FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FCD 95-43

CASANDRO WASH LOMR

prepared by:

COLLINS/PIÑA CONSULTING ENGINEERS, INC.
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October 31, 1996

Collins/Piña
Consulting Engineers, Inc.

HEC-RAS Version 1.2 April 1996
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
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X     X  XXXXXX   XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
X     X  X        X           X   X     X    X  X
XXXXXXX  XXXX     X       XXX XXXX     XXXXXX   XXXX
X     X  X        X           X  X     X    X       X
X     X  X        X    X      X   X    X    X       X
X     X  XXXXXX    XXXX       X    X   X    X   XXXXX
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PROJECT DATA
Project Title: Cassandro Wash (GIS HEC-RAS)
Project File : cass.prj
Run Date and Time: 12/18/97 2:47:38 PM

Project in English units

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PLAN DATA

Plan Title: Plan 13
Plan File : c:\jobs\3660.2\floodcon\cass.p13

Geometry Title: Plan 13
Geometry File : c:\jobs\3660.2\floodcon\cass.p13

Flow Title : Plan 13
Flow File : c:\jobs\3660.2\floodcon\cass.p13

Plan Summary Information:

Number of:	Cross Sections =	22	Mulitple Openings =	0
	Culverts =	0	Inline Weirs =	0
	Bridges =	0		

Computational Information

Water surface calculation tolerance =	.01
Critical depth calculaton tolerance =	.01
Maximum number of interations =	20
Maximum difference tolerance =	.3
Flow tolerance factor =	.001

Computational Flow Regime: Subcritical Flow

Encroachment Data: None

Flow Distribution Locations: None

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FLOW DATA

Flow Title: DAM-NAV
Flow File : c:\jobs\3660.2\floodcon\cass.f02

Flow Data (cfs)

Reach	Riv Sta	PF#1
1	7137	30
1	6268	187
1	5281	253
1	4633	275

Boundary Conditions

Reach	Profile	Upstream	Downstream
1	1		Known WS = 2085.84

GEOMETRY DATA

Geometry Title: Cassandro Wash, GIS model, DAM-NAV
Geometry File : c:\jobs\3660.2\floodcon\cass.g02

CROSS SECTION INPUT Reach: 1 River Station: 7137
Description: 51

Station Elevation Data, num = 8

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
9915	2132	9920	2131	9922	2130	10000	2130.3	10015	2130
10025	2131	10029	2131	10070	2132				

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
9915	.04	9920	.028	10015	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9920	10015	195	207.2	212	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 6930
Description: 50

Station Elevation Data, num = 10

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
9841	2130	9845	2129	9850	2128	9860	2127	9895	2126
10000	2125.9	10045	2126	10070	2127	10075	2128	10080	2130

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
9841	.04	9860	.028	10070	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9860	10070	155	153.6	155	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 6776
Description: 49

Station Elevation Data, num = 7

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
9948	2125	9953	2124	9956	2123	10000	2122.5	10052	2123
10100	2124	10150	2125						

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
9948	.04	9956	.028	10052	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9956	10052	135	182.7	210	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 6594
Description: 48

Station Elevation Data, num = 5

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
9953	2120	9957	2120	10000	2119	10027	2119	10040	2120

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
9953	.04	9957	.028	10040	.028

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9957	10040	158	158.2	165	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 6436
Description: 47

Station Elevation Data, num = 5

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
9928	2118	9939	2117	10000	2117	10050	2117	10085	2118

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
9928	.028	9928	.028	10085	.028

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9928	10085	200	167.3	100	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 6268
Description: 46

Station Elevation Data, num = 11

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
9861	2117	9868	2116	9886	2115	9930	2115	9936	2114.6
9948	2115	9955	2115	10000	2114.5	10008	2115	10012	2116
10021	2117								

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
9861	.04	9868	.028	10012	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9868	10012	118	97.9	90	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 6170
Description: 45

Station Elevation Data, num = 11

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
9882	2120	9930	2118	9940	2116	9950	2115	9988	2114
10000	2113.5	10010	2114	10020	2115	10040	2116	10069	2117
10082	2118								

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
9882	.04	9988	.028	10010	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9988	10010	65	30.9	70	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 6139
Description: 44

Station Elevation Data, num = 12

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
9904	2120	9920	2118	9939	2116	9955	2115	9982	2114
10000	2113.5	10038	2114	10061	2115	10085	2116	10101	2117
10117	2118	10147	2120						

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
9904	.04	9955	.028	10061	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9955	10061	50	35.9	58	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 6104
Description: 43

Station Elevation Data, num = 7

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
9980	2112	9982	2110	9985	2108	9997	2108	10000	2108.2
10026	2110	10029	2112						

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
9980	.04	9982	.028	10026	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9982	10026	220	229.8	232	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 5874
Description: 41

Station Elevation Data, num = 9

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
9965	2110	9970	2108	9982	2106	9985	2105	10000	2104.5
10010	2105	10020	2106	10038	2108	10063	2108		

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
9965	.04	9982	.028	10020	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9982	10020	200	201.2	198	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 5673

Description: 39

Station Elevation Data, num = 7

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
9970	2106	9972	2104	10000	2103	10008	2103	10020	2104
10022	2105	10043	2105						

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
9970	.04	9972	.028	10020	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9972	10020	111	113.6	215	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 5559
Description: 38

Station Elevation Data, num = 15

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
9920	2110	9944	2106	9960	2105	9971	2104	9975	2103
9985	2102.2	10000	2102.7	10018	2102	10028	2101.5	10035	2102
10207	2102	10225	2103	10230	2104	10235	2106	10240	2107

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
9920	.04	9985	.028	10207	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9985	10207	75	65.1	70	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 5494
Description: 37.5

Station Elevation Data, num = 9

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
9952	2106	9966	2104	9976	2102	9980	2101	10000	2100.5
10020	2101	10027	2102	10206	2104	10232	2106		

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
9952	.04	9976	.028	10027	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9976	10027	40	33.3	130	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 5461
Description: 37

Station Elevation Data, num = 9

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
9954	2106	9974	2104	9984	2103	10000	2102.5	10060	2102.7
10126	2102.9	10159	2103	10194	2103.4	10222	2104		

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
9954	.04	9984	.028	10159	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9984	10159	40	28.6	151	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 5432
Description: 36

Station Elevation Data, num = 9

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
9983	2100	9986	2098	9990	2096	10000	2094.6	10018	2096
10022	2098	10027	2100	10037	2100	10122	2100		

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
9983	.028	9983	.028	10027	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9983	10027	151	151.1	151	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 5281
Description: 35

Station Elevation Data, num = 9

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
9930	2098	9954	2097	9972	2096	9982	2095	10000	2093.5
10002	2095	10007	2096	10017	2098	10087	2098		

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
9930	.028	9930	.028	10017	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9930	10017	250	253.3	255	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 5028
Description: 33

Station Elevation Data, num = 8

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
9960	2094	9967	2094	9977	2093	9987	2092	10000	2092
10016	2092	10036	2093	10037	2094				

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
9960	.04	9977	.028	10036	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9977	10036	193	193.6	193	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 4843
Description: 31

Station Elevation Data, num = 8

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
9921	2092	9930	2091	9972	2090	10000	2089.5	10016	2090
10018	2091	10021	2092	10026	2092				

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
9921	.04	9972	.028	10016	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9972	10016	97	92.25	85	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 4742
Description: 29

Station Elevation Data, num = 6

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
9980	2090	9988	2088	10000	2087.7	10013	2088	10018	2089
10019	2090								

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
9980	.04	9988	.028	10013	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9988	10013	110	109.8	108	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 4633
Description: 28

Station Elevation Data, num = 7

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
9985	2090	9990	2088	9995	2086	10000	2085.5	10008	2086
10015	2086.3	10017	2087.93						

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
9985	.04	9990	.028	10017	.028

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9990	10017	110	118.9	120	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 4514
Description: 27

Station Elevation Data, num = 8

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
9982	2087	9983	2084.5	9988	2084	10000	2083.8	10005	2085
10013	2085.3	10013.25	2088	10014	2088				

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
9982	.028	9982	.028	10014	.028

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9982	10014	21	20.1	18	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 4494
Description: 26

Station Elevation Data, num = 8

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
9965	2088	9990	2088	9991	2088	9992	2084	10000	2083.63
10012	2084	10015	2088	10022	2087				

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
9965	.04	9991	.028	10015	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9991	10015	0	0	0	.1	.3

SUMMARY OF MANNING'S N VALUES

Reach	River Sta.	n1	n2	n3
1	7137	.04	.028	.04
1	6930	.04	.028	.04
1	6776	.04	.028	.04
1	6594	.04	.028	.028
1	6436	.028	.028	.028
1	6268	.04	.028	.04
1	6170	.04	.028	.04
1	6139	.04	.028	.04
1	6104	.04	.028	.04
1	5874	.04	.028	.04
1	5673	.04	.028	.04
1	5559	.04	.028	.04
1	5494	.04	.028	.04
1	5461	.04	.028	.04
1	5432	.028	.028	.04
1	5281	.028	.028	.04
1	5028	.04	.028	.04
1	4843	.04	.028	.04
1	4742	.04	.028	.04
1	4633	.04	.028	.028
1	4514	.028	.028	.028
1	4494	.04	.028	.04

SUMMARY OF REACH LENGTHS

Reach	River Sta.	Left	Channel	Right
1	7137	195	207.2	212
1	6930	155	153.6	155
1	6776	135	182.7	210
1	6594	158	158.2	165
1	6436	200	167.3	100
1	6268	118	97.9	90
1	6170	65	30.9	70
1	6139	50	35.9	58
1	6104	220	229.8	232
1	5874	200	201.2	198
1	5673	111	113.6	215
1	5559	75	65.1	70
1	5494	40	33.3	130
1	5461	40	28.6	151
1	5432	151	151.1	151
1	5281	250	253.3	255
1	5028	193	193.6	193
1	4843	97	92.25	85
1	4742	110	109.8	108
1	4633	110	118.9	120
1	4514	21	20.1	18
1	4494	0	0	0

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SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

Reach	River Sta.	Contr.	Expan.
1	7137	.1	.3
1	6930	.1	.3
1	6776	.1	.3
1	6594	.1	.3
1	6436	.1	.3
1	6268	.1	.3
1	6170	.1	.3
1	6139	.1	.3
1	6104	.1	.3
1	5874	.1	.3
1	5673	.1	.3
1	5559	.1	.3
1	5494	.1	.3
1	5461	.1	.3
1	5432	.1	.3
1	5281	.1	.3
1	5028	.1	.3
1	4843	.1	.3
1	4742	.1	.3
1	4633	.1	.3
1	4514	.1	.3
1	4494	.1	.3

HEC-RAS Version 1.2 April 1996
U.S. Army Corp of Engineers
Hydrologic Engineering Center
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(916) 756-1104

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X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
X     X  X        X           X   X    X    X   X
XXXXXXX  XXXX     X       XXX XXXX     XXXXXX    XXXX
X     X  X        X           X  X     X    X       X
X     X  X        X    X      X   X    X    X       X
X     X  XXXXXX    XXXX       X    X   X    X   XXXXX
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PROJECT DATA
Project Title: Cassandro Wash (GIS HEC-RAS)
Project File : cass.prj
Run Date and Time: 12/18/97 3:02:56 PM

Project in English units

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PLAN DATA

Plan Title: Plan 13
Plan File : c:\jobs\3660.2\floodcon\cass.p13

Geometry Title: Plan 13
Geometry File : c:\jobs\3660.2\floodcon\cass.p13

Flow Title : Plan 13
Flow File : c:\jobs\3660.2\floodcon\cass.p13

Plan Summary Information:

Number of:	Cross Sections =	18	Mulitple Openings =	0
	Culverts =	0	Inline Weirs =	0
	Bridges =	0		

Computational Information

Water surface calculation tolerance =	.01
Critical depth calculaton tolerance =	.01
Maximum number of interations =	20
Maximum difference tolerance =	.3
Flow tolerance factor =	.001

Computational Flow Regime: Subcritical Flow

Encroachment Data: None

Flow Distribution Locations: None

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FLOW DATA

Flow Title: Imported Flow 03
Flow File : c:\jobs\3660.2\floodcon\cass.f03

Flow Data (cfs)

Reach	Riv Sta	PF#1
1	4417	30
1	4147	59
1	3672	82
1	3363	91
1	2967	102
1	2776	280

Boundary Conditions

Reach	Profile	Upstream	Downstream
1	1		Known WS = 2064.36

GEOMETRY DATA

Geometry Title: Imported Geom 03
Geometry File : c:\jobs\3660.2\floodcon\cass.g03

CROSS SECTION INPUT Reach: 1 River Station: 4417
Description: 25

Station Elevation Data, num = 8

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
9986	2085	9988	2084	9996	2083	10000	2082.7	10004	2083
10014	2084	10031	2085	10086	2084.3				

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
9986	.022	9986	.022	10031	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9986	10031	78	73.8	75	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 4344
Description: 24

Station Elevation Data, num = 8

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
9959	2084	9984	2084	9987	2083	9990	2082	10000	2081.6
10010	2082	10025	2083	10037	2084				

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
9959	.04	9987	.022	10025	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9987	10025	70	67.8	70	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 4276
Description: 23

Station Elevation Data, num = 7

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
9955	2083	9977	2082	9992	2081	10000	2080.74	10010	2081
10020	2082	10140	2082.4						

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
9955	.04	9977	.022	10020	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9977	10020	102	100.1	95	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 4176
Description: 22

Station Elevation Data, num = 10

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
9965	2082	9975	2082.2	9978	2082	9983	2081	9985	2080
10000	2079.5	10009	2080	10017	2081	10054	2082	10110	2082

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
9965	.04	9983	.022	10017	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9983	10017	20	28.2	39	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 4147
Description: 21

Station Elevation Data, num = 7

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
9968	2082	9975	2082	9982	2080	10000	2079	10019	2080
10078	2080	10098	2080						

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
9968	.04	9982	.022	10019	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9982	10019	120	144.6	150	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 4003
Description: 20

Station Elevation Data, num = 9

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
9959	2080	9960	2078	9978	2077.2	9989	2077	10000	2076.5
10009	2077	10019	2078	10060	2079	10100	2080		

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
9959	.04	9960	.022	10019	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9960	10019	87	85.83	87	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 3917
Description: 19

Station Elevation Data, num = 8

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
9965	2079	9980	2078	9987	2076	10000	2075.6	10009	2076
10015	2077	10020	2078	10025	2080				

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
9965	.04	9980	.022	10020	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9980	10020	91	92.51	91	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 3825
Description: 18

Station Elevation Data, num = 8

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
9889	2077	9930	2076.4	9969	2076	9985	2075	10000	2074.5
10015	2075	10026	2076	10044	2077				

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
9889	.04	9969	.022	10026	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9969	10026	150	152.4	150	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 3672
Description: 17

Station Elevation Data, num = 8

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
9935	2075.4	9960	2075	9977	2074	9987	2073	10000	2072.3
10010	2073	10015	2074	10020	2076				

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
9935	.04	9987	.022	10010	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9987	10010	97.8	97.8	97.8	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 3574
Description: 16

Station Elevation Data, num = 7

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
9960	2074	9980	2073	9984	2072	10000	2071.5	10011	2072
10016	2073	10019	2074						

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
9960	.04	9980	.022	10016	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9980	10016	102	99	100	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 3475
Description: 15

Station Elevation Data, num = 5

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
9954	2072	9980	2071	10000	2070.7	10016	2071	10041	2072

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
9954	.04	9980	.022	10016	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9980	10016	112.3	112.3	112.3	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 3363
Description: 14

Station Elevation Data, num = 8

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
9994	2071	9996	2070	10000	2069	10006	2068.6	10016	2068.6
10024	2069	10026	2070	10032	2071				

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
9994	.04	9996	.022	10026	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9996	10026	160	160	160	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 3203
Description: 13

Station Elevation Data, num = 7

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
9975	2068.5	9985	2068	9990	2067	10000	2067.2	10010	2067
10015	2068	10055	2069						

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
9975	.04	9985	.022	10015	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9985	10015	54.9	54.9	54.9	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 3148
Description: 12

Station Elevation Data, num = 5

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
9977	2068	9983	2067	10000	2066.3	10008	2067	10019	2068

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
9977	.022	9977	.022	10019	.022

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9977	10019	52.3	52.3	55	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 3096
Description: 11

```
Station Elevation Data,  num = 8
    Sta.   Elev.    Sta.   Elev.    Sta.   Elev.    Sta.   Elev.    Sta.   Elev.
    9965    2068    9980    2067    9990    2066   10000  2066.1   10031    2067
   10051    2068   10078    2069   10085    2070

Manning's n Values,  num = 3
    Sta.   Value    Sta.   Value    Sta.   Value
    9965     .04    9980    .022   10031     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right    Coeff Contr.   Expan.
          9980   10031              120   128.5     130             .1       .3

CROSS SECTION INPUT    Reach: 1              River Station: 2967
Description:  10

Station Elevation Data,  num = 5
    Sta.   Elev.    Sta.   Elev.    Sta.   Elev.    Sta.   Elev.    Sta.   Elev.
    9980  2067.5    9987    2066   10000    2064   10007    2066   10019    2068

Manning's n Values,  num = 3
    Sta.   Value    Sta.   Value    Sta.   Value
    9980     .04    9987    .022   10007     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right    Coeff Contr.   Expan.
          9987   10007              125  124.63     125             .1       .3

CROSS SECTION INPUT    Reach: 1              River Station: 2843
Description:  9

Station Elevation Data,  num = 6
    Sta.   Elev.    Sta.   Elev.    Sta.   Elev.    Sta.   Elev.    Sta.   Elev.
    9979    2066    9991    2066    9995    2064   10000    2064 10005.4    2064
 10016.6    2066

Manning's n Values,  num = 3
    Sta.   Value    Sta.   Value    Sta.   Value
    9979     .04    9991    .022 10016.6    .022

Bank Sta: Left   Right    Lengths: Left Channel   Right    Coeff Contr.   Expan.
          9991 10016.6             65.82    66.8   65.82             .1       .3

CROSS SECTION INPUT    Reach: 1              River Station: 2776
Description:  8

Station Elevation Data,  num = 7
    Sta.   Elev.    Sta.   Elev.    Sta.   Elev.    Sta.   Elev.    Sta.   Elev.
    9815    2065    9950    2064  9992.5    2062   10000  2060.8 10007.5    2062
 10012.5    2064 10017.5    2066

Manning's n Values,  num = 3
    Sta.   Value    Sta.   Value    Sta.   Value
    9815     .04    9950    .022 10012.5     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right    Coeff Contr.   Expan.
          9950 10012.5                0       0       0             .1       .3

*******************************************************************************

SUMMARY OF MANNING'S N VALUES
```

Reach	River Sta.	n1	n2	n3
1	4417	.022	.022	.04
1	4344	.04	.022	.04
1	4276	.04	.022	.04
1	4176	.04	.022	.04
1	4147	.04	.022	.04
1	4003	.04	.022	.04
1	3917	.04	.022	.04
1	3825	.04	.022	.04
1	3672	.04	.022	.04
1	3574	.04	.022	.04
1	3475	.04	.022	.04
1	3363	.04	.022	.04
1	3203	.04	.022	.04
1	3148	.022	.022	.022
1	3096	.04	.022	.04
1	2967	.04	.022	.04
1	2843	.04	.022	.022
1	2776	.04	.022	.04

SUMMARY OF REACH LENGTHS

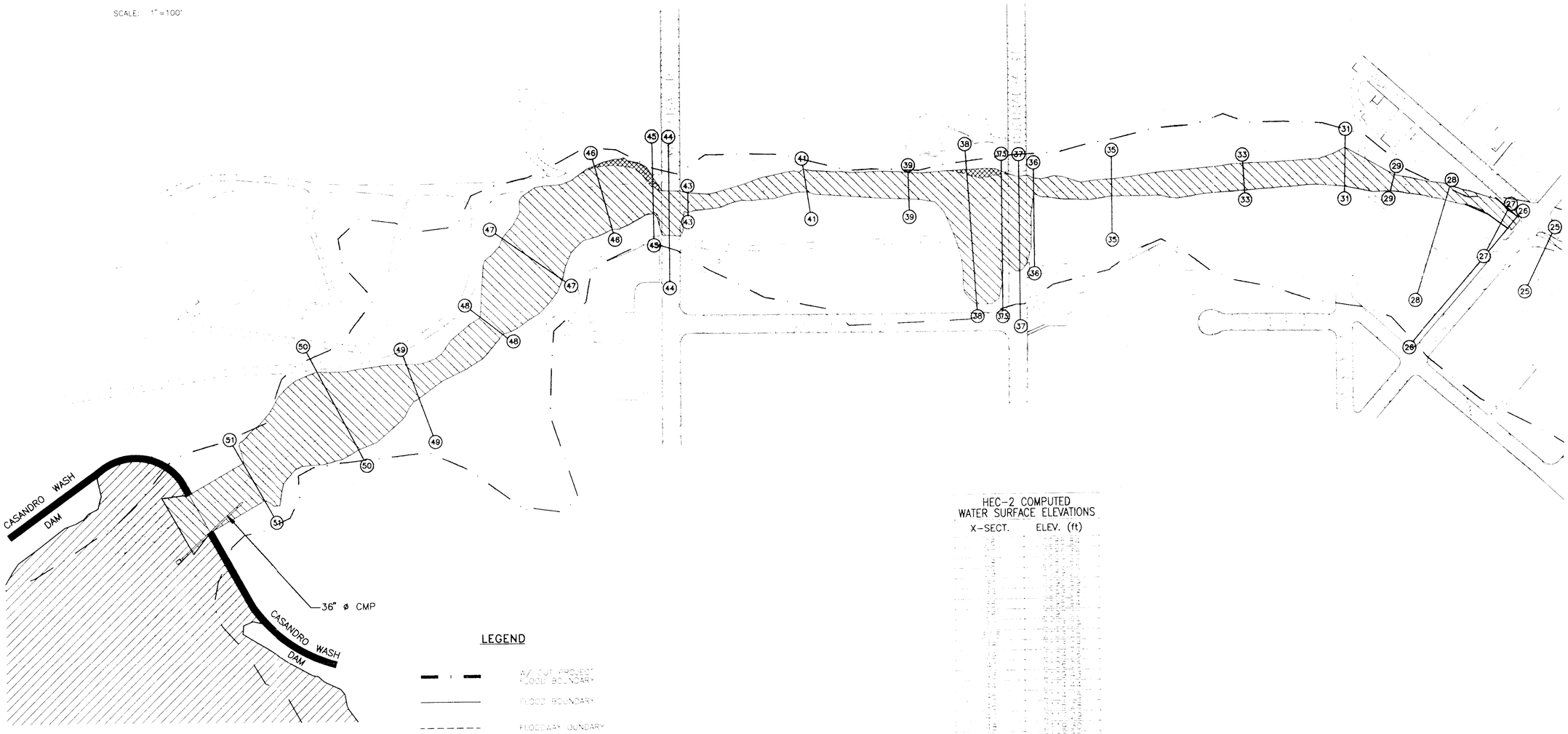
Reach	River Sta.	Left	Channel	Right
1	4417	78	73.8	75
1	4344	70	67.8	70
1	4276	102	100.1	95
1	4176	20	28.2	39
1	4147	120	144.6	150
1	4003	87	85.83	87
1	3917	91	92.51	91
1	3825	150	152.4	150
1	3672	97.8	97.8	97.8
1	3574	102	99	100
1	3475	112.3	112.3	112.3
1	3363	160	160	160
1	3203	54.9	54.9	54.9
1	3148	52.3	52.3	55
1	3096	120	128.5	130
1	2967	125	124.63	125
1	2843	65.82	66.8	65.82
1	2776	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

Reach	River Sta.	Contr.	Expan.
1	4417	.1	.3
1	4344	.1	.3
1	4276	.1	.3

```
*1          *    4176    *      .1*      .3*
*1          *    4147    *      .1*      .3*
*1          *    4003    *      .1*      .3*
*1          *    3917    *      .1*      .3*
*1          *    3825    *      .1*      .3*
*1          *    3672    *      .1*      .3*
*1          *    3574    *      .1*      .3*
*1          *    3475    *      .1*      .3*
*1          *    3363    *      .1*      .3*
*1          *    3203    *      .1*      .3*
*1          *    3148    *      .1*      .3*
*1          *    3096    *      .1*      .3*
*1          *    2967    *      .1*      .3*
*1          *    2843    *      .1*      .3*
*1          *    2776    *      .1*      .3*
*********************************************
```

SCALE: 1" = 100'



LEGEND

- W/ OUT PROJECT FLOOD BOUNDARY
- FLOOD BOUNDARY
- FLOODWAY BOUNDARY
- WITH PROJECT FLOODWAY
- WITH PROJECT FLOODPLAIN
- WITH PROJECT FLOOD-PRONE AREAS (AO)
- 49 — 49 HEC-2 CROSS-SECTION LOCATION
- APPROXIMATE DAM & DETENTION BASIN SITE

HEC-2 COMPUTED
WATER SURFACE ELEVATIONS

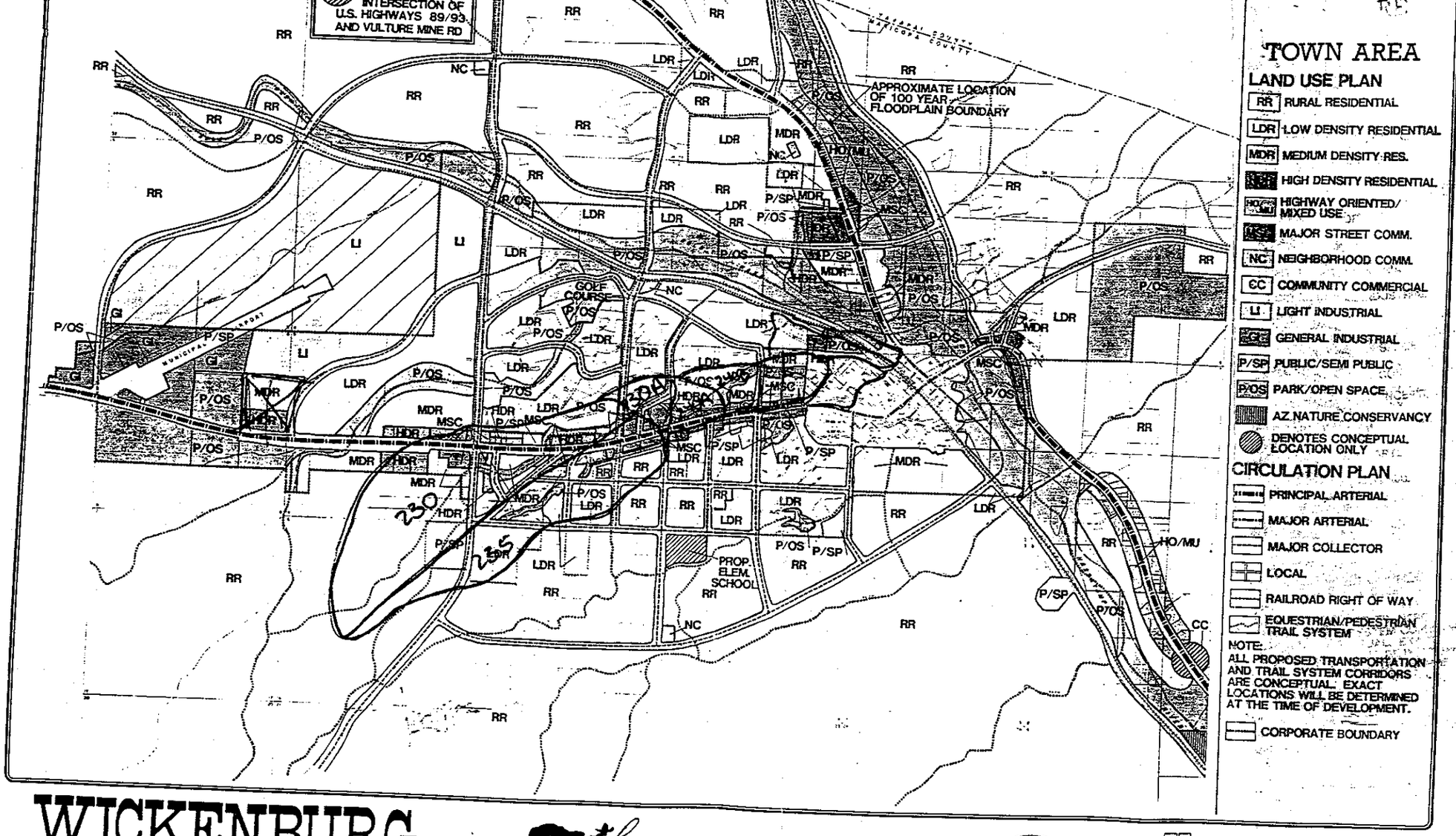
X-SECT.	ELEV. (ft)
[illegible]	[illegible]

ACCORDING TO HEC-2 MODEL
(CAP, MCH 11/15/96)

Collins-Piña Consulting Engineers Inc.

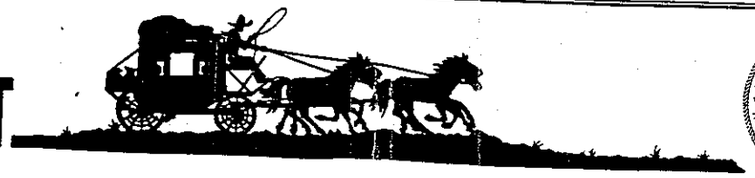
FEMA FIRM LOMR	3660.2
FIG. 5.2a WITH PROJECT FLOODPLAIN	9/96
CASANDRO WASH	MCH
HEC-2 CROSS SECTIONS AND	SAK
COMPUTED WATER SURFACE ELEVATIONS	RAGP
	1" = 100'
	3 of 4

NO	DATE	REVISION	BY	CH	APPR



WICKENBURG GENERAL PLAN

Town of Wickenburg, Arizona



WICKENBURG, ARIZONA INCORPORATED JUNE 18TH 1909

BRW

PLANNING TRANSPORTATION ENGINEERING ARCHITECTURE
BRW, INC 2700 N CENTRAL SUITE 1000 PHOENIX ARIZONA 85004

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17

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FLOW IN CASANDRO WASH*		
CONCT. PT.	PRE-DEV.	POST-DEV.
23	1101	1101
23A	1149	1149
DAM IN		1265
A	1259	30
B	1391	187
C	1430	253
O.5		275
D	1461	305
E	1475	65
F	1481	87
G	1485	95
H	1486	106
I	1596	282
J	1114	406

*according to HEC-1 MODEL (CAP, MCH 6/17/96)

LEGEND

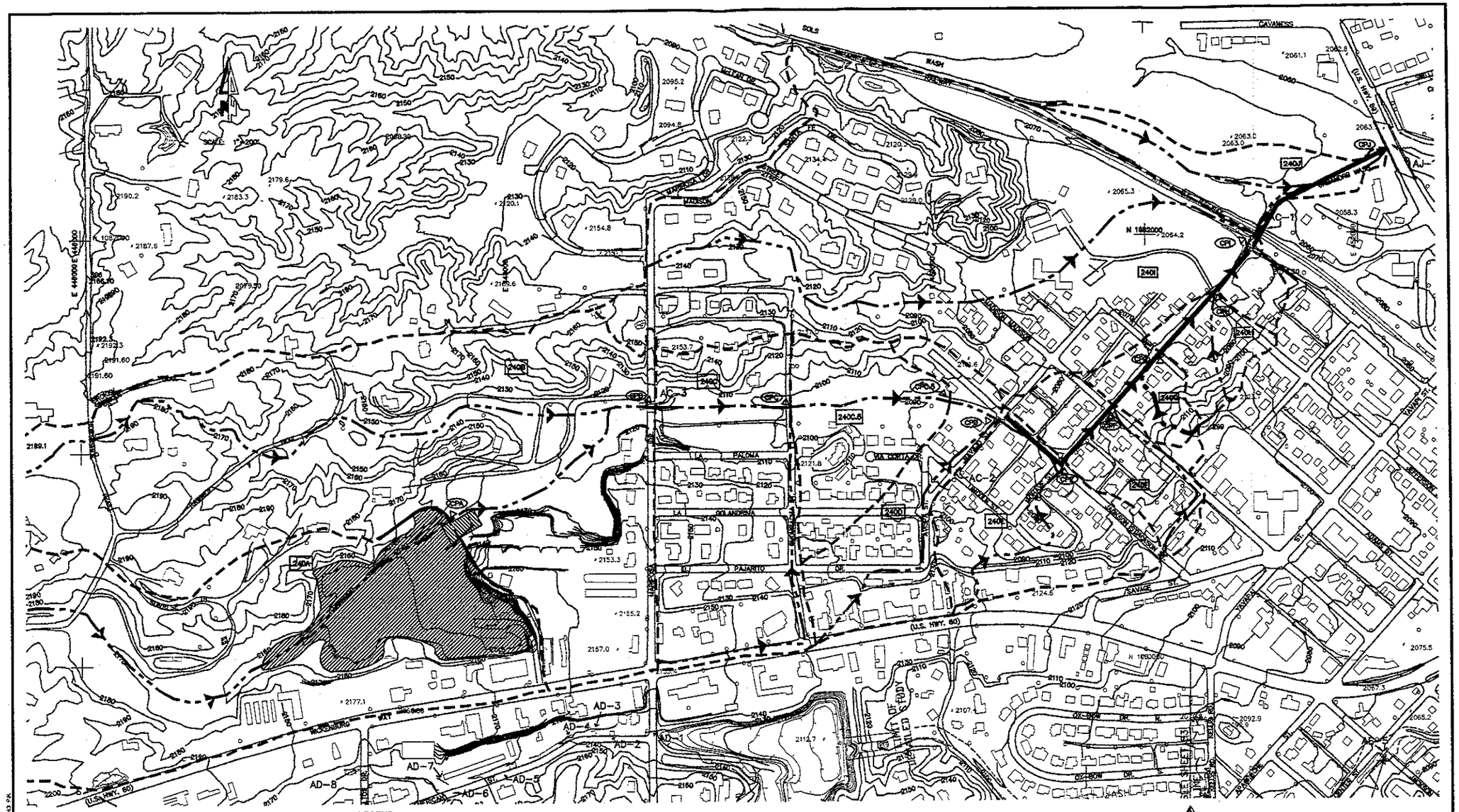
- WATERSHED DELINEATION
- FLOW PATH
- 240A SUB-BASIN
- CFA CONCENTRATION POINT
- APPROXIMATE DAM & DETENTION BASIN SITE

NO.	DATE	REVISION	BY:	CH.	APPR.

Collins-Piña Consulting Engineers Inc.
630 East 9th Street - Tucson, Arizona 85705 - (520) 623-7980
Fax - (520) 884-5278

FEMA FIRM LOMR
FIG. 4.1.1 PRE-DEVELOPMENT CONDITIONS
CASANDRO WASH
HEC-1 WATERSHED DELINEATION
SUBBASIN ALIGNMENT

job no.	3880.2
date	8/96
design	MCH
draft	SAK
chk'd	RAGP
scale	1"=600'
sheet	1 of 2



LEGEND

- WATERSHED DELINEATION
- FLOW PATH
- OUTFALL CONVEYANCE SYSTEM
- 240A — SUB-BASIN
- CPA — CONCENTRATION POINT
- APPROXIMATE DAM & DETENTION BASIN SITE

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NO.	DATE	REVISION	BY:	CH.	APPR.

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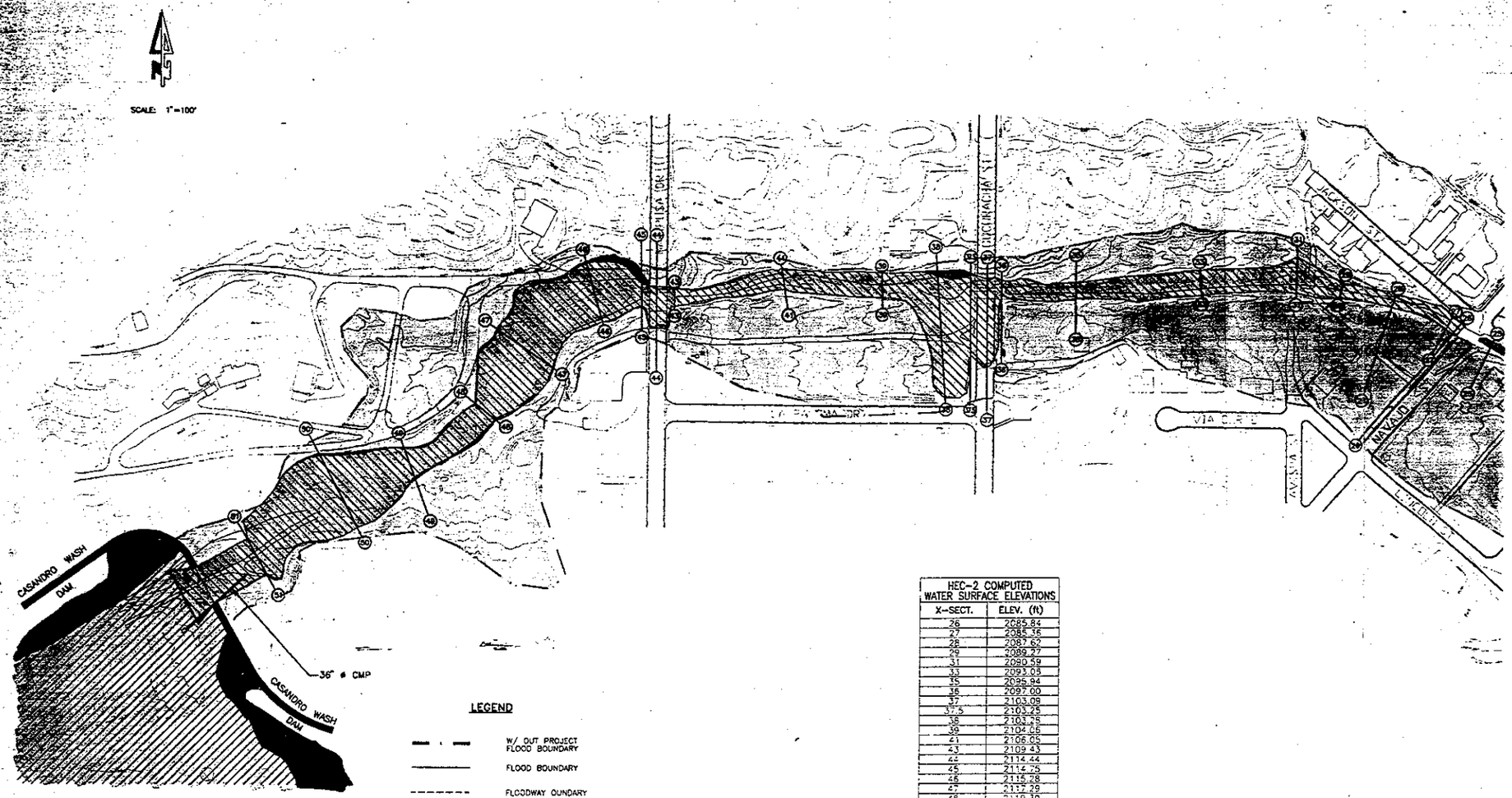
FEMA FIRM LOMR
FIG. 4.1.2 POST DEVELOPMENT CONDITIONS
CASANDRO WASH
HEC-1 WATERSHED DELINEATION
SUBBASIN ALIGNMENT

job no.	3680.2
date	6/96
design	MGH
draft	SAK
chk'd	RAGP
scale	1"=200'
sheet	2 of 2



HEC-2 COMPUTED WATER SURFACE ELEVATIONS	
X-SECT.	ELEV. (ft)
26	2085.84
27	2085.36
28	2087.62
29	2089.27
31	2090.59
33	2093.05
35	2095.94
36	2097.00
37	2103.09
37.5	2103.25
38	2103.25
39	2104.06
41	2106.05
43	2109.43
44	2114.44
45	2114.75
46	2115.28
47	2117.29
48	2119.30
49	2122.65
50	2126.10
51	2130.48

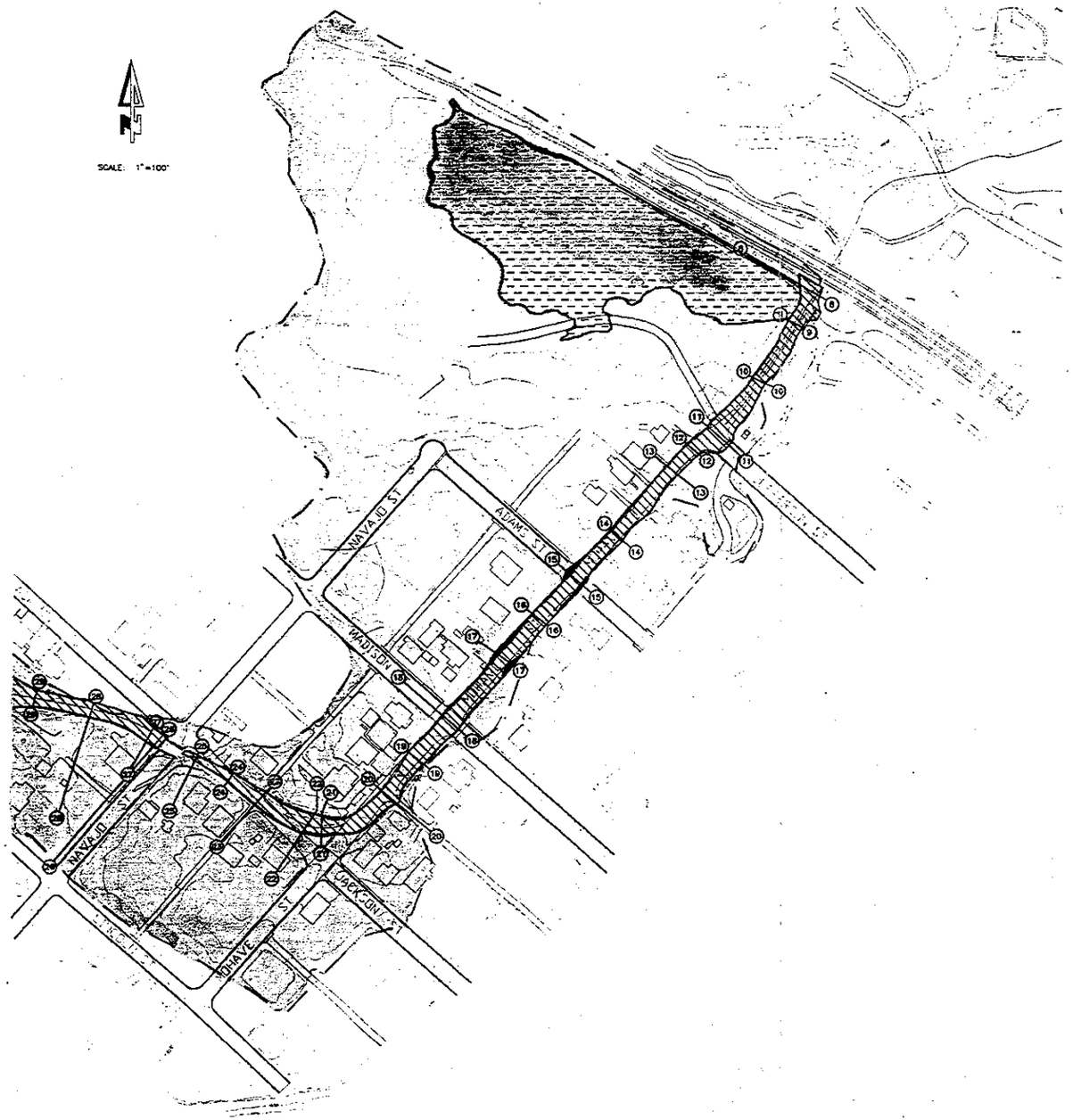
ACCORDING TO HEC-2 MODEL
(CAP. MCH 7-15-96)

NO.	DATE	REVISION	BY:	CH.	APPR.

Collins-Piño Consulting Engineers Inc.

FEMA FIRM LOMR
FIG. 5.2a WITH PROJECT FLOODPLAIN
CASANDRO WASH
HEC-2 CROSS SECTIONS AND
COMPUTED WATER SURFACE ELEVATIONS

job no	3680.2
date	9/96
design	MCH
drafn	SAK
chk'd	RAGP
scale	1"=100'
sheet	3 of 4



HEC-2 COMPUTED WATER SURFACE ELEVATIONS	
X-SECT.	ELEV. (ft)
8	2064.36
9	2065.23
10	2066.13
11	2066.85
12	2067.40
13	2067.87
14	2069.48
15	2071.39
16	2072.41
17	2073.38
18	2075.25
19	2076.40
20	2077.36
21	2079.91
22	2080.32
23	2081.30
24	2082.21
25	2083.52

ACCORDING TO HEC-2 MODEL (CAP, MCH 7-15-96)

LEGEND

- W/ OUT PROJECT FLOOD BOUNDARY
- FLOOD BOUNDARY
- FLOODWAY OUNDARY
- WITH PROJECT FLOODWAY
- WITH PROJECT FLOODPLAIN
- WITH PROJECT FLOOD-PRONE AREAS (AO)
- 49—49 HEC-2 CROSS-SECTION LOCATION
- APPROXIMATE DAM & DETENTION BASIN SITE

NO.	DATE	REVISION	BY:	CH.	APPR.

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FAX - (520) 884-5278

FEMA FIRM LOMR
FIG. 5.2b WITH PROJECT FLOODPLAIN
CASANDRO WASH
HEC-2 CROSS SECTIONS AND
COMPUTED WATER SURFACE ELEVATIONS

job no.	3680.2
date	9/96
design	MCH
draft	SMK
chkd	RAGP
scale	1"=100'
sheet	4 of 4

HEC-RAS Plan: Plan 13 River: 1 Reach: 1

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	4484	275.00	2083.63	2085.84	2085.59	2086.50	0.007191	6.52	42.20	21.84	0.83
1	4514	275.00	2083.80	2086.28		2086.63	0.003798	4.75	57.90	30.80	0.61
1	4639	275.00	2085.50	2087.62	2087.62	2088.39	0.010497	7.04	39.07	25.69	1.01
1	4742	253.00	2087.70	2089.27	2089.27	2089.90	0.009659	6.58	42.54	35.34	0.97
1	4843	253.00	2089.50	2090.74	2090.74	2091.14	0.010136	5.30	55.40	76.44	0.94
1	5028	253.00	2092.00	2093.08	2093.08	2093.50	0.012461	5.20	48.66	59.86	1.01
1	5281	253.00	2093.50	2095.94	2095.94	2096.55	0.011310	6.24	40.53	34.15	1.01
1	5432	187.00	2094.60	2097.13		2097.32	0.002242	3.47	53.90	32.53	0.48
1	5461	187.00	2102.50	2103.08	2103.08	2103.25	0.016477	3.25	57.90	183.19	1.00
1	5494	187.00	2100.50	2103.26	2101.62	2103.29	0.000198	1.32	195.52	170.49	0.15
1	5559	187.00	2101.50	2103.29		2103.30	0.000111	0.65	299.71	252.63	0.10
1	5873	187.00	2103.00	2104.19	2104.19	2104.58	0.012862	5.05	37.04	48.56	1.01
1	5874	187.00	2104.50	2106.09		2106.41	0.006725	4.56	41.06	39.29	0.77
1	6104	187.00	2108.00	2109.42	2109.42	2109.91	0.012018	5.61	33.36	34.80	1.01
1	6139	187.00	2113.50	2114.44	2114.44	2114.73	0.014238	4.29	43.57	78.06	1.01
1	6170	187.00	2113.50	2114.92	2114.92	2115.31	0.009099	5.61	45.97	66.10	0.91
1	6258	187.00	2114.50	2115.64		2115.70	0.001875	1.87	100.02	136.17	0.38
1	6436	30.00	2117.00	2117.13	2117.13	2117.19	0.022517	2.01	14.89	117.01	1.00
1	6594	30.00	2119.00	2119.36	2119.30	2119.44	0.010063	2.28	13.16	46.93	0.76
1	6776	30.00	2122.50	2122.86	2122.86	2122.95	0.020356	2.41	12.43	69.09	1.00
1	6930	30.00	2125.90	2126.07	2126.05	2126.11	0.017002	1.66	18.09	154.17	0.85
1	7137	30.00	2130.00	2130.29	2130.29	2130.37	0.021822	2.18	13.89	94.56	1.00

HEC-RAS Plan: Plan 13 River: 1 Reach: 1

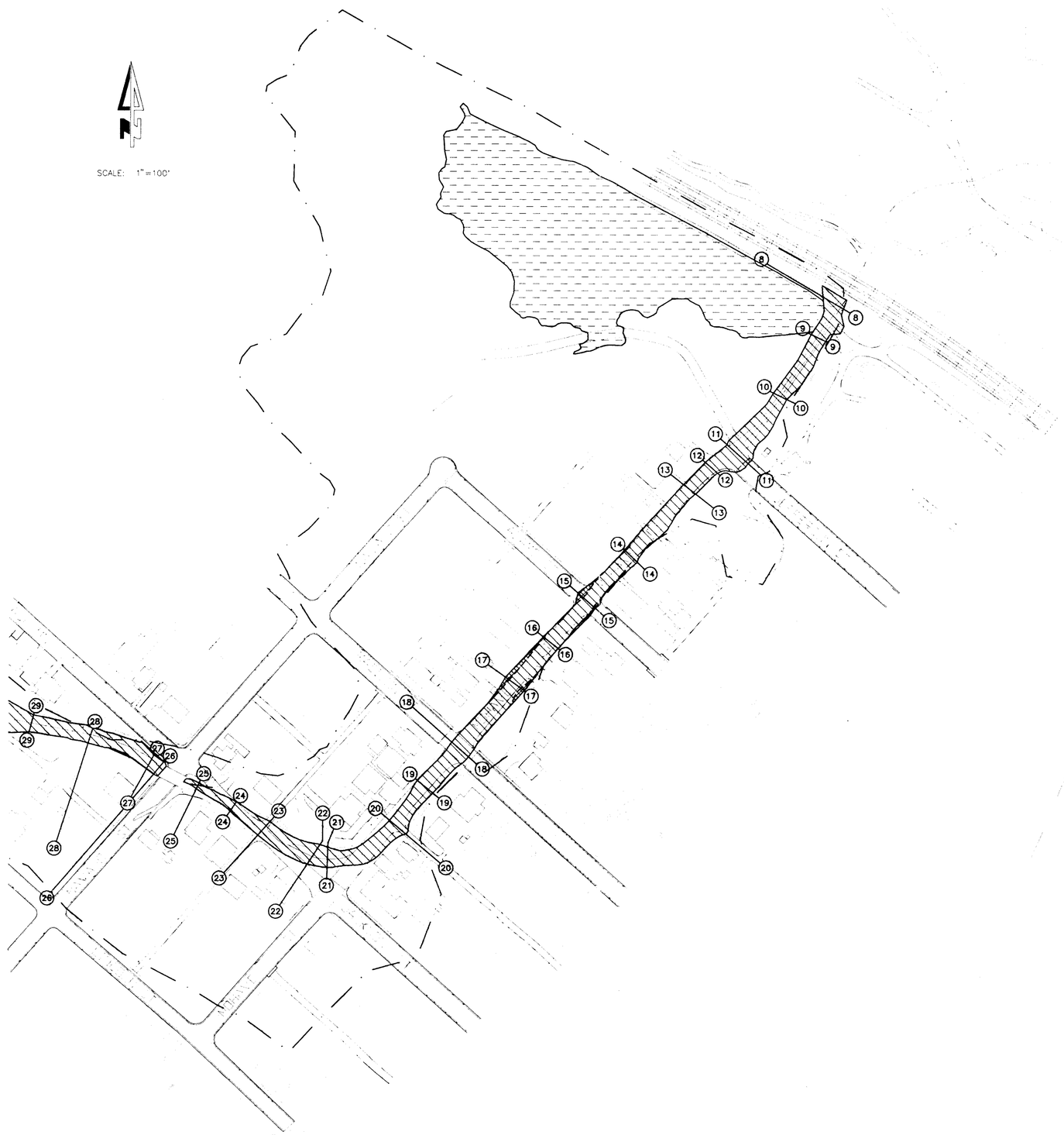
Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	2776	280.00	2060.80	2064.36	2063.28	2064.46	0.000684	2.54	117.92	112.01	0.34
1	2843	102.00	2064.00	2065.23	2065.23	2065.70	0.007478	5.52	18.48	19.73	1.00
1	2967	102.00	2064.00	2066.08	2065.91	2066.43	0.004517	4.72	21.67	20.87	0.80
1	3096	91.00	2066.00	2066.93		2067.14	0.006866	3.63	25.08	47.97	0.88
1	3146	91.00	2066.30	2067.40	2067.40	2067.72	0.008428	4.55	20.01	31.75	1.01
1	3263	91.00	2067.00	2067.88	2067.88	2068.22	0.008209	4.69	19.41	28.78	1.01
1	3363	91.00	2068.60	2069.48	2069.48	2069.84	0.008129	4.80	18.95	26.87	1.01
1	3475	82.00	2070.70	2071.39	2071.39	2071.63	0.007978	4.00	23.30	55.87	0.96
1	3574	82.00	2071.50	2072.41	2072.41	2072.71	0.008523	4.44	18.48	30.66	1.01
1	3672	82.00	2072.30	2073.39	2073.39	2073.73	0.007426	4.75	18.14	28.84	0.97
1	3825	59.00	2074.50	2075.25	2075.25	2075.47	0.009533	3.75	15.74	36.67	1.01
1	3917	59.00	2075.60	2076.40	2076.40	2076.68	0.008705	4.19	14.08	25.84	1.00
1	4063	59.00	2076.50	2077.36	2077.36	2077.57	0.009608	3.70	15.95	38.17	1.01
1	4147	59.00	2079.00	2079.91	2079.91	2080.14	0.009584	3.89	15.15	33.49	1.02
1	4176	30.00	2079.50	2080.25		2080.34	0.003700	2.45	12.24	26.47	0.64
1	4276	30.00	2080.74	2081.30	2081.30	2081.48	0.010283	3.38	8.87	25.50	1.01
1	4344	30.00	2081.60	2082.21	2082.21	2082.40	0.010282	3.48	8.63	23.81	1.02
1	4417	30.00	2082.70	2083.52	2083.52	2083.75	0.009491	3.85	7.80	17.37	1.01

HEC-RAS Plan: Plan 13 River: 1 Reach: 1

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	2776	280.00	2060.80	2064.36	2063.28	2064.46	0.000684	2.54	117.92	112.01	0.34
1	2843	102.00	2064.00	2065.23	2065.23	2065.70	0.007478	5.52	18.48	19.73	1.00
1	2967	102.00	2064.00	2066.08	2065.91	2066.43	0.004517	4.72	21.67	20.87	0.80
1	3096	91.00	2066.00	2066.93		2067.14	0.006866	3.63	25.08	47.97	0.88
1	3148	91.00	2066.30	2067.40	2067.40	2067.72	0.008428	4.55	20.01	31.75	1.01
1	3203	91.00	2067.00	2067.88	2067.88	2068.22	0.008209	4.69	19.41	28.78	1.01
1	3363	91.00	2068.60	2069.48	2069.48	2069.84	0.008129	4.80	18.95	26.87	1.01
1	3475	82.00	2070.70	2071.39	2071.39	2071.63	0.007978	4.00	23.30	55.87	0.96
1	3574	82.00	2071.50	2072.41	2072.41	2072.71	0.008523	4.44	18.48	30.66	1.01
1	3672	82.00	2072.30	2073.39	2073.39	2073.73	0.007426	4.75	18.14	28.84	0.97
1	3825	59.00	2074.50	2075.25	2075.25	2075.47	0.009533	3.75	15.74	36.67	1.01
1	3917	59.00	2075.60	2076.40	2076.40	2076.68	0.008705	4.19	14.08	25.84	1.00
1	4003	59.00	2076.50	2077.36	2077.36	2077.57	0.009608	3.70	15.95	38.17	1.01
1	4147	59.00	2079.00	2079.91	2079.91	2080.14	0.009584	3.89	15.15	33.49	1.02
1	4176	30.00	2079.50	2080.25		2080.34	0.003700	2.45	12.24	26.47	0.64
1	4276	30.00	2080.74	2081.30	2081.30	2081.48	0.010283	3.38	8.87	25.50	1.01
1	4344	30.00	2081.60	2082.21	2082.21	2082.40	0.010282	3.48	8.63	23.81	1.02
1	4417	30.00	2082.70	2083.52	2083.52	2083.75	0.009491	3.85	7.80	17.37	1.01

HEC-RAS Plan: Plan 13 River: 1 Reach: 1

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	4494	275.00	2083.63	2085.84	2085.59	2086.50	0.007191	6.52	42.20	21.84	0.83
1	4514	275.00	2083.80	2086.28		2086.63	0.003798	4.75	57.90	30.80	0.61
1	4633	275.00	2085.50	2087.62	2087.62	2088.39	0.010497	7.04	39.07	25.69	1.01
1	4742	253.00	2087.70	2089.27	2089.27	2089.90	0.009659	6.58	42.54	35.34	0.97
1	4843	253.00	2089.50	2090.74	2090.74	2091.14	0.010136	5.30	55.40	76.44	0.94
1	5028	253.00	2092.00	2093.08	2093.08	2093.50	0.012461	5.20	48.66	59.86	1.01
1	5281	253.00	2093.50	2095.94	2095.94	2096.55	0.011310	6.24	40.53	34.15	1.01
1	5432	187.00	2094.60	2097.13		2097.32	0.002242	3.47	53.90	32.53	0.48
1	5461	187.00	2102.50	2103.08	2103.08	2103.25	0.016477	3.25	57.90	183.19	1.00
1	5494	187.00	2100.50	2103.26	2101.62	2103.29	0.000198	1.32	195.52	170.49	0.15
1	5559	187.00	2101.50	2103.29		2103.30	0.000111	0.65	299.71	252.63	0.10
1	5673	187.00	2103.00	2104.19	2104.19	2104.58	0.012862	5.05	37.04	48.56	1.01
1	5874	187.00	2104.50	2106.09		2106.41	0.006725	4.56	41.06	39.29	0.77
1	6104	187.00	2108.00	2109.42	2109.42	2109.91	0.012018	5.61	33.36	34.80	1.01
1	6139	187.00	2113.50	2114.44	2114.44	2114.73	0.014238	4.29	43.57	78.06	1.01
1	6170	187.00	2113.50	2114.92	2114.92	2115.31	0.009099	5.61	45.97	66.10	0.91
1	6268	187.00	2114.50	2115.64		2115.70	0.001875	1.87	100.02	136.17	0.38
1	6436	30.00	2117.00	2117.13	2117.13	2117.19	0.022517	2.01	14.89	117.01	1.00
1	6594	30.00	2119.00	2119.36	2119.30	2119.44	0.010063	2.28	13.16	46.93	0.76
1	6776	30.00	2122.50	2122.86	2122.86	2122.95	0.020356	2.41	12.43	69.09	1.00
1	6930	30.00	2125.90	2126.07	2126.05	2126.11	0.017002	1.66	18.09	154.17	0.85
1	7137	30.00	2130.00	2130.29	2130.29	2130.37	0.021822	2.18	13.89	94.56	1.00



HEC-2 COMPUTED WATER SURFACE ELEVATIONS	
X-SECT.	ELEV. (ft)
8	2064.36
9	2065.23
10	2066.13
11	2066.85
12	2067.40
13	2067.87
14	2069.48
15	2071.39
16	2072.41
17	2073.38
18	2075.25
19	2076.40
20	2077.36
21	2079.91
22	2080.32
23	2081.30
24	2082.21
25	2083.52

ACCORDING TO HEC-2 MODEL (CAP, MCH 7-15-96)

LEGEND

- W/ OUT PROJECT FLOOD BOUNDARY
- FLOOD BOUNDARY
- FLOODWAY OUNDARY
- WITH PROJECT FLOODWAY
- WITH PROJECT FLOODPLAIN
- WITH PROJECT FLOOD-PRONE AREAS (AO)
- 49 — 49 HEC-2 CROSS-SECTION LOCATION
- APPROXIMATE DAM & DETENTION BASIN SITE

Collins-Piña Consulting Engineers Inc.

NO.	DATE	REVISION	BY:	CH.	APPR.

FEMA FIRM LOMR
FIG. 5.2b WITH PROJECT FLOODPLAIN
CASANDRO WASH
HEC-2 CROSS SECTIONS AND
COMPUTED WATER SURFACE ELEVATIONS

JOB NO.	3660.2
DATE	9/96
DESIGN	MCH
DRAWN	SAK
CHK'D	RAGP
SCALE	1"=100'
SHEET	4 of 4

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- Field Files (Data Collector)

SURVEYOR'S REPORT

Collins/Piña
Consulting Engineers, Inc.

October 31, 1996

Jerry A. Collins
Raul Fco. G. Piña, P.E., P.L.S.
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Richard B. Howell, Jr., P.L.S.
Arthur A. Witzell, P.L.S.

Pedro Calza
Engineering Division
Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, AZ 85009

RE: Casandro Wash LOMR

Dear Mr. Calza:

The following is an account of the steps and procedures used in the verification of existing topographic maps of record.

These maps in conjunction with additional field survey information were used in the development of the Casandro Wash Floodplain Delineation.

1. Reconnaissance of the Casandro Wash area. Find existing monuments used in the aerial mapping of this project prepared by Aerial Mapping Company.

2. After finding suitable monuments, set-up GPS data collector with existing information and verified locations by Plane Calibration technique. At least five monuments were found that have been used in previous studies.

3. Profile shots of the centerline of Casandro Wash were taken with GPS observations. Additional cross-section shots were also done along Mohave Street, across the AT&SF RR and down to Sols Wash.

4. Additional spot shots defining the top of the dam alignment and spillway were taken with a total station and data collector. Cross-sections were taken across the floodplain at several locations further verifying the existing topographic maps.

Work accomplished for this project is on the same horizontal and vertical datums prepared by others. Vertical = NGVD 1929 Horizontal = NAD 1983

Sincerely,

COLLINS/PIÑA CONSULTING ENGINEERS, INC.

Arthur Witzell, P.L.S.

Enc.

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
26412
ARTHUR A.
WITZELL
Date Signed 10-31-96
ARIZONA U.S.A.

630 East 9th Street
Tucson, Arizona 85705
520.623.7980 phone
520.884.5278 fax

3800 North Central
Suite 200
Phoenix, Arizona 85012
602.264.7505 phone
602.264.0568 fax

STATE PLANE COORDINATES

Pt	Northing	Easting	Elevation	Description
2	1079857.2582	447784.4806	2172.4686	WMTP
3	1080718.4675	447844.1180	2130.0034	CONC
4	1080647.7698	447885.9665	2129.9905	CONC
5	1080583.8074	447778.2288	2163.8250	CONC
6	1080580.2316	447774.4487	2163.8365	CONC
7	1080547.8101	447756.0792	2153.5783	CONC
8	1080652.4410	447694.1397	2153.3866	CONC
9	1080653.1594	447731.6652	2163.8709	CONC
10	1080654.7677	447736.3609	2163.8655	CONC
11	1080566.4310	447376.1811	2163.5255	W EDGE TOP DAM
12	1080603.9404	447431.6341	2163.4747	W EDGE TOP DAM
13	1080649.9258	447503.2337	2163.2293	W EDGE TOP DAM
14	1080697.1792	447570.0367	2162.7364	W EDGE TOP DAM
15	1080703.2806	447615.7887	2163.0351	W EDGE TOP DAM
16	1080712.3539	447641.5100	2163.6686	W EDGE TOP DAM
17	1080710.5565	447668.9503	2163.6404	W EDGE TOP DAM
18	1080700.3245	447691.9845	2163.2064	W EDGE TOP DAM
19	1080684.8166	447713.5837	2163.6799	W EDGE TOP DAM
20	1080654.8494	447731.3620	2163.4408	W EDGE TOP DAM
21	1080579.3855	447776.3573	2163.6214	W EDGE TOP DAM
22	1080521.9673	447809.1203	2163.4211	W EDGE TOP DAM
23	1080475.6493	447836.7181	2163.7426	W EDGE TOP DAM
24	1080427.4767	447863.0281	2163.5000	W EDGE TOP DAM
25	1080394.7416	447884.0396	2163.3768	W EDGE TOP DAM
26	1080370.8639	447911.9939	2163.6950	W EDGE TOP DAM
27	1080358.7579	447932.4733	2164.1809	W EDGE TOP DAM
28	1080349.9356	447954.9386	2164.1896	W EDGE TOP DAM
29	1080341.1353	447988.6987	2164.3209	W EDGE TOP DAM
30	1080564.7764	447931.8505	2145.5129	EG
31	1080642.9022	447969.8930	2140.4144	EG
32	1080671.2922	448005.3330	2141.7070	EG
33	1080689.3905	448042.5552	2146.1324	EG
34	1080692.6691	448129.8429	2144.7874	EG
35	1080634.2893	448146.3290	2143.9185	EG
36	1080633.0938	448179.3670	2144.7132	EG
37	1080714.7391	448184.9004	2135.8962	EG
38	1080787.9613	448177.1048	2125.0498	EG
39	1080935.3575	448193.8022	2122.1345	EG
40	1081046.3166	448143.0903	2122.5718	EG
41	1080723.5715	448037.2890	2127.8204	EG
42	1080687.0612	447983.8298	2128.7806	EG
43	1080648.8177	447931.8523	2130.1357	EG
44	1080972.2995	449335.1465	2106.0189	808
45	1081015.4874	448670.8039	2124.4821	PLUS
46	1081091.8113	448671.0338	2117.6345	PLUS
47	1081145.2805	448671.7924	2114.7967	PLUS
48	1081181.3839	448671.1639	2113.7288	PLUS
49	1081230.5971	448671.6724	2114.3039	PLUS
50	1081282.6032	448671.8364	2117.9277	PLUS
51	1081349.3309	448672.8141	2126.2110	PLUS
52	1081397.3658	448801.5921	2149.3326	EG
53	1081298.1057	448788.7472	2110.1946	EG
54	1081188.0094	448822.2539	2109.3328	EG
55	1081127.5383	448841.7842	2108.9627	EG
56	1081006.3169	448746.2690	2128.5294	EG
57	1080976.3304	448670.3037	2128.4141	823
58	1081066.6068	449335.5782	2103.3828	PLUS

59	1081151.3810	449336.2070	2102.9489	PLUS
60	1081207.0872	449336.4605	2102.8421	PLUS
61	1081257.3152	449336.6515	2104.0710	PLUS
62	1081340.1632	449336.9935	2111.3471	PLUS
63	1081531.6972	449408.7920	2134.1358	EG
64	1081418.1725	449456.0891	2113.6871	EG
65	1081268.3372	449447.6300	2098.3180	EG
66	1081232.1260	449431.7981	2097.2966	EG
67	1081204.1747	449383.6174	2100.0640	EG
68	1081057.8504	449386.3202	2100.1411	EG
69	1081049.4043	449383.6949	2104.4294	EG
70	1080920.8671	450590.2444	2079.9606	809
71	1081022.9881	450526.9719	2081.1376	EG
72	1081011.6598	450516.6700	2080.7627	EG
73	1080993.4524	450495.8641	2081.6341	EG
74	1080985.5451	450485.4598	2082.1811	EG
75	1081054.7346	450417.4364	2083.6094	EG
76	1081061.5266	450422.3222	2082.4301	EG
77	1081079.2279	450437.1230	2082.1572	EG
78	1081086.9517	450441.9672	2084.6511	EG
79	1081121.7957	450401.4167	2085.4044	EG
80	1081115.7009	450397.0229	2084.2709	EP
81	1081103.1791	450386.1908	2083.5263	EP
82	1081089.7245	450370.6732	2082.8954	EG
83	1081220.1134	450388.2310	2086.1957	PLUS
84	1081177.0960	450349.9381	2086.6460	PLUS
85	1081140.9863	450315.1510	2087.4037	CONC
86	1081122.9641	450301.3214	2087.3518	CONC
87	1081080.0798	450263.4888	2085.8338	PLUS
88	1081151.7923	450224.3980	2087.2565	EG @ HOUSE
89	1081161.6990	450239.7970	2087.7632	CONC 2087.76
90	1081161.9340	450240.2878	2085.6957	EG
91	1081185.2001	450249.6022	2085.0847	EG
92	1081193.5136	450252.9152	2089.6511	EG
93	1081193.8860	450253.2611	2094.0021	CONC
94	1081153.7382	450328.8796	2087.4413	JACK NAV
95	1080921.0526	450553.4323	2081.7428	EG
96	1080926.8108	450561.1619	2080.6379	EG
97	1080950.4081	450577.6916	2080.1478	EG
98	1080961.5291	450585.7081	2080.0859	EG
99	1080954.0905	450595.9999	2079.8415	EG
100	1080931.9870	450624.3399	2079.4864	EG
101	1080923.9745	450626.2874	2080.2393	EG
102	1081009.1894	450700.2781	2077.8189	EG
103	1081024.4948	450680.7309	2078.0728	EG
104	1081038.8619	450666.0793	2080.0903	EG
105	1081108.8872	450737.5943	2076.3334	EG
106	1081098.3740	450750.3653	2076.7699	EG
107	1081089.7733	450761.0047	2076.7607	EG
108	1081157.8134	450823.8973	2075.9683	EG
109	1081169.8733	450810.3174	2075.6969	EG
110	1081181.7640	450797.1349	2075.8641	EG
111	1080920.7476	450590.1130	2080.3098	JACK @ MOHAVE
112	1081716.4738	451277.6552	2068.3966	TOP WALL
113	1081716.1780	451277.9958	2067.2063	EG
114	1081730.9721	451299.0857	2066.9747	EG
115	1081731.2696	451298.5619	2068.2666	TOP WALL
116	1081744.3343	451298.1123	2068.0900	TOP WALL
117	1081744.3261	451298.4726	2067.0980	EG
118	1081753.2859	451315.5590	2066.9041	EG

119	1081753.2271	451316.2355	2067.6133	TOP WALL
120	1081747.4844	451320.1122	2067.7693	TOP WALL
121	1081746.9804	451319.9493	2066.3239	EG
122	1081784.9988	451367.5581	2065.1476	EG
123	1081785.6885	451366.6186	2067.1566	EG
124	1081781.3447	451291.1464	2067.1574	EG
125	1081754.2016	451305.9881	2067.2972	EG
126	1081740.4822	451311.5630	2066.3302	EG
127	1081717.6397	451320.2622	2066.5288	EG
128	1081691.2228	451334.6463	2067.4284	EG
129	1081650.7300	451377.6080	2070.6488	EG
130	1081613.2661	451418.5389	2076.0668	EG
131	1081720.9304	451297.3720	2066.8003	JEFF @ MOHAVE
132	1081974.1108	451513.7371	2063.3176	WWALL
133	1081982.8225	451498.9168	2063.5090	WWALL
134	1081991.8061	451506.6891	2071.6478	HWALL
135	1081985.6046	451517.6349	2071.6307	HWALL
136	1082029.7798	451542.9547	2070.8070	HWALL
137	1082036.9142	451531.4053	2070.6048	HWALL RR TIE
138	1082047.6614	451536.0981	2062.2217	WWALL
139	1082039.2184	451550.8939	2062.3734	WWALL
140	1082116.4480	451478.5937	2062.7454	EG
141	1082095.2304	451507.2374	2064.1614	EG
142	1082066.0890	451551.6678	2060.9708	EG
143	1082031.1648	451600.2710	2061.9952	EG
144	1081996.6169	451654.0520	2063.4922	EG
145	1081853.4211	451577.1469	2079.9580	CP 418
146	1081871.0252	451600.5623	2076.3262	EG
147	1081894.9922	451546.7074	2070.8407	EG
148	1081920.4493	451506.0212	2066.3479	EG
149	1081954.9951	451490.3964	2062.1735	EG
150	1081989.9624	451463.9105	2064.0658	EG
151	1082023.3770	451409.7314	2064.1562	EG
152	1082048.6441	451366.9767	2064.5489	EG
153	1080920.8348	450590.2781	2079.9651	BC
154	1081132.6511	450282.7524	2087.7463	WALL
155	1081161.7372	450239.8906	2087.7875	WALL
156	1081157.4291	450198.0330	2087.2563	HOUSE
157	1081152.0545	450224.3137	2087.2605	HOUSE
158	1081086.2471	450213.4757	2087.0135	HOUSE
159	1081229.3730	450206.9790	2100.2300	X
160	1081153.7152	450328.9065	2087.2113	NAIL 8
161	1081181.6683	450190.2045	2088.0133	WALL
162	1081189.9621	450179.9655	2085.9994	X
163	1081186.5479	450178.7563	2087.4012	X
164	1081186.5302	450178.7444	2087.3620	X
165	1081205.5833	450107.3969	2086.8310	X
166	1081201.1713	450105.4824	2089.0013	X
167	1081216.9328	450007.9410	2088.8519	X
168	1081210.8243	450007.0951	2090.3035	X
169	1081225.0599	449938.0806	2089.8289	X
170	1081215.9573	449936.4164	2092.3182	X
171	1081156.9693	450096.4483	2087.5067	X
172	1081096.8988	450187.7680	2087.1712	X
808	1080972.3000	449335.0700	2105.6700	X
809	1080920.8800	450590.2300	2079.9600	X
823	1080976.3300	448670.3700	2128.3300	X
900	1080583.0500	447781.1600	2163.7300	X
901	1081153.7200	450328.9000	2087.2100	X
902	1081720.9800	451297.4200	2066.7300	X

903	1081993.9900	451561.3000	2072.5100	X
1002	1080683.3790	447865.2930	2130.0080	CONC SPILLWAY
1003	1080735.7510	447950.0970	2128.5740	X
1004	1080780.4230	448036.3250	2126.5520	X
1005	1080830.3870	448120.1540	2125.2390	X
1006	1080857.0600	448155.5810	2123.5970	CONC BUBBLER
1007	1080890.6510	448204.2630	2121.8600	X
1008	1080939.1580	448276.0590	2120.4050	X
1009	1080997.6430	448344.1610	2118.7470	X
1010	1081065.5970	448403.0490	2117.3860	X
1011	1081125.4420	448472.9430	2115.5450	X
1012	1081168.1990	448554.0760	2114.0310	X
1013	1081194.5590	448605.2980	2111.3340	X
1014	1081206.5740	448641.2050	2110.7240	X
1015	1081191.1890	448641.0400	2111.2110	X
1016	1081221.9560	448639.3840	2110.9040	X
1017	1081230.6420	448671.4710	2114.3230	CONC
1018	1081205.9260	448670.9530	2113.7530	CONC
1019	1081181.2990	448671.0530	2113.7480	CONC
1020	1081187.9510	448699.4150	2109.8140	X
1021	1081206.1400	448700.0230	2108.8530	X
1022	1081225.9800	448703.2350	2108.6920	X
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1024	1081223.8830	448799.8750	2107.1240	X
1025	1081244.1050	448891.7300	2105.7710	X
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1027	1081237.7180	449078.7030	2103.8240	X
1028	1081236.8020	449170.7710	2103.0460	X
1029	1081231.0150	449249.7250	2102.0260	HINGE
1030	1081231.1050	449254.0510	2100.2210	TOE
1031	1081231.9420	449271.9080	2099.8260	TOE
1032	1081231.6240	449277.2560	2102.5470	HINGE
1033	1081232.8380	449293.3200	2102.0440	X
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1037	1081248.8080	449305.2930	2100.9730	X
1038	1081210.0520	449305.9910	2101.2370	X
1039	1081257.8010	449336.4170	2104.0260	CONC
1041	1081232.4290	449336.6050	2102.8490	CONC
1042	1081207.4930	449336.5430	2102.7510	CONC
1043	1081211.0600	449361.7830	2100.7210	X
1044	1081250.7480	449365.8370	2099.9770	X
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1047	1081213.9690	449365.6080	2095.0360	X
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1049	1081220.7880	449388.6650	2094.7300	X
1050	1081217.8820	449455.0900	2094.1930	X
1051	1081219.6630	449549.4450	2093.2850	X
1052	1081225.4240	449641.5860	2092.7320	X
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1057	1081216.3170	450092.1540	2086.3740	X
1058	1081209.9690	450144.9210	2085.8130	X
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1060	1081181.0070	450242.1270	2084.0440	X
1061	1081159.7310	450269.5840	2083.4230	X

1062	1081144.8090	450285.4570	2083.6280	CONC
1063	1081143.8520	450286.5390	2081.5940	CONC
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1066	1081131.2680	450308.9270	2087.2690	CONC
1067	1081123.2680	450301.6350	2087.2550	CONC
1069	1081110.8150	450350.9280	2083.0460	CONC
1070	1081114.1560	450346.9450	2080.5620	CONC
1071	1081100.5080	450373.9650	2082.9450	X
1072	1081104.4210	450386.6750	2083.5890	EP CORNER
1073	1081080.7790	450418.1790	2082.2170	ROAD
1074	1081032.5820	450470.5740	2081.7390	ROAD
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1078	1080997.6020	450577.6390	2079.4410	X
1079	1080994.8230	450621.2640	2079.0140	X
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1082	1081061.1750	450692.6100	2076.7560	X
1083	1081134.5510	450755.0740	2076.0010	X
1084	1081122.2820	450767.2590	2076.2630	X
1085	1081170.3030	450810.4680	2075.6740	CONC
1086	1081181.9160	450797.2540	2075.7970	CONC
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1090	1081237.6560	450869.3750	2073.6490	X
1091	1081247.7460	450857.9570	2073.5580	X
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1093	1081303.7100	450944.3000	2072.6580	X
1094	1081321.2400	450922.2720	2073.1330	X
1095	1081316.0300	450958.6010	2072.1140	MH
1096	1081323.5880	450950.1730	2071.9450	MH
1097	1081397.2440	451010.8850	2071.3550	X
1098	1081387.6530	451021.7140	2071.4790	X
1099	1081411.4760	450997.3910	2071.3480	X
1100	1081444.9490	451052.7130	2070.7220	X
1101	1081465.4390	451090.5930	2070.2930	X
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1103	1081487.0420	451067.4640	2070.0480	X
1104	1081555.1490	451131.7210	2068.9250	X
1105	1081544.7280	451143.6640	2069.0100	X
1106	1081535.1640	451154.8300	2069.2320	X
1107	1081556.2270	451170.6290	2068.6750	MH
1108	1081563.5290	451161.9970	2068.6480	MH
1109	1081618.2680	451210.9070	2067.9330	X
1110	1081629.8780	451198.8120	2068.3030	X
1111	1081608.6440	451222.7650	2068.2640	X
1112	1081675.4800	451285.3450	2066.9590	X
1113	1081686.9880	451270.8430	2067.0840	X
1114	1081697.6410	451260.1260	2067.2220	X
1115	1081718.9010	451301.7980	2066.7180	X
1116	1081728.7800	451327.5920	2066.2220	X
1117	1081728.7880	451327.5720	2066.2410	X
1118	1081776.0230	451381.9150	2064.5050	X
1119	1081782.1480	451373.8230	2064.2370	X
1120	1081784.7570	451370.1730	2064.5640	X
1121	1081846.7580	451428.4680	2063.3370	X
1122	1081852.7600	451419.4610	2063.3550	X
1123	1081924.0260	451479.2120	2062.8370	X

1124	1081932.3590	451471.7650	2062.9290	X
1125	1081973.5930	451503.7100	2061.7210	X
1126	1081978.9680	451439.0990	2065.0710	MH
1127	1081984.7710	451429.2440	2065.0830	MH
1128	1082054.6000	451549.4010	2060.8440	X
1129	1082074.4550	451561.3550	2060.9320	X
1130	1082170.3710	451547.1180	2062.5680	MH
1131	1082177.8460	451537.0630	2062.5820	MH
1132	1082107.4650	451581.1680	2060.2090	X
1133	1082183.0810	451645.3300	2058.8400	X
1134	1082198.4060	451721.0850	2058.0670	X
1135	1082226.7830	451831.5590	2055.8430	X
1136	1082237.8900	451902.6980	2054.7200	X
1137	1082266.1300	451967.7500	2053.2900	X
1138	1082296.6600	452010.6680	2052.5280	X
1139	1082336.6520	452141.3240	2049.8800	X
1140	1082338.2170	452140.5310	2053.0840	X
1141	1082439.9190	452094.1720	2050.6980	X
1142	1082530.1210	451974.8290	2052.0450	X
1143	1082564.4570	451894.4260	2052.5220	X
1144	1082592.2490	451826.8750	2053.3540	X
1145	1082618.1190	451748.9230	2054.3000	X
1146	1082284.6460	452349.2200	2047.8670	X
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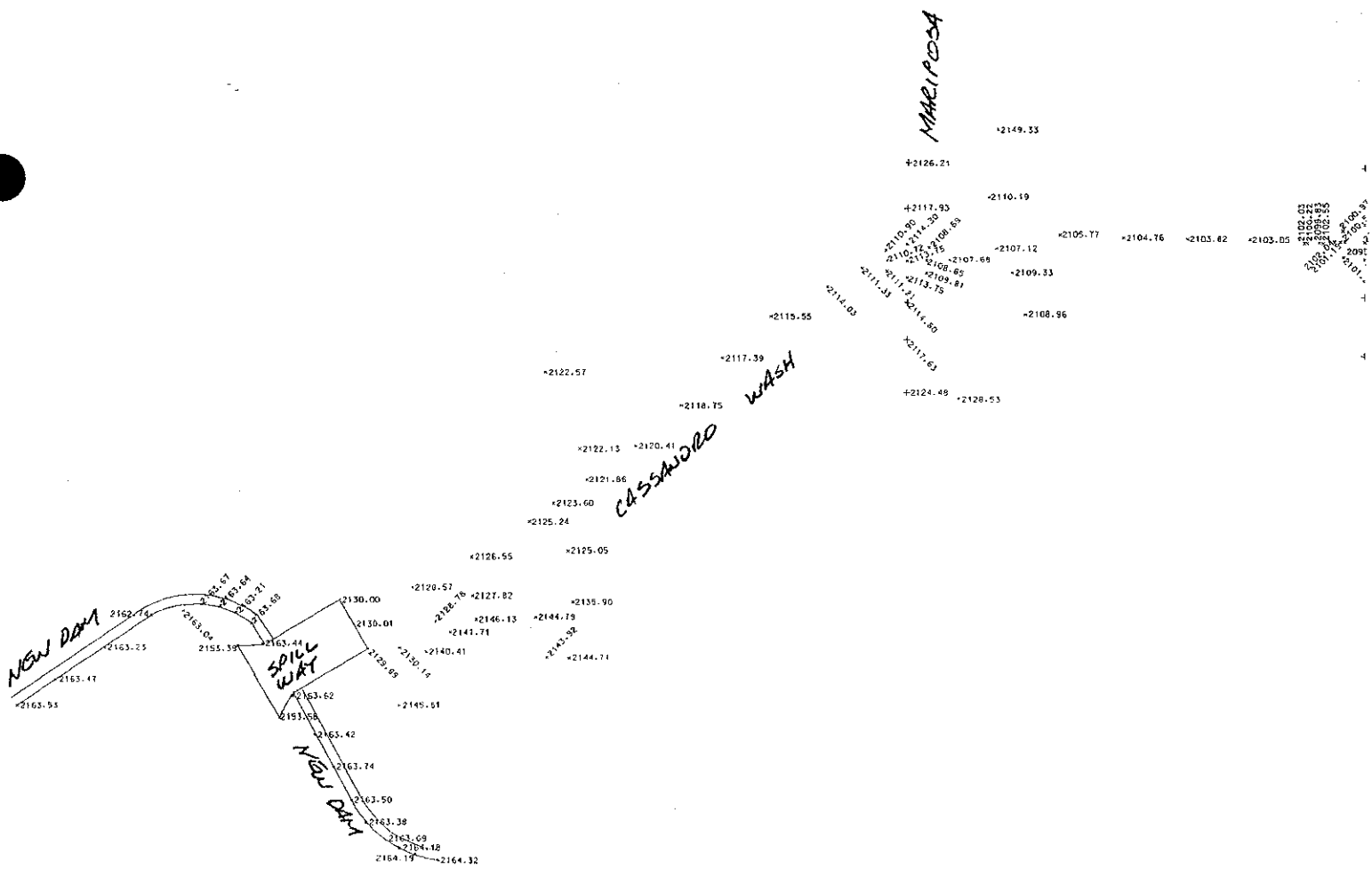
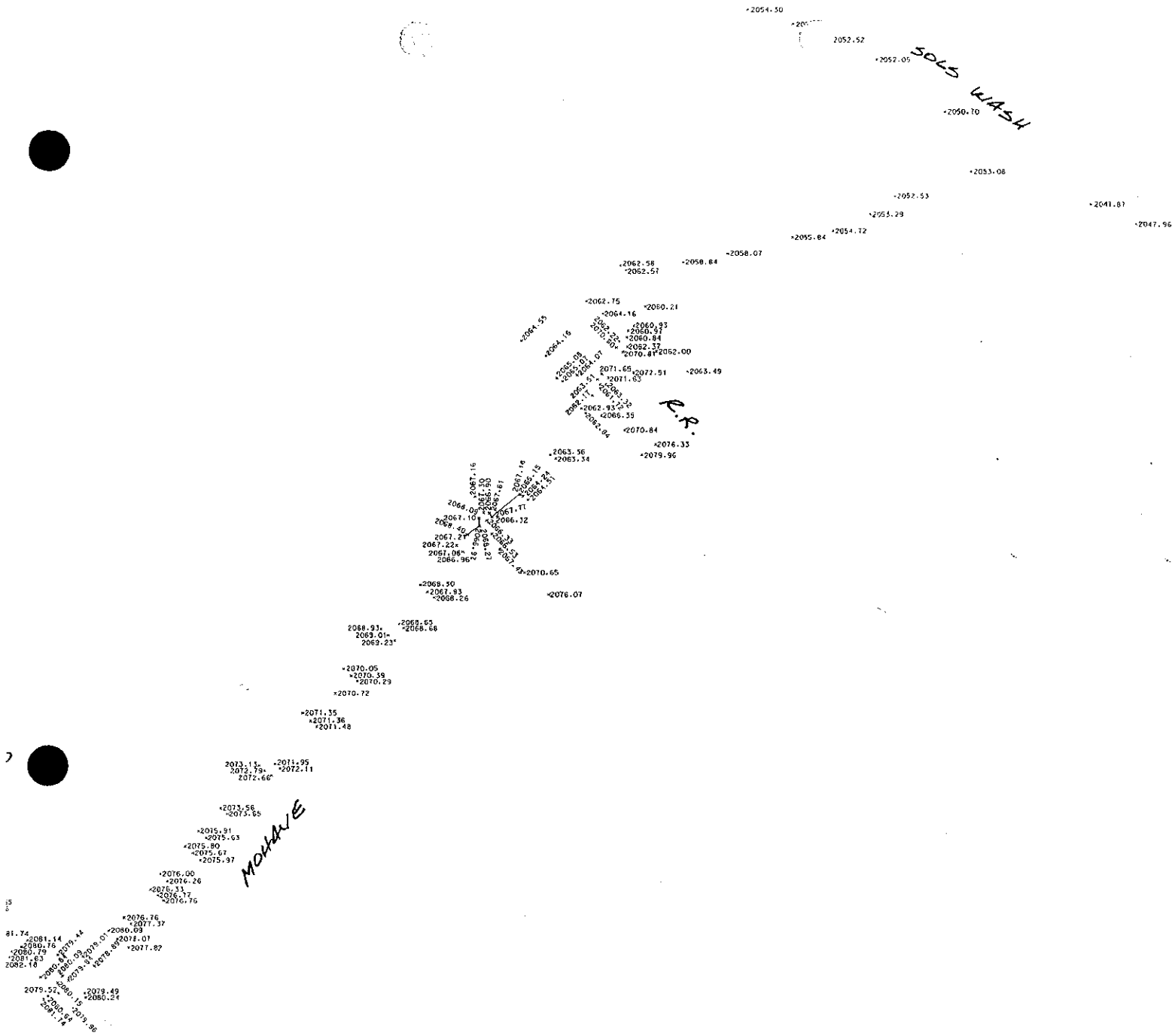
PLOTTED MAP VERIFICATION SHOTS


MARIPOSA
CASSADORO
WASH
NEW DAM
SPILL WAY
NEW DAM


SOLO WASH
R.R.
MOHAWE

CUCARACHA
CASSANDRO WASH
NAVAJO
JACKSON
MOHAVE

RAW GPS DATA

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13NMCL PROFILE
13NM7-2-96
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64KI1                                                    0.000000000000000.000000000
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13SNDistance: Feet
13SNAngle: Degrees
13SNCurvature: N
13SNCoordinates: North-East-Elev
13SNSea level: Y
13SNNorth azimuth: 0-00'00"
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69KI              8071080009.89999999448663.5499999992154.84000000000PK
69KI              8081080972.30000000449335.069999999                BC
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13BA             1000
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62TP5 1.636721134185791.038875102996821.2647508382797226
59TP6 0.044085232668070.000044444132150.00001066056276-0.00000266244450.00009359
67TP            10923000.79092307607-661.35825293219657.497824191389NG
62TP5 1.047083616256710.781835079193110.6965041160583460
59TP5 0.064241146214130.000044997138720.00000334553476-0.00000229119390.00014253
67TP            10933009.84553383783-670.10401383291650.483585265892NG
62TP6 0.848630666732780.636449337005610.5613431930541930
59TP6 0.055180990877810.000057370903630.00001024610398-0.00000580969370.00009858
67TP            10942992.99664331647-652.95479086831665.144627738751NG
62TP5 1.882304310798641.246789455413811.4101722240447944
59TP6 0.079018949944120.000085081610200.00001340839875-0.00000652018810.00016464
67TP            10953025.80624659991-668.77208348532660.492001699339MH
62TP6 1.028564572334280.776261448860160.6748060584068219
59TP6 0.049028786393050.000072742907180.00001321618984-0.00000644203000.00011373
13TSJan-12-80 23:57
67TP            10963019.65011650494-661.50055578885666.610534089614MH
62TP5 1.494519352912901.009734272956841.1018278598785 48
59TP5 0.016159328187170.00001878239551-0.00001333123000.000000361985270.00014168
67TP            10973091.31147096033-646.08808054119727.769881473142NG
62TP6 1.023132562637320.774664402008050.668352723121649
59TP6 0.026882968334540.000046944597830.00000577827363-0.00000419296590.00008444
67TP            10983099.27622190834-655.29629194576719.956006597192NG
62TP6 0.834253489971160.632181107997890.544358313083646
59TP6 0.026865955197740.000056443361970.00000879675987-0.00000539242770.00008743
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67TP            10993081.81472622093-633.54354665255739.482375136222NG
62TP6 1.020252585411070.773826301097860.6649121642112717
59TP6 0.038129733410950.000045244309560.00000535919715-0.00000426955970.00007794
67TP            11003140.12141088943-636.87254625844767.257184910360NG
62TP6 0.830538809299460.631106853485100.5399063825607312
59TP6 0.033259854390430.000048839153300.00000659899231-0.00000495894440.00007507
67TP            11013179.53812399420-640.41087722584784.260456389478NG
62TP4 1.034490704536430.856795489788050.5797175765037584
59TP5 0.082540895369420.00006178207291-0.0000065014763-0.00003038206400.00007668
71SI4860 239790.000000000511
13TPStart rover
61TP7400MSi 00016064130Compact L1/L2                          0.000000000000000.0
56TP156.00000000000000
57SI4.973753387220881
73SI            1000
71SI1860 239922.000000000411
57TP6.559999999999992
67TP            11023171.58317356553-631.43777253419792.153079008922NG
62TP6 1.002606868743890.768872201442710.643471837043769
59TP6 0.026294585131590.000045691743800.00000287849600-0.00000573057680.00006822
67TP            11033162.75321741834-620.17738071742801.889662469830NG
62TP6 1.001563906669610.768592774868010.642180204391477
59TP6 0.024310085834480.000050073940410.00000287106224-0.00000638478460.00007458
67TP            11043236.70306593699-608.58883204126858.171147447424NG
62TP6 0.816416263580320.627193331718440.5226509571075412
59TP6 0.035375811335600.000049228651970.00000229746161-0.00000647527530.00007298
67TP            11053245.53668641838-618.62402395748849.653546839861NG
62TP6 0.815421164035790.626932442188260.521409094333648
59TP6 0.030302022170670.000049094895030.00000195488996-0.00000658779590.00007257
67TP            11063253.78734224492-628.02296750286841.918481370859NG
62TP6 0.997779965400690.767597734928130.6374626159667915
59TP6 0.034122446092360.000042672628570.00000142626928-0.00000583357260.00006290
67TP            11073272.96072818073-622.72056869690859.181272778647MH
62TP6 0.813645422458640.626474142074580.5191811323165822
59TP6 0.045480529882810.000048314346020.00000117215592-0.00000678311610.00007093
67TP            11083266.51780270794-615.61265870197865.165380218061MH
62TP5 1.651240229606621.211309909820551.1221954822540223
59TP5 0.029699210801070.00002784583897-0.0000275657134-0.00000157612370.00015149
13TSJan-13-80 00:08
67TP            11093323.36567887004-605.39557788890910.486815754859MH
62TP6 0.811282515525810.625881850719450.5161890983581514
59TP6 0.036236863055330.000047530718130.00000027045191-0.00000704266110.00006919
69KI            11091081618.26839707451210.9065901802067.93257443884NG
67TP            11103314.49403549074-595.03476845841920.243264996969NG
62TP6 0.990727305412290.765854239463800.628496468067167
59TP6 0.027027225556960.00004658997503-0.0000007209094-0.00000733959620.00006716
67TP            11113332.20835512667-615.17367713285902.767214616100NG
62TP5 1.056815385818480.838627040386200.6430889964103615
59TP6 0.033821419292070.00003346096754-0.0000022311064-0.00001588406090.00004485
67TP            11123404.40273700921-603.46245182998957.881693118386NG
62TP6 0.804424524307250.624372661113730.5072056651115430
59TP6 0.052857096612530.00004759367581-0.0000034050170-0.00000881415860.00006679
67TP            11133393.36373159809-592.04674392493967.401183459949NG
62TP6 0.803781688213340.624266326427450.5063167214393613
59TP6 0.035573286554350.00004729540754-0.0000037776844-0.00000897138090.00006610
67TP            11143385.63980176871-582.52990050876976.243378249854NG
62TP5 1.285223960876460.993161737918850.8157391548156729
59TP6 0.049304330154390.00004103543749-0.0000087104745-0.00000765693420.00007234
67TP            11153428.74561686492-587.06229633597993.867786981597NG
62TP5 0.859218537807460.667919099330900.5405002832412712
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59TP5 0.023939706363130.00002677685544-0.0000272702646-0.00000408864300.00010812
67TP            11163454.80126506521-591.426613505951001.95326295582NG
62TP6 0.983042299747460.764392852783200.618122756481179
59TP6 0.025709828831190.00004089668779-0.0000041616788-0.00000826114710.00005654
67TP            11173454.77840822529-591.429331892331001.97065611072NG
62TP6 0.802198290824890.624100148677820.5040050745010310
59TP6 0.032557552225710.00004524418229-0.0000051692043-0.00000947277610.00006217
13TSJan-13-80 00:18
67TP            11183515.40847265682-586.399573223471040.53256929341NG
62TP6 0.801802873611450.624125719070430.5033437013626016
59TP6 0.035099262308100.00003782259105-0.0000049182605-0.00000828522920.00005156
67TP            11193509.29550329492-579.923416773251045.40998511061NG
62TP6 0.801708400249480.624150931835170.5031620264053311
59TP6 0.030934343754930.00004401515154-0.0000059447569-0.00000978142020.00005985
67TP            11203506.36213291723-577.425556080141047.73217960678NG
62TP6 0.801661252975460.624172210693350.5030604004859911
59TP6 0.031459899350330.00004198468540-0.0000058288828-0.00000943136920.00005699
67TP            11213573.56335312828-566.641755776081098.85174944248NG
62TP4 1.619802951812741.183319211006161.106127142906186
59TP5 0.018080237524440.000060585088810.000015357087690.000002465241190.00004665
67TP            11223566.48758566648-560.098213429031103.78095133534NG
62TP5 1.129770398139950.763920366764060.832350254058838
59TP5 0.023191236815070.000044106279140.00000561302255-0.00000175500040.00005078
71SI4860 239790.000000000511
13TPStart rover
61TP7400MSi 00016064130Compact L1/L2                          0.000000000000000.0
56TP156.00000000000000
57SI4.973753387220881
73SI            1000
13TSJan-13-80 01:28
13TPStart rover
61TP7400MSi 00016064130Compact L1/L2                          0.000000000000000.0
56TP156.00000000000000
57SI4.973753387220881
73SI            1000
71SI1860 245041.000000000411
57TP6.559999999999992
67TP             4183707.16569802141-632.410057957261114.93675657877AC
62TP5 1.496157646179190.788940548896781.271243691444395
59TP5 0.013864569835300.000063735493960.00004808045004-0.00006032628280.00005571
13TSJan-13-80 02:01
13BAStart base
61BA7400MSi 00016029120Compact L1/L2 w G/P                    0.000000000000000.7
56BA156.00000000000000
57BA4.349999999999992
73BA             418
13TPStart rover
61TP7400MSi 00016064130Compact L1/L2                          0.000000000000000.0
56TP156.00000000000000
57SI4.304462061153621
73SI             418
71SI1860 247576.000000000411
13TSJan-13-80 02:13
57TP6.559999999999992
67TP            1123-71.21444624491784.918353763430949.4284889101004NG
62TP6 1.227687358856200.687148451805111.017370820045475
59TP6 0.017796385803520.000027518424240.000026388404270.000001126338890.00018881
67TP            1124-76.38709218222392.015725956481756.3423369911540NG
62TP6 1.215859174728390.695523440837860.9972766041755610
59TP6 0.029027735780230.000032909522430.000029075227050.000002495300070.00022797
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67TP            1125-37.874509992928102.09810128374390.0750449663663NG
62TP6 1.212799191474910.697159171104430.9923965334892235
59TP6 0.049569408758840.000034410785700.000029611522560.000002946038640.00023855
67TP            1126-97.530411696611127.03426897872895.9827059472292MH
62TP7 1.401885032653800.818463742733001.138155937194825
59TP7 0.021086227798980.000029302737680.00003056603979-0.00000139806340.00020577
67TP            1127-105.43036601781133.802297768327100.737692873186MH
62TP6 1.399865150451660.819335222244261.1350383758544916
59TP7 0.034083500431160.000033357908710.000030622967010.000000995694850.00023292
67TP            112821.5345017376399127.289660053151157.070687053519NG
62TP6 3.143595695495601.557773470878602.7304825782775855
59TP6 0.031808485323440.000069223179960.00012326396366-0.00001483055740.00027537
67TP            112936.6961790094142132.943181729853173.664826565492NG
62TP6 3.060373783111571.531196951866142.649777889251709
59TP6 0.010745477186770.000046677035010.00008311415070-0.00000968988940.00018802
71SI4860 248162.000000000511
71SI1860 248432.000000000412
13TSJan-13-80 02:26
67TP            113043.0342638614560186.862189813426254.038500715978MH
62TP6 2.324332237243651.190011382102961.9965953826904214
59TP6 0.019059427879410.000069837612130.00012294565093-0.00001303850390.00028831
67TP            113135.2982920235489194.572770828747260.179504178332MH
62TP6 2.817203998565671.446976661682122.4172086715698216
59TP6 0.021514847014200.000077218727780.00013556571539-0.00001418412140.00031948
67TP            113262.1258788517544143.031985184246200.769292516694NG
62TP6 2.242785453796381.160905838012691.9189540147781327
59TP6 0.022818990420850.000052660212980.00009173373439-0.00000928453260.00021879
71SI2860 248564.000000000512
71SI1860 248941.000000000413
67TP            1133137.634814841846158.740506162793263.138422157353NG
62TP5 1.875596404075621.076278686523431.536061882972715
59TP5 0.012015925843770.000047007775790.00007560738400-0.00000380975310.00019725
71SI2860 248969.000000000513
71SI1860 249084.000000000414
13TSJan-13-80 02:37
67TP            1134211.083308609967138.303895540207275.911999280623NG
62TP5 2.985924243927001.147871613502502.7564713954925515
59TP5 0.018883990600520.000052400016920.00011540405241-0.00003903069380.00033075
71SI2860 249136.000000000514
71SI1860 249206.000000000415
67TP            1135319.803049977321112.463818087543298.925878802739NG
62TP6 1.616640448570250.934343218803401.319291234016417
59TP6 0.017114167573450.000055715897700.00007960997445-0.00000498029730.00022160
67TP            1136388.21833750710991.8739138347074307.974979207176NG
62TP6 1.576018810272210.919873952865601.2797137498855513
59TP6 0.022742672691370.000053680820600.00007463954786-0.00000441656430.00021115
67TP            1137454.68274100846782.7285162328431331.022653180563NG
62TP6 1.878268599510191.108195781707761.516507625579838
59TP6 0.020229921302220.000056839899450.00007675396574-0.00000427967710.00022083
67TP            1138500.95815185027882.7254086373535356.197787816648NG
62TP5 1.883687496185301.142897009849541.4973527193069423
59TP5 0.040704482833890.000093539878900.00012426650926-0.00000606350990.00036172
71SI2860 249416.000000000515
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71SI2860 249588.000000000516
13TSJan-13-80 02:47
67TP            1139630.88827769839155.5143242865663388.739182138045NG
62TP5 1.646197199821471.047457456588741.2699599266052221
59TP5 0.500226896891750.013107006513610.01374504059549-0.00062404339790.04465806
71SI1860 249845.000000000417
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67TP            1140629.45435212981854.1781199077911391.822731538841NG
62TP4 1.779850840568541.288433432579041.227928400039676
59TP4 0.019929908934650.000069318140240.000050076289940.000026690147900.00016954
71SI2860 249896.000000000517
71SI1860 250017.000000000418
67TP            1141608.606742436935126.459416539195474.536871444983NG
62TP5 1.252706646919250.820234954357140.9468308687210049
59TP5 0.049867331150550.000043817957220.00003894775288-0.00000330252080.00013983
71SI2860 250050.000000000518
13TPStart rover
61TP7400MSi 00016064130Compact L1/L2                        0.000000000000000.0
56TP156.00000000000000
57SI4.304462061153621
73SI             418
71SI1860 250606.000000000411
13TSJan-13-80 03:02
57TP6.559999999999992
67TP            1142516.721055846908217.835385583981549.322366809198NG
62TP5 2.168735742568960.761200606822962.030760526657104
59TP5 0.023457875262620.000119203090120.00021251299872-0.00009359878360.00052551
67TP            1143449.436722960985266.022195815282577.541122109423NG
62TP5 2.163680791854850.755926847457882.027335405349735
59TP5 0.019973080380380.000083304178940.00014893157047-0.00006711761680.00037611
67TP            1144392.549091741061305.629387535179600.614522222008NG
62TP5 1.765449643135070.615715324878691.654601812362675
59TP5 0.017928718858130.000066141904910.00011838934906-0.00005384499900.00030165
67TP            1145325.613786426545348.131221039538622.090116418834NG
62TP5 2.161191225051870.752555191516872.0259337425231913
59TP5 0.029801329343610.000072989192050.00012697732174-0.00004857606920.00032694
71SI2860 250822.000000000511
13TPStart rover
61TP7400MSi 00016064130Compact L1/L2                        0.000000000000000.0
56TP156.00000000000000
57SI4.304462061153621
73SI             418
71SI1860 251261.000000000411
13TSJan-13-80 03:13
57TP6.559999999999992
67TP            1146812.788560582884-49.414812914753345.837153901353NG
62TP5 1.082789540290830.764250695705410.767042338848118
59TP5 0.023515323626750.000041110458550.00001278523293-0.00000977253360.00008586
67TP            1147878.839019769704-96.431111573459319.523664082588NG
62TP5 1.328332901000970.937072396278380.941468775272365
59TP5 0.018014032039250.000040109733850.00001208189665-0.00000984601280.00008295
13TSJan-13-80 03:26
13TPStart rover
61TP7400MSi 00016064130Compact L1/L2                        0.000000000000000.0
56TP156.00000000000000
57SI4.304462061153621
73SI             418
71SI1860 252128.000000000411
57TP6.559999999999992
67TP            1148-3708.6864812449629.052931997128-1112.716190531940D 1000
62TP6 1.124363064765930.766108930110930.8229637742042521
59TP6 0.034524210340040.000038647086120.00001414999325-0.00002184979480.00003317
71SI4860 252232.000000000511
13TSJan-13-80 19:38
13BAStart base
```

FIELD NOTES
(INCLUDING NOTES BY OTHERS)

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BENCH CIRCUIT

Job No. 3602 Sht. _____ of _____

Project CASSANDRO WASH
ASBUILT S.D. MANHOLES ON MOHAVE ST.

Calc. BRENNAN Chk. _____ B'chk. FERNANDEZ
Date 8-20-96 Date _____ Date _____

+	HI	−	ELEV.	DIP & ELEV.	DESCRIPTION
			2068.70		N. RIM OF S.D. MH #5 SEE DETAIL & BENCH CIRCUIT NOTES (BRENNAN, FERNANDEZ 6-18)
1.83	2070.53				
		1.83	2068.70		CHECK SHOT ON N. RIM OF MH #6
		5.42	2065.11	-7.07 2058.04 ±	SHOT ON N. RIM OF MH #7
11.27	2076.38				
		13.79	2062.59	-6.93 2055.66 ±	SHOT ON N. RIM OF MH #9
13.66	2076.25				
		13.67	2062.58	NO DIP	SHOT ON N. RIM OF MH #10
13.75	2076.33				
		11.21	2065.12	-7.07 2058.05 ±	SHOT ON N. RIM OF MH #8
5.57	2070.69				
		1.98	2068.71		N. RIM OF S.D. MH #5, P.O.B OF THIS CIRCUIT ±0.01 ERROR IN THIS CIRCUIT. NO ADJUSTMENTS MADE

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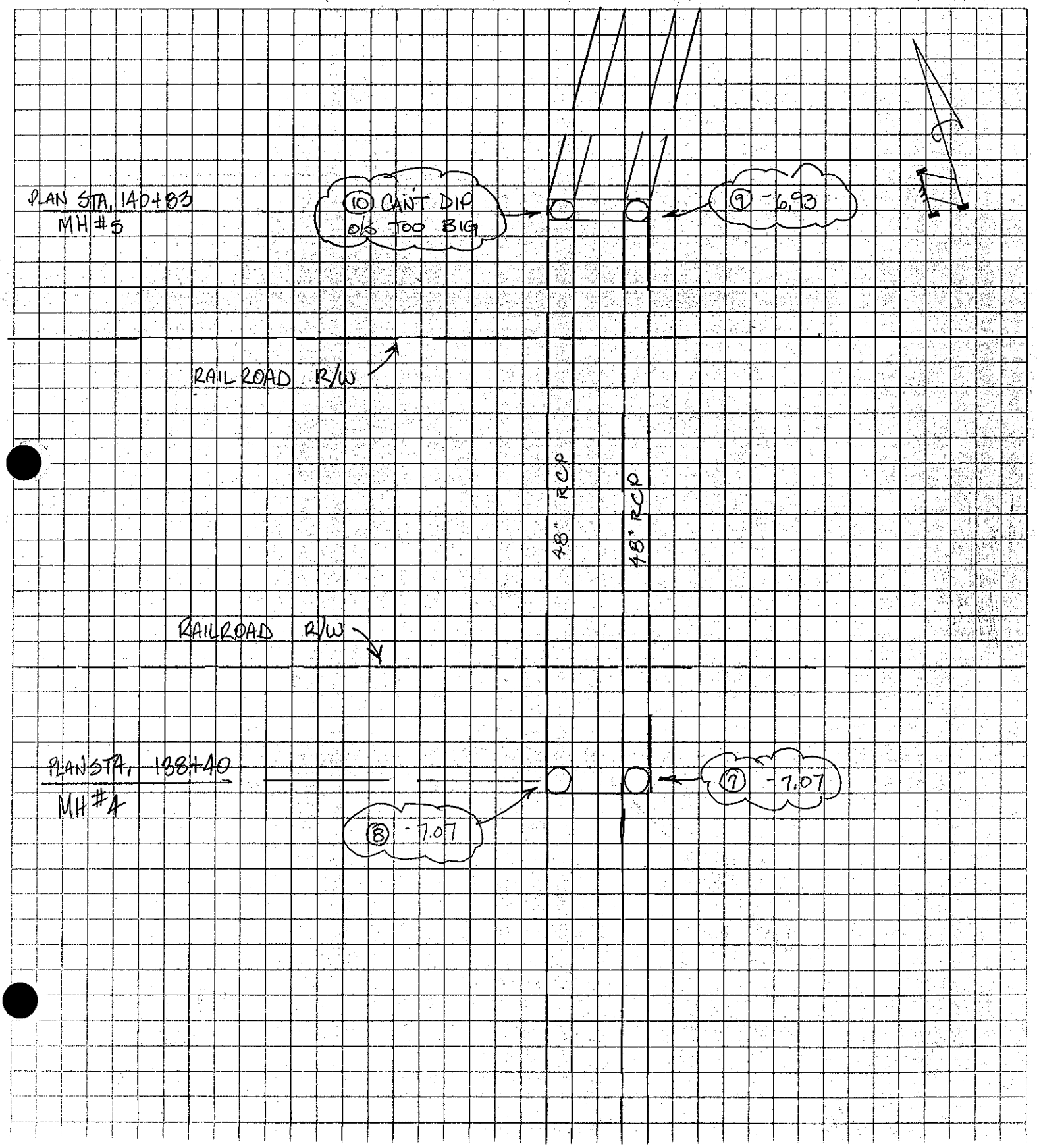
SCHEMATIC

Project CASSANDRO WASH
ASBUILT S.D. MANHOLES BY RAILROAD TRACKS

Job No. 3650 Sht. ____ of ____
Calc. BRENNAN Chk. ____ B'chk. WITZELL
Date ____ Date ____ Date ____



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Job No. 3650 Sht. _____ of _____

Project CASSANDRO WASH
ASBUILT OUTLET STRUCTURE ℄ ELEVS.

Calc. BRENNAN Chk. _____ B'chk. FERNANDEZ
Date 6-18-96 Date _____ Date _____

+	HI	−	ELEV.	DESCRIPTION
			2067.19 (2067.58)	STATION 546 BRASS CAP ON PARAPET AT S.E. CORNER OF BRIDGE OVER SOLS WASH AZ. TRANS. DEPT. STA. 803+76.28 "1958"
2.42	2069.61			
		16.50	2053.11	SHOT ON ℄ OF EASTERLY OUTLET PIPE @ SOLS WASH WEST OF
		16.50	2053.11	SHOT ON ℄ OF WESTERLY OUTLET
		16.57	2053.04	T.P. ON EDGE OF CONC. OUTLET STRUCTURE
16.52	2069.56			
		2.37	2067.19	CHECK IN TO STA. 546 — CHECKS FLAT

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BENCH CIRCUIT

Project CASSANDRO WASH
ASBUILT S.D. MANHOLES ON MOHAVE ST.

Job No. 3650 Sht. ____ of ____
Calc. BRENNAN Chk. ____ B'chk. FERNANDEZ
Date 6-18-96 Date ____ Date ____

+	HI	—	ELEV.	DIP # ELEV.	DESCRIPTION
			2079.96		STA. 809 "BRASS CAP FLUSH IN INTERSECTION OF MOHAVE ST. & JACKSON ST.
4.57	2084.53				
		5.09	2079.44	-9.70 2069.74 #	N. RIM OF STORM DRAIN MH#1 (SEE DETAIL)
1.69	2081.13				
		9.07	2072.06	-9.11 2062.95 #	N. RIM OF MH #3
3.65	2075.71				
		7.01	2068.70	-6.87 2061.83 #	N. RIM OF MH # 5
7.08	2075.78				
		7.08	2068.70	-6.92 2061.78 #	N. RIM OF MH #6
7.13	2075.83				
		3.78	2072.05	-9.21 2062.84 #	N. RIM OF MH #4
9.41	2081.46				
		2.02	2079.44	-9.71 2069.73 #	N. RIM OF MH #2
5.19	2084.63				
		4.66	2079.97		CHECK IN TO STA. 809 CHECKS 0.01 HIGH = NO ADJUSTMENTS MADE

JACKSON & NAVAJO STS INTER.

Collins/Piña
Consulting Engineers, Inc.

630 East 9th Street
Tucson, Arizona 85705
Phone (520) 623-7980
FAX (520) 884-5278

3800 N. Central, Suite 200
Phoenix, Arizona 85012
Phone (602) 264-7505
FAX (602) 264-0568

Project CASSANORO WASH
ASBUILT ℄ ELEVS @ INLET STRUCTURE

Job No. 3650 Sht. ____ of ____
Calc. BRENNAN Chk. ____ B'chk. FERNANDEZ
Date 6-18-96 Date ____ Date ____

+	HI	−	ELEV.	DESCRIPTION
			2087.64	BRASS CAP IN HEADWALL (STA. 542) @ INTERSECTION OF JACKSON ST. & NAVAJO ST.
3.02	2090.66			
		16.65	2074.01	NORTHERLY PIPE @ INLET 30' ± EAST OF BRASS CAP
		16.69	2073.97	SOUTHERLY PIPE @ INLET
		10.77	2079.89	T.P. ON BRASS CAP
7.98	2087.87			
		0.24	2087.63	

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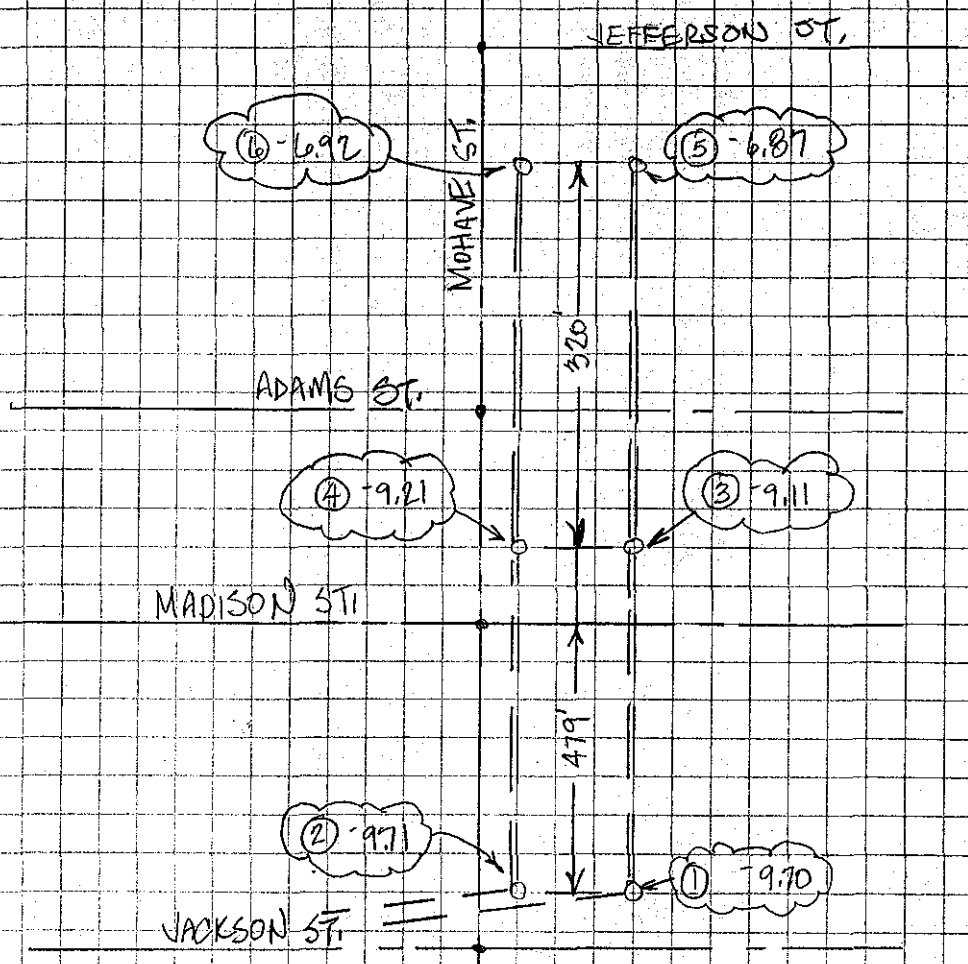
FAX (602) 264-0568

SCHEMATIC

Job No. 3650 Sht. _____ of _____

Project CASSANDRO WASH Calc. BRENNAN Chk. _____ B'chk. FERNANDEZ

ASBUILT S.D. MANHOLES ON MOHAVE ST. Date 6-18-96 Date _____ Date _____



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Job No. 3450 Sht. 1 of 3

Project CASSANDRO WASH CONTROL TRAVERSE Calc. BRENNAN Chk. WITZELL B'chk. FERNANDEZ

Date 8-20-96 Date _____ Date _____

T @ #101 B.S. #804 w/ 00°00'00"
B.S. HORIZ. DIST. = 211.85'

F.S. BRASS CAP B.M. ON DAM EL. = 2163.73 (MCFCD BRASS CAP)
PT #900

HORIZ. ∡ RT.

1) 105° 18' 41"
2) 210° 37' 19"
3) 315° 55' 54"
4) 61° 14' 29"
5) 105° 18' 37"

HORIZ DIST.

1) 725.79' (M)
2) 725.79' (M)

DATA COLLECT SETUP #2

T@ LAPALOMA & MARIPOSA #823 HI = 5.61 TO MON. 5.18 TO RIM

B.S. @ LA PALOMA & CUCARACHA #808 HT = 5.31 TO RIM
5.70 TO MON.

DATA COLLECT SETUP #3

T@ LA PALOMA & CUCARACHA #808 HI = 5.69 TO MON.
B.S. LAPALOMA & MARIPOSA #823 HT = 5.47 TO MON.

DATA COLLECT SETUP #4

T@ INT. OF JACKSON & NAVAJO 5.12

B.S. 809 JACKSON & MOHAVE HT. = 4.91

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Phoenix, Arizona 85012
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Project CASSANDRO WASH CONTROL TRAVERSE
Job No. 3450 Sht. 2 of 3
Calc. BRENNAN Chk. WITZEL B'chk. FERNANDEZ
Date 8-20-96 Date ____ Date ____

T @ 809 JACKSON & MOHAVE HI = 5.10

B.S B.C. @ INT. OF JACKSON & NAVAJO HT. = 5.17
B.S. DIST. = 350.04

F.S. BRASS CAP @ MOHAVE & JEFFERSON HT. = 4.77

HORIZ ∢ RT.
1) 89° 46' 19"
2) 179° 32' 35"
3) 269° 19' 01"
4) 359° 05' 23"
Σ) 89° 46' 21"

F.S. VERT. DIFF.
1) -13.61
2) -13.51
Σ) -13.56

HORIZ. DIST. = 068.01

DATA COLLECT SETUP #5 SAME INFO AS ABOVE

T @ MOHAVE & JEFFERSON HI = 5.12

B.S. 809 @ MOHAVE & JACKSON
B.S. HT = 5.05

SET 40D NAIL IN R.R. TIE
F.S. HT. = 4.60

HORIZ. ∢ RT.
1) 182° 33' 11"
2) 05° 06' 17"
3) 187° 39' 23"
4) 10° 12' 38"
Σ) 182° 33' 10"

VERT. DIFF. 1) +5.25
2) +5.28

HORIZ. DIST. 379.75'

DATA COLLECT SETUP #6 SAME INFO AS ABOVE

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Phoenix, Arizona 85012
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FAX (602) 264-0568

Job No. _____ Sht. 3 of 3

Project _____ Calc. _____ Chk. _____ B'chk. _____

Date _____ Date _____ Date _____

DATA COLLECT SETUP #1

T@ 40D NAIL ON R.R. TIE HI = 4.76
B.S. INT. MOHAVE & JACKSON HT. = 5.13

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[illegible]0 East 9th Street
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Phoenix, Arizona 85012
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Project CASSANDRO WASH

Job No. 3660.2 Sht. 1 of 1
Calc. ____ Chk. ____ B'chk. ____
Date 9-8-96 Date ____ Date ____

TC 901, BS 809
HI = 5.22'

901 BC @ NAVAJO & JACKSON
809 BC @ NAVAJO & MOHAVE

<-2> ROD = 4.85
<-8> ROD = 4.94

<-8> 40D NAIL SET

3660J.FLD

TC <-8>, BS 901
HI = 4.48

SEE ABOVE

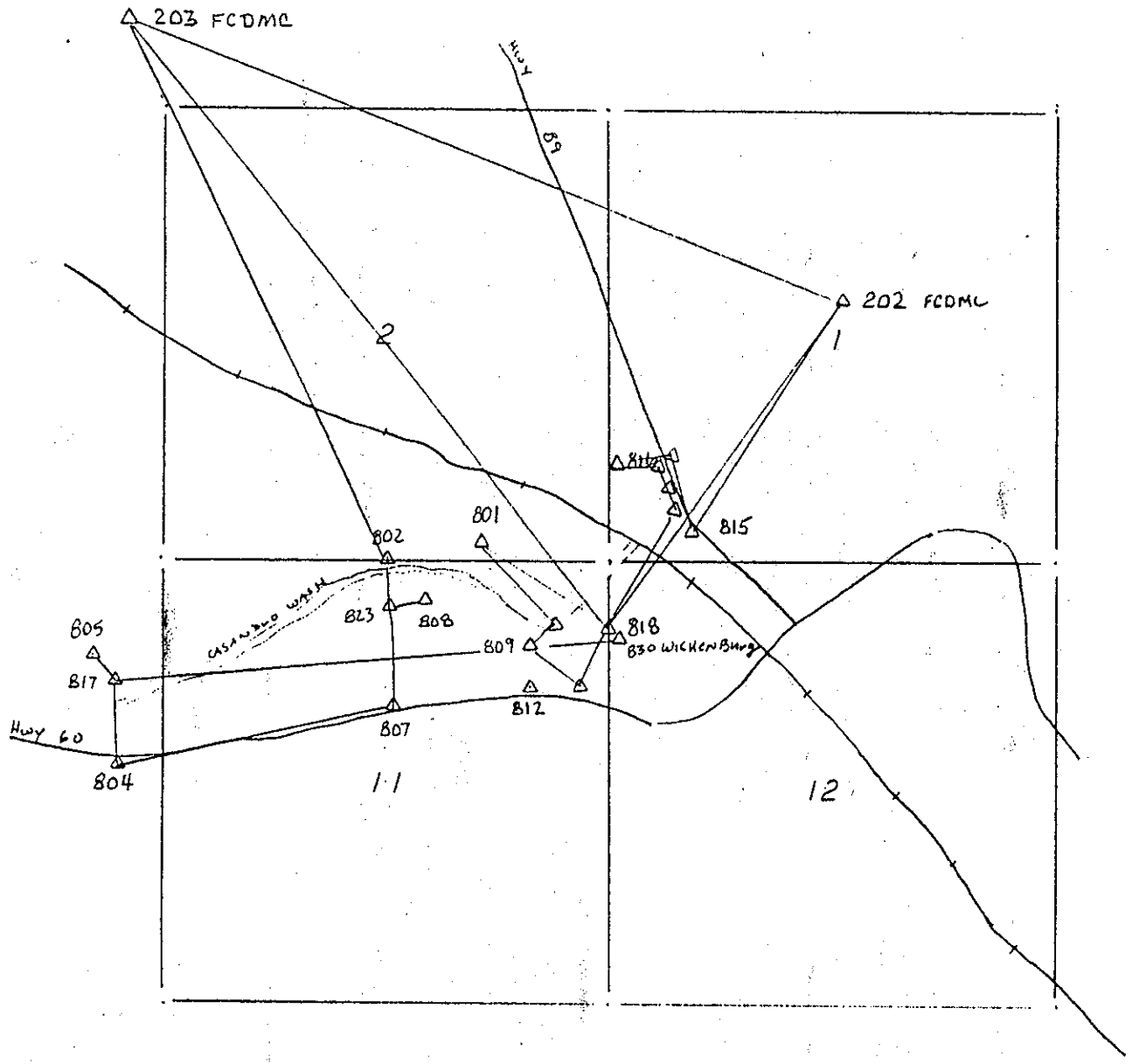
<-9> 4.85 <-10> ROD = 8.55
<-21> 4.85

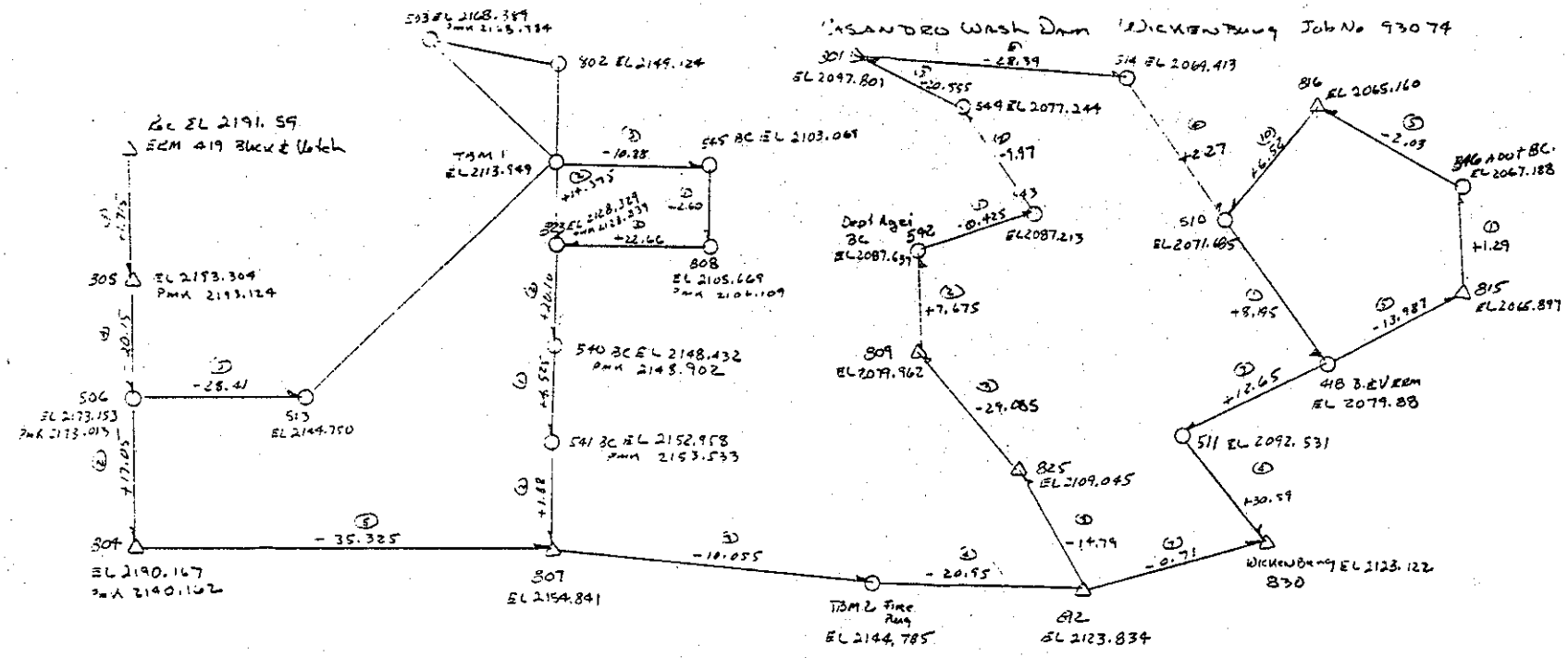
END OF JOB

3660K.FLD

ADDITIONAL SPOT SHOTS PER R. PIÑA

TRAVERSE SKETCH




Casandro Wash Dam Dickenberg Job No 93074
BC EL 2191.59
ECM 419 Block & Hatch
305 EL 2193.304
PMK 2193.124
506 EL 2173.153
PMK 2173.013
513 EL 2144.750
304 EL 2190.167
PMK 2190.162
TBM 1 EL 2113.949
502 EL 2149.124
565 BC EL 2103.069
808 EL 2105.669
PMK 2104.109
540 BC EL 2148.432
PMK 2148.902
541 BC EL 2152.958
PMK 2153.533
307 EL 2154.841
TBM 2 Fire Plug EL 2144.785
692 EL 2123.834
301 EL 2097.801
549 EL 2077.244
543 EL 2087.213
Dept Agri BC 542 EL 2087.637
809 EL 2079.962
825 EL 2109.045
514 EL 2069.413
510 EL 2071.605
816 EL 2065.160
846 ADOT BC EL 2067.188
815 EL 2065.897
48 B.E.V.RM EL 2079.88
511 EL 2092.531
Wickenburg EL 2123.122
830

COUNTRY	TYPE OF MARK	STATION	
USA	BRASS CAP	546	
COUNTY	STAMPING ON MARK	AGENCY (CAST IN MARK)	ELEVATION
		A.D.O.T.	2067.19
LATITUDE	LONGITUDE	DATUM	DATUM
			MSL 1929
(NORTHING)(EASTING) (FT) (M)	(EASTING)(NORTHING) (FT) (M)	GRID AND ZONE	ESTABLISHED BY (AGENCY)
			AMCI
(NORTHING)(EASTING) (FT) (M)	(EASTING)(NORTHING) (FT) (M)	GRID AND ZONE	ESTABLISHED BY (AGENCY)

TO OBTAIN GRID AZIMUTH, ADD ° ' " TO THE GEODETIC AZIMUTH

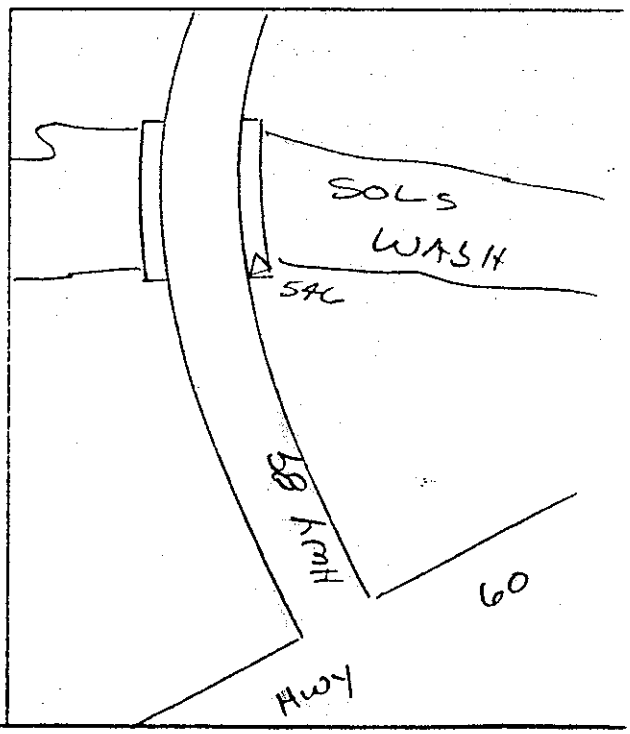
TO OBTAIN GRID AZ. (ADD)(SUB) ° ' " TO THE GEODETIC AZIMUTH

OBJECT	AZIMUTH OR DIRECTION (GEODETIC)(GRID) (MAGNETIC)	BACK AZIMUTH	GEOD. DISTANCE (METERS) (FEET)	GRID DISTANCE (METERS) (FEET)
	° ' "	° ' "		

This station is located near WICKENBURG (city), MARICOPA (county), ARIZONA (state)

To reach this station from the
INTERSECTION OF HWY. 60 & HWY. 89 GO NORTH
ON 89 3/4 MI. TO SOLS WASH.

This station is located at
SE COR OF BRIDGE ON PARAPET.



This station is c
BRASS CAP.

COUNTRY	TYPE OF MARK	STATION	
USA	BRASS CAP	543	
COUNTY	STAMPING ON MARK	AGENCY (CAST IN MARK)	ELEVATION
	NONE	NONE	2087.21
LATITUDE	LONGITUDE	DATUM	DATUM
			MSL 1929
(NORTHING)(EASTING) (FT) (M)	(EASTING)(NORTHING) (FT) (M)	GRID AND ZONE	ESTABLISHED BY (AGENCY)
			AMCI
(NORTHING)(EASTING) (FT) (M)	(EASTING)(NORTHING) (FT) (M)	GRID AND ZONE	ESTABLISHED BY (AGENCY)

TO OBTAIN GRID AZIMUTH, ADD ° ' " TO THE GEODETIC AZIMUTH

TO OBTAIN GRID AZ. (ADD)(SUB) ° ' " TO THE GEODETIC AZIMUTH

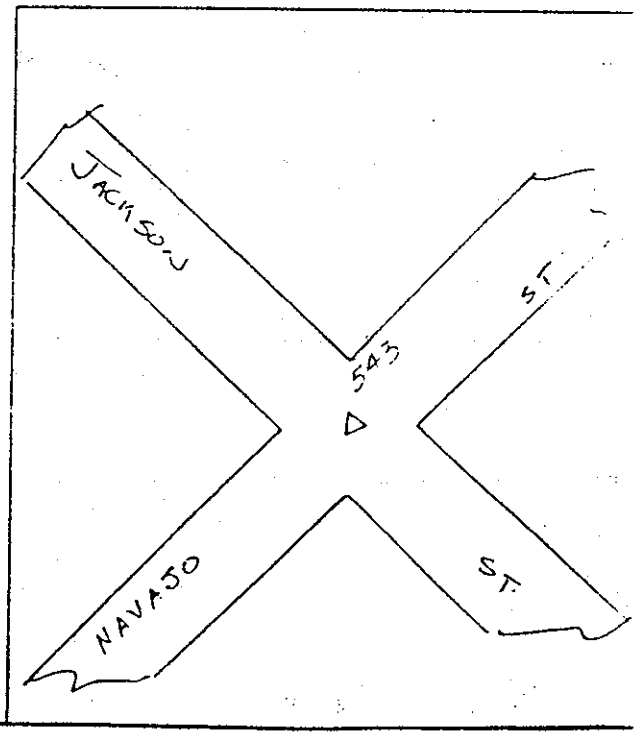
OBJECT	AZIMUTH OR DIRECTION (GEODETIC)(GRID) (MAGNETIC)	BACK AZIMUTH	GEOD. DISTANCE (METERS) (FEET)	GRID DISTANCE (METERS) (FEET)
	° ' "	° ' "		

This station is located near WICKENBURG (city), MARICOPA (county), ARIZONA (state)

To reach this station from the

This station is located at
THE INTERSECTION OF NAVAJO & JACKSON ST.

This station is c
BRASS CAP.



COUNTRY	TYPE OF MARK	STATION	
USA	BRASS CAP	823	
STATE	STAMPING ON MARK	AGENCY (CAST IN MARK)	ELEVATION
	NONE	NONE	2128.33
LATITUDE	LONGITUDE	DATUM	DATUM
		NAD 1983	MSL 1929
(NORTHING)(EASTING) (FT) (M)	(EASTING)(NORTHING) (FT) (M)	GRID AND ZONE	ESTABLISHED BY (AGENCY)
1080 976.33	448 670.37		AMCI
(NORTHING)(EASTING) (FT) (M)	(EASTING)(NORTHING) (FT) (M)	GRID AND ZONE	ESTABLISHED BY (AGENCY)

TO OBTAIN GRID AZIMUTH, ADD ° ' " TO THE GEODETIC AZIM

TO OBTAIN GRID AZ. (ADD)(SUB) ° ' " TO THE GEODETIC AZIM

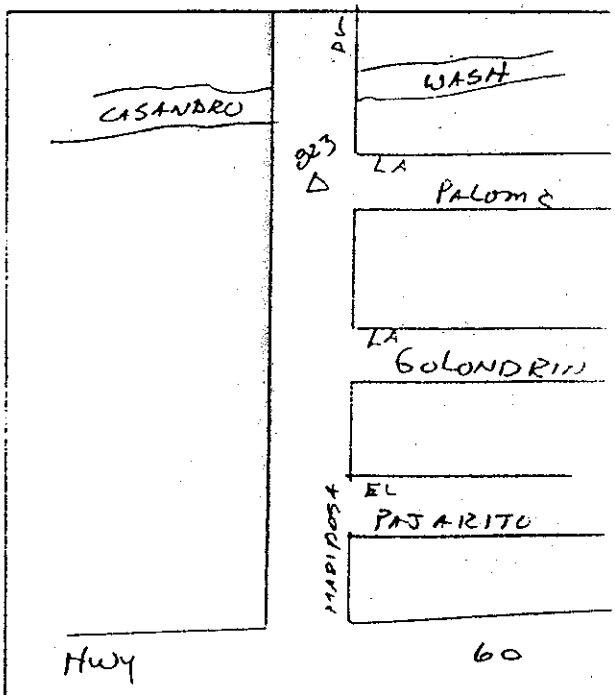
OBJECT	AZIMUTH OR DIRECTION (GEODETIC)(GRID) (MAGNETIC)	BACK AZIMUTH	GEOD. DISTANCE (METERS) (FEET)	GRID DISTANCE (METERS) (FEET)
	° ' "	° ' "		

This station is located near WICKENBURG (city) . MARICOPA (county) . ARIZONA (state)

To reach this station from the

This station is located at
THE INTERSECTION OF MARIPOSA DR. & LA PALOMA DR.

This station is c
BRASS CAP IN HAND HOLE.



COUNTRY	TYPE OF MARK	STATION	
A	ALUM. CAP	418	
CITY	STAMPING ON MARK	AGENCY (CAST IN MARK)	ELEVATION
	418	MCFDC	2079.88
LATITUDE	LONGITUDE	DATUM	DATUM
		NAD 1983	MSL 1929
NORTHING(EASTING) (FT) (M)	(EASTING)(NORTHING) (FT) (M)	GRID AND ZONE	ESTABLISHED BY (AGENCY)
1081 853.17	451 577.44		McLAIN HARBERS CO.
NORTHING(EASTING) (FT) (M)	(EASTING)(NORTHING) (FT) (M)	GRID AND ZONE	ESTABLISHED BY (AGENCY)

TO OBTAIN GRID AZIMUTH, ADD ° TO THE GEODETIC AZIMUTH

TO OBTAIN GRID AZ. (ADD)(SUB) ° TO THE GEODETIC AZIMUTH

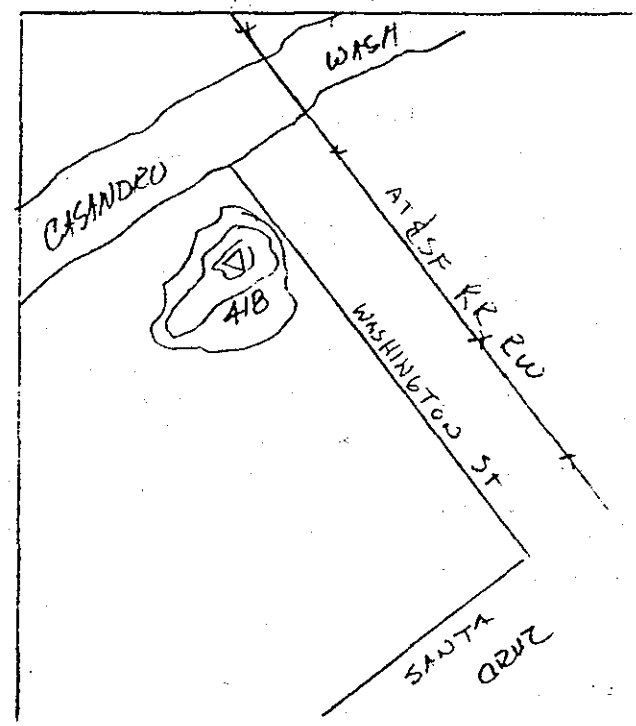
OBJECT	AZIMUTH OR DIRECTION (GEODETIC)(GRID) (MAGNETIC)	BACK AZIMUTH	GEOD. DISTANCE (METERS) (FEET)	GRID DISTANCE (METERS) (FEET)
	° ' "	° ' "		

This station is located near WICKENBURG (city), MARICOPA (county), ARIZONA (state)

To reach this station from the
WASHINGTON ST. & SANTA CRUZ GO NW ON WASHING TON 500'.

This station is located at
20' SW OF EDGE OF DIRT RD. ON SMALL RISE
JUST EAST OF CASANDRO WASH.

This station is a
ALUM. CAP ON 5/8" R.B.



TRY	TYPE OF MARK BRASS CAP	STATION 809	
LOCALITY	STAMPING ON MARK NONE	AGENCY (CAST IN MARK) NONE	ELEVATION 2079.96
LATITUDE	LONGITUDE	DATUM NAD 1983	DATUM MSL 1929
NORTHING)(EASTING) (FT) 1080 920.88 (M)	(EASTING)(NORTHING) (FT) 450 590.23 (M)	GRID AND ZONE	ESTABLISHED BY (AGENCY) AMCI
NORTHING)(EASTING) (FT) (M)	(EASTING)(NORTHING) (FT) (M)	GRID AND ZONE	ESTABLISHED BY (AGENCY)

TO OBTAIN GRID AZIMUTH, ADD ° ' " TO THE GEODETIC AZIM

TO OBTAIN GRID AZ. (ADD)(SUB) ° ' " TO THE GEODETIC AZIM

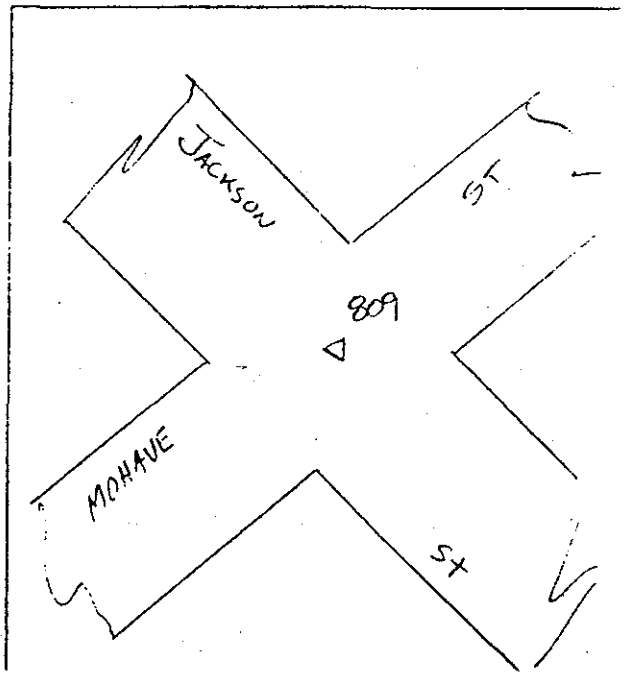
OBJECT	AZIMUTH OR DIRECTION (GEODETIC)(GRID) (MAGNETIC)	BACK AZIMUTH	GEOD. DISTANCE (METERS) (FEET)	GRID DISTANCE (METERS) (FEET)
	° ' "	° ' "		

This station is located near WICKENBURG (city), MARICOPA (county), ARIZONA (state)

To reach this station from the

This station is located at
THE INTERSECTION OF JACKSON ST. & MOHAVE ST.

This station is c
BRASS CAP.



OUNTRY 'SA	TYPE OF MARK BRASS CAP IN H.H.	STATION 808	
	STAMPING ON MARK NONE	AGENCY (CAST IN MARK) NONE	ELEVATION 2105.67
ATITUDE	LONGITUDE	DATUM NAD 1983	DATUM MSL 1929
ORTHING)(EASTING) (FT) (M) 1080 972.30	(EASTING)(NORTHING) (FT) (M) 449 335.07	GRID AND ZONE	ESTABLISHED BY (AGENCY) AMCI
ORTHING)(EASTING) (FT) (M)	(EASTING)(NORTHING) (FT) (M)	GRID AND ZONE	ESTABLISHED BY (AGENCY)

'O OBTAIN GRID AZIMUTH, ADD ° ' " TO THE GEODETIC AZI

'O OBTAIN GRID AZ. (ADD)(SUB) ° ' " TO THE GEODETIC AZI

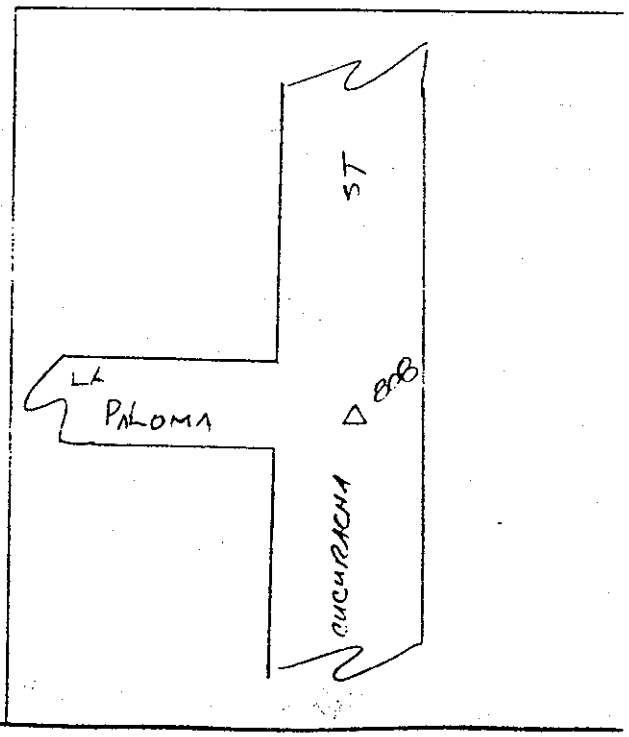
OBJECT	AZIMUTH OR DIRECTION (GEODETIC)(GRID) (MAGNETIC)	BACK AZIMUTH	GEOD. DISTANCE (METERS) (FEET)	GRID DISTANCE (METERS) (FEET)
	° ' "	° ' "		

This station is located near WICKENBURG (city) MARICOPA (county) ARIZONA (state)

To reach this station from the

This station is located at
THE INTERSECTION OF LA PALOMA DR. & CUCURACH ST.

This station is c
BRASS CAP IN HAND HOLE.



COUNTRY	TYPE OF MARK	STATION	
USA	PK & WASHER	807	
COUNTY	STAMPING ON MARK	AGENCY (CAST IN MARK)	ELEVATION
	807	AMCI	2154.84
LATITUDE	LONGITUDE	DATUM	DATUM
		NAD 1983	MSL 1929
NORTHING)(EASTING) (FT)	(EASTING)(NORTHING) (FT)	GRID AND ZONE	ESTABLISHED BY (AGENCY)
1080 009.90 (M)	448 663.55 (M)		AMCI
NORTHING)(EASTING) (FT) (M)	(EASTING)(NORTHING) (FT) (M)	GRID AND ZONE	ESTABLISHED BY (AGENCY)

TO OBTAIN GRID AZIMUTH, ADD ° ' " TO THE GEODETIC AZIM

TO OBTAIN GRID AZ. (ADD)(SUB) ° ' " TO THE GEODETIC AZIM

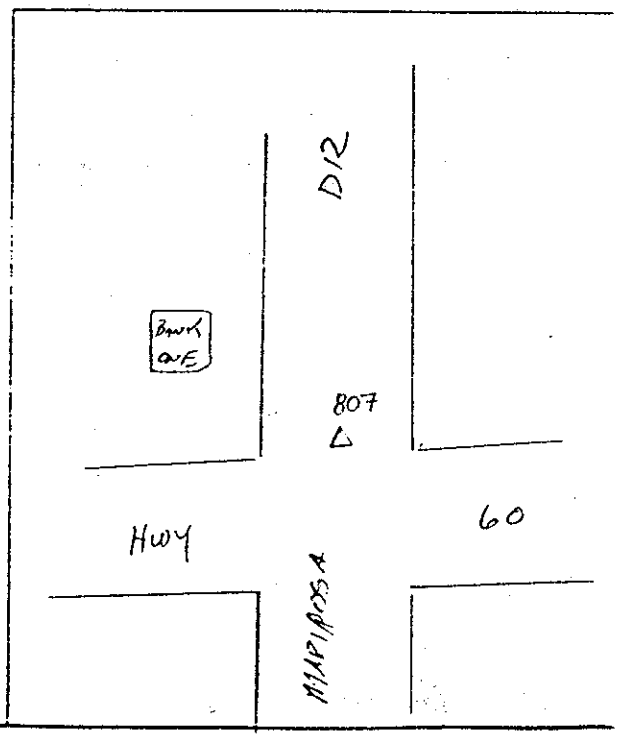
OBJECT	AZIMUTH OR DIRECTION (GEODETIC)(GRID) (MAGNETIC)	BACK AZIMUTH	GEOD. DISTANCE (METERS) (FEET)	GRID DISTANCE (METERS) (FEET)
	° ' "	° ' "		

This station is located near WICKENBURG (city), MARICOPA (county), ARIZONA (state)

To reach this station from the
INTERSECTION OF MAIPOSA DR. & HWY. 60.

This station is located at
A POINT APPROX. NORTH R/W LINE & CENTER LINE
OF MAIPOSA DR.

This station is c
PK & BRASS WASHER.



COUNTRY	TYPE OF MARK	STATION	
	ALUM. CAP	805	
COUNTY	STAMPING ON MARK	AGENCY (CAST IN MARK)	ELEVATION
	805	AMCI	2193.30
LATITUDE	LONGITUDE	DATUM	DATUM
		NAD 1983	MSL 1929
NORTHING)(EASTING) (FT)	(EASTING)(NORTHING) (FT)	GRID AND ZONE	ESTABLISHED BY (AGENCY)
1080 657.14 (M)	446 282.44 (M)		AMCI
NORTHING)(EASTING) (FT) (M)	(EASTING)(NORTHING) (FT) (M)	GRID AND ZONE	ESTABLISHED BY (AGENCY)

TO OBTAIN GRID AZIMUTH, ADD ° ' " TO THE GEODETIC AZIMU

TO OBTAIN GRID AZ. (ADD)(SUB) ° ' " TO THE GEODETIC AZIMU

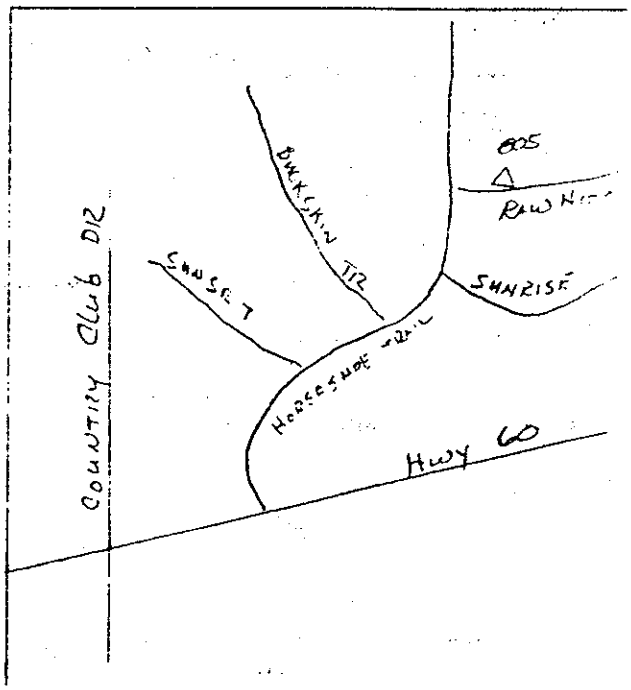
OBJECT	AZIMUTH OR DIRECTION (GEODETIC)(GRID) (MAGNETIC)	BACK AZIMUTH	GEOD. DISTANCE (METERS) (FEET)	GRID DISTANCE (METERS) (FEET)
	° ' "	° ' "		

This station is located near WICKENBURG (city) . MARICOPA (county) . ARIZONA (state)

To reach this station from the
INTERSECTION OF HWY. 60 & HORSESHOE TRAIL
FOLLOW HORSESHOE TRAIL TO RAWHIDE TRAIL.

This station is located at
70 EAST OF HORSESHOE TRAIL 30' NORTH OF
CENTER LINE OF RAWHIDE TRAIL.

This station is c
ALUM. CAP ON ½" R.B.



COUNTRY	TYPE OF MARK	STATION	
USA	PK AND WASHER	804	
	STAMPING ON MARK	AGENCY (CAST IN MARK)	ELEVATION
	804	AMCI	2190.17
LATITUDE	LONGITUDE	DATUM	DATUM
		NAD 1983	MSL 1929
NORTHING)(EASTING) (FT) (M)	(EASTING)(NORTHING) (FT) (M)	GRID AND ZONE	ESTABLISHED BY (AGENCY)
1079 532.13	446 617.38		AMCI
NORTHING)(EASTING) (FT) (M)	(EASTING)(NORTHING) (FT) (M)	GRID AND ZONE	ESTABLISHED BY (AGENCY)

TO OBTAIN GRID AZIMUTH, ADD ° ' " TO THE GEODETIC AZIM

TO OBTAIN GRID AZ. (ADD)(SUB) ° ' " TO THE GEODETIC AZIM

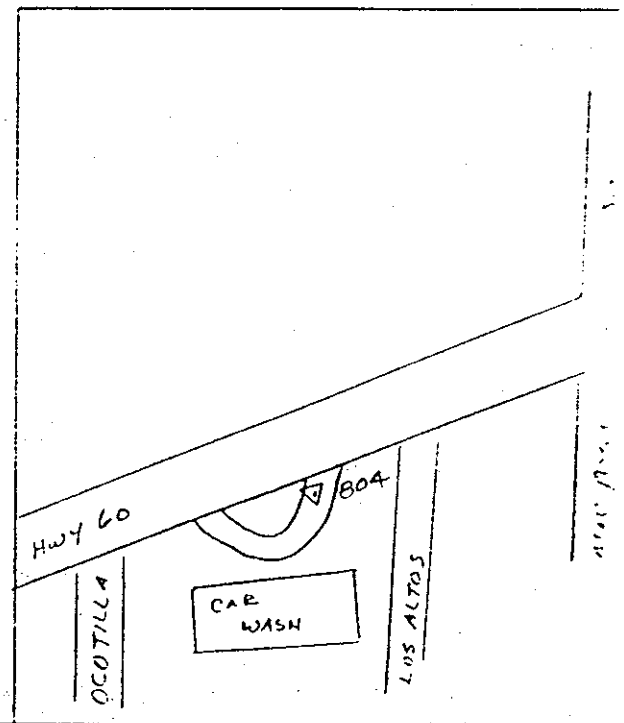
OBJECT	AZIMUTH OR DIRECTION (GEODETIC)(GRID) (MAGNETIC)	BACK AZIMUTH	GEOD. DISTANCE (METERS) (FEET)	GRID DISTANCE (METERS) (FEET)
	° ' "	° ' "		

This station is located near WICKENBURG (city) . MARICOPA (county) . ARIZONA (state)

To reach this station from the
INTERSECTION OF MARIPOSA DR. & HWY 60, GO
WEST ON HWY 60 1700' TO CARWASH ON SOUTH SIDE OF HWY.

This station is located at
IN TURN OUT EAST ENT. TO CARWASH. APPROX.
4' SOUTH OF EDGE OF PAVING.

This station is c
PK & BRASS WASHER.



FIELD FILES
(DATA COLLECTOR)

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4.76,  0.00000,  0.00000, 90.48200,  379.800, 5.13,jeff @ mohave    ,    -2
4.76,  0.00000, 23.17290, 96.45040,   51.910, 7.85,wwall            ,    -3
4.76,  0.00000, 35.49300, 95.19430,   63.650, 7.85,wwall            ,    -4
4.76,  0.00000, 43.41030, 90.48340,   54.660, 4.85,hwall            ,    -5
4.76,  0.00000, 35.06130, 91.01010,   44.470, 4.85,hwall            ,    -6
4.76,  0.00000,108.50070, 92.17480,   40.250, 4.85,hwall            ,    -7
4.76,  0.00000,101.07080, 91.59150,   52.340, 4.85,hwall rr tie     ,    -8
4.76,  0.00000,110.49170, 93.05150,   59.380,11.85,wwall            ,    -9
4.76,  0.00000,123.01020, 93.45210,   46.510,11.85,wwall            ,   -10
4.76,  0.00000,101.56230, 92.11570,  147.880, 8.85,eg               ,   -11
4.76,  0.00000,107.52190, 92.07300,  114.850, 8.85,eg               ,   -12
4.76,  0.00000,128.21530, 95.50500,   73.120, 8.85,eg               ,   -13
4.76,  0.00000,182.19320, 96.48100,   54.240, 8.85,eg               ,   -14
4.76,  0.00000,224.21070, 93.02240,   92.920, 8.85,eg               ,   -15
4.76,  0.00000,309.32320, 86.56590,  141.660, 4.85,cp 418           ,   -16
4.76,  0.00000,298.15580, 88.16000,  129.140, 4.85,eg               ,   -17
4.76,  0.00000,324.21340, 90.54150,  100.080, 4.85,eg               ,   -18
4.76,  0.00000,352.54200, 93.46340,   92.200, 4.85,eg               ,   -19
4.76,  0.00000, 17.09530, 94.24510,   81.160, 8.85,eg               ,   -20
4.76,  0.00000, 43.36220, 92.33280,   97.570, 8.85,eg               ,   -21
4.76,  0.00000, 56.56490, 91.34550,  154.450, 8.85,eg               ,   -22
4.76,  0.00000, 61.40590, 91.05550,  201.900, 8.85,eg               ,   -23
4.76,  0.00000,  0.00000,  0.00000,    0.000, 8.85,eg               ,   -24
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5.12,  0.00000, 34.38280, 89.24330,   20.010, 4.85,eg               ,    -4
5.12,  0.00000,147.59290, 90.08360,   10.130, 4.85,eg               ,    -5
5.12,  0.00000,144.51350, 83.01290,   10.430, 4.85,top wall         ,    -6
5.12,  0.00000,140.13310, 87.19440,   23.390, 4.85,top wall         ,    -7
5.12,  0.00000,141.06320, 89.45350,   23.370, 4.85,eg               ,    -8
5.12,  0.00000,167.50260, 90.08540,   37.050, 4.85,eg               ,    -9
5.12,  0.00000,168.47240, 89.03320,   37.340, 4.85,top wall         ,   -10
5.12,  0.00000,179.05470, 88.44130,   34.900, 4.85,top wall         ,   -11
5.12,  0.00000,179.26100, 91.07330,   34.410, 4.85,eg               ,   -12
5.12,  0.00000,186.08200, 91.07030,   94.980, 4.85,eg               ,   -13
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5.12,  0.00000,132.35380, 89.51050,   60.690, 4.85,eg               ,   -15
5.12,  0.00000,152.59210, 89.30130,   34.310, 4.85,eg               ,   -16
5.12,  0.00000,174.28370, 91.35330,   24.100, 4.85,eg               ,   -17
5.12,  0.00000,236.50490, 91.10100,   23.090, 4.85,eg               ,   -18
5.12,  0.00000,267.09530, 89.29060,   47.660, 4.85,eg               ,   -19
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5.07,  0.00000,104.44580, 92.21540,    3.030, 4.85,CONC               ,    -5
5.07,  0.00000, 67.28560, 90.53360,    7.280, 4.85,CONC               ,    -6
5.07,  0.00000, 35.42080,103.29030,   44.480, 4.85,CONC               ,    -7
5.07,  0.00000,128.49530, 95.25180,  111.800, 4.85,CONC               ,    -8
5.07,  0.00000,145.02290, 90.03100,   85.820, 4.85,CONC               ,    -9
5.07,  0.00000,148.16150, 90.03260,   84.560, 4.85,CONC               ,   -10
5.07,  0.00000, 87.54440, 90.03360,  405.320, 4.85,W EDGE TOP DAM     ,   -11
5.07,  0.00000, 93.40570, 90.04400,  350.150, 4.85,W EDGE TOP DAM     ,   -12
5.07,  0.00000,103.47300, 90.08400,  285.860, 4.85,W EDGE TOP DAM     ,   -13
5.07,  0.00000,118.39250, 90.17230,  240.000, 4.85,W EDGE TOP DAM     ,   -14
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5.07,  0.00000,133.03330, 90.05050,  190.320, 4.85,W EDGE TOP DAM     ,   -16
5.07,  0.00000,138.54480, 90.06160,  169.850, 4.85,W EDGE TOP DAM     ,   -17
5.07,  0.00000,143.00460, 90.17210,  147.330, 4.85,W EDGE TOP DAM     ,   -18
5.07,  0.00000,146.40360, 90.07360,  122.160, 4.85,W EDGE TOP DAM     ,   -19
5.07,  0.00000,145.31050, 90.20020,   87.380, 4.85,W EDGE TOP DAM     ,   -20
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5.07,  0.00000,332.30260, 90.08480,  175.800, 4.85,W EDGE TOP DAM     ,   -24
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5.07,  0.00000,328.36150, 90.03310,  249.280, 4.85,W EDGE TOP DAM     ,   -26
5.07,  0.00000,326.15270, 89.57040,  270.560, 4.85,W EDGE TOP DAM     ,   -27
5.07,  0.00000,323.33320, 89.57100,  290.760, 4.85,W EDGE TOP DAM     ,   -28
5.07,  0.00000,319.38090, 89.56000,  318.740, 4.85,W EDGE TOP DAM     ,   -29
5.07,  0.00000,277.10350, 96.55310,  152.910, 4.85,EG                 ,   -30
5.07,  0.00000,252.40010, 96.46440,  199.390, 4.85,EG                 ,   -31
5.07,  0.00000,248.46330, 95.16300,  241.940, 4.85,EG                 ,   -32
5.07,  0.00000,248.07290, 93.36460,  282.760, 4.85,EG                 ,   -33
5.07,  0.00000,252.48360, 93.00040,  366.010, 4.85,EG                 ,   -34
5.07,  0.00000,262.16290, 93.06340,  369.290, 4.85,EG                 ,   -35
5.07,  0.00000,263.05570, 92.44390,  401.800, 4.85,EG                 ,   -36
5.07,  0.00000,252.11500, 93.46460,  425.600, 4.85,EG                 ,   -37
5.07,  0.00000,242.53580, 94.59120,  447.520, 4.85,EG                 ,   -38
5.07,  0.00000,229.46190, 94.24250,  544.190, 4.85,EG                 ,   -39
5.07,  0.00000,218.15400, 94.01340,  589.340, 4.85,EG                 ,   -40
5.07,  0.00000,241.30410, 97.03000,  294.370, 4.85,EG                 ,   -41
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5.22,   0.00000,143.26470, 89.52010,   89.370, 4.85,wall              ,     -4
5.22,   0.00000,139.55230, 90.08300,  130.920, 4.85,ng house         ,     -5
5.22,   0.00000,137.23140, 90.10300,  104.600, 4.85,ng house         ,     -6
5.22,   0.00000,107.59260, 90.14340,  133.700, 4.85,ng house         ,     -7
5.22,   0.00000,170.07100, 84.08060,  144.240, 4.85,nail 8           ,     -8
5.22,   0.00000,  0.00000,  0.00000,    0.000, 4.85,nail 8           ,     -9
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GDATA,   13,
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4.48,359.59590,359.59580, 95.02150,  144.050, 4.85,nail 8          ,    -9
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4.48,  0.00000, 92.36290,106.10370,   49.750, 8.00,ng              ,   -11
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4.48,  0.00000, 91.33580,103.41220,   52.810, 8.00,ng              ,   -13
4.48,  0.00000,134.44390, 97.15080,  103.210, 8.00,ng              ,   -14
4.48,  0.00000,132.39060, 95.53070,  105.900, 8.00,ng              ,   -15
4.48,  0.00000,144.36130, 93.09340,  199.730, 8.00,ng              ,   -16
4.48,  0.00000,142.52420, 92.43320,  200.970, 8.00,ng              ,   -17
4.48,  0.00000,147.15400, 92.08100,  269.120, 8.00,ng              ,   -18
4.48,  0.00000,145.20290, 91.35410,  271.000, 8.00,ng              ,   -19
4.48,  0.00000,114.57110, 95.20280,  132.710, 8.00,ng              ,   -20
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5.61,  0.00000,269.58550, 95.39540,  116.050, 4.85,p                ,   -46
5.61,  0.00000,270.08060, 94.50080,  169.560, 4.85,p                ,   -47
5.61,  0.00000,269.52280, 94.17030,  205.630, 4.85,p                ,   -48
5.61,  0.00000,269.56460, 93.19410,  254.700, 4.85,p                ,   -49
5.61,  0.00000,269.55370, 92.05140,  306.480, 4.85,p                ,   -50
5.61,  0.00000,270.01410, 90.26320,  373.020, 4.85,p                ,   -51
5.61,  0.00000,286.57470, 87.22190,  441.475, 4.85,eg               ,   -52
5.61,  0.00000,289.51020, 93.09160,  343.380, 4.85,eg               ,   -53
5.61,  0.00000,305.18460, 94.20120,  261.280, 4.85,eg               ,   -54
5.61,  0.00000,318.14110, 95.01560,  229.460, 4.85,eg               ,   -55
5.61,  0.00000,338.05390, 90.23370,   81.610, 4.85,eg               ,   -56
5.61,  0.00000,  0.00000,  0.00000,    0.000, 4.85,eg               ,   -57
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GDATA,   13,
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5.69,  0.00000,104.50170, 89.06360,  462.060, 4.85,eg           ,    -9
5.69,  0.00000,110.28140, 91.28540,  316.820, 4.85,eg           ,   -10
5.69,  0.00000,110.04190, 91.54120,  277.400, 4.85,eg           ,   -11
5.69,  0.00000,101.28400, 91.33310,  236.990, 4.85,eg           ,   -12
5.69,  0.00000,120.34370, 93.39150,   99.930, 4.85,eg           ,   -13
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5.12,  0.00000,  6.29200, 91.40100,  132.860, 4.85,eg                  ,    -7
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5.12,  0.00000, 90.10550, 90.10000,   41.310, 4.85,conc                ,   -18
5.12,  0.00000, 89.54460, 90.57270,   98.510, 4.85,p                   ,   -19
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5.12,  0.00000,159.57070, 89.35380,   85.320, 7.85,eg                  ,   -23
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5.12,  0.00000,  0.00000,  0.00000,    0.000, 4.85,conc                ,   -26
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