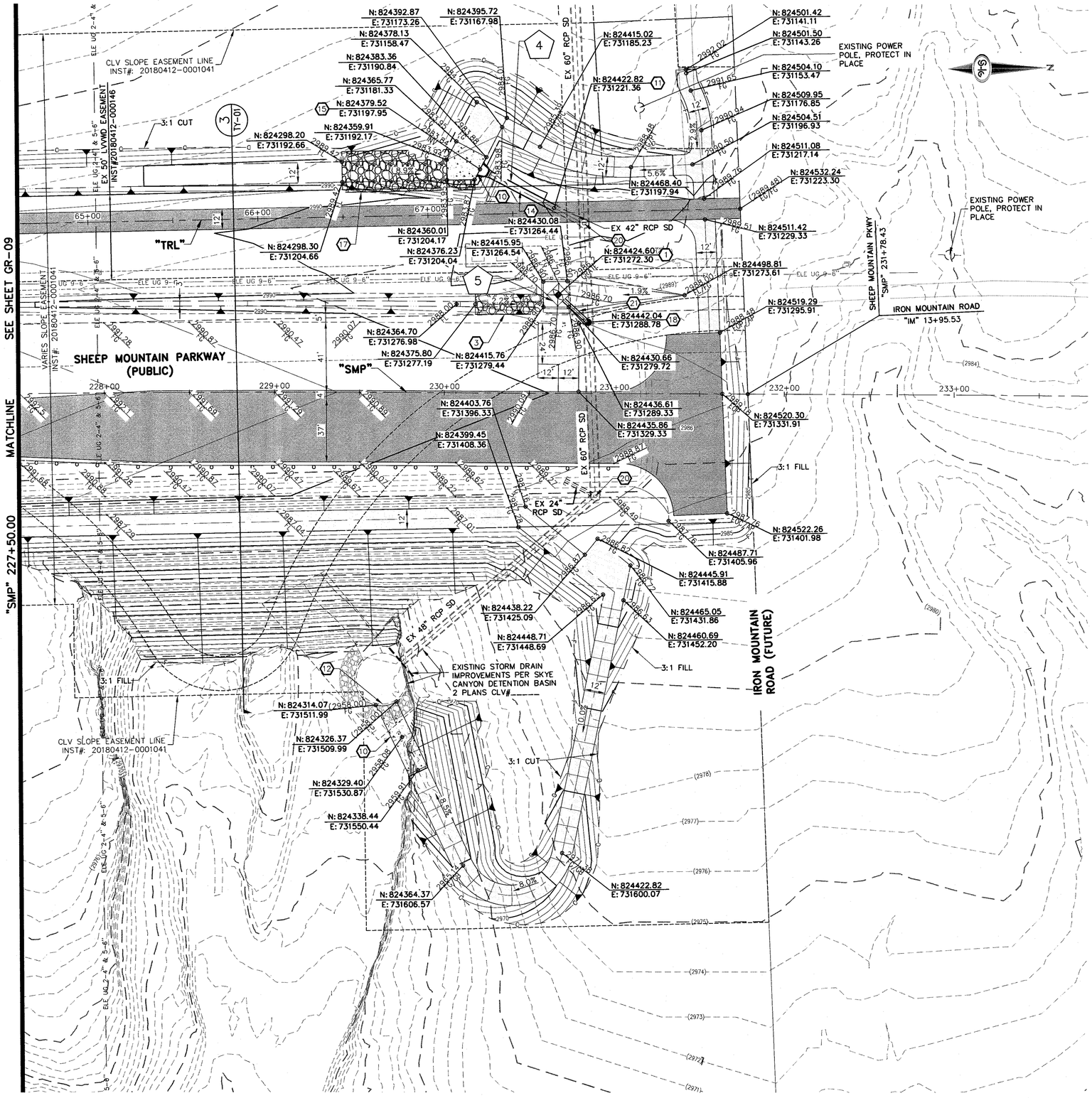
DATE: 05/29/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO. OLY1720.000

PROFESSIONAL ENGINEER STATE OF NEVADA JERRY SLATER Exp. 06/30/2018 CIVIL No. 14167

GR-08
SHEET 35 OF 50
DWG NO. _____
HANSEN NO. _____

BCC
BCC
JSR

GR-08
35



GRADING AND STORM DRAIN NOTES

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17. INSTALL RIPRAP (D50=18-INCH, T=36-INCH)
18. INSTALL 60-INCH TYPE III STORM DRAIN MANHOLE (USDCCA STD. DWG. NO. 406)
19. INSTALL 3-INCH MINUS, 6-INCH THICK GRAVEL OVER 6-INCH TYPE II AGGREGATE BASE
20. ADJUST 60-INCH TYPE III MANHOLE TO FINISH GRADE (CCAUSD NO. 406)
21. INSTALL 24-INCH RCP STORM DRAIN (USDCCA STD. DWG. NO. 503.2)

NOTES

1. SEE TY-SHEETS FOR TYPICAL SECTIONS.
2. SEE SD-SHEETS FOR STORM PROFILES.
3. SEE UT-SHEETS FOR WATER AND SEWER PLAN AND PROFILES.
4. ALL RCP SHALL BE CLASS III UNLESS OTHERWISE SHOWN IN PROFILE.
5. ALL PIPE LENGTHS ARE MEASURED ALONG PIPE CENTERLINE TO CENTER OF MANHOLE OR INSIDE EDGE OF DI OR RCB/RCA.
6. ALL DROP INLETS SHALL INCLUDE STORM WATER MANAGEMENT STAMP AND DETAIL PER USDCCA STD. DWG. NO. 421.
7. SEE STRUCTURAL PLANS FOR ADDITIONAL STRUCTURAL DETAILS AND CONNECTIONS.
8. ALL PIPES ARE PUBLICLY MAINTAINED.

LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH
- RIPRAP (SIZE PER PLAN)
- (1) STORM DRAIN LATERAL # (SEE SHEET GR-10)

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY DS-4952 ON FILE AT THE CITY OF LAS VEGAS FOR THE SUBJECT PROJECT

JERRY SLATER, P.E. 14167 — DATE

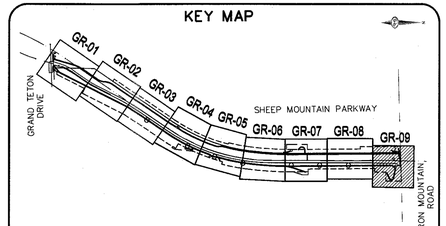
FLOOD ZONE

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE 'X' (OUTSIDE THE 500-YEAR FLOOD PLAIN) ON THE FLOOD INSURANCE RATE MAP (FIRM) PANEL: 32003C1735E, DATED SEPTEMBER 27, 2002

NOTE:

PROPERTY OWNER IS RESPONSIBLE TO MAINTAIN THE BEST MANAGEMENT PRACTICES, SUCH AS BUT NOT LIMITED TO, THE REMOVAL OF ACCUMULATED SEDIMENT AND DEBRIS AND CARE OF VEGETATION.

KEY MAP



30 0 30 60
SCALE FEET

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DIG OVERHEAD 1-702-227-2929

FAST Call before you UnderGround. 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Dig Avoid cutting underground utility lines. Call 811 or 1-800-227-2600

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

GRADING PLAN - "SMP" 227+50.00 TO "SMP" 233+50.00

DATE: 05/29/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

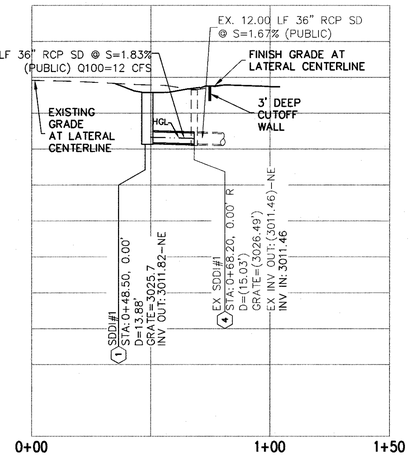
PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER STATE OF NEVADA JERRY J. SLATER Exp. 06/30/2018 CIVIL No. 14167

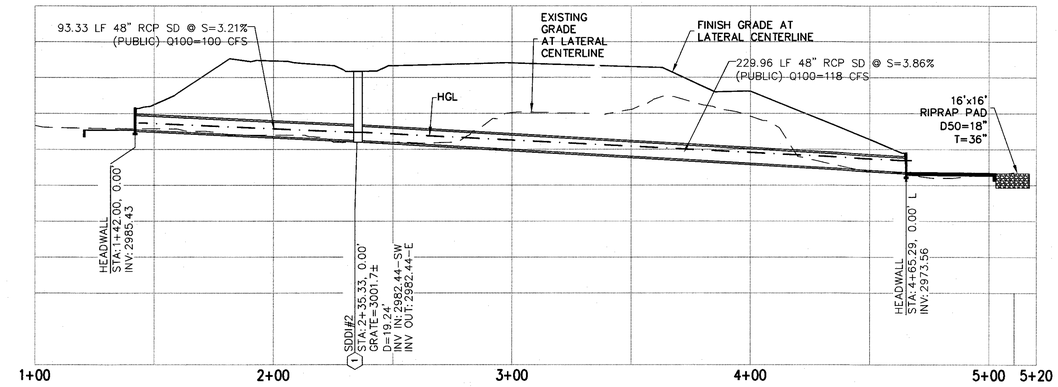
GR-09
SHEET 36 OF 50

DWG NO. _____

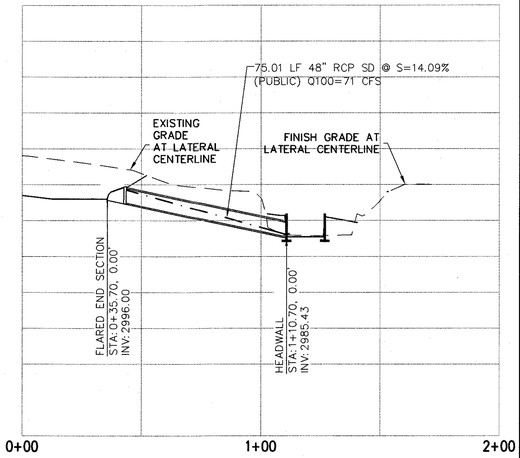
HANSEN NO. _____



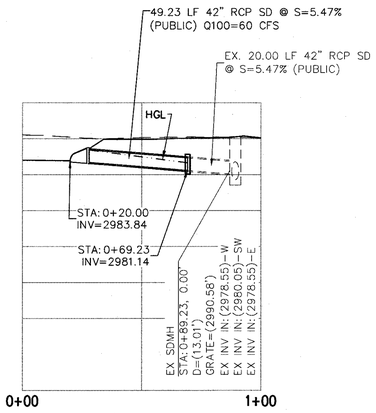
LATERAL PROFILE 1
SCALE HORIZ: 1" = 30'
SCALE VERT: 1" = 20'



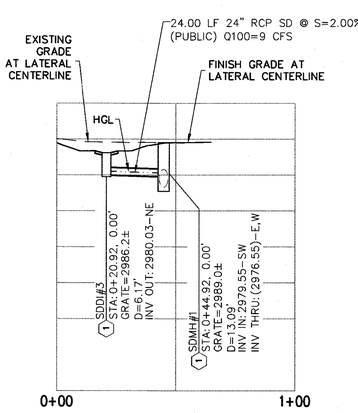
LATERAL PROFILE 2
SCALE HORIZ: 1" = 30'
SCALE VERT: 1" = 20'



LATERAL PROFILE 3
SCALE HORIZ: 1" = 30'
SCALE VERT: 1" = 20'



LATERAL PROFILE 4
SCALE HORIZ: 1" = 30'
SCALE VERT: 1" = 20'



LATERAL PROFILE 5
SCALE HORIZ: 1" = 30'
SCALE VERT: 1" = 20'

SLATER HANIFAN GROUP
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

STORM DRAIN LATERAL PROFILES

DATE: 05/29/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

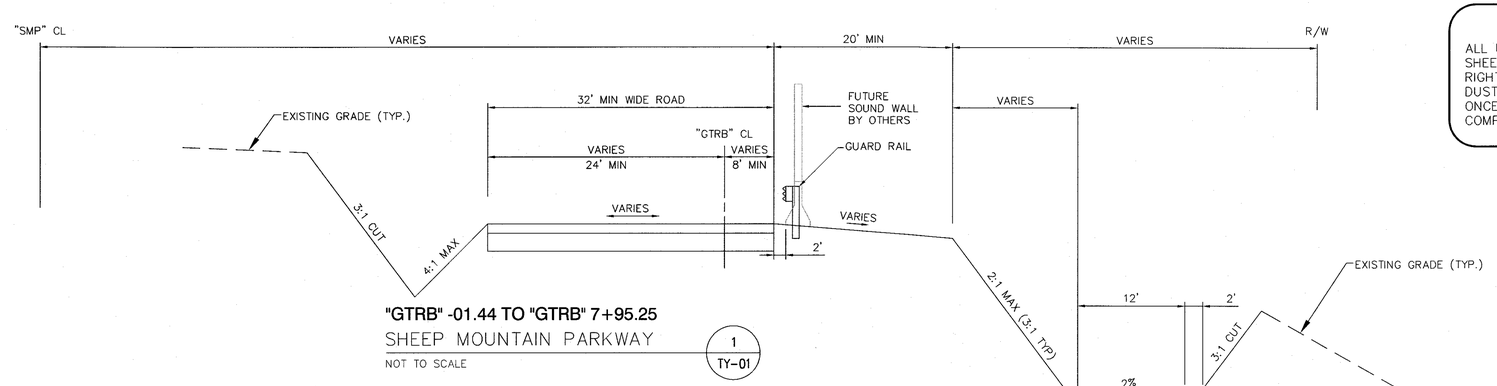
PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER – STATE OF NEVADA
JERRY SLATER
Exp. 06/30/2018
CIVIL
No. 14167

GR-10
SHEET 37 OF 50

DWG NO. _____

HANSEN NO. _____

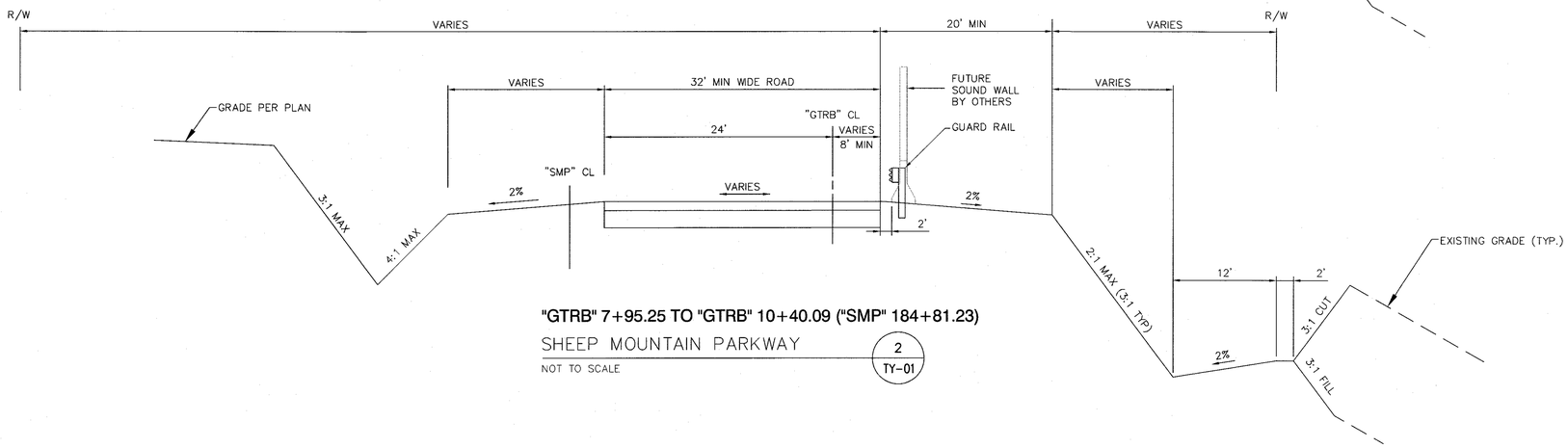


"GTRB" -01.44 TO "GTRB" 7+95.25

SHEEP MOUNTAIN PARKWAY

NOT TO SCALE

1 TY-01

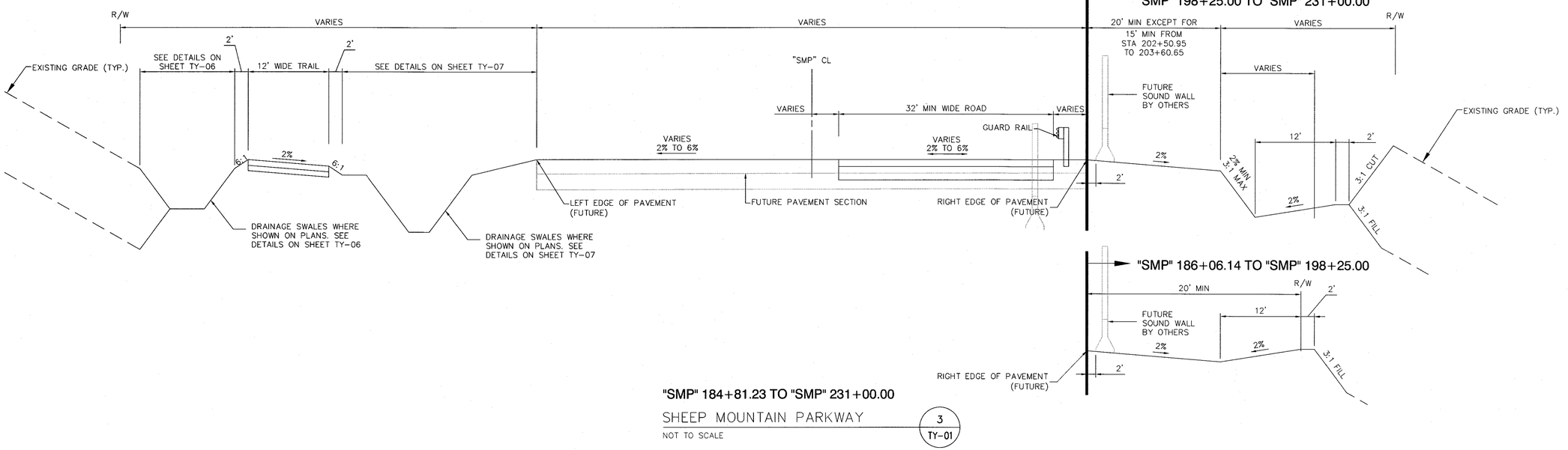


"GTRB" 7+95.25 TO "GTRB" 10+40.09 ("SMP" 184+81.23)

SHEEP MOUNTAIN PARKWAY

NOT TO SCALE

2 TY-01



"SMP" 186+06.14 TO "SMP" 198+25.00

"SMP" 184+81.23 TO "SMP" 231+00.00

SHEEP MOUNTAIN PARKWAY

NOT TO SCALE

3 TY-01

NOTE

ALL UNPAVED AREAS WITHIN THE SHEEP MOUNTAIN PARKWAY RIGHT-OF-WAY SHALL RECEIVE A DUST PALLIATIVE APPLICATION ONCE CONSTRUCTION IS COMPLETE

SLATER HANIFAN GROUP
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

TYPICAL SECTIONS 1

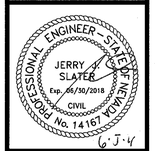
DATE: 05/29/18

DRAFTER: BCC

DESIGNER: BCC

CHECKED: JSR

PROJECT NO.
OLY1720.000

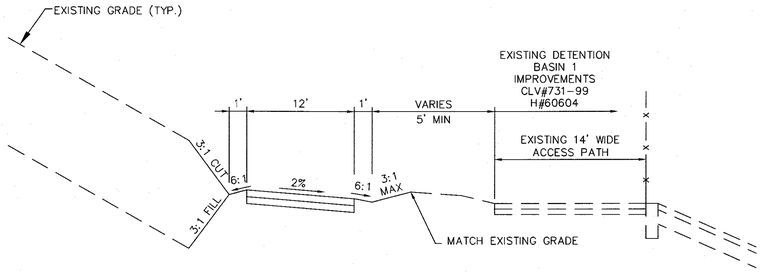


TY-01

SHEET 38 OF 50

DWG NO. _____

HANSEN NO. _____

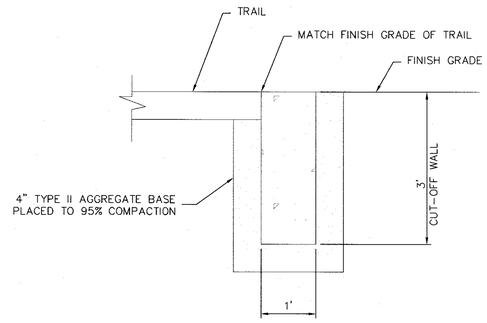


"TRL" 11+55.96 TO "TRL" 21+73.50

TRAIL SECTION

NOT TO SCALE

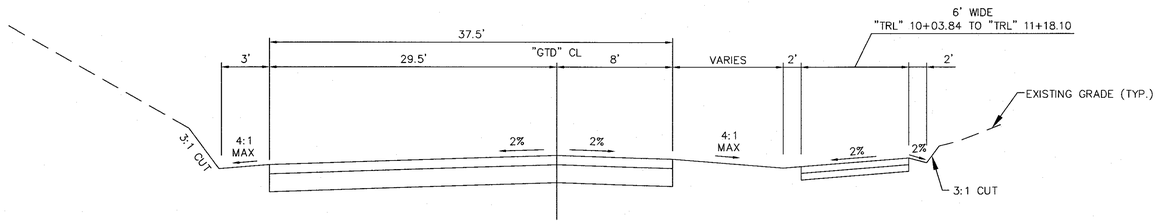
1 TY-02



CONCRETE CUTOFF WALL

NOT TO SCALE

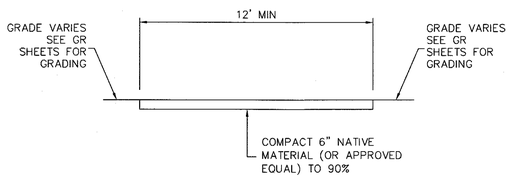
4 TY-02



GRAND TETON DRIVE

NOT TO SCALE

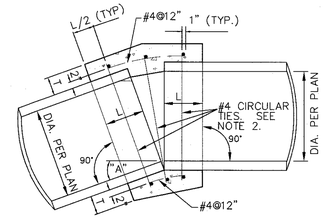
2 TY-02



MAINTENANCE ACCESS PATH

NOT TO SCALE

3 TY-02



PLAN

NOTES:

1. WHERE THE SLOPE OF THE UPSTREAM PIPE IS GREATER THAN THE SLOPE OF THE DOWNSTREAM PIPE, JOIN SOFFITS. WHERE THE SLOPE OF THE UPSTREAM PIPE IS LESS THAN THE SLOPE OF THE DOWNSTREAM PIPE, JOIN INVERTS.
2. WHERE THE SPACE BETWEEN THE PIPE EXTREMITIES EXCEEDS 2 1/2 INCHES, THE NUMBER OF CIRCULAR TIES SHALL BE INCREASED TO MAINTAIN A MAXIMUM SPACING OF 6 INCHES CENTER TO CENTER. CIRCULAR TIES SHALL HAVE A DIAMETER 5 INCHES GREATER THAN THE OUTSIDE DIAMETER OF THE LARGER PIPE.

CIRCULAR TIES

PIPE DIAMETER	SPACE BETWEEN PIPE EXTREMITIES	NO. OF CIRCULAR TIES	L	T
18"	2 1/2"	3	12"	5"
24"	2 1/2"	3	12"	6"
30"	2 1/2"	3	12"	7"
36"	2 1/2" or less	4	18"	9"
60"	2 1/2" or less	5	21"	11"

CONCRETE COLLAR

NOT TO SCALE

5 TY-02

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

TYPICAL SECTIONS 2

DATE: 05/29/18

DRAFTER: BCC

DESIGNER: BCC

CHECKED: JSR

PROJECT NO. OLY1720.000

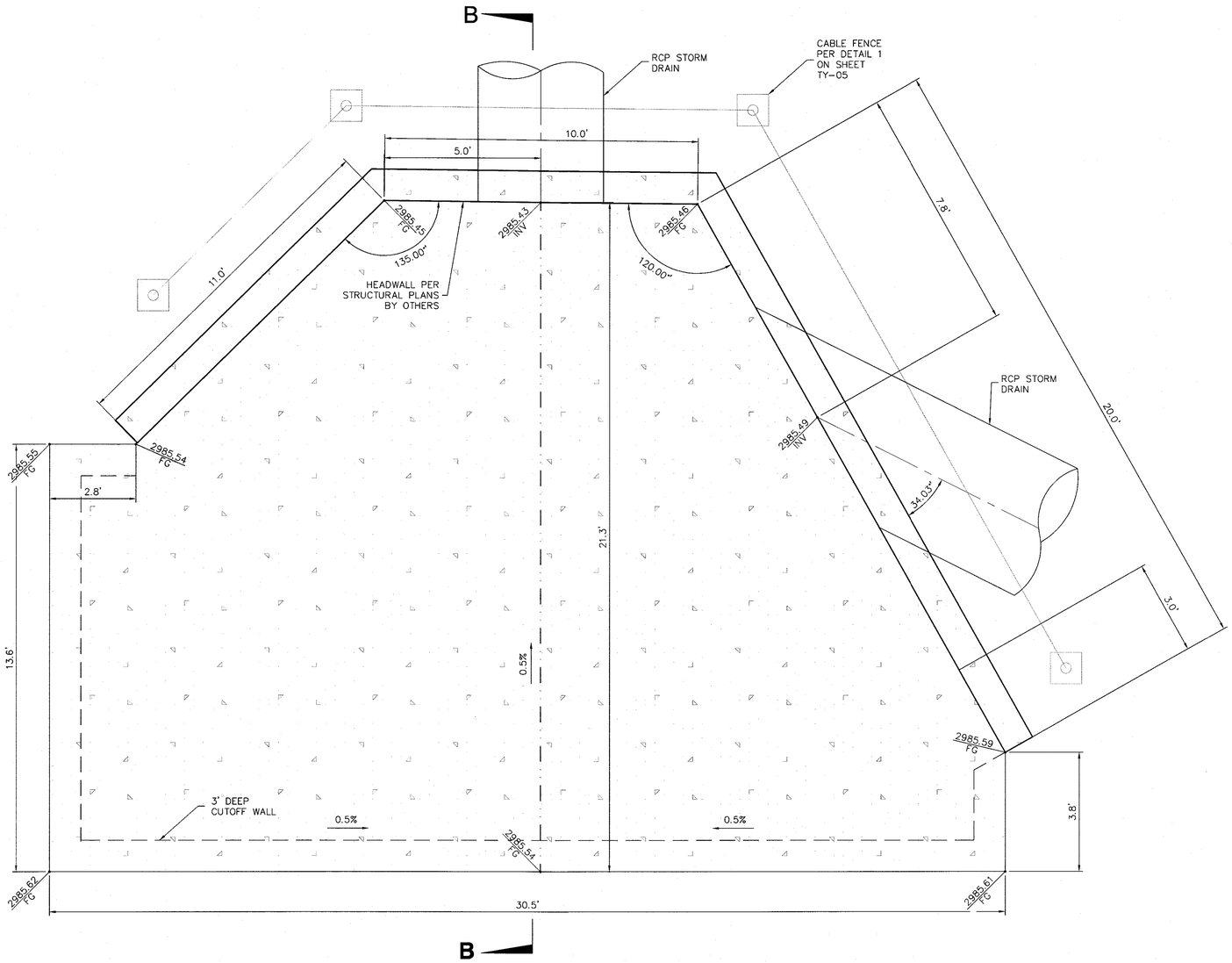
PROFESSIONAL ENGINEER STATE OF NEVADA JERRY A. SLATER Exp 06/30/2018 CIVIL No. 14167

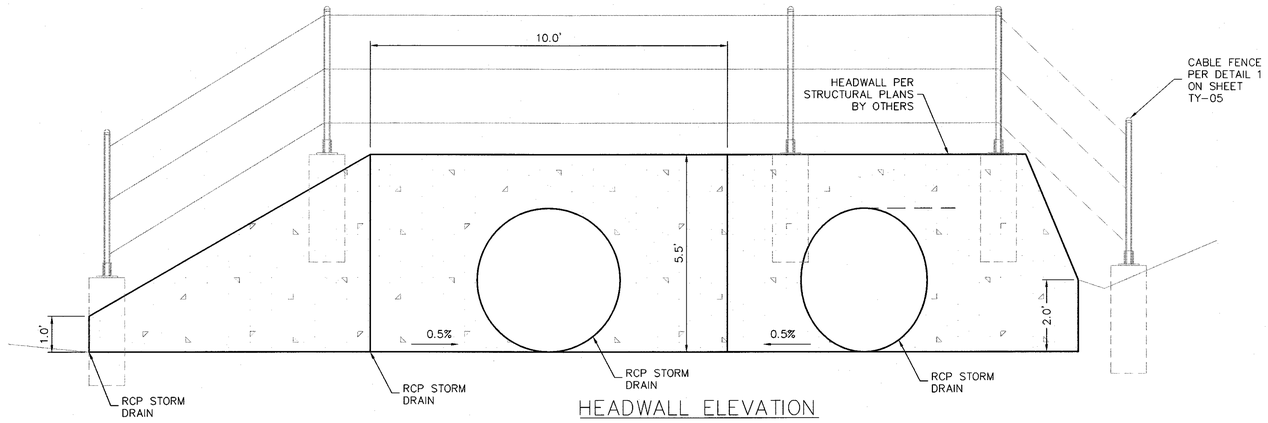
TY-02

SHEET 39 OF 50

DWG NO. _____

HANSEN NO. _____

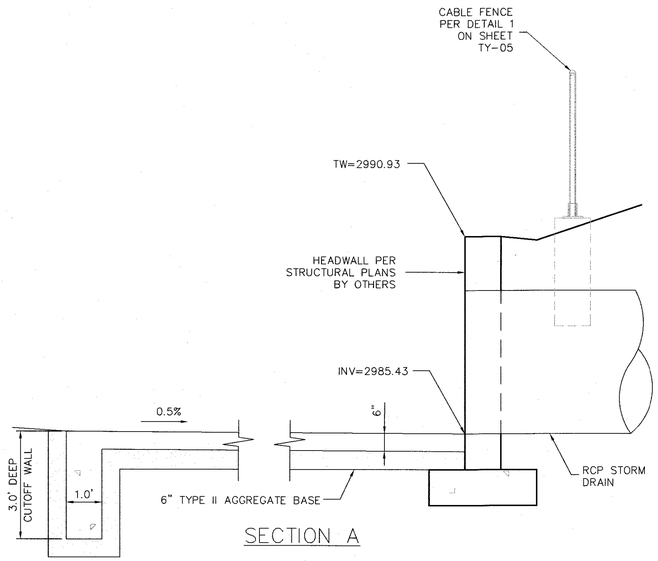




HEADWALL ELEVATION

CONCRETE AND HEADWALL DETAIL 1 TY-03

NOT TO SCALE



SECTION A

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

DETAILS 1

DATE: 05/29/18

DRAFTER: BCC

DESIGNER: BCC

CHECKED: JSR

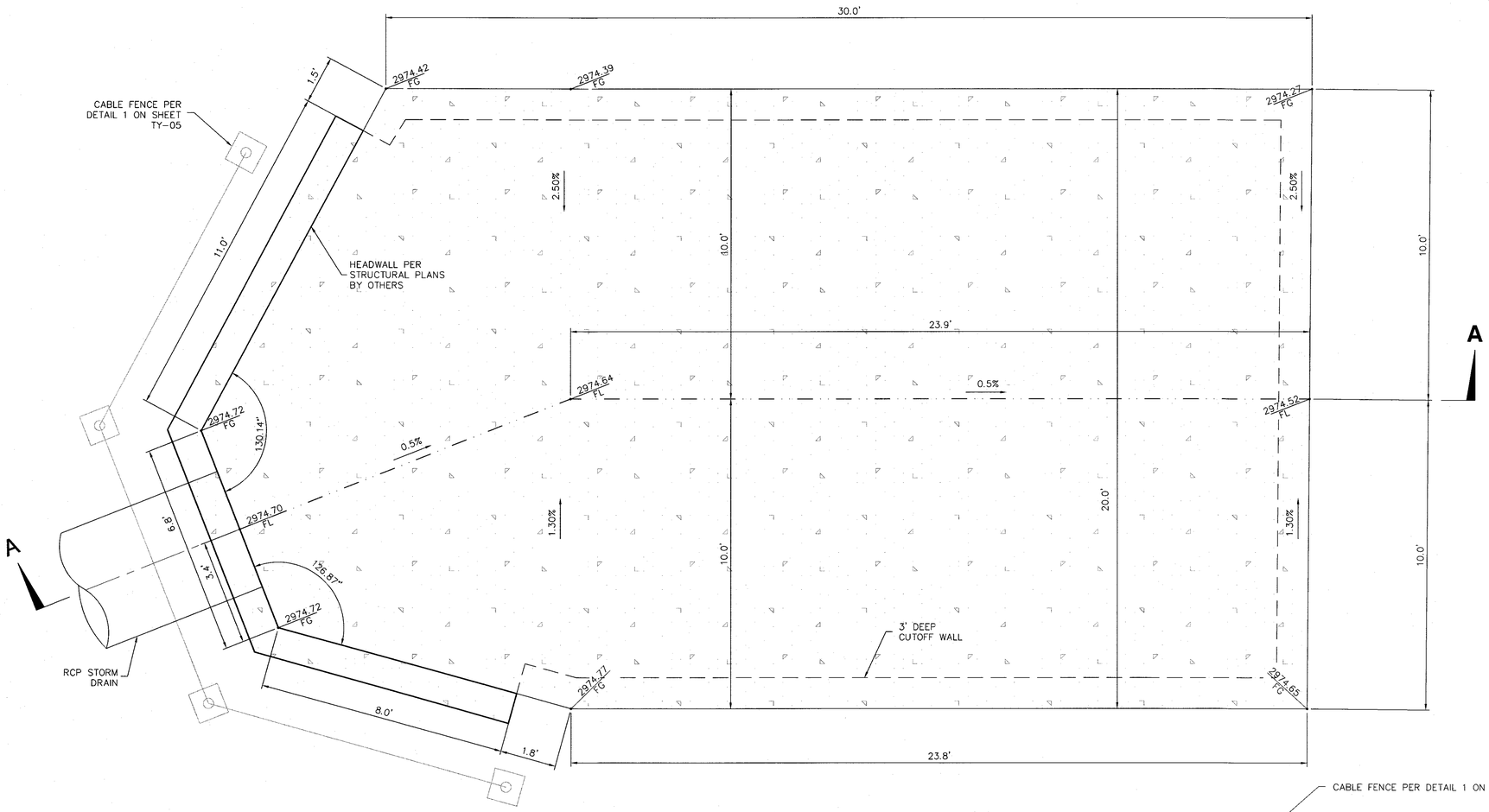
PROJECT NO.
OLY1720.000

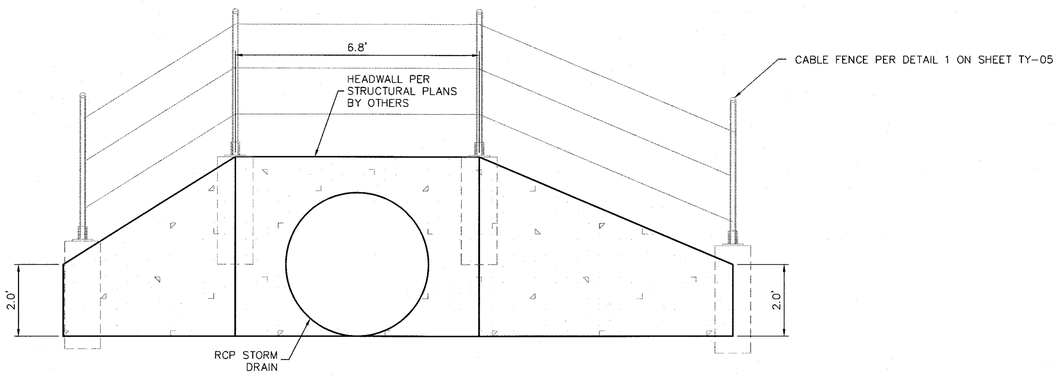
PROFESSIONAL ENGINEER STATE OF NEVADA
JERRY A. SLATER
Exp. 06/30/2018
CIVIL
No. 14167
6.3.18

TY-03
SHEET 40 OF 50

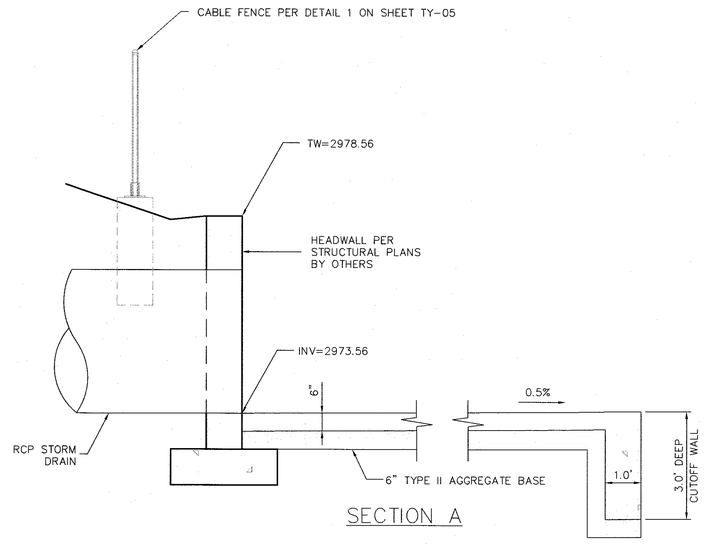
DWG NO. _____

HANSEN NO. _____





HEADWALL ELEVATION



SECTION A

CONCRETE AND HEADWALL DETAIL 1 TY-04

NOT TO SCALE

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
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PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

DETAILS 2

DATE: 05/29/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

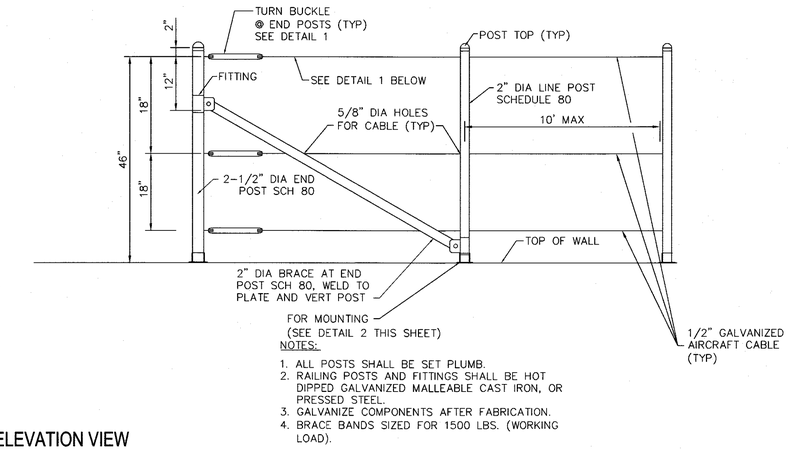
PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY SLATER
Exp. 06/30/2018
CIVIL
No. 14167

TY-04
SHEET 41 OF 50

DWG NO. _____

HANSEN NO. _____

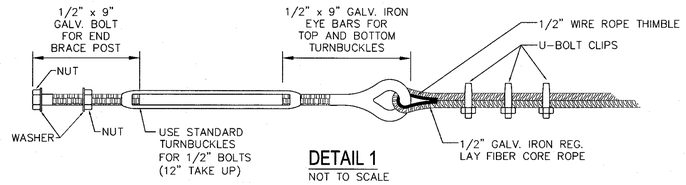


NOTES:

1. ALL POSTS SHALL BE SET PLUMB.
2. RAILING POSTS AND FITTINGS SHALL BE HOT DIPPED GALVANIZED MALLEABLE CAST IRON, OR PRESSED STEEL.
3. GALVANIZE COMPONENTS AFTER FABRICATION.
4. BRACE BANDS SIZED FOR 1500 LBS. (WORKING LOAD).

ELEVATION VIEW

NOT TO SCALE



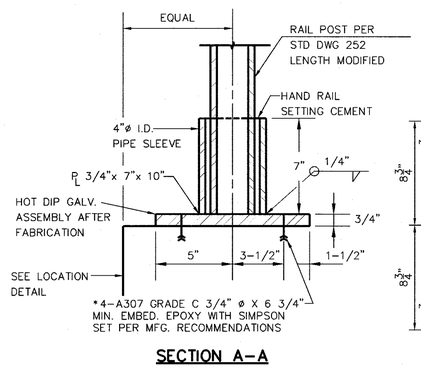
DETAIL 1

NOT TO SCALE

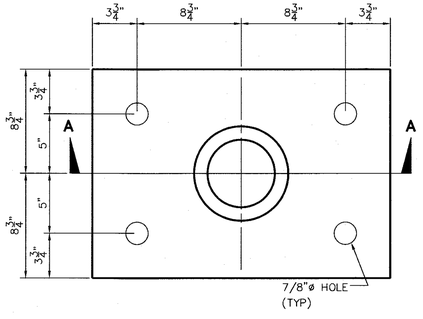
POST AND CABLE RAILING

NOT TO SCALE

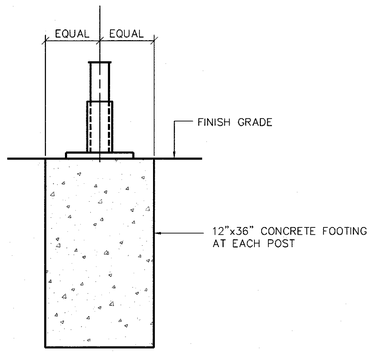
1 / DT-01



SECTION A-A



* NOTE:
FOR 8" WALLS - ROTATE PLATE AND USE (4) BOLTS. POLE MOUNTS SHALL NOT BE LOCATED WITHIN 1-FOOT OF CONTRACTION OR EXPANSION JOINTS



FOUNDATION

POST, CABLE MOUNT POLE

NOT TO SCALE

1 / TY-05

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
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PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

DETAILS 3

DATE: 05/29/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

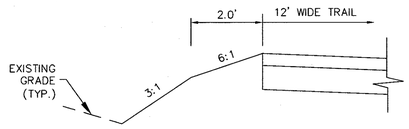
PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY SLATER
Exp. 06/30/2018
CIVIL
No. 14167

TY-05
SHEET 42 OF 50

DWG NO. _____

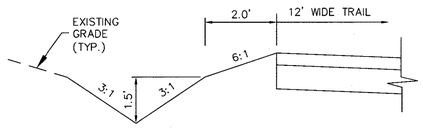
HANSEN NO. _____



"TRL" 21+73.50 TO "TRL" 29+99.53

SECTION (WEST SIDE OF TRAIL)

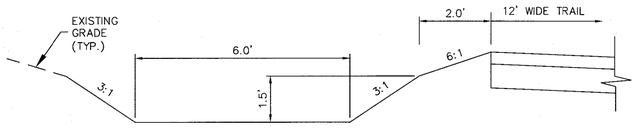
NOT TO SCALE



"TRL" 29+99.53 TO "TRL" 30+50.15

SECTION (WEST SIDE OF TRAIL)

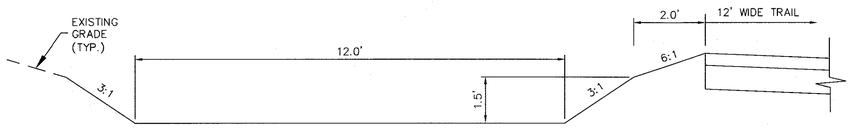
NOT TO SCALE



"TRL" 30+50.15 TO "TRL" 32+83.07

SECTION (WEST SIDE OF TRAIL)

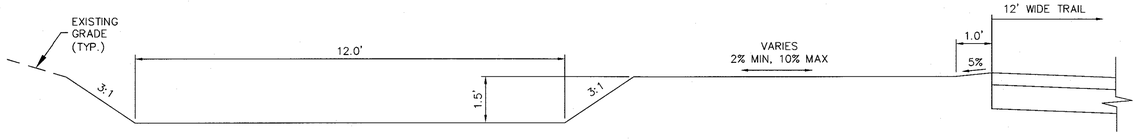
NOT TO SCALE



"TRL" 34+00.08 TO "TRL" 40+38.05

SECTION (WEST SIDE OF TRAIL)

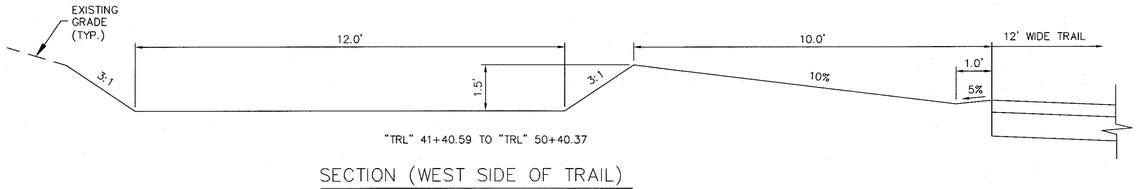
NOT TO SCALE



"TRL" 40+38.05 TO "TRL" 41+40.59

SECTION (WEST SIDE OF TRAIL)

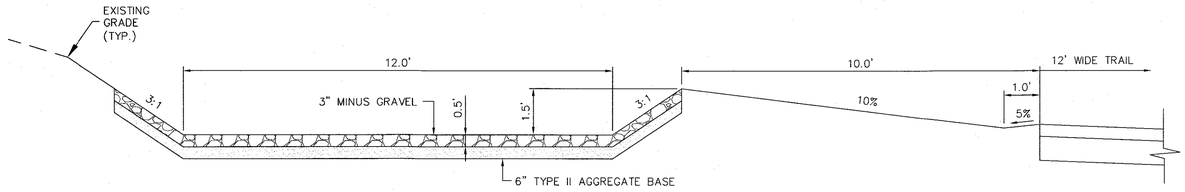
NOT TO SCALE



"TRL" 41+40.59 TO "TRL" 50+40.37

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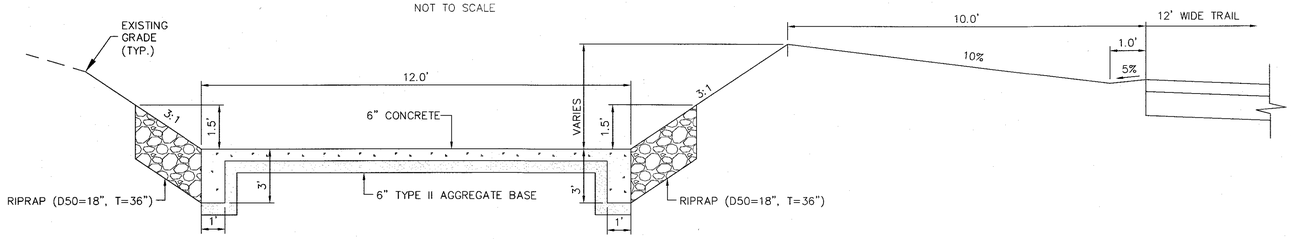
NOT TO SCALE



"TRL" 50+40.37 TO "TRL" 50+80.56

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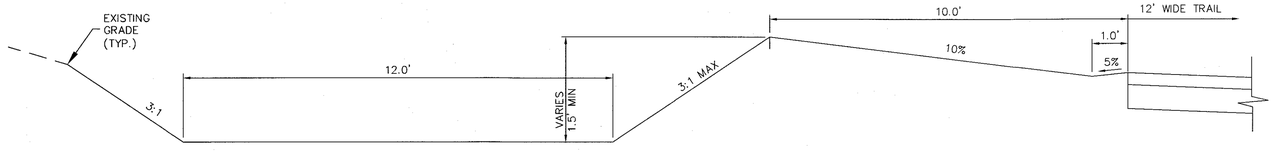
NOT TO SCALE



"TRL" 50+80.56 TO "TRL" 51+94.63

SECTION (WEST SIDE OF TRAIL)

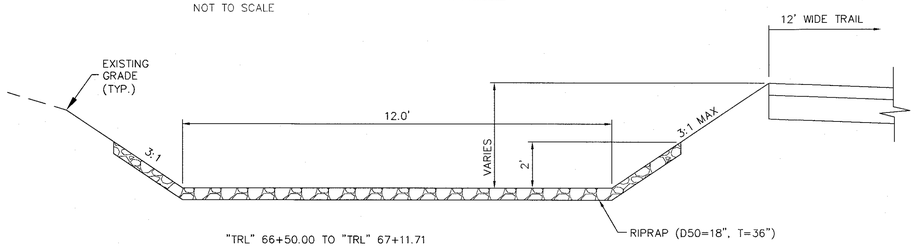
NOT TO SCALE



"TRL" 54+38.20 TO "TRL" 66+50.00

SECTION (WEST SIDE OF TRAIL)

NOT TO SCALE



"TRL" 66+50.00 TO "TRL" 67+11.71

SECTION (WEST SIDE OF TRAIL)

NOT TO SCALE

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY
DRAINAGE SWALE SECTIONS 1

DATE: 05/29/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

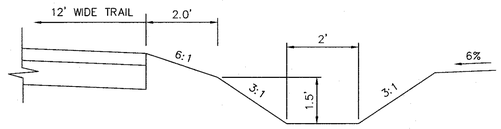
PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER STATE OF NEVADA
JERRY SLATER
Exp. 06/30/2018
CIVIL
No. 14167
6-30-18

TY-06
SHEET 43 OF 50

DWG NO. _____

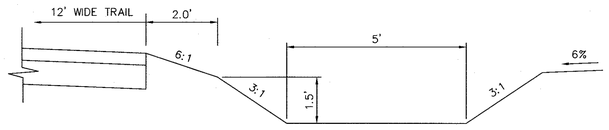
HANSEN NO. _____



"TRL" 22+40.35 TO "TRL" 28+00.00

SECTION (EAST SIDE OF TRAIL)

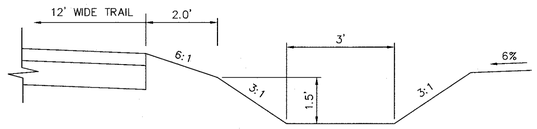
NOT TO SCALE



"TRL" 28+25.00 TO "TRL" 33+42.78

SECTION (EAST SIDE OF TRAIL)

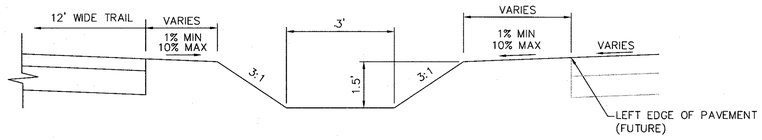
NOT TO SCALE



"TRL" 34+00.00 TO "TRL" 36+75.01

SECTION (EAST SIDE OF TRAIL)

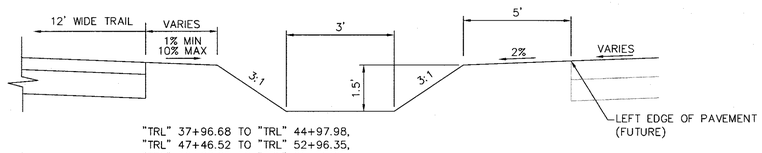
NOT TO SCALE



"TRL" 36+75.01 TO "TRL" 37+96.68

SECTION (EAST SIDE OF TRAIL)

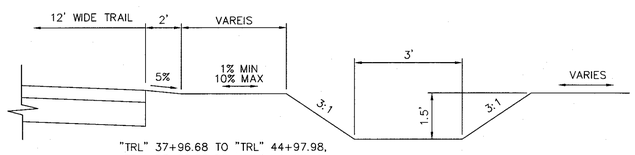
NOT TO SCALE



"TRL" 37+96.68 TO "TRL" 44+97.98,
"TRL" 47+46.52 TO "TRL" 52+96.35,
"TRL" 55+22.65 TO "TRL" 61+51.25,
"TRL" 63+02.44 TO "TRL" 67+26.76

SECTION (EAST SIDE OF TRAIL)

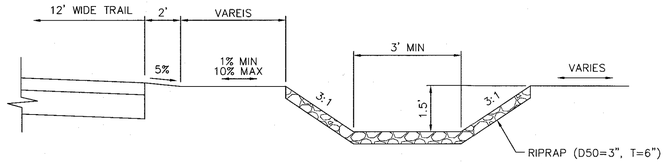
NOT TO SCALE



"TRL" 37+96.68 TO "TRL" 44+97.98,
"TRL" 53+58.32 TO "TRL" 54+22.31,
"TRL" 54+85.58 TO "TRL" 55+22.65,
"TRL" 61+51.25 TO "TRL" 63+02.44

SECTION (EAST SIDE OF TRAIL)

NOT TO SCALE



"TRL" 52+96.35 TO "TRL" 53+44.36

SECTION (EAST SIDE OF TRAIL)

NOT TO SCALE

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

DRAINAGE SWALE SECTIONS 2

DATE: 05/29/18

DRAFTER: BCC

DESIGNER: BCC

CHECKED: JSR

PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER STATE OF NEVADA
JERRY S. SLATER
Exp. 06/30/2018
CIVIL
No. 14167

TY-07

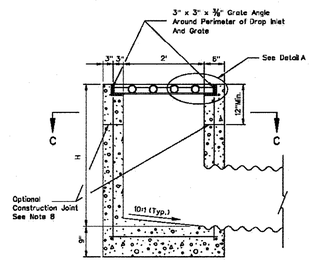
SHEET 44 OF 50

DWG NO. _____

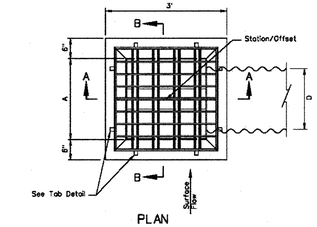
HANSEN NO. _____

PIPE SIZE (INCH)	A	H Min. (FT)	CONCRETE (CU. YD.) BASE QUAN. (H Min.)	CONCRETE (CU. YD.) ADD RATE (CU. YD./FT)	REINFORCING (LB) BASE QUAN. (H Min.)	REINFORCING (LB) ADD RATE (LB./FT)	STRUCTURAL STEEL (LB)
15"	2"	2.50	0.71	0.19	36	10	229
18"	2' 6"	3.00	0.89	0.20	40	10	254
24"	3"	3.50	1.08	0.22	58	12	278
30"	3' 6"	4.00	1.28	0.24	63	12	304
36"	4'	4.50	1.50	0.26	67	13	328
42"	4' 6"	5.00	1.71	0.28	90	15	353
48"	5'	5.50	1.94	0.30	95	15	378

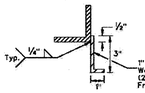
The Concrete And Reinforcing Quantities Are Based On The H Min. Shown. Increase The Concrete And Reinforcing Base Quantity By The Corresponding Add Rate (Per Foot Of Increased H) If The H Specified Is Larger Than H Min.



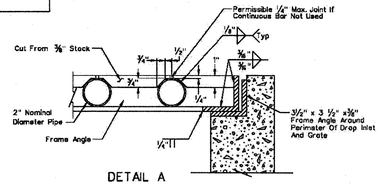
SECTION A-A



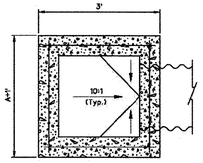
PLAN



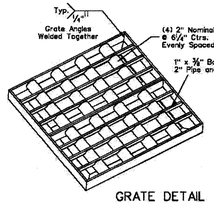
TAB DETAIL



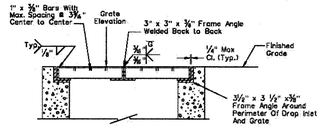
DETAIL A



SECTION C-C



GRATE DETAIL



SECTION B-B

NOTES:

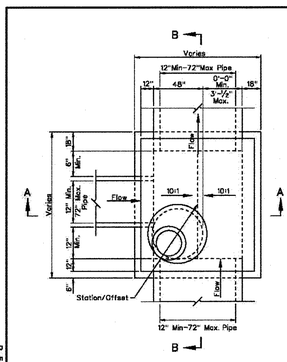
1. All concrete shall be class A or AA.
2. Reinforcing steel shall be No. 4 bars with maximum spacing at 18 inch centers, wired tightly at all intersections and embedded 2 inches clear of all concrete surfaces.
3. Exposed edges of concrete shall be chamfered 1 inch.
4. Structural steel weight includes the 2 inch normal diameter pipe standard weight and frame angles (3"x 3"x 3/8") and (3 1/2"x 3 1/2"x 3/8").
5. For 2 inch nominal diameter pipe see ASTM A53.
6. See sheet R-2.9.1 for details if connecting HDPE pipe.
7. Slope catch basin floors 10:1 from all directions toward outlet pipe. If basin is used as a junction, shape flow line(s) to outlet pipe and provide a 10:1 slope to flow line(s).
8. Run rebar continuous thru construction joint. Joint must be a minimum 3 inches from horizontal bars.
9. Additional pipe penetrations may be placed in any wall.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

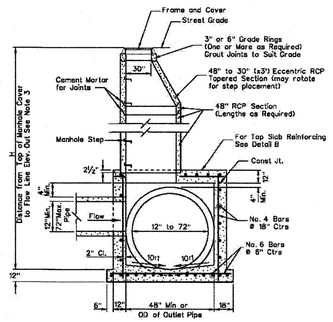
DROP INLET
TYPE 2B

R-4.2.2	(609)	Signed Original On File
ADOPTED 11/08	REVISED 10/19	CHIEF HYDRAULICS ENGR.

R-58



PLAN

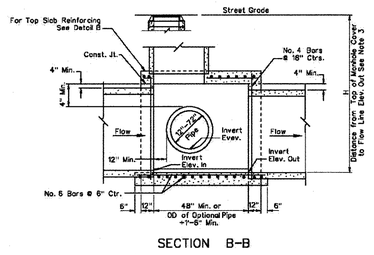


For Variable Height Situations

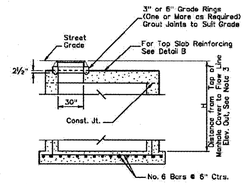
SECTION A-A

NOTES:

1. All concrete shall be class A or AA.
2. Inflow pipe invert elevations shall be greater than or equal to 0.1 foot above the outflow pipe invert elevation.
3. For values of "H", see plans. "H" is the difference in elevation between the outflow pipe invert elevation and the top of manhole elevation at street grade.
4. Precast concrete pipe sections, tapered sections, lids, grade rings, bases, and steps shall conform to AASHTO M 199 (ASTM C-478).
5. Manhole cover shall bear entity identification and system function (if applicable).
6. Shape flowline in manhole to outlet pipe, and provide a 10:1 slope from all directions toward flow line.
7. Refer to sheet R-2.9.1 for details if connecting to HDPE pipe.

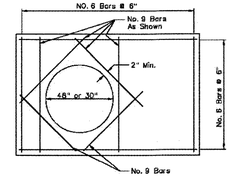


SECTION B-B



For Minimum Height Situation
Hydraulic Engineer Will Look at Other Options for Extreme Minimum Cover Situations.

SECTION A-A



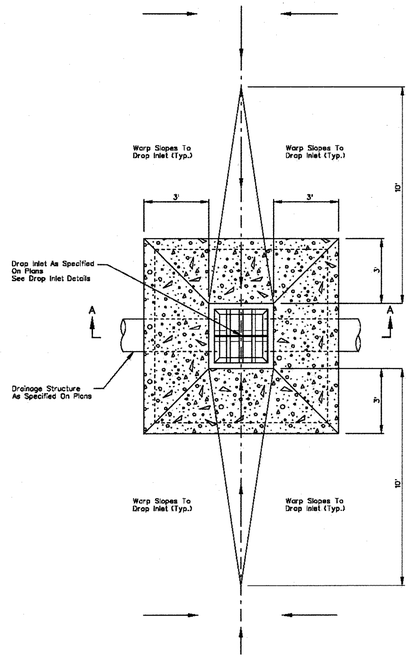
Top Slab Reinforcing
DETAIL B

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

MANHOLE
TYPE 4

R-4.3.2	(609)	Signed Original On File
ADOPTED 10/88	REVISED 5/09	CHIEF HYDRAULICS ENGR.

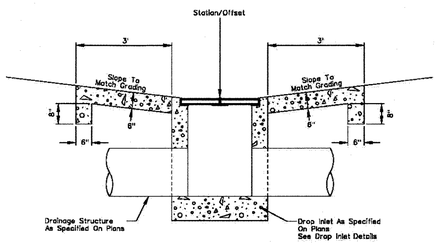
R-53



CONCRETE APRON

NOTES:

1. Concrete shall be class A or AA.



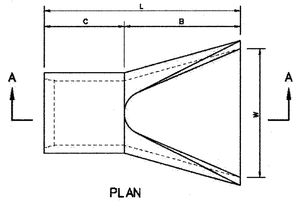
SECTION A-A

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

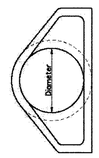
DROP INLET
CONCRETE APRON

R-4.2.7	(609)	Signed Original On File
ADOPTED 3/08	REVISED	CHIEF HYDRAULICS ENGR.

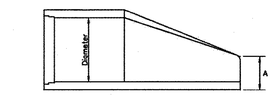
R-21



PLAN



END VIEW



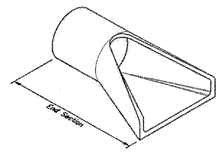
SECTION A-A

NOTES:

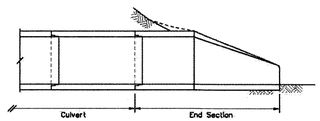
1. Class and type of concrete shall be as specified for reinforced concrete pipe.
2. Structural design of end section shall conform to that of standard reinforced concrete culvert pipe.
3. Length of pipe shown on the design plans does not include connector section (length C).
4. Contact hydraulics Engineer for sizes not listed.
5. Actual dimensions of end sections may vary by manufacturer. Adjust pipe lengths as necessary to accommodate precast end sections used. See sheets R-1.1.2 and R-2.1.4 for extension beyond fill slope and pipe pay lengths.

DIAMETER	WEIGHT	A	B	C *	L	W
18"	670	9"	27"	46"	73"	38"
24"	1300	9 ½"	43 ½"	80"	75 ½"	48"
30"	1850	12"	54"	92 ½"	75 ½"	60"
36"	3500	15"	63"	34 ½"	97"	72"
42"	4930	21"	67"	35"	98"	78"
48"	6700	24"	72"	28"	98"	84"
54"	7150	27"	65"	30"	100"	90"

* For Reference Only



ISOMETRIC VIEW



CROSS SECTION VIEW
18" TO 54" RCP

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

RCP END SECTION
18" TO 54" RCP

R-2.3.1	(803)	Signed Original On File
ADOPTED 1/13	REVISED 10/15	CHIEF HYDRAULICS ENGR.

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

NDOT DETAILS

DATE: 05/29/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER STATE OF NEVADA
JERRY J. SLATER
Exp. 06/30/2018
CIVIL
No. 14167

TY-08
SHEET 45 OF 50
DWG NO. _____

HANSEN NO. _____

TECHNICAL DRAINAGE STUDY
ADDENDUM No. 2

Sheep Mountain Parkway at Skye Canyon

City of Las Vegas, Nevada
Job No.: OLY1720.000
Date: July 2018

Prepared By:
Slater Hanifan Group, Inc.
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, NV 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 – Sheep Mountain Parkway Date: July 2018

Location of Development: a) Descriptive (Cross Streets): North/South: Sheep Mountain Parkway

East/West: Grand Teton Drive to Iron Mountain Road

b) Section: 12 Township: 19 South Range: 59 East

c) APN: 126-12-101-002

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

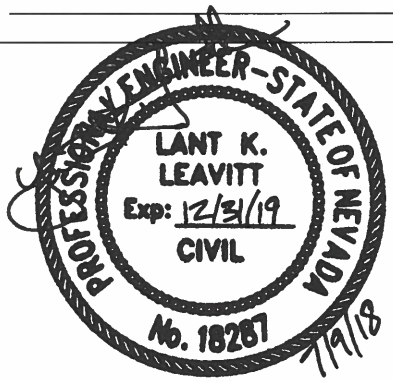
4. Proposed type of development (Residential, Commercial, Etc.): Roadway & Storm Drain Infrastructure

5. Approximate upstream land area which drains to the subject site: 1300 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 Canyon Detention Basin 1 Outfall, Existing Wash near Brent Lane alignment, and Skye Canyon Detention Basin 2 Outfall.

8. Briefly describe your proposed schedule for the subject project: ASAP Upon Substantial Completion of Detention Basin 2 Facilities.



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.

Revision	Date

Local Entity File No.

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

STANDARD FORM 1

Updated 05/01/2008

OLY1720.000

July 19, 2018

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: Addendum No.2 to the Technical Drainage Study for Sheep Mountain Parkway at Skye Canyon (CLV DS4952)

Dear Mr. Sung:

This letter is submitted in response to comments contained in the June 20, 2018 review memorandum, regarding the above referenced project. A copy of the City of Las Vegas (CLV) Department of Public Works comment letter has been provided in Appendix A.

The comments in the review memorandum have been individually addressed as follows:

1. **Comment:** *The site is adjacent to or crosses an existing or proposed Clark County Regional Flood Control District (CCRFCD) master planned facility. Therefore, CCRFCD concurrence is required prior to final approval of the drainage study.*

   Response: Noted.

2. **Comment:** *The proposed improvement plans show drainage facilities that must be reviewed for maintenance and access concerns. The engineer must submit an extra set of improvement plans to City of Las Vegas Operations and Maintenance Department (Contact Mr. Matthew Meyer, Streets & Sanitation Manager at 702-229-1688) for review and their acceptance must be obtained prior to the subject drainage study approval.*

   Response: Per email on 7/16/18, see Appendix B, TDS addendum may be submitted to CLV Flood Control while coordination is taking place to receive approval of maintenance and access.

3. **Comment:** *The improvement plans show super-elevation slope of 6% and short transition distance from superelevation to normal crown, Coordinate with City Traffic, Mr. Victor Bolanos for acceptable design. Obtain approval from Traffic prior to the final acceptance of the drainage study.*

   Response: CLV Traffic approval of roadway superelevation geometry is included in Appendix B.

4. **Comment:** *Provide a 24'x36" full size plan of Sheep Mountain Parkway right-of-way exhibit clearly including center line, both right-of-way lines with roadway stationings in the next submittal.*

   Response: Full size exhibit of Sheep Mountain Pkwy right-of-way, center line, and stationing included in Appendix C.

5. **Comment:** *Provide a 24"x36" full size plan for the Best Management Plan Exhibit (BMP) with the layout of DB#2 which was missing in the last exhibit.*

   Response: Full size BMP exhibit with DB2 layout included in Appendix C.

6. **Comment:** *Sheet C-01: Construction Note #13 indicated relocating an existing gate but the plan didn't show where the new gate is. Also, a previous required "End of Road" marker was nowhere to be found on the plan. Review and revise accordingly.*

   Show and label existing concrete curb & gutter, sidewalk and amenity zone in the Grand Teton Boulevard right-of-way on the plan.

   Response: Location of relocated gate is shown in improvement plans on construction plan Sheet C-01. A "ROAD CLOSED" sign is provided where Grand Teton Drive terminates, see signing and striping plan Sheet ST-01. Existing curb, gutter, sidewalk, and common lot are called out and dimensioned, see construction plan Sheet C-01.

7. **Comment:** *Label all existing storm drains with City of Las Vegas recorded drawing numbers in all pertinent sheets, except for DB #2 (plans not approved yet).*

   Response: Existing storm drains are labeled as requested.

8. **Comment:** *As a general comment, the plans show existing improvement drawings as "H#xxxxx". However, this is. not a City of Las Vegas recorded drawing number. Consult with City of Las Vegas plans library for the correct recorded drawing numbers in the next addendum.*

   Response: Existing improvement drawing numbers are revised to reference City of Las Vegas recorded drawing numbers.

9. **Comment:** *Add a note in all pertinent sheets for the construction of all storm drain drop inlets per a newly adopted USDCCA Drawing No, 421 (Stormwater Quality Management Stamp and Sign Detail).*

   Response: Note 6 included in all Grading Plan sheets calls for all drop inlets to include the Stormwater Quality Management Stamp and Sign Detail.

   The revised plan, profile and detail sheets adopting the revisions addressed in this letter are included with this submittal, and electronic copies are included on the CD in Appendix D. If

you have any questions or require additional information, please do not hesitate to contact us at 702-284-5300.

Respectfully Submitted,

SLATER HANIFAN GROUP

Lant Leavitt, P.E.
Flood Control Division

cc: Mark Failla, P.E., CFM – SHG
Jerry Slater, P.E. – SHG
Jerrod Ratcliffe – SHG

APPENDIX

Appendix A CLV Comment Letter

Appendix B Project Coordination
- 7/16/18 Email – maintenance and access review
- 7/9/18 Email – roadway superelevation geometry

Appendix C Exhibits
- Right-of-Way Exhibit
- BMP Exhibit

Appendix D Electronic Files CD
- TDS Addendum #2
- Improvement Plans

APPENDIX A

CLV Comment Letter

CITY OF LAS VEGAS **INTER-OFFICE MEMORANDUM**				**DATE:** **June 20, 2018**
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: **Sheep Mountain Parkway at Skye Canyon**				**COPIES TO:** Slater Hanifan Group
Cross Streets:	Grand Teton Boulevard at Puli to Iron Mountain Road			M F Land LLC / Ninety-Five Management LLC
File Number:	F:\Depot\DSMemos\DS4952B.doc			Bart Anderson, P.E., DevCo
Parcel Number:	126-12-101-002			CCRFCD
Zoning Action:	N/A			
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	2/8/2018	2/26/2018	Not Approved	$400.00	493316: $400
2nd Submittal	6/5/2018	6/19/ 2018	See Comments Below	$400.00	496458: $400
			TOTAL FEES (LDDRS):	**$800.00**	----

REMARKS:

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 Clark County Public Works Department concurrence.

1. The site is adjacent to or crosses an existing or proposed *Clark County Regional Flood Control District* (CCRFCD) master planned facility. Therefore, CCRFCD concurrence is required prior to final approval of the drainage study.

2. The proposed improvement plans show drainage facilities that must be reviewed for maintenance and access concerns. The engineer must submit an extra set of improvement plans to City of Las Vegas Operations and Maintenance Department (Contact Mr. Matthew Meyer, Streets & Sanitation Manager at 702-229-1688) for review and their acceptance must be obtained prior to the subject drainage study approval.

3. The improvement plans show super-elevation slope of 6% and short transition distance from super-elevation to normal crown. Coordinate with City Traffic, Mr. Victor Bolanos for acceptable design. Obtain approval from Traffic prior to the final acceptance of the drainage study.

4. Provide a 24"x36" full size plan of *Sheep Mountain Parkway* right-of-way exhibit clearly including center line, both right-of-way lines with roadway stationings in the next submittal.

5. Provide a 24"x36" full size plan for the *Best Management Plan Exhibit* (BMP) with the layout of DB#2 which was missing in the last exhibit.

6. **Sheet C-01**: Construction Note #13 indicated relocating an existing gate but the plan didn't show where the new gate is. Also, a previous required "End of Road" marker was nowhere to be found on the plan. Review and revise accordingly.

   Show and label existing concrete curb & gutter, sidewalk and amenity zone in the *Grand Teton Boulevard* right-of-way on the plan.

7. Label all existing storm drains with *City of Las Vegas* recorded drawing numbers in all pertinent sheets, except for DB #2 (plans not approved yet).

8. As a general comment, the plans show existing improvement drawings as "H#xxxxx". However, this is not a *City of Las Vegas* recorded drawing number. Consult with *City of Las Vegas* plans library for the correct recorded drawing numbers in the next addendum.

9. Add a note in all pertinent sheets for the construction of all storm drain drop inlets per a newly adopted USDCCA Drawing No. 421 (*Stormwater Quality Management Stamp and Sign Detail*).

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

END OF REMARKS
ays

T/R/S: T19S/R59E/12
AREA F-12

APPENDIX B

Project Coordination

MAINTENANCE AND ACCESS EMAIL

Lant Leavitt

From: Albert Sung <YSung@LasVegasNevada.GOV>
Sent: Monday, July 16, 2018 5:54 PM
To: Lant Leavitt
Subject: RE: Sheep Mt Pkwy TDS

Hi Lant,

You may submit the addendum to Flood Control and if by the time of ready for conditional approval, I can change the comment to obtain acceptance from Streets & Sanitation prior to the final approval of the improvement plans instead of drainage study.

Hope this help.

Albert Y. Sung
Project Engineer
Public Works Dept. / Flood Control
(702) 229-6541
333 N. Rancho Dr. 7th Floor
Las Vegas, NV 89106

lasvegasnevada.gov

Your opinion is important! Click here to take a short survey.

From: Lant Leavitt <lleavitt@shg-inc.com>
Sent: Thursday, July 12, 2018 5:05 PM
To: Albert Sung <YSung@LasVegasNevada.GOV>
Cc: Jerry Slater <jslater@shg-inc.com>
Subject: Sheep Mt Pkwy TDS

Hi Albert,

We've got all the Sheep Mountain Pkwy comments from your 6/20 review addressed except for the approval from Matthew Meyer at CLV Streets & Sanitation. We sent him plans on 6/25, but haven't been able to reach him. Given the importance of this project, would it be possible to submit and receive a conditional TDS approval? This would allow us to continue to coordinate with Matthew while moving the project forward with CLV Land Dev and CCRFCD. Please let me know.

Thanks,

Lant Leavitt, P.E.
Project Manager I

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LAS VEGAS
5740 S. ARVILLE STREET #216
LAS VEGAS, NV 89118
T: 702.284.5300

PHOENIX
11201 N. TATUM BLVD. #250
PHOENIX, AZ 85028
T: 602.687.9664

www.shg-inc.com

Any files contained within are to be used for information ONLY. Engineering data, calculations, and opinion transmitted via email are Preliminary and Not for Construction.
Accuracy and/or design information to be verified from approved original plans. Use of electronic media is at the sole risk of the user

ROADWAY SUPERELEVATION GEOMETRY EMAIL

Lant Leavitt

From: Jerrod Ratcliffe
Sent: Monday, July 9, 2018 7:06 AM
To: Lant Leavitt
Subject: FW: Sheep Mountain Parkway - Superelevation TablesJerry Slater <jslater@shg-inc.com>

fyi

Jerrod Ratcliffe
Senior Project Manager

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5740 S. ARVILLE STREET #216
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T: 702.284.5300

PHOENIX
11201 N. TATUM BLVD. #250
PHOENIX, AZ 85028
T: 602.687.9664

www.shg-inc.com

From: Victor Bolanos <vbolanos@LasVegasNevada.GOV>
Sent: Tuesday, July 3, 2018 9:38 AM
To: Albert Sung <YSung@LasVegasNevada.GOV>; Jerry Slater <jslater@shg-inc.com>
Cc: Lucien Paet <lpaet@LasVegasNevada.GOV>; Bart Anderson <banderson@LasVegasNevada.GOV>; Brian Chapman <bchapman@shg-inc.com>; Jerrod Ratcliffe <jratcliffe@shg-inc.com>
Subject: RE: Sheep Mountain Parkway - Superelevation TablesJerry Slater <jslater@shg-inc.com>

Albert,

Traffic Engineering agrees, that we can approve the drainage study at this time.

Thank you for the opportunity to review the plans.

Victor Bolanos

From: Jerry Slater [mailto:jslater@shg-inc.com]
Sent: Tuesday, July 03, 2018 8:56 AM
To: Victor Bolanos; Jerrod Ratcliffe
Cc: Lucien Paet; Bart Anderson; Brian Chapman
Subject: RE: Sheep Mountain Parkway - Superelevation Tables

We verified the Horrocks design with AASHTO.

Since this is a relatively minor issue and with no impact on drainage would it be possible to get an approval on the drainage so we can at least get the plan set under review?

Jerrod is on vacation this week, let me see what we can put together.

Jerry

From: Victor Bolanos <vbolanos@LasVegasNevada.GOV>
Sent: Tuesday, July 03, 2018 8:14 AM
To: Jerrod Ratcliffe <jratcliffe@shg-inc.com>
Cc: Jerry Slater <jslater@shg-inc.com>; Lucien Paet <lpaet@LasVegasNevada.GOV>; Bart Anderson <banderson@LasVegasNevada.GOV>
Subject: RE: Sheep Mountain Parkway - Superelevation Tables

Jerry,

Please provide a plan view exhibit with the grades, run-outs/transition lengths, radius and the design speed. Was the designed off Horrocks design or a independent design in accordance with AASHTO?

Thank you,

Victor

From: Jerrod Ratcliffe [mailto:jratcliffe@shg-inc.com]
Sent: Tuesday, June 26, 2018 11:36 AM
To: Victor Bolanos
Cc: Jerry Slater
Subject: Sheep Mountain Parkway - Superelevation Tables

Victor,

As discussed in the voicemail message that Jerry just left you, attached are copies of the superelevation tables for Sheep Mountain Parkway. These are based off of the proof of concept plans prepared by Horrocks for the ultimate Sheep Mountain facility.

Thanks,

Jerrod Ratcliffe
Senior Project Manager

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T: 602.687.9664

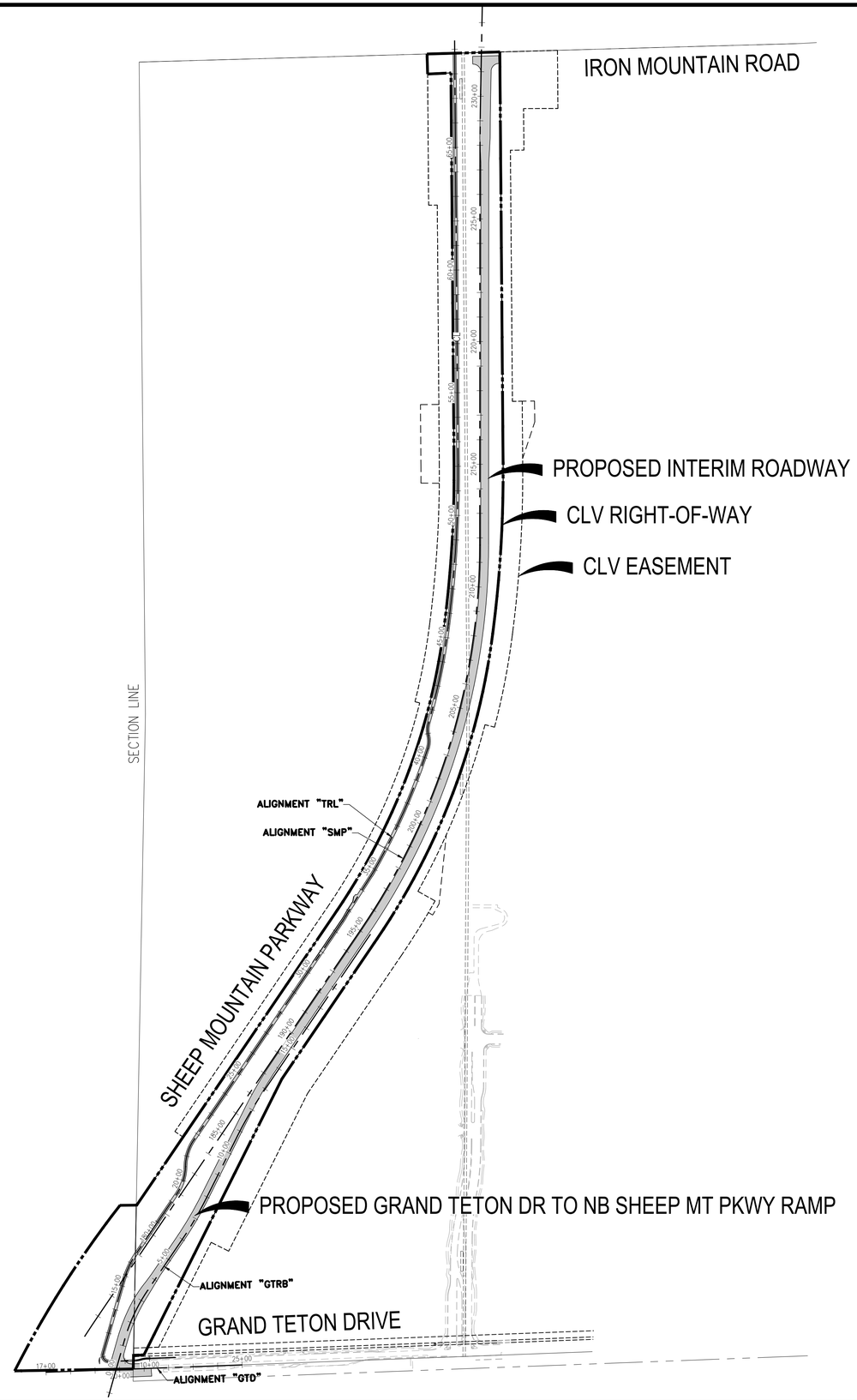
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APPENDIX C

Exhibits





SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 234-5300 FAX (702) 234-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY RIGHT-OF-WAY EXHIBIT

DATE: 7/10/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED:
PROJECT NO. OLY1720.000

SHEET 1 OF 1

J:\oly\1720.000 sheep mountain parkway access road\dwg\Figures\180710 row drainage exhibit.dwg 7/17/2018 9:55 AM Brian Chapman

LEGEND	
	PAVED ROADWAY AREA BOUNDARY
ID	PAVED AREA ID
	FLOW DIRECTION

PAVED ROADWAY AREAS

Area ID	Area (sqft)	Area (ac)	BMP Solution
BMP1	16080	0.37	Area sheet flows across pervious ground to the east.
BMP2	16605	0.38	Area drains to roadside ditch. 40' length of rock swale provided to settle out pollutants.
BMP3	28603	0.66	Area sheet flows across pervious ground to the east.
BMP4	66064	1.52	Area drains to roadside ditch. 40' length of rock swale provided to settle out pollutants.
BMP5	64525	1.48	Area sheet flows across pervious ground to the east.

N

NTS

IRON MOUNTAIN ROAD

SHEEP MOUNTAIN PARKWAY

SHAUMBER ROAD

GRAND TETON DRIVE

BMP1

BMP2

BMP3

BMP4

BMP5

40-FT ROCK SWALE

40-FT ROCK SWALE

40-FT ROCK SWALE

40-FT ROCK SWALE

40-FT ROCK SWALE

SKYE CANYON DETENTION BASIN 1

SKYE CANYON DETENTION BASIN 2

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT, LLC.

SKYE CANYON - SHEEP MOUNTAIN PARKWAY

BEST MANAGEMENT PLAN EXHIBIT

DATE: MAY 2018

DRAFTER:

DESIGNER: LKL

CHECKED:

PROJECT NO.
OLY1720.000

J:\Oly\1720.000_sheep_mountain_parkway_access_road\Engineering\Technical_study\Addendum\Figures\bmp.dwg 7/10/2018 4:20 PM Brian Chapman

APPENDIX D

Electronic Files CD

TRANSMITTAL

To: **Albert Sung, P.E.**
City of Las Vegas
333 N. Rancho Drive
Las Vegas, NV 89106

Date: July 19, 2018
Project No.: OLY1720.000

From: **Lant Leavitt, P.E.**

Subject: **Technical Drainage Study Addendum #2 for Skye Canyon – Sheep Mountain Parkway**

CC: Mark Failla, SHG
CC: Chelsea Peltier, SHG
CC: Jerrod Ratcliffe, SHG
CC: Jerry Slater, SHG
CC: Rhonda Miller, SHG
CC:

Transmitting Via:
- ☐ Mail
- ☒ Messenger / MDS
- ☐ Federal Express
- ☐ Pickup

For:
- ☒ Review & Comment
- ☐ Per your Request
- ☐ Information/File

Acknowledgement of Receipt:
- ☐ Not Required
- ☒ Acknowledgement Required

Received By: AJS
Date: 7/19/18 Time:

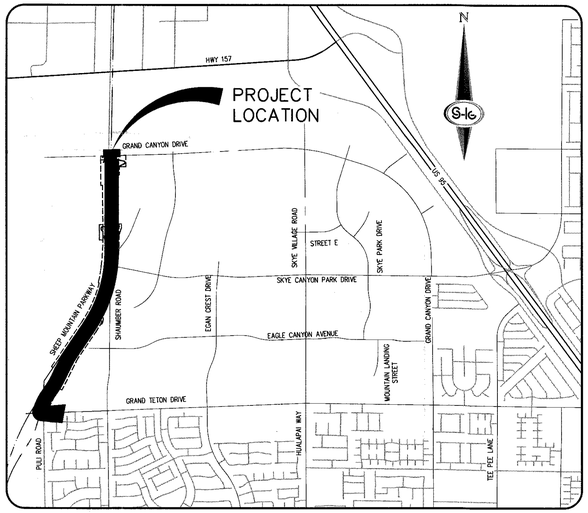
Copies	Description
1	Subject Study
1	Stamped and Signed Standard Form 1
1	24" x 36" Drainage and Grading Plans
1	Electronic Copy (CD)
1	Submittal Fee Check (Chk# 1532 from Ninety Five Management,LLC)

Comments:
Enclosed please find the above listed items in support of our application of the *Technical Drainage Study for Skye Canyon – Sheep Mountain Parkway.*

Please contact us if there are any questions at 702-284-5300. Thank you.

Signed:
Lant Leavitt, P.E.
Flood Control Division

IMPROVEMENT PLANS
FOR
SKYE CANYON PHASE II
SHEEP MOUNTAIN PARKWAY



VICINITY MAP

BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 2817.61 FEET, 858.810 METERS
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK – 2008 ADJUSTMENT (UPDATED 05/24/2010)

BASIS OF BEARING

NORTH 89°16'30" WEST, BEING THE BEARING OF THE SOUTH LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 7, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 147, PAGE 71 OF PLATS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

OWNER

M F LAND LLC
% OLYMPIA COMPANIES LLC
11411 SOUTHERN HIGHLANDS
PARKWAY, SUITE 300
LAS VEGAS, NV 89141

DEVELOPER

NINETY–FIVE MANAGEMENT LLC
% OLYMPIA COMPANIES LLC
11411 SOUTHERN HIGHLANDS
PARKWAY, SUITE 300
LAS VEGAS, NV 89141
PH (702) 220–6565
FX (702) 220–6566

ENGINEER

SLATER HANIFAN GROUP
5740 S. ARVILLE STREET #216
LAS VEGAS, NV 89118
(702) 284–5300







DRY UTILITY SUPPLEMENTAL INDEX

SOUTHWEST GAS	

APPROVALS

CITY ENGINEER–ALLEN E. PAVELKA PE #9029 DATE

APPROVAL OF THESE PLANS BY THE CITY ENGINEER IS LIMITED TO THOSE IMPROVEMENTS CONSTRUCTED IN THE DEDICATED OF RIGHT–OF–WAY, AND/OR DEDICATED EASEMENTS. THIS APPROVAL DOES NOT AUTHORIZE CONSTRUCTION OF ANY IMPROVEMENTS THAT DEVIATE FROM ADOPTED STANDARDS AND/OR SPECIFICATIONS EXCEPT THOSE SPECIALLY LISTED UNDER DEVIATIONS FORM STANDARDS. THE ENGINEER SHALL RESOLVE ANY DEVIATION OTHER THAN THOSE LISTED IN DEVIATIONS FROM STANDARDS IN FAVOR OF THE UNIFORM STANDARD DRAWINGS AND SPECIFICATIONS, CLARK COUNTY AREA, NEVADA.

CHRIS KNIGHT DATE
DIRECTOR, BUILDING AND SAFETY

THIS PLAN MEETS THE APPLICABLE STANDARDS OF THE PLANNING DEPARTMENT.

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES
PROJECT NO. _____ DATE:_____
SHEETS:

APPROVAL BY THE FIRE DEPARTMENT HAVING JURISDICTION IS REQUIRED PRIOR TO OBTAINING FINAL APPROVAL FROM THE LAS VEGAS VALLEY WATER DISTRICT.

LAS VEGAS FIRE AND RESCUE DATE

NV ENERGY – TRANSMISSION DATE

CENTRAL TELEPHONE CO, DBA CENTURYLINK DATE

THE AFFIXED CENTRAL TELEPHONE CO, DBA CENTURYLINK APPROVAL DOES NOT ASSUME OR GUARANTEE LIABILITY FOR KNOWN OR UNKNOWN CONFLICTS WITH EXISTING OR PROPOSED IMPROVEMENTS. RESOLUTION OF ANY CONFLICT WILL BE ACCOMPLISHED PURSUANT TO LOCAL ORDINANCES, NEVADA REVISED STATUES AND/OR PUBLIC UTILITY COMMISSION RULES AND REGULATIONS.

SOUTHWEST GAS CORPORATION DATE

COX COMMUNICATIONS LAS VEGAS, INC. DATE

INDEX OF DRAWINGS (STRUCTURAL)

SHT. NO.	DWG. NO.	DESCRIPTION

INDEX OF DRAWINGS

SHT. NO.	DWG. NO.	DESCRIPTION
1	G–01	COVER SHEET
2	G–02	GENERAL NOTES
3	G–03	ABBREVIATIONS, KEY MAP, LEGEND AND QUANTITIES
4	C–01	CONSTRUCTION PLAN – "GTD" 17+00.00 TO "GTD" 23+50.00
5	C–02	CONSTRUCTION PLAN – "GTRB" 0+00.00 TO "GTRB" 6+50.00
6	C–03	CONSTRUCTION PLAN – "GTRB" 6+50.00 TO "GTRB" 10+34.64
7	C–04	CONSTRUCTION PLAN – "SMP" 184+84.15 TO "SMP" 188+00.00
8	C–05	CONSTRUCTION PLAN – "SMP" 188+00.00 TO "SMP" 194+50.00
9	C–06	CONSTRUCTION PLAN – "SMP" 194+50.00 TO "SMP" 201+00.00
10	C–07	CONSTRUCTION PLAN – "SMP" 201+00.00 TO "SMP" 207+50.00
11	C–08	CONSTRUCTION PLAN – "SMP" 207+50.00 TO "SMP" 214+00.00
12	C–09	CONSTRUCTION PLAN – "SMP" 214+00.00 TO "SMP" 220+50.00
13	C–10	CONSTRUCTION PLAN – "SMP" 220+50.00 TO "SMP" 227+50.00
14	C–11	CONSTRUCTION PLAN – "SMP" 227+50.00 TO "SMP" 233+50.00
15	C–12	CONSTRUCTION PLAN – "TRL" 10+00.00 TO "TRL" 12+00.00
16	C–13	CONSTRUCTION PLAN – "TRL" 12+00.00 TO "TRL" 18+00.00
17	C–14	CONSTRUCTION PLAN – "TRL" 18+00.00 TO "TRL" 24+50.00
18	C–15	CONSTRUCTION PLAN – "TRL" 24+50.00 TO "TRL" 31+00.00
19	C–16	CONSTRUCTION PLAN – "TRL" 31+00.00 TO "TRL" 37+50.00
20	C–17	CONSTRUCTION PLAN – "TRL" 37+50.00 TO "TRL" 44+00.00
21	C–18	CONSTRUCTION PLAN – "TRL" 44+00.00 TO "TRL" 50+50.00
22	C–19	CONSTRUCTION PLAN – "TRL" 50+50.00 TO "TRL" 57+00.00
23	C–20	CONSTRUCTION PLAN – "TRL" 57+00.00 TO "TRL" 63+50.00
24	C–21	CONSTRUCTION PLAN – "TRL" 63+50.00 TO "TRL" 70+00.00
25	GR–01	GRADING PLAN – "GTRB" 0+00.00 TO "GTRB" 6+50.00
26	GR–02	GRADING PLAN – "GTRB" 6+50.00 TO "GTRB" 12+00.00
27	GR–03	GRADING PLAN – "SMP" 188+00.00 TO "SMP" 194+50.00
28	GR–04	GRADING PLAN – "SMP" 194+50.00 TO "SMP" 201+00.00
29	GR–05	GRADING PLAN – "SMP" 201+00.00 TO "SMP" 207+50.00
30	GR–06	GRADING PLAN – "SMP" 207+50.00 TO "SMP" 214+00.00
31	GR–07	GRADING PLAN – "SMP" 214+00.00 TO "SMP" 220+50.00
32	GR–08	GRADING PLAN – "SMP" 220+50.00 TO "SMP" 227+50.00
33	GR–09	GRADING PLAN – "SMP" 227+50.00 TO "SMP" 233+50.00
34	GR–10	STORM DRAIN LATERAL PROFILES
35	TY–01	TYPICAL SECTIONS 1
36	TY–02	TYPICAL SECTIONS 2
37	TY–03	DETAILS 1
38	TY–04	DETAILS 2
39	TY–05	DETAILS 3
40	TY–06	DRAINAGE SWALE SECTIONS 1
41	TY–07	DRAINAGE SWALE SECTIONS 2
42	TY–08	NDOT DETAILS
43	ST–01	SIGNING AND STRIPING 1
44	ST–02	SIGNING AND STRIPING 2
45	ST–03	SIGNING AND STRIPING 3
46	ST–04	SIGNING AND STRIPING 5
47	ST–05	SIGNING AND STRIPING 6
48	ST–06	SIGNING AND STRIPING 7
49	ST–07	SIGNING AND STRIPING 8
50	LL–01	LIGHTING PLAN 1

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY
COVER SHEET

DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER – STATE OF NEVADA
JERRY J. SLATER
Exp: 06/30/2020
CIVIL
No. 14167
7/16/18

G-01
SHEET 1 OF 50

DWG NO. _____

HANSEN NO. _____

CITY OF LAS VEGAS SEWER NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS AND THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, AS AMENDED. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO BE AWARE OF THE CONTENTS OF THE ABOVE SPECIFICATIONS.
2. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PERFORM CONSTRUCTION AS PER PLANS. ANY ADDITIONS, DELETIONS, OR CHANGES SHALL FIRST MEET WITH THE APPROVAL OF THE CITY ENGINEER.
3. CHISEL "S" OR "G" IN CURBS WHERE SEWER OR GAS LATERALS PASS UNDER THE CURB.
4. POLYVINYL (PVC) SEWER PIPE SHALL MEET ASTM D-3034 SDR 35 SPECIFICATIONS, INSTALLED WITH SAND BEDDING AND BACKFILL OF TYPE II AGGREGATE BASE.
5. ALL MANHOLES PAVED IN STREETS EIGHTY (80') FOOT R/W AND LARGER SHALL HAVE CONCRETE COLLARS. STREETS LESS THAN EIGHTY (80') FOOT R/W WILL REQUIRE RETROFIT IF PAVING DOES NOT CONFORM TO CITY STANDARDS AT THE MANHOLE.
6. TEE SADDLES SHALL BE USED TO CONNECT SEWER LATERALS TO EXISTING MAIN LINES UP TO TWELVE INCH (12") DIAMETER. CONNECTIONS TO FIFTEEN INCH (15") OR LARGER MAINS SHALL REQUIRE SPECIAL PROCEDURES. IN LINE "Y" 'S SHALL BE USED ON LINES TWELVE INCHES (12") OR ABOVE.
7. WATER MAINS SHALL BE PROTECTED IN ACCORDANCE WITH LVVWD STANDARDS WHENEVER A SEWER MAIN CROSSES OVER A WATER MAIN OR THE SEWER IS LESS THAN EIGHTEEN INCH (18") UNDER A WATER MAIN.
8. ALL CONTRACTORS INSTALLING SEWER MAINS THAT WILL BE UNDER THE JURISDICTION OF THE CITY OF LAS VEGAS MUST BE STATE OF NEVADA CLASS "A" CONTRACTORS.
9. THE CITY OF LAS VEGAS WILL NOT ACCEPT ANY SEWER MAINS WHICH HAVE A VERTICAL DEFLECTION OF MORE THAN ONE TENTH (0.1) OF A FOOT FROM THE APPROVED CONSTRUCTION PLANS AT ANY LOCATION. SEWER MAINS FOUND TO EXCEED THIS TOLERANCE WILL HAVE TO BE REPAIRED OR REMOVED OR REPLACED TO THE SATISFACTION OF THE CITY ENGINEER PRIOR TO ACCEPTANCE BY THE CITY OF LAS VEGAS.
10. INSTALLATION OF CURVED SEWER REQUIRES THE USE OF C-900 PIPE WHICH ALLOWS FOR PIPE DEFLECTION AT THE JOINTS.

REVISED 04/15/10

STORMWATER MANAGEMENT NOTES

1. THE OWNER, SITE DEVELOPER, CONTRACTOR, AND/OR THEIR AUTHORIZED AGENTS SHALL EACH DAY REMOVE ALL SEDIMENT, MUD, CONSTRUCTION DEBRIS, OR OTHER POTENTIAL POLLUTANTS THAT MAY HAVE BEEN DISCHARGED TO, OR ACCUMULATED IN, THE PUBLIC RIGHTS OF WAY OF CLARK COUNTY AS A RESULT OF CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS SITE DEVELOPMENT OR CONSTRUCTION PROJECT. SUCH MATERIALS SHALL BE PREVENTED FROM ENTERING THE STORM SEWER SYSTEM.
2. ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT PRACTICES MAY BE REQUIRED OF THE OWNER AND HIS OR HER AGENTS DUE TO UNFORESEEN EROSION PROBLEMS IF THE SUBMITTED PLAN DOES NOT MEET THE PERFORMANCE STANDARD IN THE USDCCA AND THE LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDANCE MANUAL.
3. TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE AND NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. SOME EXCEPTIONS MAY APPLY; REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.5.
4. AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL INSPECT ALL DISTURBED AREAS, AREAS USED FOR STORAGE OF MATERIALS AND EQUIPMENT THAT ARE EXPOSED TO PRECIPITATION, VEHICLE ENTRANCE AND EXIT LOCATIONS, AND ALL BMPs WEEKLY, AND WITHIN 24 HOURS AFTER ANY RAIN EVENT OF 0.5 INCHES OR MORE. THE CONTRACTOR OR HIS AGENT SHALL UPDATE OR MODIFY THE STORMWATER POLLUTION PREVENTION PLAN AS NECESSARY. SOME EXCEPTIONS TO WEEKLY INSPECTIONS MAY APPLY, SUCH AS SUSPENSION OF OF LAND DISTURBANCE ACTIVITIES. REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR 100000, SECTION III.A.12.
5. THE DEVELOPER SHALL BE RESPONSIBLE TO PROVIDE AND INSTALL ALL PERMANENT SIGNS SHOWN ON THE PLANS; STREET NAME SIGNS SHALL CONFORM IN THEIR ENTIRETY TO CLARK COUNTY AREA STANDARDS. ALL OTHER SIGNS SHALL BE STANDARD SIZE UNLESS OTHERWISE SPECIFIED ON THE PLANS. ALL SIGN POSTS SHALL BE INSTALLED IN ACCORDANCE WITH CLARK COUNTY AREA STANDARDS. ALL SIGNS SHALL USE TYPE III SHEETING.

LAS VEGAS VALLEY WATER DISTRICT (LVVWD) STANDARD NOTES

LVVWD PROJECT #_____

1. NO WORK SHALL BEGIN UNTIL THE WATER PLANS HAVE BEEN APPROVED FOR CONSTRUCTION BY THE LVVWD. FOLLOWING WATER PLAN APPROVAL, NOTICE SHALL BE GIVEN TO THE LVVWD COMMUNICATION SUPPORT CENTER (258-7171) TWO (2) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION. FOR FUTURE INSPECTIONS, NOTICE MUST BE GIVEN BY 2:00 P.M. THE BUSINESS DAY PRIOR TO THE REQUESTED LVVWD INSPECTION. **WHEN REQUESTING INSPECTIONS, PLEASE REFER TO THE PROJECT # IDENTIFIED ABOVE.**
2. ALL WORK SHALL CONFORM TO LVVWD STANDARD PLATES, DRAWINGS, AND SPECIFICATIONS, AND TO THE **2010** EDITION OF THE UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR POTABLE WATER SYSTEMS (UDACS). **THE LATEST EDITION OF UDACS SHALL SUPERSEDE ANY CONFLICTS CONTAINED IN THE APPROVED DRAWINGS AND/OR SPECIFICATIONS.**
3. ALL WORK, EXCEPT AS MODIFIED BY THESE PLANS OR BY NOTE 2 ABOVE, SHALL BE DONE IN ACCORDANCE WITH THE MOST RECENT DRAFT OR EDITION OF THE UNIFORM SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFFSITE IMPROVEMENT, CLARK COUNTY AREA.
4. A SINGLE PIPE MATERIAL SHALL BE USED THROUGHOUT THE PROJECT UNLESS OTHERWISE APPROVED BY THE LVVWD.
5. ALL SERVICE LATERALS TWO (2) INCHES IN DIAMETER AND SMALLER SHALL BE TYPE K COPPER TUBING WITH LVVWD APPROVED SERVICE SADDLES.
6. ALL WATER METER BOXES SHALL BE LOCATED OUTSIDE OF DRIVEWAY AREAS.
7. ALL VALVES SHALL BE LOCATED OUTSIDE OF DRIVEWAYS, VALLEY AND CURB GUTTERS.
8. ALL WATER AND STORM DRAIN OR SANITARY SEWER CROSSINGS SHALL CONFORM TO SECTION 2.22 OF THE **2010** EDITION OF THE UDACS
9. ALL WATER FACILITIES SHALL BE FILLED, DISINFECTED, PRESSURE TESTED, FLUSHED, FILLED, AND AN ACCEPTABLE WATER SAMPLE OBTAINED, PRIOR TO CONNECTION TO THE LVVWD DISTRIBUTION SYSTEM.
10. THE CONTRACTOR MUST OBTAIN ALL METERS TWO (2) INCHES AND SMALLER FROM LVVWD CENTRAL STORES. TELEPHONE 258-3152 OR 258-3802, TWO (2) WORKING DAYS PRIOR TO METER PICKUP.
11. ANY INTERRUPTION OF SERVICE MUST BE PERFORMED IN ACCORDANCE WITH UDACS SECTION 3.14.01, AND APPROVED BY THE LVVWD INSPECTION DIVISION PRIOR TO SHUTDOWN. PROPER WRITTEN NOTIFICATION MUST BE GIVEN TO ALL AFFECTED CUSTOMERS.
12. ALL WATER FACILITY CONSTRUCTION MATERIALS USED MUST BE LISTED ON THE LVVWD PRE-APPROVED MATERIALS AND MANUFACTURER'S LISTING FOR NEW FACILITIES, LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS.
13. TELEPHONE "CALL BEFORE YOU DIG" AT "811" OR 1-800-227-2600.
14. THE INSTALLATION OF LAS VEGAS VALLEY WATER DISTRICT (LVVWD) MUNICIPAL WATER FACILITIES WITHIN ALL STREETS IS ASSUMED TO BE IN COMPLIANCE WITH THE UNIFORM STANDARDS, INCLUDING THE PLACEMENT OF ASPHALT PAVING STREET SURFACES. ANY REPAIR WORK DONE BY THE LVVWD TO THE MUNICIPAL WATER FACILITIES WILL INCLUDE THE PLACEMENT OF AN APPROPRIATELY SIZED ASPHALT REPAIR PATCH ON THE STREET SURFACE. ANY DECORATIVE PAVING SURFACE WITHIN THE STREET IS THE RESPONSIBILITY OF THE OWNER'S ASSOCIATION, OR THE INDIVIDUAL PROPERTY OWNERS IF NO OWNER'S ASSOCIATION IS IN EXISTENCE, OR THE AGENCY HAVING JURISDICTION DECORATIVE SURFACE MATERIALS PLACED WITHIN THE TEN FOOT EASEMENT ABUTTING A PUBLIC OF PRIVATE STREET, IF DISTURBED BY THE LVVWD DURING THE REPAIR OR OPERATION OF ITS FACILITIES, WILL BE REPLACED BY LVVWD WITH AN APPROPRIATELY SIZED PLAIN FINISH CONCRETE PATCH. THE LVVWD WILL NOT RESTORE, AND WILL NOT BE RESPONSIBLE FOR THE RESTORATION OF ANY DECORATIVE PAVING SURFACE WITH THE STREET. THE LVVWD WILL NOT ATTEMPT TO MATCH COLOR OR FINISH OF ANY ADJACENT MATERIALS.

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES

DATE_____ LVVWD PROJECT #_____

CITY OF LAS VEGAS GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA NEVADA", LATEST ISSUE; THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION, CLARK COUNTY AREA NEVADA", LATEST REVISED EDITION; THE "SUMMERLIN IMPROVEMENT STANDARDS" FOR WORK IN THE SUMMERLIN AREA; AND OTHER APPLICABLE APPROVED STANDARDS ISSUED BY THE CONTROLLING AGENCY; THE UNIFORM BUILDING CODE; AND ALL LOCAL CITY CODES AND ORDINANCES APPLICABLE, EXCEPT AS NOTED ON THIS SHEET AS "DEVIATIONS FROM STANDARDS".
2. THE EXISTENCE AND LOCATION OF ANY OVERHEAD OR UNDERGROUND UTILITY LINES, PIPES, OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A RESEARCH OF THE AVAILABLE RECORDS. EXISTING UTILITIES AS SHOWN FROM CLV PLANS LIBRARY ARE APPROXIMATE AND FOR RECORD PURPOSES. EXISTING UTILITIES ARE LOCATED ON PLANS ONLY FOR THE CONVENIENCE OF THE CONTRACTOR. EXISTING UTILITY SERVICE LATERALS MAY NOT BE SHOWN ON THE PLANS. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, LOCATE ALL UNDERGROUND AND OVERHEAD INTERFERENCES WHICH MAY AFFECT HIS OPERATION DURING CONSTRUCTION AND SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID DAMAGE TO SAME. THE CONTRACTOR SHALL USE EXTREME CAUTION WHEN WORKING NEAR OVERHEAD UTILITIES SO AS TO SAFELY PROTECT ALL PERSONNEL AND EQUIPMENT, AND SHALL BE RESPONSIBLE FOR ALL COST AND LIABILITY IN CONNECTION THEREWITH.
3. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT EXISTING UTILITY LINES, STRUCTURES AND STREET IMPROVEMENTS WHICH ARE TO REMAIN IN PLACE, FROM DAMAGE, AND ALL SUCH IMPROVEMENTS OR STRUCTURES DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR REPLACED SATISFACTORY TO THE CITY ENGINEER AND OWNING UTILITY COMPANY AT THE EXPENSE OF THE CONTRACTOR.
4. ALL CONSTRUCTION SHALL BE AS SHOWN ON THESE PLANS, ANY REVISIONS SHALL HAVE THE PRIOR WRITTEN APPROVAL OF THE CITY ENGINEER.
5. TYPE V CEMENT SHALL BE USED IN ALL OFF-SITE CONCRETE WORK. CONCRETE TO BE 3000 P.S.I. MINIMUM @ 28 DAYS. MIX DESIGNS TO BE APPROVED BY THE CITY, PRIOR TO THE USE ON THE PROJECT.
6. PERMITS ARE REQUIRED FOR ANY WORK IN THE PUBLIC RIGHT-OF-WAY. THE CONTRACTOR SHALL SECURE ALL PERMITS AND INSPECTIONS REQUIRED FOR THIS CONSTRUCTION.
7. EXPANSION JOINTS REQUIRED, MAXIMUM EVERY 300'IN EXTRUDED-TYPE CURB.
8. AC PAVEMENT TO BE ONE-HALF INCH (½") ABOVE LIP OF ALL GUTTERS AFTER COMPACTION, EXCEPT AT SIDEWALK RAMPS AND CROSS GUTTERS.
9. CURB AND GUTTER FOUND TO BE UNACCEPTABLE TO THE CITY OF LAS VEGAS SHALL BE REMOVED AND REPLACED PER STANDARD DRAWING 216.
10. SIDEWALK RAMPS SHALL BE CONSTRUCTED IN EACH QUADRANT OF AN INTERSECTION PER STANDARD DRAWING 235. EXACT LOCATION OF RAMPS MAY BE ADJUSTED IN THE FIELD BY A CITY INSPECTOR.
11. CONTRACTOR SHALL PROVIDE ALL NECESSARY HORIZONTAL AND VERTICAL TRANSITIONS BETWEEN NEW CONSTRUCTION AND EXISTING SURFACES TO PROVIDE FOR PROPER DRAINAGE AND FOR INGRESS AND EGRESS TO NEW CONSTRUCTION. THE EXTENT OF THE TRANSITIONS TO BE AS SHOWN ON PLANS.
12. ALL GRADING WORK SHALL CONFORM TO THE SOILS REPORT AS PREPARED BY WRIGHT ENGINEERS, REPORT #160165, MAY 20, 2016 APPROVED BY THE CITY ENGINEER, AND AS SHOWN ON THESE PLANS.
13. EXACT LOCATION OF ALL SAWCUT LINES MAY BE ADJUSTED OR DETERMINED IN THE FIELD BY A CITY OF LAS VEGAS ENGINEER IF LOCATION ON PLANS IS NOT CLEARLY SHOWN, OR EXISTING PAVEMENT CONDITION REQUIRES RELOCATIONS.
14. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PROTECT EXISTING PERMANENT SURVEY MONUMENTS. ANY MONUMENTS DISTURBED SHALL BE REPLACED AND ADJUSTED PER AVAILABLE RECORDS IN ACCORDANCE WITH N.R.S. STATUTE NO. 625.380 & CITY OF LAS VEGAS TITLE 18, APPENDIX D.
15. UTILITY COMPANY METER BOXES, MANHOLE LIDS, VALVE COVERS, ETC., SHALL BE LOCATED OUT OF DRIVEWAYS, DRIVEWAY APRONS, FLOWLINES, AND CROSS GUTTERS UNLESS WRITTEN APPROVAL IS GRANTED BY THE UTILITY COMPANY AND THE CITY ENGINEER. ALL ABOVE GROUND UTILITY APPERTANANCES SHALL CONFORM TO THE REQUIREMENTS OF 19.12.040.

WALL NOTES:

16. ALL WALLS, NEW OR EXISTING, ARE ONLY SHOWN ON CIVIL PLANS FOR THE PURPOSE OF REVIEWING GRADING RELATIONSHIPS; FLOOD CONTROL AND SIGHT DISTANCE AT INTERSECTIONS. NEW WALLS REQUIRE A SEPARATE PERMIT AND INSPECTION BY THE BUILDING DEPARTMENT.
17. ASPHALT MIX DESIGN MUST BE SUBMITTED AND APPROVED BY THE CITY ENGINEER PRIOR TO THE PLACEMENT OF ASPHALT WITHIN CITY RIGHT OF WAY.
18. CONTRACTOR SHALL ADJUST ALL NEW AND EXISTING INLETS, VALVE BOXES, MANHOLE RIMS, AND SEWER CLEAN OUTS, ETC. TO FINISH GRADE AS APPLICABLE WHETHER OR NOT THEY ARE SHOWN ON THE PLANS.
19. MATERIALS, HANDLING AND PLACEMENT OF PORTLAND CEMENT CONCRETE SHALL BE IN ACCORDANCE WITH APPLICABLE SECTIONS OF NDOT OR THE CLARK COUNTY AREA SPECIFICATIONS (AS APPLICABLE) AND THE PLANS AND DETAILS SHOWN HEREON.
20. WHEN INSTALLING UNDERGROUND FACILITIES THAT REQUIRE UNDERGROUND LOCATING DEVICES SUCH AS MARKER BALLS, LOCATING RIBBON, ETC, THE CONTRACTOR SHALL PROVIDE WRITTEN DOCUMENTATION TO OFFSITE INSPECTION AND TESTING CERTIFYING THAT ALL DEVICES HAVE BEEN PLACED AND VERIFIED TO BE IN GOOD WORKING CONDITION PRIOR TO THE CONSTRUCTION OF ANY ROAD BASE.
21. SANITARY SEWER AND STORM DRAIN FINAL LOCATION MAP(S) SHALL BE PROVIDED TO THE CITY AND APPROVED PRIOR TO ACCEPTANCE OF FACILITY VIDEO INSPECTION. THE MAP(S) SHALL INCLUDE THE HORIZONTAL AND VERTICAL (INVERT) LOCATION OF PUBLIC SEWER MANHOLES, STORM DRAIN MANHOLES AND TRANSITION STRUCTURES, STORM DRAIN LATERALS AT THE CONNECTION TO THE STORM DRAIN MAIN AND AT THE CONNECTION TO A DROP INLET, THE CONNECTION OF SEWER SERVICE LATERALS TO THE SEWER MAIN AND WHERE THE SEWER SERVICE LATERALS EXIT THE PUBLIC RIGHT-OF-WAY, AND STORM DRAIN MAIN ALIGNMENT, INCLUDING DEFLECTION POINTS. THE LOCATION SHALL BE DESCRIBED BY COORDINATES WHICH SHALL BE BASED ON THE OFFICIAL HORIZONTAL AND VERTICAL CONTROL NETWORKS OF THE CITY OF LAS VEGAS. FINAL LOCATION MAPS MUST BE SEALED AND CERTIFIED BY A NEVADA PROFESSIONAL LAND SURVEYOR TO HAVE POSITIONAL CERTAINTIES OF ±0.09 METERS (±0.3 FEET) HORIZONTALLY AND VERTICALLY. A SEPARATE ELECTRONIC COMMA DELIMITED FILE FOR THE SANITARY SEWER AND STORM DRAIN COORDINATES SHALL ALSO ACCOMPANY THE SANITARY SEWER AND STORM DRAIN FINAL LOCATION MAP(S).

OR

~~SANITARY SEWER AND STORM DRAIN FACILITIES SHOWN ON THESE PLANS SHALL BE USED TO MEET THE REQUIREMENTS OF NRS 455 AND SHALL SHOW AT A MINIMUM THE HORIZONTAL AND VERTICAL (INVERT) LOCATION OF PUBLIC MANHOLES, STORM DRAIN MANHOLES, STORM DRAIN LATERALS AND THE CONNECTION OF SEWER SERVICE LATERALS TO THE SEWER MAIN AND WHERE THE SEWER SERVICE LATERALS EXIT THE PUBLIC RIGHT-OF-WAY. ANY DEVIATIONS FROM THE INFORMATION SHOWN SHALL BE NOTED AND SUBMITTED AS A REVISION TO THE PLANS AND APPROVED PRIOR TO ACCEPTANCE OF FACILITY VIDEO INSPECTION.~~

22. CCTV VIDEO INSPECTION IS REQUIRED FOR ALL SEWER AND STORM DRAINS. THE CCTV VIDEO INSPECTIONS NEED TO BE PERFORMED PER THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS LATEST ADDITION.
23. A SEPARATE BORING PERMIT IS REQUIRED FOR ALL BORING ACTIVITIES.

REVISED 02/03/15

CITY OF LAS VEGAS STREETLIGHT NOTES

1. ALL STREET LIGHTING INSTALLATIONS SHALL BE IN ACCORDANCE WITH THE STREET LIGHTING PLANS, THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA", LATEST REVISION, AND THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA", LATEST REVISION, AND ANY ADOPTED SPECIAL AREA STANDARDS.
2. NO DEVIATION OF STREET LIGHT, PULL BOX, CONDUITS (ETC.) LOCATIONS SHALL BE PERMITTED WITHOUT WRITTEN APPROVAL OF TRAFFIC ENGINEERING AND THE CITY ENGINEER.
3. ALL EXISTING STREET LIGHTING SHALL REMAIN OPERATIONAL DURING CONSTRUCTION.
4. ALL STREET LIGHTING CONDUITS STUB SHALL HAVE AT LEAST ONE GREEN #8 THW WIRE INSTALLED, AS TRACER WIRE. WHEN "EMPTY" CONDUIT IS COMPLETELY INSTALLED FROM PB TO PB, IT SHALL HAVE MINIMUM OF 2 #4 AND 1 #8 THW WIRE WITH THE ENDS TAPED OR "SAFE OFF" PRIOR TO FINAL INSPECTION.
5. ANY STRUCTURE SUCH AS BLOCK WALLS, CHAIN LINK FENCES, RETAINING WALLS, ETC., SHALL LEAVE A MINIMUM CLEARANCE IN ACCORDANCE WITH THE USD NO. 320A.
6. AS-BUILT DRAWINGS SHALL BE SUPPLIED TO THE TEFO PRIOR TO ANY PRE-FINAL INSPECTION. THE AS-BUILT DRAWING NEEDS TO BE STAMPED AS-BUILT AND SIGNED BY THE PREPARER.
7. SERVICE POINT SHALL BE COORDINATED WITH NV ENERGY COMPANY, AND WHEREVER POSSIBLE, BE LOCATED NEAR THE CENTER OF THE CIRCUIT. SERVICE POINTS SHALL BE SHOWN ON THE CIVIL PLANS.
8. IT SHALL BE ASSUMED THAT IN THE ABSENCE OF AN EXISTING, WORKABLE CIRCUIT TO ATTACH TO, ALL INSTALLATIONS SHALL REQUIRE A NEW SERVICE FOR OPERATION OF THE CIRCUIT.
9. WHEREVER THERE IS AN OVERHEAD UTILITY THAT MAY CONFLICT WITH THE INSTALLATION OF STREET LIGHTING CIRCUITS AND/OR POLES, THESE CONFLICTS MUST BE RESOLVED BETWEEN THE DEVELOPER AND THE UTILITIES INVOLVED, AT NO EXPENSE TO THE CITY OF LAS VEGAS, BEFORE STREETLIGHT BASES ARE INSTALLED.
10. THE CONTRACTOR SHALL FURNISH COMPLETE SERVICE TO TRANSFORMERS AND CONTROL SYSTEMS IF REQUIRED ON PLANS.
11. THE DEVELOPER/OWNER WILL BE REQUIRED TO SUPPLY POWER TO ALL NEW PUBLIC STREET LIGHTS INSTALLED UNDER THIS DESIGN PRIOR TO BOND RELEASE OR PROJECT COMPLETION. THE DEVELOPER/OWNER WILL BE RESPONSIBLE FOR ALL ITEMS ASSOCIATED WITH THE INSTALLATION, CONSTRUCTION, ENERGIZING, MAINTENANCE AND OPERATIONAL COST OF SAID STREET LIGHTS PRIOR TO PROJECT COMPLETION. REFER TO THE PLAN FOR ANY NEW SERVICE REQUIREMENTS. THE TRANSFER OF OWNERSHIP FROM THE DEVELOPER/OWNER TO THE CITY OF LAS VEGAS FOR ALL NEW PUBLIC STREET LIGHT/S AND/OR SERVICE/S INSTALLED UNDER THIS PLAN DESIGN WILL BE IN CONJUNCTION WITH THIS PROJECT COMPLETION. COORDINATE ALL MAINTENANCE AND OPERATIONAL TRANSFERS WITH THE CITY OF LAS VEGAS TRAFFIC ENGINEERING DEPARTMENT (TEFO) AT (702) 229-6331.

REVISED 04/15/10

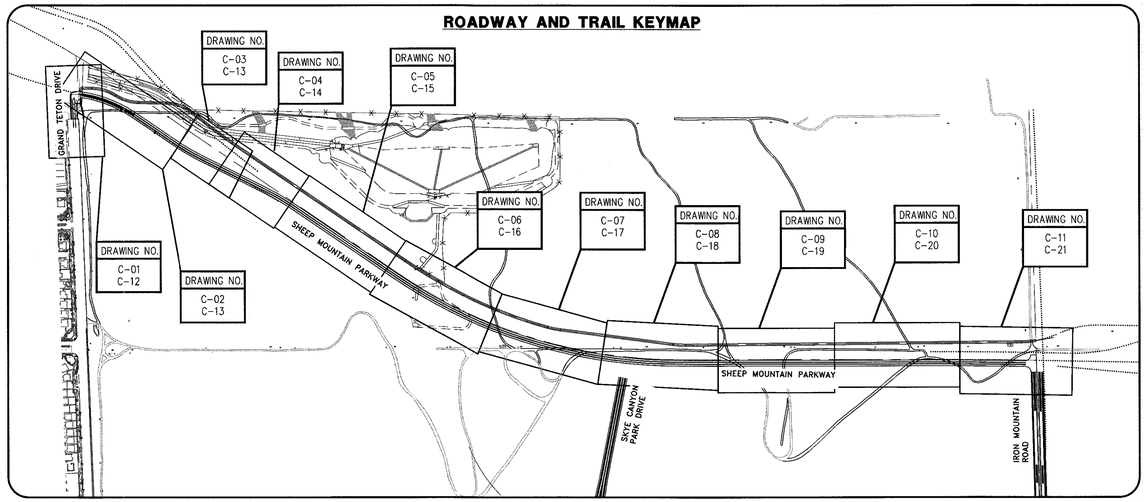
LAS VEGAS FIRE AND RESCUE GENERAL NOTES

1. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE LAS VEGAS FIRE AND RESCUE ADOPTED FIRE CODE ORDINANCE # 6325 FOR HYDRANT SPECIFICATIONS AND HYDRANT INSTALLATION SPECIFICATIONS.
2. ONLY FIRE HYDRANTS THAT ARE ON THE LAS VEGAS VALLEY WATER DISTRICT'S– APPROVED PRODUCTS LIST ARE ALLOWED TO BE INSTALLED.
3. A PERMIT IS REQUIRED FROM LAS VEGAS FIRE AND RESCUE FOR THE INSTALLATION OF ON–SITE WATER LINES AND FIRE HYDRANTS. THE PERMIT AND CONTRACTORS MATERIAL TEST CERTIFICATE FOR UNDERGROUND PIPING FORM SHALL BE OBTAINED FROM THE FIRE PROTECTION ENGINEER BEFORE COMMENCEMENT OF WORK. [IFC § 105.7.12]
4. ON ANY RESIDENTIAL OR COMMERCIAL INSTALLATIONS, FIRE HYDRANTS SHALL BE INSTALLED AND FIRE APPARATUS ACCESS ROADS SHALL BE MAINTAINED BEFORE COMMENCEMENT OF ANY COMBUSTIBLE CONSTRUCTION. ALL FIRE HYDRANTS SHALL BE IN GOOD WORKING ORDERAND SHALL BE CAPABLE OF DELIVERING THE REQUIRED FIRE FLOW. [IFC § 3310, § 3312]
5. TO IDENTIFY THE FIRE HYDRANT LOCATIONS, THE CONTRACTOR SHALL PLACE A BLUE REFLECTIVE MARKER AT THE CENTER LINE OF THE STREET ADJACENT TO THE FIRE HYDRANTS. [IFC § 507.5.7.3]
6. ALL UNDERGROUND INSPECTIONS, PRESSURE AND FLUSH VERIFICATIONS OF ALL FIRE HYDRANTS AND FIRE LINES, SHALL BE CONDUCTED BEFORE COVERING THE LINES. CENTER LOADING IS ACCEPTABLE FOR THE HYDRO TESTS WITH PRIOR FIRE PREVENTION APPROVAL. [IFC § 106.3]
7. ALL ON–SITE UNDERGROUND WATER MAINS AND MATERIALS SHALL BE U.L. LISTED, A.W.W.A APPROVED AND SHALL BE RATED FOR THE APPROPRIATE WORKING PRESSURE. [IFC § 507.2.1, NFPA 24]
8. PAINTING OF CURBS, FIRE HYDRANTS, PADS, PROTECTION OF FIRE HYDRANTS FROM PHYSICAL DAMAGE, AND ALL OTHER WORK NECESSARYPER PLANS SHALL BE COMPLETED BEFORE APPROVAL BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION. [IFC § 507]
9. PRIVATE HYDRANTS SHALL BE PAINTED RED. [IFC § 507.5.7.1]
10. PRIOR TO THE FINAL OCCUPANCY, A FIRE FLOW TEST SHALL BE WITNESSED BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION TO VERIFY AVAILABILITY OF THE REQUIRED FIRE FLOW. [IFC § 507]
11. FIRE HYDRANT SPACING SHALL BE AS FOLLOWS; [IFC § C102]
    ·RESIDENTIAL –500 FT UNSPRINKLERED; 600 FT SPRINKLERED.
    ·COMMERCIAL –300 FT UNSPRINKLERED; 400 FT SPRINKLERED.
12. WHERE THE WATER MAINS ARE EXTENDED ALONG STREETS OR NEW STREETS ARE INSTALLED WHERE FIRE HYDRANTS ARE NOT NEEDED FOR PROTECTION OF THE STRUCTURES, FIRE HYDRANTS SHALL BE INSTALLED AT A MAXIMUM OF 1000 FT SPACING, TO PROVIDE FOR TRANSPORTATION HAZARDS. WHERE STREETS ARE PROVIDED WITH MEDIAN DIVIDERS OR HAVE FOUR (4) OR MORE TRAFFIC LANES AND HAVE A TRAFFIC COUNT OF MORE THAN 30,000 PER DAY, HYDRANTS ARE REQUIRED ON EACH SIDE OF THE STREET SPACED AT 500 FT ON AN ALTERNATING BASIS. [IFC § C102.8]
13. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN THE RADIUS OF A CUL–DE–SAC OR WITHIN 20 FT OF THE PERIMETER OF THE RADIUS OF THE CUL–DE–SAC.
14. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN 6 FT OF ANY CURB RETURN, DRIVEWAY, POWER POLE, STREETLIGHT OR ANY OTHER OBSTRUCTION. [IFC § C102.12]
15. A MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A ONE–TWO FAMILY DWELLING SHALL NOT EXCEED 300 FT, AS MEASURED BY AN APPROVED ROUTE. [IFC § C102.4]
16. THE MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A FIRE DEPARTMENT CONNECTION (FDC) SHALL NOT EXCEED 100 FT, AS MEASURED BY AN APPROVED ROUTE. [IFC § C102.7]
17. THE MAXIMUM DISTANCE FROM A HYDRANT TO THE END OF A DEAD–END STREET SHALL NOT EXCEED 200 FT. [IFC § C102.6]
18. TWO (2) SOURCES OF SUPPLY ARE REQUIRED WHENEVER THERE IS 4 OR MORE FIRE HYDRANTS/SPRINKLER LEAD–INS ARE INSTALLED ON A SINGLE SYSTEM. SECTIONAL CONTROL VALVES SHALL BE PLACED SO THAT NO MORE THAN 2 FIRE HYDRANTS CAN BE OUT OF SERVICE DUE TO A BREAK IN A WATER MAIN. [IFC § C104]
19. ALL FIRE APPARATUS ACCESS ROADS SHALL BE PAVED TO PROVIDE ALL–WEATHER DRIVING CAPABILITIES, AND SHALL BE DESIGNED AND MAINTAINED TO SUPPORT THE IMPOSED LOADS OF THE FIRE APPARATUS. [IFC § 503.2.3]
20. THE GRADIENT FOR THE FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 12% ANGLES OF APPROACH AND ANGLES OF DEPARTURE SHALL NOT EXCEED 6% FOR 25 FT PRIOR TO OR AFTER THE GRADE CHANGE. ADJACENT TO THE STRUCTURES GRADIENT SHALL NOT EXCEED 6% [IFC § 503.2.7, § 503.2.8]
21. THE TURNING RADIUS OF THE FIRE APPARATUS ACCESS ROADS SHALL BE NO LESS THAN 52 FT OUTSIDE AND 28 FT INSIDE TURNING RADIUS. [IFC § 503.2.4]
22. VERTICAL CLEARANCE OF ALL FIRE APPARATUS ACCESS ROADS SHALL NOT BE LESS THAN 13FT 6 INS. [IFC § 503.2.1]
23. FIRE DEPARTMENT ACCESS ROADS SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF NOT LESS THAN 40 FT FLOW LINE TO FLOW LINE WITH PARALLEL PARKING PERMITTED ON BOTH SIDES. NOT LESS THAN 32 FT WIDE, FLOW–LINE TO FLOW–LINE, WHERE PARKING IS PERMITTED ONLY ON ONE SIDE OF THE FIRE APPARATUS ACCESS ROAD. NOT LESS THAN 24 FT WIDE, FLOW–LINE TO FLOW–LINE, WHERE NO PARKING IS PERMITTED ON EITHER SIDE. FIRE LANES THROUGH PARKING LOTS SHALL BE NOT LESS THAN 24 FT. [IFC § 503.2.1.1]
24. A FIRE APPARATUS ACCESS ROAD SHALL BE REQUIRED WHEN ANY PORTION OF AN EXTERIOR WALL OF THE FIRST STORY IS LOCATED MORE THAN 150 FT FROM A FIRE DEPARTMENT VEHICLE ACCESS. THIS DISTANCE COULD BE INCREASED TO 250 FT IF THE BUILDING IS SPRINKLERED. [IFC § 503.1.1]
25. APPROVED SECONDARY FIRE APPARATUS ACCESS SHALL BE PROVIDED FOR 100 OR MORE DWELLING UNITS, ROAD(S) WITH DEAD–ENDS OR WITH A SINGLE POINT OF ACCESS IN EXCESS OF 600 FT. COMMERCIAL AND INDUSTRIAL DEVELOPMENTS WHERE BUILDINGS EXCEED 2 STORIES OR 30 FEET IN HEIGHT, OR EXCEEDING 62,000 SQUARE FEET IN AREA. [IFC § 503.1.2]
26. ALL DEAD–END FIRE APPARATUS ROADS AND/OR FIRE LANES, PUBLIC OR PRIVATE, IN EXCESS OF 150 FT IN LENGTH SHALL BE PROVIDED WITH AN APPROVED TURN AROUND HAVING A MINIMUM DIAMETER OF 81 FT. [IFC § 503.2.5]
27. ALL FIRE APPARATUS ACCESS ROADS SHALL BE MARKED BY PLACING APPROVED SIGNS AT THE START OF THE DESIGNATED FIRE LANE, ONE SIGN AT THE END OF THE FIRE LANE AND WITH SIGNS AT INTERVALS OF 100 FT ALONG THE DESIGNATED FIRE LANES. SIGNS TO BE PLACED ON BOTH SIDES OF AN ACCESS ROADWAY IF NEEDED TO PREVENT PARKING ON EITHER SIDE. SIGNS TO BE INSTALLED NO HIGHER THAN 10 FT OR LESS THAN 6 FT FROM THE ROADWAY LEVEL. THE

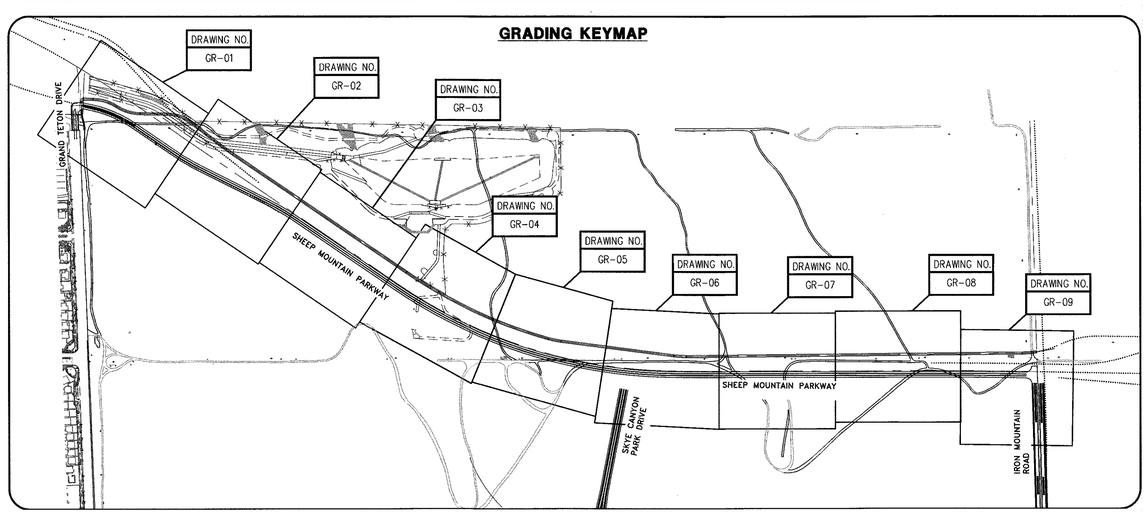
LEGEND

— — —TEL 5-4"— — —	EXISTING TELEPHONE CABLE
— — —12" SS— — —	EXISTING SANITARY SEWER LINE
— — —12" W— — —	EXISTING WATER LINE
— — —18" SD— — —	EXISTING STORM DRAIN LINE
	EXISTING STORM DRAIN (SIZE PER PLAN)
—— ——ELE UG 1-4"—— ——	EXISTING UNDERGROUND ELECTRICAL LINE
— — —OHP— — —	EXISTING OVERHEAD POWER LINE
— — —OHP/TEL— — —	EXISTING OVERHEAD POWER AND TELEPHONE LINE
— — —4" PE GAS— — —	EXISTING GAS LINE
—— ——CATV—— —— ——	EXISTING CABLE TELEVISION LINE
	EXISTING CURB & GUTTER
	EXISTING RIGHT-OF-WAY LINE
	EXISTING PROPERTY LINE
——x——x——x——	EXISTING CHAIN-LINK FENCE
SL	EXISTING STREET LIGHT CONDUIT
MH	EXISTING MANHOLE OR VAULT
	EXISTING VALVE (GAS OR WATER)
FH	EXISTING FIRE HYDRANT
PP	EXISTING POWER OR TELEPHONE POLE
	EXISTING PADMOUNTED SERVICE PEDESTAL
	EXISTING NV ENERGY TRANSFORMER
	EXISTING SWING GATE
	CENTERLINE
	EASEMENT LINE
	AEP
	PROPOSED SIGN
	MAINTENANCE ACCESS PATH
	CONCRETE OR PAVED SURFACE
	RIPRAP
	FLOWLINE
	SAWCUT LINE
1875	CONTOUR LINE
12.3 TC	ELEVATION
D	STORM DRAIN MANHOLE
S	SANITARY SEWER MANHOLE
	100 WATT STREET LIGHT
	250 WATT STREET LIGHT
—— — —4" ITS— ——	FAST ITS CONDUIT
	FAST P30 PULLBOX
	FAST TYPE 200 SPLICE VAULT
	EXISTING STREET LIGHT
	EXISTING ON-SITE LIGHT

ROADWAY AND TRAIL KEYMAP



GRADING KEYMAP



QUANTITIES

DESCRIPTION	UNIT	TOTAL QUANTITY
8" SEWER	LF	"_"
SEWER MANHOLE 6 TO 18 FEET	EA	"_"
SEWER MANHOLE > 18'	EA	"_"
8" PVC WATER MAIN	LF	"_"
8" PVC WATER LATERAL	LF	"_"
8" DIP WATER LATERAL	LF	"_"
10" PVC WATER MAIN	LF	"_"
10" DIP WATER MAIN	LF	"_"
10" DIP WATER LATERAL	LF	"_"
8" GATE VALVE	EA	"_"
10" GATE VALVE	EA	"_"
8" 45° BEND	EA	"_"
8" 5° BEND	EA	"_"
8" X 8" TEE	EA	"_"
10" 45° BEND	EA	"_"
10" 5° BEND	EA	"_"
10" X 10" TEE	EA	"_"
CAP WITH 2" BLOW-OFF ASSEMBLY	EA	"_"
FIRE HYDRANT	EA	"_"
16" X 8" REDUCER	EA	"_"
10" X 8" REDUCER	EA	"_"
CURB & GUTTER (TYPE "L" & "A")	LF	"_"
CROSS GUTTER	SF	"_"
SIDEWALK 4"	LF	"_"
SIDEWALK RAMP	EA	"_"
TYPE II GRAVEL BASE	CY	"_"
3" ASPHALTIC CONCRETE PAVING	SY	"_"
4" ASPHALTIC CONCRETE PAVING	SY	"_"
5" ASPHALTIC CONCRETE PAVING	SY	"_"

QUANTITIES

DESCRIPTION	UNIT	TOTAL QUANTITY
24" STORM DRAIN	LF	24'
36" STORM DRAIN	LF	56'
42" STORM DRAIN	LF	70'
48" STORM DRAIN	LF	398'
HEADWALL (STRUCTURAL)	EA	2
NDOT TYPE 2B STORM DRAIN DROP INLET WITH CONCRETE APRON	EA	3
NDOT RCP END SECTION	EA	2
RIPRAP (D50=3", T=6")	SF	1933
RIPRAP (D50=18", T=36")	SF	4000
3" MINUS GRAVEL ACCESS	SF	840
6" THICK CONCRETE MAINTENANCE ACCESS	SF	2865
6" THICK CONCRETE PAD WITH 3-FT DEEP CUTOFF WALL (STRUCTURAL)	SF	1163
3-FT DEEP CUTOFF WALL	LF	317
60" TYPE III STORM DRAIN MANHOLE	EA	1

ABBREVIATIONS

ABUT	ABUTMENT
AC	ALUMINUM CAP/ASPHALTIC CONCRETE
AEP	AUTHORIZATION TO ENTER PROPERTY
AP	ANGLE POINT
APN	ASSESSOR'S PARCEL NUMBER
AVE	AVENUE
BC	BEGIN CURVE/BRASS CAP/BACK OF CURB
BCR	BEGIN CURB RETURN
BLVD	BOULEVARD
BM	BENCHMARK
BOT	BOTTOM
BRG	BEARING
BSW	BACK OF SIDEWALK
BVCE	BEGIN VERTICAL CURVE ELEVATION
BVCS	BEGIN VERTICAL CURVE STATION
CATV	UNDERGROUND CABLE TV
CG	CURB AND GUTTER
CCSD	DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS
CKT	CIRCUIT
CLR	CLEAR/CLEARANCE
CLBM	CITY OF LAS VEGAS BENCHMARK
CLV	CITY OF LAS VEGAS
CMU	CONCRETE MASONRY UNIT
CONC	CONCRETE
℄, C/L	CENTERLINE
COB	CENTER OF BOLLARD
COL	COLUMN
CONST	CONSTRUCT/CONSTRUCTION
COORD	COORDINATE
COR	CORNER
CY	CUBIC YARD(S)
Δ	DELTA
DB	DIRECT BURY
DBL	DOUBLE
DI	DROP INLET
DIA	DIAMETER
DIST	DISTANCE
DR	DRIVE
DW	DRIVEWAY
DWG	DRAWING
ECR	END CURB RETURN
E	EAST
EA	EACH
ESMT	EASEMENT
ECR	END CURB RETURN
ELEC	ELECTRICAL
ELEV/EL	ELEVATION
EP/EOP	EDGE OF PAVEMENT
EQ	EQUAL
EST	ESTIMATED
EVC	END VERTICAL CURVE
EX./EXIST	EXISTING
EXP	EXPANSION JOINT
EW	EACH WAY
FC	FACE OF CURB
FG	FINISH GRADE
FH	FIRE HYDRANT
FL	FLOW LINE
FO	FIBER OPTIC
FS	FINISH SURFACE
FT	FOOT/FEET
FTG	FOOTING
FW	FACE OF WALL
FYA	FLASHING YELLOW ARROW
G	GAS
GA	GAUGE
GB	GRADE BREAK
GND	GROUND
H	HEIGHT
HGL	HYDRAULIC GRADE LINE
HORIZ	HORIZONTAL
HWY	HIGHWAY
INV	INVERT
ITS	INTELLIGENT TRANSPORTATION SYSTEM
JT	JOINT
LF	LINEAR (LINEAL) FEET
LIP	LIP OF GUTTER
LT	LEFT
LUM	LUMINAIRE
LVVWD	LAS VEGAS VALLEY WATER DISTRICT
MAX	MAXIMUM
MH	MANHOLE
MIN	MINIMUM
MLCP	MULTI-LAYERED COMPOSITE PIPE
MOD	MODIFY/MODIFIED
MON	MONUMENT
MPH	MILES PER HOUR
N	NORTH
NDOT	NEVADA DEPARTMENT OF TRANSPORTATION
NO	NUMBER
NVE	NV ENERGY
NTS	NOT TO SCALE
OC	ON CENTER
OHP	OVERHEAD POWER LINE
PAT	PATENT
PB	PULL BOX
PBS	PLANTMIX BITUMINOUS SURFACE
PC	POINT OF CURVE, PHOTO CELL
PCC	POINT OF COMPOUND CURVE
PD	PONDING DEPTH
PE	PROJECT ENGINEER/POLYETHYLENE
PED	PEDESTRIAN
PG	PROFILE GRADE (FG ON CONTROL LINE)
PGL	PROFILE GRADE LINE
PH	POTHOLE
PI	POINT OF INTERSECTION
PKWY	PARKWAY
PL	PROPERTY LINE
PMF	PAVEMENT MARKING FILM
POB	POINT OF BEGINNING
POC	POINT ON CURVE
POE	POINT OF ENDING
POT	POINT ON TANGENT
PP	POWER POLE
PPCBR	PORTABLE PRECAST CONCRETE BARRIER RAIL
PPM	POLYUREA PAVEMENT MARKINGS
PR	PAIR
PROP	PROPOSED
PRC	POINT OF REVERSE CURVE
PRVC	POINT REVERSE VERTICAL CURVE
PSI	POUNDS PER SQUARE INCH
PT	POINT OF TANGENCY
PVI	POINT OF VERTICAL INTERSECTION
PVMT	PAVEMENT
R	RADIUS
RCB	REINFORCED CONCRETE BOX
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
RDWY	ROADWAY
REC	RECTANGULAR
REINF	REINFORCED
REQD	REQUIRED
RND	ROUND
RP	RADIUS POINT
RPM	RAISED PAVEMENT MARKERS
R/W	RIGHT-OF-WAY
RT	RIGHT
S	SOUTH
SCH	SCHEDULE
SD	STORM DRAIN
SDMH	STORM DRAIN MANHOLE
SECT	SECTION
SF	SQUARE FOOT/FEET
SHLDR	SHOULDER
SHT	SHEET
SIM	SIMILAR
SP	SERVICE POINT
SPA	SPACING
SQ	SQUARE
SS	SANITARY SEWER
SSMH	SANITARY SEWER MANHOLE
STA	STATION
STD	STANDARD
ST	STREET
STL	STEEL
SL	STREET LIGHT
STRUCT	STRUCTURE
SW	SIDEWALK
SNBORS	SOUTHERN NEVADA BUILDING OFFICIALS
	REGIONAL STANDARDS
SWG	SOUTHWEST GAS
T	TELEPHONE/TOP
TAN	TANGENT
TC	TOP OF CURB
TEMP	TEMPORARY
TF	TOP OF FOOTING
TG	TOP OF GRATE
TMH	TOP OF MANHOLE
TRANS	TRANSITION STRUCTURE
THW	TOP OF HEADWALL
TRW	TOP OF RETAINING WALL
TW	TOP OF WALL
TS	TRAFFIC SIGNAL
TYP	TYPICAL
UDACS	UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR WATER DISTRIBUTION SYSTEMS
USDCCA	UNIFORM STD. DRAWINGS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS CLARK COUNTY AREA, NEVADA
UT	UNDERGROUND TELEPHONE
VAR	VARIABLE/VARIES
VC	VERTICAL CURVE
VERT	VERTICAL
VG	VALLEY GUTTER
W	WEST
WY	WAY
WT	WEIGHT
XING	CROSSING

ALIGNMENT ABBREVIATIONS

"GTD"	GRAND CANYON DRIVE
"GTRB"	GRAND TETON RAMP B
"SMP"	SHEEP MOUNTAIN PARKWAY
"TRL"	TRAIL
"IM"	IRON MOUNTAIN ROAD

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5748 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

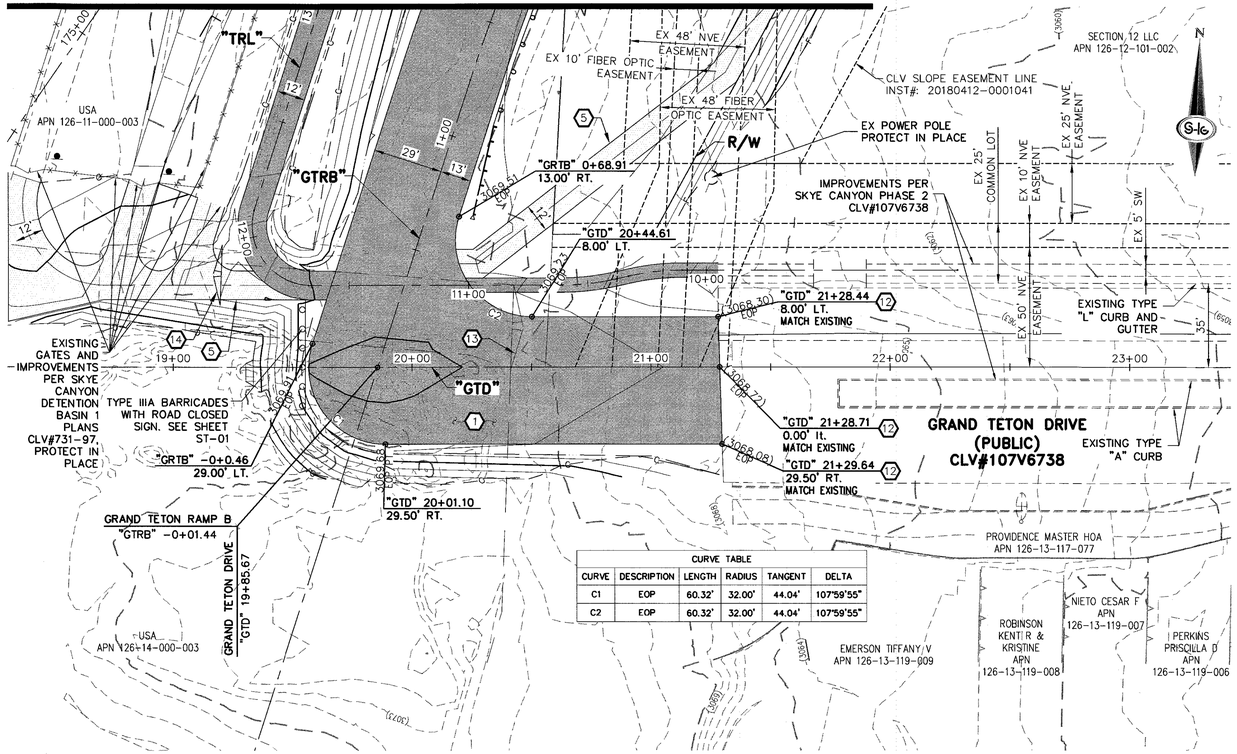
ABBREVIATIONS, KEY MAP, LEGEND AND QUANTITIES

DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO. OLY1720.000

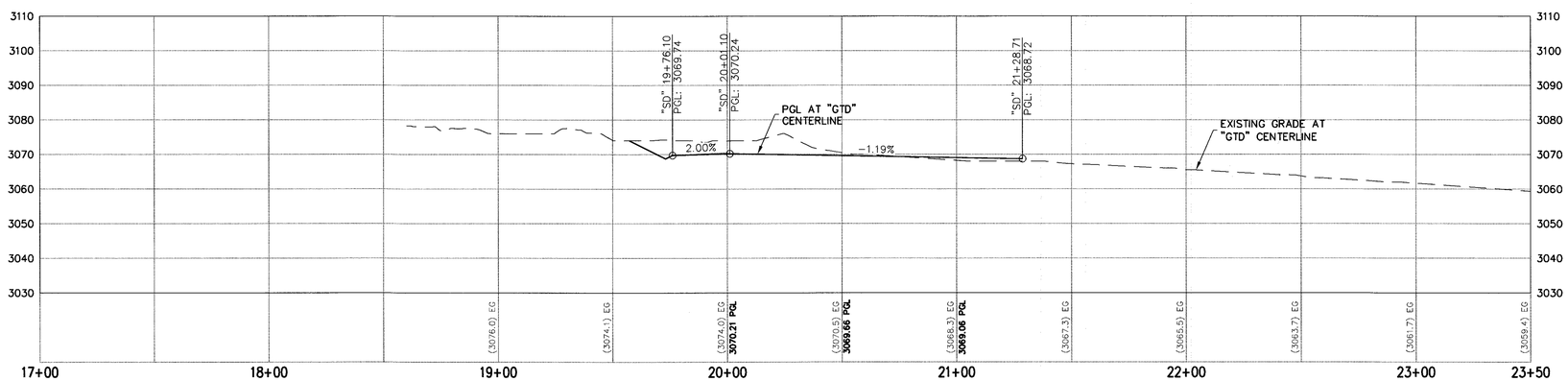
PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY J. SLATER
Exp. 06/30/2020
CIVIL
No. 14167
7/16/18

G-03
SHEET 3 OF 50
DWG NO. _____
HANSEN NO. _____

SEE SHEET C-02



CURVE TABLE					
CURVE	DESCRIPTION	LENGTH	RADIUS	TANGENT	DELTA
C1	EOP	60.32'	32.00'	44.04'	107°59'55"
C2	EOP	60.32'	32.00'	44.04'	107°59'55"



CONSTRUCTION NOTES

1. CONSTRUCT OVER 3-INCH PBS OVER 4-INCH TYPE II AGGREGATE BASE (SEE TY-SHEETS FOR TYPICAL SECTIONS)
2. SAWCUT AND MATCH EXISTING CONCRETE ACCESS ROAD
3. INSTALL GUARDRAIL (TRIPLE CORRUGATION) (NDOT STD. PLAN R-8.4.1)
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7. CONSTRUCT 3-FOOT DEEP CONCRETE CUTOFF WALL (DETAIL 4, SHEET TY-02)
8. INSTALL CHAINLINK FENCE (USDCCA STD. DWG. 252)
9. INSTALL 12-FOOT WIDE CHAINLINK GATE
10. ADJUST EXISTING CABLE VAULT TO FINISH GRADE
11. ADJUST EXISTING POWER VAULT TO FINISH GRADE
12. SAWCUT AND MATCH EXISTING PAVEMENT
13. RELOCATE EXISTING GATE
14. REINSTALL GATE ON NEW CONCRETE FOUNDATIONS TO MATCH EXISTING FOUNDATIONS

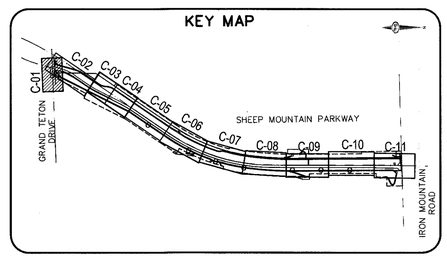
NOTES

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2. SEE SD-SHEETS FOR STORM PROFILES.
3. SEE UT-SHEETS FOR WATER AND SEWER PLAN AND PROFILES.
4. SEE GR-SHEETS FOR GRADING AND STORM DRAIN PLAN.

LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



SCALE 30 0 30 60 FEET

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FAST Call before you UnderGround. 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "GTD" 17+00.00 TO "GTD" 23+50.00

DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

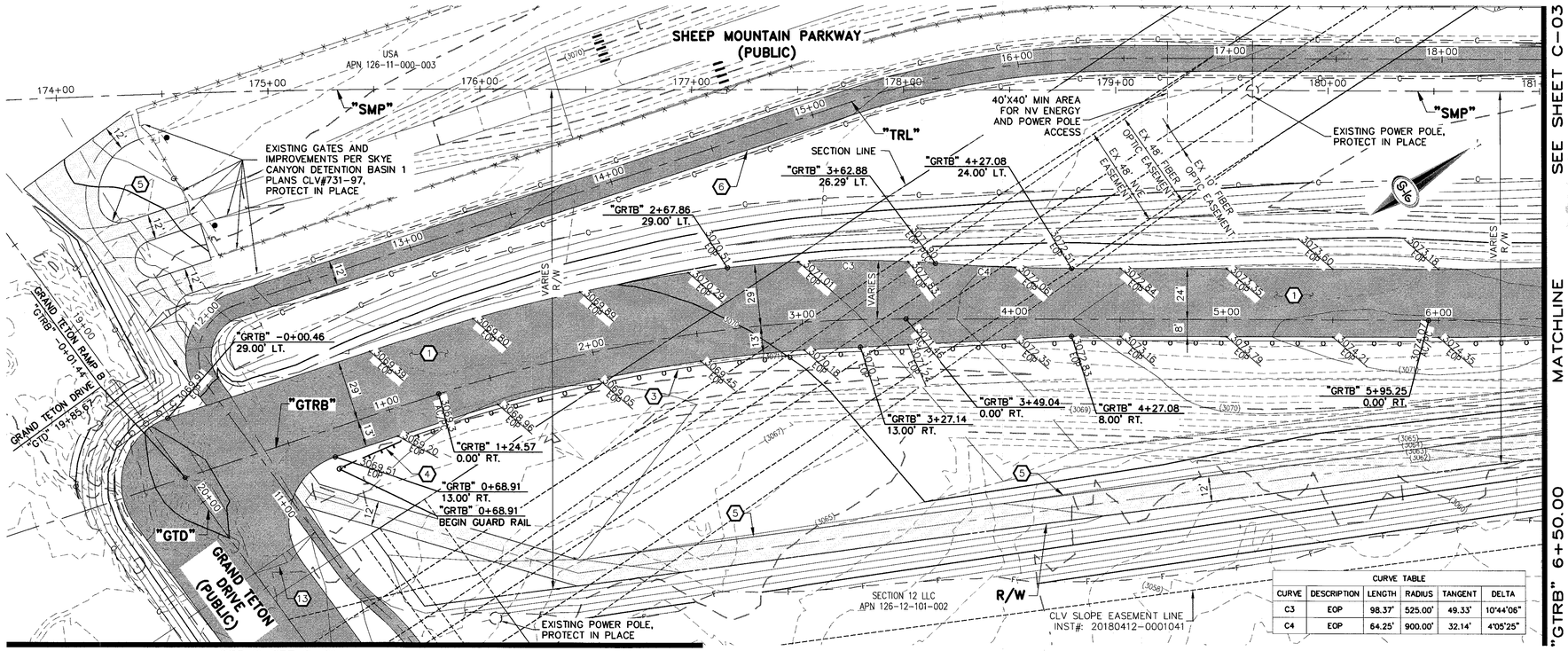
PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER STATE OF NEVADA JERRY J. SLATER Exp. 06/30/2020 CIVIL No. 14167

C-01
SHEET 4 OF 50

DWG NO. _____

HANSEN NO. _____



CURVE TABLE					
CURVE	DESCRIPTION	LENGTH	RADIUS	TANGENT	DELTA
C3	EOP	98.37'	525.00'	49.33'	10°44'06"
C4	EOP	64.25'	900.00'	32.14'	4°05'25"

CONSTRUCTION NOTES

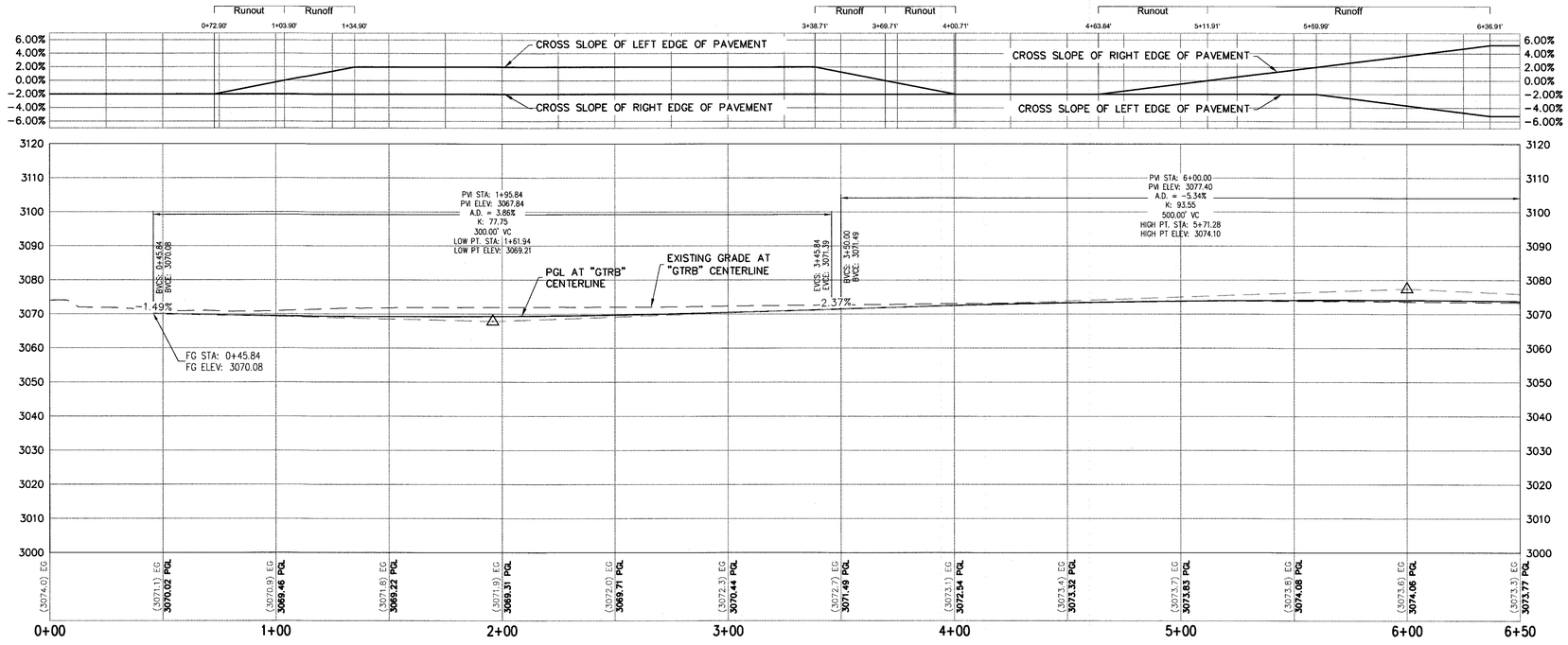
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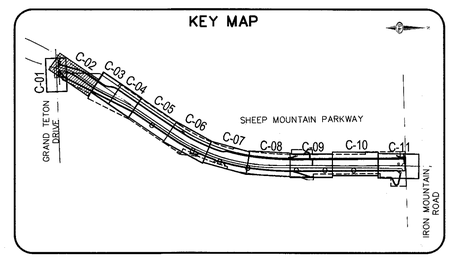
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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH





30 0 30 60
SCALE FEET

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "GTRB" 0+00.00 TO "GTRB" 6+50.00

DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

PROJECT NO.
OLY1720.000

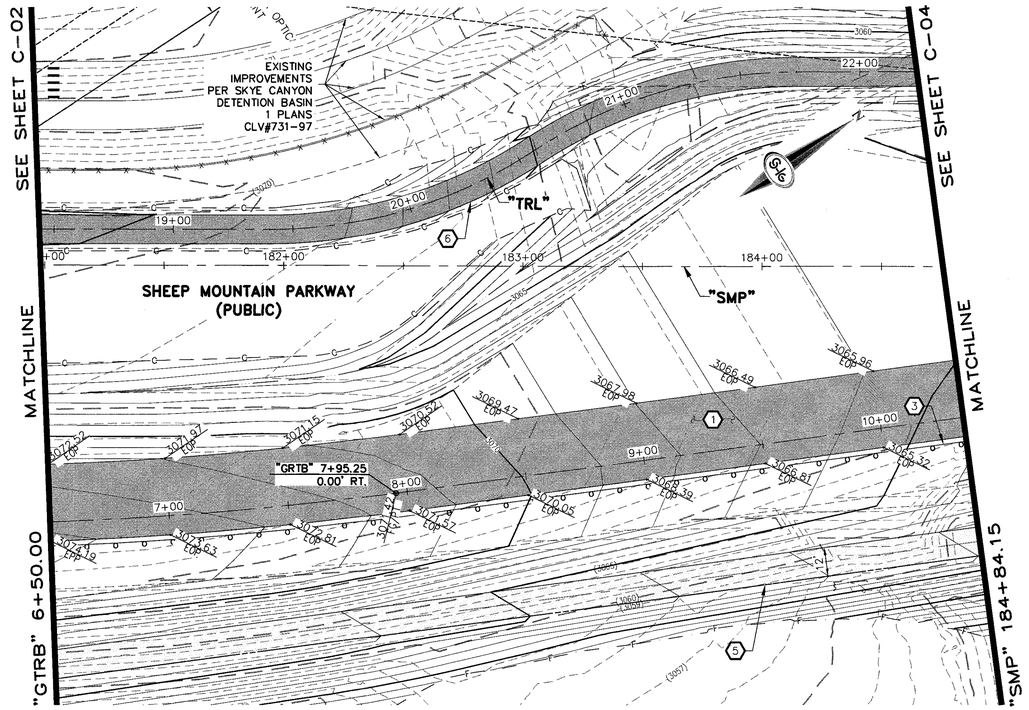
PROFESSIONAL ENGINEER - STATE OF NEVADA - JERRY C. SLATER - Exp. 06/30/2020 - CIVIL - No. 14167

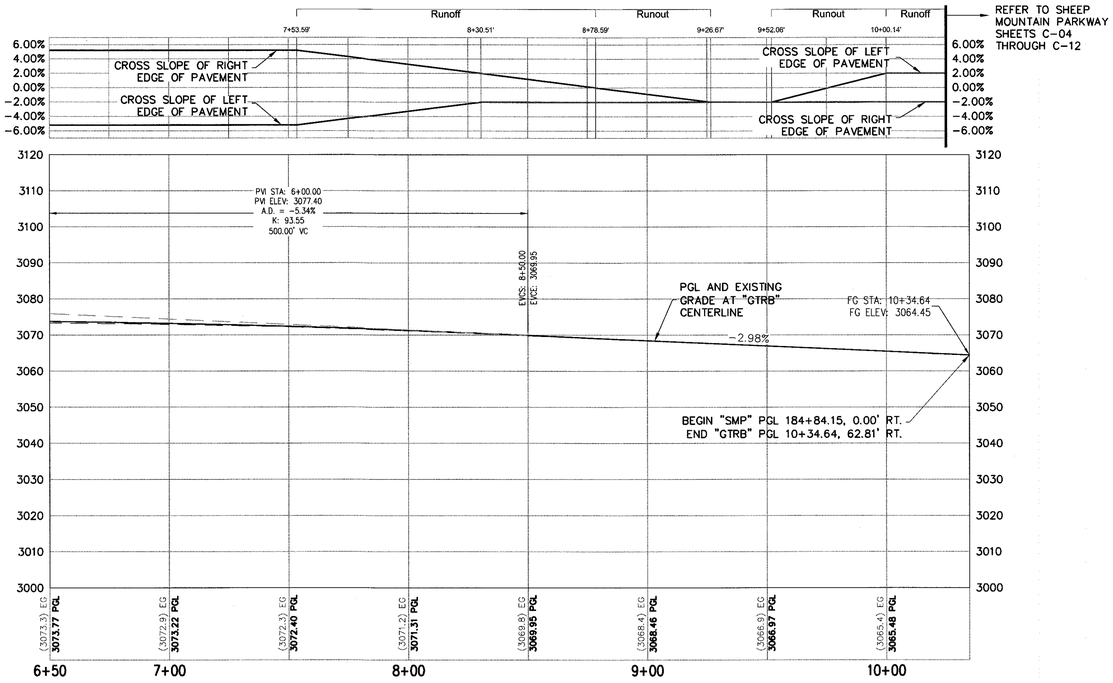
7/16/18

C-02
SHEET 5 OF 50

DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

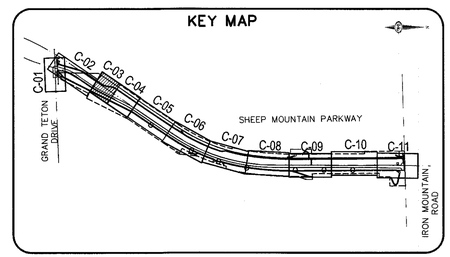
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PHONE (702) 284-5300 FAX (702) 284-5390

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

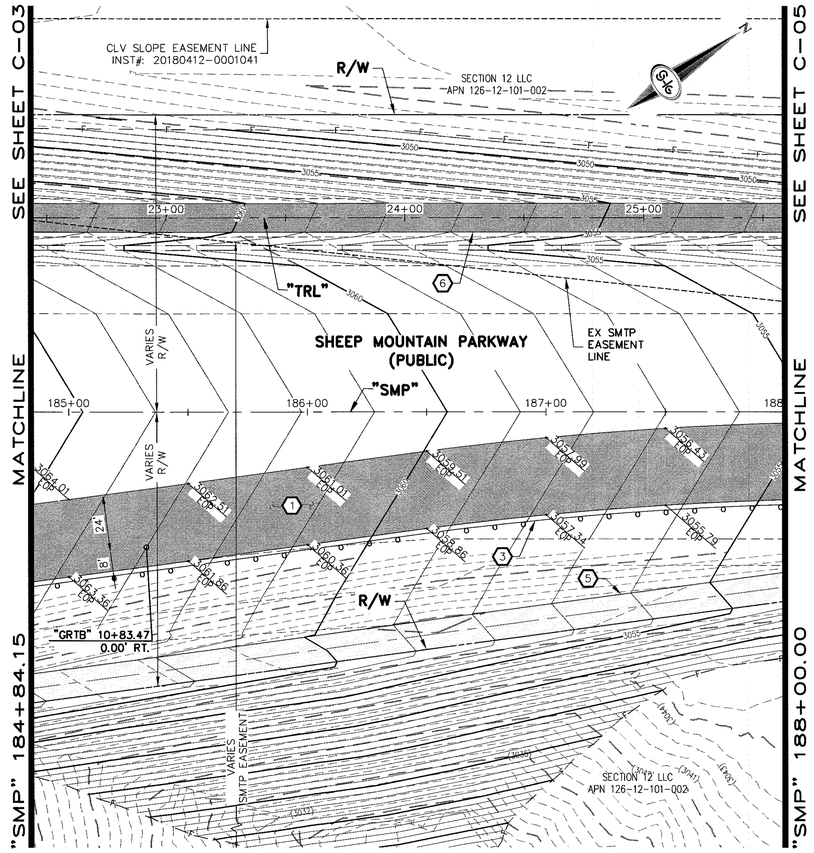
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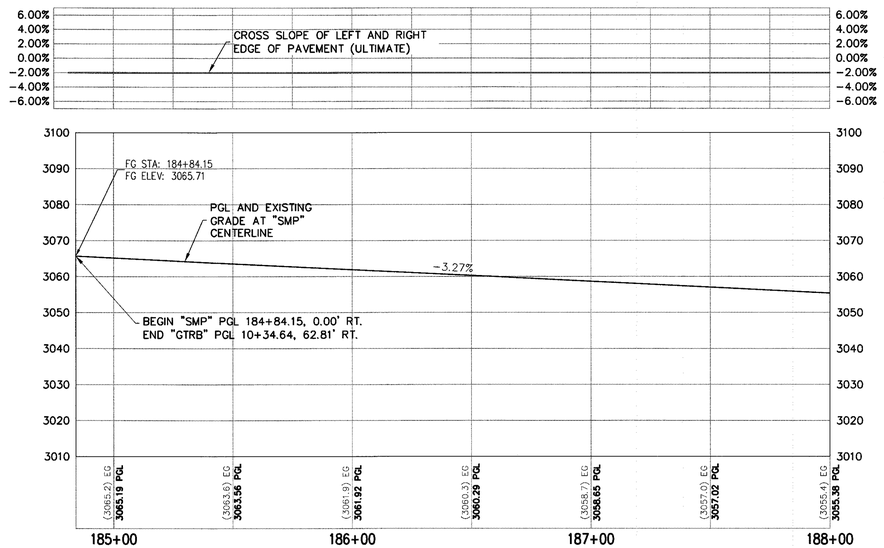
DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO. OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY D. SLATER
Exp: 06/30/2020
CIVIL
No. 14167

C-03
SHEET 6 OF 50
DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

1. CONSTRUCT OVER 3-INCH PBS OVER 4-INCH TYPE II AGGREGATE BASE (SEE TY-SHEETS FOR TYPICAL SECTIONS)
2. SAWCUT AND MATCH EXISTING CONCRETE ACCESS ROAD
3. INSTALL GUARDRAIL (TRIPLE CORRUGATION) (NDOT STD. PLAN R-8.4.1)
4. INSTALL TANGENT END TERMINAL FOR GUARDRAIL (NDOT STD. PLAN R-8.1.1)
5. CONSTRUCT 12-FOOT WIDE MINIMUM ACCESS ROAD (DETAIL 3, SHEET TY-02)
6. CONSTRUCT 2-INCH PBS SIDEWALK OVER 4-INCH TYPE II AGGREGATE BASE (SEE SHEETS C-12 THROUGH C-21 FOR PLAN AND PROFILE)
7. CONSTRUCT 3-FOOT DEEP CONCRETE CUTOFF WALL (DETAIL 4, SHEET TY-02)
8. INSTALL CHAINLINK FENCE (USDCCA STD. DWG. 252)
9. INSTALL 12-FOOT WIDE CHAINLINK GATE
10. ADJUST EXISTING CABLE VAULT TO FINISH GRADE
11. ADJUST EXISTING POWER VAULT TO FINISH GRADE
12. SAWCUT AND MATCH EXISTING PAVEMENT
13. RELOCATE EXISTING GATE
14. REINSTALL GATE ON NEW CONCRETE FOUNDATIONS TO MATCH EXISTING FOUNDATIONS

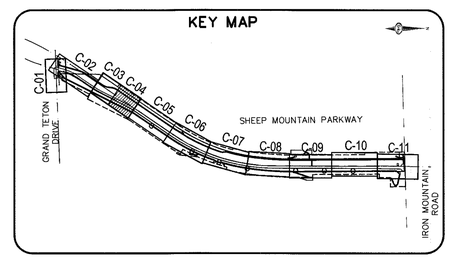
NOTES

1. SEE TY-SHEETS FOR TYPICAL SECTIONS.
2. SEE SD-SHEETS FOR STORM PROFILES.
3. SEE UT-SHEETS FOR WATER AND SEWER PLAN AND PROFILES.
4. SEE GR-SHEETS FOR GRADING AND STORM DRAIN PLAN.

LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



30 0 30 60
SCALE FEET

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD 1-702-227-2929

FAST Call before you UnderGround. 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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

SLATER HANIFAN GROUP
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "SMP" 184+84.15 TO "SMP" 188+00.00

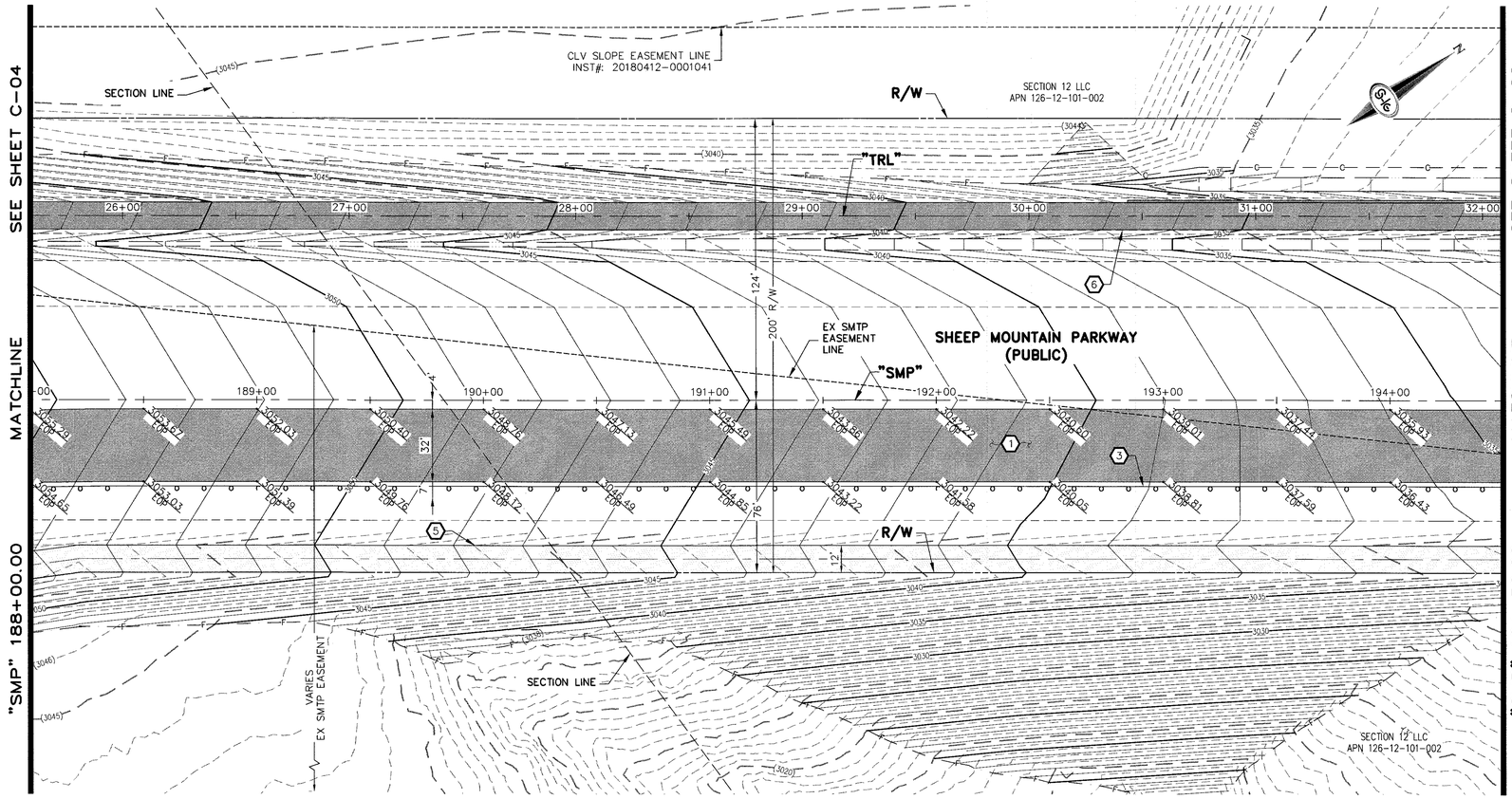
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CHECKED: JSR
PROJECT NO. OLY1720.000

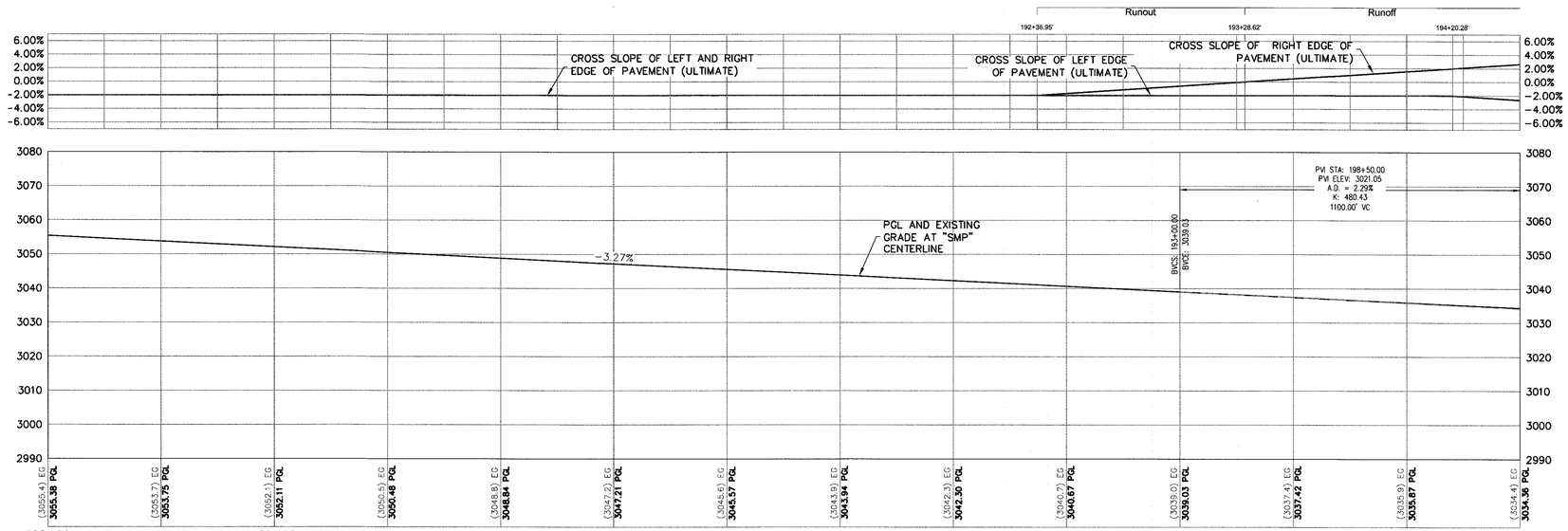
PROFESSIONAL ENGINEER - STATE OF NEVADA - JERRY R. SLATER - Exp. 06/30/2020 - CIVIL - No. 14167

7/16/18

C-04
SHEET 7 OF 50
DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

1. CONSTRUCT OVER 3-INCH PBS OVER 4-INCH TYPE II AGGREGATE BASE (SEE TY-SHEETS FOR TYPICAL SECTIONS)
2. SAWCUT AND MATCH EXISTING CONCRETE ACCESS ROAD
3. INSTALL GUARDRAIL (TRIPLE CORRUGATION) (NDOT STD. PLAN R-8.4.1)
4. INSTALL TANGENT END TERMINAL FOR GUARDRAIL (NDOT STD. PLAN R-8.1.1)
5. CONSTRUCT 12-FOOT WIDE MINIMUM ACCESS ROAD (DETAIL 3, SHEET TY-02)
6. CONSTRUCT 2-INCH PBS SIDEWALK OVER 4-INCH TYPE II AGGREGATE BASE (SEE SHEETS C-12 THROUGH C-21 FOR PLAN AND PROFILE)
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14. REINSTALL GATE ON NEW CONCRETE FOUNDATIONS TO MATCH EXISTING FOUNDATIONS

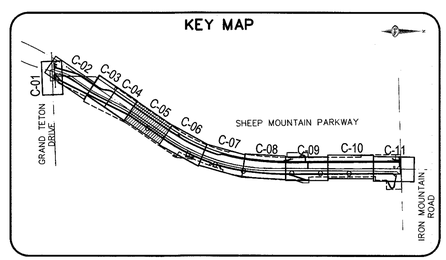
NOTES

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3. SEE UT-SHEETS FOR WATER AND SEWER PLAN AND PROFILES.
4. SEE GR-SHEETS FOR GRADING AND STORM DRAIN PLAN.

LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



SCALE 30 0 30 60 FEET

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "SMP" 188+00.00 TO "SMP" 194+50.00

DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

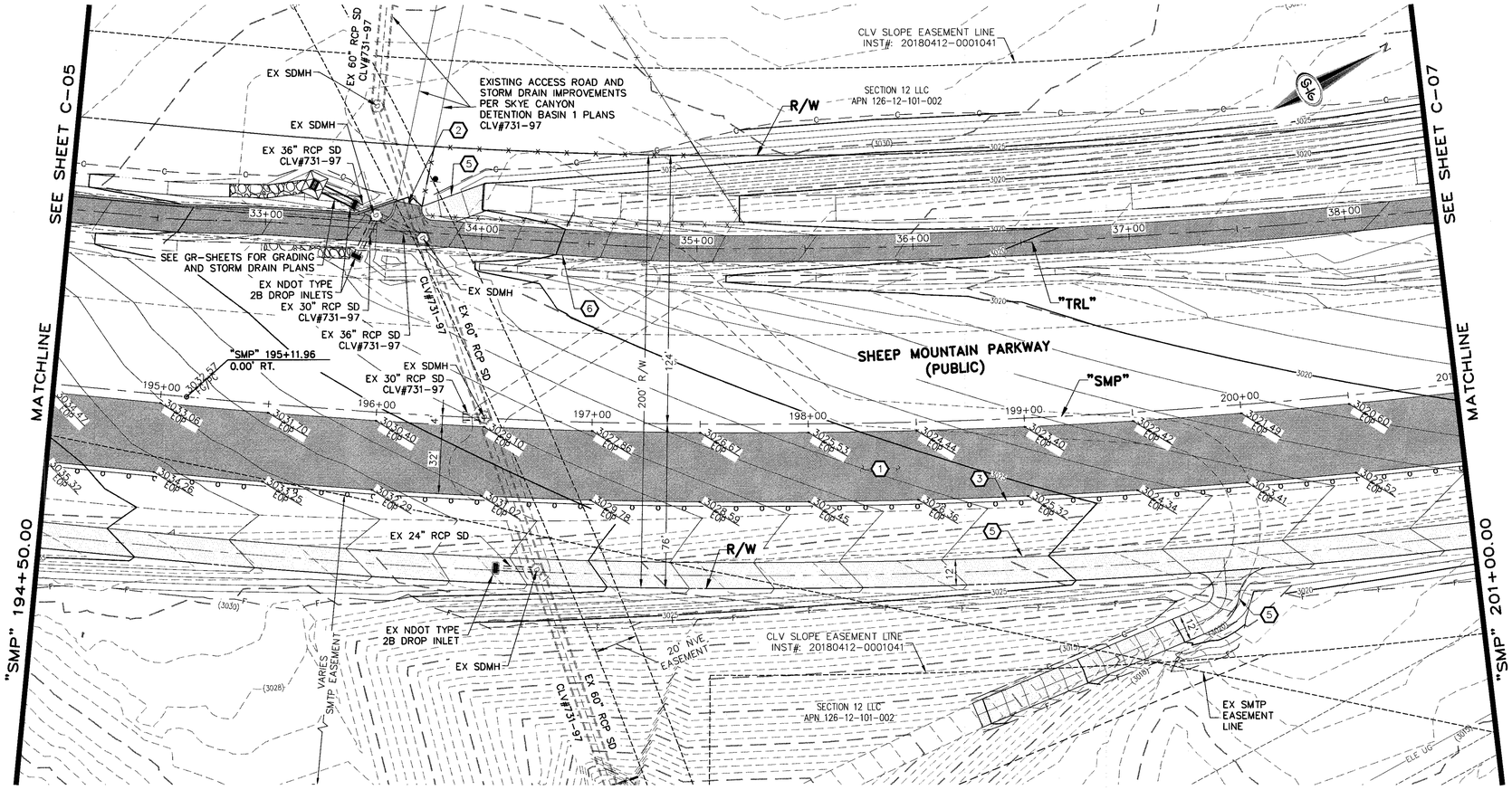
PROJECT NO.
OLY1720.000

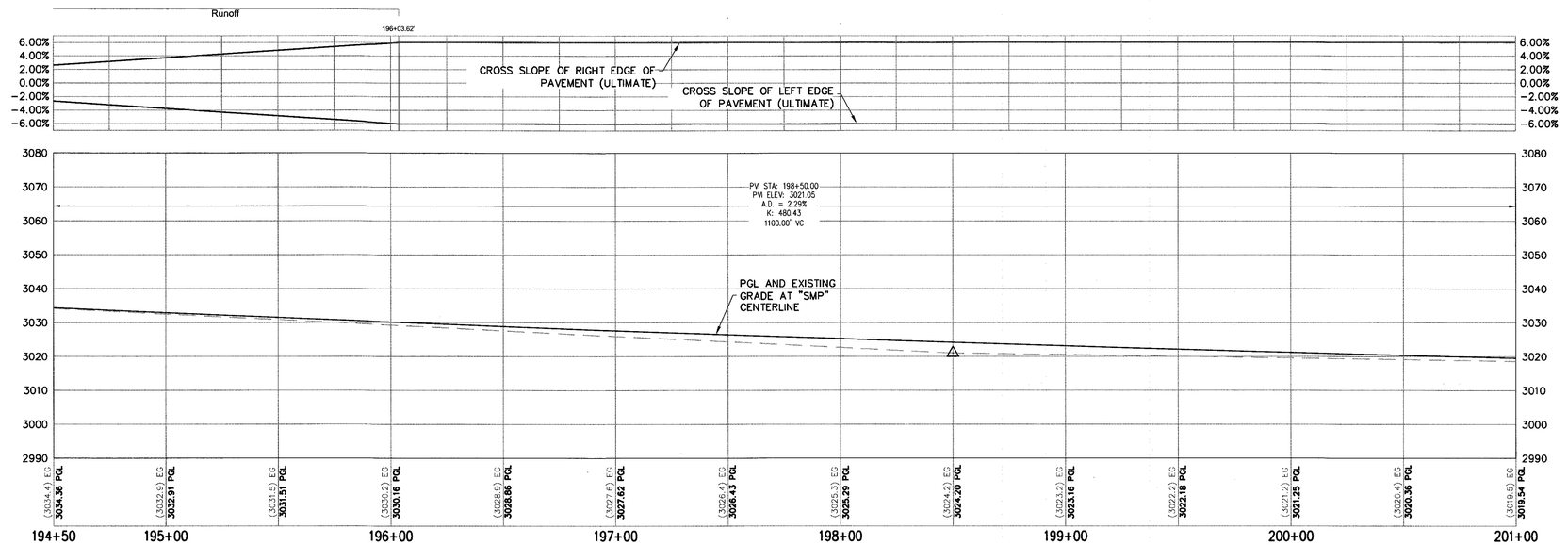
PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY SLATER
Exp: 06/30/2020
No. 14167
CIVIL

C-05
SHEET 8 OF 50

DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

1. CONSTRUCT OVER 3-INCH PBS OVER 4-INCH TYPE II AGGREGATE BASE (SEE TY-SHEETS FOR TYPICAL SECTIONS)
2. SAWCUT AND MATCH EXISTING CONCRETE ACCESS ROAD
3. INSTALL GUARDRAIL (TRIPLE CORRUGATION) (NDOT STD. PLAN R-8.4.1)
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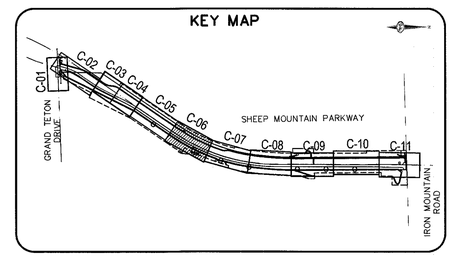
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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



30 0 30 60
SCALE FEET

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

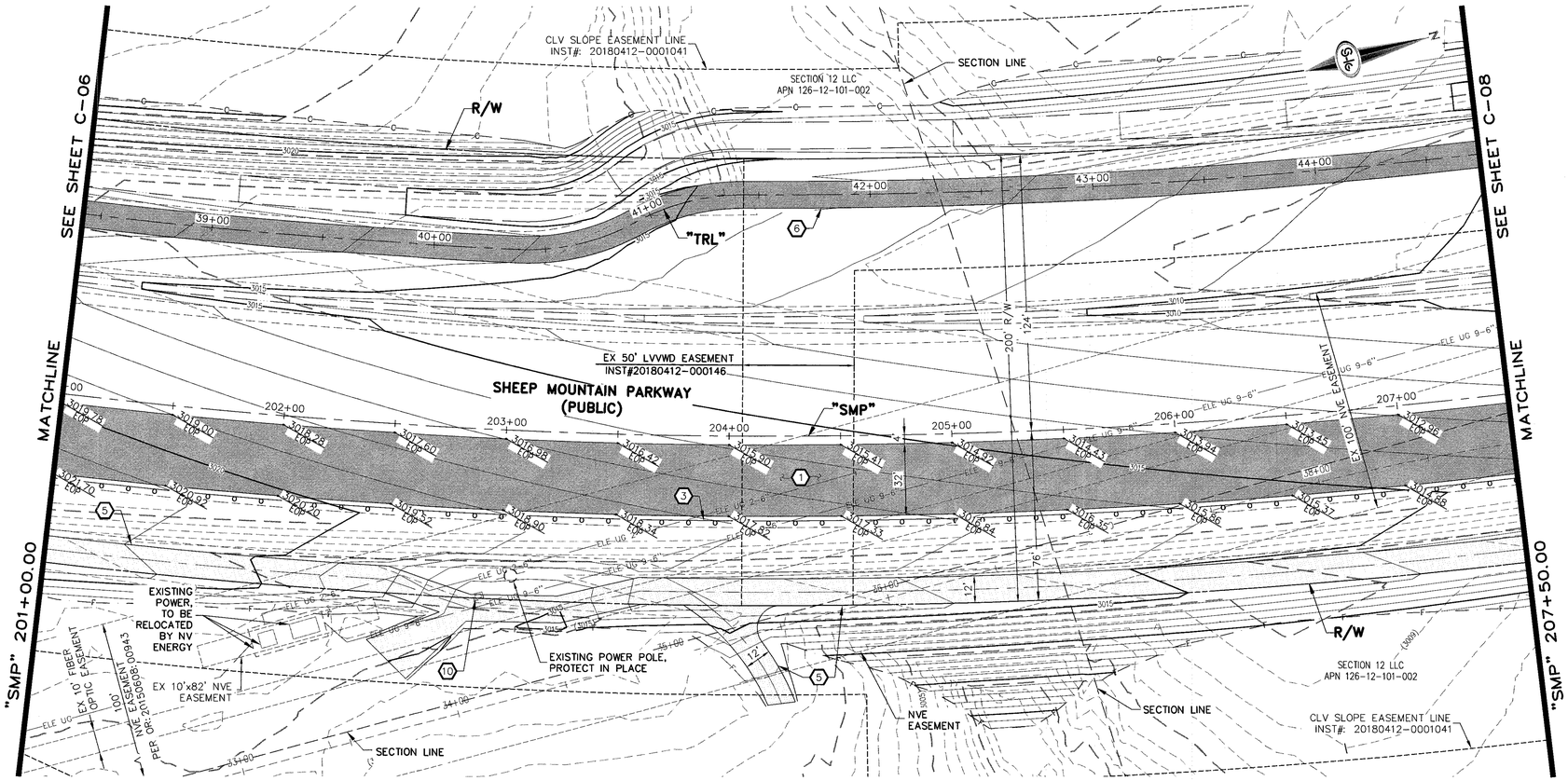
CONSTRUCTION PLAN - "SMP" 194+50.00 TO "SMP" 201+00.00

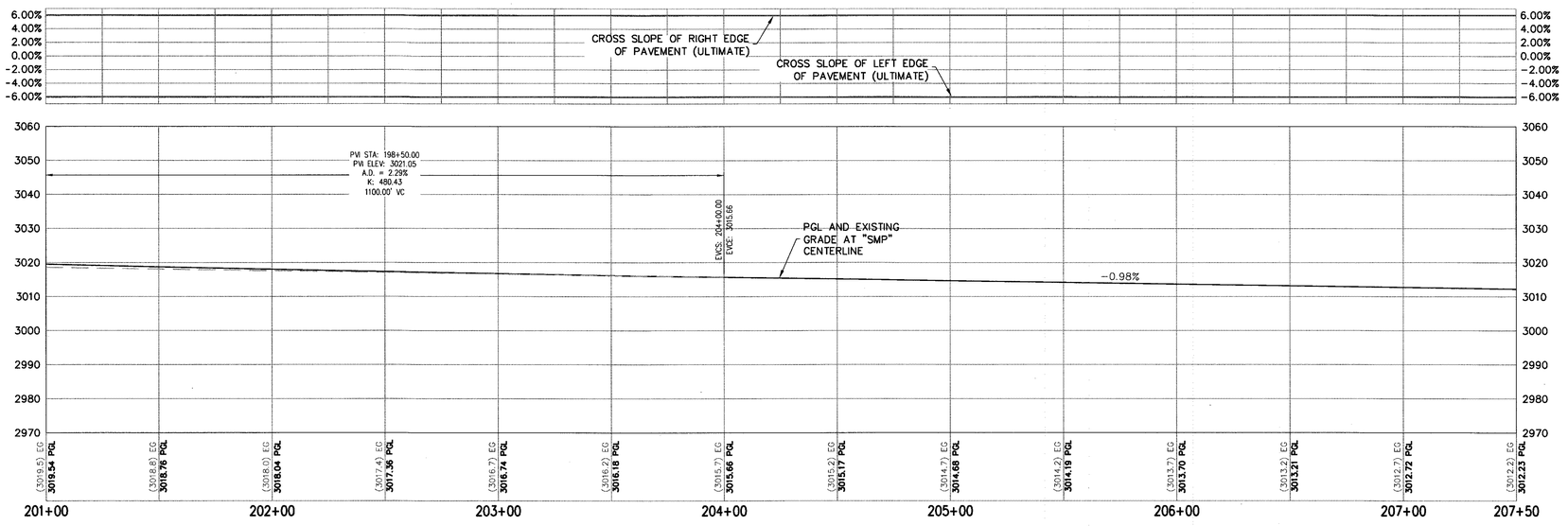
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DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER STATE OF NEVADA
JERRY J. SLATER
Exp 06/30/2020
CIVIL
No. 14167
7/16/18

C-06
SHEET 9 OF 50
DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

1. CONSTRUCT OVER 3-INCH PBS OVER 4-INCH TYPE II AGGREGATE BASE (SEE TY-SHEETS FOR TYPICAL SECTIONS)
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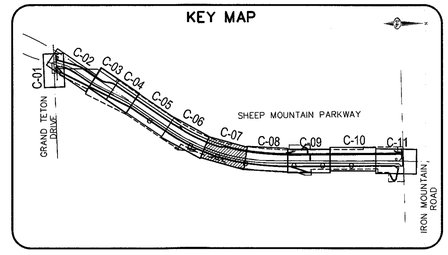
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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



30 0 30 60
SCALE FEET

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CALL BEFORE YOU DO OVERHEAD
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FAST
Call before you UnderGround.
1-702-432-5300
FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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Avoid hitting underground utility lines. It's costly.
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or 1-800-227-2600

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

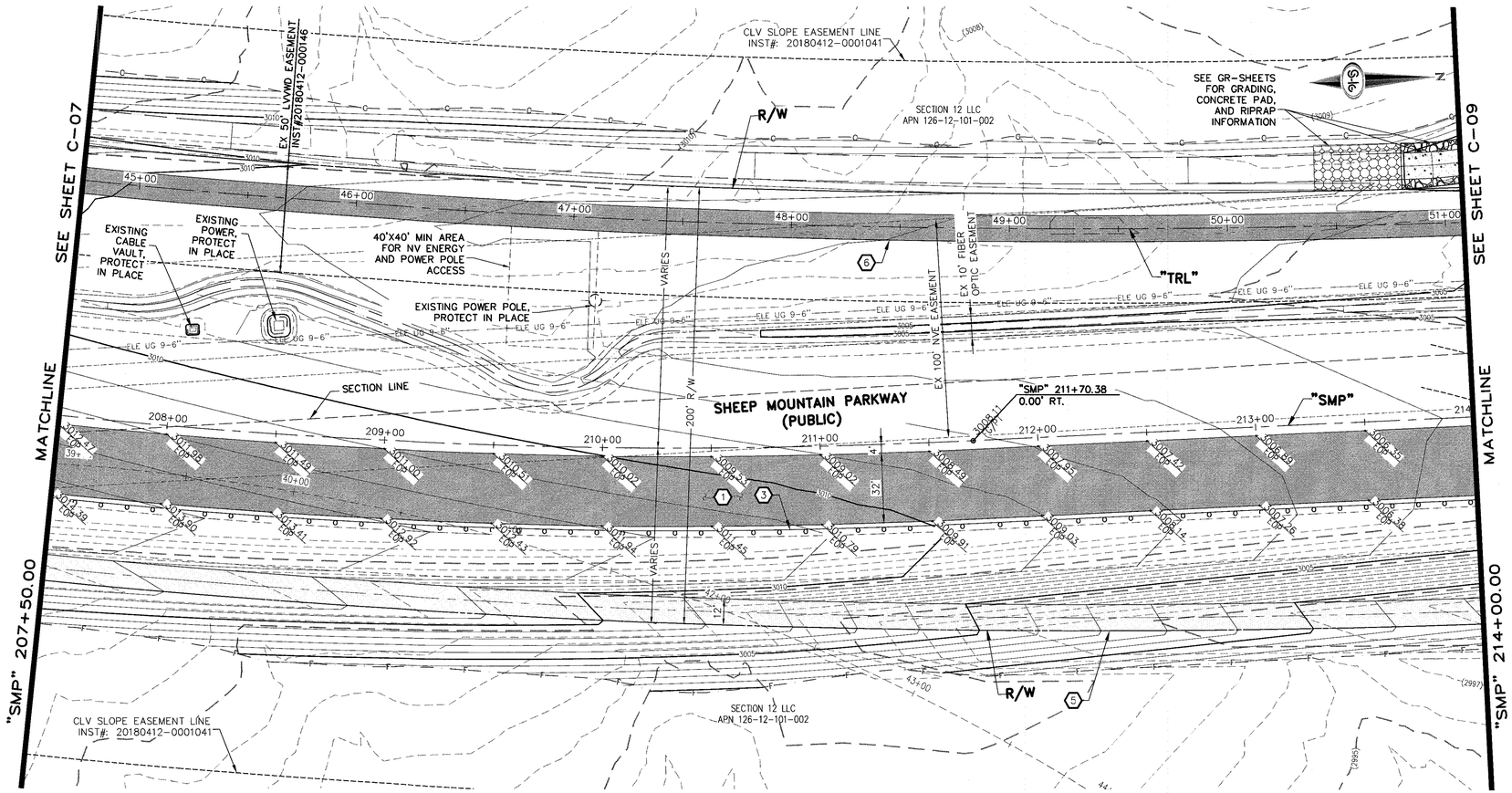
SHEEP MOUNTAIN PARKWAY
CONSTRUCTION PLAN - "SMP" 201+00.00 TO "SMP" 207+50.00

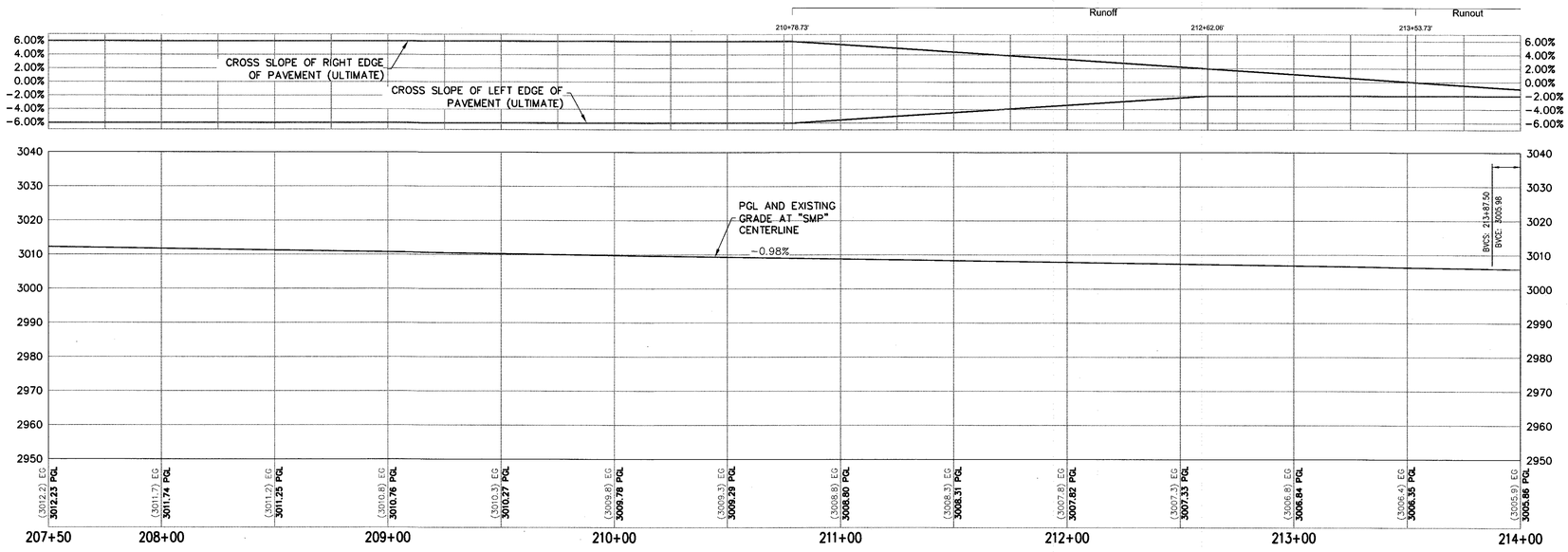
DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO. OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY J. SLATER
Exp. 06/30/2020
CIVIL
No. 14167

C-07
SHEET 10 OF 50
DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

1. CONSTRUCT OVER 3-INCH PBS OVER 4-INCH TYPE II AGGREGATE BASE (SEE TY-SHEETS FOR TYPICAL SECTIONS)
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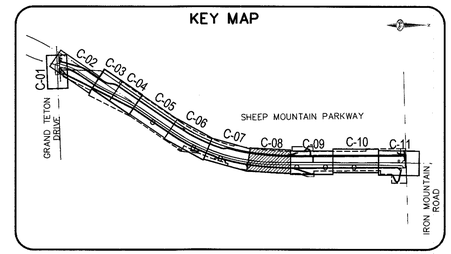
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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



30 0 30 60
SCALE FEET

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD 1-702-227-2929

FAST Call before you UnderGround. 1-702-432-5300 PREVENT AND MITIGATE SYSTEM OF DISRUPTION

Call before you Dig Avoid injury when working near underground utility lines and cables. Call 811 1-800-227-2600

SLATER HANIFAN GROUP
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "SMP" 207+50.00 TO "SMP" 214+00.00

DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO.
OLY1720.000

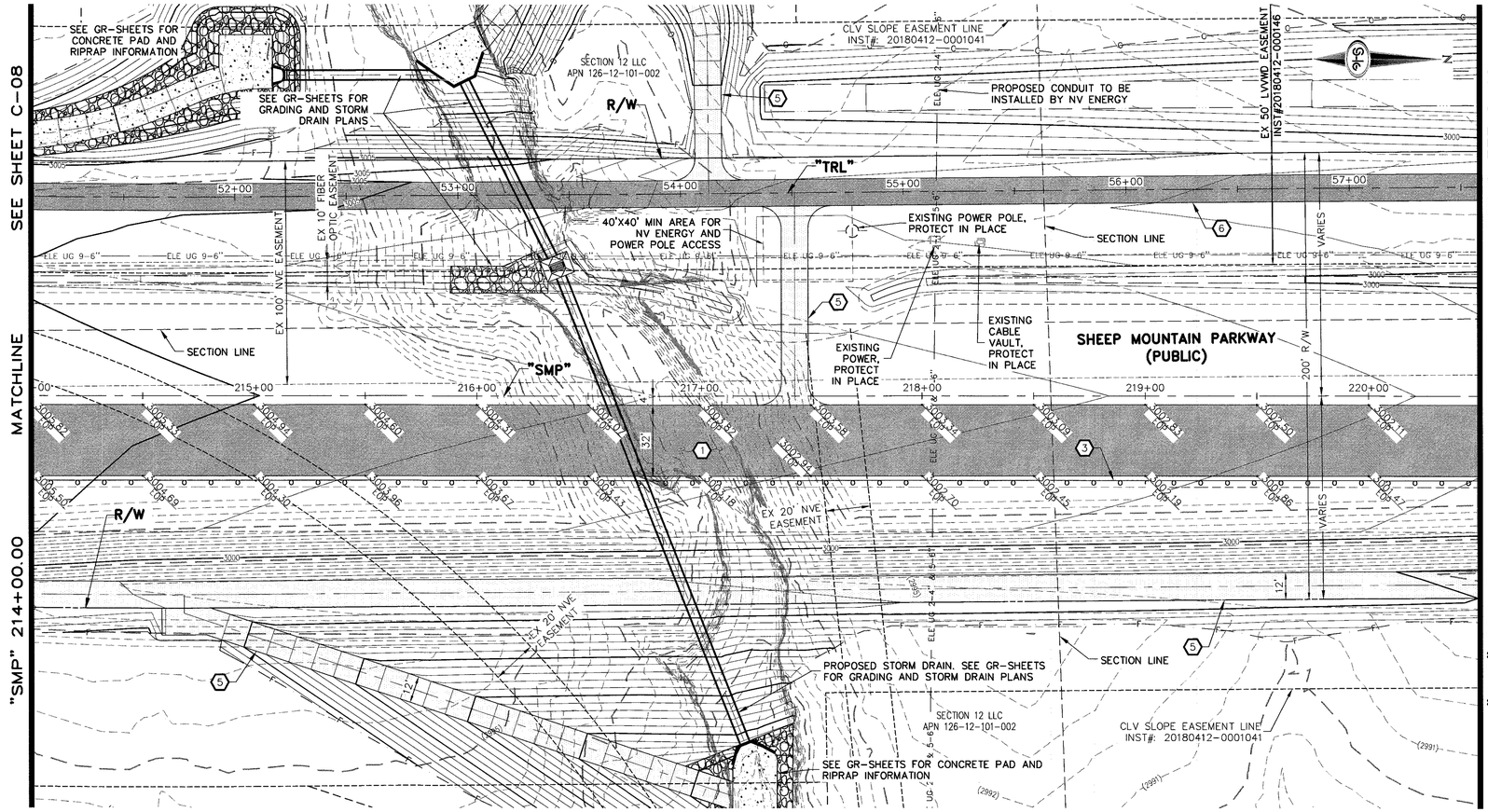
PROFESSIONAL ENGINEER - STATE OF NEVADA - JERRY J. SLATER - Exp. 06/30/2020 - CIVIL - No. 14167

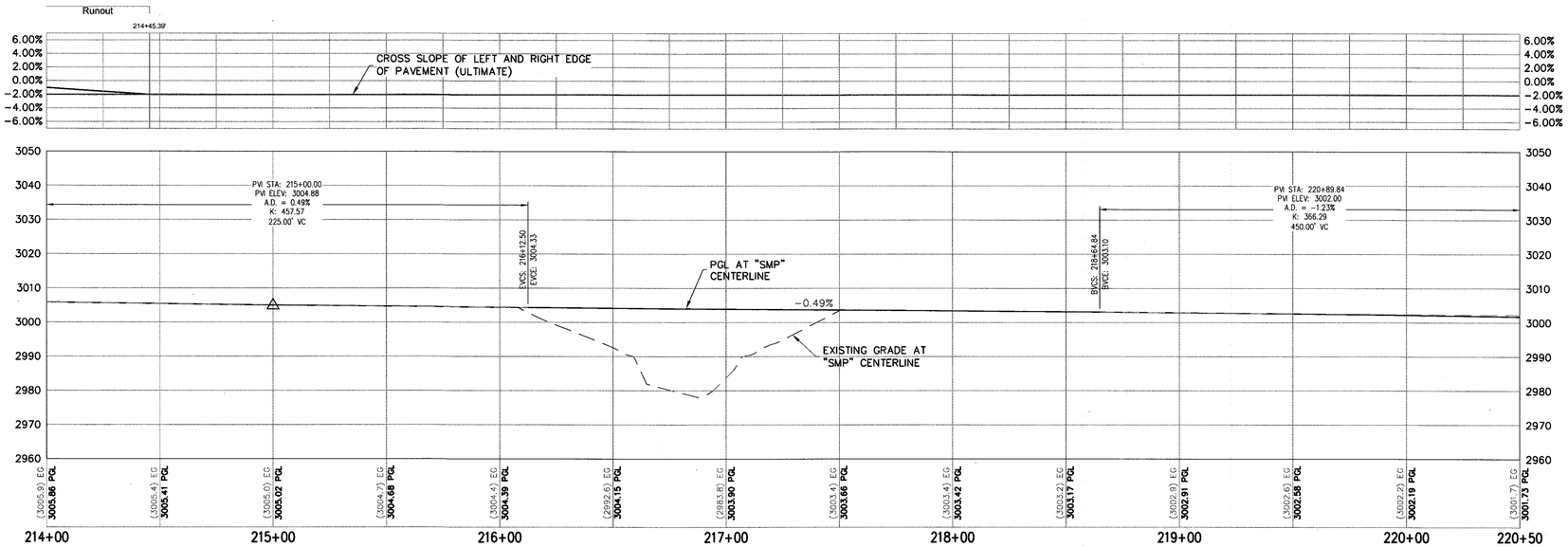
7/16/18

C-08
SHEET 11 OF 50

DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

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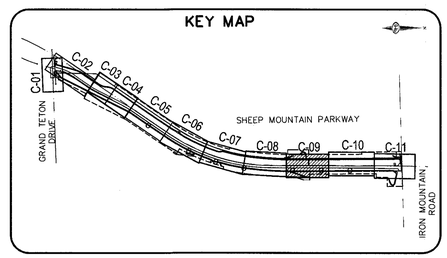
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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



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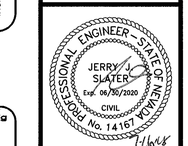
NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "SMP" 214+00.00 TO "SMP" 220+50.00

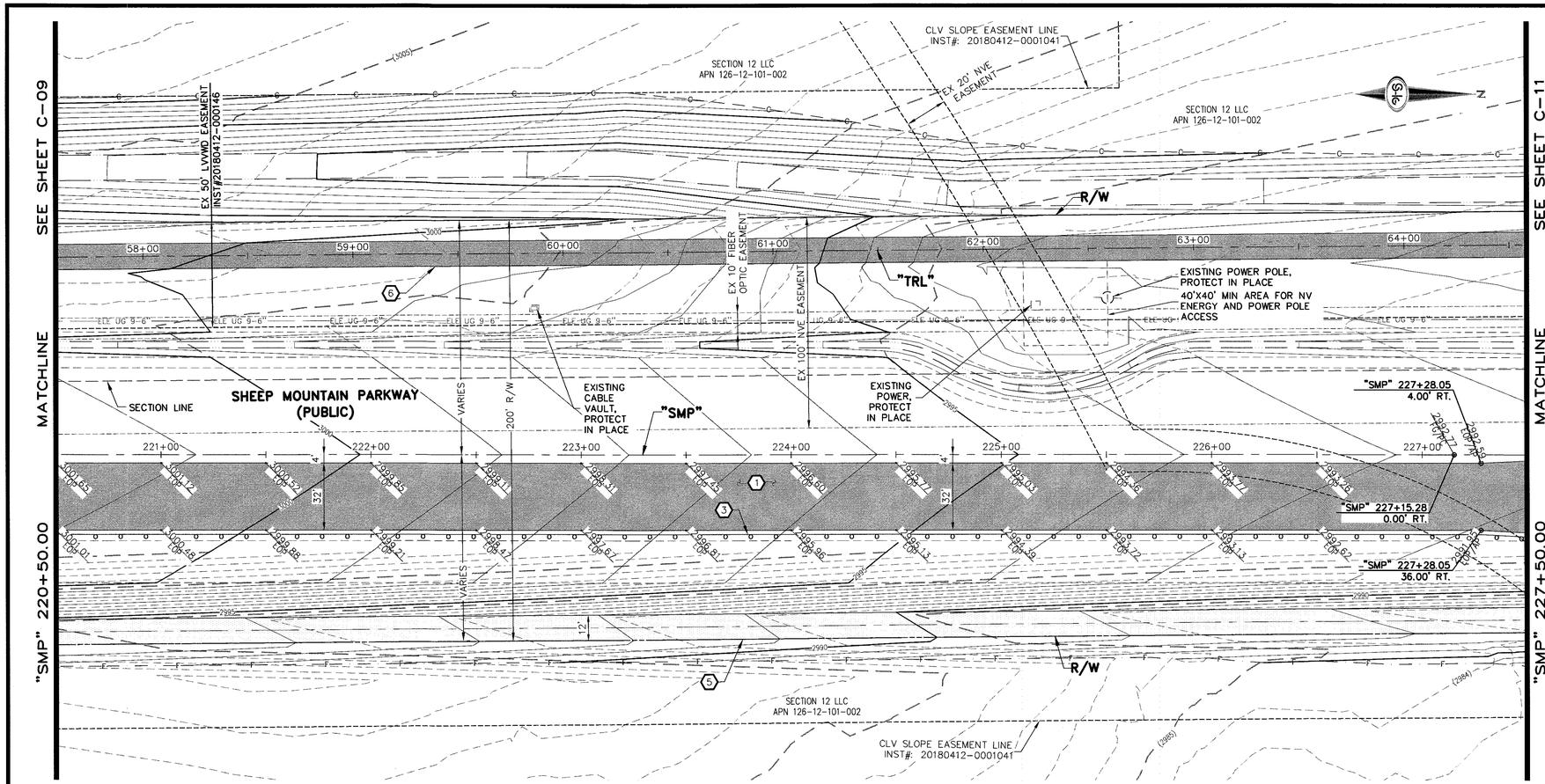
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CHECKED: JSR
PROJECT NO.
OLY1720.000

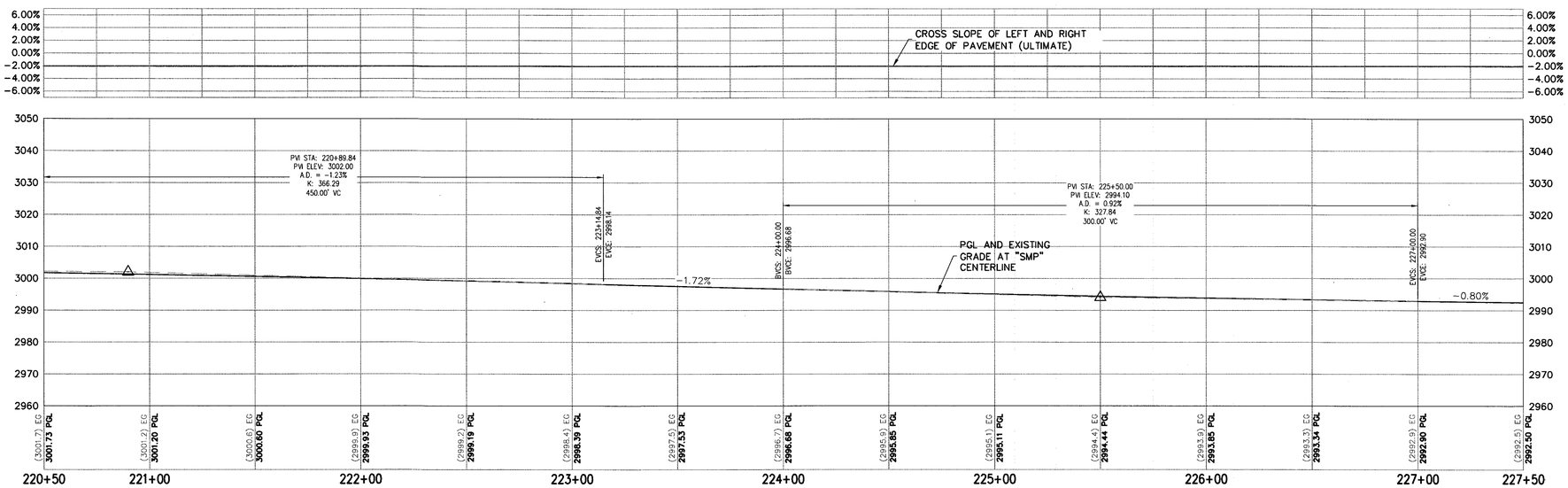


C-09
SHEET 12 OF 50

DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

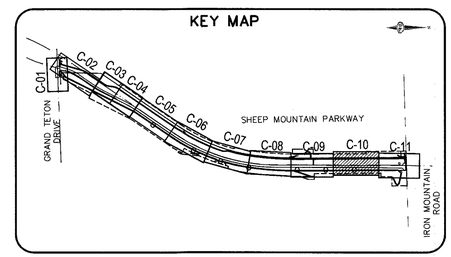
1. CONSTRUCT OVER 3-INCH PBS OVER 4-INCH TYPE II AGGREGATE BASE (SEE TY-SHEETS FOR TYPICAL SECTIONS)
2. SAWCUT AND MATCH EXISTING CONCRETE ACCESS ROAD
3. INSTALL GUARDRAIL (TRIPLE CORRUGATION) (NDOT STD. PLAN R-8.4.1)
4. INSTALL TANGENT END TERMINAL FOR GUARDRAIL (NDOT STD. PLAN R-8.1.1)
5. CONSTRUCT 12-FOOT WIDE MINIMUM ACCESS ROAD (DETAIL 3, SHEET TY-02)
6. CONSTRUCT 2-INCH PBS SIDEWALK OVER 4-INCH TYPE II AGGREGATE BASE (SEE SHEETS C-12 THROUGH C-21 FOR PLAN AND PROFILE)
7. CONSTRUCT 3-FOOT DEEP CONCRETE CUTOFF WALL (DETAIL 4, SHEET TY-02)
8. INSTALL CHAINLINK FENCE (USDCCA STD. DWG. 252)
9. INSTALL 12-FOOT WIDE CHAINLINK GATE
10. ADJUST EXISTING CABLE VAULT TO FINISH GRADE
11. ADJUST EXISTING POWER VAULT TO FINISH GRADE
12. SAWCUT AND MATCH EXISTING PAVEMENT
13. RELOCATE EXISTING GATE
14. REINSTALL GATE ON NEW CONCRETE FOUNDATIONS TO MATCH EXISTING FOUNDATIONS

NOTES

1. SEE TY-SHEETS FOR TYPICAL SECTIONS.
2. SEE SD-SHEETS FOR STORM PROFILES.
3. SEE UT-SHEETS FOR WATER AND SEWER PLAN AND PROFILES.
4. SEE GR-SHEETS FOR GRADING AND STORM DRAIN PLAN.

LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH



30 0 30 60
SCALE FEET

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD 1-702-227-2929

FAST Call before you UnderGround. 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "SMP" 220+50.00 TO "SMP" 227+50.00

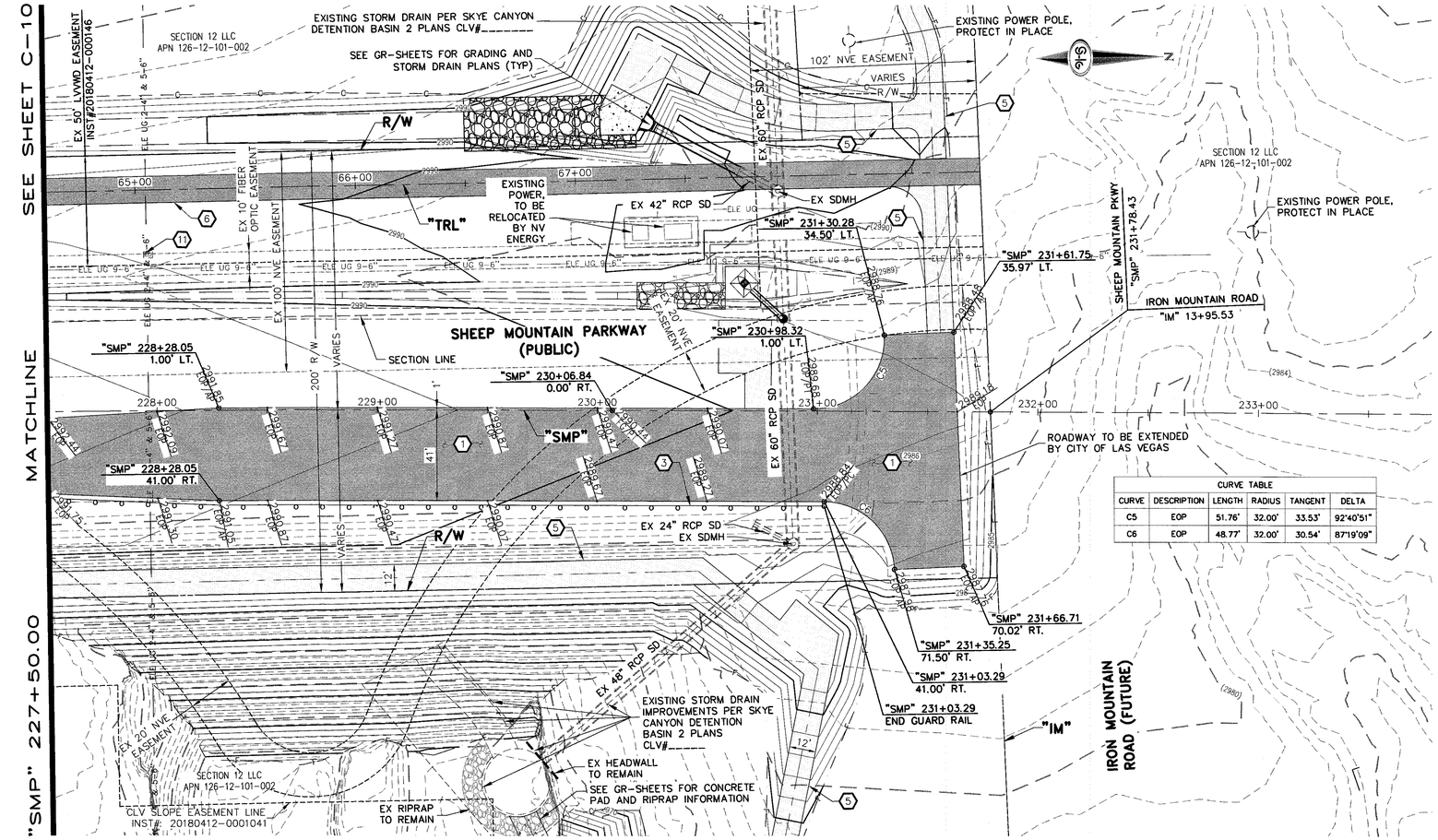
DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO. OLY1720.000

PROFESSIONAL ENGINEER STATE OF NEVADA JERRY J. SLATER Exp. 06/30/2020 CIVIL No. 14167

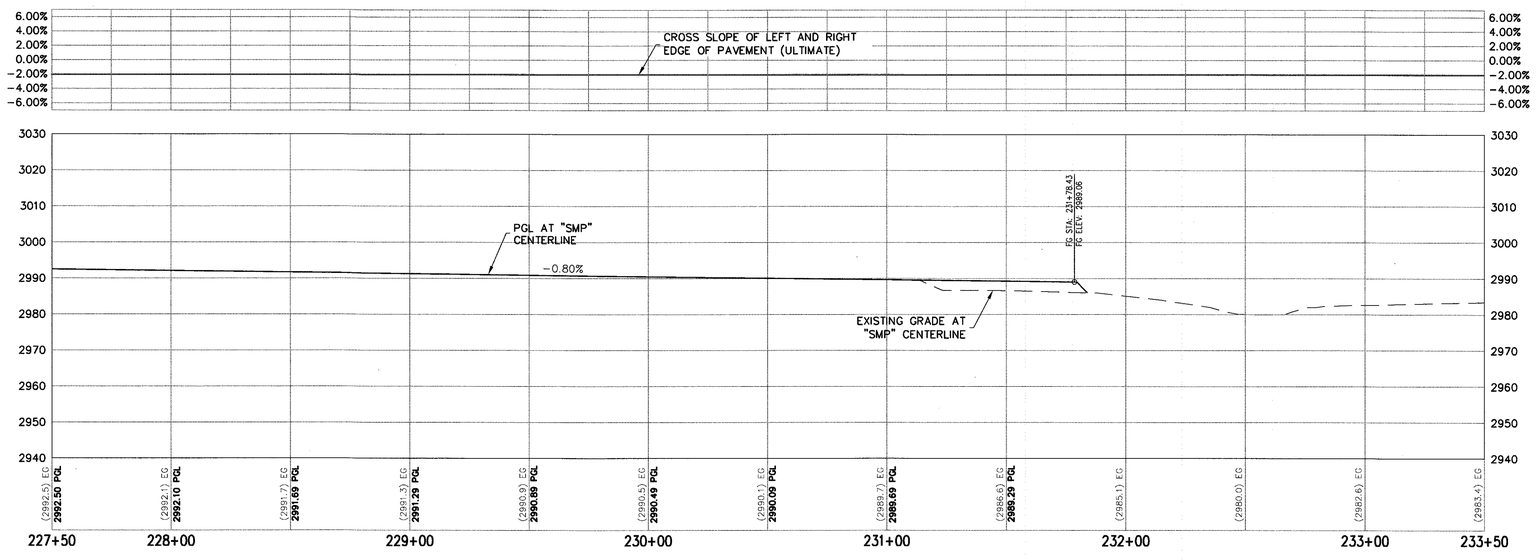
C-10
SHEET 13 OF 50

DWG NO. _____

HANSEN NO. _____



CURVE TABLE					
CURVE	DESCRIPTION	LENGTH	RADIUS	TANGENT	DELTA
C5	EOP	51.76'	32.00'	33.53'	92°40'51"
C6	EOP	48.77'	32.00'	30.54'	87°19'09"



CONSTRUCTION NOTES

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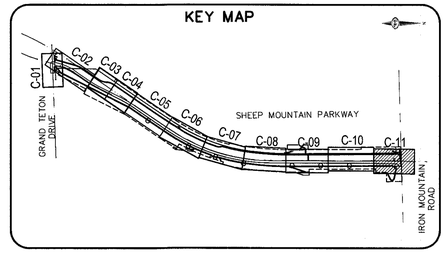
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4. SEE GR-SHEETS FOR GRADING AND STORM DRAIN PLAN.

LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



SCALE: 30 0 30 60 FEET

AVOID HITTING OVERHEAD POWER LINES. IT'S COOL! CALL BEFORE YOU DO OVERHEAD 1-702-227-2929

FAST. Call before you UnderGround. 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Dig. Avoid cutting underground utility lines in nearby. Call 811 or 1-800-227-2600

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "SMP" 227+50.00 TO "SMP" 233+50.00

DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

PROJECT NO. OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA - JERRY D. SLATER - Exp. 06/30/2020 - CIVIL - No. 14167

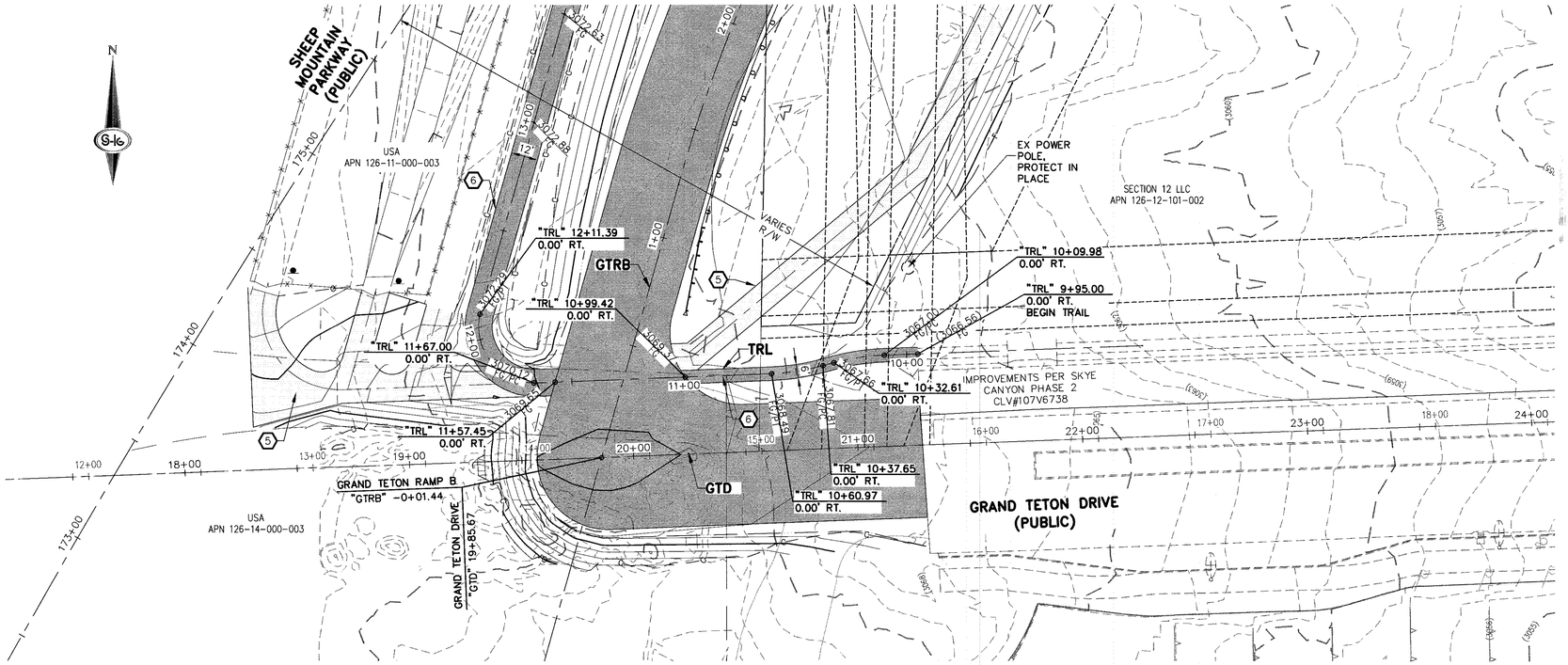
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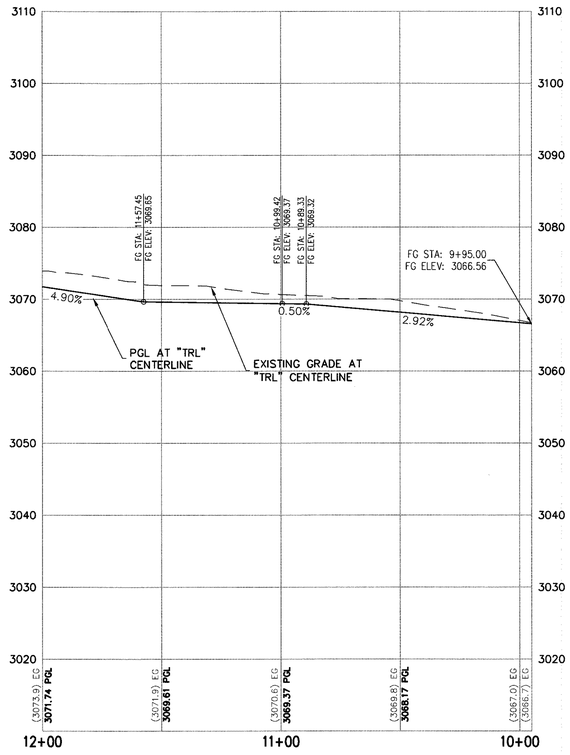
C-11
SHEET 14 OF 50

DWG NO. _____

HANSEN NO. _____

SEE SHEET C-13





CONSTRUCTION NOTES

1. CONSTRUCT OVER 3-INCH PBS OVER 4-INCH TYPE II AGGREGATE BASE (SEE TY-SHEETS FOR TYPICAL SECTIONS)
2. SAWCUT AND MATCH EXISTING CONCRETE ACCESS ROAD
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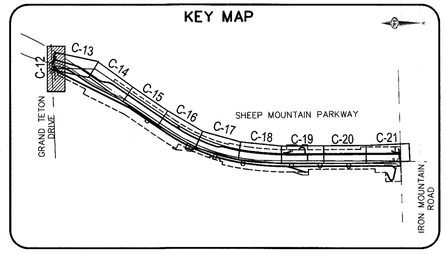
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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



30 0 30 60
SCALE FEET

AVOID HITING OVERHEAD POWER LINES. IT'S COSTLY
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1-702-227-2929

FAST
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1-702-432-5300
FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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or
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PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "TRL" 10+00.00 TO "TRL" 12+00.00

DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

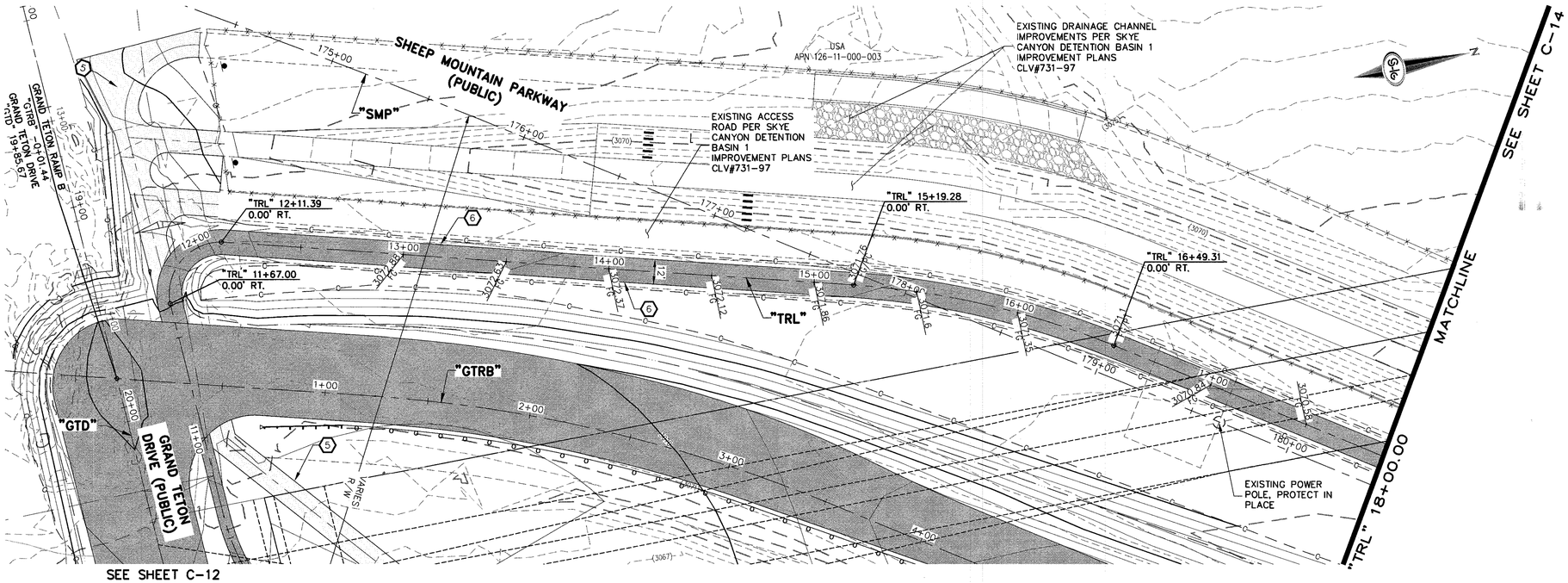
PROJECT NO.
OLY1720.000

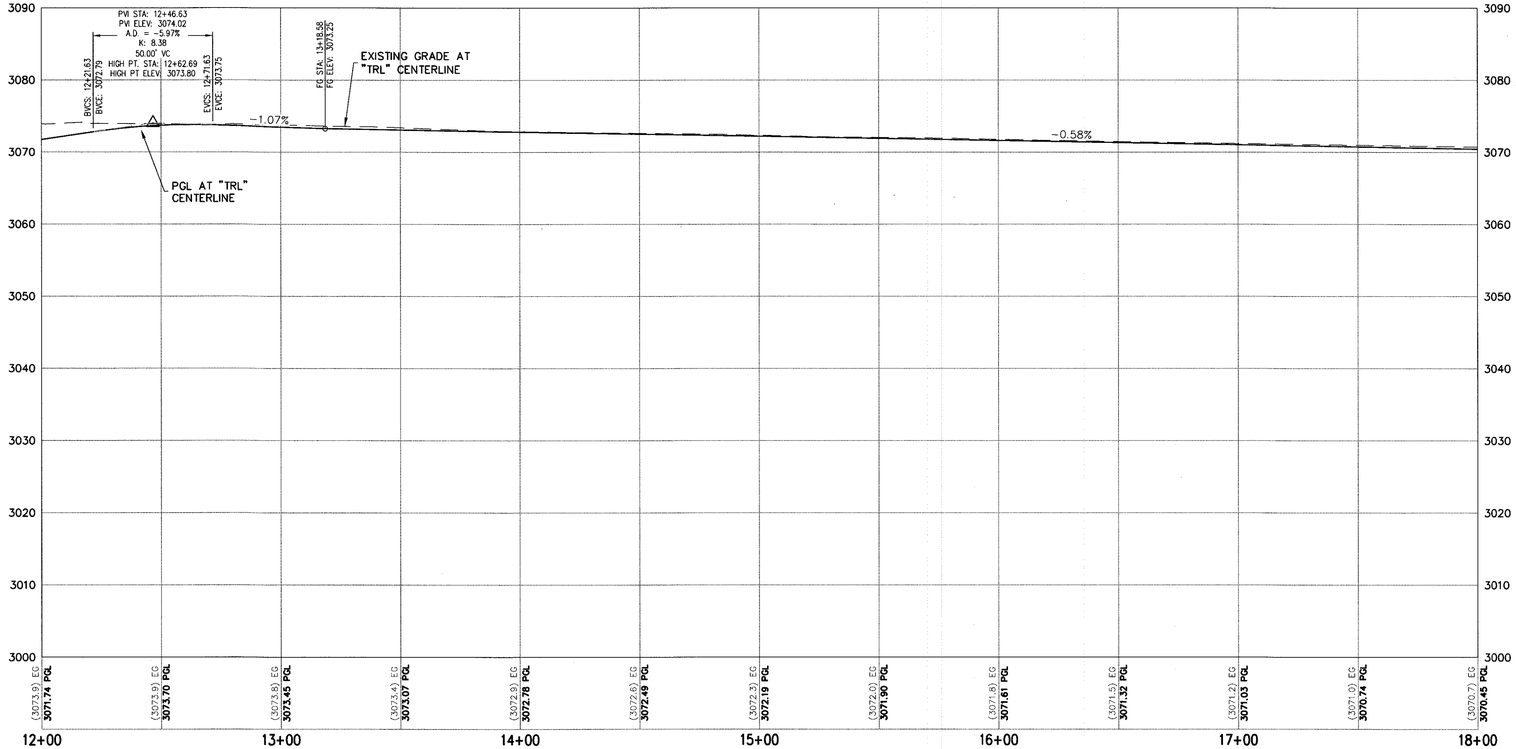
PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY J. SLATER
Exp. 08/30/2020
CIVIL
No. 14167

C-12
SHEET 15 OF 50

DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

1. CONSTRUCT OVER 3-INCH PBS OVER 4-INCH TYPE II AGGREGATE BASE (SEE TY-SHEETS FOR TYPICAL SECTIONS)
2. SAWCUT AND MATCH EXISTING CONCRETE ACCESS ROAD
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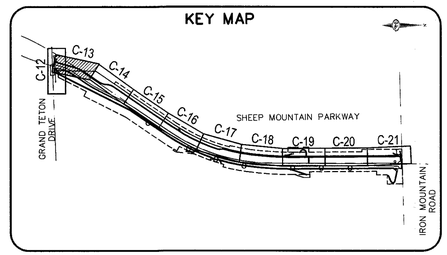
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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



30 0 30 60
SCALE FEET

AVOID HITTING OVERHEAD POWER LINES. IT'S COOL! CALL BEFORE YOU DO OVERHEAD 1-702-227-2929

FAST Call before you UnderGround. 1-702-432-5300 NEVADA AND ARIZONA SYSTEM OF TRANSPORTATION

Call before you Dig Avoid hitting underground utility lines. It's cool. Call 811 1-800-227-2600

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

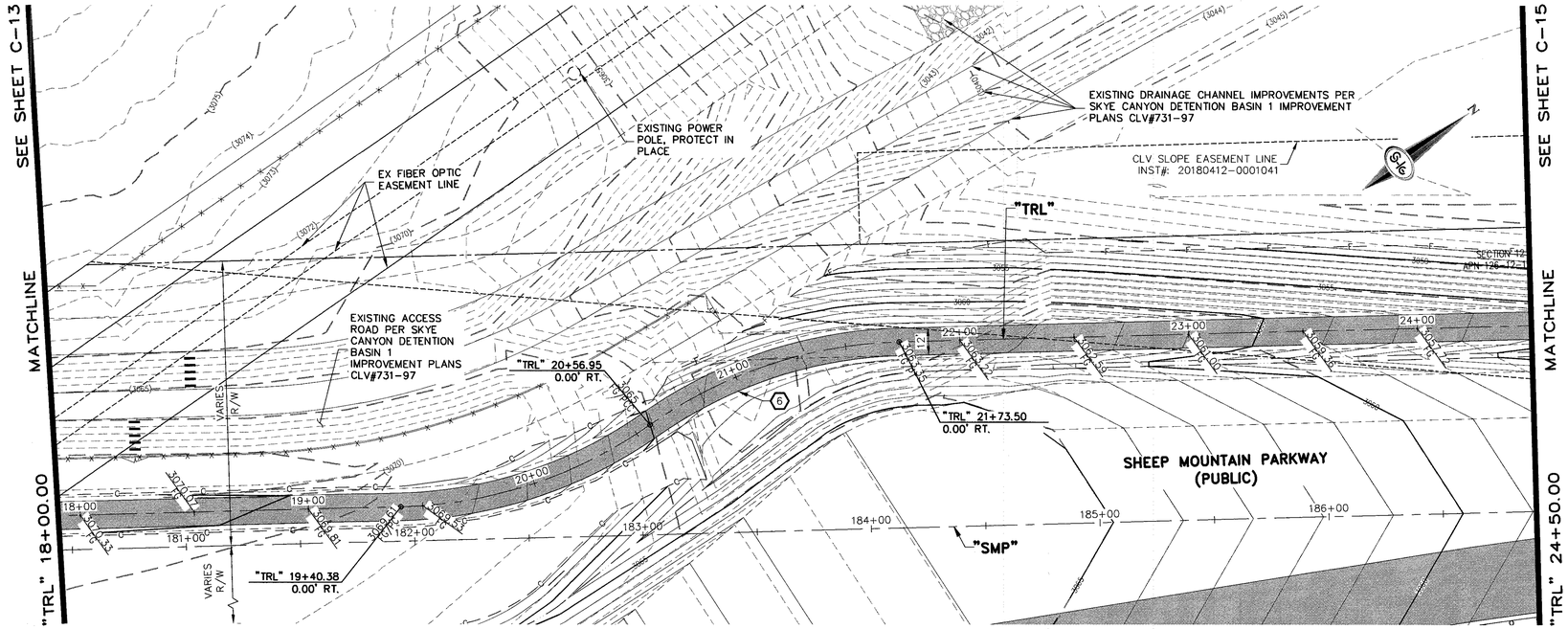
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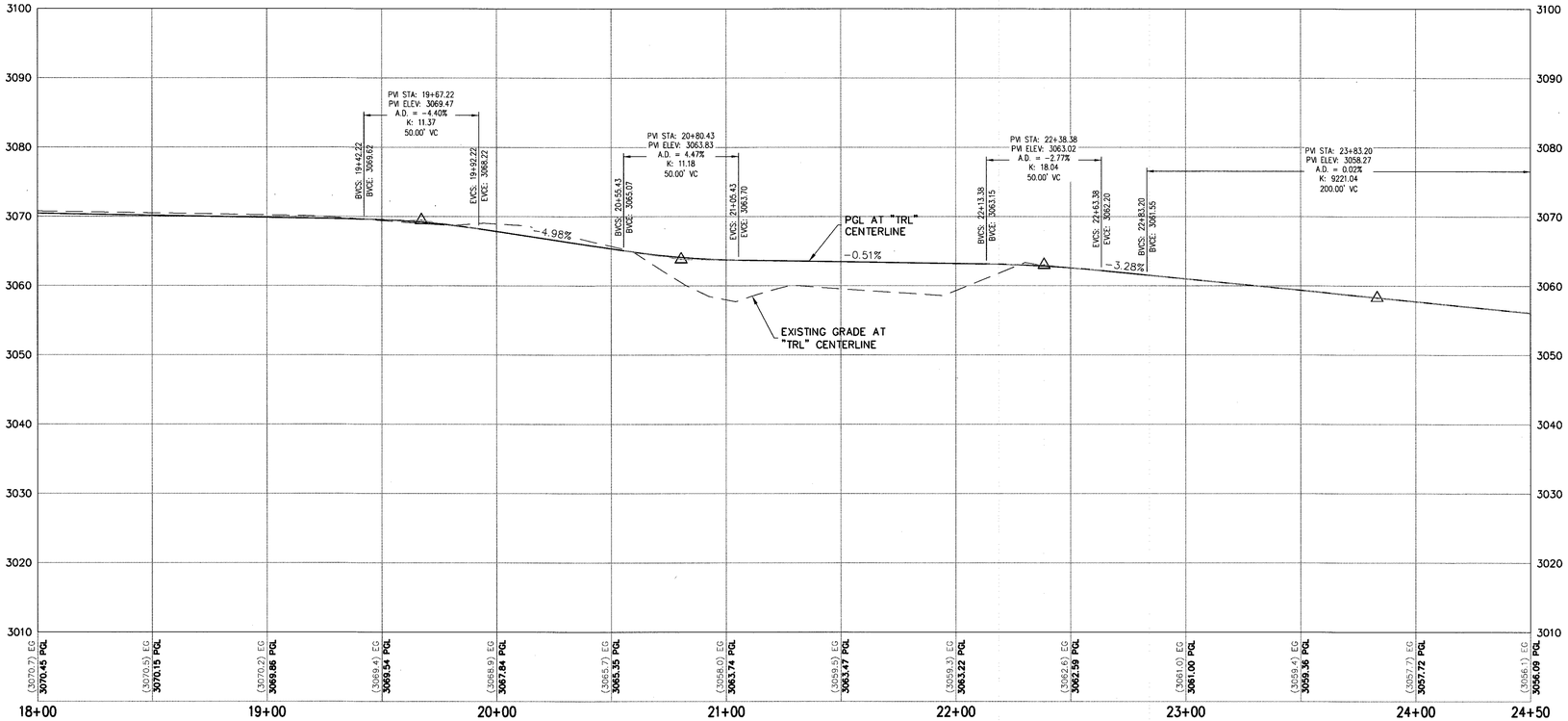
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CHECKED: JSR
PROJECT NO. OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA - JERRY J. SLATER - Exp: 06/30/2020 - CIVIL - No. 14167 - 7/16/18

C-13
SHEET 16 OF 50
DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

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2. SAWCUT AND MATCH EXISTING CONCRETE ACCESS ROAD
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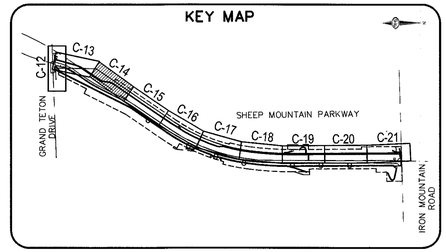
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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



SCALE 30 0 30 60 FEET

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

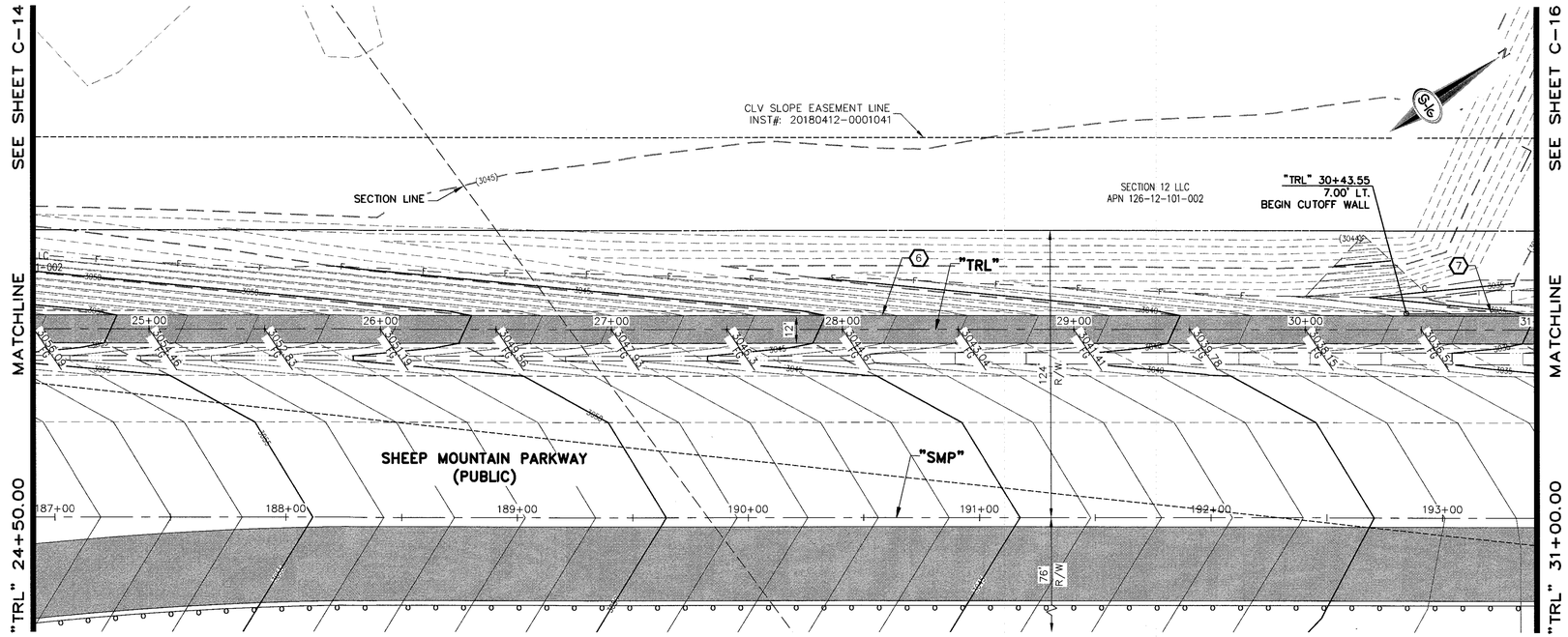
CONSTRUCTION PLAN - "TRL" 18+00.00 TO "TRL" 24+50.00

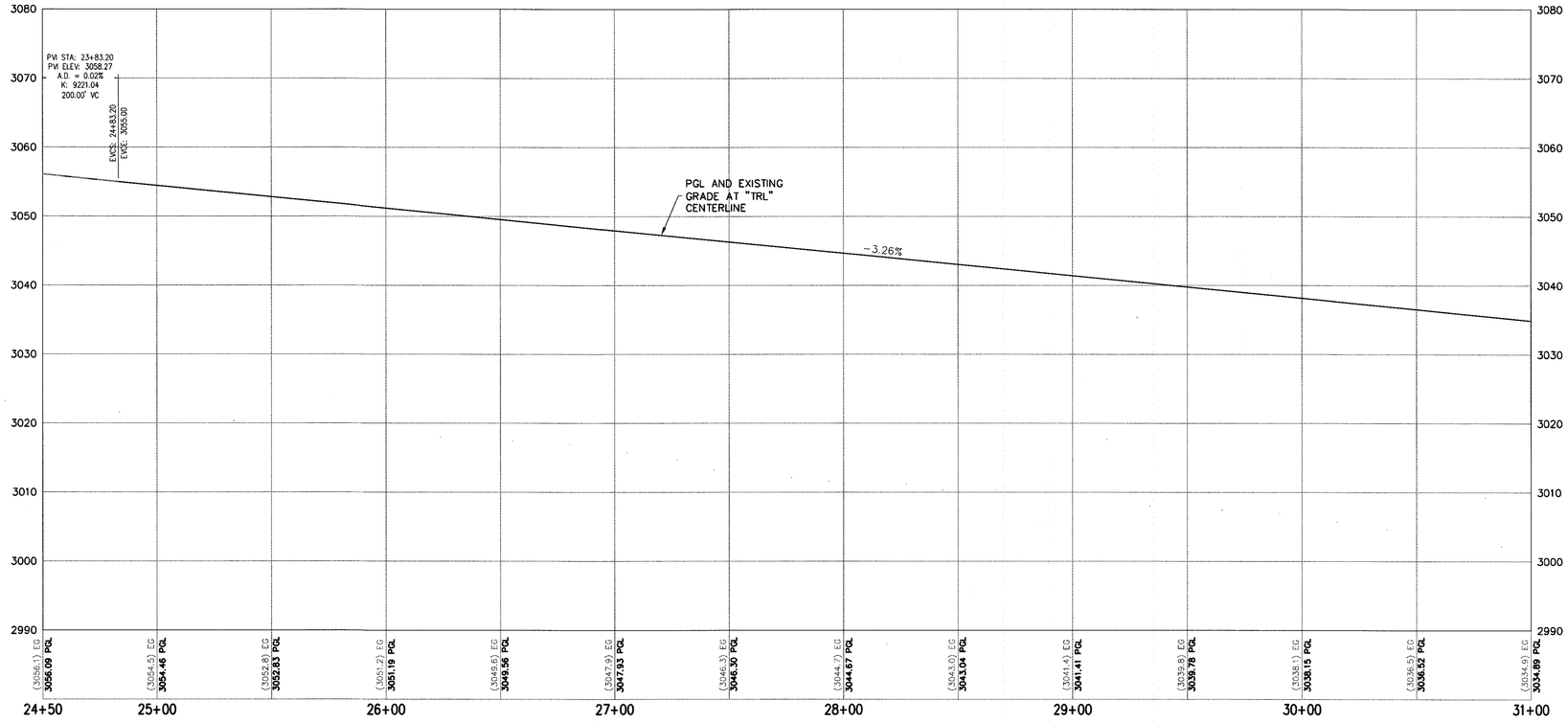
DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO. OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA - JERRY A. SLATER - Exp/06/30/2020 - CIVIL - No. 14167

C-14
SHEET 17 OF 50
DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

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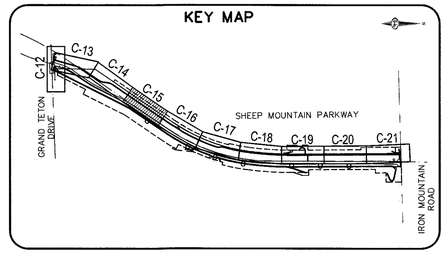
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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



SCALE 30 0 30 60 FEET

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SLATER HANIFAN GROUP
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PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "TRL" 24+50.00 TO "TRL" 31+00.00

DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

PROJECT NO.
OLY1720.000

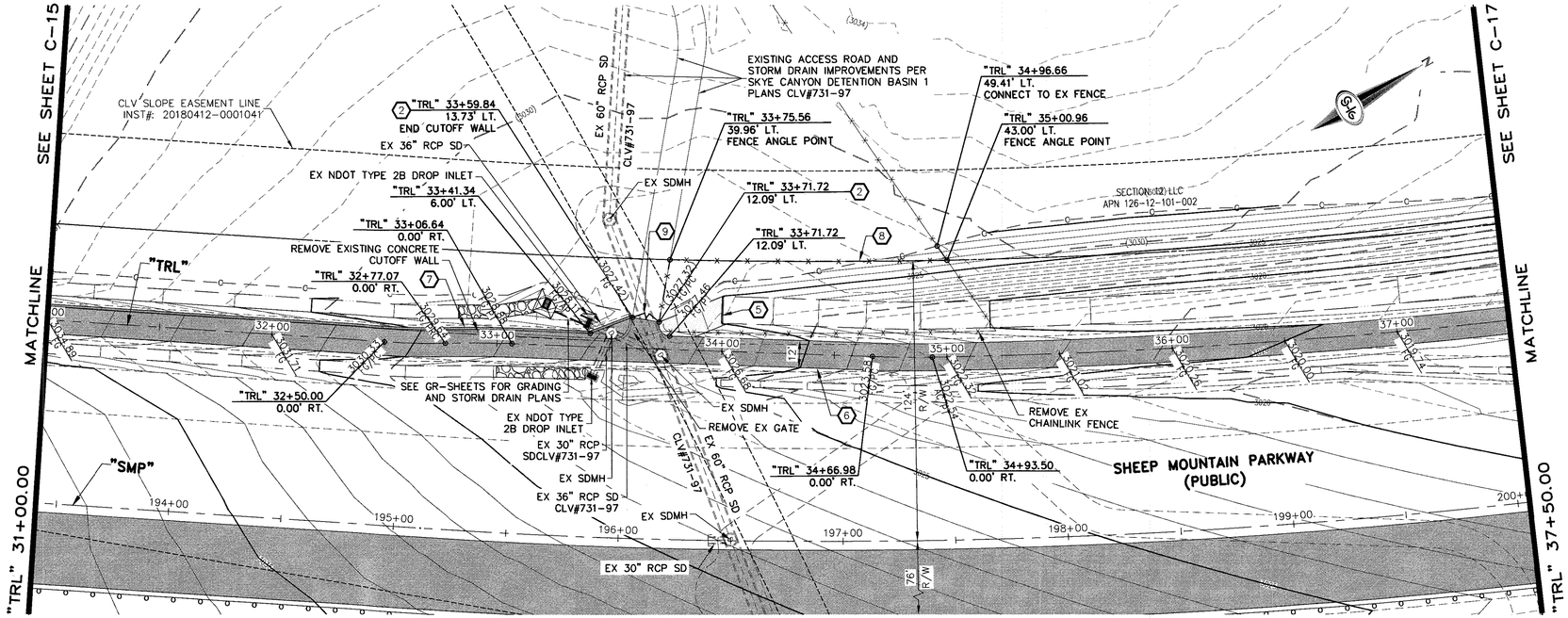
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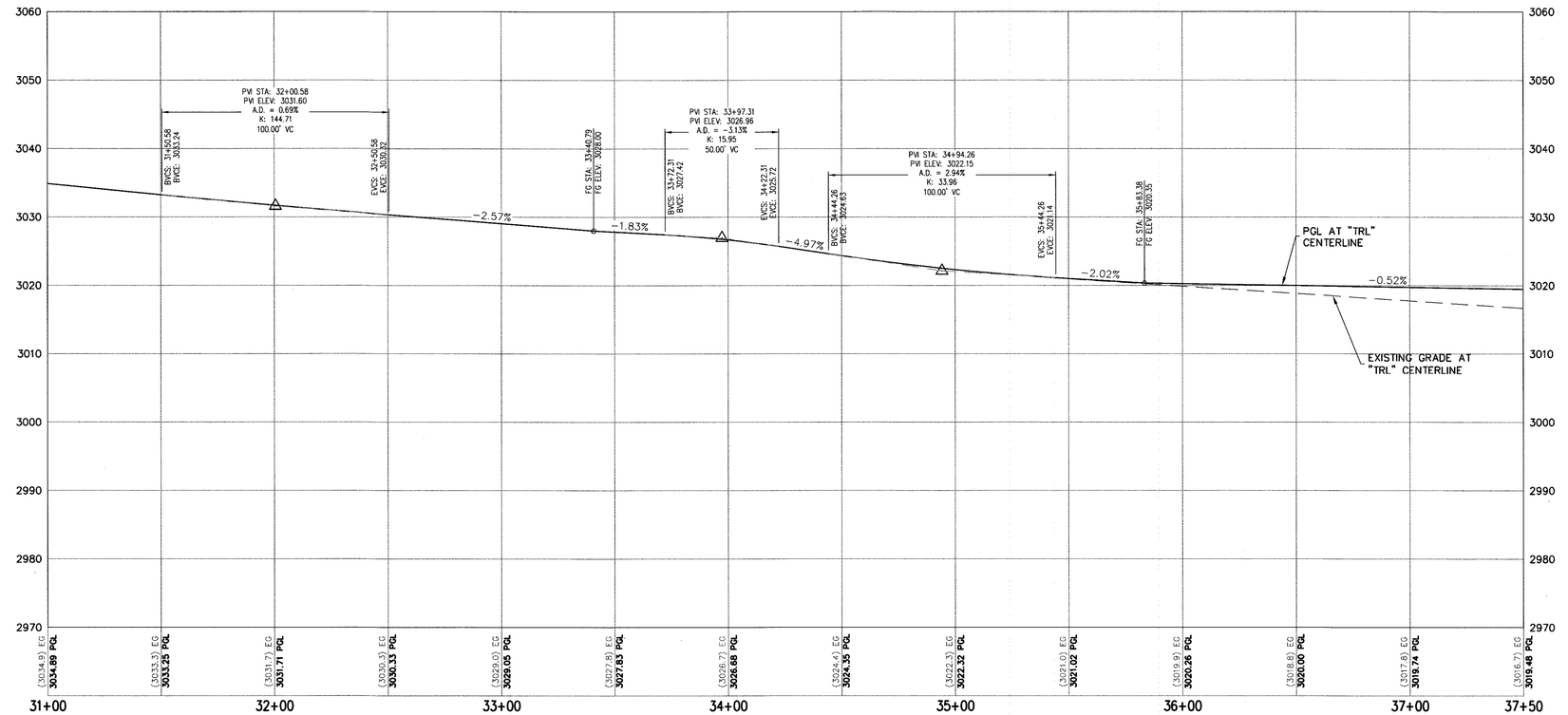
7/16/18

C-15
SHEET 18 OF 50

DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

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7. CONSTRUCT 3-FOOT DEEP CONCRETE CUTOFF WALL (DETAIL 4, SHEET TY-02)
8. INSTALL CHAINLINK FENCE (USDCCA STD. DWG. 252)
9. INSTALL 12-FOOT WIDE CHAINLINK GATE
10. ADJUST EXISTING CABLE VAULT TO FINISH GRADE
11. ADJUST EXISTING POWER VAULT TO FINISH GRADE
12. SAWCUT AND MATCH EXISTING PAVEMENT
13. RELOCATE EXISTING GATE
14. REINSTALL GATE ON NEW CONCRETE FOUNDATIONS TO MATCH EXISTING FOUNDATIONS

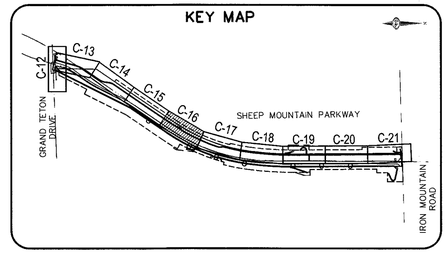
NOTES

1. SEE TY-SHEETS FOR TYPICAL SECTIONS.
2. SEE SD-SHEETS FOR STORM PROFILES.
3. SEE UT-SHEETS FOR WATER AND SEWER PLAN AND PROFILES.
4. SEE GR-SHEETS FOR GRADING AND STORM DRAIN PLAN.

LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



SCALE: 30 0 30 60 FEET

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD. 1-702-227-2929

FAST Call before you UnderGround. 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "TRL" 31+00.00 TO "TRL" 37+50.00

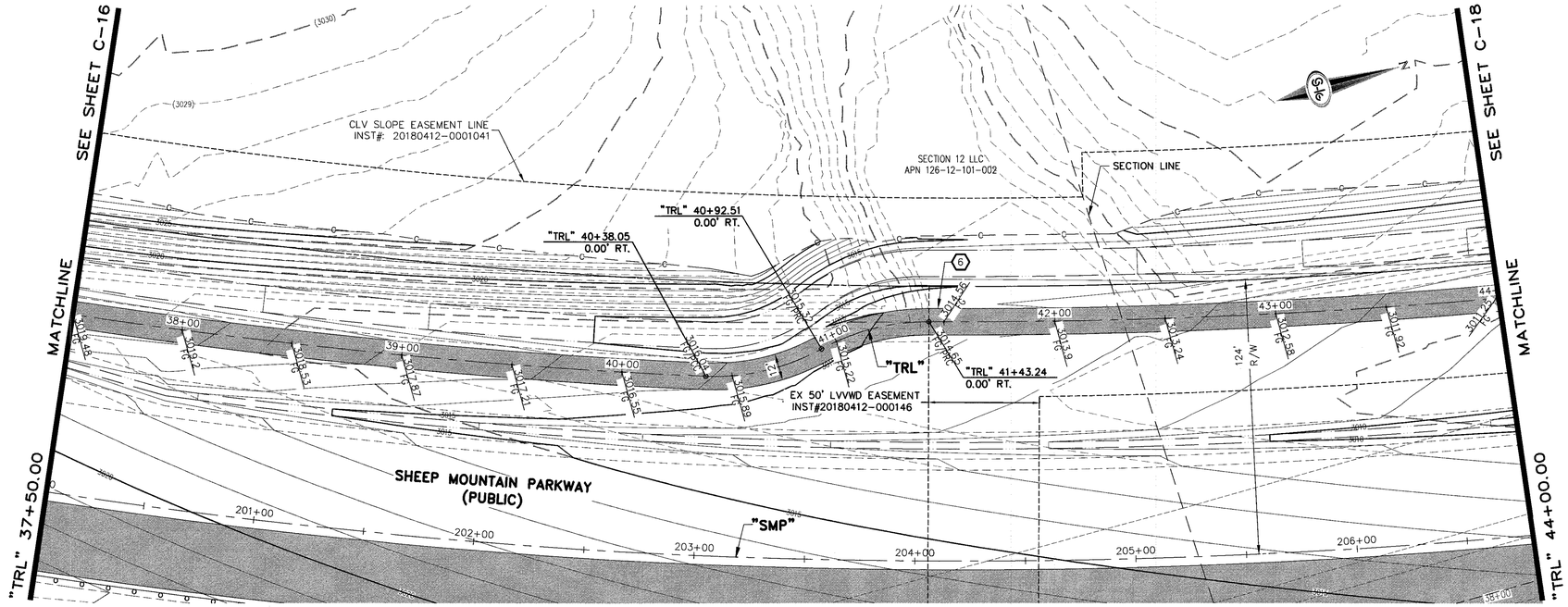
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CHECKED: JSR
PROJECT NO.
OLY1720.000

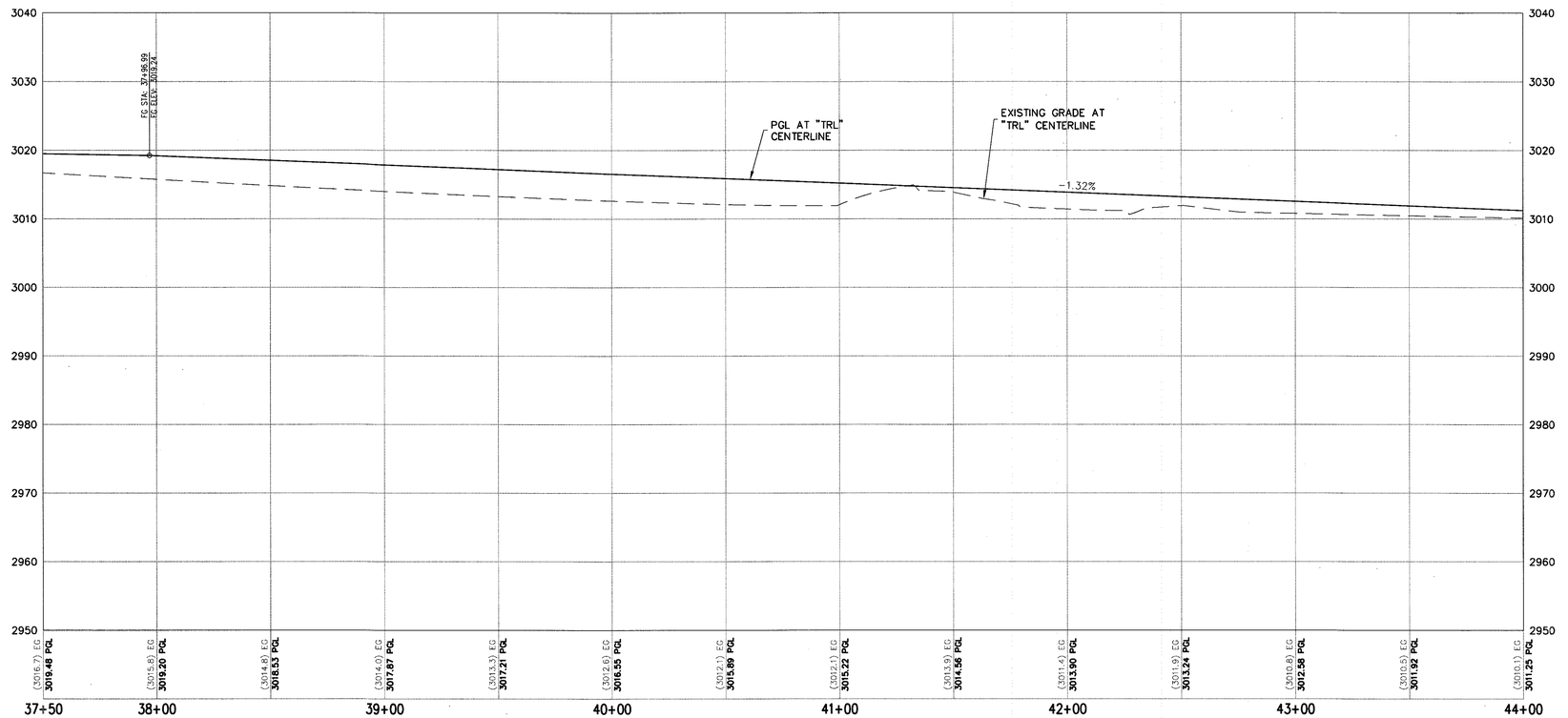
PROFESSIONAL ENGINEER - STATE OF NEVADA - JERRY J. SLATER - Exp. 06/30/2020 - CIVIL - No. 14167

C-16
SHEET 19 OF 50

DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

1. CONSTRUCT OVER 3-INCH PBS OVER 4-INCH TYPE II AGGREGATE BASE (SEE TY-SHEETS FOR TYPICAL SECTIONS)
2. SAWCUT AND MATCH EXISTING CONCRETE ACCESS ROAD
3. INSTALL GUARDRAIL (TRIPLE CORRUGATION) (NDOT STD. PLAN R-8.4.1)
4. INSTALL TANGENT END TERMINAL FOR GUARDRAIL (NDOT STD. PLAN R-8.1.1)
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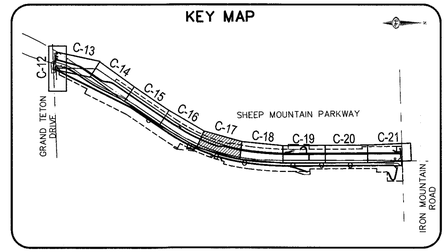
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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "TRL" 37+50.00 TO "TRL" 44+00.00

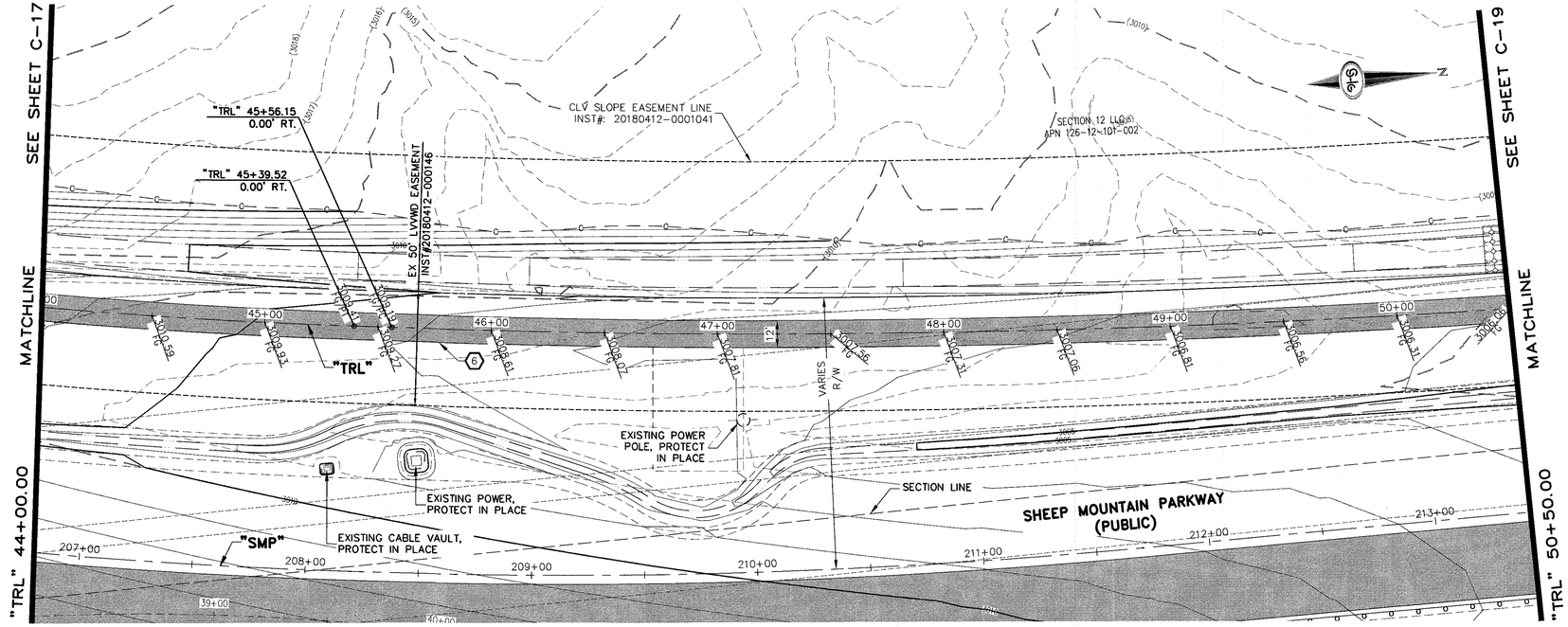
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CHECKED: JSR
PROJECT NO. OLY1720.000

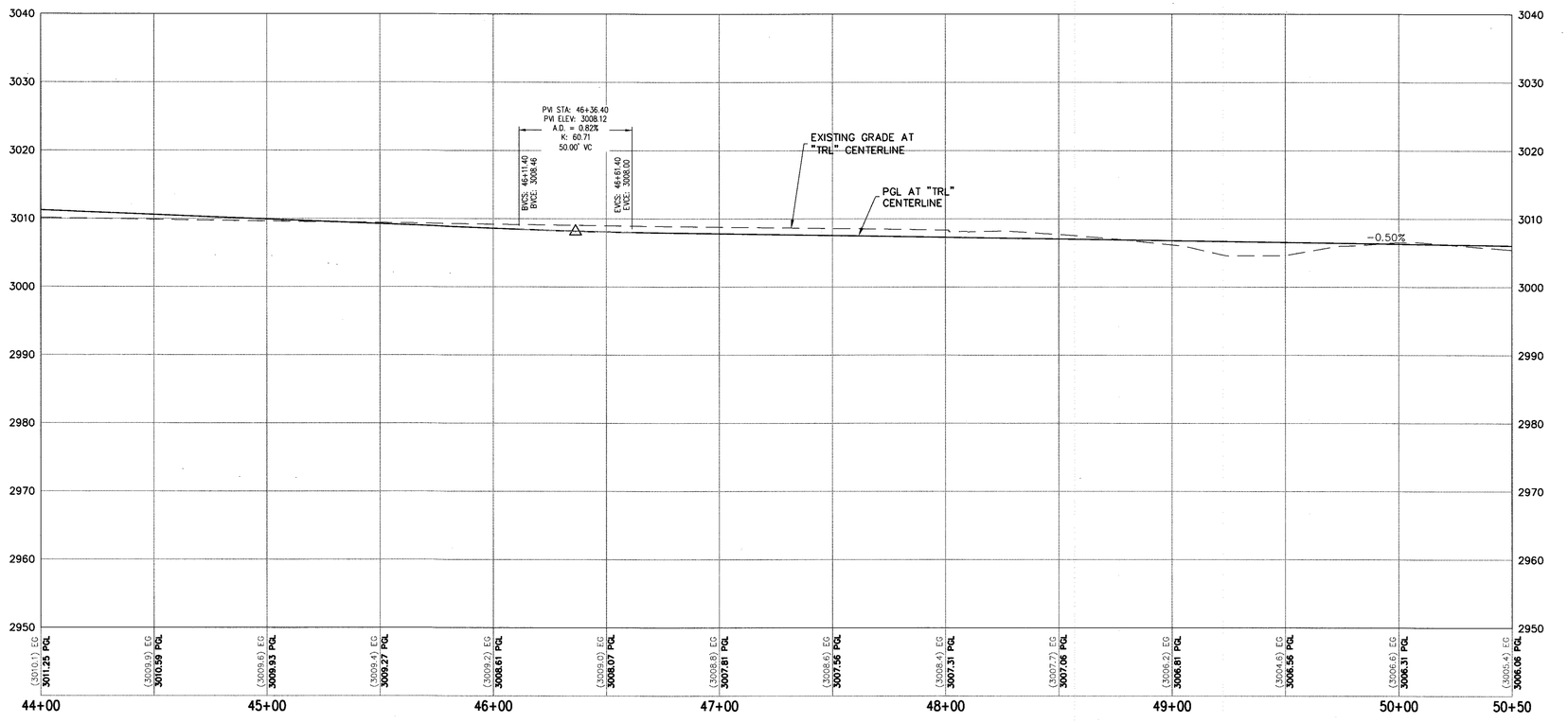
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C-17
SHEET 20 OF 50

DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

1. CONSTRUCT OVER 3-INCH PBS OVER 4-INCH TYPE II AGGREGATE BASE (SEE TY-SHEETS FOR TYPICAL SECTIONS)
2. SAWCUT AND MATCH EXISTING CONCRETE ACCESS ROAD
3. INSTALL GUARDRAIL (TRIPLE CORRUGATION) (NDOT STD. PLAN R-8.4.1)
4. INSTALL TANGENT END TERMINAL FOR GUARDRAIL (NDOT STD. PLAN R-8.1.1)
5. CONSTRUCT 12-FOOT WIDE MINIMUM ACCESS ROAD (DETAIL 3, SHEET TY-02)
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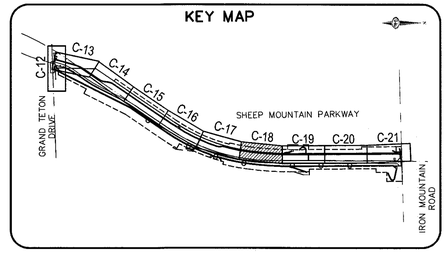
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4. SEE GR-SHEETS FOR GRADING AND STORM DRAIN PLAN.

LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



SCALE 30 0 30 60 FEET

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "TRL" 44+00.00 TO "TRL" 50+50.00

DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

PROJECT NO.
OLY1720.000

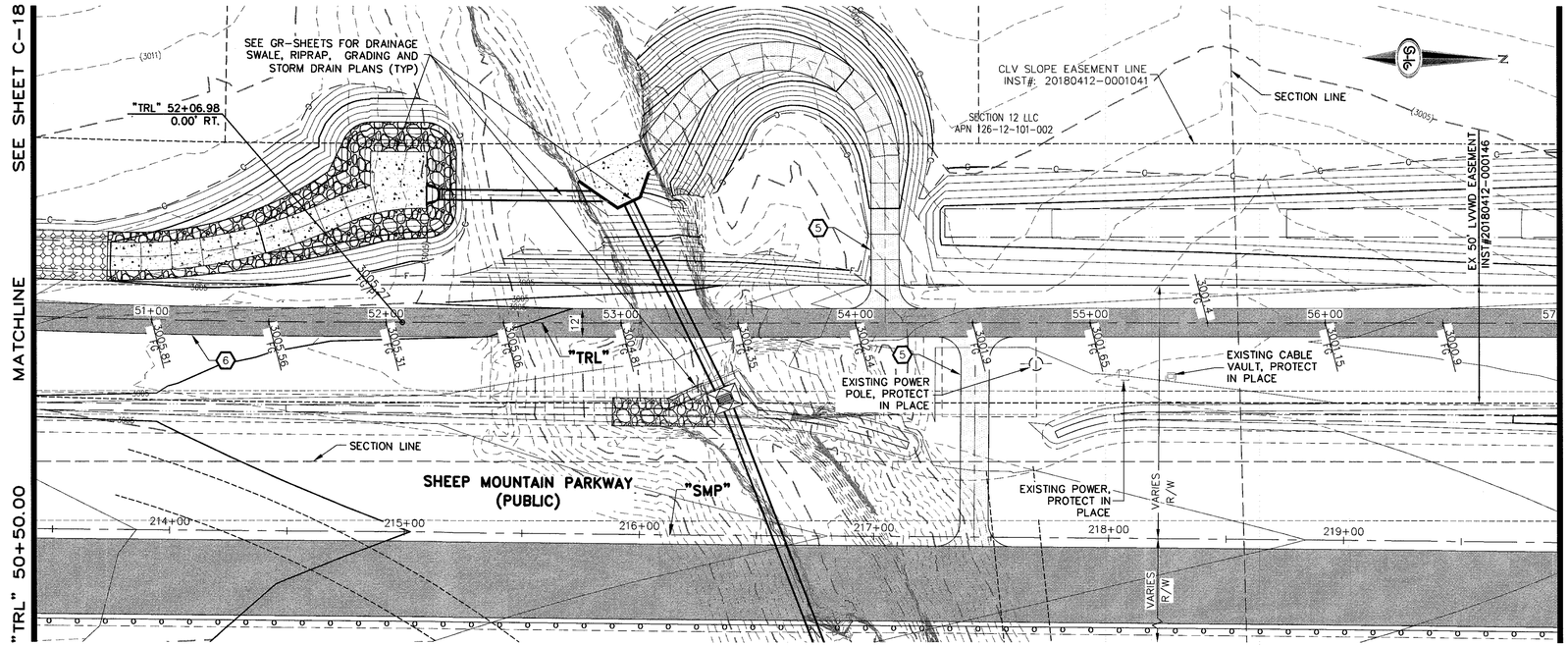
PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY J. SLATER
Exp. 06/30/2020
CIVIL
No. 14167

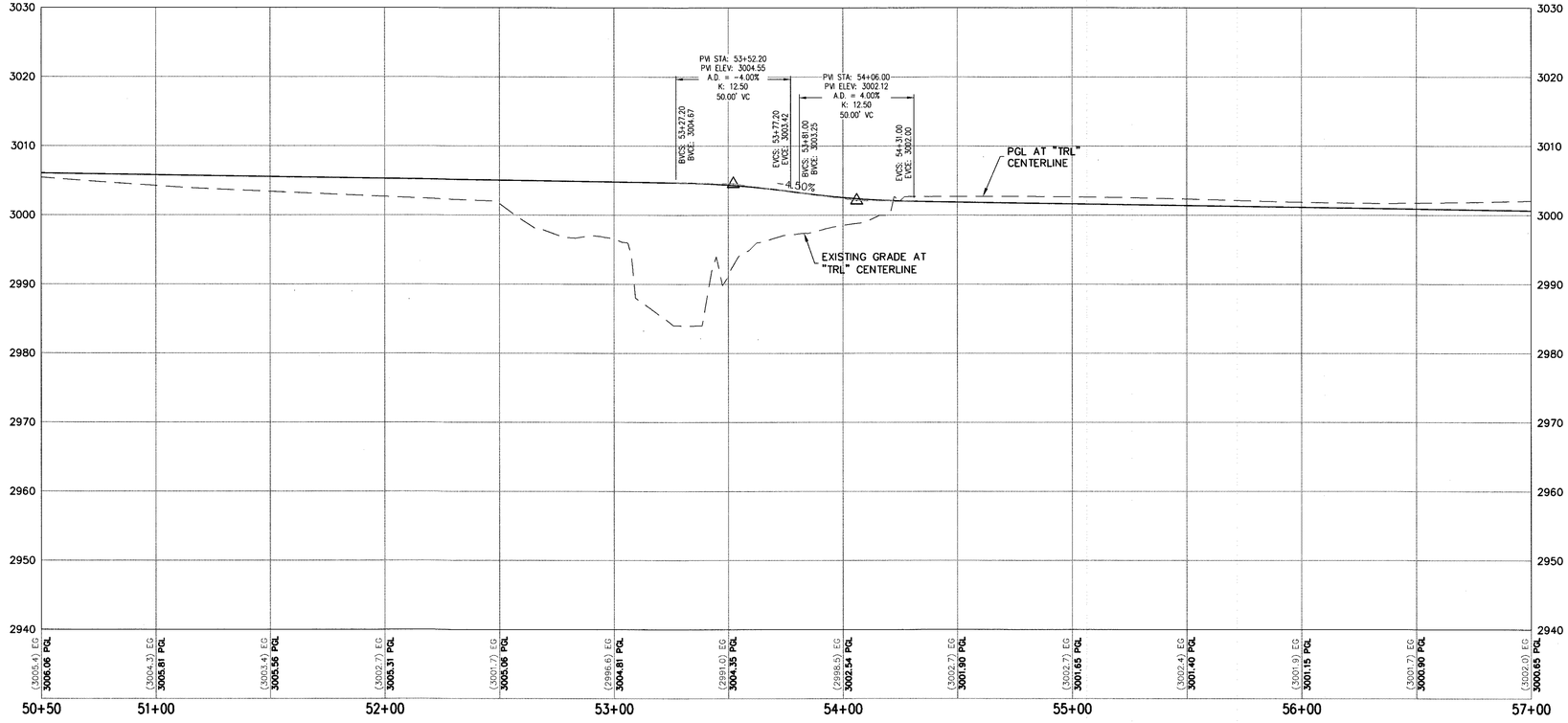
7/16/18

C-18
SHEET 21 OF 50

DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

1. CONSTRUCT OVER 3-INCH PBS OVER 4-INCH TYPE II AGGREGATE BASE (SEE TY-SHEETS FOR TYPICAL SECTIONS)
2. SAWCUT AND MATCH EXISTING CONCRETE ACCESS ROAD
3. INSTALL GUARDRAIL (TRIPLE CORRUGATION) (NDOT STD. PLAN R-8.4.1)
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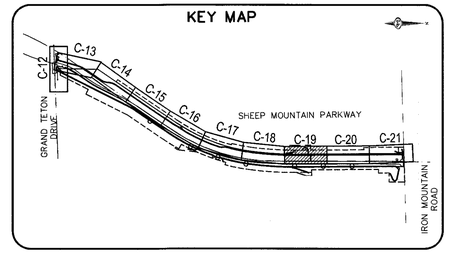
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4. SEE GR-SHEETS FOR GRADING AND STORM DRAIN PLAN.

LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



SCALE 30 0 30 60 FEET

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NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

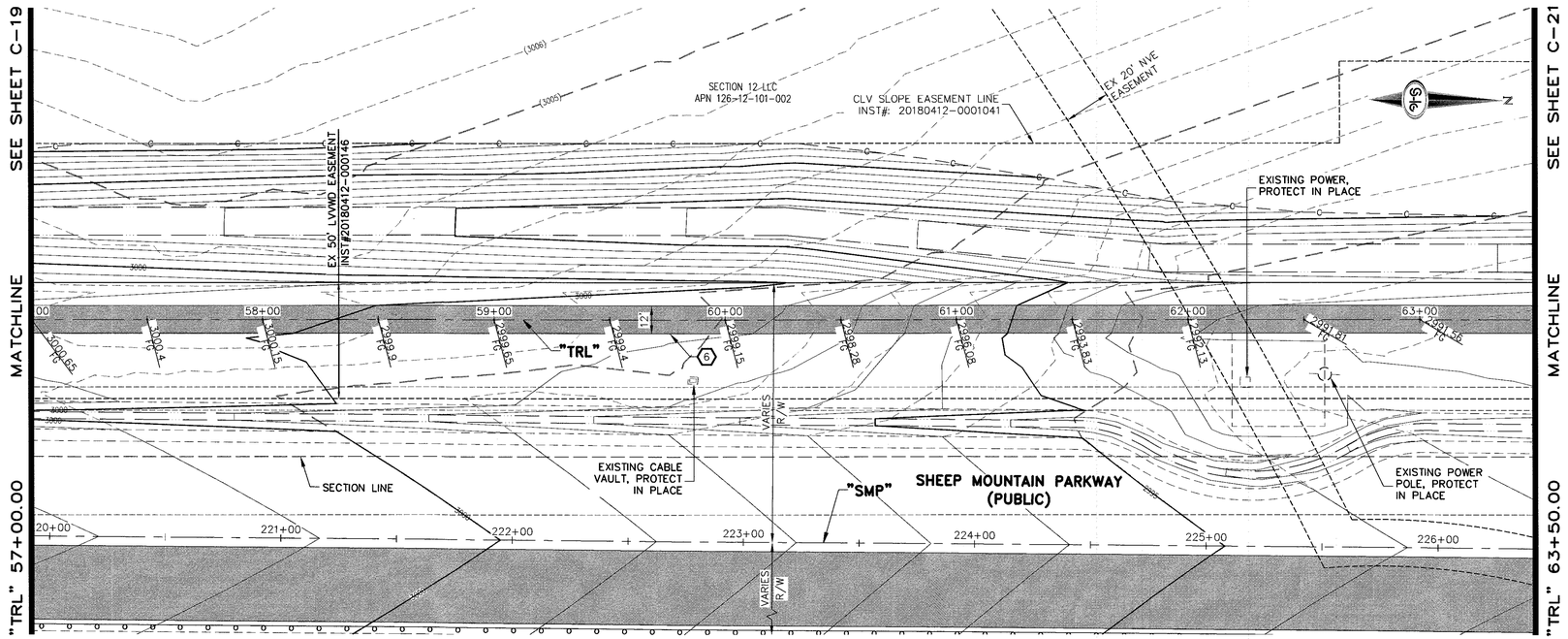
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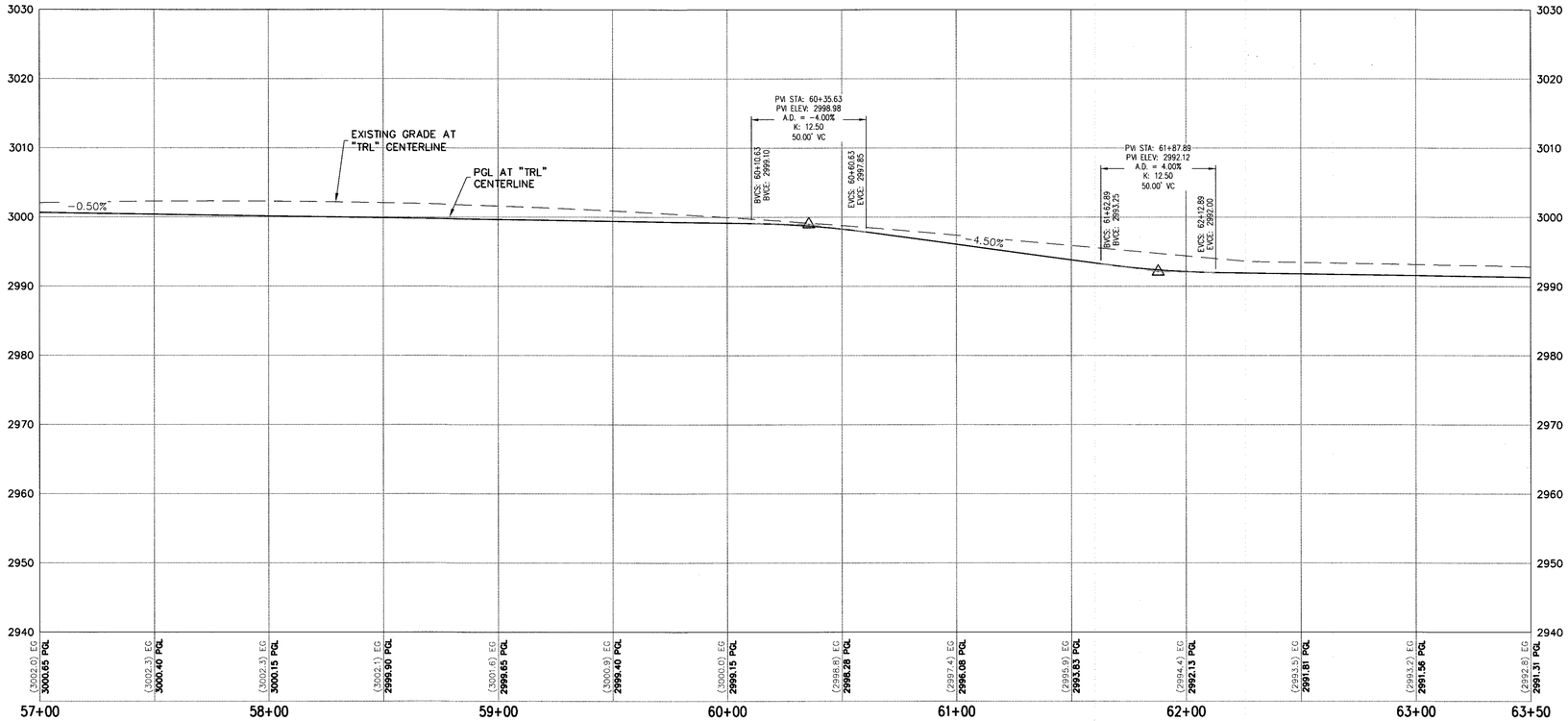
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DESIGNER: BCC
CHECKED: JSR
PROJECT NO. OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA - JERRY SLATER - Exp: 06/30/2020 - CIVIL - No. 14167

C-19
SHEET 22 OF 50
DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

1. CONSTRUCT OVER 3-INCH PBS OVER 4-INCH TYPE II AGGREGATE BASE (SEE TY-SHEETS FOR TYPICAL SECTIONS)
2. SAWCUT AND MATCH EXISTING CONCRETE ACCESS ROAD
3. INSTALL GUARDRAIL (TRIPLE CORRUGATION) (NDOT STD. PLAN R-8.4.1)
4. INSTALL TANGENT END TERMINAL FOR GUARDRAIL (NDOT STD. PLAN R-8.1.1)
5. CONSTRUCT 12-FOOT WIDE MINIMUM ACCESS ROAD (DETAIL 3, SHEET TY-02)
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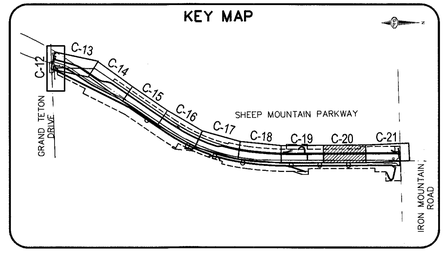
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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



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or
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

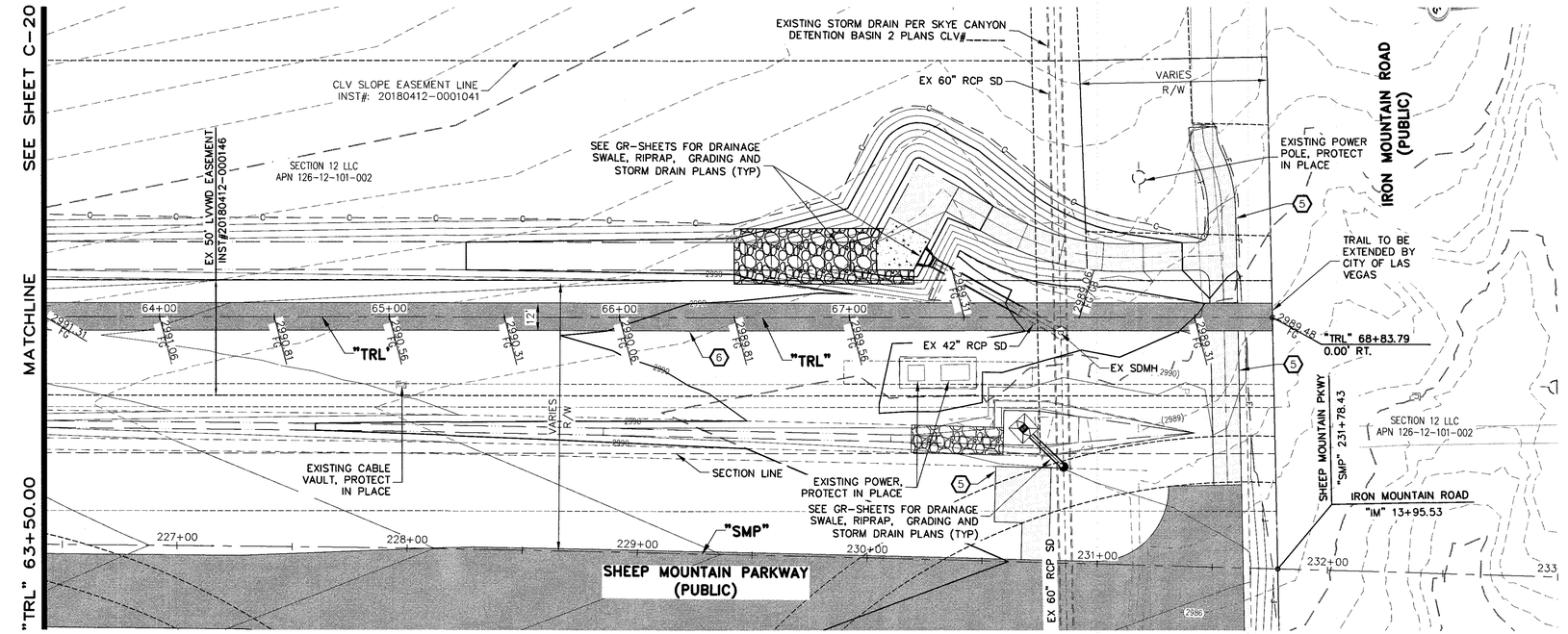
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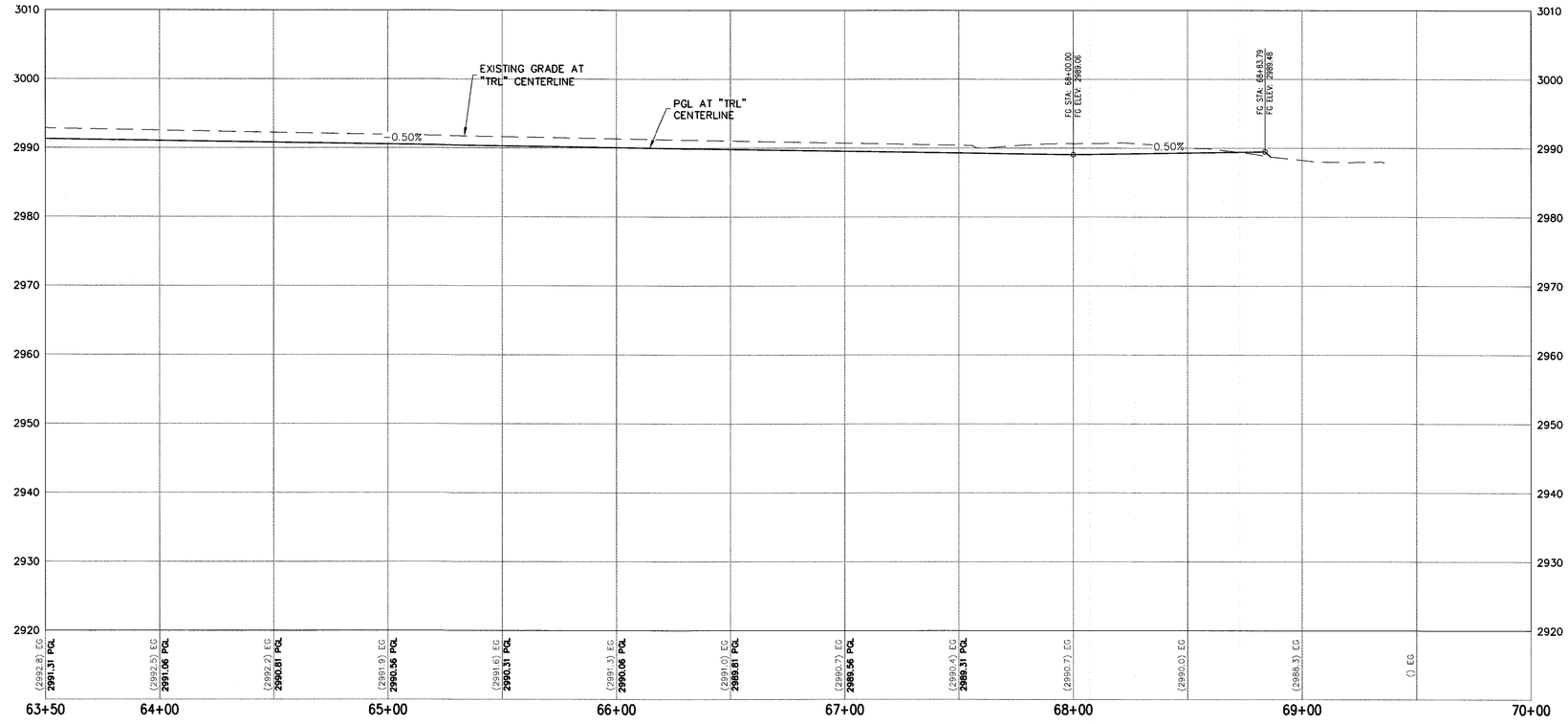
DATE: 07/16/18
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PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY SLATER
Exp. 06/30/2020
CIVIL
No. 14167
7/16/18

C-20
SHEET 23 OF 50
DWG NO. _____

HANSEN NO. _____





CONSTRUCTION NOTES

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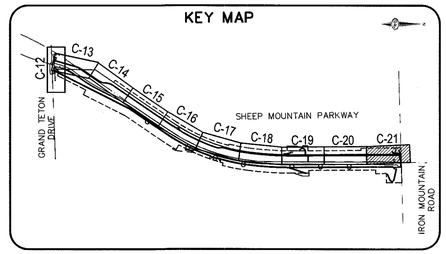
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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH

KEY MAP



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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

CONSTRUCTION PLAN - "TRL" 63+50.00 TO "TRL" 70+00.00

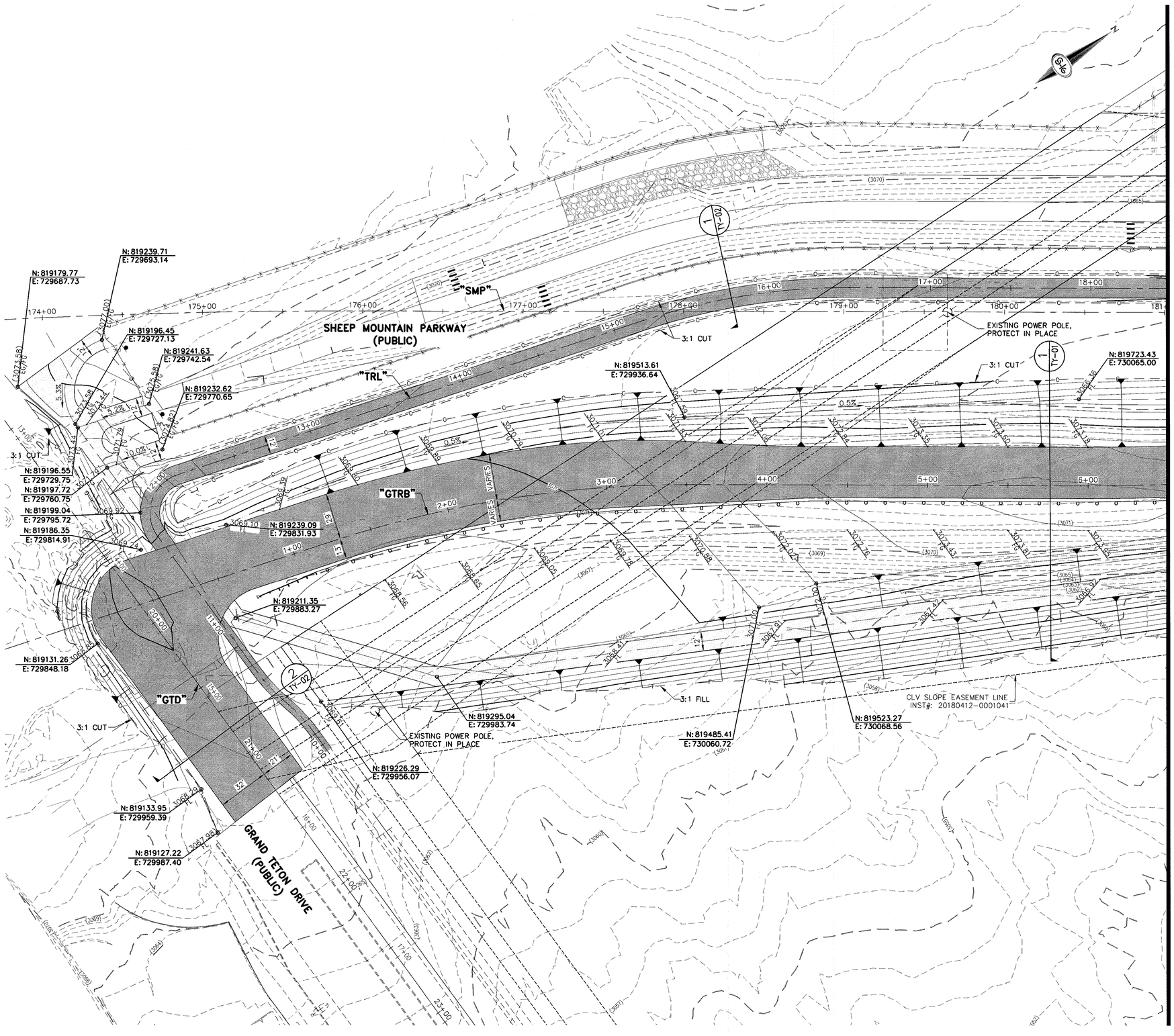
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PROFESSIONAL ENGINEER - STATE OF NEVADA - JERRY J. SLATER - Expir. 06/30/2020 - CIVIL - No. 14167

7/16/18

C-21
SHEET 24 OF 50
DWG NO. _____

HANSEN NO. _____



GRADING AND STORM DRAIN NOTES

1. INSTALL NDOT TYPE 2B STORM DRAIN DROP INLET WITH CONCRETE APRON (NDOT DETAIL R-4.2.2 AND R-4.2.7) (SEE SHEET TY-08)
2. ADJUST EXISTING STORM DRAIN DROP INLET TO FINISH GRADE (PER STRUCTURAL PLANS)
3. INSTALL RIPRAP (D50=3-INCH, T=12-INCH)
4. REMOVE EXISTING DROP INLET
5. INSTALL 36-INCH RCP STORM DRAIN (USDCCA STD. DWG. NO. 503.2)
6. INSTALL 48-INCH RCP STORM DRAIN (USDCCA STD. DWG. NO. 503.2)
7. ADJUST 72-INCH NDOT TYPE IV STORM DRAIN MANHOLE TO FINISH GRADE (NDOT DETAIL R-4.3.2) (SEE SHEET TY-08)
8. CONSTRUCT HEADWALL (PER STRUCTURAL DETAIL)
9. CONSTRUCT 6-INCH THICK CONCRETE PAD OVER 6-INCH TYPE II AGGREGATE BASE WITH 3-FOOT DEEP CUTOFF WALL (DETAIL 1, TY-04)
10. CONSTRUCT 6-INCH THICK CONCRETE PAD OVER 6-INCH TYPE II AGGREGATE BASE
11. CONNECT TO EXISTING RCP STORM DRAIN WITH CONCRETE COLLAR (DETAIL 5, SHEET TY-02)
12. REMOVE 120 SF EXISTING RIPRAP FOR INSTALLATION OF CONCRETE ACCESS ROAD
13. INSTALL 3-FT DEEP CONCRETE CUTOFF WALL (SEE DETAIL 4 ON TY-02)
14. INSTALL 42-INCH RCP STORM DRAIN (USDCCA STD. DWG. NO. 503.2)
15. INSTALL RCP END SECTION (NDOT R-2.3.1) (SEE SHEET TY-08)
16. CONSTRUCT 6-INCH THICK CONCRETE PAD OVER 6-INCH TYPE II AGGREGATE BASE WITH 3-FOOT DEEP CUTOFF WALL (DETAIL 1, SHEET TY-03)
17. INSTALL RIPRAP (D50=18-INCH, T=36-INCH)
18. INSTALL 60-INCH TYPE III STORM DRAIN MANHOLE (USDCCA STD. DWG. NO. 406)
19. INSTALL 3-INCH MINUS, 6-INCH THICK GRAVEL OVER 6-INCH TYPE II AGGREGATE BASE
20. ADJUST 60-INCH TYPE III MANHOLE TO FINISH GRADE (CCAUSD NO. 406)
21. INSTALL 24-INCH RCP STORM DRAIN (USDCCA STD. DWG. NO. 503.2)

NOTES

1. SEE TY-SHEETS FOR TYPICAL SECTIONS.
2. SEE SD-SHEETS FOR STORM PROFILES.
3. SEE UT-SHEETS FOR WATER AND SEWER PLAN AND PROFILES.
4. ALL RCP SHALL BE CLASS III UNLESS OTHERWISE SHOWN IN PROFILE.
5. ALL PIPE LENGTHS ARE MEASURED ALONG PIPE CENTERLINE TO CENTER OF MANHOLE OR INSIDE EDGE OF DI OR RCB/RCA.
6. ALL DROP INLETS SHALL INCLUDE STORM WATER MANAGEMENT STAMP AND DETAIL PER USDCCA STD. DWG. NO. 421.
7. SEE STRUCTURAL PLANS FOR ADDITIONAL STRUCTURAL DETAILS AND CONNECTIONS.
8. ALL PIPES ARE PUBLICLY MAINTAINED.

LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH
- RIPRAP (SIZE PER PLAN)
- (1) STORM DRAIN LATERAL # (SEE SHEET GR-10)

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY DS-4952 ON FILE AT THE CITY OF LAS VEGAS FOR THE SUBJECT PROJECT

JERRY SLATER, P.E. 14167 — DATE 7/16/18

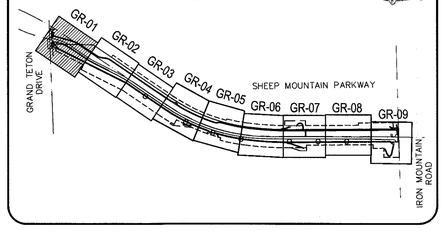
FLOOD ZONE

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE "X" (OUTSIDE THE 500-YEAR FLOOD PLAIN) ON THE FLOOD INSURANCE RATE MAP (FIRM) PANEL 32003C1735E, DATED SEPTEMBER 27, 2002

NOTE:

PROPERTY OWNER IS RESPONSIBLE TO MAINTAIN THE BEST MANAGEMENT PRACTICES, SUCH AS BUT NOT LIMITED TO, THE REMOVAL OF ACCUMULATED SEDIMENT AND DEBRIS AND CARE OF VEGETATION.

KEY MAP



30 0 30 60
SCALE FEET

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY
CALL BEFORE YOU DO OVERHEAD
1-702-227-2929

FAST
Call before you UnderGround.
1-702-432-5300
FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

GRADING PLAN - "GTRB" 0+00.00 TO "GTRB" 6+50.00

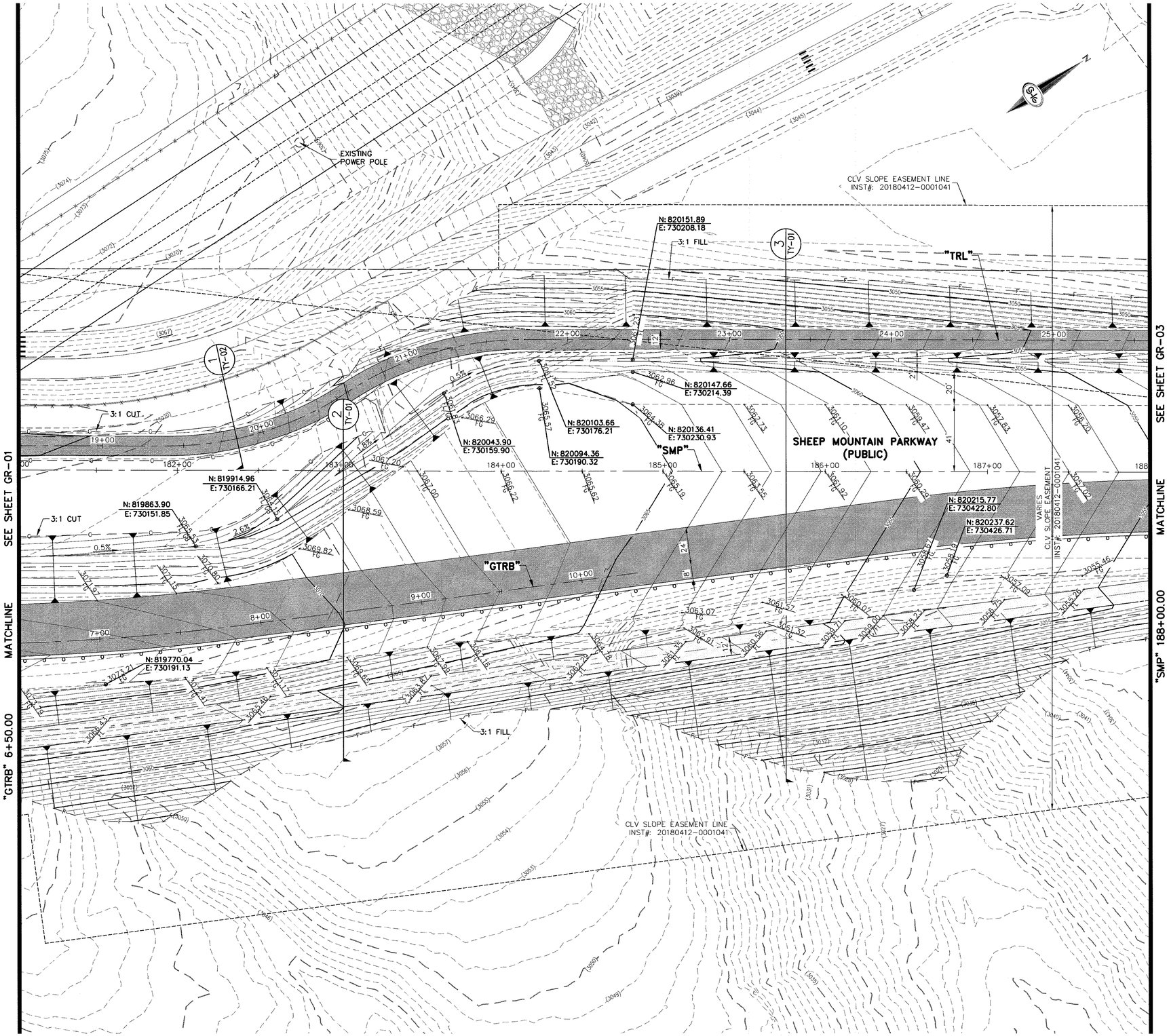
DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO. OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY D. SLATER
Exp. 06/30/2020
CIVIL
No. 14167
7.16.18

GR-01
SHEET 25 OF 50

DWG NO. _____

HANSEN NO. _____



GRADING AND STORM DRAIN NOTES

1. INSTALL NDOT TYPE 2B STORM DRAIN DROP INLET WITH CONCRETE APRON (NDOT DETAIL R-4.2.2 AND R-4.2.7) (SEE SHEET TY-08)
2. ADJUST EXISTING STORM DRAIN DROP INLET TO FINISH GRADE (PER STRUCTURAL PLANS)
3. INSTALL RIPRAP (D50=3-INCH, T=12-INCH)
4. REMOVE EXISTING DROP INLET
5. INSTALL 36-INCH RCP STORM DRAIN (USDCCA STD. DWG. NO. 503.2)
6. INSTALL 48-INCH RCP STORM DRAIN (USDCCA STD. DWG. NO. 503.2)
7. ADJUST 72-INCH NDOT TYPE IV STORM DRAIN MANHOLE TO FINISH GRADE (NDOT DETAIL R-4.3.2) (SEE SHEET TY-08)
8. CONSTRUCT HEADWALL (PER STRUCTURAL DETAIL)
9. CONSTRUCT 6-INCH THICK CONCRETE PAD OVER 6-INCH TYPE II AGGREGATE BASE WITH 3-FOOT DEEP CUTOFF WALL (DETAIL 1, TY-04)
10. CONSTRUCT 6-INCH THICK CONCRETE PAD OVER 6-INCH TYPE II AGGREGATE BASE
11. CONNECT TO EXISTING RCP STORM DRAIN WITH CONCRETE COLLAR (DETAIL 5, SHEET TY-02)
12. REMOVE 120 SF EXISTING RIPRAP FOR INSTALLATION OF CONCRETE ACCESS ROAD
13. INSTALL 3-FT DEEP CONCRETE CUTOFF WALL (SEE DETAIL 4 ON TY-02)
14. INSTALL 42-INCH RCP STORM DRAIN (USDCCA STD. DWG. NO. 503.2)
15. INSTALL RCP END SECTION (NDOT R-2.3.1) (SEE SHEET TY-08)
16. CONSTRUCT 6-INCH THICK CONCRETE PAD OVER 6-INCH TYPE II AGGREGATE BASE WITH 3-FOOT DEEP CUTOFF WALL (DETAIL 1, SHEET TY-03)
17. INSTALL RIPRAP (D50=18-INCH, T=36-INCH)
18. INSTALL 60-INCH TYPE III STORM DRAIN MANHOLE (USDCCA STD. DWG. NO. 406)
19. INSTALL 3-INCH MINUS, 6-INCH THICK GRAVEL OVER 6-INCH TYPE II AGGREGATE BASE
20. ADJUST 60-INCH TYPE III MANHOLE TO FINISH GRADE (CCAUSD NO. 406)
21. INSTALL 24-INCH RCP STORM DRAIN (USDCCA STD. DWG. NO. 503.2)

NOTES

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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH
- RIPRAP (SIZE PER PLAN)
- 1 — STORM DRAIN LATERAL # (SEE SHEET GR-10)

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY DS-4952 ON FILE AT THE CITY OF LAS VEGAS FOR THE SUBJECT PROJECT

JERRY SLATER, P.E. 14167 — DATE 7/16/18

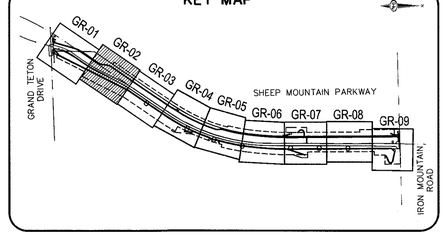
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NOTE:

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KEY MAP



SCALE: 30 0 30 60 FEET

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DIG OVERHEAD 1-702-227-2929

FAST Call before you Dig Underground. 1-702-432-5300 FREWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Dig Avoid cutting underground utility lines in the county. Call 811 or 1-800-227-2600

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

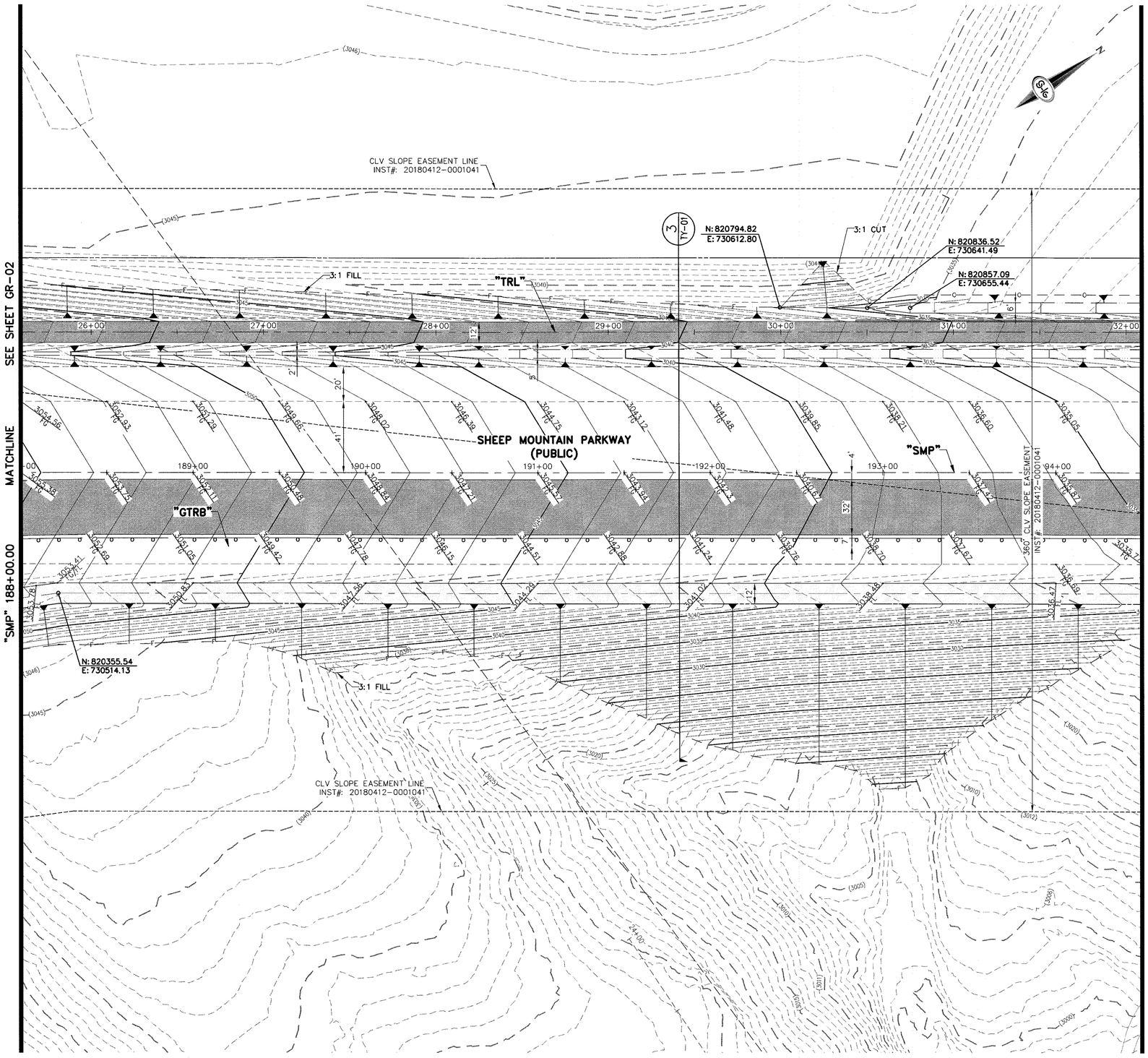
GRADING PLAN - "GTRB" 6+50.00 TO "GTRB" 12+00.00

DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO. OLY1720.000

PROFESSIONAL ENGINEER — STATE OF NEVADA — JERRY SLATER — Expires 06/30/2020 — CIVIL — No. 14167 — PROFESSIONAL
7/16/18

GR-02
SHEET 26 OF 50
DWG NO. _____

HANSEN NO. _____



GRADING AND STORM DRAIN NOTES

1. INSTALL NDOT TYPE 2B STORM DRAIN DROP INLET WITH CONCRETE APRON (NDOT DETAIL R-4.2.2 AND R-4.2.7) (SEE SHEET TY-08)
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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH
- RIPRAP (SIZE PER PLAN)
- (1) STORM DRAIN LATERAL # (SEE SHEET GR-10)

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY DS-4952 ON FILE AT THE CITY OF LAS VEGAS FOR THE SUBJECT PROJECT

JERRY SLATER, P.E. 14167 — DATE 7/16/18

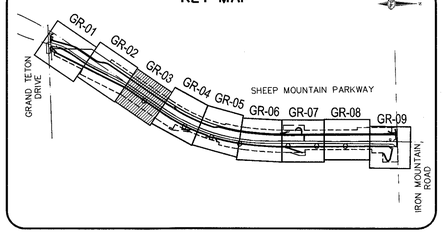
FLOOD ZONE

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KEY MAP



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SCALE FEET

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PHONE (702) 284-5300
FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT CEMENT LLC

SHEEP MOUNTAIN PARKWAY

GRADING PLAN - "SMP" 188+00.00 TO "SMP" 194+50.00

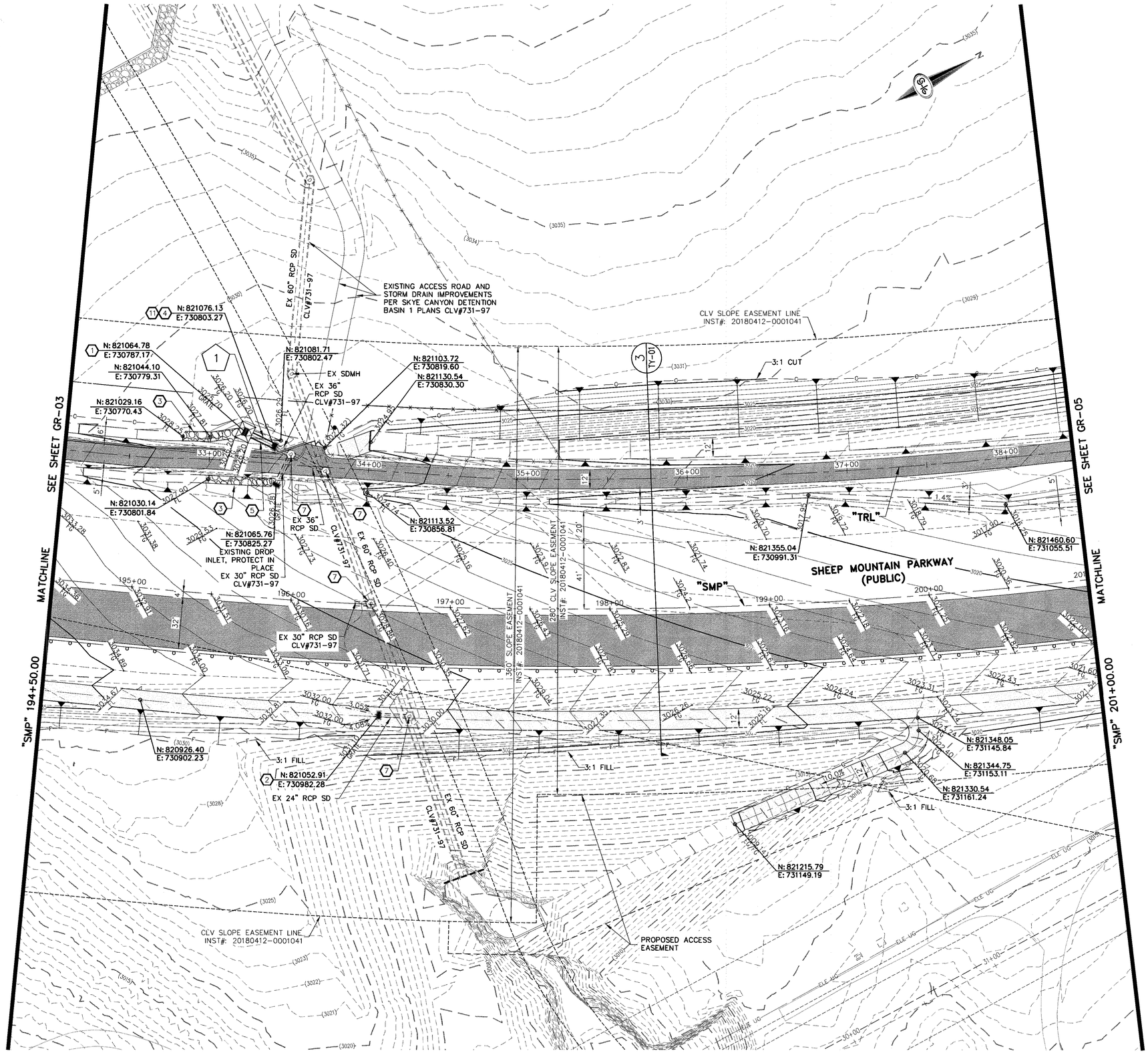
DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY J. SLATER
Exp. 06/30/2020
CIVIL
No. 14167
7-16-18

GR-03
SHEET 27 OF 50

DWG NO. _____

HANSEN NO. _____



GRADING AND STORM DRAIN NOTES

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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH
- RIPRAP (SIZE PER PLAN)
- (1) STORM DRAIN LATERAL # (SEE SHEET GR-10)

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY (DS-4552 ON FILE AT THE CITY OF LAS VEGAS FOR THE SUBJECT PROJECT

JERRY SLATER, P.E. 14167 — DATE 7/16/18

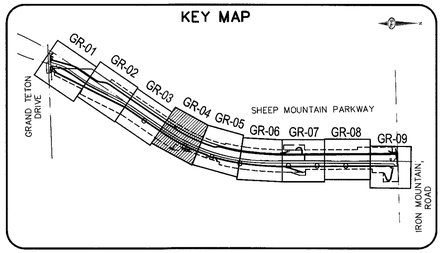
FLOOD ZONE

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KEY MAP



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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

GRADING PLAN - "SMP" 194+50.00 TO "SMP" 201+00.00

DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

PROJECT NO. OLY1720.000

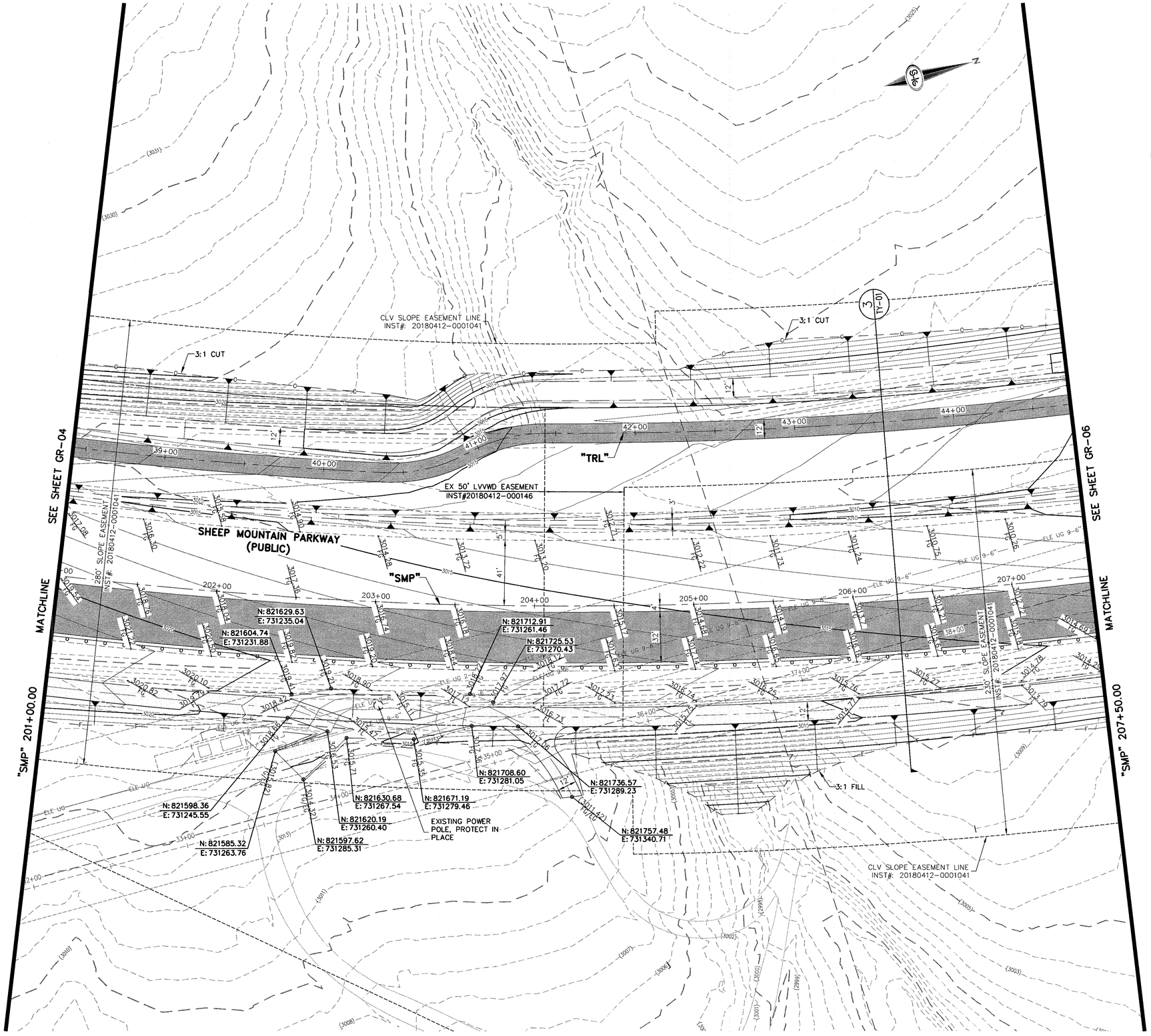
PROFESSIONAL ENGINEER - STATE OF NEVADA - JERRY J. SLATER - Exp. 06/30/2020 - CIVIL - No. 14167 - 7/16/18

GR-04

SHEET 28 OF 50

DWG NO. _____

HANSEN NO. _____



GRADING AND STORM DRAIN NOTES

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LEGEND

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- RIPRAP (SIZE PER PLAN)
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JERRY SLATER, P.E. 14167 — DATE 7-1-18

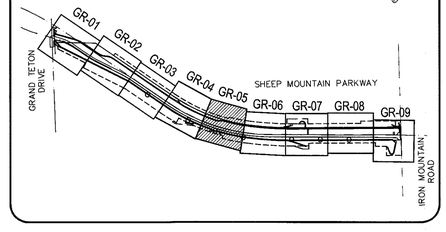
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KEY MAP



SCALE: 30 0 30 60 FEET

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD. 1-702-227-2929

FAST. Call before you UnderGround. 1-702-432-5300. TRUCKEE AND WYOMING SYSTEM OF RECOGNITION

Call before you Dig. Avoid cutting underground utility lines. Call 811 or 1-800-227-2600

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

GRADING PLAN - "SMP" 201+00.00 TO "SMP" 207+50.00

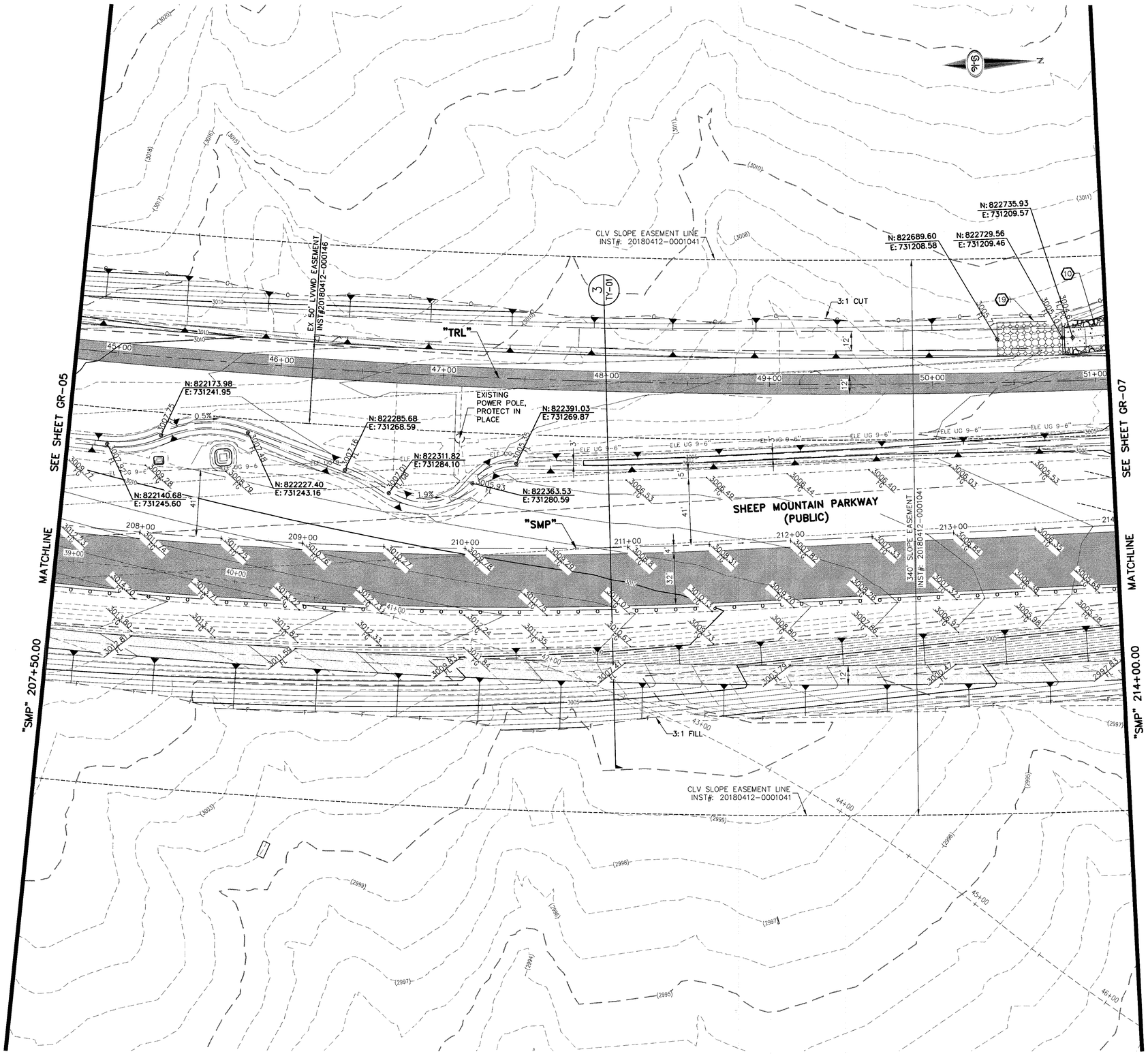
DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO. OLY1720.000

PROFESSIONAL ENGINEER — STATE OF NEVADA — JERRY SLATER — Exp. 06/30/2020 — CIVIL — No. 14167 — 7-1-18

GR-05
SHEET 29 OF 50

DWG NO. _____

HANSEN NO. _____



GRADING AND STORM DRAIN NOTES

1. INSTALL NDOT TYPE 2B STORM DRAIN DROP INLET WITH CONCRETE APRON (NDOT DETAIL R-4.2.2 AND R-4.2.7) (SEE SHEET TY-08)
2. ADJUST EXISTING STORM DRAIN DROP INLET TO FINISH GRADE (PER STRUCTURAL PLANS)
3. INSTALL RIPRAP (D50=3-INCH, T=12-INCH)
4. REMOVE EXISTING DROP INLET
5. INSTALL 36-INCH RCP STORM DRAIN (USDCCA STD. DWG. NO. 503.2)
6. INSTALL 48-INCH RCP STORM DRAIN (USDCCA STD. DWG. NO. 503.2)
7. ADJUST 72-INCH NDOT TYPE IV STORM DRAIN MANHOLE TO FINISH GRADE (NDOT DETAIL R-4.3.2) (SEE SHEET TY-08)
8. CONSTRUCT HEADWALL (PER STRUCTURAL DETAIL)
9. CONSTRUCT 6-INCH THICK CONCRETE PAD OVER 6-INCH TYPE II AGGREGATE BASE WITH 3-FOOT DEEP CUTOFF WALL (DETAIL 1, TY-04)
10. CONSTRUCT 6-INCH THICK CONCRETE PAD OVER 6-INCH TYPE II AGGREGATE BASE
11. CONNECT TO EXISTING RCP STORM DRAIN WITH CONCRETE COLLAR (DETAIL 5, SHEET TY-02)
12. REMOVE 120 SF EXISTING RIPRAP FOR INSTALLATION OF CONCRETE ACCESS ROAD
13. INSTALL 3-FT DEEP CONCRETE CUTOFF WALL (SEE DETAIL 4 ON TY-02)
14. INSTALL 42-INCH RCP STORM DRAIN (USDCCA STD. DWG. NO. 503.2)
15. INSTALL RCP END SECTION (NDOT R-2.3.1) (SEE SHEET TY-08)
16. CONSTRUCT 6-INCH THICK CONCRETE PAD OVER 6-INCH TYPE II AGGREGATE BASE WITH 3-FOOT DEEP CUTOFF WALL (DETAIL 1, SHEET TY-03)
17. INSTALL RIPRAP (D50=18-INCH, T=36-INCH)
18. INSTALL 60-INCH TYPE III STORM DRAIN MANHOLE (USDCCA STD. DWG. NO. 406)
19. INSTALL 3-INCH MINUS, 6-INCH THICK GRAVEL OVER 6-INCH TYPE II AGGREGATE BASE
20. ADJUST 60-INCH TYPE III MANHOLE TO FINISH GRADE (CCAUSD NO. 406)
21. INSTALL 24-INCH RCP STORM DRAIN (USDCCA STD. DWG. NO. 503.2)

NOTES

1. SEE TY-SHEETS FOR TYPICAL SECTIONS.
2. SEE SD-SHEETS FOR STORM PROFILES.
3. SEE UT-SHEETS FOR WATER AND SEWER PLAN AND PROFILES.
4. ALL RCP SHALL BE CLASS III UNLESS OTHERWISE SHOWN IN PROFILE.
5. ALL PIPE LENGTHS ARE MEASURED ALONG PIPE CENTERLINE TO CENTER OF MANHOLE OR INSIDE EDGE OF DI OR RCB/RCA.
6. ALL DROP INLETS SHALL INCLUDE STORM WATER MANAGEMENT STAMP AND DETAIL PER USDCCA STD. DWG. NO. 421.
7. SEE STRUCTURAL PLANS FOR ADDITIONAL STRUCTURAL DETAILS AND CONNECTIONS.
8. ALL PIPES ARE PUBLICLY MAINTAINED.

LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH
- RIPRAP (SIZE PER PLAN)
- (1) STORM DRAIN LATERAL # (SEE SHEET GR-10)

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY DS-4952 ON FILE AT THE CITY OF LAS VEGAS FOR THE SUBJECT PROJECT

JERRY SLATER, P.E. 14167 — DATE

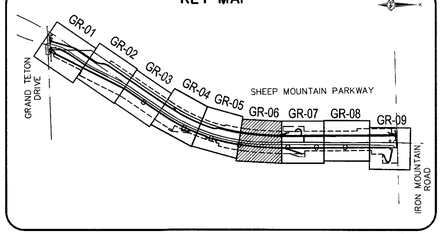
FLOOD ZONE

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE "X" (OUTSIDE THE 500-YEAR FLOOD PLAIN) ON THE FLOOD INSURANCE RATE MAP (FIRM) PANEL: 32003C1735E, DATED SEPTEMBER 27, 2002

NOTE:

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KEY MAP



30 0 30 60
SCALE FEET

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FAST
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OR
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

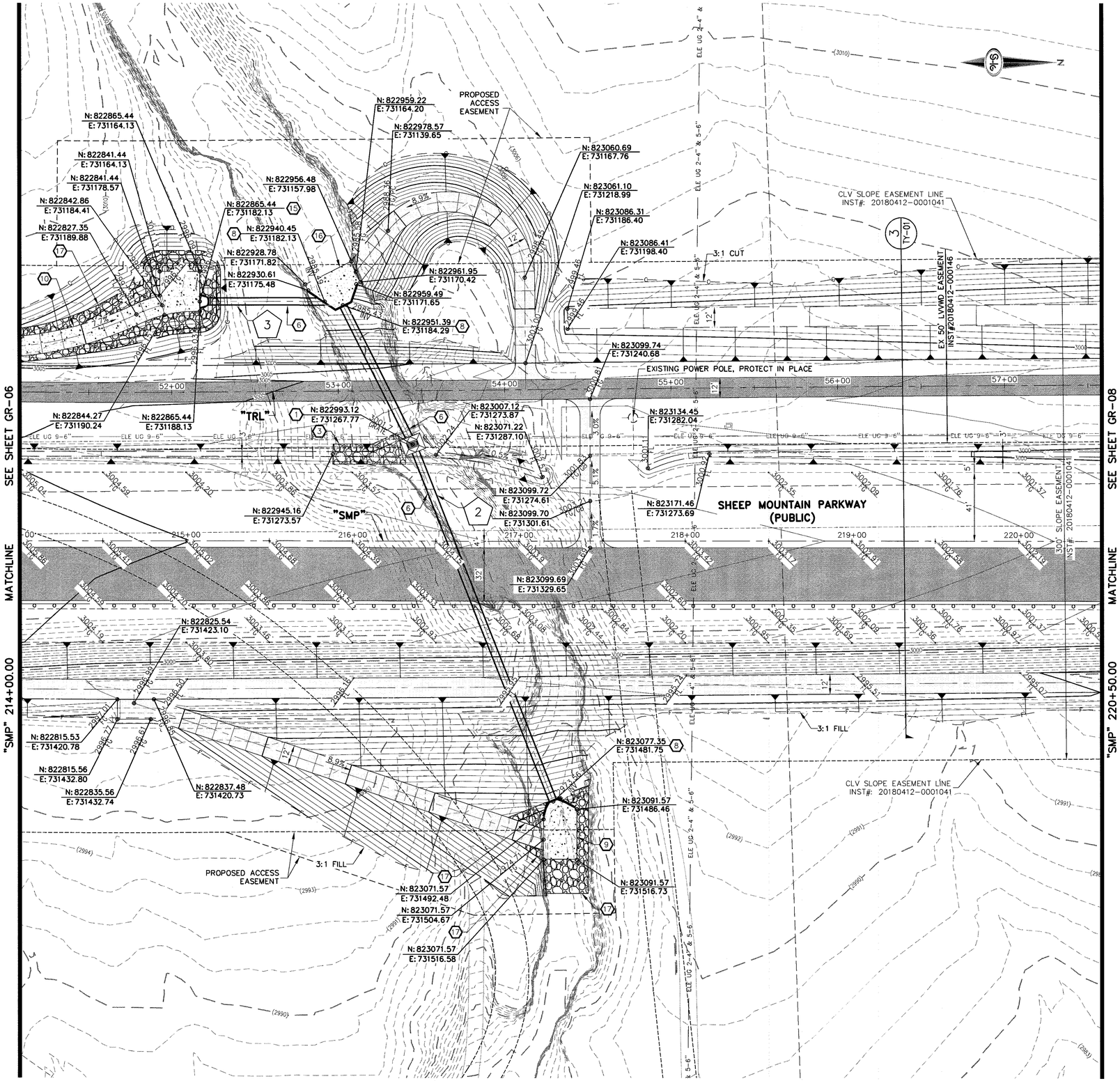
GRADING PLAN - "SMP" 207+50.00 TO "SMP" 214+00.00

DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO. OLY1720.000

PROFESSIONAL ENGINEER STATE OF NEVADA
JERRY J. SLATER
Exp. 06/30/2020
CIVIL
No. 14167

GR-06
SHEET 30 OF 50
DWG NO. _____

HANSEN NO. _____



GRADING AND STORM DRAIN NOTES

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8. CONSTRUCT HEADWALL (PER STRUCTURAL DETAIL)
9. CONSTRUCT 6-INCH THICK CONCRETE PAD OVER 6-INCH TYPE II AGGREGATE BASE WITH 3-FOOT DEEP CUTOFF WALL (DETAIL 1, TY-04)
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LEGEND

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I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY DS-4952 ON FILE AT THE CITY OF LAS VEGAS FOR THE SUBJECT PROJECT

JERRY SLATER, P.E. 14167 — DATE 7.16.18

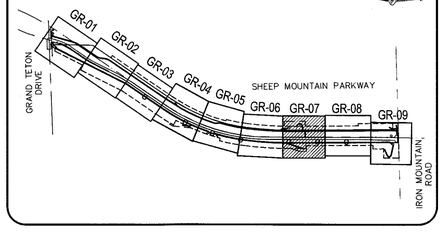
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KEY MAP



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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

GRADING PLAN - "SMP" 214+00.00 TO "SMP" 220+50.00

DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

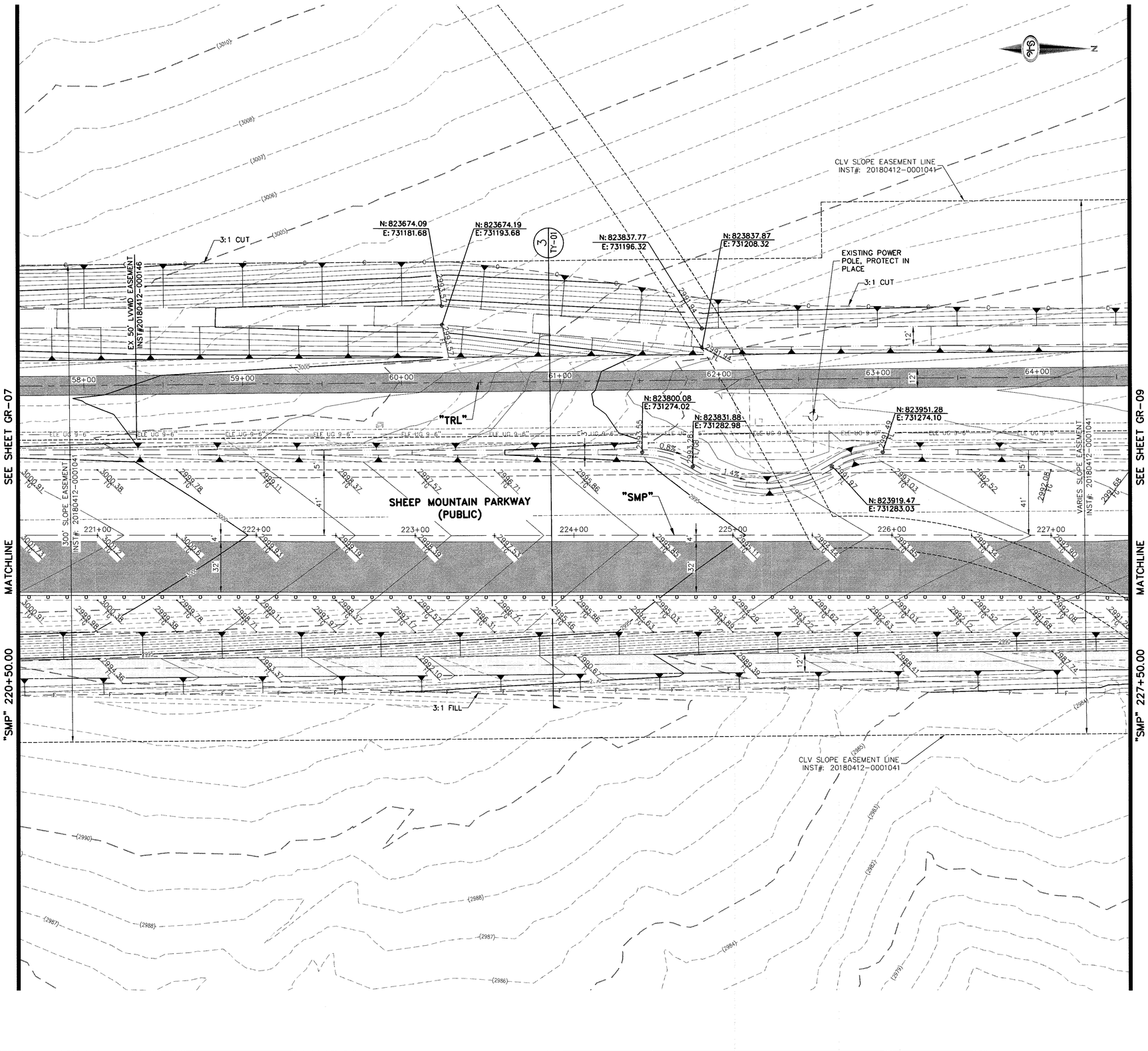
PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY V. SLATER
Exp. 06/30/2020
CIVIL
No. 14167
7-16-18

GR-07
SHEET 31 OF 50

DWG NO. _____

HANSEN NO. _____



BCC
BCC
JSR

GRADING AND STORM DRAIN NOTES

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- (1) STORM DRAIN LATERAL # (SEE SHEET GR-10)

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JERRY SLATER, P.E. 14167 — DATE

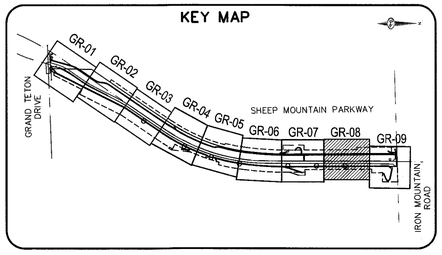
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

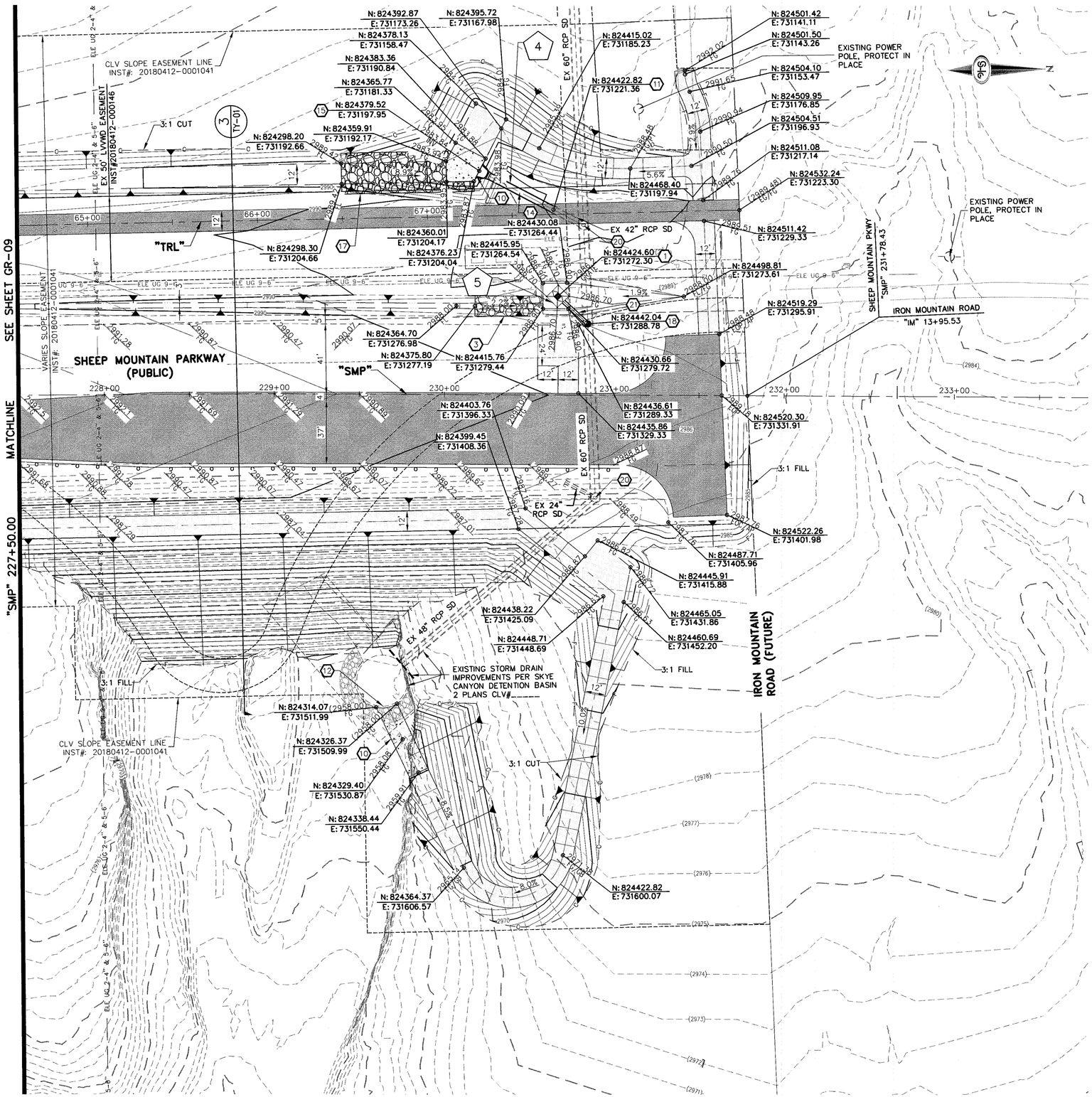
GRADING PLAN - "SMP" 220+50.00 TO "SMP" 227+50.00

DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO. OLY1720.000

PROFESSIONAL ENGINEER — STATE OF NEVADA — JERRY SLATER — Exp. 06/30/2020 — CIVIL — No. 14167

GR-08
SHEET 32 OF 50
DWG NO. _____

HANSEN NO. _____



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LEGEND

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JERRY SLATER, P.E. 14167 — DATE 7/16/18

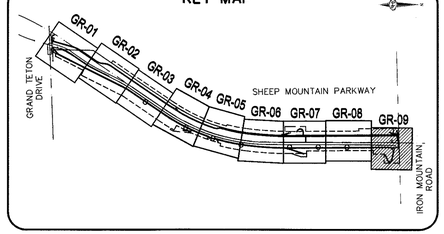
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NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

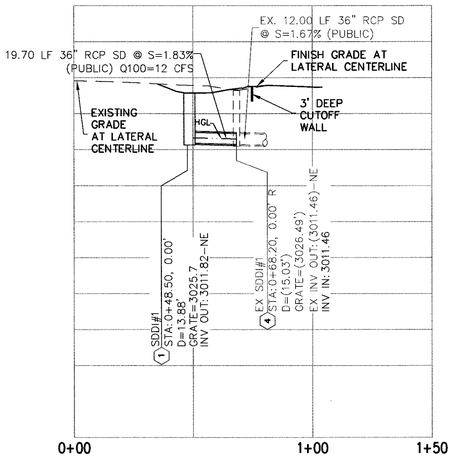
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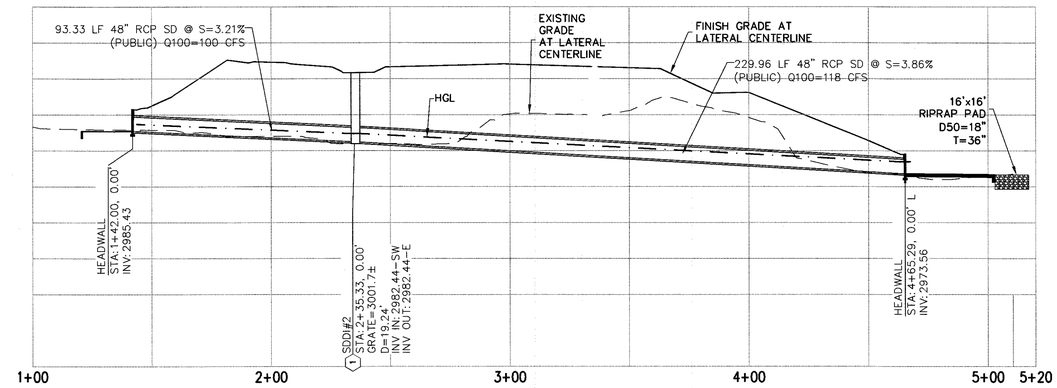
PROFESSIONAL ENGINEER — STATE OF NEVADA — JERRY SLATER — Exp. 06/30/2020 — CIVIL — No. 14167 — 7/16/18

GR-09
SHEET 33 OF 50
DWG NO. _____

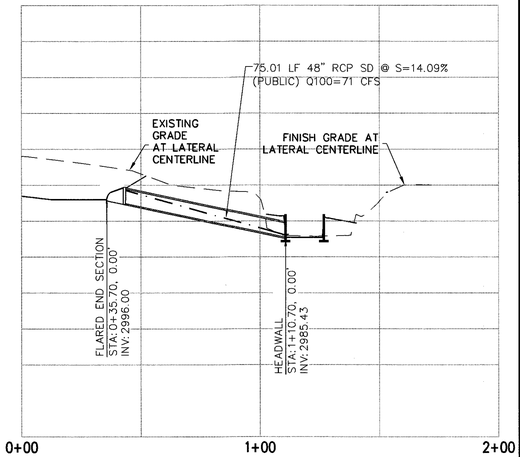
HANSEN NO. _____



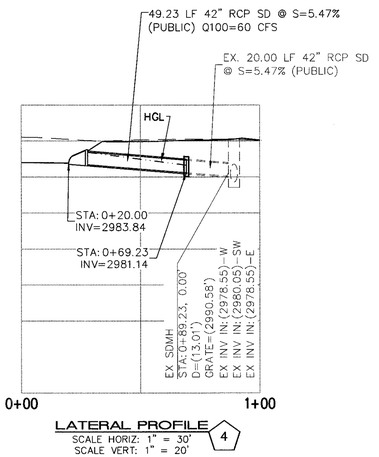
LATERAL PROFILE 1
SCALE HORIZ: 1" = 30'
SCALE VERT: 1" = 20'



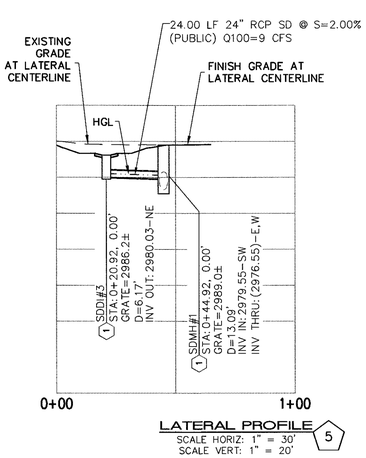
LATERAL PROFILE 2
SCALE HORIZ: 1" = 30'
SCALE VERT: 1" = 20'



LATERAL PROFILE 3
SCALE HORIZ: 1" = 30'
SCALE VERT: 1" = 20'



LATERAL PROFILE 4
SCALE HORIZ: 1" = 30'
SCALE VERT: 1" = 20'



LATERAL PROFILE 5
SCALE HORIZ: 1" = 30'
SCALE VERT: 1" = 20'

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
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PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

STORM DRAIN LATERAL PROFILES

DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

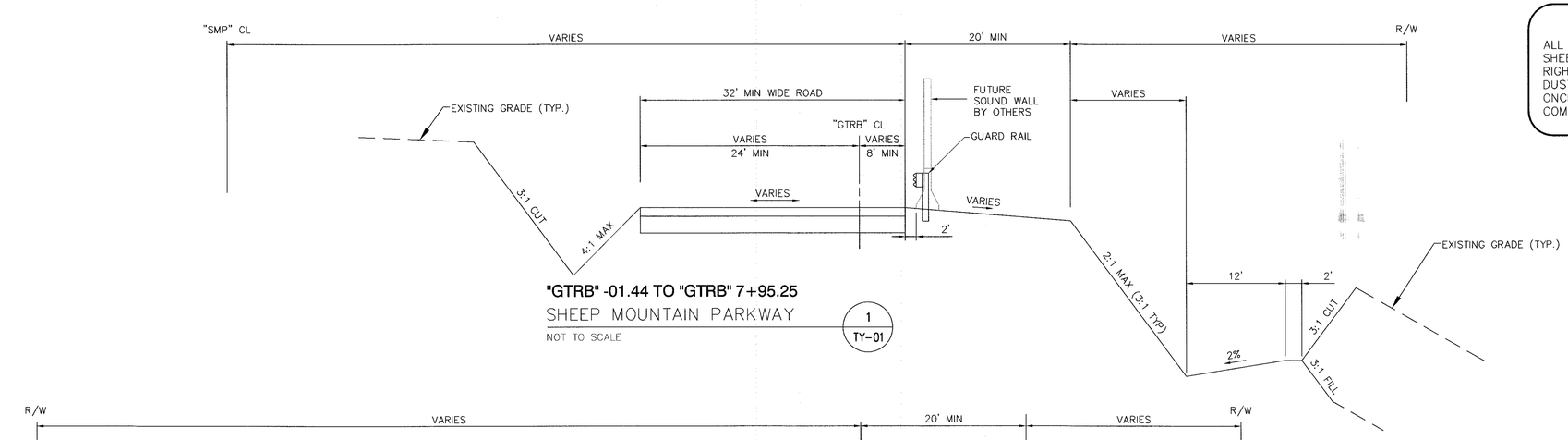
PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER STATE OF NEVADA
JERRY SLATER
Exp. 06/30/2020
CIVIL
No. 14167

GR-10
SHEET 34 OF 50

DWG NO. _____

HANSEN NO. _____

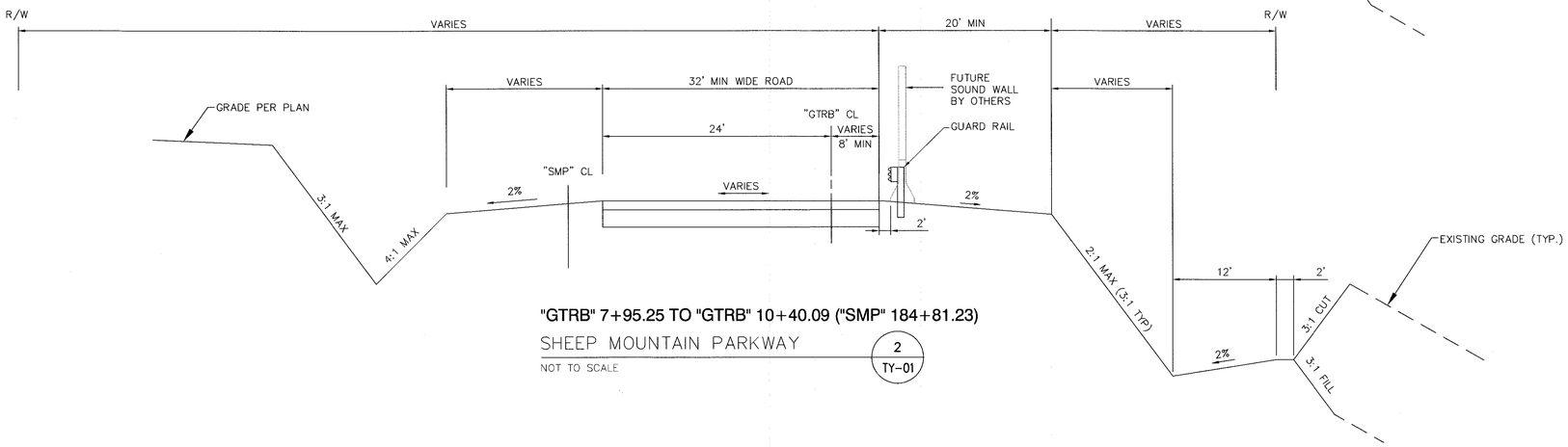


"GTRB" -01.44 TO "GTRB" 7+95.25

SHEEP MOUNTAIN PARKWAY

NOT TO SCALE

1 / TY-01

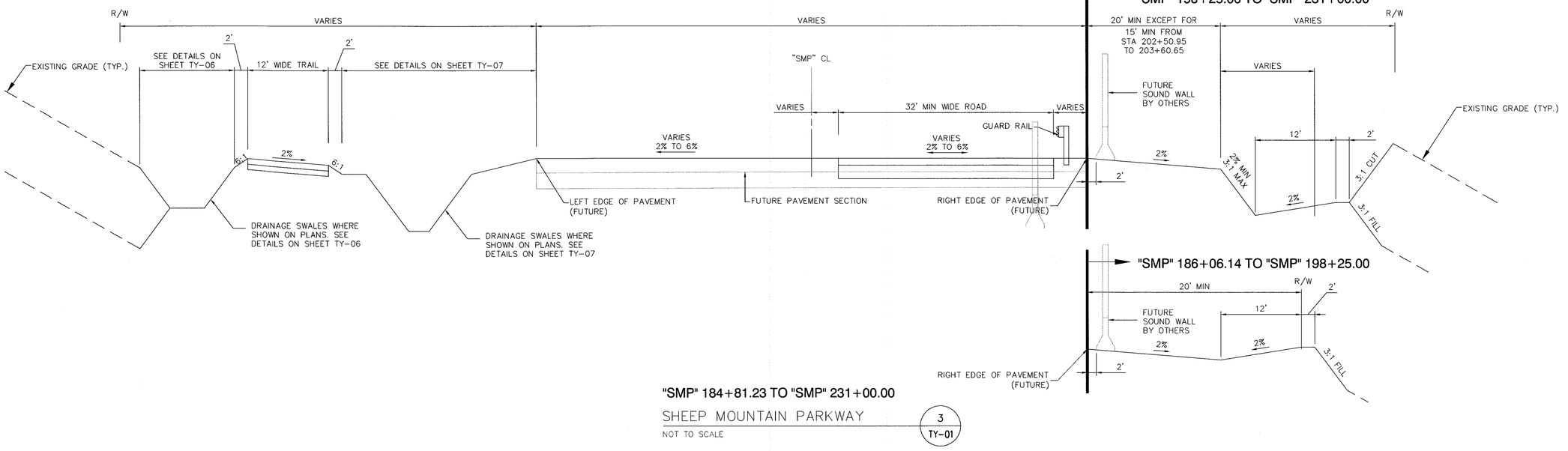


"GTRB" 7+95.25 TO "GTRB" 10+40.09 ("SMP" 184+81.23)

SHEEP MOUNTAIN PARKWAY

NOT TO SCALE

2 / TY-01



"SMP" 184+81.23 TO "SMP" 231+00.00

SHEEP MOUNTAIN PARKWAY

NOT TO SCALE

3 / TY-01

NOTE

ALL UNPAVED AREAS WITHIN THE SHEEP MOUNTAIN PARKWAY RIGHT-OF-WAY SHALL RECEIVE A DUST PALLIATIVE APPLICATION ONCE CONSTRUCTION IS COMPLETE

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

TYPICAL SECTIONS 1

DATE: 07/16/18

DRAFTER: BCC

DESIGNER: BCC

CHECKED: JSR

PROJECT NO. OLY1720.000

PROFESSIONAL ENGINEER — STATE OF NEVADA — JERRY J. SLATER — Exp. 06/30/2020 — CIVIL — No. 14167

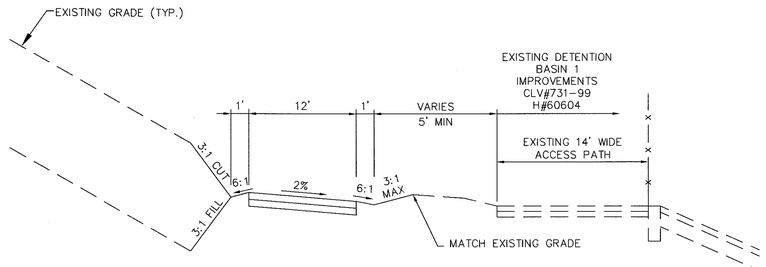
07/16/18

TY-01

SHEET 35 OF 50

DWG NO. _____

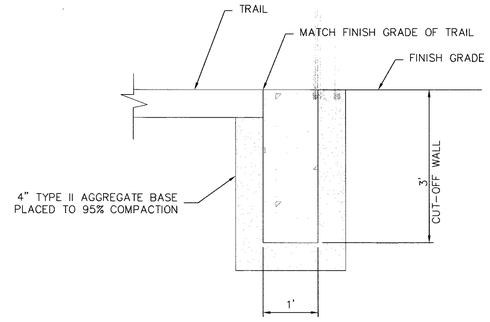
HANSEN NO. _____



"TRL" 11+55.96 TO "TRL" 21+73.50

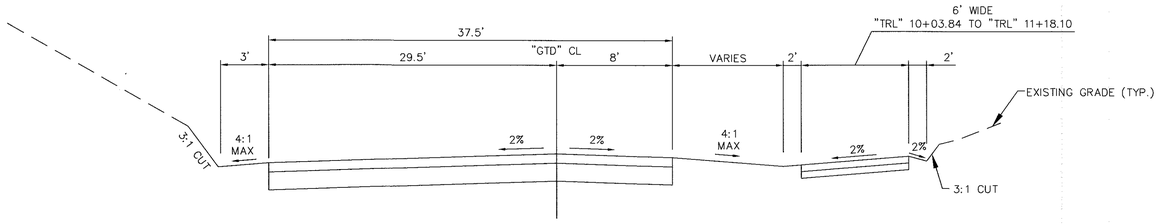
TRAIL SECTION — 1 / TY-02

NOT TO SCALE



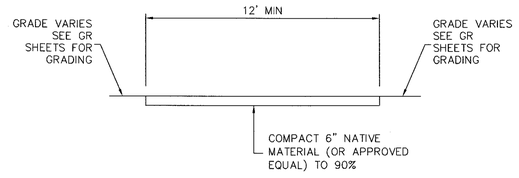
CONCRETE CUTOFF WALL — 4 / TY-02

NOT TO SCALE



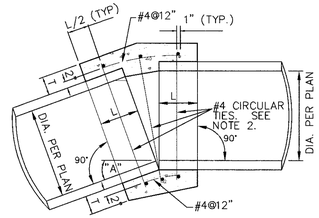
GRAND TETON DRIVE — 2 / TY-02

NOT TO SCALE



MAINTENANCE ACCESS PATH — 3 / TY-02

NOT TO SCALE



PLAN

NOTES:

1. WHERE THE SLOPE OF THE UPSTREAM PIPE IS GREATER THAN THE SLOPE OF THE DOWNSTREAM PIPE, JOIN SOFFITS. WHERE THE SLOPE OF THE UPSTREAM PIPE IS LESS THAN THE SLOPE OF THE DOWNSTREAM PIPE, JOIN INVERTS.
2. WHERE THE SPACE BETWEEN THE PIPE EXTREMITIES EXCEEDS 2 1/2 INCHES, THE NUMBER OF CIRCULAR TIES SHALL BE INCREASED TO MAINTAIN A MAXIMUM SPACING OF 6 INCHES CENTER TO CENTER. CIRCULAR TIES SHALL HAVE A DIAMETER 5 INCHES GREATER THAN THE OUTSIDE DIAMETER OF THE LARGER PIPE.

CIRCULAR TIES

PIPE DIAMETER	SPACE BETWEEN PIPE EXTREMITIES	NO. OF CIRCULAR TIES	L	T
18"	2 1/2"	3	12"	5"
24"	2 1/2"	3	12"	6"
30"	2 1/2"	3	12"	7"
36"	2 1/2" or less	4	18"	9"
60"	2 1/2" or less	5	21"	11"

CONCRETE COLLAR — 5 / TY-02

NOT TO SCALE

SLATER HANIFAN GROUP
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

TYPICAL SECTIONS 2

DATE: 07/16/18

DRAFTER: BCC

DESIGNER: BCC

CHECKED: JSR

PROJECT NO. OLY1720.000

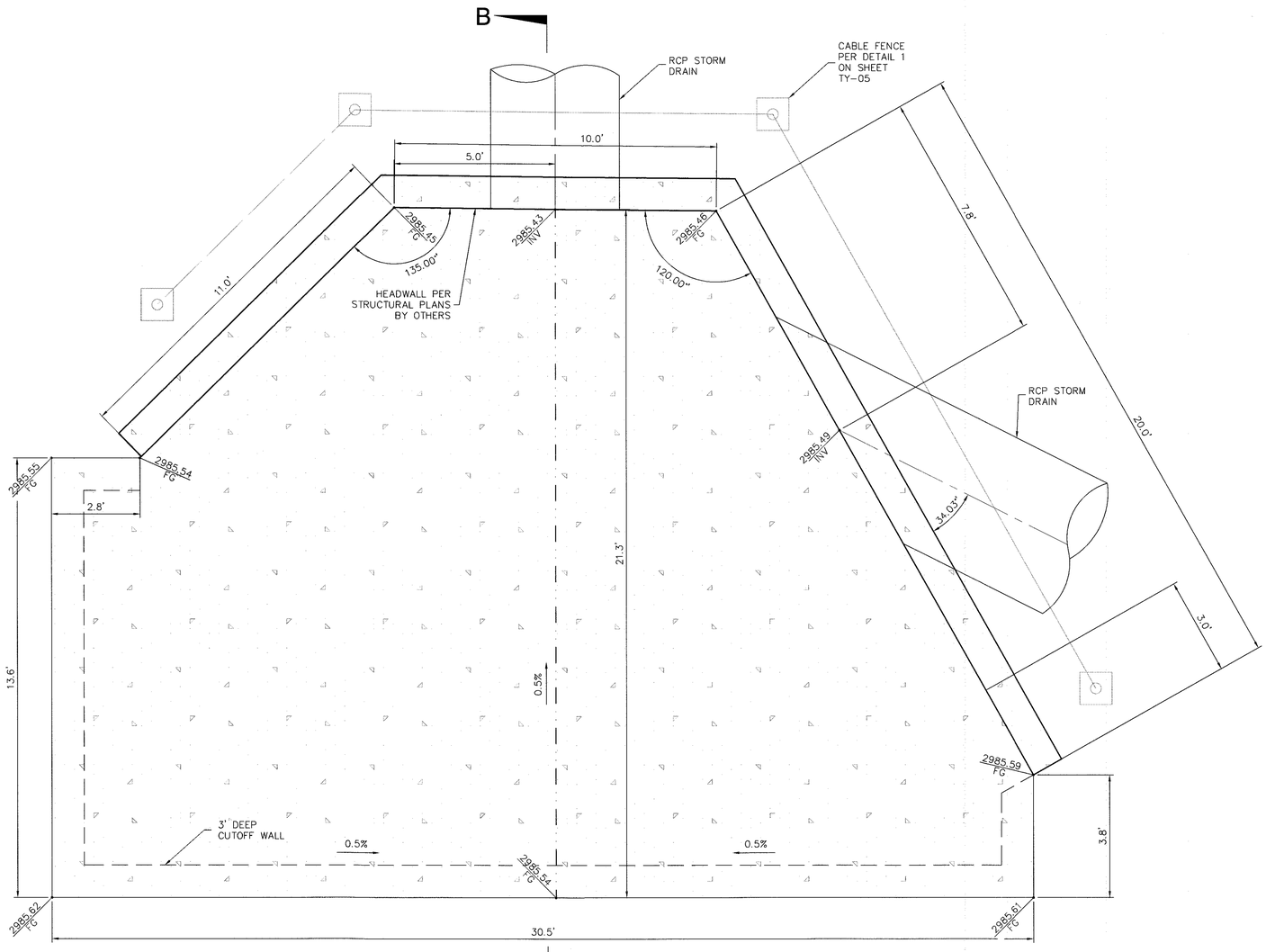
PROFESSIONAL ENGINEER — STATE OF NEVADA — JERRY J. SLATER — Exp. 06/30/2020 — CIVIL — No. 14167

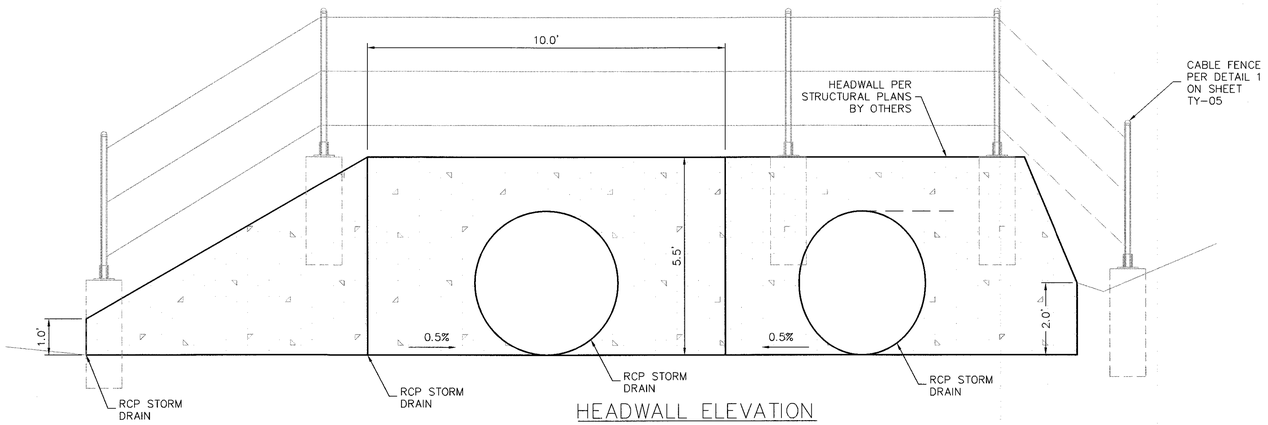
TY-02

SHEET 36 OF 50

DWG NO. _____

HANSEN NO. _____

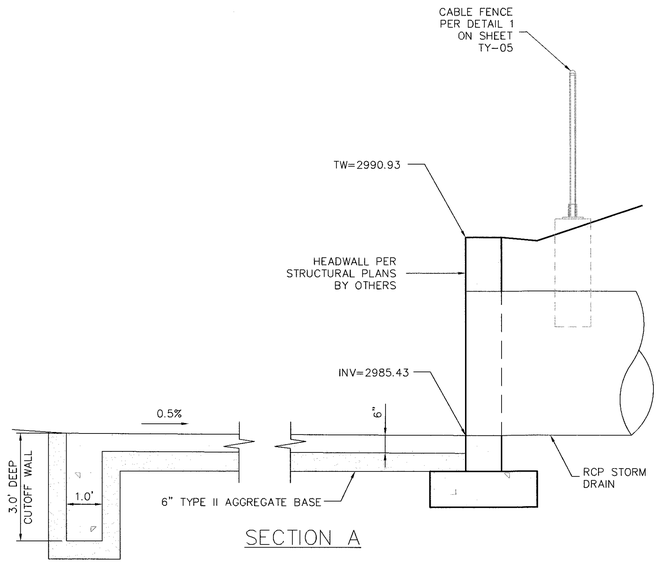




HEADWALL ELEVATION

CONCRETE AND HEADWALL DETAIL 1 / TY-03

NOT TO SCALE



SECTION A

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

DETAILS 1

DATE: 07/16/18

DRAFTER: BCC

DESIGNER: BCC

CHECKED: JSR

PROJECT NO.
OLY1720.000

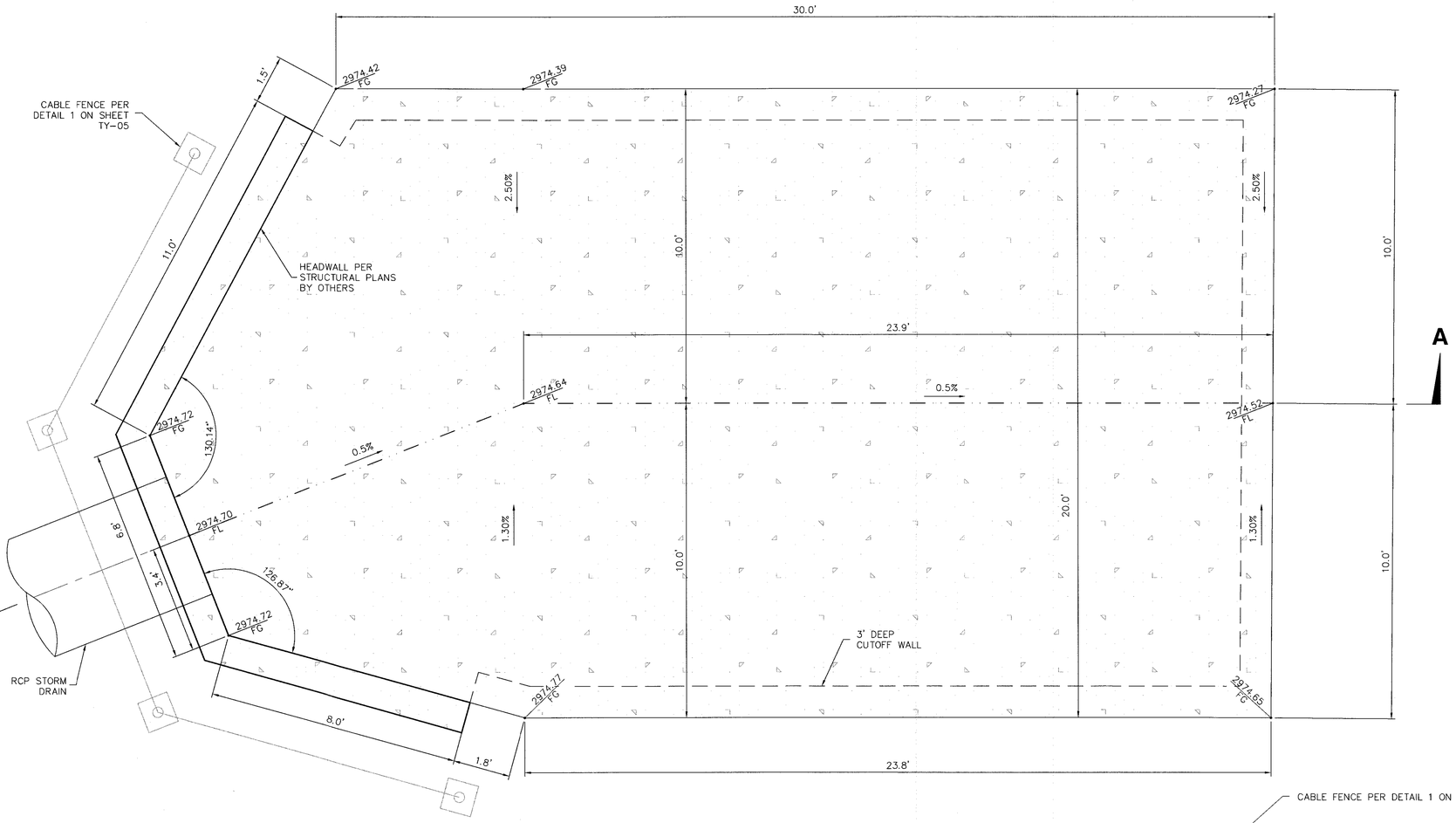
PROFESSIONAL ENGINEER STATE OF NEVADA
JERRY J. SLATER
Exp. 06/30/2020
CIVIL
No. 14167
7.16.18

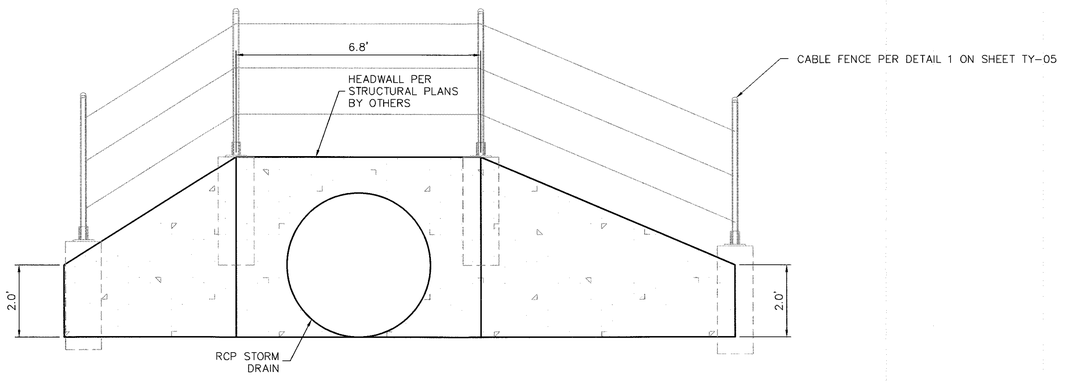
TY-03

SHEET 37 OF 50

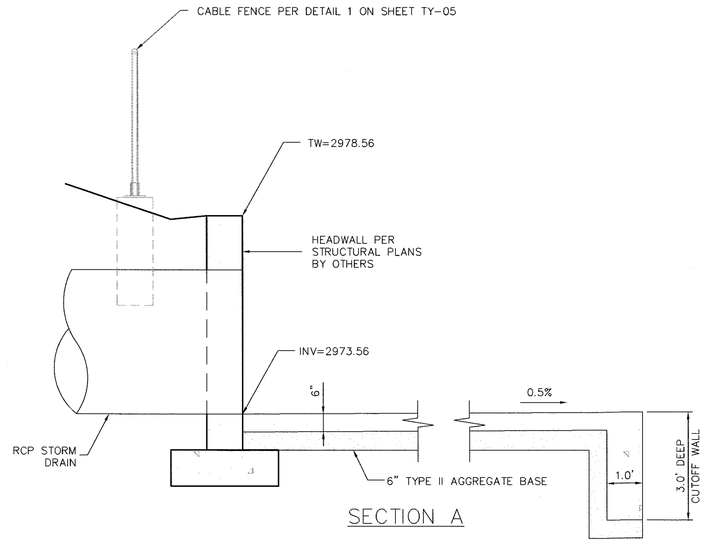
DWG NO. _____

HANSEN NO. _____





HEADWALL ELEVATION



SECTION A

CONCRETE AND HEADWALL DETAIL

NOT TO SCALE

1
TY-04

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

DETAILS 2

DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

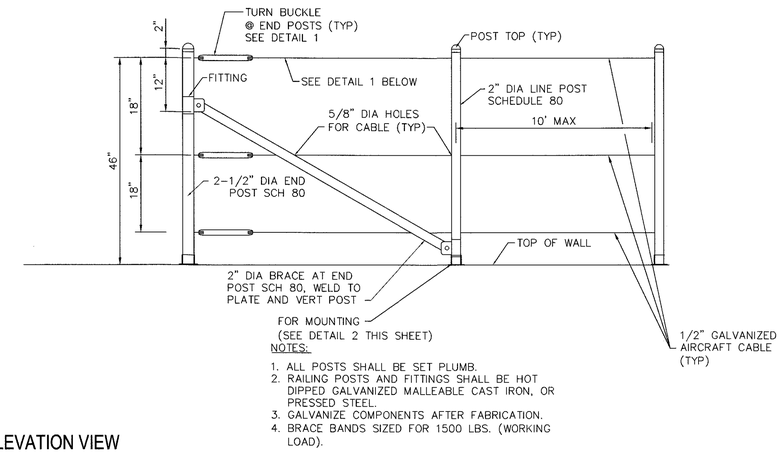
PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY J. SLATER
Exp. 06/30/2020
CIVIL
No. 14167
7/16/18

TY-04
SHEET 38 OF 50

DWG NO. _____

HANSEN NO. _____

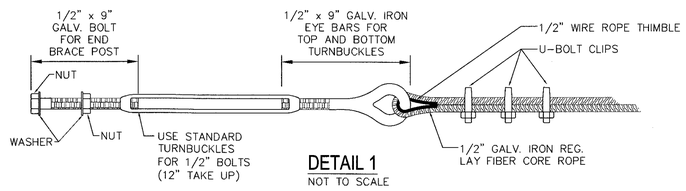


NOTES:

1. ALL POSTS SHALL BE SET PLUMB.
2. RAILING POSTS AND FITTINGS SHALL BE HOT DIPPED GALVANIZED MALLEABLE CAST IRON, OR PRESSED STEEL.
3. GALVANIZE COMPONENTS AFTER FABRICATION.
4. BRACE BANDS SIZED FOR 1500 LBS. (WORKING LOAD).

ELEVATION VIEW

NOT TO SCALE



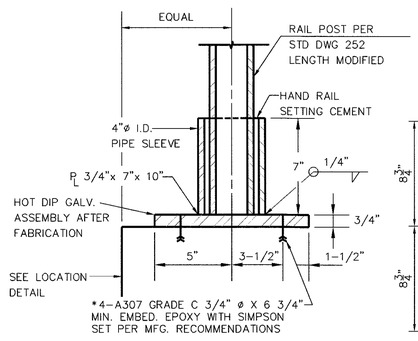
DETAIL 1

NOT TO SCALE

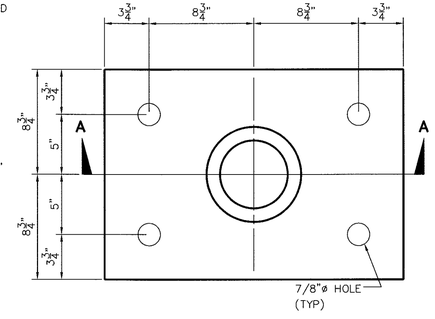
POST AND CABLE RAILING

NOT TO SCALE

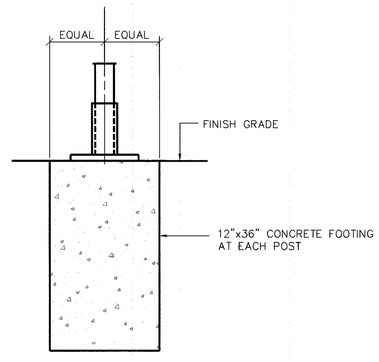
1 / DT-01



SECTION A-A



* NOTE:
FOR 8" WALLS - ROTATE PLATE AND USE (4) BOLTS.
POLE MOUNTS SHALL NOT BE LOCATED WITHIN 1-FOOT OF CONTRACTION OR EXPANSION JOINTS



FOUNDATION

POST, CABLE MOUNT POLE

NOT TO SCALE

1 / TY-05

SLATER HANIFAN GROUP
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PHONE (702) 284-5300
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NO	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

DETAILS 3

DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY SLATER
Exp. 06/30/2020
CIVIL
No. 14167

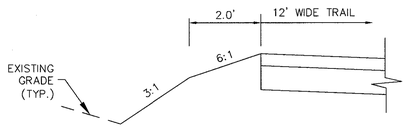
7-16-18

TY-05

SHEET 39 OF 50

DWG NO. _____

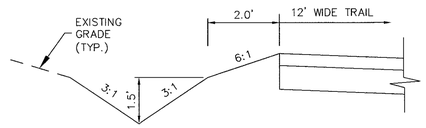
HANSEN NO. _____



"TRL" 21+73.50 TO "TRL" 29+99.53

SECTION (WEST SIDE OF TRAIL)

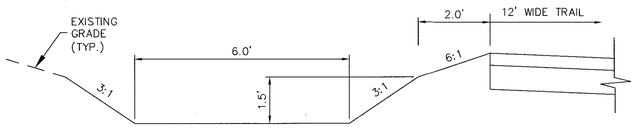
NOT TO SCALE



"TRL" 29+99.53 TO "TRL" 30+50.15

SECTION (WEST SIDE OF TRAIL)

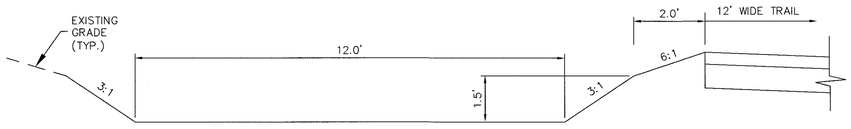
NOT TO SCALE



"TRL" 30+50.15 TO "TRL" 32+83.07

SECTION (WEST SIDE OF TRAIL)

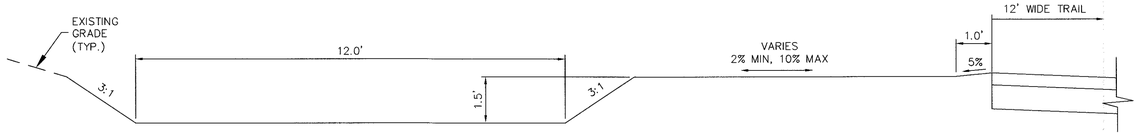
NOT TO SCALE



"TRL" 34+00.08 TO "TRL" 40+38.05

SECTION (WEST SIDE OF TRAIL)

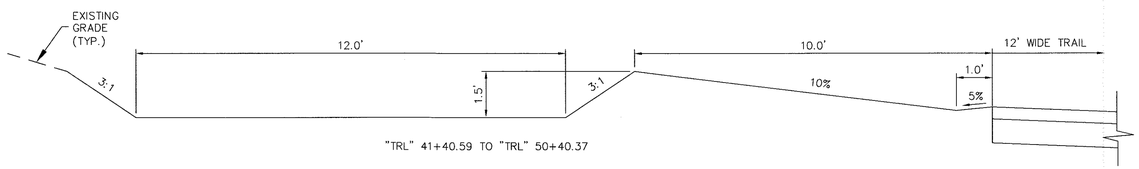
NOT TO SCALE



"TRL" 40+38.05 TO "TRL" 41+40.59

SECTION (WEST SIDE OF TRAIL)

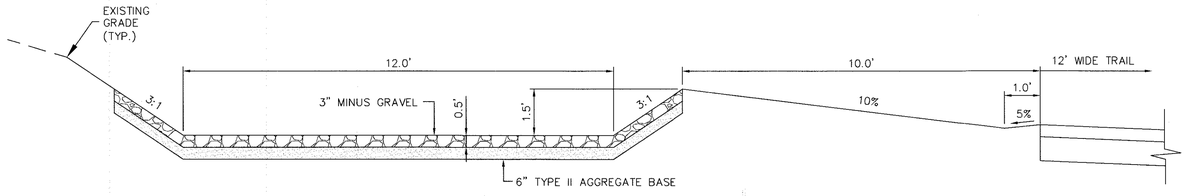
NOT TO SCALE



"TRL" 41+40.59 TO "TRL" 50+40.37

SECTION (WEST SIDE OF TRAIL)

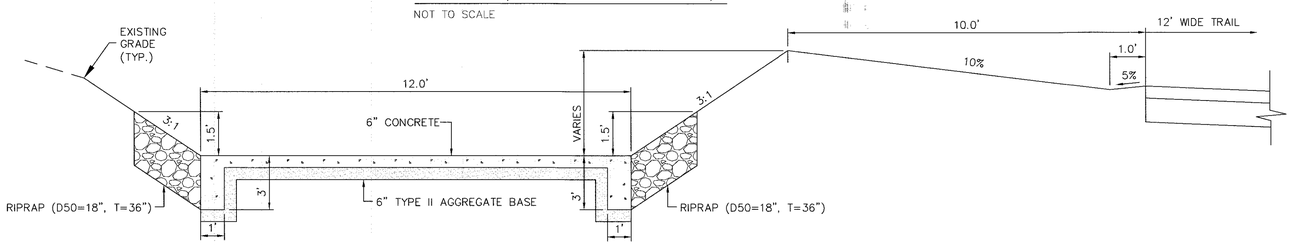
NOT TO SCALE



"TRL" 50+40.37 TO "TRL" 50+80.56

SECTION (WEST SIDE OF TRAIL)

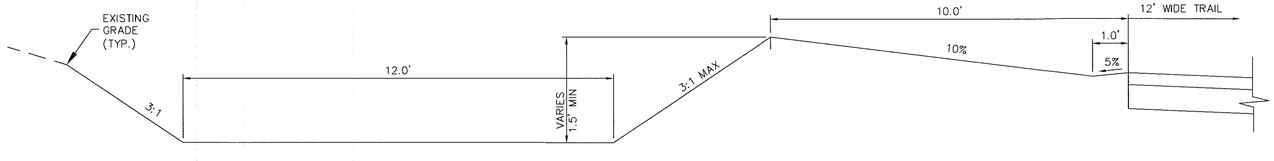
NOT TO SCALE



"TRL" 50+80.56 TO "TRL" 51+94.63

SECTION (WEST SIDE OF TRAIL)

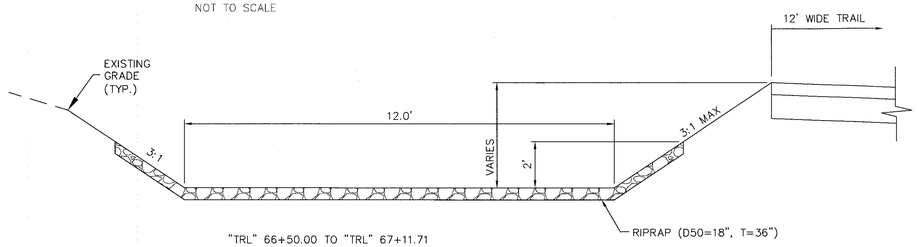
NOT TO SCALE



"TRL" 54+38.20 TO "TRL" 66+50.00

SECTION (WEST SIDE OF TRAIL)

NOT TO SCALE



"TRL" 66+50.00 TO "TRL" 67+11.71

SECTION (WEST SIDE OF TRAIL)

NOT TO SCALE

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
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PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

DRAINAGE SWALE SECTIONS 1

DATE: 07/16/18

DRAFTER: BCC

DESIGNER: BCC

CHECKED: JSR

PROJECT NO.
OLY1720.000

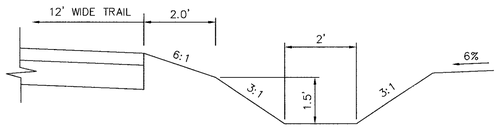
PROFESSIONAL ENGINEER – STATE OF NEVADA
JERRY J. SLATER
Exp. 06/30/2020
No. 14167
CIVIL
7-16-18

TY-06

SHEET 40 OF 50

DWG NO. _____

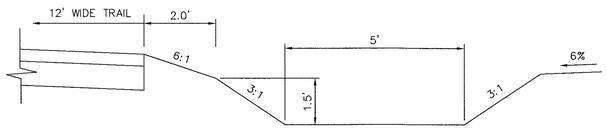
HANSEN NO. _____



"TRL" 22+40.35 TO "TRL" 28+00.00

SECTION (EAST SIDE OF TRAIL)

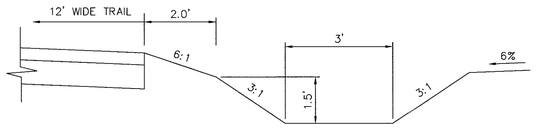
NOT TO SCALE



"TRL" 28+25.00 TO "TRL" 33+42.78

SECTION (EAST SIDE OF TRAIL)

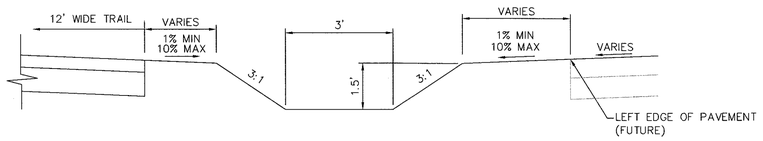
NOT TO SCALE



"TRL" 34+00.00 TO "TRL" 36+75.01

SECTION (EAST SIDE OF TRAIL)

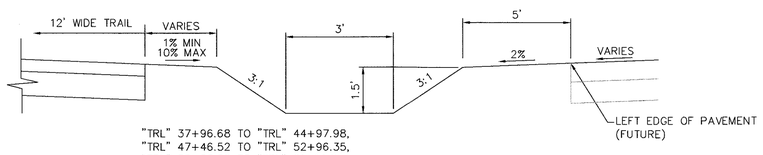
NOT TO SCALE



"TRL" 36+75.01 TO "TRL" 37+96.68

SECTION (EAST SIDE OF TRAIL)

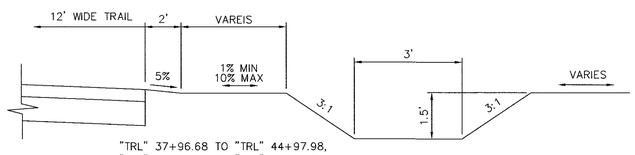
NOT TO SCALE



"TRL" 37+96.68 TO "TRL" 44+97.98,
"TRL" 47+46.52 TO "TRL" 52+96.35,
"TRL" 55+22.65 TO "TRL" 61+51.25,
"TRL" 63+02.44 TO "TRL" 67+26.76

SECTION (EAST SIDE OF TRAIL)

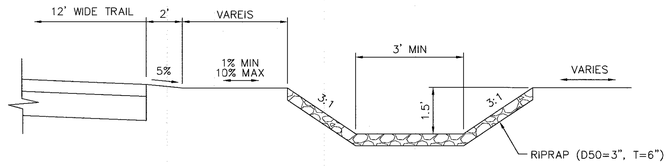
NOT TO SCALE



"TRL" 37+96.68 TO "TRL" 44+97.98,
"TRL" 53+58.32 TO "TRL" 54+22.31,
"TRL" 54+85.58 TO "TRL" 55+22.65,
"TRL" 61+51.25 TO "TRL" 63+02.44

SECTION (EAST SIDE OF TRAIL)

NOT TO SCALE



"TRL" 52+96.35 TO "TRL" 53+44.36

SECTION (EAST SIDE OF TRAIL)

NOT TO SCALE

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

DRAINAGE SWALE SECTIONS 2

DATE: 07/16/18

DRAFTER: BCC

DESIGNER: BCC

CHECKED: JSR

PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER STATE OF NEVADA
JERRY J. SLATER
Exp. 08/30/2020
CIVIL
No. 14167

7/16/18

TY-07

SHEET 41 OF 50

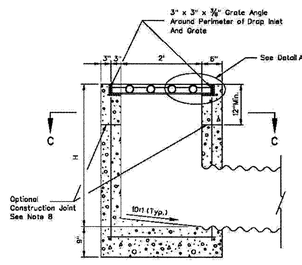
DWG NO. _____

HANSEN NO. _____

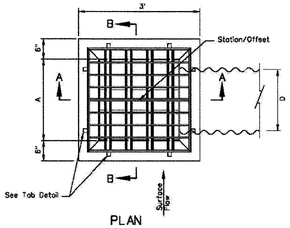
R-45

RCP / HDPE / CMP	PIPE SIZE (INCH)	A	H Min. (FT)	CONCRETE (CU. YD.) BASE QUAN. (H Min.)	CONCRETE (CU. YD.) ADD RATE (CU. YD./FT)	REINFORCING (LB) BASE QUAN. (H Min.)	REINFORCING (LB) ADD RATE (LB/FT)	STRUCTURAL STEEL (LB)
H	15"	2'	2.50	0.71	0.19	36	10	229
D	18"	2' 6"	3.00	0.89	0.20	40	10	254
P	24"	3'	3.50	1.08	0.22	58	12	278
E	30"	3' 6"	4.00	1.28	0.24	63	12	304
C	36"	4'	4.50	1.50	0.26	67	13	328
M	42"	4' 6"	5.00	1.71	0.28	90	15	353
P	48"	5'	5.50	1.94	0.30	95	15	378

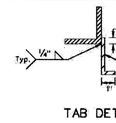
The Concrete And Reinforcing Quantities Are Based On The H Min. Shown. Increase The Concrete And Reinforcing Base Quantity By The Corresponding Add Rate (Per Foot Of Increased Ht If The H Specified Is Larger Than H Min.



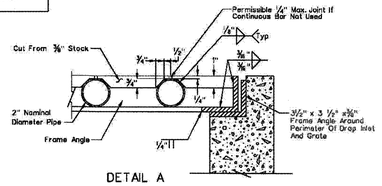
SECTION A-A



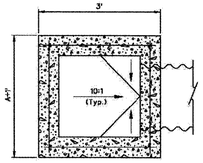
PLAN



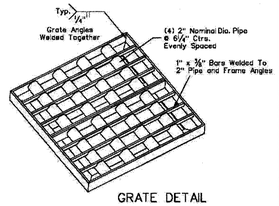
TAB DETAIL



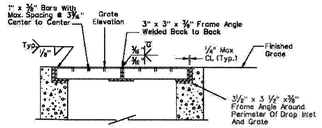
DETAIL A



SECTION C-C



GRATE DETAIL



SECTION B-B

NOTES:

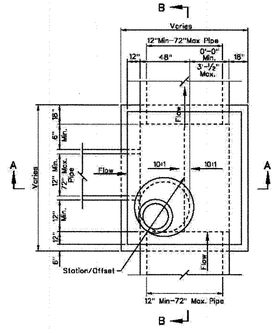
1. All concrete shall be class A or AA.
2. Reinforcing steel shall be No. 4 bars with maximum spacing at 18 inch centers, wired tightly at all intersections and embedded 2 inches clear of all concrete surfaces.
3. Exposed edges of concrete shall be chamfered 1 inch.
4. Structural steel weight includes the 2 inch normal diameter pipe standard weight and frame angles (3"x 3"x 3/8") and (3 1/2"x 3 1/2"x 3/8").
5. For 2 inch nominal diameter pipe see ASTM A53.
6. See sheet R-2.9.1 for details if connecting HDPE pipe.
7. Slope catch basin floors 10:1 from all directions toward outlet pipe. If basin is used as a junction, shape flow line(s) to outlet pipe and provide a 10:1 slope to flow line(s).
8. Run rebar continuous thru construction joint. Joint must be a minimum 3 inches from horizontal bars.
9. Additional pipe penetrations may be placed in any wall.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

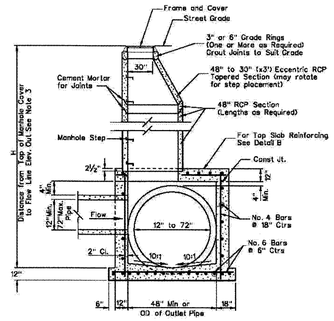
DROP INLET
TYPE 2B

R-4.2.2	(609)	Signed Original On File
ADOPTED 11/08	REVISED 10/15	CHIEF HYDRAULICS ENGR.

R-58



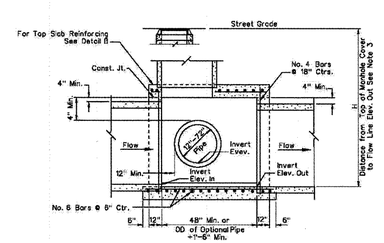
PLAN



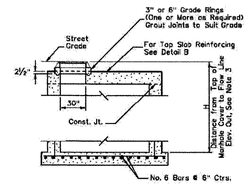
For Variable Height Situations
SECTION A-A

NOTES:

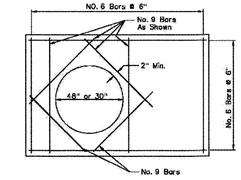
1. All concrete shall be class A or AA.
2. Inflow pipe invert elevations shall be greater than or equal to 0.1 foot above the outflow pipe invert elevation.
3. For values of "H", see plans. "H" is the difference in elevation between the outflow pipe invert elevation and the top of manhole elevation at street grade.
4. Precast concrete pipe sections, tapered sections, ifas, grade rings, bases, and steps shall conform to AASHTO M 199 (ASTM C-478).
5. Manhole cover shall bear entity identification and system function (if applicable).
6. Shape flowline in manhole to outlet pipe, and provide a 10:1 slope from all directions toward flow line.
7. Refer to sheet R-2.9.1 for details if connecting to HDPE pipe.



SECTION B-B



For Minimum Height Situation
Hydraulic Engineer Will Look at Other Options for Extreme Minimum Cover Situations.
SECTION A-A



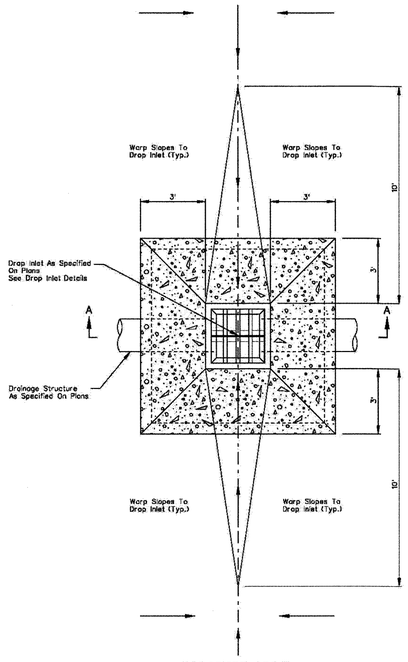
Top Slab Reinforcing
DETAIL B

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

MANHOLE
TYPE 4

R-4.3.2	(609)	Signed Original On File
ADOPTED 10/88	REVISED 5/09	CHIEF HYDRAULICS ENGR.

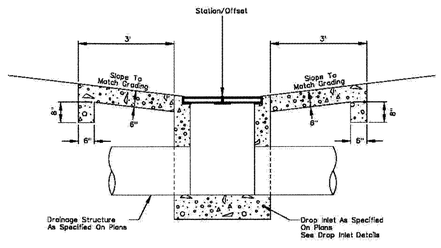
R-53



CONCRETE APRON

NOTES:

1. Concrete shall be class A or AA.



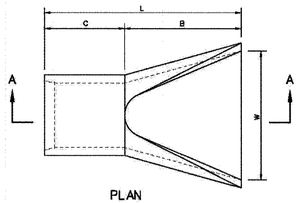
SECTION A-A

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

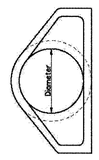
DROP INLET
CONCRETE APRON

R-4.2.7	(609)	Signed Original On File
ADOPTED 5/08	REVISED	CHIEF HYDRAULICS ENGR.

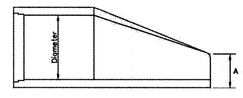
R-21



PLAN



END VIEW



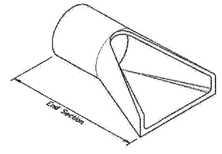
SECTION A-A

NOTES:

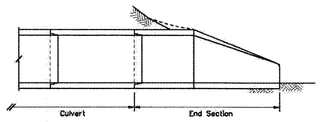
1. Class and type of concrete shall be as specified for reinforced concrete pipe.
2. Structural design of end section shall conform to that of standard reinforced concrete culvert pipe.
3. Length of pipe shown on the design plans does not include connector section (length C).
4. Contact hydraulics Engineer for sizes not listed.
5. Actual dimensions of end sections may vary by manufacturer. Adjust pipe lengths as necessary to accommodate precast end sections used. See sheets R-1.1.2 and R-2.1.4 for extension beyond fill slope and pipe pay lengths.

DIAMETER	WEIGHT	A	B	C *	L	W
18"	670	9"	27"	48"	73"	36"
24"	1300	9 7/8"	43 1/8"	30"	73 1/8"	48"
30"	1850	12"	54"	19 3/4"	73 3/8"	60"
36"	3500	15"	63"	34 3/4"	97"	72"
42"	4930	21"	63"	15"	88"	78"
48"	6700	24"	72"	28"	98"	84"
54"	7150	27"	65"	35"	100"	90"

* For Reference Only



ISOMETRIC VIEW



CROSS SECTION VIEW
18" TO 54" RCP

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

RCP END SECTION
18" TO 54" RCP

R-2.3.1	(603)	Signed Original On File
ADOPTED 1/13	REVISED 10/15	CHIEF HYDRAULICS ENGR.

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

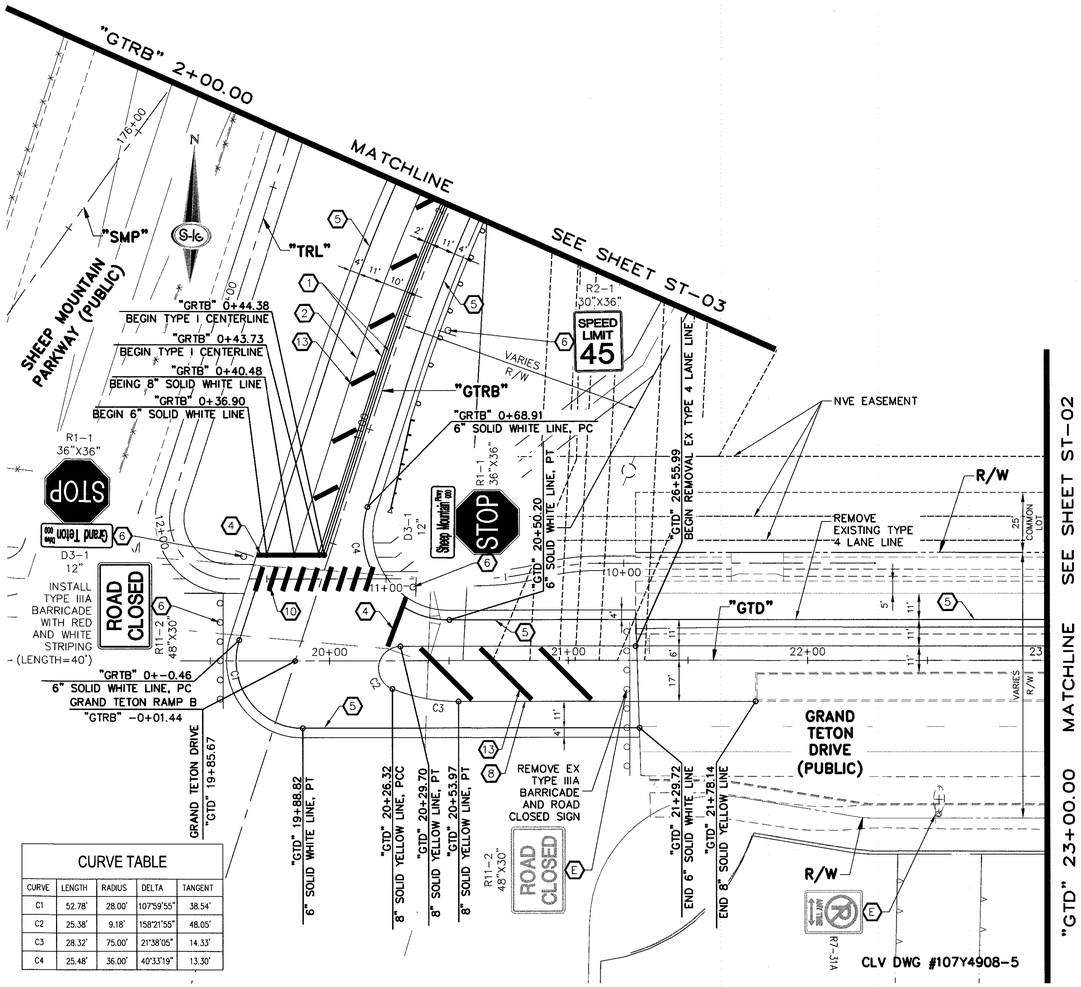
NDOT DETAILS

DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER STATE OF NEVADA
JERRY J. SLATER
Exp. 06/30/2020
CIVIL
No. 14167
1-16-18

TY-08
SHEET 42 OF 50
DWG NO. _____

HANSEN NO. _____



CURVE TABLE				
CURVE	LENGTH	RADIUS	DELTA	TANGENT
C1	52.78'	28.00'	107°59'55"	38.54'
C2	25.38'	9.18'	158°21'55"	48.05'
C3	28.32'	75.00'	21°38'05"	14.33'
C4	25.48'	36.00'	40°33'19"	13.30'

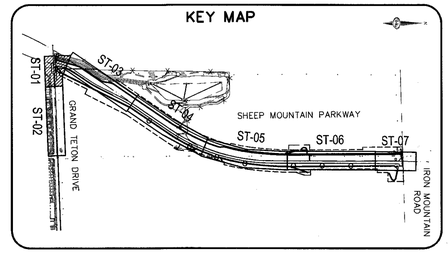
STRIPING NOTES

1. INSTALL TYPE 1 CENTERLINE (RPM) (USDCCA STD. DWG. NO. 244)
2. INSTALL STORAGE LANE LINE (RPM) (USDCCA STD. DWG. NO. 246)
3. INSTALL 24-INCH YELLOW DIAGONAL AT 25' O.C. (PMF-TYPE 2)
4. INSTALL 24-INCH WHITE STOP BAR (PMF-TYPE 2) (USDCCA STD. DWG. NO. 254)
5. INSTALL 6-INCH SOLID WHITE LINE (PPM)
6. INSTALL NEW SIGN(S) (GROUND MOUNTED)
7. INSTALL WHITE "ONLY" (PMF-TYPE 2) (USDCCA STD. DWG. NO. 246.6)
8. INSTALL 8-INCH SOLID YELLOW LINE (PPM)
9. INSTALL DROP LANE LINE (RPM) (USDCCA STD. DWG. NO. 246.6)
10. INSTALL 24-INCH WHITE CROSSWALK LINE (10-FEET WIDE) (PMF-TYPE 2) (USDCCA STD. DWG. NO. 254)
11. INSTALL SOLID YELLOW TO 5-FOOT WIDTH (PMF-TYPE 2)
12. INSTALL WHITE PAVEMENT ARROW (PMF-TYPE 2)
13. INSTALL 24-INCH YELLOW DIAGONAL AT 25' O.C. (PMF-TYPE 2)

E. EXISTING SIGN(S) TO REMAIN

NOTES

1. ALL DIMENSIONS ARE TO THE FACE OF MEDIAN CURB OR LIP OF GUTTER UNLESS OTHERWISE NOTED.
2. ALL STREET NAME SIGN LEGENDS SHALL BE APPROVED BY CLV PRIOR TO ORDERING SIGNS.
3. THE CONTRACTOR SHALL CONTACT THE TRAFFIC ENGINEERING DIVISION (TRANSPORTATION SECTION) THROUGH THE PROJECT'S OFFSITE INSPECTOR PRIOR TO INITIATING PAVING TO RECEIVE DIRECTION FOR ANY PERMANENT OR TEMPORARY MODIFICATIONS TO THE APPROVED DRAWINGS REGARDING FINAL PAVEMENT TRANSITIONS, MARKINGS AND SIGNING THAT ARE REQUIRED TO MATCH ADJACENT ROADWAY SEGMENTS. THE CONTRACTOR SHALL PROVIDE A DRAWING FOR APPROVAL BY THE TRAFFIC ENGINEERING DIVISION DEPICTING ANY ADJUSTMENTS TO THE FINAL PAVEMENT MARKINGS AND SIGNAGE, WHICH MAY INCLUDE OMITTING, ADDING OR MODIFYING PAVEMENT MARKINGS AND TRAFFIC CONTROL SIGNS SUCH THAT ADEQUATE TRANSITIONS AND LANE TERMINATIONS BETWEEN ADJACENT ROADWAY SEGMENTS ARE CONSTRUCTED.



30 0 30 60
SCALE FEET

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD 1-702-227-2929

FAST Call before you UnderGround. 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

SIGNING AND STRIPING 1

DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO. OLY1720.000

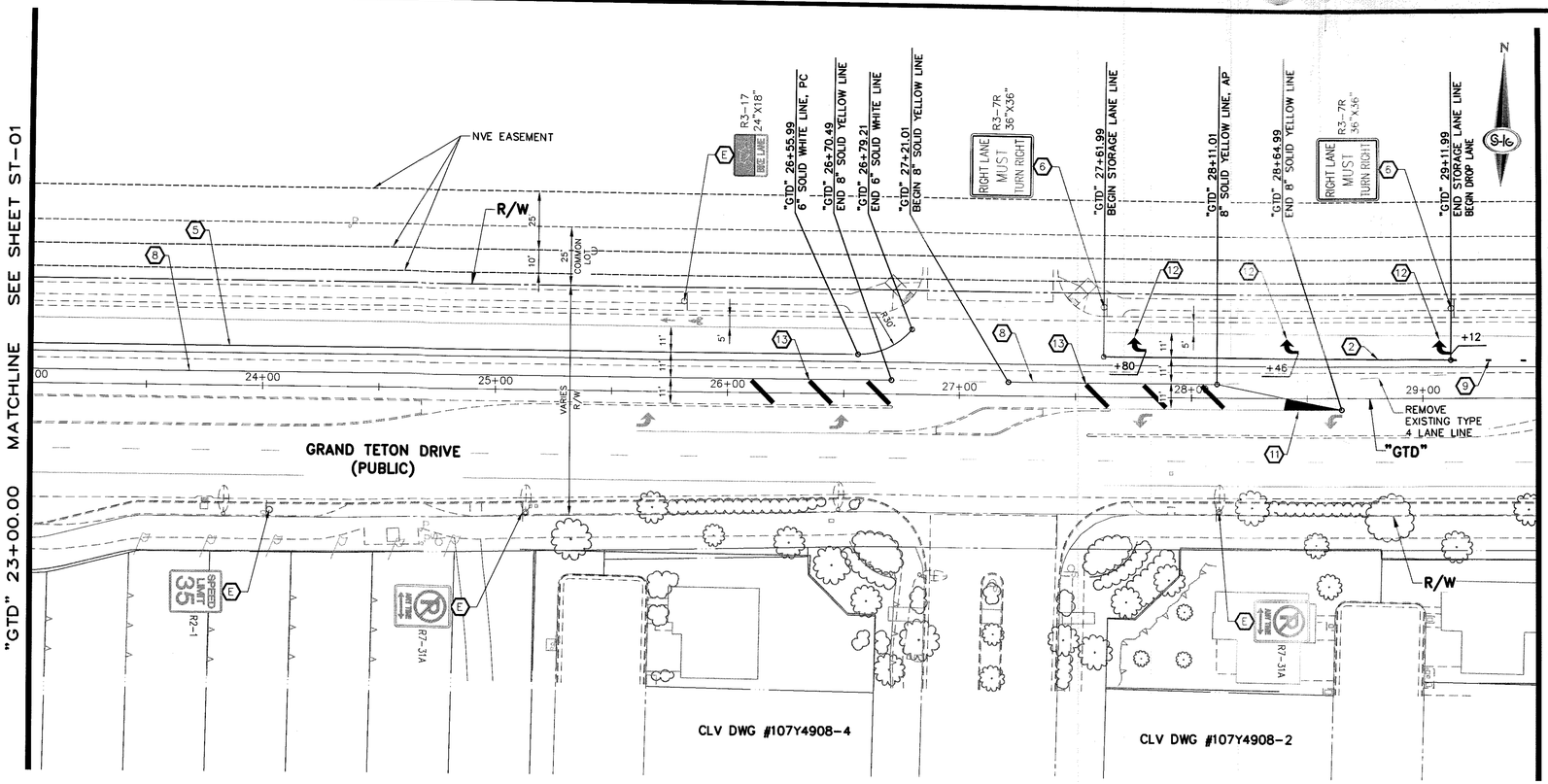
PROFESSIONAL ENGINEER - STATE OF NEVADA - JERRY J. SLATER - EXP. 08/30/2020 - CIVIL - No. 14167

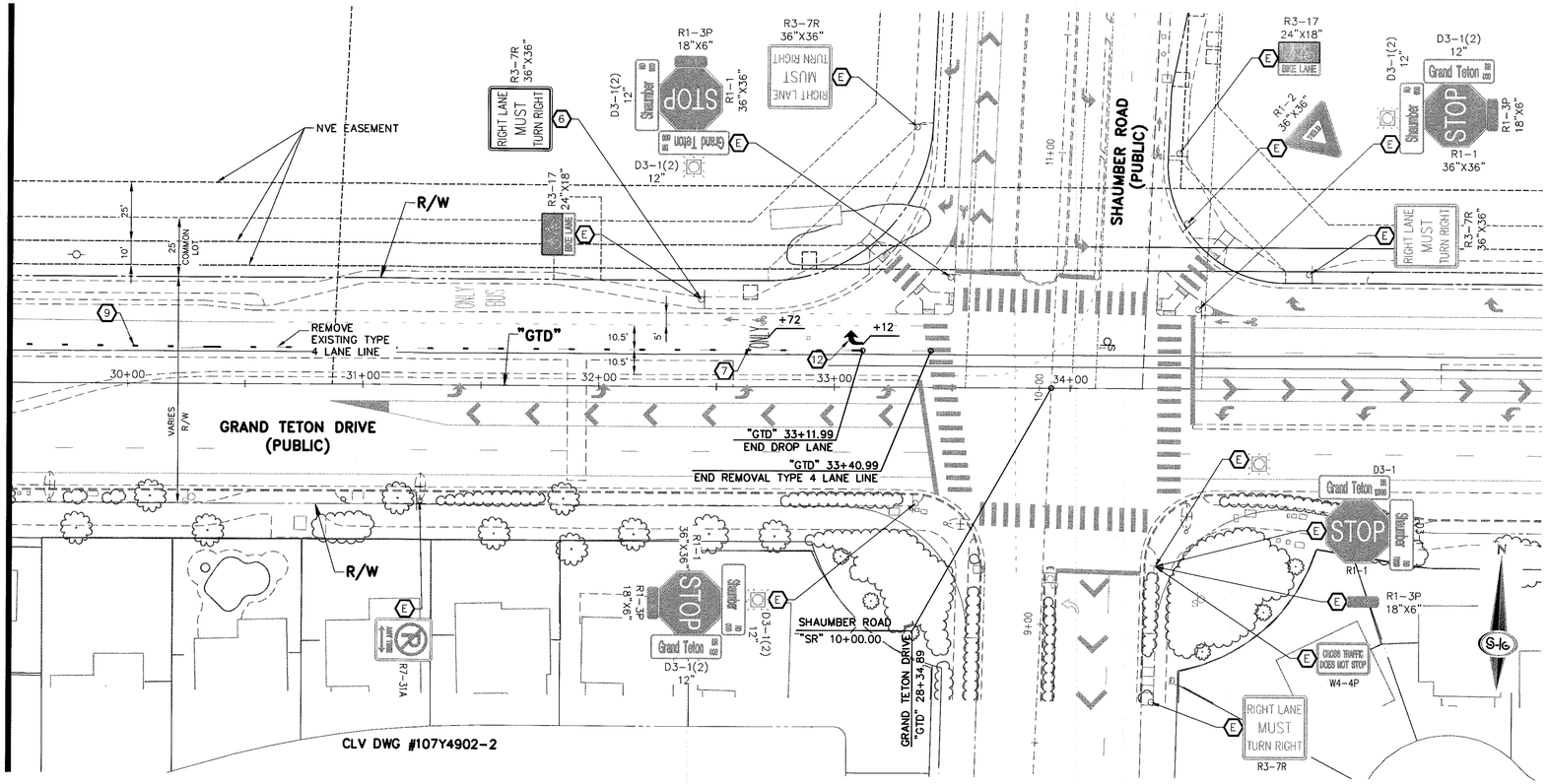
1.16.18

ST-01
SHEET 43 OF 50

DWG NO. _____

HANSEN NO. _____





STRIPING NOTES

1. INSTALL TYPE 1 CENTERLINE (RPM) (USDCCA STD. DWG. NO. 244)
2. INSTALL STORAGE LANE LINE (RPM) (USDCCA STD. DWG. NO. 246)
3. INSTALL 24-INCH YELLOW DIAGONAL AT 25' O.C. (PMF-TYPE 2)
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E. EXISTING SIGN(S) TO REMAIN

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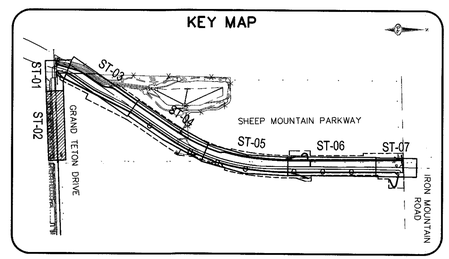
SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

SIGNING AND STRIPING 2



30 0 30 60
SCALE FEET

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DIG OVERHEAD 1-702-227-2929

FAST Call before you UnderGround. 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

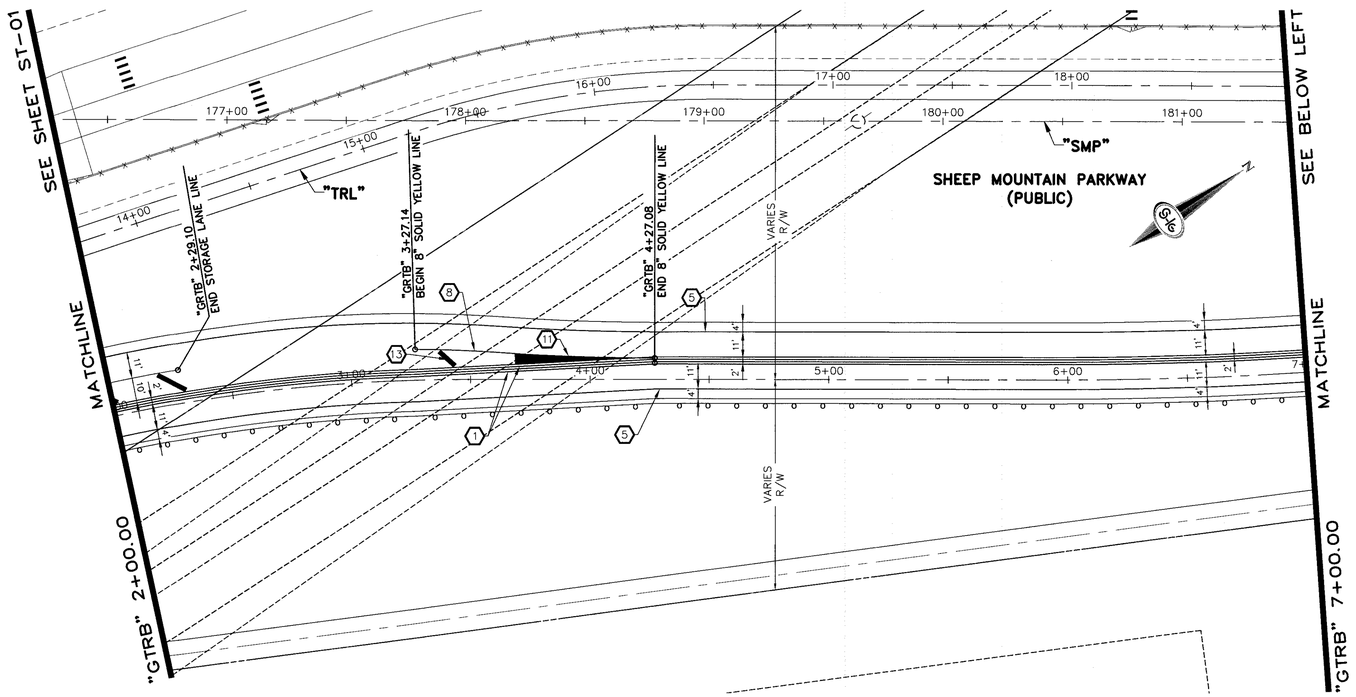
Call before you Dig Avoid cutting underground utility lines. It's costly. Call 811 1-800-227-2600

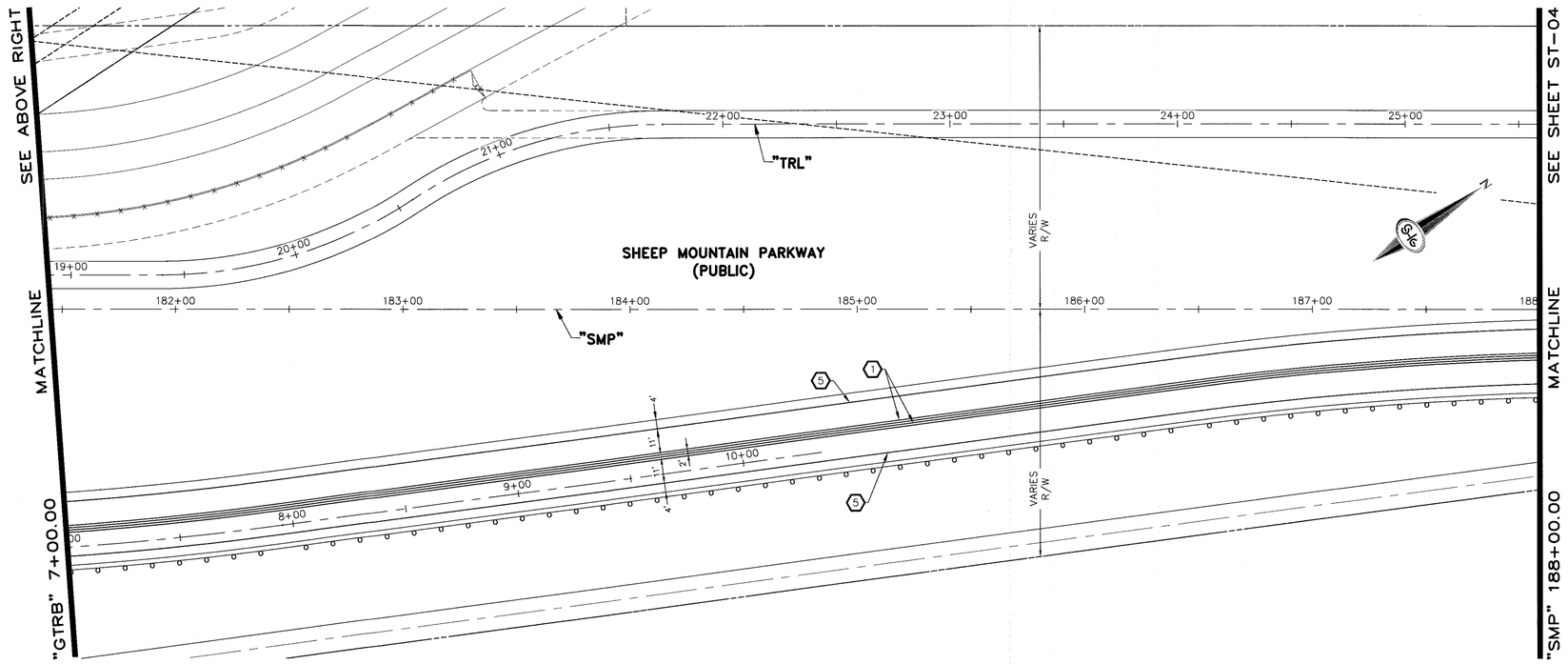
DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO. OLY1720.000

PROFESSIONAL ENGINEER STATE OF NEVADA JERRY J. SLATER Exp. 06/30/2020 CIVIL No. 14167 7/16/18

ST-02
SHEET 44 OF 50
DWG NO. _____

HANSEN NO. _____





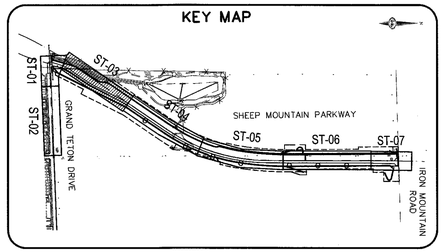
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KEY MAP



SCALE 30 0 30 60 FEET

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY
SIGNING AND STRIPING 3

DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

PROJECT NO.
OLY1720.000

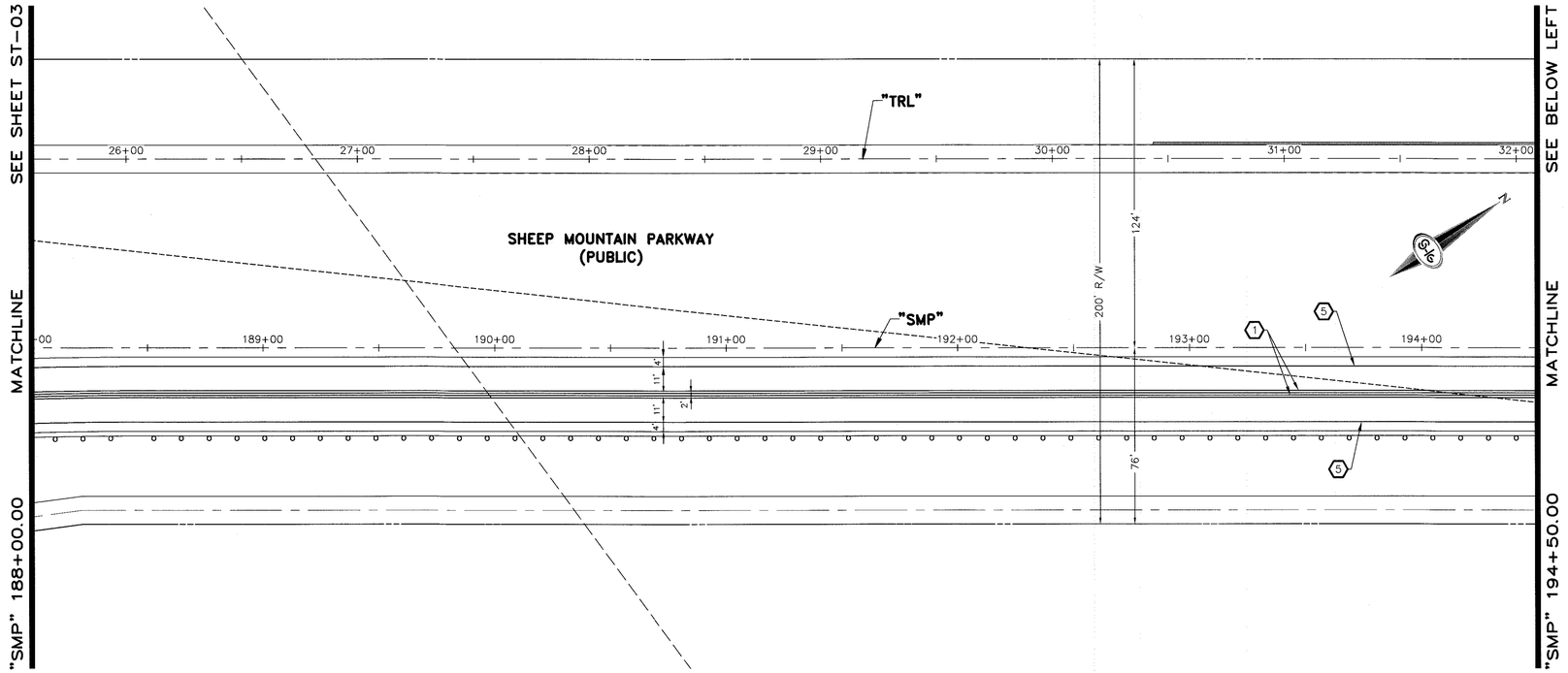
PROFESSIONAL ENGINEER STATE OF NEVADA JERRY J. SLATER Exp. 06/30/2020 CIVIL No. 14167

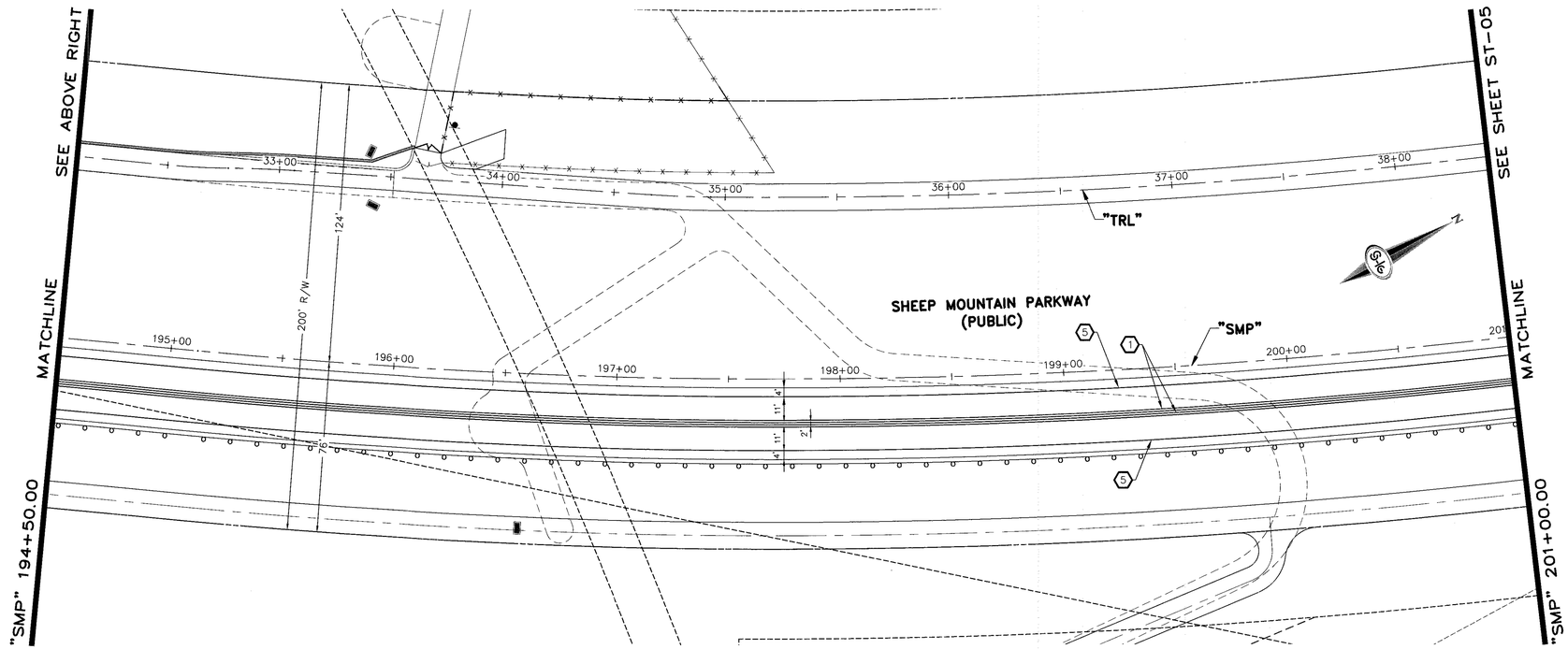
7/16/18

ST-03
SHEET 45 OF 50

DWG NO. _____

HANSEN NO. _____





STRIPING NOTES

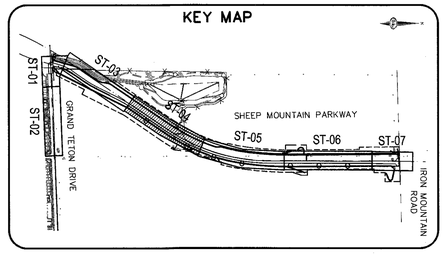
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KEY MAP



SCALE 30 0 30 60 FEET

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

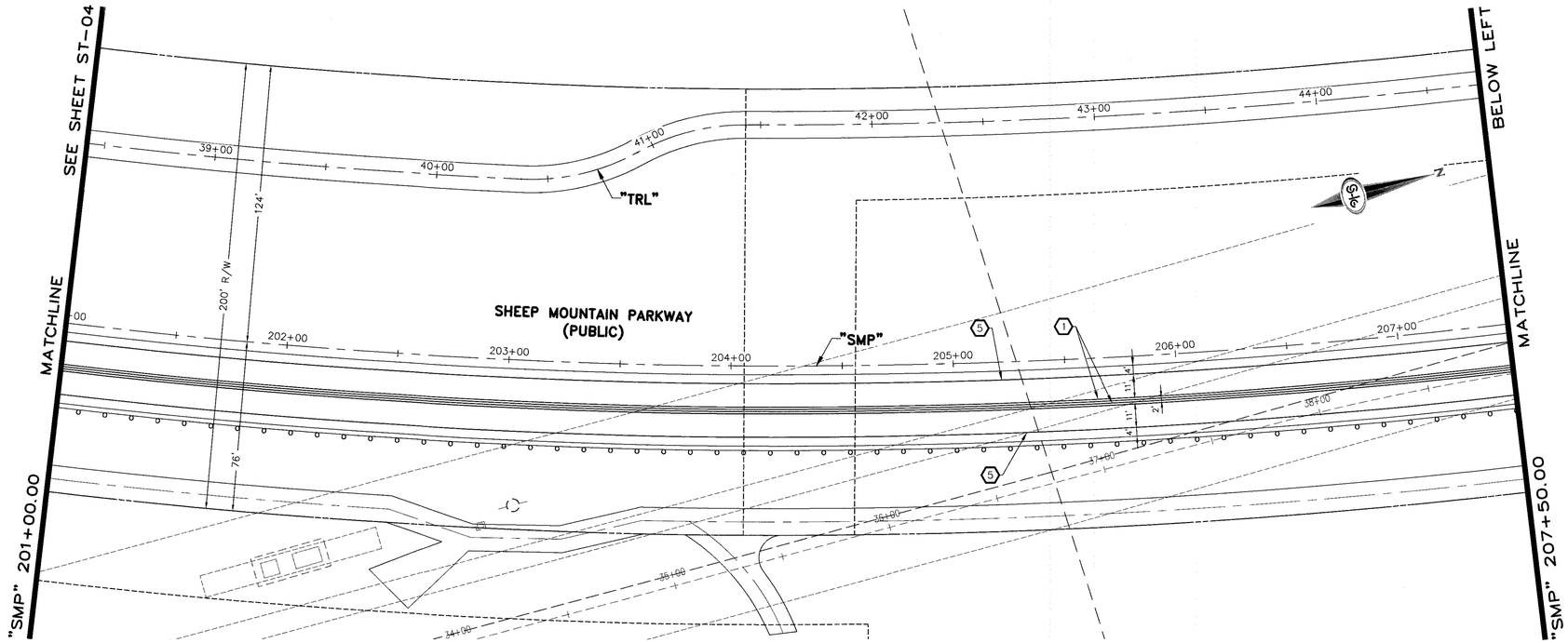
SHEEP MOUNTAIN PARKWAY
SIGNING AND STRIPING 4

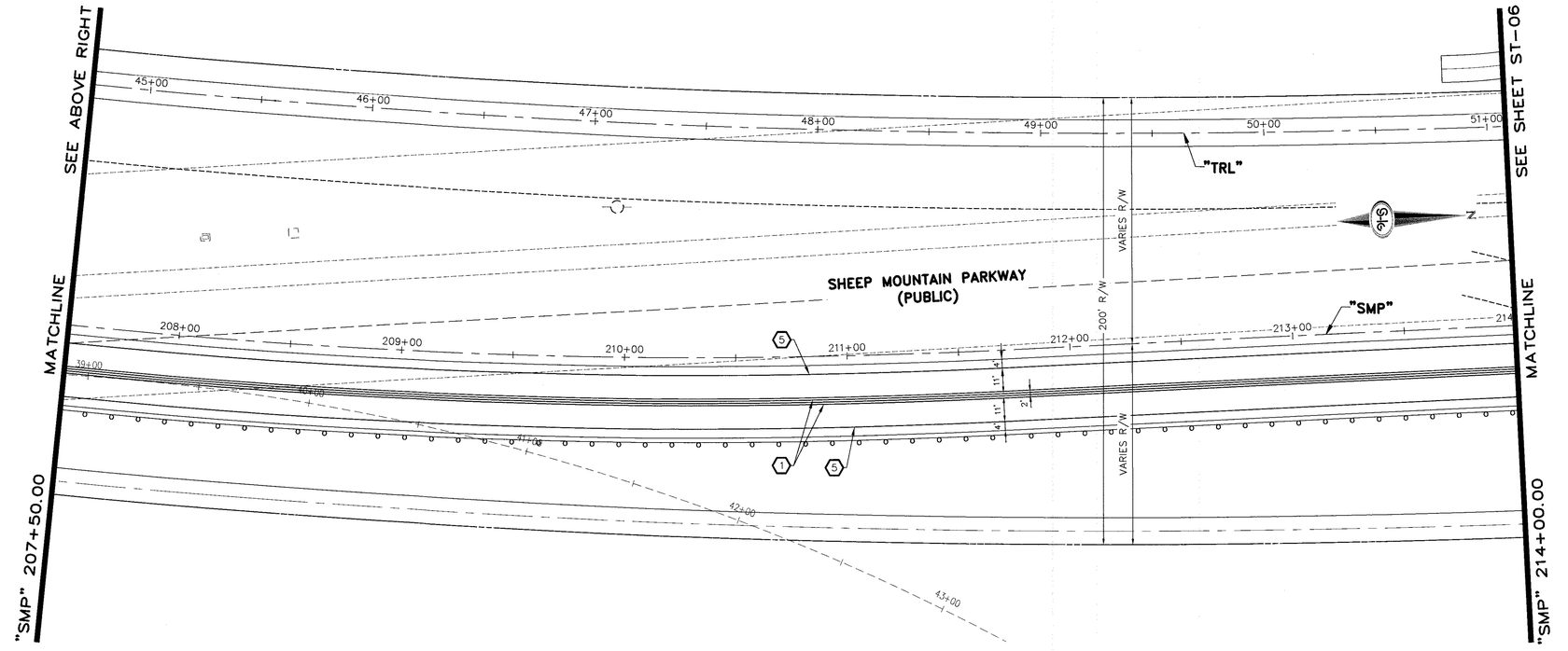
DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER · STATE OF NEVADA · JERRY SLATER · Exp. 06/30/2020 · CIVIL · No. 14167 · 7/16/18

ST-04
SHEET 46 OF 50
DWG NO. _____

HANSEN NO. _____



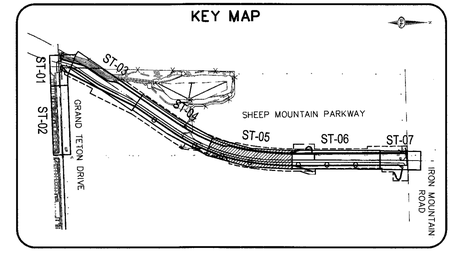


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30 0 30 60
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SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY
SIGNING AND STRIPING 5

DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

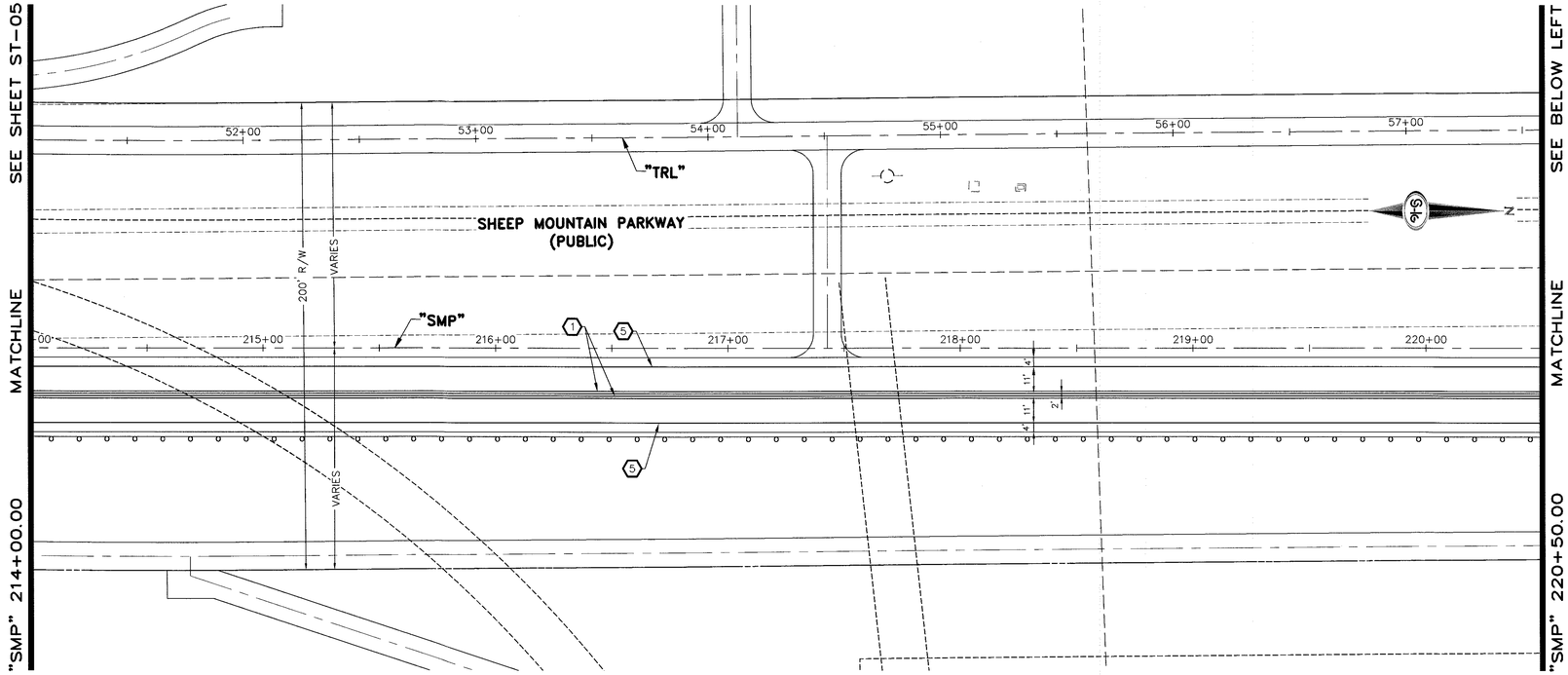
PROJECT NO.
OLY1720.000

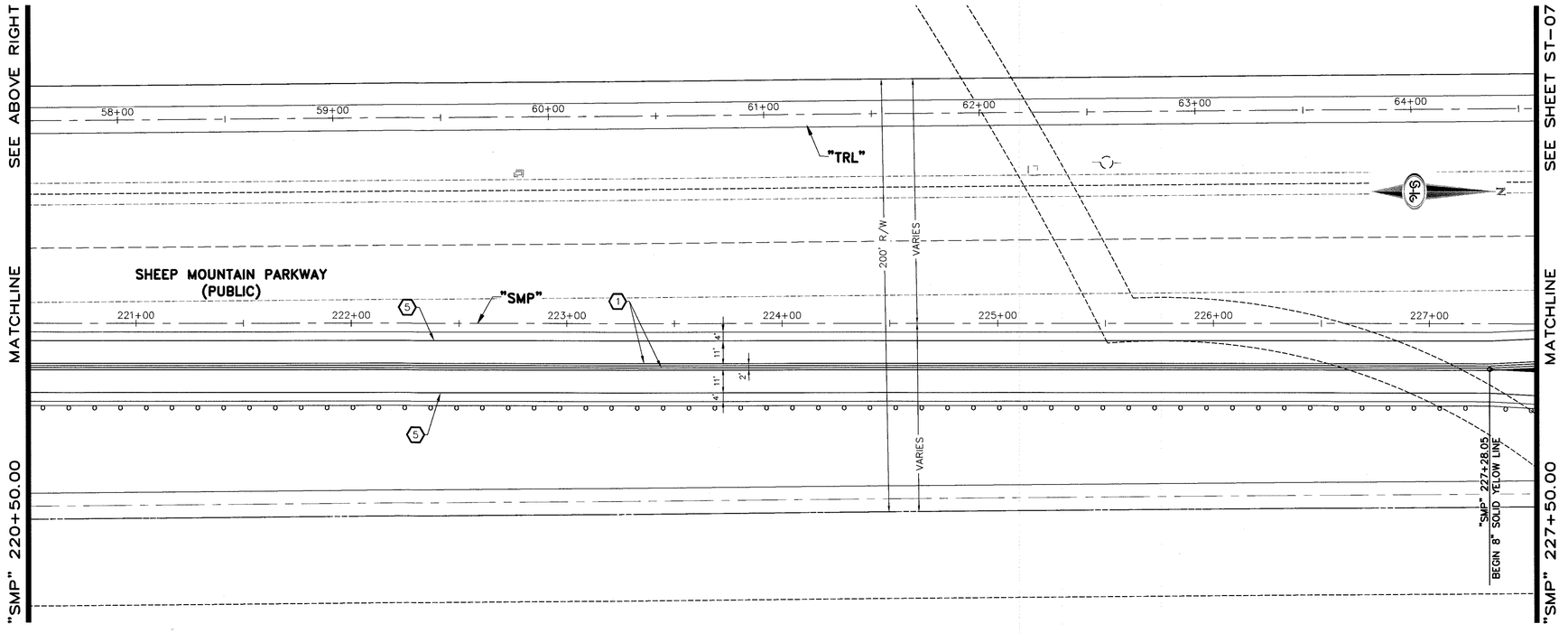
PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY J. SLATER
Exp. 06/30/2020
CIVIL
No. 14167
7/16/18

ST-05
SHEET 47 OF 50

DWG NO. _____

HANSEN NO. _____





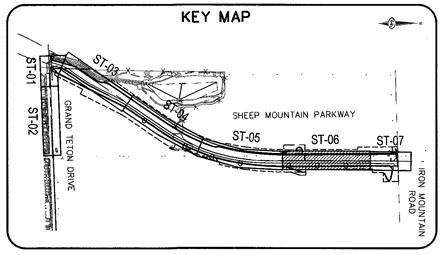
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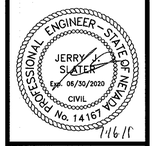
NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY
SIGNING AND STRIPING 6

DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

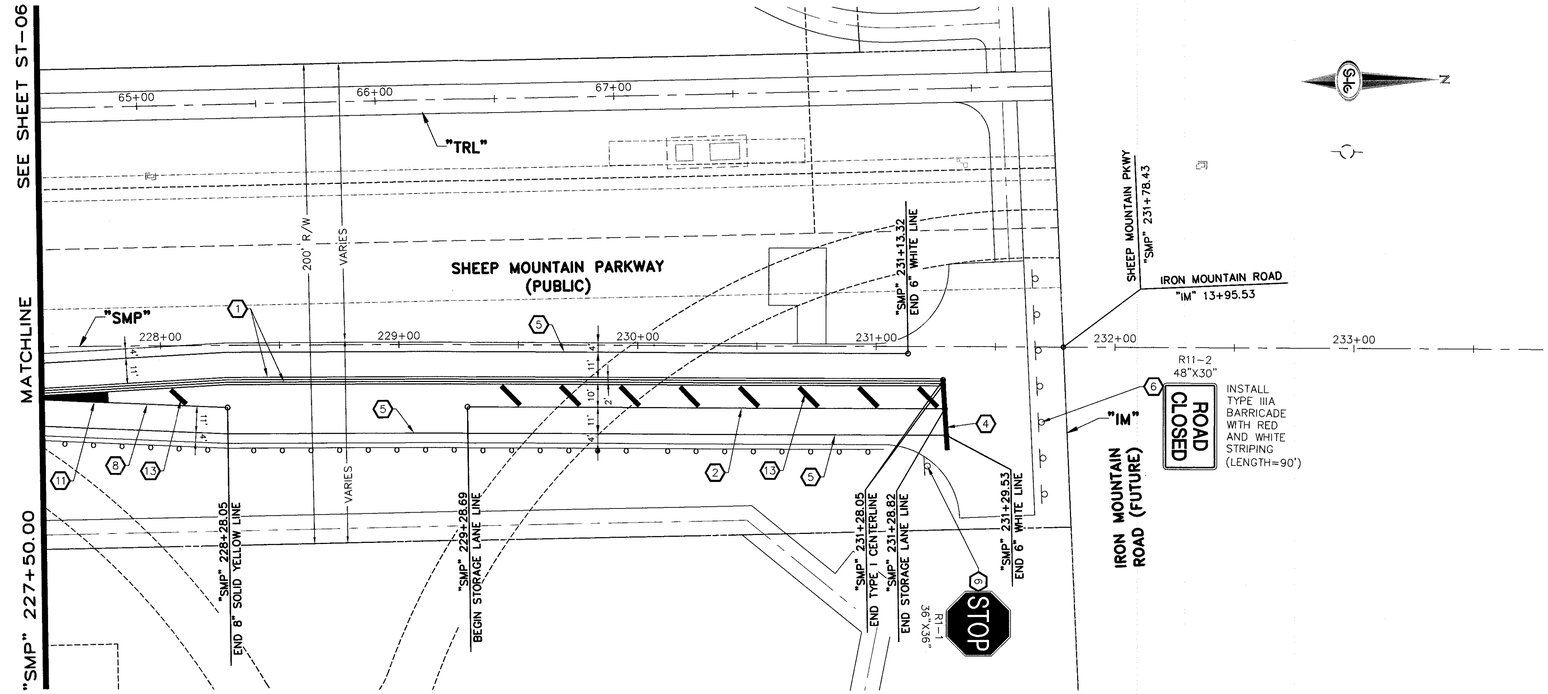
PROJECT NO.
OLY1720.000



ST-06
SHEET 48 OF 50

DWG NO. _____

HANSEN NO. _____



STRIPING NOTES

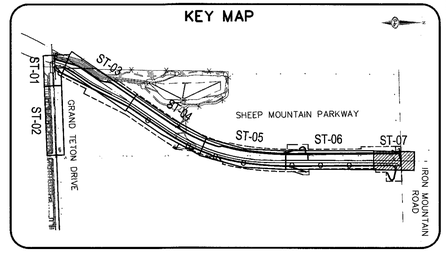
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KEY MAP



30 0 30 60
SCALE FEET







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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY
SIGNING AND STRIPING 7

DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

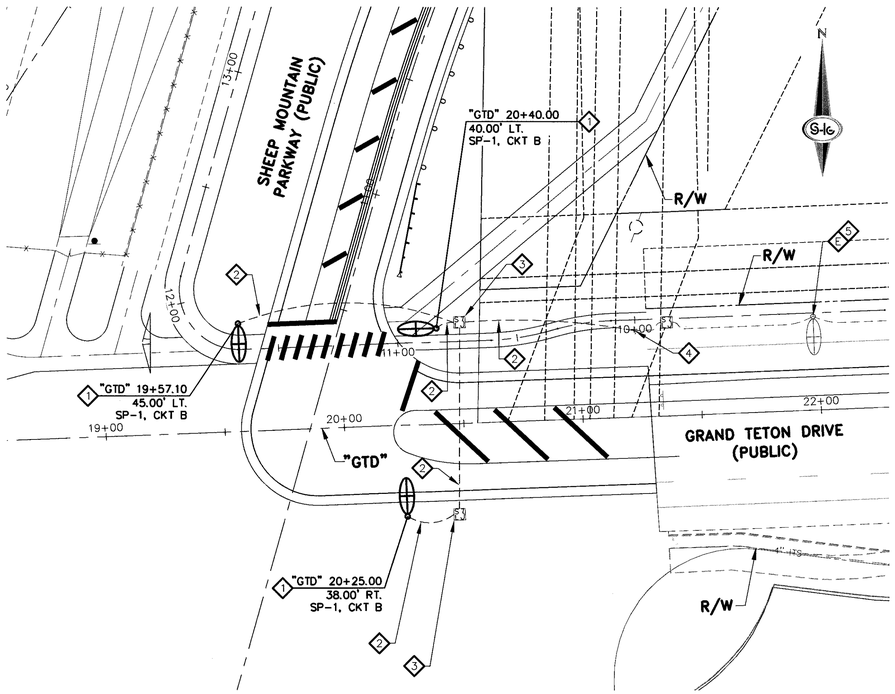
PROJECT NO.
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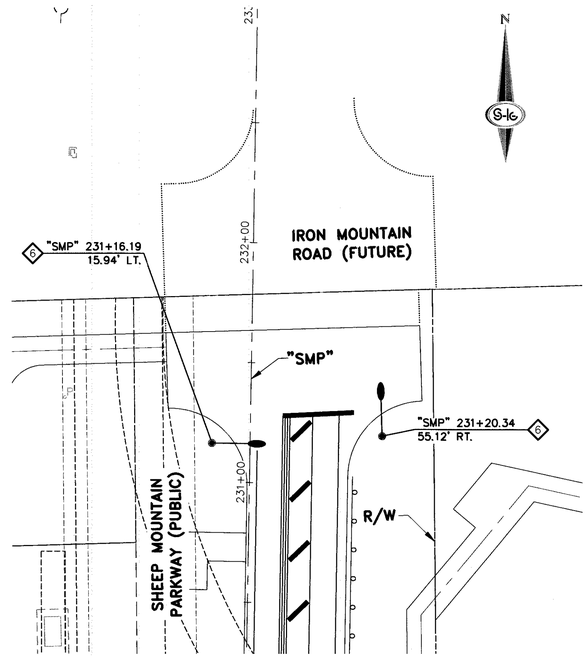
PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY J. SLATER
Exp. 06/30/2020
CIVIL
No. 14167
7/16/18

ST-07
SHEET 49 OF 50

DWG NO. _____

HANSEN NO. _____





LIGHTING NOTES

1. INSTALL STREETLIGHT ASSEMBLY (28226) WITH 198-WATT LED LUMINAIRE ON 6-FT ARM ON A 30-INCH DIAMETER 64-INCH DEEP CONCRETE FOUNDATION WITH ANCHOR BOLTS AS RECOMMENDED BY MANUFACTURER
2. 1-2" PVC CONDUIT WITH 2-#4, 1-#8 GND.
3. INSTALL NO. 3-1/2 PULL BOX (LIGHTING) (USDCCA STD. DWG. NO. 326 & 329)
4. INTERCEPT AND EXTEND EXISTING CONDUIT TO NEW PULL BOX LOCATION
5. REMOVE EXISTING 20 AMP CIRCUIT "A" BREAKER IN "SP-1" AT THE GRAND TETON AND SHAUMBER INTERSECTION AND INSTALL NEW 30-AMP CIRCUIT BREAKER FOR ADDITIONAL LOAD
6. INSTALL XX-A SIGNAL AND LUMINAIRE POLE WITH 400 WATT SOLAR POWERED EQUIVALENT LUMINAIRE ON TYPE "L" FOUNDATION (USDCCA STD. DWG. 808 AND 722).
E. EXISTING STREETLIGHT ASSEMBLY TO REMAIN IN PLACE

NOTES

1. ALL UNDERGROUND CONDUIT SHALL BE TYPE RNC (RIGID NONMETALLIC CONDUIT), SCHEDULE 40 PVC AND SHALL BE INSTALLED PER USDCCA STD. DWG. NOS. 503 & 505. ABOVE GROUND CONDUIT SHALL BE TYPE RMC (RIGID METALLIC CONDUIT). CONDUIT RISERS SHALL BE TYPE RMC WITH PVC COATING OR TAPE WRAP. ALL EMPTY CONDUIT SHALL INCLUDE A NYLON PULL STRING AND 1-#8 FOR LOCATING PURPOSES.
2. ALL CONDUCTORS SHALL BE STRANDED, 600-VOLT, TYPE THW INSULATED COPPER.
3. CONTRACTOR SHALL FURNISH AND INSTALL ALL ELECTRICAL COMPONENTS AND HARDWARE AS REQUIRED BY THE NATIONAL ELECTRICAL CODE, LATEST EDITION AND SHALL COMPLY WITH THE REQUIREMENTS OF THE INSPECTING AUTHORITY HAVING JURISDICTION.
4. REFER TO LIGHTING STUDY PROVIDED BY APPLICATION SOLUTION CENTER GE LIGHTING SOLUTIONS AND DESIGN CONCEPTS INC. (GE LAYOUT REFERENCE: A509720) FOR SPACING AND SPECIFICATIONS.
5. MIN. 12" VERTICAL SEPARATION REQUIRED BETWEEN WATER MAINS AND DRY UTILITIES PER UDACS SECTION 2.04.06
6. MIN. 3' HORIZONTAL SEPARATION REQUIRED BETWEEN WATER MAINS AND DRY UTILITIES PER UDACS SECTION 2.04.02

"SP-1" CIRCUIT CAPACITY CALCULATION

CIRCUIT NAME:	CIRCUIT (A)	
CIRCUIT TYPE:	STREET LIGHTING	
VOLTAGE:	240	
CIRCUIT CAPACITY:	30	
MAXIMUM CONTINUOUS CURRENT DRAW IS 80% OF CIRCUIT CAPACITY:	24	
	PROPOSED	
PROPOSED LOAD TO CIRCUIT:	QTY.	AMPS
198 WATT LUMINAIRE AT 240V = 0.825 AMPS	3	2.475
TOTAL PROPOSED LOAD AMPS =	2.475	
EXISTING PLUS PROPOSED LOAD AMPS =	16.57	
REMAINING AVAILABLE LOAD AMPS: =	7.93	

30 0 30 60
SCALE FEET

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD 1-702-227-2929

FAST Call before you UnderGround. 1-702-432-5300 FEDERAL AID INTERSTATE SYSTEM OF HIGHWAYS

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

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

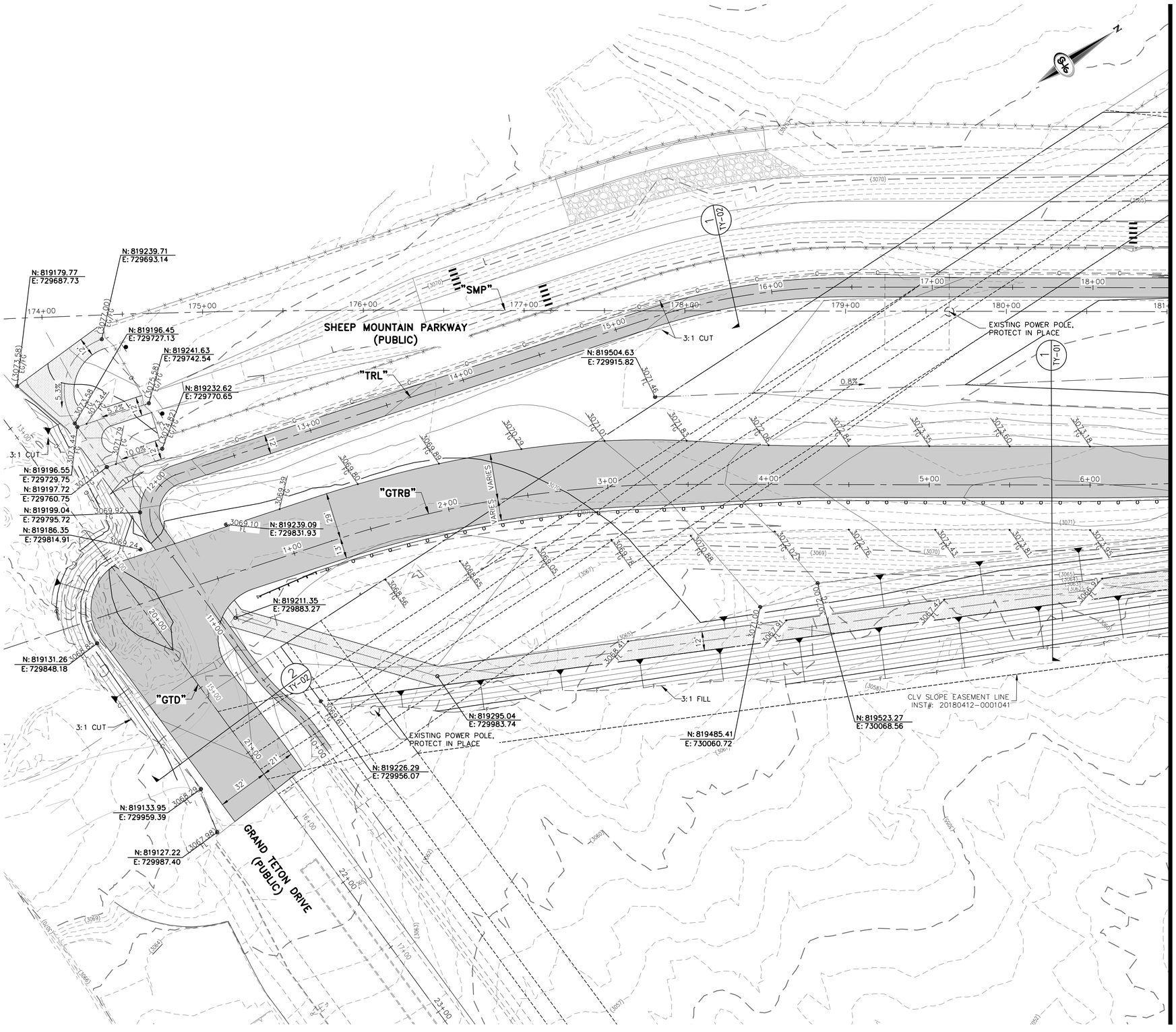
SHEEP MOUNTAIN PARKWAY
LIGHTING PLAN 1

DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY J. SLATER
Exp. 06/30/2020
CIVIL
No. 14167
7/16/18

LL-01
SHEET 50 OF 50
DWG NO. _____

HANSEN NO. _____



GRADING AND STORM DRAIN NOTES

1. INSTALL NDOT TYPE 2B STORM DRAIN DROP INLET WITH CONCRETE APRON (NDOT DETAIL R-4.2.2 AND R-4.2.7) (SEE SHEET TY-08)
2. ADJUST EXISTING STORM DRAIN DROP INLET TO FINISH GRADE (PER STRUCTURAL PLANS)
3. INSTALL RIPRAP (D50=3-INCH, T=12-INCH)
4. REMOVE EXISTING DROP INLET
5. INSTALL 36-INCH RCP STORM DRAIN (USDCCA STD. DWG. NO. 503.2)
6. INSTALL 48-INCH RCP STORM DRAIN (USDCCA STD. DWG. NO. 503.2)
7. ADJUST 72-INCH NDOT TYPE IV STORM DRAIN MANHOLE TO FINISH GRADE (NDOT DETAIL R-4.3.2) (SEE SHEET TY-08)
8. CONSTRUCT HEADWALL (PER STRUCTURAL DETAIL)
9. CONSTRUCT 6-INCH THICK CONCRETE PAD OVER 6-INCH TYPE II AGGREGATE BASE WITH 3-FOOT DEEP CUTOFF WALL (DETAIL 1, TY-04)
10. CONSTRUCT 6-INCH THICK CONCRETE PAD OVER 6-INCH TYPE II AGGREGATE BASE
11. CONNECT TO EXISTING RCP STORM DRAIN WITH CONCRETE COLLAR (DETAIL 5, SHEET TY-02)
12. REMOVE 120 SF EXISTING RIPRAP FOR INSTALLATION OF CONCRETE ACCESS ROAD
13. INSTALL 3-FT DEEP CONCRETE CUTOFF WALL (SEE DETAIL 4 ON TY-02)
14. INSTALL 42-INCH RCP STORM DRAIN (USDCCA STD. DWG. NO. 503.2)
15. INSTALL RCP END SECTION (NDOT R-2.3.1) (SEE SHEET TY-08)
16. CONSTRUCT 6-INCH THICK CONCRETE PAD OVER 6-INCH TYPE II AGGREGATE BASE WITH 3-FOOT DEEP CUTOFF WALL (DETAIL 1, SHEET TY-03)
17. INSTALL GROUTED RIPRAP (D50=12-INCH, T=24-INCH)
18. INSTALL 60-INCH TYPE III STORM DRAIN MANHOLE (USDCCA STD. DWG. NO. 406)
19. INSTALL 3-INCH MINUS, 6-INCH THICK GRAVEL OVER 6-INCH TYPE II AGGREGATE BASE
20. ADJUST 60-INCH TYPE III MANHOLE TO FINISH GRADE (CCAUSD NO. 406)
21. INSTALL 24-INCH RCP STORM DRAIN (USDCCA STD. DWG. NO. 503.2)

NOTES

1. SEE TY-SHEETS FOR TYPICAL SECTIONS.
2. SEE SD-SHEETS FOR STORM PROFILES.
3. SEE UT-SHEETS FOR WATER AND SEWER PLAN AND PROFILES.
4. ALL RCP SHALL BE CLASS III UNLESS OTHERWISE SHOWN IN PROFILE.
5. ALL PIPE LENGTHS ARE MEASURED ALONG PIPE CENTERLINE TO CENTER OF MANHOLE OR INSIDE EDGE OF DI OR RCB/RCA.
6. ALL DROP INLETS SHALL INCLUDE STORM WATER MANAGEMENT STAMP AND DETAIL PER USDCCA STD. DWG. NO. 421.
7. SEE STRUCTURAL PLANS FOR ADDITIONAL STRUCTURAL DETAILS AND CONNECTIONS.
8. ALL PIPES ARE PUBLICLY MAINTAINED.

LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH
- RIPRAP (SIZE PER PLAN)
- (1) STORM DRAIN LATERAL # (SEE SHEET GR-10)

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY 05-4952 ON FILE AT THE CITY OF LAS VEGAS FOR THE SUBJECT PROJECT

JERRY SLATER, P.E. 14167 DATE

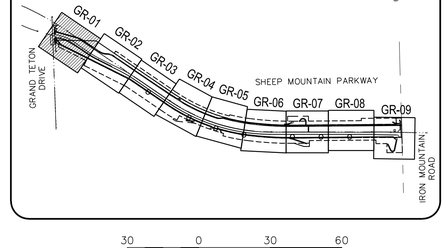
FLOOD ZONE

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE 'X' (OUTSIDE THE 500-YEAR FLOOD PLAIN) ON THE FLOOD INSURANCE RATE MAP (FIRM) PANEL 32003C1735E, DATED SEPTEMBER 27, 2002

NOTE:

PROPERTY OWNER IS RESPONSIBLE TO MAINTAIN THE BEST MANAGEMENT PRACTICES, SUCH AS BUT NOT LIMITED TO, THE REMOVAL OF ACCUMULATED SEDIMENT AND DEBRIS AND CARE OF VEGETATION.

KEY MAP



SCALE 30 0 30 60 FEET

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD 1-702-227-2929

FAST Call before you UnderGround. 1-702-432-5300 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

GRADING PLAN - "GTRB" 0+00.00 TO "GTRB" 6+50.00

DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

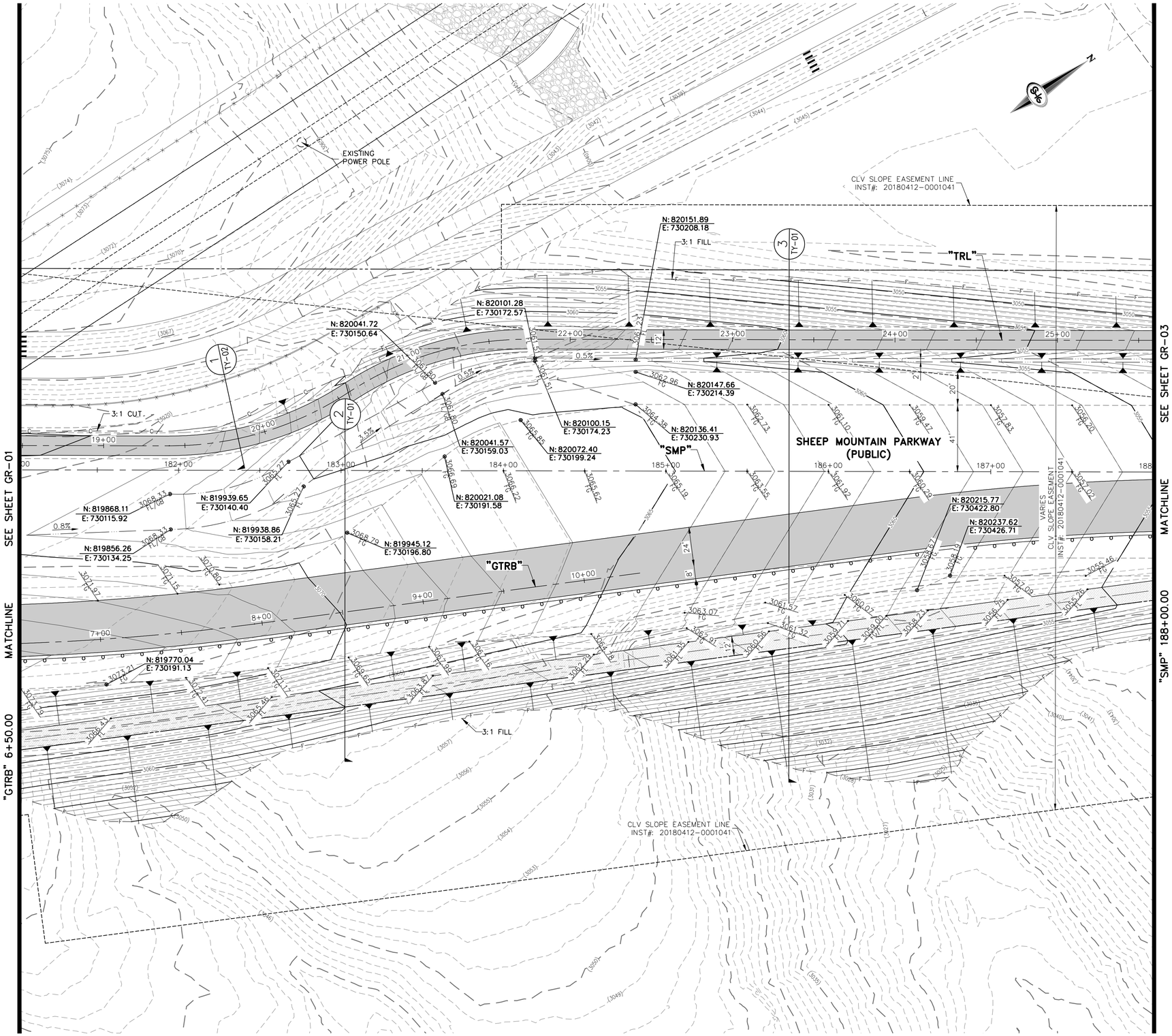
PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY J. SLATER
Exp. 06/30/2020
CIVIL
No. 14167

GR-01
SHEET 25 OF 53

DWG NO. _____

HANSEN NO. _____



GRADING AND STORM DRAIN NOTES

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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH
- RIPRAP (SIZE PER PLAN)
- 1 — STORM DRAIN LATERAL # (SEE SHEET GR-10)

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY DS-4952 ON FILE AT THE CITY OF LAS VEGAS FOR THE SUBJECT PROJECT

JERRY SLATER, P.E. 14167 — DATE

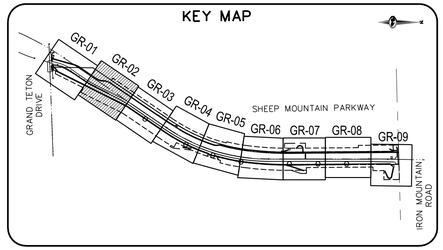
FLOOD ZONE

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE 'X' (OUTSIDE THE 500-YEAR FLOOD PLAIN) ON THE FLOOD INSURANCE RATE MAP (FIRM) PANEL-32003C1735E, DATED SEPTEMBER 27, 2002

NOTE:

PROPERTY OWNER IS RESPONSIBLE TO MAINTAIN THE BEST MANAGEMENT PRACTICES, SUCH AS BUT NOT LIMITED TO, THE REMOVAL OF ACCUMULATED SEDIMENT AND DEBRIS AND CARE OF VEGETATION.

KEY MAP



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FAST. Call before you UnderGround. 1-702-432-5300 NEVADA'S 1ST INTERNAL SYSTEM OF TRANSPORTATION

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5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

GRADING PLAN - "GTRB" 6+50.00 TO "GTRB" 12+00.00

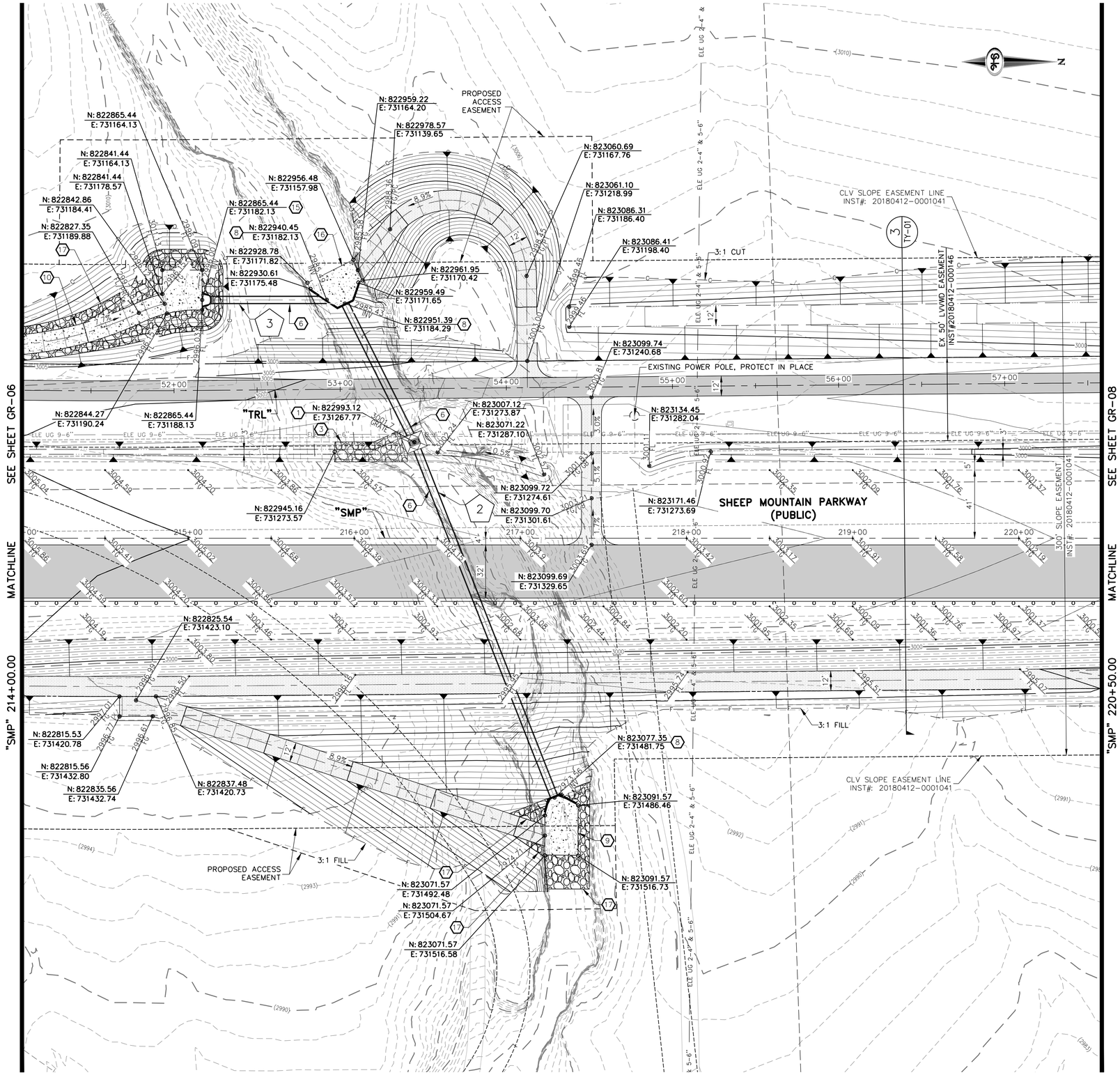
DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO. OLY1720.000

PROFESSIONAL ENGINEER STATE OF NEVADA — JERRY J. SLATER — Exp. 06/30/2020 — CIVIL — No. 14167

GR-02
SHEET 26 OF 53

DWG NO. _____

HANSEN NO. _____



GRADING AND STORM DRAIN NOTES

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NOTES

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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH
- RIPRAP (SIZE PER PLAN)
- (1) STORM DRAIN LATERAL # (SEE SHEET GR-10)

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY DS-4952 ON FILE AT THE CITY OF LAS VEGAS FOR THE SUBJECT PROJECT

JERRY SLATER, P.E. 14167 DATE

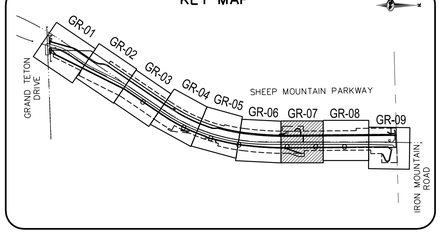
FLOOD ZONE

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE 'X' (OUTSIDE THE 500-YEAR FLOOD PLAIN) ON THE FLOOD INSURANCE RATE MAP (FIRM) PANEL: 32003C1735E, DATED SEPTEMBER 27, 2002

NOTE:

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KEY MAP



30 0 30 60
SCALE FEET

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

GRADING PLAN - "SMP" 214+00.00 TO "SMP" 220+50.00

DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

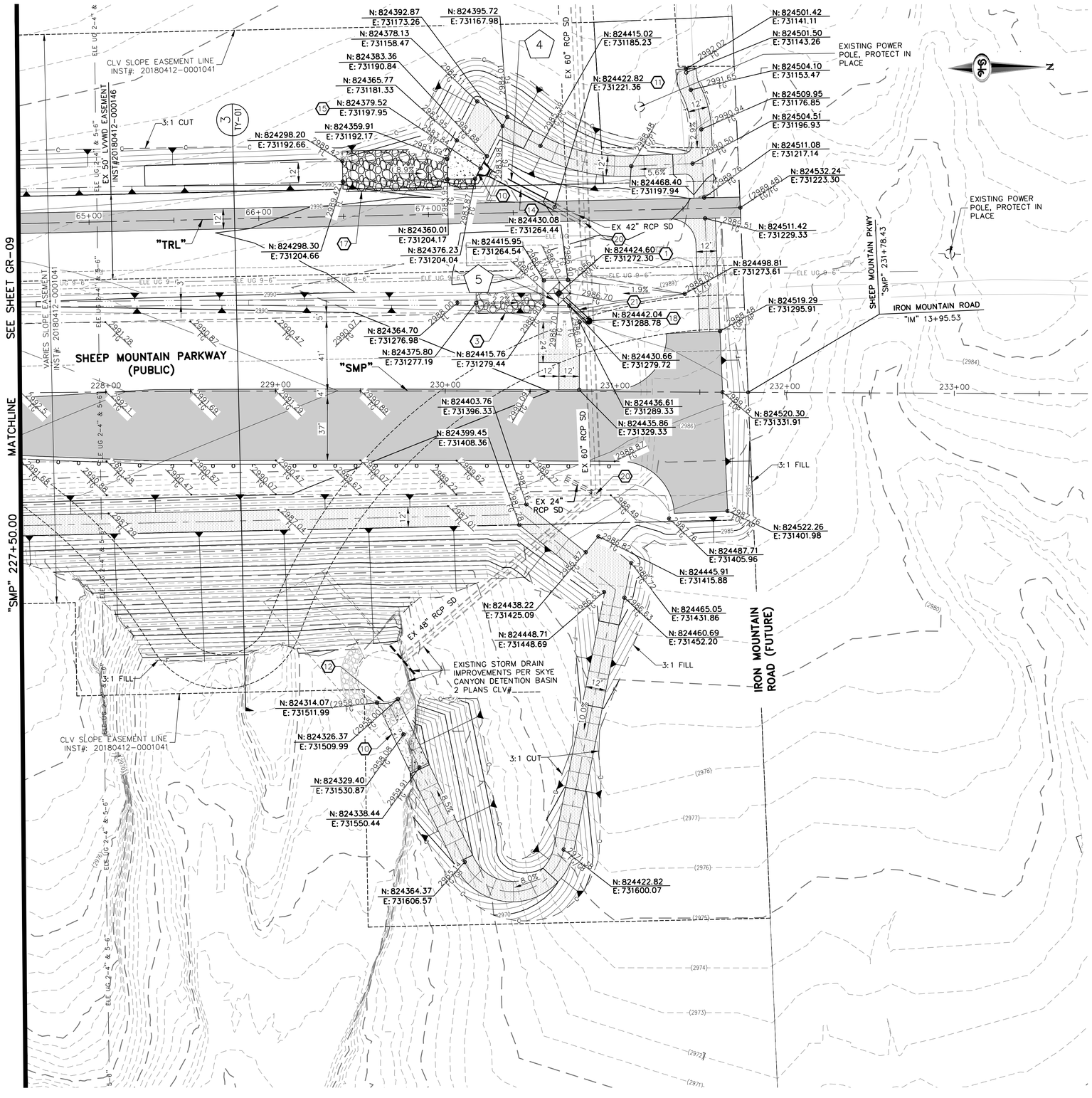
PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY J. SLATER
Exp. 06/30/2020
CIVIL
No. 14167

GR-07
SHEET 31 OF 53

DWG NO. _____

HANSEN NO. _____



GRADING AND STORM DRAIN NOTES

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- MAINTENANCE ACCESS PATH
- RIPRAP (SIZE PER PLAN)
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JERRY SLATER, P.E. 14167 — DATE

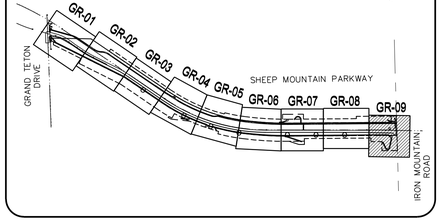
FLOOD ZONE

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE 'X' (OUTSIDE THE 500-YEAR FLOOD PLAIN) ON THE FLOOD INSURANCE RATE MAP (FIRM) PANEL: 32003C1735E, DATED SEPTEMBER 27, 2002

NOTE:

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KEY MAP



SCALE: 30 0 30 60 FEET

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD. 1-702-227-2929

FAST. Call before you UnderGround. 1-702-432-5300. FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

GRADING PLAN - "SMP" 227+50.00 TO "SMP" 233+50.00

DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO. OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA. JERRY J. SLATER. Exp. 06/30/2020. CIVIL. No. 14167

GR-09
SHEET 33 OF 53
DWG NO. _____

HANSEN NO. _____

Susan Kinney

From: Matthew Meyer <mmeyer@LasVegasNevada.GOV>
Sent: Monday, July 23, 2018 5:11 PM
To: Lant Leavitt
Cc: Jerrod Ratcliffe; Jerry Slater; Albert Sung; Oh-Sang Kwon
Subject: RE: Sheep Mt Pkwy - Revisions
Attachments: Sheep Mt Pkwy - Revisions to M Meyer Comment 180723.pdf

Thank you Lant, the drawing revisions addressed my concerns. The proposed pavement section and access to Kyle Canyon detention basin can be discussed/investigated after the drainage study is approved.
Thank you,
Matthew Meyer

From: Lant Leavitt [mailto:llleavitt@shg-inc.com]
Sent: Monday, July 23, 2018 4:11 PM
To: Matthew Meyer
Cc: Jerrod Ratcliffe; Jerry Slater
Subject: Sheep Mt Pkwy - Revisions

Matthew,

Sheep Mountain Pkwy revised sheets are attached to address your 7/20 phone comments. We revised the following:

- **Sheets GR-01 and GR-02:** Ditch grading between the Grand Teton ramp and the trail starts approx. 300-ft further north to reduce the length and depth of v-ditch requiring maintenance. The first approx. 600-ft length of ditch now has a wider bottom and/or gentler side slopes to make maintenance easier.
- **Sheets GR-07 and GR-09:** Note 17 calling for 18-inch riprap is revised to 12-inch grouted riprap to improve maintainability of riprap.

If these revisions meet your approval, please provide us an email response so we can meet the requirements of CLV Flood.

Thanks,

Lant Leavitt, P.E.
Project Manager I

SLATER HANIFAN GROUP
"The Benchmark of Our Profession."

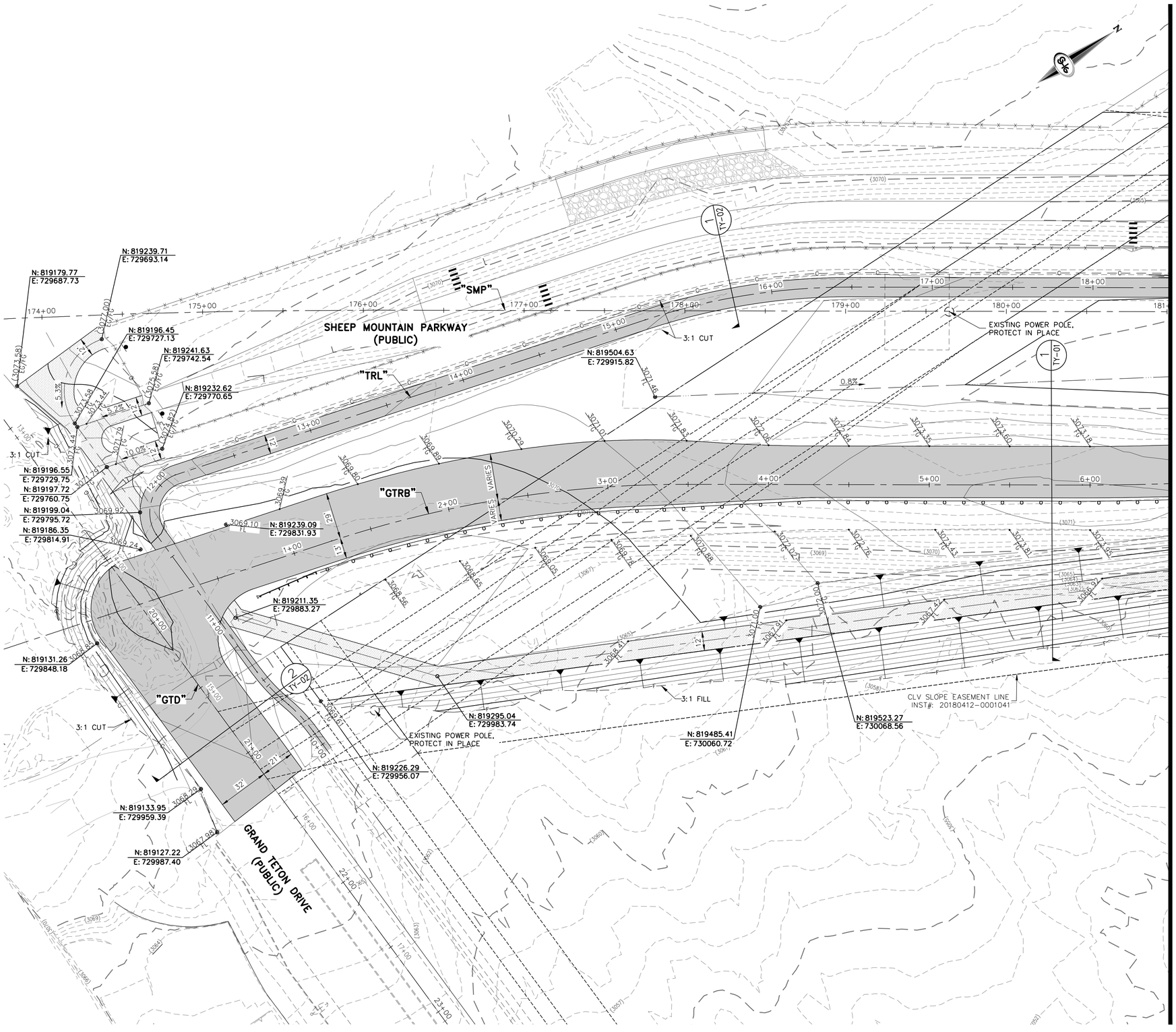
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SCOTTSDALE, AZ 85254
T: 602.687.9664

www.shg-inc.com

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Use of electronic media is at the sole risk of the user.



GRADING AND STORM DRAIN NOTES

1. INSTALL NDOT TYPE 2B STORM DRAIN DROP INLET WITH CONCRETE APRON (NDOT DETAIL R-4.2.2 AND R-4.2.7) (SEE SHEET TY-08)
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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH
- RIPRAP (SIZE PER PLAN)
- (1) STORM DRAIN LATERAL # (SEE SHEET GR-10)

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JERRY SLATER, P.E. 14167 DATE

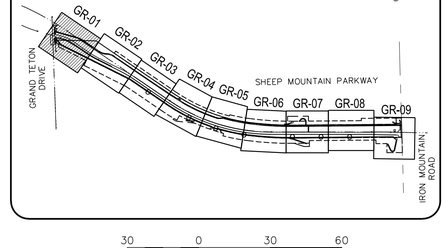
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

GRADING PLAN - "GTRB" 0+00.00 TO "GTRB" 6+50.00

DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR

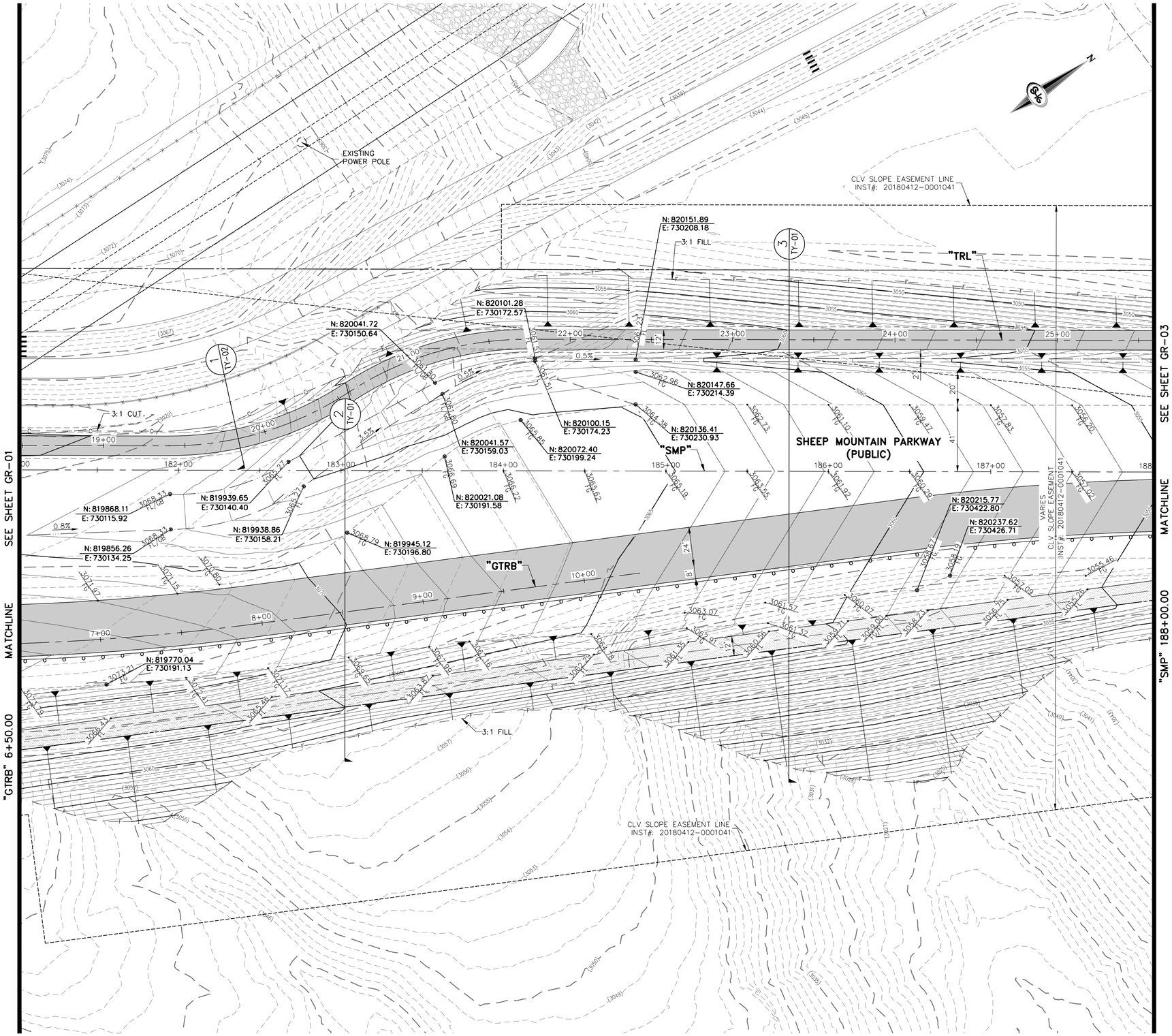
PROJECT NO.
OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY J. SLATER
Exp. 06/30/2020
CIVIL
No. 14167

GR-01
SHEET 25 OF 53

DWG NO. _____

HANSEN NO. _____



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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH
- RIPRAP (SIZE PER PLAN)
- 1 — STORM DRAIN LATERAL # (SEE SHEET GR-10)

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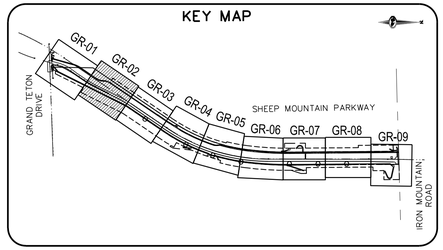
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

GRADING PLAN - "GTRB" 6+50.00 TO "GTRB" 12+00.00

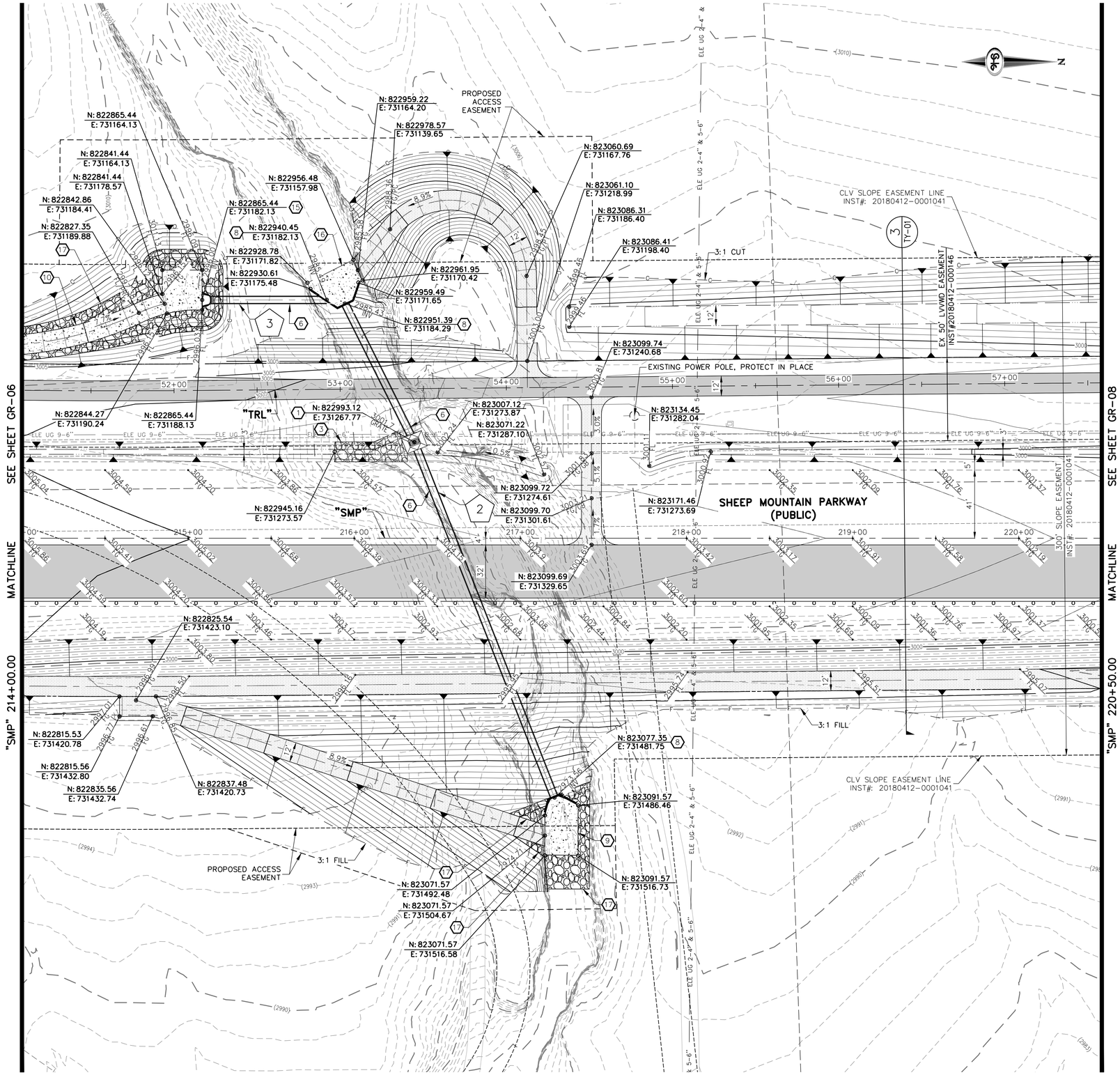
DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO. OLY1720.000

PROFESSIONAL ENGINEER STATE OF NEVADA — JERRY J. SLATER — Exp. 06/30/2020 — CIVIL — No. 14167

GR-02
SHEET 26 OF 53

DWG NO. _____

HANSEN NO. _____



GRADING AND STORM DRAIN NOTES

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LEGEND

- PLANTMIX BITUMINOUS SURFACE
- MAINTENANCE ACCESS PATH
- RIPRAP (SIZE PER PLAN)
- (1) STORM DRAIN LATERAL # (SEE SHEET GR-10)

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JERRY SLATER, P.E. 14167 DATE

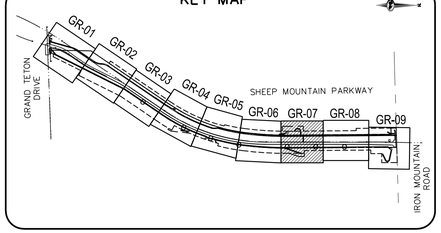
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

GRADING PLAN - "SMP" 214+00.00 TO "SMP" 220+50.00

DATE: 07/16/18
DRAFTER: BCC
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CHECKED: JSR

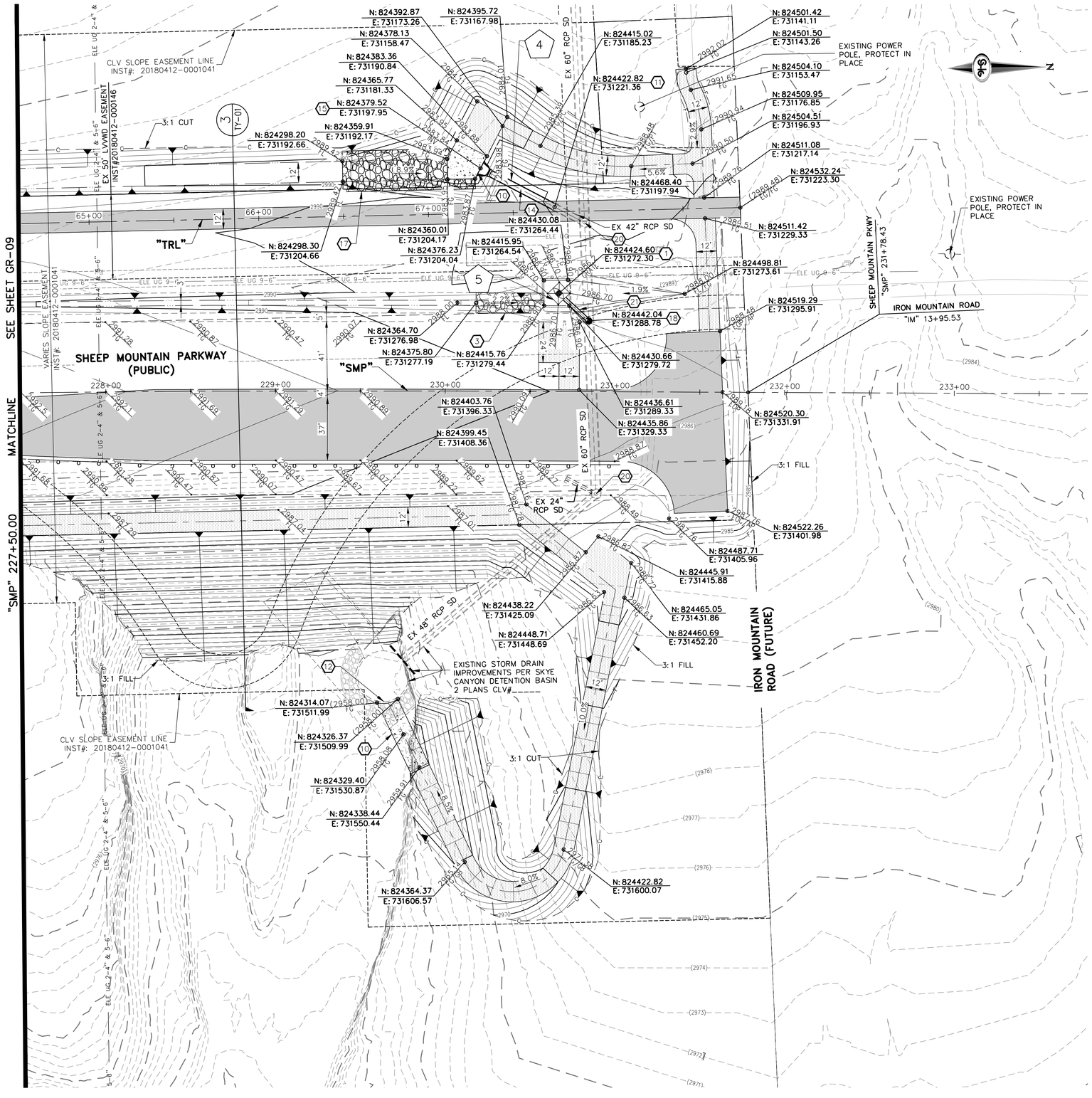
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OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY J. SLATER
Exp. 06/30/2020
CIVIL
No. 14167

GR-07
SHEET 31 OF 53

DWG NO. _____

HANSEN NO. _____



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I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY DS-4952 ON FILE AT THE CITY OF LAS VEGAS FOR THE SUBJECT PROJECT

JERRY SLATER, P.E. 14167 — DATE

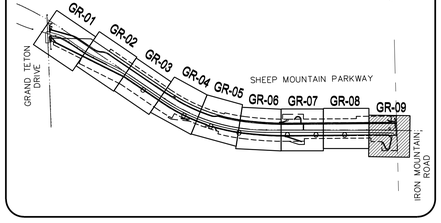
FLOOD ZONE

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE 'X' (OUTSIDE THE 500-YEAR FLOOD PLAIN) ON THE FLOOD INSURANCE RATE MAP (FIRM) PANEL: 32003C1735E, DATED SEPTEMBER 27, 2002

NOTE:

PROPERTY OWNER IS RESPONSIBLE TO MAINTAIN THE BEST MANAGEMENT PRACTICES, SUCH AS BUT NOT LIMITED TO, THE REMOVAL OF ACCUMULATED SEDIMENT AND DEBRIS AND CARE OF VEGETATION.

KEY MAP



SCALE: 30 0 30 60 FEET

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD. 1-702-227-2929

FAST. Call before you UnderGround. 1-702-432-5300. FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NINETY-FIVE MANAGEMENT LLC

SHEEP MOUNTAIN PARKWAY

GRADING PLAN - "SMP" 227+50.00 TO "SMP" 233+50.00

DATE: 07/16/18
DRAFTER: BCC
DESIGNER: BCC
CHECKED: JSR
PROJECT NO. OLY1720.000

PROFESSIONAL ENGINEER - STATE OF NEVADA. JERRY J. SLATER. Exp. 06/30/2020. CIVIL. No. 14167

GR-09
SHEET 33 OF 53
DWG NO. _____

HANSEN NO. _____