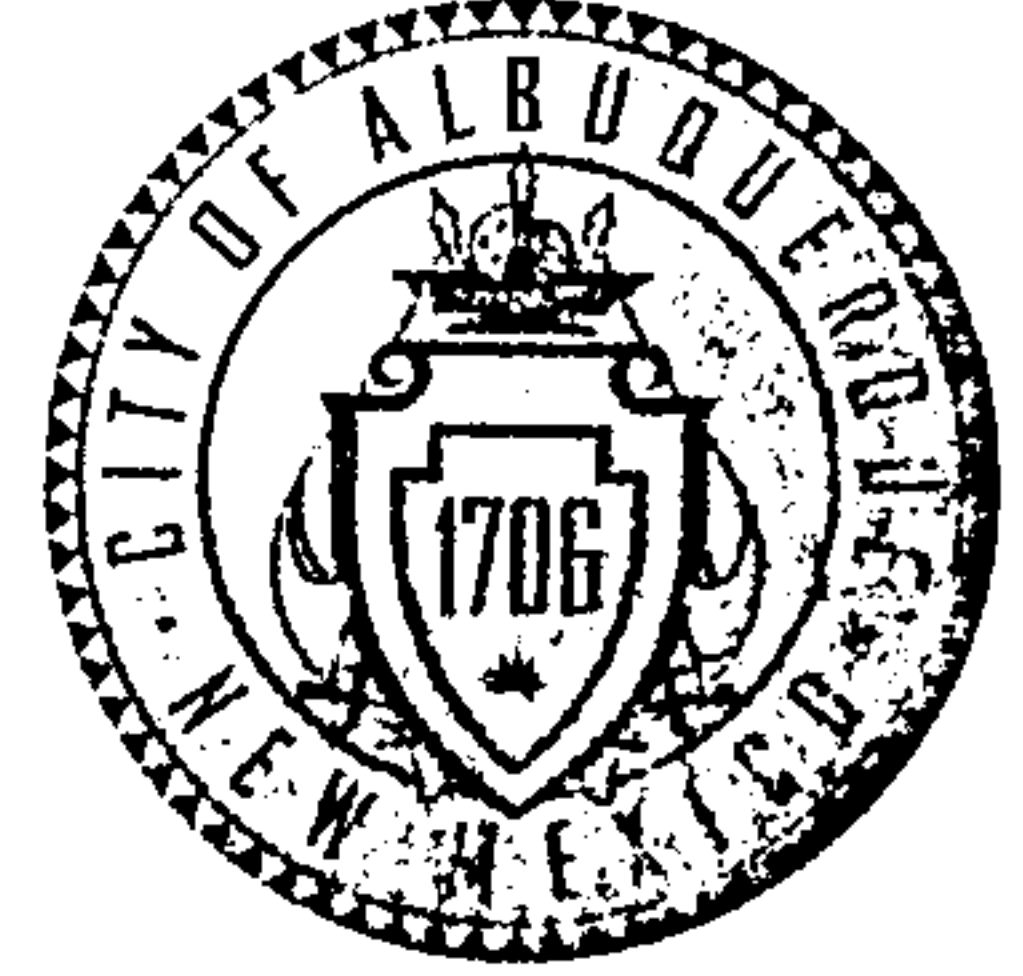


# CITY OF ALBUQUERQUE



May 8, 2008

Kevin J. Murtagh, P.E.  
**BOHANNAN-HUSTON, INC.**  
7500 Jefferson Street NE  
Albuquerque, NM 87109

**RE: Valle Paraiso Subdivision @ Andalucia @ La Luz, (F-11/D015A)**  
**Engineers Certification for Release of Financial Guaranty**  
**Engineers Stamp dated 03/30/2005**  
**Engineers Certification dated 5/08/2008**

Mr. Murtagh:

PO Box 1293

Based upon the information provided in your Engineer's Certification submittal dated 05/08/2008, the above referenced plan is adequate to satisfy the Grading and Drainage Certification for Release of Subdivision Improvement Agreement, (SIA).

Albuquerque

If you have any questions, you can contact me at 924-3982.

Sincerely,

NM 87103

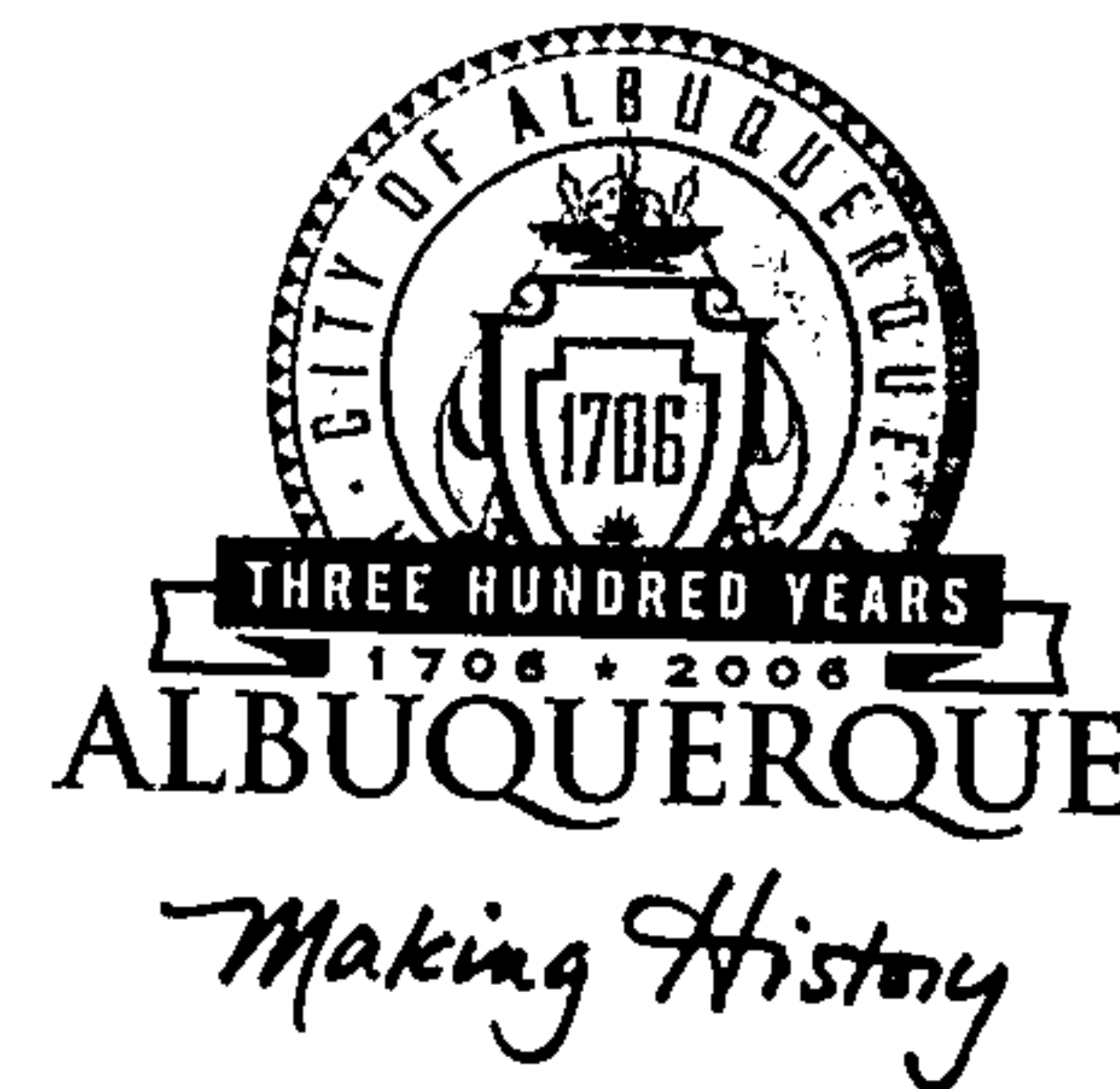
Timothy E. Sims

Plan Checker, Planning Dept. - Hydrology  
Development and Building Services

[www.cabq.gov](http://www.cabq.gov)

C: Marilyn Maldonado, COA# 730883  
File

# CITY OF ALBUQUERQUE



June 9, 2005

Kevin G. Patton, P.E.  
Bohannon Huston, Inc.  
7500 Jefferson St. NE – Courtyard 1  
Albuquerque, NM 87109

**Re: Valle Paraiso Subdivision @ Andalucia at La Luz  
Grading Plan - Engineer Stamp date 3-30-05 (F11/D15A)**

Dear Ms. Patton,

Based upon information provided in your submittal dated 4-1-05, the above referenced plan is approved as amended. This will be the plan that must be certified for Release of Financial Guaranty. Submit a mylar copy of the grading plan for my signature in order to obtain a Grading Permit.

P.O. Box 1293

If you have any questions, you can contact me at 924-3990.

Albuquerque

Sincerely,

Phillip J. Lovato, E.I., C.F.M.  
Associate Engineer, Planning Department  
Development and Building Services

New Mexico 87103

[www.cabq.gov](http://www.cabq.gov)

Cc: file

DRAINAGE REPORT  
FOR  
VALLE PARAISO SUBDIVISION  
AT ANDALUCIA AT LA LUZ

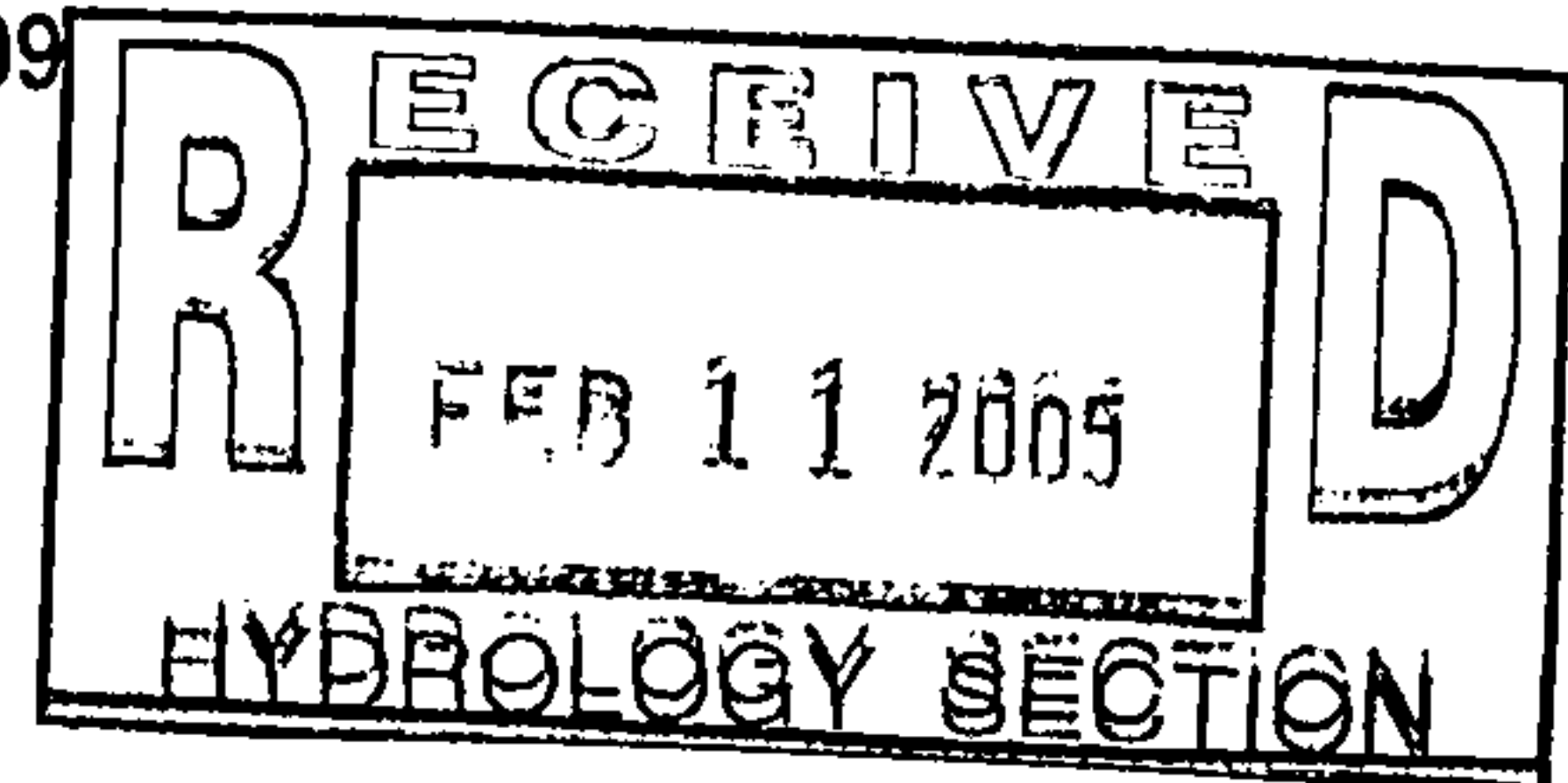
FEBRUARY 11, 2005

Prepared for:

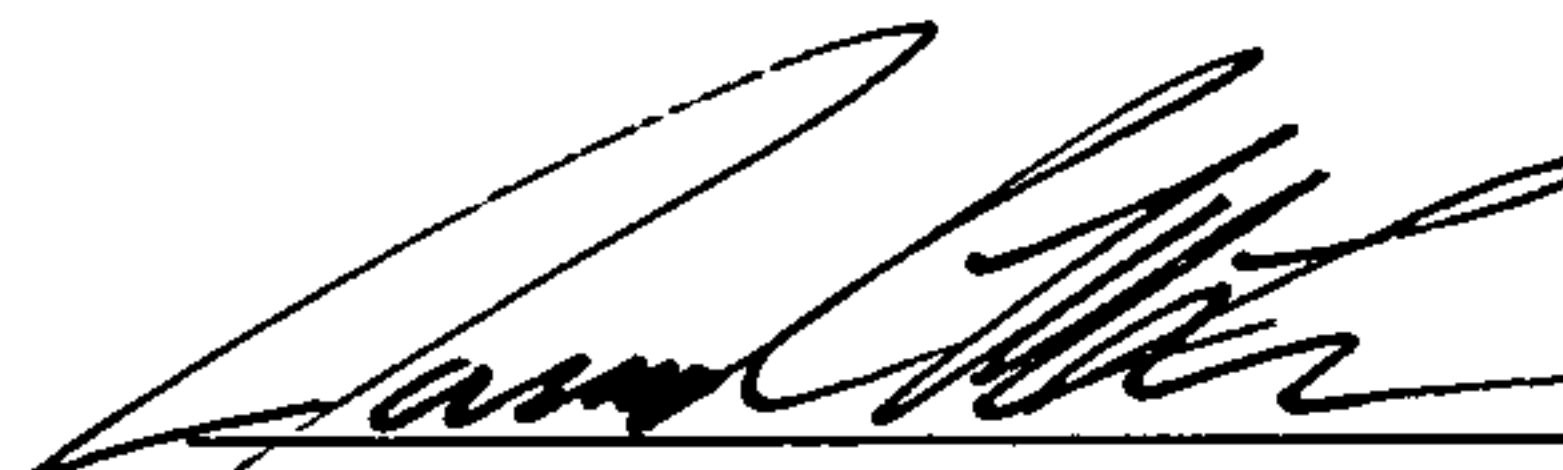
MESA VERDE DEVELOPMENT  
8300 CARMEL AVENUE NE - STE 401  
ALBUQUERQUE, NM 87122

Prepared by:

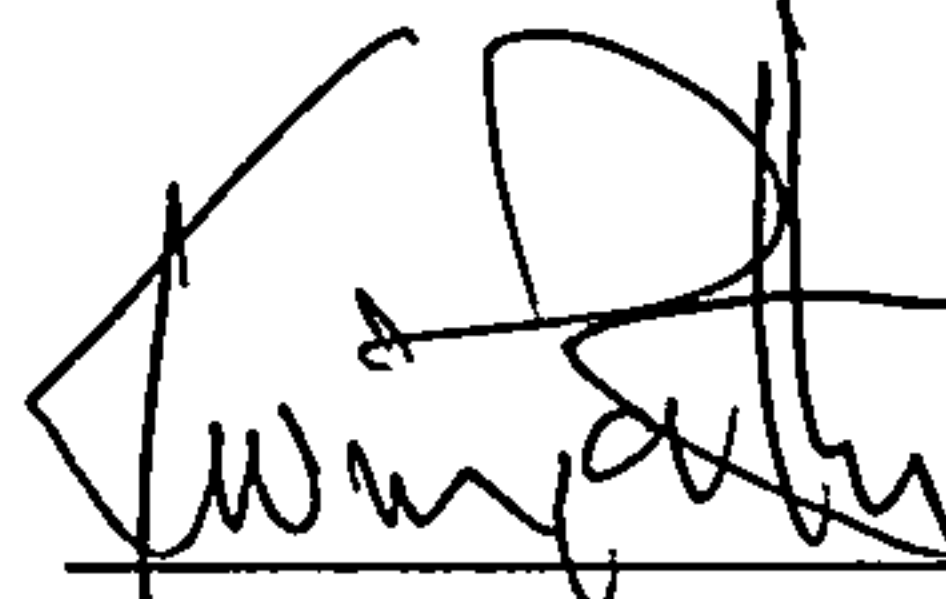
BOHANNAN HUSTON, INC.  
COURTYARD I  
7500 JEFFERSON STREET NE  
ALBUQUERQUE, NM 87109



PREPARED BY:

  
Jarad Lee, E.I.      2/11/05  
Date

UNDER THE SUPERVISION OF

  
Kevin Patton, P.E.



**Bohannon - Huston** INC.

## I. PURPOSE

The purpose of this report is to present the drainage management plan for Valle Paraiso Subdivision at Andalucia at La Luz and to obtain approval of the preliminary/final plat and grading plan by the Development Review Board (DRB). The proposed development of the Valle Paraiso Subdivision at Andalucia at La Luz consists of 54 single family detached residential lots on approximately 24 acres.

## II. METHODOLOGIES

Site conditions will be analyzed for a 10-year and 100-year, 6-hour storm event in accordance with the City of Albuquerque Drainage Ordinance and the Development Process Manual (DPM) Volume 2, Design Criteria, Section 22.2, Hydrology, for the City of Albuquerque, January 1993.

This site, as described in the 'Site Location and Characteristics' section below, is approximately 24 acres. Part A of the DPM, Section 22.2, provides a simplified procedure for projects with sub-basins smaller than 40 acres; therefore, the site was divided into smaller sub-basins.

This report will reference the following City of Albuquerque and the Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA)

- 1) San Antonio Arroyo LOMR, dated September 8, 1997

The San Antonio Arroyo LOMR, prepared by Bohannon Huston, delineates developed basins discharging into the arroyo.

## III. SITE LOCATION AND CHARACTERISTICS

Andalucia at La Luz is a development located east of Coors Boulevard. Andalucia at La Luz - Valle Paraiso Subdivision is bound by Andalucia at La Luz-Unit 1 to the west, the San Antonio Arroyo to the south and Lower Corrales Riverside Drain to the east. The site will be accessible from Tres Gracias Dr., Andalucia at La Luz Unit 1.

#### **IV. EXISTING HYDRAULIC AND HYDROLOGIC CONDITIONS**

For additional assistance throughout this portion of the report, please refer to the Existing Drainage Basin Map (Exhibit 2) enclosed in the Exhibit section of this report.

Valle Paraiso Subdivision at Andalucia at La Luz has been mass graded to match existing drainage patterns with slopes ranging from 1% to 5%. The onsite soils consist primarily of loose to dense, clean to silty sand with traces of clay at varying depths beneath the site. There is one existing onsite basin which encompasses the site in its entirety. The onsite basin (23.77 ac,  $Q_{100}=32.85$  cfs) gradually slopes from west to east directing drainage to an existing ditch adjacent to the site. The flow is then conveyed to the San Antonio Arroyo and ultimately discharges to the Rio Grande River.

#### **V. DEVELOPED HYDRAULIC AND HYDROLOGIC CONDITIONS**

For additional assistance throughout this portion of the report, please refer to the Proposed Conditions Basin Map (Exhibit 3) and the Grading and Drainage Plan (Exhibit 4) enclosed in the Exhibit section of this report.

The majority of the site (Basins A-C) will be conveyed to the San Antonio Arroyo located just south of the site and ultimately to the Rio Grande. The remaining portion of flow (Basin D) will discharge to the east to an offsite retention pond.

Storm runoff generated within Valle Paraiso Subdivision at Andalucia at La Luz will flow east on Camino Valle Trail and Valle Rio Trail and south on Valle Bosque Way and Valle Bonita Lane. There are three (3) sump conditions within the site. One is located at the northeast end of Valle Santo Trail and another is located at the south end of Valle Bonita Lane. These respective flows (Basins B & C) will be captured in a proposed storm drain system and will discharge to the San Antonio Arroyo, at the south east corner of the site. The other sump condition is located within Camino Valle Trail, just east of Valle Bosque Way. This flow (Basin A) will enter a 4' sidewalk

culvert through a curb opening on the south side of Camino Valle Trail and be conveyed by a swale to the San Antonio Arroyo, ultimately discharging into the Rio Grande. The remaining onsite flow (Basin D) will be directed to an offsite retention pond located at the eastern end of the site.

#### **A. On-Site Basins**

The proposed site is composed of four (4) basins (Basins A-D). The basins have been divided into sub-basins for hydraulic analysis reasons. The major basins are discussed below.

Basin A (4.86ac,  $Q_{100} = 15.85\text{cfs}$ ) encompasses Valle Bosque Way and the western portion of Camino Valle Trail, from the west boundary line to a high point east of lot 30. It consists of Sub-basins A-1, A-2, A-3, A-4, A-5, A-6 and A-7; see Appendix A for more information. Basin A contains nine (9) lots, #30-36, #39 and #37 which drains to the backyard to a turnblock. Basin A will flow south on Valle Bosque Way and southeast on Camino Valle Trail to a low point between lots 30 and 31. The runoff will enter a sidewalk culvert through a curb opening on the south side of Camino Valle Trail and drain via a swale to the San Antonio Arroyo, ultimately discharging into the Rio Grande River.

Basin B (12.3ac,  $Q_{100} = 37.73\text{cfs}$ ) consists of Valle Romantico Way, Valle Santo Trail, from a high point east of Valle Bonita Lane to Valle Rio Trail, and the majority of Valle Rio Trail, from Camino Valle Trail to a high point just east of Valle Santo Trail. It contains Sub-basins B-1, B-2, B-3, B-4, B-5, B-6 and B-7; see Appendix A for more information. Basin B consists of twenty-nine (29) lots, #1-14, #38, #40-44, 45 (portion) and #46-54. Flows from lots 40-44, as well as a portion of lot 45, drain to the backyards through turnblocks to Valle Romantico Way and lots #48-50 drain to the backyards through turnblocks to Valle Santo Trail. The flow will be captured by a Double Wing, Double Grate type "A" inlet at a low point within Valle Santo Trail, behind lot 50, and will be conveyed via storm drain to the existing San Antonio Arroyo. The inlet will be designed for the 100 year storm event (37.73cfs). In the event of inlet clogging, the high point in Valle Rio Trail, east of Valle Santo Trail, will act as an emergency spillway and flow to the retention pond.

Basin C (4.32ac,  $Q_{100} = 12.97\text{cfs}$ ) contains Valle Bonita Lane and a portion of Camino Valle Trail, from a high point east of lot 30 to a high point east of Valle Bonita Lane. It consists of Sub-basins C-1, and C-2; see Appendix A for more information. Basin C consists of ten (10) lots, #21-29 and a portion of lot 45. Basin C will flow east on Camino Valle Trail to a low point, where it will be directed south on Valle Bonita Lane. The total flow will be captured by a Double Wing, Single Grate type "A" AMAFCA approved storm water quality inlet in sump condition at the south end of the cul-de-sac. Since there will be no emergency spillway, the inlet will be designed for two times the 100-year storm event (25.94cfs).

Basin D (2.15ac,  $Q_{100} = 6.46\text{cfs}$ ) encompasses the stub street of Valle Rio Trail and the lots fronting the southeast portion of Valle Santo Trail. It consists of Sub-basins D-1 and D-2; see Appendix A for more information. Basin D consists of six (6) lots, #15-20. The flow from Basin D will discharge into a retention pond directly east of the site. Basins D-1 will flow southeast on Valle Rio Trail discharge into the retention pond. Basin D-2 will drain through turn blocks in the back of lots #16-20 to cobble rundowns and into the retention pond.

## VI. CONCLUSION

This report presents the hydrologic and hydraulic considerations for the proposed development of Valle Paraiso Subdivision at Andalucia at La Luz. Increases in runoff, depth and velocity due to proposed development are within parameters anticipated within the previously approved Master Drainage Plan for this area. These flows can be safely conveyed by the improvements proposed in this drainage plan to the existing San Antonio Arroyo, which has adequate capacity to accept the site runoff. Erosion and dust control, consisting of erosion control berms, silt fencing and sedimentation basins, are proposed to prevent soil washing or blowing into paved streets, storm drains, and existing development areas. This report supports the preliminary/final plat and grading plan and should be approved as requested.

**HYRDOLOGICAL VOLUMETRIC & DISCHARGE DATA  
EXISTING CONDITIONS**

|                     | BASIN | AREA  | UNITS | % LAND TREATMENT |       |       |      | DISCHARGE (CFS) |       |      |       |
|---------------------|-------|-------|-------|------------------|-------|-------|------|-----------------|-------|------|-------|
|                     | I.D.  | (AC)  | #     | A                | B     | C     | D    | 10 YR           | 100YR |      |       |
| EXISTING CONDITIONS |       |       |       |                  |       |       |      |                 |       |      |       |
| Onsite              | 1     | 23.77 | 54.0  |                  | 85.0% | 15.0% | 0.0% | 0.00%           |       | 7.76 | 32.85 |

**DEVELOPED CONDITIONS  
ONSITE**

| <b>BASINS</b> |       |    |  |      |       |       |       |  |       |       |
|---------------|-------|----|--|------|-------|-------|-------|--|-------|-------|
| A1            | 0.88  | 0  |  | 0.0% | 5.0%  | 5.0%  | 90.0% |  | 2.39  | 3.68  |
| A2            | 1.50  | 5  |  | 0.0% | 36.0% | 36.0% | 28.0% |  | 2.42  | 4.48  |
| A3            | 0.53  | 1  |  | 0.0% | 36.0% | 36.0% | 28.0% |  | 0.86  | 1.59  |
| A4            | 1.01  | 1  |  | 0.0% | 36.0% | 36.0% | 28.0% |  | 1.63  | 3.02  |
| A5            | 0.41  | 1  |  | 0.0% | 36.0% | 36.0% | 28.0% |  | 0.66  | 1.22  |
| A6            | 0.34  | 1  |  | 0.0% | 36.0% | 36.0% | 28.0% |  | 0.54  | 1.01  |
| A7            | 0.19  | 0  |  | 0.0% | 5.0%  | 5.0%  | 90.0% |  | 0.51  | 0.79  |
| B1            | 1.76  | 5  |  | 0.0% | 36.0% | 36.0% | 28.0% |  | 2.83  | 5.24  |
| B2            | 4.27  | 10 |  | 0.0% | 36.0% | 36.0% | 28.0% |  | 6.88  | 12.74 |
| B3            | 0.73  | 2  |  | 0.0% | 36.0% | 36.0% | 28.0% |  | 1.17  | 2.18  |
| B4            | 3.79  | 9  |  | 0.0% | 36.0% | 36.0% | 28.0% |  | 6.11  | 11.30 |
| B5            | 0.85  | 3  |  | 0.0% | 36.0% | 36.0% | 28.0% |  | 1.36  | 2.52  |
| B6            | 0.64  | 0  |  | 0.0% | 5.0%  | 5.0%  | 90.0% |  | 1.74  | 2.67  |
| B7            | 0.53  | 0  |  | 0.0% | 20.0% | 80.0% | 0.0%  |  | 0.71  | 1.43  |
| C1            | 2.29  | 5  |  | 0.0% | 36.0% | 36.0% | 28.0% |  | 3.68  | 6.82  |
| C2            | 2.03  | 5  |  | 0.0% | 36.0% | 36.0% | 28.0% |  | 3.28  | 6.07  |
| D1            | 0.84  | 1  |  | 0.0% | 36.0% | 36.0% | 28.0% |  | 1.35  | 2.50  |
| D2            | 1.31  | 5  |  | 0.0% | 36.0% | 36.0% | 28.0% |  | 2.11  | 3.91  |
| TOTAL         | 23.89 | 54 |  |      |       |       |       |  | 40.23 | 73.17 |

NOTES: Impervious percentages were calculated from the DPM equation A-4, with the remaining percentages distributed to land treatment type B, due to the relatively flat terrain

$$N = \text{UNITS/ACRES} = 2.3$$

$$\%D = ((N*N) + (5*N)) = 28.4 \%$$

\*Table A-4  
\*\*Table A-11

A-1/1

# Summary of Roads

## SUMMARY OF ROADWAY CAPAITY ANALYSIS FOR ANDALUCIA AT LA LUZ VALLE - PARAISO SUBDIVISION

### VALLE BOSQUE WAY - Drainage Basin A

| Roadway<br>Grade (%) | Roadway<br>Cross-slope<br>(%) | Basin | Percent<br>of Basin<br>(%) | Q (100 YR)<br>in roadway<br>(cfs) | Curb<br>Type | Depth of<br>water in<br>roadway (ft.) | Velocity of storm<br>water in roadway<br>(ft/s) | V <sup>2</sup> /2*g | EGL  | ROW<br>Elevation<br>(ft.) | Comments |
|----------------------|-------------------------------|-------|----------------------------|-----------------------------------|--------------|---------------------------------------|-------------------------------------------------|---------------------|------|---------------------------|----------|
| 0.70                 | 2.00                          | A     | 20.0                       | 3.04                              | STD          | 0.31                                  | 1.28                                            | 0.03                | 0.33 | 0.87                      | OK       |

Note:

By observation, the product of the depth times the velocity is below 6.5 for the 100-year design storm, therefore for the 10-year design storm the product of the depth times the velocity will be well below the recommended value of 6.5

### CAMINO VALLE TR. - Drainage Basin A & C

| Roadway<br>Grade (%) | Roadway<br>Cross-slope<br>(%) | Basin | Percent<br>of Basin<br>(%) | Q (100 YR)<br>in roadway<br>(cfs) | Curb<br>Type | Depth of<br>water in<br>roadway (ft.) | Velocity of storm<br>water in roadway<br>(ft/s) | V <sup>2</sup> /2*g | EGL  | ROW<br>Elevation<br>(ft.) | Comments |
|----------------------|-------------------------------|-------|----------------------------|-----------------------------------|--------------|---------------------------------------|-------------------------------------------------|---------------------|------|---------------------------|----------|
| 6.64                 | 2.00                          | A     | 10.0                       | 1.50                              | ROLL         | 0.15                                  | 3.47                                            | 0.19                | 0.34 | 0.5                       | OK       |
| 2.00                 | 2.00                          | A     | 63.0                       | 9.79                              | ROLL         | 0.32                                  | 3.08                                            | 0.15                | 0.47 | 0.5                       | OK       |
| 2.00                 | 2.00                          | A     | 100                        | 15.85                             | STD          | 0.37                                  | 3.59                                            | 0.20                | 0.57 | 0.87                      | OK       |
| 1.44                 | 2.00                          | A     | 7.50                       | 1.23                              | ROLL         | 0.19                                  | 1.74                                            | 0.05                | 0.23 | 0.5                       | OK       |
| 3.75                 | 2.00                          | C     | 28.0                       | 3.60                              | ROLL         | 0.22                                  | 3.15                                            | 0.15                | 0.37 | 0.5                       | OK       |
| 1.13                 | 2.00                          | C     | 53.0                       | 6.86                              | ROLL         | 0.32                                  | 2.28                                            | 0.08                | 0.4  | 0.5                       | OK       |

Note:

By observation, the product of the depth times the velocity is below 6.5 for the 100-year design storm, therefore for the 10-year design storm the product of the depth times the velocity will be well below the recommended value of 6.5

### VALLE SANTO TR. - Drainage Basin B

| Roadway<br>Grade (%) | Roadway<br>Cross-slope<br>(%) | Basin | Percent<br>of Basin<br>(%) | Q (100 YR)<br>in roadway<br>(cfs) | Curb<br>Type | Depth of<br>water in<br>roadway (ft.) | Velocity of storm<br>water in roadway<br>(ft/s) | V <sup>2</sup> /2*g | EGL  | ROW<br>Elevation<br>(ft.) | Comments |
|----------------------|-------------------------------|-------|----------------------------|-----------------------------------|--------------|---------------------------------------|-------------------------------------------------|---------------------|------|---------------------------|----------|
| 1.80                 | 2.00                          | B     | 14.0                       | 5.21                              | ROLL         | 0.27                                  | 2.58                                            | 0.10                | 0.38 | 0.5                       | OK       |

Note:

By observation, the product of the depth times the velocity is below 6.5 for the 100-year design storm, therefore for the 10-year design storm the product of the depth times the velocity will be well below the recommended value of 6.5

# Summary of Roads

## VALLE BONITA LN. - Drainage Basin C

| Roadway   | Roadway         | Basin | Percent      | Q (100 YR)       | Curb | Depth of               | Velocity of storm       | $V^2/2 \cdot g$ | EGL  | ROW             | Comments |
|-----------|-----------------|-------|--------------|------------------|------|------------------------|-------------------------|-----------------|------|-----------------|----------|
| Grade (%) | Cross-slope (%) |       | of Basin (%) | in roadway (cfs) | Type | water in roadway (ft.) | water in roadway (ft/s) |                 |      | Elevation (ft.) |          |
| 1.20      | 2.00            | C     | 77           | 9.91             | ROLL | 0.35                   | 2.45                    | 0.09            | 0.44 | 0.5             | OK       |

Note:

By observation, the product of the depth times the velocity is below 6.5 for the 100-year design storm, therefore for the 10-year design storm the product of the depth times the velocity will be well below the recommended value of 6.5

## VALLE RIO TR. - Drainage Basin B & D

| Roadway   | Roadway         | Basin | Percent      | Q (100 YR)       | Curb | Depth of               | Velocity of storm       | $V^2/2 \cdot g$ | EGL  | ROW             | Comments |
|-----------|-----------------|-------|--------------|------------------|------|------------------------|-------------------------|-----------------|------|-----------------|----------|
| Grade (%) | Cross-slope (%) |       | of Basin (%) | in roadway (cfs) | Type | water in roadway (ft.) | water in roadway (ft/s) |                 |      | Elevation (ft.) |          |
| 3.58      | 2.00            | B     | 7.00         | 2.63             | ROLL | 0.20                   | 2.91                    | 0.13            | 0.33 | 0.5             | OK       |
| 1.70      | 2.00            | B     | 14.00        | 5.27             | ROLL | 0.27                   | 2.50                    | 0.10            | 0.37 | 0.5             | OK       |
| 3.34      | 2.00            | B     | 20.00        | 7.57             | ROLL | 0.27                   | 3.50                    | 0.19            | 0.45 | 0.5             | OK       |
| 1.47      | 2.00            | B     | 86.00        | 32.52            | STD  | 0.49                   | 4.43                    | 0.30            | 0.79 | 0.87            | OK       |
| 3.20      | 2.00            | D     | 40.00        | 2.52             | ROLL | 0.21                   | 2.78                    | 0.12            | 0.32 | 0.5             | OK       |

Note:

By observation, the product of the depth times the velocity is below 6.5 for the 100-year design storm, therefore for the 10-year design storm the product of the depth times the velocity will be well below the recommended value of 6.5

## VALLE ROMANTICO WAY - Drainage Basin B

| Roadway   | Roadway         | Basin | Percent      | Q (100 YR)       | Curb | Depth of               | Velocity of storm       | $V^2/2 \cdot g$ | EGL  | ROW             | Comments |
|-----------|-----------------|-------|--------------|------------------|------|------------------------|-------------------------|-----------------|------|-----------------|----------|
| Grade (%) | Cross-slope (%) |       | of Basin (%) | in roadway (cfs) | Type | water in roadway (ft.) | water in roadway (ft/s) |                 |      | Elevation (ft.) |          |
| 2.26      | 2.00            | B     | 6.00         | 2.19             | STD  | 0.21                   | 2.33                    | 0.08            | 0.29 | 0.5             | OK       |
| 3.17      | 2.00            | B     | 10.00        | 3.75             | STD  | 0.23                   | 2.97                    | 0.14            | 0.37 | 0.5             | OK       |
| 0.60      | 2.00            | B     | 30.00        | 11.38            | ROLL | 0.41                   | 1.99                    | 0.06            | 0.47 | 0.5             | OK       |

Note:

By observation, the product of the depth times the velocity is below 6.5 for the 100-year design storm, therefore for the 10-year design storm the product of the depth times the velocity will be well below the recommended value of 6.5

Valle Bosque St. - 0.70% std

MANNING'S N = 0.017 SLOPE = 0.007

| POINT | DIST | ELEV | POINT | DIST | ELEV | POINT | DIST | ELEV |
|-------|------|------|-------|------|------|-------|------|------|
| 1     | 0.0  | 0.9  | 5     | 12.0 | 0.1  | 9     | 37.2 | 0.7  |
| 2     | 9.4  | 0.7  | 6     | 23.0 | 0.4  | 10    | 37.6 | 0.7  |
| 3     | 9.8  | 0.7  | 7     | 34.0 | 0.1  | 11    | 46.0 | 0.9  |
| 4     | 10.0 | 0.0  | 8     | 36.0 | 0.0  |       |      |      |

| WSEL<br>FT. | DEPTH<br>INC | FLOW<br>AREA<br>SQ.FT. | FLOW<br>RATE<br>(CFS) | WETTED<br>PER<br>(FT) | FLOW<br>VEL<br>(FPS) | TOPWID<br>PLUS<br>OBSTRUCTIONS | TOTAL<br>ENERGY<br>(FT) |
|-------------|--------------|------------------------|-----------------------|-----------------------|----------------------|--------------------------------|-------------------------|
| 0.050       | 0.050        | 0.041                  | 0.025                 | 1.694                 | 0.612                | 2.558                          | 0.056                   |
| 0.100       | 0.100        | 0.164                  | 0.159                 | 3.388                 | 0.971                | 4.197                          | 0.115                   |
| 0.150       | 0.150        | 0.383                  | 0.425                 | 6.465                 | 1.110                | 7.220                          | 0.169                   |
| 0.200       | 0.200        | 0.825                  | 1.035                 | 11.619                | 1.254                | 12.320                         | 0.224                   |
| 0.250       | 0.250        | 1.523                  | 2.249                 | 16.772                | 1.477                | 17.420                         | 0.284                   |
| 0.300       | 0.300        | 2.475                  | 4.228                 | 21.925                | 1.708                | 22.520                         | 0.345                   |
| 0.350       | 0.350        | 3.683                  | 7.122                 | 27.078                | 1.934                | 27.620                         | 0.408                   |
| 0.400       | 0.400        | 5.020                  | 11.892                | 27.230                | 2.369                | 27.720                         | 0.487                   |
| 0.450       | 0.450        | 6.363                  | 17.587                | 27.383                | 2.764                | 27.820                         | 0.569                   |
| 0.500       | 0.500        | 7.710                  | 24.134                | 27.535                | 3.130                | 27.920                         | 0.652                   |
| 0.550       | 0.550        | 9.063                  | 31.479                | 27.687                | 3.473                | 28.020                         | 0.738                   |
| 0.600       | 0.600        | 10.420                 | 39.579                | 27.839                | 3.798                | 28.120                         | 0.824                   |
| 0.650       | 0.650        | 11.783                 | 48.398                | 27.991                | 4.108                | 28.220                         | 0.912                   |
| 0.700       | 0.700        | 13.219                 | 53.875                | 31.774                | 4.076                | 31.061                         | 0.958                   |
| 0.750       | 0.750        | 14.888                 | 59.950                | 36.444                | 4.027                | 35.729                         | 1.002                   |
| 0.800       | 0.800        | 16.792                 | 67.601                | 41.113                | 4.026                | 40.398                         | 1.052                   |
| 0.850       | 0.850        | 18.928                 | 76.825                | 45.783                | 4.059                | 45.066                         | 1.106                   |

$Q_{100} = 3.04$

# Camino Valle

- 6.64% roll

MANNING'S N = 0.017 SLOPE = 0.066

| POINT | DIST | ELEV | POINT | DIST | ELEV | POINT | DIST | ELEV |
|-------|------|------|-------|------|------|-------|------|------|
| 1     | 0.0  | 0.5  | 5     | 11.0 | 0.1  | 9     | 37.2 | 0.3  |
| 2     | 8.4  | 0.3  | 6     | 23.0 | 0.4  | 10    | 37.6 | 0.3  |
| 3     | 8.8  | 0.3  | 7     | 35.0 | 0.1  | 11    | 46.0 | 0.5  |
| 4     | 9.0  | 0.0  | 8     | 37.0 | 0.0  |       |      |      |

| WSEL<br>FT. | DEPTH<br>INC | FLOW<br>AREA<br>SQ. FT. | FLOW<br>RATE<br>(CFS) | WETTED<br>PER<br>(FT) | FLOW<br>VEL<br>(FPS) | TOPWID<br>PLUS<br>OBSTRUCTIONS | TOTAL<br>ENERGY<br>(FT) |
|-------------|--------------|-------------------------|-----------------------|-----------------------|----------------------|--------------------------------|-------------------------|
| 0.050       | 0.050        | 0.040                   | 0.075                 | 1.654                 | 1.876                | 2.510                          | 0.105                   |
| 0.100       | 0.100        | 0.159                   | 0.473                 | 3.308                 | 2.977                | 4.100                          | 0.238                   |
| 0.150       | 0.150        | 0.372                   | 1.262                 | 6.346                 | 3.396                | 7.075                          | 0.329                   |
| 0.200       | 0.200        | 0.806                   | 3.091                 | 11.460                | 3.837                | 12.126                         | 0.429                   |
| 0.250       | 0.250        | 1.492                   | 6.752                 | 16.573                | 4.525                | 17.178                         | 0.568                   |
| 0.300       | 0.300        | 2.431                   | 12.733                | 21.687                | 5.237                | 22.229                         | 0.727                   |
| 0.350       | 0.350        | 3.643                   | 20.709                | 28.725                | 5.685                | 29.229                         | 0.853                   |
| 0.400       | 0.400        | 5.326                   | 33.203                | 36.570                | 6.235                | 36.153                         | 1.005                   |
| 0.450       | 0.450        | 7.256                   | 51.111                | 41.495                | 7.044                | 41.076                         | 1.222                   |
| 0.500       | 0.500        | 9.433                   | 73.444                | 46.419                | 7.786                | 46.000                         | 1.443                   |

$Q_{100} = 1.50$

# Camino Valle

- 2.0% roll

MANNING'S N = 0.017 SLOPE = 0.020

| POINT | DIST | ELEV | POINT | DIST | ELEV | POINT | DIST | ELEV |
|-------|------|------|-------|------|------|-------|------|------|
| 1     | 0.0  | 0.5  | 5     | 11.0 | 0.1  | 9     | 37.2 | 0.3  |
| 2     | 8.4  | 0.3  | 6     | 23.0 | 0.4  | 10    | 37.6 | 0.3  |
| 3     | 8.8  | 0.3  | 7     | 35.0 | 0.1  | 11    | 46.0 | 0.5  |
| 4     | 9.0  | 0.0  | 8     | 37.0 | 0.0  |       |      |      |

| WSEL<br>FT. | DEPTH<br>INC | FLOW<br>AREA<br>SQ.FT. | FLOW<br>RATE<br>(CFS) | WETTED<br>PER<br>(FT) | FLOW<br>VEL<br>(FPS) | TOPWID<br>PLUS<br>OBSTRUCTIONS | TOTAL<br>ENERGY<br>(FT) |
|-------------|--------------|------------------------|-----------------------|-----------------------|----------------------|--------------------------------|-------------------------|
| 0.050       | 0.050        | 0.040                  | 0.041                 | 1.654                 | 1.029                | 2.510                          | 0.066                   |
| 0.100       | 0.100        | 0.159                  | 0.260                 | 3.308                 | 1.634                | 4.100                          | 0.142                   |
| 0.150       | 0.150        | 0.372                  | 0.693                 | 6.346                 | 1.864                | 7.075                          | 0.204                   |
| 0.200       | 0.200        | 0.806                  | 1.696                 | 11.460                | 2.106                | 12.126                         | 0.269                   |
| 0.250       | 0.250        | 1.492                  | 3.706                 | 16.573                | 2.483                | 17.178                         | 0.346                   |
| 0.300       | 0.300        | 2.431                  | 6.988                 | 21.687                | 2.874                | 22.229                         | 0.428                   |
| 0.350       | 0.350        | 3.643                  | 11.366                | 28.725                | 3.120                | 29.229                         | 0.501                   |
| 0.400       | 0.400        | 5.326                  | 18.223                | 36.570                | 3.422                | 36.153                         | 0.582                   |
| 0.450       | 0.450        | 7.256                  | 28.051                | 41.495                | 3.866                | 41.076                         | 0.682                   |
| 0.500       | 0.500        | 9.433                  | 40.307                | 46.419                | 4.273                | 46.000                         | 0.784                   |

$Q_{100} = 9.79$

# Camino Valle

- 2.0% std

MANNING'S N = 0.017 SLOPE = 0.020

| POINT | DIST | ELEV | POINT | DIST | ELEV | POINT | DIST | ELEV |
|-------|------|------|-------|------|------|-------|------|------|
| 1     | 0.0  | 0.9  | 5     | 11.0 | 0.1  | 9     | 37.2 | 0.7  |
| 2     | 8.4  | 0.7  | 6     | 23.0 | 0.4  | 10    | 37.6 | 0.7  |
| 3     | 8.8  | 0.7  | 7     | 35.0 | 0.1  | 11    | 46.0 | 0.9  |
| 4     | 9.0  | 0.0  | 8     | 37.0 | 0.0  |       |      |      |

| WSEL<br>FT. | DEPTH<br>INC | FLOW<br>AREA<br>SQ.FT. | FLOW<br>RATE<br>(CFS) | WETTED<br>PER<br>(FT) | FLOW<br>VEL<br>(FPS) | TOPWID<br>PLUS<br>OBSTRUCTIONS | TOTAL<br>ENERGY<br>(FT) |
|-------------|--------------|------------------------|-----------------------|-----------------------|----------------------|--------------------------------|-------------------------|
| 0.050       | 0.050        | 0.039                  | 0.040                 | 1.645                 | 1.022                | 2.484                          | 0.066                   |
| 0.100       | 0.100        | 0.156                  | 0.254                 | 3.290                 | 1.622                | 4.048                          | 0.141                   |
| 0.150       | 0.150        | 0.366                  | 0.676                 | 6.318                 | 1.850                | 6.996                          | 0.203                   |
| 0.200       | 0.200        | 0.795                  | 1.663                 | 11.423                | 2.092                | 12.021                         | 0.268                   |
| 0.250       | 0.250        | 1.476                  | 3.645                 | 16.527                | 2.470                | 17.047                         | 0.345                   |
| 0.300       | 0.300        | 2.408                  | 6.888                 | 21.631                | 2.861                | 22.072                         | 0.427                   |
| 0.350       | 0.350        | 3.591                  | 11.643                | 26.735                | 3.242                | 27.098                         | 0.514                   |
| 0.400       | 0.400        | 4.981                  | 19.094                | 28.839                | 3.834                | 29.123                         | 0.629                   |
| 0.450       | 0.450        | 6.391                  | 28.866                | 28.942                | 4.516                | 29.148                         | 0.767                   |
| 0.500       | 0.500        | 7.803                  | 40.165                | 29.045                | 5.147                | 29.174                         | 0.912                   |
| 0.550       | 0.550        | 9.217                  | 52.882                | 29.148                | 5.738                | 29.199                         | 1.062                   |
| 0.600       | 0.600        | 10.631                 | 66.932                | 29.251                | 6.296                | 29.224                         | 1.217                   |
| 0.650       | 0.650        | 12.047                 | 82.246                | 29.354                | 6.827                | 29.250                         | 1.375                   |
| 0.700       | 0.700        | 13.534                 | 92.150                | 33.106                | 6.809                | 32.050                         | 1.421                   |
| 0.750       | 0.750        | 15.252                 | 103.033               | 37.757                | 6.755                | 36.700                         | 1.460                   |
| 0.800       | 0.800        | 17.204                 | 116.541               | 42.408                | 6.774                | 41.350                         | 1.514                   |

Q<sub>100</sub> = 15.85

Camino Valle Ave. - 1.44% roll

MANNING'S N = 0.017 SLOPE = 0.014

| POINT | DIST | ELEV | POINT | DIST | ELEV | POINT | DIST | ELEV |
|-------|------|------|-------|------|------|-------|------|------|
| 1     | 0.0  | 0.5  | 5     | 12.0 | 0.1  | 9     | 37.2 | 0.3  |
| 2     | 9.4  | 0.3  | 6     | 23.0 | 0.4  | 10    | 37.6 | 0.3  |
| 3     | 9.8  | 0.3  | 7     | 34.0 | 0.1  | 11    | 46.0 | 0.5  |
| 4     | 10.0 | 0.0  | 8     | 36.0 | 0.0  |       |      |      |

| WSEL<br>FT. | DEPTH<br>INC | FLOW<br>AREA<br>SQ.FT. | FLOW<br>RATE<br>(CFS) | WETTED<br>PER<br>(FT) | FLOW<br>VEL<br>(FPS) | TOPWID<br>PLUS<br>OBSTRUCTIONS | TOTAL<br>ENERGY<br>(FT) |
|-------------|--------------|------------------------|-----------------------|-----------------------|----------------------|--------------------------------|-------------------------|
| 0.050       | 0.050        | 0.044                  | 0.038                 | 1.782                 | 0.883                | 2.661                          | 0.062                   |
| 0.100       | 0.100        | 0.174                  | 0.244                 | 3.564                 | 1.402                | 4.403                          | 0.131                   |
| 0.150       | 0.150        | 0.406                  | 0.654                 | 6.730                 | 1.613                | 7.529                          | 0.190                   |
| 0.200       | 0.200        | 0.866                  | 1.578                 | 11.972                | 1.821                | 12.732                         | 0.252                   |
| 0.250       | 0.250        | 1.587                  | 3.397                 | 17.213                | 2.141                | 17.935                         | 0.321                   |
| 0.300       | 0.300        | 2.568                  | 6.345                 | 22.454                | 2.471                | 23.138                         | 0.395                   |
| 0.350       | 0.350        | 3.827                  | 10.293                | 29.468                | 2.690                | 30.127                         | 0.463                   |
| 0.400       | 0.400        | 5.468                  | 16.620                | 35.057                | 3.039                | 34.796                         | 0.544                   |
| 0.450       | 0.450        | 7.325                  | 24.889                | 39.726                | 3.398                | 39.464                         | 0.630                   |
| 0.500       | 0.500        | 9.414                  | 35.117                | 44.396                | 3.730                | 44.133                         | 0.716                   |

$Q_{100} = 1.23$

# Camino Valle

3.75% roll

MANNING'S N = 0.017 SLOPE = 0.038

| POINT | DIST | ELEV | POINT | DIST | ELEV | POINT | DIST | ELEV |
|-------|------|------|-------|------|------|-------|------|------|
| 1     | 0.0  | 0.5  | 5     | 11.0 | 0.1  | 9     | 37.2 | 0.3  |
| 2     | 8.4  | 0.3  | 6     | 23.0 | 0.4  | 10    | 37.6 | 0.3  |
| 3     | 8.8  | 0.3  | 7     | 35.0 | 0.1  | 11    | 46.0 | 0.5  |
| 4     | 9.0  | 0.0  | 8     | 37.0 | 0.0  |       |      |      |

| WSEL<br>FT. | DEPTH<br>INC | FLOW<br>AREA<br>SQ.FT. | FLOW<br>RATE<br>(CFS) | WETTED<br>PER<br>(FT) | FLOW<br>VEL<br>(FPS) | TOPWID<br>PLUS<br>OBSTRUCTIONS | TOTAL<br>ENERGY<br>(FT) |
|-------------|--------------|------------------------|-----------------------|-----------------------|----------------------|--------------------------------|-------------------------|
| 0.050       | 0.050        | 0.040                  | 0.056                 | 1.654                 | 1.410                | 2.510                          | 0.081                   |
| 0.100       | 0.100        | 0.159                  | 0.356                 | 3.308                 | 2.238                | 4.100                          | 0.178                   |
| 0.150       | 0.150        | 0.372                  | 0.948                 | 6.346                 | 2.552                | 7.075                          | 0.251                   |
| 0.200       | 0.200        | 0.806                  | 2.323                 | 11.460                | 2.883                | 12.126                         | 0.329                   |
| 0.250       | 0.250        | 1.492                  | 5.074                 | 16.573                | 3.400                | 17.178                         | 0.430                   |
| 0.300       | 0.300        | 2.431                  | 9.569                 | 21.687                | 3.936                | 22.229                         | 0.541                   |
| 0.350       | 0.350        | 3.643                  | 15.563                | 28.725                | 4.273                | 29.229                         | 0.634                   |
| 0.400       | 0.400        | 5.326                  | 24.952                | 36.570                | 4.685                | 36.153                         | 0.741                   |
| 0.450       | 0.450        | 7.256                  | 38.410                | 41.495                | 5.293                | 41.076                         | 0.886                   |
| 0.500       | 0.500        | 9.433                  | 55.193                | 46.419                | 5.851                | 46.000                         | 1.032                   |

Q<sub>100</sub> = 3.60

# Camino Valle

~~Flow Data~~ - 1.13% roll

MANNING'S N = 0.017 SLOPE = 0.011

| POINT | DIST | ELEV | POINT | DIST | ELEV | POINT | DIST | ELEV |
|-------|------|------|-------|------|------|-------|------|------|
| 1     | 0.0  | 0.5  | 5     | 11.0 | 0.1  | 9     | 37.2 | 0.3  |
| 2     | 8.4  | 0.3  | 6     | 23.0 | 0.4  | 10    | 37.6 | 0.3  |
| 3     | 8.8  | 0.3  | 7     | 35.0 | 0.1  | 11    | 46.0 | 0.5  |
| 4     | 9.0  | 0.0  | 8     | 37.0 | 0.0  |       |      |      |

| WSEL<br>FT. | DEPTH<br>INC | FLOW<br>AREA<br>SQ. FT. | FLOW<br>RATE<br>(CFS) | WETTED<br>PER<br>(FT) | FLOW<br>VEL<br>(FPS) | TOPWID<br>PLUS<br>OBSTRUCTIONS | TOTAL<br>ENERGY<br>(FT) |
|-------------|--------------|-------------------------|-----------------------|-----------------------|----------------------|--------------------------------|-------------------------|
| 0.050       | 0.050        | 0.040                   | 0.031                 | 1.654                 | 0.774                | 2.510                          | 0.059                   |
| 0.100       | 0.100        | 0.159                   | 0.195                 | 3.308                 | 1.228                | 4.100                          | 0.123                   |
| 0.150       | 0.150        | 0.372                   | 0.521                 | 6.346                 | 1.401                | 7.075                          | 0.181                   |
| 0.200       | 0.200        | 0.806                   | 1.275                 | 11.460                | 1.583                | 12.126                         | 0.239                   |
| 0.250       | 0.250        | 1.492                   | 2.785                 | 16.573                | 1.867                | 17.178                         | 0.304                   |
| 0.300       | 0.300        | 2.431                   | 5.253                 | 21.687                | 2.160                | 22.229                         | 0.373                   |
| 0.350       | 0.350        | 3.643                   | 8.543                 | 28.725                | 2.345                | 29.229                         | 0.436                   |
| 0.400       | 0.400        | 5.326                   | 13.697                | 36.570                | 2.572                | 36.153                         | 0.503                   |
| 0.450       | 0.450        | 7.256                   | 21.085                | 41.495                | 2.906                | 41.076                         | 0.581                   |
| 0.500       | 0.500        | 9.433                   | 30.298                | 46.419                | 3.212                | 46.000                         | 0.660                   |

$Q_{100} = 6.26$

# VALLE SAUTO 1.80% roll

MANNING'S N = 0.017 SLOPE = 0.018

| POINT | DIST | ELEV | POINT | DIST | ELEV | POINT | DIST | ELEV |
|-------|------|------|-------|------|------|-------|------|------|
| 1     | 0.0  | 0.5  | 5     | 12.0 | 0.1  | 9     | 37.2 | 0.3  |
| 2     | 9.4  | 0.3  | 6     | 23.0 | 0.4  | 10    | 37.6 | 0.3  |
| 3     | 9.8  | 0.3  | 7     | 34.0 | 0.1  | 11    | 46.0 | 0.5  |
| 4     | 10.0 | 0.0  | 8     | 36.0 | 0.0  |       |      |      |

| WSEL  | DEPTH | FLOW    | FLOW   | WETTED | FLOW  | TOPWID       | TOTAL  |
|-------|-------|---------|--------|--------|-------|--------------|--------|
| FT.   | INC   | AREA    | RATE   | PER    | VEL   | PLUS         | ENERGY |
|       |       | SQ. FT. | (CFS)  | (FT)   | (FPS) | OBSTRUCTIONS | (FT)   |
| 0.050 | 0.050 | 0.044   | 0.043  | 1.782  | 0.987 | 2.661        | 0.065  |
| 0.100 | 0.100 | 0.174   | 0.273  | 3.564  | 1.567 | 4.403        | 0.138  |
| 0.150 | 0.150 | 0.406   | 0.731  | 6.730  | 1.803 | 7.529        | 0.201  |
| 0.200 | 0.200 | 0.866   | 1.764  | 11.972 | 2.036 | 12.732       | 0.264  |
| 0.250 | 0.250 | 1.587   | 3.798  | 17.213 | 2.393 | 17.935       | 0.339  |
| 0.300 | 0.300 | 2.568   | 7.094  | 22.454 | 2.763 | 23.138       | 0.419  |
| 0.350 | 0.350 | 3.827   | 11.508 | 29.468 | 3.007 | 30.127       | 0.491  |
| 0.400 | 0.400 | 5.468   | 18.581 | 35.057 | 3.398 | 34.796       | 0.580  |
| 0.450 | 0.450 | 7.325   | 27.826 | 39.726 | 3.799 | 39.464       | 0.674  |
| 0.500 | 0.500 | 9.414   | 39.262 | 44.396 | 4.170 | 44.133       | 0.771  |

$Q_{100} = 5.21$

Valle Bonita Ct. - 1.20% roll

MANNING'S N = 0.017 SLOPE = 0.012

| POINT | DIST | ELEV | POINT | DIST | ELEV | POINT | DIST | ELEV |
|-------|------|------|-------|------|------|-------|------|------|
| 1     | 0.0  | 0.5  | 5     | 12.0 | 0.1  | 9     | 37.2 | 0.3  |
| 2     | 9.4  | 0.3  | 6     | 23.0 | 0.4  | 10    | 37.6 | 0.3  |
| 3     | 9.8  | 0.3  | 7     | 34.0 | 0.1  | 11    | 46.0 | 0.5  |
| 4     | 10.0 | 0.0  | 8     | 36.0 | 0.0  |       |      |      |

| WSEL<br>FT. | DEPTH<br>INC | FLOW<br>AREA<br>SQ.FT. | FLOW<br>RATE<br>(CFS) | WETTED<br>PER<br>(FT) | FLOW<br>VEL<br>(FPS) | TOPWID<br>PLUS<br>OBSTRUCTIONS | TOTAL<br>ENERGY<br>(FT) |
|-------------|--------------|------------------------|-----------------------|-----------------------|----------------------|--------------------------------|-------------------------|
| 0.050       | 0.050        | 0.044                  | 0.035                 | 1.782                 | 0.806                | 2.661                          | 0.060                   |
| 0.100       | 0.100        | 0.174                  | 0.223                 | 3.564                 | 1.280                | 4.403                          | 0.125                   |
| 0.150       | 0.150        | 0.406                  | 0.597                 | 6.730                 | 1.472                | 7.529                          | 0.184                   |
| 0.200       | 0.200        | 0.866                  | 1.440                 | 11.972                | 1.663                | 12.732                         | 0.243                   |
| 0.250       | 0.250        | 1.587                  | 3.101                 | 17.213                | 1.954                | 17.935                         | 0.309                   |
| 0.300       | 0.300        | 2.568                  | 5.793                 | 22.454                | 2.256                | 23.138                         | 0.379                   |
| 0.350       | 0.350        | 3.827                  | 9.396                 | 29.468                | 2.455                | 30.127                         | 0.444                   |
| 0.400       | 0.400        | 5.468                  | 15.172                | 35.057                | 2.775                | 34.796                         | 0.520                   |
| 0.450       | 0.450        | 7.325                  | 22.720                | 39.726                | 3.102                | 39.464                         | 0.600                   |
| 0.500       | 0.500        | 9.414                  | 32.057                | 44.396                | 3.405                | 44.133                         | 0.680                   |

$Q_{100} = 9.91$

Valle Rio Rd. - 3.58% roll

MANNING'S N = 0.017 SLOPE = 0.036

| POINT | DIST | ELEV | POINT | DIST | ELEV | POINT | DIST | ELEV |
|-------|------|------|-------|------|------|-------|------|------|
| 1     | 0.0  | 0.5  | 5     | 12.0 | 0.1  | 9     | 37.2 | 0.3  |
| 2     | 9.4  | 0.3  | 6     | 23.0 | 0.4  | 10    | 37.6 | 0.3  |
| 3     | 9.8  | 0.3  | 7     | 34.0 | 0.1  | 11    | 46.0 | 0.5  |
| 4     | 10.0 | 0.0  | 8     | 36.0 | 0.0  |       |      |      |

| WSEL<br>FT. | DEPTH<br>INC | FLOW<br>AREA<br>SQ. FT. | FLOW<br>RATE<br>(CFS) | WETTED<br>PER<br>(FT) | FLOW<br>VEL<br>(FPS) | TOPWID<br>PLUS<br>OBSTRUCTIONS | TOTAL<br>ENERGY<br>(FT) |
|-------------|--------------|-------------------------|-----------------------|-----------------------|----------------------|--------------------------------|-------------------------|
| 0.050       | 0.050        | 0.044                   | 0.061                 | 1.782                 | 1.392                | 2.661                          | 0.080                   |
| 0.100       | 0.100        | 0.174                   | 0.385                 | 3.564                 | 2.210                | 4.403                          | 0.176                   |
| 0.150       | 0.150        | 0.406                   | 1.032                 | 6.730                 | 2.543                | 7.529                          | 0.251                   |
| 0.200       | 0.200        | 0.866                   | 2.488                 | 11.972                | 2.872                | 12.732                         | 0.328                   |
| 0.250       | 0.250        | 1.587                   | 5.356                 | 17.213                | 3.375                | 17.935                         | 0.427                   |
| 0.300       | 0.300        | 2.568                   | 10.005                | 22.454                | 3.897                | 23.138                         | 0.536                   |
| 0.350       | 0.350        | 3.827                   | 16.229                | 29.468                | 4.241                | 30.127                         | 0.630                   |
| 0.400       | 0.400        | 5.468                   | 26.205                | 35.057                | 4.792                | 34.796                         | 0.757                   |
| 0.450       | 0.450        | 7.325                   | 39.243                | 39.726                | 5.358                | 39.464                         | 0.896                   |
| 0.500       | 0.500        | 9.414                   | 55.370                | 44.396                | 5.881                | 44.133                         | 1.038                   |

$Q_{100} = 2.63$

Valle Rio

- 1.7% roll

MANNING'S N = 0.017 SLOPE = 0.017

| POINT | DIST | ELEV | POINT | DIST | ELEV | POINT | DIST | ELEV |
|-------|------|------|-------|------|------|-------|------|------|
| 1     | 0.0  | 0.5  | 5     | 11.0 | 0.1  | 9     | 37.2 | 0.3  |
| 2     | 8.4  | 0.3  | 6     | 23.0 | 0.4  | 10    | 37.6 | 0.3  |
| 3     | 8.8  | 0.3  | 7     | 35.0 | 0.1  | 11    | 46.0 | 0.5  |
| 4     | 9.0  | 0.0  | 8     | 37.0 | 0.0  |       |      |      |

| WSEL<br>FT. | DEPTH<br>INC | FLOW<br>AREA<br>SQ. FT. | FLOW<br>RATE<br>(CFS) | WETTED<br>PER<br>(FT) | FLOW<br>VEL<br>(FPS) | TOPWID<br>PLUS<br>OBSTRUCTIONS | TOTAL<br>ENERGY<br>(FT) |
|-------------|--------------|-------------------------|-----------------------|-----------------------|----------------------|--------------------------------|-------------------------|
| 0.050       | 0.050        | 0.040                   | 0.038                 | 1.654                 | 0.949                | 2.510                          | 0.064                   |
| 0.100       | 0.100        | 0.159                   | 0.240                 | 3.308                 | 1.507                | 4.100                          | 0.135                   |
| 0.150       | 0.150        | 0.372                   | 0.639                 | 6.346                 | 1.719                | 7.075                          | 0.196                   |
| 0.200       | 0.200        | 0.806                   | 1.564                 | 11.460                | 1.941                | 12.126                         | 0.259                   |
| 0.250       | 0.250        | 1.492                   | 3.416                 | 16.573                | 2.289                | 17.178                         | 0.332                   |
| 0.300       | 0.300        | 2.431                   | 6.443                 | 21.687                | 2.650                | 22.229                         | 0.409                   |
| 0.350       | 0.350        | 3.643                   | 10.479                | 28.725                | 2.877                | 29.229                         | 0.479                   |
| 0.400       | 0.400        | 5.326                   | 16.800                | 36.570                | 3.155                | 36.153                         | 0.555                   |
| 0.450       | 0.450        | 7.256                   | 25.862                | 41.495                | 3.564                | 41.076                         | 0.648                   |
| 0.500       | 0.500        | 9.433                   | 37.162                | 46.419                | 3.939                | 46.000                         | 0.741                   |

Q=5.27

Valle Rio Rd. - 3.34% roll

MANNING'S N = 0.017 SLOPE = 0.033

| POINT | DIST | ELEV | POINT | DIST | ELEV | POINT | DIST | ELEV |
|-------|------|------|-------|------|------|-------|------|------|
| 1     | 0.0  | 0.5  | 5     | 12.0 | 0.1  | 9     | 37.2 | 0.3  |
| 2     | 9.4  | 0.3  | 6     | 23.0 | 0.4  | 10    | 37.6 | 0.3  |
| 3     | 9.8  | 0.3  | 7     | 34.0 | 0.1  | 11    | 46.0 | 0.5  |
| 4     | 10.0 | 0.0  | 8     | 36.0 | 0.0  |       |      |      |

| WSEL  | DEPTH | FLOW   | FLOW   | WETTED | FLOW  | TOPWID       | TOTAL  |
|-------|-------|--------|--------|--------|-------|--------------|--------|
| FT.   | INC   | AREA   | RATE   | PER    | VEL   | PLUS         | ENERGY |
|       |       | SQ.FT. | (CFS)  | (FT)   | (FPS) | OBSTRUCTIONS | (FT)   |
| 0.050 | 0.050 | 0.044  | 0.059  | 1.782  | 1.345 | 2.661        | 0.078  |
| 0.100 | 0.100 | 0.174  | 0.372  | 3.564  | 2.135 | 4.403        | 0.171  |
| 0.150 | 0.150 | 0.406  | 0.996  | 6.730  | 2.456 | 7.529        | 0.244  |
| 0.200 | 0.200 | 0.866  | 2.403  | 11.972 | 2.774 | 12.732       | 0.320  |
| 0.250 | 0.250 | 1.587  | 5.174  | 17.213 | 3.260 | 17.935       | 0.415  |
| 0.300 | 0.300 | 2.568  | 9.664  | 22.454 | 3.764 | 23.138       | 0.520  |
| 0.350 | 0.350 | 3.827  | 15.676 | 29.468 | 4.097 | 30.127       | 0.611  |
| 0.400 | 0.400 | 5.468  | 25.311 | 35.057 | 4.629 | 34.796       | 0.733  |
| 0.450 | 0.450 | 7.325  | 37.905 | 39.726 | 5.175 | 39.464       | 0.867  |
| 0.500 | 0.500 | 9.414  | 53.482 | 44.396 | 5.681 | 44.133       | 1.002  |

Q<sub>100</sub> = 7.57

Valle Rio Rd. - 1.47% std

MANNING'S N = 0.017 SLOPE = 0.015

| POINT | DIST | ELEV | POINT | DIST | ELEV | POINT | DIST | ELEV |
|-------|------|------|-------|------|------|-------|------|------|
| 1     | 0.0  | 0.9  | 5     | 12.0 | 0.1  | 9     | 37.2 | 0.7  |
| 2     | 9.4  | 0.7  | 6     | 23.0 | 0.4  | 10    | 37.6 | 0.7  |
| 3     | 9.8  | 0.7  | 7     | 34.0 | 0.1  | 11    | 46.0 | 0.9  |
| 4     | 10.0 | 0.0  | 8     | 36.0 | 0.0  |       |      |      |

| WSEL  | DEPTH | FLOW   | FLOW    | WETTED | FLOW  | TOPWID       | TOTAL  |
|-------|-------|--------|---------|--------|-------|--------------|--------|
| FT.   | INC   | AREA   | RATE    | PER    | VEL   | PLUS         | ENERGY |
|       |       | SQ.FT. | (CFS)   | (FT)   | (FPS) | OBSTRUCTIONS | (FT)   |
| 0.050 | 0.050 | 0.041  | 0.036   | 1.694  | 0.886 | 2.558        | 0.062  |
| 0.100 | 0.100 | 0.164  | 0.231   | 3.388  | 1.407 | 4.197        | 0.131  |
| 0.150 | 0.150 | 0.383  | 0.615   | 6.465  | 1.609 | 7.220        | 0.190  |
| 0.200 | 0.200 | 0.825  | 1.499   | 11.619 | 1.817 | 12.320       | 0.251  |
| 0.250 | 0.250 | 1.523  | 3.259   | 16.772 | 2.141 | 17.420       | 0.321  |
| 0.300 | 0.300 | 2.475  | 6.127   | 21.925 | 2.475 | 22.520       | 0.395  |
| 0.350 | 0.350 | 3.683  | 10.321  | 27.078 | 2.803 | 27.620       | 0.472  |
| 0.400 | 0.400 | 5.020  | 17.233  | 27.230 | 3.433 | 27.720       | 0.583  |
| 0.450 | 0.450 | 6.363  | 25.485  | 27.383 | 4.006 | 27.820       | 0.700  |
| 0.500 | 0.500 | 7.710  | 34.973  | 27.535 | 4.536 | 27.920       | 0.820  |
| 0.550 | 0.550 | 9.063  | 45.617  | 27.687 | 5.034 | 28.020       | 0.944  |
| 0.600 | 0.600 | 10.420 | 57.355  | 27.839 | 5.504 | 28.120       | 1.071  |
| 0.650 | 0.650 | 11.783 | 70.136  | 27.991 | 5.953 | 28.220       | 1.201  |
| 0.700 | 0.700 | 13.219 | 78.072  | 31.774 | 5.906 | 31.061       | 1.243  |
| 0.750 | 0.750 | 14.888 | 86.876  | 36.444 | 5.835 | 35.729       | 1.280  |
| 0.800 | 0.800 | 16.792 | 97.964  | 41.113 | 5.834 | 40.398       | 1.329  |
| 0.850 | 0.850 | 18.928 | 111.330 | 45.783 | 5.882 | 45.066       | 1.388  |

Q<sub>100</sub> = 32.57

Valle Rio Rd. - 3.20% roll

MANNING'S N = 0.017 SLOPE = 0.032

| POINT | DIST | ELEV | POINT | DIST | ELEV | POINT | DIST | ELEV |
|-------|------|------|-------|------|------|-------|------|------|
| 1     | 0.0  | 0.5  | 5     | 12.0 | 0.1  | 9     | 37.2 | 0.3  |
| 2     | 9.4  | 0.3  | 6     | 23.0 | 0.4  | 10    | 37.6 | 0.3  |
| 3     | 9.8  | 0.3  | 7     | 34.0 | 0.1  | 11    | 46.0 | 0.5  |
| 4     | 10.0 | 0.0  | 8     | 36.0 | 0.0  |       |      |      |

| WSEL  | DEPTH | FLOW   | FLOW   | WETTED | FLOW  | TOPWID       | TOTAL  |
|-------|-------|--------|--------|--------|-------|--------------|--------|
| FT.   | INC   | AREA   | RATE   | PER    | VEL   | PLUS         | ENERGY |
|       |       | SQ.FT. | (CFS)  | (FT)   | (FPS) | OBSTRUCTIONS | (FT)   |
| 0.050 | 0.050 | 0.044  | 0.057  | 1.782  | 1.317 | 2.661        | 0.077  |
| 0.100 | 0.100 | 0.174  | 0.364  | 3.564  | 2.090 | 4.403        | 0.168  |
| 0.150 | 0.150 | 0.406  | 0.975  | 6.730  | 2.404 | 7.529        | 0.240  |
| 0.200 | 0.200 | 0.866  | 2.352  | 11.972 | 2.715 | 12.732       | 0.315  |
| 0.250 | 0.250 | 1.587  | 5.064  | 17.213 | 3.191 | 17.935       | 0.408  |
| 0.300 | 0.300 | 2.568  | 9.459  | 22.454 | 3.684 | 23.138       | 0.511  |
| 0.350 | 0.350 | 3.827  | 15.344 | 29.468 | 4.010 | 30.127       | 0.600  |
| 0.400 | 0.400 | 5.468  | 24.775 | 35.057 | 4.531 | 34.796       | 0.719  |
| 0.450 | 0.450 | 7.325  | 37.102 | 39.726 | 5.065 | 39.464       | 0.849  |
| 0.500 | 0.500 | 9.414  | 52.349 | 44.396 | 5.560 | 44.133       | 0.981  |

$Q_{100} = 2.52$

# Valle Romantico

~~radius~~ - 2.23% std

MANNING'S N = 0.017 SLOPE = 0.022

| POINT | DIST | ELEV | POINT | DIST | ELEV | POINT | DIST | ELEV |
|-------|------|------|-------|------|------|-------|------|------|
| 1     | 0.0  | 0.9  | 5     | 11.0 | 0.1  | 9     | 37.2 | 0.7  |
| 2     | 8.4  | 0.7  | 6     | 23.0 | 0.4  | 10    | 37.6 | 0.7  |
| 3     | 8.8  | 0.7  | 7     | 35.0 | 0.1  | 11    | 46.0 | 0.9  |
| 4     | 9.0  | 0.0  | 8     | 37.0 | 0.0  |       |      |      |

| WSEL<br>FT. | DEPTH<br>INC | FLOW<br>AREA<br>SQ.FT. | FLOW<br>RATE<br>(CFS) | WETTED<br>PER<br>(FT) | FLOW<br>VEL<br>(FPS) | TOPWID<br>PLUS<br>OBSTRUCTIONS | TOTAL<br>ENERGY<br>(FT) |
|-------------|--------------|------------------------|-----------------------|-----------------------|----------------------|--------------------------------|-------------------------|
| 0.050       | 0.050        | 0.039                  | 0.042                 | 1.645                 | 1.079                | 2.484                          | 0.068                   |
| 0.100       | 0.100        | 0.156                  | 0.268                 | 3.290                 | 1.713                | 4.048                          | 0.146                   |
| 0.150       | 0.150        | 0.366                  | 0.714                 | 6.318                 | 1.953                | 6.996                          | 0.209                   |
| 0.200       | 0.200        | 0.795                  | 1.756                 | 11.423                | 2.209                | 12.021                         | 0.276                   |
| 0.250       | 0.250        | 1.476                  | 3.849                 | 16.527                | 2.608                | 17.047                         | 0.356                   |
| 0.300       | 0.300        | 2.408                  | 7.273                 | 21.631                | 3.021                | 22.072                         | 0.442                   |
| 0.350       | 0.350        | 3.591                  | 12.294                | 26.735                | 3.424                | 27.098                         | 0.532                   |
| 0.400       | 0.400        | 4.981                  | 20.162                | 28.839                | 4.048                | 29.123                         | 0.655                   |
| 0.450       | 0.450        | 6.391                  | 30.481                | 28.942                | 4.769                | 29.148                         | 0.804                   |
| 0.500       | 0.500        | 7.803                  | 42.412                | 29.045                | 5.435                | 29.174                         | 0.959                   |
| 0.550       | 0.550        | 9.217                  | 55.840                | 29.148                | 6.059                | 29.199                         | 1.121                   |
| 0.600       | 0.600        | 10.631                 | 70.676                | 29.251                | 6.648                | 29.224                         | 1.287                   |
| 0.650       | 0.650        | 12.047                 | 86.846                | 29.354                | 7.209                | 29.250                         | 1.458                   |
| 0.700       | 0.700        | 13.534                 | 97.305                | 33.106                | 7.190                | 32.050                         | 1.504                   |
| 0.750       | 0.750        | 15.252                 | 108.796               | 37.757                | 7.133                | 36.700                         | 1.541                   |
| 0.800       | 0.800        | 17.204                 | 123.060               | 42.408                | 7.153                | 41.350                         | 1.596                   |

$Q_{100} = 2.19$

Valle Romantico Pl. - 3.17% std

MANNING'S N = 0.017 SLOPE = 0.032

| POINT | DIST | ELEV | POINT | DIST | ELEV | POINT | DIST | ELEV |
|-------|------|------|-------|------|------|-------|------|------|
| 1     | 0.0  | 0.9  | 5     | 12.0 | 0.1  | 9     | 37.2 | 0.7  |
| 2     | 9.4  | 0.7  | 6     | 23.0 | 0.4  | 10    | 37.6 | 0.7  |
| 3     | 9.8  | 0.7  | 7     | 34.0 | 0.1  | 11    | 46.0 | 0.9  |
| 4     | 10.0 | 0.0  | 8     | 36.0 | 0.0  |       |      |      |

| WSEL<br>FT. | DEPTH<br>INC | FLOW<br>AREA<br>SQ. FT. | FLOW<br>RATE<br>(CFS) | WETTED<br>PER<br>(FT) | FLOW<br>VEL<br>(FPS) | TOPWID<br>PLUS<br>OBSTRUCTIONS | TOTAL<br>ENERGY<br>(FT) |
|-------------|--------------|-------------------------|-----------------------|-----------------------|----------------------|--------------------------------|-------------------------|
| 0.050       | 0.050        | 0.041                   | 0.053                 | 1.694                 | 1.301                | 2.558                          | 0.076                   |
| 0.100       | 0.100        | 0.164                   | 0.338                 | 3.388                 | 2.066                | 4.197                          | 0.166                   |
| 0.150       | 0.150        | 0.383                   | 0.904                 | 6.465                 | 2.363                | 7.220                          | 0.237                   |
| 0.200       | 0.200        | 0.825                   | 2.202                 | 11.619                | 2.669                | 12.320                         | 0.311                   |
| 0.250       | 0.250        | 1.523                   | 4.786                 | 16.772                | 3.144                | 17.420                         | 0.404                   |
| 0.300       | 0.300        | 2.475                   | 8.997                 | 21.925                | 3.635                | 22.520                         | 0.506                   |
| 0.350       | 0.350        | 3.683                   | 15.156                | 27.078                | 4.116                | 27.620                         | 0.613                   |
| 0.400       | 0.400        | 5.020                   | 25.307                | 27.230                | 5.041                | 27.720                         | 0.795                   |
| 0.450       | 0.450        | 6.363                   | 37.425                | 27.383                | 5.882                | 27.820                         | 0.988                   |
| 0.500       | 0.500        | 7.710                   | 51.357                | 27.535                | 6.661                | 27.920                         | 1.190                   |
| 0.550       | 0.550        | 9.063                   | 66.988                | 27.687                | 7.392                | 28.020                         | 1.400                   |
| 0.600       | 0.600        | 10.420                  | 84.225                | 27.839                | 8.083                | 28.120                         | 1.616                   |
| 0.650       | 0.650        | 11.783                  | 102.994               | 27.991                | 8.741                | 28.220                         | 1.838                   |
| 0.700       | 0.700        | 13.219                  | 114.648               | 31.774                | 8.673                | 31.061                         | 1.870                   |
| 0.750       | 0.750        | 14.888                  | 127.576               | 36.444                | 8.569                | 35.729                         | 1.892                   |
| 0.800       | 0.800        | 16.792                  | 143.859               | 41.113                | 8.567                | 40.398                         | 1.942                   |
| 0.850       | 0.850        | 18.928                  | 163.488               | 45.783                | 8.637                | 45.066                         | 2.010                   |

$Q_{max} = 3.75$

# Valle Romantica

- 0.6% roll

MANNING'S N = 0.017 SLOPE = 0.006

| POINT | DIST | ELEV | POINT | DIST | ELEV | POINT | DIST | ELEV |
|-------|------|------|-------|------|------|-------|------|------|
| 1     | 0.0  | 0.5  | 5     | 11.0 | 0.1  | 9     | 37.2 | 0.3  |
| 2     | 8.4  | 0.3  | 6     | 23.0 | 0.4  | 10    | 37.6 | 0.3  |
| 3     | 8.8  | 0.3  | 7     | 35.0 | 0.1  | 11    | 46.0 | 0.5  |
| 4     | 9.0  | 0.0  | 8     | 37.0 | 0.0  |       |      |      |

| WSEL<br>FT. | DEPTH<br>INC | FLOW<br>AREA<br>SQ.FT. | FLOW<br>RATE<br>(CFS) | WETTED<br>PER<br>(FT) | FLOW<br>VEL<br>(FPS) | TOPWID<br>PLUS<br>OBSTRUCTIONS | TOTAL<br>ENERGY<br>(FT) |
|-------------|--------------|------------------------|-----------------------|-----------------------|----------------------|--------------------------------|-------------------------|
| 0.050       | 0.050        | 0.040                  | 0.022                 | 1.654                 | 0.564                | 2.510                          | 0.055                   |
| 0.100       | 0.100        | 0.159                  | 0.142                 | 3.308                 | 0.895                | 4.100                          | 0.112                   |
| 0.150       | 0.150        | 0.372                  | 0.379                 | 6.346                 | 1.021                | 7.075                          | 0.166                   |
| 0.200       | 0.200        | 0.806                  | 0.929                 | 11.460                | 1.153                | 12.126                         | 0.221                   |
| 0.250       | 0.250        | 1.492                  | 2.030                 | 16.573                | 1.360                | 17.178                         | 0.279                   |
| 0.300       | 0.300        | 2.431                  | 3.828                 | 21.687                | 1.574                | 22.229                         | 0.339                   |
| 0.350       | 0.350        | 3.643                  | 6.225                 | 28.725                | 1.709                | 29.229                         | 0.395                   |
| 0.400       | 0.400        | 5.326                  | 9.981                 | 36.570                | 1.874                | 36.153                         | 0.455                   |
| 0.450       | 0.450        | 7.256                  | 15.364                | 41.495                | 2.117                | 41.076                         | 0.520                   |
| 0.500       | 0.500        | 9.433                  | 22.077                | 46.419                | 2.340                | 46.000                         | 0.585                   |

Q<sub>100</sub> = 11.38

13-19/19

# Type "A" Sump - VALLE BONITA

## ANALYSIS OF AN INLET IN A SUMP CONDITION - VALLE BONITA COURT

INLET TYPE: Single Grate Type "A" with curb opening wings on both sides on inlet.

WEIR:  $Q = C * L * H^{1.5}$

ORIFICE:  $Q = C * A * (2 * G * H)^{0.5}$

Wing opening

Grate opening

Grate opening

Wing opening

C=3.0

C=3.0

C=0.6

C=0.6

L=4.0 ft

L(single grate)=[(2.67')+2(1.8')]=6.27'

A=2.0 sf

$Q = 3.0(4.0')H^{1.5} = 12.0H^{1.5}$

$Q = 3.0(6.27')H^{1.5} = 18.81H^{1.5}$

$Q = 2.46 * (64.4 * H)^{0.5}$

$Q = 1.2 * (64.4 * H)^{0.5}$

|             | WS        | HEIGHT      | Q (CFS)<br>WEIR | Q (CFS)<br>WEIR | Q (CFS)<br>ORIFICE | TOTAL<br>Q | COMMENTS:                                       |
|-------------|-----------|-------------|-----------------|-----------------|--------------------|------------|-------------------------------------------------|
|             | ELEVATION | ABOVE INLET | WING<br>OPENING | SINGLE<br>GRATE | SINGLE<br>GRATE    | (CFS)      |                                                 |
| ~FL @ INLET | 0.00      | 0.00        | 0.00            | 0.00            | 0.00               | 0.00       | Flow at single "A" inlet w/ two wing openings   |
|             | 0.10      | 0.10        | 0.38            | 0.59            | 6.24               | 1.35       | Weir controls on grate analysis                 |
|             | 0.20      | 0.20        | 1.07            | 1.68            | 8.82               | 3.83       |                                                 |
|             | 0.30      | 0.30        | 1.97            | 3.09            | 10.80              | 7.03       |                                                 |
|             | 0.40      | 0.40        | 3.04            | 4.76            | 12.47              | 10.83      |                                                 |
|             | 0.50      | 0.50        | 4.24            | 6.65            | 13.94              | 15.14      | Q(100 yr)=12.97 cfs is provided at this depth   |
|             | 0.60      | 0.60        | 5.58            | 8.74            | 15.27              | 19.90      |                                                 |
| TOP OF CURB | 0.70      | 0.70        | 7.03            | 11.02           | 16.50              | 25.07      | Q(2x100 yr)=25.94 cfs is provided at this depth |
|             | 0.80      | 0.80        | 8.59            | 13.46           | 17.64              | 30.63      |                                                 |
|             | 0.90      | 0.90        | 10.25           | 16.06           | 18.71              | 36.55      |                                                 |
| ROW LIMIT   | 1.00      | 1.00        | 12.00           | 18.81           | 19.72              | 42.81      |                                                 |

NOTE:

The total runoff intercepted by the inlet at the low point in the road is:

$Q(100) = 2 * [(\text{runoff of the wing opening}) + (\text{the lesser of the weir or orifice amount taken by the double grate})]$ .

THE 100 YR STORM EVENT =12.97 CFS at the sump condition

THE 2 x 100 YR STORM EVENT =25.94 CFS at the sump condition

# Type "A" Sump- VALLE SANTO

## ANALYSIS OF AN INLET IN A SUMP CONDITION - VALLE SANTO TRAIL

INLET TYPE: Double Grate Type "A" with curb opening wings on both sides on inlet.

WEIR:  $Q=C*L*H^{1.5}$

ORIFICE:  $Q=C*A*(2*G*H)^{0.5}$

Wing opening

Grate opening

Grate opening

Wing opening

C= 3.0

C=3.0

C=0.6

C=0.6

L= 4.0 ft

L(double grate)=[2(2.67')+2(1.8')]=8. A(double grate)=8.19 sf A=2.0 sf

$Q=3.0(4.0')H^{1.5}=12.0H^{1.5}$   $Q=3.0(8.94)H^{1.5}=26.82*H^{1.5}$   $Q=4.194*(64.4*H)^{0.5}$   $Q=1.2*(64.4*H)^{0.5}$

|             | WS<br>ELEVATION | HEIGHT<br>ABOVE INLET | Q (CFS)<br>WEIR<br>"A"<br>OPENING | Q (CFS)<br>WEIR<br>DOUBLE<br>GRATE | Q (CFS)<br>ORIFICE<br>DOUBLE<br>GRATE | TOTAL<br>Q<br>(CFS) | COMMENTS:                                         |
|-------------|-----------------|-----------------------|-----------------------------------|------------------------------------|---------------------------------------|---------------------|---------------------------------------------------|
| ~FL @ INLET | 0.00            | 0.00                  | 0.00                              | 0.00                               | 0.00                                  | 0.00                | Flow at double "A" inlet w/ two wing openings     |
|             | 0.10            | 0.10                  | 0.38                              | 0.85                               | 12.47                                 | 1.61                | Weir controls on grate analysis                   |
|             | 0.20            | 0.20                  | 1.07                              | 2.40                               | 17.64                                 | 4.55                |                                                   |
|             | 0.30            | 0.30                  | 1.97                              | 4.41                               | 21.60                                 | 8.35                |                                                   |
|             | 0.40            | 0.40                  | 3.04                              | 6.78                               | 24.94                                 | 12.86               |                                                   |
|             | 0.50            | 0.50                  | 4.24                              | 9.48                               | 27.88                                 | 17.97               | Q(100 yr) = 18.86 cfs is provided at this depth   |
|             | 0.60            | 0.60                  | 5.58                              | 12.46                              | 30.55                                 | 23.62               |                                                   |
| TOP OF CURB | 0.70            | 0.70                  | 7.03                              | 15.71                              | 32.99                                 | 29.76               |                                                   |
|             | 0.80            | 0.80                  | 8.59                              | 19.19                              | 35.27                                 | 36.36               | Q(2x100 yr) = 37.73 cfs is provided at this depth |
|             | 0.90            | 0.90                  | 10.25                             | 22.90                              | 37.41                                 | 43.39               |                                                   |
| ROW LIMIT   | 1.00            | 1.00                  | 12.00                             | 26.82                              | 39.43                                 | 50.82               |                                                   |

NOTE:

The total runoff intercepted by the inlet at the low point in the road is:

$Q_r(100) = 2*[(\text{runoff of the wing opening}) + (\text{the lesser of the weir or orifice amount taken by the double grate})]$ .

THE 100 YR STORM EVENT = 18.86 CFS at the sump condition

THE 2 x 100 YR STORM EVENT = 37.73 CFS at the sump condition

# Storm Drain Analysis

## STORM DRAIN ANALYSIS FOR ANDALUCIA AT LA LUZ VALLE - PARAISO SUBDIVISION

| PIPE LOCATION   | SIZE/TYPE | LENGTH (ft.) | SLOPE (%) | PROPOSED Q<br>(100-YR, cfs) | PIPE CAPACITY<br>(100-YR, CFS) |
|-----------------|-----------|--------------|-----------|-----------------------------|--------------------------------|
| INLET 1 TO MH 1 | 24" RCP   | 30.00        | 0.09      | 37.73                       | 37.17                          |
| MH 1 TO MH 2    | 36" RCP   | 136.00       | 0.60      | 37.73                       | 51.66                          |
| MH 2 TO MH 3    | 36" RCP   | 315.00       | 0.60      | 37.73                       | 51.66                          |
| MH 3 TO INLET 2 | 36" RCP   | 200.00       | 0.60      | 37.73                       | 51.66                          |
| INLET 2 TO MH 4 | 42" RCP   | 132.00       | 2.01      | 50.70                       | 142.60                         |
| MH 4 TO OUTLET  | 42" RCP   | 117.00       | 0.60      | 50.70                       | 77.93                          |
|                 |           |              |           |                             |                                |