ARROYO VISTA SUBDIVIDISON
DRAINAGE MANAGEMENT PLAN

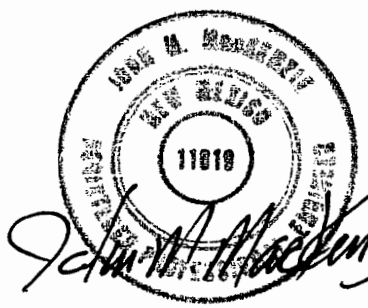
Prepared for

Vista Arroyo Development LLC
8910 Adams NE
Albuquerque, NM 87113

Prepared by

Mark Goodwin & Associates, PA
P.O. Box 90606
Albuquerque, NM 87199

July 2005



7-25-05
8-2-05

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I. INTRODUCTION

This drainage report has been prepared in support of a planned 132.7 acre single family subdivision to be located on Albuquerque's west side. The area to be subdivided is bounded on the north by Black Arroyo Blvd. The southern portion of the site fronts portions of the Calabacillas Arroyo, and the future alignment of McMahon Blvd. Units 1 & 2 of the Park Hill Subdivision border this site on the east, while an existing R.E.A. easement abuts the western reaches of this site.

See Vicinity Map and Legal description on the Preliminary Plat for Location

The approval of this study is required in order to obtain preliminary plat approval for the Arroyo Vista (AV) subdivision. Prior to final plat and building permit approvals, final grading plans and work order construction plans must be approved by the City of Albuquerque (COA), and the Albuquerque Metropolitan Flood Control Authority (AMAFCA).

II. METHODOLOGY

Existing and proposed site hydrological conditions have been analyzed for the 100-year, 6-hour storm event in accordance with the revised Section 22.2, Hydrology, of the Development Process Manual (DPM), for the COA, dated July 1997. The same storm event was used in determining street capacities using P(1 hr) = 1.87", P(6 hr) = 2.20", and P(24 hr) = 2.66". The on-site land treatment values used were Treatment D = 61%, and Treatment B = 39% for on-site developed conditions. AHYMO printouts are included within the appendices of this report. 'Water Surface Pressure Gradient Program' (WSPGW), by Civil Design Corporation, was used in analyzing storm drain hydraulics. Inlet capacity hydraulic computations are also included in this report.

III. EXISTING CONDITIONS

The Arroyo Vista (AV) site is currently undeveloped with sparse vegetation consisting of Chamisa, desert grasses, and weeds. Soils consist primarily of highly absorptive sands, with occasional silt lenses. With the Calabacillas Arroyo along the south side of the site, the property primarily falls to its interior to a naturally occurring arroyo, which then outfalls to the Calabacillas. Slopes range from 2% to over 20% along the banks on the natural arroyo traversing the site. FEMA designated floodplains are identified as impacting this site both where the Rainbow Tributary extends north and south across the site, and along the banks of the Calabacillas Arroyo. Floodplain map revisions will be obtained as a part of the development process.

A. Offsite Drainage

Concentrated storm flows from the Rainbow Tributary, a 2.17 sq. mi. watershed, impact this site from the north. A copy of a previously prepared drainage study entitled:

Drainage Management Plan
For
Arroyo Vista Subdivision
Pipe and Pond Alternatives
For
The Rainbow Tributary

has been included with this submittal. That study quantifies both existing and proposed 100-year flows, and weighs different alternatives on the conveyance of the flows across this site to the Calabacillas Arroyo. Also shown on the Offsite Drainage Basin Map, located at the rear of this report, is an additional offsite basin (43.1 acres) north of this site that impacts this site near the northwest boundary. No other offsite flows have been identified impacting this site.

IV. DEVELOPED DRAINAGE PLAN

The proposed development is a single-family, detached-unit, residential subdivision with 652 lots on approximately 132.75 acres. Approximately 40 acres will be dedicated for open space. The resulting developed densite is 4.9 DU/AC.

A. Offsite Drainage

A draft of the previously mentioned drainage study, prepared by this office, has been reviewed by officials from the COA, AMAFCA, and the Sandoval County Arroyo Flood Control Authority (SCAFCA). Subsequently, separate agreements have been entered into between Arroyo Vista and SCAFCA, and between Arroyo Vista, the COA, and AMAFCA (copies enclosed).

The agreement with SCAFCA calls for Arroyo Vista to make attempts to purchase a total of 6 acres immediately north of the proposed Black Arroyo Boulevard & Durbridge Street intersection for a future detention basin that will capture flows from the Rainbow Tributary Arroyo. If a settlement cannot be reached, Arroyo Vista agrees to pay SCAFCA a total of $200,000 to be applied towards the purchase. SCAFCA has agreed to construct, and maintain the new ponding area. Arroyo Vista is further committed to construct a storm drain, including the pond transition structure to convey the convey the Rainbow Tributary flows across this site to a downstream outfall location within the Calabacillas Arroyo.

The Arroyo Vista, City of Albuquerque, and AMAFCA agreement calls for Arroyo Vista to construct specific arroyo improvements (north side bank protection & drop structure) within the Calabacillas Arroyo adjacent to this site. The City, in turn, will construct the McMahon Boulevard crossing structure over the Calabacillas Arroyo. AMAFCA will maintain the arroyo system.

For the offsite storm flows impacting this site near the northwest boundary, it is proposed that a floodwall be constructed along the back of the northernmost properties. Flows from the north will be routed west along the floodwall to an existing drainage easement running parallel to the western site property line. Once within the easement, the flows are directed to the Calabacillas Arroyo.

Offsite flows from the New Mexico Utilities well site are ponded onsite. Controlled flows from the pond will be routed through the Arroyo Vista storm drain system.

B. On-site Drainage

A total of 37 onsite developed drainage basins have been identified under the proposed drainage management plan. Also included with the development of the Arroyo Vista site will be full improvements within the north half of McMahon Blvd., adjacent to the site, and the south half improvements along Black Arroyo Blvd. along this properties north boundary. Downstream of this property, to the east, both sides of McMahon are fully developed, while the south half of Black Arroyo is fully developed.

The overall drainage management plan calls for developed storm flows to be collected within the onsite streets, where flows will be either routed to localized storm drain collection points, or continue to surface discharge downstream within fully developed streets for collection further downstream.

As indicated on the On-site Drainage Basin Boundary Map, flows along the eastern portion of this site will surface drain to four separate outfall points to the east.

- *A total of 39.63 cfs will collect within Black Arroyo Blvd., and continue east. Existing drop inlets are in place along the south side of Black Arroyo Blvd. to intercept this flow.*
- *A total of 12.01 cfs will surface drain through the developed Park Hill Subdivision via Red Rock Park Avenue, and another 4.75 cfs will be routed through that subdivision via Park South Place. The approved drainage management plan for the Park Hill Subdivision allows for off-site runoff to be routed through that subdivision in these locations.*
- *A total of 25.93 cfs will be surface routed to the east within McMahon Blvd. The Park Hill Subdivision also identifies this future flow within McMahon.*

As reflected on the Arroyo Vista grading plan, the remainder of the developed site will fall to it's interior, Durbridge Street. With the aforementioned Rainbow Tributary outfall storm drain crossing the site within Durbridge, localized storm drain lines (shown on grading plan) are planned to extend from Durbridge to collect on-site developed storm flows from the west and east.

In order to minimize the size of the localized storm drain system, as well as the Durbridge storm drain line, flows from the far western reaches of this site are shown being collected within a planned storm drain line located in Sedna Street. Rather than extending the Sedna storm drain all the way to Durbridge, the upper Sedna storm drain will instead outfall directly into the adjacent Calabacillas Arroyo near the intersection of Sedna & Kwatee Street.

Finally, given that the intersection of Sedna St. and Durbridge St. is the low point in the entire subdivision, a concrete rundown is planned from this intersection directly into the Calabacillas Arroyo to serve as overflow protection.

Street hydraulic calculations, as well as inlet and storm drain sizing charts are included within this report. A more detailed storm drain analysis will be performed during final design to ensure adequate sizing of all identified storm drain, and arroyo improvements.

V. CONCLUSION

Previously prepared studies have been prepared, submitted, reviewed, and approved that address key drainage elements that affect the development of the Arroyo Visa site. The October, 2004 study, which addressed the off-site flows from the Rainbow Tributary, resulted in the identification of the required infrastructure that will safely routed off-site flows through this site to an outfall within the Calabacillas Arroyo. A separate Calabacillas Arroyo study, again reviewed, and approved by the pertinent government agencies, resulted in the identification of required improvements within the Calabacilla Arroyo that will allow for the narrowing of the historic limits of the arroyo floodplain. As a part of the development of the Arroyo Vista site, the identified drainage improvements will be constructed, and the necessary submittals will be made to FEMA to have the floodplain encumbered areas revised appropriately.

The on-site drainage management plan identified in this report, when constructed, will safely convey storm runoff through the site to adequately designed outfall locations within the improved arroyo downstream.

SUB-BASIN TREATMENTS LIST

PROJECT ARROYO VISTA
SUBJECT SUB-BASIN TREATMENTS
BY JSD DATE MAY 25, 2005
CHECKED _____ DATE _____
SHEET _____ OF _____

SUB-BASIN	AREA (Ac)	# LOTS	ROW (Ac)	D' ACRES	D' %	B' ACRES	B' %
DB1	2.98	10	2.35	2.62	88	0.36	12
DB2	1.43	7	0.37	0.81	57	0.62	43
DB3	1.33	0	1.33	1.06	80	0.27	20
DB4	4.19	14	1.31	2.08	50	2.11	50
DB5	3.73	21	0.70	2.10	56	1.63	44
DB6	3.11	13	0.43	1.30	42	1.81	58
DB7	1.44	6	0.18	0.58	40	0.86	60
DB8	2.44	14	0.66	1.56	64	0.88	36
DB9	4.78	23	1.45	2.85	60	1.93	40
DB10	3.29	20	0.56	1.92	58	1.37	42
DB11	3.18	19	0.53	1.82	57	1.36	43
DB12	4.03	24	0.89	2.48	62	1.55	38
DB13	2.93	17	0.50	1.65	56	1.28	44
DB14	0.93	5	0.24	0.56	60	0.37	40
DB15	1.65	10	0.35	1.02	62	0.63	38
DB16	4.72	30	0.79	2.84	60	1.88	40
DB17	4.48	28	0.92	2.80	62	1.68	38
DB18	3.39	19	0.79	2.03	60	1.36	40
DB19	0.88	5	0.27	0.58	66	0.30	34
DB20	3.80	16	0.63	1.68	44	2.12	56
DB21	2.78	14	0.58	1.49	54	1.29	46
DB22	1.18	4	0.22	0.47	40	0.71	60
DB23	1.85	10	0.49	1.13	61	0.72	39
DB24	3.71	19	1.03	2.22	60	1.49	40
DB25	10.48	27	4.94	5.94	57	4.54	43
DB26	2.63	16	0.56	1.62	62	1.01	38
DB27	3.08	18	0.76	1.93	63	1.15	37
DB28	5.26	30	1.19	3.16	60	2.10	40
DB29	1.46	9	0.35	0.94	65	0.52	35
DB30	5.45	31	0.93	3.02	55	2.43	45
DB31	5.87	34	1.31	3.55	60	2.32	40
DB32	4.82	19	2.38	3.30	68	1.52	32
DB33	3.68	19	0.58	1.86	51	1.82	49
DB34	4.27	25	0.79	2.47	58	1.80	42
DB35	3.10	12	0.93	1.63	52	1.47	48
DB36	10.06	48	2.06	5.17	51	4.89	49

D. Mark Goodwin & Associates, P.A.
Consulting Engineers
P.O. BOX 90606, ALBUQUERQUE,NM 87199
(505) 828-2200 FAX 797-9539
e-mail: goodwinengrs@comcast.net

PROJECT Arroyo Vista
SUBJECT Street Hydraulics
BY JSD DATE 6/14/06
CHECKED ____ DATE ____
SHEET ____ OF ____

Note: Street hydraulic calculations will be done for areas within the subdivision where street carrying capacities may be exceeded

1. Capa Place, north of Floret Road
   Q in St. = 9.6 cfs, 26' F-F, S = 0.91%
   - Try d = .33', A = (.07 · 26) + 2(½(.26) · .13 + .17) = 5.385
     R = 0.204
     V = 1.49(.204)^.67(.0091)^1/2/.017 = 2.88 fps
     Q = 2.88(5.45) = 15.71 cfs
     d + V²/2g = .33 + (2.88)²/64.4 = 0.46' < .53' OK
   ∴ Use roll curb w/ std. along boundary

2. Manitou St. @ ANALYSIS PT (9)
   Q = 16.19 CFS, 28' F-F, S = 5.00%
   - Try d = .28', A = 4.48 SF R = .157
     V = 5.67 fps, Q = 25.40 CFS, d + V²/2g = .78
   ∴ Vert. curb on Manitou from Mossback to Floret

3. Mossback @ (10)
   Q = 35.67 CFS 32' F-F S = 2.28%
   - d = .50, A = 10.88 SF, R = .330
     V = 6.30, Q = 68.51, d + V²/2g = 1.12 NO
   - d = .40, A = 7.68 SF, R = .234
     V = 5.00, Q = 38.4, d + V²/2g = .79 < .85 OK
   ∴ Place drop inlets just west of (10)

4. Mossback east of Manitou
   Q = 19.48 CFS, 28' F-F, S = 2.326%
   - Try Roll Curb
     d = .28', A = 4.48 SF, R = .157
     V = 3.87 FPS, Q = 17.34, d + V²/2g = .51' < .53' OK

dmg
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PROJECT
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BY DATE
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SHEET OF

EVERGLADE, NORTH OF MOSSBACK

$Q = 11.50$ CFS, 28' F-F, $S = 4.68\%$

Try Roll Curb.

$d = .28'$, $A = 4.48$ SF, $R = .157$

$V = 1.49(.157)^{.67}(.0468)^{1/2}/.017 = 5.48$ fps

$Q = 24.55$

$d + V^2/2g = .75' > .53$ no

$d = .20'$, $A = 2 + .25 = 2.25$ SF, $R = .110$

$V = 1.49(.110)^{.67}(.0468)^{1/2}/.017 = 4.32$ FPS

$Q = 4.32 \cdot 2.25 = 9.72$ CFS

$d + V^2/2g = .26 + .29 = .49 < .53$ OK

∴ Roll Curb for $Q < 9.72$ CFS

. Manitou, north of Floret:

$Q = 13.84$, 28' F-F, $S = 4.8\%$

$d = .20'$, $A = 2.25$ SF, $R = .110$

$V = 4.38$ FPS

$Q = 9.85$ CFS

$d + V^2/2g = .50' < .53$ OK

∴ Roll curb for $Q < 10$ CFS

Winwood Road & Wisteria Road east of Ourbridge

$Q = 15.38$ CFS, 28' F-F, $S = 4.88\%$

Same section & slope as Manitou, therefore roll curb for $Q < 10$ cfs

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PROJECT
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Nokomos Street

Check upstream of Sedna:

S = 2.77%
Q = 0832 + 0833 + 0834 = 17.20 + 11.71 + 14.26 = 43.17 CFS
32' F-F
d = .40?
A = (.08 · 32) + 2(1/2 · .32 · 16) + .17 = 7.85 SF
R = .239
V = 5.59 fps
Q = 43.89 CFS
$d + V^2/2g$ = .89 ≃ .85 OK, 8" std. curb will work

∴ Place inlets in Nokomos @ Sedna return

Sedna Street

1. Just east of Jogan St.:

Q = 0836 = 31.99 cfs
Section = 28' F-F
SLOPE = 1.28%
d = .40
A = 3.36 + 3.92 + .17 = 7.45 SF
R = .259
V = 4.01 fps
Q = 29.88 → A little low
$d + V^2/2g$ = .65 → Good

∴ 8" std. C96 works to just west of Nokomos. Drop inlets will be placed in Sedna @ Nokomos.

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PROJECT
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Autumn Glen Drive

Check upstream of Sedna St.

Q = 0827 + 0828 = 10.64 + 17.81 = 28.45 cfs
Section = 28' F-F
Slope = 2.12%
Try d = .50
A = (.22 · 28) + 2(1/2(.28) · 14) + .17 = 10.25 SF
R = 10.25/29 = .353
V = 6.44 fps
Q = 66.02
$d + V^2/2g$ = 1.14 → ND

Try d = .38
A = (.10 · 28) + (2(1/2(.28) · 14) + .17) = 6.89 sf
R = .240
V = 4.97 fps
Q = 34.27 → Good
$d + V^2/2g$ = .76 < .85 OK w/ 8" std curb

Next, determine where to go w/ mountable C&G

d = .28
A = 2(1/2(.28 · 14) + .17 = 4.09
R = .143
V = 3.52 fps
Q = 14.38
$d + V^2/2g$ = .47 < .53 OK

∴ carry 8" stnd. curb to Floret & mountable to Wisteria

Akna Street:

Q = 0829 + 0830 = 22.96 cfs
Section = 28' F-F
Slope = 2.18%

Same section & slope as Autumn Glen. From that analysis, carry 8" stnd. curb to Floret.

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Consulting Engineers
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P. JECT
SUBJECT
BY DATE
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Mossback Road Analysis

1. Mossback east of Manitou St.
   - Q = 8.49 + 10.99 = 19.48 cfs
   - Section = 28' F-F
   - Slope = 2.33%
   - d = .28'
   - A = 4.09 SF
   - R = .157
   - V = 3.87 fps
   - Q = 15.83
   - d = $V^2/2g$ = .51' < .53'
   - ∴ carry 8" std curb (19.48-15.83)/.702 = 5, 5 lots past Manitou
2. Mossback west of Manitou
   - Q = 35.67 cfs
   - Section = 32' F-F
   - S = 2.28%
   - d = .50
   - A = (.18 · 32) + 2(½(.32) · 16) + .17 = 11.05 SF
   - R = .335
   - V = 6.36 fps
   - Q = 70 cfs
   - d = $V^2/2g$ = 1.13 > .85 NO
   - ∴ Will place 2 drop inlets on Manitou at Mossback returns, and 2 drop inlets on Mossback. This leaves

dmg
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Floret Street Capacities

1. Just east of Manitou St.

$Q = .087 + .0811 = 14.8$ cfs, 24' F-F, $S = 2.26\%$

Try $d = .24$
$A = 2[1/2(.24)\cdot.12) + .17 = 3.05$ SF
$R = .125$
$V = 3.27$
$Q = 9.97$ cfs → NO
$d + V^2/2g = .41$

Try $d = .28$
$A = .96 + 2.88 + .17 = 4.01$ SF
$R = .163$
$V = 3.91$ fps
$Q = 15.67$ cfs
$d + V^2/2g = .52 < .53$ OK

∴ Vert curb east of Manitou to high pt. no drop inlets req'd.

2. Between Pin Oak & Manitou, street flow is minimal due to 4 drop inlets placed upstream.

$4.23 + 10.56 + 13.84 = 28.63$ → 4 Double 'A' drop inlets intercept this flow

3. Floret @ Ourbridge:

$Q = .0815 + .0824 = 5.68 + 12.57 = 18.25$ cfs
Section = 28' F-F
Slope = 3.85%

$d = .28'$
$A = [2(1/2(.28)\cdot.14) + .17] = 4.09$ SF
$R = .144$
$V = 4.69$ fps
$Q = 19.20$
$d + V^2/2g = .62 < .85$ OK

Street has capacity. Place Double 'A' DIs @ returns to keep flow from Ourbridge ROW.

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Ourbridge Street - Vert. Curb to be used due to overflow from Rainbow Trib. pond.

a) South of Winwood Rd.

$Q = DB16 + DB17 + DB26 = 40.41$

$40'$ F-F , $S = 3.48\%$

Try $d = .5'$, $A = (.1 \cdot 40') + 2(1/2(.40) \cdot 20) + .25 = 12.25SF$

$R = .299$

$V = 1.49(.299)^{.67}(.0348)^{.5}/.017 = 7.28$ fps

$Q = 7.28(12.25) = 89.18$ cfs

$d + V^2/2g = 1.32 - no$

Try $d = .4'$, $A = 12.25 - 4 = 8.25SF$, $R = .202$

$V = 5.60$ fps , $Q = 46.19$ cfs , $d + V^2/2g = .89$

∴ Drop inlets needed @ Winwood Rd.

Southern Sandoval County Arroyo Flood Control Authority

January 6, 2005

Mr. Robert Lupton
Manager
Vista Arroyo LLC
PO Box 1443
Corrales, NM 87048

RE: Transmittal of January 6, 2005 Agreement for Arroyo Vista Development

Dear Mr. Lupton:

Please find enclosed two originals of the Arroyo Vista development agreement with SSCAFCA with an attachment. Also included please find a copy of the fax from Mr. Metzgar, SSCAFCA's attorney, with his latest changes. I have taken the liberty of making the changes to the agreement that you sent me to facilitate this process. As you can see, it appears that Mr. Metzgar's changes were minimal. If there are any problems, please contact and we will work them out. If the agreement, as changed is acceptable, please sign and return one (1) original to this office.

Also enclosed is a copy of the lands SSCAFCA wishes to have purchased, as stipulated in paragraph 2 of the second page. This copy is a portion of the plat entitled, "Southerly portion of Unit 10. Rio Rancho Estates, Town of Alameda Grant, Sandoval County, New Mexico recorded on May 13, 1968". The lots are listed, as follows:

Lots: 18 through 27 and 30 & 31

I am unable to read the exact acreages, but I believe that the area is close to the six (6) areas identified in the agreement. If the area exceeds or is less than the 6 acres identified in the agreement, we will work this out. As per the agreement, you are only liable for up to 6 acres or $200,000, whichever is less. I do wish to hasten acquisition, as your development will increase the cost of the lands and I am sure that you share our sentiment to acquire at the least cost. Please contact me at your earliest convenience as to whether you wish to acquire the 6 acres or provide alternative payment.

Thank you for working this issue out with us. I know it was an unexpected surprise to you. If you should have any questions, please call.

1041 Commercial Dr. S.E. • Rio Rancho, New Mexico 87124
(505) 892-RAIN (7246) • FAX (505) 892-7241
www.sscafca.com

Sincerely,

David Stoliker, PE
Executive Director

Enclosure

CC: Bernie Metzgar

C:\Documents and Settings\Administrator\My Documents\Development\Arroyo Vista.Lupton.1.6.05.doc

January 6, 2005

HAND DELIVERED

Southern Sandoval County Arroyo Flood Control Authority
Mr. William C. Yarbourgh
Chairman, Board of Directors
1041 Commercial Drive SW
Rio Rancho, NM 87124

Dear Sir:

During the past weeks, representatives from Vista Arroyo LLC (Vista Arroyo), the Southern Sandoval County Arroyo Flood Control Authority (SSCAFCA), the Albuquerque Metropolitan Arroyo and Flood Control Authority (AMAFCA), the City of Rio Rancho, and the City of Albuquerque (Albuquerque) have held discussions concerning the Vista Arroyo subdivision in Bernalillo County and the Rainbow Tributary.

The Rainbow Tributary crosses the county line from Sandoval County into Bernalillo County and passes across the proposed Arroyo Vista subdivision and discharges into the Calabacillas Arroyo. The discussions have centered around what flood control measures and drainage structures should be built and at whose expense.

SCCAFCA and Vista Arroyo agree that the development of the public improvements associated with the Arroyo Vista subdivision are significant and serve the public interest.

This letter of understanding outlines the responsibilities of the parties. Albuquerque and AMAFCA have entered into a separate agreement with Vista Arroyo whereby Vista Arroyo will make certain improvements to the Calabacillas and construct the drainage facility in Bernalillo County for the Rainbow Tributary. In this agreement, Vista Arroyo agrees to dedicate right of way for McMahon Boulevard and construct certain portions of McMahon Boulevard. Vista Arroyo will dedicate approximately 30 acres of the Calabacillas Arroyo to Albuquerque as open space and will place appropriate easements in favor of AMAFCA on the this property. Albuquerque agrees to construct the McMahon Bridge across the Calabacillas Arroyo. Albuquerque agrees to maintain the referenced drainage structure, the bridge, and McMahon Boulevard subject to normal maintenance requirements. AMAFCA agrees to maintain the Calabacillas Arroyo. The details concerning this agreement are for information only; AMAFCA and Albuquerque are not part of this letter of understanding between SSCFCA and Vista Arroyo.

Vista Arroyo will be responsible to construct a 102 inch pipe between the county line and the Calabacillas Arroyo. Vista Arroyo will construct a concrete transition structure within Lots 28 and 29, Block J, Unit 10, Rio Rancho Estates and transfer the property and the completed and accepted transition structure to SSCAFCA. These improvements are conceptually identified on the attached exhibit. The cost of these improvements will be paid by Vista Arroyo. In addition, Vista Arroyo will provide 6 acres to SSCAFCA in fee simple or $200,000 to SSCAFCA toward the purchase of 6 acres in Unit 10 for use by SSCAFCA as ponding facilities.

SSCAFCA agrees to use its powers of condemnation, if necessary, to obtain the 6 acres of property in Unit 10 identified in the previous paragraph of this letter of understanding. SSCAFCA will also determine the location of the 6 acres that will be used as ponding facilities.

SSCAFCA agrees that Vista Arroyo is not responsible for ensuring that the allowable flow rate within the entire Rainbow Tributary Basin entering the 102 inch pipe at the county line will not exceed the capacity of the pipe.

The parties have reviewed the attached letter, dated December 20, 2004, from Clint Dodge and Karen Jacobsen with ASCG Inc. to David Stoliker of SSCAFCA. The intent of this letter of understanding is to comply with the recommendations listed on page two of the ASCG Inc. letter. It is specifically noted that the 6 acres of property to be acquired or funded for ponding facilities will serve to meet the recommendation A, " Provide space for sediment accumulation (15 AF+/-) in the event a jump does occur resulting in lower velocities and sediment drop out".

The parties agree that there will be reasonably expeditious review of the design plans for these improvements through the SSCAFCA approval process, including endorsement of the approved final design in connection with the submittal of the CLOMR to FEMA that will modify the existing floodplain designation on Lots 28 and 29.

The parties agree that this letter of understanding is binding on the signatories' successors and /or assigns.

Respectfully Submitted:

Vista Arroyo LLC

Rex Wilson
Managing Member

Accepted:

Southern Sandoval County Arroyo Flood Control Authority

William C Yarbroe

By: William C. Yarbrough
Chairman of the Board

SOUTHERLY PORTION
UNIT TEN
RIO RANCHO ESTATES
TOWN OF ALAMEDA GRANT
SANDOVAL COUNTY, NEW MEXICO

STATE OF NEW MEXICO } SS
COUNTY OF SANDOVAL }

This instrument was filed for record on

MAY 13 1968

At 9 o'clock a.m. recorded in Vol. 212 of records of said County Folio 75

Clerk & Recorder

Deputy Clerk

STATE OF NEW MEXICO } SS
COUNTY OF BERNALILLO }

On this 3rd day of May, 1968, before me, a Notary Public in and for said County and State, personally appeared John R. Sommerhalder and Sara M. McLain, who, being by me duly sworn, did say that they are Assistant Vice-President and Assistant Secretary, respectively, of RIO RANCHO ESTATES, INC., a corporation organized under the laws of the State of New Mexico; that the seal affixed to the foregoing instrument is the corporate seal of said corporation; that said instrument was signed and sealed on behalf of said corporation by authority of its board of directors; and that said John R. Sommerhalder and Sara M. McLain acknowledged said instrument to be the free act and deed of said corporation.

In Witness Whereof, I have hereunto set my hand and seal on the day and date last above written.

My Commission Expires on the 12th day of October, 1971.

J. Anthony Lucero
NOTARY PUBLIC

I, Robert K. Walsh, New Mexico Registered Land Surveyor No. 2127, do hereby certify that the plat shown hereon was made by me or under my direct supervision, and that the same is true and correct to the best of my belief and knowledge.

Robert K. Walsh
NEW MEXICO REGISTERED LAND SURVEYOR NO. 2127

I, Juan Archibeque, County Clerk of Sandoval County, New Mexico, do hereby certify that the plat shown hereon was approved and all roads shown hereon were accepted for dedication to the County of Sandoval, New Mexico, by the Board of Commissioners at their meeting held on the 6th day of May, 1968.

John Gallegos
COUNTY CLERK

NOTE: Unless otherwise indicated;
Streets run North-South,
Avenues run East-West,
All roads except Isabel Road SE and Rainbow Boulevard South have a 50-foot right-of-way,
Lot lines are perpendicular to street lines,
All cul-de-sacs have a 40-foot radius,
There is a 5-foot utility easement along all sides of each lot.

The foregoing subdivision of that certain parcel of land boundaries of the Town of Alameda Grant, Sandoval County, New particularly described by metes and bounds as follows:

Beginning at the Northwest corner of Lot numbered One (1) four (24) as shown on the plat "PORTION OF UNIT TEN, RIO RANCH GRANT, SANDOVAL COUNTY, NEW MEXICO", filed in the office of th County, New Mexico, in Rio Rancho Estates Plat Book No. 1, Pag whence United States Coast and Geodetic Survey Triangulation S Mexico State Plane co-ordinates x = 359,019.07 and y = 1,545,5 N 12° 54' 19" W, 9,484.42 feet distance; thence,

SOUTH, 272.25 feet distance to the Southwest corner of sa Block numbered Twenty-four (24); thence,

EAST, 5,600.00 feet distance to the Southeast corner of sa thence,

SOUTH, 1,162.00 feet distance to the Southeast corner of t a point on the Bernalillo - Sandoval County Line; thence,

N 89° 54' 18" W, 11,915.02 feet distance along said Bernal to the Southeast corner of "SOUTHEAST PORTION OF UNIT NINE, RIO ALAMEDA GRANT, SANDOVAL COUNTY, NEW MEXICO", filed in the offic Sandoval County, New Mexico, in Rio Rancho Estates Plat Book No 1962; thence,

NORTH, 2,250.43 feet distance along the easterly boundary OF UNIT NINE to the Northwest corner of the parcel herein descr

S 75° 40' 30" E, 2,888.63 feet distance to a point; thence

S 69° 36' 40" E, 3,268.78 feet distance to a point; thence

N 20° 23' 20" E, 311.98 feet distance to a Point of Curvat

Northeasterly, 133.44 feet distance along the arc of a cur (said arc having a radius of 375.00 feet and a long chord which 132.74 feet distance) to a Point of Tangency; thence,

NORTH, 594.50 feet distance to a point; thence,

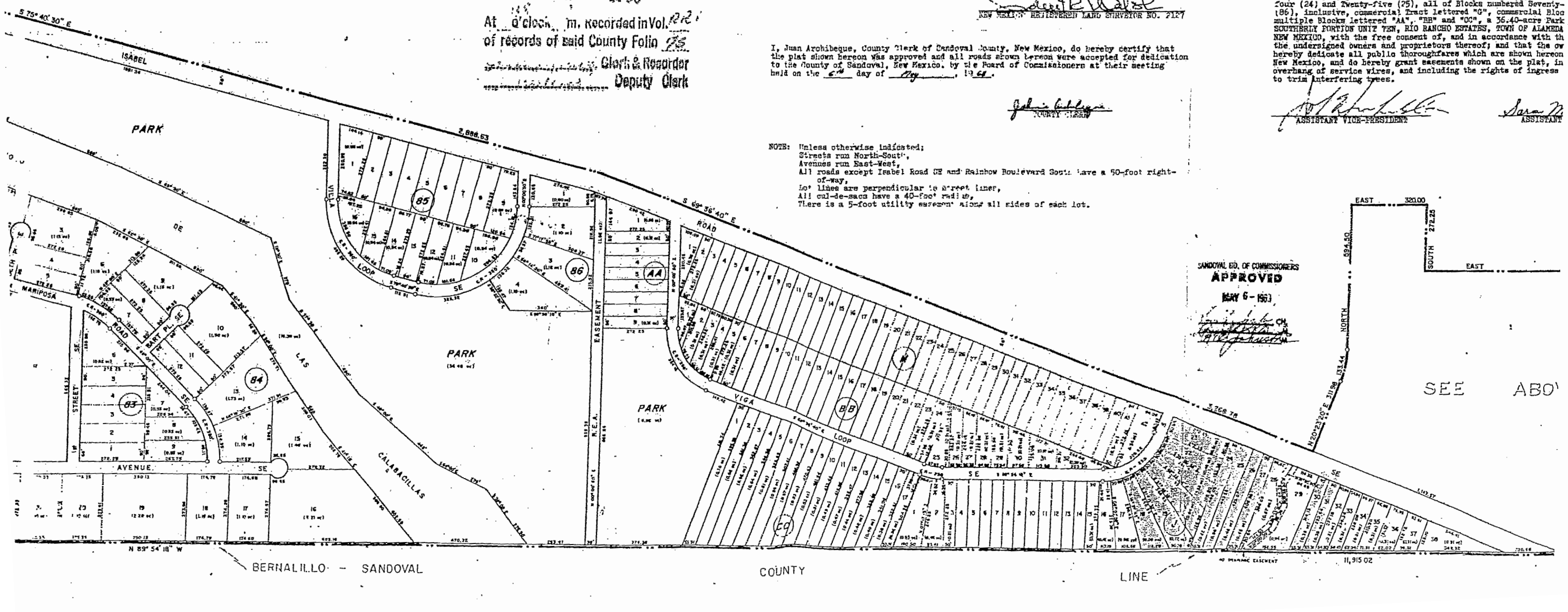
EAST, 320.00 feet distance to the place of beginning of th and containing 351.291 acres, more or less.

Surveyed, platted and subdivided, and comprising portions four (24) and Twenty-five (25), all of Blocks numbered Seventy-(86), inclusive, commercial Tract lettered "G", commercial Bloc multiple Blocks lettered "AA", "BB" and "CC", a 36.40-acre Park SOUTHERLY PORTION UNIT TEN, RIO RANCHO ESTATES, TOWN OF ALAMEDA NEW MEXICO, with the free consent of, and in accordance with th the undersigned owners and proprietors thereof; and that the ow hereby dedicate all public thoroughfares which are shown hereon New Mexico, and do hereby grant easements shown on the plat, in overhang of service wires, and including the rights of ingress to trim interfering trees.

ASSISTANT VICE-PRESIDENT

ASSISTANT

SANDOVAL CO. OF COMMISSIONERS
APPROVED
MAY 6 - 1968



AGREEMENT for
Calabacillas Arroyo Main Branch Drop Structures
Associated with McMahon Blvd. Bridge and Related Improvements
Upstream of Swinburne Detention Dam

This Agreement is entered into this _____ day of _____, 2004, by and among the Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA), a political subdivision of the State of New Mexico; the City of Albuquerque, a municipal corporation (CITY) and Vista Arroyo LLC, a New Mexico Limited Liability Corporation (VISTA), collectively referred to as the "Parties".

RECITALS:

1. Whereas, AMAFCA's Calabacillas Arroyo Drainage Management Plan, dated February, 1987, established the need to restrict flow rates in the Calabacillas Arroyo in order not to exceed the capacity of existing road crossings and to mitigate the potential of a sediment plug in the Rio Grande; and

2. Whereas, the recommended solution in the Calabacillas Arroyo Drainage Management Plan was to build a flood control dam on the Calabacillas Arroyo in the vicinity of Unser Blvd., which was built as a cost shared project between AMAFCA and the CITY in 1992; and

3. Whereas, the construction of the flood control dam lowered the base level of the arroyo, which has accelerated degradation of the arroyo thalwag above the Swinburne Dam reservoir area; and

4. Whereas, in 2000, AMAFCA, Curb West, Inc. and New Mexico Utilities, Inc. participated in joint funding of the design and construction of a grade control structure on the Calabacillas Arroyo at its inlet into Swinburne Dam (GCS #1), with the structure designed to stabilize the bed of the arroyo from further degradation in order to allow water and sanitary sewer lines to be safely extended across the arroyo above the grade control structure; and

5. Whereas, in August, 2004 AMFCA and Curb West, Inc. entered into an Agreement whereby Curb West, Inc. will contribute a lump sum of $100,000 to AMAFCA for its share of an additional grade control structure (GCS #2) in the arroyo approximately 1,200 feet upstream of GCS #1, as well as Curb West being required to design and construct approximately 450 feet of bank protection and/or spur dikes along the south side of the arroyo, and as generally shown on Exhibit A; and

6. Whereas, the CITY is currently working on the design of the McMahon Blvd Bridge over the Calabacillas Arroyo, for which erosion and scour protection is necessary; and

7. Whereas, the erosion and scour protection necessary for the bridge is dependent on the design and construction of GCS #2, as well as an additional grade control structure immediately below the bridge as well as related upstream bank protection and guide bank (GCS #3), with GCS #2 and GCS #3 collectively referred to as the "McMahon Grade Control Structures", also as generally shown on Exhibit A; and

8. Whereas, VISTA is currently designing a development, commonly know as the "Arroyo Vista Subdivision" adjacent to and on both sides of the arroyo, for which erosion protection is required, including the McMahon Grade Control Structures, an additional grade control structure approximately 1,200 feet upstream of the McMahon Bridge (GCS #4), as well as bank protection and/or spur dikes adjacent to the proposed subdivisions; and

9. Whereas, AMAFCA, the CITY and VISTA are willing to share in the costs of the design and construction of the McMahon Grade Control Structures; and

10. Whereas, the CITY is agreeable to include the design and construction of the McMahon Grade Control Structures with its McMahon Blvd. Bridge project; and

11. Whereas, at the September 23, 2004 meeting of the AMAFCA Board of Directors, the Board authorized the preparation of a cost sharing agreement for the McMahon Grade Control Structures.

NOW THEREFORE, THE PARTIES AGREE AS FOLLOWS:

SECTION ONE – PURPOSE OF AGREEMENT

The purpose of this Agreement is to:

1.1 Define responsibility for design and construction of the McMahon Grade Control Structures by the CITY, including maintenance of the Rainbow Tributary Arroyo, if the arroyo is put within an underground storm drain.

1.2 Define interim and perpetual maintenance of the arroyo by AMAFCA, including maintenance of the McMahon Grade Control Structures, Bank Protection, and Rainbow Tributary Arroyo, if the arroyo is put within a constructed open channel.

1.3 Define VISTA's $450,000 lump sum contribution to the CITY for VISTA's share of the construction of McMahon Grade Control Structures.

1.4 Define VISTA's direct payment of $7,500 directly to the CITY's design consultant, Wilson & Company, for VISTA's share of the additional analysis of the Calabacillas Arroyo and grade control and bank protection structures.

1.5 Define VISTA's responsibility to design and build the Bank Protection and to dedicate right of way for the arroyo and the improvements to the CITY.

1.6 Define AMAFCA's and the CITY's contributions for the design and construction McMahon Grade Control Structures, on a percentage of actual costs basis.

SECTION TWO – AMAFCA AGREES to:

2.1. Provide to the CITY, the lump sum of $30,000 as AMAFCA's share of the planning, analysis and design of the McMahon Grade Control Structures. CITY will invoice AMAFCA any time after CITY's authorization of the design contract amendment with Wilson & Company for the work, as further described in Exhibit B. Payment will be made by AMAFCA within 30 days of receipt of invoice from the CITY.

2.2 Review, and if appropriate, approve the design analysis report, with the understanding that the design analysis report will include, but not be limited to 1) an AHYMO model based on the year 2036 development condition as was used for Swinburne Dam, 2) HEC RAS modeling and sediment transport analysis of the arroyo, with the three proposed grade control structures in place, as well as the bank protection proposed by Curb West Inc. and VISTA, to include evaluation of different configurations and widths of the grade control structures, as necessary to maintain sediment equilibrium within the arroyo, maintain the open space character of the arroyo, while minimizing the impact and costs of structures within the arroyo. 3) The baseline analysis will include sill widths of 140 feet for GCS #2 and GCS #4, and a three span McMahon bridge with a center span of 100 feet, with side spans of approximately 60 feet each. This analysis will recognize that AMAFCA will accept periodic maintenance efforts within the arroyo.

2.3 Review, and if appropriate, approve the design plans and contract documents for the McMahon Grade Control Structures. The contract documents shall provide separate bid lots for any and all items required for the construction of GCS #2 and GCS #3, with AMAFCA and the CITY to concur with those items and quantities prior to the CITY bidding the project.

2.4 After award by the CITY of the construction contract for the McMahon Grade Control Structures and within 30 days of receipt of invoice from the CITY, AMAFCA will pay the CITY its share of the as-bid amount for the McMahon Grade Control Structures based on the percentages shown in Section 3.3 of this Agreement, including NMGRT, plus an additional 8%. The additional 8% is for AMAFCA's share of the CITY's costs of inspection, geotechnical testing and contract administration for the McMahon Grade Control Structures.

2.5 After payment of the final pay estimate for the project, AMAFCA's share of the final actual costs of the McMahon Grade Control Structures will be determined, based on the percentages shown in Section 3.3 of this Agreement, including NMGRT, plus 8%. In the event AMAFCA's share of the final costs is greater than AMAFCA's share of the as-bid amount, AMAFCA will pay the CITY that amount within 30 days of receipt of invoice from the CITY. In the event that the AMAFCA's share of the final costs is less than AMAFCA's share of the as-bid amount, the City will reimburse AMAFCA that amount within 60 days of final payment on the construction contract.

2.6. Review, and if appropriate, approve VISTA's design plans for GCS #4 and the Bank Protection along the arroyo adjacent to the Arroyo Villas subdivision.

2.7. Periodically inspect and maintain the Calabacillas Arroyo within the limits of the easement right of way to be dedicated by VISTA, to include maintenance of the

McMahon Grade Control Structures, GCS #4, the Bank Protection installed by VISTA, and the Rainbow Tributary Arroyo, if the arroyo is confined to a constructed open channel.

SECTION THREE – CITY AGREES to:

3.1 Amend its agreement with Wilson & Company, for design of the McMahon Bridge to include analysis and design of the McMahon Grade Control Structures, generally as described in Section 2.3, and as more particularly described in Exhibit B, with the understanding that AMAFCA will pay the City the lump sum of $30,000 as its share of the additional design work and that VISTA will pay Wilson & Company directly for the first $7,500 incurred in the analysis and design effort. CITY will invoice AMAFCA any time after CITY's authorization of the amendment to design contract for the work, as described in Exhibit B. Payment will be made by AMAFCA within 30 days of receipt of invoice from the CITY.

3.2 Coordinate the design and analysis with AMAFCA and VISTA as follows:

a. Provide two copies of the design analysis report and preliminary, final plans and contract documents for the McMahon Grade Control Structures and McMahon Blvd Bridge to AMAFCA for review, and if appropriate, approval.

b. Provide one copy of the approved design analysis report and all supporting documentation, including computer modeling to VISTA for their use in design of GCS #4 and the Bank Protection, as well as for VISTA's use in preparing a Federal Emergency Management Agency Conditional Letter of Map Revision (FEMA CLOMR).

c. The contract documents shall provide separate bid lots for any and all items required for the construction of GCS #2 and GCS #3, with AMAFCA and the CITY to concur with those items and quantities prior to the CITY bidding the project.

d. Storm drain outlets will be designed and constructed as part of the McMahon Grade Control Structures, with the storm drain lines to run through the structure a sufficient distance for further extension by VISTA, as determined by the CITY.

3.3 Advertise, accept bids and award the construction contract for the McMahon Bridge project, including the McMahon Grade Control Structures, with the actual construction costs of the McMahon Grade Control Structures to be split by AMAFCA and the City as follows:

Structure	Estimate	City	AMAFCA	
GCS # 2	$300,000		100%	*Less lump sum of $100,000 from VISTA
GCS # 3	$550,000	50%	50%	*Less lump sum of $350,000 from VISTA
				* For a total of $450,000 as described in Section 4.2

Advertisement and bidding shall be according to the normal City procedures for public bidding of public infrastructure projects.

3.4 Upon award of the construction contract, invoice AMAFCA for its share of the McMahon Grade Control Structures, in accordance with Sections 2.4, 2.5 and 3.3 herein.

3.5 Provide, or cause the provision of, any funding necessary for the McMahon Grade Control Structures and McMahon Blvd. Bridge in excess of the AMAFCA and VISTA participation defined herein.

3.6 Provide AMAFCA as-built record drawings of the McMahon Grade Control Structures and McMahon Blvd. Bridge, on Mylar and in digital files formatted in both dxf and pdf.

3.7 Provide AMAFCA with an accounting of all costs of the McMahon Grade Control Structures for AMAFCA's use in GASB-34 reporting requirements for infrastructure.

3.8 Provide maintenance of the McMahon Bridge and the Rainbow Tributary Arroyo, if the arroyo is confined within an underground storm drain.

SECTION FOUR - VISTA AGREES to:

4.1. Provide to AMAFCA and the CITY any topographic mapping, storm drain outlet design inverts and other information for use in the design of the McMahon Grade Control Structures.

4.2. Pay directly to the CITY's design engineering consultant (Wilson & Company) the amount of $7,500 as VISTA's share of the additional design scope which includes elements of work specific to the Arroyo Vista development. Payment will be within 30 days of billing by Wilson & Company.

4.2. Pay to CITY the lump sum of Four Hundred Fifty Thousand dollars ($450,000) as VISTA's share of the McMahon Grade Control Structures. This funding shall be received by CITY, in the form of a cashiers check, at least seven days prior to CITY's advertising for construction bids for the McMahon Grade Control Structures.

4.3 Cause to be prepared a drainage analysis report, acceptable to AMAFCA and the CITY, that shows the proposed location of the GCS # 4 and the exact locations and dimensions of the Bank Protection, consistent with the design analysis report prepared by Wilson & Company for the CITY as described in Exhibit B.

4.4 Design, construct, and provide construction inspection and geotechnical engineering testing services for GCS #4, the Bank Protection adjacent to the Arroyo Vista

subdivision, and the improvements to the Rainbow Tributary Arroyo. Design of all facilities shall be in accordance with the City of Albuquerque and AMAFCA requirements. Certification of construction of GCS # 4, the Bank Protection, and the Rainbow Tributary Arroyo shall be done by a New Mexico Registered Professional Engineer and according to the current requirements of the CITY.

4.5 Prepare, submit and pay all FEMA review fees for a FEMA CLOMR for all work within the arroyo and resulting floodplain modifications resulting from construction in the arroyo from GCS #1 upstream to the Bernalillo County line, as well as a FEMA Letter of Map Revision for any floodplain modifications within or adjacent to the Arroyo Vista Subdivision.

4.5. Grant or cause to be granted to AMAFCA, appropriate drainage easements for the arroyo, for the McMahon Grade Control Structures, for GCS #4, the Rainbow Tributary Arroyo, the Bank Protection, for an appropriate erosion buffer area between the structures, and for access around and on the both sides of the McMahon Grade Control Structures, GCS #4, and the Bank Protection, as generally shown on Exhibit A.

4.6 Provide AMAFCA with an accounting of all costs of GCS # 4, the Bank Protection and the Rainbow Tributary Arroyo for AMAFCA's use in GASB-34 reporting requirements for infrastructure.

4.7 Dedicate to the CITY in fee simple, free and clear of all liens, claims and encumbrances, portions of the Calabacillas Arroyo as shown in Exhibit A for open space purposes.

SECTION FIVE – ALL PARTIES FURTHER AGREE:

5.1. AMAFCA's and the CITY's commitment to provide funding for the McMahon Grade Control Structures as identified in this Agreement is contingent upon the timely receipt of topographic mapping, design information, and construction funding from VISTA, is subject to passage of the 2004 AMAFCA Bond authorization, and is contingent upon sufficient appropriations being made by the City Council of the CITY and the AMAFCA Board of Directors.

5.2 The scope of services for the FEMA CLOMR is based on certain assumptions as described in Exhibit B. Should the FEMA review process require substantial additional work or raise unexpected concerns, the Parties will negotiate an equitable amendment to this Agreement as necessary to secure the FEMA CLOMR. However, neither AMAFCA nor the CITY make any representation or warranty that the CLOMR will be approved

5.3. The VISTA cash contributions are fixed and are not adjustable for any reason. AMAFCA and the CITY shall bear any increased costs in the construction of the McMahon Grade Control Structures and likewise, shall benefit from any cost savings identified during the design and construction of the McMahon Grade Control Structures.

5.4. The facilities and right of way described herein have the primary purpose of conveying and managing storm flows, and any other interest granted by any party shall be subservient to that purpose, and shall be mutually agreed to, in advance of the granting.

5.5. This Agreement does not relieve VISTA of the requirement to construct or financially guarantee the construction of such related drainage or storm water quality facilities that the CITY or AMAFCA may deem necessary.

5.6. Disputes under the Agreement will be referred to binding arbitration under the provisions of the New Mexico Uniform Arbitration Act.

5.7. Except as otherwise specifically provided herein, the Agreement shall be governed by, construed and enforced in accordance with the laws of the State of New Mexico.

5.8. If any situation arises which adversely affects any of the Parties participation in the Agreement, said Party will immediately, and in writing, notify the other parties. All notices with respect to this Agreement shall be in writing and shall be delivered personally, sent via confirmed telefax, or sent postage prepaid by United States Mail, certified mail, return receipt requested, to the addresses set forth below or other such addresses as hereafter specified in writing by one party to the others:

AMAFCA
2600 Prospect N.E.
Albuquerque, New Mexico 87107
Attn: Executive Engineer

City of Albuquerque
Department of Municipal Development
P.O. Box 1293
Albuquerque, NM 87103
Attn: Assistant Director

Vista Arroyo LLC
8910 Adams N.E.
Albuquerque, New Mexico
Attn: Rex Wilson, Managing Member

5.9. This Agreement contains the entire Agreement among the parties hereto, and all prior understandings, oral or in writing, by the parties hereto with respect to this Agreement are hereby null & void. No variations, modifications, supplements, waivers or changes herein or hereof shall be binding upon any party hereto unless set forth in a document duly executed by or on behalf of such party.

5.10. The parties understand and agree the obligation of each party under this Agreement shall be performed in compliance with all applicable laws, statutes, resolutions and ordinances. Nothing herein is intended to constitute any agreement to perform any activity in violation of the Constitution or Laws of the State of New Mexico, the Ordinances of the CITY, or the Resolutions of AMAFCA.

5.11. If any provision of this Agreement, or the application thereof to a person or circumstance, shall be determined to be invalid or unenforceable to any extent, the remainder of the Agreement and the application of such provisions to other persons or circumstances shall not be affected thereby and such provisions shall be enforced to the greatest extent permitted by law.

5.12. In the event any action is instituted between AMAFCA and VISTA or between the CITY and VISTA for the purpose of enforcing or interpreting any provision of this Agreement, the prevailing party in such action shall be entitled to its reasonable attorney's fees and costs.

5.13. It is specifically agreed among the parties executing this Agreement, that this Agreement does not and is not intended to create in the public, or any member thereof, any rights whatsoever, such as, but not limited to, the rights of a third party beneficiary, or to authorize anyone not a party to the Agreement to maintain a suit(s) for wrongful death(s) and or any other claim(s) whatsoever pursuant to any provision of this Agreement.

5.14. Each party shall be solely responsible for any and all liability arising from personal injury including death(s) or damage to property arising from an act or failure to act of the respective party, its officials, agents, contractors and employees pursuant to this Agreement. Liabilities of each party shall be subject to the immunities and limitations of the Tort Claims Act, Section 41-4-1, et seq., N.M.S.A. 1978 and any amendments thereto.

5.15. Each individual signing for each of the parties hereunder warrants and represents that he/she is an authorized agent of such party, on whose benefit he/she is executing this Agreement, and is authorized to execute the same. Each party further agrees to execute such other and further instruments and documents as may be necessary or proper in order to complete the transactions contemplated by this Agreement.

5.16. This Agreement may be executed in one or more counterparts, each of which shall be deemed an original and said counterparts shall constitute but one and the same instrument which may sufficiently be evidenced by one counterpart.

5.17. This Agreement is subject to approval by the AMAFCA Board of Directors and the Chief Administrative Office (CAO) of the CITY and shall not be binding upon the parties until so approved. Upon approval by all parties, the covenants, terms and conditions of the Agreement shall inure to the benefit of and shall be binding upon the undersigned parties and their respective successor and assigns.

AGREEMENT for
Calabacillas Arroyo Main Branch Drop Structures
Associated with McMahon Blvd. Bridge and Related Improvements
Upstream of Swinburne Detention Dam

Executed the day and year first set out above.

ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY, a political subdivision of the State of New Mexico

Linda Stover, Vice-Chair
Board of Directors

ATTEST:

Ronald D. Brown
Secretary Treasurer

Vista Arroyo LLC a New Mexico Limited Liability Corporation

Rex Wilson, Managing Member

City of Albuquerque

James Lewis, Chief Administrative Officer — Date

Ed Adams, P.E., Director
Department of Municipal Development — Date

Reviewed by City Legal Department:

City Legal Department — Date

AGREEMENT for
Calabacillas Arroyo Main Branch Drop Structures
Associated with McMahon Blvd. Bridge and Related Improvements
Upstream of Swinburne Detention Dam

ACKNOWLEDGMENTS

STATE OF NEW MEXICO)
)ss.
COUNTY OF BERNALILLO)

This instrument was acknowledged before me on October 21, 2004, by Linda Stover, as Vice-Chair of the Albuquerque Metropolitan Arroyo Flood Control Authority, a political subdivision of the State of New Mexico, on behalf of said political subdivision.

My Commission Expires:
June 3, 2007
(SEAL)

Notary Public

STATE OF NEW MEXICO)
)ss.
COUNTY OF BERNALILLO)

This instrument was acknowledged before me on _____, 2004, by Rex Wilson, as Managing Member of Vista Arroyo LLC, a New Mexico Limited Liability Corporation, on behalf of said corporation.

My Commission Expires:

_____
(SEAL)

_____
Notary Public

STATE OF NEW MEXICO)
)ss.
COUNTY OF BERNALILLO)

This instrument was acknowledged before me on _____, 2004, by James Lewis, Chief Administrative Officer for the City of Albuquerque, a New Mexico municipal corporation.

_____
Notary Public

My Commission Expires:

ARROYO VISTA SUBDIVIDISON
DRAINAGE MANAGEMENT PLAN

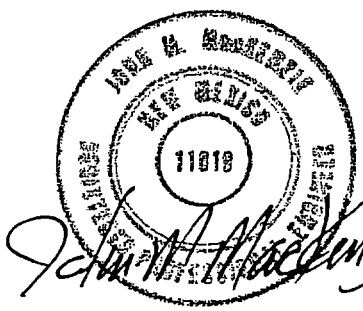
Prepared for

Vista Arroyo Development LLC
8910 Adams NE
Albuquerque, NM 87113

Prepared by

Mark Goodwin & Associates, PA
P.O. Box 90606
Albuquerque, NM 87199

July 2005



7-25-05

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T1 Saltillo Subdivision, Unit 2                                                0
T2 Del Carmen Street Storm Drain
T3 November 29, 2006
SO   1000.0005366.270  1                          5371.000
R    1100.0005367.020  1      .013                                .000 -18.000 1
JX   1106.0005367.170  4  2  3.013   10.000   10.0005370.0005370.000 40.0-59.0    .000
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JX   1188.0005368.440  7  5  6.013   10.000   10.0005373.7205373.780 18.0-47.0    .000
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SH   1442.0005374.220 13                          5374.220
CD   1  4   1    .000   4.000     .000  .000  .000   .00
CD   2  4   1    .000   2.000     .000  .000  .000   .00
CD   3  4   1    .000   2.000     .000  .000  .000   .00
CD   4  4   1    .000   3.500     .000  .000  .000   .00
CD   5  4   1    .000   1.500     .000  .000  .000   .00
CD   6  4   1    .000   2.000     .000  .000  .000   .00
CD   7  4   1    .000   3.000     .000  .000  .000   .00
CD   8  4   1    .000   2.000     .000  .000  .000   .00
CD   9  4   1    .000   3.000     .000  .000  .000   .00
CD  10  4   1    .000   2.000     .000  .000  .000   .00
CD  11  4   1    .000   1.500     .000  .000  .000   .00
CD  13  4   1    .000   2.000     .000  .000  .000   .00
Q              .001   .0
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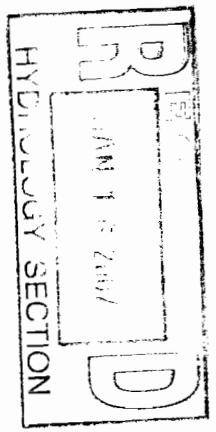

Program Package Serial Number: 1454
WATER SURFACE PROFILE LISTING

Date:12- 1-2006 Time: 1:56: 3

Saltillo Subdivision, Unit 2
Del Carmen Street Storm Drain
November 29, 2006

Station	Invert Elev / ZL	Depth (FT) / Prs/Pip	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Top Height/ Base Wt/ No Wth or I.D. FT	"N"
L/Elem / Ch Slope						SF Ave / HF	SE Dpth	Froude N	Norm Dp	X-Fall / ZR	Type Ch	
1000.000	5366.270	4.730	5371.000	100.00	7.96	.98	5371.98	.00	3.03	.00	4.000	.000
100.000	.0075					.0048	.48	4.73	.00	2.72	.013	.00
1100.000	5367.020	4.572	5371.592	100.00	7.96	.98	5372.58	.00	3.03	.00	4.000	.000
JUNCT STR	.0250					.0056	.03	4.57	.00		.013	.00
1106.000	5367.170	4.707	5371.877	80.00	8.32	1.07	5372.95	.00	2.79	.00	3.500	.000

```
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
-|-     -|-     |-
    41.000    .0117                                          .0063      .26     4.71     .00    2.23    .013
.00   .00  PIPE
          |         |        |         |         |              |         |       |        |        |
|        |      |
  1147.000  5367.650    4.788  5372.438     80.00    8.32    1.07  5373.51     .00    2.79      .00
3.500     .000   .00   1   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
-|-     -|-     |-
    37.000    .0160                                          .0063      .23     4.79     .00    2.01    .013
.00   .00  PIPE
          |         |        |         |         |              |         |       |        |        |
|        |      |
  1184.000  5368.240    4.549  5372.790     80.00    8.32    1.07  5373.86     .00    2.79      .00
3.500     .000   .00   1   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
-|-     -|-     |-
 JUNCT STR   .0499                                          .0072      .03    4.55     .00             .013
.00   .00  PIPE
          |         |        |         |         |              |         |       |        |        |
|        |      |
  1188.000  5368.440    4.958  5373.398     60.00    8.49    1.12  5374.52     .00    2.50      .00
3.000     .000   .00   1   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
-|-     -|-     |-
    99.733    .0239                                          .0081      .81     4.96     .00    1.64    .013
.00   .00  PIPE
          |         |        |         |         |              |         |       |        |        |
|        |      |
  1287.733  5370.821    3.384  5374.206     60.00    8.49    1.12  5375.32     .00    2.50      .00
3.000     .000   .00   1   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
-|-     -|-     |-
 HYDRAULIC JUMP
          |         |        |         |         |              |         |       |        |        |
|        |      |
  1287.733  5370.821    1.764  5372.585     60.00   13.88    2.99  5375.58     .00    2.50     2.95
3.000     .000   .00   1   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
-|-     -|-     |-
```

```
    30.987    .0239                                          .0181      .56     1.76    2.02    1.64    .013
.00   .00  PIPE
          |         |         |         |         |                |         |       |       |       |
|       |      |
  1318.720  5371.562    1.827  5373.389     60.00   13.31    2.75  5376.14      .00    2.50     2.93
3.000     .000   .00   1   .0
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
    22.484    .0239                                          .0161      .36     1.83    1.89    1.64    .013
.00   .00  PIPE
```

Program Package Serial Number: 1454
WATER SURFACE PROFILE LISTING

Date:12- 1-2006 Time: 1:56: 3

Saltillo Subdivision, Unit 2
Del Carmen Street Storm Drain
November 29, 2006

```
**********************************************************************************************************
*************** ********
          | Invert  |  Depth |  Water  |    Q    |  Vel     Vel  |  Energy | Super |Critical|Flow
Top|Height/|Base Wt|      |No Wth
  Station |  Elev   |  (FT)  |  Elev   |  (CFS)  | (FPS)    Head |  Grd.El.|  Elev | Depth  | Width  |Dia.-
FT|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

*********|*********|********|*********|*********|*******|*******|*********|*******|********|********|******
*|*******|***** |*******
          |         |        |         |         |               |         |       |        |        |
|       |      |
  1341.204  5372.099    1.903  5374.002     60.00   12.69    2.50  5376.50     .00    2.50     2.89
3.000     .000   .00   1   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
-|-     -|-     |-
    15.401    .0239                                        .0143      .22     1.90    1.75    1.64    .013
.00   .00  PIPE
          |         |        |         |         |               |         |       |        |        |
|       |      |
  1356.605  5372.466    1.983  5374.449     60.00   12.10    2.27  5376.72     .00    2.50     2.84
3.000     .000   .00   1   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
-|-     -|-     |-
    10.725    .0239                                        .0127      .14     1.98    1.61    1.64    .013
.00   .00  PIPE
          |         |        |         |         |               |         |       |        |        |
|       |      |
  1367.330  5372.722    2.070  5374.792     60.00   11.53    2.07  5376.86     .00    2.50     2.77
3.000     .000   .00   1   .0
```

```
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
     7.644    .0239                                                .0113       .09     2.07     1.48     1.64     .013
.00    .00  PIPE
           |         |        |         |         |                 |         |        |        |        |
|        |       |
  1374.973  5372.905    2.162  5375.067     60.00   11.00    1.88  5376.94      .00    2.50     2.69
3.000     .000   .00   1   .0
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
     5.077    .0239                                                .0101       .05     2.16     1.36     1.64     .013
.00    .00  PIPE
           |         |        |         |         |                 |         |        |        |        |
|        |       |
  1380.050  5373.026    2.263  5375.289     60.00   10.49    1.71  5377.00      .00    2.50     2.58
3.000     .000   .00   1   .0
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
     2.927    .0239                                                .0091       .03     2.26     1.24     1.64     .013
.00    .00  PIPE
           |         |        |         |         |                 |         |        |        |        |
|        |       |
  1382.977  5373.096    2.375  5375.471     60.00   10.00    1.55  5377.02      .00    2.50     2.44
3.000     .000   .00   1   .0
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
     1.023    .0239                                                .0083       .01     2.38     1.12     1.64     .013
.00    .00  PIPE
           |         |        |         |         |                 |         |        |        |        |
|        |       |
  1384.000  5373.120    2.501  5375.621     60.00    9.53    1.41  5377.03      .00    2.50     2.23
3.000     .000   .00   1   .0
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
 JUNCT STR   .0240                                                .0057       .03    2.50     1.00              .013
.00    .00  PIPE
           |         |        |         |         |                 |         |        |        |        |
|        |       |
  1389.000  5373.240    4.015  5377.255     40.00    5.66     .50  5377.75      .00    2.06      .00
3.000     .000   .00   1   .0
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
```

```
    49.000    .0180                                          .0036      .18     4.01     .00    1.41    .013
.00   .00  PIPE
          |         |         |         |         |               |         |       |        |       |
|       |      |
  1438.000  5374.120    3.336  5377.456     40.00    5.66     .50  5377.95     .00    2.06      .00
3.000     .000   .00   1   .0
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
 JUNCT STR   .0250                                          .0018      .01    3.34     .00             .013
.00   .00  PIPE
                      -------------------- WARNING - Junction Analysis - Large Lateral Flow(s)-----------
-------
          |         |         |         |         |               |         |       |        |       |
|       |      |
  1442.000  5374.220    3.740  5377.960       .00      .00      .00  5377.96     .00      .01      .00
2.000     .000   .00   1   .0
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
```

```
T1 Saltillo Subdivision, Unit 2                                                0
T2 Storm Drain for Pinzon Street
T3 November 29, 2006
SO   1000.0005388.230  1                          5392.800
R    1042.0005388.430  2      .013                                .000  35.000 1
R    1134.0005388.930  2      .013                                .000 -55.000 1
R    1442.0005390.540  2      .013                                .000    .000 0
SH   1448.0005390.750  2      .013                5390.760
CD   1  4   1    .000   4.000     .000  .000  .000   .00
CD   2  4   1    .000   3.500     .000  .000  .000   .00
Q            96.000   .0
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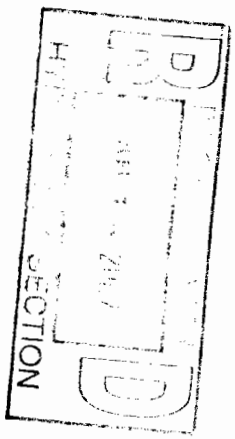

Program Package Serial Number: 1454
WATER SURFACE PROFILE LISTING

Date:11-29-2006 Time: 2:48:35

Saltillo Subdivision, Unit 2
Storm Drain in Pinzon Street
November 29, 2006

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Top Width/ Dia.-FT or I.D.	Base Wt ZL	No Wth Prs/Pip
1000.000	5388.230	4.570	5392.800	96.00	7.64	.91	5393.71	.00	2.97	.00	4.000	.000	.00 1 .0
42.000	.0048					.0045	.19	4.57	.00	3.17	.013	.00	.00 PIPE
1042.000	5388.430	4.707	5393.137	96.00	7.64	.91	5394.04	.00	2.97	.00	4.000	.000	.00 1 .0
JUNCT STR	.0166					.0068	.04	4.71	.00		.013	.00	.00 PIPE
1048.000	5388.530	4.020	5392.550	96.00	9.98	1.55	5394.10	.00	3.02	.00	3.500	.000	.00 1 .0

L/Elem	Ch Slope	ZR	Type Ch	X-Fall	SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"

```
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
    86.000    .0047                                                .0091       .78     4.02      .00     3.50     .013
.00    .00  PIPE
          |         |        |         |         |               |         |       |        |        |
|       |      |
  1134.000  5388.930    4.761  5393.691     96.00    9.98    1.55  5395.24      .00     3.02       .00
3.500     .000   .00   1   .0
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
 JUNCT STR   .0166                                                .0091       .05     4.76      .00              .013
.00    .00  PIPE
          |         |        |         |         |               |         |       |        |        |
|       |      |
  1140.000  5389.030    4.716  5393.745     96.00    9.98    1.55  5395.29      .00     3.02       .00
3.500     .000   .00   1   .0
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
    302.000    .0050                                                .0091      2.75     4.72      .00     3.50     .013
.00    .00  PIPE
          |         |        |         |         |               |         |       |        |        |
|       |      |
  1442.000  5390.540    5.955  5396.495     96.00    9.98    1.55  5398.04      .00     3.02       .00
3.500     .000   .00   1   .0
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
      3.000    .0050                                                .0046      6.56     5.95      .00     3.50     .013
.00    .00  PIPE
          |         |        |         |         |               |         |       |        |        |
|       |      |
  1445.000  5390.750    5.955  5396.705     96.00    9.98    1.55  5398.25      .00     3.02       .00
3.500     .000   .00   1   .0
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
```

```
T1 Saltillo Subdivision, Phase 2 - Los Cantos Storm Drain                    0
T2 Sta 1000 = Sta 1198 - Rainbow Trip SD Analysis
T3 November 11, 2006
SO    994.5005353.750  1                          5363.110
TS   1000.0005356.500  2      .013                                  .000
R    1242.7005361.280  2      .013                                  .000  53.000 1
R    1273.2005361.730  4      .013                                  .000  20.000 1
JX   1277.2005361.830  4  3   .013    7.000         5366.500         35.0         .000
R    1366.4005362.720  6      .013                                  .000 -75.000 1
JX   1370.4005362.760  6  5   .013    7.000         5364.000         20.0         .000
R    1385.8005363.010  6      .013                                  .000    .000 0
JX   1389.8005363.110  9  7  8.013    5.000    5.0005366.0005366.000 75.0-50.0    .000
R    1568.8005365.010  9      .013                                  .000  56.000 1
R    1652.9005366.000  9      .013                                  .000    .000 0
JX   1654.9105366.023 12 10 11.013   15.000    7.0005366.2005366.200 36.0-53.0    .000
SH   1654.9105366.023 12                          5368.200
CD   1  4   1    .000   9.000     .000  .000  .000   .00
CD   2  4   1    .000   3.500     .000  .000  .000   .00
CD   3  4   1    .000   2.000     .000  .000  .000   .00
CD   4  4   1    .000   3.000     .000  .000  .000   .00
CD   5  4   1    .000   2.000     .000  .000  .000   .00
CD   6  4   1    .000   2.500     .000  .000  .000   .00
CD   7  4   1    .000   2.000     .000  .000  .000   .00
CD   8  4   1    .000   2.000     .000  .000  .000   .00
CD   9  4   1    .000   2.500     .000  .000  .000   .00
CD  10  4   1    .000   2.000     .000  .000  .000   .00
CD  11  4   1    .000   2.000     .000  .000  .000   .00
CD  12  4   1    .000   2.000     .000  .000  .000   .00
Q              .001   .0
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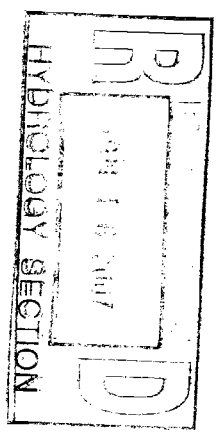

Program Package Serial Number: 1454
WATER SURFACE PROFILE LISTING

Date:11- 6-2006 Time: 2:41:10

Saltillo Subdivision, Phase 2 - Los Cantos Storm Drain
Sta 1000 = Sta 1198 - Rainbow Trip SD Analysis
November 11, 2006

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Top Height/ Dia.-FT or I.D.	Base Wt ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
994.500	5353.750	9.360	5363.110	46.00	.72	.01	5363.12	.00	1.60	.00	9.000	.000	.00	1 .0
TRANS STR	.5000					.0011	.01	9.36	.00		.013	.00	.00	PIPE
1000.000	5356.500	6.442	5362.942	46.00	4.78	.35	5363.30	.00	2.12	.00	3.500	.000	.00	1 .0
171.375	.0197					.0021	.36	6.44	.00	1.37	.013	.00	.00	PIPE
1171.375	5359.875	3.500	5363.375	46.00	4.78	.35	5363.73	.00	2.12	.00	3.500	.000	.00	1 .0

```
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
-|-     -|-     |-
    16.248    .0197                                              .0019      .03     3.50     .00    1.37    .013
.00   .00  PIPE
          |         |        |         |         |               |         |       |        |        |
|       |      |
  1187.624  5360.195    3.175  5363.370     46.00    5.01     .39  5363.76     .00    2.12     2.03
3.500     .000   .00   1   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
-|-     -|-     |-
     8.367    .0197                                              .0019      .02     3.18     .42    1.37    .013
.00   .00  PIPE
          |         |        |         |         |               |         |       |        |        |
|       |      |
  1195.991  5360.359    2.987  5363.347     46.00    5.26     .43  5363.78     .00    2.12     2.48
3.500     .000   .00   1   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
-|-     -|-     |-
     6.407    .0197                                              .0020      .01     2.99     .49    1.37    .013
.00   .00  PIPE
          |         |        |         |         |               |         |       |        |        |
|       |      |
  1202.398  5360.485    2.831  5363.316     46.00    5.52     .47  5363.79     .00    2.12     2.75
3.500     .000   .00   1   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
-|-     -|-     |-
      .243    .0197                                              .0021      .00     2.83     .56    1.37    .013
.00   .00  PIPE
          |         |        |         |         |               |         |       |        |        |
|       |      |
  1202.641  5360.490    2.831  5363.321     46.00    5.52     .47  5363.79     .00    2.12     2.75
3.500     .000   .00   1   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
-|-     -|-     |-
 HYDRAULIC JUMP
          |         |        |         |         |               |         |       |        |        |
|       |      |
  1202.641  5360.490    1.554  5362.044     46.00   11.15    1.93  5363.97     .00    2.12     3.48
3.500     .000   .00   1   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
-|-     -|-     |-
```

```
     4.421    .0197                                          .0124      .05     1.55    1.80    1.37    .013
.00   .00  PIPE
          |         |         |          |          |                |          |       |         |         |
|        |      |
  1207.061  5360.578    1.570  5362.148     46.00   11.00    1.88  5364.03      .00    2.12     3.48
3.500     .000   .00   1   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
-|-     -|-     |-
    13.678    .0197                                          .0114      .16     1.57    1.77    1.37    .013
.00   .00  PIPE
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Program Package Serial Number: 1454
WATER SURFACE PROFILE LISTING

Date:11- 6-2006 Time: 2:41:10

Saltillo Subdivision, Phase 2 - Los Cantos Storm Drain
Sta 1000 = Sta 1198 - Rainbow Trip SD Analysis
November 11, 2006

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Top Dia.-FT or I.D.	Height/ ZL	Base Wt| Prs/Pip	No Wth
1220.739	5360.847	1.628	5362.475	46.00	10.49	1.71	5364.18	.00	2.12	3.49	3.500	.000	.00	1 .0
L/Elem 9.791	Ch Slope .0197					SF Ave .0101	HF .10	SE Dpth 1.63	Froude N 1.65	Norm Dp 1.37	X-Fall .013	ZR .00	Type Ch .00	PIPE
1230.531	5361.040	1.689	5362.729	46.00	10.00	1.55	5364.28	.00	2.12	3.50	3.500	.000	.00	1 .0
L/Elem 7.030	Ch Slope .0197					SF Ave .0089	HF .06	SE Dpth 1.69	Froude N 1.54	Norm Dp 1.37	X-Fall .013	ZR .00	Type Ch .00	PIPE
1237.560	5361.179	1.754	5362.933	46.00	9.53	1.41	5364.34	.00	2.12	3.50	3.500	.000	.00	1 .0

```
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
     5.140    .0197                                                .0078       .04      1.75     1.43     1.37     .013
.00    .00  PIPE
           |          |         |          |          |                 |          |        |         |         |
|        |       |
  1242.700  5361.280     1.821  5363.102      46.00    10.24     1.63  5364.73      .00     2.21      2.93
3.000      .000    .00    1    .0
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
     8.470    .0148                                                .0098       .08      1.82     1.46     1.62     .013
.00    .00  PIPE
           |          |         |          |          |                 |          |        |         |         |
|        |       |
  1251.170  5361.405     1.861  5363.267      46.00     9.98     1.55  5364.81      .00     2.21      2.91
3.000      .000    .00    1    .0
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
    10.832    .0148                                                .0090       .10      1.86     1.40     1.62     .013
.00    .00  PIPE
           |          |         |          |          |                 |          |        |         |         |
|        |       |
  1262.002  5361.565     1.939  5363.504      46.00     9.52     1.41  5364.91      .00     2.21      2.87
3.000      .000    .00    1    .0
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
     6.607    .0148                                                .0080       .05      1.94     1.29     1.62     .013
.00    .00  PIPE
           |          |         |          |          |                 |          |        |         |         |
|        |       |
  1268.609  5361.663     2.022  5363.685      46.00     9.07     1.28  5364.96      .00     2.21      2.81
3.000      .000    .00    1    .0
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
     3.552    .0148                                                .0071       .03      2.02     1.19     1.62     .013
.00    .00  PIPE
           |          |         |          |          |                 |          |        |         |         |
|        |       |
  1272.161  5361.715     2.111  5363.826      46.00     8.65     1.16  5364.99      .00     2.21      2.74
3.000      .000    .00    1    .0
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
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```
     1.038    .0148                                                .0063      .01     2.11    1.09    1.62    .013
.00   .00  PIPE
          |         |         |          |          |                |          |        |         |         |
|        |      |
  1273.200  5361.730    2.209  5363.939     46.00    8.25    1.06  5364.99     .00    2.21     2.64
3.000     .000   .00   1   .0
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
 JUNCT STR   .0250                                                .0045      .02    2.21    1.00             .013
.00   .00  PIPE
```

Program Package Serial Number: 1454
WATER SURFACE PROFILE LISTING

Date:11- 6-2006 Time: 2:41:10

Saltillo Subdivision, Phase 2 - Los Cantos Storm Drain
Sta 1000 = Sta 1198 - Rainbow Trip SD Analysis
November 11, 2006

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Top Width/ Dia.-FT or I.D.	Base Wt ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1277.200	5361.830	2.928	5364.758	39.00	7.95	.98	5365.74	.00	2.11	.00	2.500	.000	.00	1 .0
89.200	.0100					.0090	.81	2.93	.00	1.95	.013	.00	.00	PIPE
1366.400	5362.720	3.136	5365.856	39.00	7.95	.98	5366.84	.00	2.11	.00	2.500	.000	.00	1 .0
JUNCT STR	.0099					.0076	.03	3.14	.00		.013	.00	.00	PIPE
1370.400	5362.760	3.675	5366.435	32.00	6.52	.66	5367.09	.00	1.93	.00	2.500	.000	.00	1 .0

```
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
    15.400    .0162                                          .0061       .09     3.67      .00     1.41     .013
.00   .00  PIPE
          |         |        |         |         |              |         |       |        |        |
|       |      |
  1385.800  5363.010    3.519  5366.528     32.00    6.52     .66  5367.19      .00     1.93      .00
2.500     .000   .00   1   .0
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
 JUNCT STR   .0250                                          .0045       .02     3.52      .00              .013
.00   .00  PIPE
          |         |        |         |         |              |         |       |        |        |
|       |      |
  1389.800  5363.110    4.132  5367.242     22.00    4.48     .31  5367.55      .00     1.60      .00
2.500     .000   .00   1   .0
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
   179.000    .0106                                          .0029       .51     4.13      .00     1.28     .013
.00   .00  PIPE
          |         |        |         |         |              |         |       |        |        |
|       |      |
  1568.800  5365.010    2.821  5367.831     22.00    4.48     .31  5368.14      .00     1.60      .00
2.500     .000   .00   1   .0
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
    36.040    .0118                                          .0029       .10     2.82      .00     1.24     .013
.00   .00  PIPE
          |         |        |         |         |              |         |       |        |        |
|       |      |
  1604.840  5365.434    2.500  5367.934     22.00    4.48     .31  5368.25      .00     1.60      .00
2.500     .000   .00   1   .0
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
    21.942    .0118                                          .0027       .06     2.50      .00     1.24     .013
.00   .00  PIPE
          |         |        |         |         |              |         |       |        |        |
|       |      |
  1626.782  5365.692    2.268  5367.960     22.00    4.70     .34  5368.30      .00     1.60     1.45
2.500     .000   .00   1   .0
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
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T1 Saltillo Subdivision, Phase 2 - Los Cantos Storm Drain                    0
T2 Sta 1000 = Sta 1198 - Rainbow Trip SD Analysis
T3 November 11, 2006
SO    994.5005353.750  1                          5363.110
TS   1000.0005356.500  2      .013                                .000
R    1242.7005361.280  2      .013                                .000  53.000 1
R    1273.2005361.730  4      .013                                .000  20.000 1
JX   1277.2005361.830  4  3   .013    7.000         5366.500       35.0         .000
R    1366.4005362.720  6      .013                                .000 -75.000 1
JX   1370.4005362.760  6  5   .013    7.000         5364.000       20.0         .000
R    1385.8005363.010  6      .013                                .000    .000 0
JX   1389.8005363.110  9  7  8.013    5.000    5.0005366.0005366.000 75.0-50.0    .000
R    1568.8005365.010  9      .013                                .000  56.000 1
R    1652.9005366.000  9      .013                                .000    .000 0
JX   1654.9105366.023 12 10 11.013   15.000    7.0005366.2005366.200 36.0-53.0    .000
SH   1654.9105366.023 12                          5368.200
CD   1  4   1    .000   9.000     .000  .000  .000   .00
CD   2  4   1    .000   3.500     .000  .000  .000   .00
CD   3  4   1    .000   2.000     .000  .000  .000   .00
CD   4  4   1    .000   3.000     .000  .000  .000   .00
CD   5  4   1    .000   2.000     .000  .000  .000   .00
CD   6  4   1    .000   2.500     .000  .000  .000   .00
CD   7  4   1    .000   2.000     .000  .000  .000   .00
CD   8  4   1    .000   2.000     .000  .000  .000   .00
CD   9  4   1    .000   2.500     .000  .000  .000   .00
CD  10  4   1    .000   2.000     .000  .000  .000   .00
CD  11  4   1    .000   2.000     .000  .000  .000   .00
CD  12  4   1    .000   2.000     .000  .000  .000   .00
Q              .001   .0
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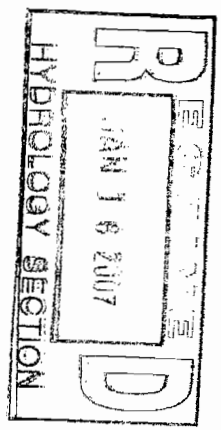

Program Package Serial Number: 1454
WATER SURFACE PROFILE LISTING

Date:11- 6-2006 Time: 2:41:10

Saltillo Subdivision, Phase 2 - Los Cantos Storm Drain
Sta 1000 = Sta 1198 - Rainbow Trip SD Analysis
November 11, 2006

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Top Height/Dia.-FT or I.D.	Base Wt ZL	No Wth Prs/Pip	L/Elem	Ch Slope	SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
994.500	5353.750	9.360	5363.110	46.00	.72	.01	5363.12	.00	1.60	.00	9.000	.000	.00	1	.0									
TRANS STR		.5000					.0011	.01	9.36	.00			.013	.00	.00	PIPE								
1000.000	5356.500	6.442	5362.942	46.00	4.78	.35	5363.30	.00	2.12	.00	3.500	.000	.00	1	.0									
171.375		.0197					.0021	.36	6.44	.00	1.37		.013	.00	.00	PIPE								
1171.375	5359.875	3.500	5363.375	46.00	4.78	.35	5363.73	.00	2.12	.00	3.500	.000	.00	1	.0									

```
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
-|-     -|-     |-
    16.248    .0197                                          .0019      .03     3.50     .00    1.37    .013
.00   .00  PIPE
          |         |        |         |         |               |         |       |        |        |
|       |      |
  1187.624  5360.195    3.175  5363.370     46.00    5.01     .39  5363.76     .00    2.12     2.03
3.500     .000   .00   1   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
-|-     -|-     |-
     8.367    .0197                                          .0019      .02     3.18     .42    1.37    .013
.00   .00  PIPE
          |         |        |         |         |               |         |       |        |        |
|       |      |
  1195.991  5360.359    2.987  5363.347     46.00    5.26     .43  5363.78     .00    2.12     2.48
3.500     .000   .00   1   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
-|-     -|-     |-
     6.407    .0197                                          .0020      .01     2.99     .49    1.37    .013
.00   .00  PIPE
          |         |        |         |         |               |         |       |        |        |
|       |      |
  1202.398  5360.485    2.831  5363.316     46.00    5.52     .47  5363.79     .00    2.12     2.75
3.500     .000   .00   1   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
-|-     -|-     |-
      .243    .0197                                          .0021      .00     2.83     .56    1.37    .013
.00   .00  PIPE
          |         |        |         |         |               |         |       |        |        |
|       |      |
  1202.641  5360.490    2.831  5363.321     46.00    5.52     .47  5363.79     .00    2.12     2.75
3.500     .000   .00   1   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
-|-     -|-     |-
 HYDRAULIC JUMP
          |         |        |         |         |               |         |       |        |        |
|       |      |
  1202.641  5360.490    1.554  5362.044     46.00   11.15    1.93  5363.97     .00    2.12     3.48
3.500     .000   .00   1   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
-|-     -|-     |-
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     4.421    .0197                                          .0124      .05     1.55    1.80    1.37    .013
.00    .00  PIPE
          |         |         |         |         |                |         |       |         |         |
|        |      |
  1207.061  5360.578    1.570  5362.148     46.00   11.00    1.88  5364.03      .00    2.12     3.48
3.500     .000   .00   1   .0
         -|-       -|-       -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
-|-     -|-     |-
    13.678    .0197                                          .0114      .16     1.57    1.77    1.37    .013
.00    .00  PIPE
```

Program Package Serial Number: 1454
WATER SURFACE PROFILE LISTING

Date:11- 6-2006 Time: 2:41:10

Saltillo Subdivision, Phase 2 - Los Cantos Storm Drain
Sta 1000 = Sta 1198 - Rainbow Trip SD Analysis
November 11, 2006

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Top Dia.-FT or I.D.	Height/ ZL	Base Wt Prs/Pip	No Wth
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1220.739	5360.847	1.628	5362.475	46.00	10.49	1.71	5364.18	.00	2.12	3.49	3.500	.000	.00	1 .0
9.791	.0197					.0101	.10	1.63	1.65	1.37	.013	.00	.00	PIPE
1230.531	5361.040	1.689	5362.729	46.00	10.00	1.55	5364.28	.00	2.12	3.50	3.500	.000	.00	1 .0
7.030	.0197					.0089	.06	1.69	1.54	1.37	.013	.00	.00	PIPE
1237.560	5361.179	1.754	5362.933	46.00	9.53	1.41	5364.34	.00	2.12	3.50	3.500	.000	.00	1 .0

```
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
      5.140    .0197                                              .0078       .04     1.75    1.43    1.37    .013
.00    .00  PIPE
           |         |         |         |         |                |         |       |        |        |
|        |       |
  1242.700  5361.280    1.821  5363.102     46.00   10.24    1.63  5364.73     .00    2.21     2.93
3.000     .000   .00   1   .0
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
      8.470    .0148                                              .0098       .08     1.82    1.46    1.62    .013
.00    .00  PIPE
           |         |         |         |         |                |         |       |        |        |
|        |       |
  1251.170  5361.405    1.861  5363.267     46.00    9.98    1.55  5364.81     .00    2.21     2.91
3.000     .000   .00   1   .0
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
     10.832    .0148                                              .0090       .10     1.86    1.40    1.62    .013
.00    .00  PIPE
           |         |         |         |         |                |         |       |        |        |
|        |       |
  1262.002  5361.565    1.939  5363.504     46.00    9.52    1.41  5364.91     .00    2.21     2.87
3.000     .000   .00   1   .0
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
      6.607    .0148                                              .0080       .05     1.94    1.29    1.62    .013
.00    .00  PIPE
           |         |         |         |         |                |         |       |        |        |
|        |       |
  1268.609  5361.663    2.022  5363.685     46.00    9.07    1.28  5364.96     .00    2.21     2.81
3.000     .000   .00   1   .0
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
      3.552    .0148                                              .0071       .03     2.02    1.19    1.62    .013
.00    .00  PIPE
           |         |         |         |         |                |         |       |        |        |
|        |       |
  1272.161  5361.715    2.111  5363.826     46.00    8.65    1.16  5364.99     .00    2.21     2.74
3.000     .000   .00   1   .0
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
```

```
     1.038    .0148                                          .0063      .01     2.11    1.09    1.62    .013
.00   .00  PIPE
          |         |         |         |         |               |         |       |         |         |
|       |      |
  1273.200  5361.730    2.209  5363.939     46.00    8.25    1.06  5364.99     .00    2.21     2.64
3.000     .000   .00   1   .0
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
 JUNCT STR   .0250                                          .0045      .02    2.21    1.00             .013
.00   .00  PIPE
```

Program Package Serial Number: 1454
WATER SURFACE PROFILE LISTING

Date:11- 6-2006 Time: 2:41:10

Saltillo Subdivision, Phase 2 - Los Cantos Storm Drain
Sta 1000 = Sta 1198 - Rainbow Trip SD Analysis
November 11, 2006

Station	Invert Elev / ZL	Depth (FT) / Prs/Pip	Water Elev / Ch Slope	Q (CFS) / Type Ch	Vel (FPS) / SF Ave	Vel Head / HF	Energy Grd.El. / SE Dpth	Super Elev / Froude N	Critical Depth / Norm Dp	Flow Width / "N"	Top|Height/|Base Wt| No Wth FT|or I.D.| X-Fall| ZR
1277.200	5361.830	2.928	5364.758	39.00	7.95	.98	5365.74	.00	2.11	.00	2.500 .000 .00 1 .0
89.200	.0100				.0090	.81	2.93	.00	1.95	.013	.00 .00 PIPE
1366.400	5362.720	3.136	5365.856	39.00	7.95	.98	5366.84	.00	2.11	.00	2.500 .000 .00 1 .0
JUNCT STR	.0099				.0076	.03	3.14	.00		.013	.00 .00 PIPE
1370.400	5362.760	3.675	5366.435	32.00	6.52	.66	5367.09	.00	1.93	.00	2.500 .000 .00 1 .0

```
         -|-       -|-       -|-       -|-       -|-     -|-     -|-       -|-     -|-       -|-       -|-
-|-     -|-     |-
    15.400    .0162                                          .0061      .09     3.67     .00    1.41    .013
.00   .00  PIPE
          |         |        |         |         |               |         |       |        |        |
|       |      |
  1385.800  5363.010    3.519  5366.528     32.00    6.52     .66  5367.19     .00    1.93      .00
2.500     .000   .00   1   .0
         -|-       -|-       -|-       -|-       -|-     -|-     -|-       -|-     -|-       -|-       -|-
-|-     -|-     |-
 JUNCT STR   .0250                                          .0045      .02    3.52     .00             .013
.00   .00  PIPE
          |         |        |         |         |               |         |       |        |        |
|       |      |
  1389.800  5363.110    4.132  5367.242     22.00    4.48     .31  5367.55     .00    1.60      .00
2.500     .000   .00   1   .0
         -|-       -|-       -|-       -|-       -|-     -|-     -|-       -|-     -|-       -|-       -|-
-|-     -|-     |-
   179.000    .0106                                          .0029      .51     4.13     .00    1.28    .013
.00   .00  PIPE
          |         |        |         |         |               |         |       |        |        |
|       |      |
  1568.800  5365.010    2.821  5367.831     22.00    4.48     .31  5368.14     .00    1.60      .00
2.500     .000   .00   1   .0
         -|-       -|-       -|-       -|-       -|-     -|-     -|-       -|-     -|-       -|-       -|-
-|-     -|-     |-
    36.040    .0118                                          .0029      .10     2.82     .00    1.24    .013
.00   .00  PIPE
          |         |        |         |         |               |         |       |        |        |
|       |      |
  1604.840  5365.434    2.500  5367.934     22.00    4.48     .31  5368.25     .00    1.60      .00
2.500     .000   .00   1   .0
         -|-       -|-       -|-       -|-       -|-     -|-     -|-       -|-     -|-       -|-       -|-
-|-     -|-     |-
    21.942    .0118                                          .0027      .06     2.50     .00    1.24    .013
.00   .00  PIPE
          |         |        |         |         |               |         |       |        |        |
|       |      |
  1626.782  5365.692    2.268  5367.960     22.00    4.70     .34  5368.30     .00    1.60     1.45
2.500     .000   .00   1   .0
         -|-       -|-       -|-       -|-       -|-     -|-     -|-       -|-     -|-       -|-       -|-
-|-     -|-     |-
```

```
    10.980    .0118                                          .0026      .03     2.27     .46    1.24    .013
.00   .00  PIPE
          |         |         |         |         |                |         |       |        |        |
|        |      |
  1637.762  5365.822    2.133  5367.955     22.00    4.93     .38  5368.33     .00    1.60     1.77
2.500     .000   .00   1   .0
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
     8.180    .0118                                          .0028      .02     2.13     .55    1.24    .013
.00   .00  PIPE
```

Program Package Serial Number: 1454
WATER SURFACE PROFILE LISTING

Date:11- 6-2006 Time: 2:41:10

Saltillo Subdivision, Phase 2 - Los Cantos Storm Drain
Sta 1000 = Sta 1198 - Rainbow Trip SD Analysis
November 11, 2006

Station	Invert Elev / ZL	Depth (FT) / Prs/Pip	Water Elev / No Wth	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Top Height/ Base Wt / Dia.-FT or I.D. / "N"
1645.942	5365.918	2.022	5367.940	22.00	5.17	.42	5368.36	.00	1.60	1.97	2.500
L/Elem 6.397	Ch Slope .0118	Type Ch PIPE				SF Ave .0031	HF .02	SE Dpth 2.02	Froude N .62	Norm Dp 1.24	.013
											.00 .00
1652.339	5365.993	1.925	5367.918	22.00	5.42	.46	5368.38	.00	1.60	2.10	2.500
L/Elem .561	Ch Slope .0118	Type Ch PIPE				SF Ave .0033	HF .00	SE Dpth 1.93	Froude N .69	Norm Dp 1.24	.013
											.00 .00
1652.900	5366.000	1.916	5367.916	22.00	5.45	.46	5368.38	.00	1.60	2.12	2.500

```
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
 JUNCT STR    .0114                                              .0016       .00     1.92      .70              .013
.00    .00  PIPE
                          -------------------- WARNING - Junction Analysis - Large Lateral Flow(s)-----------
-------
           |         |         |         |         |                |         |        |         |         |
|        |       |
  1654.910  5366.023     2.351  5368.375        .00      .00      .00  5368.37      .00      .01       .00
2.000      .000    .00    1    .0
         -|-       -|-       -|-       -|-       -|-      -|-      -|-       -|-      -|-       -|-       -|-
-|-      -|-      |-
```