SALT - GILA WATERCOURSE MASTER PLAN

Phase I

SURVEYORS REPORT

Volume I of II

FCDMC Contract No. 90-59

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
21080
ROBERT J.
PECHA
Date Signed 3-27-97
ARIZONA, U.S.A.

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
17575
MASON L.
WOMBLE
DATE SIGNED 3-27-97
ARIZONA, U.S.A.

Greiner, Inc.

SALT - GILA WATERCOURSE MASTER PLAN

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Phase I

SURVEYORS REPORT

Volume I of II

FCDMC
Contract No. 90-59

REGISTERED LAND SURVEYOR
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Greiner, Inc.

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EXECUTIVE SUMMARY

INTRODUCTION

The Salt-Gila Watercourse Master Plan - Phase I Survey Project extends along the Salt/Gila River watercourse from the Granite Reef Diversion Dam upstream, to Gillespie Dam downstream. The entire length of this project is approximately 75 to 80 miles, with approximately 150 to 200 square miles of surface area. The magnitude and time constraints of this project made it essential to field three to four fully equipped survey crews at one time.

Due to the length of this project, it was broken into four "reaches." This enabled efficient control of crew schedules and time spent on each particular task, and avoided duplication of previously performed work. This was especially important because the survey tasks were performed by a team made up of two separate companies working together. The commitment, teamwork, close coordination and confidence between Greiner, Inc. and Jaykim Engineers resulted in a win/win project for all.

The Greiner/Jaykim team provided Baker with horizontal and vertical control of aerial targets to a minimum of Third Order accuracies. Target densities were such to control a 1" = 400', 4-foot contour interval map. The team also established elevation reference marks (ERM's) to Third Order accuracies on each side of the river, detailed hydraulic structures, performed field surveys for mapping accuracy verification and provided this Surveyors Report. All work was performed to satisfy the Flood Control District of Maricopa County Specifications and FEMA Guidelines.

SCOPE OF SERVICES

Following is a summary of the survey scope of services, problems encountered and recommendations for future projects.

Reconnaissance - Total Project Reconnaissance

- *Features*
  - Recovery of First and Second Order USC&GS monuments upon which to base horizontal control
  - Recovery of vertical benchmark monuments upon which to base vertical control
  - Selection of aerial target positions
  - Selection of ERM locations
  - Section corners, one-quarter corners and centers of sections were utilized whenever possible

- *Problems*
  - Some First and Second Order USC&GS monuments obliterated or non-accessible by one person
  - Some vertical benchmark monuments obliterated

- *Recommendations*
  - Allow enough "up-front" reconnaissance time for primary control monuments

Ground Control - Horizontal

Horizontal control was established on predetermined panel point locations to control aerial mapping.

- *Features*
  - 129 horizontal panel points
  - Based on State Plane Coordinate System - Central Zone
  - Global Positioning System (GPS) utilized
  - Total network underwent a simultaneous Least Squares adjustment
  - Data delivered in NAD 27, NAD 83 and Geographic Coordinates

- *Problems*
  - Weather -- one GPS receiver out of service for two weeks due to seal leaking
  - Satellite windows - survey crews had to work early morning hours (1:00 a.m. to 8:00 a.m.), causing a security concern in some areas and problems with locating points in remote areas
  - Could not "stream feed" control, as proposed, due to simultaneous adjustment
  - Some predetermined targets moved due to traffic
  - Planned First-Order Monumentation obliterated or non-accessible by one person

- *Recommendations*
  - Present a realistic schedule to account for weather and available satellites
  - More coordination between GPS and panel crews

Ground Control - Vertical

Vertical control was established on predetermined panel point locations to control aerial mapping.

- *Features*
  - 185 vertical panel points
  - Based on NGVD 29 Datum

- Broken into primary and secondary loops
- Underwent Least Squares adjustments
- Met Third Order accuracies

- *Problems*
  - Addition and subtraction errors
  - Planned monuments obliterated
  - Some predetermined targets moved due to traffic

- *Recommendations*
  - Redundant addition and subtraction checks
  - More coordination between GPS and panel crews

Aerial Mapping Panels

Panels were laid out on predetermined locations to control aerial mapping.

- *Features*
  - 185 panel points located

- *Problems*
  - Weather -- many targets were checked, repainted and repapered three to four times to be ready for flights

- *Recommendations*
  - Provide a mechanism for reimbursement of excess time spent on checking and repairing panels due to inclement weather
  - More coordination between GPS and panel crew

Elevation Reference Marks (ERM's)

ERM's were established to satisfy FEMA Guidelines of one reference per mile of landowner use.

- *Features*
  - 112 ERM's were established utilizing existing brass cap cross-section corner markers, benchmarks and other permanent monuments
  - Based on NGVD 29 Datum
  - A narrative description of the monument and a location map was prepared

- *Problems*
  - Few existing monuments were found on the west end of the project at the time of the initial reconnaissance and survey; secondary level runs had to be performed to tie in monuments subsequently found

- *Recommendations*
  - Plan ahead -- incorporate ***all*** ERM's in initial loops

Hydraulic Structures

The sizes (openings) of all hydraulic structures (bridges, conveyors, culverts, etc.) that crossed the riverbed were measured.

- *Features*
  - 25 structures

- *Problems*
  - Needed extra vertical control at structures
  - Water in riverbed
  - Vegetation in riverbed

- *Recommendations*
  - Preplan level "runs"

Mapping Checks

Planimetric features and contours were field verified to ensure that mapping met required accuracies.

- *Features*
  - At least one cross-section per three stereo models was performed
  - Planimetric features were checked by traditional surveying methods

- *Problems*
  - Established horizontal control not dense enough
  - Water in riverbed
  - Vegetation in riverbed

- *Recommendations*
  - None

Surveyors Report

A detailed report was prepared that described the scope of services, coordinate values and elevations of aerial targets, calculations, problems encountered, quality/cost control, recommendations and copies of original field notes.

- *Features*
  - Due to the size of the project, two volumes required
  - 14-volume GPS report submitted

- *Recommendations*
  - None

QUALITY / COST CONTROL

Following is a summary of the Quality/Cost Control for this project.

Quality Control

- Extensive cross-checking between the Greiner/Jaykim team
- Analysis of Least Squares adjustment residuals
- Constant communication between project managers
- Constant communication between all project team members
- At least one project manager available at all times

Cost Control

- Man-hours and costs controlled by CFMS
- Weekly project cost summary
- Weekly project labor summary

- Weekly detailed project labor report
- Monthly current earnings report
- Billing by project managers

MARICOPA COUNTY SALT-GILA WATERCOURSE MASTER PLAN PHASE 1 AERIAL MAPPING GPS CONTROL SURVEY NETWORK PHOENIX, ARIZONA GREINER, INC. 1991

SUMMARY

The intent of this GPS Control Survey was to provide a photogrammetric horizontal control network for a 400 scale 4-foot contour aerial topographic map of the Salt-Gila Rivers in the general vicinity of Phoenix Arizona. Approximately 150 record monuments were targeted and occupied using Trimble 4000 ST single frequency receivers in accordance with the FGCC "Geometric Accuracy Standards and Specifications for using GPS Relative Positioning Techniques" in order to develop the photogrammetric horizontal control for this aerial mapping project. The photogrammetric vertical control for this aerial mapping project was developed by a Least Squares Adjustment of conventional leveling and is not a part of this report.

In accordance with the contract specifications, this GPS horizontal control network was tied into the Arizona State Plane Coordinate System by direct measurements to 3 NGS first order triangulation stations within the immediate vicinity of this mapping project. These first order NGS triangulation stations are: Broadway, Etta and Val Vista. Additionally, in consideration of the fact that the East-West scope of this aerial mapping project extended approximately 80 miles, several other NGS first order triangulation stations were occupied around the project perimeter. These additional first order triangulation stations were occupied in order to verify the existence of a uniform State Plane Coordinate Network and to identify any "Local Control" coordinate discrepancies which may exist and thereby have an impact on this project or future projects within the same general area. Although verification of the existing NGS triangulation network is beyond the scope of this 400 scale 4-foot contour aerial topographic mapping project, all baselines between the NGS triangulation stations listed below were measured at least twice in order to provide redundant measurements as defined in the FGCC specifications. Due to its historical significance, as the initial point of the Arizona public lands survey system, one NGS second order triangulation station "Initial Point" was occupied instead of the NGS first order triangulation station "Initial Monument" only a few feet away. The published NAD83 record coordinates of triangulation stations Etta, Broadway, Squaw Peak, Litchfield, and Initial Point (not Initial Monument) appear to be in general agreement due to the lack of significant differences between the record coordinate values and the (measured) coordinate values generated by the unconstrained GPS project adjustment. However, triangulation stations Val Vista, Powers Butte, and Wintersburg exhibit larger positional differences between the published record coordinate values and the (measured) coordinate values generated by the unconstrained GPS project adjustment. This positional discrepancy would appear to cast some doubt on the accuracy of the published record coordinates of these three triangulation stations in relation to the overall area network. Please see the attached table entitled "NAD83 Grid Coordinate Value Comparisons (International Foot)".

Once again, it should be emphasized that the intent of this particular GPS control survey was to provide photogrammetric horizontal control for a 4-foot contour 400 scale aerial topographic map of the Salt-Gila Rivers, and an examination of the precision of the unconstrained adjustment proved to be well within the PPM requirements specified in the contract for this GPS control network. Under no circumstances should the resultant coordinate values of this GPS control survey be used for boundary analysis or land net control of a GIS digital mapping database.

THE FOLLOWING APPENDICES ARE INCLUDED AS PART OF THIS PROJECT REPORT:

An Appendix entitled GPS PROJECT COORDINATES which contains the following sections: NAD83 Arizona State Plane Ground Coordinates in International Feet, NAD83 Arizona State Plane Grid Coordinates in International Feet, NAD83 State Plane Grid Coordinates in Meters, and NAD27 Arizona State Plane Grid Coordinates in U.S. Survey Feet. Once again, it should be noted that the intent of this GPS control survey was to develop horizontal photogrammetric control for a 400 scale, 4-foot contour aerial topographic map of the Salt-Gila Rivers and under no circumstances should the resultant coordinate values be used for boundary analysis or land net control of a GIS digital mapping database.

An Appendix entitled GPS PROJECT ADJUSTMENTS which contains a GEOLAB least squares statistical adjustment with the title "Unscaled, #8 Constrained NAD83 Adjustment - Salt River GPS - 1991". This project adjustment was developed by the constrained NAD83 values of the following 8 NGS triangulation stations: Initial Point (not Initial Monument), Powers Butte, Wintersburg, Litchfield, Etta, Squaw Peak, Val Vista, and Broadway. It should be noted that due to the relatively large distance away from the immediate project, the record coordinate values of these 8 NGS control points were held "fixed" in the Geolab least squares adjustment but were not heavily weighted. Therefore, minor differences in the final coordinates of these points will be evident in the least squares adjustment report and the resultant coordinate listings due to a lack of agreement between the record coordinate values and the redundant GPS baseline vector measurements. The average ppm of the constrained project adjustment was 6 ppm, with a low value of 1 ppm and a high value of 35 ppm in a vector distance of 685 meters. This constrained adjustment was used to develop the NAD83 Coordinate values for this 400 scale 4-foot contour aerial topographic mapping project.

An Appendix entitled GPS PROJECT ADJUSTMENTS which contains a GEOLAB least squares statistical adjustment with the title: "Unscaled, #8 Constrained NAD27 Adjustment - Salt River GPS - 1991". This project adjustment was developed from the constrained NAD27 values of the following 8 NGS triangulation stations: Initial Point (not Initial Monument), Powers Butte, Wintersburg, Litchfield, Etta, Squaw Peak, Val Vista, and Broadway. It should be noted that due to the relatively large distance away from the immediate project, the record coordinate values of these 8 NGS control points were held "fixed" in the Geolab least squares adjustment but were not heavily weighted. Therefore, minor differences in the final coordinates of these points will be evident in the least squares adjustment report and the resultant coordinate listings due to a lack of agreement between the record coordinate values and the redundant GPS baseline vector measurements. The average ppm of this constrained project adjustment was 6 ppm with a low value of 1 ppm and a high value of 31 ppm in a vector distance of 685 meters. This constrained adjustment was used to develop the NAD27 coordinate values for this 400 scale 4-foot contour aerial topographic mapping project.

An Appendix entitled GPS PROJECT ADJUSTMENTS which contains a GEOLAB least squares statistical adjustment with the title: "Scaled Unconstrained Project Adjustment - Salt River GPS - 1991". This project adjustment was developed by constraining the NAD83 value of a single NGS triangulation station (Etta), in order to provide a quality check of the internal consistency of the GPS measurements. This adjustment was scaled to better fit a bell curve graph and to pass the Chi-squared test. The average ppm of this scaled unconstrained project network was 3 ppm with a low value of 1 ppm, and a high value of 13 ppm, in a vector distance of 685 meters. This scaled unconstrained adjustment is well within contract specifications and was produced in order to examine the actual precision of the GPS measurements used for this 400 scale 4-foot contour aerial topographic mapping project.

An Appendix entitled GPS PROJECT PROCESSING which contains the Trimble (Rev E) automatic baseline processing software parameters for the GPS observations of the NGS triangulation station network verification along with the resulting baseline summary reports and a Trimble "TMAP" plot of the baselines observed. In consideration of the relatively long baselines measured in the NGS triangulation station verification, the GPS observation data was first processed using the Trimble preset "automatic" processing parameters and then reprocessed using "manually" modified processing parameters in order to provide a comparison of the resultant vector differences. For all intents and purposes, the resultant raw GPS baseline vectors developed from the program preset "automatic" processing parameters were nearly identical to the resultant raw GPS baseline vectors developed from the "manually" modified processing. Therefore, the "automatic" GPS vectors were considered to be adequate for the NGS triangulation station verification of this 400 scale, 4 foot contour aerial mapping project. Please see the attached comparison tables entitled "Trimble 4000 ST Single Frequency Field Calibration and Comparisons".

An Appendix entitled GPS PROJECT PROCESSING which contains the Trimble (Rev E) manually modified baseline processing software parameters for the GPS observations of the NGS triangulation station verification along with the resulting baseline summary reports and a Trimble "TMAP" plot of the baselines observed. In consideration of the relatively long baseline measurements included in the NGS triangulation station verification, the Trimble processing parameters were manually modified in order to provide a comparison to the preset automatic processing sequence. Although the positional dilution of precision (PDOP) improved noticeably, the resultant raw GPS "Manual" baseline vectors were only slightly different than the processed preset "Automatic" baselines. Therefore, the program processed and adjusted "Automatic" baselines were considered to be adequate for the NGS triangulation station verification of this 400 scale, 4 foot contour aerial mapping project. Please see the attached comparison tables entitled "Trimble 4000 ST Single Frequency Field Calibration and Comparisons".

An Appendix entitled GPS PROJECT CLOSURES which contains the Trimble (Rev E) "Tclose" traverse closure reports for the NGS triangulation station verification and the 20 project loops. In accordance with the FGCC standards and specifications, all 20 project network loops were 10 sides or less. The average ppm closure for the loops in the project network was 2 ppm with a low value of 1 ppm and a high value of 5 ppm. The average value of 2 ppm for all the loops in this project network was considerably less than the specified allowable average of 16 ppm, and the maximum project loop closure of 4.53 ppm for Loop #8 was also considerably less than the allowable maximum of 25 ppm as specified in the FGCC standards.

An Appendix entitled GPS OBSERVATION REPORTS which contains the daily work reports recorded by the GPS field crew for each GPS observation day. These daily work reports are a general summary of the hours worked and points observed by each member of the GPS field crew. In order to satisfy contract requirements, daily work reports were recorded in addition to the GPS observation sheets which provide a detailed summary of each observation session.

An Appendix entitled GPS OBSERVATION SHEETS which contains the GPS observation sheets for all the points of this project as recorded by each member of the GPS field crew. These observation sheets show relevant information concerning each GPS occupation including: the name of the field operator, the model and serial number of the GPS receiver, the location and description of the point occupied, information regarding the satellite constellation for each individual observation session, and the antenna height entered into the receiver along with the three independent measurement checks required by the FGCC specifications.

An Appendix entitled GPS OBSERVATION WINDOWS which contains the satellite windows available for this project as well as the Trimble satellite "SKYPLOT" configurations for the individual observation sessions. All observations sessions were designed according to the "FGCC Geometric Accuracy Standards and Specifications for using GPS Relative Positioning Techniques".

An Appendix entitled GPS OBSERVATION POINTS which contains the recon sheet "Visibility", "To Reach", and "Point Identification" descriptions for all the GPS observation points of this project. This binder also includes the published record coordinates and "To Reach" descriptions for the occupied NGS triangulation stations surrounding the general vicinity of this 400 scale 4-foot contour aerial topographic mapping project.

David Paul Johnson
Project Surveyor, G.P.S.

Robert J. Pecha, P.L.S.
Project Manager

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
21080
ROBERT J.
PECHA
Date Signed 7-17-92
ARIZONA, U.S.A.

R00704

MARICOPA COUNTY SALT-GILA WATERCOURSE AERIAL MAPPING

NAD 83 GRID COORDINATE VALUE COMPARISONS (INTERNATIONAL FOOT)

NAME	NUMBER		RECORD	CONSTRAINED	± DIF	UNCONSTRAINED	± DIF
		N	864,981.997	864,981.987	-0.010	864,981.913	-0.084
INITIAL POINT	0001	E	581,116.248	581,116.362	+0.114	581,116.537	+0.289
		N	840,141.032	840,141.074	+0.042	840,141.285	+0.253
POWERS BUTTE	0005	E	450,010.732	450,011.135	+0.403	450,011.819	+1.087
		N	880,381.043	880,381.056	+0.013	880,381.027	-0.016
WINTERSBURG	0007	E	407,444.792	407,444.862	+0.070	407,446.665	+1.873
		N	917,126.638	917,126.633	-0.005	917,126.404	-0.234
LITCHFIELD	0009	E	564,283.971	564,283.975	+0.004	564,284.542	+0.571
		N	896,344.272	896,344.272	HELD	896,344.272	HELD
ETTA	0013	E	647,409.040	647,409.040	HELD	647.409.040	HELD
		N	926,687.833	926,687.747	-0.086	926,687.466	-0.367
SQUAW PEAK	0015	E	668,215.780	668,215.769	-0.011	668,215.654	-0.126
		N	900,292.414	900,292.274	-0.140	900,292.259	-0.155
VAL VISTA	0019	E	750,259.803	750,259.198	-0.605	750,258.834	-0.969
		N	875,535.738	875,535.795	+0.057	875,535.783	+0.045
BROADWAY	0021	E	684,546.463	684,546.424	-0.039	684,546.338	-0.125

* NOTE: Although verification of the local existing NGS triangulation network is beyond the scope of this 400 scale, 4-foot contour aerial mapping project, the published NAD83 Record Coordinates of Triangulation Stations Etta, Broadway, Squaw Peak, Litchfield, and Initial Point (not Initial Monument) appear to be in general agreement according the lack of major differences between the record coordinate values and the (measured) coordinate values generated by the unconstrained adjustment. Triangulation stations Val Vista, Powers Butte and Wintersburg exhibit larger positional differences between the (measured) unconstrained coordinates and the published record values. This discrepancy would appear to cast some doubt on the accuracy of the published record coordinates of these three triangulation stations relative to the overall area network.

MARICOPA COUNTY SALT-GILA WATERCOURSE AERIAL MAPPING

RAW GPS "AUTOMATIC" BASELINE MEASUREMENT COMPARISONS (DIRECTORY VCTR1)

TRIMBLE 4000 ST SINGLE FREQUENCY RECEIVER FIELD CALIBRATION AND COMPARISONS

STATION FROM	RECEIVER FROM	STATION TO	RECEIVER TO	GPS DAY	VECTOR DISTANCE (m)
0001	WHITE	0013	BLUE	330-1	22,356.121 *
0001	WHITE	0013	BLUE	330-2	22,356.297
0001	RED	0013	WHITE	337-1	22,356.248
0001	RED	0013	WHITE	337-2	22,356.214
0001	GREEN	0013	RED	339-1	22,356.396
0001	GREEN	0013	RED	339-4	22,356.352

#2934A00381 = RED #2934A00379 = WHITE #2934A00382 = BLUE #2934A00373 = GREEN

* NOTE: As noted per the attached letter, Trimble GPS receivers are calibrated before they leave the factory, and also undergo a self calibration routine each time they are turned on. However, in an effort to provide an actual project field comparison, a common network baseline was measured repeatedly using three different receiver combinations with the resultant raw GPS vector distances shown above. Except for the first raw GPS vector distance which would appear to contain operator error, the maximum difference between any pair of measured "automatic" vectors is 182mm in 22,356m, or 8ppm. Of further note is the fact that the maximum difference realized between any raw GPS vector developed from preset "Automatic" processing and the corresponding raw GPS vector developed from "Manual" processing (set to process each measurement observation) was only 91mm in 22,356 meters, or 4ppm (please refer to the following page).

MARICOPA COUNTY SALT-GILA WATERCOURSE AERIAL MAPPING

RAW GPS "MANUAL" BASELINE MEASUREMENT COMPARISONS (DIRECTORY VCTR1M)

TRIMBLE 4000 ST SINGLE FREQUENCY RECEIVER FIELD CALIBRATION AND COMPARISONS

STATION FROM	RECEIVER FROM	STATION TO	RECEIVER TO	GPS DAY	VECTOR DISTANCE (m)
0001	WHITE	0013	BLUE	330-1	22,356.139 *
0001	WHITE	0013	BLUE	330-2	22,356.273
0001	RED	0013	WHITE	337-1	22,356.291
0001	RED	0013	WHITE	337-2	22,356.281
0001	GREEN	0013	RED	339-1	22,356.305
0001	GREEN	0013	RED	339-4	22,356.288

#2934A00381 = RED #2934A00379 = WHITE #2934A00382 = BLUE #2934A00373 = GREEN

* NOTE: As noted per the attached letter, Trimble GPS receivers are calibrated before they leave the factory, and also undergo a self calibration routine each time they are turned on. However, in an effort to provide an actual project field comparison, a common network baseline was measured repeatedly using three different receiver combinations with the resultant raw GPS vector distances shown above. Except for the first raw GPS vector distance which would appear to contain operator error, the maximum difference between any pair of measured "manual" vectors is 32mm in 22,356m, or 1ppm. Of further note is the fact that the maximum difference realized between any raw GPS vector developed from preset "Automatic" processing and the corresponding raw GPS vector developed from "Manual" processing (set to process each measurement observation) was only 91mm in 22,356 meters, or 4ppm (please refer to the previous page).

RECEIVED
DEC 1991
GREINER ENG.

TrimbleNavigation

1 November 1991

Dave Johnson
GREINER, INC.
1261 East Dyer Road
Santa Ana, CA 92705-5605

Dear Mr. Johnson:

As per your request for information regarding the calibration of GPS Carrier Phase Tracking receivers. All receivers are calibrated before leaving Trimble Navigation Ltd by our Q.A. group. This calibration includes measuring a baseline of known coordinates to determine any abnormalities in the antenna phase center or the receivers tracking loop. The receivers also do a self calibration between all the channels every time a survey is started. The results of this calibration are available for the user to analyze, and are located in the double difference output file.

Should you have any further questions or if I can be of service to you, please call me at 1-800-874-6253 extension 2019.

Regards,

TRIMBLE NAVIGATION LTD.

Ken Mooyman

Ken Mooyman
Survey Sales
Western Region

645 North Mary Avenue
Post Office Box 3642
Sunnyvale, CA 94088-3642

(408) 730-2900
FAX (408) 730-2997
Telex 6713973

Greiner

SALT-GILA WATERCOURSE - PHASE I

15 JANUARY 1992

AERIAL CONTROL
NAD 83 STATE PLANE COORDINATES - GROUND VALUES
CENTRAL ZONE - INTERNATIONAL FOOT

REGISTERED LAND SURVEYOR
CERTIFICATE NO. 21080
ROBERT J. PECHA
Date signed 2-18-92
ARIZONA, U.S.A.

GROUND TO GRID FACTOR IS 0.999863

* - denotes revised elevation - 22 January 1992
** - denotes control for the Hohokam Floodplain
*** - denotes elevation revision per Jay-Kim Engineering - 18 Feb 1992

Pt No	Northing	Easting	Elev
1	865100.49	581195.98	
5	840256.17	450072.79	
7	880501.67	407500.68	
9	917252.28	564361.28	
13	896467.07	647497.74	
15	926814.70	668307.32	
19	900415.61	750361.98	
21	875655.74	684640.21	
101			946.64
102	878288.36	575938.80	950.56
103			937.81
104	878502.98	560200.53	942.35
105			910.34
106			912.43
107	870588.84	544379.37	889.83
108	875993.89	539108.94	901.91
109			892.33
110			886.16
111	873279.23	528518.29	897.97
112	870760.87	528505.91	882.38
113	862840.49	528713.32	881.73
114			872.73
115	870817.10	520744.17	889.23
116	862908.36	515509.87	860.96
117	868258.46	510202.82	879.27
118			854.85
119	865590.51	502305.11	875.97

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Pt No	Northing	Easting	Elev
120	863073.42	499569.92	861.00
121			874.31
122			824.99
123	863077.53	478553.87	879.80
124	860461.85	473134.95	864.23
125	855176.32	473122.00	831.85
126	849996.53	473106.87	806.54
127	857899.94	467905.53	858.05
128			828.38
129	855375.52	457251.66	837.64
130	852878.43	449325.01	930.45
131			864.73
132	847204.82	441331.70	803.01
133	847526.40	436046.24	832.68
134	845321.49	432277.33	809.33
135			775.61
136	839591.88	432291.83	800.32
137	832945.64	427266.96	794.97
138			769.44
139			764.80
140	824859.36	429824.86	784.40
141	819153.68	427949.84	807.66
142	817959.68	433855.20	767.15
143			811.29
144	811233.58	437926.26	780.81
145	811420.21	440470.58	753.29
146	816152.52	441896.73	770.22
147	824194.60	441399.88	765.01
148	832142.48	446725.02	794.02
149			785.89 *
150	839620.36	451266.60	793.51
151	839620.15	457153.91	795.88
152	839622.24	462420.33	822.79
153	847397.71	457394.41	809.64
154			805.85
155			808.01
156	842141.47	473008.57	824.96
157			808.77
158			815.06
159			824.20 *
160	839479.88	483537.64	887.00
161	844617.28	488831.98	872.30

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Pt No	Northing	Easting	Elev
162	847327.29	491747.94	836.66
163	849658.90	494112.93	839.59
164	855159.74	488940.96	829.91
165			839.16
166			850.70
167			957.86
168	849720.48	515280.46	902.82
169	854155.17	515388.81	859.16
170			879.88
171			899.52
172	852246.98	531141.73	928.86
173	854882.79	531143.08	917.48
174			934.47
175			885.31
176	860036.93	541991.70	943.28
177			894.51
178	860014.65	544641.33	957.26
179			916.49
180	866574.13	560079.87	933.92
181	870796.55	560117.28	923.16
182			921.87
183			963.87
184	870443.61	575981.79	936.00
185	862488.90	575947.72	962.13
186	862455.55	581179.25	959.18 *
187	859917.90	581117.32	1013.70 *
188			952.17
189	859157.10	595690.73	965.16
190	865153.99	591621.07	960.05
191	870574.12	591593.42	961.10
192	875725.42	591563.39	985.58
193	878384.64	586330.48	965.08
194			948.49
301	894502.59	707644.00	1192.68
302	891842.04	702354.01	1188.89
303	889279.04	702220.05	1181.35 *
304	889201.85	697116.69	1187.97
305			1183.29
306	889145.32	681252.10	1153.94
307	889009.15	674148.59	1123.60
308	886395.21	671245.08	1117.01
309	883942.93	665410.64	1100.63

Greiner

Pt No	Northing	Easting	Elev
310	881303.24	665383.66	1095.80
311			1083.92
312	883448.33	649511.41	1069.40
313	883447.73	644200.89	1059.71
314			1048.28
315	881425.43	633615.24	1039.06
316			1020.48
317	881369.06	622997.35	1024.07
318	878848.15	617750.17	1015.13
319			1005.17
320	876392.08	607094.97	995.22
321	870355.35	607520.14	982.47
322	873375.09	602330.68	981.80
323			979.38
324			972.34
325	862445.87	607445.82	982.90
326	865064.55	612842.69	994.65
327	867717.22	618008.14	1002.50
328	870330.89	618040.17	1005.57
329			1011.38
330	870368.01	628596.36	1021.05
331	873028.49	633868.97	1032.75
332	875582.61	633771.69	1035.58
333			1050.31
334	875663.11	649635.83	1067.61
335			1081.26
336	875718.82	665565.85	1101.42
337			1127.34
338			1114.61
339	878288.63	681346.81	1139.83
340	881071.07	681549.39	1135.35
341			1150.13
342	880898.47	697151.62	1174.88
343			1175.08
344	881227.76	710364.42	1192.57
345			1190.00
346			1189.94 *
501	918537.62	771169.79	1326.03
502	918773.77	765558.42	1426.19
503			1312.01
504	915874.60	760622.47	1331.81
505	913230.50	760625.91	1302.81

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Pt No	Northing	Easting	Elev
506			1303.80
507	913216.50	750064.48	1290.31
508	907939.09	750077.22	1274.71
509			1261.89
510			1277.82
511	909468.66	735769.73	1278.20
512			1236.12
513	907849.35	728933.36	1272.63
514	905210.75	728933.28	1262.14
515	905177.06	723655.06	1252.17
516	899862.11	718381.46	1231.04
517	897227.37	718321.00	1219.13 *
518			1218.39
519	883888.90	718506.34	1234.21
520	889194.60	718516.63	1205.30
521			1216.49
522	891932.70	728843.09	1225.33
523	897370.21	728761.28	1227.29
524			1238.11
525	894712.73	739475.14	1292.83
526	897371.28	739498.33	1255.22
527	902651.29	739489.71	1254.16
528			1340.67
529	905154.48	757906.33	1307.79
530	902716.24	760543.64	1372.04
531	907952.63	760009.18	1307.37
532	910991.10	771050.81	1516.87
533	913236.05	771045.67	1390.83
701			1148.65 **
702	875926.64	691771.78	1160.64 **
703	865258.75	691789.96	1180.98 **
704	859961.33	691173.69	1196.70 **
705	859963.12	682439.69	1311.26 **
706			1206.85 ***
707	863990.15	675163.72	1220.13 **
708	865194.41	670746.72	1178.12 **
709			1269.36 **
710			1177.99 ***
711	857675.04	652457.90	1306.15 **
712	865117.73	649219.33	1156.13 **
801	875666.65	652272.41	
802	875665.02	657623.26	

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Pt No	Northing	Easting	Elev
803	886583.10	665437.76	
804	881157.02	676053.60	
805	878500.03	676065.31	
901	883807.59	702415.45	
902	883666.52	697162.59	
903	883775.75	689212.38	

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Greiner

CITY OF PHOENIX REQUESTED MONUMENTS
NAD 83 Grid Values - Central Zone - Meters

Monuments Common to Salt/Gila Aerial Mapping

Point No.	Northing	Easting	Description
336	266882.534	202836.683	N/E Corner Sec.27 T1N R3E Intersection 24th St.& Broadway Rd. Found Brass Cap in Handhole

Monuments Included in Salt/Gila Aerial Mapping

801	266866.633	198785.396	S.1/4 Corner Sec.20 T1N R3E Intersection Central Ave.& Broadway Rd. Found Brass Cap in Handhole
802	266866.138	200416.112	S.1/4 Corner Sec.21 T1N R3E Intersection 12th St.& Broadway Rd. Found Brass Cap in Handhole
803	270193.511	202797.644	N/E Corner Sec.15 T1N R3E Intersection 24th St.& Buckeye Rd. Found Brass cap in Handhole
804	268539.871	206032.909	N/E Corner Sec.24 T1N R3E Intersection 40th St.& University Dr. Found Brass Cap in Handhole
805	267730.130	206036.481	E.1/4 Corner Sec.24 T1N R3E Intersection 40th St.& Elwood St. Found Brass Cap Flush

Requested Monuments Not Found

N.1/4 Corner Sec.20 T1N R3E
Intersection Central Ave.& Lower Buckeye Rd.

N.1/4 Corner Sec.21 T1n R3E
Intersection 12th St.& Lower Buckeye Rd.

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
21080
ROBERT J.
PECHA
Date Signed 4-25-94
ARIZONA, U.S.A.

NAD83GRD.GEN

Greiner

CITY OF TEMPE REQUESTED MONUMENTS
NAD 83 Grid Values - Central Zone - Meters

Monuments Common to Salt/Gila Aerial Mapping

Point No.	Northing	Easting	Description
342	268461.076	212462.705	E.1/4 Corner Sec.10 T1N R4E Intersection Rural & Weber Rds. Found Brass Cap in Handhole

Monuments Included in Salt/Gila Aerial Mapping

901	269347.652	214066.901	E.1/4 Corner Sec.14 T1N R4E Intersection 1st St.& McClintock Rd. Found Brass Cap in Handhole
902	269304.660	212466.050	Intersection 1st St.& Rural Rd. Found Brass Cap in Handhole
903	269337.950	210043.158	Center of Sec.16 T1N R4E Intersection 1st St.& Hardy Dr. Found Brass Cap Flush

Requested Monuments Not Found

Center of Sec.9 T1N R4E

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
21080
ROBERT J.
PECHA
Date Signed 11-25-97
ARIZONA, U.S.A.

COTNAD83.GEN

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
FLOOD PLAIN DELINEATION
GILA/SALT RIVER (Gillespie/Granite Reef Dam)

ELEVATION REFERENCE MARKS

1	A USGS brass cap stamped "P-13" and located on the north pier at the west end of the steel girder bridge over the Gila River at Gillespie Dam approximately located near the center of Section 28, Township 2 south, Range 5 west of the Gila and Salt River base and meridian, Maricopa County Arizona.	Elevation: 746.43
2	A USGS Brass cap stamped "Q-13" and located on the north pier at the east end of the steel girder bridge over the Gila River at Gillespie Dam located in Section 28, Township 2 south, Range 5 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 746.44
3	A BLM brass cap on a pipe 6" above the ground. The brass cap is the quarter corner of Sections 18 and 19 of Township 2 south, Range 5 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 808.25
4	A 1/2" steel bar for the northwest corner of Section 17 Township 2 south, Range 5 west of the Gila and Salt River base and meridian, Maricopa County, Arizona. This point is located in the intersection of old U.S. Highway 80 and a dirt road to the east.	Elevation: 779.69
5	A 1/2" steel bar in a mound of stone for the northwest corner of Section 15, Township 2 south, Range 5 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 764.94
6	A BLM brass cap on a pipe for the east quarter corner of Section 10, Township 2 south, Range 5 west of the Gila and Salt River base and meridian, Maricopa County, Arizona. This point is approximately 100 feet east of a north-south gravel road.	Elevation: 823.07
7	A BLM brass cap on a pipe for the northeast corner of Section 10, Township 2 south, Range 5 west of the Gila and Salt River base and meridian, Maricopa County, Arizona. This point is approximately 200 feet west of a north-south gravel road.	Elevation: 833.27
8	A ½" steel bar for the northwest corner of Section 8, Township 2 south, Range 5 west of the Gila and Salt River base and meridian, Maricopa County, Arizona. This point is located in the intersection of old U.S. Highway 80 and Desert Rose Road.	Elevation: 786.51
9	A brass cap in a hand hole for the northeast corner of Section 32, Township 1 south, Range 5 west of the Gila and Salt River base and meridian, Maricopa County, Arizona. This point is located in the intersection of Arlington School and Cactus Rose Roads.	Elevation: 776.38

10	A BLM brass cap on a 2" pipe. This point is the northerly of two reference monuments, located 78.2 feet northeast of the northeast corner of Section 34, Township 1 south, Range 5 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 785.63
11	A USGS brass cap stamped "Z-361" located approximately 100 feet north of the intersection of old U.S. Highway 80 and 331st Avenue. This brass cap is in the proximity of the east quarter corner of Section 21, Township 1 south, Range 5 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 803.06
12	A 4" metal plate on a 1½" pipe in concrete. This point is for the center of Section 23, Township 1 south, Range 5 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 865.76
13	A USGS brass cap stamped "Q-10" located on the south side of old U.S. Highway 80 approximately 400 feet west of the intersection of Salome Road and said highway. This point is approximately 650 feet east and 200 feet south of the northwest corner of Section 13, Township 1 south, Range 5 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 849.23
14	A BLM brass cap on a 2" pipe. This point is the south one quarter corner of Section 25, Township 1 south, Range 5 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 804.18
15	A BLM brass cap on a 2" pipe. This point is the southeast corner of Section 25, Township 1 south, Range 5 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 796.46
16	A 1" pipe in a hand hole at the intersection of 307th Avenue and old U.S. Highway 80. This point is the northeast corner of section 13, Township 1 south, Range 5 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 836.68
17	A BLM brass cap on a 2" pipe. This point is the southeast corner of Section 30, Township 1 south, Range 4 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 823.21
18	A BLM brass cap on a 2" pipe. This point is the north 1/16 corner of Sections 28 and 29, Township 1 south, Range 4 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 813.01
19	A brass cap in a hand hole in the intersection of Palo Verde Road and Old U.S. Highway 80. This point is the northwest corner of Section 16, Township 1 south, Range 4 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 845.81
20	A BLM brass cap on a 2" pipe. This point is the east quarter corner of Section 28, Township 1 south, Range 4 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 825.54

21	A BLM brass cap on a 2" pipe. This point is the east quarter corner of Section 27, Township 1 south, Range 4 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 840.71
22	A BLM brass cap on a 2" pipe. This point is the southeast corner of Section 23, Township 1 south, Range 4 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 825.47
23	A brass cap in a hand hole in the intersection of State Route 85 and Hazen Road. This point is the east quarter corner of Section 11, Township 1 south, Range 4 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 837.84
24	A BLM brass cap on a 2" pipe. This point is the northeast corner of Section 13, Township 1 south, Range 4 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 830.66
25	A BLM brass cap on a 2" pipe. This point is the southeast corner of Section 24, Township 1 south, Range 4 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 873.17
26	A 3/4" steel bar in a hand hole in the intersection of Miller and Beloat Roads. This point is the northeast corner of Section 7, Township 1 south, Range 3 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 851.27
27	A brass cap in a hand hole in the intersection of Beloat and Cemetery Roads. This point is the southwest corner of Section 4, Township 1 south, Range 3 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 843.55
28	A brass cap in a hand hole in the intersection of Beloat and Watson Roads. This point is the southwest corner of Section 3, Township 1 south, Range 3 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 847.67
29	A BLM brass cap on a 2" pipe. This point is the northeast corner of Section 21, Township 1 south, Range 3 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 958.91
30	A brass cap in a hand hole in the intersection of Beloat and Rainbow Roads. This point is the northeast corner of Section 10, Township 1 south, Range 3 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 856.82
31	A brass cap in a hand hole in the intersection of Beloat and Dean Roads. This point is the northeast corner of Section 11, Township 1 south, Range 3 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 859.05

32	A brass cap in the intersection of Narramore and Dean Roads. This point is the northeast corner of Section 23, Township 1 south, Range 3 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 900.82
33	A brass cap in the intersection of Narramore and Airport Roads. This point is the northeast corner of Section 24, Township 1 south, Range 3 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 904.25
34	A brass cap in a hand hole in the intersection of Beloat and Tuthill Roads. This point is the south quarter corner of Section 6, Township 1 south, Range 2 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 868.82
35	A brass cap in a hand hole in the intersection of Tuthill and Elliot Roads. This point is the northeast corner of Section 18, Township 1 south, Range 2 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 885.99
36	A brass cap in a hand hole in the intersection of Elliot and Rainbow Valley Roads. This point is the northeast corner of Section 17, Township 1 south, Range 2 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 917.07
37	An Arizona Highway Department brass cap in the center of an irrigation structure headwall, approximately 36 feet southerly of the centerline of State Route 85, and 25 feet easterly of the centerline of Perryville Road. This point is located in the proximity of the southeast corner of Section 33, Township 1 north, Range 2 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 887.63
38	A brass cap on a 2" pipe. This point is the southeast corner of Section 3, Township 1 south, Range 2 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 945.73
39	An Arizona Highway Department brass cap in the center of an irrigation structure headwall, approximately 25 feet southerly of the centerline of State Route 85, and 100 feet easterly of the centerline of Cotton Lane. This point is approximately 700 feet south and 100 feet east of the northwest corner of Section 25, Township 1 north, Range 2 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 909.14
40	An Arizona Highway Department brass cap in the center of a culvert headwall, located approximately 25 feet southerly of the centerline of State Route 85, and 500 feet easterly of the north-south mid-section line of Section 25, Township 1 north, Range 2 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 905.44

41	An Arizona Highway Department brass cap in the center of a culvert headwall, located approximately 25 feet southerly of the centerline of State Route 85, and 500 feet easterly of the north-south mid-section line of Section 19, Township 1 north, Range 1 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 913.48
42	A brass cap flush with pavement on the west edge of Estrella Parkway at the intersection of Vineyard Road. This point is approximately one quarter of a mile south of the northeast corner of Section 31, Township 1 north, Range 1 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 916.49
43	A brass cap in a hand hole at the intersection of Vineyard and Bullard Roads. This point is approximately 2100 feet southerly of the northwest corner of Section 33, Township 1 north, Range 1 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 920.73
44	A brass cap in a hand hole in Litchfield Road and one-half mile north of Broadway Road. This point is the west quarter corner of Section 22, Township 1 north, Range 1 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 953.32
45	A brass cap in a hand hole at the intersection of Dysart Road and Southern Avenue. This point is the northwest corner of Section 35, Township 1 north, Range 1 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 929.24
46	A brass cap in a hand hole at the intersection of El Mirage Road and Southern Avenue. This point is the northeast corner of Section 35, Township 1 north, Range 1 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 935.63
47	A Maricopa County Highway Department brass cap in a hand hole at the intersection of Southern and 115th Avenues. This point is the northeast corner of Section 36, Township 1 north, Range 1 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 943.62
48	A Maricopa County brass cap in a hand hole located one half mile south of the intersection of Southern and 115th Avenues. This point is the east quarter corner of Section 36, Township 1 north, Range 1 west of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 930.75
49	A brass cap in a hand hole at the intersection of Southern and 107th Avenues. This point is the southeast corner of Section 30, Township 1 north, Range 1 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 952.31
50	A Maricopa County brass cap in a hand hole in the intersection of Southern and 99th Avenues. This point is the southeast corner of Section 29, Township 1 north, Range 1 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 960.72

51	A Gila Indian Reservation brass cap flush with the pavement at the intersection of Baseline Road and 91st Avenue (south). This point is the northeast corner of Section 4, Township 1 south, Range 1 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 969.29
52	A Maricopa County brass cap in a hand hole in the intersection of Broadway Road and 91st Avenue. This point is the southwest corner of Section 22, Township 1 north, Range 1 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 983.21
53	A brass cap in a hand hole at the intersection of Broadway Road and 83rd Avenue (north). This point is the southeast corner of Section 22, Township 1 north, Range 1 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 985.37
54	A Gila Indian Reservation brass cap flush with the pavement at the intersection of Baseline Road and 83rd Avenue (south). This point is the northeast corner of Section 3, Township 1 south, Range 1 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 977.49
55	A Maricopa County brass cap in a hand hole in the intersection of Southern and 75th Avenues. This point is the northeast corner of Section 35, Township 1 north, Range 1 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 982.10
56	A brass cap in a hand hole at the intersection of Broadway Road and 75th Avenue. This point is the southeast corner of Section 26, Township 1 north, Range 1 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 994.70
57	A Maricopa County brass cap in a hand hole in the intersection of Broadway Road and 67th Avenue. This point is the northeast corner of Section 25, Township 1 north, Range 1 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1004.62
58	A Maricopa County Engineering brass cap in a hand hole in the intersection of Southern and 67th Avenues. This point is the northeast corner of Section 36, Township 1 north, Range 1 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 995.66
59	A steel rod in concrete in the intersection of Baseline Road and 59th Avenue (north). This point is the southeast corner of Section 31, Township 1 north, Range 2 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1001.40
60	A Maricopa County brass cap in a hand hole in the intersection of Broadway Road and 59th Avenue. This point is the northeast corner of Section 30, Township 1 north, Range 2 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1008.01

61	A brass cap in a hand hole at the intersection of Lower Buckeye Road and 51st Avenue. This point is the northeast corner of Section 20, Township 1 north, Range 2 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1023.48
62	A brass cap in a hand hole at the intersection of Southern and 51st Avenues. This point is the northeast corner of Section 32, Township 1 north, Range 2 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1012.35
63	A brass cap in a hand hole at the intersection of Southern and 43rd Avenues. This point is the northeast corner of Section 33, Township 1 north, Range 2 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1020.50
64	A brass cap in a hand hole at the intersection of Lower Buckeye Road and 43rd Avenue. This point is the northeast corner of Section 21, Township 1 north, Range 2 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1029.81
65	A City of Phoenix brass cap in a hand hole at the intersection of Lower Buckeye Road and 35th Avenue. This point is the northeast corner of Section 22, Township 1 north, Range 2 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1038.56
66	A brass cap in a hand hole at the intersection of Broadway Road and 35th Avenue. This point is the northeast corner of Section 27, Township 1 north, Range 2 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1035.26
67	A City of Phoenix brass cap in a hand hole at the intersection of Lower Buckeye Road and 27th Avenue. This point is the northeast corner of Section 23, Township 1 north, Range 2 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1047.72
68	A City of Phoenix brass cap flush with the pavement in the intersection of West Hilton and 19th Avenues. This point is located approximately 550 feet south of the east quarter corner of Section 13, Township 1 north, Range 2 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1059.71
69	A brass cap in a hand hole at the intersection of Broadway Road and 19th Avenue. This point is the northeast corner of Section 25, Township 1 north, Range 2 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1053.10
70	An Arizona Highway Department brass cap in a hand hole in the intersection of Broadway Road and 7th Avenue. This point is the northeast corner of Section 30, Township 1 north, Range 3 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1066.97

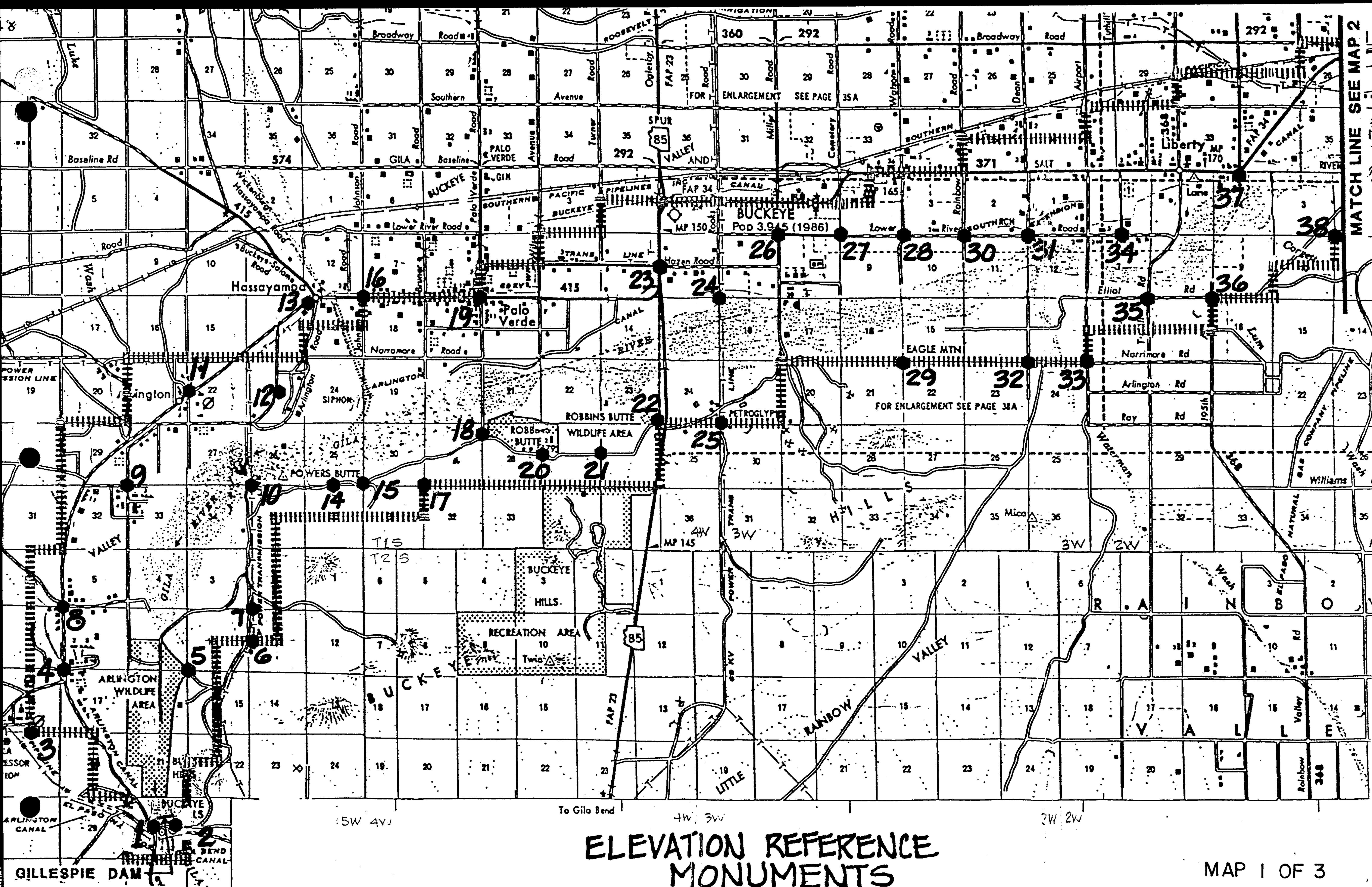
71	A brass cap in a hand hole at the intersection of Broadway Road and 7th Street. This point is the northeast corner of Section 29, Township 1 north, Range 3 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1076.65
72	A City of Phoenix brass cap in a hand hole in the intersection of Broadway Road and 16th Street. This point is the northeast corner of Section 28, Township 1 north, Range 3 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1088.56
73	A City of Phoenix brass cap in a hand hole in the intersection of Broadway Road and 24th Street. This point is the northeast corner of Section 27, Township 1 north, Range 3 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1100.95
74	A brass cap in a hand hole at the intersection of University Drive and 24th Street. This point is located approximately 750 feet north of the southeast corner of Section 15, Township 1 north, Range 3 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1196.11
75	A brass cap in a hand hole at the intersection of Buckeye Road and 24th Street. This point is the northeast corner of the Section 15, Township 1 north, Range 3 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1103.27
76	A City of Phoenix brass cap flush with the pavement in the parking lot of the Airport Operation Building at the east end of Terminal Building Two of Sky Harbor Airport. This point is the northeast corner of Section 14, Township 1 north, Range 3 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1117.01
77	A City of Phoenix brass cap in a hand hole in the intersection of Broadway Road and 32nd Street. This point is the northeast corner of Section 26, Township 1 north, Range 3 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1112.04
78	A City of Phoenix brass cap in a hand hole in the intersection of University Drive and 38th Street. This point is one quarter of a mile west of the northeast corner of Section 24, Township 1 north, Range 3 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1114.09
79	A City of Phoenix brass cap flush with the pavement in the intersection of Broadway Road and 40th Street. This point is the northeast corner of Section 25, Township 1 north, Range 3 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1127.34
80	An Arizona Highway Department brass cap in concrete at the right of way line at the southeast corner of the intersection of Broadway Road and 48th Street. The center of the street intersection is at the northeast corner of Section 30, Township 1 north, Range 4 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1141.59

81	A brass cap in a hand hole at the center of 48th Street approximately 50 feet north of the Southern Pacific RailRoad. This point is the east quarter corner of Section 7, Township 1 north, Range 4 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1153.55
82	A brass cap in a hand hole in the intersection of Washington Boulevard and Priest Drive. This point is approximately 1700 feet south and 1400 feet east of the northwest corner of Section 9, Township 1 north, Range 4 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1171.26
83	A brass cap in a hand hole in the intersection of University and Priest Drives. This point is the northeast corner of Section 20, Township 1 north, Range 4 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1145.44
84	A brass cap in a hand hole for the centerline of the intersection of University Drive and Farmer Avenue. This point is located approximately 150 feet west of the northeast corner of Section 21, Township 1 north, Range 4 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1159.96
85	A brass cap in a hand hole in the intersection of University Drive and Rural Road. This point is the northeast corner of Section 22, Township 1 north, Range 4 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1166.35
86	A brass cap in a hand hole in the intersection of Scottsdale and Weber Roads. This point is the east quarter corner of Section 10, Township 1 north, Range 4 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1187.17
87	A brass cap in a hand hole in the intersection of Hayden and Weber Roads. This point is the east quarter corner of Section 11, Township 1 north, Range 4 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1180.62
88	A brass cap in a hand hole in the intersection of University and McClintock Drives. This point is the northeast corner of Section 23, Township 1 north, Range 4 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1174.40
89	A brass cap in a hand hole in the intersection of University Drive and Smith Road. This point is the south quarter corner of Section 13, Township 1 north, Range 4 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1181.73
90	A brass cap in a hand hole in the intersection of McKellips and Pima Roads. This point is the southwest corner of Section 6, Township 1 north, Range 5 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1190.35

91	A brass cap in a hand hole in the intersection of Evergreen Road and University Drive. This point is the south quarter corner of Section 18, Township 1 north, Range 5 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1191.88
92	A brass cap in a hand hole in the intersection of McKellips and Dobson Roads. This point is the northeast corner of Section 7, Township 1 north, Range 5 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1196.26
93	A brass cap in a hand hole at the center line intersection of 8th and Longmore Streets. This point is approximately 100 feet east of the center of Section 17, Township 1 north, Range 5 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1214.57
94	A brass cap in a hand hole in the intersection of McLellan and Alma School Roads. This point is the one quarter corner between Sections 8 and 9 of Township 1 north, Range 5 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1204.35
95	A brass cap in a hand hole in the intersection of Alma School and McDowell Roads. This point is the southeast corner of Section 32, Township 2 north, Range 5 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1218.72
96	A brass cap in a hand hole in the intersection of Thomas and Country Club Roads. This point is the northeast corner of Section 33, Township 2 north, Range 5 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1244.28
97	A brass cap in a hand hole in the intersection of Center Street and McKellips Road. This point is the north quarter corner of Section 10, Township 1 north, Range 5 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1219.19
98	A brass cap in a hand hole in the intersection of Mesa Drive and McKellips Road. This point is the northeast corner of Section 10, Township 1 north, Range 5 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1224.71
99	A brass cap in a hand hole in the intersection of Mesa Drive and Osborn Road. This point is the east quarter corner of Section 27, Township 2 north, Range 5 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1261.69
100	A US Army Corps of Engineers brass cap set in concrete, 6 inches above the ground. The brass cap is stamped "TT-AB1 1960 Army Map Service". This point is located near the southerly right of way line of State Highway 87 and is approximately 30 feet northwest of the southeast corner of Section 23, Township 2 north, Range 5 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1275.03

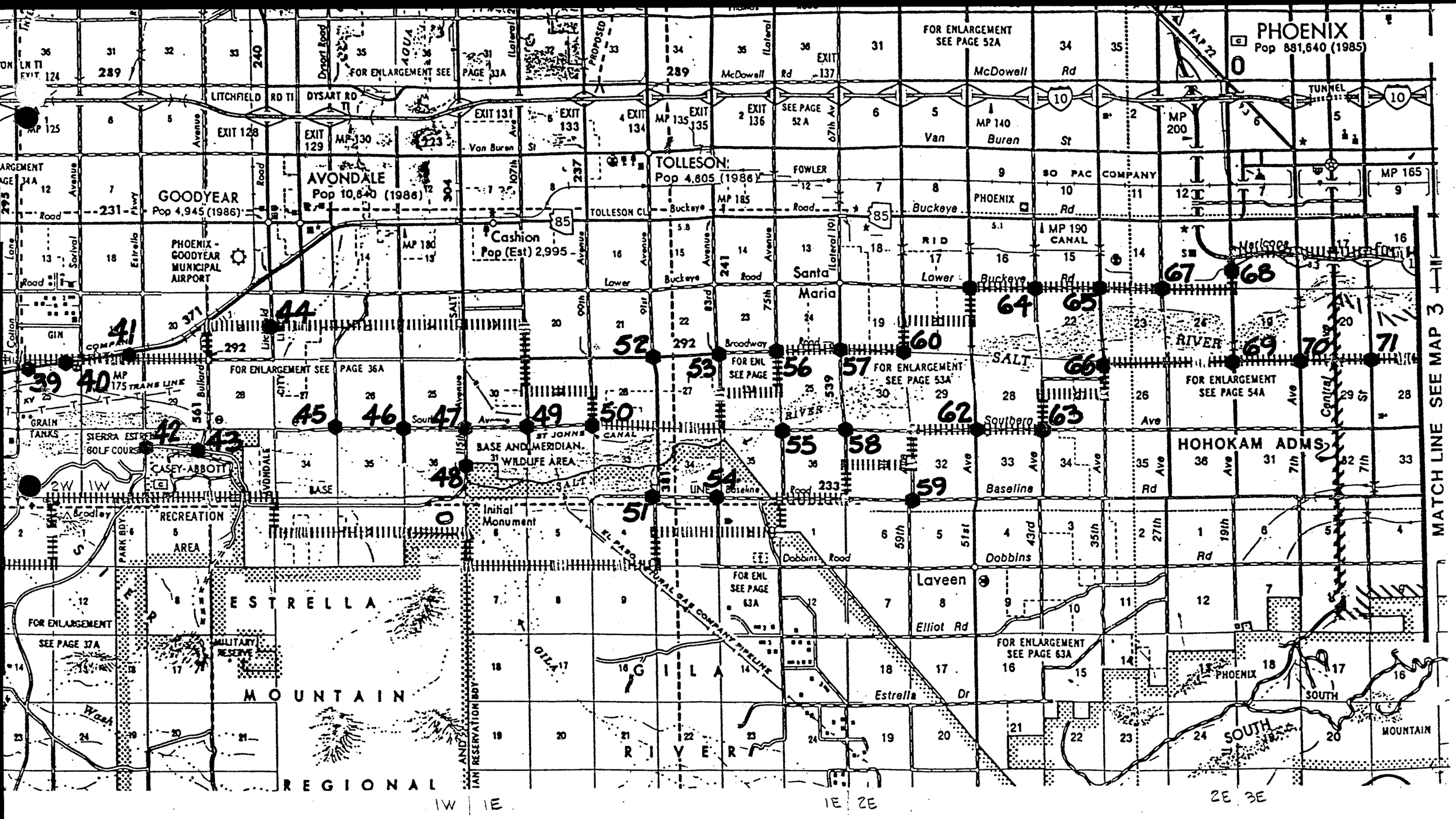
101	A brass cap in a hand hole in the intersection of Thomas and Gilbert Roads. This point is the northeast corner of Section 36, Township 2 north, Range 5 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1253.73
102	A brass cap in a hand hole in the intersection of McDowell and Gilbert Roads. This point is the northeast corner of Section 1, Township 1 north, Range 5 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1254.89
103	A brass cap in a hand hole in the intersection of Lindsay and McDowell Roads. This point is the southeast corner of Section 31, Township 2 north, Range 6 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1320.28
104	A GLO brass cap on a 1½" iron pipe for the northeast corner of Section 30, Township 2 north, Range 6 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1262.37
105	A GLO brass cap in the intersection of a dirt road north and south (Val Vista Drive) and a dirt road to the west (Indian School Road). This point is the northeast corner of Section 29, Township 2 north, Range 6 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1274.66
106	A US Coast & Geodetic brass cap set in concrete stamped "Val Vista 1935". This point is located approximately 350 feet east and 350 feet north of the west quarter corner of Section 33, Township 2 north, Range 6 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1347.44
107	A GLO meander corner brass cap stamped "∢ PT. 34 SECT 27 1934". This point is a meander corner on the south side of Salt River approximately 600 feet east and 2200 feet north of the southwest corner of Section 27, Township 2 north, Range 6 east of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1304.19
108	A GLO brass cap flush with the ground. This point is the northeast corner of Section 27, Township 2 north, Range 6 east, of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1312.54
109	A GLO brass cap on an iron pipe. This point is the northeast corner of Section 22, Township 2 north, Range 6 east, of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1303.21
110	A BLM brass cap witness post on the south bank of the Salt River approximately 230 feet east of the northwest corner of Section 24, Township 2 north, Range 6 east, of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1308.79
111	A GLO brass cap 5" above the ground on a 1" iron post. This point is the northeast corner of Section 13, Township 2 north, Range 6 east, of the Gila and Salt River base and meridian, Maricopa County, Arizona.	Elevation: 1326.43

112 A GLO brass cap 6" above the ground on an iron post. This point is the northeast corner of Section 24, Township 2 north, Range 6 east, of the Gila and Salt River base and meridian, Maricopa County, Arizona. Elevation: 1391.03

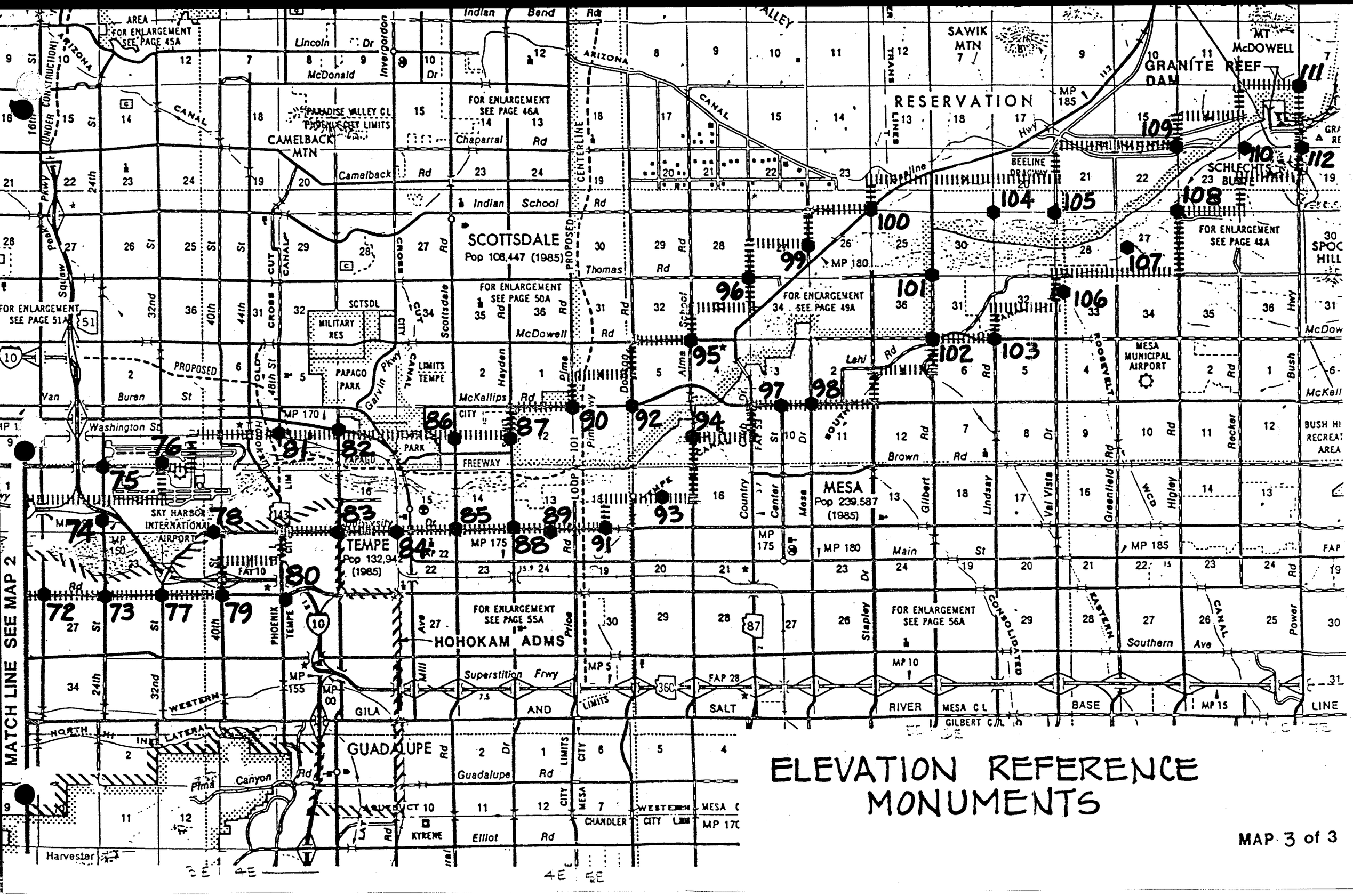


ELEVATION REFERENCE MONUMENTS

MAP 1 OF 3



ELEVATION REFERENCE MONUMENTS


MATCH LINE SEE MAP 2
SCOTTSDALE
Pop 108,447 (1985)
TEMPE
Pop 132,942 (1985)
MESA
Pop 239,587 (1985)
RESERVATION
GRANITE REEF DAM
SAWIK MTN
MT McDOWELL
CAMELBACK MTN
SKY HARBOR INTERNATIONAL AIRPORT
MESA MUNICIPAL AIRPORT
HOHOKAM ADMS
GUADALUPE
PAPAGO PARK
MILITARY RES
FOR ENLARGEMENT SEE PAGE 45A
FOR ENLARGEMENT SEE PAGE 46A
FOR ENLARGEMENT SEE PAGE 48A
FOR ENLARGEMENT SEE PAGE 49A
FOR ENLARGEMENT SEE PAGE 50A
FOR ENLARGEMENT SEE PAGE 51A
FOR ENLARGEMENT SEE PAGE 55A
FOR ENLARGEMENT SEE PAGE 56A
PARADISE VALLEY CL
PHOENIX CITY LIMITS
SCTSDL
TEMPE CITY LIMITS
MESA CL
GILBERT CL
Indian Bend Rd
Lincoln Dr
McDonald
Camelback Rd
Indian School Rd
Chaparral Rd
Thomas Rd
McDowell Rd
McKellips Rd
Lehi Rd
Brown Rd
Main St
Southern Ave
Superstition Frwy
Elliot Rd
Guadalupe Rd
Pima Canyon Rd
Harvester
Van Buren St
Washington St
Squaw Peak Pkwy
Invergordon
Scottsdale Rd
Hayden Rd
Alma School
Dobson
Gilbert
Lindsay
Val Vista
Greenfield
Higley
Power
Stapley
Price
Mill
Rural
Country Club
Center
Mesa
Roosevelt
Bush
Recker
Hoover
Galvin Pkwy
Pima Pkwy
Loop 101
Loop 202
Loop 143
Loop 10
Loop 60
Loop 87
Loop 360
Loop 202
ARIZONA CANAL
CROSS CUT CANAL
OLD CROSS CUT CANAL
WESTERN CANAL
NORTH INL LATERAL
SOUTH CANAL
EASTERN CANAL
CONSOLIDATED CANAL
CENTERLINE
PROPOSED
UNDER CONSTRUCTION
BEELINE DRIVEWAY
BUSH HI RECREAT AREA
SPOC HILL
MP 150
MP 155
MP 160
MP 170
MP 175
MP 180
MP 185
MP 5
MP 10
MP 15
FAP 10
FAP 28
FAP 22
FAP 31
FAP 34
FREEWAY
CITY LIMITS
MESA CITY LIMITS
CHANDLER
WESTERN CITY LIMIT
RIVER
BASE
LINE
ELEVATION REFERENCE MONUMENTS
MAP 3 of 3

1341

SALT - GILA

VERTICAL

BK. 61

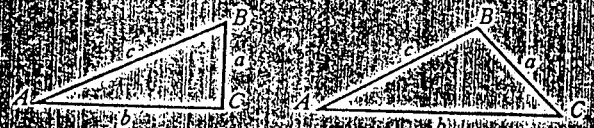
LIETZ
SINCE 1882

LIETZ
SINCE 1882

ECONOMY FIELD BOOK

No. 8152-05

FORMULAE FOR SOLVING RIGHT TRIANGLES



$\text{Sin } A = \frac{a}{c} = \text{Cos } B$ $\quad$ $\text{Cot } A = \frac{b}{a} = \text{Tan } B$

$\text{Cos } A = \frac{b}{c} = \text{Sin } B$ $\quad$ $\text{Sec } A = \frac{c}{b} = \text{Cosec } B$

$\text{Tan } A = \frac{a}{b} = \text{Cot } B$ $\quad$ $\text{Cosec } A = \frac{c}{a} = \text{Sec } B$

Given	Required	Solution
A, c	B, a, b	$B = 90° - A;\ a = c \sin A;\ b = c \cos A$
A, b	B, a, c	$B = 90° - A;\ a = b \tan A;\ c = \frac{b}{\cos A}$
A, a	B, b, c	$B = 90° - A;\ b = a \cot A;\ c = \frac{a}{\sin A}$
a, c	A, B, b	$\sin A = \frac{a}{c};\ \cos B = \frac{a}{c};\ b = \sqrt{(c+a)(c-a)}$
a, b	A, B, c	$\tan A = \frac{a}{b};\ \cot B = \frac{a}{b};\ c = \sqrt{a^2+b^2}$

FORMULAE FOR SOLVING OBLIQUE TRIANGLES

Given	Required	Solution
A, a, b	B, c	$\sin B = \frac{b \sin A}{a};\ c = \frac{a \sin C}{\sin A}$
A, B, a	b	$b = \frac{a \sin B}{\sin A}$
a, b, C	A, c	$A + B = 180° - C;\ c = \frac{a \sin C}{\sin A}$
a, b, c	Area	side $= \frac{a+b+c}{2};\ \text{area} = \sqrt{s(s-a)(s-b)(s-c)}$
A, b, c	Area	$\text{area} = \frac{bc \sin A}{2}$
A, B, C, a	Area	$\text{area} = \frac{a^2 \sin B \sin C}{2 \sin A}$

MADE IN U.S.A.

TITLE PAGE

SALT - GILA VERTICAL

INDEX PAGE

DESCRIPTION	PAGE
LEVEL PEG	1
LEVEL LOOP G-1A	2-6
LEVEL LOOP G-1B	7-12
LEVEL LOOP G-1C	13-16
LEVEL LOOP G-1D	17-21
LEVEL LOOP G-1E	22-26
LEVEL LOOP G-1F	27
LEVEL LOOP G-1G	28
LEVEL LOOP G-1H	29-30
LEVEL LOOP G-1I	31
	32-35

OCT 16 .91

D. ARCHER
S. CROY

LEVEL PEG

4.804 5.418

4.52 5.133

.283 .285

.002 ERROR
NOT ADJUSTED

10/16/91

D. ARCHER
S. CROY

	+	HI	−	ELEV	ADJ. EL.	DESCRIPTION
						B/C IN H.H. 115TH AVE & SOUTHERN INT. FROM JAYKIN LOOP BK PG
	5.95					
			5.74			TP ROCK
	5.04					
			4.65			TP ROCK
	5.06					
			4.64			TP ROCK
	6.09					
			4.49			TP ROCK
	4.88					
			3.55			TP ROCK
	4.96					
V-101			3.71			B/C IN H.H. 115TH AVE & BROADWAY
	4.07					
* S.S			3.65			SIDE SHOT; A/C TOP H.H @ V-101
			6.62			TP ROCK
	4.33					
			6.66			TP ROCK
	4.74					
			6.03			TP ROCK

	+	HI	−	ELEV	ADJ. EL.	DESCRIPTION
	4.44					
			5.60			TP ROCK
	4.17					
			5.75			TP ROCK
	5.07					
			5.75			TP ROCK
	4.83					
TBM		*	4.36			B/C IN H.H JNT. EL MIRAGE & BROADWAY (SEC. COR)
	5.51					
			4.63			TP ROCK
	5.82					
			3.25			TP ROCK
	8.19					
			1.17			TP ROCK
	9.58					
H&V-102			7.42			B/C IN H.H JNT EL MIRAGE & ELWOOD ST.
	9.97					
* SS.			9.45			SIDE SHOT; A/C TOP H.H @ H&V-102
			2.85			TP ROCK
	6.64					
			1.19			TP ROCK
	3.58					
			10.22			TP ROCK
	7.55					

	+	HI	−	ELEV	ADJ. EL	DESCRIPTION
			8.89			TP ROCK
	7.84					
			4.93			TP ROCK
	3.38					
TP40 TBM		*	9.20		951.72	TBM: SET 1/2" R.BW/FLAG @ IRON POST WEST SIDE DYSART & ELLWOOD ST. INT.
	*		*			
	5.61					
			4.82			TP ROCK
	3.13					
			5.71			TP ROCK
	2.38					
			10.67			TP ROCK
	1.43					
			7.94			TP ROCK
	4.49					
			5.86			TP ROCK
	4.58					
			5.71			TP ROCK
	4.25					
			6.29			TP ROCK
	4.12					
			6.48			TP ROCK
	4.46					
			6.30			TP ROCK

	+	HI	−	ELEV	ADJ. EL	DESCRIPTION
	4.81					
			6.24			TP ROCK
	5.24					
			3.85			TP ROCK
	6.45					
TP 87 TBM		*	3.70		929.24	TBM; B/C IN MH @ INT DYSART & SOUTHERN
	6.31					
			4.85			TP ROCK
	5.72					
			5.28			TP ROCK
	4.95					
			4.90			TP ROCK
	5.69					
			4.95			TP ROCK
	5.73					
			4.68			TP ROCK
	5.61					
			4.79			TP ROCK
	5.76					
			4.45			TP ROCK
	5.52					
			4.73			TP ROCK
	5.42					
H&V-184			5.69			H&V-184: B/C IN HH @ INT ELMIRAGE & SOUTHERN

	+	HI	−	ELEV	ADJ. EL	DESCRIPTION
						⑥
	6.19					
* S.S.			5.82			SUCE: NOTI: TOP OF H.H A/C @ H&V-184
			4.77			TP ROCK
	5.57					
			4.80			TP ROCK
	5.70					
			4.69			TP ROCK
	5.25					
			4.44			TP ROCK
	5.63					
			4.62			TP ROCK
	5.48					
			4.84			TP ROCK
	5.67					
			4.73			TP ROCK
	5.59					
			5.01			TP ROCK
	5.55					
			4.81			TP ROCK
	5.51					
			5.44			VIN POB: -.04 VIN.
			END	TINS		LOOP
	.30		.34			
		-04 DIFF	IN ± 7.0	MILE LOOP		

	+	HI	−	ELEV	ADJ. EL.
T.B.M.					
	*		*		
	5.74				
			6.05		
	4.23				
			4.91		
	3.00				
			7.40		
	5.04				
			5.48		
	2.90				
			5.71		
	3.58				
			4.69		
	5.54				
H&V-108			2.34		
	4.13				
S.S.		*	3.71		
			5.79		

7

10/18/91

SUNNY, HOT, 100°

D. ARCHER
S. CROY
C. Mikelich

DESCRIPTION

BOULDER IN HEADWALL S/E COR. COTTON LANE & M.C. 85 FROM LOOP 6-2C
BK. 1342 PG. 12

T.P. Rock

T.P. Rock

T.P. Rock

T.P. Rock

T.P. Hub (in Field)

T.P. Hub (in Field)

"Iron Pipe in Pot Hole – "T" Intersection Citrus Broad Way

Side-shot – Paving @ H&V Target (same as above)

T.P. Nail

	+	HI	−	ELEV	ADJ. EL	DESCRIPTION
	5.72					
			8.68			T.P. Rock
	5.80					
			5.07			T.P. Rock
	5.84					
			5.35			T.P. Rock
	7.37					
			9.07			T.P. Rock
	4.75					
V-109			8.82			V panel # 109 (PARAKEET HOUSE)
	8.58					
T.B.M.		☆	6.37			SIDESHOT - HEADWALL ± 300' SOUTH OF PANEL # V-109
			5.83			T.P. Nail
	5.31					
			5.08			T.P. Nail
	4.91					
			6.15			T.P. Rock
	5.00					
			5.16			T.P. Nail
	5.32					
			4.61			T.P. Nail
	5.27					
			5.37			T.P. Nail

	+	HI	−	ELEV	ADJ. EL	DESCRIPTION
	5.06					
			6.30			T.P. w/Nail
	6.09					
			4.89			T.P. w/Nail
	4.73					
H&V-111			1.25			Alum. Cap Flush w/paving H&V # 111
	1.53					
			4.02			T.P. Rock
	3.28					
			12.00			T.P. Rock
	2.83					
H&V-112			7.83			1" Iron Pipe H&V # 112 (Southern & Jack Rabbit)
	4.52					
S.S.		*	3.90			SIDESHOT - Ground next to Iron Pipe
			7.10			T.P. Rock
	4.66					
			6.14			T.P. Rock
	4.17					
			5.04			T.P. Rock
	5.13					
			4.17			T.P. Rock

T.B.M.	+	HI	−	ELEV	ADJ. EL	DESCRIPTION
	5.79					
P			6.05			T.P. Rock
	4.35					
T.B.M.		☆	3.81			Top Bolt - Signal Pole S.W. Cor. Jack Rabbit Hwy 85
	5.10					
P			5.40			Rock
	6.17					
P			4.37			Rock
	5.85					
P			4.44			Rock
	6.00					
P			4.54			Rock
	6.18					
P			4.10			Rock
	10.05					
P			3.68			Rock
	4.22					
P			6.13			Rock
	5.06					
P			4.14			Rock
	6.56					
P			4.93			Rock

	+	HI	−	ELEV	ADJ. EL	DESCRIPTION
	5.56					
T.B.M		☆	5.67			PK. NAIL E. SIDE M.C. 85, ± 3/4 mi. NE of Perryville Rd
	5.80					
P			4.96			Rock
	6.42					
P			4.75			Rock
	5.31					
P			4.47			Rock
	5.49					
P			5.86			Rock
	5.28					
P			5.56			Rock
	6.55					
P			2.71			Rock
	5.89					
T.B.M.		S.S. ☆	4.27			(SIDESHOT) CHS. "X" W. HEADWALL INT. OF M.C. 85 & BUCKEYE CANAL.
			*			
			*			
P			6.27			Rock
	4.75					
P			5.34			Rock
	5.84					
P			6.03			Rock
	6.49					

T.B.M	+	H.I.	-	ELEV.	ADJ. EL	DESCRIPTION
P			4.17			Rock
	7.04					
P			2.70			Rock
	7.14					
P			3.03			Rock
	4.55					
P			5.72			Rock
	7.46					
T.B.M.		☆	5.91			√-IN B.O.B.
			——— END THIS			LOOP ———
		.08 DIFF IN ± 8 MILE LOOP				
	294.96		295.04			

	+	HI	−	ELEV	ADJ EL.
	5.05				
			3.69		
	8.54				
			5.96		
	5.00				
H&V 113			5.73		
	5.31				
* S.S.		*	4.86		
			6.18		
	5.04				
			6.51		
	6.62				
TBM		☆	6.61		
	4.41				
			5.57		
	4.97				
			5.25		
	9.76				
			0.63		
	8.06				

(13)

10/21/91 — D. ARCHER

PTLY CLDY, BREEZEY 95° — S. CROY

DESCRIPTION

TOP BOLT SIGNAL POLE S/W COR. NWY 85 & JACKRABBIT FROM LOOP 6-18 PG. 10 OF THIS BK.

TP ROCK

TP ROCK

SPIKE NAIL IN N W ℄ OF JACKRABBIT ±1200 S NWY 85

TOP OF N/W A/C @ H&V-113

TP ROCK

TP ROCK

TP NAIL & SHINER; BELOAT RD & JACKRABBIT

TP ROCK

TP ROCK

TP ROCK

	+	HI	-	ELEV	ADJ. EL	DESCRIPTION
			3.18			TP ROCK
	5.46					
			8.19			TP ROCK
	2.61					
			7.91			TP ROCK
	5.77					
TBM		☆	3.27			TBM - B/C IN H.H @ INT OF TOTHILL & ELLIOT
	3.87					
			1.43			TP ROCK
	7.18					
			0.40			TP ROCK
	11.34					
			2.56			TP ROCK
	8.09					
			2.81			TP ROCK
	7.83					
			2.65			TP ROCK
	6.73					
H&V-173			4.11			B/C IN H.H. @ INT OF ELLIOT & RAINBOW VALLEY RD
	3.91					LOOP BACK
*S.S.		*	3.50			TOP N/W A/C @ H&V-173
			7.24			TP ROCK
	2.42					
			7.57			TP ROCK

	+	HI	−	ELEV	ADJ. EL	DESCRIPTION
	2.15					
			8.10			TP ROCK
	2.69					
			10.26			TP ROCK
	0.45					
			5.78			TP ROCK
	1.04					
			8.47			TP NAIL IN POWER POLE
	8.26					
✓S.S ✳		✳	4.58			B/C IN W/H @ INT OF ELLIOT & TUTHILL RD
			7.59			TP ROCK
	6.62					
			2.07			TP ROCK
	8.57					
			4.32			TP ROCK
	4.51					
			8.71			TP ROCK
	2.19					
			10.45			TP ROCK
	3.69					
			5.68			TP ROCK
	5.66					
			4.57			TP ROCK
	6.47					

	+	HI	−	ELEV	ADJ. EL	DESCRIPTION	
							(16)
✓* S.S.		*	5.97			HAIL & SHINER ; BELOAT RD & JACKRABBIT	
			4.74			TP ROCK	
	5.73						
			5.04			TP ROCK	
	5.03						
			5.49			TP ROCK	
	5.90						
			5.07			TP ROCK	
	5.83						
			5.31			TP ROCK	
	5.84						
			5.08			TP ROCK	
	5.15						
			8.44			TP ROCK	
	4.52						
			5.74			✓ IN P.O.B.	
			END		THIS	LOOP	
	218.29		218.34				
		.07 DIFF	IN 6.5 MILE LOOP				

(1)

10/22/91 — D. ARCHER

CLEAR, SUNNY 95° — S. CROY

	+	HI	−	ELEV	ADJ. EL	DESCRIPTION
H4V-125						PK NAIL @ JNT OF WILSON & OLD U.S. 80
						FROM LOOP 6-3B BK. 1343 PG. 9
	6.13					
			4.29			TP ROCK
	6.74					
			2.24			TP ROCK
	8.94					
			6.27			TP ROCK
	5.79					
			3.95			TP ROCK
	7.87					
			5.06			TP ROCK
	5.05					
TBM		★	4.76			TBM - B/C IN N/W @ JNT OF PALO VERDE & OLD U.S. 80
	4.84					
			5.74			TP ROCK
	5.40					
			4.18			TP ROCK
	6.34					
			5.86			TP ROCK
	4.53					
			5.65			TP ROCK

	+	HI	−	ELEV	ADJ. EL	DESCRIPTION
	5.37					
			5.14			TP ROCK
	7.58					
TBM		✱	1.56			WEST COR. HEADWALL NO. SIDE OF ROAD @ OLD U.S. 80 & BRUNER RD
	✱		✱			
	4.61					
			8.44			TP ROCK
	4.55					
			3.79			TP ROCK
	7.02					
			0.76			TP ROCK
	6.84					
			14.16			TP ROCK
	1.03					
			9.83			TP ROCK
	3.71					
			6.07			TP ROCK
	5.48					
H&V-129			5.76			1' OP IN H.H. @ INT OF. 307th AVE & OLD U.S. 80
	5.71					
✱SS		✱	4.75			TOP OF H.H ON A/C @ H&V-129
			4.37			TP ROCK
	6.20					
			4.28			TP ROCK

	+	HI	−	ELEV	ADJ. EL	DESCRIPTION
	5.18					
			5.51			TP ROCK
	6.40					
			0.12			TP ROCK
	3.99					
			7.53			TP ROCK
	7.89					
TBM		☆	2.57			SET NAIL N/W COR. E.P. SALOME NWY & OLD U.S. 80
	2.47					— LOOP BACK —
			6.65			TP ROCK
	6.46					
			5.00			TP ROCK
	1.55					
			6.92			TP ROCK
	5.46					
			5.666			TP ROCK
	5.21					
			6.43			TP ROCK
	4.59					
			5.67			TP ROCK
	5.29					
			4.76			TP ROCK
	7.48					
			1.49			TP ROCK

+	HI	−	ELEV	ADJ. EL	DESCRIPTION
9.25					
		0.60			TP ROCK
11.55					
		9.96			TP ROCK
1.81					
		7.37			TP ROCK
4.62					
		5.47			TP ROCK
8.05					
	☆	3.29			TP ✓ TBm @ BRONER & HWY 80
2.04					
		8.22			TP ROCK
5.07					
		5.16			TP ROCK
5.21					
		4.41			TP ROCK
6.28					
		5.77			TP ROCK
4.55					
		6.97			TP ROCK
5.53					
		5.36			TP ROCK
6.57					
	☆	5.35			TP ✓ - TBm @ PALO VERDE & HWY 80
~~[illegible]~~		~~238.40~~			

+	HI	-	ELEV	ADJ. EL	DESCRIPTION
5.03					
		5.51			TP ROCK
5.32					
		7.50			TP ROCK
3.52					
		5.92			TP ROCK
5.43					
		5.22			TP ROCK
1.79					
		7.95			TP ROCK
3.95					
		5.96			TP ROCK
4.80					
		5.76			✓ in POB @ WILSON & HWY 80
	END		THIS		LOOP
282.10		282.22			
	.12 DIFF	IN 7.7	MILE LOOP		

10/23/91

D ARCHER
S CROY

	+	HI	−	ELEV	ADJ. EL	DESCRIPTION
						T.B.M. (Nail) @ Hassayampa Intersection (Salome Hwy. & Old U.S. 80) Loop 6+10 Pg. 19 This BK.
	8.18					
*		S.S	*6.63			*U.S.G.S. Bt. Ess 1'Q-10" Elev. 849.237 ±400 West of Intersection - South side Road
			3.27			T.P. Rock
	14.96					
			3.45			T.P. Rock
	21.77					
			0.49			T.P. Rock
	16.77					
			0.24			T.P. Rock
	21.98					
			1.08			T.P. Rock
	13.20					
H&V-130		S.S.	5.55			H&V #130 C.P.S. @ Old Hwy 80 & 319th Ave. on Exist. Panel
			6.34			T.P. Rock
	2.49					
			10.52			T.P. Rock
	3.17					
			16.05			T.P. Rock

	+	H.I.	−	ELEV.	ADJ. EL	DESCRIPTION
	1.19					
			10.72			T.P. Rock
	6.91					
			10.13			T.P. Rock
	1.46					
			3.86			T.P. Rock
	2.01					
			16.35			T.P. Rock
	5.41					
			7.94			T.P. Rock
	0.84					
			16.39			T.P. Rock
	0.30					
			14.17			T.P. Rock
	0.73					
			20.80			T.P. Rock
	0.09					
			19.25			T.P. Rock
	1.10					
			5.79		.77	T.P. Rock
	5.25					
H&V-132			5.62			H&V # 132 ON Hwy. #80 @ ARLINGTON POST OFFICE
						P.K. NAIL IN INT. @ EXIST. PANEL ON 331ST AV.

	+	H.I.	−	Elev.	ADJ. EL	DESCRIPTION
						H&W #132 RETURN LOOP
	5.81					
*		S.S.	5.76			*E. U.S.G.S. BRASSCAP Z-36" B.M. (±100 North H&W #132)
			5.48			T.P. Rock
	7.82					
			0.98			T.P. Rock
	21.03					
			0.47			T.P. Rock
	22.58					
			0.25			T.P. Rock
	10.19					
			0.35			T.P. Rock
	15.68					
			1.07			T.P. Rock
	7.10					
			5.28			T.P. Rock
	15.51					
			1.67			T.P. Rock
	4.33					
			4.57			T.P. Rock
	10.25					
			3.19			T.P. Rock

	+	H.I.	−	Elev.	ADJ. EL	ID Description
.55 −	4.53					
			2.21			T.P. Rock
	15.53					
			0.36			T.P. Rock
	8.80					
			2.03			T.P. Rock
	9.95					
			5.03			T.P. Rock
	5.69					
			4.36			H&U # 130 OLD Hwy 80 & 310th Ave
	0.32					
			19.20			T.P. Rock
	0.97					
			13.81			T.P. Rock
	0.43					
			12.19			T.P. Rock
	2.57					
			12.63			T.P. Rock
	0.36					
			15.36			T.P. Rock
	4.27					
			11.49			T.P. Rock

+	H.I.	−	GLGN.	ADJ. EL	DESCRIPTION
1.97					
		7.40			W.S.G.S. Brass Cap "Q"
6.44					
		7.99			P.O.B. @ Hassayampa Intersection
END		LEVEL	LOOP		
309.94		309.83			
	.11 DIFF IN 5.7 MILE Loop				

10/28/91 D ARCHER
WINDY, CLEAR, 54° S CROY

	+	HI	−	ELEV	ADJ. EL
TBM					
	7.93				
TP			2.57		
	7.94				
TP			3.15		
	7.57				
V-171			4.50		
	4.21				
T.P.			7.09		
	3.45				
T.P.			7.28		
	2.88				
TBM			9.40		
	———	———	END	THIS	
	31.95		33.99		
		.04' DIFF in 10 mi			

DESCRIPTION

TBM - B/C IN N.H. @ INT OF TUTHILL & ELLIOT RD
FROM LOOP G-1C PG 14 THIS BOOK

ROCK

ROCK

B/C IN N.H. @ "T" INT OF CARVER & TUTHILL
——— LOOP BACK ———

ROCK

ROCK

1/2 IN POB

LOOP ———

NOTE: ✕ .3 FROM B/C IN N.H. @ CARVER & TUTHILL TO TOP OF AC FOR PANEL

+5.76
-5.37

	+	HI	-	ELEV	ADJ. EL
TBM					
	8.73				
TP			3.11		
	8.07				
TP			2.89		
	10.19				
H&V-172			5.73		
	5.44				
S.S.		*	4.91		
T.P.			6.02		
	2.96				
T.P.			8.06		
	2.74				
TBM			8.33		
			FINIS	THIS	
	34.13		34.14		
		.01 DIFF	IN 1.0 mi		

10/28/91 D. ARCHER
WINDY, CLEAR, 56° T. S. CIBOY
"COLD"

DESCRIPTION

H&V-173: B/C IN H.M. @ "T" INT OF ELLIOT & RAINBOW VALLEY RD.
From Loop G-1C Pg. 14 This Book

ROCK

ROCK

B/C IN H.M. @ "T" INT OF RAINBOW VALLEY & CARVER
LOOP BACK

TOP N.N. A/C @ H&V-172
ROCK

ROCK

√+ IN DOB
LOOP

10/28/91 D. ARCHER
WINDY, CLEAR, 60° S. CROY

	+	HI	−	ELEV	ADJ. EL
TBM					
	*		*		
	1.56				
T.P.			10.87		
	4.40				
T.P.			5.29		
	5.89				
T.P.			3.91		
	3.39				
T.P.			6.68		
	3.15				
T.P.			3.74		
	11.18				
V-179			3.32		
	*		*		
	1.90				
T.P.			12.63		
	6.78				
T.P.			3.79		
	7.45				
T.P.			3.70		

DESCRIPTION

B/C IN A.N @ "T" INT OF BULLARD & VINEYARD
ELEV FROM LOOP G-41 BOOK 1344 PG. 26

ROCK

ROCK

ROCK

ROCK

ROCK

B/C FLUSH WEST SIDE E.P @ "T" INT OF
ESTRELLA PARKWAY & VINEYARD
—— LOOP BACK ——

ROCK

ROCK

ROCK

	CON'T +	HI	−	ELEV	ADJ. EL.	DESCRIPTION
	3.98					
T.P.			6.05			ROCK
	5.31					
T.P.			1.91			ROCK
	9.74					
TBM			2.83			V-IN POB (BILLARD & VINEYARD)
	———		END	THIS		LOOP ———
	14.73		14.72			
		.01 DIFF IN		MI LOOP		

(31)

10/28/91 — D ARCHER

WINDY, PTLY CLDY 62° — T S. CROY

	+	HI	−	ELEV	ADJ. EL	DESCRIPTION
TBM						B/C IN N.M @ VINEYARD RD & BULLARD FROM LOOP G-4II BK. 1BHH PG. 26
	0.92					
T.P.			6.76			ROCK
	4.07					
TP			5.84			ROCK
	7.01					
T.P.			1.32			ROCK
	17.70					
H&N-180			2.59			SET PK NAIL ± 225 SO OF CASEY ABBOT & WEST AMPHITHEATER ENTRANCE IN ℄
	*		*			
	0.49					LOOP BACK
TP			19.31			ROCK
	3.08					
TP			3.77			ROCK
	2.77					
TP			8.01			ROCK
	12.75					
TBM			1.19			√ IN POB (BULLARD & VINEYARD)
			END	THIS		LOOP
	48.79		48.79			

FLAT IN ± 1.0 MILE

+	HI	-	ELEV.	ADJ. EL	DESCRIPTION

1341

SALT - GILA
VERTICAL
BK. G-2

LIETZ
SINCE 1882

LIETZ
SINCE 1882

ECONOMY FIELD BOOK

No. 8152-05

FORMULAE FOR SOLVING RIGHT TRIANGLES

$\text{Sin } A = \frac{a}{c} = \text{Cos } B$ | $\text{Cot } A = \frac{b}{a} = \text{Tan } B$

$\text{Cos } A = \frac{b}{c} = \text{Sin } B$ | $\text{Sec } A = \frac{c}{b} = \text{Cosec } B$

$\text{Tan } A = \frac{a}{b} = \text{Cot } B$ | $\text{Cosec } A = \frac{c}{a} = \text{Sec } B$

Given	Required		Solution
A, c	B, a, b	$B = 90° - A$	$a = c \sin A,\ b = c \cos A$
A, b	B, a, c	$B = 90° - A$	$a = b \tan A,\ c = \frac{b}{\cos A}$
A, a	B, b, c	$B = 90° - A$	$b = a \cot A,\ c = \frac{a}{\sin A}$
a, c	A, B, b	$\sin A = \frac{a}{c}$	$\cos B = \frac{a}{c},\ b = \sqrt{(c+a)(c-a)}$
a, b	A, B, c	$\tan A = \frac{a}{b}$	$\cot B = \frac{a}{b},\ c = \sqrt{a^2+b^2}$

FORMULAE FOR SOLVING OBLIQUE TRIANGLES

Given	Required		Solution
A, a, b	B, c	$\sin B = \frac{b \sin A}{a}$	$c = \frac{a \sin C}{\sin A}$
A, B, a	b	$b = \frac{a \sin B}{\sin A}$	
a, b, C	A, c	$A + B = 180° - C$	$c = \frac{a \sin C}{\sin A}$
a, b, c	Area	side $= \frac{a+b+c}{2}$	area $= \sqrt{s(s-a)(s-b)(s-c)}$
A, b, c	Area	area $= \frac{bc \sin A}{2}$	
A, B, C, a	Area	area $= \frac{a^2 \sin B \sin C}{2 \sin A}$	

MADE IN U.S.A.

TITLE PAGE

SALT-GILA VERTICAL

INDEX

Pg.	DESC.
1	LEVEL PEG TEST
2 → 7	BENCH Loop G-2A (Void)
8 → 10	BENCH Loop G-2B
11 → 16	BENCH Loop G-2C
17	BENCH Loop G-2D
18 → 23	BENCH Loop G-2E
24 → 26	BENCH Loop G-2F
27 → 30	BENCH Loop G-2G
31 → 34	BENCH Loop G-2H

E

LEVEL PEG TEST

WILD NA 2
522132

1ST TEST

4.705 5.330

DIFF. 0.625

100' 100' 10'

4.697 4.928

DIFF 0.631
ERROR = 0.006

①

10-16-91
SUNNY, WARM

T - C SCHLITE
H - C MILHELICH

2ND TEST

4.641 5.263

DIFF = 0.622

100' 100' 10'

4.461 5.083

DIFF = 0.622
ERROR + 0.000

	+	HI	−	ELEV
TBM	4.09			
T.P			5.25	
	5.10			
T.P.			6.00	
	6.15			
T.P			4.25	
	6.86			
T.P			6.37	
	1.29			
T.P			7.79	
	3.97			
T.P.			6.31	
	4.55			
* T.P.			5.32	
	6.30			
T.P.			1.65	
	13.34			
T.P			1.66	
	8.81			
T.P.			8.89	

(2)

10-17-91

T K KEVEER
D C SCHULTE

DESCRIPTION

ASPHALT CONC. NAIL & SHINNER, ℄ OF EXISTING PANEL PT. POINTED @ INT BROADWAY (B/W) & CITY FIELD RD. TBM

ROCK N. EDGE PAV. B/W RD. & N ROAD. T.P. ORANGE POINT MARK

ROCK S. EDGE PAV. B/W RD. ROCK T.P. ORANGE POINT MARK (P.M)

ROCK S. EDGE PAV. B/W RD. T.P. O.P.M.

ROCK N. EDGE PAV. B/W RD. T.P. O.P.M.

ROCK S. EDGE PAV. B/W (EAST) OF N. SIDE ICE. CRANK.

ROCK N. EDGE PAV. B/W O.P.M.

B.C. IN H.H. @ INT. OF BROADWAY RD. & BULLARD AVE.

EAST C/L (TOP) BULLARD AVE. O.P.M.

WEST OF C/L @ ℄ LA ESTRELLA O.P.M.

EDGE C/L (TOP) BULLARD AVE. O.P.M.

(CONT.)

(CONT)

	+	HI	-	ELEV.
1	5.14			
T.P			5.72	
#55			5.28	
	4.40			
T.P			7.60	
	1.38			
T.P			8.00	
	3.28			
T.P			5.21	
	3.37			
T.P			10.21	
	3.29			
T.P			4.85	
	4.82			
T.P			6.77	
	2.90			
T.P.			7.10	
	4.35			
T.P.			6.25	
	4.41			
T.P			5.53	
	4.67			
*T.P			6.87	

(3)

DESC.

10/17/91 T C. KEEVER
H C. SCHULTE

BC. IN H.H. PT H.V. #104 @ JCT ELSOL & BULLARD AVE.

SIDESHOT ON RIM H.H. @ PAV @ JCT. ELSOL & BULLARD

T.P ON BC

ROCK N. EDGE PAV. MC 85. (OPM)

ROCK N. SAFTEY SHOULDER LANE (OPM)

ROCK N. SAFTEY SHOULDER LANE (OPM)

ROCK N. SAFTEY SHOULDER LANE (OPM) T/ N/O EDGE

ROCK N. SAFTEY SHOULDER LANE (OPM)

ROCK N. SAFTEY SHOULDER LANE (OPM)

N. EDGE PAV. MC 85 (CONT.) (OPM)

ROCK N. SAFTEY SHOULDER LANE (OPM)

ROCK N. SAFTEY SHOULDER LANE (OPM)

SET 1/2" REBAR W/FLAG V-#105 ±40' S/O MC 85 N/O IRR. CANAL

(CONT)

(CONT)

	+	HI	−	ELEV
	4.82			
T.P			6.52	
	4.10			
T.P.			6.06	
	4.62			
T.P			5.31	
	5.30			
T.P.			5.41	
	5.50			
T.P.			5.67	
	5.26			
T.P.			5.03	
	5.95			
T.P.			4.73	
	5.96			
T.P			4.61	
	5.08			
TBM T.P.			5.54	
	8.30			
T.P.			4.15	
SS			3.89	

10/17/91 T C. ICEVER

DESC. A C. SCHULTE

N. EDGE SAFTEY SHOULDER LANE (OPM) MC 85 (CONT)

N. EDGE SAFTEY SHOULDER LANE (OPM) "

N. EDGE SAFTEY SHOULDER LANE (OPM) "

N. EDGE SAFTEY SHOULDER LANE (OPM) "

N. EDGE " " " "

N. EDGE SAFTEY SHOULDER LANE (OPM) "

N. EDGE " " " (OPM) "

N. EDGE " " " " "

N. EDGE " " " " "

TBM TOP OF HEADWALL SE COR. @ INT CATON LANE & MC 85
INKED X'

3/4" PIPE WITH TACK IN TOP OF COO N/O MC 85 ON CATON LANE @ BC. 3 FT. OF BROADWAY
HOLE INT. OF ASPHALT
SIDESHOT RIM (TOP) (TOP PAV)

(END DAY)

10/18/91 — T. C. REEVES, H. C. SCHULTE

	+	HI	−	ELEV
Bm.	4.01			
T.P.			7.04	
	4.13			
T.P.			5.22	
	3.97			
T.P.			5.35	
	4.36			
T.P			5.34	
	5.42			
T.P			5.16	
	5.47			
T.P.			5.43	
	5.83			
T.P.			4.55	
	6.19			
TP			3.45	
	7.33			
T.P.			4.53	
	5.66			
T.P.			3.87	
	6.69			

Desc.

3/4" PIPE W/TRACK @ ± 1600' N/O MC 85 ON COTTONLANE @ INT. COTTONLANE & BROADWAY/RD. ASPHALT HM

B.C. ON TOP OF IRR. HEAD WALL S/O MC 85 ± 70' E/O COTTONLANE.

ROCK - E.B. S. SAFTEY SHOULDER (0pm) ALONG MC 85

ROCK - " S. SAFTEY SHOULDER (0pm) "

" " " " " " "

" " " " " " "

" " " " " " "

" " " " " " "

" " " " " " "

" " " " " " "

" " " " " " "

(CONT.)

	+	Hi	-	ELEV
T.P.			4.05	
	1.26			
T.P.			4.82	
	6.82			
T.P			3.83	
	6.68			
T.P.			5.14	
	5.97			
T.P			3.70	
	6.95			
T.P.			5.27	
	4.97			
T.P.			5.72	
	5.35			
T.P.			5.40	
	5.84			
T.P.			4.07	
	7.83			
T.P.			1.29	
	7.68			
T.P.			6.78	

(CONT.)

10/18/91 T C. KEELER
B C. SCHULTE

DESC.

N.B. TRAVEL ESTRELLA PARKWAY MEDIAN TOP CURB @ RETURN.

TOP MEDIAN CURB @ RET. N.B. ESTRELLA @ BROADWAY

ROCK - SOUTHSIDE BROADWAY RD. (GRAVEL) (OPEN)

" - " " " " "

" - " " " " "

" - " " " " "

" - " " " " "

B.L. IN H.H. @ INT. BROADWAY RD & BULLARD AVE.

ROCK - S. EDGE PAV. BROADWAY RD "

ROCK " " " " " WHITE SHOULDER STRIPE "

" N. " " " " "

	+	HI	−	ELEV
	3.70			
T.P.			4.74	
	4.93			
T.P.			5.08	
	6.24			
T.B.M.			4.75	
	290.64	DIFF .43	290.21	
			END LOOP	

10/18/91

T C. KEENER

II C. SCHULTE

DESC.

Rock - S. EDGE PAV. BROADWAY RD. WHITE SHOULDER LINE (Opm)

" " " " " " " "

ASPHALT CONC. NAIL SHINER E OF EXISTING PANEL PT. POINTED @ = INT. BROADWAY RD. & LITTLEFIELD RD (TAM)

10-18-91

T. C. SCHULTE
C. KEEVER

TBM	+	HI	−	ELEV.	DESCRIPTION
TBM					1/2" REBAR WEST SIDE DYSART & ELWOOD ST. FROM LOOP G-1A BK 1341 PG. 4
	6.07				
T.P.			1.97		HUB IN SAND
	1.47				
T.P.			17.27		" "
	4.20				
T.P.			5.18		" "
	4.15				
T.P.			4.69		" "
	3.61				
T.P.			4.21		" "
	5.13				
V-103			5.22		V-103 1/2 REBAR WITH WHOOPIE IN SEC. 22
	1.45				
T.P.			6.77		HUB IN WASH
	1.05				
T.P.			5.37		" "
	5.31				

TBM	+	HI	−	ELEV.	DESCRIPTION
T.P.			6.77		HUB IN WASH
	12.72				
T.P.			1.44		ROCK
	6.87				
T.P.			6.65		ROCK
	0.57				
T.BM			8.28		CON. NL @ INT BROADWAY & LITCHFIELD
					RETURN LOOP
	7.95				
T.P.			1.69		ROCK
	8.60				
T.P.			7.35		ROCK
	1.50				
T.P.			12.78		HUB IN WASH
	6.74				
T.P.			5.27		" "
	5.26				
T.P.			0.96		" "
	6.62				
T.P.			1.31		V 103 1/2" REBAR
	5.30				

TBM	+	HI	−	ELEV.
T.P			5.20	
	4.22			
T.P.			3.63	
	4.75			
T.P.			4.22	
	5.36			
T.P.			4.35	
	18.55			
T.P.			2.75	
	2.12			
TBM			6.22	
	129.57		129.55	
		DIFF 0.02		
			END LOOP	
			END DAY	

10-18-91

T C. SCHULTE
R C. KEEVER

DESCRIPTION

HUB IN SAND

" "

" "

" "

" "

✓ POB 1/2" REBAR WEST SIDE DYSART & ELWOOD

	+	HI	−	ELEV.	
TBM					
	4.24				
T.P.			5.56		
	5.47				
T.P			5.97		
	6.64				
T.P.			4.18		
	5.23				
T.P.			9.46		
	3.06				
T.P.			7.22		
	4.61				
TP 98 / T.B.M.			6.15		921.22
* SS.			5.73		
	7.10				
T.P.			1.06		
	13.83				
T.P.			0.62		

10-21-91

C. SCHULTZ
C. KEEVER

DESCRIPTION

CONC. NL. @ INT LITCHFIELD RD & BROADWAY FROM Loop G-2B PG. 9 OF THIS BOOK

Rock

"

"

"

"

P/C H/H @ INT. BROADWAY & BULLARD (NOT A P.P.)

RIM " " " " " (SIDE SHOT)

T.B.C. E SIDE BULLARD

" " "

	+	HI	—	ELEV	10·21-91 DESC.
	7.03				
H&V-104			5.59		H&V-104 B/C N/A @ JCT. EL SOL & BOLLARD
* S.S			5.15		SIDE SHOT RIM " " " " "
	4.47				
T.P.			9.20		ROCK
	2.00				
T.P.			8.46		"
	4.65				
T.P.			5.78		"
	2.41				
T.P.			8.34		"
	3.24				
T.P.			5.24		"
	4.57				
T.P.			7.19		"
	3.15				
T.P.			7.18		"
	4.59				
T.P.			6.27		"
	4.87				
T.P.			5.70		"
	4.87				
V-105			7.04		V-105 1/2" REBAR w/wooppie ± 40' S. & 85 SEC. 19
	4.62				
T.P.			6.74		ROCK

	+	HI	−	ELEV	10-21-91	DESC.
	4.53					
T.P.			6.06		Rock	
	4.75					
T.P.			5.44		"	
	5.24					
T.P.			5.24		"	
	5.31					
T.P.			5.72		"	
	5.70					
T.P.			4.86		"	
	6.22					
T.P.			4.90		"	
	5.91					
T.P.			5.15		"	
	5.46					
T.B.M			5.96		BOULDER ON TOP HEADWALL S.E. COR @ INT COTTON & MC 85	
	8.83					
V-106			4.66		V-106 3/4" PIPE IN A.C. HOLE W/TACK @ JCT COTTON & BRDWY.	
* S.S.			4.41		TOP F.S. A.C. (SIDE SHOT) " "	
					RETURN LOOP	
	4.58					
T.P.			7.81		B/C TOP HEADWALL 200' ± E. COTTON LN & SIDE MC 85	

	+	HI	−	ELEV.	10-21-91	DESC.
	4.37					
T.P.			5.31			ROCK
	4.87					
T.P.			5.97			"
	4.77					
T.P.			5.96			"
	5.12					
T.P.			5.18			"
	5.60					
T.P.			5.45			"
	5.50					
T.P.			5.53			"
	5.84					
T.P.			4.80			"
	5.84					
T.P.			4.31			"
	7.18					
T.P.			3.62			"
	5.91					
T.P.			4.89			"
	6.20					
T.P.			4.22			"
	7.01					
T.P.			8.16			MT RIM ± 400' S. MT. 85 ON ESTRELLA

10-21-91 DESC. (15)

	+	HI	−	ELEV.		
	5.47					
T.P.			3.25			ROCK
	5.92					
T.P.			3.60			"
	4.60					
T.P.			4.63			"
	6.63					
T.P.			3.87			"
	7.45					
T.P.			6.60			"
	5.12					
T.P.			5.86			"
	5.62					
T.P.			4.99			"
	6.26					
T.P.			3.76			"
	7.81					
T.P.			1.46			"
	6.04					
T.P.			6.81			"
	4.28					
T.P.			5.22			"
	5.45					
T.P.			5.24			"

	+	HI	−	ELEV
	5.66			
TBM			4.38	
	301.70		301.82	
		DIFF. +0.12		

10-21-91 DESC. (6)

√- IN P.O.B. CONC. NL. @ INT 21TH FIELD & BROAD WAL

END LOOP

10/21/71

T C. KEEKER
I C. SCHULTE

	+	HI	−	ELEV.	
T.B.M.					
	3.81				
T.P.			7.03		
	4.74				
T.P.			5.29		
	3.81				
T.P.			5.80		
	3.90				
T.P.			5.44		
	4.96				
V-182			4.43		
	4.62				RETURN
T.P.			4.61		
	6.04				
T.P.			4.39		
	6.24				
T.P.			4.22		
	6.27				
T.B.M.			2.57		
	44.39		44.38		

DESC.

T.B.M. B.C. IN H.H. INT. @ DYSART & SOUTHERN
FROM LOOP G-1A BK. 1341 PG. 5

Rock –

Nail –

Nail –

Nail –

1/2" REBAR & Flag, V-182 1/2 mi. W. of T.B.M.

LOOP –

~~Nail~~ – 1"x2" HUB

"

Rock.

P.O.B. B.C. in H.H @ INT. DYSART & SOUTHERN

END LOOP

END DAY

SUNNY/ WARM

T CKEEVER
C. SCHULTE

10/22/91

(5-2)

DEAC

	+	H.	−	ELEV
TBM.				
	5.97			
T.P.			4.23	
	5.75			
T.P.			4.06	
	5.31			
T.P			3.78	
	5.85			
T.P.			6.95	
	5.23			
T.P			2.95	
	4.90			
T.P.			1.70	
	3.82			
T.B.M.			2.69	
	3.83			

(CONT)

CHISLED OUT ☐' IN CONC. TOP OF RR. HEADWALL @ N.E COR. OF INT. RAINBOW RD. & MC. 85 FROM LOOP G-3A BK. 1343 PG. 3

N. EDGE PAVE

1"x 2" HUB S. of MC 85 ± 40' S/O ℄

" " " " " " "

" " " " " " "

" " N/O ℄ MC 85

OPM N. EDGE PAV MC 85

JEF TBM
CHISLED + IN S.E. COR IRR. CONTROL BOX HEADWALL ± 18' S/O MC 85 @ S.W. COR. of WASTON RD & MC 85 ORANGE & BLUE

10/22/91 — T. CKEEVER, C. SCHULTE

DISC.

	+	HI	-	ELEV
	5.03			
T.P.			3.24	
	5.77			
T.P.			2.38	
	4.45			
T.P.			5.40	
	5.91			
H&V-119			5.94	
	7.31			
T.P.			4.37	
	7.41			
T.P.			3.99	
	3.07			
T.P.			7.56	
	1.58			
T.P.			8.72	
	1.73			
T.P.			7.90	
	2.68			
H&V-120			6.21	
	2.86			
T.P.			6.26	

(CONT)

N. EDGE PAV MC 85 (OPM)

" " " " " "

" " " " " "

SET ½" REBAR & FLAG. CONTROL PT. HV-#119
~~LAID SID MAG OF INLENG WITH CHANNEL~~

N. EDGE PAV MC 85 (OPM)

" " " " " "

" " " " " "

" " " " " "

N EDGE PAV OFF ROAD @ LINENGE BRANCH.

TOP ½" REBAR (BENT) HV-#120 CONTROL PT.

1"x2" HUB

10/22/91

T C. KEEVER
R C. SCHUCTE

	+	Hi	−	ELEV	
	1.61				
T.P.			6.11		
	1.36				
T.P.			8.55		
	3.11				
T.P.			4.50		
	5.80				
T.P.			4.55		
	5.72				
T.P.			4.47		
	4.91				
T.P.			4.67		
	6.10				
T.P.			3.05		
	6.31				
T.P.			4.85		
	5.07				
~~T.BM.~~ T.P.			5.58		
	5.62				
T.P.			5.16		
	4.66				
T.P.			7.09		

(CONT)

DESC.

TOP LONG. IRR. CHANNEL

1"x2" HUB

N. EDGE PAV. (IRWIN) (OPP)

" " " " "

" " " " "

" " " " "

" " " " "

" " " " "

REBAR 3/4" IN H/H INTER. OF SMULLER RD & RECOAT. (CROWN)
(RETURN LOOP) B.M. FOR JAY KIM — (LOWER RIVER)

S. EDGE PAVE. IRWIN RD

" " " "

	+	HI	−	ELEV	
	3.69				
T.P.			5.85		
	4.30				
T.P.			4.42		
	4.66				
T.P.			5.75		
	4.65				
T.P.			5.91		
	4.68				
T.P.			3.40		
	8.39				
T.P.			1.20		
	6.08				
T.P.			1.57		
	6.89				
T.P.			1.55		
	9.12				
T.P.			1.63		
	8.10				
T.P.			3.00		
	8.01				
T.P.			3.33		

(CONT)

10/22/91 T. CLEAVER
D. C. SCHULTE

DESC.

S. EDGE PAVE. IRWIN RD (OPM)

" " " " "

" " " " "

" " " " "

1"X2" HUB

~~LOCK~~ MANHOLE RIM

1"X2" HUB

(OPM) EAST EDGE PAVE

ROCK

S. EDGE PAV. MC 85 (OPM)

" " " " " "

10/22/91

T C. KEEVER
☐ C. SCHULTE.

	+	HI	-	ELEV
	6.99			
T.P.			(8.29) 8.28	
	4.63			
T.P.			5.94	
	3.64			
T.P.			5.40	
	5.87			
T.P			5.74	
	(1.72) 2.73			
T.P.			5.96	
	4.31			
T.P.			6.00	
	2.25			
T.P.			6.05	
	4.10			
T.P.			5.21	
	5.39			
T.P.			5.73	
	3.89			
T.P.			5.43	
	(.28) 4.27			
T.P.			5.73	

DESC.

S. EDGE PAV. MC 85 (OPT)

" " " " "

" " " " "

" " " " "

" " " " "

" " " " "

" " " " "

" " " " "

" " " " "

" " " " "

" " " " "

" " " " "

	+	HI	-	ELEV
	3.50			
T.B.M. - T.P.			5.00	
	255.04		254.99	

10/22/91

T C. KEEVER
R C. SCHULTE.

DESC.

T.B.M. @ IN TOP LONG. CHISELED ⊓ ON N.E. COR OF RAINBOW RD & NC-85 ✓ IN POB

END LOOP

	+	HI	−	ELEV.
T.B.M				
	6.14			
T.P.			5.01	
	6.12			
T.P.			5.07	
	5.74			
T.P.			4.87	
	5.03			
T.P.			6.30	
	5.66			
T.P.			5.54	
	6.31			
T.P.			4.54	
	5.73			
T.B.M			3.58	
	5.54			
T.P.			3.27	
	7.65			

10-22-91

(24)

SUNNY, WARM

C. SCHULTE
C. KEEVER

DESCRIPTION

3/4" REBAR IN H/H @ INT MILLER & BELOAT (LOWER RIVER)
FROM LOOP G-2E PG. 20 THIS BOOK

ROCK

"

"

"

"

"

CHISLED "X" TOP HEADWALL N.E. COR INT ROOKS & BELOAT

ROCK

10-22-91

(25)

	+	HI	-	ELEV	DESC.
T.P.			2.00		ROCK
	6.75				"
T.P.			3.33		
	7.51				
V-121			2.32		V-121 B/G H/H @ INT M.C. 85 & ROOKS RD.
* S.S			1.64		RIM " " " " "
					RETURN LOOP
	2.03				
T.P.			7.44		ROCK
	3.01				"
T.P.			6.58		
	1.60				"
T.P.			8.41		
	3.61				"
T.P.			5.80		
	4.43				"
T.P.			5.56		
	3.67				"
T.P.			4.82		
	4.83				"
T.P.			5.03		

	+	HI	−	DESC.
	6.76			
T.P.			6.08	
	5.15			
T.P.			5.73	
	4.95			
T.P.			6.03	
	5.05			
T.B.M.			5.98	
	113.27		113.29	
		-0.02		

10-22-91

	DESC.
ROCK	
"	
"	
	√-IN P.O.B. 3/4" REBAR @ E INT MILLER & BELOAT
END LOOP	
END DAY	

	+	HI		ELEV.
H&V-132				
	5.13			
T.P.			4.27	
	6.15			
T.P.			5.81	
	7.89			
T.P.			4.79	
	3.77			
T.P.			10.20	
	1.95			
T.P.			6.42	
	4.96			

CONT.

10/23/91 — C. KEEVER, C. SCHULTE

DESC.

P.O.B. CONTROL PT H.V.-132 / PANEL 00 RR IN EXISTING
(FROM LOOP G-1E) @ INT. US.80 (OLD) & 331ST AVE
(BK. 1341 PG. 23)
(OPM) N. EDGE PAV. OLD U.S. 80

COTTON SPINDEL @ ℄ OLD US. 80 & 333RD AVE.

(OPM) S. EDGE PAV. OLD US. 80 ROCK

WESTERLY
PK & SHINER @ US. 80 & 335TH AVE

ROCK N. EDGE US 80

10/23/91 — π G. Keever; Π C. Schulte

	+	HI	−	ELEV
T.P.			3.38	
	5.51			
T.P.			7.52	
	4.19			
T.B.M. T.P.			5.33	
	5.24			
T.P.			6.13	
	10.27			
T.P.			3.44	
	5.59			
T.P.			5.25	
	5.90			
T.P.			2.78	
	5.87			
T.P.			11.09	
	0.40			
T.P.			2.74	
	10.38			
T.P.			6.36	
	4.64			
H&V-136			5.00	

(CONT)

DESC.

(OPM) N. EDGE PAV. US. 80

ROCK - N. EDGE PAV. US 80

PK & SHINNER @ JCT OF OLD US. 80 & ARLINGTON & SCHOOL RD.

B.C. IN HW. N. OF US. 80

ROCK (N)

ROCK (N)

N. EDGE PAV. US. 80 (OPM)

ROCK (N)

ROCK (N)

ROCK (N)

SET PK. CONTROL AT HV #136 @ +130' S.W OF JCT CACTUS ROSE RD. & OLD US 80

10/23/91 T. C. KLEEVEN
/ C SCHULTE

DESC.
RETURN LOOP FROM BM. @ CACTUS ROAD & US-80

	+	HI	−	ELEV	
	4.68				S. EDGE PAV. US 80 (OPM)
T.P.			4.09		
	2.47				" " " " " "
T.P.			9.65		
	6.70				Rock, (S)
T.P.			1.17		
	10.81				Rock (S)
T.P.			6.33		
	2.81				" "
T.P.			5.76		
	5.30				S. EDGE PAV. US. 80 (UPM)
T.P.			5.83		
	1.77				" " " " " "
T.P.			8.30		
	5.83				" " " " " "
T.P.			5.47		
	6.51				Rock (S)
T.P.			3.30		
	7.02				"
T.P.			7.37		
	4.23				"
T.P.			4.45		

(CONT)

10/23/91 T. C. KEEKER
II. C. SCHULTE

	+	HI	-	ELEV
	6.44			
T.P.			1.90	
	9.68			
T.P.			3.98	
	5.23			
T.P.			8.28	
	5.95			
T.P.			5.62	
	3.99			
H.V.-132			5.13	
	177.25		177.14	

DESC.

Rock (S) US.80

Rock (E) "

" " "

" " "

✓ P.O.B. CONTROL PT H.V.-132 JCT U.S. 80 & 33rd AVE.

END LOOP

10-23-91

PT C SCHULTE
// C KEEVER

SUNNY, WARM

	+	HI	−	ELEV.
H&V-136				
	5.67			
T.P.			5.04	
	5.62			
T.P.			9.23	
	0.62			
T.P.			3.71	
	13.63			
T.P.			4.22	
	3.13			
T.P.			9.40	
	0.38			
T.P.			6.74	
	8.25			
T.P.			1.52	
	5.75			
T.P.			5.85	
	5.07			

DESCRIPTION

PK. NL. H&V 136 ± 130' W. JCT. CACTUS ROSE RD. & 80
FROM Loop 6-26 PG 28 This BK.

ROCK

"

"

"

"

"

"

"

10-23-91

	+	HI	-	ELEV	DESC.
T.P.			6.32		ROCK
	3.26				
T.P.			6.41		"
	0.55				
T.P.			8.17		"
	6.23				
T.P.			4.31		"
	5.92				
T.P.			7.11		"
	5.38				
T.P.			4.13		"
	4.81				
T.B.M			5.91		1/2" REBAR @ E MT. DESERT ROSE & OLD US 80
					RETURN LOOP
	5.76				
T.P.			4.74		ROCK
	4.17				
T.P.			4.77		"
	6.21				
T.P.			6.27		"
	4.22				

	+	HI	−	ELEV.	DESC.
T.P.			5.35		ROCK
	10.27				
T.P.			2.38		"
	6.62				
T.P.			3.18		"
	5.82				
T.P.			5.51		"
	5.76				
T.P.			5.83		"
	1.50				
T.P.			7.84		"
	7.00				
T.P.			0.60		"
	9.57				
T.P.			3.30		"
	2.52				
T.P.			12.26		"
	3.72				
T.P.			1.06		"
	9.56				
T.P.			5.08		"
	5.44				

	+	HI	−	ELEV.
H&V-136			6.18	
	162.41		162.42	
		-0.01		

10-23-91

(34)

DESC.

V-M ROB P.K NL. ± 130' N. OF JCT. CACTUS ROSE AND OLD US 80

END LOOP

END DAY

LIETZ
SINCE 1882

1349

SALT-GILA
VERTICAL
BK. G-3

LIETZ
SINCE 1882

ECONOMY FIELD BOOK

No. 8152-05

FORMULAE FOR SOLVING RIGHT TRIANGLES

$\text{Sin } A = \frac{a}{c} = \text{Cos } B$ $\quad$ $\text{Cot } A = \frac{b}{a} = \text{Tan } B$

$\text{Cos } A = \frac{b}{c} = \text{Sin } B$ $\quad$ $\text{Sec } A = \frac{c}{b} = \text{Cosec } B$

$\text{Tan } A = \frac{a}{b} = \text{Cot } B$ $\quad$ $\text{Cosec } A = \frac{c}{a} = \text{Sec } B$

Given	Required	Solution
$A\ c$	$B\ a\ b$	$B = 90° - A \quad a = c \sin A \quad b = c \cos A$
$A\ b$	$B\ a\ c$	$B = 90° - A \quad a = b \tan A \quad c = \frac{b}{\cos A}$
$A\ a$	$B\ b\ c$	$B = 90° - A \quad b = a \cot A \quad c = \frac{a}{\sin A}$
$a\ c$	$A\ B\ b$	$\sin A = \frac{a}{c} \quad \cos B = \frac{a}{c} \quad b = \sqrt{(c+a)(c-a)}$
$a\ b$	$A\ B\ c$	$\tan A = \frac{a}{b} \quad \cot B = \frac{a}{b} \quad c = \sqrt{a^2 + b^2}$

FORMULAE FOR SOLVING OBLIQUE TRIANGLES

Given	Required	Solution
$A\ a\ b$	$B\ c$	$\sin B = \frac{b \sin A}{a} \quad c = \frac{a \sin C}{\sin A}$
$A\ B\ a$	b	$b = \frac{a \sin B}{\sin A}$
$a\ b\ C$	$A\ c$	$A + B = 180° - C \quad c = \frac{a \sin C}{\sin A}$
$a\ b\ c$	Area	side $= \frac{a+b+c}{2}$ $\quad$ area $= \sqrt{s(s-a)(s-b)(s-c)}$
$A\ b\ c$	Area	area $= \frac{bc \sin A}{2}$
$A\ B\ C\ a$	Area	area $= \frac{a^2 \sin B \sin C}{2 \sin A}$

MADE IN U.S.A.

TITLE PAGE

SALT + GILA VERTICAL

INDEX

PG.	DESC.
1	LEVEL PEG TEST
2 → 6	BENCH LOOP G-3A
7 → 12	BENCH LOOP G-3B
13 → 16	BENCH LOOP G-3C
17 → 20	BENCH LOOP G-3D
21 → 22	BENCH LOOP G-3E
23 → 24	BENCH LOOP G-3F
25 → 26	BENCH LOOP G-3G
27 → 28	BENCH LOOP G-3H

— CON'T. —

INDEX

PG.	DESC.
29 → 30	BENCH Loop G-3I
31	BENCH Loop G-3J
32	BENCH Loop G-3K
33	BENCH Loop G-3L
34	

LEVEL PEG TEST

WILD NA2
522034

1ST TEST

4.821 5.446

DIFF. = 0.625

100' 100' 10'

4.452 5.093

DIFF = 0.641
ERROR = 0.016

①

10-16-91
SUNNY, WARM

A - C. MIHELICH
B - T. PRICE

2ND TEST

4.848 5.472

DIFF. = 0.624

100' 100' 10'

4.485 5.112

DIFF = 0.627
ERROR = 0.003

B.M.	+	H.I.	−	ELEV.	ADJ EL.	DESC.
T.B.M.						Top of NW Bolt Traf Sig. Pole @ SW cor. of Jackrabbit & M.C. 85 From Loop G-1B Bk. 1341 Pg. 10
	4.40					
T.P.			5.86			Rock
	5.38					
T.P.			6.78			Rock
	5.89					
T.P.			6.60			Rock
	4.74					
T.P.			6.53			Rock
	3.85					
T.B.M.			5.82			Nail in P.P. S.E. cor. Tuthill & M.C. 85.
	3.45					
TP			6.03			Rock
	4.83					
T.P.			5.41			Rock
	5.41					
T.B.M.			5.60			Nail in P.P. S.W. cor. Airport & M.C. 85
	3.38					
TP			6.23			Rock
	6.10					

B.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC.
T.P.			7.35			Rock
	5.70					
T.P.			5.76			Rock
	5.28					
T.P.			6.41			Rock
	5.71					
T.B.M.			6.44			CHS. "+" IN HEADWALL N. SIDE OF DEAN R.D. S. @ M.C. 85
	4.45					
T.P.			5.92			Rock
	5.43					
T.P.			6.28			Rock
	6.29					
T.P.			5.75			Rock
	4.46					
T.P.			4.08			Rock
	5.35					
T.P			5.65			Rock
	6.40					
T.B.M			4.79			CHS. "□" ON HEADWALL E. SIDE OF RAINBOW RD. N. @ M.C. 85
	8.31					

B.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC.
T.P.			1.67			Rock
	9.00					
T.P.			2.40			Rock
	7.80					
H&V-117			3.06			1/2" I.P. FLUSH W/A.C. 1/2 MI. N. OF M.C. 85 ON RAINBOW RD.
	12.52					
T.P.			4.91			Rock
	5.77					
T.P.			4.28			Rock
	5.81					
T.P.			5.68			Rock
	5.09					
T.P.			5.41			Rock
	4.79					
T.P.			4.70			TOP OF HEADWALL S.W. COR. CANAL BRIDGE ON DEAN
	5.06					
T.P.			5.12			Rock
	5.82					
T.P.			6.66			Rock
	6.67					
T.P.			5.89			Rock

B.M.	+	H.I.	−	ELEV.	ADJ. ELEV.	DESC.
	6.38					
T.P.			5.77			Rock
	5.58					
T.P.			5.38			Rock
	6.37					
H&V-115			6.82			1/2" I. BAR IN. POTHOLE. ± 1 MI N. OF M.C. 85 ON AIRPORT RD.
	6.37					
S.S.			5.65			(SIDESHOT) A.C. FOR PANEL ELEV. H&V-115
T.P.			6.27			Rock
	6.74					
T.P.			6.84			Rock
	5.91					
T.P.			5.73			Rock
	6.81					
T.P.			4.92			Rock
	6.04					
T.P.			5.03			Rock
	8.13					
T.P.			4.20			Rock
	5.81					

B.M.	+	H.I.	−	ELEV.	ADJ. ELEV.	DESC.
T.P.			5.58			Rock
	11.55					
H&V-111			9.47			ALUM CAP
						FROM Loop G-1B Bk. 1341 Pg. 9
	248.83		229.08	7.9	mi.	

10-21-91
SUNNY, COOL
A - C MIHELICH
P - T PRICE

END DAY

B.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC.
V-121						B/C IN H/H INT. Rooks Rd. & M.C. 85 From Loop G-2F BK. 1342 PG. 25
	5.35					
T.P.			5.84			Rock
	5.96					
T.P.			4.75			Rock
	5.47					
T.P.			5.37			Rock
	5.05					
T.P.			6.11			Rock
	6.36					
T.P.			0.47			Rock
	4.58					
T.P.			5.84			Rock
	5.59					
T.P.			5.67			Rock
	5.68					
T.P.			5.79			Rock
	6.36					
T.P.			8.47			Rock
	7.46					

B.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC.
T.P.			5.35			Rock
	4.36					
T.P.			4.93			Rock
	6.18					
H&V-123			3.65			SET PK NAIL ON ℄ OF TURNER RD ± 1.5 MI. N. OF OLD U.S. 80
	3.76					
T.P.			6.51			Rock
	5.30					
T.P.			5.27			Rock
	5.36					
T.P.			5.60			Rock
	4.89					
T.P.			5.69			Rock
	5.31					
T.P.			5.80			Rock
	5.42					
T.P.			11.91			Rock
	3.22					
H&V-124			8.39			FND. 1/8" IRON BAR IN POTHOLE ON WILSON RD ± 1.0 MI. N. OF U.S. 80
	2.50					

B.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC.
S.S.			2.17			(SIDE SHOT) O.G. ON DIRT RD. FOR PANEL
T.P.			7.88			ROCK
	0.14					
T.P.			8.47			ROCK
	1.93					
T.P.			9.26			ROCK
	3.25					
T.P.			9.36			ROCK
	2.22					
H&V-125			7.13			SET PK NAIL @ INT. OF WILSON RD. & OLD U.S. 80
	5.69					
T.P.			5.58			ROCK
	5.27					
T.P.			6.21			ROCK
	4.10					
T.P.			6.88			ROCK
	4.06					
T.P.			6.09			ROCK
	5.55					

B.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC.
T.P.			5.17			ROCK
	4.88					
T.P.			5.74			ROCK
	5.05					
V-122			5.79			SET CONC. NAIL @ INT. OF OLD U.S. 80 & ARLINGTON LEVEE BRIDGE
	5.60					
T.P.			5.18			ROCK
	5.29					
T.P.			5.36			ROCK
	5.46					
T.P.			3.97			ROCK
	6.11					
T.P.			4.90			ROCK
	5.28					
T.B.M.			5.12			SET PK NAIL ON P.O.C. OF E/P @ NW COR. OF OLD U.S. 80 & S.R. 85
	6.72					
T.P.			2.44			ROCK
	8.32					

B.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC.
T.P.			3.68			Rock
	5.92					
T.P.			5.03			Rock
	4.97					
T.P.			5.64			Rock
	4.98					
T.P.			5.57			Rock
	5.07					
T.P.			4.54			Rock
	6.15					
T.P.			6.31			Rock
	5.27					
T.P.			5.40			Rock
	6.70					
S.S			6.24			(SIDE SHOT) JAY KIM T.B.M. P.K. NAIL @ INT. OF ROOKS RD. & HAZEN RD
T.P.			3.54			Rock
	8.84					
T.P.			2.91			ROCK
	9.60					

B.M.	+	H.I.	−	ELEV	ADJ. EL.	DESC.
T.P.			1.95			Rock
	8.35					
T.P.			3.74			Rock
	8.76					
T.P.			1.97			Rock
	6.78					
T.P.			3.83			Rock
	7.63					
V-121			1.98			P.O.B.
	278.11		278.03		8.8 mi.	

10-22-91
Sunny, cool
A - T. Price
B - C. Mitelick

END DAY

B.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC
T.B.M.						FND. 1/2" REBAR IN POTHOLE @ T.O.T. OF DESERT ROSE & OLD U.S. 80 FROM LOOP G-2H BK. 1342 PG. 32
	4.06					
T.P.			8.43			ROCK
	2.81					
T.P.			6.71			ROCK
	2.49					
T.P.			2.35			ROCK
	2.43					
T.P.			2.44			ROCK
	5.87					
T.B.M.			4.55			FND 1/2" REBAR W/AERIAL TARGET ON OLD U.S. 80 ±1000'N. OF AGUA CALIENTE RD. NW COR S17 T1S R5W
	6.50					
T.B.M.			4.00			SET P.K. NAIL ON W. E/P OF OLD U.S 80 ±50'N. OF AGUA CALIENTE RD.
	6.26					
T.P.			7.90			ROCK
	4.71					
T.P.			5.12			ROCK
	7.06					

B.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC
T.P.			5.23			Rock
	8.98					
T.P.			10.61			Rock
	2.54					
T.P.			8.45			Rock
	1.41					
H&V-142			8.68			FD NAIL IN SHINER ON ℄ OLD U.S. 80 @ INT OF FARM ROAD IN SEC. 20
	5.59					
T.P.			3.01			Rock
	3.43					
T.P			5.95			Rock
	6.10					
T.P.			0.38			Rock
	18.02					
T.P			0.33			Rock
	21.52					
V-143			0.84			SET 1/2" REBAR ON E. SHOULDER OF OLD US 80 ± 0.8 MI. N. OF GILLESPIE DAM BRIDGE.
	0.76			—	RETURN	LOOP-

B.M.	+	H.I.	−	ELEV	ADJ EL	DESC.
T.P.			23.33			Rock
	0.20					
T.P.			16.71			Rock
	0.47					
T.P.			5.32			Rock
	5.93					
T.P.			4.32			Rock
	3.47					
T.P.			5.21			Rock
	8.55					
T.P.			1.03			Rock
	8.96					
T.P.			2.18			Rock
	6.95					
T.P.			6.82			Rock
	5.23					
T.P.			7.45			Rock
	5.43					
T.P.			4.66			Rock
	6.67					

B.M	+	H.I.	−	ELEV.	ADJ. EL.	DESC.
T.P			4.04			Rock
	3.63					
T.P.			6.82			Rock
	5.06					
T.P			6.32			Rock
	5.36					
T.P			5.61			Rock
	4.78					
T.P.			7.78			Rock
	9.22					
T.P.			5.10			Rock
	7.30					
T.P.			2.75			Rock
	8.06					
T.B.M			5.40			V- IN P.O.B.
	205.81		205.83		6.1 mi.	

10-23-91
cloudy, cool
A - C Mikelich
B - T. Price

END DAY

B.M.	+	H.I.	−	ELEV.	ADJ. EL	DESC.
V-143						1/2" REBAR ON E. SHLD. OF OLD U.S. 80 FROM Loop G-3C PG. 14 OF This Book
	24.78					
T.P.			0.15			Rock
	22.15					
T.P.			0.39			Rock
	14.37					
T.P.			10.94			Rock
	0.90					
T.P.			12.52			Rock
	1.29					
T.P.			18.72			Rock
	0.45					
T.P.			23.96			Rock
	0.78					
T.P.			15.67			Rock
	2.07					
H&V-144			14.92			SET 1/2" REBAR ON S. SHLD. OF OLD U.S. 80 ± 550' W. OF GILLESPIE DAM BRDG.
	1.81					
T.P.			20.25			Rock
	0.66					

B.M.	+	H.I.	−	ELEV.	ADJ. el	DESC.
T.P.			10.67			CURB ON BRIDGE
	4.79					
T.P.			4.80			CURB ON BRIDGE
	6.15					
H4V-145			5.20			SET 1/2" REBAR ON N. SHLD. OF OLD U.S. 80 ±300' E. OF GILLESPIE DAM BRDG.
				— RETURN		LOOP —
	4.94					
S.S.			11.79			U.S.G.S. B/C ON CONC. PIER NE COR. OF GILLESPE DAM BRIDGE STAMPED "Q 13" ELEV. = 746.478 '1927'
S.S.			11.79			A.H.D. B/C 0.5' E. OF ABOVE DESC. STAMPED ELEV. = 746.24 '1930'
T.P.			5.92			CURB ON BRIDGE
	4.82					
T.P.			4.74			CURB ON BRIDGE
	5.76					

R.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC.
S.S.			11.70			U.S.G.S. B/C ON CONC PIER NW COR OF GILLESPIE DAM BRIDGE STAMPED "P13" ELEV = 746.462 '1927'
T.P.			0.45			Rock
	22.68					
T.P.			0.17			Rock
	15.73					
T.P.			1.08			Rock
	24.18					
T.P.			0.50			Rock
	24.44					
T.P.			0.17			Rock
	16.05					
T.P.			0.19			Rock
	12.83					
T.P.			9.97			Rock
	2.54					
T.P.			23.75			Rock
	0.41					

B.M.	+	H.I.	−	ELEV	ADJ. CL.	DESC.
T.P.			13.43			
	0.15					
V-143			16.18			P.O.B.
	214.73		214.74		2.4 mi.	

10-24-91
cloudy, cool
A - T Price
B - S. Croy
B - C. Mihelich

B.M.	+	H.I.	−	ELEV.	ADJ EL.	DESC.
T.B.M.						1/2" REBAR IN P/H @ INT. OF DESERT ROSE & OLD U.S. 80 FROM PAGE 13 THIS BOOK
	5.77					
T.P.			4.50			ROCK
	5.69					
T.P.			3.57			ROCK
	6.77					
T.P.			4.58			ROCK
	8.05					
T.P.			6.30			ROCK
	8.58					
T.P.			7.63			ROCK
	5.59					
H&V-137			5.41			SET 1/2" R.B. 0.8 MILES N.W. OF TBM OF DESERT ROSE & OLD U.S. 80, IN SEC. 6
	*		*			LOOP BACK
	5.61					
T.P.			3.64			ROCK
	5.39					
T.P.			8.13			ROCK
	5.99					
T.P.			8.12			ROCK
	4.59					
T.P.			7.13			ROCK

B.M.	+	H.I.	−	ELEV.	ADJ. EL	DESC
	2.86					
T.P.			4.71			ROCK
	4.666					
TBM			5.85			√-IN P.O.B.
	69.55		69.57		1.6 mi.	

10-24-91
cloudy, cool
A - S. Cray
B - C. Mihelich
B - T. Price

END DAY

B.M.	+	H.I.	−	ELEV	ADJ. EL	DESC.
T.B.M.						1/2" REBAR IN P/H @ INT. OF DESERT ROSE & OLD U.S. 80 FROM PG. 13 THIS BOOK
	4.52					
T.P			7.75			Rock
	3.41					
T.P			7.51			Rock
	3.59					
T.P.			7.90			Rock
	3.67					
T.P			8.06			Rock
	4.36					
T.P.			6.23			Rock
	5.75					
V-138			4.92			SET PK. NAIL ℄ OF ARLINGTON SCL. RD ± 0.4 MI N. OF INT ARLINGTON SCL & DESERT ROSE
					RETURN	LOOP
	4.72					
T.P			4.82			Rock
	5.97					
T.P.			5.87			Rock
	8.28					

B.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC
T.P.			3.53			Rock
	6.54					
T.P.			2.76			Rock
	6.01					
T.P.			3.99			Rock
	6.65					
T.P.			4.13			Rock
	7.75					
T.B.M.			3.76			✓ - IN P.O.B.
	71.22		71.23	2.7 MI.		

10-25-91
SUNNY, COOL
T - C. MILLELICH
R - T. PRICE
R - S. CROY

B.M.	+	H.I.	−	ELEV	ADJ. EL	DESC.
T.B.M.						PK. & SHINNER @ JCT. OF OLD U.S. 80 & ARLINGTON SCH. RD. FROM loop G-26 BK. 1342 PG. 28
	11.19					
T.P.			0.27			ROCK
	15.45					
T.B.M.			1.78			SET PK. NAIL ON W. E/P OF ARLINGTON SCH. RD. ± 1/4 mi. N. OF OLD U.S. 80
	6.23					
T.P.			2.09			ROCK
	6.65					
T.P.			1.84			ROCK
	8.26					
H&V-133			3.95			SET 1/2" REBAR ON SHLD @ JCT. OF ARL SCH. RD. - KNOX RD - 339TH AVE.
				— RETURN		loop —
	4.13					
T.P.			8.27			ROCK
	3.13					

B.M.	+	H.I.	−	ELEV.	ADJ. EL	DESC.
T.P.			7.51			Rock
	3.28					
T.P.			7.35			Rock
	1.69					
T.P.			13.58			Rock
	1.98					
T.B.M.			15.35			P.O.B.
	61.99		61.99		1.5 mi.	

10-25-91
Sunny, cool
A - T. Peice
B - S. Cro
B - C. M. Helich

B.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC.
T.B.M.						PK NAIL ON W. E/P OF ARLINGTON SCH. RD. FROM LOOP G-3K3 PG. 25
	1.61					
T.P.			9.91			ROCK
	3.80					
T.P.			6.64			ROCK
	15.41					
T.P.			1.11			ROCK
	9.15					
T.P.			3.85			ROCK
	3.31					
T.P.			13.52			ROCK
	3.82					
H&V-134			12.16			SET 1/2" RB .75 MI W. OF TBM. IN SEC. 20
	11.30					—— LOOP BACK ——
T.P.			4.08			ROCK
	15.25					
T.P.			4.03			ROCK
	4.23					
T.P.			9.69			ROCK
	0.61					
T.P.			17.17			ROCK
	12.00					

B.M.	+	HI	-	ELEV	ADJ.EL	DESC.
T.P			5.65			ROCK
	8.54					
TBM			1.21			√-IN P.O.B.
	89.03		89.02		1.5 mi.	

10-25-91
SUNNY, COOL
⊼-S. CROY
⊽-C. MIHELICH
⊽-T. PRICE

B.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC.
H&V-130						Cotton Picker Spindle @ Exist. Panel Int. Old U.S. 80 & 319TH Ave. From Loop G-1F Bk. 1341 Pg. 22
	1.04					
T.P.			17.97			Rock
	0.29					
T.P.			15.53			Rock
	0.11					
T.P.			21.74			Rock
	0.35					
T.P.			12.50			Rock
	3.64					
T.P.			1.69			Rock
	8.14					
T.P.			5.47			Rock
	5.83					
T.P.			6.77			Rock
	3.47					
V-131			5.89			4" METAL PLATE ON 1½" PIPE IN CONC. BASE W/ R.L.S. #5357 DRAWN IN CONC. BASE POSSIBLE CENTER SECTION SECT. 23
					RETURN	LOOP
	5.79					

B.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC.
S.S.			6.82			(SIDESHOT) O.G. NEXT TO MONUMENT FOR PANEL ELEV
T.P.			2.41			Rock
	5.64					
T.P.			5.94			Rock
	5.24					
T.P.			8.27			Rock
	3.66					
T.P.			7.26			Rock
	8.92					10-25-91
T.P.			0.23			Rock — SUNNY; COOL
	19.14					A - C. MILHELICH
T.P.			0.45			Rock — B - T. PRICE
	16.24					B - S. CROY
T.P.			0.09			Rock
	11.25					
T.P.			0.64			Rock
	16.26					
H&V-130			2.15			V - IN P.O.B.
						END DAY
	115.01		115.00	1.9 MI.		

B.M.	+	H.I.	−	ELEV.	ADJ. EL	DESC.
T.B.M.						CHS "+" ON HOWL W. SIDE OF DEAN RD. S. @ M.C. 85 FROM LOOP G-3A PG. 3
	6.15					
T.P.			5.79			ROCK
	4.49					
T.P.			5.69			ROCK
	5.88					
H&V-1116			5.46			SET P.K. NAIL ON ℄ OF DEAN RD. ± 0.5 mi. S. OF M.C. 85
				— RETURN		LOOP —
	5.29					
T.P.			6.23			ROCK
	6.58					
T.P.			5.46			ROCK
	5.99					
T.B.M.			5.75			P.O.B.
	34.38		34.36		1.0 mi.	

10-26-91
SUNNY, cool
A - T. PRICE
B - C. MIHELICH

B.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC.
T.B.M.						NAIL IN P.P. SE COR. TUTHILL RD. & M.C. 85 FROM LOOP G-3A PG. 2
	5.24					
T.P.			5.55			Rock
	6.72					
T.P.			5.23			Rock
	5.57					
V-114			4.77			SET P.K. NAIL ON ℄ TUTHILL RD. ± 0.5 MI. S. OF M.C. 85.
					RETURN	LOOP
	4.69					
T.P			5.27			Rock
	5.18					
T.P			6.86			Rock
	5.06					
T.B.M.			4.78			V-IN P.O.B
	32.46		32.41	1.0 MI.		

10-26-91
SUNNY, COOL
T - C. MIHELICH
R - T. PRICE

B.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC.
T.B.M.						PK NAIL E. SIDE OF M.C. 85, ± 3/4 mi. NE OF PERRYVILLE RD. FROM LOOP G-1B BK. 1341 PG. 11
	3.91					
T.P.			4.63			ROCK
	5.93					
V-110			10.47			SET 1/2" REBAR ± 800' S. OF T.B.M.
				— RETURN		LOOP —
	10.87					
T.P			6.27			ROCK
	4.66					
T.B.M.			4.00			P.O.B.
	25.37		25.37	0.3 mi.		

10-26-91
SUNNY, COOL
A - T. PRICE
P - C. MILLELICH

1944

SALT-GILA
VERTICAL

BK. G-4

LIETZ
SINCE 1882

LIETZ
SINCE 1882

ECONOMY FIELD BOOK

No. 8152-05

FORMULAE FOR SOLVING RIGHT TRIANGLES

$\text{Sin } A = \frac{a}{c} = \text{Cos } B$ $\quad$ $\text{Cot } A = \frac{b}{a} = \text{Tan } B$

$\text{Cos } A = \frac{b}{c} = \text{Sin } B$ $\quad$ $\text{Sec } A = \frac{c}{b} = \text{Cosec } B$

$\text{Tan } A = \frac{a}{b} = \text{Cot } B$ $\quad$ $\text{Cosec } A = \frac{c}{a} = \text{Sec } B$

Given	Required	Solution
A, c	B, a, b	$B = 90° - A,\ a = c \sin A,\ b = c \cos A$
A, b	B, a, c	$B = 90° - A,\ a = b \tan A,\ c = \frac{b}{\cos A}$
A, a	B, b, c	$B = 90° - A,\ b = a \cot A,\ c = \frac{a}{\sin A}$
a, c	A, B, b	$\sin A = \frac{a}{c},\ \cos B = \frac{a}{c},\ b = \sqrt{(c+a)(c-a)}$
a, b	A, B, c	$\tan A = \frac{a}{b},\ \cot B = \frac{a}{b},\ c = \sqrt{a^2 + b^2}$

FORMULAE FOR SOLVING OBLIQUE TRIANGLES

Given	Required	Solution
A, a, b	B, c	$\sin B = \frac{b \sin A}{a},\ c = \frac{a \sin C}{\sin A}$
A, B, a	b	$b = \frac{a \sin B}{\sin A}$
a, b, C	A, c	$A + B = 180° - C,\ c = \frac{a \sin C}{\sin A}$
a, b, c	Area	side $= \frac{a+b+c}{2}$, area $= \sqrt{s(s-a)(s-b)(s-c)}$
A, b, c	Area	area $= \frac{bc \sin A}{2}$
A, B, C, a	Area	area $= \frac{a^2 \sin B \sin C}{2 \sin A}$

MADE IN U.S.A.

TITLE PAGE

SALT-GILA VERTICAL

INDEX

PG.	DESC.		
1			
2 → 5	BENCH LOOP	"	G-4A
6 → 7	"	"	G-4B
8 → 9	"	"	G-4C
10 → 14	"	"	G-4D
15 → 16	"	"	G-4E
17 → 18	"	"	G-4F
19 → 21	"	"	G-4G
22 → 24	"	"	G-4H
25 → 27	"	"	G-4I
28 → 32	"	"	G-4J
33			
34			
35			

10-24-91

π C. SCHULTE
/ C. KEEVER

A

	+	HI	−	ELEV.	DESCRIPTION
T.B.M					P.K. NL ON E.P STRIPE W. SIDE OLD US 80 @ AGUA CALIENTE RD
	4.08				FRM LP. 6-3C BK 1343 PG 13
T.P.			5.77		ROCK
	4.51				
T.P.			2.10		"
	8.62				
HEV 140			7.12		1/2" REBAR ± 1000' WEST OLD US 80 ± 1000' N AGUA CALIENTE RD.
	6.49				
T.P.			5.53		ROCK
	7.10				
T.P.			8.21		"
	8.86				
T.P.			3.10		"
	8.13				
T.P.			2.54		"
	9.26				
T.P.			0.31		"

10-24-91

③

	+	HI	−	ELEV	DESC.
	9.04				
T.P.			5.45		ROCK
	8.90				
T.P.			3.45		"
	5.20				
T.P.			3.68		"
	7.15				
T.P.			5.48		"
	7.27				
T.P.			0.58		"
	8.28				
T.P.			4.79		"
	7.14				
T.P.			6.56		"
	0.96				
T.P.			8.74		"
	6.82				
H.Y. 141			18.33		B/C ON PIPE 1/4 COR 18 & 19 ± 1½' ABOVE O.G.
* S.S.			18.92		O.G. @ " " (SIDE SHOT)
					RETURN LOOP
	18.32				

10-24-91

(4)

	+	HI	-	ELEV.	DESC
T.P			6.83		ROCK
	8.95				
T.P.			1.16		"
	6.95				
T.P.			7.52		"
	4.18				
T.P.			6.46		"
	1.38				
T.P.			8.74		"
	4.12				
T.P.			5.63		"
	4.47				
T.P.			7.21		"
	4.71				
T.P.			8.23		"
	3.64				
T.P.			6.49		"
	0.88				
T.P.			10.24		"
	2.89				
T.P.			7.46		"
	2.62				
T.P.			7.38		"

	+	HI	−	ELEV.
	3.20			
T.P.			6.96	
	4.94			
TBM			6.95	
	189.00	0.4 +0.06	189.00	

(5)

10-24-91

DESC.

ROCK

✓-IN POB BK. NL. E.P. STRIPE OLD US 80 & NAVA CALIENE RD.

B

SUNNY / 14 ARM

10/24/91 T C. KEEVER
R C. SCHULTE

	+	HI	−	ELEV	DESC.
TBM.					TBM ± 1,000' N/O ROUT CALIENTE RD. 1/2" REBAR IN HOLE OF (FRM. LP. G-30 BK. 1343 PG. 13) & OLD P.S. 80
	0.99				
T.P.			6.57		Rock
	3.50				
T.P.			6.09		Rock
	4.79				
T.P.			5.78		Rock
	4.88				
T.P.			6.05		Nail
	2.25				
T.P.			5.67		"
	4.23				
V-139.			5.37		1/2" REBAR & FLAG CONTROL PT V-139
	5.48				RETURN LOOP

(CON'T)

	+	HI	−	ELEV
T.P.			4.24	
	6.02			
T.P.			2.68	
	6.18			
T.P.			5.05	
	5.57			
T.P.			4.55	
	6.22			
T.P			3.93	
	6.50			
TBM TP.			0.63	
	54.61		54.61	

6

10/24/91

A C. KEEVER
/ C. SCHULTE

	DESC.
Hole	
"	
Rock	
"	
"	
TBM	R.O.B. ± 1600' W/o AGUA CALIENTE RD. 1/2" REBAR IN HOLE W/ 4 OUTLYS 80 END LOOP.

10-24-91

T C SCHULTE
// C. KEENER

SUNNY, WARM

C

	+	HI	-	ELEV.
HV 136 TBM				
	1.16			
T.P.			12.73	
	0.56			
T.P.			7.98	
	3.36			
T.P.			6.84	
	5.08			
T.P.			5.50	
	4.85			
T.P.			5.50	
	5.16			
T.P.			5.56	
	4.58			
T.P.			5.23	
	5.55			

DESC.

HV-136 PK NL & OLD US 80 ± 130' S. CACTUS ROSE RD.
(FROM LOOP 6-26 BK. 1342 PG. 28)

ROCK

"

"

"

"

B/C 4/H @ INT CACTUS ROSE RD. & ARLINGTON SCHOOL RD.

10-24-91

	+	HI	-	ELEV	DESC.
V-135			5.67		1/2" REBAR ± 1800' E OF INT CACTUS ROSE & ARLINGTON SCHOOL RD.
					RETURN LOOP
	5.57				
T.P.			5.58		ROCK
	5.65				
T.P.			4.56		"
	4.72				
T.P.			5.05		"
	5.37				
T.P			5.00		"
	5.42				
T.P.			4.63		"
	6.89				
T.P.			3.21		"
	10.92				
T.P.			1.82		"
	12.46				
HV-136 TBM			2.42		V-IN POB P.K. NL & OLD US 80 ± 130' S. CACTUS ROSE RD
					END LOOP
	87.30		87.28		END DAY
		+0.02			

D

10/25/91

C. KEEVER
C. SCHULTE

	+	HI	-	ELEV.	DESC.
H&V-125					BM PK INT. OF WILSON RD & OLD US. 80 R.O.B. & CONTROL PT H&V-#125 (FROM LOOP G-3B BK. 1343 PG. 9)
	1.51				
T.P.			6.84		NAIL
	4.04				
T.P.			6.39		"
	3.39				
T.P.			8.66		NAIL
	3.51				
T.P.			6.92		"
	4.22				
T.P.			6.53		"
	5.06				
T.P.			9.41		"

(CONT)

10/25/91

π C. KEEVER

∥ C. SCHULTE

	+	HI	−	ELEV	DESC.
	5.53				
H&V-126			7.84		1/2" REBAR & FLAG CONTROL PT HV-#126 (± 1½ MILES S/O OF 80 & WILLSTON)
	5.70				
T.P.			5.74		NAIL
	4.61				
T.P.			5.38		"
	5.53				
T.P.			5.88		"
	4.21				
T.P.			4.38		"
	5.70				
T.P			5.10		"
	5.63				
T.P.			5.37		"
	5.95				
T.P.			3.62		"
	3.61				
T.P.			6.30		"
	4.48				
T.P.			3.26		"
	6.63				
T.P.			2.77		"

(CON'T.)

10/25/91 π C. KEEVER
∥ C. SCHULTE

	+	HI	-	ELEV	DESC.
	4.91				
T.P.			6.22		NAIL
	3.24				
T.P.			5.78		"
	4.21				
V-154			5.30		1/2" REBAR & FLAG CONTROL PT V-154
	4.07				
T.P.			4.91		NAIL
	4.69				
T.P.			5.80		NAIL
	3.43				
T.B.M.			3.99		TBM: 1/2 OF A MILE W/O CONTROL PT V-154 S/O CANAL NAIL BRIDGE X-CROSSING WEST SIDE.
	3.51				
T.P.			4.61		NAIL
	7.53				
T.P.			3.99		NAIL
	8.73				
T.P.			3.32		"
	5.74				
T.P.			3.22		"
	7.14				
T.P.			2.96		"

(CONT)

10/25/91 T. C. KEEVER
// C. SCHULTE

	+	HI	−	ELEV.	DESC.
	7.07				
T.P.			0.84		NAIL
	8.94				
T.P.			4.29		"
	5.27				
T.P.			3.74		"
	4.21				
T.P			5.55		"
	4.78				
V-128			5.36		1/2" REBAR & FLAG CONTROL PT. V-128 1/2 MILE W/O PRIVATE DR. & 1/2 MILE N/O NALLEY MOREL RD.
	2.66				
T.P.			5.25		NAIL
	5.75				
T.P.			4.02		"
	5.78				
T.P.			4.49		"
	7.48				
T.P.			5.26		"
	6.29				
T.P.			4.49		"
	6.81				
T.P.			2.20		"

(CONT)

	+	HI	-	ELEV
	6.86			
T.P			4.23	
	6.60			
#BM1 T.P.			0.87	
	215.03	(D.H. 13.95)	201.08	

(1)

10/25/91 π C KEEVER
// C SCHOLTE

DESC.

NAIL

B.C. IN H.H. @ INT. PALO VERDE RD & 05.80
TBM. Vin. Flat

END LOOP

10-25-91

T. C. SCHULTE
R. C. KEEVER

E

	+	HI	−	ELEV.	DESC.
TBM					B/C H/H @ INT PALO VERDE RD & OLD US 80
	6.82				FROM Loop G-1D Bk 1341 Pg. 17
T.P.			4.47		ROCK
	6.42				
T.P.			4.24		"
	6.95				
T.P.			3.84		"
	7.07				
T.P.			3.76		"
	6.29				
T.P. H/V-127			6.03		COTTON SPINDLE IN POT HOLE & PALO VERDE RD ± 1/2"
					NORTH OF OLD US 80 & 1' BELOW F.S
* SS.		*	5.00	*	SIDE SHOT F.S.
					RETURN LOOP
	5.06				

10-25-91.

	+	HI	−	ELEV	DESC
T.P.			6.82		ROCK
	3.58				
T.P			6.75		"
	4.08				
T.P.			6.52		"
	3.47				
T.B.M.			7.28		1-1/2 ROB B/G 1/4 @ INT PALO VERDE RD & OLD US 80
					END LOOP
	49.74		49.71		END DAY
		+0.03			

	+	HI	-	ELEV	ADJ. EL
F					
TBM	*		*		
	*		*		
	4.55				
T.P.			3.54		
	4.67				
T.P.			6.66		
	5.28				
T.P.			3.51		
	5.03				
T.P.			5.25		
	6.13				
T.P			3.44		
	6.21				
T.P.			2.94		
	4.48				
T.P.			3.96		
	5.13				
H&V-153			5.88		
	5.99				
T.P.			5.33		
	4.07				
T.P.			4.51		

10/26/91

T S. CROY
R C. SHULTE

DESC

± 1/2 MILE W/O CONTROL PT V-154 S/O CANAL
NAIL @ BRIDGE X-ING, WEST SIDE
(FROM LOOP G-4D PG. 12 THIS BK.)

ROCK
"
"
"
"
"
"
SET 1/2" R.B. E SIDE TOP OF CANAL, ± 1 1/4 mi W/O V-154
LOOP BACK
ROCK
"

10-26-91

	+	HI	-	ELEV	ADJ. EL	DESC
	3.17					
T.P.			6.47			ROCK
	3.48					"
T.P.			6.20			
	5.82					"
T.P.			7.27			
	5.52					"
T.P.			3.95			
	5.81					
T.B.M.			6.45			✓-IN P.O.B. 1/2" RB E SIDE TOP OF CANAL
						END LOOP
	25.34		25.36			

10-26-91

T. C. SCHULTE
S. CROY

G

	+	HI	-	ELEV	DESC
TBM					CHISLED "X" IN HEADWALL S.W. SIDE WATSON RD & M.C. 85
	0.59				FROM LOOP G-2E BK 1342 PG. 18
T.P.			7.09		ROCK
	2.05				
T.P.			7.27		"
	2.35				
V-118			7.35		1/2" REBAR E. SIDE IRR. CANAL ± 40' E. & WATSON RD.
	3.04				
T.P.			7.59		ROCK
	3.55				
T.P.			6.85		"
	5.13				
T.P.			4.85		"
	5.15				
T.P.			5.66		"
	5.80				
T.P.			4.39		"

10-26-91

	+	HI	−	ELEV	DESC
	6.43				
T.P.			8.03		ROCK
	6.17				
T.P.			4.92		"
	7.11				
T.P.			5.65		"
	5.37				
T.P.			3.41		"
	4.67				
T.P.			4.68		"
	5.17				
V-1166			5.71		½" REBAR ± 90' E. of IRR DITCH RETURN LOOP
	5.63				
T.P.			5.01		ROCK
	4.41				
T.P.			5.20		"
	3.96				
T.P.			5.25		"
	5.87				
T.P.			7.14		"
	4.67				
T.P.			6.41		"

10-26-91

	+	HI	−	ELEV	DESC.
	8.51				
T.P.			7.16		ROCK
	5.49				
T.P.			5.47		B/C 4/4 @ ℄ INT WATSON RD & BELOAT (LOWER BLEEK RD)
	4.66				
T.P.			4.81		ROCK
	5.38				
T.P.			5.57		"
	4.53				
T.P.			4.17		"
	6.17				
T.P.			3.15		"
	8.01				
T.P.			4.77		"
	7.72				
T.P.			3.74		"
	8.29				
T.P.			4.27		"
	7.74				
T.P.			3.50		"
	5.97				
TBM			0.27		MC 85 ✓- IN POB CHISLED "X" T/HEADWALL INT WATSON RD
	159.59		159.34		END LOOP
		+0.05			END DAY

	+	HI	−	ELEV.
T.B.M.				
	4.15			
T.P.			5.23	
	4.94			
T.P.			4.91	
	6.73			
T.P			3.71	
	5.21			
T.P.			5.02	
	5.60			
T.P.			4.02	
	3.21			
T.P.			6.59	
	3.33			

(CONT)

10/28/91 T C. KEENER
II C. SCHUTE

(T.B.M.) NAIL IN POWER POLE S.W. COR. OF
MC. BS & AIRPORT RD. 1.28
(FROM LOOP G-3A BK. 1343 PG. 2)

NAIL

NAIL

"

" W/O EDGE AIRPORT RD

TOP HEADWALL

NAIL

10/28/91

T C. KOEGUER
H C. SCHULTE

	+	HI	-	ELEV	
T.P.			11.93		
	6.57				
T.P.			5.44		
	5.44				
T.P.			5.61		
	0.19				
T.P			6.66		
	15.01				
T.P.			7.73		
	4.95				
T.P.			1.03		
	15.45				
V-170			0.42		
	0.18				
T.P.			15.41		
	0.37				
T.P.			0.85		
	0.40				
T.P.			11.57		
	12.15				
T.P.			4.05		

(CONT)

DECK.

ROCK.

NAIL

"

"

REFLECTOR (PAV)

" "

CONTINUE PT # V-170

PK @ INT OF ELLIOT RD & AIRPORT RD.

RETURN LOOP

REFLECTOR (PAV)

" "

" " @ E

" "

10/28/91

T. C. KEEVER
Z. SCHULTE

	+	HI	-	ELEV.	
	4.60				DECK
T.P.			5.47		REFLECTOR (PAN EDGE)
	5.05				" "
T.P.			4.18		
	10.61				NAIL
T.P.			3.55		
	6.31				"
T.P.			4.30		
	4.83				Rock.
T.P.			6.19		
	5.47				"
T.P.			5.48		
	5.34				NAIL
T.P.			5.99		
	3.46				"
T.P.			5.73		
	5.85				
T.P.			4.87		
	4.37				
(TBM) T.P.			3.84		
	149.77	D.A. -0.01	149.78		

END LOOP: P.O. TBM NAIL IN POWERTIBLE ON COR. OF NL 85 & DEPART R.P.

10-28-91

(25)

T. C. SCHILTE
C. KEEVER

	+	HI	-	ELEV	DESC
TBM					B/C H/H @ INT BULLARD & BROADWAY
	4.80				FROM Loop 6-DC BK. 1342 PG. 11
T.P.			5.77		ROCK
	5.10				
T.P.			5.16		"
	4.92				
T.P.			4.82		"
	4.99				
T.P.			4.90		"
	5.01				
T.P.			4.28		"
	6.08				
T.P.			4.91		"
	5.71				
HV-181			4.83		B/C FLUSH ± 175' N. OF BRIDGE E BULLARD
	8.76				

10-28-91

	+	HI	−	ELEV	DESC
T.P.			3.50		BRIDGE
	5.97				
T.P.			6.24		"
	2.70				
TBM			10.12		B/C H/H @ INT. BULLARD & VINEYARD RD. RETURN LOOP
	9.64				
T.P.			2.38		BRIDGE
	6.23				
T.P.			5.68		"
	1.25				
T.P.			6.89		ROCK
	6.40				
T.P.			5.38		"
	2.30				
T.P.			6.98		"
	6.09				
T.P.			5.23		"
	5.14				
T.P.			4.96		"
	4.78				
T.P.			4.61		"
	4.63				

	+	HI	−	ELEV	DESC
T.P.			4.81		ROCK
	5.84				
TBM			4.85 ^		✓ IN POB 8/C 4/4 @ INT BROADWAY & BULLARD
	105.32	Diff. +0.02	105.34		

10/30/91

C. KEEVER
C. SCHULTE

	+	HI	−	ELEV.	DESC.
HIY-184					(TBM) BG. IN AH. @ INT. ELMIRAGE'S SOUTHERN AVE. CONTROL PT. HV. #184 (FRM Lp. G-1A BK. 1341 PG. 5)
	5.30				
T.P.			5.93		NAIL W/O 1/2 EL. W. EDGE OF PAV EDGE
	5.57				
T.P.			4.96		" " "
	5.09				
T.P.			6.02		" " "
	7.68				
T.P.			13.82		" " "
	6.78				
T.P.			6.11		" " "
	6.76				
T.P			5.75		" " "
	5.75				

(CONT'D)

10/30/91 T C. KEEVER
H C. SCHULTE

	+	HI	−	ELEV	DESC.
T.P.			13.13		NAIL : W/O RAN EDGE EL MIRAGE
	20.18				
T.P.			3.54		" S/O BASELINE RD DIRT RD.
	10.95				
T.P			0.59		" " " "
	10.75				
T.P.			2.00		ROCK " " " "
	7.00				
HEV-185			4.76		"1/4 COR" 1/2" REBAR @ FENCE COR. CONTROL PT HV-185
	4.50				~~[illegible]~~
T.P.			10.15		NAIL
	0.47				
T.P.			9.04		NAIL
	0.58				
T.P.			9.52		NAIL S. EDGE BASELINE RD.
	4.82				
T.P.			6.01		" N. EDGE " "
	4.38				
T.P.			6.63		" " " "
	4.41				
T.P			5.95		" " " "

(CON'T)

10/30/91 T: C. KEEVER
R: C. SCHULTE

DESK.

NAIL: S. EDGE PAV. BASELINE RD.

" " " " "

" " " " "

" " " " "

" " " " "

" @ 133rd AVE S/O BASELINE RD.

" W. BEVERLY RD.

" " " "

" " " "

1/2" REBAR & FLAG. CONTROL PT. V-183

RETURN LOOP:

NAIL: W. BEVERLY RD.

	+	HI	-	ELEV.
	5.10			
T.P.			1.17	
	6.68			
T.P.			9.70	
	7.15			
T.P.			6.94	
	1.91			
T.P.			6.91	
	6.40			
T.P.			4.30	
	8.11			
T.P.			1.43	
	17.23			
T.P.			9.49	
	6.05			
T.P.			2.75	
	14.21			
T.P.			2.82	
	8.82			
V-183			4.97	
	1.53			
T.P.			12.17	

(CONT)

10/30/91

T. C. KEEVER
K. C. SCHULTE

DEAL

	+	HI	-	ELEV
	1.22			
T.P.			7.29	
	8.27			
T.P.			17.61	
	1.74			
T.P.			7.50	
	4.00			
T.P.			6.97	
	6.49			
T.P.			1.74	
	6.71			
T.P.			5.93	
	8.75			
T.P.			7.86	
	2.68			
T.P.			4.95	
	5.91			
T.P.			3.31	
	6.49			
T.P.			4.89	
	5.41			
			19.99	

(CONT)

N. W. BEVERLY RD.

NAIL
" @ 133RD AVE.

NAIL : S. EDGE PAV. BASELINE

" ROCK " " " "

" " " "

" " " "

" " " "

" " " "

" " " "

" " " "

" E/D SE MIRAGE PAV.

10/30/91 T. CREEVER
C. SOULTE

	+	HI	−	ELEV	DESC.
	13.38				
T.P.			5.86		NAIL E. EDGE PAV. EL MIRAGE
	5.45				
T.P.			9.92		" " " "
	9.21				
T.P.			5.34		" " " "
	11.70				
T.P.			5.28		" " " "
	3.86				
T.P.			4.62		" " " "
	4.70				
T.P.			5.47		" " " "
	6.47				
H&Y-184			5.46		V.M. BC. IN H.H. @ INT. OF EL MIRAGE & SOUTHGEN AVE. END LOOP, CONTROLPT. HV. 184.
	306.60	D.PA + 0.05	306.55		

LIETZ
SINCE 1882

(13) 45

SALT - GILA
VERTICAL
G-5

LIETZ
SINCE 1882

ECONOMY FIELD BOOK

No. 8152-05

FORMULAE FOR SOLVING RIGHT TRIANGLES

$\sin A = \frac{a}{c} = \cos B$ $\quad$ $\cos A = \frac{b}{c} = \sin B$

$\cos A = \frac{b}{c} = \sin B$ $\quad$ $\sin B = \frac{b}{c} = \cos A$

$\tan A = \frac{a}{b} = \cot B$ $\quad$ $\cot A = \frac{b}{a} = \tan B$

Given	Required	Solution
A, a	B, b, c	$B = 90^\circ - A$; $b = a \tan B = a \cot A$; $c = \frac{a}{\sin A} = \frac{a}{\cos B}$
A, b	B, a, c	$B = 90^\circ - A$; $a = b \tan A = b \cot B$; $c = \frac{b}{\cos A} = \frac{b}{\sin B}$
A, c	B, a, b	$B = 90^\circ - A$; $a = c \sin A = c \cos B$; $b = c \cos A = c \sin B$
a, b	A, B, c	$\tan A = \frac{a}{b} = \cot B$; $\tan B = \frac{b}{a} = \cot A$; $c = \frac{a}{\sin A} = \frac{b}{\sin B}$
a, c	A, B, b	$\sin A = \frac{a}{c} = \cos B$; $\sin B = \frac{c}{a} = \cos A$; $b = \sqrt{(c+a)(c-a)}$

FORMULAE FOR SOLVING OBLIQUE TRIANGLES

Given	Required	Solution
A, B, a	b, c	$\sin B = \frac{b \sin A}{a}$; $C = \frac{a \sin C}{\sin A}$
A, B, c	b, a	$b = \frac{c \sin B}{\sin A}$; $a = \frac{c \sin C}{\sin A}$
a, b, C	A, B, c	$A + B = 180^\circ - C$; $c = \frac{a \sin C}{\sin A}$
a, b, c	Area	$\sin \frac{a+b+c}{2}$; area $= \sqrt{(s-a)(s-b)(s-c)}$
A, b, c	Area	area $= \frac{bc \sin A}{2}$
A, B, C, a	Area	area $= \frac{a^2 \sin B \sin C}{2 \sin A}$

MADE IN U.S.A.

TITLE PAGE

SALT-GILA VERTICAL

INDEX

	DESCRIPTION		PAGE
*	LEVEL LOOP	G-5A	1-5 VOID*
	LEVEL LOOP	G-5B	6-10
	LEVEL LOOP	G-5C	11-14
	LEVEL LOOP	G-5D	15-18
	LEVEL LOOP	G-5E	19-23
	LEVEL LOOP	G-5F	24-27

10/31/91

T. Pisciotta
D. ARENER

+	H.I.	−	ELEV.	DESCRIPTION
			1053.10	B/C No H/H 19th Ave/Broadway
4.11 (4.41)				
T.P.		3.36 (3.73)		Rock
6.91 (7.00)				
T.P.		6.41 (6.49)		Rock
4.52 (4.18)				
T.P.		7.20 (6.85)		Rock
3.96 (3.87)				
V.		5.32 (5.24)	1050.31	SET PK NAIL & ~~[illegible]~~ 2600 W of 19th Ave & Broadway
*		*		
3.54 (3.55)	1049.27			
T.P.		5.25 (5.27)		Rock
5.31 (5.30)				
T.P.		6.06 (6.11)		Rock
4.72 (4.64)				
T.P.		6.08 (6.00)		Rock
4.67 (4.68)				
T.P.		5.83 (5.83)		Rock
1.84 (1.63)				
T.P.		7.20 (6.77)		Rock
8.50 (3.30)				
T.P.		5.15 (4.76)		Rock
8.32 (7.82)				

	+ T	H.I.	-	ELEV.	DESCRIPTION
TP	3.91 (3.90)		7.23 (7.22)		ROCK
H&V	6.14 (*5.16)	1034.22	7.46 (*6.60)	1035.26	B/C IN H.H. @ ∃ 35th AVE & BROADWAY
S.S.		*	5.91 (B/C 5.98)	1039.27	A.C. TOP OF H.H. @ ABOVE PANEL
T.P	6.99 (B/C 5.74)		5.75		ROCK
T.P.	4.60 (*6.89)		8.78 (*5.75)		ROCK
H&V	3.666 (*7.38)	1031.36	6.56 (*7.94)	1032.40	B/C IN H.H. @ 'T' ∃ OF ROESER & 35th AVE
S.S.		*	3.31 (B/C 6.56)	1032.41	A.C. TOP OF H.H. @ ABOVE PANEL
T.P	5.92 (*4.93)		5.87 (SS 3.58)		ROCK
T.P.	6.61 (5.89)		2.45 (6.14)		ROCK
T.P.	2.57 (*7.92)		9.92 (*3.34)		ROCK
T.P.	3.67 (*2.78)		6.11 (*9.77)		ROCK
T.P.	5.55 (*3.97)		5.73 (*6.61)		ROCK
T.P.	3.92 (*4.54)		5.43 (*5.74)		ROCK

	+	H.I.		ELEV	DESCRIPTION
T.P.	4.66		5.36		ROCK
H&V	5.39	1019.86	5.61	1020.50	B/C IN M.H. @ ℄ of 43RD AVE & SOUTHERN
S.S.		*	4.84		A.C. TOP OF M.H. @ ABOVE PANEL
T.P.	4.41		5.84		ROCK
T.P.	4.61		5.81		ROCK
T.P.	4.07		5.46		ROCK
T.P.	3.88		6.38		ROCK
T.P.	4.52		5.78		ROCK
TBM	6.01	1011.31	5.76	1012.35	B/C IN M.H. @ ℄ OF 51ST AVE & SOUTHERN
T.P.	7.06		4.71		ROCK
T.P.	4.58		6.65		ROCK
T.P.	4.29		5.49		ROCK
T.P.			5.93		ROCK

+	H.I.		ELEV	DESCRIPTION
4.91				
V-		4.04	1012.38	SET PK & SIST AVE ±7600' N OF SIST AVE & SOUTHERN ⅓
14.80	1011.34			
TP		1.35		+ ROCK
9.51				
TP		5.07		* ROCK
2.54				
TP		10.63		ROCK
1.21				
TP		8.35		ROCK
6.23				
TP		6.51		ROCK
6.73				
TP		4.02		ROCK
5.88				
TP		4.78		ROCK
5.48				
TP		3.31		ROCK
6.97				
TP		3.80		ROCK
5.99				
H&V-		5.41	1024.49	BK IN HH @ ⅓ OF LOWER BUCKEYE & 51ST AVE
*		*		
5.75	1223.45			

	+	H.I.		ELEV.		DESCRIPTION
S.S.		*	5.17			AC. TOP OF H.H @ PREVIOUS PANEL
T.P.			5.23			ROCK
	3.96					
T.P.			5.83			ROCK
	5.77					
T.P.			4.97			ROCK
	6.34					
TBM			3.80		1026.04	V+W; AHD ALUM DISK STAMPED "EYE"
	*		*			PUBLISHED ELEV. = 312.7M = 1025.906 FT
	*		*			ADOT PUBLICATION ELEV. = 312.842M = 1026.3845 FT
						1027.086
		END	ONE	LEGGED		LOOP
	245.49		274.51			
	248.49					

11/1/91 D ARCHER

TOS CROSS

+	HI	−	ELEV	ADJ EL	DESCRIPTION
					B/L IN H.H. @ 19th AVE & BROADWAY
4.11					FROM LOOP JK 1-D BK. PG. 24
T.P		3.36			ROCK
6.91					
T.P		6.41			ROCK
4.52					
T.P		7.20			ROCK
3.96					
V-333		5.32			SET PK NAIL & OF BROADWAY ± 2600' W OF
*		*			19th AVE & BROADWAY ⊥.
3.54					
T.P		5.25			ROCK
5.31					
T.P		6.66			ROCK
4.72					
T.P		6.08			ROCK
4.67					
T.P		5.83			ROCK
1.84					
T.P		7.20			ROCK
3.50					
T.P		5.15			ROCK

	+	HI	−	ELEV	ADJ EL	DESCRIPTION
	8.32					
T.P.			7.23			ROCK
	3.91					
H&V-332			7.46			B/C IN H.H. @ ℄ OF 35th AVE & BROADWAY
	6.14					
S.S.		*	5.91			A.C. TOP OF H.H. @ ABOVE PANAL
T.P			5.75			ROCK
	6.99					
T.P			8.28			ROCK
	4.60					
H&V-331			6.56			B/C IN H.H. @ "T" ℄ OF ROESER & 35th AVE
	3.66					
S.S.		*	3.31			AC TOP OF H.H. @ ABOVE PANAL
T.P.			5.87			ROCK
	5.92					
T.P			2.45			ROCK
	6.61					
T.P			9.92			ROCK
	2.57					
T.P			6.11			ROCK
	3.67					
T.P			5.73			ROCK
	3.55					
T.P			5.43			ROCK

	+	HI	−	ELEV	ADJ EL	DESCRIPTION
	3.92					
T.P			5.34			ROCK
	4.66					
H&N-330			5.61			B/C IN H.N @ ⅓ OF 43RD AVE & SOUTHERN
	5.39					
S.S.		*	4.84			TOP AC @ H.N. @ ABOVE PANEL
T.P.			5.84			ROCK
	4.41					
T.P			5.81			ROCK
	4.61					
T.P			5.46			ROCK
	4.07					
T.P			6.38			ROCK
	3.88					
T.P			5.78			ROCK
	4.52					
TBM		☆	5.76			B/C IN H.N. @ 51ST AVE & SOUTHERN
	6.09					
T.P			4.79			ROCK
	7.11					
T.P			6.11			ROCK
	3.42					
T.P			6.20			ROCK
	4.47					

	+	HI	−	ELEV	ADJ. EL	DESCRIPTION
T.P			6.02			ROCK
	5.25					
V-329			4.19			SET PK NAIL & 51ST AVE ±2600' N OF 51ST AVE & SOUTHERN ⊥
	*		*			
	14.80					
T.P			1.35			ROCK
	9.51					
T.P			5.07			ROCK
	2.54					
T.P			10.63			ROCK
	1.21					
T.P			8.35			ROCK
	6.23					
T.P			6.51			ROCK
	6.73					
T.P.			4.02			ROCK
	5.88					
T.P.			4.78			ROCK
	5.48					
T.P			3.31			ROCK
	6.97					
T.P			3.80			ROCK
	5.99					
H&V-317			5.41			B/C IN H.H. @ ⊥ OF 51ST AVE & LOWER BUCKEYE

	+	HI	−	ELEV	ADJ. EL	DESCRIPTION
	5.75					
S.S.		*	5.17			AC. TOP OF M.N @ PREVIOUS PANEL
T.P			5.23			ROCK
	3.96					
T.P			5.83			ROCK
	5.77					
T.P			4.97			ROCK
	6.34					
TBM			3.20			1/-IN ; ADOT ALUM. DISK STAMPED "EYE"
	*		*			PUBLISHED EL. = 312.7m = 1025.90ft
	*		*			ADOT PUBLISHED EL = 312.842 m = 1026.3845'
						(SEE LOOP TK BK. PG.)
		END	ONE	LEGGED		LOOP

11/5/91

D. ARCHER
S. CROY

						DESCRIPTION
	4	HI		ELEV	ADJ. EL	
H4V-342						B/C IN H.N. @ E OF UNIVERSITY & RIBBON RD.
	4.40					FROM Loop 6-6G BK. 1346 PG. 18
T.P.			7.14			T.B.C.
	3.41					
T.P.			4.80			T.B.C.
	3.71					
T.P.			4.58			Rock
	12.62					
T.P.			2.49			B/C (S.G. COR: BRidge)
	11.89					
T.P.			4.16			Rock in Side Walk
	2.78					
T.P.			12.60			Rock
	0.40					
T.P.			10.74			Rock
	6.72					
T.P.			3.97			Rock
	5.09					
T.P.			6.55			Rock
	8.80					
T.P.			1.45			Rock
	13.09					

	+	HI	−	ELEV	ADJ. EL	DESCRIPTION
T.P.			3.20			High Pt. in Gutter
	11.40					
H&V-304			1.81			B/c H/H Scottsdale Rd/Weber H&V # 304
	3.85					
*S.S.			3.05			Paving @ H/H Rim
T.P.			8.52			B/c Flush Weber/Mary
	3.48					
T.P.			6.97			Rock
	6.05					
T.P.			6.25			Rock
	6.47					6.25
T.P.			4.80			Rock
	6.56					6.83
T.P.			4.94			H.P. in Gutter
	7.89					2.85
T.P.			4.59			" " " 3.33
	7.59					
T.P.			2.90			" " "
	5.11					
T.P.			2.84			Rock
	4.56					
T.P.			10.69			Rock
	6.47					
T.P.			0.18			Str. Line ~~[illegible]~~ Back Top Bolt
	5.17					

	+	HI		ELEV	ADJ. EL	DESCRIPTION
H&V-302			9.28			B/C H/H McKellips / Hayden H&V # 302
	5.09					
S.S.		*	4.61			Rim (Pavling) H/H
T.P.			6.13			H.D. Conc. Drive
	N/G					
T.P.			6.14			Rock
	5.66					
T.P.			7.37			Rock
	2.50					
H&V-303			6.06			B/C H/H Hayden / Weber H&V # 303
	4.37					
S.S.		*	3.64			Paving @ H/H
T.P.			4.62			Top F.H.
	2.01					
T.P.			7.94			T.B.C.
	3.27					
T.P.			6.63			Rock
	14.08					
T.P.			1.70			Rock in Bridge Wall
	8.98					
T.P.			6.97			" " " "
	0.38					
T.P.			13.47			Rock
	4.37					
T.P.			5.72			Rock

	+	HI	−	ELEV	ADJ. EL	DESCRIPTION
	6.89	.81				
T.P.			6.30			Rock
	5.30					
T.P.			4.37			Rock
	6.56					
T.P.			6.10			Rock
	4.76					
T.P.			4.39			Rock
	6.29					
V-343			15:24			B/L H/H McCUNTOCK & UNIVERSITY VERT #343
			4.56			Paving @ H/H (From Loop G-6G Bk. 134 Pg. 9)
			—	END		Loop —
	232.68		229.60			

11/6/91 D. ARCHER
CLEAR, SUNNY, 85° S. CROY

	+	HI	−	ELEV	ADJ. EL	DESCRIPTION
H&V-302						B/C IN H.H. @ J. HAYDEN & McKELLIPS
	4.66					FROM LOOP G-5C PG. 13 THIS BOOK
			5.92			Rock
	6.80					
			5.97			Rock
	4.82					
			6.45			Rock
	6.08					
			4.67			Rock
	5.85					
			4.24			Rock
	6.27					
S.S.		*	5.35			S.W. COR SEC. 6 (B/C H/H) 7th/McKellips
T.P.			4.50			Rock
	5.95					
			4.14			Rock
	6.10					
T.B.M.			4.47			B/C H/H McKELLIP/92nd STREET
	6.03					
			4.65			Rock
	4.27					

	+	HI	-	ELEV	ADJ. EL	DESCRIPTION
			5.67			Rock
	5.84					
T.B.M			4.14			B/C H/H McKGLLIPS / DOBSON
	5.77					
			3.19			Wall & Rd
	5.82					
			4.48			Rock
	6.19					
			4.23			H.P. & Rd
	5.85					
			4.13			H.P. & Rd
	7.81					
			1.15			Rock
	9.27					
V-518			1.81			B/C H/H McDowell & Dobson RD. South
	4.28					
S.S.			3.87			Paving @ H/H
			5.08			Rock
	5.11					
			5.62			Rock
	4.39					
T.B.M			3.44			B/C H/H McDowell & 92nd STR.
	2.47					
			7.15			Rock
	3.86					

	+	HI	−	ELEV	ADJ. EL	DESCRIPTION
			8.39			Rock
	5.08					
			8.44			Rock
	7.12					
			9.99			Rock
	8.84					
			3.87			Rock
	3.67					
			9.79			Rock
	0.67					
W&V-301			9.02			1" IRON PIPE (ALONG PIMA RD) W ¼ SEC. 6
	4.37					
			5.79			Rock
	5.12					
			4.97			Rock
	7.82					
T.B.M.			5.88			B/C 4/11 McKellips & Pima
	4.17					
			5.88			Rock
	4.80					
			5.75			Rock
	4.92					
			5.87			Rock
	5.68					
			4.82			Rock

	+	HI	−	ELEV	ADJ EL	DESCRIPTION
	5.51					
			4.53			Rock
	5.67					
			6.47			Rock
	4.60					
V-P.O.B			3.88			B/c H/H McKellips/McCintock (Hayden)
	201.53		201.44			
	END		Loop			

	+	HI	=	ELEV	ADJ. EL	DESCRIPTION
						11/7/91 — H. D. ARCHER, X S. CROY
H&V-513						(B/C 4/H) @ INDIAN SCHOOL / NH MESA DRIVE N.E. COR. SEC. 27
	6.89					FROM Loop 6-7H BK 1347 PG. 27
T.P.			4.61			ROCK
	6.12					
T.P.			5.13			ROCK
	4.65					
T.P.			4.63			ROCK
	5.42					
T.P.			5.18			ROCK
	5.59					
T.P.			13.64			ROCK
	12.23					
T.B.M.		☆	3.82			A C OF E B/C ±30' N/E OF N/E SEC COR OF 26
	5.85					
T.P.			8.07			ROCK
	6.69					
T.P.			3.69			ROCK
	7.75					
H&V-511			5.36			SET R.B. ±80 N. OF BEELINE, ±2300' N/E OF N/E COR OF 26
	7.72					
T.P.			4.84			ROCK
	6.98					
T.P.			2.72			ROCK

	+	HI	-	ELEV	ADJ. EL	DESCRIPTION
	7.43					
T.P.			4.11			ROCK
	6.41					
T.P.			9.85			ROCK
	2.05					
T.P.			10.70			ROCK
	6.21					
T.P.			3.01			ROCK
	4.53					
T.P.			6.44			ROCK
	3.70					
V-510			3.73			SET PK E OF BELLINE IN SEC 19
	6.84					
T.P.			2.63			ROCK
	7.47					
T.P.			2.40			ROCK
	6.39					
T.P.			1.59			ROCK
	7.35					
T.P.			2.97			ROCK
	5.86					
T.P.			3.71			ROCK
	5.13					
T.P.			5.94			ROCK

	+	HI	−	ELEV.	ADJ. EL	DESCRIPTION
	3.81					
T.P.			5.95			ROCK
	4.64					
T.B.M.		★	6.77			SET RB ± 100 SO. OF ℄ @ SALT RIVER ROCK ℄ SAWA ENTRANCE
	*		*			℄ BEELINE HWY, W. SIDE RW FENCE COR. (MP 184)
	7.01					LOOP BACK
T.P.			4.83			ROCK
	5.90					
T.P.			4.09			ROCK
	5.86					
T.P.			5.79			ROCK
	4.29					
T.P.			6.19			ROCK
	3.48					
T.P.			6.84			ROCK
	2.66					
T.P.			7.81			ROCK
	2.87					
T.P.			7.71			ROCK
	2.88					
T.P.			7.22			PK NAIL
	3.36					
T.P.			4.08			ROCK
	6.33					

	+	HI	—	ELEV	ADJ. EL	DESCRIPTION
TP			4.04			Rock
	5.13					
T.P			7.63			Rock
	5.06					
T.P			1.43			Rock
	11.35					
T.P.			1.96			Rock
	4.48					
T.P.			6.63			Rock
	3.72					
T.P.			6.69			Rock
	3.78					
T.P.			6.86			Rock
	3.74					
T.P.			7.30			R.B.
	6.39					
T.P.			10.00			Rock
	4.29					
T.P.			6.08			Rock
	8.49					
T.P.			6.25			B/C
	4.41					
T.P.			8.95			Rock
	9.01					

STA	+	HI	—	ELEV	ADJ. EL	DESCRIPTION
T.P.			3.68			ROCK
	4.31					
T.P.			5.75			ROCK
	5.33					
T.P.			6.01			ROCK
	5.90					
T.P.			5.33			ROCK
	5.22					
T.P.			6.08			ROCK
	4.80					
H&V-513			7.09			V-IN P.O.B.
		END		THIS		LOOP
	293.76		293.81			

	+	H.I.	−	ELEV.	DESCRIPTION
T.B.M.					1/2" Rebar Feeding Hwy. & Salt River Sand & Gravel Entrance
	5.40				W. Side - Cor. Fence (Loop G-5E Pg. 21)
T.P.			4.32		Rock
	7.57				
T.P.			3.47		Rock
	9.38				
T.B.M.			3.55		S.W. Cor. Small Bridge A Conc. Base
	3.06				With Burnt off 1/2 Iron (Painted Blue & White)
T.P.			4.27		Rock
	6.84				
T.P.			5.99		Rock
	6.24				
T.P.			5.50		Rock
	3.82				
T.P.			5.36		Rock
	4.11				
T.P.			5.57		Rock
	4.76				
V-506			5.69		1/2" Rebar I.C. Northside Canal Rd.
	6.37				
T.P.			4.60		Rock

	+	H.I.	−	ELEV.	DESCRIPTION
	5.08				
T.P.			6.90		Rock
	8.18				
T.P.			5.49		Rock
	5.65				
T.P.			4.69		Rock
	6.75				
T.P.			5.03		Rock
	7.07				
T.P.			4.94		Rock
	6.11				
T.P.			10.35		Rock
	2.35				
HBJ-505			6.12		B/C ON TRON POST N.E. SEC. COR. 22
	14.57				
T.P.			5.79		Rock
	7.89				
T.P.			5.55		Rock
	7.74				
"			2.32		"
	8.54				
"			1.83		"
	9.38				
"			5.21		"
	6.74				

	+	H.I.		ELEV.		DESCRIPTION
H.B.S. 504			4.75			E 1/4 COR. SEC. 15 (B/C ON 1" Iron Pipe)
	2.31					
			3.96			Rock
	4.10					
			6.32			"
	4.92					
			9.14			"
	6.03					
			6.55			"
	3.44					
			6.01			"
	6.03					
			6.04			"
	5.07					
			5.94			"
	5.89					
			6.19			"
	5.56					
			6.67			"
	5.41					
			6.99			"
	4.18					
			7.60			"
	3.77					

		H.I.		ELEV.	DESCRIPTION
	4				
T.P.			7.05		Rock
	4.79				
"			6.50		"
	4.61				
"			4.27		"
	4.14				
TBM			4.17		S.W. Cor. Single Lane Bridge @ Canal (7" down in ground)
	5.22				
T.P.			12.31		Rock
	3.64				
T.P.			6.39		Rock
	4.28				
✓ P.O.B.			5.45		T.B.M. @ Baseline Hwy & Gravel Rd (½" R.b. @ W 45' Cor. Fence)
	239.88		239.87		

LIETZ
SINCE 1882

1844

SALT - GILA
VERTICAL
BR. G-6

LIETZ
SINCE 1882

ECONOMY FIELD BOOK

FORMULAE FOR SOLVING RIGHT TRIANGLES

$\sin A = \frac{a}{c} = \cos B$; $\cot A = \frac{b}{a} = \tan B$

$\cos A = \frac{b}{c} = \sin B$; $\sec A = \frac{c}{b} = \csc B$

$\tan A = \frac{a}{b} = \cot B$; $\csc A = \frac{c}{a} = \sec B$

Given	Required		Solution
A, c	B, a, b	$B = 90° - A$	$a = c \sin A$, $b = c \cos A$
A, b	B, a, c	$B = 90° - A$	$a = b \tan A$, $c = \frac{b}{\cos A}$
A, a	B, b, c	$B = 90° - A$	$b = a \cot A$, $c = \frac{a}{\sin A}$
a, c	A, B, b	$\sin A = \frac{a}{c}$, $B = 90° - A$	$b = \sqrt{(c+a)(c-a)}$
a, b	A, B, c	$\tan A = \frac{a}{b}$, $B = 90° - A$	$c = \sqrt{a^2 + b^2}$

FORMULAE FOR SOLVING OBLIQUE TRIANGLES

Given	Required		Solution
A, a, b	B, c	$\sin B = \frac{b \sin A}{a}$	$c = \frac{a \sin C}{\sin A}$
A, B, a	b	$b = \frac{a \sin B}{\sin A}$	
a, b, C	A, c	$A + B = 180° - C$	$c = \frac{a \sin C}{\sin A}$
a, b, c	Area	Side $= \frac{a+b+c}{2}$	area $= \sqrt{s(s-a)(s-b)(s-c)}$
A, b, c	Area	area $= \frac{bc \sin A}{2}$	
A, B, C, a	Area	area $= \frac{a^2 \sin B \sin C}{2 \sin A}$	

"MADE" IN U.S.A.

✓ TITLE PAGE

SALT-GILA VERTICAL

INDEX

PG	DESC
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3 – 4	BENCH LOOP G-6B
5 – 6	BENCH LOOP G-6C
7 – 10	BENCH LOOP G-6D
11 – 14	BENCH LOOP G-6E
15 – 16	BENCH LOOP G-6F
17 – 20	BENCH LOOP G-6G
21 – 25	BENCH LOOP G-6H
26 – 29	BENCH LOOP G-6I

CON'T

INDEX

PG.	DESC
30 → 31	BENCH LOOP G-6J
32 → 33	BENCH LOOP G-6K

B.M.	+	H.T.	—	ELEV.	ADJ. EL.	DESC.
T.B.M.						BOULDER ON TOP OF HOWL SE COR. OF COTTON LN. & M.C. 85 FROM LOOP 6-2C BK. 1342 PG. 13
	1.25					
T.P.			7.87			Rock
	1.38					
T.P.			7.85			Rock
	5.36					
T.P.			6.27			Rock
	3.95					
T.P.			6.94			Rock
	5.15					
H/V-107			6.34			SET 1/2" REBAR E. SHOULDER OF COTTON LN. ± 0.85 MI. S. OF M.C. 85.
					RETURN	LOOP
	6.20					
T.P.			4.48			Rock
	6.34					
T.P.			3.75			Rock
	6.83					

B.M.	+	H.I.	—	ELEV.	ADJ. EL.	DESC.
T.P.			6.18			Rock
	8.02					
T.P.			1.33			Rock
	7.70					
T.B.M.			1.15			V-IN P.O.B.
	52.18		52.16	1.7 MI.		

10-26-91
SUNNY, COOL
A - C. MIHELICH
R - T. PRICE

END DAY

B.M.	+	H.I.	−	ELEV.	ADJ. EL	DESC.
T.B.M.						3/4" REBAR IN 1/4 INT. BELOAT (LOWER RIVER) & MILLER, FROM LOOP G-2E BK. 1342 PG. 20
	5.84					
T.P.			6.23			ROCK
	2.60					
T.P.			6.84			ROCK
	3.87					
T.P.			6.76			ROCK
	4.92					
T.P.			9.46			ROCK
	4.96					
T.P.			5.47			ROCK
	7.81					
T.P.			8.56			ROCK
	8.14					
V-165			6.93			SET 5/8" REBAR ± 3/4 MI. S. OF BELOAT (LOWER RIVER RD.) & ± 1/2 MI. E. OF MILLER RD. IN SEC. 8
				— RETURN		LOOP —
	6.69					

B.M.	+	H.I.	−	ELEV.	ADJ. ±2	DESC.
T.P.			8.45			Rock
	8.88					
T.P.			9.28			Rock
	7.02					
T.P.			5.27			Rock
	9.58					
T.P.			4.68			Rock
	6.67					
T.P.			4.18			Rock
	6.60					
T.P.			4.43			Rock
	7.78					
T.P.			4.61			Rock
	5.82					
T.B.M.			6.09			P.O.B.
	97.18		97.24		2.5 mi.	

10-28-91
SUNNY, COLD
A-T. PRICE
B-C. MILHELICH

B.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC.
V-101						B/C IN H/H IN 115TH AVE. & BROADWAY RD FROM LOOP G-1A BK. 1341 PG. 2
	6.09					
T.P.			4.24			Rock
	7.62					
T.P.			0.54			Rock
	11.01					
T.P.			3.72			Rock
	7.53					
T.P.			3.43			Rock
	7.88					
T.P.			2.80			Rock
	5.60					
T.P.			6.81			Rock
	2.78					
T.P.			9.47			Rock
	4.92					
H&V-193			3.56			SET P.K. NAIL & 107TH AVE. ± 0.5 MI. N. OF BROADWAY.
					RETURN	LOOP
	3.72					

B.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC.
T.P.			5.25			Rock
	9.41					
T.P.			2.47			Rock
	6.63					
T.P.			6.19			Rock
	3.12					
T.P.			7.67			Rock
	2.69					
T.P.			7.13			Rock
	3.45					
T.P.			10.96			Rock
	0.21					
T.P.			6.89			Rock
	4.50					
V-101			6.01			V-IN P.O.B.
	87.16		87.14	3.0 MI.		

10-28-91
SUNNY, COLD
T-C. MILHELICH
R-T. PRICE

B.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC
V-170						P.K. NAIL W/EXIST. PANEL @ INT. OF AIRPORT RD. & ELLIOT RD. (WOT SEC. COR.) FROM Loop G-4 BK. 1344 PG. 23
	11.38					
T.P.			4.48			Rock
	6.62					
T.P.			3.32			Rock
	7.64					
T.P.			2.04			Rock
	6.63					
T.P.			4.69			Rock
	10.37					
T.B.M.			3.74			B/C IN POTHOLE ± 19' B/W. A/C @ INT. OF AIRPORT RD. & NARRAMORE RD.
	3.27					
T.P.			9.04			Rock
	2.23					
T.P.			16.86			Rock
	21.33					
T.P.			1.09			Rock
	6.51					

B.M.	+	H.I.	−	ELEV	ADJ. EL	DESC
T.P.			4.34			ROCK
	4.19					
H&V-168			9.63			B/C IN POTHOLE SEC COR 14 13 23 24 INT. NARRAMORE RD & DEAN RD
	2.28					
S.S.			0.28			(SIDE-SHOT) A.C. BY B/C FOR PANEL ELEV
T.P.			13.61			ROCK
	2.83					
T.P.			6.83			ROCK
	2.41					
T.B.M.			6.29			NAIL IN P.P. NE COR. INT. OF DEAN RD & EAGLE MTN. RD
	0.34					
T.P.			15.93			ROCK
	0.56					
H&V-169			7.42			SET 5/8" REBAR @ END OF DEAN RD ± 1.0 MI. N. OF NARRAMORE RD.
				— RETURN		LOOP —
	7.18					

B.M.	+	H.I.	−	ELEV	ADJ EL	DESC.
T.P.			0.33			Rock
	15.57					
T.P.			1.30			Rock
	9.94					
T.P.			3.13			Rock
	12.22					
T.P.			0.59			Rock
	10.44					
T.P.			3.77			Rock
	6.91					
T.P.			6.78			Rock
	3.93					
T.P.			13.38			Rock
	0.07					
T.P.			0.57			Rock
	8.34					
T.P.			2.46			Rock
	8.47					
T.P.			6.61			Rock
	1.57					

B.M.	+	H.I.	−	ELEV.	ADJ. el	DESC.
T.P.			8.38			Rock
	5.73					
T.P.			9.85			Rock
	3.84					
T.P.			7.12			Rock
	3.20					
T.P.			5.13			Rock
	2.47					
V-170			9.73			P.O.B.
	188.47		188.44		6.0 mi.	

10-30-91
Cloudy, cold
A - T. Price
R - C. Milleich

B.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC.
T.B.M.						NAIL IN P.P. NE COR. DEAN RD. & EAGLE MTN RD. FROM Loop 6-6D PG. 8
	5.45					
T.P.			7.72			Rock
	4.97					
T.P.			8.04			Rock
	0.36					
T.P.			11.98			Rock
	2.84					
T.P.			6.26			Rock
	3.85					
T.P.			1.49			Rock
	13.46					
T.P.			10.05			Rock
	24.45					
T.P.			14.83			Rock
	16.50					
T.P.			0.42			Rock
	10.93					
T.P.			14.52			Rock
	6.52					

B.M.	+	H.I.	−	ELEV.	ADJ. EL	DESC
T.P.			1.41			Rock
	3.57					
T.P.			21.40			Rock
	1.29					
T.P.			21.07			Rock
	9.53					
T.P.			15.12			Rock
	6.25					
T.P.			2.06			Rock
	14.14					
T.P.			0.58			Rock
	20.55					
T.P.			0.94			Rock
	22.43					
T.P.			0.29			Rock
	23.30					
T.P.			0.30			Rock
	24.35					
T.P.			2.34			Rock
	5.80					

B.M.	+	H.I.	−	ELEV	ADJ. EL.	DESC.
V-167			2.42			B.L.M. B/C. ON 3" I.P. 16/21 15/22 T1S, R3W. (1958)
				— RETURN		LOOP —
	2.15					
S.S.			3.20			(SIDESHOT) 0.6 NEXT TO MONUMENT FOR PANEL ELEV.
T.P.			24.96			Rock
	0.08					
T.P.			24.93			Rock
	4.73					
T.P.			23.51			Rock
	0.67					
T.P.			21.87			Rock
	2.17					
T.P.			18.37			Rock
	2.02					
T.P.			5.14			Rock
	14.55					
T.P.			5.06			Rock
	21.52					

B.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC.
T.P.			0.10			Rock
	19.08					
T.P.			8.63			Rock
	10.83					
T.P.			22.85			Rock
	13.39					
T.P.			24.44			Rock
	4.69					
T.P.			12.12			Rock
	3.88					
T.P.			1.21			Rock
	7.07					
T.P.			0.16			Rock
	11.96					
T.P.			5.67			Rock
	8.64					
T.B.M.			5.81			√- IN P.O.B.
	347.97		348.07		5.5 mi.	

10-31-91
SUNNY, COOL
A- C. MINEAICH
R- T. PRICE

B.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC.
T.B.M.						Spike nail SE side of Dirt Rd. @ Int of Jeep Trail ± 1600 NE of V-174 From Loop G-7A Bk. 1347 Pg. 3
	2.13					
T.P.			8.43			Rock
	4.33					
T.P.			9.51			Rock
	3.00					
T.P.			10.80			Rock
	2.56					
T.P.			11.19			Rock
	2.94					
V-175			21.80			Set 5/8" rebar N. side of small hill ± 3/4 mi. N. of T.B.M.
				— RETURN		Loop —
	23.99					
T.P.			0.86			Rock
	10.48					

B.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC
T.P.			1.48			Rock
	8.44					
T.P.			3.03			Rock
	7.65					
T.P.			3.34			Rock
	8.39					
T.B.M.			3.52			P.O.B.
	73.91		73.96		15 mi.	

10-31-91
Sunny, cool
A-T. Price
B-C. Mihelich

B.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC.
T.B.M.						B/C IN H/H INT. PRIEST RD. & UNIVERSITY FROM LOOP G-7G BK 1347 PG. 24
	6.07					
T.P.			4.48			T.B.C.
	6.37					
T.P.			4.95			T.B.C.
	7.01					
V-341			5.79			B/C IN H/H INT. HARDY & UNIVERSITY
	7.13					
S.S.			6.666			(SIDESHOT) A.C. NEXT TO MONUMENT FOR PANEL ELEV.
T.P.			4.15			T.B.C.
	7.02					
T.P.			3.30			T.B.C.
	6.81					
T.B.M.			3.21			B/C IN H/H INT. FARMER & UNIVERSITY
	7.83					
T.P.			3.66			T.B.C.
	6.54					
T.P.			4.36			T.B.C.
	6.90					

B.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC.
T.P.			4.77			T.B.C.
	6.32					
T.P.			4.52			T.B.C.
	10.49					
T.P.			9.07			T.B.C.
	1.62					
H&V-342			6.93			B/C IN H/H INT. RURAL RD & UNIVERSITY
	5.04					
S.S.			4.56			(SUPESHOT) A.C. NEXT TO MONUMENT FOR PANEL ELEV.
T.P.			4.97			T.B.C.
	6.47					
T.P.			5.13			T.B.C.
	5.75					
T.B.M.			5.38			B/C IN H/H INT. DORSEY LN. & UNIVERSITY
	6.78					
T.P.			4.67			T.B.C.
	7.01					
T.P.			4.76			T.B.C.
	7.07					

B.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC.
V-343			5.15			B/C IN H/N INT McCLINTOCK & UNIVERSITY
				— RETURN		LOOP —
	4.95					
S.S.			4.27			(SIDESHOT) A.C. NEXT TO MONUMENT FOR PANEL ELEV.
T.P.			7.11			T.B.C.
	4.91					
T.P.			7.53			T.B.C.
	4.91					
T.P.			6.11			T.B.C.
	5.10					
T.P.			6.36			T.B.C.
	4.82					
T.P.			6.31			T.B.C.
	7.30					
T.P.			0.25			T.B.C.
	4.53					
T.P.			7.98			T.B.C.
	5.40					

B.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC.
T.P.			6.86			T.B.C.
	4.73					
T.P.			6.54			T.B.C.
	4.64					
T.B.M.			6.56			B/C IN H/H INT. MILL AVE & UNIVERSITY
	5.96					
T.P.			7.28			T.B.C.
	5.25					
T.P.			8.98			T.B.C.
	3.05					
T.P.			8.14			T.B.C.
	4.10					
T.P.			7.40			T.B.C.
	4.54					
T.P.			6.88			T.B.C.
	4.84					
T.P.			6.12			T.B.C.
	4.66					
T.P.			5.03			T.B.C.
	5.16					
T.B.M.			6.33			V - IN P.O.B.
	207.08		207.02	6.0 MI.		

11-4-91
SUNNY, COOL
T - C MIHELICH
R - T. PRICE

B.M.	+	H.I.	−	ELEV.	ADJ. EL	DESC.
V-343						B/C IN H/H INT. McCLINTOCK & UNIVERSITY FROM LOOP G-66 PG 19 THIS BOOK
	6.49					
T.P.			4.46			CURB S. SIDE OF UNIV
	6.68					
T.P.			1.87			CURB
	6.64					
T.B.M.			6.15			B/C IN H/H INT. SMITH RD & UNIVERSITY
	6.79					
T.P.			4.21			CURB
	6.19					
T.P.			5.16			CURB
	6.33					
T.B.M.			5.31			B/C IN H/H INT. UNIVERSITY & PRICE RD. S.B. @ Fwy. LOOP 101 INTERCHANGE
	7.94					
T.P.			5.15			CURB
	6.03					
T.P.			4.56			CURB
	6.48					

B.M.	+	H.I.	−	ELEV.	ADJ. EL	DESC
H&V-344			5.21			B/C IN H/H INT. EVERGREEN & UNIVERSITY
	8.07					
S.S.			7.38			A.C. NEXT to MON. FOR PANEL ELEV.
T.P.			2.82			CURB
	13.47					
T.P.			5.19			ROCK ALONG CANAL BANK
	4.30					
T.B.M.			1.40			INK ☒ ON B/WALK NW COR OF CANAL BRIDGE ON DOBSON RD.
	3.55					
T.P.			4.05			ROCK ALONG CANAL BANK
	4.73					
T.P.			7.43			" " " "
	5.96					
T.P.			3.60			B/WALK S. SIDE OF 8TH ST.
	15.82					
T.P.			0.09			CURB
	7.72					

B.M.	+	H.I.	−	ELEV.	ADJ. EL	DESC.
T.P.			2.97			CURB
	7.69					
T.P.			3.61			CURB
	6.90					
H&V-519			5.68			B/C IN H/H INT. 8TH ST. & ALMA SCHOOL RD
				— RETURN		LOOP —
	4.54					
S.S.			3.58			A.C. NEXT TO MON. FOR PANEL ELEV
T.P.			8.88			CURB
	3.04					
T.P.			7.11			CURB
	3.00					
T.B.M.			13.27			B/C IN H/H JCT 8TH ST. & LONGMORE
	1.46					
T.P.			9.18			ROCK ALONG CANAL BANK
	4.90					
T.P.			5.64			" " " "
	8.41					

B.M.	+	H.T.	−	ELEV	ADJ. EL	DESC
T.P.			5.88			ROCK ALONG CANAL BANK
	5.21					
T.P.			4.29			" " " "
	3.91					
T.P.			9.16			CURB N SIDE OF UNIV
	0.35					
T.P			9.94			A.C. " " " "
	3.40					
T.P.			7.42			"
	4.57					
T.P.			6.31			"
	5.51					
T.P.			6.89			"
	4.06					
T.P.			6.82			"
	4.53					
T.P.			6.55			"
	4.84					
T.P.			6.87			"
	3.72					

B.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC.
T.P.			7.51			CURB
	5.14					
T.P.			7.13			"
	5.86					
V-343			6.43			P.O.B.
	214.23		214.20		6.0 mi.	

11-5-91
SUNNY, COOL
A - T. PRICE
B - C. MIHELICH

B.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC.
V-518						B/C IN H/H INT DOBSON RD. SOUTH AND McDOWELL RD FROM LOOP G-SD BK 1345 PG. 16
	5.30					
T.P.			4.08			Rock
	7.34					
T.P.			3.54			Rock
	7.43					
T.B.M.			2.83			B/C FLUSH INT. OAK ST. & DOBSON
	5.57					
T.P.			4.60			Rock
	5.55					
T.P.			5.80			Rock
	5.61					
T.B.M.			6.63			B/C IN H/H INT. OAK ST. & LONGMORE RD.
	6.61					
T.P.			5.12			Rock
	6.30					
T.P.			4.92			Rock
	5.99					
H&V-516			4.86			N. RIM OF H/H INT. OAK ST. & ALMA SCHOOL RD. (SURVEY MON. INACCESSABLE. ±3' BELOW R.M. HAS P.K STRADDLERS FOR G.P.S.)

B.M.	+	H.I.	−	ELEV.	ADJ. EL	DESC.
T.P.	2.80					
T.P.			6.47			Rock
	4.01					
T.P.			8.74			Rock
	2.56					
H&V-517			6.49			B/C IN H/H INT. ALMASCHOOL RD & McDOWELL
	1.08					
S.S.			0.67			(SIDESHOT) A.C. NEXT TO MONUMENT FOR PANEL ELEV.
T.P.			5.76			Rock
	3.21					
T.P.			5.13			Rock
	3.96					
T.P.			7.58			Rock
	2.32					
T.B.M.			6.52			FD. P.K. NAIL INT. McKELLIPS RD & ALMASCHOOL
	6.53					
T.P.			5.27			Rock
	5.47					

B.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC.
T.B.M.			6.15			MCHD B/C IN H/H IN S.B. LANES OF ALMA SCHOOL RD. ± 1/4 MI. S. OF MCKELLIPS RD.
	2.75					
T.P.			2.74			Rock
	5.60					
T.P.			7.30			Rock
	9.24					
H&V-520			8.08			B/C IN H/H INT. McLELLAN & ALMA SCHOOL RD.
	5.80					
S.S.			4.85			(SIDESHOT) A.C NEXT TO MONUMENT FOR PANEL ELEV.
T.P.			6.23			Rock
	5.24					
T.P.			5.78			Rock
	5.07					
T.P.			0.34			T.B.C.
	24.16					
T.P.			0.69			T.B.C.
	5.32					

B.M.	+	H.I.	−	ELEV.	ADJ EL.	DESC.
T.P.			4.44			Rock
	6.87					
H&V-519			6.09			B/C IN H/H INT. 8TH ST. & ALMA SCH. RD.
						FROM LOOP G-6H PG. 23 THIS BOOK
	157.69		142.18	4.5 MI.		

11-6-91
SUNNY, COOL
A - C. M. HELICH
P - T. PRICE

B.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC.
T.B.M.						PK NAIL @ I&T McKellips & Alma School From Loop 6-6T Pg. 27 This Book
	2.62					
T.P.			18.56			Rock
	4.97					
T.P.			4.14			Rock in River Bottom
	6.11					
T.P.			0.59			Rock
	20.86					
T.P.			4.17			Curb
	7.26					
T.P.			5.23			Curb
	7.38					
V-521			4.32			PK nail in Carl's Jr. Parking Lot NW cor. McKellips & Country Club
				— RETURN		Loop —
	3.69					
T.P.			6.38			Curb
	3.27					

B.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC.
T.P.			7.56			A.C.
	5.17					
T.P.			21.09			Rock
	2.21					
T.P.			6.65			Rock in River Bottom
	6.46					
T.P.			0.90			Rock
	15.09					
T.B.M.			5.48			P.O.B.
	85.09		85.07	2.0 MI.		

11-7-91
Sunny, cool
T - T. Price
R - C. Mihelich

B.M.	+	H.I.	−	ELEV.	ADJ. EL	DESC.
T.B.M.						Ink "X" on B/walk NW cor. Canal Beds & Dobson From Loop G-6H Pg 22
	0.30					
T.P.			12.07			T.B.C.
	4.98					
T.P.			6.06			T.B.C.
	6.42					
T.B.M.			5.19			B/C in H/H Int. 8th St. & Dobson
	3.55					
T.P.			7.64			T.B.C.
	5.67					
V-345			8.27			Set conc. nail & Riverview Park Rd. ± 1/4 mi. N of 8th St. @ sew. disp. ent.
				— RETURN		LOOP —
	7.96					
T.P.			5.56			T.B.C.
	8.03					
T.P.			3.77			T.B.C.
	4.83					

B.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC.
T.P.			5.73			T.B.C.
	6.37					
T.P			2.16			T.B.C.
	10.34					
T.B.M.			1.99			√- IN P.D.B.
	58.45		58.44	1.5 MI.		

11-7-91
SUNNY, cool
A- C. MIHELICH
R- T. PRICE

B.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC

1347

SACT GNA

VERTICAL

BK. 6-7

LIETZ

SINCE 1882

ECONOMY FIELD BOOK

No. 8162-05

FORMULAE FOR SOLVING RIGHT TRIANGLES

$\sin A = \frac{a}{c} = \cos B$ | $\cot A = \frac{b}{a} = \tan B$

$\cos A = \frac{b}{c} = \sin B$ | $\sec A = \frac{c}{b} = \operatorname{cosec} B$

$\tan A = \frac{a}{b} = \cot B$ | $\operatorname{cosec} A = \frac{c}{a} = \sec B$

Given	Required	Solution
A, c	B, a, b	$B = 90^\circ - A$; $a = c \sin A$; $b = c \cos A$
A, a	B, c, b	$B = 90^\circ - A$; $b = a \tan A$; $c = \frac{a}{\cos A}$
A, b	B, a, c	$B = 90^\circ - A$; $a = b \cot A$; $c = \frac{b}{\sin A}$
a, c	A, B, b	$\sin A = \frac{a}{c}$; $\cos B = \frac{a}{c}$; $b = \sqrt{(c+a)(c-a)}$
a, b	A, B, c	$\tan A = \frac{a}{b}$; $\cot B = \frac{a}{b}$; $c = \sqrt{a^2+b^2}$

FORMULAE FOR SOLVING OBLIQUE TRIANGLES

Given	Required	Solution
A, a, b	B, c	$\sin B = \frac{b \sin A}{a}$; $c = \frac{a \sin C}{\sin A}$
A, B, a	b, c	$b = \frac{a \sin B}{\sin A}$; $c = \frac{a \sin C}{\sin A}$
a, b, C	A, c	$A + B = 180^\circ - C$; $c = \frac{a \sin C}{\sin A}$
a, b, c	Area	side $= \frac{a+b+c}{2} = s$; area $= \sqrt{s(s-a)(s-b)(s-c)}$
A, b, c	Area	area $= \frac{bc \sin A}{2}$
A, B, C, a	Area	area $= \frac{a^2 \sin B \sin C}{2 \sin A}$

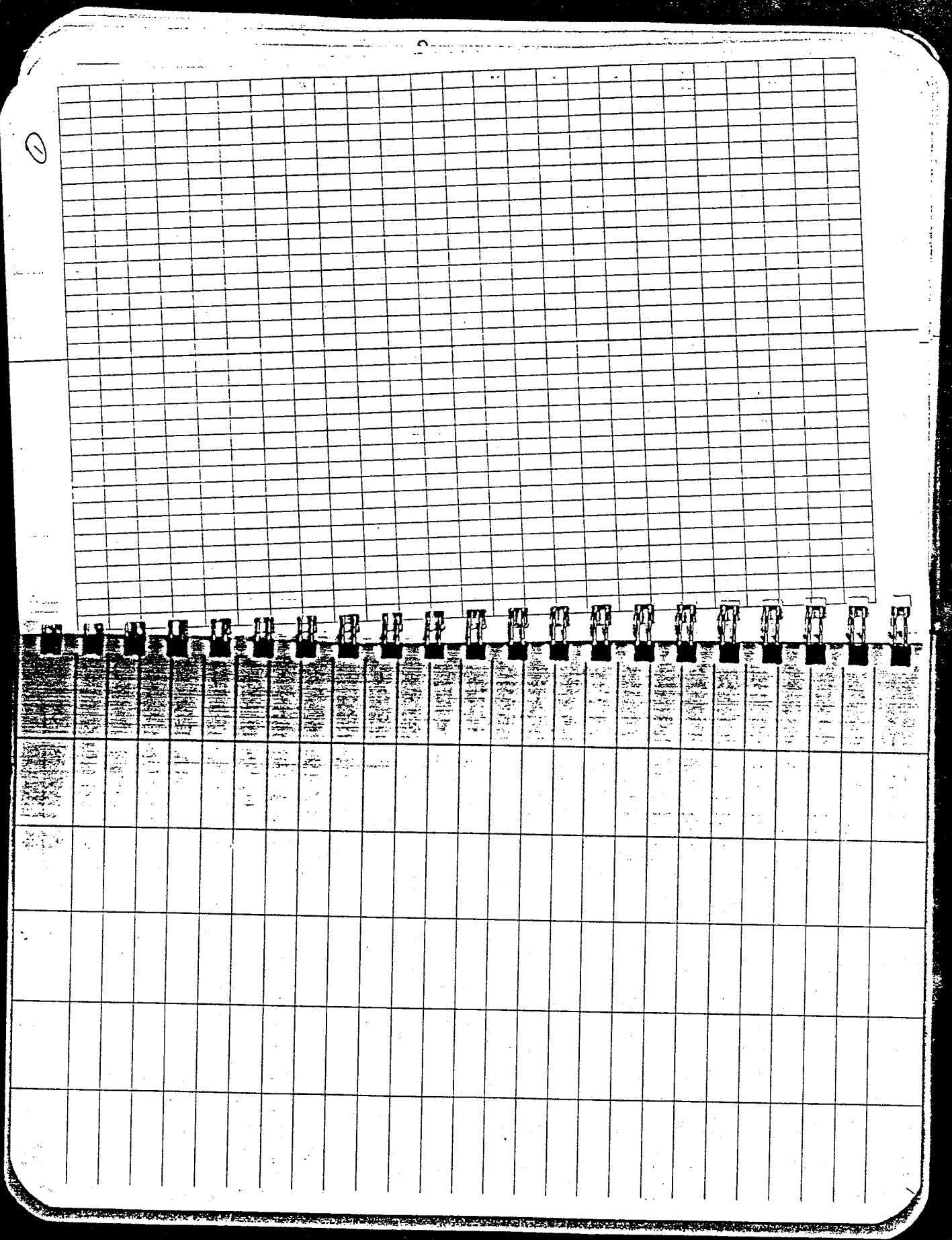
MADE IN U.S.A.

✓ TITLE PAGE

SALT-GILA VERTICAL

INDEX

PG	DESC
1	
2-4	BENCH LOOP G-7A
5-6	" " G-7B
7-8	" " G-7C
9-10	" " G-7D
11-14	" " G-7E
15-18	" " G-7F
19-24	" " G-7G
25-30	" " G-7H
31-36	" " G-7I



10-31-91

T. C. SCHULTE
R. C. KEEVER

	+	HI	−	ELEV.	DESC.
HV-173 TBM					B/C H/H @ ICT. RAINBOW VALLEY RD & ELLIOT RD.
	6.57				FROM Loop Co-IC BK 1B41 PG. 14
T.P.			5.67		T.B.C. ELLIOT RD.
	3.60				
T.P.			3.17		" "
	10.92				
T.P.			3.74		" "
	6.75				
T.P.			6.71		" "
	11.18				
T.P.			0.31		" "
	10.62				
T.P.			2.55		BULNOSE T.B.C. MEDIAN ELLIOT RD.
	12.20				
T.P.			9.29		ROCK
	4.46				
T.P.			5.72		"
	7.13				

11-31-91

	+	HI	-	ELEV	DESC.
T.P.			16.01		ROCK
	2.04				
V-174			4.90		1/2" REBAR
	5.61				
T.P.			1.70		ROCK
	0.28				
T.P			6.03		"
	4.96				
TBM			5.51		LARGE SPIKE RWL BL. FLAGGING BY JCT OF JEEP TRAIL LEADING TO V-175 RETURN LOOP
	6.12				
T.P.			7.15		ROCK
	7.77				
T.P.			2.67		"
	3.15				
T.P.			3.52		"
	18.65				
T.P.			8.08		"
	5.76				
T.P.			4.54		"
	8.28				
T.P.			12.92		T.B.C. ELLIOT RD.
	1.53				

10-31-91

	+	HI	-	ELEV.	DESC.
T.P.			8.98		T.B.C. ELLIOT RD.
	2.92				
T.P.			13.04		" "
	6.15				
T.P.			5.06		" "
	3.60				
T.P.			6.99		" "
	1.42				
T.P.			7.93		" "
	6.28				
HV 173 TBM			5.73		✓ IN POB B/6 H/H JCT. RAINBOW VALLEY RD & ELLIOT RD.
	157.95	D.H. +0.03	157.92		END LOOP
		5 MI. LOOP			

10/31/91 — C. KOEVER, C. SCHULTE

	+	HI	-	ELEV.	
T.B.M.					
	5.26				
T.P			5.31		
	2.65				
T.P.			9.26		
	0.24				
T.P.			2.50		
	5.44				
T.P.			8.67		
	9.39				
T.P.			1.92		
	19.16				
HV-176 TBM			0.83		
" SS.			3.28		
	0.77				

(CONT)

DESC

P.O.B.
LARGE SPIKE R.W. FROM ALIGNING BY INT. OF JEEP TRAIL LEADING TO V-775
(FRM. LP. G-7A PG. 3 THIS BOOK)

NAIL

ROCK (OP)

NAIL

NAIL

1"x2" HUB

SECTION COR. # 32,10,11 (FOUND)
B.C. ON 2" PIPE CONTROL PT - HV. #176

ORIGINAL GROUND

RETURN LOOP OFF OF BOSS CAP (SEC)

10/31/91

T. C. KEEVER
R C. SCHULTE

DESC.

	+	HI	−	ELEV
T.P.			19.34	
	2.38			
T.P.			9.67	
	9.23			
T.P.			6.92	
	4.04			
T.P.			0.83	
	9.42			
T.P.			3.56	
	5.64			
TBM: T.P.			4.79	
	73.62	Diff +0.02	73.60	

1"x2" 14.08

"

"

ROCK (OP)

" "

√-in P.O.B. LARGE SPIKE W/ R,W,I & BLUE FLAGGING by JCT OF JEFFTRAIL
END LOOP

1.5 MI. LOOP

10-31-91

T C SCHULTE
C. KEEVER

	+	HI	−	ELEV.	DESC.
HV-176 TBM					B/C ON 2" I.P. SEC COR. 3, 2, 10, & 11 HV 176 (FROM LOOP G-7B PG. 5 THIS BOOK)
	3.86				
T.P.			12.57		ROCK
	8.37				
T.P.			1.55		"
	10.47				
T.P.			2.47		"
	13.51				
T.P.			1.43		"
	8.15				
HV-178			13.24		B/C ON 1" PIPE IN WASH 1/4 COR SEC. 2, 1
*SS			14.81		9/6
					RETURN LOOP
	13.45				
T.P.			9.60		ROCK
	2.05				
T.P.			13.52		"
	1.25				
T.P.			8.68		"

10-31-91

	+	HI	−	ELEV	DESC.
	1.36				
T.P.			5.44		ROCK
	4.34				
T.P.			1.73		"
	8.73				
HV 176 TBM			5.29		✓ IN POR B/C ON 2" IP.
	75.541		75.52		END LOOP
		+0.02			END DAY
	2.2 MI. LOOP				

11-1-91

T C. KEEVER
C. SCHLUTE

	+	HI	-	ELEV.	DESC.
H&V-178					P.O.B. B.C. ON 1" PIPE IN WASH 1/4 COR. SEC. 32 S1 STAMPED CONTROL HV-178 (FRM. LP. G-7C PG 7 THIS BOOK)
	11.11				
T.P			9.49		1"x2" HUB
	1.79				
T.P.			8.71		" "
	0.42				
T.P.			11.34		" "
	0.46				
T.P.			11.79		" "
	1.45				
T.P.			10.83		" "
	2.32				
T.P.			19.51		" "
	2.88				

(CONT)

	+	HI	−	ELEV
T.P.			11.54	
	4.38			
V-177			5.92	
	6.07			
T.P.			0.33	
	4.95			
T.P.			0.51	
	18.31			
T.P.			1.93	
	11.14			
T.P.			0.97	
	11.02			
T.P.			0.52	
	11.00			
T.P.			0.42	
	9.91			
T.P.			2.43	
	10.81			
H&V-178			11.76	
	108.02	D.P. +0.02	108.00	
	2.0 MILE LOOP			

11-1-91 T. C. KEEVER
C. SCHULTE

DESC

1"x2" HUB

1/2" REBAR & FLAG CONTROL PT V-177

RETURN LOOP

1"x2" HUB

" "

" "

" "

" "

" "

" "

V-IN - ROB B.C. ON 1" PIPE IN WASH "1/4 COR" Sampson Corner of sec 2&11 H&V 178

END LOOP

11-1-91

C. SCHULTE
C. KEEVER

SUNNY, COOL

	+	HI	-	ELEV	DESC.
TBM					B/C IN CONC BASE S.E. COR 48 ST. & BROADWAY FROM LOOP JK 1-A BK. PG. 20
	2.98				
T.P.			1.71		T.B.C. & MEDIAN 48 ST
	19.64				
T.P.			0.64		" " "
	0.78				
T.P.			15.96		T.B.C. E. SIDE 48 ST.
	0.38				
HV-339			7.22		CONC NL IN N.B. GORE AREA 48 ST
	3.59				
T.P.			6.67		ROCK
	5.03				
T.P.			7.20		"
	3.20				
T.P.			5.00		"
	5.07				
HV-340			2.50		1/2" REBAR & FLAG S.E. COR. 48 ST. & UNIVERSITY DC
	6.07				
T.P.			6.26		T.B.C. UNIVERSITY N. SIDE

11-1-91

	+	HI	-	ELEV.	DESC
	3.67				
T.P.			6.10		T.B.C. UNIVERSITY N. SIDE
	2.77				
T.P.			6.09		" " "
	3.14				
T.P.			6.71		" " "
	3.93				
T.P.			5.78		" " "
+	4.03				
T.P.			8.98		" " "
	4.90				
T.P.			4.15		BOLT ON F.H. W. OF INT 40 ST. & UNI. DR.
	1.58				
V-338			7.28		B/C H/H INT. 38 ST. & UNIVERSITY DR.
* S.S.			6.76		FS. " " " "
	9.48				
T.P.			3.46		T.B.C. 38 ST E. SIDE
	6.01				
T.P.			5.11		" " "
	4.33				
T.P.			5.14		"
	5.68				
T.P.			4.41		"

11-1-91

(13)

	+	HI	-	ELEV	DESC.
	5.48				
T.P.			5.68		T.B.C. 40 ST E. SIDE
	5.95				
T.P.			0.63		" " W. SIDE
	12.88				
T.P.			0.94		" " "
	16.73				
T.P.			5.13		" " "
	1.26				
T.P.			12.95		" " "
	0.56				
T.P.			10.93		" " "
	3.67				
V-337			4.30		B/C. FLUSH INT 40 ST. & BROADWAY
* S.S.			5.32		STONE IN H/H " "
	6.33				
T.P.			3.81		T.B.C. BROADWAY
	5.67				
T.P.			3.71		" "
	4.17				
T.P.			4.32		" "
	5.17				
T.P.			4.31		" "

11-1-91

	+	HI	−	ELEV.	DESC
	6.57				
T.P.			4.57		ROCK
	6.62				"
T.P.			4.15		
	6.28				
TBM			1.72		✓ IN P.O.B. B/C S.E COR. 48 ST. & BROADWAY
	183.00	T.P. +0.08	183.52		
		4 MI	LOOP		

11-4-91

T C. KEEVER
// C SCHULTE
CLEAR & WARM

	+	Hz	−	ELEV.	DESC.
TBM HV-313				1059.70	BK FLUSH @ 197th AVE & HILTON — CONTROL PT. HV-313
	4.52				FROM LOOP JK 1-D BK — PG. 26
T.P			5.07		T/C
	6.16				
T.P.			4.71		"
	5.78				
T.P.			4.77		"
	6.16				
T.P.			4.21		N. EAGLE PAV. ENG. RD. S.W. CORN. CATCH BASIN
	5.73				
T.P.			5.06		T/C
	6.37				
T.P.			2.94		"
	5.97				
HV-312			4.17		CONTROL PT. CONC NAIL ± 20' S/O FRONTAGE RD. & 17th AVE.

(cont)

11-4-91

A. CREEVEY
A. C. SCHULTE
CLEARING WORK

	+	HI	-	ELEV.	DESC.
	4.34				
T.P.			3.44		T/C.
	6.18				
T.P.			3.87		T/C.
	5.33				
T.P.			4.56		T/C
	6.97				
T.P			4.04		"
	5.54				
T.P.			3.93		"
	5.60				
T.P.			3.29		"
	6.52				
T.P.			3.34		"
	6.27				
T.P.			4.55		"
	4.44				
V-311			5.65		1/2" REBAR & FLAG 1 GOOD w/o 12 TH 55 OFF ATH RD SL 335 CONTROL PT V-311
	5.74				
T.P.			4.09		T/C
	5.34				
T.P.			4.27		T/C

(Cont)

11-4-91

A C. KEEVER
N C. SCHULTE
NORM & CLEAR

	+	HI	-	ELEV	DESC.
	6.02				
T.P.			4.19		T/C
	6.78				
T.P.			5.50		"
	3.94				
T.P.			7.53		" 1"x2" HUB
	5.57				
T.P.			6.58		T/C
	6.29				
T.P.			4.10		"
	5.67				
T.P			5.94		"
	6.84				
T.P			4.37		"
	6.16				
T.P			4.41		"
	8.63				
TBM			3.81		B.C. IN H.H. @ INT. UNIVERSITY & 24TH ST.
	4.71				
HV-310			5.02		PK. NAIL ± 30' S/O MAGNOLIA ST & 24TH ST. ADJACENT ISLAND CONTROL PT. HV-310
	11.19				
T.P.			9.80		T/C
					(CONT)

16-4-91

T C. KEEVER
A. SCHULIE WARM, CLEAR

DESC.

	+	HI	-	ELEV	
	5.97				
T.P.			4.78		
	5.87				
T.P.			8.31		
	4.23				
T.P.			4.26		
	10.51				
T.P.			5.03		
	5.43				
HV-336			5.98		
	206.77		165.57		1101.00
		Y-DIFF 41.20			
		(-0.10)	5.6 N.L. LOOP		

T/W

T/C

T/C

"

BK. H.H. CONT. BROADWAY & 24TH ST. CONTROL PT. HV-336

END LOOP

(FROM LOOP JK 1-C BK. Pg. 18)

11-5-91

T. C. SCHULTE
& C. KEEVER

	+	HI	−	ELEV.	DESC
TBM				96.26	B/C H/H @ 24 ST. & UNIVERSITY DR. (FROM LOOP 6-7E PG 17 THIS BOOK)
	6.31				
T.P.			3.88		T.B.C. 24 ST
	7.21				
T.P.			4.15		" "
	4.68				
HV-309			6.16		B/C H/H ± 200' N OF HESS ST. ON 24 ST.
+ S.S.			5.65		FS. " " "
	6.22				
T.P.			4.54		T.B.C. 24 ST
	5.64				
T.P.			6.07		" "
	5.74				
T.P.			3.53		" "
	5.30				
T.B.M			5.61		B/C H/H 24 ST. & BUCKEYE
	5.49				
T.P.			5.42		T.B.C. 24 ST
	4.24				

11-5-91

	+	HI.	-	ELEV.	DESC.
T.P.			5.08		T.B.C. 24 ST
	6.11				
T.P.			3.31		" "
	4.77				
T.P.			5.04		" AIRLANE
	5.91				
T.P.			4.01		" "
	5.96				
T.P.			4.28		" "
	6.23				
T.P.			3.97		" "
	5.73				
T.P.			4.40		" "
	5.57				
T.P.			4.01		" "
	6.21				
T.P.			2.95		" "
	4.21				
T.P.			6.43		" "
	6.27				
T.P.			4.17		" "
	5.77				
T.P.			1.56		" "

11-5-91

	+	HI	−	ELEV.	DESC.
	6.38				
T.P.			4.32		T.B.C. AIRLANE
	4.97				
HV-307			4.54		1/2" REBAR IN DIRT LOT N. SIDE AIRLN. E. OF D-VERSO BLDNG.
	4.50				
T.P.			4.09		T.B.C. AIRLANE
	6.55				
T.P.			4.32		" "
	5.13				
T.P.			3.20		" 40 ST.
	9.25				
T.P.			7.71		ROCK
	6.74				
T.P.			3.98		"
	7.94				
T.P.			5.31		"
	8.12				
T.P.			9.07		"
	7.81				
T.P.			2.71		"
	4.22				
T.P.			4.68		"
	10.54				
			142.52		

11-5-91

	+	HI	−	ELEV.	DESC
T.P.			5.95		ROCK
	6.69				
T.P.			0.98		"
	8.34				
H.V-306			3.88		B/K H/H ± 50' N. OF RR. TRACKS ON 48 ST. E. OF PAPINEAU BRIDGE
	7.75				
T.P.			2.27		ROCK
	11.71				
T.P.			1.49		" ON WASHINGTON
	9.57				
T.P.			0.83		"
	9.11				
T.P.			1.76		"
	9.41				
T.P.			3.66		"
	2.80				
T.P.			11.68		"
	0.84				
T.P.			9.80		"
	4.23				
T.P.			2.71		"
	11.18				
T.P.			4.65		"
			112.16		

11-5-91

(23)

	+	HI	−	ELEV.	DESC.
	0.63				
T.P.			15.84		ROCK
	8.94				
T.P.			6.33		"
	7.47				
T.B.M.			4.91		B/C H/H & INT. WASHINGTON & PRIEST DR.
	2.52				
T.P.			2.94		T.B.C. PRIEST DR.
	18.99				
T.P.			1.16		ROCK
	6.03				
T.P.			12.84		"
	0.97				
T.P.			12.69		"
	1.30				
T.P.			8.45		"
	2.26				
T.P.			7.81		"
	2.57				
T.P.			10.30		"
	0.95				
T.P.			5.29		"
	2.67				
			-50.72		

11-5-91

	+	HI	−	ELEV.		DESC.
T.P.			3.37			ROCK
	9.38					
T.P.			7.16			"
	5.49					
T.P.			6.82			"
	5.74					
T.P.			4.68			"
	4.14					
T.B.M. 59			5.33	145.58	✓	B/C H/H & INT PRIEST DR. & UNIVERSITY DR.
	4.88					
T.P.			6.10			T.B.C. UNIVERSITY
	3.88					
T.P.			6.94			" "
	4.18					
T.P.			5.89			" "
	4.80					
T.P.			5.01			" "
	4.15					
T.P.			5.86			" "
	6.22					
T.P.			7.20			" "
	4.95					
HV-340 TBM			6.15	125.49		V-IN HV ½" REBAR S.E. COR. 48 ST. UNIVERSITY
	390.6	Y-DIFF 39.23	351.23	8.6 MI LOOP		(FROM LOOP G-7E PG. 11 THIS BOOK)

11-6-91

T. C. KEEVER
C. SCHULTE

DEEP

P.O.B. - CONTROL POINT HV-516 WARM & CLEAR
TOP OF NORTH RIM H.H. @ INT. OF OAK ST. & ALMA SCHOOL RD.
(FROM LOOP G-6I BK. 1346 PG. 26)

	+	HI	-	ELEV
HV-516				
	4.73			
T.P.			4.34	
	7.47			
T.P.			3.87	
(TEM)	5.70			
T.P			3.61	
	6.06			
T.P.			4.31	
	6.12			
T.P.			4.26	
	6.28			
T.P.			3.39	
	7.51			
(TEM) T.P.			4.44	

ROCK

ROCK

NORTH BUTTERFIELD
FARM
BK. 1346 @ OAK SCHOOL & THOMAS

ROCK

"

"

1" REBAR ±.30 @ INT ALMA SCHOOL & OSBORN RD

(Cont)

* NOTE: NO BK. OR STONE FD. IN H.H (TO DEEP)
USED H.H. (RIM) NORTH AS BENCH.

11-6-91

π C. KEEVER

∎ C. SCHULTE

WARM & CLOUDY

	+	HI	−	ELEV.	DESC.
	6.13				
T.P			3.74		Rock
	6.75				
T.P.			3.79		Rock
	6.51				
T.P.			3.95		"
	6.19				
(TBM) T.P.			4.02		3/4" O.D. IRON PIPE 1.17' BELOW INT. OF ALMO SCHOOL RD & INDIAN SCHOOL RD.
	4.72				
T.P.			4.85		Rock
	5.54				
T.P.			4.63		"
	6.06				
T.P.			4.51		"
	5.78				
T.P.			5.16		3/4" BOLT & WASHER 1' BELOW HWY. @ INT. OF INDIAN SCHOOL & EXTENSION RD
	6.71				
T.P.			3.68		Rock
	6.26				
T.P.			4.52		"
	4.86				
T.P.			5.30		"

(Cont)

11-6-91 T. C. KEEVER
F. C. SCHULTE

	+	HI	-	ELEV	
	5.08				
(TBM) T.P.			3.98		
	3.90				
T.P.			5.21		
	5.04				
T.P.			4.73		
	5.57				
T.P.			3.79		
	5.55				
(TBM) T.P.			3.88		
	5.33				
T.P.			4.56		
	5.22				
T.P.			4.33		
	5.67				
T.P.			4.35		
	5.94				
HV-513			5.36		
	5.28				
T.P.			6.82		
	3.55				
T.P			6.65		

(CONT)

DISC. USBR & CLAR

BC. IN L.H. ± 1.0 BELOW @ INT. OF INDIAN SCHOOL & N. CONVERY (ARIZONA DR.)

ROCK

"

BC. FLUSH (INDIAN PAINT CAP) @ INT. OF INDIAN SCHOOL & CENTER ST.

ROCK

ROCK

"

BC. IN L.H. - 1.48 BELOW (RIM) CENTERLINE HV- @ INT. OF N. MESA DR. & INDIAN SCHOOL

ROCK.

"

11-6-91 T C. Kreuter
H C. Schulte
Warm & Clear

Desc

	+	HI	-	ELEV
	3.75			
T.P.			6.24	
	4.19			
HV-514			6.52	
	4.54			
T.P.			5.39	
	4.28			
T.P.			5.63	
	3.77			
T.P.			5.31	
	3.67			
T.P.			5.81	
	3.80			
T.P.			5.62	
	4.46			
T.P.			5.55	
	4.60			
HV-515			5.83	
	4.13			
H 55			3.65	
T.P.			5.85	
	3.81			

Rock

B.C. in H.H. -.45 from top rim @ int of Osborn Rd & N. Country Rd. Center Pt. HV-

& pav. Osborn Rd (pav. marker)

" " " "

" " " "

" " " "

" " " "

" " " "

B.C. in H.H. ± .50 round @ int. of N. Country Club Rd & Osborn Rd. Center of HV-

Rim of HH @ int of N. Country Club Rd. & Osborn & pav marker.

(CONT)

11-6-91 A. C. KEEVER
J. C. SCHULTE
DESC. WET & CLEAR

	+	HI	−	ELEV
T.P.			6.46	
	4.53			
T.P.			5.32	
	3.93			
T.P.			6.16	
	4.38			
T.P.			6.57	
	3.80			
T.P.			5.47	
	3.98			
T.P.			8.91	
	1.51			
T.P.			6.44	
	6.48			
T.P.			4.10	
	6.13			
T.P.			4.27	
	4.40			
T.P.			5.44	
	4.71			
T.P.			7.10	
	5.31			

(CONT)

1½" TR COR. B.C. IN H.H. ON N. COUNTRY CLUB RD. S/O OSBORN

@ PAV. MARKER

B.C. IN H.H. @ INT. THOMAS RD & N. COUNTRY CLUB RD.

@ PAV. MARKER

" " "

" " "

TOP OF RIM ON H.H. STONE WARRANTY @ INT. OF N. COUNTRY CLUB RD & OAK ST.

@ PAV MARKER. (OAK)

ROCK

"

2" BC AND 2" PVC 7½° BELOW @ INT. OF OAK ST & EXTENSION RD

	+	HI	-	ELEV.
T.P.			5.79	
	4.43			
T.P.			5.18	
	4.77			
T.P.			4.92	
	5.73			
HV=516			4.62	
	274.60		274.53	
		+0.07		

11-6-91 T C. KEENER

II C. SCHULTE

DESC. WEATHER CLEAR

ROCK.

"

"

HV. CONTROL PT.

✓-IN - Rod N. Rim H.H. @ INT. ALMA SCHOOL & OAK ST.

11-7-91

T C SCHULTE
R C KEEYER

	+	HI	-	ELEV.	DESC.
TBM V-521					P.K. NL IN PRKNG LOT N.W. COR (COUNTRY CLUB) AZ. AVE & McKELLERS (FROM Loop G-6J BK. 1346 PG. 30)
	4.27				
T.P.			5.54		T.B.C. McKELLERS
	5.80				
T.P.			4.44		" "
	5.36				
T.P.			4.35		" "
	5.85				
T.P.			4.25		B/C H/H INT McKELLERS & CENTER ST. M.C. COUNTY 4" DIAM.
	6.32				
T.P.			4.95		T.B.C. McKELLERS
	6.26				
T.P.			3.90		" "
	5.65				
T.P.			4.34		" "
	5.36				
HV-522			4.88		B/C H/H INT McKELLERS & MESA DR. M.C. COUNTY B/C
& SS			4.26		RIM " " SIDE SHOT
	5.86				
T.P.			4.85		T.B.C. MESA DR.

11-7-91

	+	HI	−	ELEV.	DESC.
	6.08				
T.P.			4.61		MI BIM MESA DR
	6.47				
T.P.			5.28		ROCK " "
	5.21				
T.P.			4.65		" LEHI RD.
	6.21				
T.P.			4.58		" " "
	6.13				
T.P.			3.95		" "
	5.66				
T.P.			4.91		" "
	5.64				
T.P.			4.83		" "
	6.11				
T.P.			5.06		" "
	5.60				
T.P.			5.08		" "
	5.86				
V-524			4.00		½" REBAR JCT STAPLEY DR & LEHI RD
⊥ SS.			3.63		F.S. A.C.
	6.23				
T.P.			4.56		ROCK ON LEHI RD.

11-7-91

	+	HI	−	ELEV.	DESC.
	8.18				
T.P.			2.81		ROCK ON LEHI RD
	6.81				
T.P.			5.08		" "
	5.64				
T.P.			5.12		" "
	9.27				
T.P.			4.16		CITY SPNDL "
	4.42				
T.P.			4.64		ROCK
	5.60				
T.P.			5.00		"
	5.49				
T.P.			4.79		"
	6.17				
T.P.			3.21		"
	4.78				
HV-526			6.07		D/C H/H @ INT MCDOWELL RD & GILBERT RD MC COUNTY B/C
* SS			5.74		RIM " " (SIDESHOT)
	3.03				
T.P.			6.35		ROCK
	3.87				
T.P.			6.11		"

11-7-91

	+	HI	−	ELEV.		DESC
	4.21					
T.P.			6.53			ROCK
	3.68					
T.P.			6.13			"
	4.02					
T.P.			6.40			"
	4.64					
T.P.			5.72			"
	4.63					
T.P.			5.60			"
	4.64					
T.P.			6.12			"
	4.29					
T.P.			5.80			"
	5.03					
T.P.			5.79			"
	4.23					
T.P.			5.31			"
	4.43					
T.P.			5.24			"
	4.93					
T.P.			5.56			"
	4.24					

11-7-91

	+	HI	−	ELEV.	DESC.
T.P.			6.46		ROCK
	4.08				
HV-523			8.43		½ REBAR & FLAG IN FIELD WEST OF MESA DR & McDOWELL RD.
	7.51				
T.P.			5.23		ROCK
	6.28				
T.P.			6.01		"
	4.25				
T.P.			6.15		"
	5.14				
T.P.			4.79		"
	5.31				
T.P.			5.09		"
	4.94				
T.P.			6.50		"
	4.64				
T.P.			6.34		"
	4.93				
T.P.			5.90		"
	4.92				
T.P.			6.08		T.B.C. McKELLEPS
	4.60				" "
T.P.			6.06		

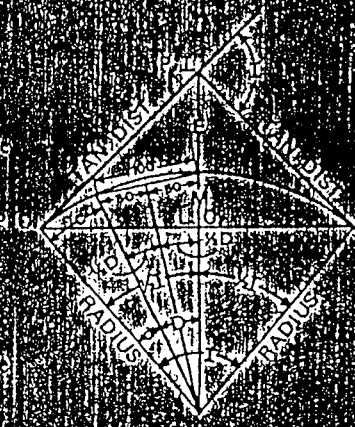
CONT ON BACK PAGE

36

	+	HI	−	ELEV
	4.12			
T.P.			5.54	
	4.19			
T.P.			6.13	
	4.32			
T.P.			5.56	
	4.53			
T.P.			5.83	
	5.08			
T.P.			5.24	
	5.43			
TBM V-521 PoB			4.49	
	316.43	D.H +.05	316.38	
		7.6 MI	LOOP	

CURVE FORMULAE

D = Degree of Curve
D' = 1 Degree of Curve
D'' = 2 Degree of Curve
P.C. = Point of Curve
P.T. = Point of Tangent
P.I. = Point of Intersection
I = Intersection Angle
Angle Between Two Tangents
L = Length of Curve
Chord From P.C. to P.T.
T = Tangent Distance
E = External Distance
R = Radius
L.C. = Length of Chord
M = Length of Middle Ordinate
l = Length of Sub-Chord
i = Angle of Sub-Chord



$R = \frac{L.C.}{2 \sin D/2}$ $T = R \tan D/2$ $L = \frac{L.C.}{2 \sin D/2}$

$L.C. = R \sin D$ $D = \frac{5730}{R}$ $R = \frac{5730}{D}$

$M = R(1 - \cos D/2) = T - R \sin D/2$

$E = R \sec D/2 - R = M \sec D/2$

$R = \frac{S}{2 \sin i}$ $R = \frac{l}{2 \sin i}$

$l = 2R \sin i$ $i = \frac{l}{2R}$

$L.C. = 2R \sin i$ $L = 2R \sin i = 100 \frac{R}{l}$

Minutes in Decimals of a Degree

1'	.0167	11'	.1833	21'	.3500	31'	.5167	41'	.6833	51'	.8500
2'	.0333	12'	.2000	22'	.3667	32'	.5333	42'	.7000	52'	.8667
3'	.0500	13'	.2167	23'	.3833	33'	.5500	43'	.7167	53'	.8833
4'	.0667	14'	.2333	24'	.4000	34'	.5667	44'	.7333	54'	.9000
5'	.0833	15'	.2500	25'	.4167	35'	.5833	45'	.7500	55'	.9167
6'	.1000	16'	.2667	26'	.4333	36'	.6000	46'	.7667	56'	.9333
7'	.1167	17'	.2833	27'	.4500	37'	.6167	47'	.7833	57'	.9500
8'	.1333	18'	.3000	28'	.4667	38'	.6333	48'	.8000	58'	.9667
9'	.1500	19'	.3167	29'	.4833	39'	.6500	49'	.8167	59'	.9833
10'	.1667	20'	.3333	30'	.5000	40'	.6667	50'	.8333	60'	1.0000

Inches in Decimals of a Foot

1/16"	1/8"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	9/16"	5/8"	11/16"	3/4"
.0052	.0078	.0104	.0156	.0208	.0260	.0313	.0417	.0521	.0625	.0729	
1"	2"	3"	4"	5"	6"	7"	8"	9"	10"	11"	12"
.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167	

1348

SALT-GILA
VERTICAL
G-8

LIETZ
SINCE 1882

LIETZ
SINCE 1882

ECONOMY FIELD BOOK

No. 8 [illegible]

FORMULAE FOR SOLVING RIGHT TRIANGLES

$\text{Sin } A = \frac{a}{c} = \text{Cos } B$ $\quad \text{Cot } A = \frac{b}{a} = \text{Tan } B$

$\text{Cos } A = \frac{b}{c} = \text{Sin } B$ $\quad \text{Sec } A = \frac{c}{b} = \text{Cosec } B$

$\text{Tan } A = \frac{a}{b} = \text{Cot } B$ $\quad \text{Cosec } A = \frac{c}{a} = \text{Sec } B$

Given	Required	Solution
A, c	B, a, b	$B = 90° - A,\ a = c \sin A,\ b = c \cos A$
A, b	B, a, c	$B = 90° - A,\ a = b \tan A,\ c = \frac{b}{\cos A}$
A, a	B, b, c	$B = 90° - A,\ b = a \cot A,\ c = \frac{a}{\sin A}$
a, c	A, B, b	$\sin A = \frac{a}{c},\ \cos B = \frac{a}{c},\ b = \sqrt{(c+a)(c-a)}$
a, b	A, B, c	$\tan A = \frac{a}{b},\ \cot B = \frac{a}{b},\ c = \sqrt{a^2+b^2}$

FORMULAE FOR SOLVING OBLIQUE TRIANGLES

Given	Required	Solution
A, a, b	B, c	$\sin B = \frac{b \sin A}{a},\ c = \frac{a \sin C}{\sin A}$
A, B, a	b	$b = \frac{a \sin B}{\sin A}$
a, b, C	A, c	$A + B = 180° - C,\ c = \frac{a \sin C}{\sin A}$
a, b, c	Area	$\text{side} = \frac{a+b+c}{2},\ \text{area} = \sqrt{s(s-a)(s-b)(s-c)}$
A, b, c	Area	$\text{area} = \frac{bc \sin A}{2}$
A, B, C, a	Area	$\text{area} = \frac{a^2 \sin B \sin C}{2 \sin A}$

MADE IN U.S.A.

TITLE PAGE

SALT - GILA VERTICAL

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Pg.	Desc.	
1 → 2	BENCH LOOP	G-8A
3 → 4	" "	G-8B
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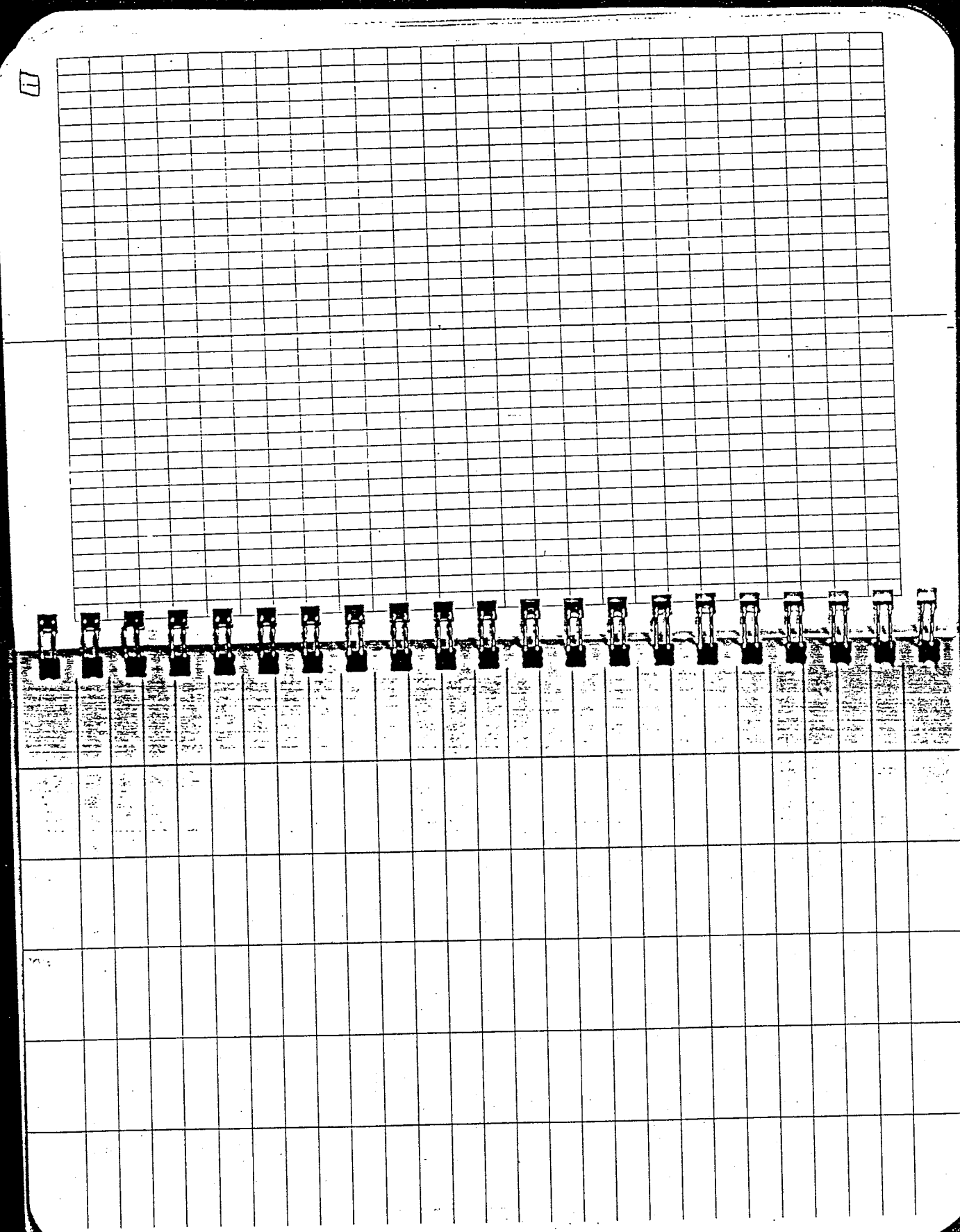
10	" "	G-8D
11	" "	G-8E
12 → 13	" "	G-8F
14 → 17	LEVELS TO ALTERNATE PANELS	



①

11-7-91

T. C. KEEVER
R. SCHULTE
WARM & CLEAR

DESC

TBM.	+	HI	−	ELEV.	
HV-526					ROB. BC. IN H.H. @ JCT. OF GILBERT RD. & McDOWELL
	5.08				FROM LOOP G-71 BK 1347 PG. 33
T.P.			5.81		ROCK.
	4.71				
T.P.			5.66		"
	5.18				
T.P			5.34		"
	5.65				
T.P.			4.73		T/C
	5.29				
T.P			5.63		"
	5.37				
T.P			5.52		ROCK
	4.79				
HV-527			5.14		BC. IN H.H. @ INT. CONTINUATION GILBERT RD. & THOMAS RD
SS.			4.71		END OF H.H.
	5.29				RETURN LOOP.
T.P.			5.35		ROCK
	5.61				
T.P.			4.97		"
	4.66				
T.P.			5.19		"
					(CONT)

	+	HI	-	ELEV
	5.27			
T.P			5.74	
	5.03			
T.P.			5.32	
	5.17			
T.P.			4.96	
	5.41			
T.P.			4.51	
	6.00			
HV-526			5.28	
	78.51		78.55	
		-0.04		
		2 MI. LOOP		

11-7-91

T. C. KEEVER
H. C. SCHLOSE

Decl.

Rock

"

"

"

V-IN B.C. INKA @ SLT GILBERT RD. & MCDOWELL RD.

11-8-91

X C. SCHULTE
/ C. KEENER

	+	HI	−	ELEV	DESC
HV-526 TBM					B/C H/H @ E INT GILBERT & MCDOWELL
					FROM LOOP 6-7I BK. 1347 PG. 33
	6.35				
T.P.			1.33		ROCK
	23.80				
T.P.			0.45		"
	13.22				
T.P.			4.13		"
	4.75				
T.P.			5.64		"
	5.79				
T.P.			5.78		"
	5.03				
T.P.			1.93		"
	3.81				
HV-525			6.27		B/C H/H INT GILBERT RD. HERMOSA VISTA RD
* SS.			5.55		RIM " " " SIDE SHOT
					RETURN LOOP
	6.15				
T.P.			7.31		ROCK
	4.55				

11-8-91

	+	HI	−	ELEV.	DESC.
T.P.			5.98		ROCK
	5.26				"
T.P.			3.15		"
	4.52				"
T.P.			4.38		"
	1.14				"
T.P.			19.40		"
	0.26				"
T.P.			16.79		
	3.62				
HV-526 TBM			5.68		✓ IN PUB B/C 4/4 INT GILBERT & McDOWELL
	88.25	+0.03	88.22		END LOOP
		1.6 MI LOOP			

11-8-91

T C. KEEVER

II C. SCHLUTE

WORM
COGDIR.
HV-526

	+	HI	−	ELEV.	DESC.
HV-526					PROP B.C. IN H.H @ GILBERT & McDOWELL RD.
	5.93				
T.P			5.05		Rock
	5.34				
T.P.			4.95		"
	6.53				
T.P.			0.79		"
	24.99				
T.P.			1.88		"
	22.63				
T.P.			1.16		"
	7.56				
T.P.			1.78		T/C
	8.90				
T.P.			3.87		B/L

(CON'T)

11-8-91

T C. KEEVER
A C. SCHULTE

Warm & Clear

	+	HI	-	ELEV	DESC.
	6.20				
T.P			4.18		B/W
	6.75				
T.P.			5.77		B.C. IN H.H @ JT. OF LINDSAY & McDONALD
	6.05				
T.P.			4.14		B/C
	5.86				
T.P.			3.58		B/C
	6.21				
T.P.			3.76		B/C
	7.00				
T.P.			2.98		B/C
	6.30				
T.P			3.68		T/C
	5.00				
T.P.			4.85		Rock
	5.86				
T.P.			3.28		"
	5.85				
T.P.			3.95		Rock
	7.03				
T.P.			3.38		T/C

(Cont)

11-8-91

π C. KLEEVER
γ C. SCHULTE

DELL. WARM CLEAR

	+	HI	-	ELEV
	6.27			
T.P.			3.90	
	4.40			
T.P.			5.22	
	4.89			
HV-528			7.86	
56			7.62	
	8.19			
T.P.			4.19	
	4.37			
T.P.			6.11	
	3.85			
T.P.			6.41	
	3.40			
T.P			6.35	
	3.50			
T.P.			6.54	
	4.71			
T.P.			5.87	
	4.50			
T.P.			6.04	

(CONT)

B/W

Rock.

½" REBAR @ SE. QUENTON DR. & VAL VISTA HV-528

F.S. OF A.C.

RETURN LOOP

(OFF BC.)

Rock

Rock

"

"

"

"

"

11-8-91

T C. KOEVER
R C. SCHULTE

	+	HI	−	ELEV	DESC.	LOCATION
	4.70					
T.P.			7.00		Rock	
	2.74					
T.P.			6.35		"	
	3.89					
T.P.			6.77		"	
	4.01					
T.P.			6.04		"	
	3.94					
T.P.			6.52		"	
	4.23					
T.P			6.28		B/W	
	1.36					
T.P			8.49		Rock	
	1.76					
T.P.			22.17		"	
	0.27					
T.P.			22.42		"	
	1.15					
T.P.			10.97		"	
	4.91					
T.P.			5.62		"	

(CONT)

11-2-91

T. C. KEEVER

K. C. SCHULTE

DESA

WARM CLEAR.

	+	HI	-	ELEV
	4.56			
T.P.			5.03	
	4.98			
HV-526			5.32	
	240.57	O.R. +0.07	240.50	

ROCK

POP

V-in HV-526 @ INT. GILBERT & McDOWELL

ENG COOP.

B.M.	+	H.I.	−	ELEV.	ADJ.EL.	DESC
T.B.M.						B/C IN H/H IN T M^cKELLIPS & 92ND ST. FROM LOOP G-5D BK 1345 PG 15
	4.97					
T.P.			5.88			ROCK
	3.62					
T.P.			8.64			HUB
	6.63					
V-346			5.34			SET 1/2" REBAR ON DIRT PLATEAU ± 0.5 MI. S. OF M^cKELLIPS ON 92ND ST. ℄ PROP (± 300' N. OF TRANS. LINES)
				RETURN		LOOP
	5.51					
T.P.			6.99			HUB
	9.05					
T.P.			4.00			ROCK
	6.06					
T.B.M.			5.01			P.O.B.
						11-14-91
						CLOUDY, COOL
						A - T. PRICE
						A - C. MITHEUCH
	35.84		35.86		1.0 MI.	

B.M.	+	H.I.	−	ELEV.	ADJ. EL	DESC.
T.B.M.						B/C IN H/H INT. WASHINGTON ST. & PRIEST DR. FROM LOOP G-76 BK. 1347 PG. 23
	16.57					
T.P.			1.40			T.B.C.
	3.99					
T.P.			4.72			ROCK
	3.69					
V-305			6.10			½" REBAR IN DIRT CLEARING ± 150' S. OF CENTER PARKWAY (OLD WASHINGTON) ± ¼ MI. EAST OF PRIEST DR.
			—	RETURN		LOOP —
	5.87					
T.P.			2.97			T.B.C.
	4.25					
T.P.			4.59			B/WALK
	0.17					
T.B.M.			14.75			✓ IN R.O.B.
	34.54		34.53	1.0 MI.		

11-14-91
CLOUDY, COOL
A - C. MIHELICH
B - T. PRICE

B.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC.
T.B.M.						B/c IN H/H IN T 24TH ST. & BUCKEYE RD. FROM LOOP G-7G BK. 1347 PG. 19
	6.61					
T.P.			5.38			CURB
	6.17					
T.P.			3.15			"
	6.76					
T.P.			5.11			"
	7.40					
T.P.			3.07			"
	6.31					
T.P.			5.66			"
	7.62					
HV-308			4.76			B/c FLUSH @ PARKING STALL AIRPORT OPERATIONS BLDG. S. SIDE OF SKY HARBOR BLVD., ± 1/2 MI. EAST OF 24TH ST., ± 500' E. OF TERMINAL 2
				— RETURN		LOOP —
	3.13					
T.P.			6.28			CURB
	4.72					

B.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC.
T.P.			7.79			CURB
	4.03					
T.P.			6.94			"
	5.61					
T.P.			8.19			"
	4.69					
T.P.			5.77			"
	5.83					
T.B.M.			6.79			P.O.B.
	68.88		68.89			

11-14-91
cloudy, cool
A - T. Price
R - C. Mihelich

↑ C. MIHELICH
/ C. SCHULTE (14)

1-14-92

B.M.	+	H.I.	−	ELEV.	ADJ. EL.	DESC
HV-185				960.68		1/2" REBAR @ FENCE COR ± 0.3 MI S. OF BASELINE & EL MIRAGE
	5.94	+1.30				
HV 185 ALT			4.64	961.98		1/2" REBAR ± 25' S.E. OF HV 185
					RETURN	LOOP
	4.30					
HV-185			5.61			√-IN
						1-14-92 C SCHULTE C. MIHELICH
HV 187 ALT						B/C IN CONC CYL ± 1° MI S. OF INITIAL MON.
			-0.4			MEAS DOWN TO B/C
	10.24		10.75			

BM.	+	H.I.	−	ELEV.	ADJ.EL.	DESC.
						1-14-92
H&V-332				1035.26		B/C IN H/H INT. 35TH AVE. & BROADWAY
	5.19	10.32				
ALT. H&V-332			5.87	1035.58		1/2" REBAR S.W. COR BROADWAY & 35TH AVE IN DIRT LOT ± 150' S.W. OF B/C IN H/H
					RETURN	LOOP
	5.59					
H&V-332			4.90			√-IN
						1-14-92
HV 712						B/C H/H @ SET N.B 7TH AVE & BASELINE
	4.10					
712 HV ALT			8.09			B/C H/H @ SET S.B. 7TH AVE & BASELINE
					RETURN	LOOP
	8.34					
H&V-712			4.35			√-IN
	10.78 12.44		10.77 12.44			

B.M	+	H.I.	−	ELEV	ADJ EL.	DESC.
H&V-342				1166.43		B/C IN H/H INT. RURAL & UNIVERSITY
	10.75					
ALT. H&V-342			2.22	1174.96		P.K. & SHINER ± 25' N. OF R.R. TRACKS & ± 400' S. OF INT. RURAL & UNIVERSITY IN PAINTED MEDIAN
					RETURN	LOOP
	2.12					
H&V-342			10.65			✓-IN
H&V-303				1180.70		B/C IN H/H INT. WEBER & McCLINTOCK
	6.20	+0.38				
ALT. H&V-303			5.82	1181.08		1/2" REBAR IN VACANT LOT N.W. COR. WEBER & McCLINTOCK ± 125' N.W. OF B/C IN H/H
					RETURN	LOOP
	5.59					
H&V-303			5.98			✓-IN
	11.79		11.80			
	12.87		12.87			

B.M.	+	H.I.	−	ELEV.	ADJ. EL	DESC.
H&V-517				1218.83		B/C IN H/H INT. ALMA SCHOOL RD & McDOWELL
	5.88	+0.83				
ALT. H&V-517			5.05	1219.66		1/2" REBAR IN OPEN FIELD N.W. COR ALMA SCHOOL RD & McDOWELL ± 150' N.W. OF B/C IN H/H.
					RETURN	LOOP
	4.78					
H&V-517			5.60			V-IN
HV 533			0 Z			B/C ON 2" PIPE ± 100' E & BUSH HOG MEAS. DOWN TO O/G
	10.66		10.65			

1381

A/B

CONTOURS
SALT-GILD

TELEDYNE
426

FORMULAE FOR SOLVING RIGHT TRIANGLES

$\sin A = \frac{a}{c} = \cos B$ $\quad$ $\cot A = \frac{b}{a} = \tan B$

$\cos A = \frac{b}{c} = \sin B$ $\quad$ $\sec A = \frac{c}{b} = \operatorname{cosec} B$

$\tan A = \frac{a}{b} = \cot B$ $\quad$ $\operatorname{cosec} A = \frac{c}{a} = \sec B$

Given	Required	Solution
A, c	B, a, b	$B = 90° - A$, $a = c \sin A$, $b = c \cos A$
A, b	B, a, c	$B = 90° - A$, $a = b \tan A$, $c = \frac{b}{\cos A}$
A, a	B, b, c	$B = 90° - A$, $b = a \cot A$, $c = \frac{a}{\sin A}$
a, c	A, B, b	$\sin A = \frac{a}{c}$, $\cos B = \frac{a}{c}$, $b = \sqrt{(c+a)(c-a)}$
a, b	A, B, c	$\tan A = \frac{a}{b}$, $\cot B = \frac{a}{b}$, $c = \sqrt{a^2 + b^2}$

FORMULAE FOR SOLVING OBLIQUE TRIANGLES

Given	Required	Solution
A, a, b	B, c	$\sin B = \frac{b \sin A}{a}$, $c = \frac{a \sin C}{\sin A}$
A, B, a	b	$b = \frac{a \sin B}{\sin A}$
a, b, C	A, c	$A + B = 180° - C$, $c = \frac{a \sin C}{\sin A}$
a, b, c	Area	side $= \frac{a+b+c}{2}$, area $= \sqrt{s(s-a)(s-b)(s-c)}$
A, b, c	Area	area $= \frac{bc \sin A}{2}$
A, B, C, a	Area	area $= \frac{a^2 \sin B \sin C}{2 \sin A}$

MADE IN U.S.A.

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BK 13581

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Bk 1381

STA	+	H.I.	—	Elev.
0+00				875.97
*F.S.				
18+75				864' CONTOUR
CHECK	HZ DIST	1873.45 ✓		
0+00		875.97		875.97
0+38			2.38	873.59
3+00			4.09	871.88
5+66			5.71	870.26
8+41			7.01	868.96
12+82			9.82	866.15
15+68			11.48	864.49
18+40			12.00	863.97
18+73			11.81	864.16 ✓

Aug 3, 1992 (1)

X-SEC. CHECK FH. 8 - Model 8+9

DESCRIPTION

H&W # 119 (1/2 Reddy) ±145' South Hwy 85 & Cemetary Rd. N 865590.5
E 502305.1

BTM. DIRT RD. & CONC. LINED 'V' DITCH
Scaled Co-ordinates N 864252
E 503610

O.G. @ H&W # 119

TOE DIRT RD & Hay Field (mowed)

O.G.

O.G.

O.G.

O.G.

O.G.

GRND BREAK O.G.

O.G. @ F.S. - CHECK +0.16 elev.

SEE PAGE 2 CG FLOW CHECK

BK 1381

STA	Flow Contour	-Rod	Elev.
0+00			875.97
0+39		2.38	873.6
1+35	876.0	2.96	873.0
2+45	876.0	3.81	872.2
7+15	872.0	6.63	869.3
9+27		7.44	868.3
9+56		6.44	869.5
10+40	872.0	6.64	869.3
11+25	872.0	6.55	869.4
12+00	872.0	7.62	868.3
12+28		9.65	866.3
13+90	868.0	10.65	865.3
18+38		13.27	862.7
18+73.5	864.0	11.81	864.2

8-4-92 (2)

FLT. 8 - MODEL U #8 & #9

Description

H&W #119 (1½" Retain)

G.B. (Toe @ Half Ht)

G.B. (Toe)

G.B. (Top)

G.B. (Toe)

G.B. (Toe)

BK 1381

STA	H.I.	–	Elev.
0+00			889.23
*F.S.	℄ AIRPORT Rd – plan check Elev.		
0+00	889.23		889.23
2+69.50		6.40	882.83
5+20		9.25	879.98
7+97		11.19	878.04
10+67		12.65	876.58
13+65		14.73	874.50
16+29		16.22	873.01
19+01		17.31	871.92
21+29		17.93	871.30

Aug. 3, 1992 (3)

T-LT. 8 model #13

Pavement Elevation

H&V #115 (3/4" Rebar in Pothole) N 870817.10 E 520744.20

873.3 @ 7.64'± SOUTH OF H&V #115

H.&V. #115

℄ Paving AIRPORT Rd

" " " "

" " " "

" " " "

" " " "

" " " "

" " " "

" " " "

Bk 1381

STA	HT.	–	ELEV
	889.23		
24+08		18.65	870.58
26+45		18.86	870.37

℄ Pedding Direction Rd

1/2 IN

SEE Page 5
Contour Check

BK 1381

STA	P.C.N. CONTOUR	-ROD	ELEV.
0+00			881^{23}
0+65	888^{0}	1^{24}	888^{0}
2+18	884^{0}	5^{03}	884^{2}
7+32	880^{0}	10^{70}	878^{5}
13+00	876^{0}	14^{06}	875^{2}
16+87	875^{0}	16^{36}	872^{9}
21+40	874^{0}	18^{05}	871^{2}
26+50	873^{3}	19^{02}	870^{2}

8-4-92 (5)

FLT 8 - MODEL #13 * CONTOUR CHECK *

H&W# 115 (PAVEMENT ELEV.

℄ AIRPORT Rd (PAVEMENT)

" " " "

" " " "

" " " "

" " " "

" " " "

" " " " (SOUTH OF H&W# 115)

BK 1381

STA	PLAN CONTOUR		~Rod	ELEV.
0+00	901.9			901.91
2+00	902.3	-	0.23	901.7
7+85	902.4	-	0.19	901.7
11+50	902.7	+	0.33	902.3
18+30	904.0	+	1.60	903.51
24+45	905.2	+	3.56	905.5
±26+75 (scale)				906.96
26+74.91 (meas.)			5.06	

8-5-92 (6)

FLT. 12 - MODEL #4 & #5

DESCRIPTION

H&W# 108 ~~E ITEMS~~ BROADWAY LOOKING EAST

℄ BROADWAY

" "

" "

" "

" "

H&W BROADWAY & 175th AVE BC. FLUSH

BK 1381

STA	MAN CONTOUR		-Rod	ELEV.
18+30 = 0+00 SOUTH	904^{0}			902^{5}
0+15		-	0.21	902^{2}
0+39 3		-	1.96	901^{5}
0+45 5		-	1.84	901^{7}
0+52 7		-	1.12	902^{4}
2+00	902^{6}	-	1.22	901^{8}
8+25	901^{4}		3.40	900^{10}
9+79 35		-	3.94	899^{6}
10+32		-	2.00	901^{5}
10+35			-0^{70}	902^{8}
10+44			-6^{13}	897^{4}
10+55			-1^{41}	902^{10}
10+82 5	902^{4}		-1^{90}	901^{6}
10+99			-4^{83}	898^{7}
11+80			-4^{21}	899^{3}

8-5-92 (7)

FLT. 12 - MODEL #4

DESCRIPTION

℄ BROADWAY / 1830 EAST OF ℄ TRUSSELL (HEW #08)

E.P.

TOE

FT. 5' CONC. IRR. DITCH

O.G.

GB. OG.

GB OG

NORTH TOP DIRT BANK IRR. DITCH

℄ OF IRR. DITCH

SOUTH TOP DIRT BANK IRR. DITCH

℄ R.R. TRACKS

TOE R.R. FILL @ O.G.

G.B.

BK 1381

STA	Plan Contour		± Rod	Elev.
0+00				883.36
3+35	884.2	+	1.87	885.2
4+47	884.8	+	2.46	885.8
8+00	886.[illegible]	+	4.69	888.05
8+32	888.6	+	4.89	888.3
10+58	892.0	+	8.55	891.9
12+90	895.5	+	12.38	895.7

Aug. 5, 92 (8)

FLT. 12 - MODEL 2

[illegible] SET @ ℄ JACK RABBITT 55.54

[illegible] N 870[illegible] / E 5[illegible] / PANEL ELEV. 882.38

[illegible] N 870760.9
E 527661.5

EQUAL. N 872000 @ ℄ Jack Rabbitt
@ END CONC. DISTANCE SLAB TO CONN FENCE

BK 1381

8-6-92 (9)

FLT 8 - MODEL 10

STA	PAN CONTOUR		± Rod	ELEV.	DESCRIPTION
0+00				879.27	PAVEMENT FULL HEIGHT IN RAINBOW RD. SOUTH OF R.R.
2+50	880.3	-	2.15	877 10	℄ RAINBOW RD
6+52	876.9	-	4.45	874 8	" " "
10+50	874.5	-	7.41	871 8	" " "
14+70	871.2	-	11.05	868 2	" " "
18+75	867.7	-	14.10	865 2	" " "
22+75	866.0	-	16.73	862 5	" " "
26+75	865.5	-	18.21	861 10	℄ INTERSECTION RAINBOW RD & HWY 85

(26+64 ±) MEASURED HEIGHT.

Book 1381

8-6-92 (10)

FLT. 10 - MODEL 7 & 8

* SET X-SEC. 0+00 POINT
FROM H&U * 190 N 865 183.99 / E 591 621.07 / ELEV. 960.05
0+00 INTERSECTION POINT DIRT Rd
TO EAST & DIRT Rd TO SOUTH.
0+00 = N 865048.00 / E 591564.20 // ELEV. 960.10

STA	Elev. Cutoff		+ 5.30 ± Rod	Elev.	
0+00				960.10	N&W @ Dirt Rd. - X-SEC. TO EAST
4+00		-	0.23	960.20	O.G. DIRT Road
8+30	960.10	+	0.20	960.60	" " "
12+00		+	0.52	960.90	" " "
16+30	960.10	+	1.02	961.40	" " "
20+00		+	1.75	962.10	" " "
24+20	962.5	+	2.11	962.50	" " "

BK 1381

8-6-92 (11)

FLT-10 - MODEL #7

STA	PLAN CONTOUR	± ROD	ELEV.	
0+00			960.40	SEE PAGE 10 FOR DESCRIPTION
0+50	960.0	+ 0.44	960.2	O.G. DIRT RD.
1+22		- 2.12	958.3	G.B. " "
4+00		- 2.02	958.1	O.G. " "
6+00	955.6	- 4.57	955.8	O.G. " "
9+50	956.0	- 5.95	954.5	* LOW POINT O.G. DIRT RD
12+50	956.0	- 3.03	957.4	G.B. DIRT RD.
16+54		- 2.81	957.6	O.G. " "
19+00		- 1.66	958.7	O.G. " "
20+08		- 0.68	959.7	O.G. " "

* FLT. 10 CONTINUED ON PAGE 18 BK 1381

BK 1381

	+	H.I.	−	Elev.	Description
T.B.M.				891.42	PK NAIL SOUTH SIDE Hwy 85 T.P. #42
	3.89	895.31			
T.P.			6.13	889.18	TOP CONCRETE DITCH
	7.05	896.2[illegible]			
T.P.			6.78	889.45	" " "
	6.48	895.93			
T.P.			6.46	889.47	Rock
	3.28	892.75			
T.P.			5.28	887.47	Rock
	3.72	891.19			
T.B.M.			5.83	885.36	B/C FLUSH SOUTHERN AVE & PEERDYVILLE RD.
	Loop Back				
	6.00	891.36			
T.P.			4.05	887.31	Rock
	6.12	893.43			
T.P.			3.96	887.47	Rock
	5.99	895.46			
T.P.			6.17	889.29	TOP CONCRETE DITCH
	6.38	895.67			
T.P.			6.61	889.06	TOP CONCRETE DITCH
	6.21	895.27			
T.B.M.			3.87	891.40	V-IN P.O.B. -0.02

8-7-92 (12)

BENCH LOOP FOR FLT 11 (model 3,4,5)

BK 1381

STA	Hwy Contour		± Rod	ELEV.
0+00	884.3			885.36
2+92 West	882.5	-	1.17	884.2
6+30 West	882.1	-	1.72	883.6
10+82 West	883.2	-	2.73	882.6
15+50 West	882.2	-	2.93	882.4
19+05 West	882.5	-	3.88	881.5
3+65 East	883.9	-	0.76	884.6
7+80 East	884.3	+	0.30	885.7
12+40 East	885.6	+	1.26	886.6
16+65 East	886.9	+	1.78	887.1
23+00 East	888.0	+	3.13	888.5
3+20 South	885.4	+	0.25	885.6
8+00 South	886.3	+	0.93	886.3
14+10 South	886.4	+	0.75	886.1
19+45 South	886.0	+	0.66	886.0
26+30 South	887.0	+	0.13	885.5

8-7-92 (13)

FLT. 11 - MODEL #3

DESCRIPTION	SCALE & COORDINATES
BC FLUSH SOUTHERN & PERRYVILLE	N870680 E532940
℄ PAVING SOUTHERN	
" " "	
" " "	
" " "	
" " "	
" " "	
" " "	
" " "	
" " "	
" " "	
" " "	
℄ PAVING PERRYVILLE	
" " "	
" " "	
" " "	
" " "	

BK 1381

TA @ Southern & Perryville (B/C Flush)

F.S. INTERSECTION Southern & Hwy 85
SCALE DIST: 1287.0'
MEASURED HZ. DIST: 4388.01'

F.S. INTERSECTION Perryville & Hwy 85
SCALE DIST: 5170.0'
MEASURED HZ. DIST: 5176.14'

8-7-92 (14)

FLT. 11 - MODEL #3

BK 1381

FLT. 11 - model # 5

8-10-92 (15)

TIE 60penny nail, scaled Co-ordinates
N863770
E540880 Field Rd & edge 5' wide concrete
IRRIGATION DITCH.

① SCALE HZ DIST TIE TO HUB # 176 → 3915°
CALCED " " → 3919°

② SCALE HZ DIST TIE TO HUB # 178 → 5365°
CALCED " " → 5372°

③ MEASURED HZ DIST TIE TO HUB # 177
(scaled CO-ORDINATES) N862892
E543085

A) CALCULATED Brg: S 68-58-52E
HZ. DIST: 2447.88

B) MEASURED
HZ. DIST: 2450.62

BK 128

8-10-92 (16)

FLT. 11 - Model #5

STA	PLAN CONTROL		± Rod	ELEV.	
0+00	"			888.60	Lead penny @ ⊼ N863770 E540800
0+62		-	0.42	888.18	Top
0+71		-	1.73	886.87	Toe
1+67		-	2.21	886.39	Toe
1+76		-	0.41	888.19	Top
2+00		-	0.17	888.43	Top
2+08		-	2.34	886.26	Toe
4+00		-	2.63	885.97	OG
6+00		-	2.68	885.92	"
9+00		-	2.00	886.60	"
12+00		-	2.22	886.38	"
14+19		+	0.55	889.15	G.B.
15+00		+	0.07	888.67	OG
18+00		+	0.79	889.39	OG
20+00		+	1.19	889.79	OG

309-16-04

8-10-92 (17)

BK 1381

FLT. 11 - Model #19 (NORTH)

STA	Plan Contour		± Rod	Elev.
0+00	969^{3}"			970.83
V-	in Hz. Dist to 91st ave			
	Calced Hz. Dist. 5280^{04}			
	Measured Hz. Dist. $5276.^{40}$ +1 ^{54}			
2+30	968^{0}	-	2.11	968^{7}
4+85	965^{4}	-	4.55	966^{3}
6+50	964^{0}	-	6.06	964^{8}
10+50	960^{0}	-	10.60	960^{2}
12+50	957^{7}	-	12.31	958^{5}
15+25	955^{6}	-	14.38	956^{5}
20+60	955^{9}	-	14.34	956^{5}
25+70	956^{0}	-	14.21	956^{6}

Continued Page 19 Bk. 1381

BC MH @ Baseline & 91st ave North N 850080 E 597020 (scaled co-ord.)

Intersection Sewer Treatment - (scaled co-ord.) N 870360 E 597040

→ Elev. ~~97~~ 972^{4}

8-10-92 (18)

FLT 10 - Models #5, & #6

BK 1381

STA	PLAN CONTOUR		-Rod	ELEV.	DESCRIPTION
0+00				1159.19	INITIAL MONUMENT
6+64			-223^{22}	935.97	INTERSECT DIRT RD FROM SOUTH EAST
18+06			-222^{91}	936.23	G.B. TOP SLOPE
18+28			-221^{18}	933.01	℄ ⊥
18+50			-223^{29}	935.90	G.B. TOP SLOPE
24+75	940^{0}		-219^{81}	939.38	
30+00			-217^{48}	941.71	
39+00			-216^{79}	942.40	
40+59			-217^{50}	941.69	G.B. - TOP SLOPE
41+21			-224^{40}	934.79	WEST EDGE G/10 RIVER (FLOWING STREAM ± 40 WIDE)

Sta	Plan Contour		± Rod	Elev.
0+00	969.3			970.83
V-IN 1½ DIST TO "T" INTERSECTION				
* MEASURED Hz DIST:				(2407.58)
3+36		+	1.48	972.3
5+25	970.3	+	1.53	972.1
10+50	971.5	+	1.42	972.3
17+25	970.8	+	1.76	972.6
24+05	972.5	+	2.80	973.6

FLT. 11- Model 19 (EAST) 8-11-92 (19)
Continued

B/C #11 Bechtel ½ 91st AVE NORTH
± 2405' - SCALED CO-ORDINATES N865074
E599425

(E.B. (High Pr. ±)

@ Proving Baseline EAST

" " " "

" " " "

" " " " "T" INTERSECTION

TRIG'S FOR BASE ELEV.

(1) T@ H&V # 173 Panel Elev. 917.48

(1) Backsite TOP MOUNTAIN N.E.

DIRECT: VERT ∠ 88-16-54 H.I. = 5^{31}

slope DIST. 3670^{05}

CALC. HZ DIST. 3668.40

MEASURED HZ DIST 3668.39 27^{66}

MEASURED VERT = 110.30

CALCED VERT = 110.05

INDIRECT: VERT ∠ 271-43-10 H.I. = 5^{06}

slope DIST. 3670^{06}

CALC. HZ DIST. 3668.41 27^{70}

MEAS. HZ DIST. 3668.40

MEAS. VERT = 110.66

CALC. VERT = 110.18

(2) T@ N.E. MOUNTAIN

(2) Backsite H&V # 173

DIRECT: VERT ∠ — 91-45-09 H.I. = 5^{41}

slope DIST — 3670^{07}

CALC. HZ DIST — 3668^{35}

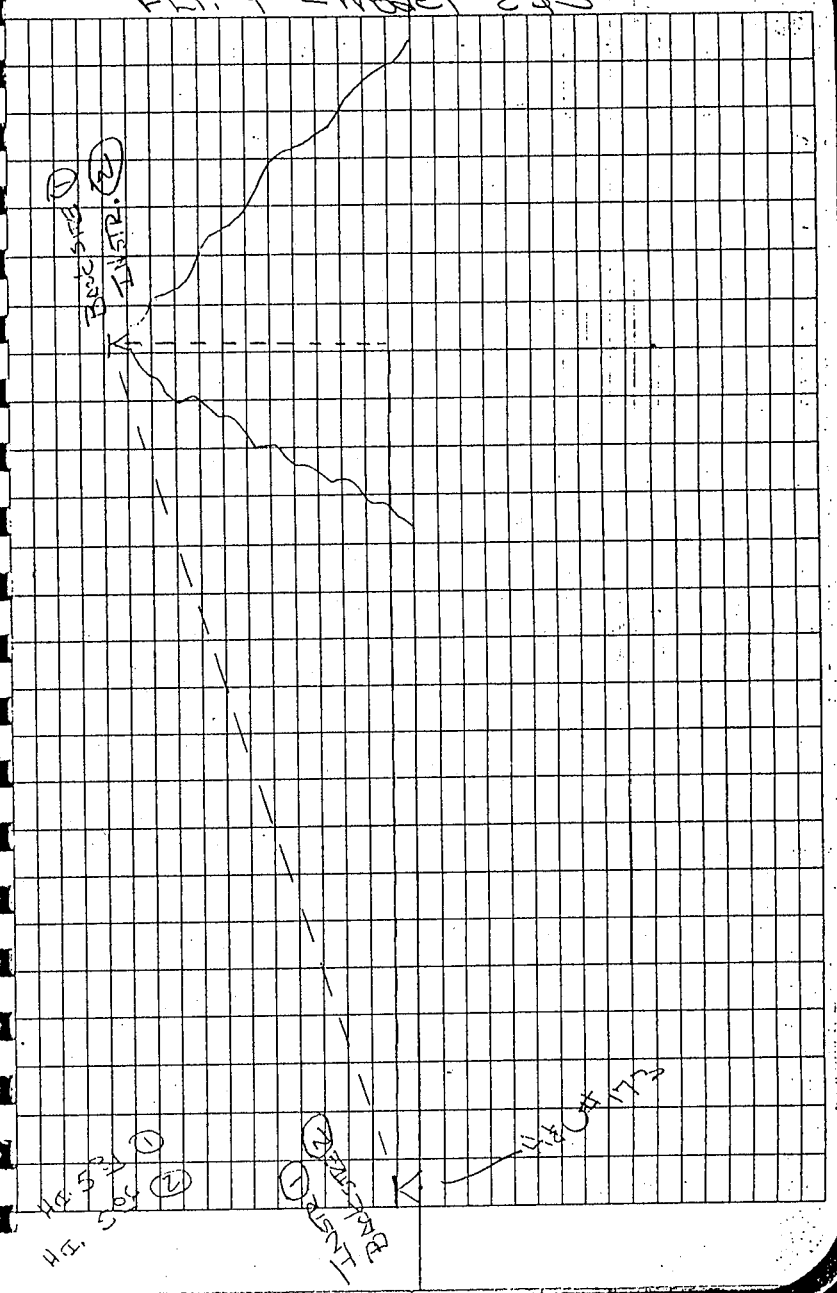
MEAS. HZ DIST — 3668^{37} 29^{55}

MEAS VERT — -111.90

CALC VERT — -112.24

✳ MEAN ELEV. N.E. MOUNTAIN = 1028^{65}

FIG. 9 - Model 233



8-12-92 (21)

Flt 9- model 2 & 3

~~Plan~~ STA	~~Plan~~ Contour	A/B Dist	-Rod	Elev.	
0+00			+3 12	1031 77	
0+13				1028 65	*
0+42	1020 0		-7 00	1021 6	
~~0+4~~		0+46	-8 65	1020 0	
1+15	1000 0		-28 65	1000 0	
1+85	980 0		49 68	978 97	
		1+83	48 65	980 0	
		1+85	49 15	979 5	
2+50	960 0		-69 08	959 57	
		2+48	68 65	960 0	
2+60	940 0		90 28	938.37	
		3+51	88 65	940 0	
6+85	920 0		109 07	919 58	

Continued Page 22

DESCRIPTION

"N.E." Mountain Top *

* set-up (Flat-spot)

Measured Dist From 0+00

Elt. 9 model 2&3

HAD STA	HAD CONTOUR	HTB DIST	-Rod	ELEV.	DESCRIPTION
				1031.7	
13+90	920°		110.69	917.96	
		13+92.27	108.65	920°	
15+55	940°		89.46	939.19	
		15+61	88.65	940°	
16+20					N.W. MOUNTAIN TOP
		16+22	85.51	943.14	
END		THIS	CONTOUR	CHECK	
0+00					π = 0+00 TO NORTH
0+45	1020°		-13.24	1015.49	
		0+34		1020°	
0+90	1000°		31.86	996.79	
		0+84		1000°	
1+48	980°		50.58	978.07	
		1+44		980°	
4+10	960°		69.16	959.49	
		3+95		960°	

Continued Page 23

8-12-92 (23)

FLT. 9 model 2 & 3

Stad Sta	Stad Contour	NB Dist	± Rod	Elev.	Description
6+70	980°		49.12	979.53	
	"	6+73		980.0	
8+10	1000°		-29.42	999.23	
		8+13		1000.0	
9+45	1020°		-4.90	1023.75	
		9+30	-8.29	1020.36	
10+20	1040°		+13.69	1042.34	
		10+14		1040.0	
10+70	1060°		+29.52	1058.22	
		10+75		1060.0	
11+80			+49.63	1078.28	" North Mountain Top

FLT. 9 MODEL H.&S

TRIG.'S FOR BASE ELEV.

* @ MOUNTAIN "A" SCALED N860330 E542340

B.S. H&U# 176 N860036.93 E541991.70

" ELEV. 943.28 (Ground)

DIRECT: VERT ∠ — 95-59-55

Slope Dist — 452.05

Calced Hz Dist — 449.57

MEASURED Hz Dist — 449.57

MEASURED VERT — 47.18

CALCED VERT — 47.24

H&U # 176 GROUND ELEV. 943.28

VERT. DIFF. + 47.21

ELEV. MOUNTAIN "A" → 990.49

* MOUNTAIN "A" TO H&U# 176

SCALED → 460°

Calced → 455 ²

MEAS → 449 ⁶

FLT. 9 - Model 4 & 5

PLAN STA	HOR CONTOUR	W/B DIST	± ROD	ELEV.	DESCRIPTION
0+00	994.0			990.50	TOP MOUNTAIN "A"
0+68	980.0		-14.3	976.2	
		0+56	-10.5	980.0	
1+48	960.0		-33.5	957.0	
		1+36	-30.5	960.0	
2+62	940.0		-52.9	937.6	
		2+30	-50.5	940.0	
3+45	940.0		-55.0	935.5	
		4+28	-50.5	940.0	
6+22	960		-34.9	955.60	
		6+75	-30.5	960.0	
7+20			-28.1	962.4	TOP MOUNTAIN "B"

FLT. 9 Model 5E6

TRIG'S FOR BASE ELEV.

∡ @ MOUNTAIN "C" N860480 E543970

B.S. H&U# 178 N860014.65 E544641.33

PANEL ELEV. 957.26

DIRECT: VERT. ∡ — 91-50-00

Slope DIST — 815.18

CALCED HZ DIST — 814.77

MEAS. HZ DIST — 814 79

MEAS. VERT — 26 0

CALCED VERT — 26 08

F.S. H.I. = 8 50 ∡ H.I. 5 12

H&U# 178 PANEL ELEV. 957.26

VERT. DIFF. + 29.42

ELEV. MOUNTAIN "C" 986.68

* MOUNTAIN "C" TO H&U# 178

scaled. 815

Calced. 816.8

MEAS. 814.8

FLT. 9 - model 5 & 6

HON STA	HON CONTOUR	A/B DIST.	± Rod	ELEV.	DESCRIPTION
0+00	980.0			986.7	T @ MOUNTAIN "C"
0+35	980.0		-9.8	976.9	
		0+23	-6.7	980.0	
1+15	960.0		-27.3	959.4	
		1+09	-26.7	960.0	
5+00	940.0		—	—	5+00 FOLLS IN DEEP GULLY
		4+80	-48.10	938.6	
		4+70	-46.7	940.0	
6+05	940.0		-48.2	938.5	
		~~6+21~~ 6+13	-46.7	940.0	
8+00	940.0		—	—	
		8+10	-49.1	937.60	* CAN NOT CATCH 940 CONTOUR IN HT
14+05	940.0		-49.7	937.0	
		14+20	-46.7	940.0	
14+90	960.0		-29.3	957.4	
		15+00	-26.7	960.0	

FLT 9 model 5 & 6

PLAN STA	PLAN CONTOUR	A/B DIST	± ROD	ELEV.
				986.7
15+70	980		-9.1	977.6
		15+86	-6.7	980.0
16+30 scaled		1'22.8 (1.44%)	+4.42	991.12 *

COMPARE TO ELEV. 990.5
Page 24

DESCRIPTION

TOP MOUNTAIN "A"

Bk 1321

T@ H&U # 178			N 860000 E 544641.33		
B.S. Monument "C"			N 860480 E 543970		
REF Brg: N 54-16-16 W (816.80)					
F.S. - Point on Pipeline R/W			N 860000 E 545390		
Brg: S 88-52-44 E					
Hz. Dist. 748.8					
∡ RT. 145-23-32					
Hz Dist. 748.8					
	+	H.I.	−	Elev.	
B.M.				957.26	H&U # 176
	14.56	971.82			
T.P.			3.00	968.82	
	13.97	982.79			
Pipeline ~~TT~~			3.62	979.17	
RETURN LOOP					
	3.87	982.01			
T.P.			14.21	968.23	
	2.73	971.56			
B.M. V-in			14.28	957.28	

TRAV. & Bench Loop 8-20-92

Fig. 9 Mod. 1-6

FLT. 9 MODEL 6

STA	Hon Contour		± Rod	Elev.	
0+00				979.2	Pt. on Pipeline R/W N 860000 E 545390
1+90	976.0		-4.59	974.6	
3+90	972.0		-9.23	970.0	
5+85	972.0		-4.81	974.4	
6+60	972.0		-10.44	968.8	
7+50	972.0		-4.15	975.0	
8+05	976.0		-1.54	977.7	
9+20	972.0		-5.56	973.6	
10+05	976.0		-1.96	977.2	
11+70	972.0		-7.71	971.5	TURNING POINT
13+25	960.0		-15.19	956.3	
14+20	948.0		-21.83	949.7	
15+30	960.0		-9.03	962.5	
18+00	964.0		-5.53	966.0	TURNING POINT
19+30	960.0		-8.89	957.10	
20+45	948.0		-20.7	945.3	

1983

SALT - GILA

HYD. STRUCT.

TELEDYNE

425

FORMULAE FOR SOLVING RIGHT TRIANGLES

$\text{Sin } A = \frac{a}{c} = \text{Cos } B$ $\quad$ $\text{Cot } A = \frac{b}{a} = \text{Tan } B$

$\text{Cos } A = \frac{b}{c} = \text{Sin } B$ $\quad$ $\text{Sec } A = \frac{c}{b} = \text{Cosec } B$

$\text{Tan } A = \frac{a}{b} = \text{Cot } B$ $\quad$ $\text{Cosec } A = \frac{c}{a} = \text{Sec } B$

Given	Required	Solution	
A, c	B, a, b	$B = 90° - A$	$a = c \sin A$, $b = c \cos A$
A, b	B, a, c	$B = 90° - A$	$a = b \tan A$, $c = \frac{b}{\cos A}$
A, a	B, b, c	$B = 90° - A$	$b = a \cot A$, $c = \frac{a}{\sin A}$
a, c	A, B, b	$\sin A = \frac{a}{c}$, $\cos B = \frac{a}{c}$	$b = \sqrt{(c+a)(c-a)}$
a, b	A, B, c	$\tan A = \frac{a}{b}$, $\cot B = \frac{a}{b}$	$c = \sqrt{a^2+b^2}$

FORMULAE FOR SOLVING OBLIQUE TRIANGLES

Given	Required	Solution	
A, a, b	B, c	$\sin B = \frac{b \sin A}{a}$	$c = \frac{a \sin C}{\sin A}$
A, B, a	b, c	$b = \frac{a \sin B}{\sin A}$	
a, b, C	A, c	$A + B = 180° - C$	$c = \frac{a \sin C}{\sin A}$
a, b, c	Area	side $= \frac{a+b+c}{2}$	area $= \sqrt{s(s-a)(s-b)(s-c)}$
A, b, c	Area	area $= \frac{1}{2} bc \sin A$	
A, B, C, a	Area	area $= \frac{a^2 \sin B \sin C}{2 \sin A}$	

MADE IN U.S.A.

BK. 1383 $\quad$ INDEX I

TITLE PAGE

SALT-GILA
BRIDGE PROFILES

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8-9	PROFILE E. SIDE ESTRELLA BRDG
10	SKETCH E. SIDE ESTRELLA BRDG
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Bk. 1383

INDEX II

BK. 1383 GILA RIVER @ TUTHILL RD.

BENCH LOOP PG. 1

STA.	+	H.I.	−	ELEV.	DESC.
ERM 35				885.99	BRASS CAP IN HANDHOLE TUTHILL RD. AND ELLIOT RD. NE COR SEC 18
	2.82	88.81			
			5.94		
T.P.				882.87	ROCK
	6.59	89.46			
			11.40		
0+00 (EAST)				878.06	SET 60d NAIL 5' EAST OF SE COR. TUTHILL RD. BRIDGE ON GILA RIVER
	12.62	90.68			
			10.97		
0+00 (WEST)				879.71	SET 60d NAIL 5' WEST OF SW COR. TUTHILL RD. BRIDGE ON GILA RIVER
	10.65	90.36			
			7.35		
T.P.				883.01	ROCK
	6.28	89.29			
			3.31		
ERM 35				885.98	P.O.B. 1-IN = 0.01 Loss

BK. 1383 GILA RIVER @ TUTHILL RD. BRIDGE PROFILE EAST SIDE PG. 2

STA.	BS	H.I	N.G. ELEV	BRDG + ROD	BOTT. DECK	DESC.
0+00 EAST		5.4	878.1			60d NAIL 5.0' EAST OF SE COR. TUTHILL RD. BRIDGE AT SOUTH ABUTMENT
17+71.5 EAST						60d NAIL 5.0' EAST OF NE COR. TUTHILL RD. BRIDGE AT NORTH ABUTMENT
0-15.6			885.0			NG 5' E. OF SE COR. APPROACH SLAB
0+00			878.1			NG 5 E OF NE COR. APPROACH SLAB
0+07.3			876.7			TOP OF RIVER BANK @ EDGE OF RIP-RAP
0+37.2			863.5			TOE OF RIVER BANK @ EDGE OF RIP-RAP
0+80.5			862.8			G.B.
1+21.0			860.5	27.6	888.1	℄ 4' WIDE PIER

BK. 1383 GILA RIVER @ TOT HILL RD. BRIDGE PROFILE EAST SIDE PG. 3

STA.	BS	H.I.	N.G. ELEV.	BRDG. + ROD	BOTT. DECK	DESC.
1+66.8		5.4	861.3			G.B.
2+38.7			861.1			℄ 4' WIDE PIER
2+89.8			861.5			G.B.
3+56.1			859.1	30.3	889.4	℄ 4' WIDE PIER
4+48.4			860.9			G.B.
4+74.0			860.7			℄ 4' WIDE PIER
5+35.5			861.7			G.B.
5+91.5			862.7	28.1	890.8	℄ 4' WIDE PIER
6+52.0			862.8			G.B.
7+10.0			862.3			℄ 4' WIDE PIER

BK 1383 GILA RIVER @ TUTHILL RD. BRIDGE PROFILE EAST SIDE PG. 4

STA	BS	H.I.	N.G. ELEV.	BRDG. + ROD	BOTT DECK	DESC.
7+70.1		5.4	861.7			G.B.
8+27.8			861.3	30.0	891.3	℄ 4' WIDE PIER
8+83.2			861.2			G.B.
9+45.9			862.7			℄ 4' WIDE PIER / TOP
9+73.0			857.9			TOE
10+63.7			857.1	34.2	891.3	℄ 4' WIDE PIER
11+26.8			858.5			G.B.
11+82.5			857.3			℄ 4' WIDE PIER
12+38.9			857.8			G.B.
13+00.0			857.5	32.8	890.3	℄ 4' WIDE PIER / TOE

BK. 1383 GILA RIVER @ TUTHILL RD.

BRIDGE PROFILE EAST SIDE PG. 5

STA.	B.S.	H.I.	N.G. ELEV.	BRDG. + ROD	BOTT. DECK	DESC.
13+75.2		5.4	859.6			TOP
13+88.1			854.8			TOE
14+18.0			854.3			℄ 4' WIDE PIER
14+30.1			855.6			TOE
14+64.6			858.3			TOP
15+35.9			862.0	28.2	890.2	℄ 4' WIDE PIER
15+89.1			865.1			G.B.
16+53.6			865.9	21.8	887.7	℄ 4' WIDE PIER
17+44.9			867.2			TOE OF RIVER BANK @ EDGE OF RIP-RAP

BK. 1383 GILA RIVER @ TUTHILL RD.

STA.	B.S	H.I.	N.G. ELEV.	BRDG. + RAP	BOTT. DECK
17+67 8		5.4	878.1		
17+71 5			879.5		
17+88 8			886.5		

VERTICAL COMPARISON, E. PROFILE / W. PROFILE

RANDOM SHOT #	VERT ± E → W
1	-1.0'
2	-0.3'
3	-0.2'
4	-0.4
5	-0.7

AVG. VERT. DIFF. E → W = ± 0.5'

NOTE:

SEE SKETCH PG. 11 FOR WEST SIDE DIMENSIONS IN PARENTHESIS

BRIDGE PROFILE EAST SIDE PG. 10

DESC.

TOP OF RIVER BANK @ EDGE OF RIP-RAP

N.G. 5.0' E. OF SE COR. NORTH APPR. SLAB

N.G. 5.0' E. OF NE COR. NORTH APPR. SLAB

END THIS SET-UP

NOTE: BOTT. WEB. IS 5.6' LOWER THAN BOTT. DECK (TYPICAL)

SEE SKETCH PAGE 11

6-30-92

T. PRICE

J. O'DELL

SUNNY, HOT

BK. 1383 GILA RIVER @ ESTRELLA Pkwy. BENCH LOOP PG. 72

STA.	+	H.I.	−	ELEV.	DESC.
V-179	"			916.49	V-179 B/C @ SOT VINEYARD & ESTELLA PKWY
	6.04	922.53			
0+00 (EAST)			6.58	915.95	"X" ON ROCK, 5' O.S. S.E. END BRIDGE
	6.53	922.48			
P.O.B			5.99	916.49	✓-IN P.O.B

VERT. COMPARISON, E. PROFILE / W. PROFILE

RANDOM SHOT #	VERT ± E → W.
1	0.0'
2	-0.2'
3	-0.4'
4	-0.5'
5	-0.4'

AVG. VERT. DIFF. E → W = -0.3'

NOTE:

SEE SKETCH PG. 10 FOR WEST SIDE DIMENSIONS IN PARENTHESIS

Bk. 1383 GILA RIVER @ ESTRELLA PRKWY BRIDGE PROFILE EAST SIDE Pg. 8

STA.	H.I.	N.G. ELEV.	BRDG + ROD	BOTT. DECK	BOTT. WEB	DESC.
0+00	4.7	915.95				MARKED "X" ON ROCK 5' EAST OF SE COR. BRIDGE
-0+20		917.25				TOP / RIP-RAP
0+60		891.6				TOE / RIP-RAP
1+20 5		891.8	26.8	918.6	912.5	℄ 5' PIER
1+38 4		891.4				TOP
1+54		889.0				TOE
2+21		887.3				TOE
2+29 5		890.1				TOP
2+41		891.0				℄ 5' PIER
3+01		892.2				N/G
3+61		892.4	27.8	920.2	914.2	℄ 5' PIER
4+22 5		892.3				N/G
4+83		892.6				℄ 5' PIER
5+43 9		893.1				N/G
6+02 5		893.5	28.1	921.6	915.4	℄ 5' PIER
6+64		893.9				N/G
7+24 5		893.9				℄ 5' PIER
7+84		893.9				N/G
8+44 5		894.2	28.3	922.5	916.3	℄ 5' PIER
9+05 5		894.5				N/G
9+65 5		895.1				℄ 5' PIER

BK 1383 GILA RIVER @ ESTRELLA PKWY

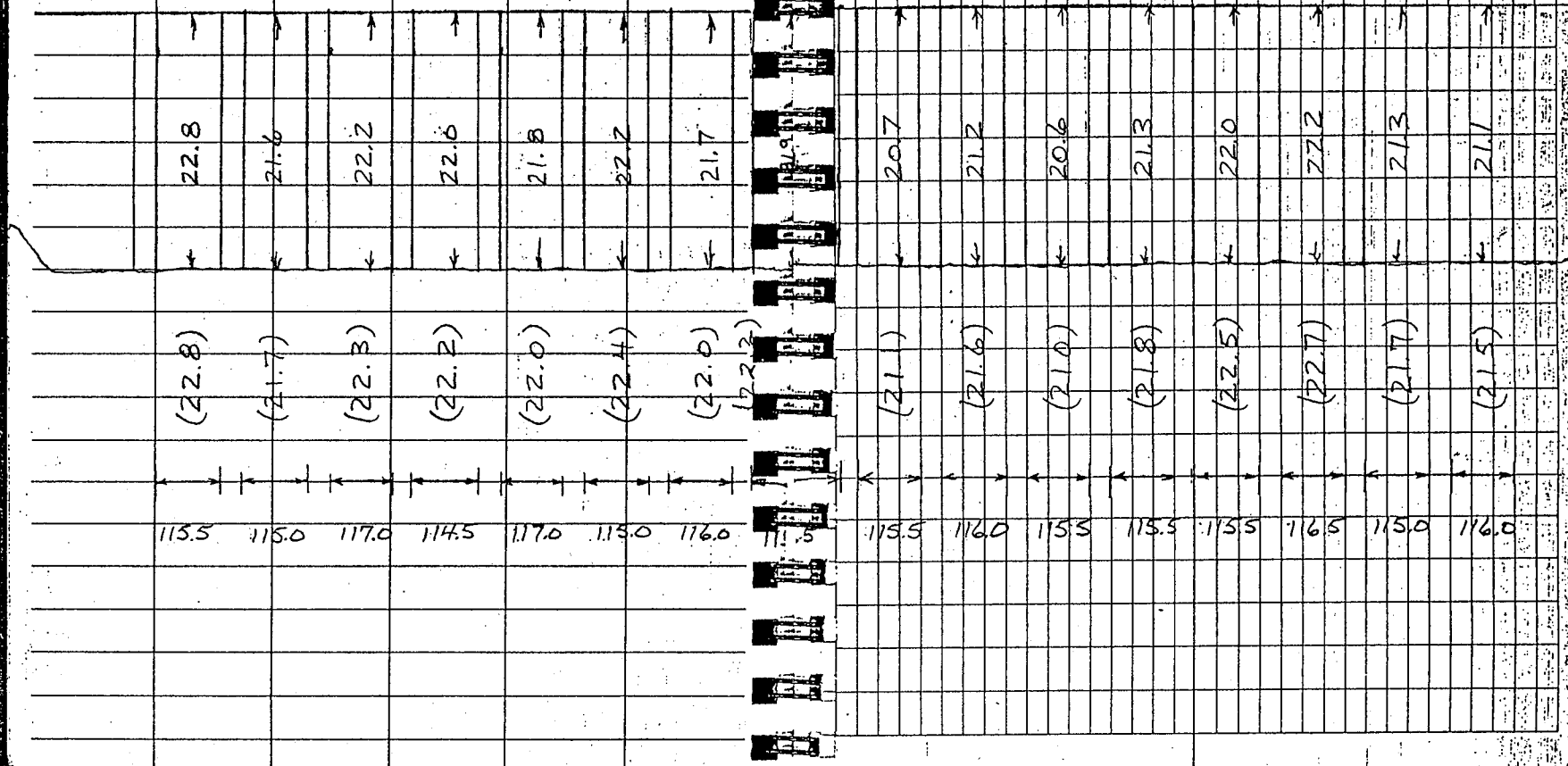
BRIDGE PROFILE EAST SIDE PG. 9

STA	HI	N.G. ELEV.	BRDG + ROD	BOTT. DECK	BOTT. WEBB	DESC
	4.7					
10+24		894.3				N/G
10+86		895.3	27.2	922.5	916.2	℄ 5' DIA. PIER
11+46		895.5				N/G
12+06.5		895.3				℄ 5' DIA. PIER
12+66.5		895.0				N/G
13+27.5		894.7	27.8	922.5	916.2	℄ 5' DIA. PIER
13+87		895.4				N/G
14+48		895.1				℄ 5' DIA. PIER
15+08		894.4				N/G
15+68.5		893.6	28.1	921.7	915.6	℄ 5' DIA. PIER
16+29		893.2				N/G
16+89		892.5				℄ 5 DIA. PIER
17+49.5		892.3				N/G
18+10.5		892.0	28.2	920.2	914.1	℄ 5' DIA. PIER
18+71		892.3				N/G
19+30.5		892.3				℄ 5' DIA. PIER
20+13		891.5				G.B.
20+51.5		890.1	28.1	918.2	912.1	℄ 5 DIA. PIER
20+99		890.1				TOE RIP-RAP
21+71.5		912.7				END BRIDGE / TOP RIP-RAP
21+90.5		916.1				END APPROACH SLAB

END THIS SET UP —

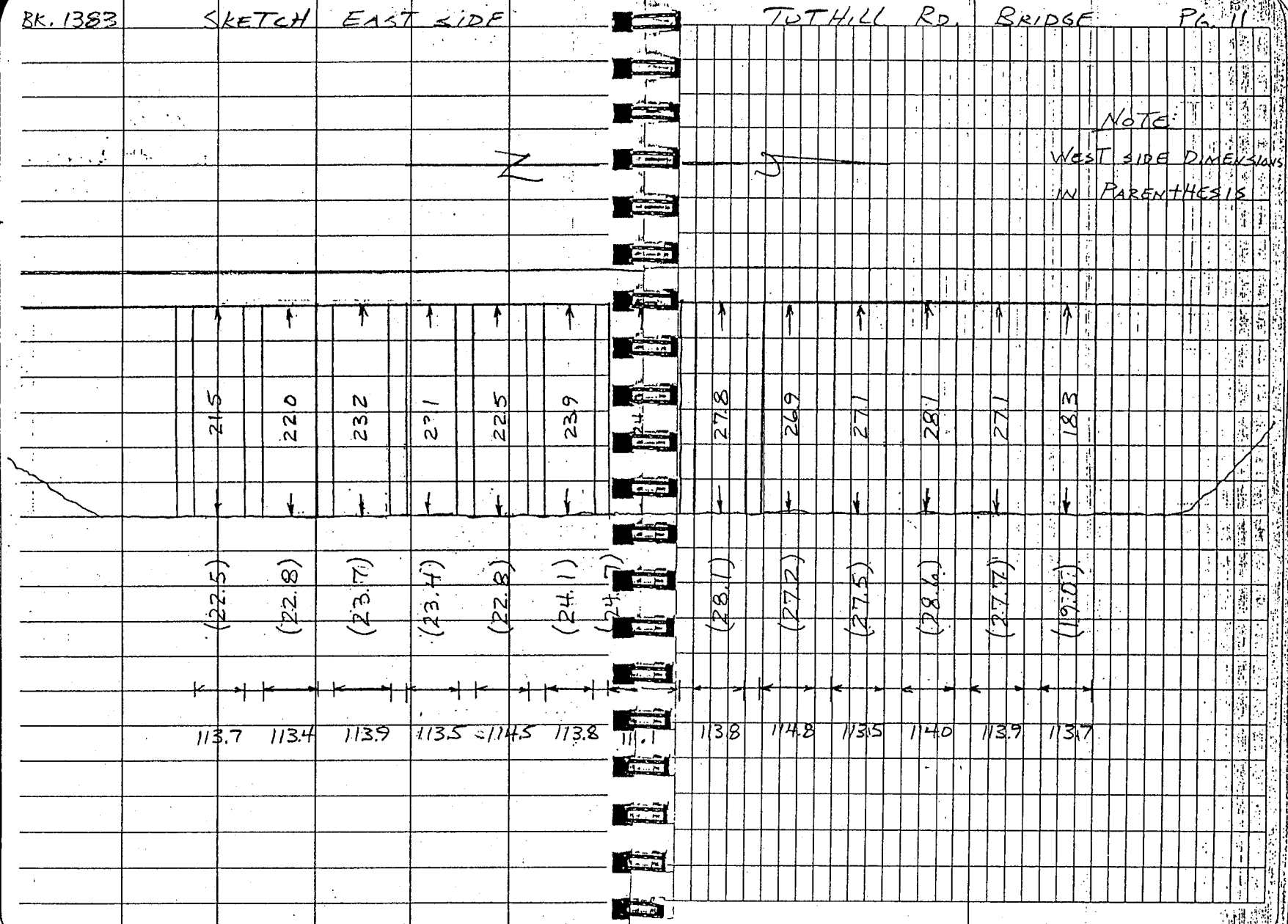
NOTE: FOR VERT. COMPARISON E/W PROFILE SEE PG. 7

NOTE:
WEST SIDE DIMENSIONS IN PARENTHESIS



BK. 1383 SKETCH EAST SIDE TOTHILL RD. BRIDGE PG. 11

NOTE:
WEST SIDE DIMENSIONS
IN PARENTHESIS



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24th STREET BRIDGE PROFILE

NO SKEW

7-1692B 3

24TH STREET BRIDGE PROFILE

STA	H.I.	—	TOP DECK	BOTT WEB	—Rod (TOP DECK)	N.G.	N.G. (WESTSIDE)
	1104.70						
-0+7.5 (TOP SLOPE)		7.02	1097.68	1094.51	Ø	1097.7	Ø 1097.7
0+00 (SOUTH FACE ABUT)		6.99	1097.71	1094.54	-6.3	1088.2	-0.2 1088.0
0+37.5 (TOE)		6.72	1097.98	1094.81	-22.7	1072.10	-0.3 1071.8
0+70.5 (℄ PIER)		6.65	1098.05	1094.88	-23.0	1071.9	-0.3 1071.6
1+42.50 (℄ PIER)		6.25	1098.45	1095.28	-21.1	1074.2	-0.6 1073.6
2+14.50 (℄ PIER)		-6.04	1098.66	1095.49	-20.2	1075.3	-0.3 1075.0
2+86.50 (℄ PIER)		-6.03	1098.67	1095.50	-22.1	1073.4	-0.5 1072.9
3+17.5 (G.B.)		-5.89	1098.81	1095.64	-24.0	1071.6	Ø 1071.6
3+58.50 (℄ PIER)		-5.77	1098.93	1095.76	-28.5	1067.3	-0.4 1066.9
4+06.5 (G.B.)		-5.70	1099.0	1095.83	-24.9	1070.9	-0.5 1070.4
4+30.5 (℄ PIER)	1104.70	-5.77	1098.93	1095.76	-24.4	1071.4	-0.4 1071.0

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24TH STREET BRIDGE PROFILE

STA	H.I.	—	Top Deck	Bott Web	-Rod (Top Deck)	N.E	N.E. (WEST SIDE)	
	1104^{70}							
4+69 (G.B)		5^{69}	1099^{01}	1095^{84}	-25^{2}	1070^{4}	-0^{3}	1070^{3}
$5+02^{5}$ (℄ PIER)		5^{76}	1098^{94}	1095^{77}	-24^{3}	1071^{5}	-0^{4}	071^{1}
5+44 (G.B.)		5^{78}	1098^{92}	1095^{75}	-22^{5}	1073^{2}	-0^{4}	1072^{8}
$5+74^{5}$ (℄ PIER)		5^{87}	1098^{83}	1095^{66}	-22^{0}	1073^{6}	-0^{3}	1073^{3}
$6+46^{5}$ (℄ PIER)		6^{01}	1098^{69}	1095^{52}	-23^{5}	1072^{0}	$+0^{4}$	1072^{4}
$7+18^{5}$ (℄ PIER)		6^{23}	1098^{47}	1095^{30}	-22^{3}	1072^{9}	-0^{3}	1072^{7}
$7+90^{5}$ (℄ PIER)		6^{51}	1098^{19}	1095^{02}	-23^{1}	1071^{9}	$+0^{3}$	1072^{2}
$8+34^{5}$ (TOE)		6^{65}	1098^{05}	1094^{88}	-21^{0}	1073^{9}	-0^{5}	1073^{4}
8+61 (NORTH FACE ABUTT)		6^{85}	1097^{85}	1094^{68}	-8^{8}	1085^{9}	-0^{4}	1085^{5}
$8+75^{5}$ (TOP SLOPE)	1104^{70}	6^{80}	1097^{90}	—	Ø	1097^{9}	Ø	1097^{9}

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24TH STREET BRIDGE PROFILE

NORTH ABUT		
21.0	0.0	8+61
22.70	0.0	7+70.5
22.90	0.0	7+18.5
22.85	0.0	6+46.5
22.75	0.0	5+74.5
25.3	0.0	5+02.5
25.2	0.0	4+30.5
24.0	0.0	3+58.5
21.10	0.0	2+86.5
20.6	0.0	2+14.5
22.10	0.0	1+42.5
22.50	0.0	0+70.5
SOUTH ABUT		0+00

BOT WEB

TOP DECK

I-10 BRIDGE PROFILE

I-10 Bridge Profile

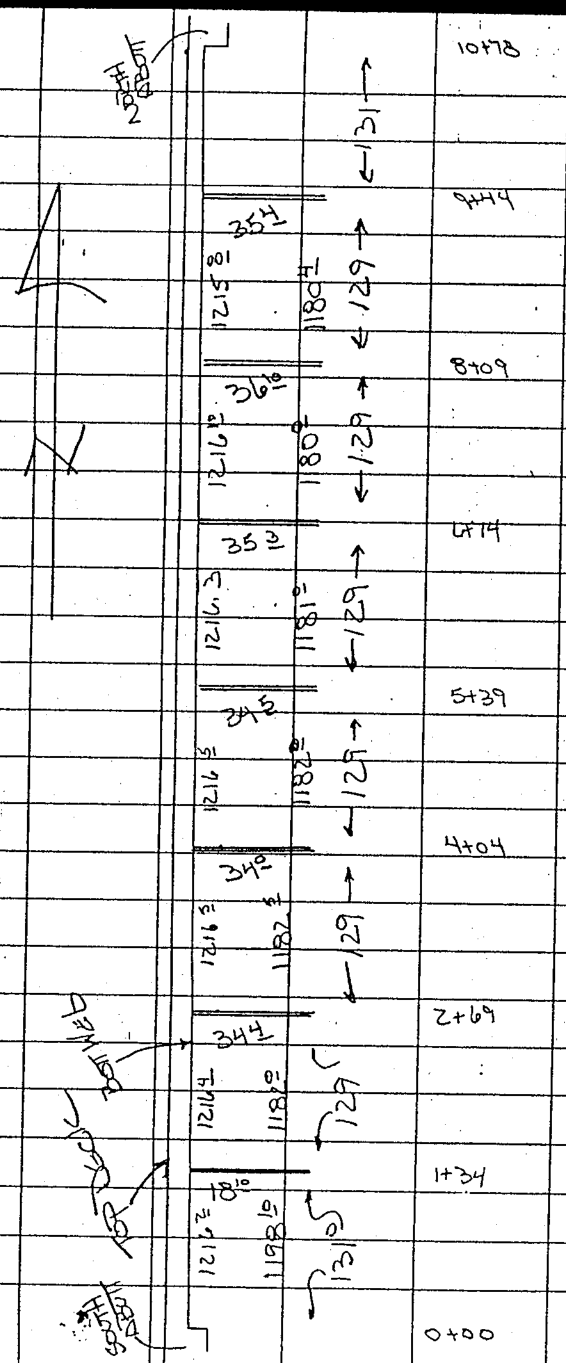
STA	H.I	+Rod	Bott Web	Bott Beam	-Rod	N.G.	N.G. (Westbound)
11997.75							
-0+18 (Top Slope)	1203.55	+19.55	—	—	—	1223.19	Ø 1223.19
0+00 (South Face Abutt)	"	+12.45	1216.0	—	—	1216.0	Ø 1216.0
0+34 (Toe)		+12.55	1216.10		-4.02	1199.5	Ø 1199.5
1+01 (Top Slope)		+12.70	1216.25		-5.42	1198.19	Ø 1198.19
1+34 (℄ Pier)		+6.23	1216.34	1209.78	-15.80	1187.75	Ø 1187.75
1+55 (Toe)		+12.75	1216.30		-21.83	1181.72	-0.4 1181.10
1+78 (G.B.)		+12.85	1216.40		-21.53	1182.0	-0.4 1181.6
2+69 (℄ Pier & G.B.)		+6.29	1216.40	1209.84	-18.53	1185.9	-1.1 1183.9
3+36.5 (Pier Sh'ft)		+12.55	1216.50		-20.65	1182.9	-0.8 1182.1
4+04 (℄ Pier)		+6.34	1216.45	1209.89	-21.10	1182.5	-0.5 1182.0
4+71.5 (Split)		+12.94	1216.49		-20.85	1182.70	-1.2 1181.5
5+39 (℄ Pier)	1203.55	+6.30	1216.41	1209.85	-21.53	1182.0	-0.5 1181.5

STA	H.I.	+Rod	BOTT WEB	BOTT BEAM	-Rod
	1203^{55}				
$6+06^{50}$ (SPLIT)		$+12^{79}$	1216^{34}		-21^{92}
$6+74$ (℄ PIER)		$+6^{08}$	1216^{19}	1209^{63}	-20^{20}
$7+41^{5}$ (SPLIT)		$+12^{52}$	1216^{07}		-22^{65}
$8+09$ (℄ PIER)		$+5^{83}$	1215^{94}	1209^{38}	-21^{90}
$8+76^{5}$ (SPLIT)		$+12^{25}$	1215^{80}		-23^{25}
$9+44$ (℄ PIER)		$+5^{50}$	1215^{61}	1209^{05}	-22^{0}
$9+59$ (TOE)		$+12^{05}$	1215^{60}		-20^{8}
$10+04$ (TOP SLOPE)		$+11^{95}$	1215^{50}		-6^{30}
$10+34$ (TOE)		$+11^{90}$	1215^{45}		-5^{35}
$10+64$ (TOP SLOPE)		$+11^{85}$	1215^{40}		—
$10+78$ (NORTH FACE ABUT)		$+11^{82}$	1215^{37}		
$10+90$ (TOP SLOPE)	1203^{55}	$+11^{78}$	—		—

I-10 BRIDGE PROFILE

N.G	N.G. (WEST SIDE)	
1181^{6}	-1^{1}	1180^{5}
1183^{3}	-1^{7}	1181^{6}
1180^{90}	-1^{4}	1179^{5}
1181^{6}	-1^{0}	1180^{6}
1180^{3}	$+0^{2}$	1180^{5}
1181^{5}	-0^{2}	1181^{3}
1182^{7}	Ø	1182^{7}
1197^{3}	Ø	1197^{3}
1198^{2}	Ø	1198^{2}
1214^{9}	Ø	1214^{9}
1214^{7}	Ø	1214^{7}
1215^{3}	Ø	1215^{3}

I-10 BRIDGE PROFILE



N
PRIEST RD RAMP
EDGE DECK
℄ HOHOKAM
EDGE DECK
0+00
22°
22°
44° SKEW

HOHOKAM BRIDGE
B-20
8'1/2" DECK
6" WEB
6'-9" BEAM
6" PIER
(4 PIERS ACROSS)

$1125^{09} + 5^{04}$

STA	H.I.	+Rod	BOTT W/GB	BOTT BEAM	−Rod
	1130.98				
0+00 (SOUTH FACE ABUT)			1137^{60}		-
$0+23^{5}$ (TOP SLOPE)		$+6^{70}$	1137^{68}		
0+58 (TOE)		$+6^{82}$	1137^{80}		-16^{73}
0+88 (G.B.)		$+6^{92}$	1137.90		-17^{88}
0+96 (G.B.)		$+6^{94}$	1137.92		-20^{63}
1+26 (℄ PIER)		$+6^{74}$	1137^{72}	1130^{82}	-20^{73}
$1+90^{25}$ (INTERMOD)		$+7^{32}$	1138^{30}		-20^{74}
$2+54^{50}$ (℄ PIER)		$+7^{58}$	1138^{56}	1131^{66}	-20^{51}
$3+19^{25}$ (INTERMED)		$+7^{88}$	1138^{86}		-21^{15}
3+84 (℄ PIER)		$+7^{95}$	1138^{93}	1132^{03}	-21^{15}
$4+49^{25}$ (INTERMED)		$+8^{26}$	1139^{24}		-20^{30}
$4+94^{0}$ (G.B.)	1130.98	—			-19^{62}

HOHOKAM BRIDGE PROFILE

N.G	N.G. WEST SIDE
1136^{0}	$\emptyset$ 1136^{9}
1136^{0}	$\emptyset$ 1136^{9}
1114^{25}	-0^{7} 1113^{5}
1113^{10}	$\emptyset$ 1113^{10}
1110^{35}	-0^{5} 1109^{85}
1110^{25}	-0^{3} 1110^{0}
1110^{2}	-0^{6} 1109^{6}
1110^{5}	-0^{4} 1110^{1}
1109^{8}	$\emptyset$ 1109^{8}
1109^{8}	$\emptyset$ 1109^{8}
1110^{7}	-0^{6} 1110^{1}
1111^{4}	-0^{2} 1111^{2}

HOHOKAM BRIDGE PROFILE

STA	H.I.	+Rod	BOTT WEB	BOTT BEAM	-Rod	N.G.	N.G. (WEST SIDE)	
	1130.98							
5+05 (G.B)		—			-17^{30}	1113^{7}	-0^{3}	1113^{4}
$5+14^{50}$ (℄ PIER)		$+8^{35}$	1139^{33}	1132^{43}	-17^{50}	1113^{5}	0	1113^{5}
$5+80^{75}$ (INTERMED)		$+8^{65}$	1139^{63}		-17^{35}	1113^{6}	-0^{6}	1113^{0}
6+46 (℄ PIER)		$+8^{75}$	1139^{73}	1132^{83}	-16^{90}	1114^{10}	-0^{5}	1113^{4}
$7+13^{75}$ (INTERMED)		$+8^{97}$	1139^{95}		-17^{20}	1113^{8}	-0^{6}	1113^{2}
$7+78^{50}$ (℄ PIER)		$+9^{00}$	1140^{0}	1133^{10}	-17^{38}	1113^{6}	-0^{2}	1113^{4}
$8+46^{75}$ (INTERMED)		$+9^{32}$	1140^{30}		-17^{05}	1113^{9}	-0^{4}	1113^{5}
9+12 (℄ PIER)		$+9^{30}$	1140^{28}	1133^{38}	-16^{50}	1114^{5}	-0^{4}	1114^{0}
$9+78^{25}$ (INTERMED)		$+9^{00}$	1140^{0}		-16^{30}	1114^{7}	-0^{7}	1114^{0}
$10+44^{59}$ (℄ PIER)	1130.98	$+8^{55}$	1139^{53}	1132^{63}	-16^{20}	1114^{8}	-0^{3}	1114^{5}

(CONTINUED NEXT PAGE)

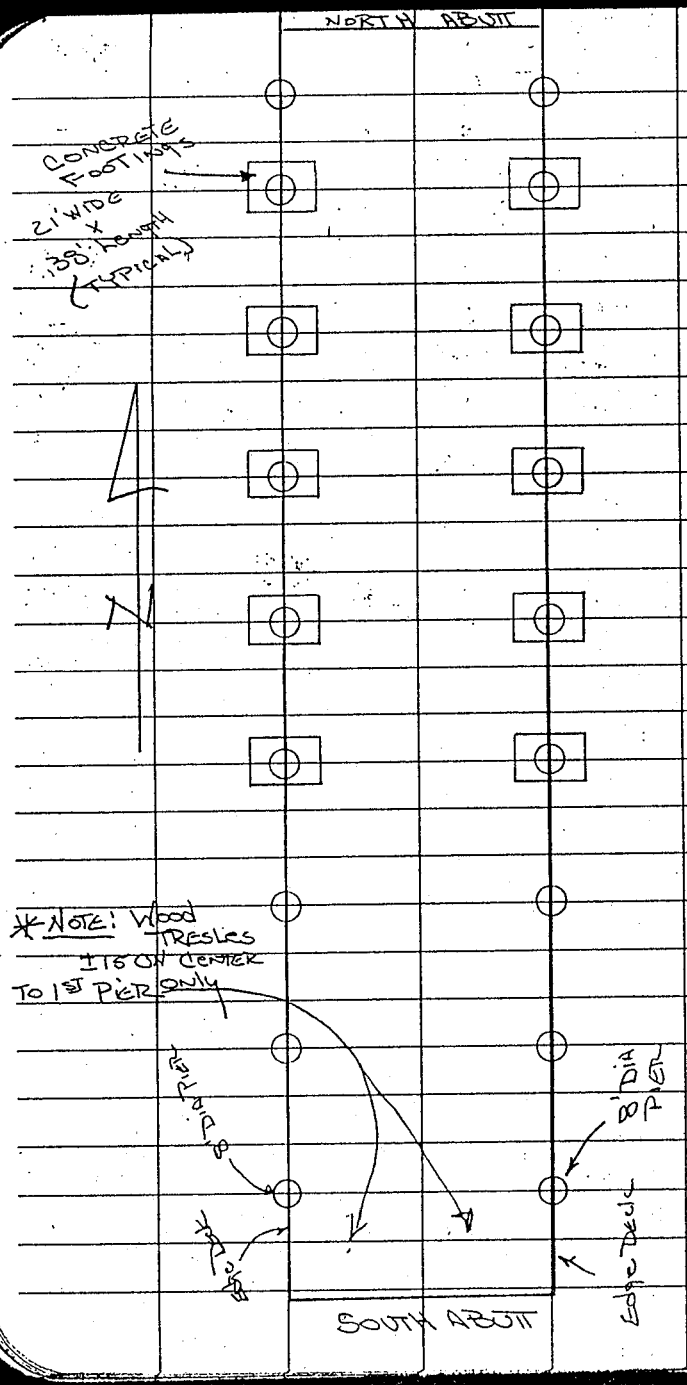
Hoboken Bridge Profile

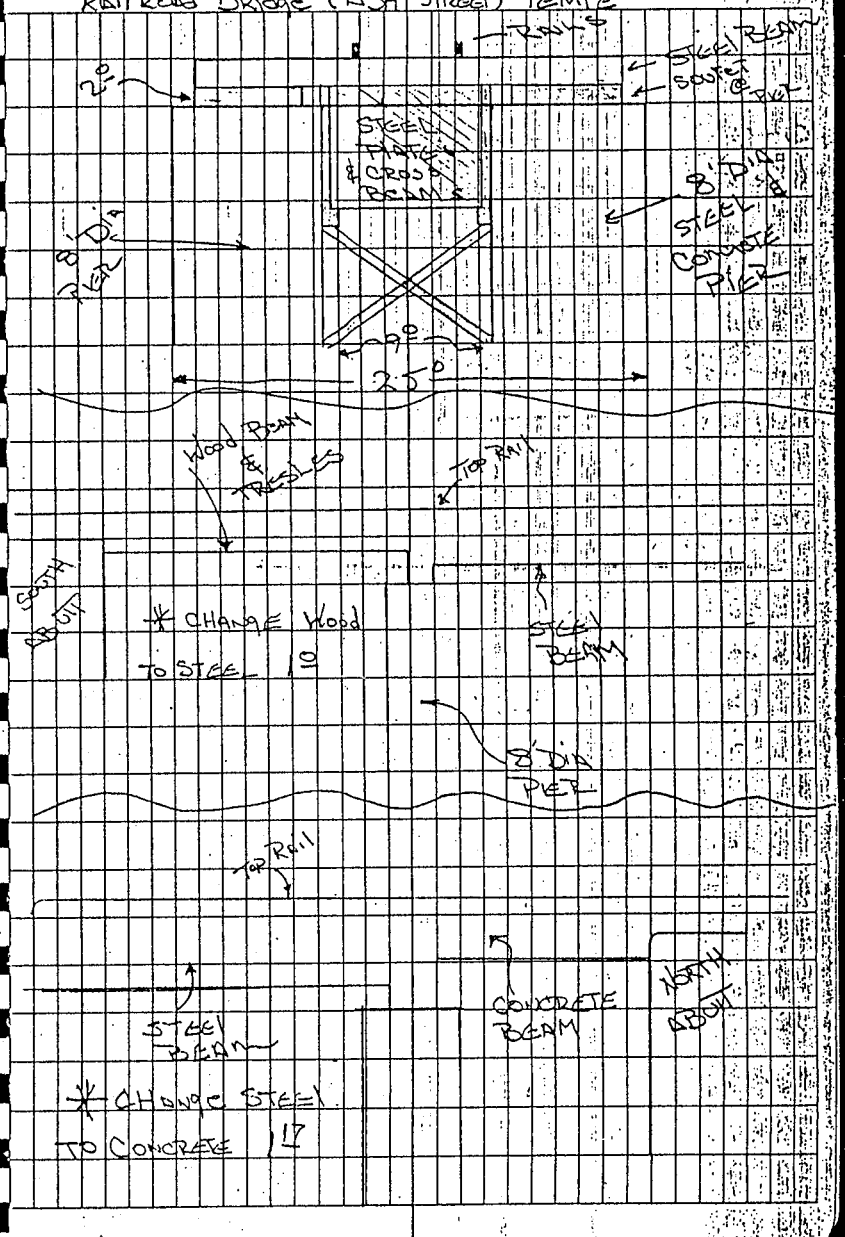
Pg 23

STA	H.I.	+Rod	BOTT WEB	BOTT BEAM	-Rod	N.G.	N.G. (West side)
11+00.5 (TOE)		+7.85	1138.83		-16.25	1114.7	1114.7
11+42.5 (Top slope)		+7.65	1138.63			1137.9	1137.9
11+78.5 (North Face Spall)		+7.55	1138.53			1137.9	1137.9

HOHOKAM Bridge PROFILE

Rail Road Bridge (ASH STREET) TEMPE

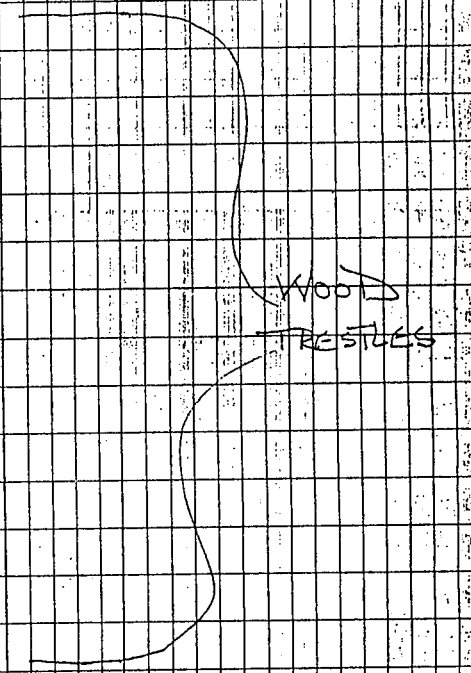




Rail Road Bridge (Ash Street) TEMPE

1144.88 +10.57

STA	H.I.	+Rod	BOTT BEAM	-Rod	TOP CONCRETE FOOTING	N.G.
	1155.45					
0+00 (SOUTH ABUT)		+6.78	1162.23	-1.28		1154.2
+14						
+29						
+44						
+59 G.B		+7.14	1162.59	-5.85		1149.60
+74						
+89						
1+04						
+19 (G.B.)		+7.45	1162.90	-7.46		1147.83
+34						
+49						
+64						
+79						
+94						
2+09						
2+22.5 (℄ PIER)		+6.34	1161.79	-8.33		1147.19
+32.5 (G.B.)				-8.29		1147.2
+60.5 (G.B.)		+6.46	1161.91	-11.54		1143.91
2+71.2 (E.P.) Rio SOLADO	1155.45			-10.97		1144.5



RAILROAD Bridge (ASH STREET) TEMPE

STA	H.I	+Rod	BOTT BEAM	-Rod	TOP Concrete Footing	M.G.
	1155^{45}					
$3+03^{5}$ (E.P.) RIO SALADO				-10^{97}		1144^{50}
$3+23^{7}$ (℄ PIER)		$+6^{70}$	1162^{15}	-12^{68}		1142.8
+34 (G.B)				-12^{28}		1143^{7}
+54 (G.B.)				-8^{59}		1146.9
4+00 (G.B.)		+6.65	1162^{10}	-7^{59}		1147^{9}
+19 (G.B.)				-5^{02}		1150^{4}
$4+49^{4}$ (℄ PIER)		$+6^{70}$	1162^{15}	-5^{26}		1150^{2}
+94 (G.B. TOP slope)		$+6^{75}$	1162^{20}	-5^{45}		1150^{0}
5+57 (TOE)		$+6^{75}$	1162^{20}	-22^{35}		1133^{10}
$6+01^{4}$ (℄ PIER)				-17^{25}	1138^{20}	
6+77 (INTERMED)		$+6^{72}$	1162^{17}	-25^{65}		1129^{8}
$7+53^{4}$ (℄ PIER)	1155^{45}			-17^{53}	1137^{92}	

Rail Road Bridge (Ash Street) Tempe

STA	H.I.	+Rod	Bott Beam	-Rod	Top Concrete Footing	N.G.	
	1155.45						
8+29 (INTERMED)		+6.74	1162.19	-24.73		1130.7	
9+05.4 (℄ PIER)				-15.10	1140.35		
9+87 (INTERMED)		+6.78	1162.23	-23.96		1131.5	
10+68.4 (℄ PIER)				-14.48	1140.97		
11+50 (INTERMED)		+6.78	1162.23	-22.23		1133.20	
12+31.4 (℄ PIER)	1155.45			-13.60	1141.85		
+59 (TOE)	1161.30	+0.99	1162.29	-26.05		1135.25	@ Re-channeled River Bottom
+93 (G.B)				-15.91		1146.4	
13+19 (G.B)		+1.03	1162.33	-15.45		1145.85	
13+58 (TOP slope)		+1.03	1162.33	-26.2		1158.68	@ Re-channeled River Bottom
+73 (G.B.)	1161.30			-26.5		1158.65	

* Continued in Book # 1385

From page 28

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SALT - GILA

HYD. STREET

TELEDYNE

425

FORMULAE FOR SOLVING RIGHT TRIANGLES

$\sin A = \frac{a}{c} = \cos B$ $\quad$ $\cot A = \frac{b}{a} = \tan B$

$\cos A = \frac{b}{c} = \sin B$ $\quad$ $\sec A = \frac{c}{b} = \operatorname{cosec} B$

$\tan A = \frac{a}{b} = \cot B$ $\quad$ $\operatorname{cosec} A = \frac{c}{a} = \sec B$

Given	Required	Solution
A, c	B, a, b	$B = 90° - A$; $a = c \sin A$; $b = c \cos A$
A, b	B, a, c	$B = 90° - A$; $a = b \tan A$; $c = \frac{b}{\cos A}$
A, a	B, b, c	$B = 90° - A$; $b = a \cot A$; $c = \frac{a}{\sin A}$
a, c	A, B, b	$\sin A = \frac{a}{c}$; $\cos B = \frac{a}{c}$; $b = \sqrt{(c+a)(c-a)}$
a, b	A, B, c	$\tan A = \frac{a}{b}$; $\cot B = \frac{a}{b}$; $c = \sqrt{a^2+b^2}$

FORMULAE FOR SOLVING OBLIQUE TRIANGLES

Given	Required	Solution
A, a, b	B, c, c	$\sin B = \frac{b \sin A}{a}$; $c = \frac{a \sin C}{\sin A}$
A, B, a	b, c	$b = \frac{a \sin B}{\sin A}$
a, b, C	A, c	$A + B = 180° - C$; $c = \frac{a \sin C}{\sin A}$
a, b, c	Area	side $= \frac{a+b+c}{2}$; area $= \sqrt{s(s-a)(s-b)(s-c)}$
A, b, c	Area	area $= \frac{bc \sin A}{2}$
A, B, C, a	Area	area $= \frac{a^2 \sin B \sin C}{2 \sin A}$

MADE IN U.S.A.

BK 1385

INDEX I

TITLE PAGE

SALT-GILA
BRIDGE PROFILES

INDEX

PG	DESC
1	BENCH LOOP to BULLARD BRDG
2-3	PROFILE E. SIDE OF BULLARD BRDG
4	PROFILE COMPARISON BULLARD BRDG
5	BENCH LOOP to 51ST AV. BRDG
6	PROFILE E. SIDE 51ST AV. BRDG
7	PROFILE COMPARISON 51ST AV. BRDG
8	SKETCH E. SIDE BULLARD BRDG
9	SKETCH E. SIDE 51ST AV. BRDG
10-11	CONT' PROFILE R.R. (ASH ST.) BRDG
12-17	PROFILE MILL AVE. BRIDGE
18-23	PROFILE RURAL RD. BRIDGE
24-26	PROFILE GILA RIVER BRIDGE
27-28	PROFILE TANNER CONVEYOR BRDG
29	PROFILE UNION ROCK CONVEYOR
30	PROFILE CAL-MAT CONVEYOR

BK 1385

INDEX II

BK. 1385 GILA RIVER @ BULLARD AVE.

STA.	+	H.I.	−	ELEV.	DESC
T.P. #86	"			920.73	M.C.H.D. B/C IN H/H VINEYARD & BULLARD
	6.53	927.26			
			9.52		
TP				917.74	NAIL
	9.33	927.07			
			9.85		
0+00				917.22	HUB & TACK 0+00 5' E. OF SE COR. BRDG.
EAST	10.08	927.30			
			6.58		
T.P. #86				920.72	P.O.B. 1-IN = 0.01 LOW

BENCH LOOP

BK 1385 GILA RIVER @ Bullard

STA	H.I.	N.G. ELEV.	BRDG + RAIL	BOTT DECK	BOTT WEB	DESCRIPTION
0+00	4.91	917.22				HUBBTRACK 5' EAST OF S.E. COR. BRIDGE
0+20		922.29				TOP SLOPE
0+53.5		900.32				TOE R.P. RAP
1+20.7		888.56	26.0	924.56	918.41	℄ PIER (4')
1+81.9		898.90				N.G. (INTERMED.)
2+41.05		899.16				℄ PIER (4')
3+01.8		898.87				N.G. (INTERMED.)
3+62.10		897.85	28.3	926.16	920.01	℄ PIER
4+03.5		898.05				N.G. TOP SLOPE
4+17.65		896.64				TOE
4+46.9		896.58				TOE
4+82.7		898.70				℄ PIER (4') & TOP SLOPE
5+46.19		900.10				N.G. (INTERMED)
6+02.85		901.10	26.1	927.81	921.66	℄ PIER (4')
6+64.4		901.60				N.G. (INTERMED)
7+24.8		902.19				℄ PIER (4')
7+84.7		902.10				N.G. (INTERMED)
8+44.6		901.10	26.9	928.0	921.85	℄ PIER (4') F.G.B.
9+10		896.90				N.G. (INTERMED)
9+65.8		896.74				℄ PIER (4')
10+51.0		900.60				G.B.

BRIDGE PROFILE EAST SIDE

BK 1385

STA	H.I.	N.G.	BRDG + Rod	BOTT Deck	BOTT Web	
10+85.4		901.30	26.2	927.50	921.35	℄ PIER (A1)
11+18.3	"	900.50				N.G. (INTERMED)
12+06.4		897.[illegible]				℄ PIER (A1)
12+36.5		897.8				G.B.
12+68.2		897.6				N.G. (INTERMED)
13+28.0		899.10	27.8	926.9	920.75	℄ PIER (A)
13+87.7		901.20				N.G. (INTERMED)
14+48.50		900.50				℄ PIER (A) & TOP SLOPE
14+88.7		895.60				TOE
15+69		896.10	29.2	925.30	919.15	℄ PIER (A)
16+28.3		896.10				N.G. (INTERMED)
16+90.5		896.65	27.70	924.35	918.60	℄ PIER (A)
17+57.8		899.0				TOE ROCK SLOPE
18+09.46		917.44				(B) EAST N.G. CON.
18+30		923.10				TOP SLOPE
		END	SET	UP		

SEE SKETCH
PG. 8

BK 1385

GILA RIVER AT BULLARD

SHOT #	EAST	WEST
1	⊖	⊖
2	⊖	-0.1'
3	⊖	+0.6'
4	⊖	⊖
5	⊖	⊖
6	⊖	⊖
7	⊖	-0.4
8	⊖	⊖
9	⊖	⊖
10	⊖	-0.3
11	⊖	+0.5
12	⊖	+0.4

EAST → WEST PROFILE COMPARISON

4

REMARKS

EAST = ⊖, WEST SHOT IS COMPARISON, − IS LOWER ELEV., + IS HIGHER ELEV., SHOTS TAKEN @ RANDOM ORDER SOUTH → NORTH

SEE SKETCH ON PAGE 8 FOR WEST SIDE DIMENSIONS IN PARENTHESIS

BK 1385 SALT GILA RIVER BRIDGE PROFILE

STA	+	HI		ELEV.
± -4+00				1011.38
	13.45	24.83		
0+00			3.60	1021.23
	9.49	30.72		
T.P. #2			2.58	1028.14
	6.52	34.66		
T.P. #3			5.69	1028.97
	3.64	32.61		
10+00 TO			11.07	1021.54
			RETURN	
	11.01	32.55		
T.P. #5			3.38	1029.17
	5.08	34.25		
T.P. #6			7.54	1026.71
	0.33	27.04		
± -4+00			15.65	
	(49.52)			
			(49.51)	

51ST AVE. BRIDGE BENCH LOOP

DESC.

V-329 P.K. NL FLSH E 51ST AVE

FLD MARKR "X" ON BRDG. 5' W. OF E EDGE BRDG @ S. END

F.S. CONC. BRDG. ± 5+00 (WHITE PAINT SPOT)

" " " ± 10+00 "

FLD. MARKR "X" ON F.S. BRDG 5' W. OF E. EDGE @ N. END

LOOP

F.S. BRDG.

"

✓- IN P.O.B. (+0.01)

7-6-92

SUNNY / HOT

C. SCHUTE

C. MIHELICH

BK 1385 SALT GILA RIVER, BRIDGE PROFILE

STA.	T/JERSEY RAIL ELEV.	- ROD	N/G ELEV	BOTT. DK. ~3.5 TYP. FROM T/RAIL	BOTT WEBB ~8.0 TYP. FROM T/RAIL
-0+15	—	—	1018.9	—	—
0+00	1023.86	-10.3	1013.6	—	—
0+26	1024.40	-26.5	997.9	1020.9	1016.4
1+00	1025.78	-28.5	997.3	1022.3	1017.8
2+00	1027.50	-30.5	997.0	1024.0	1019.5
3+00	1028.90	-32.5	996.4	1025.4	1020.9
4+00	1030.00	-30.5	999.5	1026.5	1022.0
5+00	1030.90	-33.5	997.4	1027.4	1022.9
6+00	1031.60	-37.0	994.6	1028.1	1023.6
7+00	1032.0	-36.5	995.5	1028.5	1024.0
8+00	1032.10	-32.5	999.6	1028.6	1024.1
9+00	1032.00	-33.5	998.5	1028.5	1024.0
10+00	1031.64	-32.7	998.9	1028.1	1023.6
11+00	1031.02	-34.3	996.7	1027.5	1023.0
12+00	1030.15	-32.3	997.9	1026.7	1022.2
13+00	1029.04	-31.0	998.0	1025.5	1021.0
14+00	1027.65	-27.8	999.9	1024.2	1019.7
15+00	1026.00	-28.0	998.0	1022.5	1018.0
15+72	1024.70	-25.5	999.2	1021.2	1016.7
16+00 TO	1024.17	-9.5	1014.7	—	—
16+15	—	—	1019.5	—	—

END THIS SET UP

51ST AVE BRIDGE EAST SIDE

PG 6

7-6-92

DESC SUNNY / HOT

T C. SCHULTE

P C. MIKELKH

TOP

BEG. RIP RAP IN GUNNITE / G.B.

TOE / END " " " "

& 4' DIAMETER PIER *

" " " " /G.B

" " " " /G.B

BEG. RIP RAP IN GUNNITE @ TOE

END " " " " /G.B

TOP

* 4' DIAMETER PIER'S TYPICAL

SEE SKETCH PG. 9

BK 1385 SALT - GILA RIVER, BRIDGE PROFILE

± STA.	E. - ROD	W. - ROD	VERT. DIFF.	SHOT #
2+00	30.5	29.0	+1.5'	1
5+00	33.5	33.0	+0.5	2
7+00	36.5	35.8	+0.7'	3
11+00	34.3	32.8	+1.5'	4
14+30	29.5	29.8	-0.3	5

51ST AVE BRIDGE WEST SIDE

REMARKS

NOTE:

SEE SKETCH PG. 9
FOR WEST SIDE DIMENSIONS
IN PARENTHESIS

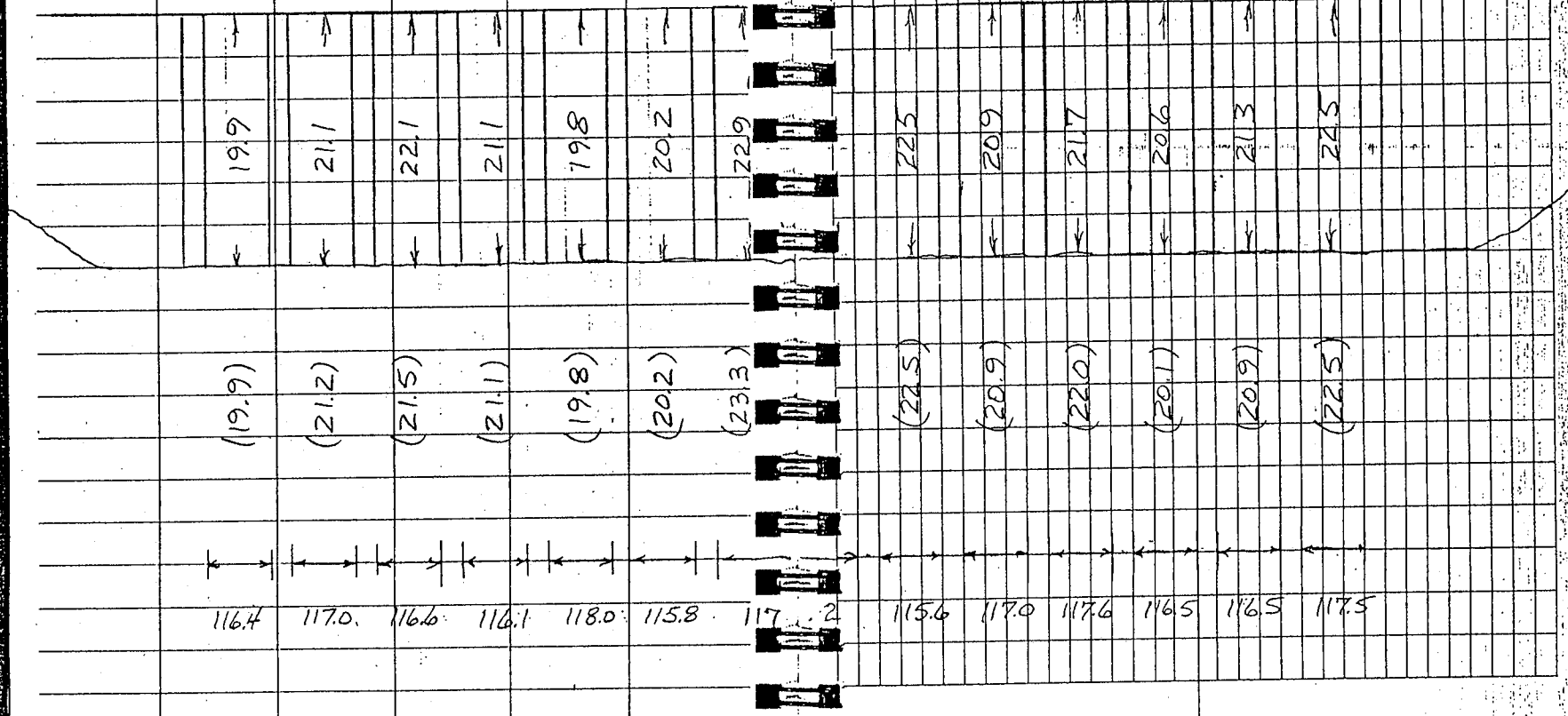
BK. 1385

SKETCH EAST SIDE

BULLARD AVE. BRIDGE

(8)

NOTE
WEST SIDE DIMENSIONS
IN PARENTHESIS



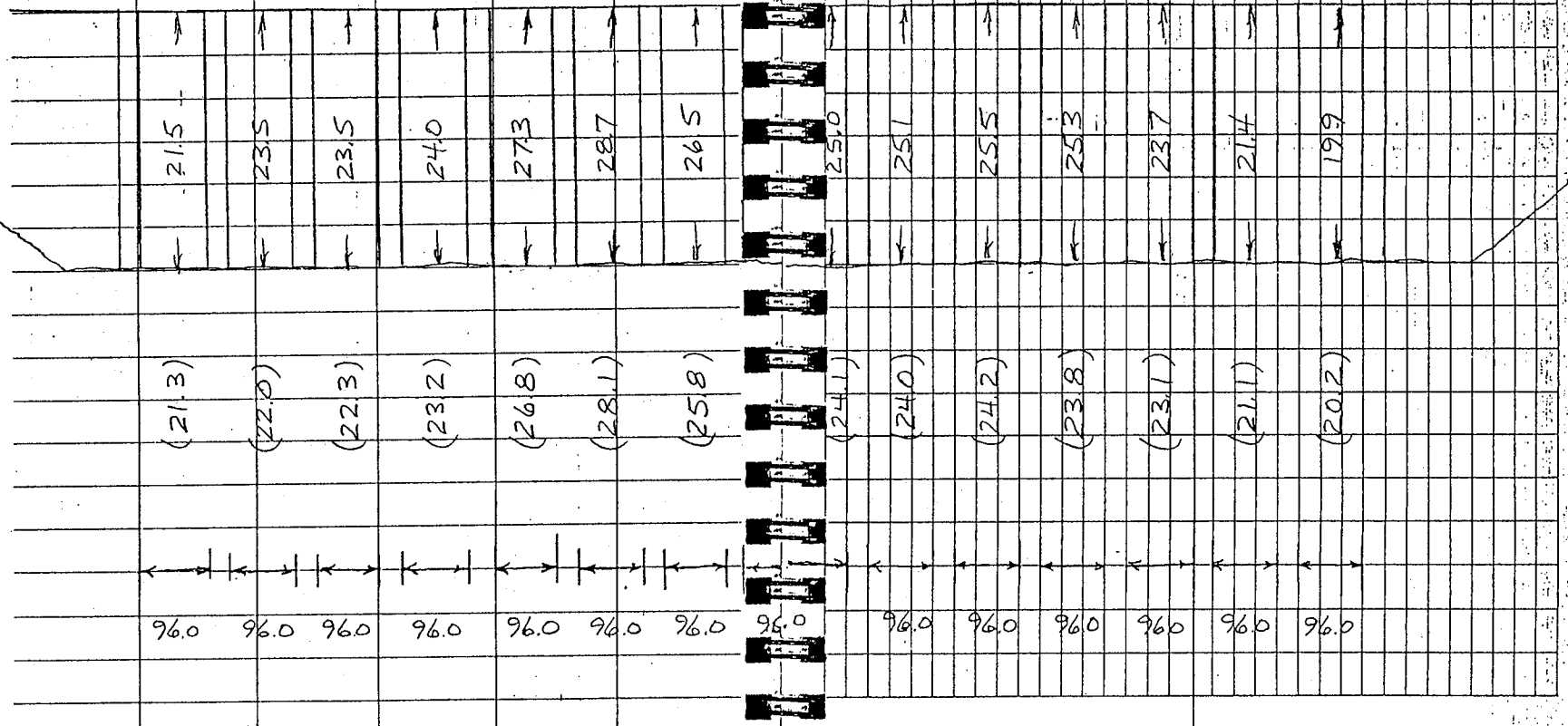
BK 1385

SKETCH EAST SIDE

51ST AVE. BRIDGE

NOTE:
WEST SIDE DIMENSIONS ARE LESS DUE TO SILT BUILD UP

NOTE:
WEST SIDE DIMENSIONS IN PARENTHESIS



Railroad Bridge (Tempe)

* Continued from Page 28 Book #1383

STA	H.I.	+Rod	Bottom Beam	−Rod	Top Conc. Footing	N.G.	
	1161^{30}						
13+83 (℄ Pier)		$+0^{97}$	1162^{27}	-7^{98}		1153.3	
+95 (G.B.)				-11^{02}		1150.3	
$14+85^{5}$ (℄ Pier)		$+0^{90}$	1162.20	-11^{85}		1149.5	
	*	$+2^{08}$	1163.38				* Bot. Conc. Beam
$15+46^{5}$ (Nor-14 Face of Post)	1161^{30} *	$+2^{07}$	1163.37	-1^{77}		1159.5	* Bott Conc. Beam

RAILROAD BRIDGE (ASH STREET) TEMPE

	+	H.I.	−	ELEV.
T.B.M.				1152.61
	5.82	57.43		
T.P.			4.89	1152.54
	23.21	75.75		
T.B.M.			0.25	1175.50
	0.10	75.60		
T.P.			23.12	1152.48
	4.92	57.40		
T.B.M.			5.82	1151.58

BENCH LOOP TO TOP BRIDGE MILL AVE

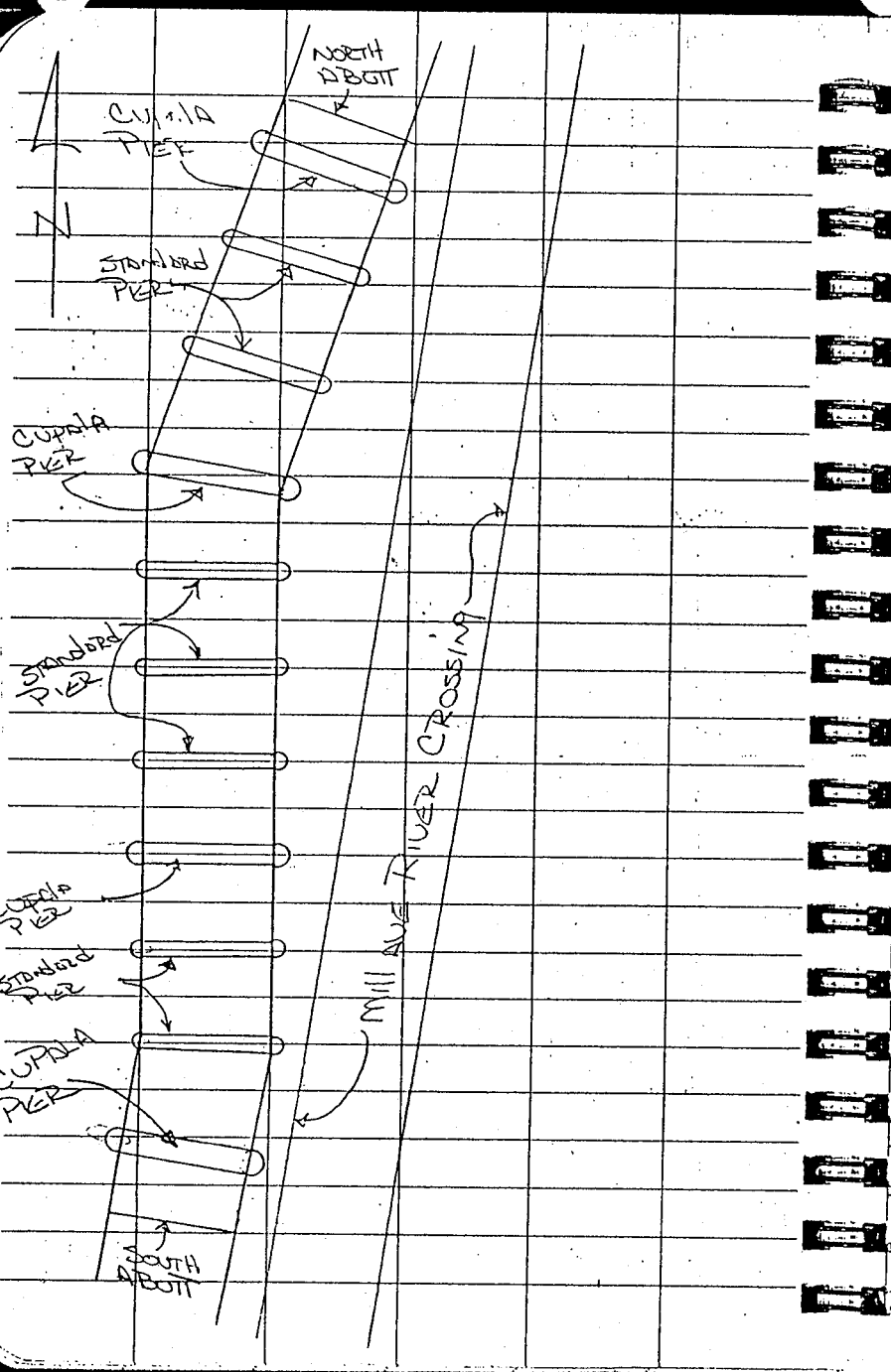
(SET by Jakim) T.B.C. @ N.W. CURB RET. MILL AV. & RIO SALADO PKY (PAINT SPOT)

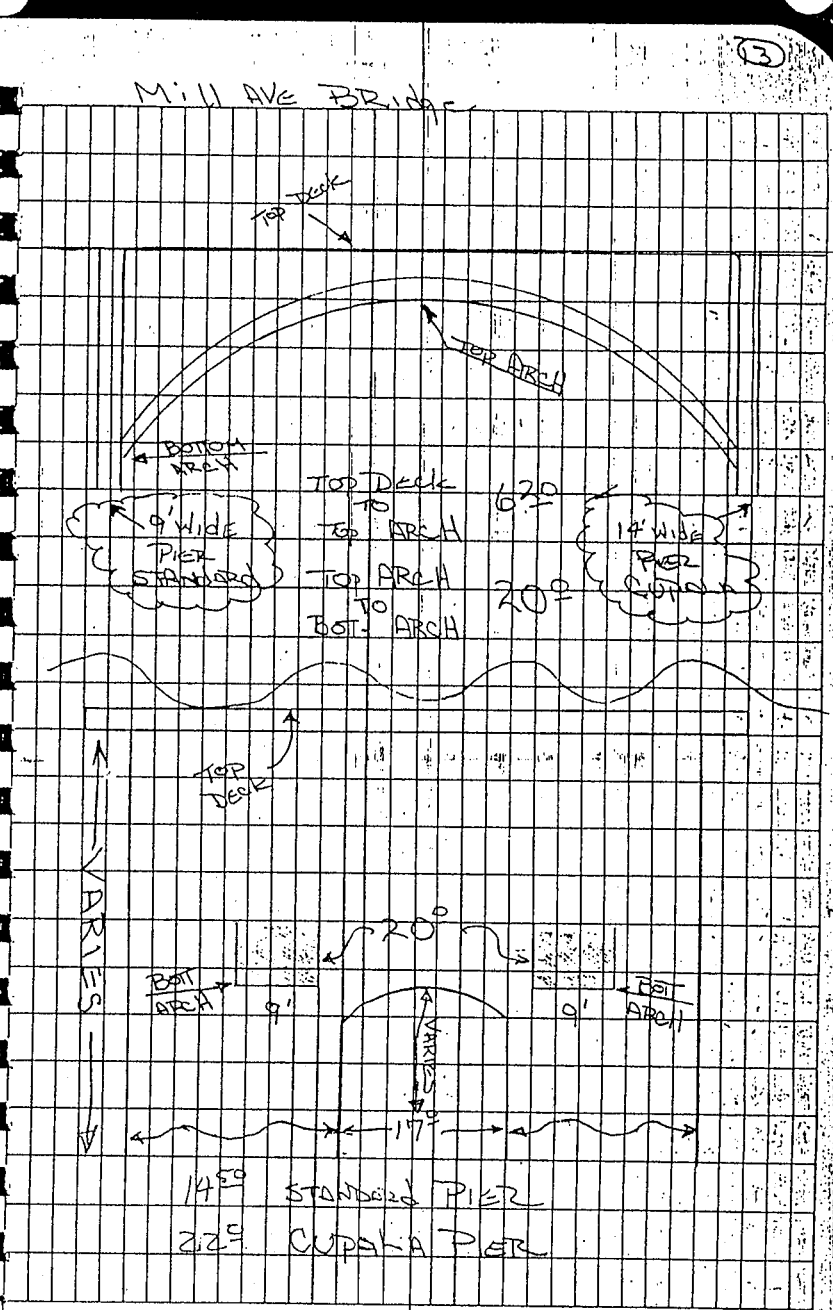
T.B.C.

2' I.P. IN CONC. F/W @ S.E. ABUT MILL AVE BRIDGE

T.B.C.

✓- IN P.D.B.


N
CUPOLA PIER
NORTH ABUTT
STANDARD PIER
CUPOLA PIER
STANDARD PIER
CUPOLA PIER
STANDARD PIER
CUPOLA PIER
SOUTH ABUTT
MILL AVE RIVER CROSSING


13
MILL AVE BRIDGE
TOP DECK
TOP ARCH
BOTTOM ARCH
TOP DECK TO TOP ARCH 6'20
TOP ARCH TO BOT. ARCH 20°
9' WIDE PIER STANDARD
14' WIDE PIER CUPOLA
TOP DECK
N
VARIES
20°
BOT ARCH
9'
9'
BOT ARCH
VARIES
17'
14'9" STANDARD PIER
22'9" CUPOLA PIER

MILL AVE BRIDGE PROFILE

STA	H.I.	-Rod	Top Deck	Bott Arch	Bott Arch @ Pier	-Rod (from Top Deck)	N.G.	N.G. (Westside)
	1182^{59}							
0+00 (South Abutt)		7^{06}	1175^{53}	—	—	-10^{32}	1165^{21}	-10^{81} 1164^{7}
0+36.5 ℄ Pier (Cupola) & Toe		6^{90}	1175^{69}	—	1149^{49}	-21^{12}	1154^{16}	-23^{56} 1152^{10}
1+11.5 (Split)		6^{72}	1175^{87}	1169^{67}	—	-25^{52}	1150^{8}	-17^{16} 1158^{7}
1+87.0 (℄ Pier)		6^{44}	1176^{15}	—	1149^{95}	-25^{22}	1150^{9}	-22^{96} 1153^{2}
2+23.3 E.P.-Rio Salado		6^{35}	1176^{24}	—	—	-24^{86}	1151^{4}	-25^{56} 1150^{7}
2+68.0 E.P.-Rio Salado		6^{15}	1176^{44}	—	—	-24^{96}	1151^{5}	-25^{60} 1150^{7}
3+35.5 (℄ Pier)		5^{90}	1176^{69}	—	1150^{49}	-25^{02}	1151^{7}	-26^{26} 1150^{4}
*3+72.5 West-side Top		5^{80}	1176^{79}	—	—	—	—	-26^{66} 1150^{10}
*4+10.5 Split & Toe (West)		5^{70}	1176^{89}	1170^{69}	—	-30^{62}	1146^{27}	-39^{26} 1137^{6}
4+86.0 (℄ Pier Cupola)		5^{40}	1177^{19}	—	1150^{99}	-34^{82}	1142^{4}	-40^{46} 1136^{7}
5+61 (Split)		5^{34}	1177^{25}	1171^{05}	—	-39^{82}	1137^{4}	-42^{16} 1135^{10}
6+35.7 (℄ Pier)	1182^{59}	5^{28}	1177^{31}	—	1151^{11}	-41^{82}	1135^{5}	-42^{96} 1134^{7}

Mill Ave Bridge Profile

STA	H.I.	-Rod	Top Deck	Bott Arch	Bott Arch @ Pier	-Rod (from Top Deck)	N.G.	N.G. (West Side)
	1182^{59}							
$7+09^{7}$ (Split)		5^{24}	1177^{35}	1171^{15}	—	-45^{12}	1132^{2}	-46^{66} 1130^{7}
7+83 (℄ Pier)		5^{19}	1177^{40}	—	1151^{20}	-45^{92}	1131^{5}	-48^{06} 1129^{3}
8+57 (Split)		5^{22}	1177^{37}	1171^{17}	—	-47^{52}	1129^{8}	-48^{26} 1129^{10}
$9+30^{8}$ (℄ Pier)		5^{24}	1177^{35}	—	1151^{15}	-46^{82}	1130^{5}	-47^{66} 1129^{10}
$10+05^{5}$ (Split)		5^{35}	1177^{24}	1171^{04}	—	-45^{92}	1131^{3}	-44^{66} 1132^{6}
$10+80^{5}$ (℄ Pier Cuddia)	1182^{59}	5^{41}	1177^{18}	—	1150^{98}	-40^{52}	1136^{66}	-41^{76} 1135^{4}
$11+54^{8}$ (Split)	1182^{66}	5^{77}	1176^{89}	1170^{69}	—	-40^{12}	1136^{8}	-41^{96} 1135^{8}
12+29 (℄ Pier)		5^{94}	1176^{72}	—	1150^{52}	-36^{22}	1140^{5}	-39^{16} 1137^{6}
13+48 (G.B.)		6^{42}	1176^{24}	—	—	-28^{22}	1148^{0}	-36^{26} 1140^{0}
13+62 (G.B.)		6^{46}	1176^{20}	—	—	-18^{92}	1157^{3}	-29^{26} 1146^{9}
13+76 (℄ Pier)		6^{48}	1176^{18}	—	1149^{98}	-18^{12}	1158^{10}	-25^{16} 1151^{9}
13+94 (G.B.)	1182^{66}	6^{64}	1176^{02}	—	—	-17^{22}	1158^{22}	-22^{66} 1153^{4}

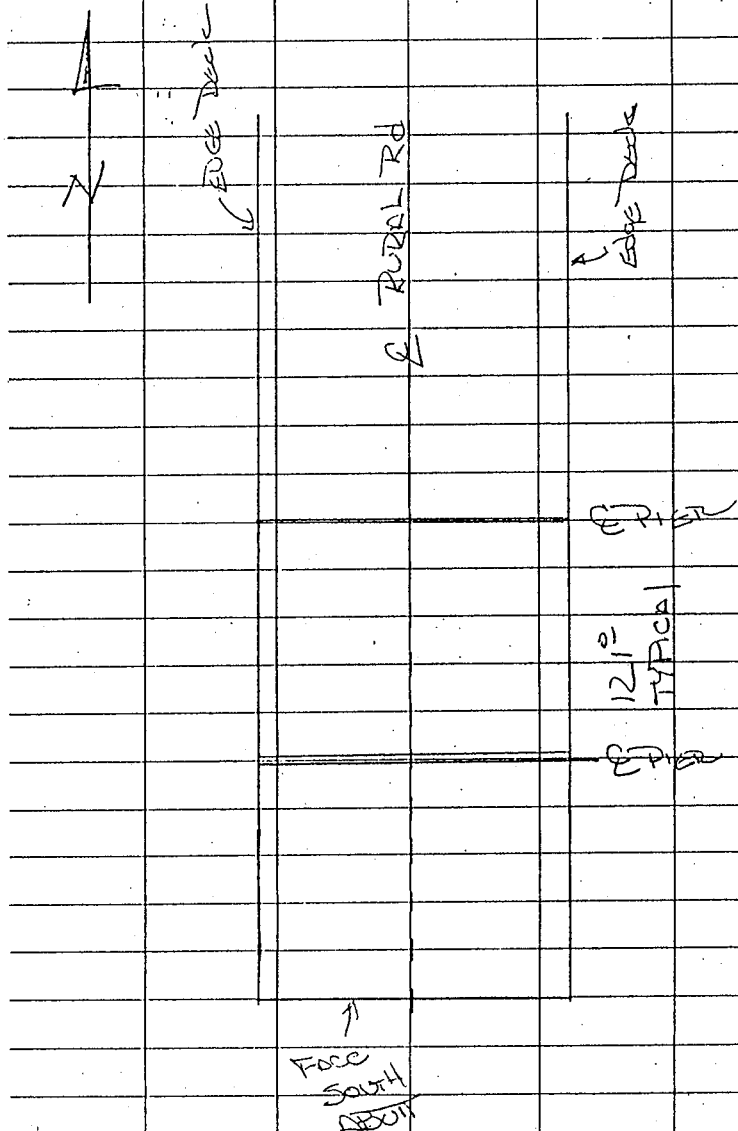
Mill AVE Bridge Profile

STA	H.I.	-Rod	TOP DECK	BOTT ARCH	BOTT ARCH @ PIER
	1182^{66}				
14+10 (G.B.)		6^{72}	1175^{94}	—	—
15+25 ℄ PIER (CUPOLA) & TOE		7^{00}	1175^{66}		1149^{46}
15+63 (NORTH ABUT)	1182^{66}	7^{12}	1175^{54}	—	—

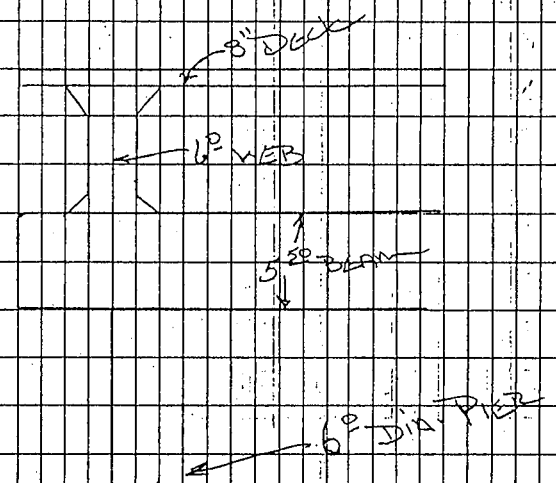
-Rod (FROM TOP DEC.)	N.G	N.G. (WESTSIDE)
-23^{32}	1152^{6}	-21^{76} 1154^{2}
-21^{32}	1154^{3}	-18^{96} 1156^{7}
-9^{92}	1165^{6}	-10^{56} 1165^{9}

MILL AVE BRIDGE PROFILE

WESTSIDE		EASTSIDE		
				15+63.2
16.40		11.0	137.5	15+25 (CUPOLA)
30.0		22.0	138	13+76
34.9		33.9	137	12+29
38.14		39.70	132.5	10+80.5 (CUPOLA)
42.10		41.40	138.21	9+30.8
40.5		37.0	138.2	7+83
35.8		33.6	138.2	6+35.7
33.10		24.4	139	4+86.2 (CUPOLA)
19.5		18.5	139.2	3+35.5
11.0		18.7	139	1+87.0
				0+36.5 (CUPOLA)
				0+00



RURAL ROAD BRIDGE PROFILE



1171^{49} $+13^{18}$					
STA	H.I.	-Rod	TOP Deck	BOTT WEB	BOTT BEAM
	1184.67				
$-0+17^{50}$ (TOP)		12^{38}	1171^{29}		
0+00 (SOUTH FACE BOTT)		12^{86}	1171^{81}	1165^{14}	
0+41 (TOE)		12^{0}	1172^{67}	1166^{0}	
0+94 (TOP)		10^{91}	1173^{76}	1167^{09}	
1+21 (EPIER)		10^{45}	1174^{22}	1167^{55}	1162^{05}
1+27 (TOE)		10^{30}	1174^{37}	1167^{70}	
$1+81^{5}$ (INTERMED)		9^{28}	1175^{39}	1168^{72}	
2+42 (EPIER)		8^{47}	1176^{20}	1169^{53}	1164^{03}
2+83 (TOE)		7^{85}	1176^{82}	1170^{15}	
2+92 (TOP)		7^{73}	1176^{94}	1170^{27}	
3+11 (TOP)		7^{53}	1177^{14}	1170^{47}	
$3+38^{5}$ (TOE)	1184.67	7^{27}	1177^{40}	1170^{73}	

RURAL ROAD BRIDGE PROFILE

-Rod (FROM TOP DECK)	N.G.	N.G.	WESTSIDE
Ø	1171^{3}	Ø	1171^{3}
7^{2}	1164^{6}	7^{1}	1164^{7}
20^{9}	1152^{71}	19^{3}	1153^{37}
21^{9}	1151^{9}	21^{9}	1151^{9}
30^{4}	1143^{8}	31^{2}	1143^{0}
35^{8}	1138^{6}	34^{7}	1139^{7}
36^{8}	1138^{6}	37^{6}	1137^{8}
37^{9}	1138^{3}	38^{2}	1138^{0}
26^{0}	1140^{3}	39^{0}	1137^{8}
32^{3}	1144^{6}	32^{2}	1144^{7}
32^{0}	1145^{10}	31^{8}	1145^{3}
41^{7}	1135^{79}	40^{9}	1136^{70}

RURAL ROAD BRIDGE PROFILE

STA	H.I.	-Rod	TOP DECK	BOTT WEB	BOTT BEAM
	1184.67				
3+63 (℄ PIER)		7^{05}	1177^{62}	1170^{95}	1165^{45}
3+86 (TOE)		6^{77}	1177^{90}	1171^{23}	
4+06 (TOP)		6^{60}	1178^{07}	1171^{40}	
4+37 (TOP)		6^{34}	1178^{33}	1171^{66}	
$4+59^{5}$ (TOE)		6^{21}	1178^{46}	1171^{79}	
4+84 (℄ PIER)		6^{05}	1178^{62}	1171^{95}	1166^{45}
$5+44^{5}$ (INTERMED)		5^{70}	1178^{97}	1172^{30}	
6+05 (℄ PIER)		5^{61}	1179^{06}	1172^{39}	1166^{89}
6+39 (E.B)		5^{50}	1179^{17}	1172^{50}	
6+49 (E.B)		5^{51}	1179^{16}	1172^{49}	
6+53 (E.B)		5^{51}	1179^{16}	1172^{49}	
6+78 (E.B)	1184.67	5^{54}	1179^{13}	1172^{46}	

-Rod (FROM TO DECK)	N.G	N.G (WEST SIDE)
42^{4}	1135^{2}	42^{9} 1135^{6}
42^{2}	1135^{7}	42^{6} 1135^{3}
33^{4}	1144^{70}	32^{7} 1145^{4}
33^{0}	1145^{3}	32^{5} 1145^{8}
42^{3}	1136^{2}	39^{9} 1138^{6}
41^{1}	1135^{5}	42^{0} 1136^{0}
40^{4}	1138^{6}	43^{5} 1135^{5}
42^{0}	1137^{10}	41^{9} 1137^{20}
39^{8}	1139^{4}	41^{9} 1137.39
37^{2}	1142^{0}	—
—		33^{2} 1146^{0}
—		33^{1} 1146^{0}

STA	H.I.	-Rod	TOP DECK	BOTT WEB	BOTT BEAM
	1184^{67}				
6+93 (G.B)		5^{53}	1179^{14}	1172^{47}	
7+26 (℄ PIER)		5^{56}	1179^{11}	1172^{44}	1166^{94}
$7+86^{5}$ (INTERMED)		5^{70}	1178^{97}	1172^{30}	
8+47 (℄ PIER)		6^{04}	1178^{63}	1171^{96}	1166^{46}
$9+07^{5}$ (INTERMED)		6^{47}	1178^{20}	1171^{53}	
9+68 (℄ PIER & DE)		7^{10}	1177^{57}	1170^{90}	
$9+94^{5}$ (TOP)		7^{28}	1177^{39}	1170^{72}	1165^{40}
10+24 (TOE)		7^{70}	1176^{97}	1170^{30}	
10+62 (TOP)		8^{14}	1176^{53}	1169^{86}	
10+77 (TOP)		8^{40}	1176^{27}	1169^{60}	
10+89 (℄ PIER)		8^{55}	1176^{12}	1169^{45}	1163^{95}
$11+10^{5}$ (TOE)	1184^{67}	8^{82}	1175^{85}	1169^{18}	

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Rural Rd. Bridge Profile

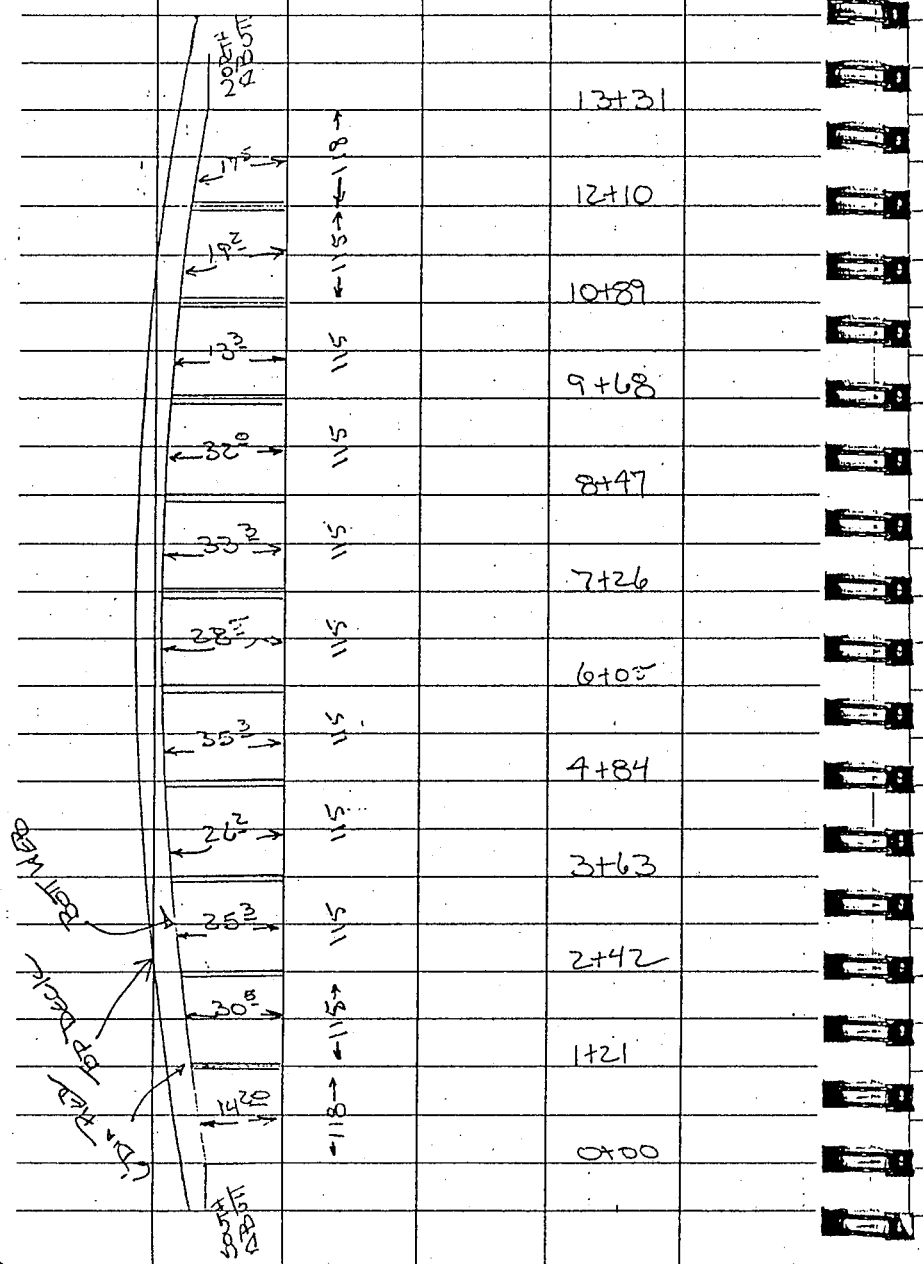
-Rod (FROM TOP DECK)	N.G.	N.G.	N.G. WEST SIDE
—	—	39^{0}	1140^{10}
39^{9}	1139^{2}	40^{3}	1138^{8}
39^{8}	1139^{4}	40^{6}	1138^{4}
40^{3}	1138^{3}	41^{3}	1137^{3}
29^{1}	1138^{8}	37^{2}	1140^{9}
35^{6}	1142^{0}	35^{1}	1142^{5}
25^{2}	1152^{2}	24^{2}	1153^{2}
23^{10}	1153^{1}	23^{7}	1153^{3}
15^{6}	1160^{7}	15^{4}	1161^{10}
16^{0}	1160^{3}	14^{9}	1161^{10}
16^{0}	1160.1	14^{4}	1161^{15}
23^{3}	1153^{6}	23^{7}	1152^{2}

STA	H.I.	-Rod	Top Deck	Bott Web	Bott Beam
	1184 67				
11+26 5 (Top)		9 08	1175 59	1168 92	
11+47 5 (TOG)		9 36	1175 31	1168 64	
12+10 (EPVR)		10 52	1174 15	1167 48	1161 98
12+16 (G.B.)		10 62	1174 05	1167 38	
12+75 (TOG GUNITE)		11 78	1172 89	1166 22	
13+16 (TOP GUNITE)		12 68	1171 99	1165 32	
13+31 (NORTH FACE ABUT)		12 93	1171 74	1165 07	
13+48 (TOP)	1184 67	13 33	1171 34		

Rural Rd. Bridge Profile

-Rod (from top deck)	N.G.	N.G. Westside
22 5	1153 10	—
28 9	1146 4	—
28 3	1145 4	19 0	1155 20
29 0	1144 8	22 0	1152 0
26 3	1146 7	20 7	1152 7
11 3	1160 7	11 6	1160 3
7 2	1164 2	11 6	1160 19
Ø	1171 3	—	

RUROI Rd. Bridge Profile



	+	H.I.	−	ELEV.
B.M.				824.20
	5.35	829.55		
T.P.			5.32	824.23
	5.50	829.73		
T.B.M			5.73	824.00
	4.90	828.90		
T.P.			4.72	824.18
	4.38	828.56		
B.M			4.37	824.19

(24)

BENCH LOOP Hwy 85 TO Bridge

V# 159 P.K Nail EDGE side Hwy 85 (± 3 ℄ P.)

Rock

J.W. Corr Gila River Bridge

Rock

V-1N P.O.B.

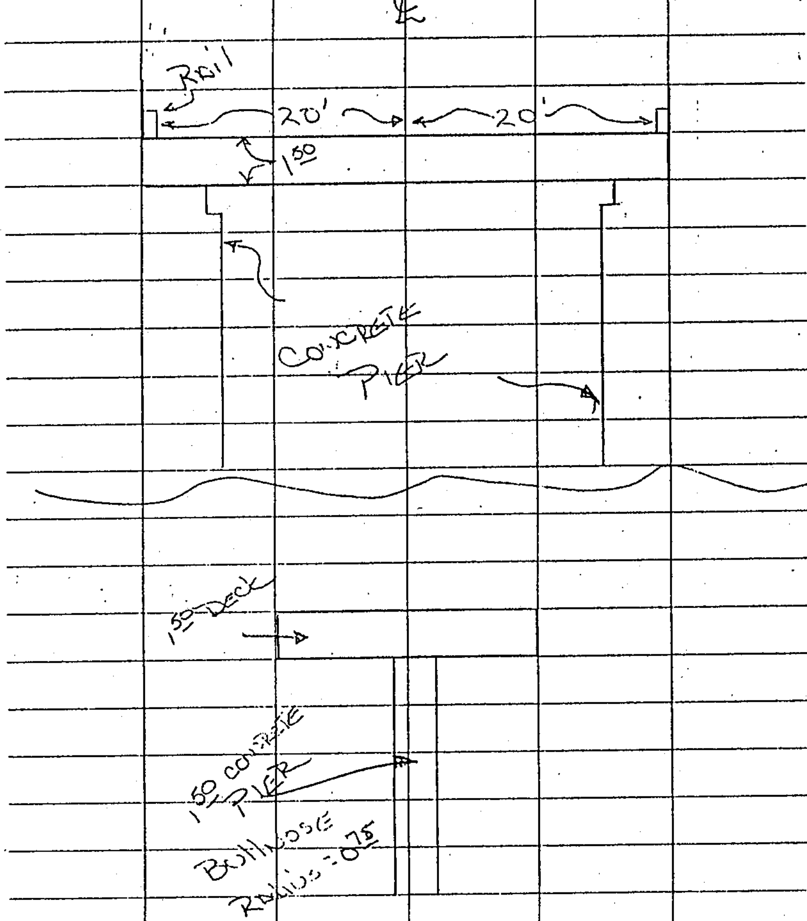
− .01

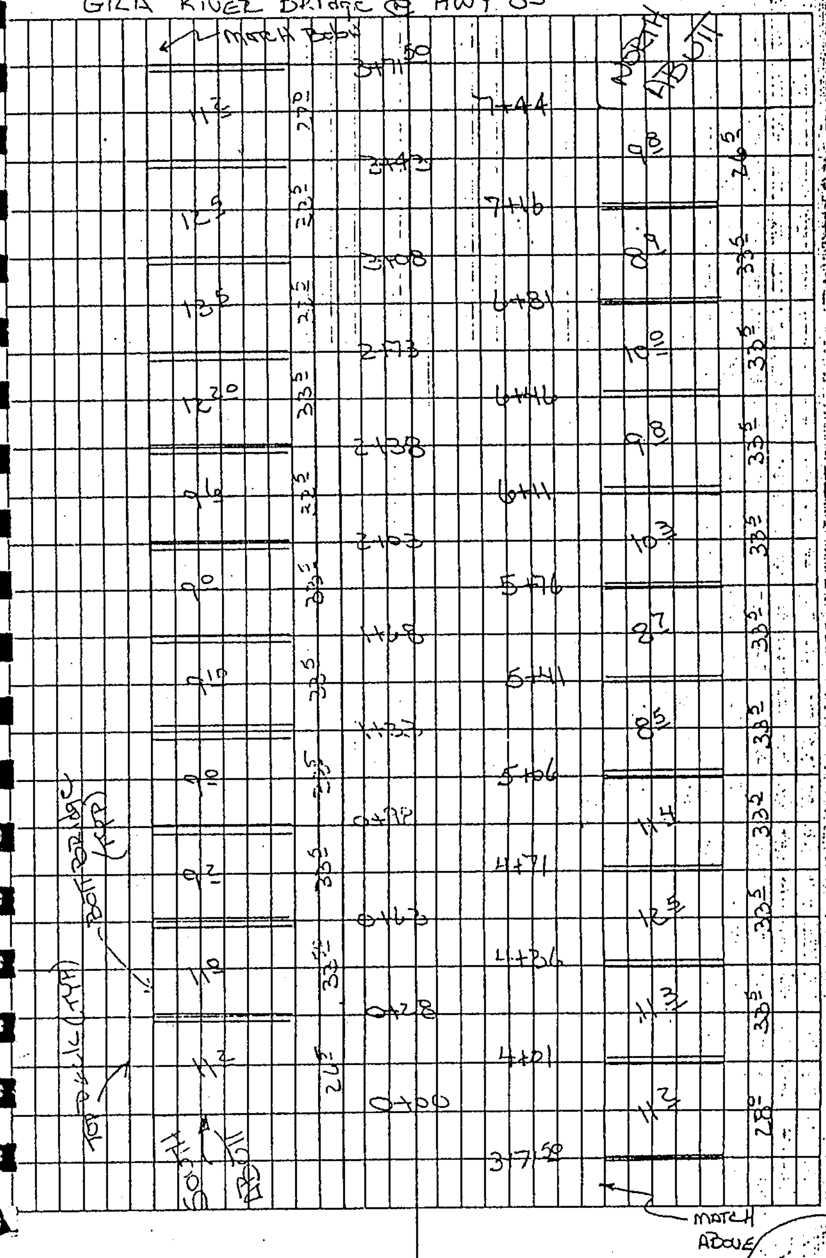
824.02 S.L.

GILA RIVER BRIDGE @ HWY 85

STA	H.I.	-Rod	TOP Deck	BOTT Bridge	-Rod (BOTT Bridge)	N.G	DESCRIPTION
	829.12						
-0+16 50		5 12	824 0	822 50	+1 50	825 50	Begin Approach Slab & TOP SLOPE
0+00 "		5 05	824 07	822 57	-13 37	809 20	SOUTH FACE ABUT
0+28		5 08	824 04	822 54	-11 17	811 40	℄ PIER
0+63		5 03	824 09	822 59	-11 02	811 60	℄ PIER (G.B)
0+98		5 04	824 08	822 58	-9 24	813 80	℄ PIER (G.B)
1+33		5 04	824 08	822 58	-8 97	813 60	℄ PIER
1+68		5 05	824 07	822 57	-9 07	813 50	℄ PIER
2+03		5 04	824 08	822 58	-9 00	813 60	℄ PIER (TOP)
2+38		5 04	824 08	822 58	-9 57	813 00	℄ PIER (G.B.)
2+73		5 05	824 07	822 57	-12 20	810 40	℄ PIER (TOE)
3+08		5 04	824 08	822 58	-13 53	809 00	℄ PIER
3+43		5 05	824 07	822 57	-12 50	810 10	℄ PIER
3+71 50		5 05	824 07	822 57	-11 17	811 40	℄ PIER (1.25 THICK) + CENTER BRIDGE
4+01		5 08	824 04	822 54	-11 33	811 20	℄ PIER
4+36		5 09	824 03	822 53	-12 52	810 00	℄ PIER
4+71		5 10	824 02	822 52	-11 37	811 15	℄ PIER (TOE)
5+06		5 03	824 09	822 59	-8 51	814 10	℄ PIER (TOP)
5+41		5 02	824 10	822 60	-8 67	813 90	℄ PIER
5+76		5 02	824 10	822 60	-10 27	812 30	℄ PIER
6+11		5 03	824 09	822 59	-9 83	812 80	℄ PIER
6+46		5 06	824 06	822 56	-10 02	812 40	℄ PIER
6+81		5 09	824 03	822 53	-8 92	813 60	℄ PIER
7+16		5 08	824 04	822 54	-9 84	812 70	℄ PIER
7+44		5 08	824 04	822 54	+1 50	825 54	NORTH FACE ABUT

GILA RIVER Bridge @ HWY 85





	+	H.I.	−	ELEV.
B.M.				1050 31
	4.42	1054 13		
T.P.			6.42	1048 31
	5.87	1054 18		
T.P.			6.47	1047 71
	4.38	1052 09		
T.B.M.			4.77	1047 32
	4.34	1051.66		
T.P.			4.82	1046 84
	6.65	1053.44		
T.P.			4.81	1048 63
	5.58	1054.21		
T.P.			5.57	1048 64
	6.34	1054 98		
B.M.			4.65	1050.33

BENCH LOOP TO TANNER CONVEYOR BRIDGE

V# 333 - P.K. Nail @ BROADWAY Rd ± 28th AVE

Rock

Rock

Black ☒ Marker Top Headwall/North side Broadway @ Conveyor Entrance ± 28th AVE

Rock

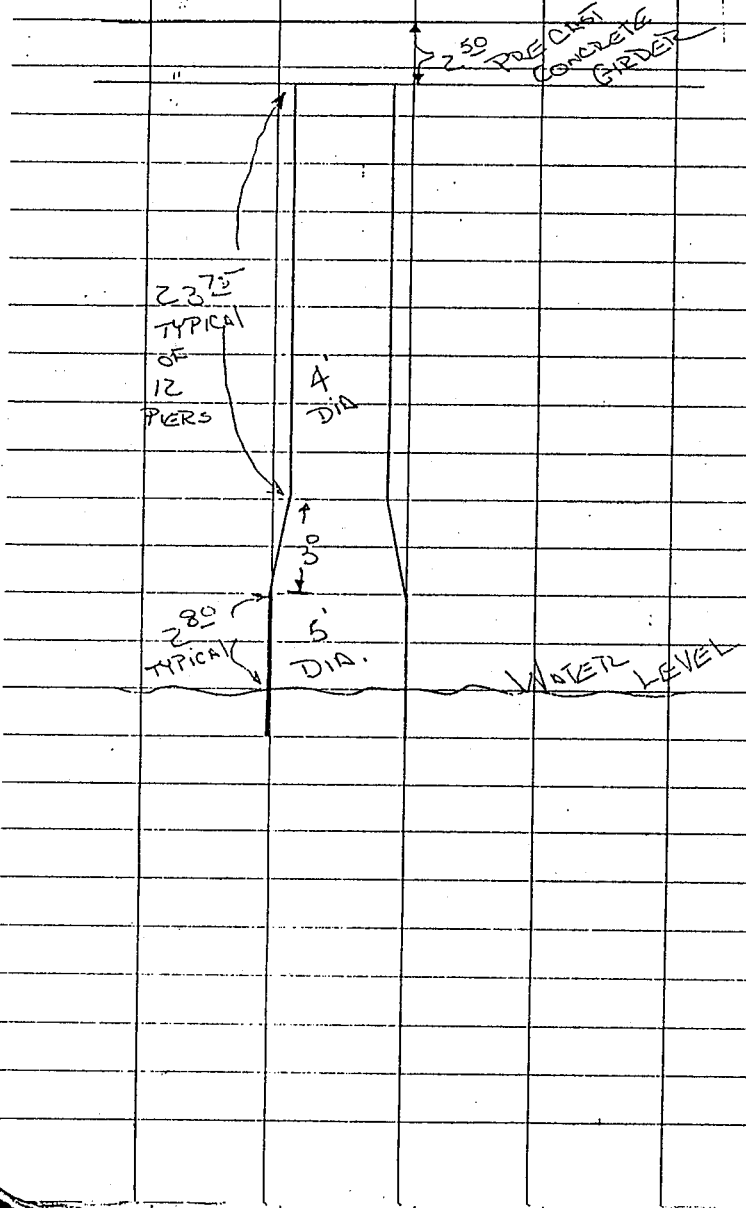
Rock

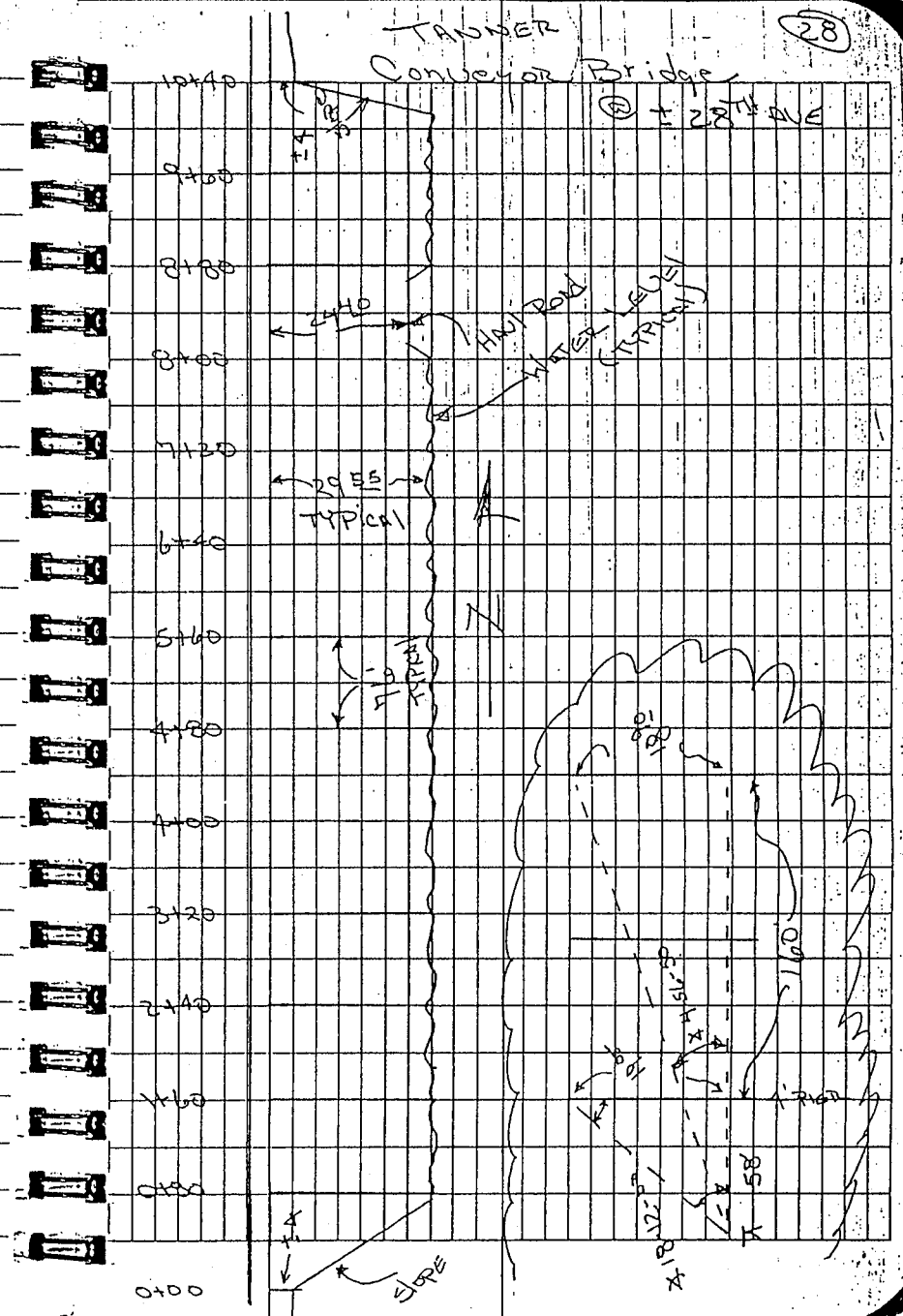
Rock

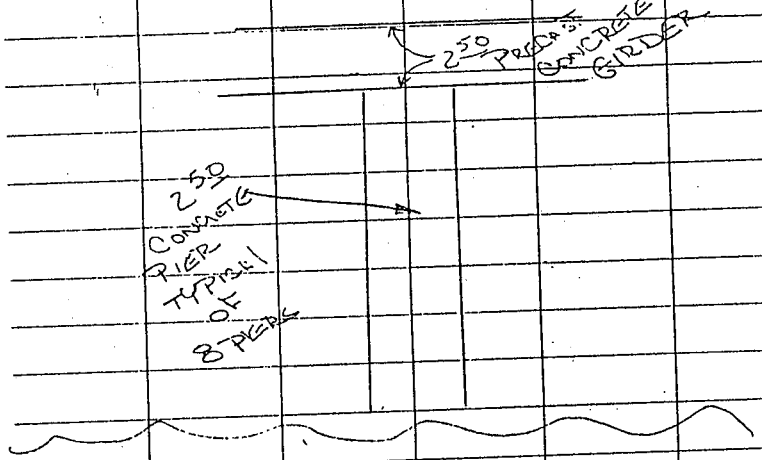
V-IN P.O.B.

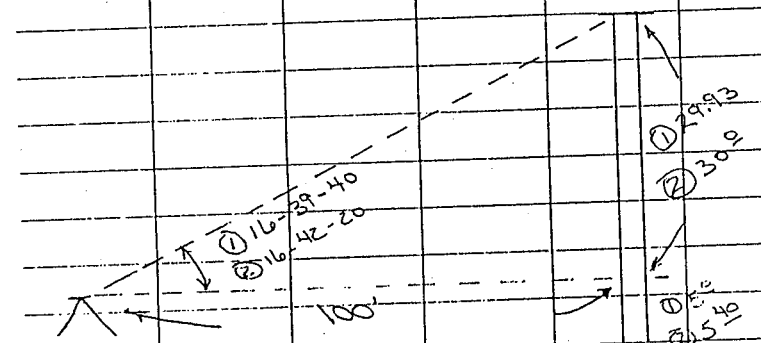
− 0.02

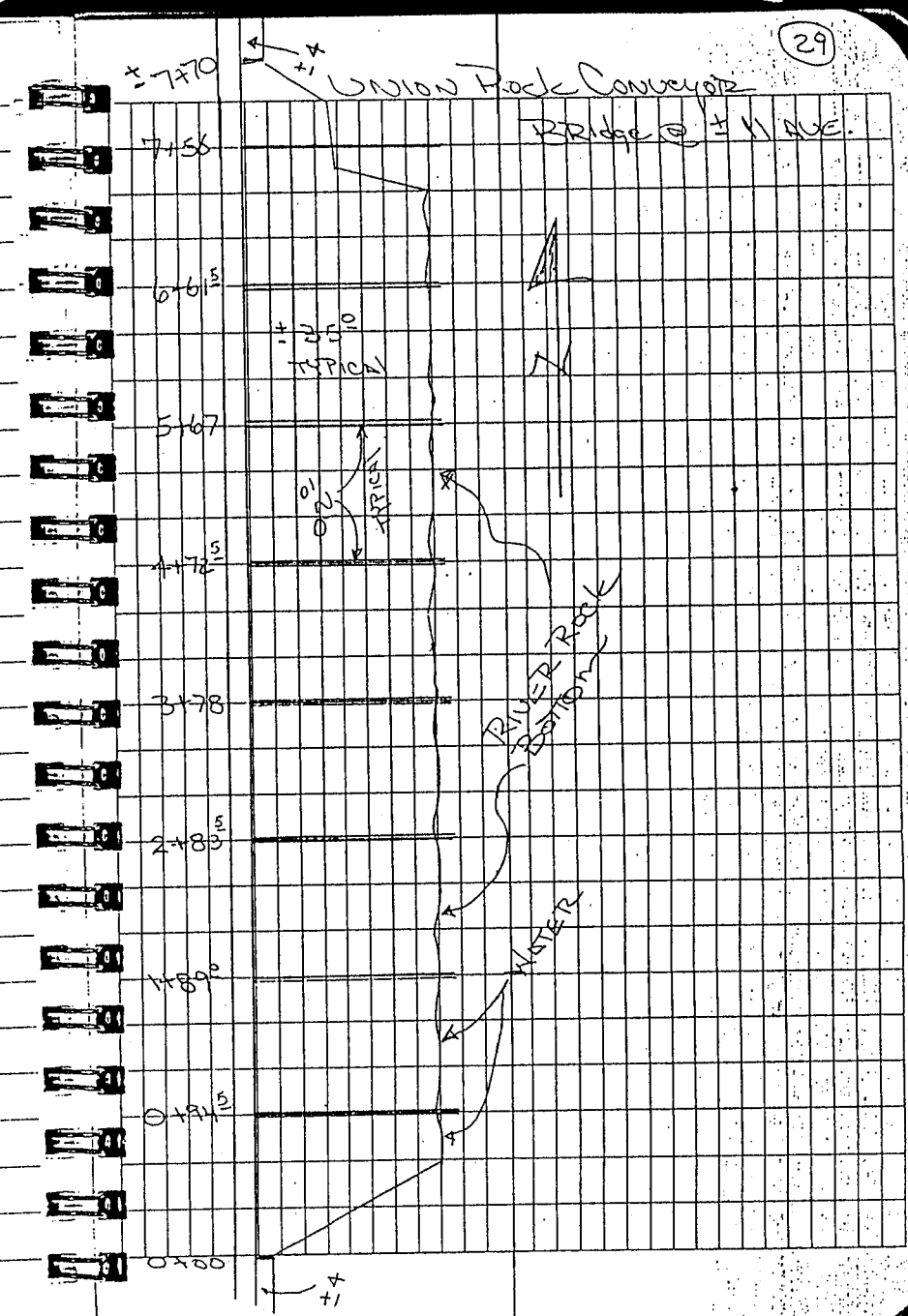
TAUNTER Conveyor Bridge @ + 28TH AVE





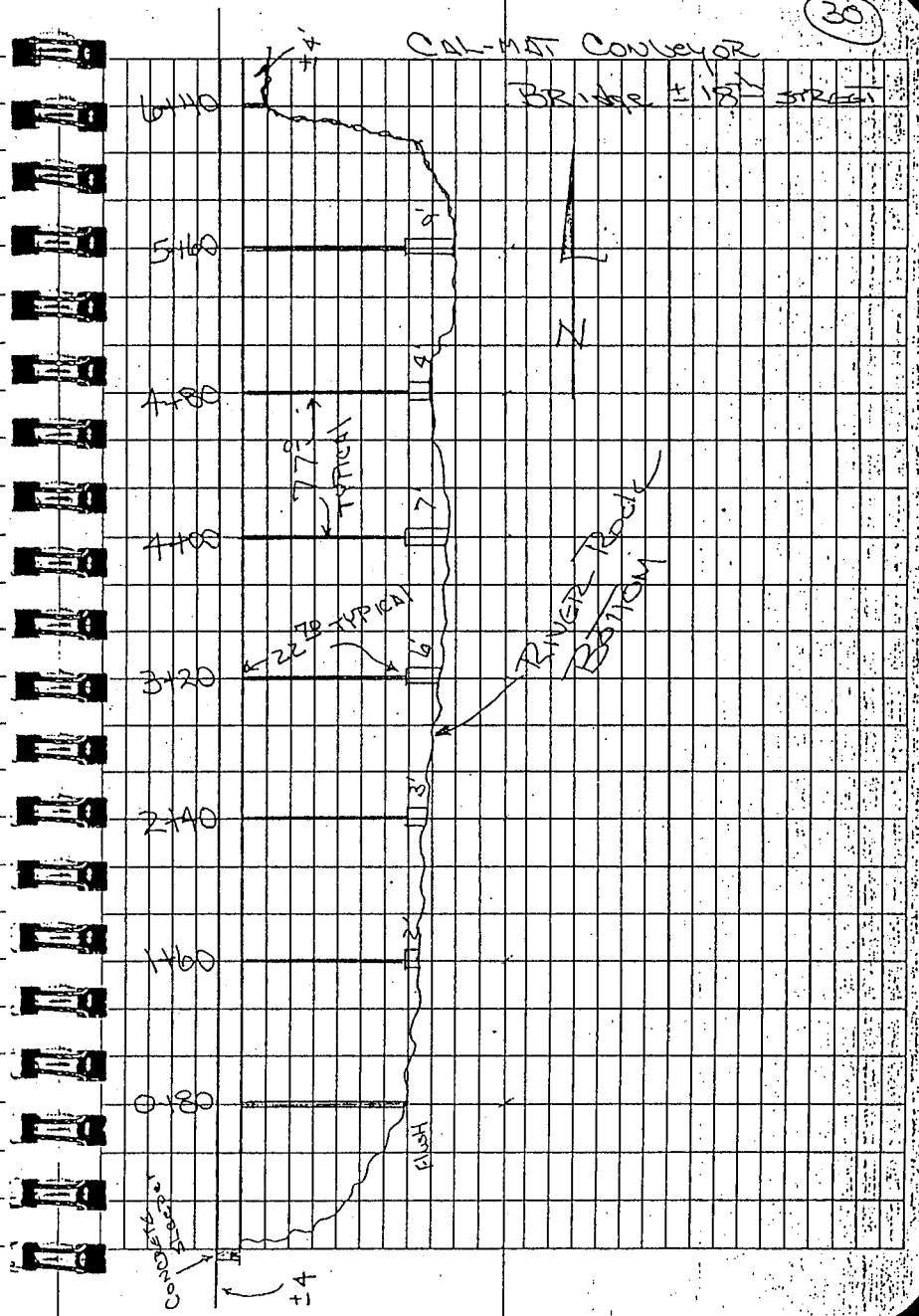

2'-0" PRECAST CONCRETE GIRDER
2'-0" CONCRETE PIER TYPICAL OF 8 PIERS

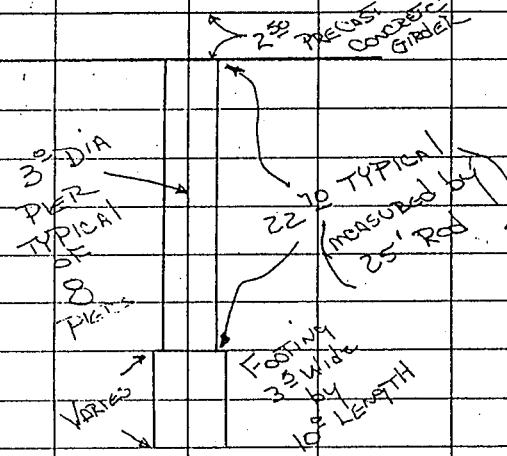

① 16-39-40
② 16-42-20
100'
① 29.93
② 30.0
① 5.0
② 5.40
① @ PIER 7
② @ PIER 6


UNION ROCK CONVEYOR
BRIDGE @ ± 11 AVE.
±7+70
7+56
6+61.5
5+67
4+72.5
3+78
2+83.5
1+89.0
0+94.5
0+00
±1
±1
± 3.5°
TYPICAL
01
ON
BRIDGE
RIVER ROCK BOTTOM
WATER

CAL-MAT CONVEYOR

BRIDGE ± 18" STREET





1987

SALT/GILA STRUCTURES

TELEDYNE

425

FORMULAE FOR SOLVING RIGHT TRIANGLES

$\sin A = \frac{a}{c} = \cos B$ $\quad \cot A = \frac{b}{a} = \tan B$

$\cos A = \frac{b}{c} = \sin B$ $\quad \sec A = \frac{c}{b} = \csc B$

$\tan A = \frac{a}{b} = \cot B$ $\quad \csc A = \frac{c}{a} = \sec B$

Given	Required	Solution
A, a	B, c, b	$B = 90° - A$, $c = \frac{a}{\sin A}$, $b = c \cos A$
A, b	B, a, c	$B = 90° - A$, $a = b \tan A$, $c = \frac{b}{\cos A}$
A, c	B, b, a	$B = 90° - A$, $b = c \cos A$, $a = c \sin A$
a, c	A, B, b	$\sin A = \frac{a}{c}$, $\cos B = \frac{a}{c}$, $b = \sqrt{(c+a)(c-a)}$
a, b	A, B, c	$\tan A = \frac{a}{b}$, $\cot B = \frac{a}{b}$, $c = \sqrt{a^2 + b^2}$

FORMULAE FOR SOLVING OBLIQUE TRIANGLES

Given	Required	Solution
A, a, b	B, c	$\sin B = \frac{b \sin A}{a}$, $c = \frac{a \sin C}{\sin A}$
A, B, a	b	$b = \frac{a \sin B}{\sin A}$
a, b, C	A, c	$A + B = 180° - C$, $c = \frac{a \sin C}{\sin A}$
a, b, c	Area	side $= \frac{a+b+c}{2}$, area $= \sqrt{(s-a)(s-b)(s-c)}$
A, b, c	Area	area $= \frac{bc \sin A}{2}$
A, B, C, a	Area	area $= \frac{a^2 \sin B \sin C}{2 \sin A}$

MADE IN U.S.A.

INDEX I

TITLE PAGE

SALT - GILA
BRIDGE PROFILES

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PG.	DESC.
1-5	PROFILE 35TH AVE. BRIDGE
6-10	PROFILE 19TH AVE. BRIDGE
11-14	PROFILE 7TH AVE. BRIDGE
15-19	PROFILE CENTRAL AVE. BRIDGE
20-22	PROFILE 7TH ST. BRIDGE
23-27	PROFILE 16TH ST. BRIDGE
28-30	BENCH LOOPS

INDEX II

	+	H.I.	−	Elev.
T.B.M.	"			1035.26
	6.57	1041.83		
* S.S.	"		7.27	1034.56
T.P.			9.21	1032.62
	1.77	1034.39		
T.P.			0.68	1033.71
	12.04	1045.75		
T.B.M.			2.83	1042.92
	6.02	1048.94		
T.B.M.			7.26	1041.68
	LOOP BACK			
	7.04	1048.72		
T.B.M.			5.79	1042.93
	0.22	1043.15		
T.P.			13.92	1029.23
	12.19	1041.42		
* S.S.			6.84	1034.58
T.B.M.			6.14	1035.28
V-in	0.02			
	45.85		45.[illegible]	
	46.55		46.53	

7-7-92 (1)

BENCH LOOP FOR 35th AVE BRDG.

DESTR. STAR

B/C H/H 35th AVE & BROADWAY

PANEL PT. # SW. COR. 35th AVE & BROADWAY (1/2" Below)

ROCK

TOP BOLT (GUARD RAIL) W/SIDE 35th AVE (± 125 SOUTH BRDG)

SIDEWALK (± 30 NORTH OF N.W. ABUT)

TOP BOLT END GUARD RAIL (± 125 SOUTH BRDG)

ROCK

PANEL PT. # S.W. COR. 35th AVE & BROADWAY

P/C H/H 35th AVE & BROADWAY

7-7-92 (2)

PROFILE 35TH AVE BRIDGE

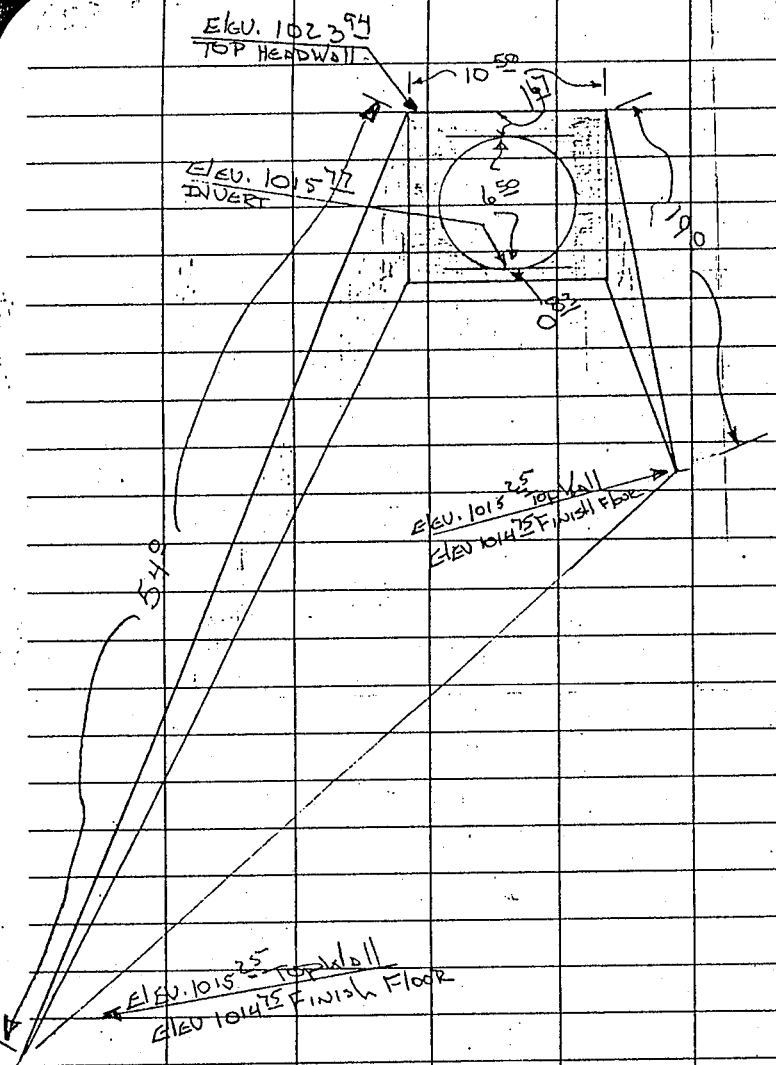
STA	H.I.	BOTT DECK	BOTT WEB	BRDG ±Rod	N.G.	
+5.62	1048.54					T.B.M. TOP BOLT END GUARD RAIL S.W. SIDE
0+00		1043.24	1037.09	-9.35	1033.9	S.W. COR ABUTT
0+82		1043.07	1036.92	-28.65	1014.4	TOE
1+25		1043.11	1036.96	-33.35	1009.76	℄ PIER (4')
1+92.5		1042.81	1036.66	-32.75	1010.06	N.G. (INTERMED)
2+50		1042.87	1036.72	-32.85	1010.02	℄ PIER (-1')
3+17.5		1042.49	1036.34	-32.55	1009.9	N.G. (INTERMED)
3+75		1042.39	1036.24	-32.95	1009.4	℄ PIER (A)
4+35		1042.01	1035.86	-27.45	1014.6	TOE
4+97		1041.83	1035.68	-11.0	1030.8	N.W. COR ABUTT
✓-in	-6.87				1041.67	T.B.M. N.W. ABUTT (S.W. COR ADOT PULL BOX)

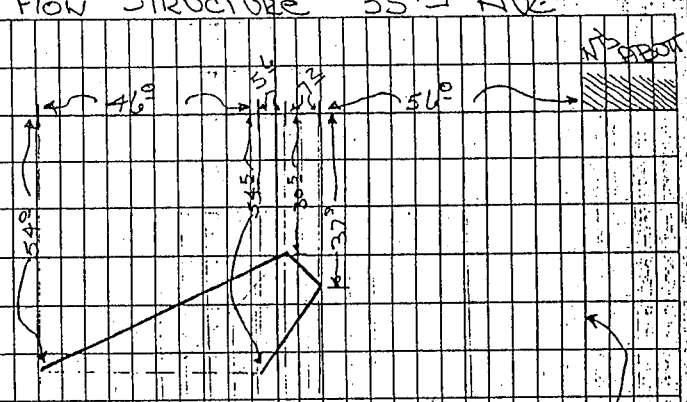
30th AVE BRIDGE

7-7-92 (3)

7-7-92 (4)

OUT FLOW STRUCTURE 35TH AVE





5

	+	H.I.	−	Elev.
T.B.M.				1053.10
	5.13	1058.23		
T.B.M.			1.81	1056.42
	1.89	1058.31		
T.B.M.			5.21	1053.10 ✓

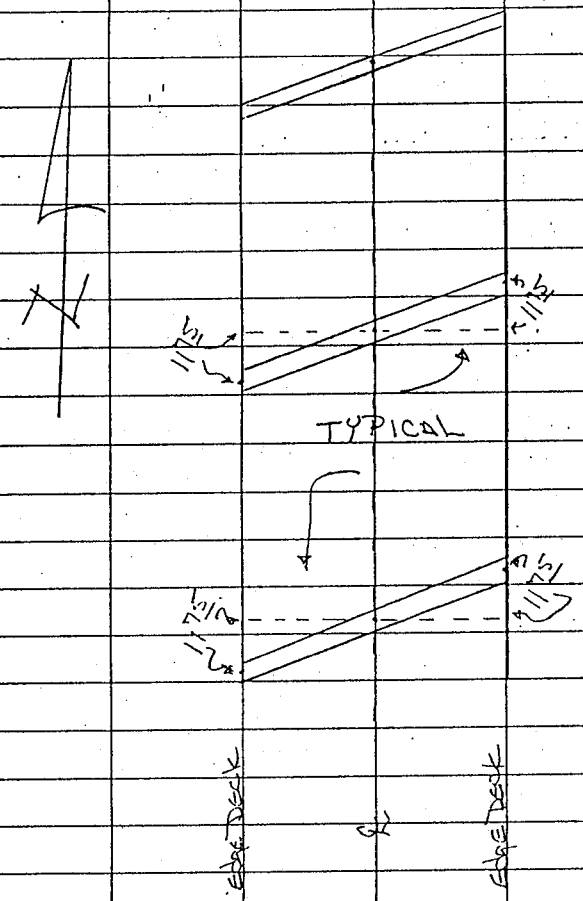
BENCH LOOP 7-8-92 (6)

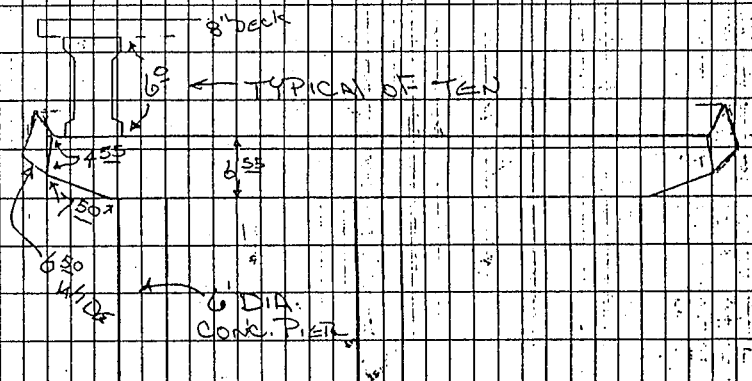
B/C H/H 19th AVE & BROADWAY

BEGIN SURVEY RUN WEST SIDE / SOUTH OF BRIDGE

B/C H/H 19th AVE & BROADWAY

19th AVE BRIDGE @ SALT RIVER





— TYPICAL —

6' DIA PIER (CONCRETE)

6.55 BEAM (CONCRETE)

6.0 GIRDERS (PRE-CAST CONCRETE)

0.67 BRIDGE DECK

* NOTE: ABUTMENTS, PIERS, & BEAMS SKEWED 11.75 EACH WAY FROM ℄ 21.50 TOTAL (TYPICAL)

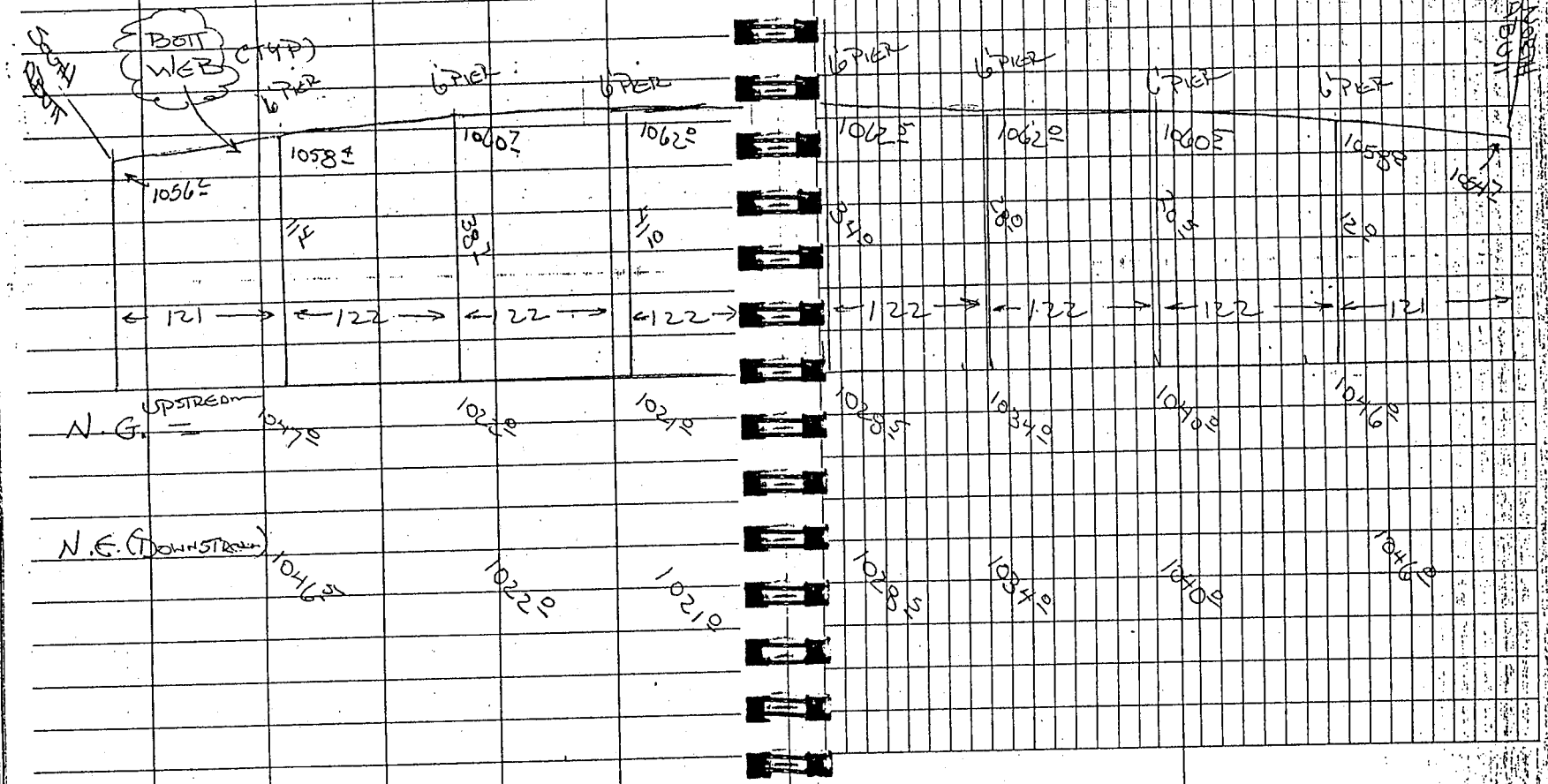
19th AVE BRIDGE (EASTSIDE)

STA	H.I.	—	TOP DECK	BOTT DECK	BOTT WEB	BOTT BOOM	MINUS ROD	TOP FROM DECK	N.G.	N.G.	WEST SIDE
FACE SOUTH ABUT (EASTSIDE)	1069^{53}										
$0+11^{75}$		6^{65}	1062^{88}	1062^{21}	1056^{21}		-9^{70}		1053^{18}	$+2^{9}$	1055^{18}
0+21 (TOE)		6^{38}	1063^{15}	1062^{48}	1056^{48}		-12^{79}		1050^{45}	-0^{4}	1050^{0}
0+74 (INTERMED)		5^{98}	1063^{55}	1062^{88}	1056^{88}		-16^{40}		1047^{15}	-0^{2}	1047^{9}
$1+32^{75}$ (℄ PIER)		4^{43}	1065^{10}	1064^{43}	1058^{43}	1051^{88}	-18^{0}		1047^{10}	-0^{4}	1046^{7}
1+40 (TOP)		4^{31}	1065^{22}	1064^{55}	1058^{55}		-18^{7}		1046^{52}	Ø	1046^{50}
$1+72^{5}$ (TOE)		3^{59}	1065^{94}	1065^{27}	1059^{27}		-36^{9}		1029^{04}	Ø	1029^{0}
2+36 (G.B.)		2^{50}	1067^{03}	1066^{36}	1060^{36}		-40^{8}		1026^{29}	$+0^{3}$	1026^{5}
$2+57^{75}$ (℄ PIER)		2^{13}	1067^{40}	1066^{73}	1060^{73}	1054^{18}	-45^{4}		1022^{0}	Ø	1022^{0}
2+75 (TOE)		1^{93}	1067^{63}	1066^{96}	1060^{96}		-47^{6}		1020^{0}	Ø	1020^{0}
3+13 (G.B.)		1^{45}	1068^{08}	1067^{41}	1061^{41}		-45^{4}		1022^{7}	Ø	1022^{70}
$3+82^{75}$ (℄ PIER)		0^{81}	1068^{72}	1068^{05}	1062^{05}	1055^{50}	-48^{9}		1020^{7}	$+0^{3}$	1021^{0}
4+57 (TOE)	1069^{53}	0^{45}	1069^{08}	1068^{41}	1062^{41}		-47^{3}			-0^{6}	

19th AVE BRIDGE (EAST SIDE)

STA	H.I.	—	TOP DECK	BOTT DECK	BOTT WEB	BOTT BEAM	MINUS ROD FROM TOP DECK	N.G.	N.G. WEST SIDE
4+86 (TOP)	1074.36	5.21	1069.15	1068.48	1062.48		-41.9	1028.15	-0.3 / 1028.5
5+07.75 (℄ PIER)		5.18	1069.18	1068.51	1062.51	1055.96	-40.5	1028.7	-0.3 / 1028.4
5+70.5 (INTERMED)		5.32	1069.04	1068.37	1062.37		-37.4	1031.6	-0.5 / 1031.1
6+32.75 (℄ PIER)		5.69	1068.67	1068.0	1062.0	1055.45	-34.7	1033.97	-0.3 / 1033.7
6+95 (INTERMED)		6.33	1068.03	1067.36	1061.36		-30.8	1037.23	-0.4 / 1036.4
7+57.75 (℄ PIER)		7.18	1067.18	1066.51	1060.51	1053.96	-27.10	1040.10	-0.3 / 1039.8
8+20 (INTERMED)		8.30	1066.06	1065.39	1059.39		-23.40	1042.66	Ø / 1042.7
8+82.75 (℄ PIER)		9.59	1064.77	1064.10	1058.10	1051.55	-19.9	1046.71	Ø / 1045.8
9+44.5 (INTERMED)		11.25	1063.11	1062.44	1056.44		-14.89	1048.31	+0.6 / 1049.0
9+95.5 (TOE)		12.68	1061.68	1061.01	1055.01		-10.90	1050.78	+0.5 / 1051.3
10+03.75 (North FACE ABUT-EAST)		12.96	1061.40	1060.73	1054.73		-8.59	1052.98	+0.5 / 1053.4
10+27.5 (TOP)	1074.36	13.65	1060.71	—	—		-1.0	1059.7	

1st AVE BRIDGE



N
EDGE DECK
℄ 7TH AVE
20° (TYP)
20° (TYP)
SKEW
EDGE DECK

7TH AVE BRIDGE @ SALT RIVER
11
8" DECK
6'5" WEB
1'50 CONCRETE BLOCK (OVER PIERS)
6'0 CONCRETE (7'7" WIDE)
6' DIA. (TYP) CONCRETE PIER

7-9-92 (12)

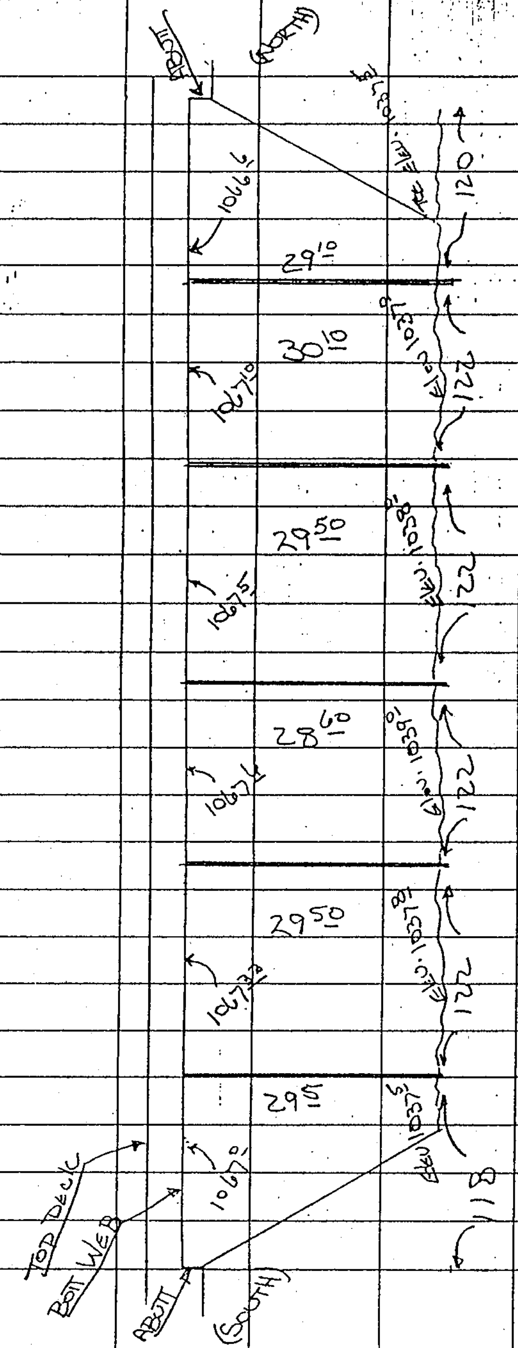
PROFILE EAST SIDE 7TH AVE BRIDGE

STA	H.I.	—	TOP Deck	BOTT DECK	BOTT WEB	BOTT BEAM	MINUS FROM TOP DECK	N.G.	N.G.	WEST SIDE
0+20.5 FACE SOUTH ABUTT	1080.05	7.02	1073.03	1072.36	1066.21		-3.60	1069.4	+2.8	1067.4
4+06.5 (TOP)		6.47	1073.58	1072.91	1066.76		-3.62	1037.4	+0.5	1036.9
1+41.5 (℄ PIER)		6.15	1073.90	1073.23	1067.08	1059.58	-3.62	1037.7	-0.4	1037.3
1+97.0 (INTERNER)		5.90	1074.15	1073.48	1067.33		-3.63	1037.8	Ø	1037.8
2+66.5 (℄ PIER) & (TOE)		5.70	1074.35	1073.68	1067.53	1060.93	-3.62	1038.15	-0.6	1037.6
2+85 (TOP)		5.71	1074.34	1073.67	1067.52		-3.59	1039.3	-0.4	1038.9
3+53 (TOE)		5.61	1074.44	1073.77	1067.62		-3.65	1037.9	-0.6	1037.3
3+64 (TOP)		5.60	1074.45	1073.78	1067.63		-3.43	1040.2	-0.4	1039.8
3+91.5 (℄ PIER)		5.57	1074.48	1073.81	1067.66	1060.16	-3.47	1039.8	-0.8	1039.0
4+09.5 (G.B.)		5.61	1074.44	1073.77	1067.62		-3.73	1037.4	MARSH	
4+21 (G.B.)		5.63	1074.42	1073.75	1067.60		-3.64	1038.0	MARSH	
4+65.5 (G.B.)	1080.05	5.71	1074.34	1073.67	1067.52		-3.59	1039.3	MARSH	

7-9-92 (13)

PROFILE 7TH AVE BRIDGE

STA	H.I.	—	TOP DECK	BOTT DECK	BOTT WGB	BOTT BENM	MINUS RAD FROM TOP DECK	N.G.	N.G. WEST SIDE
	1080^{05}								
$5+16^{5}$ (℄ PIER)		5^{81}	1074^{24}	1073^{57}	1067^{42}	1059^{92}	-36^{7}	1037^{5}	MARSH
5+80 (E.B.)		6^{10}	1073^{95}	1073^{28}	1067^{13}		-37^{9}	1036^{7}	MARSH
$6+41^{5}$ (℄ PIER)		6^{45}	1073^{60}	1072^{93}	1066^{78}	1059^{28}	-35^{5}	1038^{14}	MARSH
6+81 (TOE)		6^{78}	1073^{27}	1072^{60}	1066^{45}		-35^{8}	1037^{5}	MARSH
$7+64^{5}$ (FACE NORTH ABUT)		7^{39}	1072^{66}	1071^{99}	1065^{84}		-5^{70}	1066^{95}	$+1^{9}$ 1067^{95}
7+73 (TOP)	1080^{05}	7^{32}	1072^{67}	1072^{0}			-0^{9}	1071^{8}	Ø $107\,^{8}$



7-9-92 (14)

PROFILE 7TH AVE BRIDGE

7-10-92 (15)

CENTRAL AVE BRIDGE

PROFILE CENTRAL AVE

T.B.M. 75 92

STA	H.I.	—	TOP DECK	BOTT DECK	BOTT WEB	MINUS RA FROM TOP DECK	W.G.	N.G.	N.G. (WEST SIDE)
0+00 (South Face About)	83 59	5 45	1078 14	1077 47	1072 97	-7.9	1070 2	-1	1069 10
0+07 (TOP)	"	5 46	1078 13	1077 46	1072 98	-8.3	069 8	-1 2	1068 6
0+29 (TOE)		5 34	1078 25	1077 54	1073 04	-20.8	1057 5	Ø	1057 5
0+76 (G.B.)		5 16	1078 43	1077 72	1073 22	-22.6	1055 8	+0 3	1056 0
0+96 (G.B.)		5 11	1078 48	1077 77	1073 27	-27.5	1051 0	+0 5	1051 5
1+00 (℄ PIER)		5 09	1078 50	1077 79	1073 29	-28.0	1050 5	+1 0	1051 5
1+50 (INTERMED)		4 89	1078 70	1077 99	1073 49	-29.8	1013 9	-1 7	1047 2
2+00 (℄ PIER)		4 73	1078 86	1078 15	1073 65	-31.0	1047 0	-1 2	1046 7
2+16 (G.B.)		4 66	1078 93	1078 22	1073 72	-31.3	1047 6	-0 7	1046 9
2+55 (G.B.)		4 55	1079 04	1078 33	1073 83	-36.8	1042 2	Ø	1042 2
3+00 (℄ PIER)		4 44	1079 15	1078 44	1073 94	-37.0	1042 15	Ø	1042 15
3+50 (INTERMED)	83 59	4 29	1079 30	1078 59	1074 09	-36.5	1042 8	Ø	1042 8

7-10-92

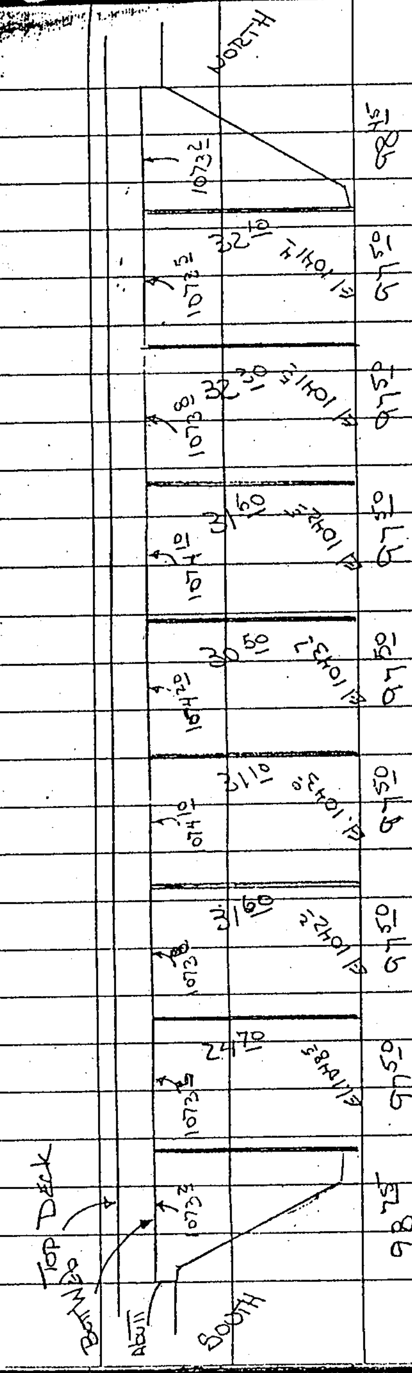
PROFILE CENTRAL AVE BRIDGE

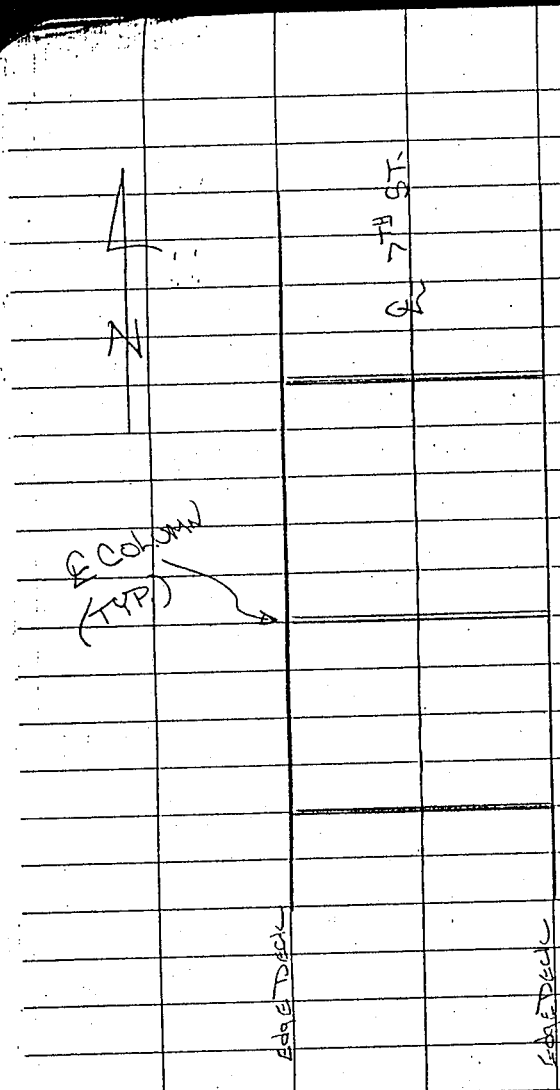
STA	H.I.	—	TOP DECK	BOTT. DECK	BOTT. WEB	MINUS RED FROM TOP DECK	N.G	N.G	(WEST SIDE)
3+83.5 (G.B.)	83.59	4.21	1079.38	1078.67	1074.17	-36.4	1042.0	-0.2	1042.8
4+00 (℄ PIER)		4.22	1079.37	1078.66	1074.16	-35.4	1044.0	-0.3	1043.7
4+50 (INTERMED)		4.15	1079.44	1078.73	1074.23	-35.3	1044.10	Ø	1044.10
5+00 (℄ PIER)		4.21	1079.38	1078.67	1074.17	-36.10	1043.3	-1.2	1042.10
5+50 (INTERMED)		4.29	1079.30	1078.59	1074.09	-37.0	1042.3	Ø	1042.3
6+00 (℄ PIER)		4.46	1079.13	1078.42	1073.92	-36.0	1043.10	-0.5	1042.60
6+33.5 (G.B.)		4.51	1079.08	1078.37	1073.87	-36.2	1042.9	+0.8	1043.70
6+83 (G.B.)		4.64	1078.95	1078.24	1073.74	-38.10	1040.9	+0.3	1041.2
7+00 (℄ PIER)		4.70	1078.89	1078.18	1073.68	-38.2	1040.7	+0.3	1041.0
7+35 (G.B.)		4.79	1078.80	1078.09	1073.59	-38.4	1040.40	Ø	1040.40
7+60.5 (G.B.)	83.59	4.86	1078.73	1078.02	1073.52	-36.5	1042.2	Ø	1042.2

PROFILE CENTRAL AVE BRIDGE

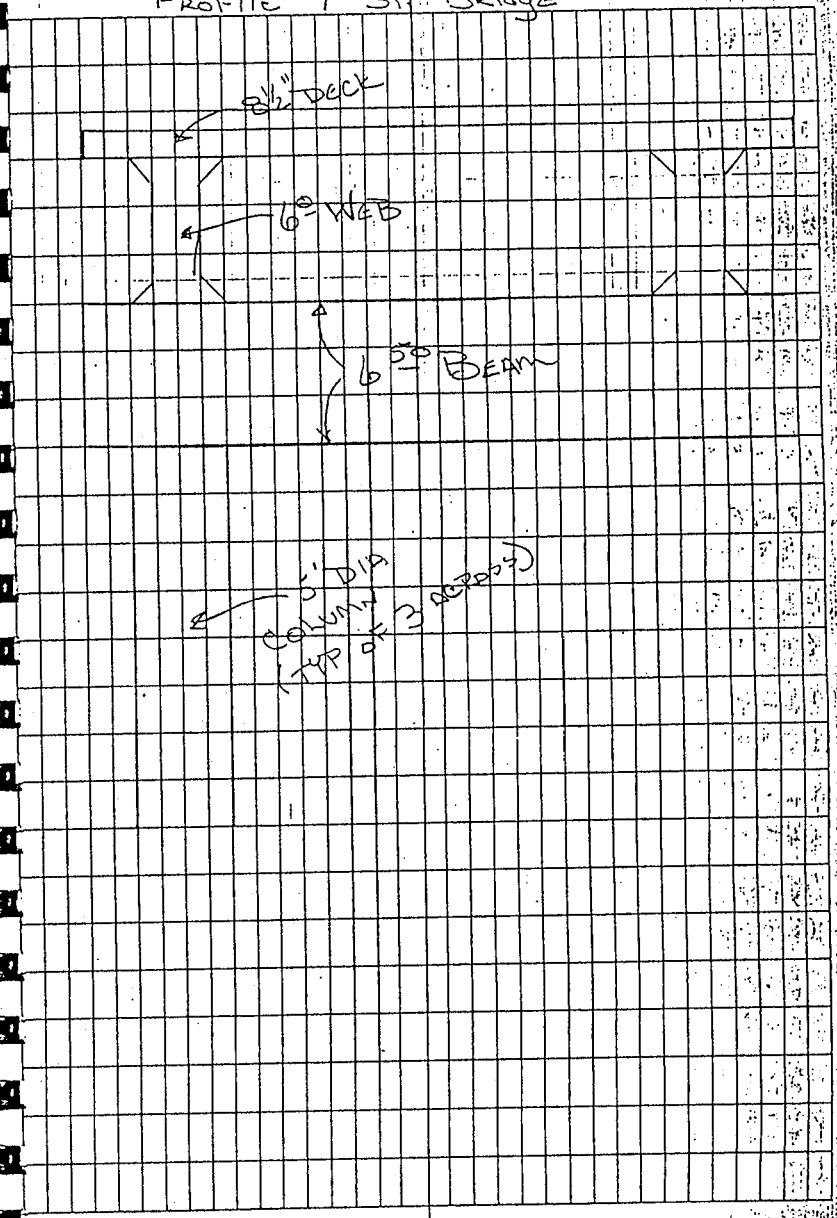
STA	HI	—	TOP DECK	BOTT DECK	BOTT WEB	MINUS FROM FLOW TOP DECK	N.G.	N.G. (WEST SIDE)
	83^{59}							
8+00 (℄ PIER)		5.06	1078^{53}	1077^{82}	1073^{32}	-35.4	1043^{10}	$+0^{6}$ 1043^{70}
$8+19^{5}$ (TOE)		5.09	1078^{50}	1077^{79}	1073^{29}	-34.3	1044^{29}	$+0^{3}$ 1044^{5}
$8+94^{5}$ (TOP)		5.40	1078^{19}	1077^{48}	1072^{98}	-8.3	1069^{9}	-0^{5} 1069^{4}
$8+99^{1}$ (NORTH FACE ABUT)	83^{59}	5.40	1078^{19}	1077^{48}	1072^{98}	-7.5	1070^{70}	-0^{5} 1070^{20}
V-IN		-7^{67}	ELEV. 1075.92			T.B.M. B/C FLUSH ℄ CENTRAL ±400 SOUTH BRIDGE		

ProFile Central Ave Bridge





PROFILE 7th ST. BRIDGE



7-10-92 (21)

PROFILE 7TH ST. BRIDGE

STA	H.I.	—	Top Deck	Bott Deck	Bott Web	Bott Beam	Minus Rod Top Deck	W.G.	N.G.-Westside
	1087 55								
0+00 (South Face Abut)	"	6 71	1080 84	1080 13	1074 13		-6 9	1073 9	-0 7 / 1073 2
0+75 5 (Toe)		4 19	1083 36	1082 65	1076 65		-34 7	1048 7	-0 3 / 1048 4
1+33 (℄ Pier)		2 99	1084 56	1083 85	1077 85	1071 85	-37 6	1047 0	Ø / 1047 0
2+01 (Intermed)		2 17	1085 38	1084 67	1078 67		-38 1	1047 3	-0 3 / 1047 0
2+68 (℄ Pier)		1 59	1085 96	1085 25	1079 25	1072 75	-39 4	1046 6	Ø / 1046 6
3+25 5 (Intermed)		1 39	1086 16	1085 45	1079 45		-39 2	1047 0	Ø / 1047 0
4+03 (℄ Pier)		1 60	1085 95	1085 24	1079 24	1072 74	-41 2	1044 8	-0 4 / 1044 4
4+70 5 (Intermed)		2 31	1085 24	1084 53	1078 53		-40 0	1045 2	-0 4 / 1044 8
5+38 (℄ Pier)		3 10	1084 45	1083 74	1077 74	1071 24	-38 7	1045 8	-0 6 / 1045 2
6+07 (Toe)		4 48	1083 07	1082 36	1076 36		-33 5	1049 6	-0 5 / 1049 1
6+71 5 (North Face Abut)	1087 55	6 02	1081 53	1080 82	1074 82		-7 3	1074 2	-0 8 / 1073 4

7-10-92 (22)

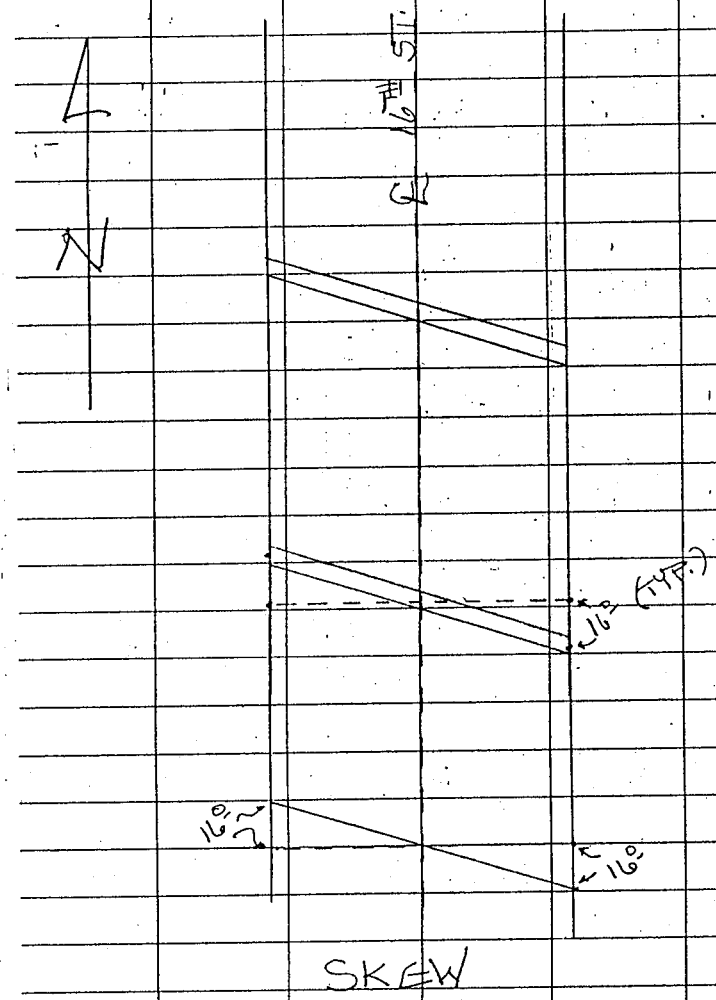
PROFILE 7TH ST. BRIDGE

	+	H.I.	−	ELEV.
E.R.M.				1088.56
	6.90	95.46		
T.P.	"		5.16	1090.30
	6.26	96.56		
T.P.			8.39	1088.17
	5.26	93.43		
T.P.			5.47	1087.96
	6.52	94.48		
T.B.M.			3.17	1091.31
	RETURN LOOP			
	2.91	94.22		
T.P.			6.27	1087.95
	5.46	93.41		
T.P.			5.40	1088.01
	8.62	96.63		
T.P.			6.35	1090.28
	5.13	95.41		
E.R.M.			6.86	1088.55

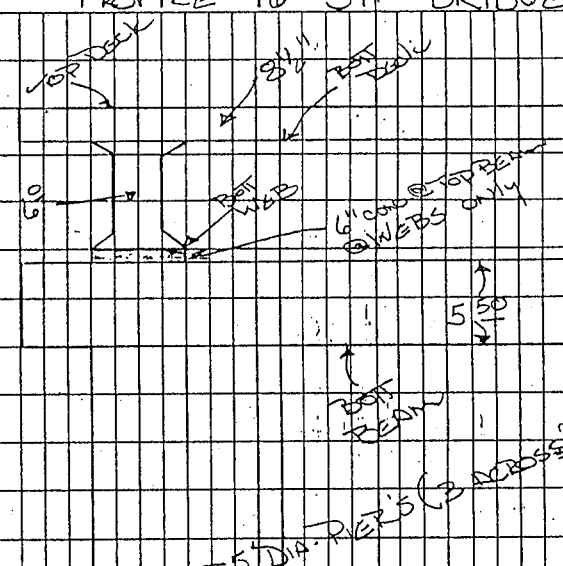
7-13-92 (23)

BENCH LOOP 16th ST.

DESCRIPTION
E.R.M. #72 B/C 1/4 16th ST./BROADWAY
T.B.C.
T.B.C.
T.B.C.
P.K. Nail in N.B. E.P. - Begin BARRIER WALL SE. COR. 16th ST. Bridge
T.B.C.
T.B.C.
T.B.C.
V-in E.R.M. #72



PROFILE 16TH ST. BRIDGE



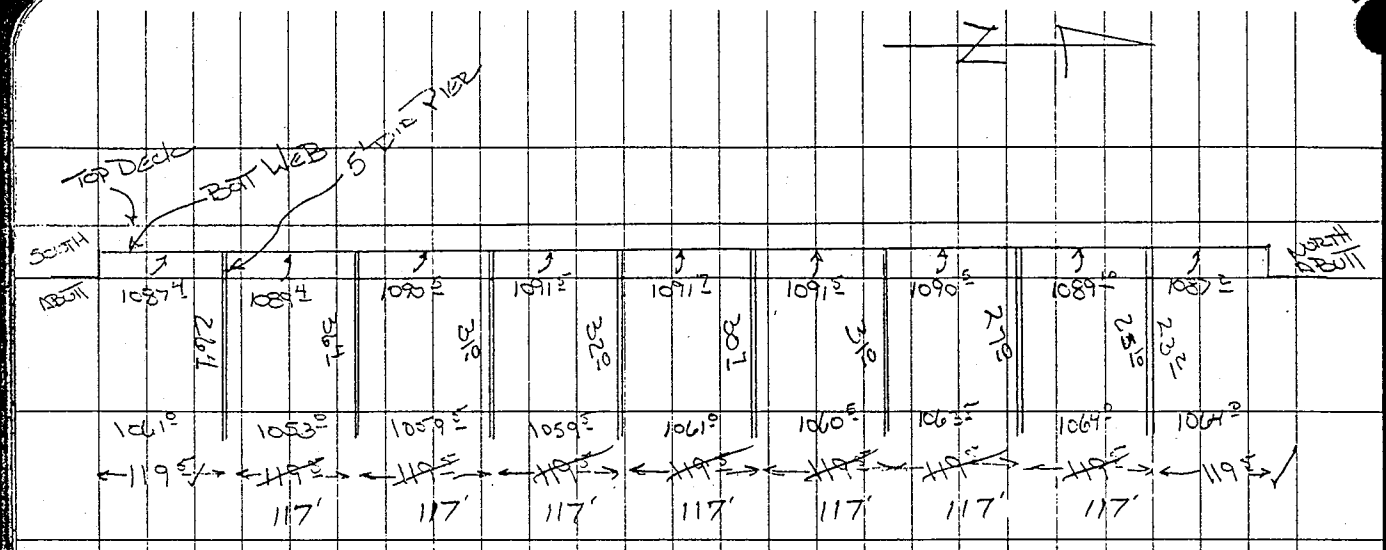
PROFILE 16th ST. BRIDGE

STA	H.I.	–	TOP DECK	BOTT DECK	BOTT WEB	BOTT BEAM	MMWS Rod FROM TOP DECK	N.G.	N.G. (WEST SIDE)
TBM 1091.31	+12.85								
0+21 (TOP)	1104.16	11.50	1092.66				-0.5	1092.10	
0+00 (FACE SOUTH ABUT)		11.11	1093.05	1092.34	1086.34		-9.3	1083.8	-0.8 1083.0
0+55 (TOE)		10.06	1094.10	1093.39	1087.39		-33.1	1061.9	-0.3 1060.7
1+22 (℄ PIER)		8.98	1095.18	1094.47	1088.47	1082.47	-36.1	1059.10	-0.4 1058.5
1+50 (TOE)		8.51	1095.65	1094.94	1088.94		-42.8	1052.9	-0.4 1052.5
2+26 (TOE)		7.55	1096.61	1095.90	1089.90		-43.5	1053.10	-0.2 1052.8
2+44 (℄ PIER)		7.40	1096.76	1096.05	1090.05	1084.05	-39.2	1057.6	Ø 1057.6
2+80 (G.B.)		7.02	1097.14	1096.43	1090.43		-37.9	1060.10	-0.4 1059.7
3+66 (℄ PIER)		6.28	1097.88	1097.17	1091.17	1085.17	-39.2	1058.7	-0.3 1059.0
4+32 (G.B.)		6.00	1098.16	1097.45	1091.45		-38.6	1059.6	Ø 1059.6
4+88 (℄ PIER)		5.81	1098.35	1097.64	1091.64	1085.64	-37.8	1060.5	-0.4 1060.1
5+53 (INTERMED)		5.73	1098.43	1097.72	1091.72		-37.3	1061.10	-0.4 1060.7
6+10 (℄ PIER)		5.84	1098.32	1097.61	1091.61	1085.61	-38.2	1060.9	-0.5 1059.6

9-13-92 (26)

PROFILE 16th ST BRIDGE

STA	H.I.	–	TOP DECK	BOTT DECK	BOTT WEB	BOTT BEAM	MINUS ROD FROM TOP DECK	N G	N.G. (WEST SIDE)
6+65 (TOP)	1104^{16}	6.00	1098^{16}	1097^{45}	1091^{45}		-37^{8}	1060^{4}	$+0^{4}$	1060^{8}
7+15 (TOE)		6.29	1097^{87}	1097^{16}	1091^{16}		-38^{9}	1059^{9}	Ø	1059^{9}
7+32 (℄ PIER)		6.40	1097^{76}	1097^{05}	1091^{05}	1085^{05}	-35^{3}	1062^{5}	Ø	1062^{5}
8+00 (INTERMED)		6.95	1097^{21}	1096^{50}	1090^{5}		-33^{6}	1063^{4}	$+0^{3}$	1063^{3}
8+54 (℄ PIER & GB)		7.57	1096^{59}	1095^{88}	1089^{88}	1083^{88}	-33^{5}	1063^{10}	-0^{3}	1062^{8}
8+85 (G.B.)		7.84	1096^{32}	1095^{61}	1089^{61}		-32^{4}	1063^{9}	-0^{4}	1063^{5}
9+20 (INTERMED)		8.35	1095^{81}	1095^{10}	1089^{10}		-31^{5}	1064^{3}	-0^{3}	1064^{0}
9+76 (℄ PIER)		9.17	1094^{99}	1094^{28}	1088^{28}	1082^{28}	-30^{9}	1064^{0}	-0^{3}	1063^{8}
10+50 (TOE)		10.43	1093^{73}	1093^{02}	1087^{02}		-29^{5}	1064^{20}	Ø	1064^{2}
10+98 (NORTH FACE ABUT)		11.33	1092^{83}	1092^{12}	1086^{12}		-9^{4}	1083^{3}	-0^{4}	1082^{5}
		12.85	V-IN	FLAT					



★ CORRECTED 3-18-93
SKETCH BUST
PROFILE STATIONING IS GOOD

PROFILE 16TH ST. BRIDGE

7-13-92 (RJ)

	+	H.I.	−	ELEV.
B.M.				1100.95
	6.98	1107.93		
T.P.			6.03	1101.90
	5.77	1107.67		
T.P.			6.96	1100.71
	1.16	1101.87		
T.P.			6.43	1095.44
	7.21	1102.65		
T.B.M.			4.92	1097.73
	4.98	1102.71		
T.P.			7.26	1095.45
	6.43	1101.88		
T.P.			1.15	1100.73
	6.95	1107.68		
T.P.			6.00	1101.68
	6.46	1108.14		
B.M.			7.17	1100.97

BENCH LOOP 24TH ST.

E.R.M. #73 BRASS CAP H/H 24TH ST. / BROADWAY

T.B.C.

T.B.C.

T.B.C.

U.S.G.S. B/C FLUSH IN CONC @ S.E. ABUT 24TH / BROADWAY

T.B.C.

T.B.C.

T.B.C.

V+ IN B/C H/H 24TH ST. & BROADWAY

	+	H.I.	−	ELEV.
B.M. ERM.#74				1196.11
	4.64	1200.75		
T.P.			3.66	1197.09
	7.16	04.25		
T.P.			4.91	1199.34
	5.80	05.14		
T.P.			2.92	1202.22
	5.51	07.73		
T.P.			1.14	1206.59
	3.90	10.49		
T.B.M.			12.74	1197.75
		— RETURN LOOP —		
	13.26	11.01		
T.P.			4.42	1206.59
	1.11	07.70		
T.P.			5.48	1202.22
	3.10	05.32		
T.P.			5.97	1199.35
	4.95	04.30		
T.P.			7.21	1197.09
	3.75	1200.84		
ERM.#74			4.74	1196.10
	53.18		53.19	

FREEWAY BRIDGE LEVEL LOOP

B.C. 4/11 ERM#74 2HT AT / UNIVERSITY

T.B.C.

T.B.C.

T.B.C.

Rock

INK 'X' ON N.E. COR. OF CONC. HEADWALL ± 200' W. OF N.W. COR. OF BRIDGE

Rock

T.B.C.

T.B.C.

T.B.C.

√-IN P.O.B. 0.01 LOW

	+	H.I.	—	ELEV.
B.M.				1135.35
	7.45	1142.80		
T.P.			6.67	1136.13
	2.73	1138.86		
T.P.			5.82	1133.04
	3.86	1136.90		
T.P.			5.94	1130.96
	7.69	1138.65		
T.B.M.			12.71	1125.94
	RETURN LOOP			
	11.96	1137.90		
T.P.			6.97	1130.93
	5.46	1136.39		
T.P.			3.38	1133.01
	6.99	1140.00		
T.P.			3.90	1136.10
	7.09	1143.19		
B.M.			7.87	1135.32

HOHOKAM BRIDGE LEVEL LOOP

DESCRIPTION
H&V # 340
Rock
Rock
Rock
60p. NAIL ± 300' EAST OF S.E. COR. HOHOKAM BRIDGE
Rock
Rock
Rock
1/2 IN H&V # 340

1988

SALT - GILA

X - SECTIONS

TELEDYNE

425

FORMULAE FOR SOLVING RIGHT TRIANGLES

$\text{Sin}\,A = \frac{a}{c} = \text{Cos}\,B \qquad \text{Cot}\,A = \frac{b}{a} = \text{Tan}\,B$

$\text{Cos}\,A = \frac{b}{c} = \text{Sin}\,B \qquad \text{Sec}\,A = \frac{c}{b} = \text{Cosec}\,B$

$\text{Tan}\,A = \frac{a}{b} = \text{Cot}\,B \qquad \text{Cosec}\,A = \frac{c}{a} = \text{Sec}\,B$

Given	Required	Solution
A, c	B, a, b	$B = 90° - A,\ a = c \sin A,\ b = c \cos A$
A, b	B, a, c	$B = 90° - A,\ a = b \tan A,\ c = \frac{b}{\cos A}$
A, a	B, b, c	$B = 90° - A,\ b = a \cot A,\ c = \frac{a}{\sin A}$
a, c	A, B, b	$\sin A = \frac{a}{c},\ \cos B = \frac{a}{c},\ b = \sqrt{(c+a)(c-a)}$
a, b	A, B, c	$\tan A = \frac{a}{b},\ \cot B = \frac{a}{b},\ c = \sqrt{a^2+b^2}$

FORMULAE FOR SOLVING OBLIQUE TRIANGLES

Given	Required	Solution
A, a, b	B, c	$\sin B = \frac{b \sin A}{a},\ c = \frac{a \sin C}{\sin A}$
A, B, a	b	$b = \frac{a \sin B}{\sin A}$
a, A, C	A, c	$A + B = 180° - C,\ c = \frac{a \sin C}{\sin A}$
a, b, c	Area	side $= \frac{a+b+c}{2}$, area $= \sqrt{s(s-a)(s-b)(s-c)}$
A, b, c	Area	area $= \frac{bc \sin A}{2}$
A, B, C, a	Area	area $= \frac{a^2 \sin B \sin C}{2 \sin A}$

MADE IN U.S.A.

BK. 1388 INDEX I

TITLE PAGE

SALT-GILA X-SECTIONS

INDEX

PG.	DESC.		
1			
2 - 3	FLIGHT 17	MODELS	15/16
4 - 5	FLIGHT 11	MODEL	6
6	FLIGHT 11/12	MODEL	8/8
7 - 8	FLIGHT 12	MODEL	9/10
9	FLIGHT 12	MODEL	13
10 - 11	FLIGHT 11	MODEL	11 12
12 - 13	FLIGHT 11/12	MODEL	13/14
14	FLIGHT 12	MODEL	16
15 - 16	FLIGHT 11	MODEL	17
17 - 18	FLIGHT 12	MODEL	11/12

BK. 1388

INDEX II

Bk. 1388

Pg. 1

BK 1388 8-4-92

STA	+	HI	−	SHOT ELEV.	PLAN ELEV.
		868.92			
3+00				871.6	873.4
6+50				873.3	874.6
9+60				872.8	873.1
13+40				873.8	874.3
16+90				873.2	872.4
20+40				873.4	873.5
22+70				873.9	873.7
26+19.5	*			872.77	872.73

FLIGHT 7, MODEL 15 PG. 2

DESC.

X @ 3/4 4/4 @ BELDAT & TUTTHILL STA = 0+00

COLING AL/PANEL # 1/4 @ 26+19.5 * HZ ✓

SCALED SHOT = −1.8' VS. PLAN EL.

" −1.3 "

" −0.3 "

" −0.5 "

" +0.8 "

" −0.1 "

" +0.2 "

HZ ✓ = 0.50' VERT. ✓ = + 0.04'

(SET UP CONT. ON PG. 3)

8-4-92

C. SCHULTE, C. MIHELICH

SUNNY, HOT

BK. 1388 8-4-92

STA	+	HI	−	SHOT ELEV	PLAN ELEV
		868.92			
3+70				869.2	870.9
7+30				868.4	870.6
13+10				868.8	871.0
18+00				870.0	870.9
23+30				871.5	872.1
27+70				872.5	873.4
32+10				872.6	874.0
36+70				873.3	875.0
40+80				873.8	874.8

— END THIS SET UP —

FLIGHT # 7, MODEL 16 PG. 32

DESC

1 @ B/C 4/4 @ BELOAT & TUTWILL 0+00

GOING EAST ON BELOAT

SCALED IN SHOT = −1.70 VS. PLAN EL.
" −2.20 "
" −2.20 "
" −0.90 "
" −0.60 "
" −0.90 "
" −1.40 "
" −1.70 "
" −1.00 "

8-4-92

SCHULTE, MIHELICH

BK. 1388 8-5-92

STA	+	HI	-	SHOT ELEV.	PLAN ELEV.
		889.83			
- 2+60				891.4	891.6
0+00				890.1	889.8
4+20				889.4	890.8
11+00				889.9	891.2
16+30				892.0	891.7
± 19+00				896.9	896.6

FLIGHT #11 MODEL 6 PG. 4

± COTTON LANE & MC. 85

DESC.

T @ HIV #107 ½" REBAR 0+00 (GOING EAST)
N. 870,588.84
E. 544,379.37 REBAR EL = 889.83. PANEL IS ± 1 MI. SOUTH OF M.C. 85 ON COTTON LANE

N/G - 0.2 VS. MAP EL.
N/G + 0.3 "
N/G - 1.4 "
N/G - 1.3 "
N/G + 0.3 "
N/G + 0.3 "

(SET UP CONT. ON PG. 5)

8-5-92
C. SCHULTE, C. WITHELICH
RAIN, WARM

BK. 1388 8-5-92

STA	+	HI	−	SHOT ELEV	PLAN ELEV
		889.83			
0+00				890.1	889.8
3+30				890.5	891.0
7+60				891.4	891.6
15+00				893.4	893.7
21+50				894.7	895.6
32+30				900.3	902.2
36+60				901.9	902.8
42+40				904.7	905.8
45+80				908.6	910.0
47+50				911.1	912.4
52+50				912.3	913.2
V-106 ± 52+80				912.40	

— END SET UP, END DAY —

FLIGHT 12, MODEL 6 PG. 54

± COTTON LANE & MC 85

DESC

TC HEX # 107 ½ REBAR 0+00 (INCREASING STA N)
N 874588.84
PANEL EL = 889.83 E 544379.37

N/G + 0.3' = VS. MAP EL.
N/G − 0.5' "
N/G − 0.2' "
N/G − 0.3' "
N/G − 0.9' "
N/G − 1.9' "
N/G − 0.9' "
N/G − 1.1' "
F/S M.C. 85/HZ. ✓ (GOOD) / − 1.4 VS MAP EL
F/S ± 8R TRACKS ON COTTON LN / − 1.3' VS. MAP EL.
AC F.S. − 0.9' VS. MAP EL

✓ IN V-106 EL. = 912.43 (−0.03)

SCHULTE, MIHELICH
8-5-92

RAIN, MUDDY

BK. 1388 8-7-92

STA.	+	HI	−	SHOT ELEV.	MAP ELEV.
		912.29			
0+20				918.4	917.8
6+45				912.4	912.1
12+50 (π 12+70)				911.8	911.7
14+50				911.7	910.7
17+35				909.8	908.6
24+00				911.0	911.1
30+50				910.1	909.9
39+20				912.0	911.0
43+50				912.8	911.3
— END THIS SET UP —					

FLIGHT 11/12, MODEL 8/8 PG. 65

REMARKS

π @ S.E. COR. CANAL BRIDGE + N 872755.00 E 554980.00 (± 12+70)

HZ ✓ & N. END ESTRELLA PKWY. BRDG. SCALED N 871488.00 E 554940.00

HZ / GOOD NOTE: STA 0+00 IS N. END ESTRELLA BRDG.

STA. INCREASING GOING N.

A.C. F.S. / + 0.6 VS. MAP ELEV.

" + 0.3 VS. MAP ELEV.

" + 0.1 " "

" + 1.0 " "

" + 1.2 " "

" − 0.1 " "

HZ ✓ GOOD W/INT DIRT RD / + 0.2 VS. MAP ELEV.

A.C. F.S. + 1.0 VS. MAP ELEV.

HZ ✓ GOOD W/INT DIRT RD. / + 1.5 VS MAP ELEV.

8-7-92

C. SCHULTE, C. MIHELICH

SUNNY, HOT, HUMID

BK 1388 8-7-92

STA.	+	HI	-	SHOT ELEV.	MAP ELEV.
		921.22			
0+80				921.8	921.4
5+90				921.5	920.8
10+00 *				921.7	921.8
13+80				922.1	922.1
18+00				923.0	923.5
22+90				925.0	926.4

REMARKS

TP @ & INT BULLARD & BROADWAY B/C H/H STA = 10+00 INCREASING TO EAST. CAP EL = 921.22 / N 87580 E 560170

& DIRT RD / + 0.4 VS. MAP ELEV.
" " + 0.7 " " "
* TP & INT AC PVMT / -0.1 " "
F.S. A.C. PVMT. / 0 " "
" " " / -0.5 " "
" " " / -1.4 " "

(SET UP CONT. ON PG. 7)

BK 1388 8-7-92

FLIGHT 12, MODEL 9 PG. 84

STA.	+	HI	−	SHOT ELEV	MAP ELEV	REMARKS
						T @ & INT. BULLARD & BROADWAY, B/C 4/10 STA=10+00
						INCREASING TO SOUTH CAP. EL=921.22 N.875870 E.560170
		921.22				
-3+00				937.7	937.5	HZ ✓, INCT. PVED STREET, GOOD / +0.2 VS. MAP ELEV.
5+38				924.00	—	SHOT TAKEN @ C.B. & BULLARD
10+00						
12+40				921.2	921.2	0 VS. MAP ELEV.
15+70				920.7	920.7	0 " " " "
19+70				920.2	920.6	-0.4 " " " "
23+40				920.8	921.5	HZ ✓, DIRT RD, GOOD / -0.7 VS. MAP ELEV.
25+20				920.4	921.1	-0.7 VS. MAP EL.

— END THIS SET UP —

BK. 1388 8-7-92

STA	+	HI	-	SHOT ELEV.	MAP ELEV.
		950.56			
0+00					
1+60				948.6	949.1
5+90				942.4	942.9
8+20				939.9	940.7
13+10				939.0	939.8
15+80				938.5	940.4
20+60				938.1	939.2
26+00				937.8	939.6
27+30				938.1	940.6
31+60				937.5	939.7
36+40				936.7	939.8
39+30				935.9 (936.1) RE-✓ 8-10-92	939.8
"					

— END THIS SET UP —

FLIGHT 12, MODEL 13 PG. 98

REMARKS

N. 878,288.36 / E. 575,938.80

Δ @ H&V 102, PANEL EL. = 950.56

STA. = 0+00, INCREASING TO SOUTH

B/C H/H @ JCT. ELWOOD & EL MIRAGE, H&V 102

AC PVMNT. / -0.5 VS. MAP EL.

" " -0.5 " "

" " -0.8 " "

HZ ✓ INT. DIRT RD GOOD (±2.0') -0.8 VS. MAP EL

AC PVMNT. / -1.9 VS. MAP EL.

" " -1.1 " "

HZ ✓ INT. DIRT RD (±26+10) -1.8 "

AC PVMNT. / -2.5 VS. MAP EL.

" " -1.8 " "

" " -2.9 " " (RE-CHECK GRADES 8-10-92)

HZ ✓ INT DIRT RD. (GOOD) / -3.9 VS. MAP EL

BK. 1388 8-7-92

STA	+	HI	-	SHOT ELEV.	MAP ELEV.
		929.24			
0+00				929.7	929.4
3+80				928.3	928.2
8+80				926.5	927.0
13+35				924.7	925.1
19+20				926.0	926.7
24+60				927.5	928.8
29+70				928.7	930.5
36+60				930.4	932.7
39+05				930.9	932.5

FLIGHT 11 MODEL 11 PG. 10

REMARKS

T.C. 0+00 ± SCT DYSART RD & SOUTHERN AVE, STA. INCREASING TO NORTH / N. 870,470.00 E. 570,740.00 POINT

B/C H/H T.P.# 87 CAP EL = 929.24

ES A.C. PVMT. / +0.1 VS. MAP EL.

" " -0.5 " "

HZ ✓ ℄ CANAL GOOD -0.4 VS. MAP EL.

" " -0.7 " "

" " -1.3 " "

" " -1.8 " "

HZ ✓ INT TRANS. LINE GOOD / -2.30 VS MAP EL.

HZ ✓ INT. DIAT RD. GOOD / -1.6 " "

(SET UP CONT. ON PG. 11)

BK. 1388 8-7-92

STA	+	HI	-	SHOT ELEV.	MAP ELEV.
		929.24			
-20+70				930.8	931.5
-13+10				930.6	930.5
-5+00				930.4	929.9
T 0+00 *				929.7	929.4
+4+50				926.4	926.7
+11+20				924.8	924.4
+18+80				922.5	922.7
+28+00				921.4	921.9

— END SET UP, END DAY —

REMARKS

T @ 0+00 JCT. DUSART & SOUTHERN (NEGATIVE STA.'S TO EAST POSITIVE STA.'S TO WEST ON SOUTHERN AVE)

A.C. PVMNT / -0.7 VS. MAP EL.

HZ ✓, JCT. 129TH AV. (GOOD) / +0.1 VS. MAP EL.

E.S. A.C. PVMNT / +0.5 VS. MAP EL.

* T @ B/C IN H/H (SEE PG. 10) A.C. PVMNT / +0.3 VS. MAP EL.

& DIRT RD. -0.3 VS. MAP EL.

" " +0.4 " "

" " -0.2 " "

HZ ✓ JCT. DIRT RDS GOOD / -0.5 VS. MAP EL.

C. SCHULTE & M. HELICH

8-7-92

SUNNY, HUMID, HOT

BK. 1388. 8-10-92

STA.	+	H.I	—	SHOT ELEV.	MAP ELEV.
		936.00			
0+00					
2+50				934.0	934.9
6+70				933.4	935.3
10+50				932.7	934.9

STA.	+	H.I	—	SHOT ELEV.	MAP ELEV.
		936.00			
1+30				936.7	938.9
13+20				—	—
17+70				935.0	936.3

REMARKS

T @ B/C H/H @ ℄ INT. SOUTHERN & EL MIRAGE, STA = 0+00 INCREASING TO N. / PANEL # HFV 184, EL. = 936.00 / N 870443 E 575981

NOTE: SEE PG. 9 THIS BOOK FOR MORE HZ'S VERT. ✓'S ± 1.8 MI. N. ON EL MIRAGE

A.C. PVMNT. / +0.9 VS MAP EL.
" " " -1.9 " "
" " " -2.2 " "

T @ SAME AS ABOVE, STA. 0+00 INCREASING TO S.

A.C. PVMNT. / -2.2 VS. MAP EL.
HZ. ✓ ℄ JCT. DIRT RD. E. A/B 13+19? (-0.3)
A.C. PVMNT. / -1.3 VS. MAP EL.

8-10-92
C. SCHULTE, C. MIKELICH
SUNNY, HOT, HUMID

(SET UP CONT. ON PG. 13)

BK 1388 ! 8-10-92

STA.	+	HI	−	SHOT ELEV.	MAP ELEV.
		936.00			
2+10				936.3	937.3
6+70				936.9	939.4
11+70				937.7	937.6
18+70				938.7	939.2
26+20 ✗				939.6	939.5
35+40				940.8	941.2

STA.	+	HI	−	SHOT ELEV.	MAP ELEV.
		936.00			
3+70				935.6	936.5
8+60				935.0	935.2
16+50				933.1	933.7
22+10				932.1	932.7
26+70				—	—
27+50				931.2	932.0

REMARKS

T@ H&V 18.4, B/L H/H & INT. EL MIRAGE & SOUTHERN N. 870443.6 STA = 0+00 INCREASING TO E., EL = 936.00 E. 575981.7

A.C. PVMNT. / +1.0 VS. MAP EL.
" " " −2.5 " "
" " " +0.1 " "
" " " −0.5 " "
" " " +0.1 " " ✗ HZ ✓ 26+20.5 & INT. 119TH AVE.
" " " −0.4 " "

T@ SAME AS ABOVE, STA. 0+00 INCREASING TO W.

A.C. PVMNT. / −0.9 VS. MAP EL.
" " −0.2 " "
" " −0.6 " "
" " −0.6 " "
HZ ✓ = 26+70.3 ACT. DIRT RD S.
AC. PVMNT. / −0.8 VS. MAP EL.

— END THIS SET UP —

BK. 1388 8-10-92

STA	+	HI	−	SHOT ELEV.	MAP ELEV.
		965.08			
0+00				965.08	965.08
7+00				963.5	962.3
15+00				968.5	967.5
23+00				972.6	972.6
26+80				975.2	974.3
31+10				974.3	975.5

— END SET UP, END DAY —

REMARKS

π @ P.P. H&V 193, P.K. NL IN AC. PVMNT. E 107TH AVE (± 2680' N. OF BROADWAY) π STA = 0+00 INCREASING TO S., N. 878384.64 E. 586330.48 EL = 965.08

AC PVMNT. / Ø VS. MAP EL.

" " " +1.2 " "

" " " +1.0 " "

" " " Ø " "

" " " +0.9 " " / HZ. ✓ ± & INT. BROADWAY 26+75 L-0.4

" " " −1.2 " "

C. SCHULTE, C. MIHELICH
8-10-92
SUNNY, HOT, HUMID

BK 1388 8-11-92

STA.	+	HI.	−	SHOT ELEV.	MAP ELEV.
		961.10			
0+00					
2+00				960.5	960.5
10+00				958.4	958.4
18+00				956.5	955.8
26+00				955.7	956.1
34+00				954.9	962.6
38+20				954.3	962.2

FLIGHT 11, MODEL 17 PG. 15

REMARKS

T @ P.P. H&V 191, B/L H/H @ JCT'S 99TH AVE & SOUTHERN.
STA. = 0+00 INCREASING TO WEST N 870574.12 E 591593.42 EL. = 961.10

A.C. PYMNT. / ∅ VS. MAP EL.
" " − ∅ " "
" " ∅ " "
" " + 0.7 " "
" " − 0.4 " " / HZ.✓ 26+09.9
" " − 7.7 " "
" " − 7.9 " "

(SET UP CONT. ON PG. 16)

8-11-92
C. SCHULTE, C. MIHELICH
SUNNY, HOT

BK: 1388 8-11-92

STA.	+	HI	—	SHOT ELEV.	MAP ELEV.
		961.10			
7+70				960.5	960.8
12+60				960.4	—
15+80				960.7	961.5
20+75				963.5	—
23+80				966.8	968.6
25+25				968.5	—

REMARKS

T.C. PR # 191, 8½ H/W @ JCT'S 99TH AVE & SOUTHERN

STA. = 0+00 INCREASING TO NORTH, EL = 961.10

A.C. PVMNT. / -.03 VS. MAP EL.
" " / HZ. ✓ 12+57.7
" " / -5.8 VS. MAP EL.
" " / HZ. ✓ 20+69.4
" " / -1.8 VS. MAP EL.
" " / HZ. ✓ 25+21.0

BK. 1388 8-11-92

T @ 0+00 BASELINE ON TRANS. POWER LINE

B.S. T.B.M. T.P. #4 P.K. & SHINER @ JCT.

BROADWAY RD. & LITCHFIELD RD.

SL. DIST. = 1077.40

ZEN. ∡ = 90-00-15

VERT. DIFF. = -0.08 (-/+)

T.B.M. EL. = 930.50

HI/BASE EL. = 930.58

REMARKS

NOTHING SET @ 0+00, TO ESTABLISH CO-ORDINATES FOR 0+00 WE SHOT A HZ. DIST. TO THE WESTERLY COR. OF A TRANS. TOWER THAT HAS SCALED CO-ORDINATES, THUS, SAID SHOT HZ DIST. = STA. OF SAID WESTERY TRANS. TOWER

WESTERLY COR. TRANS. TOWER = N 875350.0 E 566490.0

(SET UP CONT. ON PG. 18)

8-11-92

C. SCHULTE C. MIHELICH

SUNNY, HOT, HUMID

BK. 1388 8-11-92

STA	+	HI	ELEV.
0+00		930.58	
0+27 ²			932.7
0+84			918.3
2+82			917.6
3+14 ²			918.8
5+17 ⁴			919.3
5+51			920.7
8+61			923.3
8+78			925.5
11+01			925.7
15+56			929.5
16+73			933.2
19+34			930.3
24+13			928.0
24+52			935.2

— END SET UP, END DAY —

REMARKS

Δ @ 0+00 BASELINE ± 1000' SOUTH, SOUTHEAST
INT. BROADWAY & LITCHFIELD RD. S/ N 874935.0 E 566490.0 *

TOP, E. EDGE DIRT RD.
TOE, @ BOTT. DRY RIVER BED — HZ DIST. = 517'
C.B. " " "
" " " "
N.C. @ WESTERLY COR. TRAS. TOWER/ N 875359.0 E 566490.0 *
C.B. = NORTHERLY COR. " "
TOE, C.B. BOTT. DRY RIVER BED
TOP, C.B. " " " "
± & DIRT RD @ INT. TRANS. POWER LINES
" " " " "
WESTERLY COR TRANS TOWER (TOP CONC. FOOTER)
N.C. BOTT. DRY RIVER BED @ INT. 2 TRANS. POWER LINES
TOE " " " "
HI PT. TOP OF SMALL SAND HILL ± 14' LT. OF LINE

* CO-ORDINATES SCALED IN FROM MAP.