

DS #: 4537

APN: 138-22-701-009

PROJECT: Lake Mead Rock Springs Commercial Subdivision - update

SUBMITTAL: 4th

SCANNED BY/DATE: \_\_\_\_\_

CHECKED BY/DATE: \_\_\_\_\_



# CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM

DATE:

July 19, 2012

TO:

Land Development Services  
Department of Public Works

FROM:

Albert Sung, P.E.  
Flood Control Project Engineer  
Department of Public Works

SUBJECT:

Drainage Study for:

**Lake Mead Rock Springs Commercial Subdivision - Update**

COPIES TO:

Slater Hanifan Group

Cross Streets:

SWQ of Lake Mead Bl. & Rock Springs Dr.

Roohani Khusrow Family Trust

File Number:

F:\Depot\DSMemos\DS4537D.doc

Bart Anderson, P.E., DevCo

Parcel Number:

138-22-701-009

Zoning Action:

GPA-41883; ZON-41884; SUP-41885; SDR-41886 & TMP-42978

FEMA Flood Zone

YES

NO

X

Proposed Storm Drain

YES

NO

X

| HISTORY                   | DATE RECEIVED | DATE REVIEWED | COMMENTS           | REVIEW FEES | FEES PAID<br>Payment Trn # |
|---------------------------|---------------|---------------|--------------------|-------------|----------------------------|
| 1 <sup>st</sup> Submittal | 8/25/2011     | 8/30/2011     | Not Approved       | \$400.00    | 259046: \$400              |
| 2 <sup>nd</sup> Submittal | 9/22/2011     | 9/29/2011     | Not Approved       | \$400.00    | 261449: \$400              |
| 3 <sup>rd</sup> Submittal | 10/10/2011    | 10/17/2011    | Approved           | \$400.00    | 262963: \$400              |
| 4 <sup>th</sup> Submittal | 7/12/2012     | 7/19/2012     | See Comments Below | \$100.00    | 289479: \$100              |
| TOTAL FEES (LDDRS):       |               |               |                    | \$1,300.00  | ----                       |

## REMARKS:

### 4<sup>th</sup> Submittal: Update #1 to revise the site layout at the southeast corner of the development

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

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

1. It appears that the handicapped parking areas exceed the ADA 2%-max. slope criterion. Review and revise accordingly.

**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 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

ays

T/R/S: T20S/R60E/22

AREA L-22

# TECHNICAL DRAINAGE STUDY UPDATE

## Lake Mead Rock Springs Commercial Subdivision

City of Las Vegas, Nevada

Job No.: RCI1105-000

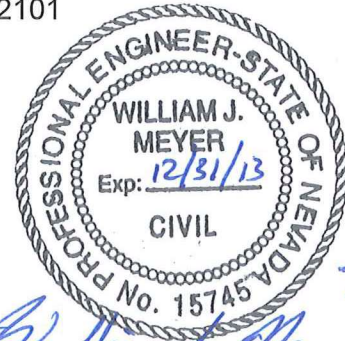
Date: July 2012

### 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:

Roohani Khusrow Family Trust  
3455 Cliff Shadows Pkwy, Suite 220  
Las Vegas, NV 89148  
Phone: 702-982-2100 • Fax: 702-982-2101



*William J. Meyer*  
William J. Meyer, P.E.  
NV Professional Engineer No. 15745

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL  
**DRAINAGE STUDY INFORMATION FORM**

Name of Development: Lake Mead Rock Springs (Update) Date: July 2012  
 Location of Development: a) Descriptive (Cross Streets): North/South: Rock Springs Drive  
East/West: Lake Mead Boulevard  
 b) Section: 22 Township: 20 S Range: 60 E  
 c) APN: 138-22-701-009

Name of Owner: Roohani Khusrow Family Trust  
 Telephone No.: (702) 982-2100 Fax No.: (702) 982-2101 E-mail Address: gmarkowski@gdpdgroup.com  
 Address: 9315 West Sunset Road #100, Las Vegas, NV 89148

Contact Person – Name: William Meyer, P.E. Telephone No.: (702) 284-5300  
 \*E-mail Address: bmeyer@shg-inc.com Fax No.: (702) 284-5399  
 Firm: Slater Hanifan Group  
 Address: 5740 S. Arville St. #216, Las Vegas, NV 89118

Type of Land Development/Land Disturbance Process:

|                                           |                                                   |                                                                  |
|-------------------------------------------|---------------------------------------------------|------------------------------------------------------------------|
| <input type="checkbox"/> Rezoning         | <input type="checkbox"/> Subdivision Map          | <input type="checkbox"/> Clearing and grading Only               |
| <input type="checkbox"/> Parcel Map       | <input type="checkbox"/> Planned Unit Development | <input checked="" type="checkbox"/> Other (Please specify below) |
| <input type="checkbox"/> Large Parcel Map | <input type="checkbox"/> Building Permit          | Commercial Development                                           |

1. Total Owned Land Area: At Site: ± 4.4 acres Being Developed/Disturbed: ± 4.4 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.): Commercial

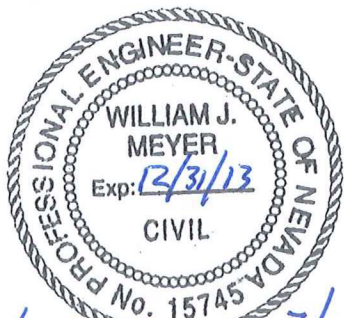
5. Approximate upstream land area which drains to the subject site: ± 0.0 acres

6. Has the site drainage been evaluated in the past? ☒ Yes\*\* ☐ No If yes, please identify documentation: \_\_\_\_\_

Technical Drainage Study for Lake Mead Rock Springs Residential Development (DS4171)

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Rock Springs Drive

8. Briefly describe your proposed schedule for the subject project: Phase 1 followed by Phase 2



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:

STANDARD FORM 1

Updated 05/01/2008



RCI1105.000

July 11, 2010

Albert Sung, P.E. – Flood Control Project Engineer  
City of Las Vegas Public Works  
333 N. Ranch Drive 89106  
Las Vegas, Nevada 89101

**Subject: Update to the Technical Drainage Study for  
Lake Mead Rock Springs Commercial Subdivision**

Mr. Sung:

Submitted for your review is this *Update to the Technical Drainage Study for Lake Mead Rock Springs Commercial Subdivision* (hereafter referred to as the Update). The purpose of this update is to revise the site layout for the two buildings at the southeastern portion of the site. The revision incorporates finish floor elevation changes and some layout revisions in the area of the two buildings. The redesign does not change the 100-year flowrate or the flow egress location from the site, and site drainage is consistent with the previously approved drainage study.

**Hydrology**

The revision has had no effect on the overall calculated 100-year flowrate of 13 cfs for the entire site as previously presented in the approved drainage study. Grading revisions have resulted in some minor changes to the drainage subbasin delineation at ONC and OND for the proposed site, and these revisions can be seen on the revised Exhibit F included in Appendix A. There has been no change in the individual areas of each subbasin, therefore, there has been no change in the calculated flowrates for each of the subbasins as can be seen on the Prorated Flow Computations Summary Table shown on the revised Exhibit F. Additionally, the revision has had no effect on the drainage outlet or runoff rate to Rock Springs Drive; therefore, the revisions have no negative impact to the NDOT right of way and do not change the conditions of the NDOT approval.

**Hydraulics**

The grading revisions have resulted in some changes to the cross sections used in the onsite hydraulic calculation. In an effort to aid in the review, the cross section numbering has been held consistent with the previous submittal for Cross Sections 6 and 14. There has also been the addition of several new cross sections, labeled 6A, 15, and 16, that are intended to reflect the grading changes to the southeastern portion of the site. All finish floor elevations are twice the depth of flow from the low point of the adjacent parking area and meet criteria. Note that the perimeter streets have not been revised, and no additional calculations are included with this letter.

## **Conclusion**

The site revision has no adverse impact on the upstream or downstream properties, and meets all applicable criteria as set forth by the Clark County Regional Flood Control Manual. As an aid in review, a copy of the approved drainage map from Addendum 2 of the technical drainage study has been included in Appendix C of this letter. Additionally the CLV and NDOT approval letters for the previously approved study have been included in Appendix C for your reference.

If you have any questions or require additional information, please do not hesitate to contact us at 284-5300.

Respectfully Submitted,

SLATER HANIFAN GROUP

William J. Meyer, P.E.  
Flood Control Division

pc: Mark J. Failla, SHG  
Raul Sotelo, RCI

## APPENDIX

1. Appendix A – Exhibits
  - Exhibit F – Revised Onsite Drainage Map
2. Appendix B – Hydraulic Computations
  - Onsite Hydraulic Computations
3. Appendix C - Reference Material: Addendum #2 to the Technical Drainage Study for Lake Mead Rock Springs Commercial Subdivision
  - CLV Approval Letter
  - NDOT Approval Letter
  - Exhibit F – Onsite Drainage Map
4. Appendix D – Grading Plans
5. Appendix E – Previously Approved Grading Plans (with a cloud around the area subject to change)

**TRANSMITTAL**

**To:** City of Las Vegas  
333 N. Rancho Drive  
Las Vegas, NV

**Date:** July 11, 2012

**Project No.:** RCI1105.000

**From:** William Meyer, P.E.

**Subject:** Update to the Technical Drainage Study for Lake Mead Rock Springs Commercial Subdivision

**CC:** Raul Sotelo

**CC:** Mark Fallia

**CC:** File

**CC:**

**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: \_\_\_\_\_

Date: \_\_\_\_\_ Time: \_\_\_\_\_

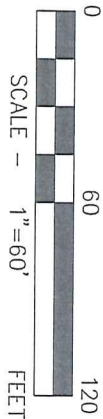
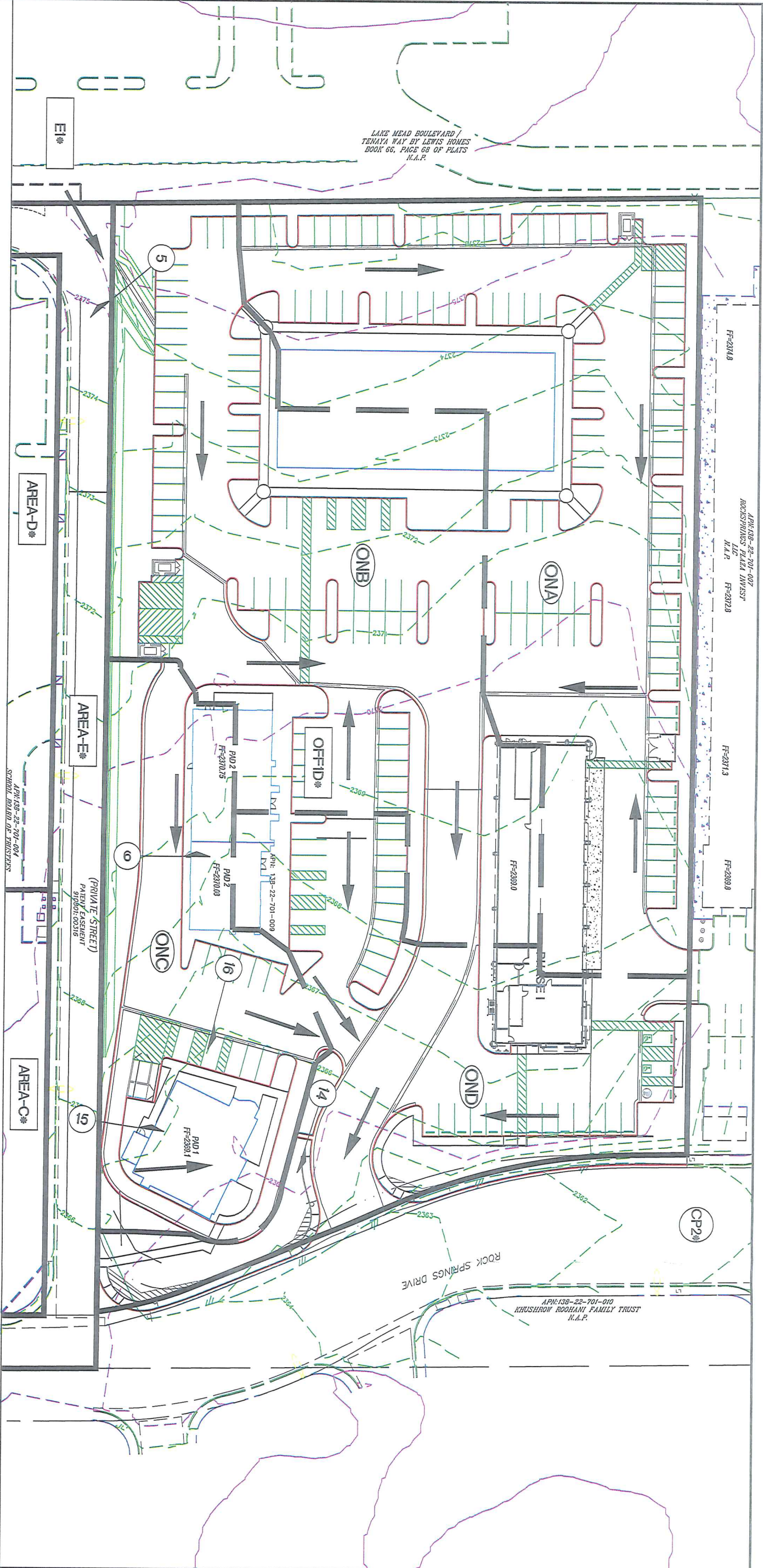
| Copies | Description                                                 |
|--------|-------------------------------------------------------------|
| 1      | Update to the Technical Drainage Study                      |
| 1      | Standard Form 1 (bound into study)                          |
| 1      | Revised Grading Plans (bound into study)                    |
| 1      | Approved Grading Plans (bound into study)                   |
| 1      | Fee – Check in the amount of \$100.00 (Check #xxxx)         |
| 1      | CD containing PDF of submittal documents (bound into study) |

**Comments:**

Signed: \_\_\_\_\_  
William J. Meyer

*Please, notify us at (702) 284-5300 if there are any problems receiving this transmission.*





| Flow Summary |           |                        |                        |                        |
|--------------|-----------|------------------------|------------------------|------------------------|
| Subbasin ID  | Area (ac) | Q <sub>100</sub> (cfs) | Q <sub>100</sub> (cfs) | Q <sub>100</sub> (cfs) |
| E1           | 19.2      | 19                     | 42                     |                        |
| OFF-ID       | 4.53      | 5                      | 13                     |                        |
| AREA-C       | 1.17      | 1                      | 2                      |                        |
| AREA-D       | 2.28      | 4                      | 7                      |                        |
| AREA-E       | 1.30      | 2                      | 4                      |                        |
| CP-2         | N/A       | 32                     | 71                     |                        |

Referenced from the Rural Center Study's Urban Condition Analysis

| Prorated Flow Computations (Phase II) |                        |              |                           |  |
|---------------------------------------|------------------------|--------------|---------------------------|--|
| Subbasin                              | Q <sub>100</sub> (cfs) | Area (acres) | 100-yr Unit Flow (cfs/ac) |  |
| OFF-ID*                               | 13                     | 4.53         | 2.9                       |  |
| Prorated Subbasin                     | Q <sub>100</sub> (cfs) | Area (acres) | 100-yr Unit Flow (cfs/ac) |  |
| ONA                                   | 4.3                    | 1.51         | 2.9                       |  |
| ONB                                   | 4.1                    | 1.42         | 2.9                       |  |
| ONC**                                 | 2.0                    | 0.70         | 2.9                       |  |
| OND**                                 | 2.6                    | 0.90         | 2.9                       |  |
| TOTAL                                 | 13.0                   | 4.53         |                           |  |

Referenced from the Rural Center Study

\*\* Revised for the Update

| Summary of Onsite Hydraulic Sections |           |         |                 |                     |                |                |
|--------------------------------------|-----------|---------|-----------------|---------------------|----------------|----------------|
| Phase II Drainage Condition          |           |         |                 |                     |                |                |
| Section                              | Slope (%) | Q (cfs) | Flow Depth (ft) | Facility Depth (ft) | Top Width (ft) | Velocity (fps) |
| Section 6 (Q = ONC)                  | 1.00      | 2.0     | 0.32            | 0.80                | 25.00          | 2.03           |
| Section 14 (Q = ONC)                 | 26.80     | 2.0     | 0.09            | 0.50                | 2.00           | 11.21          |
| Section 15 (Q = ONC)                 | 0.80      | 2.0     | 0.28            | 0.78                | 10.00          | 2.05           |
| Section 16 (Q = ONC)                 | 0.50      | 2.0     | 0.17            | 1.22                | 52.00          | 1.51           |

Referenced from Rural Center Study

ON-D1

BASIN BOUNDARY

PH1

PRORATED BASIN BOUNDARY

PT1

PRORATED BASIN ID

Flow Arrow

FLOW DIRECTION

CP

CONCENTRATION POINT

MS

FLOWMASTER SECTION

ROOHANI KHUSROW FAMILY TRUST (FIRESTONE)

LAKE MEAD ROCK SPRINGS COMMERCIAL SUBDIVISION

PHASE II CONDITION ONSITE DRAINAGE MAP UPDATE

| NO. | DESCRIPTION | DATE | BY | APP. DATE | APP. |
|-----|-------------|------|----|-----------|------|
|     |             |      |    |           |      |
|     |             |      |    |           |      |
|     |             |      |    |           |      |
|     |             |      |    |           |      |

S-I-G

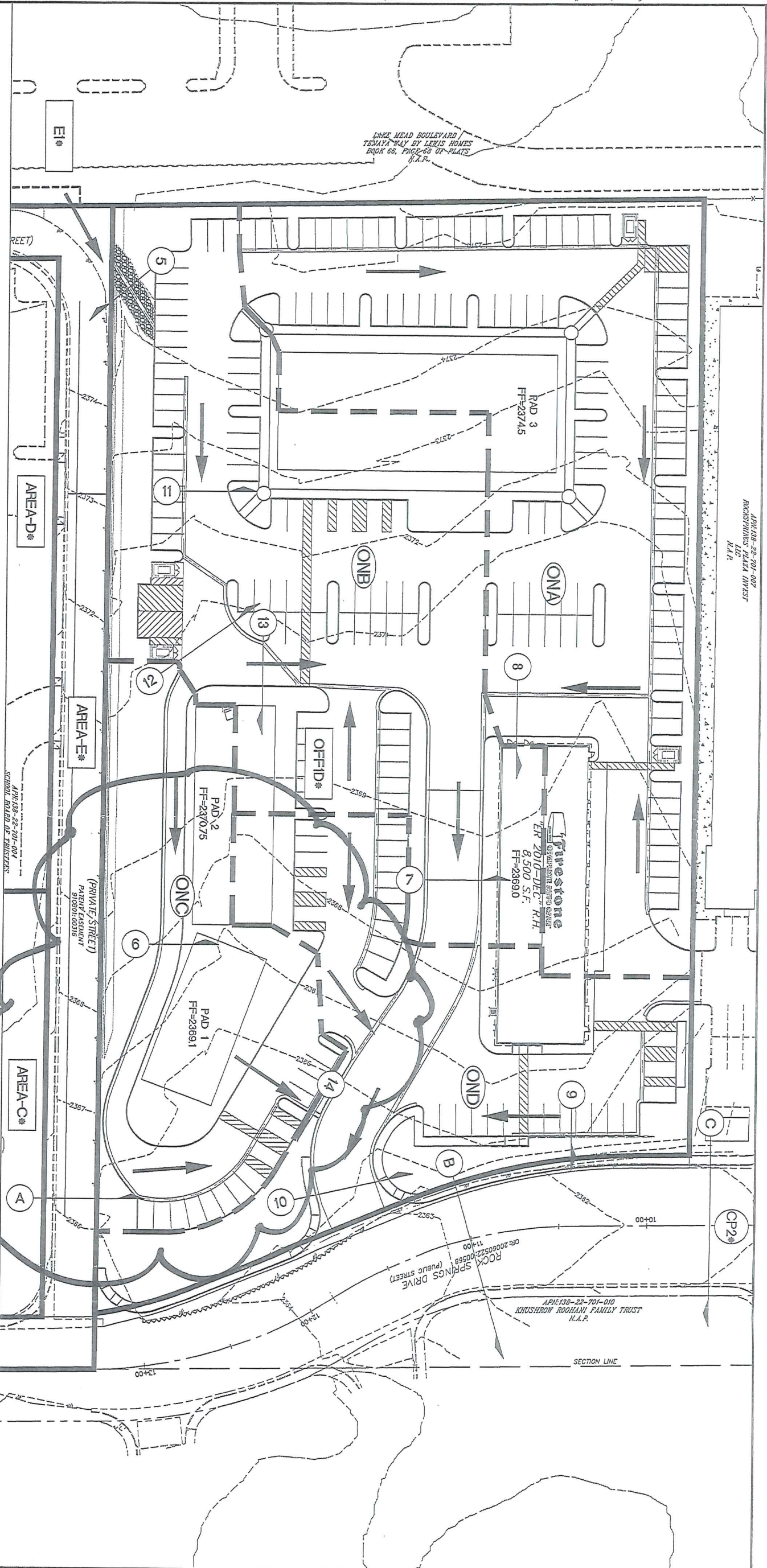
SLATER HANIFAN GROUP

CONSULTING ENGINEERS & PLANNERS

5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118

PHONE (702) 284-5300 FAX (702) 284-5399



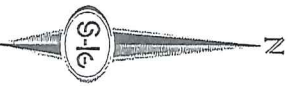
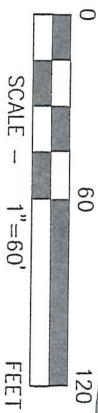


| Flow Summary<br>Proposed Condition |           |                       |                        |  |
|------------------------------------|-----------|-----------------------|------------------------|--|
| Subbasin ID                        | Area (ac) | Q <sub>10</sub> (cfs) | Q <sub>100</sub> (cfs) |  |
| E1                                 | 19.2      | 19                    | 42                     |  |
| OFF-ID                             | 4.53      | 5                     | 13                     |  |
| AREAC                              | 1.17      | 1                     | 2                      |  |
| AREAD                              | 2.26      | 4                     | 7                      |  |
| AREAE                              | 1.30      | 2                     | 4                      |  |
| CP-2                               | N/A       | 32                    | 71                     |  |

| Prorated Flow Computations (Phase II) |                        |              |                           |
|---------------------------------------|------------------------|--------------|---------------------------|
| Subbasin                              | Q <sub>100</sub> (cfs) | Area (acres) | 100-yr Unit Flow (cfs/ac) |
| OFF-ID*                               | 13                     | 4.53         | 2.9                       |
| Prorated Subbasin                     | Q <sub>100</sub> (cfs) | Area (acres) | 100-yr Unit Flow (cfs/ac) |
| ONA                                   | 4.3                    | 1.51         | 2.9                       |
| ONB                                   | 4.1                    | 1.42         | 2.9                       |
| ONC                                   | 2.0                    | 0.70         | 2.9                       |
| OND                                   | 2.6                    | 0.90         | 2.9                       |
| TOTAL                                 | 13.0                   | 4.53         |                           |

| Summary of Onsite Hydraulic Sections<br>Phase II Drainage Condition |           |         |                 |                     |                |                |
|---------------------------------------------------------------------|-----------|---------|-----------------|---------------------|----------------|----------------|
| Section                                                             | Slope (%) | Q (cfs) | Flow Depth (ft) | Facility Depth (ft) | Top Width (ft) | Velocity (fps) |
| Section 5<br>(Q = E1)                                               | 0.50      | 42.0    | 1.43            | 1.50                | 14.00          | 4.86           |
| Section 6<br>(Q = ONC)                                              | 0.50      | 2.0     | 0.3             | 0.50                | 12.00          | 1.65           |
| Section 7<br>(Q = E1 + ONA + ONB)                                   | 0.60      | 50.4    | 0.69            | 0.50                | 33.00          | 3.89           |
| Section 8<br>(Q = OND)                                              | 0.74      | 4.3     | 0.23            | 0.39                | 20.70          | 1.99           |
| Section 9<br>(Q = OND)                                              | 0.94      | 2.6     | 0.35            | 0.50                | 10.33          | 2.16           |
| Section 10<br>(Q = E1 + OFF-ID)                                     | 3.40      | 55.0    | 0.54            | 0.50                | 33.00          | 6.86           |
| Section 11<br>(Q = E1 + ONB)                                        | 1.00      | 46.1    | 0.82            | 1.51                | 19.09          | 5.55           |
| Section 12<br>(Q = E1 + ONB)                                        | 3.90      | 46.1    | 0.53            | 0.50                | 38.60          | 6.26           |
| Section 13<br>(Q = E1 + ONB)                                        | 3.90      | 46.1    | 0.51            | 0.50                | 25.60          | 7.30           |
| Section 14<br>(Q = ONC)                                             | 3.70      | 2.0     | 0.09            | 0.50                | 2.00           | 11.61          |

| Perimeter Street Flow Summary<br>Proposed Condition            |           |                        |            |                |           |
|----------------------------------------------------------------|-----------|------------------------|------------|----------------|-----------|
| Section                                                        | Slope (%) | Q <sub>100</sub> (cfs) | Depth (ft) | Velocity (fps) | VxD (cfs) |
| SECTION A<br>Pinale Drive<br>(Q = AREA-C* + AREA-D* + AREA-E*) | 1.52      | 13.0                   | 0.42       | 3.48           | 1.5       |
| SECTION B<br>Rock Springs Drive (60' ROW)<br>(Q = CP2)         | 1.00      | 71.0                   | 0.69       | 4.15           | 2.9       |
| SECTION C<br>Rock Springs Drive (60' ROW)<br>(Q = CP2)         | 1.00      | 71.0                   | 0.70       | 3.97           | 2.8       |



ON-D1

BASIN ID

PH1

PRORATED BASIN BOUNDARY

PT1

CONCENTRATION POINT

000

FLOWMASTER SECTION

Revised



## APPENDIX B

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### Hydraulic Computations

## Section 6 100-Year Worksheet for Irregular Channel

| Project Description |                    |
|---------------------|--------------------|
| Worksheet           | Section 6 100-Year |
| Flow Element        | Irregular Channel  |
| Method              | Manning's Formula  |
| Solve For           | Channel Depth      |

| Input Data    |                |
|---------------|----------------|
| Channel Slope | 0.010000 ft/ft |
| Discharge     | 2.00 cfs       |

| Options                         |                          |
|---------------------------------|--------------------------|
| Current Roughness Method        | Improved Lotter's Method |
| Open Channel Weighting Method   | Improved Lotter's Method |
| Closed Channel Weighting Method | Horton's Method          |

| Results                 |                     |
|-------------------------|---------------------|
| Mannings Coefficient    | 0.015               |
| Water Surface Elevation | 0.32 ft             |
| Elevation Range         | 0.00 to 0.98        |
| Flow Area               | 1.0 ft <sup>2</sup> |
| Wetted Perimeter        | 10.09 ft            |
| Top Width               | 9.73 ft             |
| Actual Depth            | 0.32 ft             |
| Critical Elevation      | 0.33 ft             |
| Critical Slope          | 0.007751 ft/ft      |
| Velocity                | 2.03 ft/s           |
| Velocity Head           | 0.06 ft             |
| Specific Energy         | 0.38 ft             |
| Froude Number           | 1.13                |
| Flow Type               | Supercritical       |

| Roughness Segments |             |                      |
|--------------------|-------------|----------------------|
| Start Station      | End Station | Mannings Coefficient |
| 0+100.0            | 0+101.5     | 0.013                |
| 0+101.5            | 0+125.0     | 0.016                |
| 0+125.0            | 0+125.0     | 0.013                |

| Natural Channel Points |                |
|------------------------|----------------|
| Station (ft)           | Elevation (ft) |
| 0+100.0                | 0.50           |
| 0+100.0                | 0.00           |
| 0+101.5                | 0.13           |
| 0+101.5                | 0.17           |
| 0+125.0                | 0.59           |
| 0+125.0                | 0.98           |

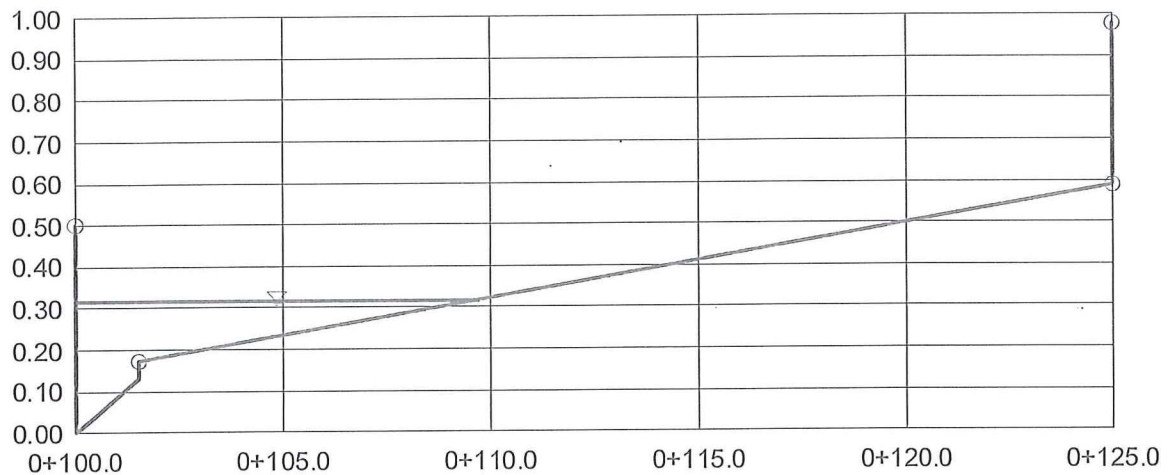


## Section 6 100-Year Cross Section for Irregular Channel

| Project Description |                    |
|---------------------|--------------------|
| Worksheet           | Section 6 100-Year |
| Flow Element        | Irregular Channel  |
| Method              | Manning's Formula  |
| Solve For           | Channel Depth      |

| Section Data            |                |
|-------------------------|----------------|
| Mannings Coefficient    | 0.015          |
| Channel Slope           | 0.010000 ft/ft |
| Water Surface Elevation | 0.32 ft        |
| Elevation Range         | 0.00 to 0.98   |
| Discharge               | 2.00 cfs       |



V:10.0  
H:1  
NTS

## Section 14 100-Year Worksheet for Rectangular Channel

| Project Description |                     |
|---------------------|---------------------|
| Worksheet           | Section 14 100-Year |
| Flow Element        | Rectangular Channel |
| Method              | Manning's Formula   |
| Solve For           | Channel Depth       |

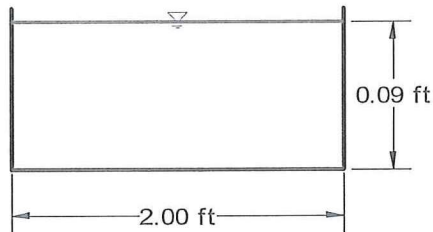
| Input Data           |                |
|----------------------|----------------|
| Mannings Coefficient | 0.013          |
| Channel Slope        | 0.268000 ft/ft |
| Bottom Width         | 2.00 ft        |
| Discharge            | 2.00 cfs       |

| Results          |                     |
|------------------|---------------------|
| Depth            | 0.09 ft             |
| Flow Area        | 0.2 ft <sup>2</sup> |
| Wetted Perimeter | 2.18 ft             |
| Top Width        | 2.00 ft             |
| Critical Depth   | 0.31 ft             |
| Critical Slope   | 0.005214 ft/ft      |
| Velocity         | 11.21 ft/s          |
| Velocity Head    | 1.95 ft             |
| Specific Energy  | 2.04 ft             |
| Froude Number    | 6.61                |
| Flow Type        | Supercritical       |

## Section 14 100-Year Cross Section for Rectangular Channel

| Project Description |                     |
|---------------------|---------------------|
| Worksheet           | Section 14 100-Year |
| Flow Element        | Rectangular Channel |
| Method              | Manning's Formula   |
| Solve For           | Channel Depth       |

| Section Data         |                |
|----------------------|----------------|
| Mannings Coefficient | 0.013          |
| Channel Slope        | 0.268000 ft/ft |
| Depth                | 0.09 ft        |
| Bottom Width         | 2.00 ft        |
| Discharge            | 2.00 cfs       |



V:10.0  
H:1  
NTS



## Section 15 100-Year Worksheet for Irregular Channel

| Project Description |                     |
|---------------------|---------------------|
| Worksheet           | Section 15 100-Year |
| Flow Element        | Irregular Channel   |
| Method              | Manning's Formula   |
| Solve For           | Channel Depth       |

| Input Data    |                |
|---------------|----------------|
| Channel Slope | 0.008000 ft/ft |
| Discharge     | 2.00 cfs       |

| Options                         |                          |
|---------------------------------|--------------------------|
| Current Roughness Method        | Improved Lotter's Method |
| Open Channel Weighting Method   | Improved Lotter's Method |
| Closed Channel Weighting Method | Horton's Method          |

| Results                 |                     |
|-------------------------|---------------------|
| Mannings Coefficient    | 0.013               |
| Water Surface Elevation | 0.28 ft             |
| Elevation Range         | 0.00 to 0.73        |
| Flow Area               | 1.0 ft <sup>2</sup> |
| Wetted Perimeter        | 10.37 ft            |
| Top Width               | 10.00 ft            |
| Actual Depth            | 0.28 ft             |
| Critical Elevation      | 0.29 ft             |
| Critical Slope          | 0.005772 ft/ft      |
| Velocity                | 2.05 ft/s           |
| Velocity Head           | 0.07 ft             |
| Specific Energy         | 0.34 ft             |
| Froude Number           | 1.16                |
| Flow Type               | Supercritical       |

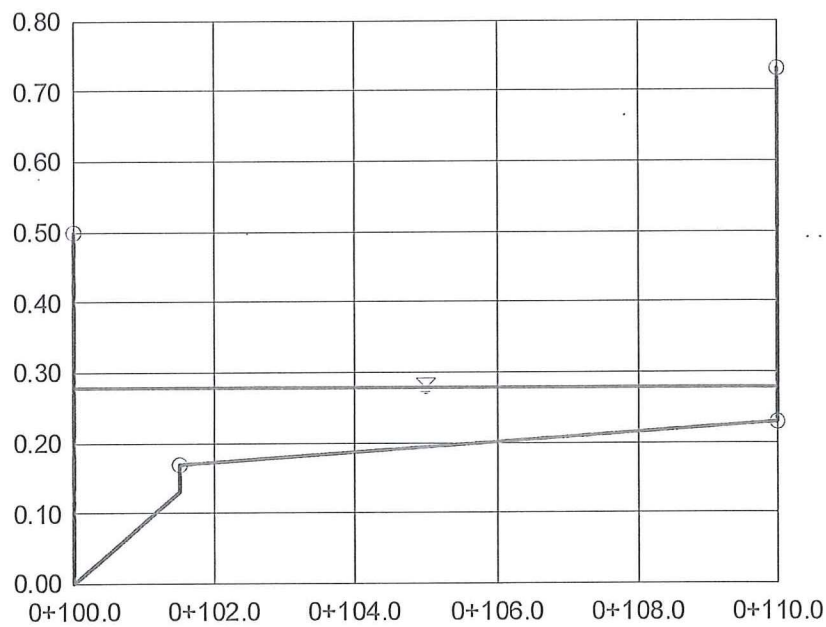
| Roughness Segments |             |                      |
|--------------------|-------------|----------------------|
| Start Station      | End Station | Mannings Coefficient |
| 0+100.0            | 0+101.5     | 0.013                |
| 0+101.5            | 0+110.0     | 0.016                |
| 0+110.0            | 0+110.0     | 0.013                |

| Natural Channel Points |                |
|------------------------|----------------|
| Station (ft)           | Elevation (ft) |
| 0+100.0                | 0.50           |
| 0+100.0                | 0.00           |
| 0+101.5                | 0.13           |
| 0+101.5                | 0.17           |
| 0+110.0                | 0.23           |
| 0+110.0                | 0.73           |

## Section 15 100-Year Cross Section for Irregular Channel

| Project Description |                     |
|---------------------|---------------------|
| Worksheet           | Section 15 100-Year |
| Flow Element        | Irregular Channel   |
| Method              | Manning's Formula   |
| Solve For           | Channel Depth       |

| Section Data            |                |
|-------------------------|----------------|
| Mannings Coefficient    | 0.013          |
| Channel Slope           | 0.008000 ft/ft |
| Water Surface Elevation | 0.28 ft        |
| Elevation Range         | 0.00 to 0.73   |
| Discharge               | 2.00 cfs       |



V:10.0  
H:1  
NTS

## Section 16 100-Year Worksheet for Irregular Channel

| Project Description |                     |
|---------------------|---------------------|
| Worksheet           | Section 16 100-Year |
| Flow Element        | Irregular Channel   |
| Method              | Manning's Formula   |
| Solve For           | Channel Depth       |

| Input Data    |                |
|---------------|----------------|
| Channel Slope | 0.005000 ft/ft |
| Discharge     | 2.00 cfs       |

| Options                         |                          |
|---------------------------------|--------------------------|
| Current Roughness Method        | Improved Lotter's Method |
| Open Channel Weighting Method   | Improved Lotter's Method |
| Closed Channel Weighting Method | Horton's Method          |

| Results                 |                     |
|-------------------------|---------------------|
| Mannings Coefficient    | 0.013               |
| Water Surface Elevation | 0.17 ft             |
| Elevation Range         | 0.00 to 1.19        |
| Flow Area               | 1.3 ft <sup>2</sup> |
| Wetted Perimeter        | 16.03 ft            |
| Top Width               | 16.03 ft            |
| Actual Depth            | 0.17 ft             |
| Critical Elevation      | 0.17 ft             |
| Critical Slope          | 0.005913 ft/ft      |
| Velocity                | 1.51 ft/s           |
| Velocity Head           | 0.04 ft             |
| Specific Energy         | 0.21 ft             |
| Froude Number           | 0.92                |
| Flow Type               | Subcritical         |

| Roughness Segments |             |                      |
|--------------------|-------------|----------------------|
| Start Station      | End Station | Mannings Coefficient |
| 0+100.0            | 0+100.0     | 0.013                |
| 0+100.0            | 0+130.5     | 0.016                |
| 0+130.5            | 0+133.5     | 0.013                |
| 0+133.5            | 0+152.0     | 0.016                |
| 0+152.0            | 0+152.0     | 0.013                |

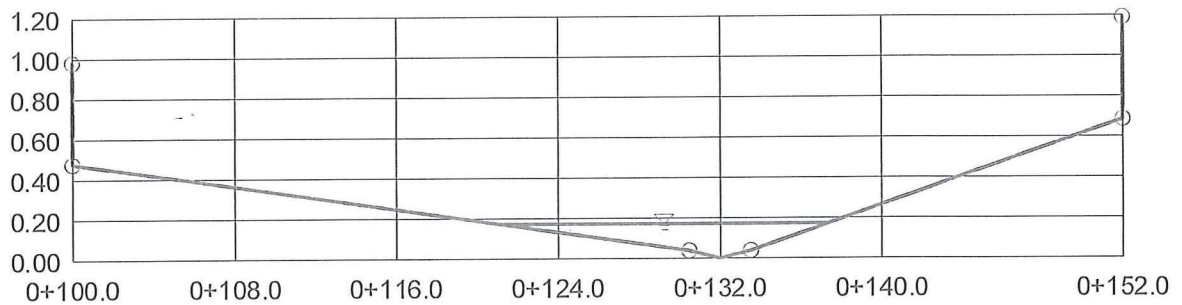
| Natural Channel Points |                |
|------------------------|----------------|
| Station (ft)           | Elevation (ft) |
| 0+100.0                | 0.98           |
| 0+100.0                | 0.48           |
| 0+130.5                | 0.04           |
| 0+132.0                | 0.00           |
| 0+133.5                | 0.04           |
| 0+152.0                | 0.69           |
| 0+152.0                | 1.19           |



## Section 16 100-Year Cross Section for Irregular Channel

| Project Description |                     |
|---------------------|---------------------|
| Worksheet           | Section 16 100-Year |
| Flow Element        | Irregular Channel   |
| Method              | Manning's Formula   |
| Solve For           | Channel Depth       |

| Section Data            |                |
|-------------------------|----------------|
| Mannings Coefficient    | 0.013          |
| Channel Slope           | 0.005000 ft/ft |
| Water Surface Elevation | 0.17 ft        |
| Elevation Range         | 0.00 to 1.19   |
| Discharge               | 2.00 cfs       |



V:10.0  
H:1  
NTS

# APPENDIX C

---

## Reference Material

*Addendum #2 to the Technical Drainage Study for Lake Mead Rock Springs Commercial  
Subdivision*

by Slater-Hanifan Group, CLV DS4537

**TECHNICAL DRAINAGE STUDY  
ADDENDUM NO. 2  
Lake Mead Rock Springs  
Commercial Subdivision  
City of Las Vegas, Nevada**

Job No.: RCI1105.000  
Date: October 2011

**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:**  
Roohani Khusrow Family Trust  
9315 W. Sunset Road #100  
Las Vegas, NV 89148  
Phone: 702-982-2100 • Fax: 702-982-2101

---

Kylie Rowbury, P.E.  
NV Professional Engineer No. 21172



|                                                                       |                                                           |                                                                                                   |
|-----------------------------------------------------------------------|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| <b>CITY OF LAS VEGAS</b>                                              |                                                           | <b>DATE:</b>                                                                                      |
| <b>INTER-OFFICE MEMORANDUM</b>                                        |                                                           | October 17, 2011                                                                                  |
| <b>TO:</b><br>Land Development Services<br>Department of Public Works |                                                           | <b>FROM:</b><br>Albert Sung, P.E.<br>Flood Control Project Engineer<br>Department of Public Works |
| <b>SUBJECT:</b>                                                       | Drainage Study for:                                       | <b>COPIES TO:</b>                                                                                 |
|                                                                       | Lake Mead Rock Springs Commercial Subdivision             | Slater Hanifan Group                                                                              |
| <b>Cross Streets:</b>                                                 | SWQ of Lake Mead Bl. & Rock Springs Dr.                   | Roohani Khusrow Family Trust                                                                      |
| <b>File Number:</b>                                                   | F:\Depot\DS\Memos\DS4537C.doc                             | Bart Anderson, P.E., DevCo                                                                        |
| <b>Parcel Number:</b>                                                 | 138-22-701-009                                            |                                                                                                   |
| <b>Zoning Action:</b>                                                 | GPA-41883; ZON-41884; SUP-41885;<br>SDR-41886 & TMP-42978 |                                                                                                   |
| <b>FEMA Flood Zone</b>                                                | YES                                                       | NO <input checked="" type="checkbox"/>                                                            |
| <b>Proposed Storm Drain</b>                                           | YES                                                       | NO <input checked="" type="checkbox"/>                                                            |

| HISTORY                    | DATE RECEIVED | DATE REVIEWED | COMMENTS           | REVIEW FEES       | FEES PAID<br>Payment Trn # |
|----------------------------|---------------|---------------|--------------------|-------------------|----------------------------|
| 1 <sup>st</sup> Submittal  | 8/25/2011     | 8/30/2011     | Not Approved       | \$400.00          | 259046: \$400              |
| 2 <sup>nd</sup> Submittal  | 9/22/2011     | 9/29/2011     | Not Approved       | \$400.00          | 261449: \$400              |
| 3 <sup>rd</sup> Submittal  | 10/10/2011    | 10/17/2011    | See Comments Below | \$400.00          | 262963: \$400              |
| <b>TOTAL FEES (LDDRS):</b> |               |               |                    | <b>\$1,200.00</b> |                            |

**REMARKS:**

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

|                                     |                                                                                                |
|-------------------------------------|------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | 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. |

- The following perpetual drainage right note must be added to the Final Map:

**ALL SUBDIVIDED PARCELS COMPRISING THIS COMMERCIAL SUBDIVISION SHALL PROVIDE PERPETUAL INTERSITE COMMON DRAINAGE RIGHTS ACROSS ALL EXISTING AND FUTURE PARCEL LIMITS.**

- The proposed variable width public drainage easement (privately maintained) must be recorded within the Final Map prior to the final acceptance of the improvement plans.

In an effort to increase administrative efficiency, the City of Las Vegas Public Works Department requires all soil reports, drainage studies and traffic impact analysis submittals to be accompanied by an electronic copy of the submittal. Electronic documents must be submitted with one original hard copy of the study. Electronic documents should be on a universal computer-readable digital output replicating your submittal to be used for archival or display purposes. This may be more than one file if necessary. An Indexed Portable Document Format (PDF) or Print Ready CAD file formats with a minimum of 300dpi are the desired formats, but provided it is a high quality digitized replication of the submittal, other formats may be acceptable. If figures are in color, they must be scanned in color and saved as a separate file. The new submittal requirement is effective on July 1, 2011. If there are any questions regarding these new requirements, please contact Robert Welch in the Flood Section at (702) 229-2177 or Rick Schroder in Traffic Engineering at (702) 229-6327.

**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 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**

ays

T/R/S: T20S/R60E/22  
AREA L-22

|                               |               |         |             |            |   |
|-------------------------------|---------------|---------|-------------|------------|---|
| Post-It <sup>®</sup> Fax Note | 7671          | Date    | 10/17/11    | # of pages | 2 |
| To                            | Kylie Rowbury | From    | Albert SUNG |            |   |
| Co./Dept.                     | SHG           | Co.     | CLW         |            |   |
| Phone #                       |               | Phone # | 229-2007    |            |   |
| Fax #                         | 284-5399      | Fax #   |             |            |   |



**RIGHT OF WAY OCCUPANCY PERMIT APPLICATION  
REVIEW AND RECOMMENDATIONS**

Name Jim Moore  
Ph. No. 888-7799

Division Design/Hydraulics

Permit No.

District Permit Coordinator

- |                                                   |                                                     |
|---------------------------------------------------|-----------------------------------------------------|
| <input checked="" type="checkbox"/> 1 Rudy Lucero | <input type="checkbox"/> 3a (Ely) John Ogden        |
| <input type="checkbox"/> 2 Janet Reck             | <input type="checkbox"/> 3b (Elko) Jim Aagard       |
| <input type="checkbox"/> 9 (HQ) Bill Bowman       | <input type="checkbox"/> 3c (Winnemucca) Jay Marden |

Documents Reviewed:

TDS For Lake Mead At Rock Springs (DATED 11/16/11)

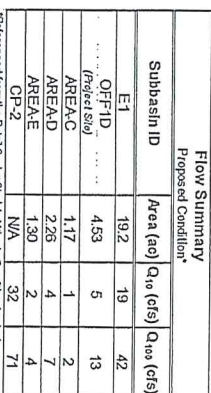
Recommendation:

- ☒ Approve – No Comments
- ☐ Approve with Conditions as stated below (Follow-up review **not** required)
- ☐ Changes Required as stated below (Follow-up review required)
- ☐ Deny as justified below

Comments and Conditions:

Save the document and send via email it to the appropriate District Permit Coordinator from the list above.

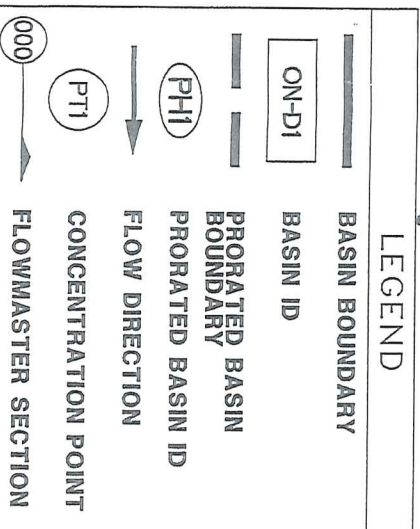
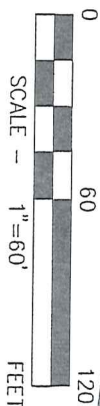




| Purified Flow Computations (Phase II) |                        |              |                           |
|---------------------------------------|------------------------|--------------|---------------------------|
| Subbasin                              | Q <sub>100</sub> (cfs) | Area (acres) | 100-yr Unit Flow (cfs/ac) |
| OFF-ID*                               | 13                     | 4.53         | 2.9                       |
| Purified Subbasin                     |                        |              |                           |
| OMA                                   | 4.3                    | 1.51         | 2.9                       |
| ONB                                   | 4.1                    | 1.42         | 2.9                       |
| ONC                                   | 2.0                    | 0.70         | 2.9                       |
| OND                                   | 2.6                    | 0.90         | 2.9                       |
| TOTAL                                 | 13.0                   | 4.53         |                           |

| Summary of Onsite Hydraulic Sections |       |       |                 |                     |                |                |                                                        |
|--------------------------------------|-------|-------|-----------------|---------------------|----------------|----------------|--------------------------------------------------------|
| Phase II Drainage Condition          |       |       |                 |                     |                |                |                                                        |
| Section                              | Slope | Q (%) | Flow Depth (ft) | Facility Depth (ft) | Top Width (ft) | Velocity (fps) | Section Description                                    |
| Section 5<br>(Q = EI7)               | 0.50  | 42.0  | 1.43            | 1.50                | 14.00          | 4.96           | Riprap Drainage Swale<br>(Trapezoidal, 2.0' BW, 4" SS) |
| Section 6<br>(Q = OM6)               | 0.50  | 2.0   | 0.3             | 0.50                | 12.00          | 1.66           | Drive Aisle/L-Curb                                     |
| Section 7<br>(Q = E17 + OM4 + OM6)   | 0.60  | 50.4  | 0.69            | 0.50                | 33.00          | 3.89           | Drive Aisle/L-Curb                                     |
| Section 8<br>(Q = OM4)               | 0.74  | 4.3   | 0.23            | 0.99                | 20.70          | 1.99           | Drive Aisle/Valley Gutter                              |
| Section 9<br>(Q = OM6)               | 0.94  | 2.6   | 0.35            | 0.50                | 10.33          | 2.16           | L-Curb                                                 |
| Section 10<br>(Q = E17 + OFF/D)      | 3.40  | 55.0  | 0.54            | 0.50                | 33.00          | 6.86           | Driveway Entrance                                      |
| Section 11<br>(Q = E17 + OM6)        | 1.00  | 46.1  | 0.82            | 1.61                | 19.09          | 5.55           | Drive Aisle/Valley Gutter                              |
| Section 12<br>(Q = E17 + OM6)        | 3.90  | 46.1  | 0.53            | 0.50                | 38.60          | 6.26           | Drive Aisle/L-Curb                                     |
| Section 13<br>(Q = E17 + OM6)        | 3.90  | 46.1  | 0.51            | 0.50                | 26.50          | 7.30           | Drive Aisle/L-Curb                                     |
| Section 14<br>(Q = OM6)              | 3.70  | 2.0   | 0.09            | 0.50                | 2.00           | 11.61          | Concrete Flume                                         |

| Perimeter Street Flow Summary                             |           |                        |            |                |                 |                                     |
|-----------------------------------------------------------|-----------|------------------------|------------|----------------|-----------------|-------------------------------------|
| Proposed Condition                                        |           |                        |            |                |                 |                                     |
| Section                                                   | Slope (%) | Q <sub>100</sub> (cfs) | Depth (ft) | Velocity (fps) | V <sub>90</sub> | Q <sub>10</sub> Dry Lane Width (ft) |
| SECTION A<br>Pine Drive<br>(Q = AREA-C + AREA-D + AREA-E) | 1.52      | 13.0                   | 0.42       | 3.48           | 1.5             | 7.0                                 |
| SECTION B<br>Rock Springs Drive (60' ROW)<br>(Q = CP2)    | 1.00      | 71.0                   | 0.69       | 4.15           | 2.9             | 32.0                                |
| SECTION C<br>Rock Springs Drive (60' ROW)<br>(Q = CP2)    | 1.00      | 71.0                   | 0.70       | 3.97           | 2.8             | 32.0                                |
|                                                           |           |                        |            |                |                 | 13.0                                |



# Reise

[illegible]

**S-I-G SLATER  
HANIFAN  
GROUP**  
**CONSULTING ENGINEERS & PLANNERS**  
5740 S. ARVILLE STREET #215, LAS VEGAS, NV 89118  
PHONE (702) 284-5300 FAX (702) 284-5399

**ROOHANI KHUSROW FAMILY TRUST (FIRESTONE)**  
**LAKE MEAD ROCK SPRINGS COMMERCIAL SUBDIVISION**  
**PHASE II CONDITION ONSITE DRAINAGE MAP**

|             |            |
|-------------|------------|
| DATE:       | 10/04/11   |
| DRAFTER:    | KCR        |
| DESIGNER:   | KCR        |
| CHECKED:    | MJF        |
| PROJECT NO. | RC1105.000 |
| EXHIBIT     |            |

SHEET 1 OF

## Aaddendum #2



---

## APPENDIX D

### Grading Plans

## APPENDIX E

---

### Previously Approved Grading Plans

# TECHNICAL DRAINAGE STUDY UPDATE

## Lake Mead Rock Springs Commercial Subdivision

City of Las Vegas, Nevada

Job No.: RCI1105-000

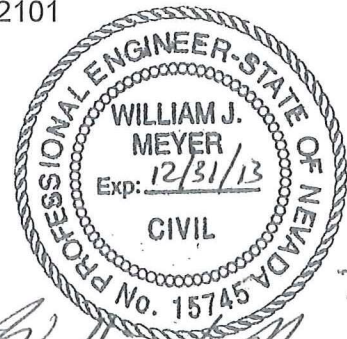
Date: July 2012

### 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:

Roohani Khusrow Family Trust  
3455 Cliff Shadows Pkwy, Suite 220  
Las Vegas, NV 89148  
Phone: 702-982-2100 • Fax: 702-982-2101



*William J. Meyer*  
\_\_\_\_\_  
William J. Meyer, P.E.  
NV Professional Engineer No. 15745

7/11/12



HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL  
**DRAINAGE STUDY INFORMATION FORM**

Name of Development: Lake Mead Rock Springs (Update) Date: July 2012  
 Location of Development: a) Descriptive (Cross Streets): North/South: Rock Springs Drive  
East/West: Lake Mead Boulevard  
 b) Section: 22 Township: 20 S Range: 60 E  
 c) APN: 138-22-701-009

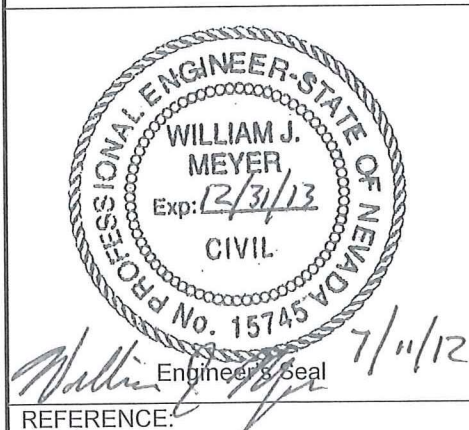
Name of Owner: Roohani Khusrow Family Trust  
 Telephone No.: (702) 982-2100 Fax No.: (702) 982-2101 E-mail Address: gmarkowski@gdpdgroup.com  
 Address: 9315 West Sunset Road #100, Las Vegas, NV 89148

Contact Person – Name: William Meyer, P.E. Telephone No.: (702) 284-5300  
 \*E-mail Address: bmeyer@shg-inc.com Fax No.: (702) 284-5399  
 Firm: Slater Hanifan Group  
 Address: 5740 S. Arville St. #216, Las Vegas, NV 89118

Type of Land Development/Land Disturbance Process:

|                                           |                                                   |                                                                  |
|-------------------------------------------|---------------------------------------------------|------------------------------------------------------------------|
| <input type="checkbox"/> Rezoning         | <input type="checkbox"/> Subdivision Map          | <input type="checkbox"/> Clearing and grading Only               |
| <input type="checkbox"/> Parcel Map       | <input type="checkbox"/> Planned Unit Development | <input checked="" type="checkbox"/> Other (Please specify below) |
| <input type="checkbox"/> Large Parcel Map | <input type="checkbox"/> Building Permit          | <input type="checkbox"/> Commercial Development                  |

- Total Owned Land Area: At Site: ± 4.4 acres Being Developed/Disturbed: ± 4.4 acres
- Is a portion or all of the subject property located in a FEMA Flood Hazard Area? ☐ Yes\*\* ☒ No
- Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? ☐ Yes\*\* ☒ No
- Proposed type of development (Residential, Commercial, Etc.): Commercial
- Approximate upstream land area which drains to the subject site: ± 0.0 acres
- Has the site drainage been evaluated in the past? ☒ Yes\*\* ☐ No If yes, please identify documentation: Technical Drainage Study for Lake Mead Rock Springs Residential Development (DS4171)
- If known, please briefly identify the proposed discharge point(s) of runoff from the site: Rock Springs Drive
- Briefly describe your proposed schedule for the subject project: Phase 1 followed by Phase 2



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: \_\_\_\_\_

STANDARD FORM 1

Updated 05/01/2008

RCI1105.000

July 11, 2010

Albert Sung, P.E. – Flood Control Project Engineer  
City of Las Vegas Public Works  
333 N. Ranch Drive 89106  
Las Vegas, Nevada 89101

**Subject: Update to the Technical Drainage Study for  
Lake Mead Rock Springs Commercial Subdivision**

Mr. Sung:

Submitted for your review is this *Update to the Technical Drainage Study for Lake Mead Rock Springs Commercial Subdivision* (hereafter referred to as the Update). The purpose of this update is to revise the site layout for the two buildings at the southeastern portion of the site. The revision incorporates finish floor elevation changes and some layout revisions in the area of the two buildings. The redesign does not change the 100-year flowrate or the flow egress location from the site, and site drainage is consistent with the previously approved drainage study.

**Hydrology**

The revision has had no effect on the overall calculated 100-year flowrate of 13 cfs for the entire site as previously presented in the approved drainage study. Grading revisions have resulted in some minor changes to the drainage subbasin delineation at ONC and OND for the proposed site, and these revisions can be seen on the revised Exhibit F included in Appendix A. There has been no change in the individual areas of each subbasin, therefore, there has been no change in the calculated flowrates for each of the subbasins as can be seen on the Prorated Flow Computations Summary Table shown on the revised Exhibit F. Additionally, the revision has had no effect on the drainage outlet or runoff rate to Rock Springs Drive; therefore, the revisions have no negative impact to the NDOT right of way and do not change the conditions of the NDOT approval.

**Hydraulics**

The grading revisions have resulted in some changes to the cross sections used in the onsite hydraulic calculation. In an effort to aid in the review, the cross section numbering has been held consistent with the previous submittal for Cross Sections 6 and 14. There has also been the addition of several new cross sections, labeled 6A, 15, and 16, that are intended to reflect the grading changes to the southeastern portion of the site. All finish floor elevations are twice the depth of flow from the low point of the adjacent parking area and meet criteria. Note that the perimeter streets have not been revised, and no additional calculations are included with this letter.

## Conclusion

The site revision has no adverse impact on the upstream or downstream properties, and meets all applicable criteria as set forth by the Clark County Regional Flood Control Manual. As an aid in review, a copy of the approved drainage map from Addendum 2 of the technical drainage study has been included in Appendix C of this letter. Additionally the CLV and NDOT approval letters for the previously approved study have been included in Appendix C for your reference.

If you have any questions or require additional information, please do not hesitate to contact us at 284-5300.

Respectfully Submitted,

SLATER HANIFAN GROUP

William J. Meyer, P.E.  
Flood Control Division

pc: Mark J. Failla, SHG  
Raul Sotelo, RCI



## APPENDIX

1. Appendix A – Exhibits
  - Exhibit F – Revised Onsite Drainage Map
2. Appendix B – Hydraulic Computations
  - Onsite Hydraulic Computations
3. Appendix C - Reference Material: Addendum #2 to the Technical Drainage Study for Lake Mead Rock Springs Commercial Subdivision
  - CLV Approval Letter
  - NDOT Approval Letter
  - Exhibit F – Onsite Drainage Map
4. Appendix D – Grading Plans
5. Appendix E – Previously Approved Grading Plans (with a cloud around the area subject to change)

## TRANSMITTAL

**To:** City of Las Vegas  
333 N. Rancho Drive  
Las Vegas, NV

**Date:** July 11, 2012

**Project No.:** RC11105.000

**From:** William Meyer, P.E.

**Subject:** Update to the Technical Drainage Study for Lake Mead Rock Springs Commercial Subdivision

**CC:** Raul Sotelo

**CC:** Mark Fallia

**CC:** File

**CC:**

**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: \_\_\_\_\_

Date: \_\_\_\_\_ Time: \_\_\_\_\_

| Copies | Description                                                 |
|--------|-------------------------------------------------------------|
| 1      | Update to the Technical Drainage Study                      |
| 1      | Standard Form 1 (bound into study)                          |
| 1      | Revised Grading Plans (bound into study)                    |
| 1      | Approved Grading Plans (bound into study)                   |
| 1      | Fee – Check in the amount of \$100.00 (Check #xxxx)         |
| 1      | CD containing PDF of submittal documents (bound into study) |

**Comments:**

Signed: \_\_\_\_\_  
William J. Meyer

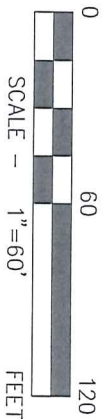
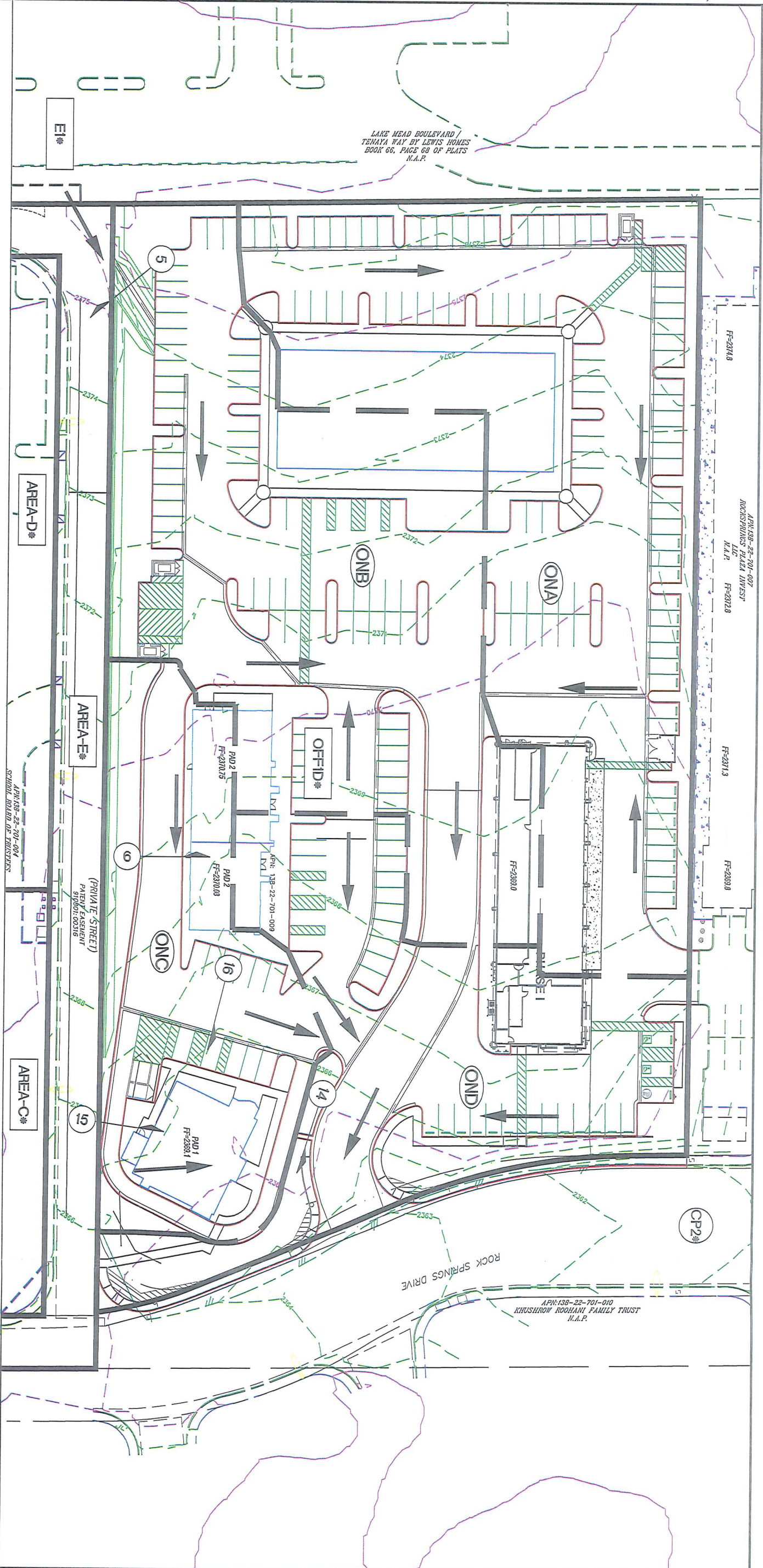
*Please, notify us at (702) 284-5300 if there are any problems receiving this transmission.*

# APPENDIX A

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## Drainage Exhibits





| Flow Summary     |           |                       |                        |
|------------------|-----------|-----------------------|------------------------|
| Forced Condition |           |                       |                        |
| Subbasin ID      | Area (ac) | Q <sub>10</sub> (cfs) | Q <sub>100</sub> (cfs) |
| E1               | 19.2      | 19                    | 42                     |
| OFFID            | 4.53      | 5                     | 13                     |
| AREA-C           | 1.17      | 1                     | 2                      |
| AREA-D           | 2.26      | 4                     | 7                      |
| AREA-E           | 1.30      | 2                     | 4                      |
| CP-2             | N/A       | 32                    | 71                     |

Referenced from the Rural Center Study's Urban Condition Analysis

| Prioritized Flow Computations (Phase II)                                               |                        |              |                           |
|----------------------------------------------------------------------------------------|------------------------|--------------|---------------------------|
| Subbasin                                                                               | Q <sub>100</sub> (cfs) | Area (acres) | 100-yr Unit Flow (cfs/ac) |
| OFFID*                                                                                 | 13                     | 4.53         | 2.9                       |
| Prioritized Subbasin Q <sub>100</sub> (cfs) / Area (acres) / 100-yr Unit Flow (cfs/ac) |                        |              |                           |
| ONA                                                                                    | 4.3                    | 1.51         | 2.9                       |
| ONB                                                                                    | 4.1                    | 1.42         | 2.9                       |
| ONC**                                                                                  | 2.0                    | 0.70         | 2.9                       |
| OND**                                                                                  | 2.6                    | 0.90         | 2.9                       |
| TOTAL                                                                                  | 13.0                   | 4.53         |                           |

Referenced from the Rural Center Study

\*\* Revised for the Update

| Summary of Onsite Hydraulic Sections |           |         |                 |                     |                |                |
|--------------------------------------|-----------|---------|-----------------|---------------------|----------------|----------------|
| Phase II Drainage Condition          |           |         |                 |                     |                |                |
| Section                              | Slope (%) | Q (cfs) | Flow Depth (ft) | Facility Depth (ft) | Top Width (ft) | Velocity (fps) |
| Section 6 (Q = ONC)                  | 1.00      | 2.0     | 0.32            | 0.80                | 25.00          | 2.03           |
| Section 14 (Q = ONC)                 | 26.80     | 2.0     | 0.09            | 0.50                | 2.00           | 11.21          |
| Section 15 (Q = ONC)                 | 0.80      | 2.0     | 0.28            | 0.78                | 10.00          | 2.05           |
| Section 16 (Q = ONC)                 | 0.50      | 2.0     | 0.17            | 1.22                | 52.00          | 1.51           |

Referenced from Rural Center Study

## LEGEND

BASIN BOUNDARY

ON-D1

BASIN ID

PH1

PRORATED BASIN BOUNDARY

PT1

PRORATED BASIN ID

FLOW DIRECTION

CONCENTRATION POINT

FLOWMASTER SECTION

## ROOHANI KHUSROW FAMILY TRUST (FIRESTONE) LAKE MEAD ROCK SPRINGS COMMERCIAL SUBDIVISION PHASE II CONDITION ONSITE DRAINAGE MAP UPDATE

| NO. | DESCRIPTION | DATE | BY | APP. DATE | APP. |
|-----|-------------|------|----|-----------|------|
|     |             |      |    |           |      |
|     |             |      |    |           |      |
|     |             |      |    |           |      |
|     |             |      |    |           |      |
|     |             |      |    |           |      |
|     |             |      |    |           |      |
|     |             |      |    |           |      |
|     |             |      |    |           |      |
|     |             |      |    |           |      |

**SLATER  
HANIFAN  
GROUP**  
CONSULTING ENGINEERS & PLANNERS  
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118  
PHONE (702) 284-5300 FAX (702) 284-5309

**EXHIBIT F**  
SHEET 1 OF 1

DATE: 10/04/11  
DRAFTER: KCR  
DESIGNER: KCR  
CHECKED: WJM  
PROJECT NO.: RCI1105.000



## APPENDIX B

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### Hydraulic Computations

## Section 6 100-Year Worksheet for Irregular Channel

| Project Description |                    |
|---------------------|--------------------|
| Worksheet           | Section 6 100-Year |
| Flow Element        | Irregular Channel  |
| Method              | Manning's Formula  |
| Solve For           | Channel Depth      |

| Input Data    |                |
|---------------|----------------|
| Channel Slope | 0.010000 ft/ft |
| Discharge     | 2.00 cfs       |

| Options                         |                          |
|---------------------------------|--------------------------|
| Current Roughness Method        | Improved Lotter's Method |
| Open Channel Weighting Method   | Improved Lotter's Method |
| Closed Channel Weighting Method | Horton's Method          |

| Results                 |                     |
|-------------------------|---------------------|
| Mannings Coefficient    | 0.015               |
| Water Surface Elevation | 0.32 ft             |
| Elevation Range         | 0.00 to 0.98        |
| Flow Area               | 1.0 ft <sup>2</sup> |
| Wetted Perimeter        | 10.09 ft            |
| Top Width               | 9.73 ft             |
| Actual Depth            | 0.32 ft             |
| Critical Elevation      | 0.33 ft             |
| Critical Slope          | 0.007751 ft/ft      |
| Velocity                | 2.03 ft/s           |
| Velocity Head           | 0.06 ft             |
| Specific Energy         | 0.38 ft             |
| Froude Number           | 1.13                |
| Flow Type               | Supercritical       |

| Roughness Segments |             |                      |
|--------------------|-------------|----------------------|
| Start Station      | End Station | Mannings Coefficient |
| 0+100.0            | 0+101.5     | 0.013                |
| 0+101.5            | 0+125.0     | 0.016                |
| 0+125.0            | 0+125.0     | 0.013                |

| Natural Channel Points |                |
|------------------------|----------------|
| Station (ft)           | Elevation (ft) |
| 0+100.0                | 0.50           |
| 0+100.0                | 0.00           |
| 0+101.5                | 0.13           |
| 0+101.5                | 0.17           |
| 0+125.0                | 0.59           |
| 0+125.0                | 0.98           |

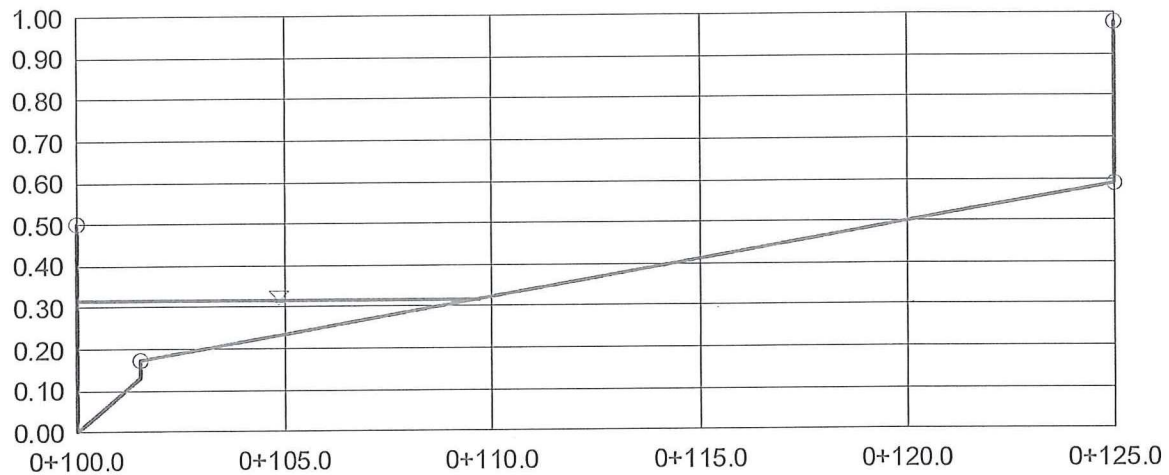


## Section 6 100-Year Cross Section for Irregular Channel

| Project Description |                    |
|---------------------|--------------------|
| Worksheet           | Section 6 100-Year |
| Flow Element        | Irregular Channel  |
| Method              | Manning's Formula  |
| Solve For           | Channel Depth      |

| Section Data            |                |
|-------------------------|----------------|
| Mannings Coefficient    | 0.015          |
| Channel Slope           | 0.010000 ft/ft |
| Water Surface Elevation | 0.32 ft        |
| Elevation Range         | 0.00 to 0.98   |
| Discharge               | 2.00 cfs       |



V:10.0  
H:1  
NTS

## Section 14 100-Year Worksheet for Rectangular Channel

| Project Description |                     |
|---------------------|---------------------|
| Worksheet           | Section 14 100-Year |
| Flow Element        | Rectangular Channel |
| Method              | Manning's Formula   |
| Solve For           | Channel Depth       |

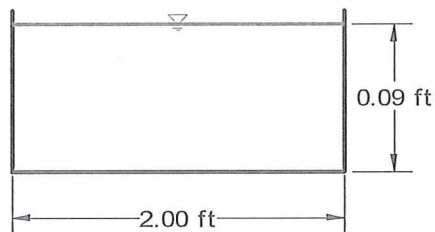
| Input Data           |                |
|----------------------|----------------|
| Mannings Coefficient | 0.013          |
| Channel Slope        | 0.268000 ft/ft |
| Bottom Width         | 2.00 ft        |
| Discharge            | 2.00 cfs       |

| Results          |                     |
|------------------|---------------------|
| Depth            | 0.09 ft             |
| Flow Area        | 0.2 ft <sup>2</sup> |
| Wetted Perimeter | 2.18 ft             |
| Top Width        | 2.00 ft             |
| Critical Depth   | 0.31 ft             |
| Critical Slope   | 0.005214 ft/ft      |
| Velocity         | 11.21 ft/s          |
| Velocity Head    | 1.95 ft             |
| Specific Energy  | 2.04 ft             |
| Froude Number    | 6.61                |
| Flow Type        | Supercritical       |

## Section 14 100-Year Cross Section for Rectangular Channel

| Project Description |                     |
|---------------------|---------------------|
| Worksheet           | Section 14 100-Year |
| Flow Element        | Rectangular Channel |
| Method              | Manning's Formula   |
| Solve For           | Channel Depth       |

| Section Data         |                |
|----------------------|----------------|
| Mannings Coefficient | 0.013          |
| Channel Slope        | 0.268000 ft/ft |
| Depth                | 0.09 ft        |
| Bottom Width         | 2.00 ft        |
| Discharge            | 2.00 cfs       |



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H:1  
NTS



## Section 15 100-Year Worksheet for Irregular Channel

| Project Description |                     |
|---------------------|---------------------|
| Worksheet           | Section 15 100-Year |
| Flow Element        | Irregular Channel   |
| Method              | Manning's Formula   |
| Solve For           | Channel Depth       |

| Input Data    |                |
|---------------|----------------|
| Channel Slope | 0.008000 ft/ft |
| Discharge     | 2.00 cfs       |

| Options                         |                          |
|---------------------------------|--------------------------|
| Current Roughness Method        | Improved Lotter's Method |
| Open Channel Weighting Method   | Improved Lotter's Method |
| Closed Channel Weighting Method | Horton's Method          |

| Results                 |                     |
|-------------------------|---------------------|
| Mannings Coefficient    | 0.013               |
| Water Surface Elevation | 0.28 ft             |
| Elevation Range         | 0.00 to 0.73        |
| Flow Area               | 1.0 ft <sup>2</sup> |
| Wetted Perimeter        | 10.37 ft            |
| Top Width               | 10.00 ft            |
| Actual Depth            | 0.28 ft             |
| Critical Elevation      | 0.29 ft             |
| Critical Slope          | 0.005772 ft/ft      |
| Velocity                | 2.05 ft/s           |
| Velocity Head           | 0.07 ft             |
| Specific Energy         | 0.34 ft             |
| Froude Number           | 1.16                |
| Flow Type               | Supercritical       |

| Roughness Segments |             |                      |
|--------------------|-------------|----------------------|
| Start Station      | End Station | Mannings Coefficient |
| 0+100.0            | 0+101.5     | 0.013                |
| 0+101.5            | 0+110.0     | 0.016                |
| 0+110.0            | 0+110.0     | 0.013                |

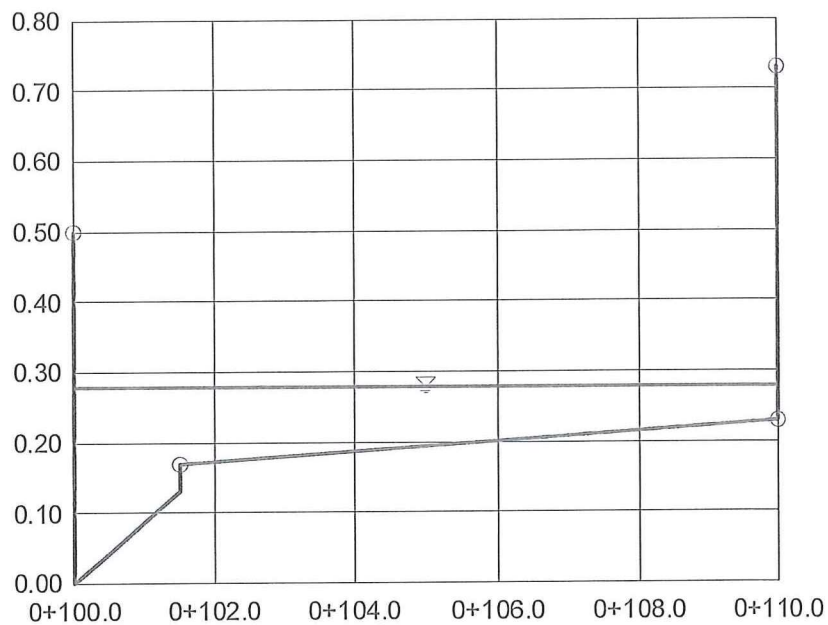
| Natural Channel Points |                |
|------------------------|----------------|
| Station (ft)           | Elevation (ft) |
| 0+100.0                | 0.50           |
| 0+100.0                | 0.00           |
| 0+101.5                | 0.13           |
| 0+101.5                | 0.17           |
| 0+110.0                | 0.23           |
| 0+110.0                | 0.73           |

## Section 15 100-Year Cross Section for Irregular Channel

| Project Description |                     |
|---------------------|---------------------|
| Worksheet           | Section 15 100-Year |
| Flow Element        | Irregular Channel   |
| Method              | Manning's Formula   |
| Solve For           | Channel Depth       |

| Section Data            |                |
|-------------------------|----------------|
| Mannings Coefficient    | 0.013          |
| Channel Slope           | 0.008000 ft/ft |
| Water Surface Elevation | 0.28 ft        |
| Elevation Range         | 0.00 to 0.73   |
| Discharge               | 2.00 cfs       |



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H:1  
NTS

## Section 16 100-Year Worksheet for Irregular Channel

| Project Description |                     |
|---------------------|---------------------|
| Worksheet           | Section 16 100-Year |
| Flow Element        | Irregular Channel   |
| Method              | Manning's Formula   |
| Solve For           | Channel Depth       |

| Input Data    |                |
|---------------|----------------|
| Channel Slope | 0.005000 ft/ft |
| Discharge     | 2.00 cfs       |

| Options                         |                          |
|---------------------------------|--------------------------|
| Current Roughness Method        | Improved Lotter's Method |
| Open Channel Weighting Method   | Improved Lotter's Method |
| Closed Channel Weighting Method | Horton's Method          |

| Results                 |                     |
|-------------------------|---------------------|
| Mannings Coefficient    | 0.013               |
| Water Surface Elevation | 0.17 ft             |
| Elevation Range         | 0.00 to 1.19        |
| Flow Area               | 1.3 ft <sup>2</sup> |
| Wetted Perimeter        | 16.03 ft            |
| Top Width               | 16.03 ft            |
| Actual Depth            | 0.17 ft             |
| Critical Elevation      | 0.17 ft             |
| Critical Slope          | 0.005913 ft/ft      |
| Velocity                | 1.51 ft/s           |
| Velocity Head           | 0.04 ft             |
| Specific Energy         | 0.21 ft             |
| Froude Number           | 0.92                |
| Flow Type               | Subcritical         |

| Roughness Segments |             |                      |
|--------------------|-------------|----------------------|
| Start Station      | End Station | Mannings Coefficient |
| 0+100.0            | 0+100.0     | 0.013                |
| 0+100.0            | 0+130.5     | 0.016                |
| 0+130.5            | 0+133.5     | 0.013                |
| 0+133.5            | 0+152.0     | 0.016                |
| 0+152.0            | 0+152.0     | 0.013                |

| Natural Channel Points |                |
|------------------------|----------------|
| Station (ft)           | Elevation (ft) |
| 0+100.0                | 0.98           |
| 0+100.0                | 0.48           |
| 0+130.5                | 0.04           |
| 0+132.0                | 0.00           |
| 0+133.5                | 0.04           |
| 0+152.0                | 0.69           |
| 0+152.0                | 1.19           |

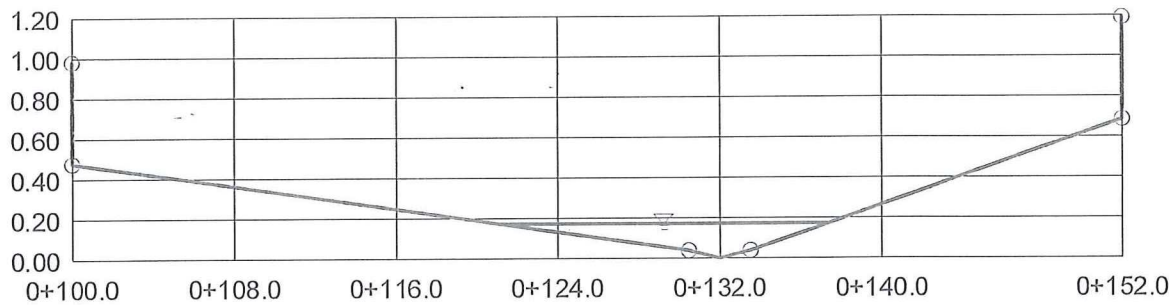


## Section 16 100-Year Cross Section for Irregular Channel

| Project Description |                     |
|---------------------|---------------------|
| Worksheet           | Section 16 100-Year |
| Flow Element        | Irregular Channel   |
| Method              | Manning's Formula   |
| Solve For           | Channel Depth       |

| Section Data            |                |
|-------------------------|----------------|
| Mannings Coefficient    | 0.013          |
| Channel Slope           | 0.005000 ft/ft |
| Water Surface Elevation | 0.17 ft        |
| Elevation Range         | 0.00 to 1.19   |
| Discharge               | 2.00 cfs       |



V:10.0  
H:1  
NTS

## APPENDIX C

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### Reference Material

*Addendum #2 to the Technical Drainage Study for Lake Mead Rock Springs Commercial  
Subdivision*

by Slater-Hanifan Group, CLV DS4537

TECHNICAL DRAINAGE STUDY  
ADDENDUM NO. 2  
**Lake Mead Rock Springs  
Commercial Subdivision**  
City of Las Vegas, Nevada

Job No.: RCI1105.000  
Date: October 2011

**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:**  
Roohani Khusrow Family Trust  
9315 W. Sunset Road #100  
Las Vegas, NV 89148  
Phone: 702-982-2100 • Fax: 702-982-2101

---

Kylie Rowbury, P.E.  
NV Professional Engineer No. 21172



|                                                                       |                                                           |                                                                                                   |
|-----------------------------------------------------------------------|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| <b>CITY OF LAS VEGAS</b>                                              |                                                           | <b>DATE:</b>                                                                                      |
| <b>INTER-OFFICE MEMORANDUM</b>                                        |                                                           | October 17, 2011                                                                                  |
| <b>TO:</b><br>Land Development Services<br>Department of Public Works |                                                           | <b>FROM:</b><br>Albert Sung, P.E.<br>Flood Control Project Engineer<br>Department of Public Works |
| <b>SUBJECT:</b>                                                       | Drainage Study for:                                       | <b>COPIES TO:</b>                                                                                 |
|                                                                       | Lake Mead Rock Springs Commercial Subdivision             | Slater Hanifan Group                                                                              |
| <b>Cross Streets:</b>                                                 | SWQ of Lake Mead Bl. & Rock Springs Dr.                   | Roohani Khusrow Family Trust                                                                      |
| <b>File Number:</b>                                                   | F:\Depot\DS\Memos\DS4537C.doc                             | Bart Anderson, P.E., DevCo                                                                        |
| <b>Parcel Number:</b>                                                 | 138-22-701-009                                            |                                                                                                   |
| <b>Zoning Action:</b>                                                 | GPA-41883; ZON-41884; SUP-41885;<br>SDR-41886 & TMP-42978 |                                                                                                   |
| <b>FEMA Flood Zone</b>                                                | YES                                                       | NO <input checked="" type="checkbox"/>                                                            |
| <b>Proposed Storm Drain</b>                                           | YES                                                       | NO <input checked="" type="checkbox"/>                                                            |

| HISTORY                    | DATE RECEIVED | DATE REVIEWED | COMMENTS           | REVIEW FEES       | FEES PAID<br>Payment Trn # |
|----------------------------|---------------|---------------|--------------------|-------------------|----------------------------|
| 1 <sup>st</sup> Submittal  | 8/25/2011     | 8/30/2011     | Not Approved       | \$400.00          | 259046; \$400              |
| 2 <sup>nd</sup> Submittal  | 9/22/2011     | 9/29/2011     | Not Approved       | \$400.00          | 261449; \$400              |
| 3 <sup>rd</sup> Submittal  | 10/10/2011    | 10/17/2011    | See Comments Below | \$400.00          | 262963; \$400              |
| <b>TOTAL FEES (LDDRS):</b> |               |               |                    | <b>\$1,200.00</b> |                            |

**REMARKS:**

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

|                                     |                                                                                                |
|-------------------------------------|------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | 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. |

- The following perpetual drainage right note must be added to the Final Map:

**ALL SUBDIVIDED PARCELS COMPRISING THIS COMMERCIAL SUBDIVISION SHALL PROVIDE PERPETUAL INTERSITE COMMON DRAINAGE RIGHTS ACROSS ALL EXISTING AND FUTURE PARCEL LIMITS.**

- The proposed variable width public drainage easement (privately maintained) must be recorded within the Final Map prior to the final acceptance of the improvement plans.

In an effort to increase administrative efficiency, the City of Las Vegas Public Works Department requires all soil reports, drainage studies and traffic impact analysis submittals to be accompanied by an electronic copy of the submittal. Electronic documents must be submitted with one original hard copy of the study. Electronic documents should be on a universal computer-readable digital output replicating your submittal to be used for archival or display purposes. This may be more than one file if necessary. An Indexed Portable Document Format (PDF) or Print Ready CAD file formats with a minimum of 300dpi are the desired formats, but provided it is a high quality digitized replication of the submittal, other formats may be acceptable. If figures are in color, they must be scanned in color and saved as a separate file. The new submittal requirement is effective on July 1, 2011. If there are any questions regarding these new requirements, please contact Robert Welch in the Flood Section at (702) 229-2177 or Rick Schroder in Traffic Engineering at (702) 229-6327.

**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 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**

ays

T/R/S: T20S/R60E/22  
AREA L-22

|                               |               |         |             |            |   |
|-------------------------------|---------------|---------|-------------|------------|---|
| Post-It <sup>®</sup> Fax Note | 7671          | Date    | 10/17/11    | # of pages | 2 |
| To                            | Kylie Rowbury | From    | Albert SUNG |            |   |
| Co./Dept.                     | SHG           | Co.     | CLW         |            |   |
| Phone #                       |               | Phone # | 229-2007    |            |   |
| Fax #                         | 284-5399      | Fax #   |             |            |   |



**RIGHT OF WAY OCCUPANCY PERMIT APPLICATION  
REVIEW AND RECOMMENDATIONS**

Name Jim Moore  
Ph. No. 888-7799

Division Design/Hydraulics

Permit No.

District Permit Coordinator

- |                                                   |                                                     |
|---------------------------------------------------|-----------------------------------------------------|
| <input checked="" type="checkbox"/> 1 Rudy Lucero | <input type="checkbox"/> 3a (Ely) John Ogden        |
| <input type="checkbox"/> 2 Janet Reck             | <input type="checkbox"/> 3b (Elko) Jim Aagard       |
| <input type="checkbox"/> 9 (HQ) Bill Bowman       | <input type="checkbox"/> 3c (Winnemucca) Jay Marden |

Documents Reviewed:

TDS For Lake Mead At Rock Springs (DATED 11/16/11)

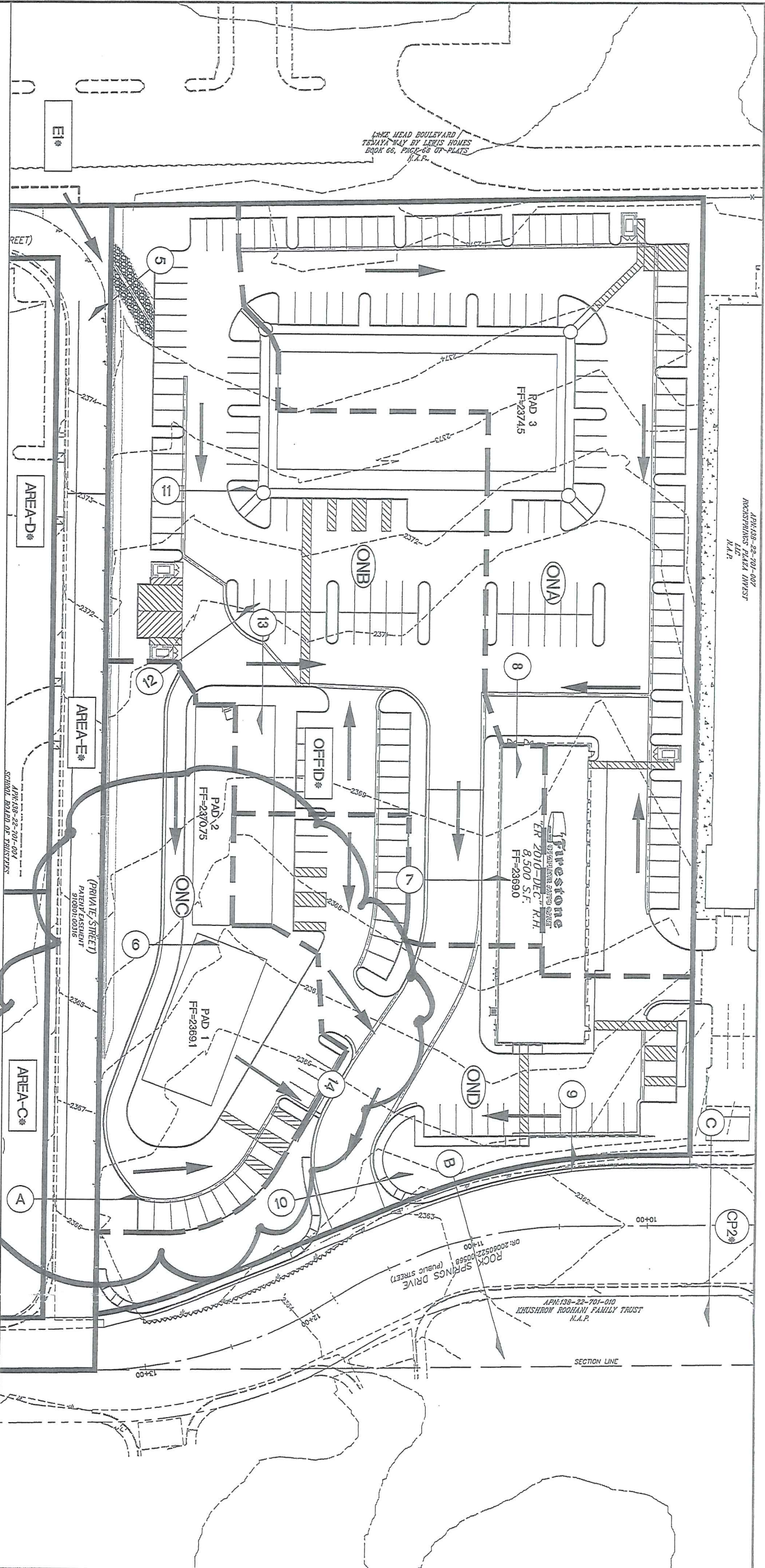
Recommendation:

- ☒ Approve – No Comments
- ☐ Approve with Conditions as stated below (Follow-up review **not** required)
- ☐ Changes Required as stated below (Follow-up review required)
- ☐ Deny as justified below

Comments and Conditions:

Save the document and send via email it to the appropriate District Permit Coordinator from the list above.

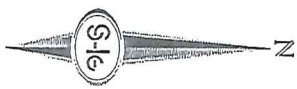
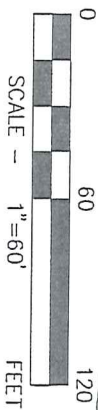




| Flow Summary                                                                    |                        |                       |                           |                         |
|---------------------------------------------------------------------------------|------------------------|-----------------------|---------------------------|-------------------------|
| Subbasin ID                                                                     | Area (ac)              | Q <sub>10</sub> (cfs) | Q <sub>100</sub> (cfs)    | Q <sub>1000</sub> (cfs) |
| E1                                                                              | 19.2                   | 19                    | 42                        |                         |
| OFF-ID                                                                          | 4.53                   | 5                     | 13                        |                         |
| AREAC                                                                           | 1.17                   | 1                     | 2                         |                         |
| AREAD                                                                           | 2.26                   | 4                     | 7                         |                         |
| AREAE                                                                           | 1.30                   | 2                     | 4                         |                         |
| CP-2                                                                            | N/A                    | 32                    | 71                        |                         |
| Referenced from Retail Center Study & Urban Condition Analysis                  |                        |                       |                           |                         |
| Prorated Flow Computations (Phase II)                                           |                        |                       |                           |                         |
| Subbasin                                                                        | Q <sub>100</sub> (cfs) | Area (acres)          | 100-yr Unit Flow (cfs/ac) |                         |
| OFF-ID*                                                                         | 13                     | 4.53                  | 2.9                       |                         |
| Prorated Subbasin Q <sub>100</sub> (cfs) Area (acres) 100-yr Unit Flow (cfs/ac) |                        |                       |                           |                         |
| ONA                                                                             | 4.3                    | 1.51                  | 2.9                       |                         |
| ONB                                                                             | 4.1                    | 1.42                  | 2.9                       |                         |
| ONC                                                                             | 2.0                    | 0.70                  | 2.9                       |                         |
| OND                                                                             | 2.6                    | 0.90                  | 2.9                       |                         |
| TOTAL                                                                           | 13.0                   | 4.53                  |                           |                         |
| Referenced from Retail Center Study                                             |                        |                       |                           |                         |

| Summary of Onsite Hydraulic Sections |           |         |                 |                     |                |                               |
|--------------------------------------|-----------|---------|-----------------|---------------------|----------------|-------------------------------|
| Section                              | Slope (%) | Q (cfs) | Flow Depth (ft) | Facility Depth (ft) | Top Width (ft) | Velocity (fps)                |
| Section 5                            | 0.50      | 42.0    | 1.43            | 1.50                | 14.00          | 4.86                          |
| (Q = E1)                             |           |         |                 |                     |                | (Trapezoidal, 2.0' BW, 4:1SS) |
| Section 6                            | 0.50      | 2.0     | 0.3             | 0.50                | 12.00          | 1.66                          |
| (Q = ONC)                            |           |         |                 |                     |                | Driv. Aisle/L-Curb            |
| Section 7                            | 0.60      | 50.4    | 0.69            | 0.50                | 33.00          | 3.89                          |
| (Q = E1 + ONA + ONB)                 |           |         |                 |                     |                | Driv. Aisle/L-Curb            |
| Section 8                            | 0.74      | 4.3     | 0.23            | 0.99                | 20.70          | 1.99                          |
| (Q = ONB)                            |           |         |                 |                     |                | Driv. Aisle/Valley Gutter     |
| Section 9                            | 0.94      | 2.6     | 0.35            | 0.50                | 10.33          | 2.16                          |
| (Q = OND)                            |           |         |                 |                     |                | L-Curb                        |
| Section 10                           | 3.40      | 55.0    | 0.54            | 0.50                | 33.00          | 6.86                          |
| (Q = E1 + OFF-ID)                    |           |         |                 |                     |                | Driveway Entrance             |
| Section 11                           | 1.00      | 46.1    | 0.82            | 1.61                | 19.09          | 5.55                          |
| (Q = E1 + ONB)                       |           |         |                 |                     |                | Driv. Aisle/Valley Gutter     |
| Section 12                           | 3.90      | 46.1    | 0.53            | 0.50                | 38.60          | 6.26                          |
| (Q = E1 + ONB)                       |           |         |                 |                     |                | Driv. Aisle/L-Curb            |
| Section 13                           | 3.90      | 46.1    | 0.51            | 0.50                | 25.50          | 7.30                          |
| (Q = E1 + ONB)                       |           |         |                 |                     |                | Driv. Aisle/L-Curb            |
| Section 14                           | 3.70      | 2.0     | 0.09            | 0.50                | 2.00           | 11.61                         |
| (Q = ONC)                            |           |         |                 |                     |                | Concrete Flume                |
| Referenced from Retail Center Study  |           |         |                 |                     |                |                               |

| Perimeter Street Flow Summary           |           |                        |            |                |                        |                     |
|-----------------------------------------|-----------|------------------------|------------|----------------|------------------------|---------------------|
| Section                                 | Slope (%) | Q <sub>100</sub> (cfs) | Depth (ft) | Velocity (fps) | V <sub>x/D</sub> (cfs) | Dry Lane Width (ft) |
| SECTION A                               | 1.52      | 13.0                   | 0.42       | 3.46           | 1.5                    | 7.0                 |
| Private Drive                           |           |                        |            |                |                        | N/A                 |
| SECTION B                               | 1.00      | 71.0                   | 0.69       | 4.15           | 2.9                    | 32.0                |
| Rock Springs Drive (60' ROW)            |           |                        |            |                |                        | N/A                 |
| SECTION C                               | 1.00      | 71.0                   | 0.70       | 3.97           | 2.8                    | 32.0                |
| Rock Springs Drive (60' ROW)            |           |                        |            |                |                        | N/A                 |
| SECTION D                               | 1.00      | 71.0                   | 0.70       | 3.97           | 2.8                    | 32.0                |
| Rock Springs Drive (60' ROW)            |           |                        |            |                |                        | N/A                 |
| Referenced from the Retail Center Study |           |                        |            |                |                        |                     |



| LEGEND |                         |
|--------|-------------------------|
| ON-D1  | BASIN BOUNDARY          |
| PHI    | PRORATED BASIN BOUNDARY |
| PTI    | PRORATED BASIN ID       |
|        | CONCENTRATION POINT     |
|        | FLOWMASTER SECTION      |

Revised

ROOHANI KHUSROW FAMILY TRUST (FIRESTONE)  
LAKE MEAD ROCK SPRINGS COMMERCIAL SUBDIVISION  
PHASE II CONDITION ONSITE DRAINAGE MAP

| NO. | DESCRIPTION | DATE | BY | APP. DATE | APP. |
|-----|-------------|------|----|-----------|------|
|     |             |      |    |           |      |
|     |             |      |    |           |      |
|     |             |      |    |           |      |
|     |             |      |    |           |      |
|     |             |      |    |           |      |

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

DATE: 10/04/11  
DRAFTER: KCR  
DESIGNER: KCR  
CHECKED: MAF  
PROJECT NO.: RCH105.000  
**EXHIBIT F**  
SHEET 1 OF 1

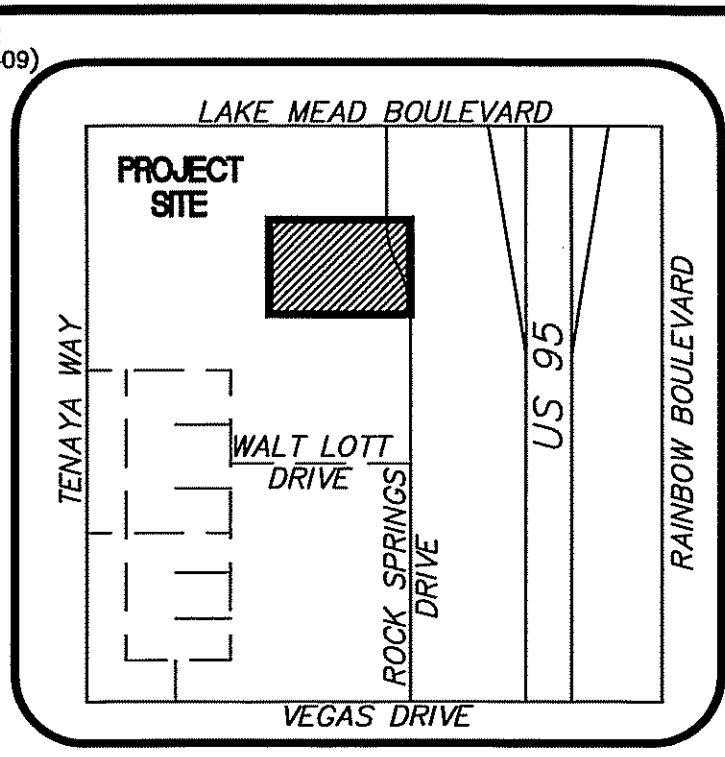
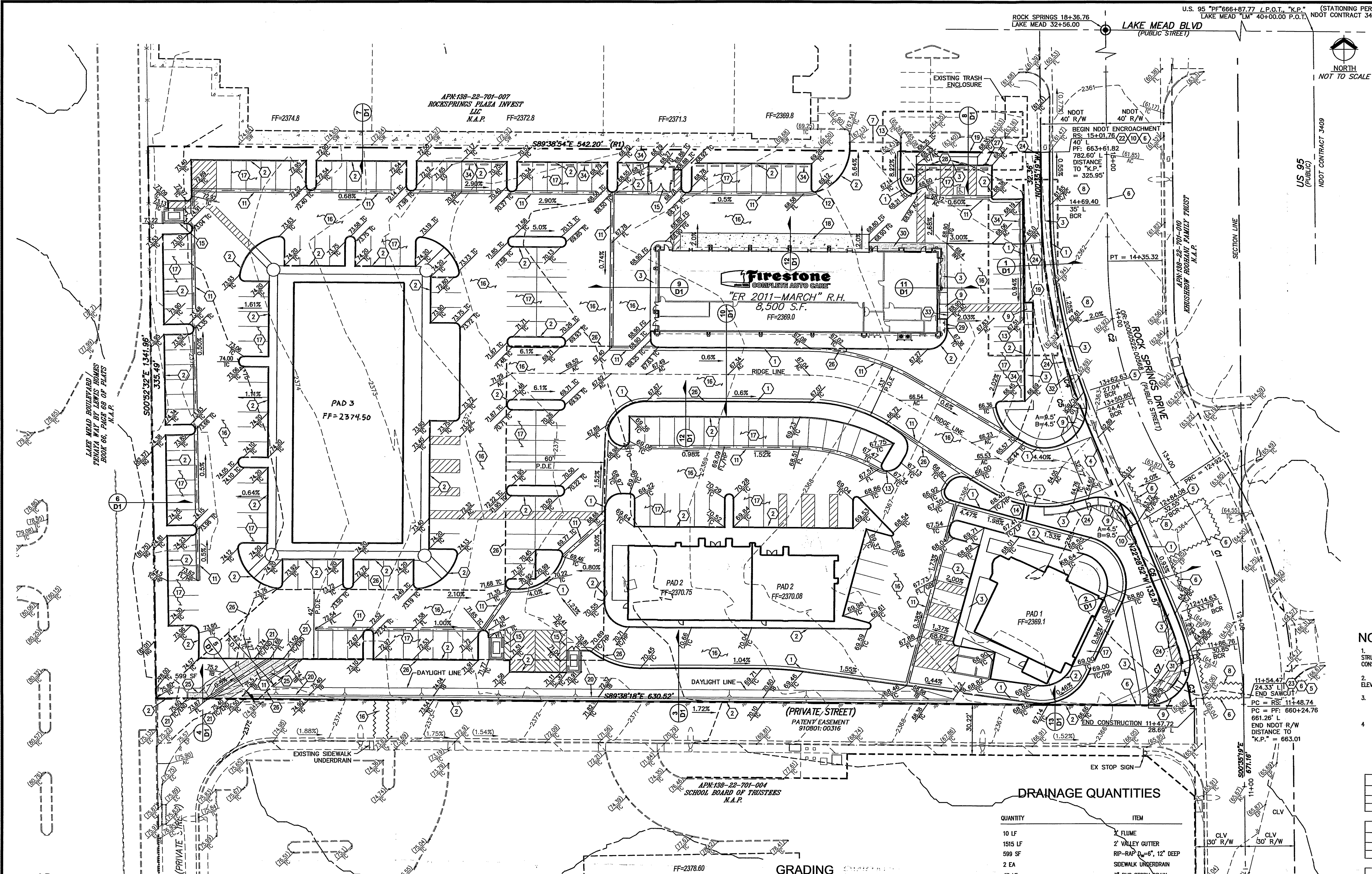


## APPENDIX D

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### Grading Plans





**LEGEND**

|     |                                    |
|-----|------------------------------------|
| --- | INDEX CONTOUR (5' INTERVAL)        |
| --- | INTERMEDIATE CONTOUR (1' INTERVAL) |
| --- | CENTERLINE                         |
| --- | RIGHT-OF-WAY                       |
| --- | BOUNDARY LINE                      |
| --- | NDOT RIGHT-OF-WAY                  |
| --- | PROPOSED EDGE OF PAVEMENT          |
| --- | EXISTING EDGE OF PAVEMENT          |
| --- | PROPOSED FLOW LINE                 |
| --- | PROPOSED CMU WALL                  |
| --- | EXISTING CMU WALL                  |
| --- | EXISTING CHAIN LINK FENCE          |
| --- | EXISTING LOT LINE                  |
| --- | PROPOSED CURB AND GUTTER           |
| --- | EXISTING CURB AND GUTTER           |
| --- | SAWCUT LINE                        |

| PROPOSED               | EXISTING               |
|------------------------|------------------------|
| 00.00 TOP BACK CURB    | 00.00 TOP BACK CURB    |
| 00.00 FINISH GRADE     | 00.00 FINISH GRADE     |
| 00.00 EDGE OF PAVEMENT | 00.00 EDGE OF PAVEMENT |
| 00.00 FLOW LINE        | 00.00 FLOW LINE        |
| 00.00 ASPHALT CONCRETE | 00.00 ASPHALT CONCRETE |
| 00.00 TOP OF BERM      | N/A                    |
| N/A                    | 00.00 EDGE OF CONCRETE |
| N/A                    | 00.00 NATURAL GRADE    |
| N/A                    | 00.00 SIDEWALK         |
| 00.00 HIGH POINT       | N/A                    |

**NOTES**

- CONTRACTOR TO VERIFY LOCATION AND ELEVATION OF EXISTING STRUCTURES AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION.
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY LOCATION AND ELEVATION OF EXISTING UTILITIES PRIOR TO CONSTRUCTION.
- OWNER RESPONSIBLE TO PROVIDE SURVEY MONUMENTATION AS SHOWN AND TO REPLACE ALL SURVEY MONUMENTATION DAMAGED, DISTURBED, DESTROYED OR OBLISCURED DURING CONSTRUCTION.
- ALL WALLS ARE SHOWN FOR REFERENCE ONLY. ALL WALLS SHALL BE PERMITTED BY A SEPARATE WALL PERMIT THROUGH THE CITY OF LAS VEGAS BUILDING DEPARTMENT.

**CENTER LINE CURVE TABLE**

| CURVE | LENGTH  | RADIUS  | DELTA     |
|-------|---------|---------|-----------|
| C1    | 143.38' | 250.00' | 32°51'34" |
| C2    | 143.37' | 250.00' | 32°51'29" |

**RIGHT-OF-WAY CURVE TABLE**

| CURVE | LENGTH  | RADIUS  | DELTA     |
|-------|---------|---------|-----------|
| C3    | 55.89'  | 220.00' | 14°33'23" |
| C4    | 130.87' | 342.51' | 21°53'33" |

**NDOT RIGHT-OF-WAY CURVE TABLE**

| CURVE | LENGTH  | RADIUS  | DELTA      |
|-------|---------|---------|------------|
| C5    | 166.31' | 290.00' | 32°51'29"  |
| C6    | 78.01'  | 210.00' | 21°17'05"  |
| C7    | 73.35'  | 40.00'  | 105°03'37" |

**DRAINAGE QUANTITIES**

| QUANTITY | ITEM                      |
|----------|---------------------------|
| 10 LF    | 2" FLUME                  |
| 1515 LF  | 2" VALLEY GUTTER          |
| 599 SF   | RII-RAP 6" x 6", 12" DEEP |
| 2 EA     | SIDEWALK UNDERDRAIN       |
| 47 LF    | 3" PVC STORM DRAIN        |

**GRADING**

- CONSTRUCT "L" CURB AND GUTTER PER CCAUSD #216
- CONSTRUCT "A" CURB AND GUTTER PER CCAUSD #219
- CONSTRUCT 4" THICK SIDEWALK PER CCAUSD #234, WIDTH PER PLAN
- CONSTRUCT 8" CROSS GUTTER PER CCAUSD #228
- CONSTRUCT COMMERCIAL DRIVEWAY PER CCAUSD #222A AND #228
- SAWCUT (CLEAN), REMOVE EXISTING ASPHALT PAVEMENT
- SAWCUT (CLEAN), REMOVE CURB
- ASPHALT PAVING FOR ROCK SPRINGS PER CCAUSD #200A AND REFERENCED GEOTECHNICAL REPORT # AC & 3/4" OPEN GRADE OVER 16" TYPE II AGGREGATE BASE
- CONSTRUCT HANDICAP RAMPS PER CCAUSD #235 CASE 1 A AND B = 8' UNLESS OTHERWISE NOTED
- CONSTRUCT 3" SIDEWALK UNDER DRAIN PER DETAIL S-13 SHEET D2
- INSTALL 2" VALLEY GUTTER PER DETAIL 18 SHEET D1
- TURN OUT VALLEY GUTTER TO ENSURE POSITIVE DRAINAGE
- TURN OUT "L" CURB TO ENSURE POSITIVE DRAINAGE
- INSTALL 2" "U" CHANNEL PER DETAIL 13 SHEET D1
- TRASH ENCLOSURE (SEE ARCHITECTURAL PLANS SHEET)
- MAIN CORRIDOR (TRUCK ACCESS) INSTALL 3" AC OVER 5" TYPE II AGGREGATE BASE PER GEOTECH REPORT PREPARED BY TERRACON JANUARY 13, 2011
- AUTOMOBILE ROUTE / PARKING, INSTALL 2" AC OVER 4" TYPE II AGGREGATE BASE PER GEOTECH REPORT PREPARED BY TERRACON JANUARY 13, 2011

**STORMWATER RUNOFF MANAGEMENT**

- (REQUIRED FOR ALL SITES GREATER THAN 1 ACRE (43,560 SQ.FT.))
- THE OWNER, SITE DEVELOPER, CONTRACTOR AND/OR THEIR AUTHORIZED AGENTS SHALL EACH DAY REMOVE ALL SEDIMENT AND CONSTRUCTION DEBRIS, OR OTHER POTENTIAL POLLUTANTS THAT MAY HAVE BEEN DISCHARGED TO, OR ACCUMULATE IN, THE PUBLIC RIGHTS OF WAYS 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.
  - ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT PRACTICES MAY BE REQUIRED OF THE OWNER AND HIS OR HER AGENTS DUE TO UNFORESEEN EROSION PROBLEMS OR IF THE SUBMITTED PLAN DOES NOT MEET THE PERFORMANCE STANDARDS SPECIFIED IN TITLE 24.40 AND THE LAS VEGAS VALLEY CONSTRUCTION SITE BEST MANAGEMENT PRACTICES MANUAL.
  - 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 NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.5.
  - 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 ACTUAL 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 MAY APPLY. INSPECTIONS MAY APPLY, SUCH AS SUSPENSION OF LAND DISTURBANCE ACTIVITIES. REFER TO NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.12.
  - ACCUMULATED SEDIMENT IN BMPs SHALL BE REMOVED WITHIN SEVEN DAYS AFTER A STORMWATER RUNOFF EVENT OR PRIOR TO THE NEXT ANTICIPATED STORM EVENT, WHICHEVER IS EARLIER. SEDIMENT MUST BE REMOVED WHEN BMP DESIGN CAPACITY HAS BEEN REDUCED BY 50 PERCENT OR MORE.

**BASIS OF BEARING**  
NORTH 01°00'07" EAST, BEING THE BEARING OF THE EAST LINE OF THE NORTHWEST QUARTER (NW 1/4) OF THE NORTHWEST QUARTER (NW 1/4) OF SECTION 11, TOWNSHIP 22 SOUTH, RANGE 62 EAST, M.D.M., LAS VEGAS, NEVADA, AS SHOWN BY MAP THREE ON FILE IN FILE 153, PAGE 8 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

**BENCHMARK**  
BENCHMARK STATION: 7C20 2SW6 1997  
CITY OF LAS VEGAS BENCHMARK # 0LV00226A  
RIVET & PLATE IN TOP OF CURB @ NW CORNER OF LAKE MEAD & ROCK SPRINGS.  
ELEVATION = 2362.22 FEET  
N.A.M.D. 88 DATUM

**FLOOD ZONE**  
THIS SITE IS LOCATED IN ZONE "X", AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN, PER THE FLOOD INSURANCE RATE MAP COMMUNITY PANEL 32002C2615 C, CLARK COUNTY, NEVADA DATED SEPTEMBER 27, 2002.

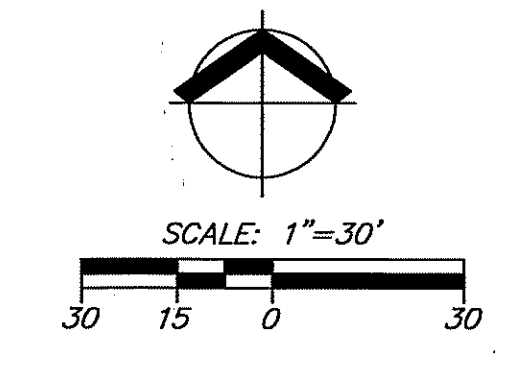
**DISCLAIMER NOTE:**  
EXISTING UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT VERTICAL AND HORIZONTAL LOCATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN HEREON. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITIES NOT SHOWN IN THEIR PROPER LOCATION.

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY.

**Call before you dig**  
811  
1-800-227-2600  
1-702-227-2929

AVOID HITTING UNDERGROUND TRAFFIC SIGNAL SYSTEMS AND STREET LIGHT SYSTEMS. IT'S COSTLY.

**do UnderGround**  
1-702-455-7511  
1-702-432-8300



I CERTIFY THAT THIS GRADING PLAN CONFORMS TO THE APPROVED DRAINAGE STUDY CLV # \_\_\_\_\_ FOR THIS SITE ON FILE AT CITY OF LAS VEGAS FOR THIS PROJECT.

ERIC J. RIETZ, P.E. No. 16350 DATE

**RIETZ CONSULTING INC.**  
5740 SOUTH ARVILLE STREET, #206  
LAS VEGAS, NEVADA 89118  
PH: 702.521.3355 FX: 702.212.3963

**GRADING PLAN**

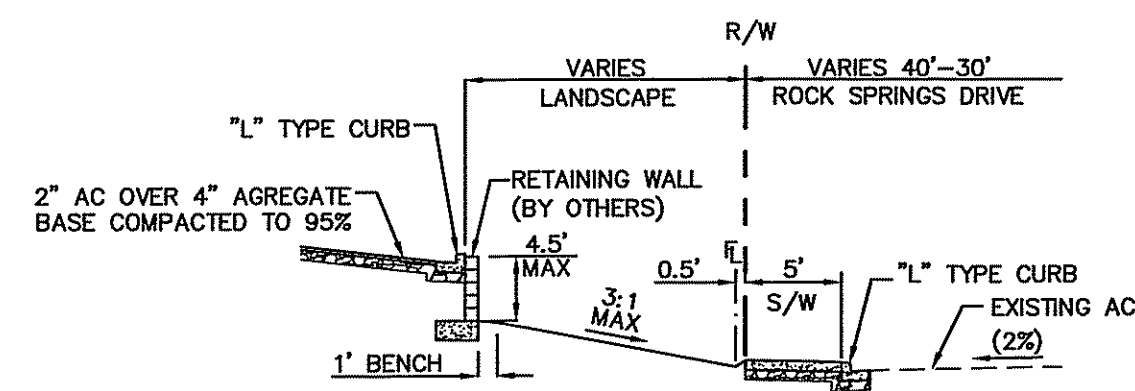
LAKE MEAD/ROCK SPRINGS  
ROOHANI KHUSROW FAMILY TRUST  
LAS VEGAS, NEVADA

DATE: 7/11/12  
DRAWN: RES  
CHECKED: EJR  
SCALE: NTS

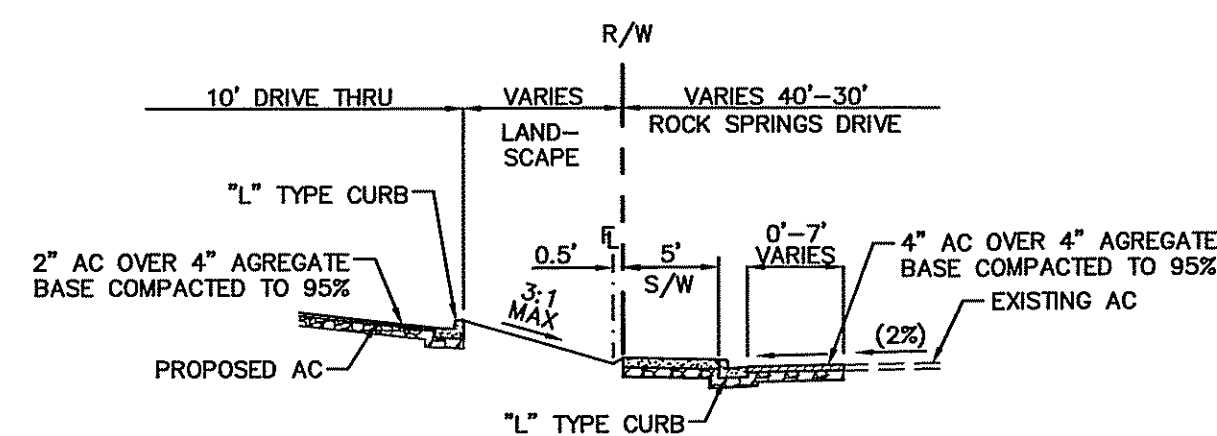
**PROFESSIONAL ENGINEER - STATE OF NEVADA**  
ERIC J. RIETZ  
No. 16350

**SHEET**  
**G1**  
SHEET 3 OF 9 SHEETS

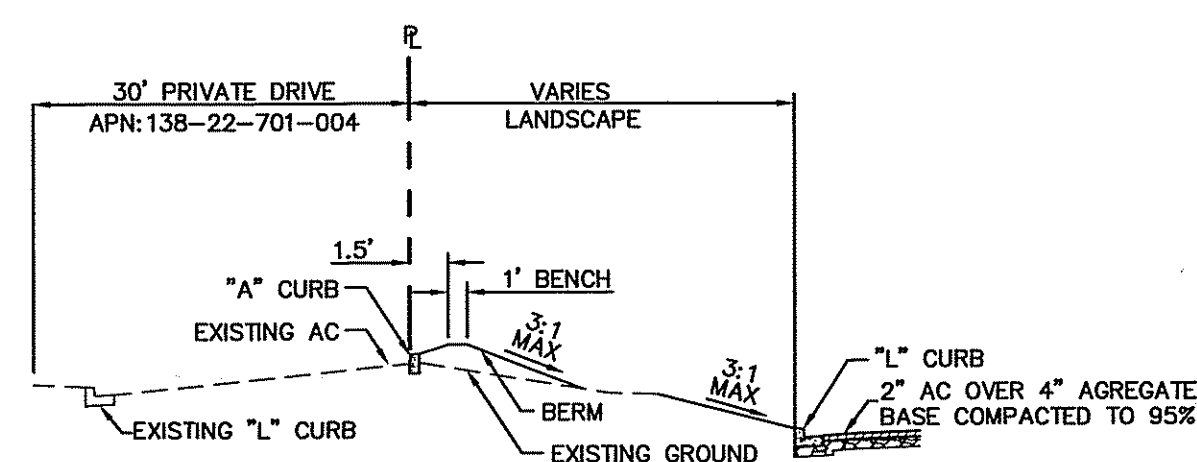




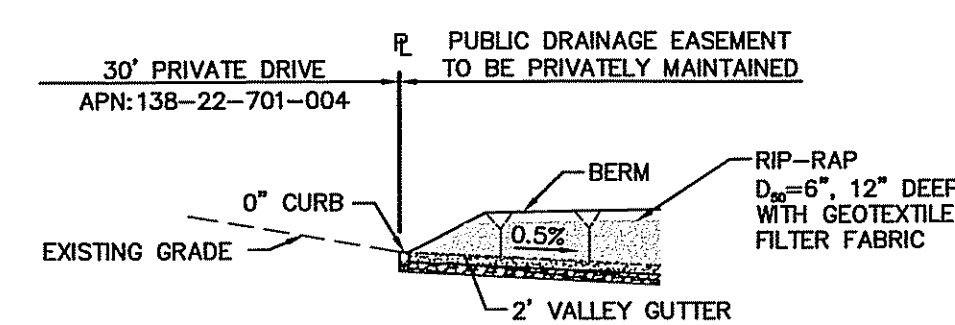
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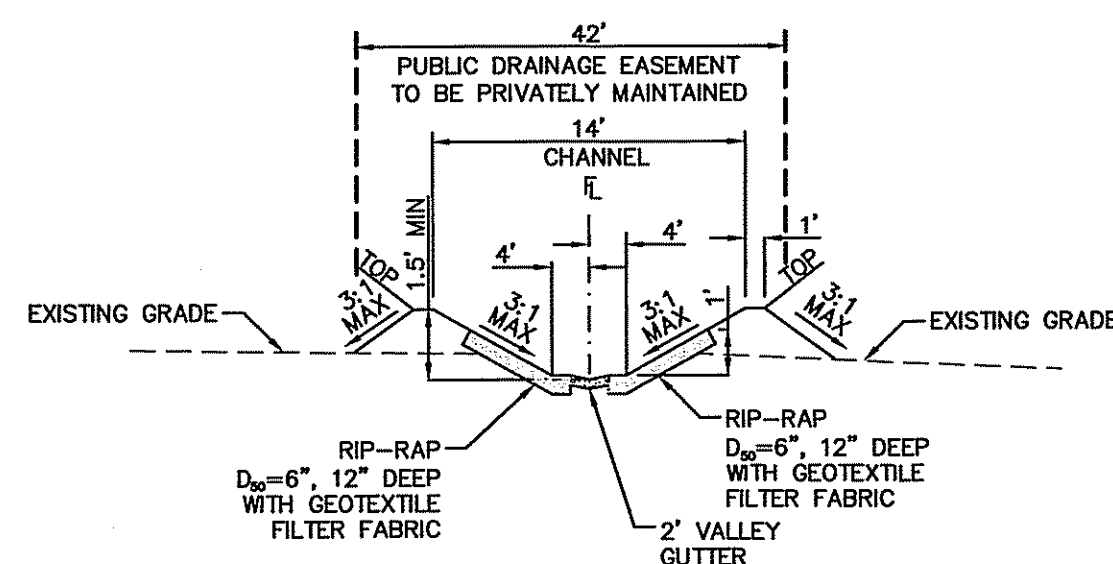
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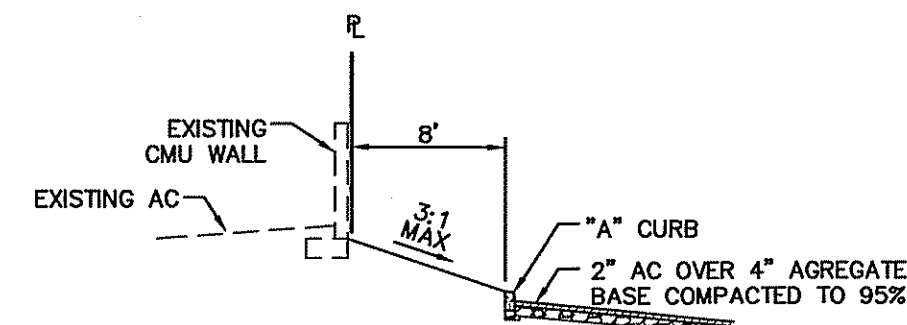
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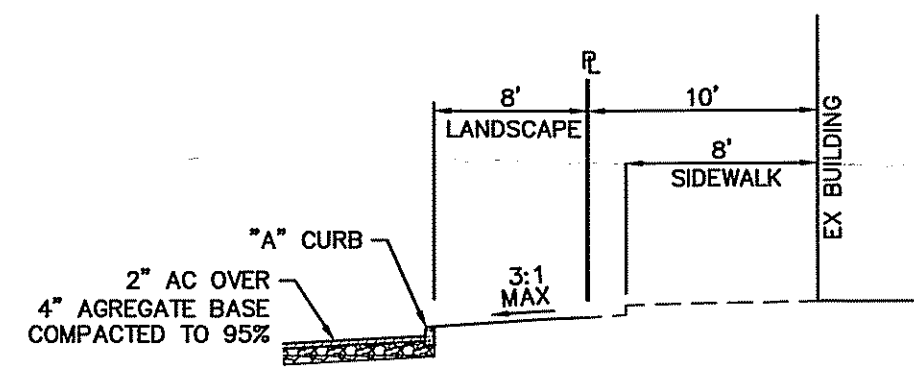
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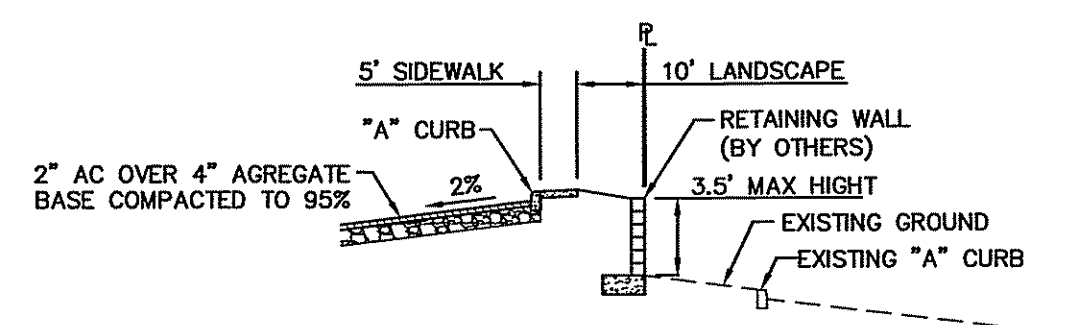
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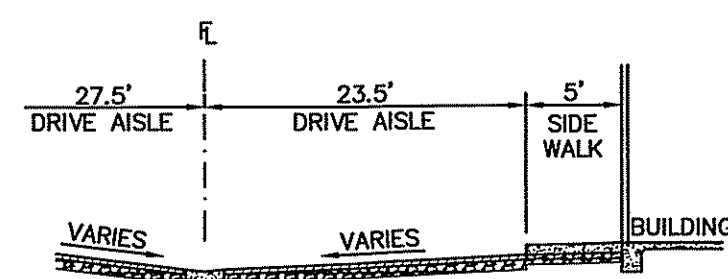
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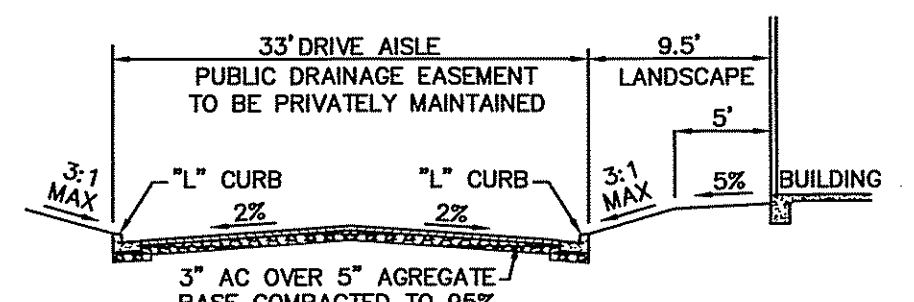
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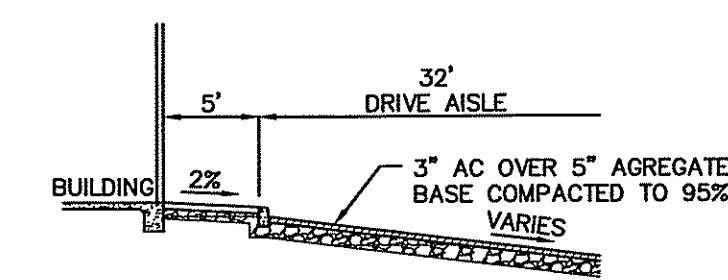
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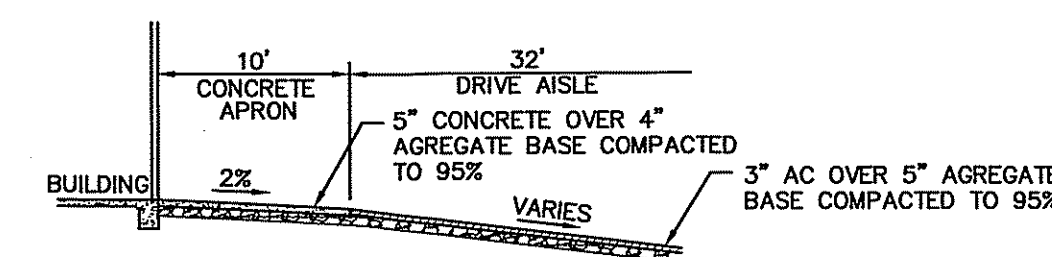
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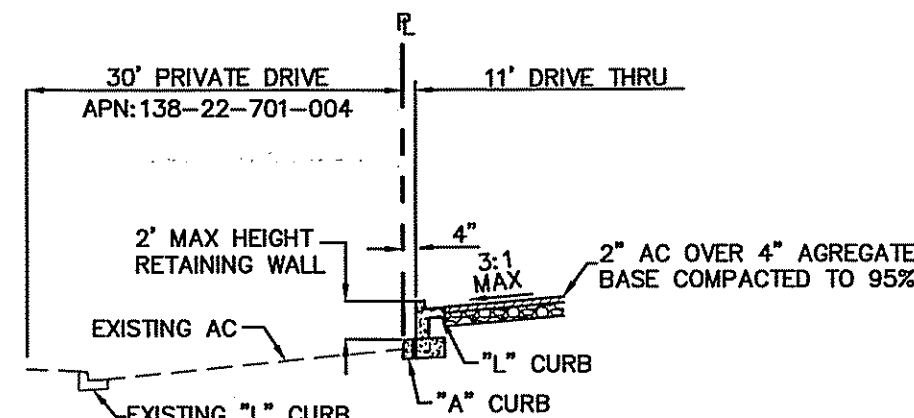
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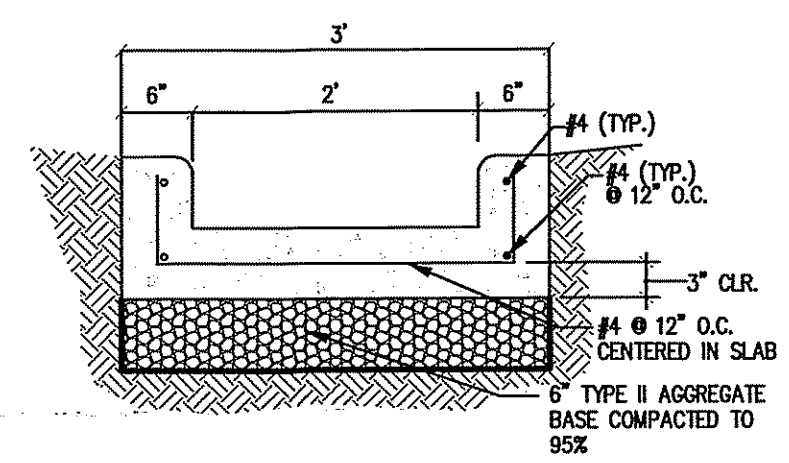
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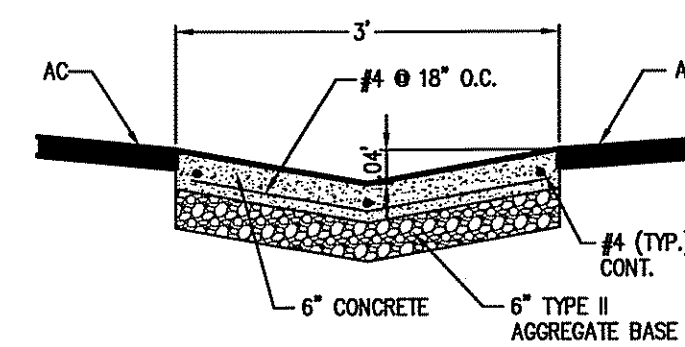
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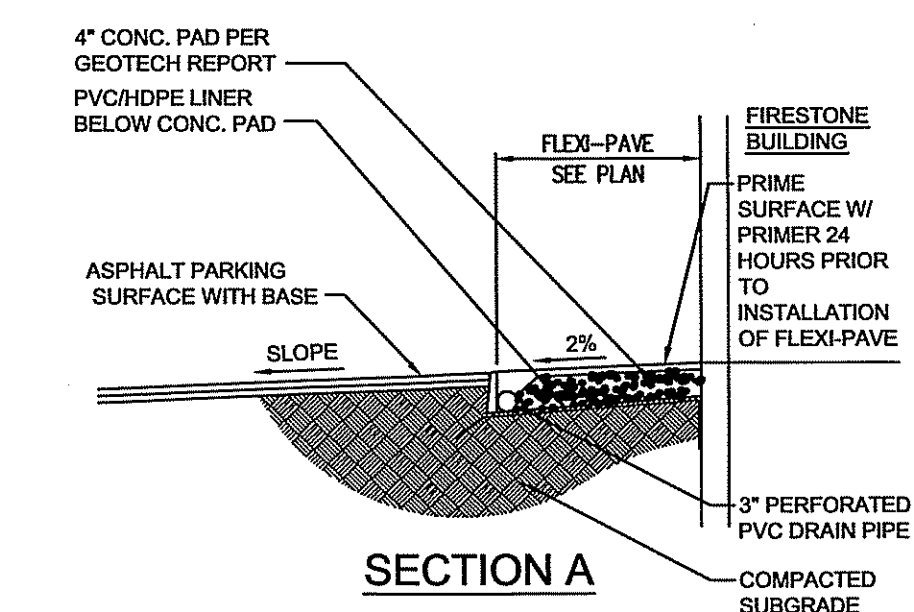
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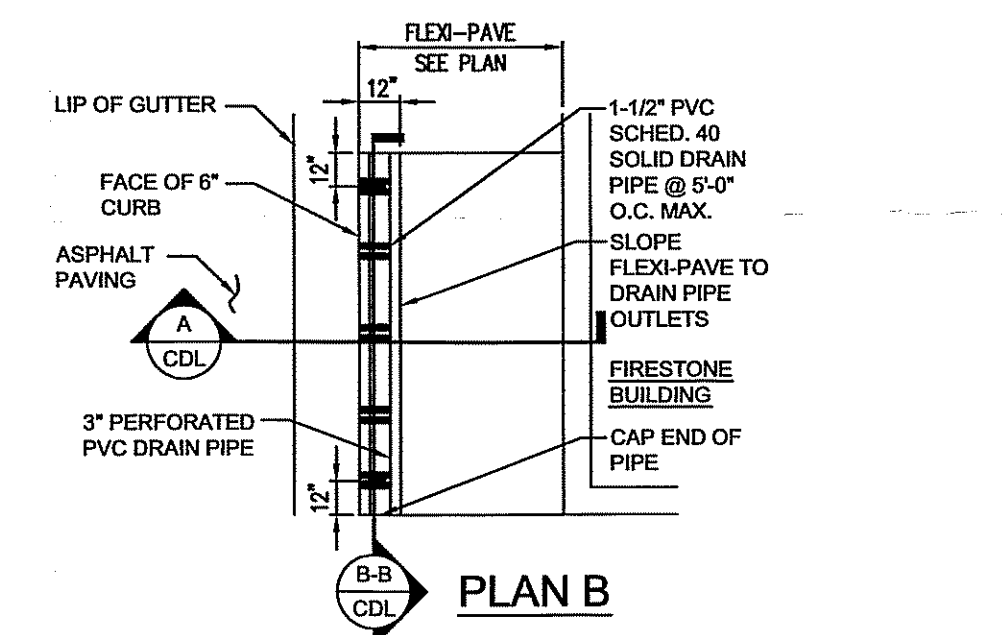
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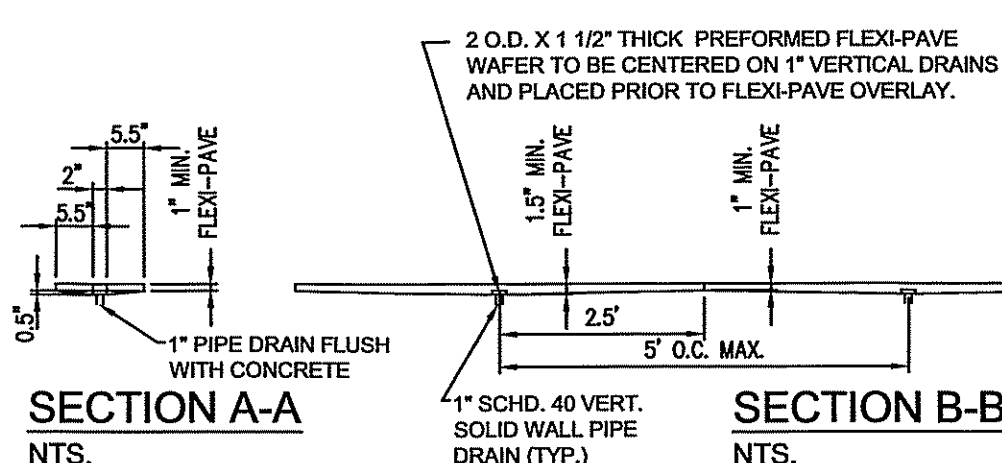
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SECTION A



PLAN B



SECTION A-A  
NTS

FLEXI-PAVE DETAIL

NOT TO SCALE



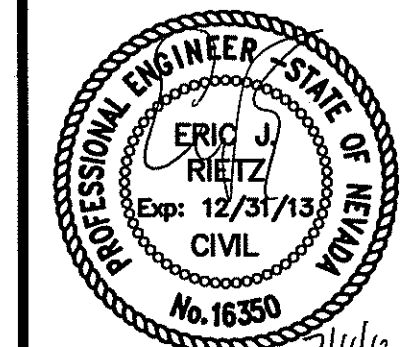
SECTION B-B  
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16

RIETZ CONSULTING INC.  
5740 SOUTH ARVILLE STREET, #206  
LAS VEGAS, NEVADA 89118  
PH: 702.521.3355 FX: 702.212.3963

DETAIL SHEET  
LAKE MEAD/ROCK SPRINGS  
ROOHANI KHUSROW FAMILY TRUST  
LAS VEGAS, NEVADA

DATE: 7/11/12  
DRAFTER: RES  
CHECKED: EUR  
SCALE

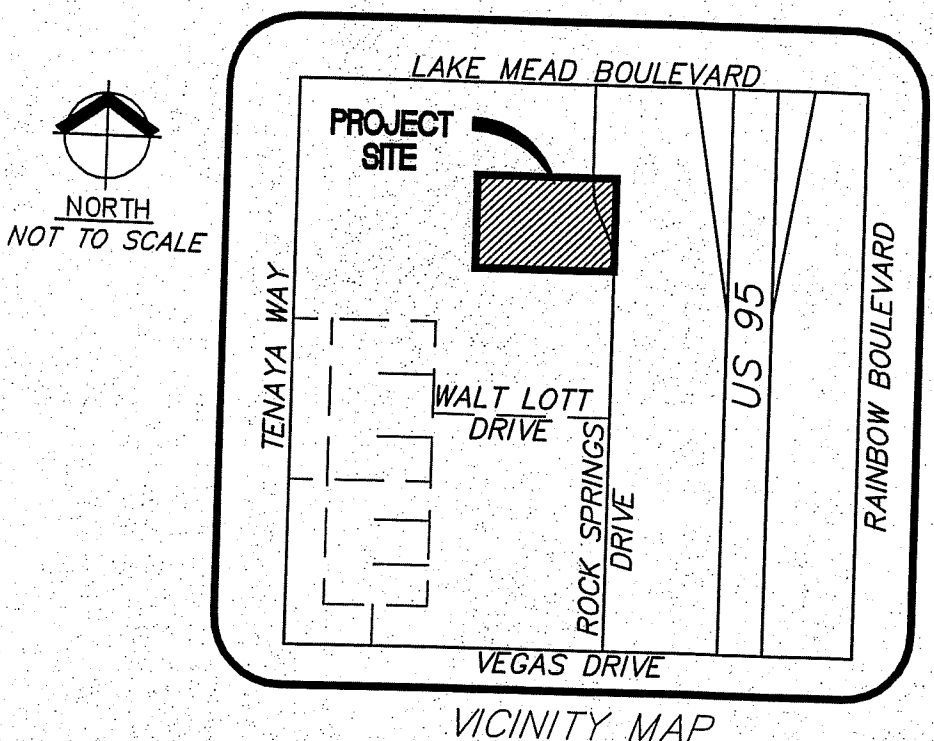
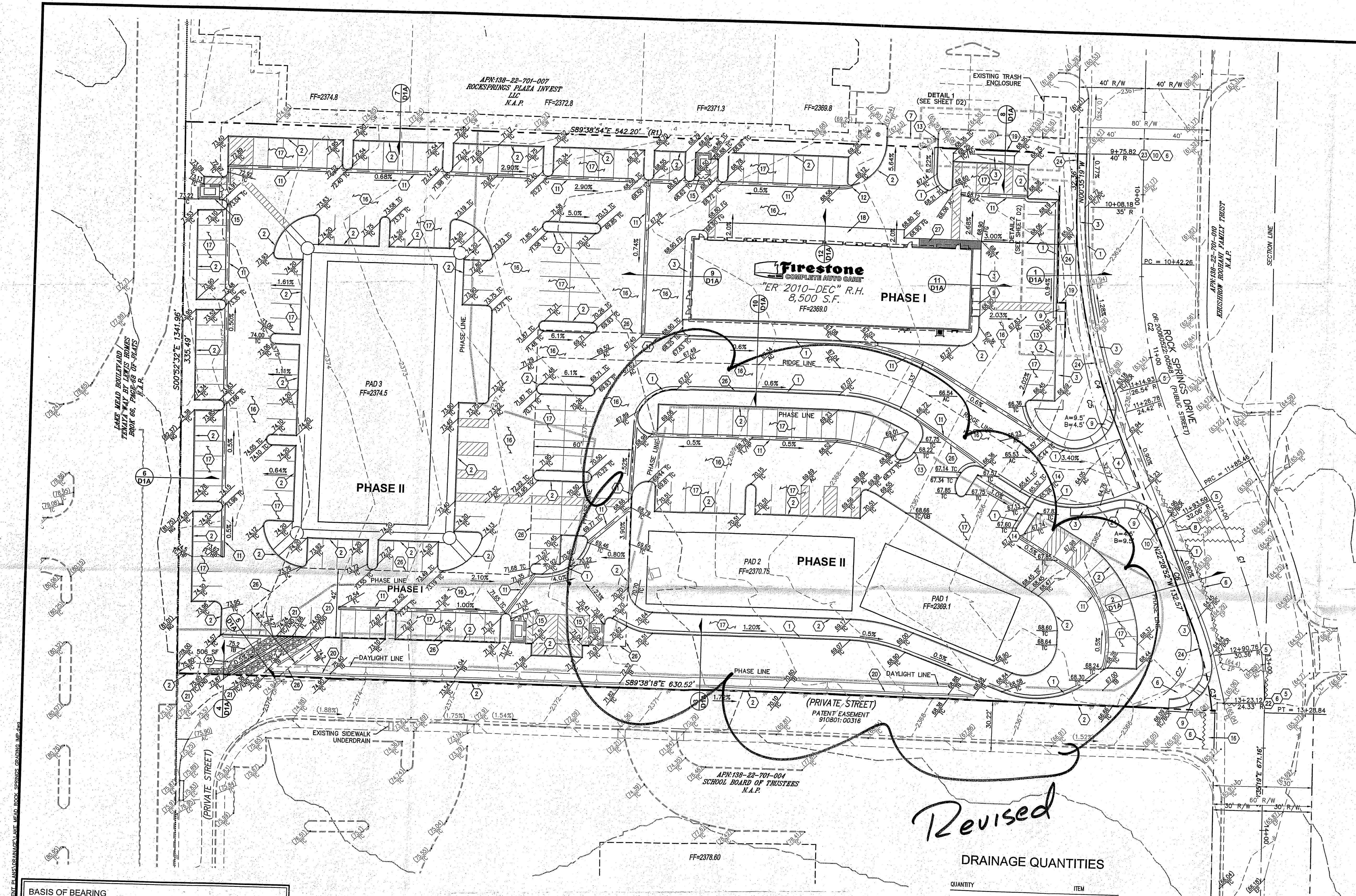


SHEET  
**D1**  
SHEET 4 OF 9 SHEETS

## APPENDIX E

### Previously Approved Grading Plans





**LEGEND**

| PROPOSED                  | EXISTING                  |
|---------------------------|---------------------------|
| 00.00 TC TOP BACK CURB    | 00.00 TC TOP BACK CURB    |
| 00.00 FG FINISH GRADE     | 00.00 FG FINISH GRADE     |
| 00.00 EP EDGE OF PAVEMENT | 00.00 EP EDGE OF PAVEMENT |
| 00.00 FL FLOW LINE        | 00.00 FL FLOW LINE        |
| 00.00 AC ASPHALT CONCRETE | 00.00 AC ASPHALT CONCRETE |
| 00.00 TB TOP OF BURM      | N/A                       |
| N/A EC EDGE OF CONCRETE   | 00.00 EC                  |
| N/A NG NATURAL GRADE      | 00.00 NG                  |
| N/A SW SIDEWALK           | 00.00 SW                  |
| 00.00 HP HIGH POINT       | N/A                       |

**NOTES**

- CONTRACTOR TO VERIFY LOCATION AND ELEVATION OF EXISTING STRUCTURES AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION.
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY LOCATION AND ELEVATION OF EXISTING UTILITIES PRIOR TO CONSTRUCTION.
- OWNER RESPONSIBLE TO PROVIDE SURVEY MONUMENTATION AS SHOWN AND TO REPLACE ALL SURVEY MONUMENTATION DAMAGED, DISTURBED, DESTROYED OR OBSOLETE DURING CONSTRUCTION.
- ALL WALLS ARE SHOWN FOR REFERENCE ONLY. ALL WALLS SHALL BE PERMITTED BY A SEPARATE WALL PERMIT THROUGH THE CITY OF LAS VEGAS BUILDING DEPARTMENT.

**CENTER LINE CURVE TABLE**

| CURVE | LENGTH  | RADIUS  | DELTA     |
|-------|---------|---------|-----------|
| C1    | 143.36' | 250.00' | 32°51'34" |
| C2    | 143.37' | 250.00' | 32°51'29" |

**RIGHT-OF-WAY CURVE TABLE**

| CURVE | LENGTH  | RADIUS  | DELTA     |
|-------|---------|---------|-----------|
| C3    | 55.89'  | 220.00' | 14°33'23" |
| C4    | 130.97' | 342.91' | 21°53'33" |

**NDOT RIGHT-OF-WAY CURVE TABLE**

| CURVE | LENGTH  | RADIUS  | DELTA      |
|-------|---------|---------|------------|
| C5    | 186.31' | 230.00' | 32°51'29"  |
| C6    | 78.01'  | 210.00' | 21°17'05"  |
| C7    | 73.35'  | 40.00'  | 105°03'37" |

**DRAINAGE QUANTITIES**

| QUANTITY | ITEM                                 |
|----------|--------------------------------------|
| 855 LF   | 2" VALLEY GUTTER                     |
| 508 SF   | RIP-RAP D <sub>6</sub> =6", 12" DEEP |
| 47 EA    | 3" PVC STORM DRAIN                   |

**GRADING**

- CONSTRUCT "L" CURB AND GUTTER PER CCAUSD #216
- CONSTRUCT "A" CURB AND GUTTER PER CCAUSD #219
- CONSTRUCT 4" SIDEWALK PER CCAUSD #234
- CONSTRUCT 8" CROSS GUTTER PER CCAUSD #229 AND #228
- CONSTRUCT COMMERCIAL DRIVEWAY PER CCAUSD #222A AND #228
- SAWCUT (CLEAN) 1" FROM EDGE OF PAVEMENT, REMOVE EXISTING ASPHALT PAVEMENT
- SAWCUT (CLEAN), REMOVE CURB
- ASPHALT PAVING FOR ROCK SPRINGS PER CCAUSD #200A AND REFERENCED GEOTECHNICAL REPORT 3" AC OVER 4" TYPE II
- CONSTRUCT HANDICAP RAMPS PER CCAUSD #235 CASE III A AND B = 6" UNLESS OTHERWISE NOTED
- CONSTRUCT 3" SIDEWALK UNDER DRAIN PER DETAIL S-13 SHEET D24
- INSTALL 2" VALLEY GUTTER PER DETAIL 14 SHEET D1A
- TURN OUT VALLEY GUTTER TO ENSURE POSITIVE DRAINAGE
- TURN OUT "L" CURB TO ENSURE POSITIVE DRAINAGE
- INSTALL 2" "U" CHANNEL PER DETAIL 13 SHEET D1A
- TRASH ENCLOSURE (SEE ARCHITECTURAL PLANS SHEET)
- MAIN CORRIDOR (TRUCK ACCESS) INSTALL 3" AC OVER 6" TYPE II AGGREGATE BASE PER GEOTECH REPORT PREPARED BY TERRACON JANUARY 13, 2011
- AUTOMOBILE ROUTE / PARKING, INSTALL 2" AC OVER 4" TYPE II AGGREGATE BASE PER GEOTECH REPORT PREPARED BY TERRACON JANUARY 13, 2011
- CONCRETE APRON, INSTALL 5" CONCRETE OVER 4" TYPE II AGGREGATE BASE PER GEOTECH REPORT PREPARED BY TERRACON JANUARY 13, 2011
- CONSTRUCT CMU RETAINING WALL (STRUCTURAL ENGINEERING BY OTHERS)
- CONSTRUCT EARTH BERM AND COMPACT TO 95%
- CONSTRUCT 0" CURB
- BEGIN CONSTRUCTION, MEET AND MATCH EXISTING CROSS GUTTER AND ASPHALT
- END CONSTRUCTION, MEET AND MATCH EXISTING CURB, GUTTER, AND SIDEWALK
- CONSTRUCT EARTH SHALE TO ENSURE POSITIVE DRAINAGE
- INSTALL RIP-RAP PAD D<sub>6</sub>=6", 12" DEEP (PAD SIZE PER PLAN)
- WITH GEOTEXTILE FILTER FABRIC
- PUBLIC DRAINAGE EASEMENT TO BE PRIVATE MAINTAINED
- INSTALL FLEXI-PAVE PAVEMENT PER DETAIL 15 SHEET D1A

**STORMWATER RUNOFF MANAGEMENT**

- (REQUIRED FOR ALL SITES GREATER THAN 1 ACRE (43,560 SQ.FT.))
- 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 WAYS 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.
  - ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT PRACTICES MAY BE REQUIRED OF THE OWNER AND HIS OR HER AGENTS DUE TO UNFORESEEN EROSION PROBLEMS OR IF THE SUBMITTED PLAN DOES NOT MEET THE PERFORMANCE STANDARDS SPECIFIED IN TITLE 24.40 AND THE LAS VEGAS VALLEY CONSTRUCTION SITE BEST MANAGEMENT PRACTICES MANUAL.
  - 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 NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY IN NV100000, SECTION III.A.5.
  - AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL INSPECT ALL DISTURBED AREAS, AREAS ENTRANCE AND EXIT LOCATIONS AND ALL BMPs WEEKLY, AND WITHIN 24 HOURS AFTER ANY ACTUAL STORMWATER POLLUTION PREVENTION PLAN AS NECESSARY. THE CONTRACTOR OR HIS AGENT SHALL UPDATE OR MODIFY INSPECTIONS MAY APPLY, SUCH AS SUSPENSION OF LAND DISTURBANCE ACTIVITIES. REFER TO NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY IN NV100000, SECTION III.A.12.
  - ACCUMULATED SEDIMENT IN BMPs SHALL BE REMOVED WITHIN SEVEN DAYS AFTER A STORMWATER RUNOFF EVENT OR PRIOR TO THE NEXT ANTICIPATED STORM EVENT, WHICHEVER IS EARLIER. SEDIMENT MUST BE REMOVED WHEN BMP DESIGN CAPACITY HAS BEEN REDUCED BY 50 PERCENT OR MORE.

**BASIS OF BEARING**  
NORTH 01°00'07" EAST, BEING THE BEARING OF THE EAST LINE OF THE NORTHWEST QUARTER (NW 1/4) OF THE NORTHWEST QUARTER (NW 1/4) OF SECTION 11, TOWNSHIP 22 SOUTH, RANGE 82 EAST, MAP 1, LAS VEGAS, NEVADA, AS SHOWN BY MAP THEREOF ON FILE IN FILE 153, PAGE 8 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

**BENCHMARK**  
BENCHMARK STATION: 7C20 25WS 1997  
CITY OF LAS VEGAS BENCHMARK # 0LV002266A  
RIVET & PLATE IN TOP OF CURB @ NW CORNER OF LAKE MEAD & ROCK SPRINGS.  
ELEVATION = 2362.22 FEET  
N.A.V.D. 88 DATUM

**FLOOD ZONE**  
THIS SITE IS LOCATED IN ZONE "X" AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN, PER THE FLOOD INSURANCE RATE MAP COMMUNITY PANEL 320032615 E. CLARK COUNTY, NEVADA DATED SEPTEMBER 27, 2002.

**DISCLAIMER NOTE:**  
EXISTING UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT VERTICAL AND HORIZONTAL LOCATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN HEREON. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITIES NOT SHOWN IN THEIR PROPER LOCATION.

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

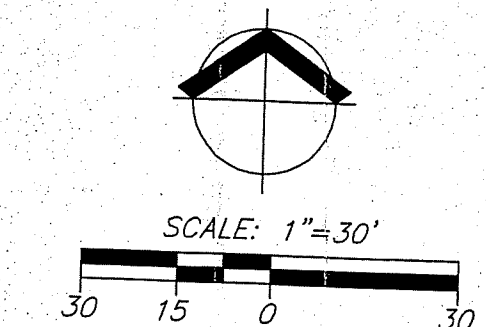
**Call before you Dig**  
Avoid hitting overhead power lines. It's costly.

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

**Call before you Dig**  
Avoid hitting overhead power lines. It's costly.

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Avoid hitting overhead power lines. It's costly.



I CERTIFY THAT THIS GRADING PLAN CONFORMS TO THE APPROVED DRAINAGE STUDY CLV # XXXXX FOR THIS SITE ON FILE AT CITY OF LAS VEGAS FOR THIS PROJECT.

ERIC J. RIETZ, P.E. No. 16350

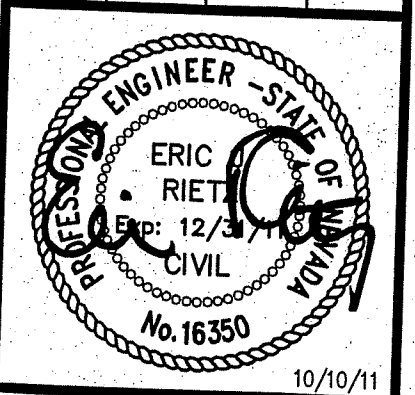
DATE

**PHASE II GRADING PLAN**

**Firestone**  
COMPLETE AUTO CARE

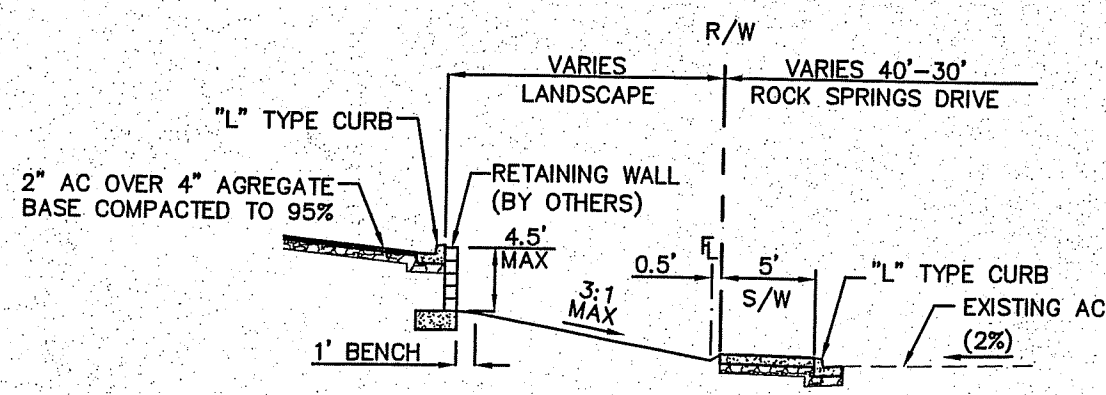
**RIETZ CONSULTING INC.**  
5740 SOUTH ARVILLE STREET - #206  
LAS VEGAS, NEVADA 89118  
PH: 702.521.3355 FAX: 702.212.3963

**ROHANI KHESROW FAMILY TRUST**  
9365 W. SUNSET RD # 400  
LAS VEGAS, NV 89148

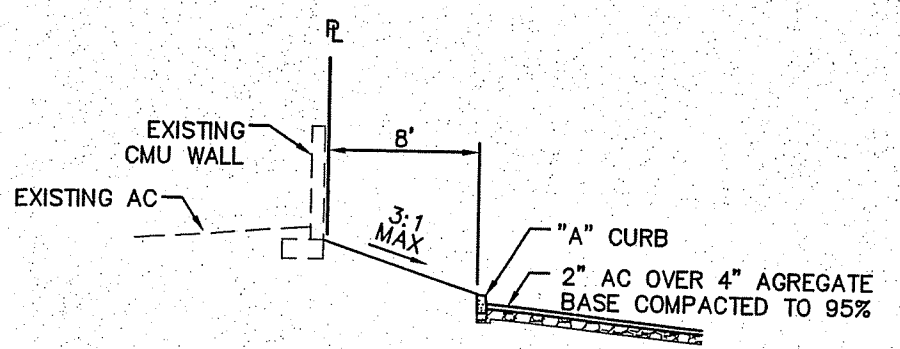


**SHEET**  
**C3A**  
SHEET 3 OF X SHEETS

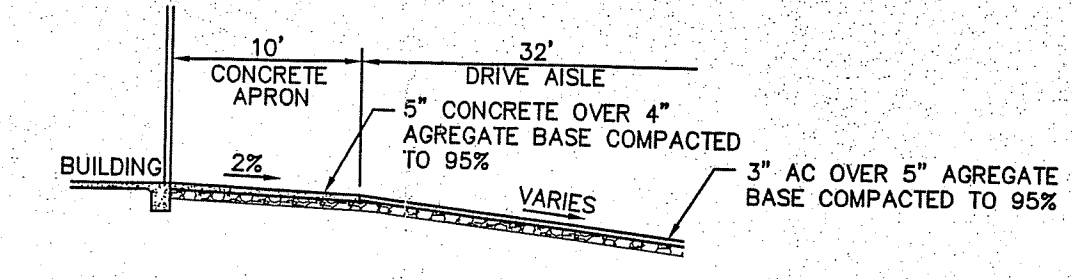




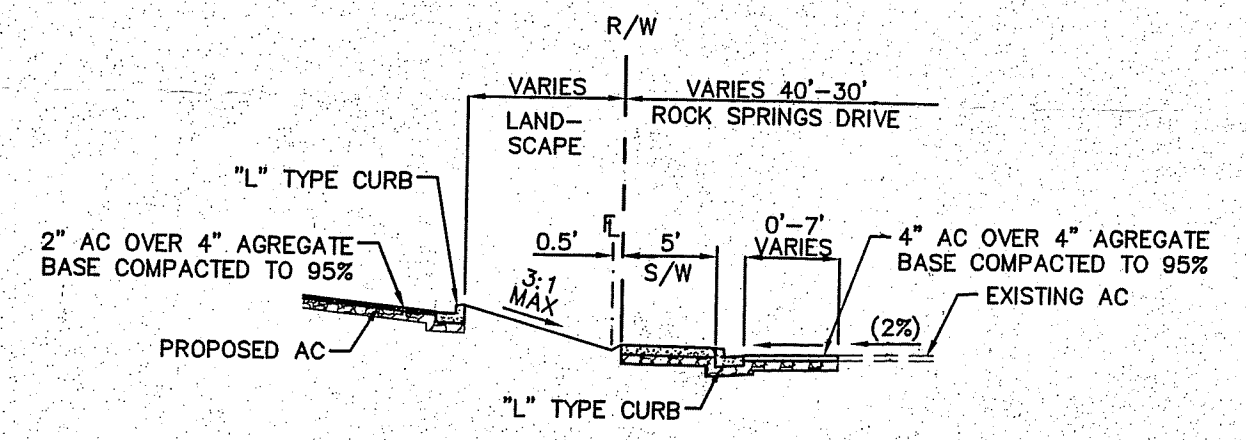
SECTION 1  
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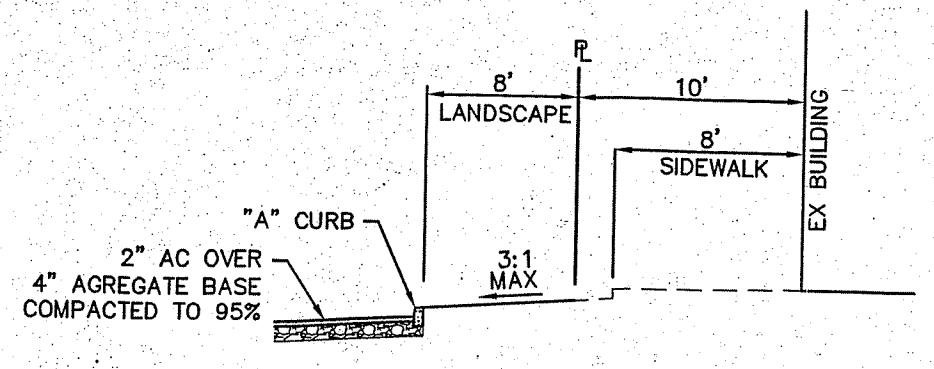
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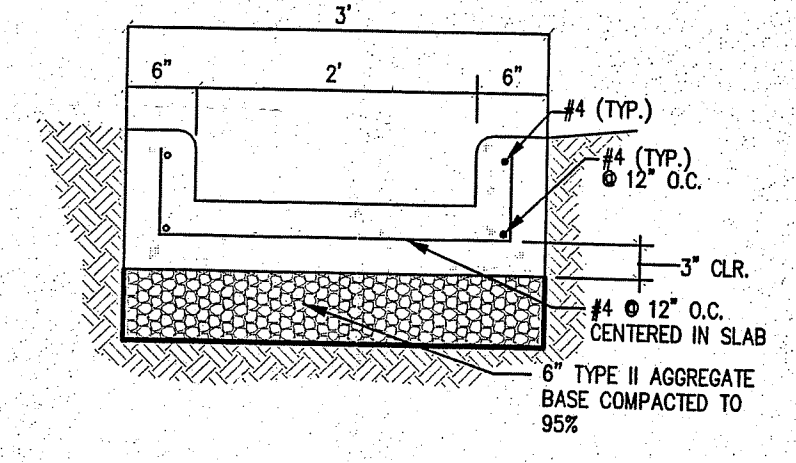
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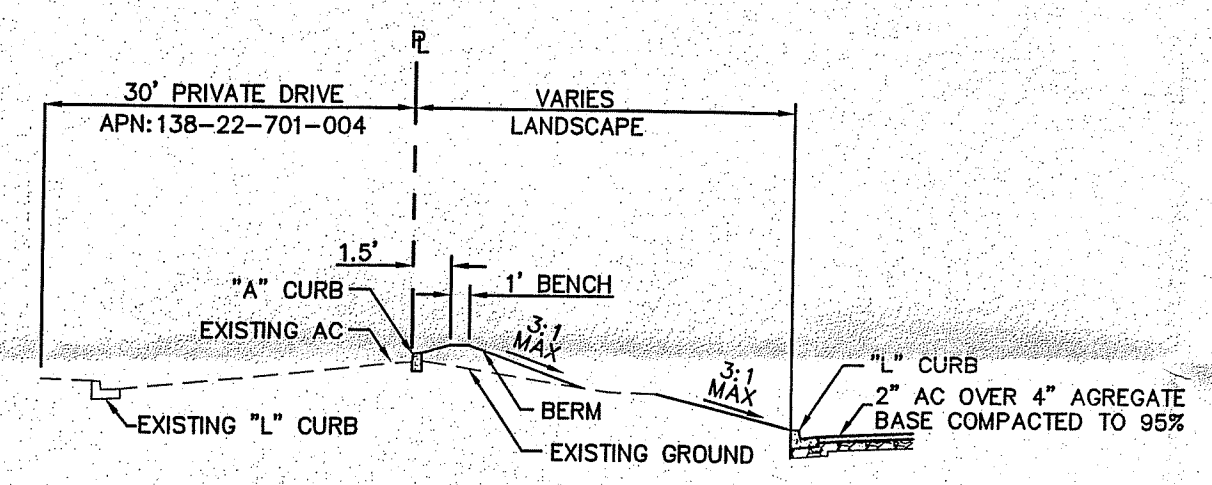
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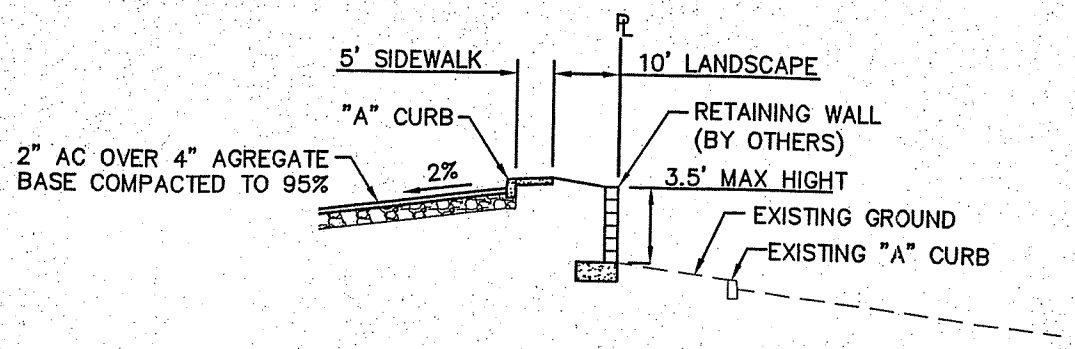
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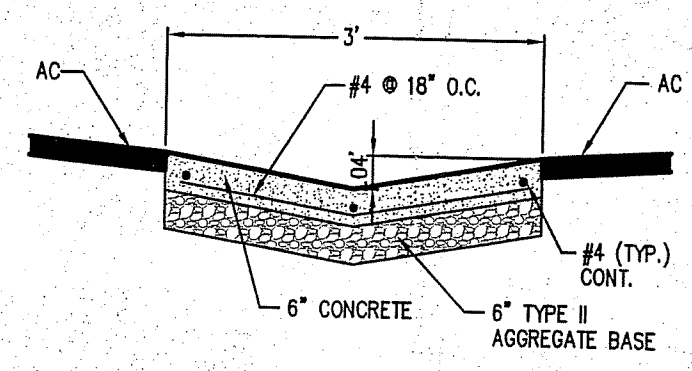
2' WIDE CONCRETE FLUME  
NOT TO SCALE



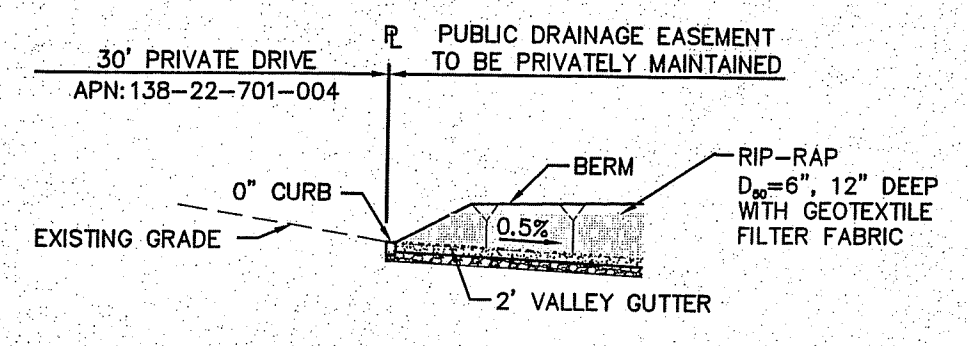
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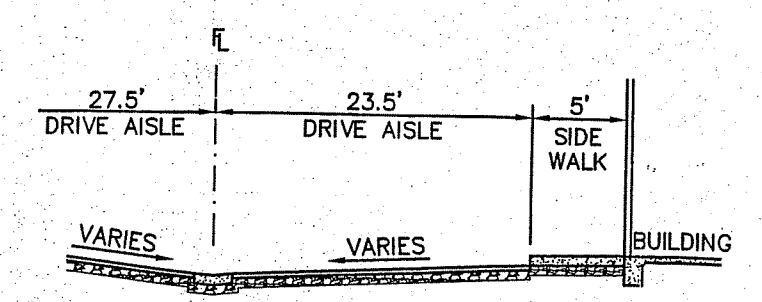
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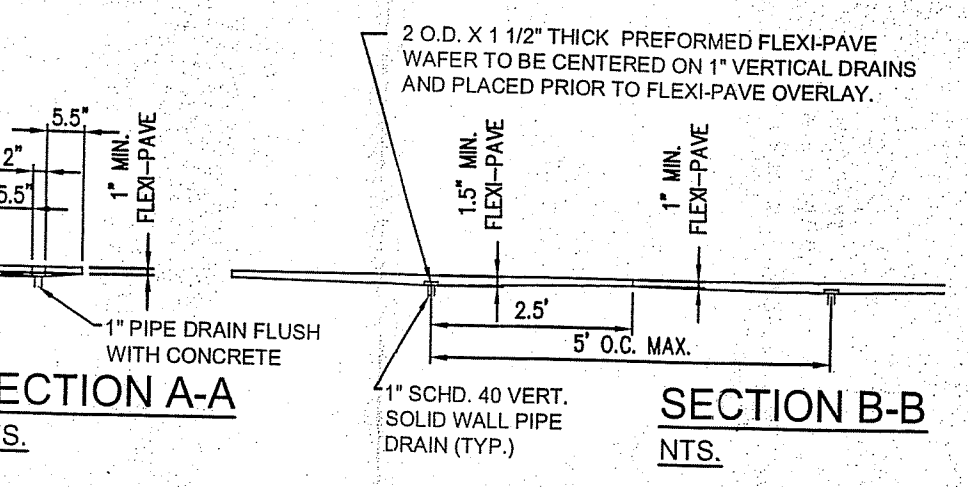
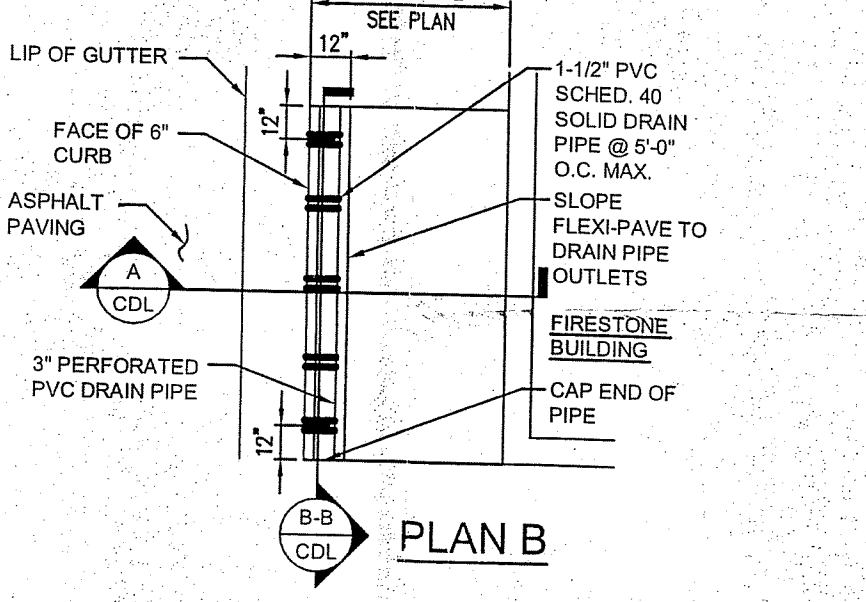
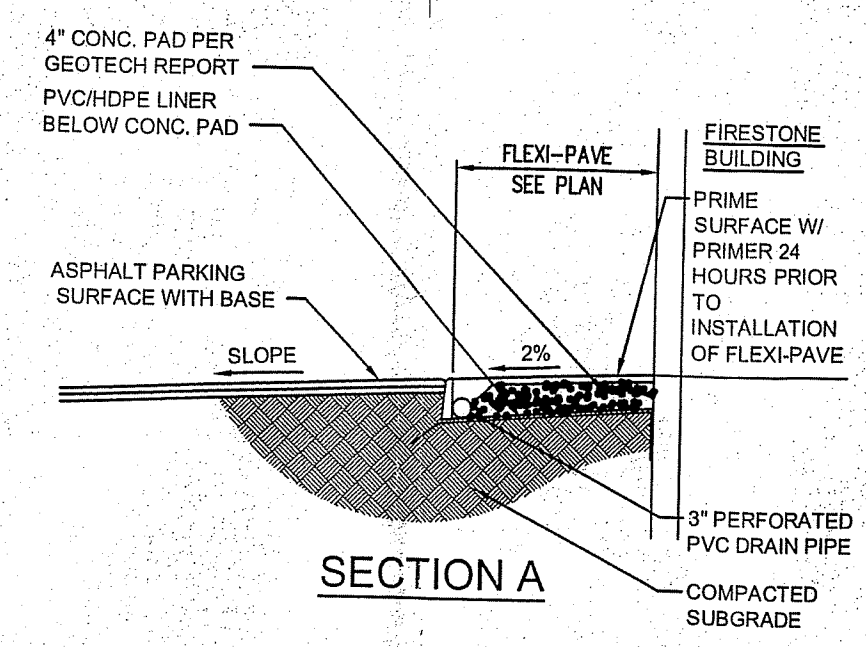
2' WIDE VALLEY GUTTER  
NOT TO SCALE



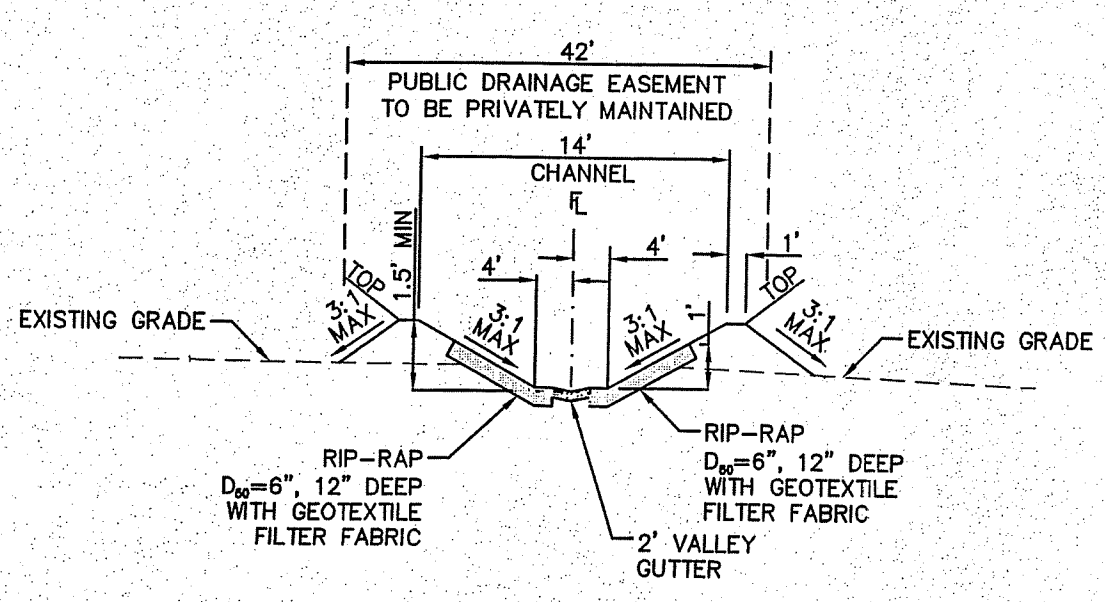
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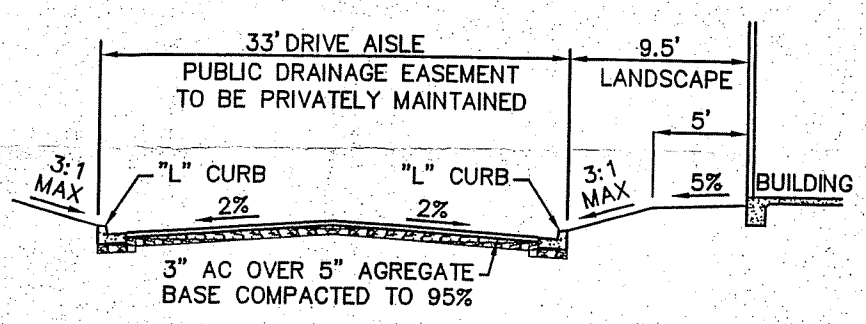
SECTION 9  
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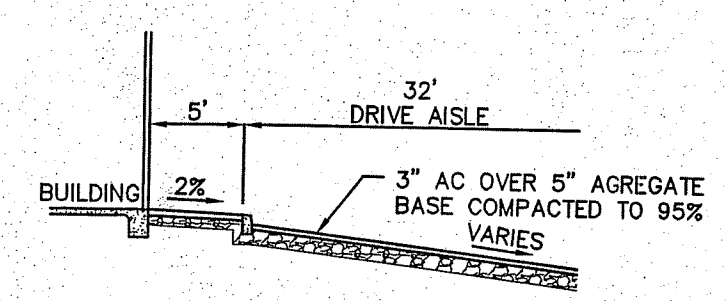
FLEXI-PAVE DETAIL  
NOT TO SCALE



SECTION 5  
NOT TO SCALE



SECTION 10  
NOT TO SCALE



SECTION 11  
NOT TO SCALE

|                                                                                                                          |              |              |       |
|--------------------------------------------------------------------------------------------------------------------------|--------------|--------------|-------|
| <b>Firestone</b><br>COMPLETE AUTO CARE                                                                                   |              |              |       |
| RIETZ CONSULTING INC.<br>5740 SOUTH ARVILLE STREET, #206<br>LAS VEGAS, NEVADA 89118<br>PH: 702.521.3355 FX: 702.212.3963 |              |              |       |
| PHASE II DETAIL SHEET                                                                                                    |              |              |       |
| ROOHANI KHEISROW FAMILY TRUST<br>9345 W. SIOSET RD # 100<br>LAS VEGAS, NV 89148                                          |              |              |       |
| DATE: 10/10/2011                                                                                                         | DRAFTER: RES | CHECKED: EUR | SCALE |
|                                                                                                                          |              |              |       |
| SHEET<br><b>D1A</b><br>SHEET 4 OF X SHEETS                                                                               |              |              |       |