

TECHNICAL DRAINAGE STUDY  
ADDENDUM No. 1 - SUPPLEMENT

**Skye Canyon**  
**Phase 3 Infrastructure**  
City of Las Vegas, Nevada

Job No.: OLY1602.000  
Date: July 2016

**Prepared By:**  
Slater Hanifan Group, Inc.  
5740 S. Arville Street, Suite 216  
Las Vegas, Nevada 89118  
Phone: 702-284-5300 • Fax: 702-284-5399

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



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Steve Jones, P.E.  
NV Professional Engineer No. 19638

Assisted by: Cameron Bencini, E.I.

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

Name of Development: Skye Canyon - Phase 3 Infrastructure - Addendum #1 - Supplement Date: July 2016  
Location of Development: a) Descriptive (Cross Streets) North/South: Grand Canyon Drive  
East/West: Skye Canyon Park Drive  
b) Section: 7 Township: 19 South Range: 60 East  
c) APN : 125-07-201-003, 125-07-201-001

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

Contact Person-Name: Steve Jones, P.E. Telephone No.: 702-284-5300  
\* E-Mail Address: sjones@shg-inc.com Fax No.: 702-284-5399  
Firm: Slater Hanifan Group  
Address: 5740 S. Arville Street #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 checked="" type="checkbox"/> | Infrastructure Improvements  |

1. Total Owned Land Area: At Site: 37.5 acres Being Developed/Disturbed: 3.4 acres
2. Is a portion or all of the subject property located in a designated FEMA Flood Hazard Area? ☐ Yes\*\* ☒ No
3. Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? ☐ Yes\*\* ☒ No
4. Proposed type of development (Residential, Commercial, Etc.): Roadway
5. Approximate upstream land area which drains to the subject site: 1.0 Sq. Miles +/-
6. Has the site drainage been evaluated in the past? ☒ YES ☐ NO If yes, please identify documentation: Master Drainage Study for Kyle Canyon (SHG, DS4420)
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: East into ephemeral wash that crosses Grand Canyon approximately 700-ft north of Skye Canyon Park Drive
8. Briefly describe your proposed schedule for the subject project: Phase 3 is divided into 2 phases:  
Roadways - Infrastructure TDS; Commercial Subdivision - Onsite TDS



Engineer's Seal

Submit this form as part of the required drainage study to the local entity which has jurisdiction over the subject property. This form may provide sufficient information to serve as the Conceptual Drainage Study.

**\*New Required Field**

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

Local Entity File No. \_\_\_\_\_

Revision

Date

REFERENCE:

STANDARD FORM 1

OLY1602.000

July 25, 2016

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

**Subject: Supplemental Information to Addendum No. 1 to the Technical Drainage Study for Skye Canyon Phase 3 (DS4796)**

Dear Mr. Sung:

This letter is submitted to supplement information provided in the July 21, 2016 submittal of the subject study. After an email/phone conversation with Albert Sung it was concluded that supplemental documents could be provided for the subject study. In general this supplement is provided to address an erroneous WSPW model for the culvert at Grand Canyon Drive. Upon fixing the error, the WSE of other WSPGW models changed and therefore those affected models had to be reanalyzed and/or added to this submittal.

The following documents replace the items in the July 21, 2016 submittal:

- Grand Canyon Drive - Future WSPG for Culvert Crossing (WSPGW Model "FUT")
- Grand Canyon Drive - Proposed WSPG for Culvert Crossing (WSPGW Model (PRCB))
- Grand Canyon Drive - WSPG for South Storm Drain (WSPGW Model "PROP")
- Grand Canyon Drive - Improvement Plan Sheets SD-06 & SD-08
- Digital Copy of the Plans (CD)

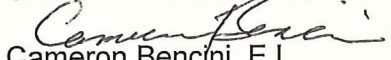
Additional information:

- Grand Canyon Drive - WSPG Model for Ex. RCB Lateral "Lat3" (To be placed directly behind "WSPG for South Storm Drain")

All supplemented/additional documents are provided on the digital file located on the attached CD. If you have any questions or require additional information, please do not hesitate to contact us at 284-5300.

Respectfully Submitted,

SLATER HANIFAN GROUP

  
Cameron Bencini, E.I.  
Engineer Intern II – Flood Control Division

cc: Steve Jones, P.E. – SHG  
Jerrod Ratcliffe – SHG  
David Myhre, E.I. – SHG



## Cameron Bencini

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**From:** Albert Sung <YSung@LasVegasNevada.GOV>  
**Sent:** Monday, July 25, 2016 10:27 AM  
**To:** Cameron Bencini  
**Subject:** RE: Skye Canyon PH3 (DS4796)

Cameron,

Called you back but to no avail.

Just send a runner to drop off whatever supplement to us. Thanks.

Albert Sung, P.E.  
Flood Control

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**From:** Cameron Bencini [mailto:cbencini@shg-inc.com]  
**Sent:** Monday, July 25, 2016 10:19 AM  
**To:** Albert Sung  
**Subject:** Skye Canyon PH3 (DS4796)

Mr. Sung,

Our apology, on Thursday (7/21/2016) we submitted an Addendum of the subject study with an erroneous WSPGW model. This model dictates the hydraulic design of the project and is important to have the correct information. We have since corrected the WSPGW model and wish to supplement the new model with the one that was submitted. Would you please contact me at 702-284-5300 (ext. 6660) so we can discuss.

Thanks for your time.

Sincerely,

**Cameron Bencini,**  
Engineering Intern II

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Any files contained within are to be used for information ONLY. Accuracy and/or design information to be verified from approved original plans.  
Use of electronic media is at the sole risk of the user.



## Future WSPG for Culvert Crossing

|    |                                                                 |    |      |       |        |        |          |     |       | FUT      |
|----|-----------------------------------------------------------------|----|------|-------|--------|--------|----------|-----|-------|----------|
| T1 | SKYE CANYON PHASE 3                                             |    |      |       |        |        |          |     |       |          |
| T2 | STORM DRAIN SYSTEM AT GRAND CANYON LOW POINT (CULVERT CROSSING) |    |      |       |        |        |          |     |       |          |
| T3 | 14' W x 5' H RCB DISCHARGING TO NATURAL WASH (FUTURE CONDITION) |    |      |       |        |        |          |     |       |          |
| SO | 998.0002748.980                                                 | 1  |      |       |        |        |          |     |       | 2751.970 |
| R  | 999.0002749.000                                                 | 1  |      | .035  |        |        |          |     | .000  | .000 0   |
| TS | 1007.0002749.090                                                | 5  |      | .042  |        |        |          |     | .000  |          |
| JX | 1017.0002749.190                                                | 5  | 2    | .015  | 24.000 |        | 2749.240 |     | .0    | .000     |
| WX | 1017.00 2749.19                                                 | 3  |      |       |        |        |          |     |       |          |
| R  | 1033.50 2749.24                                                 | 3  |      | .013  |        |        |          |     |       |          |
| JX | 1033.50 2749.24                                                 | 3  | 66   | .013  | 172.0  |        | 2749.23  |     | 45.0  |          |
| R  | 1074.00 2749.37                                                 | 3  |      | .013  |        |        |          |     | -45.0 |          |
| TS | 1084.00 2749.57                                                 | 72 |      | .013  |        |        |          |     |       |          |
| R  | 1110.00 2749.89                                                 | 72 |      | .013  |        |        |          |     | 0.0   |          |
| R  | 1120.00 2750.28                                                 | 72 |      | .013  |        |        |          |     | 0.0   |          |
| R  | 1179.00 2752.05                                                 | 72 |      | .013  |        |        |          |     | -37.0 |          |
| R  | 2355.00 2787.32                                                 | 72 |      | .013  |        |        |          |     | 0.0   |          |
| SH | 2355.00 2787.32                                                 | 72 |      |       |        |        |          |     |       |          |
| CD | 1 1 0                                                           |    | .000 | 4.000 | 20.000 | 1.000  | 1.000    | .00 |       |          |
| CD | 2 3 0                                                           |    | .000 | 5.000 | 6.000  | .000   | .000     | .00 |       |          |
| CD | 3 3 0                                                           |    | .000 | 5.000 | 14.000 | .000   | .000     | .00 |       |          |
| CD | 4 1 0                                                           |    | .000 | 5.000 | 20.000 | 3.000  | 3.000    | .00 |       |          |
| CD | 5 1 0                                                           |    | .000 | 5.000 | 30.500 | 10.000 | 10.000   | .00 |       |          |
| CD | 54 4 1                                                          |    | .000 | 4.500 | .000   | .000   | .000     | .00 |       |          |
| CD | 60 4 1                                                          |    | .000 | 5.000 | .000   | .000   | .000     | .00 |       |          |
| CD | 66 4 1                                                          |    | .000 | 5.500 | .000   | .000   | .000     | .00 |       |          |
| CD | 72 4 1                                                          |    | .000 | 6.000 | .000   | .000   | .000     | .00 |       |          |
| Q  | 499.000                                                         | .0 |      |       |        |        |          |     |       |          |

FILE: FUT.WSW

FUT  
W S P G W - EDIT LISTING - Version 14.06

Date: 7-22-2016 Time: 11:58:37

PAGE 1

| CARD CODE | SECT NO | CHN TYPE | NO OF PIER/PIP | AVE WIDTH | HEIGHT 1 DIAMETER | BASE WIDTH | ZL     | ZR     | INV DROP | Y(1) | Y(2) | Y(3) | Y(4) | Y(5) | Y(6) | Y(7) | Y(8) | Y(9) | Y(10) |
|-----------|---------|----------|----------------|-----------|-------------------|------------|--------|--------|----------|------|------|------|------|------|------|------|------|------|-------|
| CD        | 1       | 1        | 0              | .000      | 4.000             | 20.000     | 1.000  | 1.000  | .00      |      |      |      |      |      |      |      |      |      |       |
| CD        | 2       | 3        | 0              | .000      | 5.000             | 6.000      | .000   | .000   | .00      |      |      |      |      |      |      |      |      |      |       |
| CD        | 3       | 3        | 0              | .000      | 5.000             | 14.000     | .000   | .000   | .00      |      |      |      |      |      |      |      |      |      |       |
| CD        | 4       | 1        | 0              | .000      | 5.000             | 20.000     | 3.000  | 3.000  | .00      |      |      |      |      |      |      |      |      |      |       |
| CD        | 5       | 1        | 0              | .000      | 5.000             | 30.500     | 10.000 | 10.000 | .00      |      |      |      |      |      |      |      |      |      |       |
| CD        | 54      | 4        | 1              |           | 4.500             |            |        |        |          |      |      |      |      |      |      |      |      |      |       |
| CD        | 60      | 4        | 1              |           | 5.000             |            |        |        |          |      |      |      |      |      |      |      |      |      |       |
| CD        | 66      | 4        | 1              |           | 5.500             |            |        |        |          |      |      |      |      |      |      |      |      |      |       |
| CD        | 72      | 4        | 1              |           | 6.000             |            |        |        |          |      |      |      |      |      |      |      |      |      |       |

W S P G W

PAGE NO 1

HEADING LINE NO 1 IS - WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 2 IS - SKYE CANYON PHASE 3

HEADING LINE NO 3 IS - STORM DRAIN SYSTEM AT GRAND CANYON LOW POINT (CULVERT CROSSING)

PAGE NO 2

W S P G W

PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

| ELEMENT NO | IS | A | SYSTEM OUTLET | STATION  | INVERT   | SECT | W S ELEV |  |  |  |  |  |  |  |  |  |  |  |  |
|------------|----|---|---------------|----------|----------|------|----------|--|--|--|--|--|--|--|--|--|--|--|--|
| 1          | IS | A | SYSTEM OUTLET | 998.000  | 2748.980 | 1    | 2751.970 |  |  |  |  |  |  |  |  |  |  |  |  |
| 2          | IS | A | REACH         | 999.000  | 2749.000 | 1    |          |  |  |  |  |  |  |  |  |  |  |  |  |
| 3          | IS | A | TRANSITION    | 1007.000 | 2749.090 | 5    |          |  |  |  |  |  |  |  |  |  |  |  |  |
| 4          | IS | A | JUNCTION      | 1017.000 | 2749.190 | 5    |          |  |  |  |  |  |  |  |  |  |  |  |  |
| 5          | IS | A | WALL EXIT     | 1017.000 | 2749.190 | 3    |          |  |  |  |  |  |  |  |  |  |  |  |  |
| 6          | IS | A | REACH         | 1033.500 | 2749.240 | 3    |          |  |  |  |  |  |  |  |  |  |  |  |  |
| 7          | IS | A | JUNCTION      | 1033.500 | 2749.240 | 3    |          |  |  |  |  |  |  |  |  |  |  |  |  |

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

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

| ELEMENT NO | IS | A | REACH                                                                                                        | STATION  | INVERT   | SECT | RADIUS | ANGLE | ANG PT  | MAN H |
|------------|----|---|--------------------------------------------------------------------------------------------------------------|----------|----------|------|--------|-------|---------|-------|
| 8          | IS | A | REACH <td>1074.000</td> <td>2749.370</td> <td>3</td> <td>.000</td> <td>.000</td> <td>-45.000</td> <td>0</td> | 1074.000 | 2749.370 | 3    | .000   | .000  | -45.000 | 0     |
| 9          | IS | A | TRANSITION <td>1084.000</td> <td>2749.570</td> <td>72</td> <td>.000</td> <td>.000</td> <td></td> <td></td>   | 1084.000 | 2749.570 | 72   | .000   | .000  |         |       |

W S P G W

PAGE NO 3

WATER SURFACE PROFILE - ELEMENT CARD LISTING

| ELEMENT NO | IS | A | REACH                                                                                                         | STATION  | INVERT   | SECT | RADIUS | ANGLE | ANG PT  | MAN H |
|------------|----|---|---------------------------------------------------------------------------------------------------------------|----------|----------|------|--------|-------|---------|-------|
| 10         | IS | A | REACH <td>1110.000</td> <td>2749.890</td> <td>72</td> <td>.000</td> <td>.000</td> <td>.000</td> <td>0</td>    | 1110.000 | 2749.890 | 72   | .000   | .000  | .000    | 0     |
| 11         | IS | A | REACH <td>1120.000</td> <td>2750.280</td> <td>72</td> <td>.000</td> <td>.000</td> <td>.000</td> <td>0</td>    | 1120.000 | 2750.280 | 72   | .000   | .000  | .000    | 0     |
| 12         | IS | A | REACH <td>1179.000</td> <td>2752.050</td> <td>72</td> <td>.000</td> <td>.000</td> <td>-37.000</td> <td>0</td> | 1179.000 | 2752.050 | 72   | .000   | .000  | -37.000 | 0     |
| 13         | IS | A | REACH <td>2355.000</td> <td>2787.320</td> <td>72</td> <td>.000</td> <td>.000</td> <td>.000</td> <td>0</td>    | 2355.000 | 2787.320 | 72   | .000   | .000  | .000    | 0     |
| 14         | IS | A | SYSTEM HEADWORKS <td>2355.000</td> <td>2787.320</td> <td>72</td> <td></td> <td></td> <td></td> <td></td>      | 2355.000 | 2787.320 | 72   |        |       |         |       |



SKYE CANYON PHASE 3  
STORM DRAIN SYSTEM AT GRAND CANYON LOW POINT (CULVERT CROSSING)  
14' W x 5' H RCB DISCHARGING TO NATURAL WASH (FUTURE CONDITION)

| Station        | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/Dia.-FT | Base Wt or I.D. | ZL      | No Wth Prs/Pip |
|----------------|-------------|------------|------------|---------|-----------|----------|----------------|------------|----------------|----------------|----------------|-----------------|---------|----------------|
| L/Elem         | Ch Slope    |            |            |         | SF Ave    | HF       | SE Dpth        | Froude N   | Norm Dp        | "N"            | X-Fall         | ZR              | Type Ch |                |
| 998.000        | 2748.980    | 3.071      | 2752.051   | 695.00  | 9.81      | 1.49     | 2753.55        | .00        | 3.17           | 26.14          | 4.000          | 20.000          | 1.00    | 0 .0           |
| 1.000          | .0200       |            |            |         | .0152     | .02      | 3.07           | 1.05       | 2.87           | .035           | .00            | 1.00            | TRAP    |                |
| 999.000        | 2749.000    | 3.168      | 2752.168   | 695.00  | 9.47      | 1.39     | 2753.56        | .00        | 3.17           | 26.34          | 4.000          | 20.000          | 1.00    | 0 .0           |
| TRANS STR      | .0113       |            |            |         | .0107     | .09      | 3.17           | 1.00       | .042           | .00            | 1.00           | TRAP            |         |                |
| 1007.000       | 2749.090    | 4.840      | 2753.930   | 695.00  | 1.82      | .05      | 2753.98        | .00        | 2.01           | 127.29         | 5.000          | 30.500          | ****    | 0 .0           |
| JUNCT STR      | .0100       |            |            |         | .0001     | .00      | 4.84           | .19        | .015           | .00            | ****           | TRAP            |         |                |
| 1017.000       | 2749.190    | 4.743      | 2753.933   | 671.00  | 1.82      | .05      | 2753.98        | .00        | 1.98           | 125.35         | 5.000          | 30.500          | ****    | 0 .0           |
| HYDRAULIC JUMP |             |            |            |         |           |          |                |            |                |                |                |                 |         |                |
| 1017.000       | 2749.190    | 2.005      | 2751.195   | 671.00  | 23.90     | 8.87     | 2760.07        | .00        | 4.15           | 14.00          | 5.000          | 14.000          | .00     | 0 .0           |
| 16.500         | .0030       |            |            |         | .0251     | .41      | 2.01           | 2.97       | 4.06           | .013           | .00            | .00             | BOX     |                |
| 1033.500       | 2749.240    | 1.960      | 2751.200   | 671.00  | 24.45     | 9.28     | 2760.48        | .00        | 4.15           | 14.00          | 5.000          | 14.000          | .00     | 0 .0           |
| JUNCT STR      | .0000       |            |            |         | .0368     | .00      | 1.96           | 3.08       | .013           | .00            | .00            | BOX             |         |                |
| 1033.500       | 2749.240    | 1.328      | 2750.568   | 499.00  | 26.84     | 11.19    | 2761.76        | .00        | 3.40           | 14.00          | 5.000          | 14.000          | .00     | 0 .0           |
| 19.645         | .0032       |            |            |         | .0510     | 1.00     | 1.33           | 4.11       | 3.24           | .013           | .00            | .00             | BOX     |                |
| 1053.145       | 2749.303    | 1.272      | 2750.576   | 499.00  | 28.01     | 12.18    | 2762.76        | .00        | 3.40           | 14.00          | 5.000          | 14.000          | .00     | 0 .0           |
| 20.855         | .0032       |            |            |         | .0588     | 1.23     | 1.27           | 4.38       | 3.24           | .013           | .00            | .00             | BOX     |                |
| 1074.000       | 2749.370    | 1.213      | 2750.583   | 499.00  | 29.38     | 13.40    | 2763.99        | .00        | 3.40           | 14.00          | 5.000          | 14.000          | .00     | 0 .0           |
| TRANS STR      | .0200       |            |            |         | .0459     | .46      | 1.21           | 4.70       | .013           | .00            | .00            | BOX             |         |                |

SKYE CANYON PHASE 3  
STORM DRAIN SYSTEM AT GRAND CANYON LOW POINT (CULVERT CROSSING)  
14' W x 5' H RCB DISCHARGING TO NATURAL WASH (FUTURE CONDITION)

| Station  | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/Dia.-FT | Base Wt or I.D. | ZL      | No Wth Prs/Pip |
|----------|-------------|------------|------------|---------|-----------|----------|----------------|------------|----------------|----------------|----------------|-----------------|---------|----------------|
| L/Elem   | Ch Slope    |            |            |         | SF Ave    | HF       | SE Dpth        | Froude N   | Norm Dp        | "N"            | X-Fall         | ZR              | Type Ch |                |
| 1084.000 | 2749.570    | 3.688      | 2753.258   | 499.00  | 27.37     | 11.64    | 2764.89        | .00        | 5.67           | 5.84           | 6.000          | .000            | .00     | 1 .0           |
| 26.000   | .0123       |            |            |         | .0294     | .76      | 3.69           | 2.73       | 5.36           | .013           | .00            | .00             | PIPE    |                |
| 1110.000 | 2749.890    | 3.622      | 2753.512   | 499.00  | 27.97     | 12.15    | 2765.66        | .00        | 5.67           | 5.87           | 6.000          | .000            | .00     | 1 .0           |
| 10.000   | .0390       |            |            |         | .0300     | .30      | 3.62           | 2.83       | 3.34           | .013           | .00            | .00             | PIPE    |                |
| 1120.000 | 2750.280    | 3.635      | 2753.915   | 499.00  | 27.85     | 12.05    | 2765.96        | .00        | 5.67           | 5.86           | 6.000          | .000            | .00     | 1 .0           |
| 59.000   | .0300       |            |            |         | .0299     | 1.76     | 3.63           | 2.81       | 3.63           | .013           | .00            | .00             | PIPE    |                |
| 1179.000 | 2752.050    | 3.635      | 2755.685   | 499.00  | 27.85     | 12.04    | 2767.73        | .00        | 5.67           | 5.86           | 6.000          | .000            | .00     | 1 .0           |
| 331.528  | .0300       |            |            |         | .0297     | 9.83     | 3.64           | 2.81       | 3.63           | .013           | .00            | .00             | PIPE    |                |
| 1510.528 | 2761.993    | 3.651      | 2765.644   | 499.00  | 27.70     | 11.91    | 2777.56        | .00        | 5.67           | 5.86           | 6.000          | .000            | .00     | 1 .0           |
| 421.307  | .0300       |            |            |         | .0278     | 11.70    | 3.65           | 2.78       | 3.63           | .013           | .00            | .00             | PIPE    |                |
| 1931.835 | 2774.628    | 3.802      | 2778.430   | 499.00  | 26.41     | 10.83    | 2789.26        | .00        | 5.67           | 5.78           | 6.000          | .000            | .00     | 1 .0           |
| 153.967  | .0300       |            |            |         | .0246     | 3.79     | 3.80           | 2.57       | 3.63           | .013           | .00            | .00             | PIPE    |                |
| 2085.802 | 2779.246    | 3.963      | 2783.209   | 499.00  | 25.18     | 9.85     | 2793.06        | .00        | 5.67           | 5.68           | 6.000          | .000            | .00     | 1 .0           |
| 89.426   | .0300       |            |            |         | .0219     | 1.96     | 3.96           | 2.38       | 3.63           | .013           | .00            | .00             | PIPE    |                |
| 2175.228 | 2781.928    | 4.135      | 2786.063   | 499.00  | 24.01     | 8.95     | 2795.01        | .00        | 5.67           | 5.55           | 6.000          | .000            | .00     | 1 .0           |
| 60.059   | .0300       |            |            |         | .0195     | 1.17     | 4.14           | 2.19       | 3.63           | .013           | .00            | .00             | PIPE    |                |
| 2235.287 | 2783.729    | 4.320      | 2788.050   | 499.00  | 22.89     | 8.14     | 2796.19        | .00        | 5.67           | 5.39           | 6.000          | .000            | .00     | 1 .0           |
| 42.914   | .0300       |            |            |         | .0175     | .75      | 4.32           | 2.01       | 3.63           | .013           | .00            | .00             | PIPE    |                |

SKYE CANYON PHASE 3  
STORM DRAIN SYSTEM AT GRAND CANYON LOW POINT (CULVERT CROSSING)  
14' W x 5' H RCB DISCHARGING TO NATURAL WASH (FUTURE CONDITION)

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---------|-------------|------------|------------|---------|-----------|----------|----------------|------------|----------------|----------------|----------------|-----------------|----|----------------|
|---------|-------------|------------|------------|---------|-----------|----------|----------------|------------|----------------|----------------|----------------|-----------------|----|----------------|

| L/Elem   | Ch Slope |       |          |        |       | SF Ave | FUT HF  | SE Dpth | Froude N | Norm Dp | "N"   | X-Fall | ZR  | Type Ch |
|----------|----------|-------|----------|--------|-------|--------|---------|---------|----------|---------|-------|--------|-----|---------|
| 2278.201 | 2785.017 | 4.522 | 2789.539 | 499.00 | 21.83 | 7.40   | 2796.94 | .00     | 5.67     | 5.17    | 6.000 | .000   | .00 | 1 .0    |
| 31.502   | .0300    |       |          |        |       | .0157  | .49     | 4.52    | 1.83     | 3.63    | .013  | .00    | .00 | PIPE    |
| 2309.703 | 2785.961 | 4.744 | 2790.706 | 499.00 | 20.81 | 6.73   | 2797.43 | .00     | 5.67     | 4.88    | 6.000 | .000   | .00 | 1 .0    |
| 22.942   | .0300    |       |          |        |       | .0142  | .33     | 4.74    | 1.65     | 3.63    | .013  | .00    | .00 | PIPE    |
| 2332.645 | 2786.649 | 4.993 | 2791.643 | 499.00 | 19.84 | 6.11   | 2797.76 | .00     | 5.67     | 4.48    | 6.000 | .000   | .00 | 1 .0    |
| 15.521   | .0300    |       |          |        |       | .0130  | .20     | 4.99    | 1.48     | 3.63    | .013  | .00    | .00 | PIPE    |
| 2348.166 | 2787.115 | 5.285 | 2792.400 | 499.00 | 18.92 | 5.56   | 2797.96 | .00     | 5.67     | 3.89    | 6.000 | .000   | .00 | 1 .0    |
| 6.834    | .0300    |       |          |        |       | .0122  | .08     | 5.29    | 1.28     | 3.63    | .013  | .00    | .00 | PIPE    |
| 2355.000 | 2787.320 | 5.670 | 2792.990 | 499.00 | 18.04 | 5.05   | 2798.04 | .00     | 5.67     | 2.74    | 6.000 | .000   | .00 | 1 .0    |

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F

### SKYE CANYON PHASE 3

#### STORM DRAIN SYSTEM AT GRAND CANYON LOW POINT (CULVERT CROSSING)

#### 14'W x 5'H RCB DISCHARGING TO NATURAL WASH (FUTURE CONDITION)

|         |    |   |    |   |   |   |   |  |  |  |  |  |  |    |
|---------|----|---|----|---|---|---|---|--|--|--|--|--|--|----|
| 998.00  | .I | W | HE |   |   |   |   |  |  |  |  |  |  | R  |
| 1025.69 | .I | W | HE |   |   |   |   |  |  |  |  |  |  | TX |
| 1053.39 | .I | C | H  |   |   |   |   |  |  |  |  |  |  | JX |
| 1081.08 | .I | Y | Y  | Y | Y | Y | Y |  |  |  |  |  |  | WX |
| 1108.78 | .I | W | C  | H |   | E |   |  |  |  |  |  |  | R  |
| 1136.47 | .I | W | C  | H |   | E |   |  |  |  |  |  |  | JX |
| 1164.16 | .I | W | C  | H |   | E |   |  |  |  |  |  |  | R  |
| 1191.86 | .I | W | C  | H |   | E |   |  |  |  |  |  |  | R  |
| 1219.55 | .I | W | C  | H |   | E |   |  |  |  |  |  |  | TX |
| 1247.24 | .I | W | CH |   | E |   |   |  |  |  |  |  |  | R  |
| 1274.94 | .I | W | CH |   | E |   |   |  |  |  |  |  |  | R  |
| 1302.63 | .I | W | H  |   | E |   |   |  |  |  |  |  |  | R  |
| 1330.33 | .I | W | CH |   | E |   |   |  |  |  |  |  |  | R  |
| 1358.02 | .  |   |    |   |   |   |   |  |  |  |  |  |  | .  |
| 1385.71 | .  |   |    |   |   |   |   |  |  |  |  |  |  | .  |
| 1413.41 | .  |   |    |   |   |   |   |  |  |  |  |  |  | .  |
| 1441.10 | .  |   |    |   |   |   |   |  |  |  |  |  |  | .  |
| 1468.80 | .  |   |    |   |   |   |   |  |  |  |  |  |  | .  |
| 1496.49 | .  |   |    |   |   |   |   |  |  |  |  |  |  | .  |
| 1524.18 | .  | I | W  | H |   | E |   |  |  |  |  |  |  | R  |
| 1551.88 | .  |   |    |   |   |   |   |  |  |  |  |  |  | .  |
| 1579.57 | .  |   |    |   |   |   |   |  |  |  |  |  |  | .  |
| 1607.27 | .  |   |    |   |   |   |   |  |  |  |  |  |  | .  |
| 1634.96 | .  |   |    |   |   |   |   |  |  |  |  |  |  | .  |

[illegible]

## 1. GLOSSARY

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

## Proposed WSPG for Culvert Crossing

PRCB

T1 SKYE CANYON PHASE 3  
T2 STORM DRAIN SYSTEM AT GRAND CANYON LOW POINT (CULVERT CROSSING)  
T3 14' W X 5' H RCB DISCHARGING TO NATURAL WASH (PROPOSED CONDITION)

|    |                  |   |      |       |        |          |        |      |      |
|----|------------------|---|------|-------|--------|----------|--------|------|------|
| SO | 998.0002748.980  | 1 |      |       |        | 2751.970 |        |      |      |
| R  | 999.0002749.000  | 1 |      | .035  |        |          | .000   | .000 | 0    |
| TS | 1007.0002749.090 | 5 |      | .042  |        |          | .000   |      |      |
| JX | 1017.0002749.190 | 5 | 2    | .015  | 29.000 | 2749.240 | .0     |      | .000 |
| WX | 1017.00 2749.19  | 3 |      |       |        |          |        |      |      |
| R  | 1092.97 2749.44  | 3 |      | .013  |        |          |        |      |      |
| WX | 1092.97 2749.44  | 6 |      |       |        |          |        |      |      |
| R  | 1106.97 2751.70  | 6 |      | .013  |        |          |        |      |      |
| SH | 1106.97 2751.70  | 6 |      |       |        |          |        |      |      |
| CD | 1 1 0            |   | .000 | 4.000 | 20.000 | 1.000    | 1.000  | .00  |      |
| CD | 2 3 0            |   | .000 | 5.000 | 6.000  | .000     | .000   | .00  |      |
| CD | 3 3 0            |   | .000 | 5.000 | 14.000 | .000     | .000   | .00  |      |
| CD | 4 1 0            |   | .000 | 5.000 | 20.000 | 3.000    | 3.000  | .00  |      |
| CD | 5 1 0            |   | .000 | 5.000 | 30.500 | 10.000   | 10.000 | .00  |      |
| CD | 6 3 0            |   | .000 | 7.000 | 14.000 | .000     | .000   | .00  |      |
| CD | 54 4 1           |   | .000 | 4.500 | .000   | .000     | .000   | .00  |      |
| CD | 60 4 1           |   | .000 | 5.000 | .000   | .000     | .000   | .00  |      |
| CD | 66 4 1           |   | .000 | 5.500 | .000   | .000     | .000   | .00  |      |
| CD | 72 4 1           |   | .000 | 6.000 | .000   | .000     | .000   | .00  |      |
| Q  | 665.0            |   | .0   |       |        |          |        |      |      |



FILE: PRCB.WSW

PRCB  
W S P G W - EDIT LISTING - Version 14.06  
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

Date: 7-22-2016 Time: 10: 3:57  
PAGE 1

| CARD CODE | SECT NO | CHN TYPE | NO OF PIER/PIP | AVE PIER WIDTH | HEIGHT 1 DIAMETER | BASE WIDTH | ZL     | ZR     | INV DROP | Y(1) | Y(2) | Y(3) | Y(4) | Y(5) | Y(6) | Y(7) | Y(8) | Y(9) | Y(10) |
|-----------|---------|----------|----------------|----------------|-------------------|------------|--------|--------|----------|------|------|------|------|------|------|------|------|------|-------|
| CD        | 1       | 1        | 0              | .000           | 4.000             | 20.000     | 1.000  | 1.000  | .00      |      |      |      |      |      |      |      |      |      |       |
| CD        | 2       | 3        | 0              | .000           | 5.000             | 6.000      | .000   | .000   | .00      |      |      |      |      |      |      |      |      |      |       |
| CD        | 3       | 3        | 0              | .000           | 5.000             | 14.000     | .000   | .000   | .00      |      |      |      |      |      |      |      |      |      |       |
| CD        | 4       | 1        | 0              | .000           | 5.000             | 20.000     | 3.000  | 3.000  | .00      |      |      |      |      |      |      |      |      |      |       |
| CD        | 5       | 1        | 0              | .000           | 5.000             | 30.500     | 10.000 | 10.000 | .00      |      |      |      |      |      |      |      |      |      |       |
| CD        | 6       | 3        | 0              | .000           | 7.000             | 14.000     | .000   | .000   | .00      |      |      |      |      |      |      |      |      |      |       |
| CD        | 54      | 4        | 1              |                | 4.500             |            |        |        |          |      |      |      |      |      |      |      |      |      |       |
| CD        | 60      | 4        | 1              |                | 5.000             |            |        |        |          |      |      |      |      |      |      |      |      |      |       |
| CD        | 66      | 4        | 1              |                | 5.500             |            |        |        |          |      |      |      |      |      |      |      |      |      |       |
| CD        | 72      | 4        | 1              |                | 6.000             |            |        |        |          |      |      |      |      |      |      |      |      |      |       |

W S P G W

PAGE NO 1

HEADING LINE NO 1 IS - WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 2 IS - SKYE CANYON PHASE 3

HEADING LINE NO 3 IS - STORM DRAIN SYSTEM AT GRAND CANYON LOW POINT (CULVERT CROSSING)

14'W x 5'H RCB DISCHARGING TO NATURAL WASH (PROPOSED CONDITION)

W S P G W

PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

| ELEMENT NO   | IS | A | SYSTEM OUTLET    | STATION  | INVERT   | SECT        | W S ELEV    | RADIUS            | ANGLE       | ANG PT | MAN H |
|--------------|----|---|------------------|----------|----------|-------------|-------------|-------------------|-------------|--------|-------|
| ELEMENT NO 1 | IS | A | SYSTEM OUTLET    | 998.000  | 2748.980 | 1           | 2751.970    |                   |             |        |       |
| ELEMENT NO 2 | IS | A | REACH            | 999.000  | 2749.000 | 1           |             | .000              | .000        | .000   | 0     |
| ELEMENT NO 3 | IS | A | TRANSITION       | 1007.000 | 2749.090 | 5           |             | .000              | .000        |        |       |
| ELEMENT NO 4 | IS | A | JUNCTION         | 1017.000 | 2749.190 | 5           |             |                   |             |        |       |
|              |    |   | U/S DATA         |          |          | LAT-1 LAT-2 | Q3 Q4       | INVERT-3 INVERT-4 | PHI 3 PHI 4 |        |       |
|              |    |   |                  |          |          | 0           | .015 29.000 | .000              | .000        | .000   | .000  |
| ELEMENT NO 5 | IS | A | WALL EXIT        | 1017.000 | 2749.190 | 3           |             |                   |             |        |       |
| ELEMENT NO 6 | IS | A | REACH            | 1092.970 | 2749.440 | 3           |             | .000              | .000        | .000   | 0     |
| ELEMENT NO 7 | IS | A | WALL EXIT        | 1092.970 | 2749.440 | 6           |             |                   |             |        |       |
| ELEMENT NO 8 | IS | A | REACH            | 1106.970 | 2751.700 | 6           |             | .000              | .000        | .000   | 0     |
| ELEMENT NO 9 | IS | A | SYSTEM HEADWORKS | 1106.970 | 2751.700 | 6           |             |                   |             |        |       |
|              |    |   | U/S DATA         |          |          |             | W S ELEV    |                   |             |        |       |
|              |    |   |                  |          |          |             | .000        |                   |             |        |       |

SKYE CANYON PHASE 3  
STORM DRAIN SYSTEM AT GRAND CANYON LOW POINT (CULVERT CROSSING)  
14'W X 5'H RCB DISCHARGING TO NATURAL WASH (PROPOSED CONDITION)

| Station        | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/Dia.-FT | Base Wt or I.D. | ZL      | No Wth Prs/Pip |
|----------------|-------------|------------|------------|---------|-----------|----------|----------------|------------|----------------|----------------|----------------|-----------------|---------|----------------|
| L/Elem         | Ch Slope    |            |            |         | SF Ave    | HF       | SE Dpth        | Froude N   | Norm Dp        | "N"            | X-Fall         | ZR              | Type Ch |                |
| 998.000        | 2748.980    | 3.069      | 2752.049   | 694.00  | 9.80      | 1.49     | 2753.54        | .00        | 3.16           | 26.14          | 4.000          | 20.000          | 1.00    | 0 .0           |
| 1.000          | .0200       |            |            |         | .0152     | .02      | 3.07           | 1.05       | 2.87           | .035           | .00            | 1.00            | TRAP    |                |
| 999.000        | 2749.000    | 3.164      | 2752.164   | 694.00  | 9.47      | 1.39     | 2753.56        | .00        | 3.16           | 26.33          | 4.000          | 20.000          | 1.00    | 0 .0           |
| TRANS STR      | .0113       |            |            |         | .0107     | .09      | 3.16           | 1.00       | .042           | .00            | 1.00           | TRAP            |         |                |
| 1007.000       | 2749.090    | 4.836      | 2753.926   | 694.00  | 1.82      | .05      | 2753.98        | .00        | 2.01           | 127.22         | 5.000          | 30.500          | ****    | 0 .0           |
| JUNCT STR      | .0100       |            |            |         | .0001     | .00      | 4.84           | .19        | .015           | .00            | ****           | TRAP            |         |                |
| 1017.000       | 2749.190    | 4.740      | 2753.930   | 665.00  | 1.80      | .05      | 2753.98        | .00        | 1.97           | 125.30         | 5.000          | 30.500          | ****    | 0 .0           |
| HYDRAULIC JUMP |             |            |            |         |           |          |                |            |                |                |                |                 |         |                |
| 1017.000       | 2749.190    | 2.636      | 2751.826   | 665.00  | 18.02     | 5.04     | 2756.87        | .00        | 4.12           | 14.00          | 5.000          | 14.000          | .00     | 0 .0           |
| 29.691         | .0033       |            |            |         | .0109     | .32      | 2.64           | 1.96       | 3.92           | .013           | .00            | .00             | BOX     |                |
| 1046.691       | 2749.288    | 2.561      | 2751.848   | 665.00  | 18.55     | 5.34     | 2757.19        | .00        | 4.12           | 14.00          | 5.000          | 14.000          | .00     | 0 .0           |
| 46.279         | .0033       |            |            |         | .0123     | .57      | 2.56           | 2.04       | 3.92           | .013           | .00            | .00             | BOX     |                |
| 1092.970       | 2749.440    | 2.441      | 2751.881   | 665.00  | 19.46     | 5.88     | 2757.76        | .00        | 4.12           | 14.00          | 5.000          | 14.000          | .00     | 0 .0           |
| WALL EXIT      |             |            |            |         |           |          |                |            |                |                |                |                 |         |                |
| 1092.970       | 2749.440    | 2.440      | 2751.880   | 665.00  | 19.46     | 5.88     | 2757.76        | .00        | 4.12           | 14.00          | 7.000          | 14.000          | .00     | 0 .0           |
| .004           | .1614       |            |            |         | .0131     | .00      | 2.44           | 2.20       | 1.08           | .013           | .00            | .00             | BOX     |                |
| 1092.974       | 2749.440    | 2.441      | 2751.881   | 665.00  | 19.46     | 5.88     | 2757.76        | .00        | 4.12           | 14.00          | 7.000          | 14.000          | .00     | 0 .0           |
| 2.786          | .1614       |            |            |         | .0123     | .03      | 2.44           | 2.20       | 1.08           | .013           | .00            | .00             | BOX     |                |

SKYE CANYON PHASE 3  
STORM DRAIN SYSTEM AT GRAND CANYON LOW POINT (CULVERT CROSSING)  
14'W X 5'H RCB DISCHARGING TO NATURAL WASH (PROPOSED CONDITION)

| Station  | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/Dia.-FT | Base Wt or I.D. | ZL      | No Wth Prs/Pip |
|----------|-------------|------------|------------|---------|-----------|----------|----------------|------------|----------------|----------------|----------------|-----------------|---------|----------------|
| L/Elem   | Ch Slope    |            |            |         | SF Ave    | HF       | SE Dpth        | Froude N   | Norm Dp        | "N"            | X-Fall         | ZR              | Type Ch |                |
| 1095.760 | 2749.890    | 2.560      | 2752.450   | 665.00  | 18.56     | 5.35     | 2757.80        | .00        | 4.12           | 14.00          | 7.000          | 14.000          | .00     | 0 .0           |
| 2.396    | .1614       |            |            |         | .0107     | .03      | 2.56           | 2.04       | 1.08           | .013           | .00            | .00             | BOX     |                |
| 1098.156 | 2750.277    | 2.685      | 2752.961   | 665.00  | 17.69     | 4.86     | 2757.82        | .00        | 4.12           | 14.00          | 7.000          | 14.000          | .00     | 0 .0           |
| 2.043    | .1614       |            |            |         | .0092     | .02      | 2.68           | 1.90       | 1.08           | .013           | .00            | .00             | BOX     |                |
| 1100.199 | 2750.607    | 2.816      | 2753.422   | 665.00  | 16.87     | 4.42     | 2757.84        | .00        | 4.12           | 14.00          | 7.000          | 14.000          | .00     | 0 .0           |
| 1.723    | .1614       |            |            |         | .0080     | .01      | 2.82           | 1.77       | 1.08           | .013           | .00            | .00             | BOX     |                |
| 1101.922 | 2750.885    | 2.953      | 2753.838   | 665.00  | 16.09     | 4.02     | 2757.86        | .00        | 4.12           | 14.00          | 7.000          | 14.000          | .00     | 0 .0           |
| 1.432    | .1614       |            |            |         | .0070     | .01      | 2.95           | 1.65       | 1.08           | .013           | .00            | .00             | BOX     |                |
| 1103.354 | 2751.116    | 3.097      | 2754.213   | 665.00  | 15.34     | 3.65     | 2757.87        | .00        | 4.12           | 14.00          | 7.000          | 14.000          | .00     | 0 .0           |
| 1.164    | .1614       |            |            |         | .0061     | .01      | 3.10           | 1.54       | 1.08           | .013           | .00            | .00             | BOX     |                |
| 1104.518 | 2751.304    | 3.248      | 2754.552   | 665.00  | 14.62     | 3.32     | 2757.87        | .00        | 4.12           | 14.00          | 7.000          | 14.000          | .00     | 0 .0           |
| .918     | .1614       |            |            |         | .0053     | .00      | 3.25           | 1.43       | 1.08           | .013           | .00            | .00             | BOX     |                |
| 1105.435 | 2751.452    | 3.407      | 2754.859   | 665.00  | 13.94     | 3.02     | 2757.88        | .00        | 4.12           | 14.00          | 7.000          | 14.000          | .00     | 0 .0           |
| .689     | .1614       |            |            |         | .0046     | .00      | 3.41           | 1.33       | 1.08           | .013           | .00            | .00             | BOX     |                |
| 1106.125 | 2751.563    | 3.573      | 2755.137   | 665.00  | 13.29     | 2.74     | 2757.88        | .00        | 4.12           | 14.00          | 7.000          | 14.000          | .00     | 0 .0           |
| .477     | .1614       |            |            |         | .0040     | .00      | 3.57           | 1.24       | 1.08           | .013           | .00            | .00             | BOX     |                |
| 1106.602 | 2751.640    | 3.748      | 2755.388   | 665.00  | 12.67     | 2.49     | 2757.88        | .00        | 4.12           | 14.00          | 7.000          | 14.000          | .00     | 0 .0           |
| .278     | .1614       |            |            |         | .0035     | .00      | 3.75           | 1.15       | 1.08           | .013           | .00            | .00             | BOX     |                |

SKYE CANYON PHASE 3  
STORM DRAIN SYSTEM AT GRAND CANYON LOW POINT (CULVERT CROSSING)  
14'W X 5'H RCB DISCHARGING TO NATURAL WASH (PROPOSED CONDITION)

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---------|-------------|------------|------------|---------|-----------|----------|----------------|------------|----------------|----------------|----------------|-----------------|----|----------------|
|---------|-------------|------------|------------|---------|-----------|----------|----------------|------------|----------------|----------------|----------------|-----------------|----|----------------|

| L/Elem   | Ch Slope |       |          |        |       | SF Ave | PRCB HF | SE Dpth | Froude N | Norm Dp | "n"   | X-Fall | ZR    | Type Ch |
|----------|----------|-------|----------|--------|-------|--------|---------|---------|----------|---------|-------|--------|-------|---------|
| *****    | *****    | ***** | *****    | *****  | ***** | *****  | *****   | *****   | *****    | *****   | ***** | *****  | ***** | *****   |
| 1106.880 | 2751.685 | 3.930 | 2755.616 | 665.00 | 12.09 | 2.27   | 2757.88 | .00     | 4.12     | 14.00   | 7.000 | 14.000 | .00   | 0 .0    |
| .090     | .1614    |       |          |        |       | .0031  | .00     | 3.93    | 1.07     | 1.08    | .013  | .00    | .00   | BOX     |
| 1106.970 | 2751.700 | 4.123 | 2755.823 | 665.00 | 11.52 | 2.06   | 2757.88 | .00     | 4.12     | 14.00   | 7.000 | 14.000 | .00   | 0 .0    |

## SKYE CANYON PHASE 3

STORM DRAIN SYSTEM AT GRAND CANYON LOW POINT (CULVERT CROSSING)

14'W x 5'H RCB DISCHARGING TO NATURAL WASH (PROPOSED CONDITION)

|         |     |                                                     |    |   |     |   |   |   |    |
|---------|-----|-----------------------------------------------------|----|---|-----|---|---|---|----|
| 998.00  | .I  |                                                     | WC | H | E   |   |   | . | R  |
| 1000.22 | .I  |                                                     | W  | H | E   |   |   | . | TX |
| 1002.45 | .   |                                                     |    |   |     |   |   | . |    |
| 1004.67 | .   |                                                     |    |   |     |   |   | . |    |
| 1006.90 | .   |                                                     |    |   |     |   |   | . |    |
| 1009.12 | . I | C                                                   |    |   | WEH |   |   | . | JX |
| 1011.34 | .   |                                                     |    |   |     |   |   | . |    |
| 1013.57 | .   |                                                     |    |   |     |   |   | . |    |
| 1015.79 | .   |                                                     |    |   |     |   |   | . |    |
| 1018.01 | . I | YYYYYYYYYYYYYYYYYYYYCYYYYYYYYYYYYYYYYYYYYYYYYYYWEYH |    |   |     |   |   | . | WX |
| 1020.24 | . I |                                                     | W  |   | C   | H | E | . | R  |
| 1022.46 | .   |                                                     |    |   |     |   |   | . |    |
| 1024.69 | .   |                                                     |    |   |     |   |   | . |    |
| 1026.91 | .   |                                                     |    |   |     |   |   | . |    |
| 1029.13 | .   |                                                     |    |   |     |   |   | . |    |
| 1031.36 | .   |                                                     |    |   |     |   |   | . |    |
| 1033.58 | .   |                                                     |    |   |     |   |   | . |    |
| 1035.81 | .   |                                                     |    |   |     |   |   | . |    |
| 1038.03 | .   |                                                     |    |   |     |   |   | . |    |
| 1040.25 | .   |                                                     |    |   |     |   |   | . |    |
| 1042.48 | .   |                                                     |    |   |     |   |   | . |    |
| 1044.70 | .   |                                                     |    |   |     |   |   | . |    |
| 1046.93 | . I |                                                     | W  |   | C   | H | E | . | R  |
| 1049.15 | .   |                                                     |    |   |     |   |   | . |    |
| 1051.37 | .   |                                                     |    |   |     |   |   | . |    |
| 1053.60 | .   |                                                     |    |   |     |   |   | . |    |
| 1055.82 | .   |                                                     |    |   |     |   |   | . |    |
| 1058.04 | .   |                                                     |    |   |     |   |   | . |    |

| Wavelength (nm) | Intensity (a.u.) | Feature | Assignment | Wavelength (nm) | Intensity (a.u.) | Feature | Assignment |
|-----------------|------------------|---------|------------|-----------------|------------------|---------|------------|
| 1060.27         | .                |         |            | 1073.61         | .                |         |            |
| 1062.49         | .                |         |            | 1075.84         | .                |         |            |
| 1064.72         | .                |         |            | 1078.06         | .                |         |            |
| 1066.94         | .                |         |            | 1080.28         | .                |         |            |
| 1069.16         | .                |         |            | 1082.51         | .                |         |            |
| 1071.39         | .                |         |            | 1084.73         | .                |         |            |
| 1073.61         | .                |         |            | 1086.96         | .                |         |            |
| 1075.84         | .                |         |            | 1089.18         | .                |         |            |
| 1078.06         | .                |         |            | 1091.40         | .                |         |            |
| 1080.28         | .                |         |            | 1093.63         | .                | I       | WX         |
| 1082.51         | .                |         |            | 1095.85         | .                | I       | R          |
| 1084.73         | .                |         |            | 1098.07         | .                | I       | R          |
| 1086.96         | .                |         |            | 1100.30         | .                | I       | R          |
| 1089.18         | .                |         |            | 1102.52         | .                | I       | R          |
| 1091.40         | .                |         |            | 1104.75         | .                | I       | R          |
| 1093.63         | .                | I       | WX         | 1106.97         | .                | I       | R          |
| 1095.85         | .                | I       | R          |                 |                  |         |            |
| 1098.07         | .                | I       | R          |                 |                  |         |            |
| 1100.30         | .                | I       | R          |                 |                  |         |            |
| 1102.52         | .                | I       | R          |                 |                  |         |            |
| 1104.75         | .                | I       | R          |                 |                  |         |            |
| 1106.97         | .                | I       | R          |                 |                  |         |            |

## 1. GLOSSARY

- ```

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

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Page 3

## WSPG for South Storm Drain

PROP

T1 SKYE CANYON PHASE 3  
T2 STORM DRAIN SYSTEM AT GRAND CANYON LOW POINT (SOUTH STORM DRAIN)  
T3 6'W X 5'H EX RCB DISCHARGING TO NATURAL WASH (PROP CONDITION)

|    |         |         |    |      |       |        |       |         |         |         |      |   |
|----|---------|---------|----|------|-------|--------|-------|---------|---------|---------|------|---|
| SO | 1017.00 | 2749.19 | 2  |      |       |        |       |         | 2753.93 |         |      |   |
| R  | 1017.00 | 2749.19 | 2  | .013 |       |        |       |         |         | 0.0     |      |   |
| R  | 1041.00 | 2749.31 | 2  | .013 |       |        |       |         |         | -97.403 | .000 | 0 |
| R  | 1088.00 | 2749.70 | 2  | .013 |       |        |       |         |         |         | 0.0  |   |
| R  | 1137.00 | 2749.95 | 2  | .013 |       |        |       |         |         |         | 0.0  |   |
| JX | 1137.00 | 2749.95 | 2  | 18   | .013  | 4.0    |       | 2749.95 |         | 45.0    |      |   |
| R  | 1733.36 | 2752.92 | 2  | .013 |       |        |       |         |         |         | 0.0  |   |
| SH | 1733.36 | 2752.92 | 2  |      |       |        |       |         |         |         |      |   |
| CD | 1       | 1       | 0  | .000 | 4.000 | 20.000 | 1.000 | 1.000   | .00     |         |      |   |
| CD | 2       | 3       | 0  | .000 | 5.000 | 6.000  | .000  | .000    | .00     |         |      |   |
| CD | 3       | 3       | 0  | .000 | 5.000 | 14.000 | .000  | .000    | .00     |         |      |   |
| CD | 4       | 1       | 0  | .000 | 5.000 | 14.000 | 3.000 | 3.000   | .00     |         |      |   |
| CD | 18      | 4       | 1  | .000 | 1.500 | .000   | .000  | .000    | .00     |         |      |   |
| CD | 54      | 4       | 1  | .000 | 4.500 | .000   | .000  | .000    | .00     |         |      |   |
| CD | 60      | 4       | 1  | .000 | 5.000 | .000   | .000  | .000    | .00     |         |      |   |
| CD | 66      | 4       | 1  | .000 | 5.500 | .000   | .000  | .000    | .00     |         |      |   |
| CD | 72      | 4       | 1  | .000 | 6.000 | .000   | .000  | .000    | .00     |         |      |   |
| Q  |         | 121.000 | .0 |      |       |        |       |         |         |         |      |   |

FILE: PROP.WSW

PROP  
W S P G W - EDIT LISTING - Version 14.06

Date: 7-22-2016 Time:10:29:51  
PAGE 1

| CARD CODE | SECT NO | CHN TYPE | NO OF PIER/PIP | AVE PIER WIDTH | HEIGHT 1 DIAMETER | BASE WIDTH | ZL    | ZR    | INV DROP | Y(1) | Y(2) | Y(3) | Y(4) | Y(5) | Y(6) | Y(7) | Y(8) | Y(9) | Y(10) |
|-----------|---------|----------|----------------|----------------|-------------------|------------|-------|-------|----------|------|------|------|------|------|------|------|------|------|-------|
| CD        | 1       | 1        | 0              | .000           | 4.000             | 20.000     | 1.000 | 1.000 | .00      |      |      |      |      |      |      |      |      |      |       |
| CD        | 2       | 3        | 0              | .000           | 5.000             | 6.000      | .000  | .000  | .00      |      |      |      |      |      |      |      |      |      |       |
| CD        | 3       | 3        | 0              | .000           | 5.000             | 14.000     | .000  | .000  | .00      |      |      |      |      |      |      |      |      |      |       |
| CD        | 4       | 1        | 0              | .000           | 5.000             | 14.000     | 3.000 | 3.000 | .00      |      |      |      |      |      |      |      |      |      |       |
| CD        | 18      | 4        | 1              |                | 1.500             |            |       |       |          |      |      |      |      |      |      |      |      |      |       |
| CD        | 54      | 4        | 1              |                | 4.500             |            |       |       |          |      |      |      |      |      |      |      |      |      |       |
| CD        | 60      | 4        | 1              |                | 5.000             |            |       |       |          |      |      |      |      |      |      |      |      |      |       |
| CD        | 66      | 4        | 1              |                | 5.500             |            |       |       |          |      |      |      |      |      |      |      |      |      |       |
| CD        | 72      | 4        | 1              |                | 6.000             |            |       |       |          |      |      |      |      |      |      |      |      |      |       |

W S P G W

PAGE NO 1

HEADING LINE NO 1 IS - WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 2 IS - SKYE CANYON PHASE 3

HEADING LINE NO 3 IS - STORM DRAIN SYSTEM AT GRAND CANYON LOW POINT (SOUTH STORM DRAIN)

PAGE NO 2

W S P G W

PAGE NO 2

| ELEMENT NO | IS | A | SYSTEM OUTLET | STATION  | INVERT   | SECT | W S ELEV | RADIUS | ANGLE   | ANG PT | MAN H |          |          |        |       |
|------------|----|---|---------------|----------|----------|------|----------|--------|---------|--------|-------|----------|----------|--------|-------|
| 1          | IS | A | SYSTEM OUTLET | 1017.000 | 2749.190 | 2    | 2753.930 |        |         |        |       |          |          |        |       |
| 2          | IS | A | REACH         | 1017.000 | 2749.190 | 2    |          | .000   | .000    | .000   | 0     |          |          |        |       |
| 3          | IS | A | REACH         | 1041.000 | 2749.310 | 2    |          | 14.118 | -97.403 | .000   | 0     |          |          |        |       |
| 4          | IS | A | REACH         | 1088.000 | 2749.700 | 2    |          | .000   | .000    | .000   | 0     |          |          |        |       |
| 5          | IS | A | REACH         | 1137.000 | 2749.950 | 2    |          | .000   | .000    | .000   | 0     |          |          |        |       |
| 6          | IS | A | JUNCTION      | 1137.000 | 2749.950 | 2    |          | .000   | .000    | .000   | 0     |          |          |        |       |
|            |    |   | U/S DATA      | STATION  | INVERT   | SECT | LAT-1    | LAT-2  | N       | Q3     | Q4    | INVERT-3 | INVERT-4 | PHI 3  | PHI 4 |
|            |    |   | U/S DATA      | 1733.360 | 2752.920 | 2    | 18       | 0      | .013    | 4.000  | .000  | 2749.950 | .000     | 45.000 | .000  |

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

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

| ELEMENT NO | IS | A | REACH            | STATION  | INVERT   | SECT | RADIUS   | ANGLE | ANG PT | MAN H |
|------------|----|---|------------------|----------|----------|------|----------|-------|--------|-------|
| 7          | IS | A | REACH            | 1733.360 | 2752.920 | 2    | .000     | .000  | .000   | 0     |
| 8          | IS | A | SYSTEM HEADWORKS | 1733.360 | 2752.920 | 2    |          |       |        |       |
|            |    |   | U/S DATA         | STATION  | INVERT   | SECT | W S ELEV |       |        |       |
|            |    |   | U/S DATA         | 1733.360 | 2752.920 | 2    | .000     |       |        |       |



SKYE CANYON PHASE 3  
STORM DRAIN SYSTEM AT GRAND CANYON LOW POINT (SOUTH STORM DRAIN)  
6'W x 5'H EX RCB DISCHARGING TO NATURAL WASH (PROP CONDITION)

| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                | ***** |  |
|----------------------------------------------------------|-------------|------------|------------|---------|-----------|----------|----------------|------------|----------------|----------------|----------------|-----------------|-------|----------------|-------|--|
| Station                                                  | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top width | Height/Dia.-FT | Base Wt or I.D. | ZL    | No Wth Prs/Pip |       |  |
| L/Elem                                                   | Ch Slope    |            |            |         |           | SF Ave   | HF             | SE Dpth    | Froude N       | Norm Dp        | "N"            | X-Fall          | ZR    | Type Ch        |       |  |
| *****                                                    | *****       | *****      | *****      | *****   | *****     | *****    | *****          | *****      | *****          | *****          | *****          | *****           | ***** | *****          |       |  |
| 1017.000                                                 | 2749.190    | 4.740      | 2753.930   | 125.00  | 4.40      | .30      | 2754.23        | .25        | 2.38           | 6.00           | 5.000          | 6.000           | .00   | 0 .0           |       |  |
| 24.000                                                   | .0050       |            |            |         |           | .0007    | .02            | 4.99       | .36            | 2.20           | .013           | .00             | .00   | BOX            |       |  |
| ----- WARNING - Flow depth near top of box conduit ----- |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| 1041.000                                                 | 2749.310    | 4.621      | 2753.931   | 125.00  | 4.51      | .32      | 2754.25        | .00        | 2.38           | 6.00           | 5.000          | 6.000           | .00   | 0 .0           |       |  |
| 24.300                                                   | .0083       |            |            |         |           | .0007    | .02            | 4.62       | .37            | 1.84           | .013           | .00             | .00   | BOX            |       |  |
| ----- WARNING - Flow depth near top of box conduit ----- |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| 1065.300                                                 | 2749.512    | 4.406      | 2753.917   | 125.00  | 4.73      | .35      | 2754.26        | .00        | 2.38           | 6.00           | 5.000          | 6.000           | .00   | 0 .0           |       |  |
| 22.700                                                   | .0083       |            |            |         |           | .0008    | .02            | 4.41       | .40            | 1.84           | .013           | .00             | .00   | BOX            |       |  |
| 1088.000                                                 | 2749.700    | 4.202      | 2753.902   | 125.00  | 4.96      | .38      | 2754.28        | .00        | 2.38           | 6.00           | 5.000          | 6.000           | .00   | 0 .0           |       |  |
| 37.902                                                   | .0051       |            |            |         |           | .0009    | .03            | 4.20       | .43            | 2.18           | .013           | .00             | .00   | BOX            |       |  |
| 1125.902                                                 | 2749.893    | 4.006      | 2753.900   | 125.00  | 5.20      | .42      | 2754.32        | .00        | 2.38           | 6.00           | 5.000          | 6.000           | .00   | 0 .0           |       |  |
| 11.098                                                   | .0051       |            |            |         |           | .0010    | .01            | 4.01       | .46            | 2.18           | .013           | .00             | .00   | BOX            |       |  |
| 1137.000                                                 | 2749.950    | 3.949      | 2753.899   | 125.00  | 5.28      | .43      | 2754.33        | .00        | 2.38           | 6.00           | 5.000          | 6.000           | .00   | 0 .0           |       |  |
| JUNCT STR                                                | .0000       |            |            |         |           | .0009    | .00            | 3.95       | .47            |                | .013           | .00             | .00   | BOX            |       |  |
| 1137.000                                                 | 2749.950    | 4.006      | 2753.956   | 121.00  | 5.03      | .39      | 2754.35        | .00        | 2.33           | 6.00           | 5.000          | 6.000           | .00   | 0 .0           |       |  |
| 37.012                                                   | .0050       |            |            |         |           | .0009    | .03            | 4.01       | .44            | 2.15           | .013           | .00             | .00   | BOX            |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
| *****                                                    |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
|                                                          |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |

SKYE CANYON PHASE 3  
STORM DRAIN SYSTEM AT GRAND CANYON LOW POINT (SOUTH STORM DRAIN)  
6'W x 5'H EX RCB DISCHARGING TO NATURAL WASH (PROP CONDITION)

| ***** EXCEL DESIGNING *****                            |             |            |            |         |           |          |                |            |                |                |                |                 |       |                | ***** |  |
|--------------------------------------------------------|-------------|------------|------------|---------|-----------|----------|----------------|------------|----------------|----------------|----------------|-----------------|-------|----------------|-------|--|
| Station                                                | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top width | Height/Dia.-FT | Base Wt or I.D. | ZL    | No Wth Prs/Pip |       |  |
| L/Elem                                                 | Ch Slope    |            |            |         |           | SF Ave   | HF             | SE Dpth    | Froude N       | Norm Dp        | "N"            | X-Fall          | ZR    | Type Ch        |       |  |
| *****                                                  | *****       | *****      | *****      | *****   | *****     | *****    | *****          | *****      | *****          | *****          | *****          | *****           | ***** | *****          |       |  |
| 1174.012                                               | 2750.134    | 3.820      | 2753.954   | 121.00  | 5.28      | .43      | 2754.39        | .00        | 2.33           | 6.00           | 5.000          | 6.000           | .00   | 0 .0           |       |  |
| 35.002                                                 | .0050       |            |            |         |           | .0011    | .04            | 3.82       | .48            | 2.15           | .013           | .00             | .00   | BOX            |       |  |
| 1209.014                                               | 2750.309    | 3.642      | 2753.950   | 121.00  | 5.54      | .48      | 2754.43        | .00        | 2.33           | 6.00           | 5.000          | 6.000           | .00   | 0 .0           |       |  |
| 33.013                                                 | .0050       |            |            |         |           | .0012    | .04            | 3.64       | .51            | 2.15           | .013           | .00             | .00   | BOX            |       |  |
| 1242.027                                               | 2750.473    | 3.472      | 2753.945   | 121.00  | 5.81      | .52      | 2754.47        | .00        | 2.33           | 6.00           | 5.000          | 6.000           | .00   | 0 .0           |       |  |
| 31.026                                                 | .0050       |            |            |         |           | .0014    | .04            | 3.47       | .55            | 2.15           | .013           | .00             | .00   | BOX            |       |  |
| 1273.054                                               | 2750.627    | 3.311      | 2753.938   | 121.00  | 6.09      | .58      | 2754.51        | .00        | 2.33           | 6.00           | 5.000          | 6.000           | .00   | 0 .0           |       |  |
| 29.011                                                 | .0050       |            |            |         |           | .0016    | .04            | 3.31       | .59            | 2.15           | .013           | .00             | .00   | BOX            |       |  |
| 1302.065                                               | 2750.772    | 3.157      | 2753.929   | 121.00  | 6.39      | .63      | 2754.56        | .00        | 2.33           | 6.00           | 5.000          | 6.000           | .00   | 0 .0           |       |  |
| 26.927                                                 | .0050       |            |            |         |           | .0018    | .05            | 3.16       | .63            | 2.15           | .013           | .00             | .00   | BOX            |       |  |
| 1328.992                                               | 2750.906    | 3.010      | 2753.916   | 121.00  | 6.70      | .70      | 2754.61        | .00        | 2.33           | 6.00           | 5.000          | 6.000           | .00   | 0 .0           |       |  |
| 24.706                                                 | .0050       |            |            |         |           | .0020    | .05            | 3.01       | .68            | 2.15           | .013           | .00             | .00   | BOX            |       |  |
| 1353.698                                               | 2751.029    | 2.870      | 2753.899   | 121.00  | 7.03      | .77      | 2754.67        | .00        | 2.33           | 6.00           | 5.000          | 6.000           | .00   | 0 .0           |       |  |
| 22.240                                                 | .0050       |            |            |         |           | .0023    | .05            | 2.87       | .73            | 2.15           | .013           | .00             | .00   | BOX            |       |  |
| 1375.938                                               | 2751.140    | 2.736      | 2753.876   | 121.00  | 7.37      | .84      | 2754.72        | .00        | 2.33           | 6.00           | 5.000          | 6.000           | .00   | 0 .0           |       |  |
| 19.323                                                 | .0050       |            |            |         |           | .0026    | .05            | 2.74       | .79            | 2.15           | .013           | .00             | .00   | BOX            |       |  |
| 1395.261                                               | 2751.236    | 2.609      | 2753.845   | 121.00  | 7.73      | .93      | 2754.77        | .00        | 2.33           | 6.00           | 5.000          | 6.000           | .00   | 0 .0           |       |  |
| 12.587                                                 | .0050       |            |            |         |           | .0029    | .04            | 2.61       | .84            | 2.15           | .013           | .00             | .00   | BOX            |       |  |
| % FILE: PROP.WSW W S P G W - CIVILDESIGN Version 14.06 |             |            |            |         |           |          |                |            |                |                |                |                 |       |                |       |  |
|                                                        |             |            |            |         |           |          |                |            |                |                |                |                 |       | PAGE           |       |  |

SKYE CANYON PHASE 3  
STORM DRAIN SYSTEM AT GRAND CANYON LOW POINT (SOUTH STORM DRAIN)  
6'W x 5'H EX RCB DISCHARGING TO NATURAL WASH (PROP CONDITION)

| *****          |             |            |            |         |           |          |                |            |                |                |                |                 |     |         | No Wth |
|----------------|-------------|------------|------------|---------|-----------|----------|----------------|------------|----------------|----------------|----------------|-----------------|-----|---------|--------|
| Station        | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/Dia.-FT | Base Wt or I.D. | ZL  | Prs/Pip |        |
| L/Elem         | Ch Slope    |            |            |         |           | SF Ave   | HF             | SE Dpth    | Froude N       | Norm Dp        | "N"            | X-Fall          | ZR  | Type Ch |        |
| 1407.847       | 2751.299    | 2.516      | 2753.814   | 121.00  | 8.02      | 1.00     | 2754.81        | .00        | 2.33           | 6.00           | 5.000          | 6.000           | .00 | 0 .0    |        |
| HYDRAULIC JUMP |             |            |            |         |           |          |                |            |                |                |                |                 |     |         |        |

| PROP     |          |       |          |        |      |       |         |      |      |      |       |       |     |      |
|----------|----------|-------|----------|--------|------|-------|---------|------|------|------|-------|-------|-----|------|
| 1407.847 | 2751.299 | 2.151 | 2753.450 | 121.00 | 9.37 | 1.36  | 2754.81 | .00  | 2.33 | 6.00 | 5.000 | 6.000 | .00 | 0 .0 |
| 243.992  | .0050    | - -   | - -      | - -    | - -  | .0050 | 1.22    | 2.15 | 1.13 | 2.15 | .013  | .00   | .00 | BOX  |
| 1651.839 | 2752.514 | 2.151 | 2754.665 | 121.00 | 9.37 | 1.36  | 2756.03 | .00  | 2.33 | 6.00 | 5.000 | 6.000 | .00 | 0 .0 |
| 69.755   | .0050    | - -   | - -      | - -    | - -  | .0048 | .33     | 2.15 | 1.13 | 2.15 | .013  | .00   | .00 | BOX  |
| 1721.594 | 2752.861 | 2.220 | 2755.081 | 121.00 | 9.09 | 1.28  | 2756.36 | .00  | 2.33 | 6.00 | 5.000 | 6.000 | .00 | 0 .0 |
| 11.766   | .0050    | - -   | - -      | - -    | - -  | .0043 | .05     | 2.22 | 1.07 | 2.15 | .013  | .00   | .00 | BOX  |
| 1733.360 | 2752.920 | 2.329 | 2755.249 | 121.00 | 8.66 | 1.16  | 2756.41 | .00  | 2.33 | 6.00 | 5.000 | 6.000 | .00 | 0 .0 |
| - -      | - -      | - -   | - -      | - -    | - -  | - -   | - -     | - -  | - -  | - -  | - -   | - -   | - - | -    |

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# SKYE CANYON PHASE 3

## STORM DRAIN SYSTEM AT GRAND CANYON LOW POINT (SOUTH STORM DRAIN)

### 6'W x 5'H EX RCB DISCHARGING TO NATURAL WASH (PROP CONDITION)

|         |     |  |   |  |   |     |  |  |  |  |  |  |  |    |
|---------|-----|--|---|--|---|-----|--|--|--|--|--|--|--|----|
| 1017.00 | .I  |  | C |  | W | H   |  |  |  |  |  |  |  | R  |
| 1031.62 | .   |  |   |  |   |     |  |  |  |  |  |  |  | .  |
| 1046.24 | . I |  | C |  | W | EH  |  |  |  |  |  |  |  | R  |
| 1060.86 | .   |  |   |  |   |     |  |  |  |  |  |  |  | .  |
| 1075.48 | . I |  | C |  | W | E H |  |  |  |  |  |  |  | R  |
| 1090.10 | . I |  | C |  | W | E H |  |  |  |  |  |  |  | R  |
| 1104.72 | .   |  |   |  |   |     |  |  |  |  |  |  |  | .  |
| 1119.34 | .   |  |   |  |   |     |  |  |  |  |  |  |  | .  |
| 1133.96 | . I |  | C |  | W | E H |  |  |  |  |  |  |  | R  |
| 1148.58 | . I |  | C |  | W | E H |  |  |  |  |  |  |  | JX |
| 1163.20 | . I |  | C |  | W | E H |  |  |  |  |  |  |  | R  |
| 1177.82 | . I |  | C |  | W | E H |  |  |  |  |  |  |  | R  |
| 1192.44 | .   |  |   |  |   |     |  |  |  |  |  |  |  | .  |
| 1207.05 | .   |  |   |  |   |     |  |  |  |  |  |  |  | .  |
| 1221.67 | . I |  | C |  | W | E H |  |  |  |  |  |  |  | R  |
| 1236.29 | .   |  |   |  |   |     |  |  |  |  |  |  |  | .  |
| 1250.91 | . I |  | C |  | W | E H |  |  |  |  |  |  |  | R  |
| 1265.53 | .   |  |   |  |   |     |  |  |  |  |  |  |  | .  |
| 1280.15 | . I |  | C |  | W | E H |  |  |  |  |  |  |  | R  |
| 1294.77 | .   |  |   |  |   |     |  |  |  |  |  |  |  | .  |
| 1309.39 | . I |  | C |  | W | E H |  |  |  |  |  |  |  | R  |
| 1324.01 | .   |  |   |  |   |     |  |  |  |  |  |  |  | .  |
| 1338.63 | . I |  | C |  | W | E H |  |  |  |  |  |  |  | R  |
| 1353.25 | .   |  |   |  |   |     |  |  |  |  |  |  |  | .  |
| 1367.87 | . I |  | C |  | W | E H |  |  |  |  |  |  |  | R  |
| 1382.49 | . I |  | C |  | W | E H |  |  |  |  |  |  |  | R  |

| PROP     |          |          |          |          |          |          |          |          |          |          |   |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|---|
| 1397.11  | .        | I        |          |          | C        | W        | E        |          | H        | .        | R |
| 1411.73  | .        | I        |          |          | C        | W        | E        |          | H        | .        | R |
| 1426.35  | .        | I        |          |          | W        | C        | E        |          | H        | .        | R |
| 1440.97  | .        |          |          |          |          |          |          |          |          | .        |   |
| 1455.59  | .        |          |          |          |          |          |          |          |          | .        |   |
| 1470.21  | .        |          |          |          |          |          |          |          |          | .        |   |
| 1484.83  | .        |          |          |          |          |          |          |          |          | .        |   |
| 1499.45  | .        |          |          |          |          |          |          |          |          | .        |   |
| 1514.07  | .        |          |          |          |          |          |          |          |          | .        |   |
| 1528.69  | .        |          |          |          |          |          |          |          |          | .        |   |
| 1543.31  | .        |          |          |          |          |          |          |          |          | .        |   |
| 1557.92  | .        |          |          |          |          |          |          |          |          | .        |   |
| 1572.54  | .        |          |          |          |          |          |          |          |          | .        |   |
| 1587.16  | .        |          |          |          |          |          |          |          |          | .        |   |
| 1601.78  | .        |          |          |          |          |          |          |          |          | .        |   |
| 1616.40  | .        |          |          |          |          |          |          |          |          | .        |   |
| 1631.02  | .        |          |          |          |          |          |          |          |          | .        |   |
| 1645.64  | .        |          |          |          |          |          |          |          |          | .        |   |
| 1660.26  | .        |          |          | I        |          |          | W        | C        | E        | H        | R |
| 1674.88  | .        |          |          |          |          |          |          |          |          | .        |   |
| 1689.50  | .        |          |          |          |          |          |          |          |          | .        |   |
| 1704.12  | .        |          |          |          |          |          |          |          |          | .        |   |
| 1718.74  | .        |          |          |          |          |          |          |          |          | .        |   |
| 1733.36  | .        |          |          | I        |          |          | WC       |          | E        | H        | R |
| 2749.190 | 2750.063 | 2750.936 | 2751.809 | 2752.682 | 2753.555 | 2754.428 | 2755.301 | 2756.174 | 2757.047 | 2757.920 |   |

# NOTES

## 1. GLOSSARY

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

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

WSPG for Ex. RCB Lateral "Lat3"

LAT3

FILE: LAT3.WSW LAT3  
W S P G W - EDIT LISTING - Version 14.06 Date: 7-22-2016 Time:11: 9:34  
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING  
CARD SECT CHN NO OF AVE PIER HEIGHT I BASE ZL ZR INV Y(1) Y(2) Y(3) Y(4) Y(5) Y(6) Y(7) Y(8) Y(9) Y(10)  
CODE NO TYPE PIER/PIP WIDTH DIAMETER WIDTH DROP

CD 24 4 1 2.000  
W S P G W  
PAGE NO 1

HEADING LINE NO 1 IS - WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 2 IS - SKYE CANYON PHASE 3

HEADING LINE NO 3 IS - STORM DRAIN SYSTEM AT GRAND CANYON )

6'W X 5'H EX RCB LATERAL  
W S P G W  
PAGE NO 2

ELEMENT NO 1 IS A SYSTEM OUTLET  
WATER SURFACE PROFILE - ELEMENT CARD LISTING

U/S DATA STATION INVERT SECT W S ELEV  
1000.000 2749.950 24 2753.960

ELEMENT NO 2 IS A REACH  
U/S DATA STATION INVERT SECT N RADIUS ANGLE ANG PT MAN H  
1037.000 2750.320 24 .013 .000 .000 .000 0

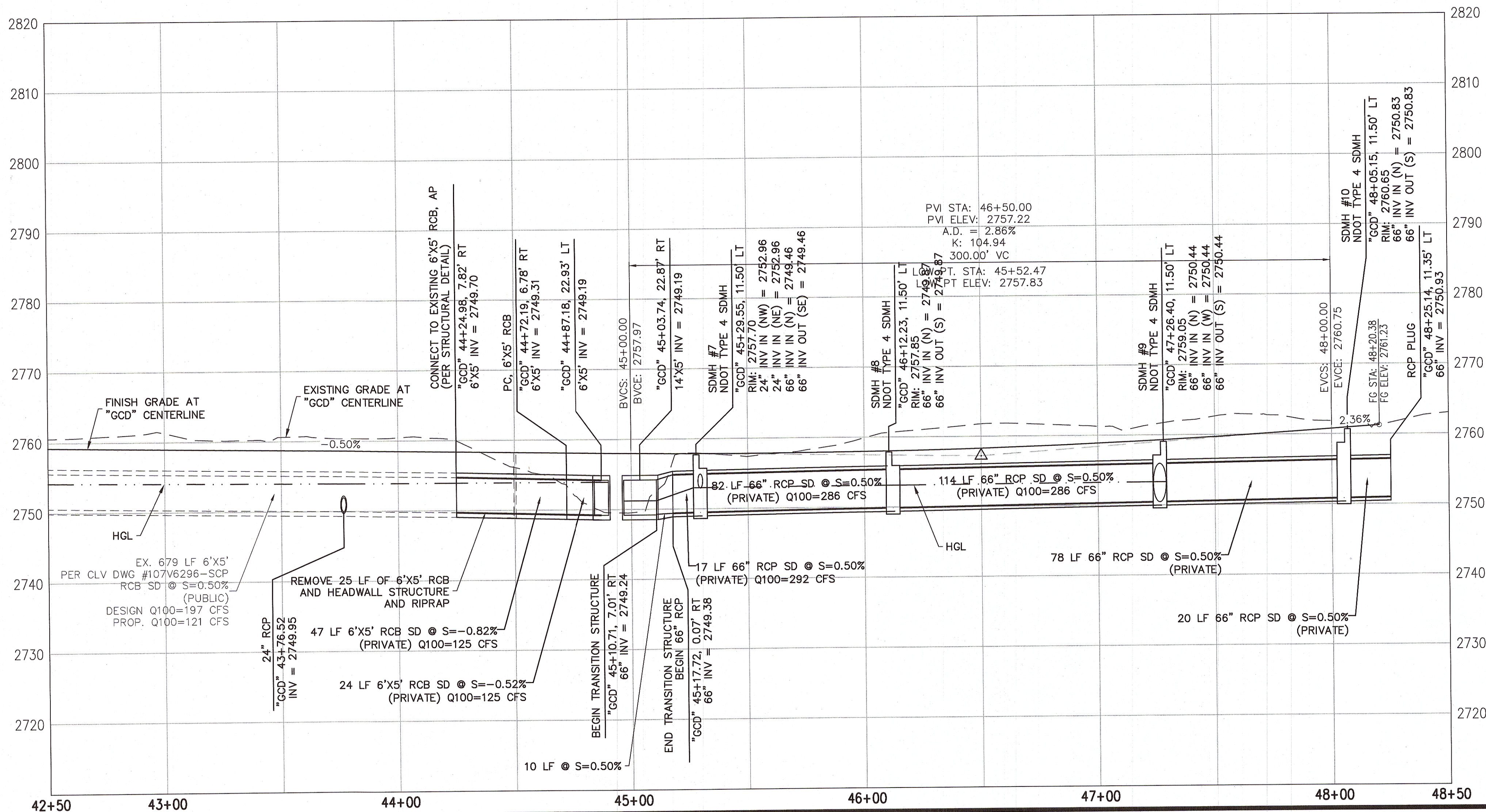
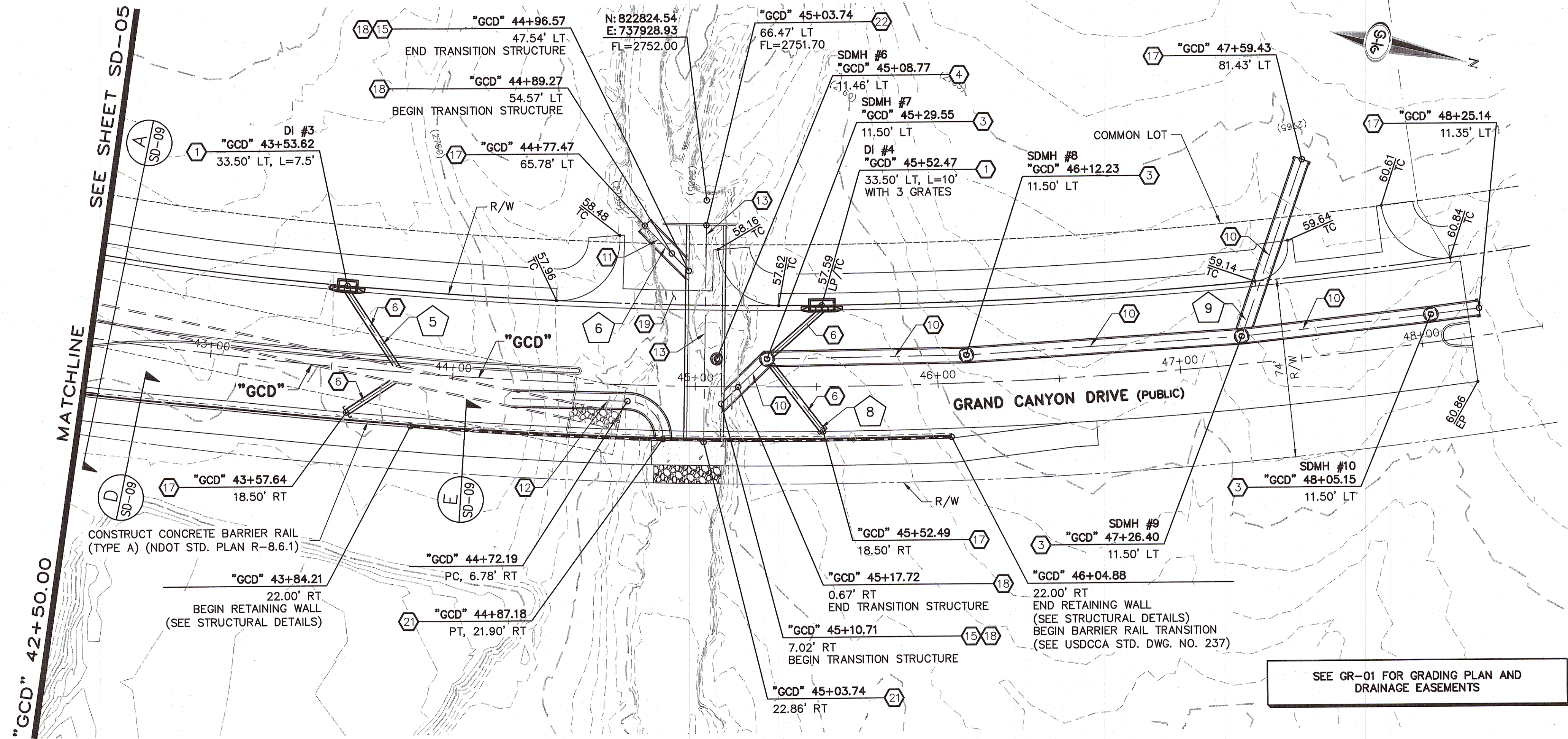
ELEMENT NO 3 IS A SYSTEM HEADWORKS  
U/S DATA STATION INVERT SECT W S ELEV  
1037.000 2750.320 24 .000

SKYE CANYON PHASE 3  
STORM DRAIN SYSTEM AT GRAND CANYON )  
6'W x 5'H EX RCB LATERAL

| Station  | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/Dia.-FT | Base Wt or I.D. | ZL  | No Wth Prs/Pip |
|----------|-------------|------------|------------|---------|-----------|----------|----------------|------------|----------------|----------------|----------------|-----------------|-----|----------------|
| L/Elem   | Ch Slope    |            |            |         |           | SF Ave   | HF             | SE Dpth    | Froude N       | Norm Dp        | "N"            | X-Fall          | ZR  | Type Ch        |
| 1000.000 | 2749.950    | 4.010      | 2753.960   | 5.00    | 1.59      | .04      | 2754.00        | .00        | .79            | .00            | 2.000          | .000            | .00 | 1 .0           |
| 37.000   | .0100       |            |            |         |           | .0005    | .02            | 4.01       | .00            | .64            | .013           | .00             | .00 | PIPE           |
| 1037.000 | 2750.320    | 3.658      | 2753.978   | 5.00    | 1.59      | .04      | 2754.02        | .00        | .79            | .00            | 2.000          | .000            | .00 | 1 .0           |

\*\* WARNING NO. 22 \*\* - NO PLOT GENERATED, BAD DATA OR NOT ENOUGH POINTS, 3 OR LESS





- ### STORM DRAIN NOTES
1. CONSTRUCT TYPE "CM2" DROP INLET (USDCCA STD. DWG. NO. 412.1 & 421)
  2. CONSTRUCT 60" TYPE III MANHOLE (USDCCA STD. DWG. NO. 406.1)
  3. CONSTRUCT NDOT TYPE 4 MANHOLE (NDOT STD. PLAN R-4.3.2)
  4. CONSTRUCT RCB ACCESS MANHOLE (TYPE 1 OR 1A MANHOLE ASSEMBLY PER USDCCA STD. DWG. NO. 403 OR 404. USE OF TYPE 1 OR 1A SHALL BE DETERMINED BASED ON FINAL COVER REQUIRED)
  5. NOT USED
  6. INSTALL 24" RCP OR WATER QUALITY C905 AS SHOWN ON PROFILES (USDCCA STD. DWG. NO. 503.2)
  7. INSTALL 30" RCP (USDCCA STD. DWG. NO. 503.2)
  8. INSTALL 54" RCP (USDCCA STD. DWG. NO. 503.2)
  9. INSTALL 60" RCP (USDCCA STD. DWG. NO. 503.2)
  10. INSTALL 66" RCP (USDCCA STD. DWG. NO. 503.2)
  11. INSTALL 72" RCP (USDCCA STD. DWG. NO. 503.2)
  12. CONSTRUCT PRECAST 6' X 5' RCB (NDOT STD. PLAN B-20.1.2)
  13. CONSTRUCT PRECAST 14' X 5' RCB (NDOT STD. PLAN B-20.1.8)
  14. CONSTRUCT PRECAST 14' X 7' RCB (NDOT STD. PLAN B-20.1.8)
  15. PIPE PENETRATION PER STRUCTURAL DETAIL
  16. CONSTRUCT CONCRETE COLLAR (SEE DETAIL 2, DRAWING SD-11)
  17. CONSTRUCT BRICK AND MORTAR PLUG (SEE DETAIL 1, DRAWING SD-11)
  18. CONSTRUCT TRANSITION STRUCTURE (SEE STRUCTURAL DETAIL)
  19. CONSTRUCT CONCRETE CROSS GUTTER (USDCCA STD. DWG. NO. 228)
  20. CONSTRUCT TYPE "CM2" DROP INLET PER STRUCTURAL DETAIL & DWG. NO. 421
  21. CONSTRUCT HEADWALL PER STRUCTURAL DETAIL W/POST AND CABLE FENCE, SEE DETAIL 4, DRAWING SD-11
  22. CONSTRUCT NDOT TYPE II HEADWALL (NDOT STD. PLAN B-20.1.5 & B-20.1.5.1) W/POST AND CABLE FENCE, SEE DETAIL 4, DRAWING SD-11
  23. MAINTENANCE ACCESS PATH, SEE GR-01 FOR GRADING PLAN
  24. CONSTRUCT SIDEWALK DRAIN (USDCCA STD. DWG. NO. 236)
  25. CONSTRUCT MANHOLE PER STRUCTURAL DETAILS

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

### DROP INLET NOTE

WHERE 10 FEET PARALLEL SEPARATION IS NOT PRACTICABLE, CAST-IN-PLACE MONOLITHIC POUR WITH WATERSTOP BETWEEN SLAB AND WALLS. BASE, WALLS AND TOP TO BE CONSTRUCTED WITH WATERSTOPS, CENTER BULB, OR FLAT STRIP (VINYLEX, GREENSTREAK PLASTIC PRODUCTS OR APPROVED EQUAL).

### LEGEND

1. STORM DRAIN LATERAL # (SEE SHEETS SD-07 THRU SD-08)

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY DS-4796 ON FILE AT THE CITY OF LAS VEGAS FOR THE SUBJECT PROJECT

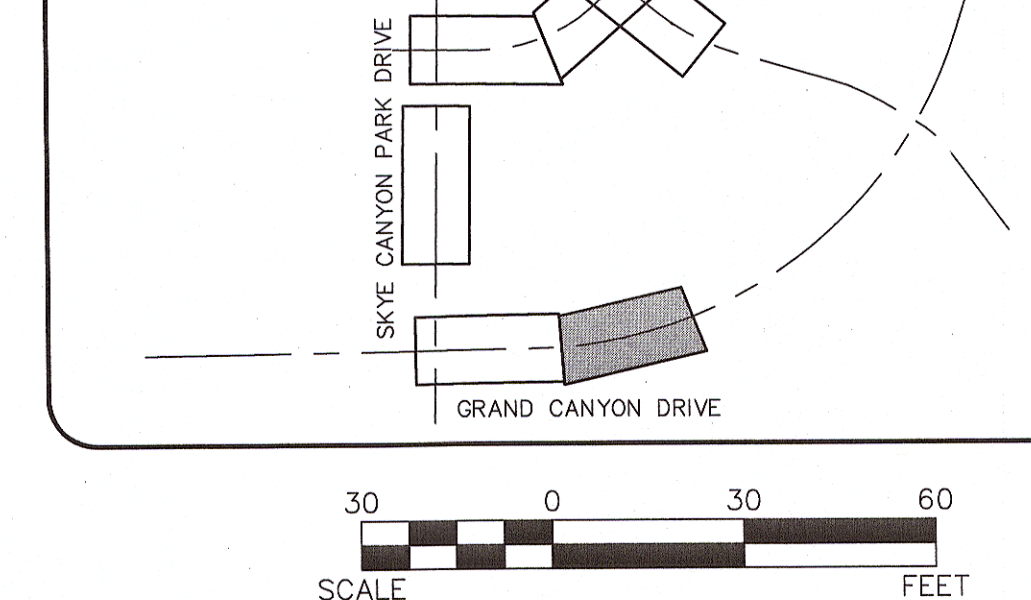
JERRY SLATER, P.E. 14167 DATE

### FLOOD ZONE

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

### NOTE:

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



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

**NINETY-FIVE MANAGEMENT LLC**

**SKYE CANYON PHASE 3**  
**GRAND CANYON DRIVE STORM DRAIN PLAN AND PROFILE**  
**"GCD" 42+50.00 TO "GCD" 48+50.00**

DATE: 4/28/16  
DRAFTER: DAM  
DESIGNER: DAM  
CHECKED: JSR  
PROJECT NO. OLY1602-000

**SD-06**  
SHEET 9 OF 15



