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INTERCEPTOR CHANNEL/NATURE AREA

INDIAN BEND WASH

SCOTTSDALE, ARIZONA

INTERMEDIATE DESIGN DATA

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Prepared For

DEPARTMENT OF THE ARMY

LOS ANGELES DISTRICT, CORPS OF ENGINEERS

300 N. LOS ANGELES STREET, P. O. BOX 2711

LOS ANGELES, CALIFORNIA 90053

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SEPTEMBER 8, 1980

RGA #97479F

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877 South Alvernon Way / Tucson, Arizona 85711 / (602) 881-4309

INTERCEPTOR CHANNEL/NATURE AREA

INDIAN BEND WASH

SCOTTSDALE, ARIZONA

INTERMEDIATE DESIGN DATA

FOR

BEAUTIFICATION AND RECREATION

SEPTEMBER 1980

Prepared For

DEPARTMENT OF THE ARMY

LOS ANGELES DISTRICT, CORPS OF ENGINEERS

300 N. LOS ANGELES STREET, P. O. BOX 2711

LOS ANGELES, CALIFORNIA 90053

Prepared By

RGA Consulting Engineers
877 South Alvernon Way
Tucson, Arizona 85711

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SECTION A

BASIS OF DESIGN

INDIAN BEND WASH INTERCEPTOR CHANNEL/NATURE AREA

SCOTTSDALE, ARIZONA

1. GENERAL

a. Project: Interceptor channel/nature area, Indian Bend Wash, Scottsdale, Arizona.

b. Scope: Hiking/riding trails system with comfort station and ramada, along the banks of the interceptor channel, between Sta. 4 + 50 and Sta. 75 + 100 (1.3 mi.). Native landscaping for recreation, beautification and wildlife enhancement.

c. Authorization: Public law 89-298, Flood Control Act of 1965.

d. Basic Criteria:

(1) Recreation Master Plan, Supplemental Report No. 2 U.S. Army Corps of Engineers, January 1977.

(2) Work Order No. 12., U.S. Army Corps of Engineers, March 04, 1980.

(3) Conference minutes dated July 9, 1980.

e. Standards for Design:

(1) Arizona Department of Transportation, Standard Specifications For Road and Bridge Construction, 1969.

(2) Arizona Department of Health Services, Engineering Bulletin No. 10, May 1978.

(3) Arizona Department of Health Services, Engineering Bulletin No. 11, July 1978.

(4) Department of the Army, Corps of Engineers, Instructions for Preparation of Specifications.

(5) Department of the Army, Corps of Engineers, Instructions for Preparation of Cost Estimates, May 1978.

(6) Department of the Army, Corps of Engineers, Instructions for Preparation of Cost Estimates, Appendixes 1 & 2, May 1978.

(7) AFM-88-15 and EM-1110-1-103, "Design for Physically Handicapped".

(8) Department of the Army, Corps of Engineers, Standards for Drafting.

f. Ownership of Real Estate: All real estate included in this project is within the limits of the City of Scottsdale.

Maricopa County

2. SITING

a. The new trail system will be located along the banks of the interceptor channel. The land between the Arizona Canal and the interceptor channel contains most of the recreational facilities provided in this project; four sections of trail cross the channel connecting the trail located along the north bank to the main recreational facilities.

The comfort station and the ramada lie just east of Hayden Road; a 24-foot wide road and a 4-space parking area complete these facilities.

The site is naturally flat with existing ground elevations approximately at 1280. The new site grading creates high and low zones where accentuated landscaping will be provided.

Trails constructed with asphaltic concrete will consist of 2 in. surface course on 6 in. subgrade compacted to 95%.

Trails constructed with concrete will be 4 in. thick and will have 6 in. thick aggregate subbase compacted to 95%.

All graded open spaces will be compacted to 80%. Drainage for the project site will have a sheet flow pattern running toward the interceptor channel.

3. UNDERGROUND UTILITIES

a. Sanitary Sewer: The estimated peak flow for the new facilities is 30 GPM (8 fixture units). A new 6" diameter gravity line originates at the north face of the comfort station and runs westerly at a grade of 1.00% to an existing sanitary manhole located on the east side of Hayden Road. Pipe material will be P.V.C. SDR-35.

b. Potable Water: The water demand of the new recreational facilities is 52 GPM (8 fixture units). Fire protection is not provided for this project. Water is obtained from an existing 14" water main located on the east side of Hayden Road. A pressure reducing unit will be installed at the new tap to lower to 50 PSI the water main pressure of 90-100 PSI.

The water supply line will be 2" PVC. SCH 80.

The south section of the new irrigation system will branch off the common tap into the 14" line in the vicinity of the comfort station. Backflow preventer will equip the supply line for the irrigation system.

4. DESIGN SUPPLEMENT

COMPUTATION SHEET

PROJECT INDIAN BEND WASH / NATURE AREA
ITEM BIKE PATH CALCULATIONS

SHEET NO. 1 OF 40 SHEETS
DATE SEPT 4, 1980
FILE
REF. DRWG. NO. G-1

COMPUTED BY WDB CHECKED BY

COGO 1

NORTH BIKE PATH

STARTING FILE 10

POINT	QUAD	BEAR ANGLE	DISTANCE	NORTHING	EASTING
START					
321				922445.781	500929.079
INV	NE	38 51 59.0	371.996		
327				922735.421	501162.509
INV	NE	62 39 51.7	183.000		
315				922819.927	501324.828
		43 42 29.1	DELTA		
	(55)	342.775	RADIUS		
		542.911	ARC		CURVE DATA (TYPICAL)
		627.435	CHORD		
		338.008	TANGENT		
PC TO PT THRU 322					
INV	NE	76 59 52.1	627.435		
310				922961.093	501936.177
INV	SE	81 8 53.1	419.952		
258				922896.470	502351.127

SOUTH B. PATH

START					
321				922445.781	500929.079
INV	NE	79 51 3.8	372.144		
326				922511.355	501295.400
INV	NE	55 19 11.6	183.000		
317				922615.481	501445.889
		9 39 54.7	DELTA		
	(59)	303.277	RADIUS		
		140.178	ARC		
		140.000	CHORD		
		70.267	TANGENT		
PC TO PT THRU 324					
INV	NE	70 53 52.1	140.000		
328				922661.297	501578.180
		22 36 39.9	DELTA		
		303.277	RADIUS		
	(56)	317.004	ARC		
		314.951	CHORD		
		160.591	TANGENT		
PC TO PT THRU 324					
INV	NE	87 12 9.2	314.951		
311				922676.668	501892.755
INV	SE	81 29 30.9	419.952		
257				922614.537	502308.085

PROJECT INDIAN BEND WASH / NATURE AREA
ITEM BIKE PATH CALCULATIONS

SHEET NO. 2 OF 40 SHEETS
DATE SEPT. 4, 1980
FILE
REF. DRWG. NO. G-1

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LOOP "G"

POINT	QUAD	BEAR. ANGLE	DISTANCE	NORTHING	EASTING
START					
328				922661.297	501578.180
		67 48 13.5	DELTA		
	(57)	100.000	RADIUS		
		118.340	ARC		
		111.554	CHORD		
		67.202	TANGENT		
PC TO PT THRU 329					
INV	SW	41 59 42.4	111.554		
332				922578.389	501503.542
		49 7 33.0	DELTA		
	(58)	175.000	RADIUS		
		150.046	ARC		
		145.492	CHORD		
		79.984	TANGENT		
PC TO PT THRU 331					
INV	SW	32 39 22.2	145.492		
330				922455.896	501425.035
INV	NW	66 30 17.5	141.000		
326				922511.355	501295.400

PROJECT INDIAN BEND WASH / NATURE AREA
ITEM BIKE PATH CALCULATIONS

SHEET NO. 3 OF 40 SHEETS
DATE SEPT 4, 1980
FILE
REF. DRWG. NO. G-1

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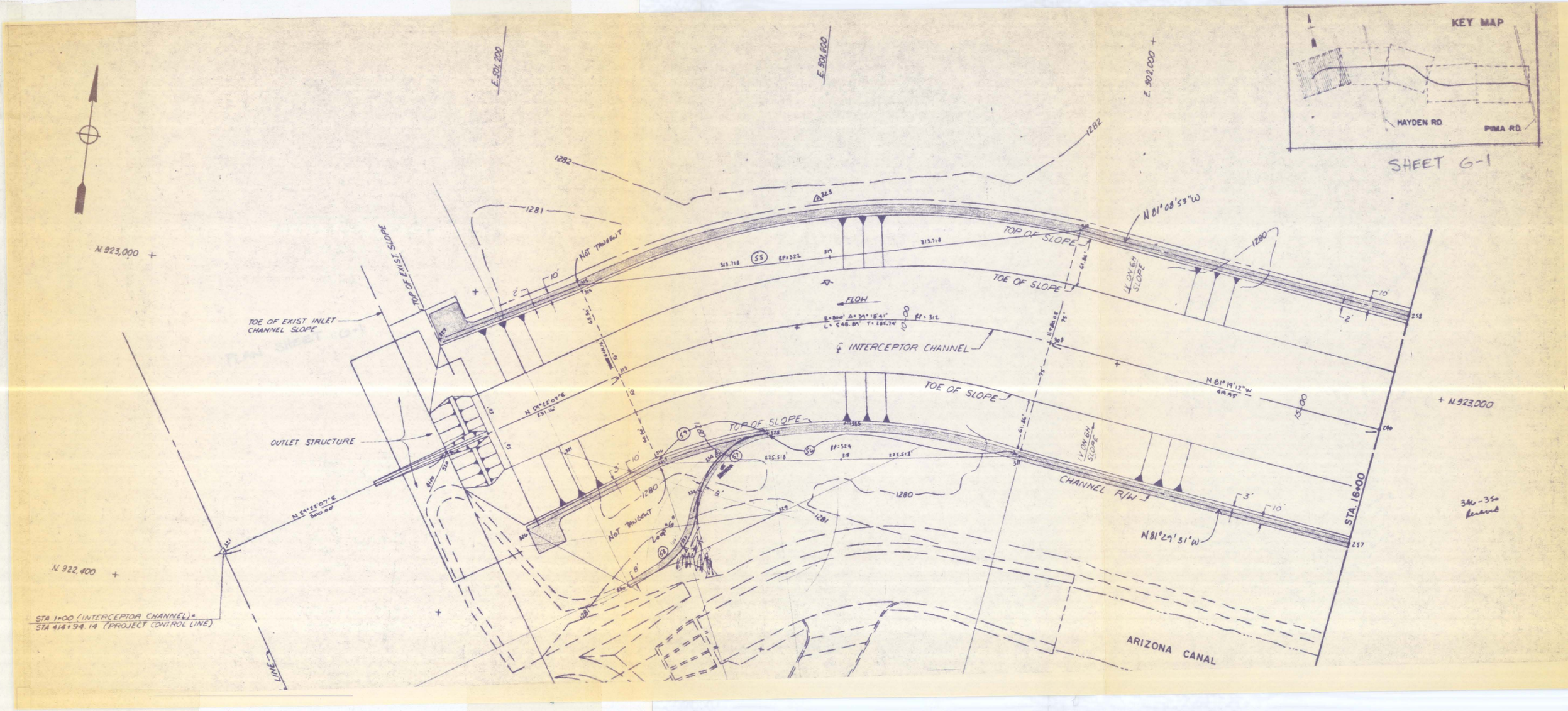

SPD FORM 1 OCT 74 284

EDITION OF 15 DEC 59 WILL BE USED UNTIL EXHAUSTED

PROJECT INDIAN BEND WASH/NATURE AREA
ITEM BIKE PATH CALCULATIONS

SHEET NO. 4 OF 40 SHEETS
DATE SEPT 4, 1980
FILE
REF. DRWG. NO. G-2

COMPUTED BY WDB CHECKED BY

COGO 1

STARTING FILE 10 NORTH B. PATH

POINT	QUAD	BEAR ANGLE	DISTANCE	NORTHING	EASTING
START					
258				922896.470	502351.127
INV	SE	81 9 4.9	100.000		
270				922881.088	502449.936
INV	SE	81 9 4.9	506.055		
266				922803.244	502949.968
INV	SE	81 9 4.9	712.771		
239				922693.602	503654.256

START LOOP "F"

266				922803.244	502949.968
INV	SW	73 33 42.9	166.828		
273				922756.035	502789.959
INV	NW	81 19 12.0	190.462		
277				922784.779	502601.679
		24 35 24.8	DELTA		
		30.000	RADIUS		
	(53)	12.875	ARC		
		12.777	CHORD		
		6.533	TANGENT		
PC TO PT THRU 276					
INV	NW	69 1 29.6	12.777		
278				922789.352	502589.748
INV	NW	56 43 47.2	167.221		
270				922881.088	502449.936
START					
267				922524.800	502907.460
INV	NW	56 11 24.5	166.844		
272				922617.639	502768.831
INV	NW	81 19 12.0	174.046		
280				922643.905	502596.778
		22 27 3.3	DELTA		
		30.000	RADIUS		
	(54)	11.755	ARC		
		11.680	CHORD		
		5.954	TANGENT		
PC TO PT THRU 279					
INV	SW	87 27 16.4	11.680		
281				922643.386	502585.109
INV	SW	76 13 44.7	103.398		
269				922599.730	502406.983
START					
272				922617.639	502768.831
INV	NE	8 40 48.0	140.000		
273				922756.035	502789.959

PROJECT INDIAN BEND WASH / NATURE AREA
ITEM BIKE PATH CALCULATIONS

SHEET NO. 5 OF 40 SHEETS
DATE SEPT 4, 1980
FILE
REF. DRWG. NO. 6-2

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SOUTH BIKE PATH

POINT	QUAD	BEAR. ANGLE	DISTANCE	NORTHING	EASTING
START					
257				922614.537	502308.085
INV	SE	81 29 6.2	100.000		
269				922599.730	502406.983
INV	SE	81 29 6.2	506.055		
267				922524.800	502907.460
INV	SE	81 29 6.2	536.029		
262				922445.431	503437.580
		19 59 13.1	DELTA		
		163.118	RADIUS		
	52	56.902	ARC		
		56.614	CHORD		
		28.743	TANGENT		
PC TO PT THRU 256					
INV	SE	71 19 35.5	56.614		
254				922427.305	503491.214
		25 44 23.8	DELTA		
		218.838	RADIUS		
	51	98.312	ARC		
		97.488	CHORD		
		50.000	TANGENT		
PC TO PT THRU 255					
INV	SE	74 12 10.8	97.488		
222				922400.766	503585.020
INV	SE	87 4 22.7	15.000		
27				922400.000	503600.000
INV	NE	12 1 17.8	159.981		
24				922556.473	503633.321
INV	NE	8 40 48.0	138.718		
239				922693.602	503654.256

PROJECT INDIAN BEND WASH/NATURE AREA
ITEM BIKE PATH CALCULATIONS

COMPUTED BY WDB CHECKED BY

SHEET NO. 6 OF 40 SHEETS
DATE SEPT 4, 1980
FILE
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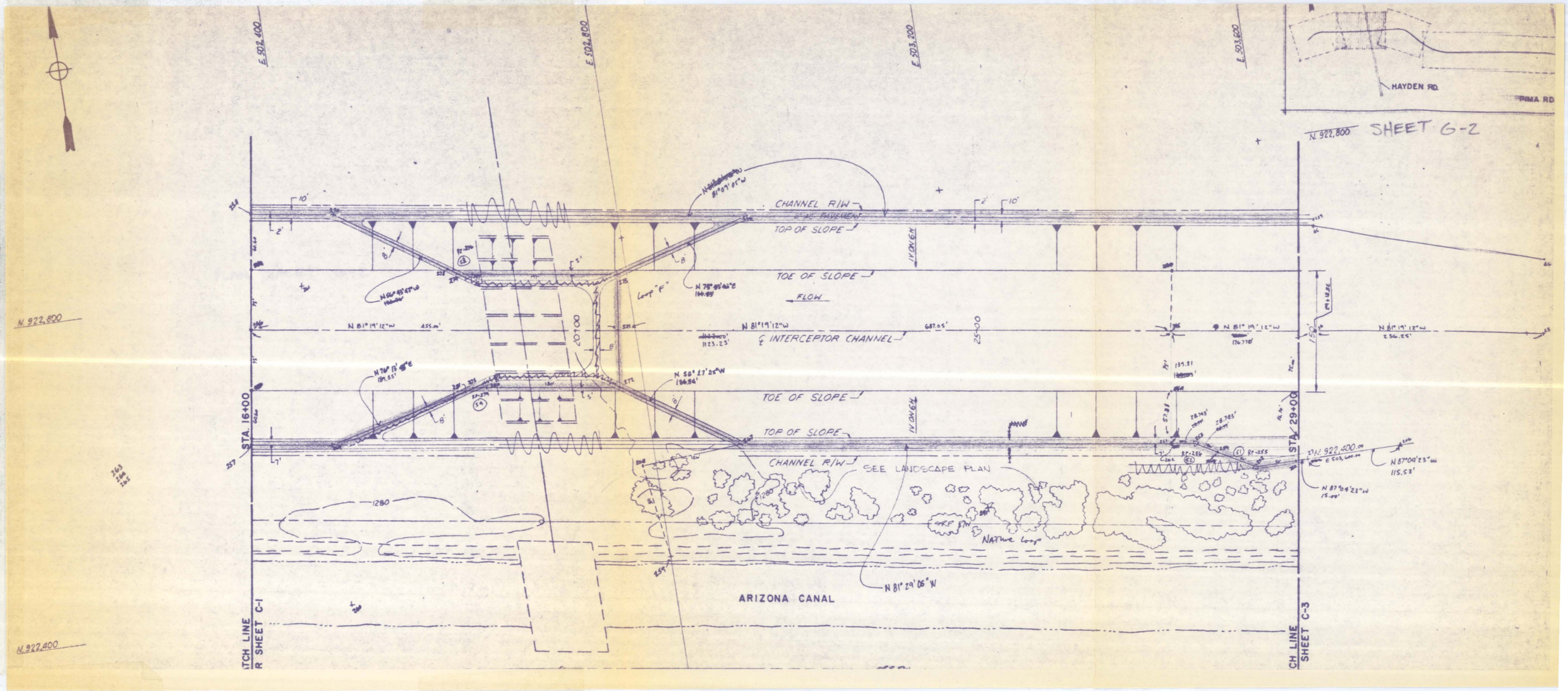

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EDITION OF 15 DEC 59 WILL BE USED UNTIL EXHAUSTED

PROJECT INDIAN BEND WASH / NATURE AREA
ITEM BIKE PATH CALCULATIONS

SHEET NO. 7 OF 40 SHEETS
DATE SEPT 4, 1980
FILE
REF. DRWG. NO. G-6

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COGO 1

STARTING FILE 10 NATURE Loop

POINT	QUAD	BEAR ANGLE	DISTANCE	NORTHING	EASTING
START					
267				922524.800	502907.460
INV	SW	86 15 29.2	126.000		
268				922516.577	502781.728
INV	SE	76 57 30.0	62.381		
265				922502.500	502842.500
		29 24 45.2	DELTA		
		62.837	RADIUS		
61		32.257	ARC		
		31.904	CHORD		
		16.492	TANGENT		
PC TO PT THRU 339					
INV	SE	89 19 48.7	31.904		
338				922502.127	502874.402
INV	SE	74 37 25.5	12.065		
337				922498.928	502886.034
		18 53 51.7	DELTA		
		140.000	RADIUS		
60		46.176	ARC		
		45.967	CHORD		
		23.300	TANGENT		
PC TO PT THRU 335					
INV	SE	84 4 21.4	45.967		
336				922494.181	502931.756
INV	NE	86 28 42.8	13.927		
341				922495.037	502945.656
		22 32 18.6	DELTA		
		140.000	RADIUS		
62		55.072	ARC		
		54.718	CHORD		
		27.897	TANGENT		
PC TO PT THRU 340					
INV	SE	82 15 8.0	54.718		
342				922487.660	502999.874
		0 31 18.7	DELTA		
		143.683	RADIUS		
81		1.309	ARC		
		1.309	CHORD		
		0.654	TANGENT		
PC TO PT THRU 344					
INV	SE	71 13 46.8	1.309		
345				922487.239	503001.113
		20 26 11.9	DELTA		
		143.683	RADIUS		
63		51.250	ARC		
		50.978	CHORD		
		25.900	TANGENT		
PC TO PT THRU 344					

PROJECT INDIAN BEND WASH/NATURE AREA
ITEM BIKE PATH CALCULATIONS
COMPUTED BY WDB CHECKED BY

SHEET NO. 8 OF 40 SHEETS
DATE SEPT 4, 1980
FILE
REF. DRWG. NO. 6-6

NATURE LOOP cont.

POINT	QUAD.	BEAR. ANGLE	DISTANCE	NORTHING	EASTING
INV	SE	81 43 24.4	50.979		
343				922479.900	503051.561
INV	NE	88 3 30.6	2.941		
305				922480.000	503054.500
INV	SE	60 51 56.5	34.918		
306				922463.000	503085.000
INV	SE	78 52 48.6	36.763		
393				922455.910	503121.073
INV	SE	78 52 48.6	22.364		
352				922451.597	503143.017
		12 2 13.5	DELTA		
		140.000	RADIUS		
64		29.412	ARC		
		29.358	CHORD		
		14.760	TANGENT		
PC TO PT THRU 351					
INV	SE	72 51 41.8	29.358		
353				922442.945	503171.071
		20 37 34.2	DELTA		
		166.932	RADIUS		
65		60.095	ARC		
		59.771	CHORD		
		30.376	TANGENT		
PC TO PT THRU 355					
INV	SE	77 9 22.1	59.771		
354				922429.659	503229.346
INV	SE	87 28 9.3	44.446		
357				922427.696	503273.749
		12 9 59.6	DELTA		
		147.934	RADIUS		
66		31.413	ARC		
		31.354	CHORD		
		15.766	TANGENT		
PC TO PT THRU 358					
INV	SE	81 23 9.6	31.354		
356				922423.000	503304.750
		25 45 30.6	DELTA		
		68.953	RADIUS		
67		30.999	ARC		
		30.739	CHORD		
		15.766	TANGENT		
PC TO PT THRU 360					
INV	SE	88 10 55.0	30.739		
359				922422.025	503335.473
INV	NE	78 56 19.7	23.531		
362				922426.539	503358.567
		63 29 33.3	DELTA		
		46.000	RADIUS		
68		50.975	ARC		
		48.407	CHORD		
		28.462	TANGENT		
PC TO PT THRU 361					

PROJECT INDIAN BEND WASH / NATURE AREA
ITEM BIKE PATH CALCULATIONS

SHEET NO. 9 OF 40 SHEETS
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COMPUTED BY WDB CHECKED BY

NATURE LOOP CONT.

POINT	QUAD	BEAR. ANGLE	DISTANCE	NORTHING	EASTING
INV	SE	69 18 53.6	48.407		
363				922409.441	503403.853
INV	SE	37 34 6.9	9.254		
365				922402.106	503409.496
		98 34 21.5	DELTA		
		24.000	RADIUS		
69		41.290	ARC		
		36.383	CHORD		
		27.889	TANGENT		
PC TO PT THRU 364					
INV	SW	11 43 3.8	36.383		
366				922366.481	503402.107
		43 1 56.0	DELTA		
		49.610	RADIUS		
70		37.260	ARC		
		36.390	CHORD		
		19.558	TANGENT		
PC TO PT THRU 368					
INV	SW	82 31 12.0	36.390		
367				922361.744	503366.026
INV	NW	75 57 49.5	55.309		
370				922375.158	503312.368
		9 34 8.7	DELTA		
		140.000	RADIUS		
71		23.382	ARC		
		23.355	CHORD		
		11.718	TANGENT		
PC TO PT THRU 369					
INV	NW	80 44 53.9	23.355		
371				922378.913	503289.318
INV	NW	85 31 58.2	29.785		
374				922381.233	503259.623
		18 24 48.5	DELTA		
		140.000	RADIUS		
72		44.993	ARC		
		44.799	CHORD		
		22.692	TANGENT		
PC TO PT THRU 372					
INV	NW	76 19 34.0	44.799		
373				922391.823	503216.094
		29 15 35.4	DELTA		
		139.684	RADIUS		
73		71.334	ARC		
		70.561	CHORD		
		36.463	TANGENT		
PC TO PT THRU 376					

PROJECT INDIAN BEND WASH / NATURE AREA
ITEM BIKE PATH CALCULATIONS

SHEET NO. 10 OF 40 SHEETS
DATE SEPT 4, 1980
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REF. DRWG. NO. 6-6

COMPUTED BY WDB CHECKED BY

NATURE LOOP CONT.

POINT	QUAD	BEAR. ANGLE	DISTANCE	NORTHING	EASTING
INV 375	NW	81 44 57.9	70.561	922401.949	503146.263
INV 378	SW	83 37 14.7	2.924	922401.624	503143.357
		12 18 4.6 DELTA			
		140.000 RADIUS			
(82)		30.058 ARC			
		30.000 CHORD			
		15.087 TANGENT			
PC TO PT THRU 377					
INV 392	SW	89 46 17.7	30.000	922401.504	503113.357
		20 48 27.3 DELTA			
		140.000 RADIUS			
(74)		50.843 ARC			
		50.564 CHORD			
		25.704 TANGENT			
PC TO PT THRU 377					
INV 379	NW	73 40 27.4	50.564	922415.717	503064.832
		31 37 43.6 DELTA			
		127.809 RADIUS			
(75)		70.554 ARC			
		69.661 CHORD			
		36.201 TANGENT			
PC TO PT THRU 381					
INV 380	NW	79 5 5.0	69.661	922428.908	502996.431
		28 14 48.2 DELTA			
		135.348 RADIUS			
(76)		66.726 ARC			
		66.053 CHORD			
		34.056 TANGENT			
PC TO PT THRU 383					
INV 382	NW	80 46 32.3	66.053	922439.497	502931.233
INV 386	NW	66 39 8.4	8.130	922442.719	502923.769
		26 55 26.4 DELTA			
		140.000 RADIUS			
(77)		65.788 ARC			
		65.184 CHORD			
		33.513 TANGENT			
PC TO PT THRU 385					
INV 384	NW	80 6 51.6	65.184	922453.910	502859.552
INV 387	SW	86 25 25.2	4.922	922453.602	502854.640
		72 38 1.3 DELTA			
		29.498 RADIUS			
(78)		37.395 ARC			
		34.941 CHORD			
		21.682 TANGENT			
PC TO PT THRU 388					

PROJECT INDIAN BEND WASH / NATURE AREA
ITEM BIKE PATH CALCULATIONS

SHEET NO. 11 OF 40 SHEETS
DATE SEPT 4, 1980
FILE
REF. DRWG. NO. 6-6

COMPUTED BY WDB CHECKED BY

NATURE LOOP CONT.

POINT	QUAD.	BEAR. ANGLE	DISTANCE	NORTHING	EASTING
INV	NW	57 15 32.9	34.941		
264				922472.500	502825.250
INV	NW	44 38 12.9	61.943		
268				922516.577	502781.728
INV	SE	8 54 28.0	118.000		
259				922400.000	502800.000
START					
345				922487.239	503001.113
INV	SW	18 29 42.5	5.304		
389				922482.209	502999.431
		27 57 22.2	DELTA		
		100.433	RADIUS		
	79	49.004	ARC		
		48.519	CHORD		
		25.000	TANGENT		
PC TO PT THRU 391					
INV	SW	4 31 1.4	48.519		
390				922433.840	502995.609
START					
393				922455.910	503121.073
INV	SE	15 47 36.5	5.044		
394				922451.056	503122.446
		47 43 50.4	DELTA		
		56.508	RADIUS		
	80	47.074	ARC		
		45.725	CHORD		
		25.000	TANGENT		
PC TO PT THRU 396					
INV	SW	8 4 18.7	45.725		
395				922405.784	503116.025
INV	SW	31 56 13.9	5.044		
392				922401.504	503113.357
START					
390				922433.840	502995.609
INV	SE	9 27 39.7	5.000		
380				922428.908	502996.431
INV	SE	81 55 3.3	205.611		
291				922400.000	503200.000

COMPUTATION SHEET

PROJECT INDIAN BEND WASH / NATURE AREA
ITEM BIKE PATH CALCULATIONS
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SHEET NO. 12 OF 40 SHEETS
DATE SEPT 4, 1980
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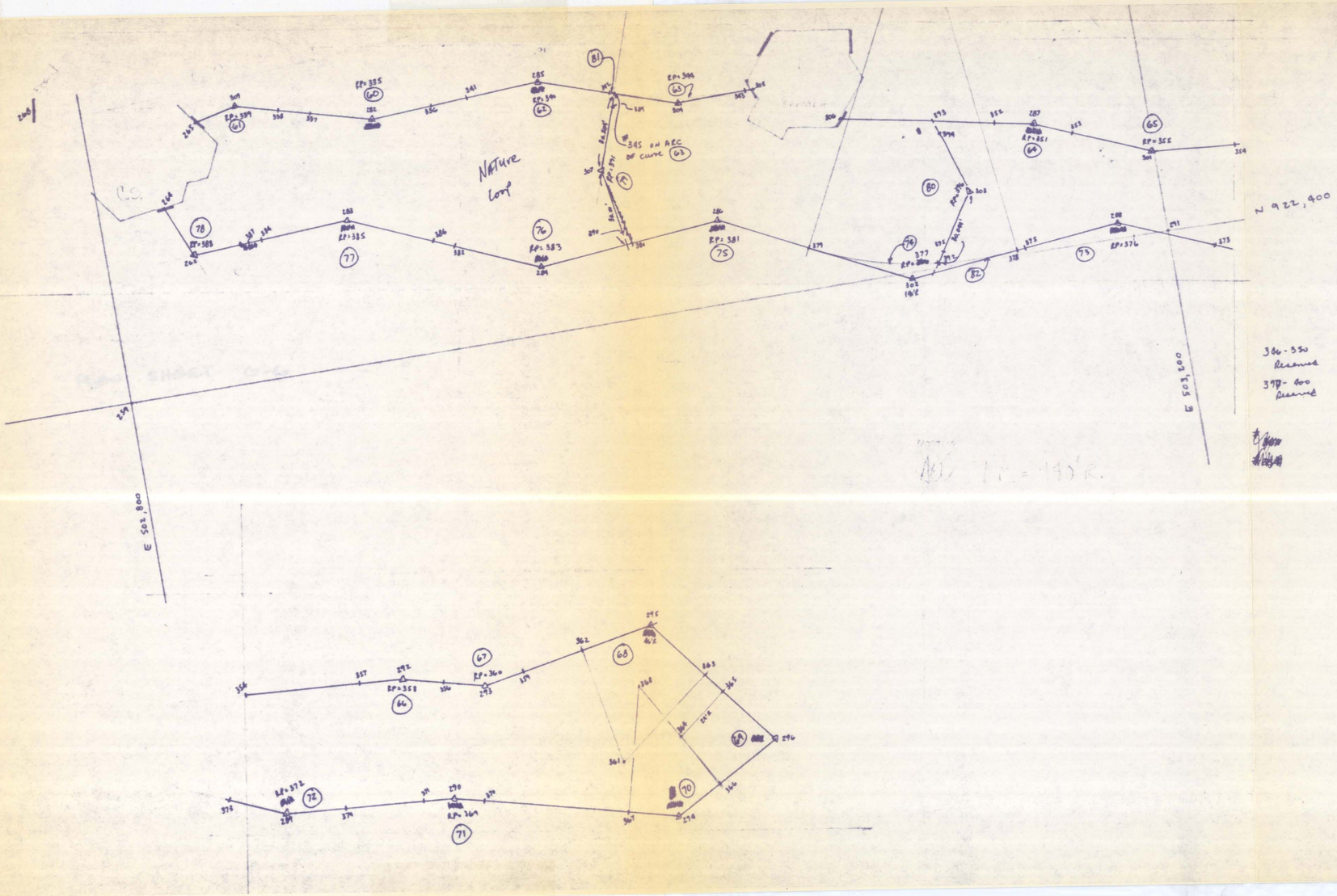
REF. DRWG. NO. G-6

SHEET G-6



SPD FORM 1 OCT 74 284

EDITION OF 15 DEC 59 WILL BE USED UNTIL EXHAUSTED

PROJECT INDIAN BEND WASH/NATURE AREA
ITEM BIKE PATH CALCULATIONS

SHEET NO. 13 OF 40 SHEETS
DATE SEPT 4, 1980
FILE
REF. DRWG. NO. G-3

COMPUTED BY WDB CHECKED BY

NORTH BIKE PATH

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COGO 1

STARTING FILE   10

   POINT  QUAD   BEAR ANGLE   DISTANCE    NORTHING      EASTING

START
      24                                 922556.473  503633.321
INV          NE     8 40 48.0    138.718
     239                                 922693.602  503654.256
INV          SE    72  9 50.1    209.299
     242                                 922629.495  503853.495
                   16 42 44.4 DELTA
                      204.241 RADIUS
                       59.574 ARC
                       59.363 CHORD
                       30.000 TANGENT
PC TO PT THRU 244
INV          SE    80 31 12.3     59.363
     243                                 922619.718  503912.048
INV          SE    88 52 34.4    196.212
     241                                 922615.870  504108.222
INV          SE    74 59 14.1      0.599
     183                                 922615.714  504108.800
                   31 10 44.8 DELTA
                    1126.080 RADIUS
                     612.788 ARC
                     605.255 CHORD
                     314.186 TANGENT
PC TO PT THRU 185
INV          SE    59 23 51.7    605.255
     180                                 922307.594  504629.756
START
     183                                 922615.714  504108.800
                   16 21 31.6 DELTA
                    1126.080 RADIUS
                     321.512 ARC
                     320.422 CHORD
                     161.857 TANGENT
PC TO PT THRU 185
INV          SE    66 48 28.3    320.422
     187                                 922489.527  504403.328
                   14 49 13.1 DELTA
                    1126.080 RADIUS
                     291.275 ARC
                     290.464 CHORD
                     146.455 TANGENT
PC TO PT THRU 185
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50

35 + 36

35

36

PROJECT INDIAN BEND WASH/NATURE AREA
ITEM BIKE PATH CALCULATIONS
SHEET NO. 14 OF 40 SHEETS
DATE SEPT 4, 1980
FILE
COMPUTED BY WDB CHECKED BY
REF. DRWG. NO. G-3

NORTH BIKE PATH CONT.

POINT	QUAD.	BEAR. ANGLE	DISTANCE	NORTHING	EASTING
INV	SE	51 13 5.8	290.464		
180				922307.594	504629.756
INV	SE	45 1 13.9	270.183		
128				922116.614	504820.873
		37 25 0.3	DELTA		
		859.988	RADIUS		
(19)		561.611	ARC		
		551.685	CHORD		
		291.230	TANGENT		
PC TO PT THRU 32					
INV	SE	62 48 30.6	551.684		
96				921864.513	505311.588

SOUTH B. PATH

START					
222				922400.766	503585.020
INV	SE	87 4 22.7	15.000		
27				922400.000	503600.000
		4 2 36.4	DELTA		
		3272.683	RADIUS		
(40)		230.959	ARC		
		230.911	CHORD		
		115.527	TANGENT		
PC TO PT THRU 208					
INV	SE	85 3 4.5	230.911		
207				922380.081	503830.050
INV	SE	83 1 46.3	61.473		
214				922372.620	503891.068
		16 22 32.0	DELTA		
		305.801	RADIUS		
(43)		87.400	ARC		
		87.103	CHORD		
		44.000	TANGENT		
PC TO PT THRU 215					
INV	SE	74 50 30.3	87.103		
212				922349.844	503975.141
		6 1 25.3	DELTA		
		1900.594	RADIUS		
(42)		199.816	ARC		
		199.724	CHORD		
		100.000	TANGENT		
PC TO PT THRU 213					

PROJECT INDIAN BEND WASH / NATURE AREA
ITEM BIKE PATH CALCULATIONS

SHEET NO. 15 OF 40 SHEETS
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COMPUTED BY WDB CHECKED BY

SOUTH BIKE PATH CONT.

POINT	QUAD	BEAR. ANGLE	DISTANCE	NORTHING	EASTING
INV	SE	69 39 57.0	199.724		
209				922280.441	504162.418
		27 48 58.7	DELTA		
		403.835	RADIUS		
(41)		196.056	ARC		
		194.136	CHORD		
		100.000	TANGENT		
PC TO PT THRU 211					
INV	SE	58 46 10.3	194.136		
210				922179.785	504328.422
INV	SE	44 51 40.8	135.677		
177				922083.615	504424.128
INV	SE	44 51 40.8	6.842		
174				922078.765	504428.954
		12 51 31.4	DELTA		
		487.183	RADIUS		
(33)		109.337	ARC		
		109.108	CHORD		
		54.899	TANGENT		
PC TO PT THRU 175					
INV	SE	51 17 26.7	109.108		
170				922010.533	504514.094
		13 37 11.8	DELTA		
		502.431	RADIUS		
(32)		119.434	ARC		
		119.153	CHORD		
		60.000	TANGENT		
PC TO PT THRU 172					
INV	SE	50 54 36.4	119.153		
171				921935.402	504606.576
INV	SE	44 6 0.5	19.000		
127				921921.758	504619.798
		21 48 20.8	DELTA		
		1139.988	RADIUS		
(20)		433.859	ARC		
		431.246	CHORD		
		219.587	TANGENT		
PC TO PT THRU 32					
INV	SE	55 0 10.8	431.246		
130				921674.424	504973.067

PROJECT INDIAN BEND WASH/NATURE AREA
ITEM BIKE PATH CALCULATIONS

SHEET NO. 16 OF 40 SHEETS
DATE SEPT 4, 1980
FILE
REF. DRWG. NO. G-3

COMPUTED BY WDB CHECKED BY

Loop "C"

POINT	QUAD.	BEAR. ANGLE	DISTANCE	NORTHING	EASTING
START					
177				922083.615	504424.128
INV	SW	19 59 50.7	20.379		
178				922064.465	504417.159
		81 42 44.5	DELTA		
		97.700	RADIUS		
34		139.335	ARC		
		127.824	CHORD		
		84.500	TANGENT		
PC TO PT THRU 179					
INV	SE	20 51 31.5	127.824		
166				921945.019	504462.673
		36 31 53.0	DELTA		
		174.214	RADIUS		
31		111.077	ARC		
		109.206	CHORD		
		57.500	TANGENT		
PC TO PT THRU 167					
INV	SE	43 26 57.2	109.206		
162				921865.737	504537.774
		50 43 55.0	DELTA		
		97.024	RADIUS		
30		85.909	ARC		
		83.130	CHORD		
		46.000	TANGENT		
PC TO PT THRU 164					
INV	SE	50 32 58.2	83.130		
163				921812.915	504601.965
INV	SE	75 54 55.7	56.309		
159				921799.212	504656.582
		64 44 5.7	DELTA		
		50.000	RADIUS		
29		56.492	ARC		
		53.535	CHORD		
		31.691	TANGENT		
PC TO PT THRU 158					
INV	SE	43 32 52.8	53.535		
160				921760.410	504693.465
INV	SE	11 10 49.9	6.105		
155				921754.422	504694.649
		44 41 1.0	DELTA		
		65.976	RADIUS		
28		51.453	ARC		
		50.159	CHORD		
		27.115	TANGENT		
PC TO PT THRU 156					

PROJECT INDIAN BEND WASH / NATURE AREA
ITEM BIKE PATH CALCULATIONS

SHEET NO. 17 OF 40 SHEETS
DATE SEPT 4, 1980
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COMPUTED BY WDB CHECKED BY

Loop "C" cont.

POINT	QUAD.	BEAR. ANGLE	DISTANCE	NORTHING	EASTING
INV	SE	33 31 20.5	50.159		
140				921712.605	504722.350
		34 51 12.8	DELTA		
		250.000	RADIUS		
25		152.078	ARC		
		149.744	CHORD		
		78.474	TANGENT		
PC TO PT THRU 141					
INV	SE	73 17 27.3	149.744		
139				921669.552	504865.771
INV	NE	89 16 56.2	4.950		
137				921669.614	504870.720
		30 57 24.1	DELTA		
		40.000	RADIUS		
24		21.612	ARC		
		21.350	CHORD		
		11.077	TANGENT		
PC TO PT THRU 136					
INV	SE	75 14 21.8	21.350		
138				921664.175	504891.365
INV	SE	59 45 39.8	35.423		
133				921646.335	504921.968
		90 0 0.0	DELTA		
		30.000	RADIUS		
22		47.124	ARC		
		42.426	CHORD		
		30.000	TANGENT		
PC TO PT THRU 135					
INV	NE	75 14 20.2	42.426		
134				921657.145	504962.995
INV	NE	30 14 20.2	20.000		
130				921674.424	504973.067

PROJECT INDIAN BEND WASH/NATURE AREA
ITEM BIKE PATH CALCULATIONS
COMPUTED BY WOB CHECKED BY

SHEET NO. 18 OF 40 SHEETS
DATE SEPT 4, 1980
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REF. DRWG. NO. 6-3

LOOP "D"

POINT	QUAD.	BEAR. ANGLE	DISTANCE	NORTHING	EASTING
START					
187				922489.527	504403.328
INV	SE	24 53 20.1	129.707		
191				922371.867	504457.917
		62 44 52.7 DELTA			
		30.000 RADIUS			
		32.855 ARC			
	(31)	31.237 CHORD			
		18.293 TANGENT			
PC TO PT THRU 190					
INV	SW	6 29 6.2	31.237		
192				922340.830	504454.389
INV	SW	37 51 32.6	89.233		
194				922270.378	504399.624
		57 32 37.2 DELTA			
		30.000 RADIUS			
		30.130 ARC			
	(38)	28.879 CHORD			
		16.473 TANGENT			
PC TO PT THRU 193					
INV	SW	9 5 14.0	28.879		
195				922241.861	504395.063
INV	SE	19 41 4.6	104.794		
202				922143.191	504430.362
		39 40 55.3 DELTA			
		63.000 RADIUS			
		43.633 ARC			
	(39)	42.766 CHORD			
		22.732 TANGENT			
PC TO PT THRU 201					
INV	SW	0 9 23.1	42.766		
203				922100.425	504430.246
INV	SW	19 59 50.7	17.889		
177				922083.615	504424.128

PROJECT INDIAN BEND WASH / NATURE AREA
ITEM BIKE PATH CALCULATIONS

SHEET NO. 19 OF 40 SHEETS
DATE SEPT 4, 1980
FILE
REF. DRWG. NO. G-3

COMPUTED BY WDB CHECKED BY

LOOP "E"

POINT	QUAD	BEAR. ANGLE	DISTANCE	NORTHING	EASTING
START					
222				922400.766	503585.020
		25 58 29.6	DELTA		
		191.291	RADIUS		
(44)		86.721	ARC		
		85.980	CHORD		
		44.119	TANGENT		
PC TO PT THRU 224					
INV	SE	35 38 21.1	85.980		
223				922330.890	503635.119
INV	SE	48 37 35.7	9.381		
226				922324.689	503642.158
		78 16 2.1	DELTA		
		93.406	RADIUS		
(45)		127.594	ARC		
		117.903	CHORD		
		76.000	TANGENT		
PC TO PT THRU 225					
INV	SE	87 45 36.7	117.903		
227				922320.081	503759.971
		55 26 18.2	DELTA		
		64.708	RADIUS		
(46)		62.610	ARC		
		60.196	CHORD		
		34.000	TANGENT		
PC TO PT THRU 229					
INV	NE	80 49 31.4	60.196		
228				922329.679	503819.397
INV	SE	71 27 19.5	4.500		
237				922328.248	503823.663
		38 9 55.4	DELTA		
		112.735	RADIUS		
(49)		75.094	ARC		
		73.714	CHORD		
		39.000	TANGENT		
PC TO PT THRU 238					
INV	NE	89 27 42.8	73.714		
235				922328.940	503897.374
		65 44 10.4	DELTA		
		54.168	RADIUS		
(48)		62.147	ARC		
		58.795	CHORD		
		35.000	TANGENT		
PC TO PT THRU 234					

PROJECT INDIAN BEND WASH / NATURE AREA
ITEM BIKE PATH CALCULATIONS

SHEET NO. 20 OF 40 SHEETS
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COMPUTED BY WDB CHECKED BY

LOOP "E" CONT.

POINT	QUAD.	BEAR. ANGLE	DISTANCE	NORTHING	EASTING
INV 236	SE	76 45 9.8	58.795	922315.467	503954.604
INV 233	SE	43 53 4.6	10.863	922307.637	503962.134
		90 36 16.6 DELTA			
		60.000 RADIUS			
	47	94.881 ARC			
		85.299 CHORD			
		60.637 TANGENT			
PC TO PT THRU 231					
INV 232	SE	89 11 12.9	85.299	922306.427	504047.425
INV 230	NE	45 30 38.9	14.363	922316.493	504057.672
INV 204	SE	55 35 56.3	11.205	922310.216	504066.954
INV 209	SE	72 40 39.7	100.000	922280.441	504162.418

PROJECT INDIAN BEND WASH / NATURE AREA
ITEM BIKE PATH CALCULATIONS

COMPUTED BY WDB CHECKED BY

SHEET NO. 21 OF 40 SHEETS
DATE SEPT 4, 1980
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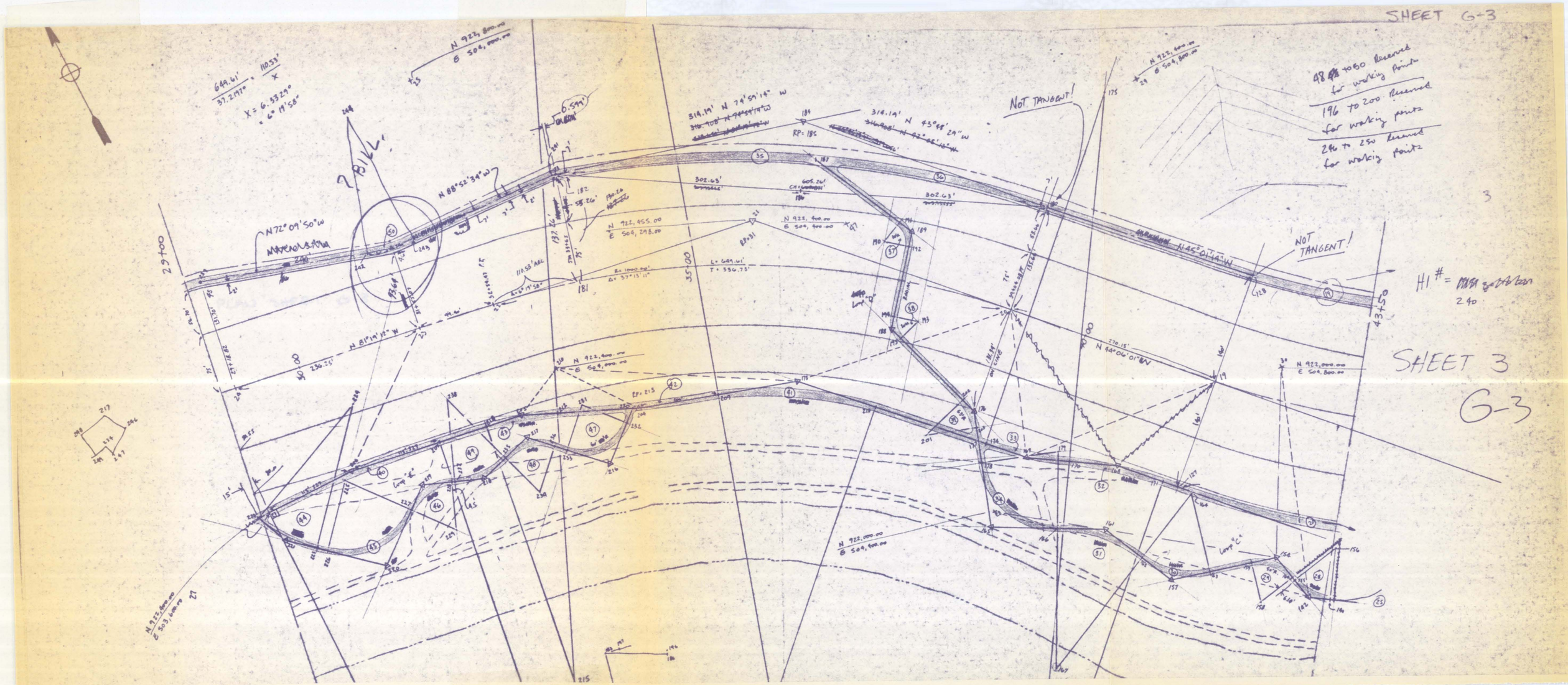

SPD FORM 1 OCT 74 284

EDITION OF 15 DEC 59 WILL BE USED UNTIL EXHAUSTED

PROJECT INDIAN BEND WASH/NATURE AREA
ITEM BIKE PATH CALCULATIONS
COMPUTED BY WDB CHECKED BY

SHEET NO. 22 OF 40 SHEETS
DATE SEPT 4, 1980
FILE
REF. DRWG. NO. G-4

```
COGO 1

STARTING FILE   10          NORTH B. PATH

   POINT  QUAD   BEAR ANGLE   DISTANCE    NORTHING      EASTING

START
     128                                 922116.614   504820.873
                 37 25  0.3 DELTA
                 859.988 RADIUS
                 561.611 ARC
                 551.685 CHORD
                 291.230 TANGENT
PC TO PT THRU 32 ·
INV          SE    62 48 30.6    551.684
      96                                 921864.513   505311.588
INV          SE    81 27  4.5    692.072
     105                                 921761.636   505995.970
INV          SE    81 27  4.5    356.500
      72                                 921708.642   506348.509


START                SOUTH B. PATH
     130                                 921674.424   504973.067
                 15 36 39.5 DELTA
                 1139.988 RADIUS
                 310.604 ARC
                 309.644 CHORD
                 156.270 TANGENT
PC TO PT THRU 32
INV          SE    73 42 41.1    309.644
      95                                 921587.576   505270.283
                 16 47 31.2 DELTA
                 365.864 RADIUS
                 107.226 ARC
                 106.843 CHORD
                  54.000 TANGENT
PC TO PT THRU 104
INV          SE    73  7 15.2    106.843
     101                                 921556.554   505372.522
                 23 44  2.2 DELTA
                 189.658 RADIUS
                  78.563 ARC
                  78.003 CHORD
                  39.853 TANGENT
PC TO PT THRU 103
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19

21

13

12

COMPUTATION SHEET

PROJECT INDIAN BEND WASH / NATURE AREA
ITEM BIKE PATH CALCULATIONS

SHEET NO. 23 OF 40 SHEETS
DATE SEPT 4, 1980
FILE
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COMPUTED BY WDB CHECKED BY

SOUTH BIKE PATH CONT.

POINT	QUAD.	BEAR. ANGLE	DISTANCE	NORTHING	EASTING
INV 102	SE	76 35 30.6	78.003	921538.466	505448.399
INV 93	SE	88 27 31.8	77.106	921536.393	505525.477
		21 23 57.4 DELTA			
		307.184 RADIUS			
		114.729 ARC			
	(11)	114.064 CHORD			
		58.041 TANGENT			
PC TO PT THRU 94					
INV 91	SE	77 45 33.2	114.064	921512.209	505636.947
		15 14 23.0 DELTA			
		250.000 RADIUS			
	(10)	66.496 ARC			
		66.300 CHORD			
		33.445 TANGENT			
PC TO PT THRU 90					
INV 114	SE	74 40 45.5	66.300	921494.691	505700.891
		14 19 12.3 DELTA			
		250.000 RADIUS			
	(23)	62.483 ARC			
		62.321 CHORD			
		31.405 TANGENT			
PC TO PT THRU 90					
INV 88	SE	89 27 33.1	62.321	921494.103	505763.209
		22 5 45.6 DELTA			
		572.000 RADIUS			
	(9)	220.591 ARC			
		219.226 CHORD			
		111.683 TANGENT			
PC TO PT THRU 87					
INV 89	SE	85 34 16.5	219.226	921477.174	505981.781
INV 110	SE	74 31 23.7	72.176	921457.914	506051.339
		17 22 52.3 DELTA			
		399.998 RADIUS			
	(14)	121.343 ARC			
		120.878 CHORD			
		61.141 TANGENT			
PC TO PT THRU 112					
INV 111	SE	83 12 49.9	120.878	921443.631	506171.371
INV 109	NE	88 5 44.0	62.248	921445.699	506233.585
INV 108	SE	81 31 0.7	18.000	921443.044	506251.388
INV 77	SE	81 31 0.7	56.878	921434.653	506307.644

COMPUTATION SHEET

PROJECT INDIAN BEND WASH / NATURE AREA
ITEM BIKE PATH CALCULATIONS

SHEET NO. 24 OF 40 SHEETS
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COMPUTED BY WDB CHECKED BY

Loop "A"

POINT	QUAD.	BEAR. ANGLE	DISTANCE	NORTHING	EASTING
START					
105				921761.636	505995.970
INV	SE	56 53 2.5	150.753		
144				921679.274	506122.235
		65 22 1.5	DELTA		
		30.000	RADIUS		
	26	34.226	ARC		
		32.400	CHORD		
		19.247	TANGENT		
PC TO PT THRU 143					
INV	SE	24 12 1.8	32.400		
145				921649.722	506135.517
INV	SW	8 28 59.0	90.882		
153				921559.834	506122.110
		61 33 47.6	DELTA		
		30.000	RADIUS		
	27	32.234	ARC		
		30.706	CHORD		
		17.871	TANGENT		
PC TO PT THRU 151					
INV	SE	22 17 54.8	30.706		
152				921531.424	506133.761
INV	SE	53 4 48.6	147.129		
108				921443.044	506251.388

COMPUTATION SHEET

PROJECT INDIAN BEND WASH/ NATURE AREA

ITEM BIKE PATH CALCULATIONS

COMPUTED BY WDB CHECKED BY

SHEET NO. 25 OF 40 SHEETS

DATE SEPT 4, 1980

FILE

REF. DRWG. NO. G-4

LOOP "B"

POINT	QUAD	BEAR. ANGLE	DISTANCE	NORTHING	EASTING
START					
114				921494.691	505700.891
		65 3 3.9	DELTA		
		84.680	RADIUS		
		96.142	ARC		
		91.060	CHORD		
		54.000	TANGENT		
PC TO PT THRU 117					
INV	SE	52 38 34.0	91.060		
116				921439.437	505773.272
INV	SE	85 10 5.9	110.011		
125				921430.171	505882.892
		15 56 6.5	DELTA		
		300.000	RADIUS		
		83.436	ARC		
		83.168	CHORD		
		41.989	TANGENT		
PC TO PT THRU 124					
INV	SE	77 12 2.7	83.168		
126				921411.746	505963.993
INV	SE	69 13 59.4	44.214		
122				921396.070	506005.334
		27 16 47.5	DELTA		
		395.610	RADIUS		
		188.359	ARC		
		186.585	CHORD		
		96.000	TANGENT		
PC TO PT THRU 123					
INV	SE	82 52 23.2	186.585		
120				921372.920	506190.478
		85 1 4.8	DELTA		
		68.731	RADIUS		
		101.986	ARC		
		92.884	CHORD		
		63.000	TANGENT		
PC TO PT THRU 121					
INV	NE	40 58 40.7	92.884		
108				921443.044	506251.388

COMPUTATION SHEET

PROJECT INDIAN BEND WASH / NATURE AREA

ITEM BIKE PATH CALCULATIONS

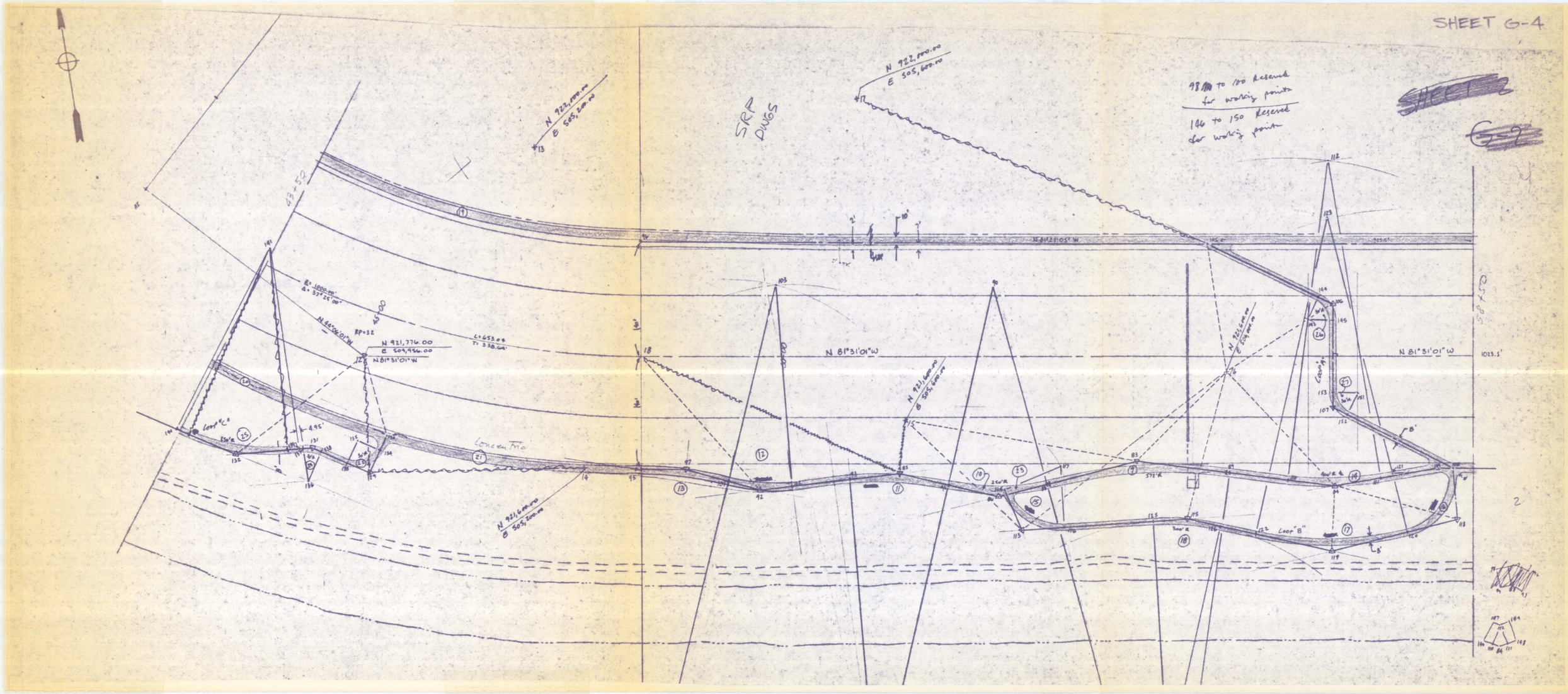
COMPUTED BY WDB CHECKED BY

SHEET NO. 26 OF 40 SHEETS

DATE SEPT 4, 1980

FILE

REF. DRWG. NO. G-4



SPD FORM 1 OCT 74 284

EDITION OF 15 DEC 59 WILL BE USED UNTIL EXHAUSTED

COMPUTATION SHEET

PROJECT INDIAN BEND WASH / NATURE AREA
ITEM BIKE PATH CALCULATIONS

SHEET NO. 27 OF 40 SHEETS
DATE SEPT 4, 1980
FILE
REF. DRWG. NO. G-5

COMPUTED BY WDB CHECKED BY

NORTH BIKE PATH

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COGO 1

STARTING FILE   10

   POINT  QUAD   BEAR ANGLE   DISTANCE    NORTHING      EASTING

START
      34                                 921571.361   506328.034
INV         NE     8 28 59.2    138.799
      72                                 921708.642   506348.509
                  26 12 29.0 DELTA
                  438.780 RADIUS
                  200.705 ARC
                  198.960 CHORD
                  102.140 TANGENT
PC TO PT THRU 33
INV         SE    68 24 46.3    198.960
      71                                 921635.441   506533.514
INV         SE    55 18 31.8    160.947
      64                                 921543.838   506665.850
                  20  5 49.6 DELTA
                  157.820 RADIUS
                   55.357 ARC
                   55.074 CHORD
                   27.966 TANGENT
PC TO PT THRU 69
INV         SE    65 21 26.8     55.074
      60                                 921520.874   506715.908
INV         SE    75 24 21.3      9.275
      70                                 921518.537   506724.883
INV         SW    11 42 22.9    138.799
      38                                 921382.625   506696.721
INV         NE    11 42 22.9    138.799
      70                                 921518.537   506724.883
INV         SE    75 24 21.3    949.570
      67                                 921279.275   507643.816
                  81 14 49.6 DELTA
                   40.000 RADIUS
                   56.721 ARC
                   52.087 CHORD
                   34.313 TANGENT
PC TO PT THRU 65
INV         SE    34 47 32.2     52.087
      66                                 921236.500   507673.537
INV         SW     5 49 19.4     20.673
      62                                 921215.933   507671.440
                  84  6 56.6 DELTA
                   16.203 RADIUS
                   23.788 ARC
                   21.708 CHORD
                   14.619 TANGENT
PC TO PT THRU 63
```

SPD FORM 1 OCT 74 284 EDITION OF 15 DEC 59 WILL BE USED UNTIL EXHAUSTED

COMPUTATION SHEET

PROJECT INDIAN BEND WASH / NATURE AREA
ITEM BIKE PATH CALCULATIONS

SHEET NO. 28 OF 40 SHEETS
DATE SEPT 4, 1980
FILE
REF. DRWG. NO. G-5

COMPUTED BY WDB CHECKED BY

NORTH BIKE PATH cont.

POINT	QUAD.	BEAR. ANGLE	DISTANCE	NORTHING	EASTING
INV 57	SE	36 14 9.9	21.708	921198.424	507684.272
		15 33 3.1 DELTA			
		119.966 RADIUS			
	(2)	32.560 ARC			
		32.461 CHORD			
		16.381 TANGENT			
PC TO PT THRU 40					
INV 52	SE	70 31 5.5	32.461	921187.598	507714.874
INV 41	SW	27 15 26.0	20.000	921169.818	507705.714
INV 52	NE	27 15 26.0	20.000	921187.598	507714.874
INV 54	SE	62 44 34.0	76.396	921152.609	507782.787
		27 28 8.1 DELTA			
		175.000 RADIUS			
	(1)	83.899 ARC			
		83.098 CHORD			
		42.772 TANGENT			
PC TO PT THRU 56					
INV 55	SE	76 28 50.2	83.098	921133.183	507863.582

COMPUTATION SHEET

PROJECT INDIAN BEND WASH/ NATURE AREA
ITEM BIKE PATH CALCULATIONS

SHEET NO. 29 OF 40 SHEETS
DATE SEPT 4, 1980
FILE
REF. DRWG. NO. G-5

COMPUTED BY WDB CHECKED BY

SOUTH BIKE PATH

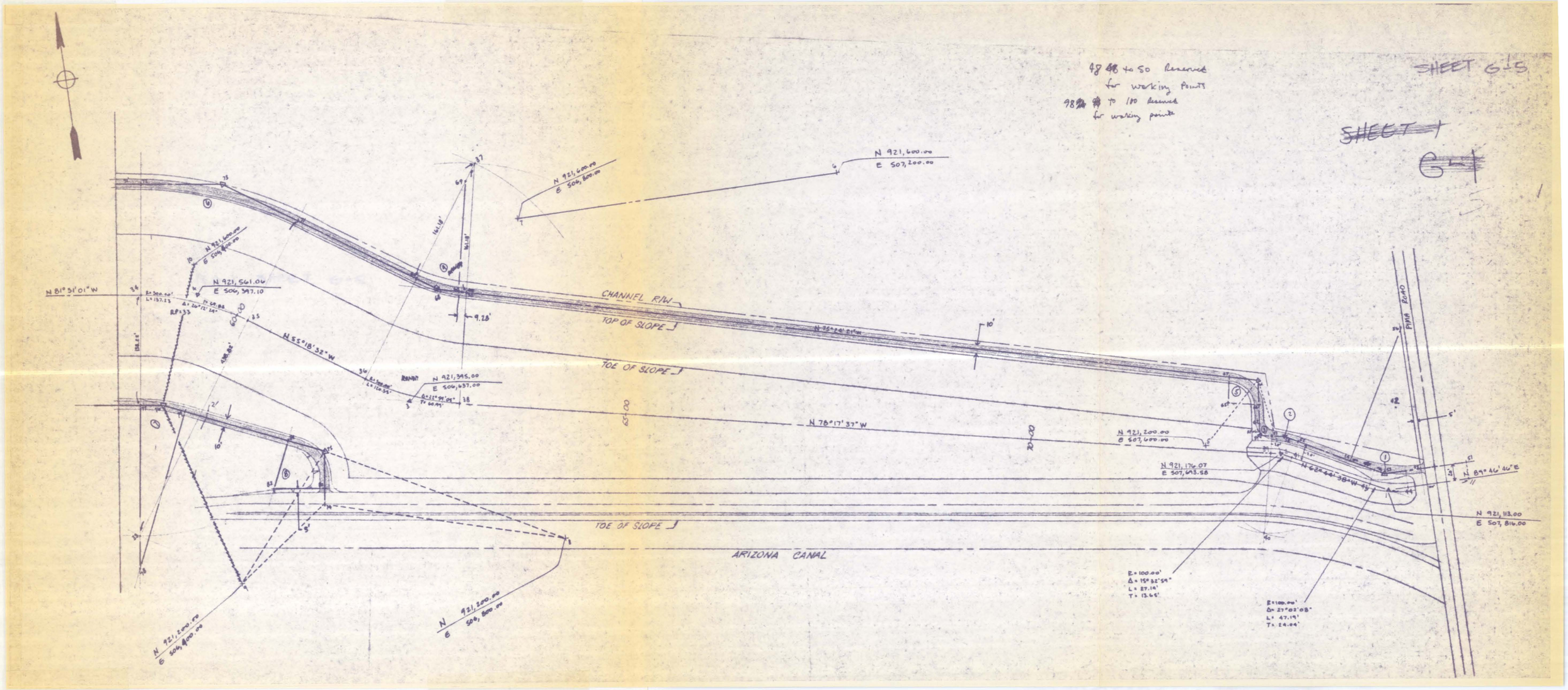
POINT	QUAD	BEAR. ANGLE	DISTANCE	NORTHING	EASTING
START					
108				921443.044	506251.388
INV	SE	81 31 0.7	56.878		
77				921434.653	506307.644
		14 29 13.9	DELTA		
		192.443	RADIUS		
	7	48.659	ARC		
		48.530	CHORD		
		24.460	TANGENT		
PC TO PT THRU 78					
INV	SE	74 16 23.8	48.530		
79				921421.500	506354.357
INV	SE	67 1 46.9	137.245		
81				921367.939	506480.719
		75 31 18.6	DELTA		
		59.305	RADIUS		
	8	78.170	ARC		
		72.633	CHORD		
		45.937	TANGENT		
PC TO PT THRU 82					
INV	SE	29 16 7.3	72.633		
80				921304.579	506516.230
INV	SW	8 29 31.7	20.000		
74				921284.798	506513.277
INV	NE	61 55 47.6	207.900		
38				921382.625	506696.721
INV	NW	66 48 4.4	119.534		
36				921429.713	506586.852
INV	SW	26 55 3.4	162.523		
74				921284.798	506513.277

COMPUTATION SHEET

PROJECT INDIAN BEND WASH / NATURE AREA
ITEM BIKE PATH CALCULATIONS

COMPUTED BY WDB CHECKED BY

SHEET NO. 30 OF 40 SHEETS
DATE SEPT 4, 1980
FILE
REF. DRWG. NO. G-5



SPD FORM 1 OCT 74 284 EDITION OF 15 DEC 59 WILL BE USED UNTIL EXHAUSTED

COMPUTATION SHEET

PROJECT INDIAN BEND WASH / NATURE AREA
SHEET NO. 31 OF 40 SHEETS
ITEM BIKE PATH CALCULATIONS
DATE SEPT 4, 1980
COORDINATE LIST
FILE
COMPUTED BY WDB CHECKED BY
REF. DRWG. NO.

POINT	NORTHING	EASTING
1	921113.000	507816.000
2	921176.070	507693.580
3	921395.000	506637.000
4	921561.060	506397.100
5	921200.000	507600.000
6	921600.000	507200.000
7	921600.000	506800.000
8	921200.000	506800.000
9	921200.000	506400.000
10	921600.000	506400.000
11	921113.477	507940.039
12	921776.000	504956.000
13	922000.000	505200.000
14	921600.000	505200.000
15	921600.000	505600.000
16	921600.000	506000.000
17	922000.000	505600.000
18	921726.044	505290.935
19	922019.186	504720.335
20	922213.186	504532.335
21	922455.000	504298.000
22	922505.818	503965.127
23	922520.819	503866.865
24	922556.473	503633.321
25	922800.000	504000.000
26	922400.000	504000.000
27	922400.000	503600.000
28	922000.000	504400.000
29	922400.000	504800.000
30	922000.000	504800.000
31	921517.271	503814.211
32	922715.092	505438.451
33	921274.662	506283.781
34	921571.361	506328.034
35	921521.316	506454.516
36	921429.713	506586.852
37	921676.365	506757.586
38	921382.625	506696.721
39	921178.840	507680.214
40	921080.953	507659.931
41	921169.818	507705.714
42	921211.418	507839.661

COMPUTATION SHEET

PROJECT INDIAN BEND WASH / NATURE AREA
ITEM BIKE PATH CALCULATIONS
COORDINATE LIST
COMPUTED BY WDB CHECKED BY

SHEET NO. 32 OF 40 SHEETS
DATE SEPT 4, 1980
FILE
REF. DRWG. NO.

POINT	NORTHING	EASTING
43	921124.010	507794.629
44	921113.093	507840.040
45	922686.664	503653.197
46	922613.386	503880.997
47	922400.000	504400.000
51	921133.477	507939.962
52	921187.598	507714.874
53	921133.019	507820.813
54	921152.609	507782.787
55	921133.183	507863.582
56	921308.182	507862.925
57	921198.424	507684.272
58	921195.100	507700.312
59	921201.390	507669.957
60	921520.874	506715.908
61	921270.630	507677.017
62	921215.933	507671.440
63	921214.290	507687.559
64	921543.838	506665.850
65	921240.564	507633.744
66	921236.500	507673.537
67	921279.275	507643.816
68	921527.921	506688.844
69	921673.602	506755.673
70	921518.537	506724.883
71	921635.441	506533.514
72	921708.642	506348.509
73	921693.574	506449.532
74	921284.798	506513.277
75	921350.012	506523.014
76	921431.045	506331.836
77	921434.653	506307.644
78	921244.316	506279.255
79	921421.500	506354.357
80	921304.579	506516.230
81	921367.939	506480.719
82	921313.336	506457.575
83	921506.976	505874.148
84	921441.599	506110.264

COMPUTATION SHEET

PROJECT INDIAN BEND WASH / NATURE AREA

ITEM BIKE PATH CALCULATIONS

COORDINATE LIST

COMPUTED BY WDB CHECKED BY

SHEET NO. 33 OF 40 SHEETS

DATE SEPT 4, 1980

FILE

REF. DRWG. NO.

POINT	NORTHING	EASTING
85	921534.832	505583.497
86	921486.499	505697.690
87	920925.915	505829.144
88	921494.103	505763.209
89	921477.174	505981.781
90	921742.436	505734.391
91	921512.209	505636.947
92	921539.538	505408.560
93	921536.393	505525.477
94	921229.320	505517.215
95	921587.576	505270.283
96	921864.513	505311.588
97	921579.610	505323.692
101	921556.554	505372.522
102	921538.466	505448.399
103	921728.056	505453.500
104	921225.715	505216.311
105	921761.636	505995.970
106	921668.759	506138.356
107	921542.159	506119.474
108	921443.044	506251.388
109	921445.699	506233.585
110	921457.914	506051.339
111	921443.631	506171.371
112	921843.408	506158.078
113	921443.985	505719.464
114	921494.691	505700.891
115	921426.634	505924.732
116	921439.437	505773.272
117	921523.816	505780.405
118	921380.066	506253.071
119	921362.031	506095.097
120	921372.920	506190.478
121	921441.208	506182.682
122	921396.070	506005.334
123	921765.977	506145.604
124	921131.237	505857.623
125	921430.171	505882.892
126	921411.746	505963.993

COMPUTATION SHEET

PROJECT INDIAN BEND WASH / NATURE AREA

ITEM BIKE PATH CALCULATIONS

COORDINATE LIST

COMPUTED BY WOB CHECKED BY

SHEET NO. 34 OF 40 SHEETS

DATE SEPT 4, 1980

FILE

REF. DRWG. NO.

POINT	NORTH	EAST
127	921921.758	504619.798
128	922116.614	504820.873
129	921631.227	504947.886
130	921674.424	504973.067
131	921669.753	504881.796
132	921668.569	504787.303
133	921646.335	504921.969
134	921657.145	504962.995
135	921672.253	504937.077
136	921629.618	504871.221
137	921669.614	504870.720
138	921664.175	504891.365
139	921669.552	504865.771
140	921712.605	504722.350
141	921919.533	504862.639
142	921727.821	504699.906
143	921654.147	506105.845
144	921679.274	506122.235
145	921649.722	506135.517
151	921555.409	506151.782
152	921531.424	506133.761
153	921559.834	506122.110
154	921791.500	504687.320
155	921754.422	504694.649
156	921767.215	504759.373
157	921824.109	504557.348
158	921750.715	504644.414
159	921799.212	504656.582
160	921760.410	504693.465
161	921917.772	504513.307
162	921865.737	504537.774
163	921812.915	504601.965
164	921907.023	504625.577
165	921985.060	504388.262
166	921945.019	504462.673
167	921791.606	504380.120
168	921978.490	504564.821
169	922039.852	504467.679
170	922010.533	504514.094

COMPUTATION SHEET

PROJECT INDIAN BEND WASH/ NATURE AREA
ITEM BIKE PATH CALCULATIONS
COORDINATE LIST

SHEET NO. 35 OF 40 SHEETS
DATE SEPT 4, 1980
FILE
REF. DRWG. NO.

COMPUTED BY WDB CHECKED BY

POINT	NORTHING	EASTING
171	921935.402	504606.576
172	921585.753	504245.767
173	922250.667	504257.883
174	922078.765	504428.954
175	922422.421	504774.277
176	922121.787	504438.020
177	922083.615	504424.128
178	922064.465	504417.159
179	922031.054	504508.969
180	922307.594	504629.756
181	922483.139	504073.245
182	922608.953	504106.987
183	922615.714	504108.800
184	922534.330	504412.262
185	921528.070	503817.107
186	922461.654	504369.278
187	922489.527	504403.328
188	922257.372	504389.514
189	922355.273	504465.616
190	922359.241	504430.703
191	922371.867	504457.917
192	922340.830	504454.389
193	922251.966	504423.310
194	922270.378	504399.624
195	922241.861	504395.063
201	922121.970	504371.044
202	922143.191	504430.362
203	922100.425	504430.246
204	922310.216	504066.954
205	922367.281	503934.743
206	922394.101	503715.377
207	922380.081	503830.050
208	919131.587	503432.884
209	922280.441	504162.418
210	922179.785	504328.422
211	921894.922	504042.178
212	922349.844	503975.141
213	924094.833	504728.314
214	922372.620	503891.068

COMPUTATION SHEET

PROJECT INDIAN BEND WASH / NATURE AREA
SHEET NO. 36 OF 40 SHEETS
ITEM BIKE PATH CALCULATIONS
DATE SEPT 4, 1980
COORDINATE LIST
FILE
COMPUTED BY WDB CHECKED BY
REF. DRWG. NO.

POINT	NORTHING	EASTING
215	922069.079	503853.957
216	922263.934	504004.168
217	922340.693	503930.342
218	922315.844	503860.638
219	922340.493	503787.162
220	922274.456	503699.190
221	922360.051	503602.011
222	922400.766	503585.020
223	922330.890	503635.119
224	922474.437	503761.555
225	922394.782	503703.896
226	922324.689	503642.158
227	922320.081	503759.971
228	922329.679	503819.397
229	922268.331	503798.817
230	922316.493	504057.672
231	922349.230	504005.379
232	922306.427	504047.425
233	922307.637	503962.134
234	922277.918	503915.563
235	922328.940	503897.374
236	922315.467	503954.604
237	922328.248	503823.663
238	922435.130	503859.518
239	922693.602	503654.256
240	922620.306	503882.053
241	922615.870	504108.222
242	922629.495	503853.495
243	922619.718	503912.048
244	922823.919	503916.053
245	922583.150	503458.576
246	922755.503	502329.606
251	922445.436	503437.552
252	922403.319	503535.085
253	922441.094	503465.994
254	922427.305	503491.214
255	922619.319	503596.194
256	922284.182	503412.963
257	922614.537	502308.085

COMPUTATION SHEET

PROJECT INDIAN BEND WASH /NATURE AREA
ITEM BIKE PATH CALCULATIONS
COORDINATE LIST
COMPUTED BY WDB CHECKED BY

SHEET NO. 37 OF 40 SHEETS
DATE SEPT 4, 1980
FILE
REF. DRWG. NO.

POINT	NORTHING	EASTING
258	922896.470	502351.127
259	922400.000	502800.000
260	922400.000	502400.000
261	922800.000	502400.000
262	922445.431	503437.580
263	922452.250	502833.000
264	922472.500	502825.250
265	922502.500	502842.500
266	922803.244	502949.968
267	922524.800	502907.460
268	922516.577	502781.728
269	922599.730	502406.983
270	922881.088	502449.936
271	922686.837	502779.395
272	922617.639	502768.831
273	922756.035	502789.959
274	922785.765	502595.215
275	922644.803	502590.892
276	922814.435	502606.206
277	922784.779	502601.679
278	922789.352	502589.748
279	922614.248	502592.251
280	922643.905	502596.778
281	922643.386	502585.109
282	922492.750	502908.500
283	922456.000	502893.000
284	922426.000	502962.500
285	922496.750	502973.500
286	922432.000	503032.500
287	922448.750	503157.500
288	922406.000	503182.500
289	922383.000	503237.000
290	922378.000	503301.000
291	922400.000	503200.000
292	922427.000	503289.500
293	922419.000	503320.000
294	922357.000	503385.000
295	922432.000	503386.500
296	922380.000	503426.500

COMPUTATION SHEET

PROJECT INDIAN BEND WASH / NATURE AREA
ITEM BIKE PATH CALCULATIONS
COORDINATE LIST

SHEET NO. 38 OF 40 SHEETS
DATE SEPT 4, 1980
FILE
REF. DRWG. NO.

COMPUTED BY WDB CHECKED BY

POINT	NORTHING	EASTING
301	922431.000	503199.000
302	922397.000	503102.000
303	922427.000	503129.250
304	922479.000	503025.000
305	922480.000	503054.500
306	922463.000	503085.000
307	922458.500	502991.500
308	922818.881	501914.466
309	922506.500	502858.500
310	922961.093	501936.177
311	922676.668	501892.755
312	922028.043	501793.733
313	922716.414	501386.123
314	922813.904	501328.395
315	922819.927	501324.828
316	922621.505	501442.322
317	922615.481	501445.889
318	922646.075	501669.322
319	922890.510	501630.502
320	922598.635	501187.218
321	922445.781	500929.079
322	922128.356	501806.489
323	923013.106	501602.195
324	921882.231	501773.911
325	922711.432	501660.373
326	922511.355	501295.400
327	922735.421	501162.509
328	922661.297	501578.180
329	922564.311	501602.546
330	922455.896	501425.035
331	922603.027	501330.285
332	922578.389	501503.542
333	922499.202	501492.282
334	922644.922	501513.003
335	922633.917	502923.156
336	922494.181	502931.756
337	922498.928	502886.034
338	922502.127	502874.402
339	922441.540	502857.740
340	922355.301	502954.255
341	922495.037	502945.656
342	922487.660	502999.874

COMPUTATION SHEET

PROJECT INDIAN BEND WASH/NATIVE AREA
ITEM BIKE PATH CALCULATIONS
COORDINATE LIST

SHEET NO. 39 OF 40 SHEETS
DATE SEPT 4, 1980
FILE
REF. DRWG. NO.

COMPUTED BY WDB CHECKED BY

POINT	NORTHING	EASTING
343	922479.900	503051.561
344	922623.501	503046.693
345	922487.239	503001.113
351	922314.225	503116.016
352	922451.597	503143.017
353	922442.945	503171.071
354	922429.659	503229.346
355	922596.428	503236.717
356	922423.000	503304.750
357	922427.696	503273.749
358	922279.907	503267.217
359	922422.025	503335.473
360	922489.697	503322.244
361	922381.394	503367.393
362	922426.539	503358.567
363	922409.441	503403.853
364	922387.473	503390.473
365	922402.106	503409.496
366	922366.481	503402.107
367	922361.744	503366.026
368	922409.873	503378.058
369	922239.338	503278.413
370	922375.158	503312.368
371	922378.913	503289.318
372	922520.807	503270.527
373	922391.823	503216.094
374	922381.233	503259.623
375	922401.949	503146.263
376	922263.130	503161.783
377	922540.757	503127.802
378	922401.624	503143.357
379	922415.717	503064.832
380	922428.908	502996.431
381	922301.566	503007.346
382	922439.497	502931.233
383	922563.762	502984.872
384	922453.910	502859.552
385	922314.182	502868.285
386	922442.719	502923.769

COMPUTATION SHEET

PROJECT INDIAN BEND WASH/NATURE AREA
ITEM BIKE PATH CALCULATIONS
COORDINATE LIST
COMPUTED BY WDB CHECKED BY

SHEET NO. 40 OF 40 SHEETS
DATE SEPT 4, 1980
FILE
REF. DRWG. NO.

POINT	NORTHING	EASTING
387	922453.602	502854.640
388	922483.044	502852.800
389	922482.209	502999.431
390	922433.840	502995.609
391	922450.349	503094.676
392	922401.504	503113.357
393	922455.910	503121.073
394	922451.056	503122.446
395	922405.784	503116.025
396	922435.676	503068.071

COMPUTATION SHEET

PROJECT INDIAN BEND WASH / NATURE AREA
ITEM SANITARY SEWER

SHEET NO. 1 OF ___ SHEET
DATE 18 AUG, 1980
FILE
REF. DRWG. NO.

COMPUTED BY JFFL CHECKED BY

SEWAGE FLOW GENERATED @ COMFORT STATION

I- AVERAGE FLOW PER CAPITA = 10 GPD/CAP (WPCF Manual NO. 9 and ADHS Bulletin NO. 11)

ASSUME 100 PERSONS USING STATION FACILITIES IN 1 DAY.
ASSUME FLOW IS GENERATED DURING A PERIOD OF 10 HOURS.

RATE OF FLOW BASED ON 10-HOUR USE:
10 × 100 × 24/10 = 2400 GPD

INFILTRATION FOR 6" VCP LINE BASED ON ALLOWABLE MAXIMUM OF 200 GAL / IN OF Ø / MILE / DAY = 0.23 GAL/LF/DAY.
INFILTRATION FOR 125 FT RUN = 29 GPD

- USE 2500 GAL AS ADF

MAXIMUM FLOW = 2 ADF = 4800 GPD

MINIMUM FLOW = ⅓ ADF = 800 GPD

II - BASED ON FIXTURE-UNIT METHOD (WPCF Manual NO. 9)

FIXTURES	UNITS
3 WC (FLUSH VALVES)	3 × 8 = 24
1 URINAL	1 × 4 = 4
2 LAVATORIES	2 × 2 = 4
2 DRINK. FOUNTAINS	2 × 0.5 = 1
	33 UNITS

Peak Discharge = 30 GPM

COMPUTATION SHEET

PROJECT INDIAN BEND WASH / NATURE AREA

ITEM SANITARY SEWER

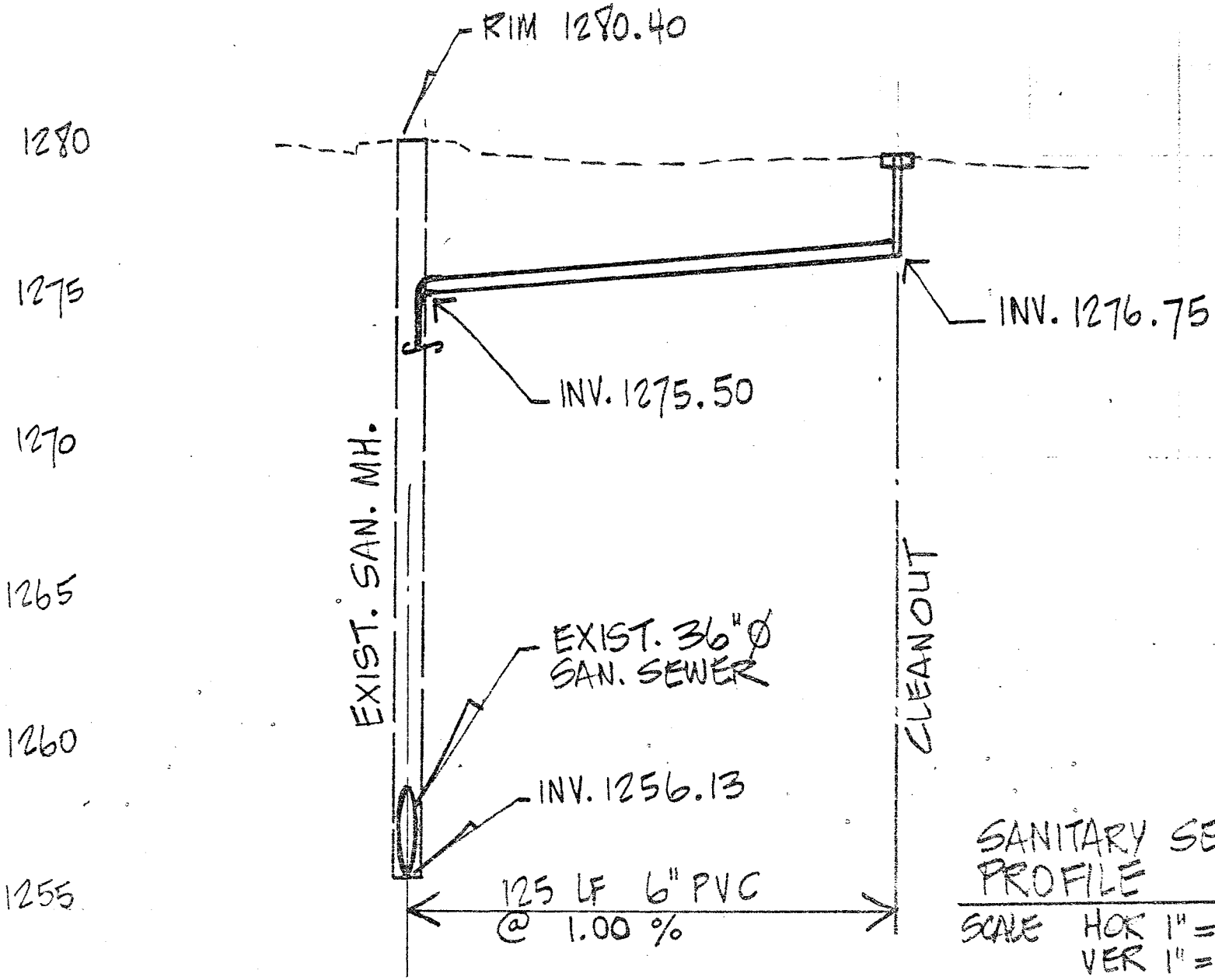
COMPUTED BY JFFL CHECKED BY

SHEET NO. 2 OF SHEETS

DATE 29 AUG, 1980

FILE

REF. DRWG. NO.



SANITARY SEWER PROFILE

SCALE HOR 1" = 40'
VER 1" = 5'

SPD FORM 284 1 OCT 74

EDITION OF 15 DEC 59 WILL BE USED UNTIL EXHAUSTED

COMPUTATION SHEET

PROJECT INDIAN BEND WASH / NATURE AREA
ITEM SANITARY SEWER

SHEET NO. 3 OF ___ SHEET
DATE 29 AUG, 1980
FILE
REF. DRWG. NO.

COMPUTED BY JFEL CHECKED BY

6" PVC _ SDR 35
n = 0.009

Computation Form for Design of Sanitary Sewers

	Line No	Location	Manhole No. From	Manhole No. To	Length (ft)	Max Flow: Infiltration (mgd)	Max Flow: Sewage (mgd)	Max Flow: Sewage and Infiltration (mgd)	Max Flow: Sewage and Infiltration (cfs)	Min Flow: Infiltration (mgd)	Min Flow: Sewage (mgd)	Min Flow: Sewage and Infiltration (mgd)	Min Flow: Sewage and Infiltration (cfs)
I	1	EAST HAYDEN	1	EX. MH.	125	.000 03	.0048	.0048	.007	.000 03	.0008	.0008	.001
II	1	"	"	"	125	.000 03	.0432	.0432	.067	.000 03	.0072	.0072	.011

	% Slope of Sewer	Diam (in.)	Capacity Full (cfs)	Velocity Full (fps)	Min Velocity (fps)	Max Velocity (fps)	Max Depth (ft)	Manhole Invert Drop (ft)	Fall in Sewer (ft)	Sewer Invert Elevation: Upper End	Sewer Invert Elevation: Lower End	Elevation Ground Surface: Upper End	Elevation Ground Surface: Lower End
I	1.00	6	.82	4.0	0.6	0.9	4.9	EXIST.	1.25	76.75	75.50	80.0	80.4
II	1.00	6	.82	4.0	1.6	2.9	"	"	"	"	"	"	"

SPD FORM 1 OCT 74 284 EDITION OF 15 DEC 59 WILL BE USED UNTIL EXHAUSTED

COMPUTATION SHEET

PROJECT INDIAN BEND WASH/ NATURE AREA
ITEM WATER SYSTEM
COMPUTED BY JFFL CHECKED BY

SHEET NO. 4 OF ___ SHEET
DATE 29 AUG, 1980
FILE
REF. DRWG. NO.

DOMESTIC DEMAND @ COMFORT STATION

I – DEMAND BASED ON NUMBER OF FIXTURES

FIXTURES	FLOW			
3 WC (FLUSH VALVES)	30 x 3	=	90 GPM	(SEELYE)
1 URINAL	20 x 1	=	20 "	
2 LAVATORIES	4 x 2	=	8 "	
2 DRINK. FOUNTAINS	2 x 2	=	4 "	
	ΣQ	=	122 GPM	

FACTOR OF USAGE = 42% (SEELYE)

AVERAGE FLOW = 122 x 0.42 = 51.2 GPM
USE 52 GPM

II – DEMAND BASED ON FIXTURE UNITS:
PEAK DEMAND = 30 GPM.

USE AVERAGE DEMAND FLOW OF 30 GPM.

PIPE SIZE SELECTION

LENGTH FOR RUN TO COMFORT STATION = 47 FT.
PIPE MATERIAL = PVC
C FACTOR = 150

HEAD LOSS THROUGH A 1" WATER METER.
FOR Q = 30 GPM AND BASED ON HERSEY'S CURVES, PRESSURE LOSS IS 5 PSI.

PRESSURE LOSS BETWEEN METER & CONFORT STATION
20.7 x 47/(1000 x 2.31) = 0.42 PSI
WITH VALVES & FITTINGS, USE PRESSURE LOSS OF 2 PSI.

COMPUTATION SHEET

PROJECT INDIAN BEND WASH / NATURE AREA
ITEM WATER SYSTEM

SHEET NO. 5 OF ___ SHEETS
DATE 29 AUG, 1980
FILE
REF. DRWG. NO.

COMPUTED BY JFFL CHECKED BY

FOR PIPE RUN BETWEEN COMFORT STATION AND DRINKING FOUNTAIN @ EAST END OF NATURE AREA :

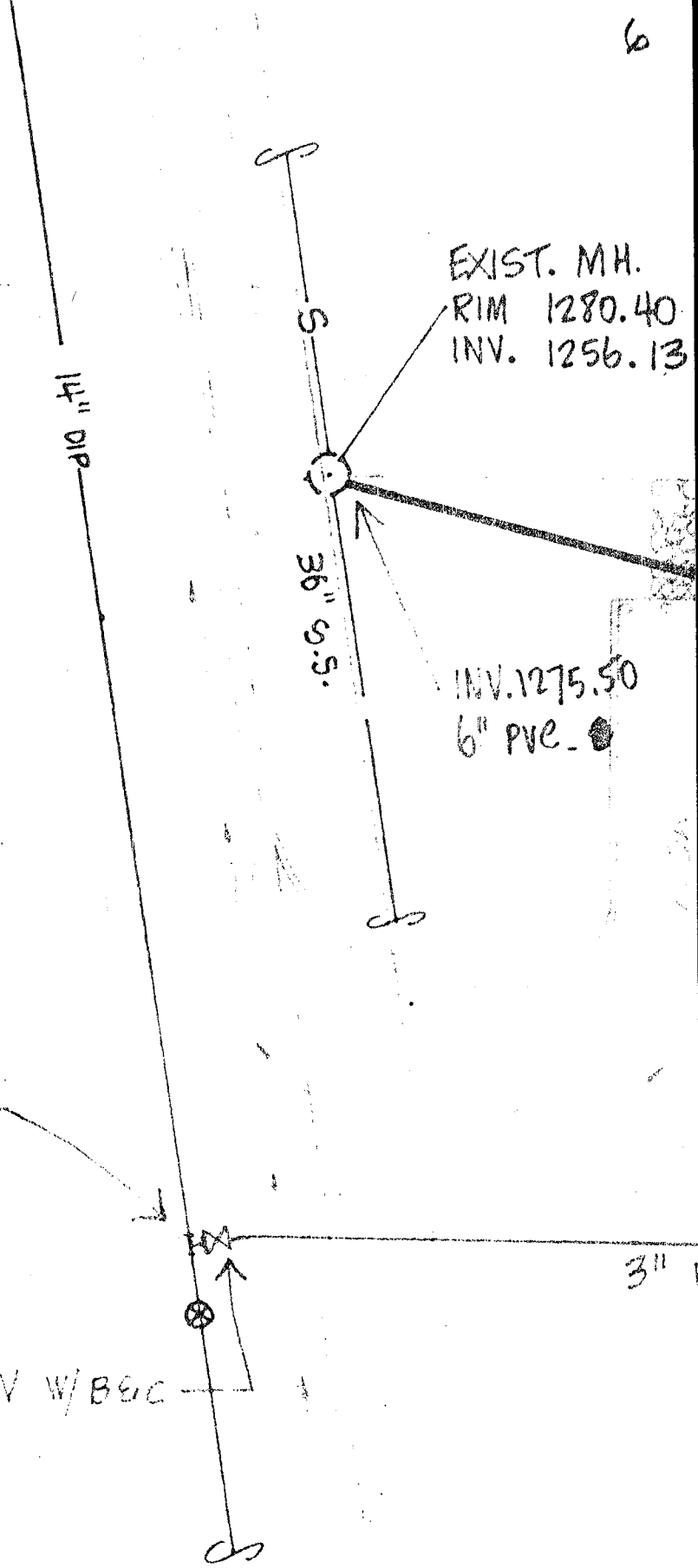
LENGTH = 662 LF

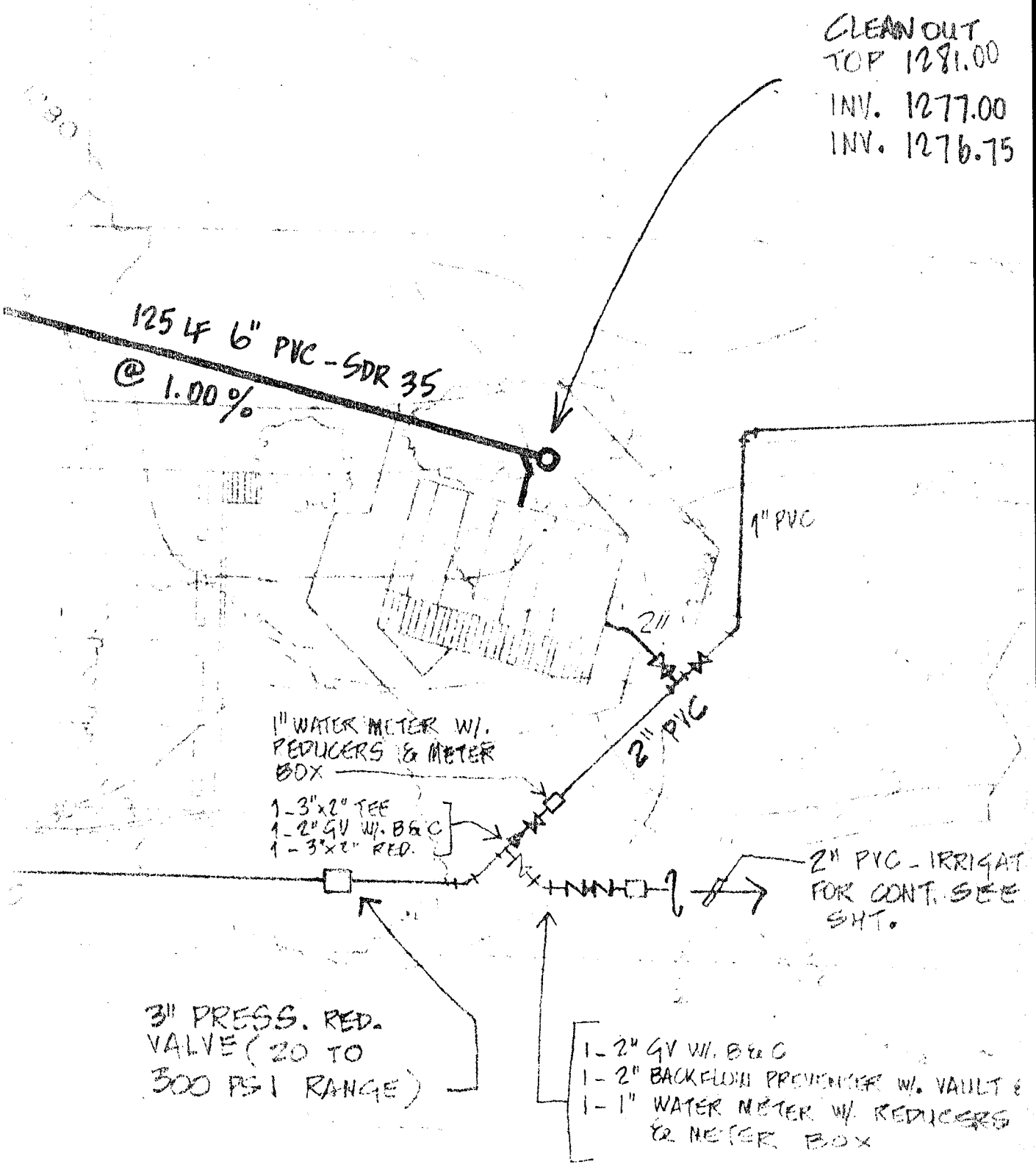
Q = 2 GPM

WITH 1"Ø PVC PIPE, PRESSURE LOSS

6.8 x 662 / (1000 x 2.31) = 2.0 PSI

USE 1"Ø PVC LINE


EXIST. MH.
RIM 1280.40
INV. 1256.13
14" dip
36" S.S.
INV. 1275.50
6" PVC
14" x 3"
WET TAP
3"
3" GV W/BOX

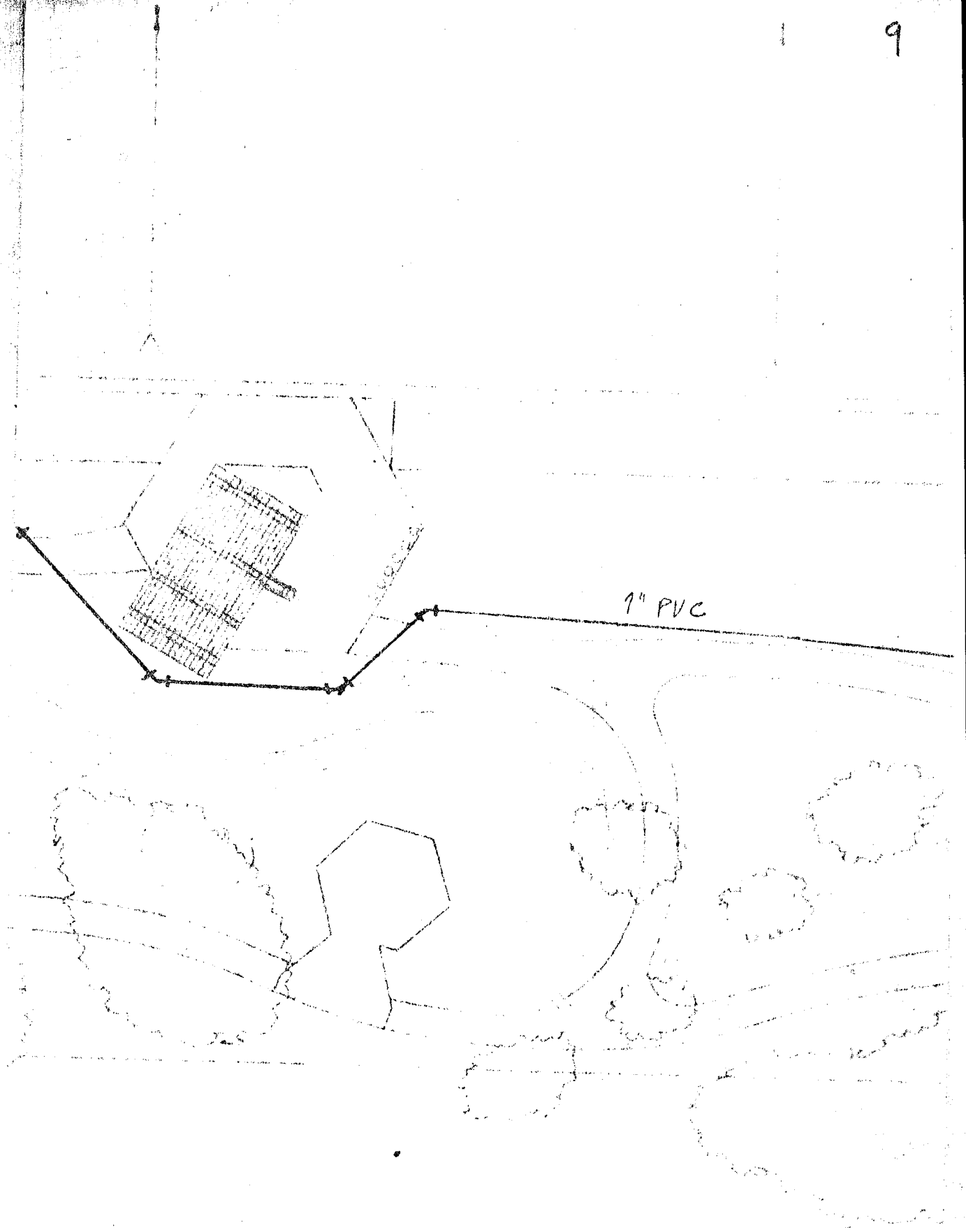

CLEAN OUT
TOP 1281.00
INV. 1277.00
INV. 1276.75
125 LF 6" PVC - SDR 35
@ 1.00%
1" PVC
2"
2" PVC
1" WATER METER W/
REDUCERS & METER
BOX
1 - 3"x2" TEE
1 - 2" GV W/ B&C
1 - 3"x2" RED.
2" PVC - IRRIGAT
FOR CONT. SEE
SHT.
3" PRESS. RED.
VALVE (20 TO
300 PSI RANGE)
1 - 2" GV W/ B&C
1 - 2" BACKFLOW PREVENTER W/ VAULT &
1 - 1" WATER METER W/ REDUCERS
& METER BOX

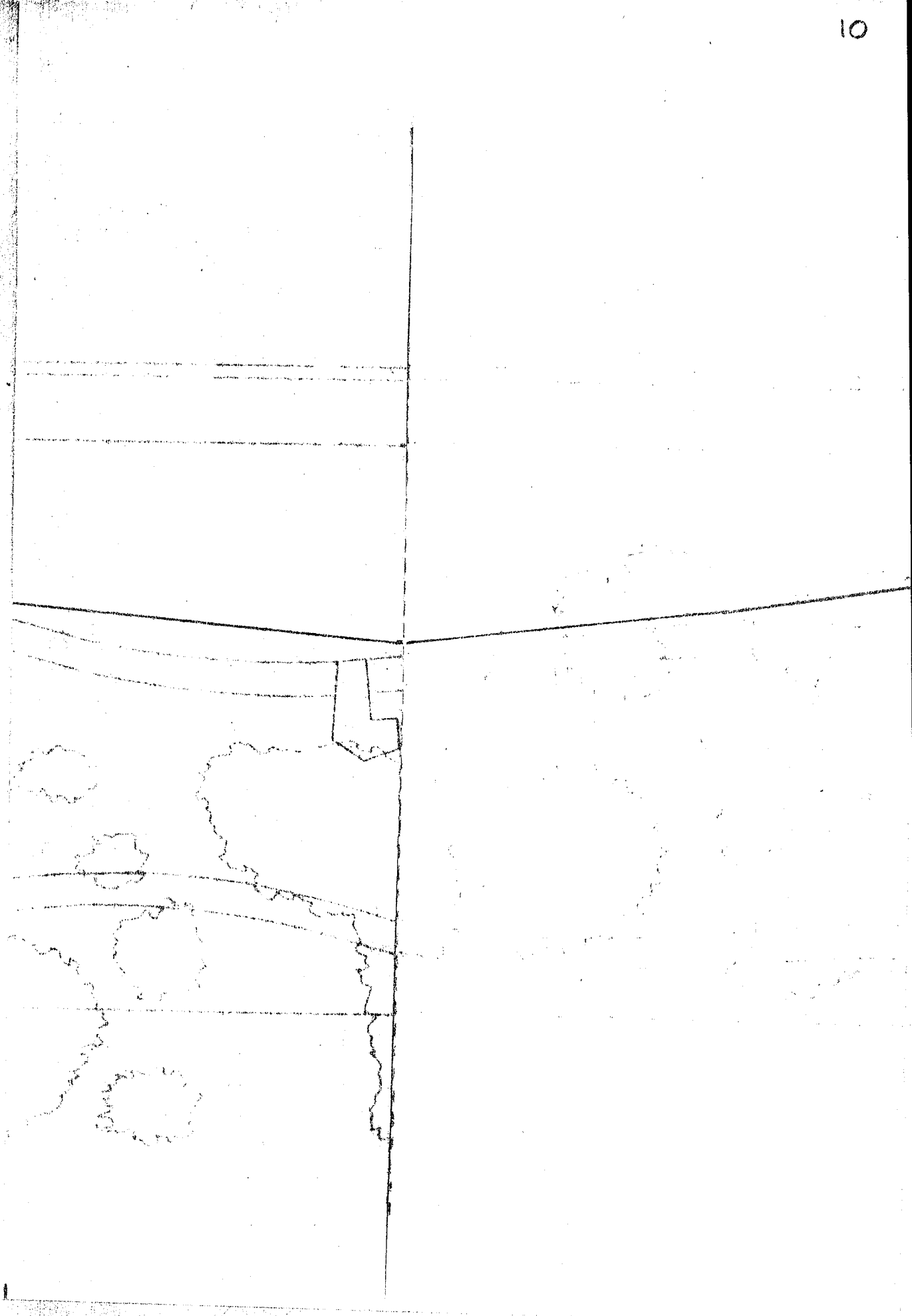
4" S.
6" W.

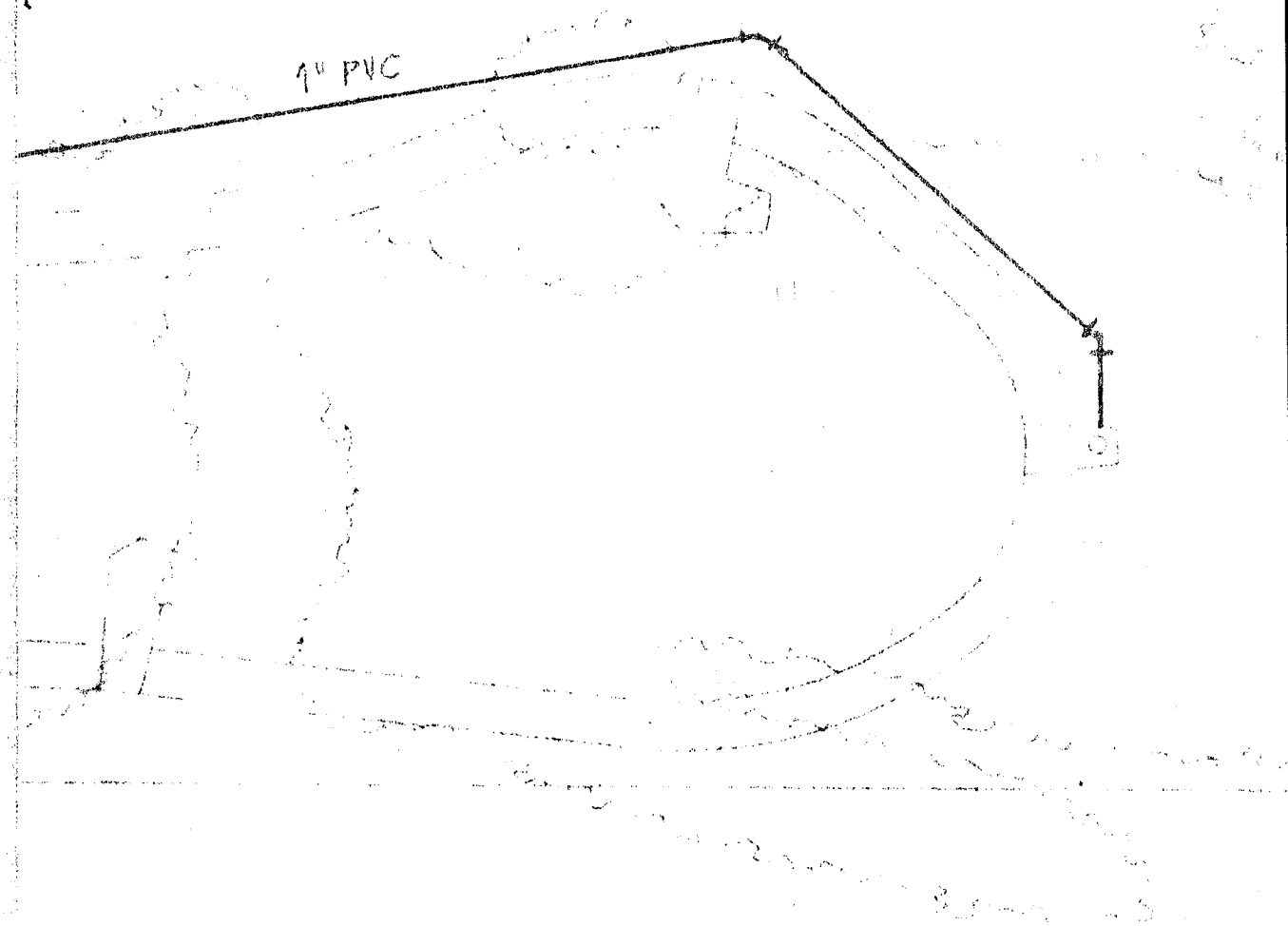
1" PVC

ON

x COVER


1" PVC




1" PVC

COMPUTATION SHEET

PROJECT INDIAN BEND WASH
ITEM EARTHWORK

SHEET NO. 1 OF ___ SHEETS
DATE 3 SEP, 1980
FILE
REF. DRWG. NO.

COMPUTED BY JFEL CHECKED BY

SUMMARY

	CUT (CY)	FILL (CY)
ZONE 1	0	779
ZONE 2	1,079	3,813
ZONE 3	2,336	1,649
ZONE 4	2,297	334
ZONE 5	0	586
ZONE 6	26	657
ZONE 7	110	568
ZONE 8	405	0
SUBTOTAL	6,253	8,386
CLEARING & GRUBBING	− 400	+ 500
SUBTOTAL	5,853	8,886
COMPACTION FACTOR 1.30		11,552
TOTAL	5,853	11,552
(BORROWED MATERIAL FROM STOCK PILE ON SITE		5,699)

COMPUTATION SHEET

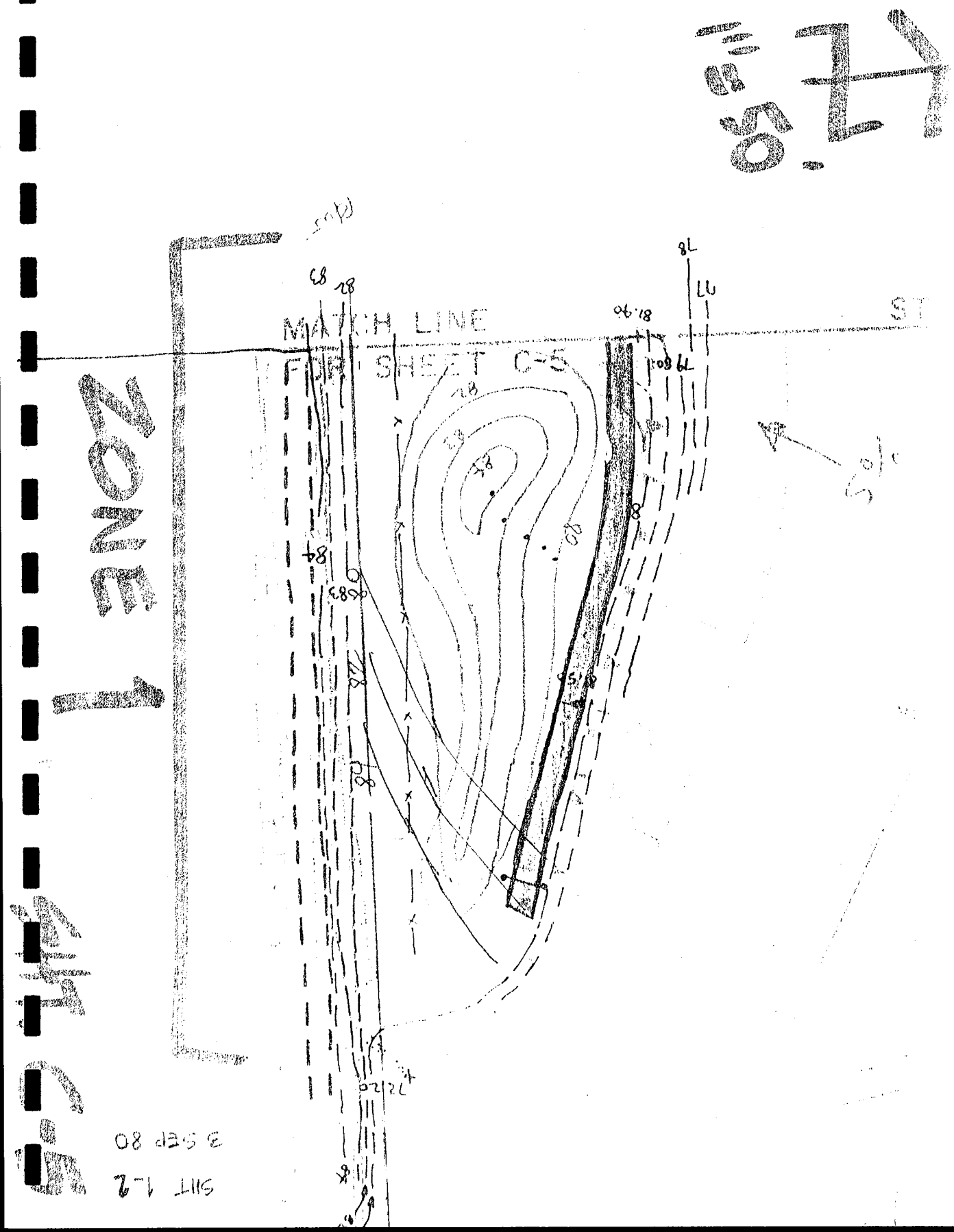
PROJECT INDIAN BEND WASH
ITEM EARTHWORK
ZONE 1
COMPUTED BY JFFL CHECKED BY
4098.35

SHEET NO. 1-1 OF ___ SHEETS
DATE 3 SEP, 1980
FILE
REF. DRWG. NO. C-5

		CUT			FILL			
		Area	Volume CF	Volume CY	Area		Volume CF	Volume CY
0		0			2.19	8975		
	1.0					8258	8258	306
1		0			1.84	7541		
	1.0					6947	6947	257
2		0			1.55	6352		
	1.0					4365	4365	162
3		0			0.58	2377		
	1.0					1394	1394	52
4		0			0.10	410		
	0.2					205	41	2
4.2		0			0	0		
		Σ_V ZONE 1						779

FORM 334

ENVIRONMENTAL
ENHANCEMENT
THRU ENGINEERING



COMPUTATION SHEET

PROJECT INDIAN BEND WASH
ITEM EARTHWORK
ZONE 2
COMPUTED BY JFFL CHECKED BY

SHEET NO. 2-1 OF ___ SHEETS
DATE 29 AUG, 1980
FILE
REF. DRWG. NO. 6-4

160 − 1.63934 × 2500 = 4098.35

		CUT				FILL			
		Area		Volume CF	Volume CY	Area		Volume CF	Volume CY
						U.	SF		
80		0				7.65	31 353		
	1.0						27 480	27 480	1,018
81		0				5.76	23 607		
	1.0						20 165	20 165	747
82		0				4.08	16 722		
	1.0						13 402	13 402	497
83		0				2.46	10 082		
	1.0						7 767	7 767	288
84		0				0.85 0.48 1.33	5 451		
	0.5						2726	1 363	51
85.5		0				0	0		
									2,601
77		0	0			0			
	1.0		2787	2787	103				
78		1.36	5 574			0			
	1.0		9 242	9242	343				
79		3.15	12 910			0			
	1.0		15 615	15615	578				
80		4.47	18 320			0			
					1,024				

FORM

COMPUTATION SHEET

PROJECT INDIAN BEND WASH
ITEM EARTHWORK
ZONE 2
COMPUTED BY JFFL CHECKED BY

SHEET NO. 2-2 OF ___ SHEETS
DATE 29 AUG, 1980
FILE
REF. DRWG. NO. C-4

		CUT			FILL			
		Area	Volume CF	Volume CY	Area U.	Area SF	Volume CF	Volume CY
80		0			0.93	3812		
	1.0					3197	3197	119
81		0			0.63	2582		
	1.0					1886	1886	70
82		0			0.29	1189		
	1.0					779	779	29
83		0			0.09	369		
	0.5					185	92	4
83.5		0			0	0		
								222
80		0			0.71	2910		
	1.0					2275	2275	85
81		0			0.40	1640		
	1.0					1046	1046	39
82		0			0.11	451		
	0.5					226	113	5
82.5		0			0	0		
								129

FORM

COMPUTATION SHEET

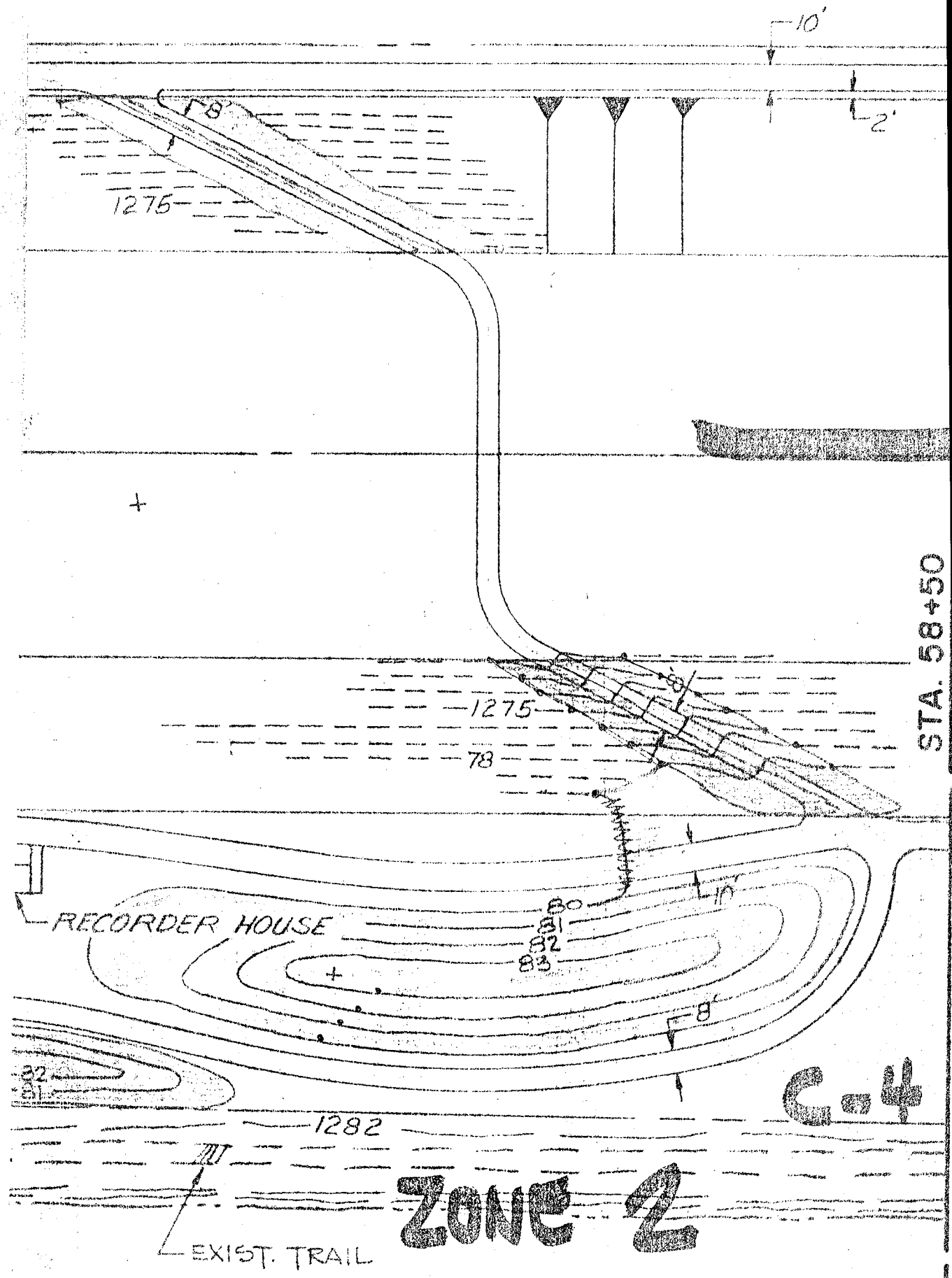
PROJECT INDIAN BEND WASH
ITEM EARTHWORK
ZONE 2
COMPUTED BY JEFL CHECKED BY

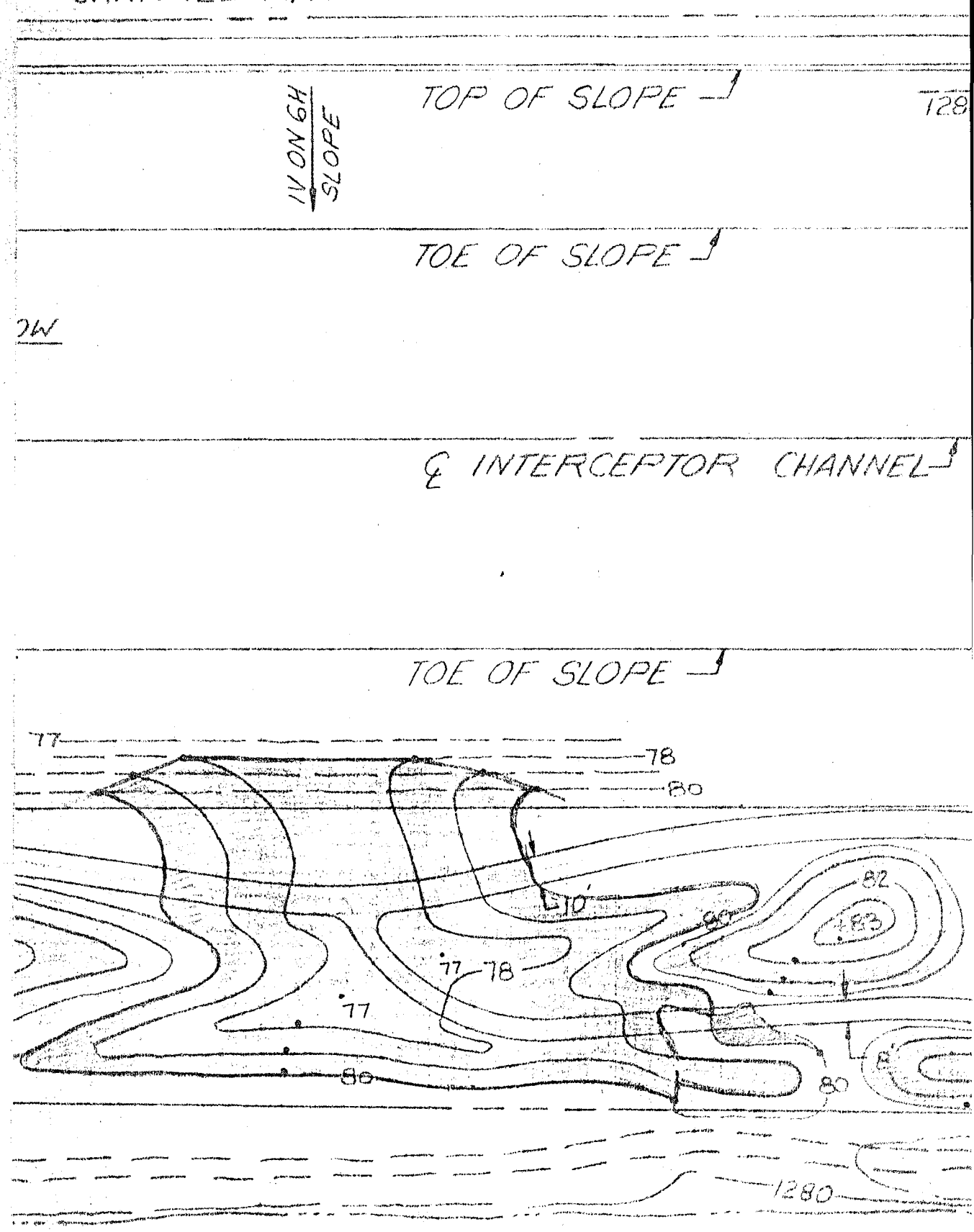
SHEET NO. 2-3 OF ___ SHEETS
DATE 29 AUG, 19 80
FILE
REF. DRWG. NO. C-4

		CUT			FILL		
		Area	Volume CF	Volume CY	Area	Volume CF	Volume CY
80		0			3.30 13 525		
	1.0				10 923	10 923	405
81		0			2.03 8 320		
	1.0				6 579	6 579	244
82		0			1.12 4 837		
	1.0				3300	3300	123
83		0			0.43 1763		
	0.5				882	882	33
83.5		0			0 0		
							805
TRAILS & SLOPES		$2 \times 25 \times 0.5 \times \frac{1}{2} \times 120$	1500	55	$2 \times 25 \times 0.5 \times \frac{1}{2} \times 120$		56
		Σ_V ZONE 2		1,079			3,813

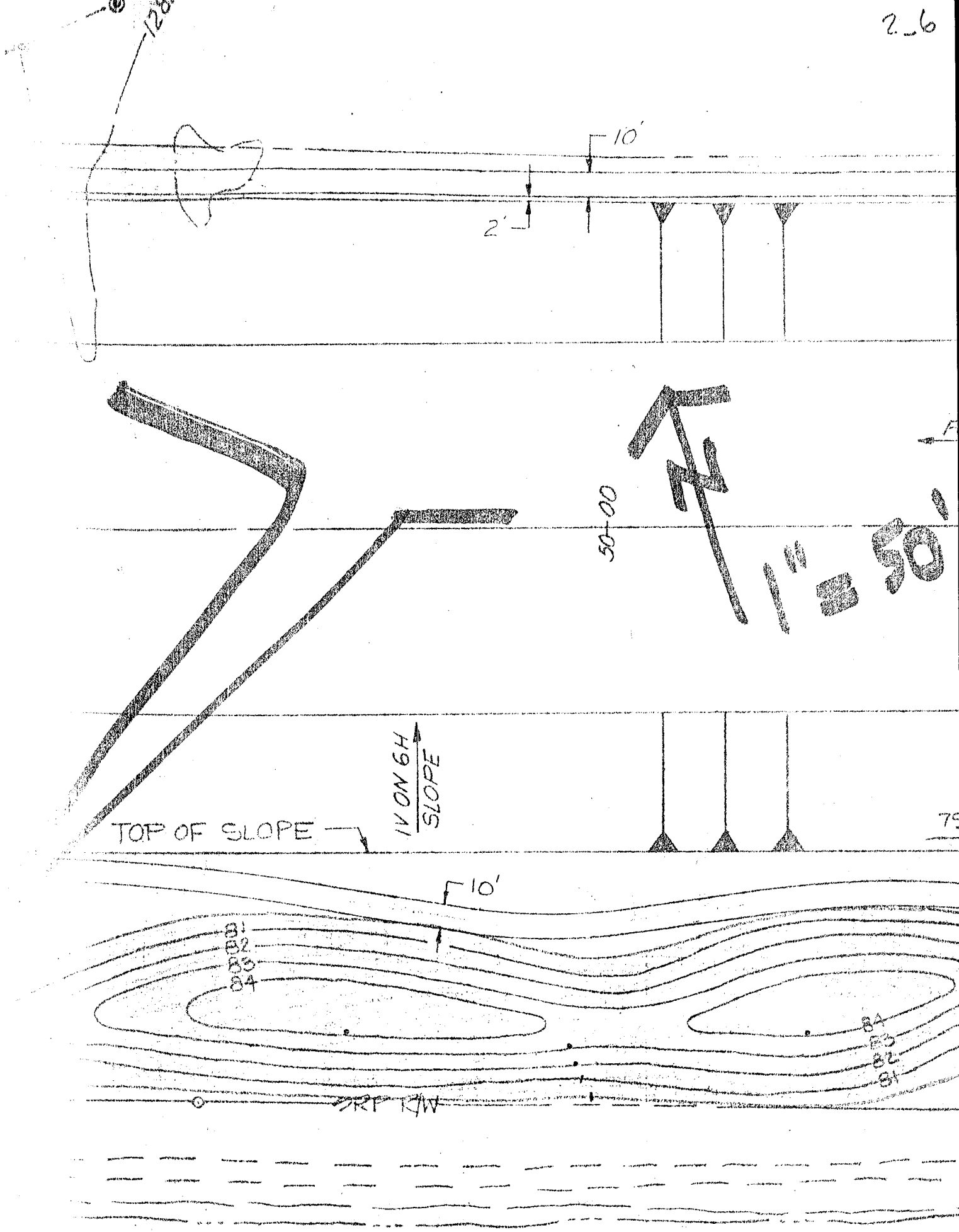
FORM

2-4
29 AUG 1980




CHANNEL R/W
TOP OF SLOPE
1V ON 6H
SLOPE
TOE OF SLOPE
℄ INTERCEPTOR CHANNEL
TOE OF SLOPE
77
78
80
10'
82
83
77
78
77
80
80
1280

A CANAL


10'
2'
50-00
1" = 50'
1V ON 6H
SLOPE
TOP OF SLOPE
10'
B1
B2
B3
B4
B4
B3
B2
B1
RP RW

COMPUTATION SHEET

PROJECT INDIAN BEND WASH
ITEM EARTHWORK
ZONE 3
COMPUTED BY JEFL CHECKED BY

SHEET NO. 3-1 OF ___ SHEETS
DATE 29 AUG, 1980
FILE
REF. DRWG. NO. C-4

4098.35

		CUT			FILL		
		Area	Volume CF	Volume CY	Area U.	Area SF	Volume CF	Volume CY
80		0			4.28	17 541		
	1.0					14 017	14 017	520
81		0			2.56	10 492		
	1.0					7419	7419	275
82		0			1.06	4345		
	1.0					2501	2501	93
83		0			0.16	656		
	0.5					328	164	7
83.5		0			0	0		
								895
77		0	0		0			
	1.0		246	246				9
78		0.12	492		0			
	1.0		2398	2398				89
79		0.25 0.28 0.52 1.05	4304		0			
	1.0		7644	7644				283
80		2.68	10 984		0			
								381

COMPUTATION SHEET

PROJECT INDIAN BEND WASH
ITEM EARTHWORK
ZONE 3
COMPUTED BY JEFL CHECKED BY

SHEET NO. 3.2 OF ___ SHEETS
DATE 02 SEP, 19 80
FILE
REF. DRWG. NO. C-4
C-3

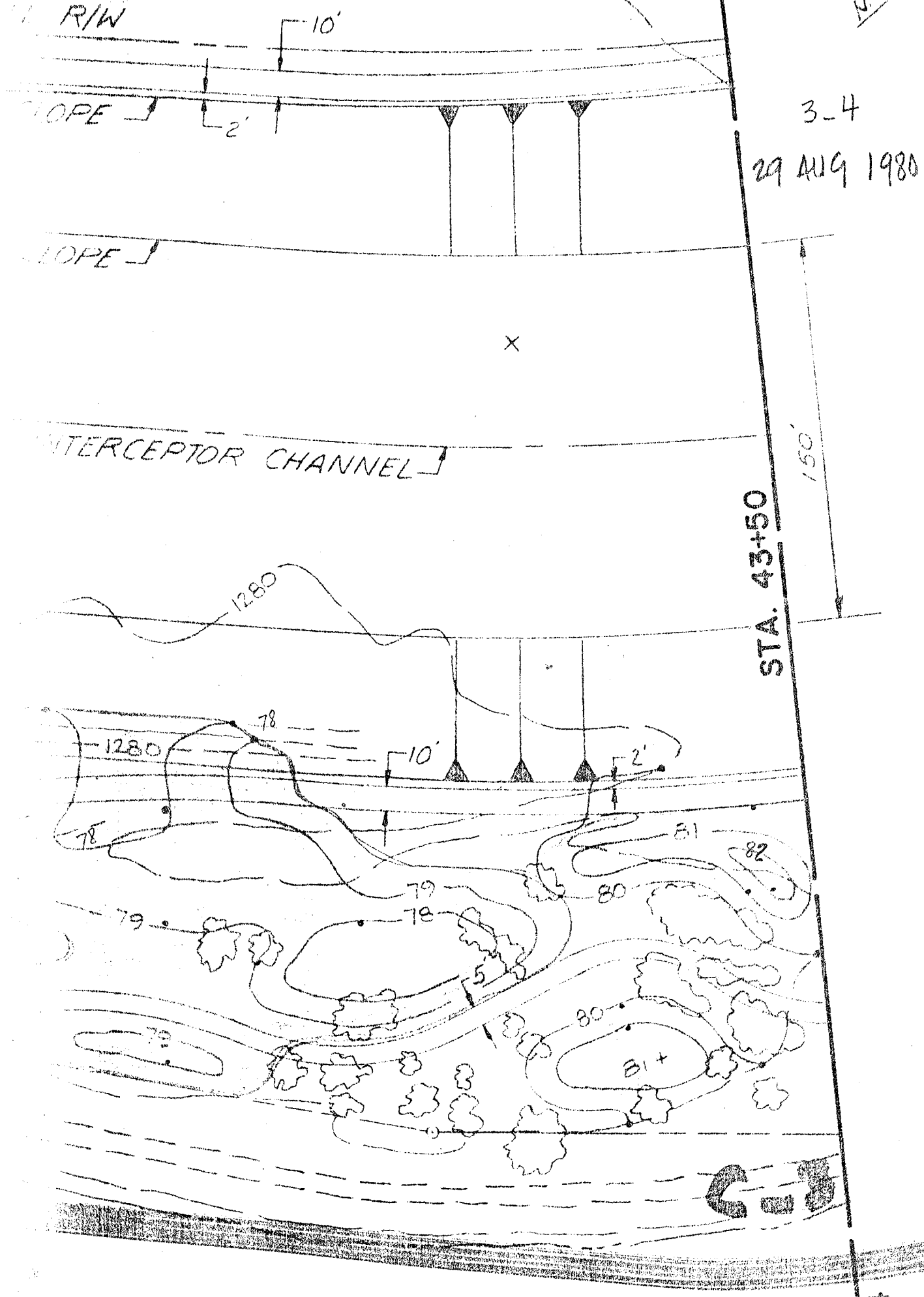
		CUT			FILL			
		Area	Volume CF	Volume CY		Area	Volume CF	Volume CY
50		0			1.87	7664		
	1.0					6435	6435	239
51		0			1.27	5205		
	1.0					3812	3812	142
52		0			0.59	2419		
	1.0					1210	1210	45
53		0			0	0		
								426
50		0			0.98	4016		
	1.0					2787	2787	103
51		0			0.38	1557		
	1.0					922	922	34
52		0			0.07	287		
								137
50		0			0.70	2869		
	1.0					1947	1947	72
51		0			0.25	1025		
	0.5					513	256	9
52.5		0			0	0		
								81

COMPUTATION SHEET

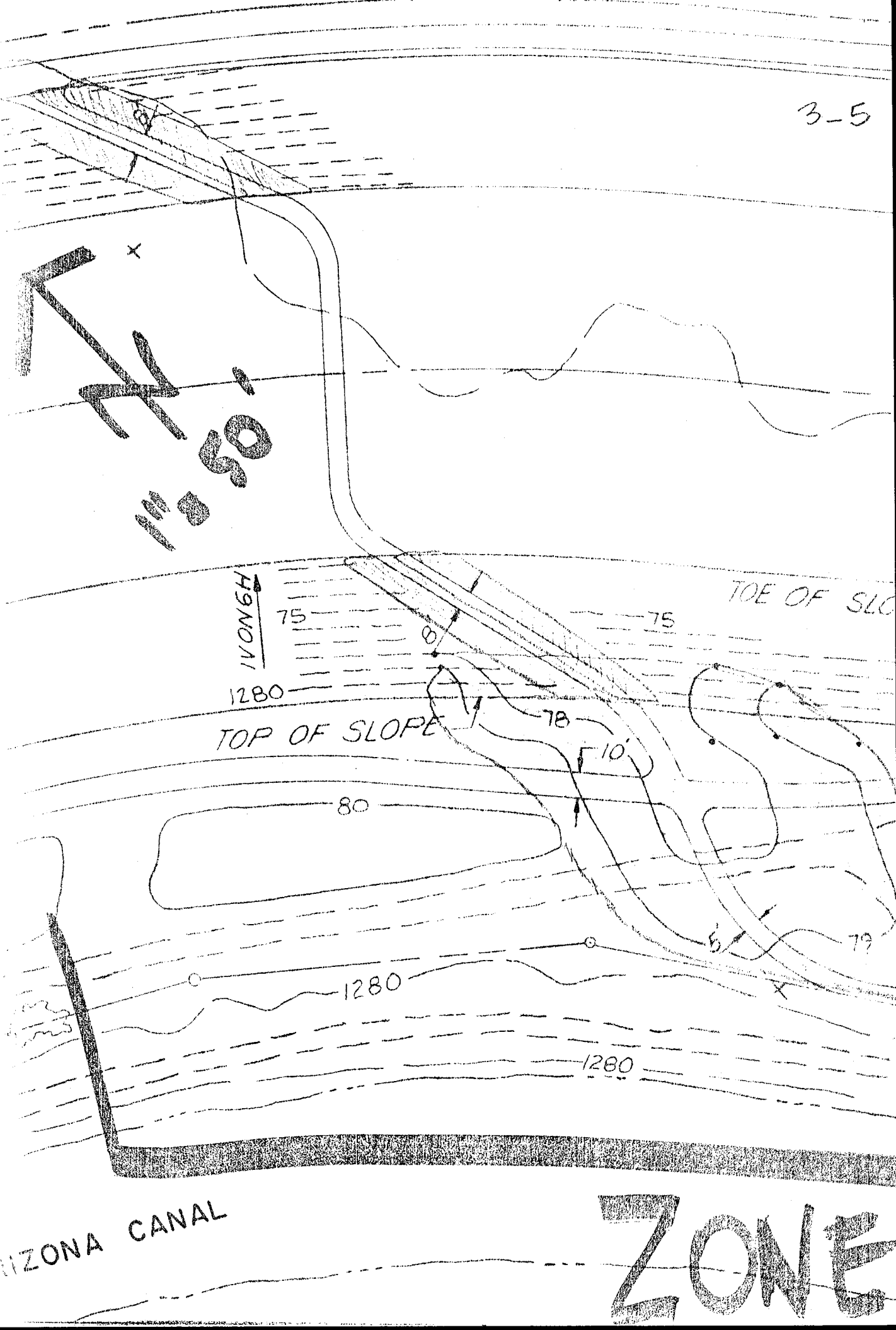
PROJECT INDIAN BEND WASH
ITEM EARTHWORK
ZONE 3
COMPUTED BY JFFL 4098.35 CHECKED BY

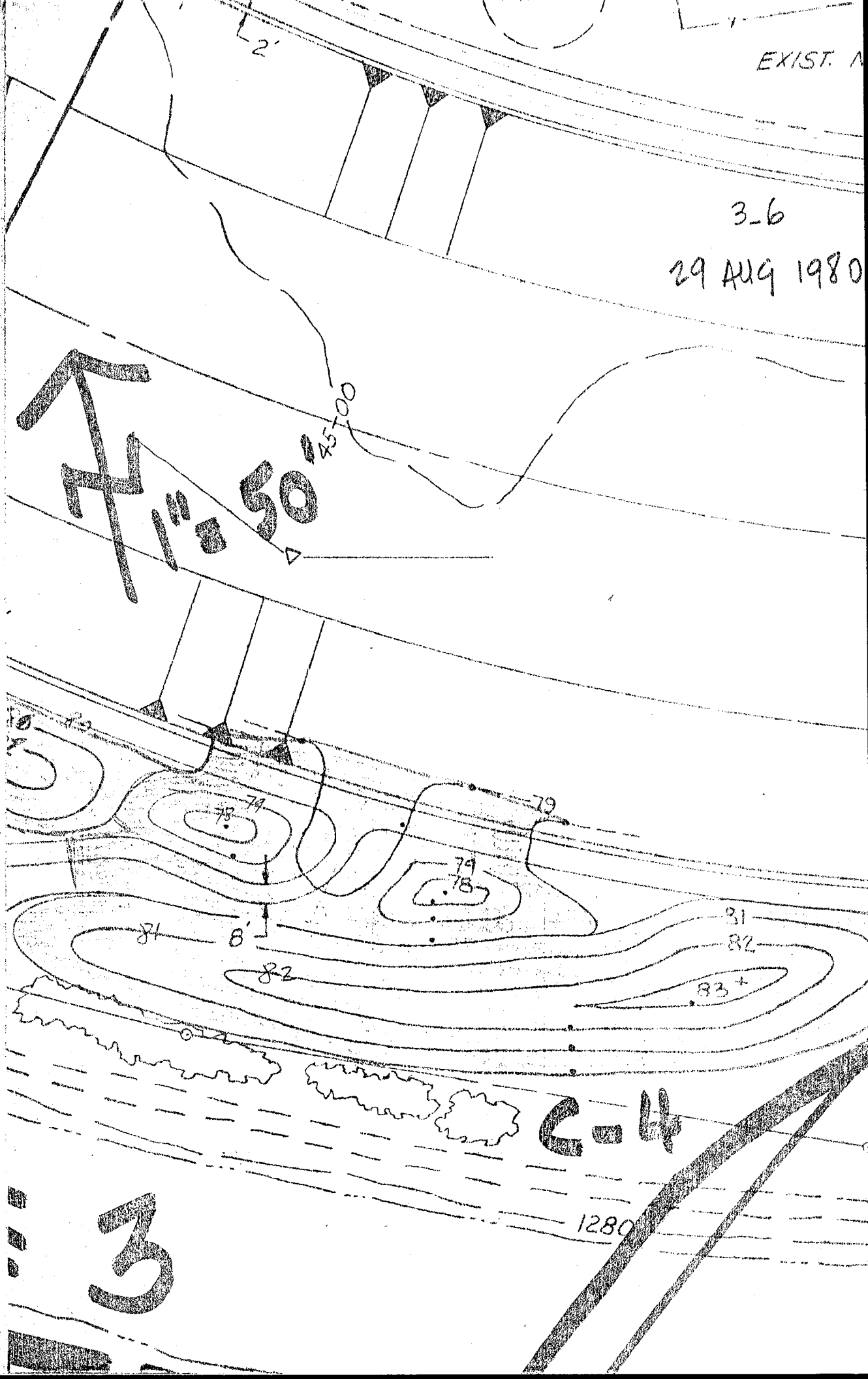
SHEET NO. 3.3 OF ___ SHEETS
DATE 02 SEP, 1980
FILE
REF. DRWG. NO. C3

		CUT				FILL			
		Area		Volume CF	Volume CY	Area		Volume CF	Volume CY
		0.57 0.99 1.56	6393			0			
	1.0		10 000	10 000	370				
		3.17 0.15 3.32	13607			0			
	1.0		18 156	18 156	672				
		5.54	22705			0			
					1,042				
						0.53	2172		
	1.0						1373	1373	51
		0				0.14	574		
	0.3						287	86	3
		0				0	0		
									54
		1.17	4795						
	1.0		8586	8586	318				
		3.02	12377						
	1.0		14 570	14 570	540				
		4.09	16762						
					55				56
		Σ_V ZONE 3			3,336				1,649


R/W
10'
OPE
2'
3-4
29 AUG 1980
OPE
ITERCEPTOR CHANNEL
160'
STA. 43+50
1280
78
1280
10'
2'
78
81
82
79
80
79
78
5
80
79
81+

C-4


1" = 50'
1V/0N6H
75
8
1280
TOP OF SLOPE
78
10'
80
75
TOE OF SLO
79
1280
1280
ZONE
ARIZONA CANAL


EXIST.
3-6
29 AUG 1980
1" = 50'
4500
2'
78
79
74
78
79
8'
81
82
82
81
82
83+
C-4
1280
3

3-7

N. 922,000

150'

STA. 43+50

82

84

73

N. 921,600

MATCH LINE
FOR SHEET C-3

ZONE

ENVIRONMENTAL
ENHANCEMENT
THRU ENGINEERING

COMPUTATION SHEET

PROJECT INDIAN BEND WASH
ITEM EARTHWORK
ZONE 4
COMPUTED BY JEFL 4098.35 CHECKED BY

SHEET NO. 4-1 OF ___ SHEETS
DATE 02 SEP, 1980
FILE
REF. DRWG. NO. C-3

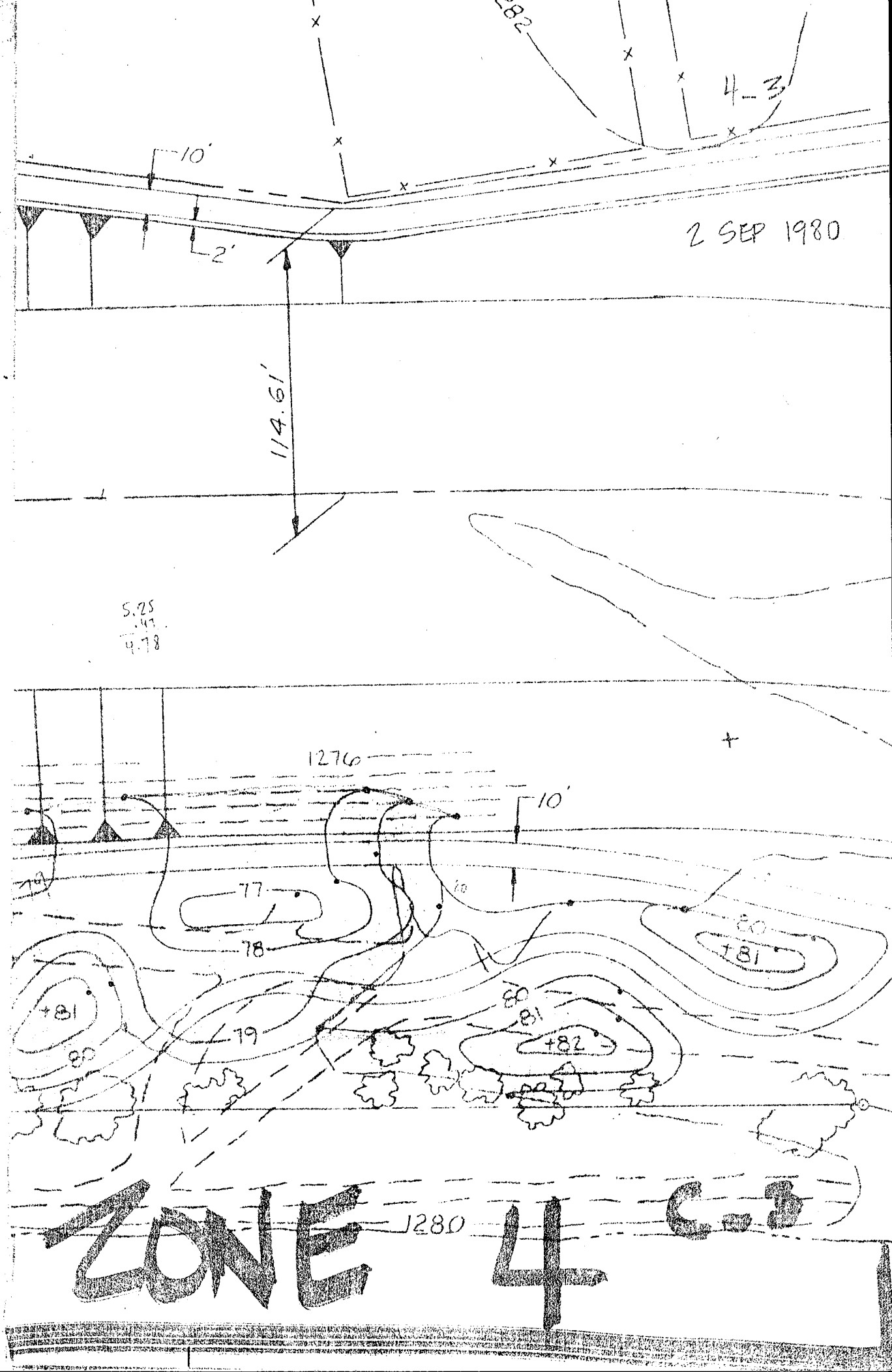
		CUT			FILL			
		Area	Volume CF	Volume CY	Area		Volume CF	Volume CY
		0			0.38	1557		
	1.0					963	963	36
		0			0.09	369		
	0.3					185	55	2
		0			0	0		
								38
		0			1.04	4262		
	1.0					2951	2951	109
		0			0.40	1639		
	1.0					983	983	36
		0			0.08	328		
	0.3					164	49	2
		0			0	0		
								147
		0			0.45	1844		
	1.0					1229	1229	46
		0			0.15	615		
	0.5					308	154	6
		0			0	0		
								52

COMPUTATION SHEET

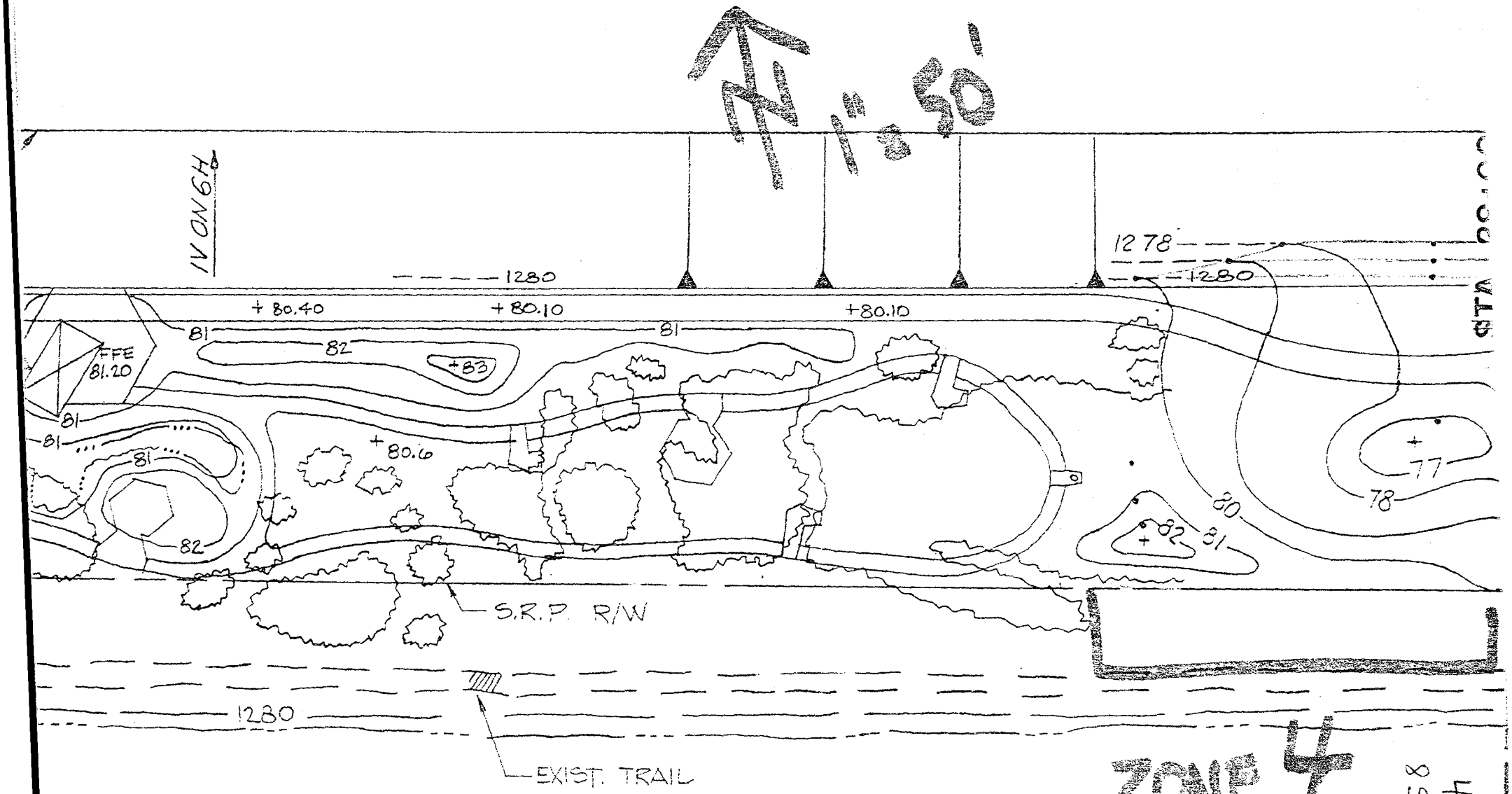
PROJECT INDIAN BEND WASH
ITEM EARTHWORK
ZONE 4
COMPUTED BY JFFL CHECKED BY
4098.35

SHEET NO. 4-2 OF ___ SHEETS
DATE 02 SEP, 1980
FILE
REF. DRWG. NO. C-3
C-2

		CUT				FILL			
		Area		Volume CF	Volume CY	Area		Volume CF	Volume CY
77		0.16	1189						
		0.13							
	1.0	0.29	5246	5246	194				
77		1.14	9303						
		1.13							
	1.0	2.27	14 447	14 447	535				
78		4.78	19 590						
	1.0		21 639	21 639	801				
79		5.78	23 688						
					1530				
80.5		0	0			0			
	0.5		349	174	6				
79		0.17	697			0			
	1.0		2828	2828	105				
78		1.21	4959			0			
	1.0		7029	7029	260				
79		2.22	9098			0			
	1.0		10 697	10 697	396				
80		3.0	12 295			0			
	1.0				767	0.73	2992		
							1988	1988	74
81		0				0.24	984		
	1.0						595	595	22
82		0				0.05	205		
	0.2						103	21	1
82.1		0				0	0		
									97
		Σ_V ZONE 4			2297				334


4-3
10'
2'
2 SEP 1980
114.61'
5.25
.47
4.78
1276
10'
77
78
79
80
+81
+82
1280
ZONE 4 C-3

4-4
NE
T C-3
1" = 50'
150'
30+00
STA. 29+00
1276
1280
+77
N. 922,400



ZONE 4

C-2

4-5
8 SEP 1980

COMPUTATION SHEET

PROJECT INDIAN BEND WASH
ITEM EARTHWORK
ZONE 5 - RAMADA
COMPUTED BY JFFL CHECKED BY

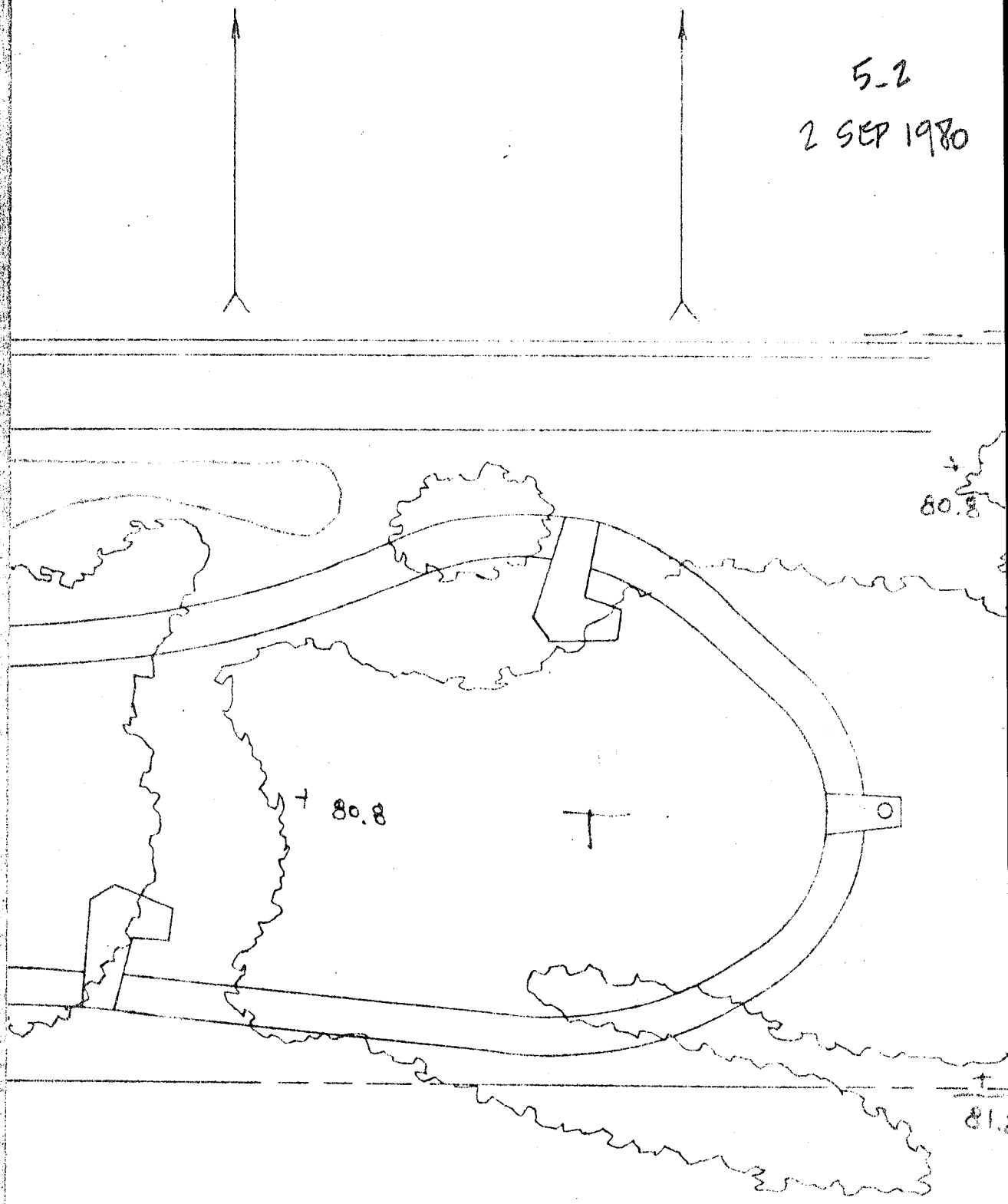
SHEET NO. 5-1 OF ___ SHEETS
DATE 02 SEP, 1980
FILE
REF. DRWG. NO. G-6

655.74

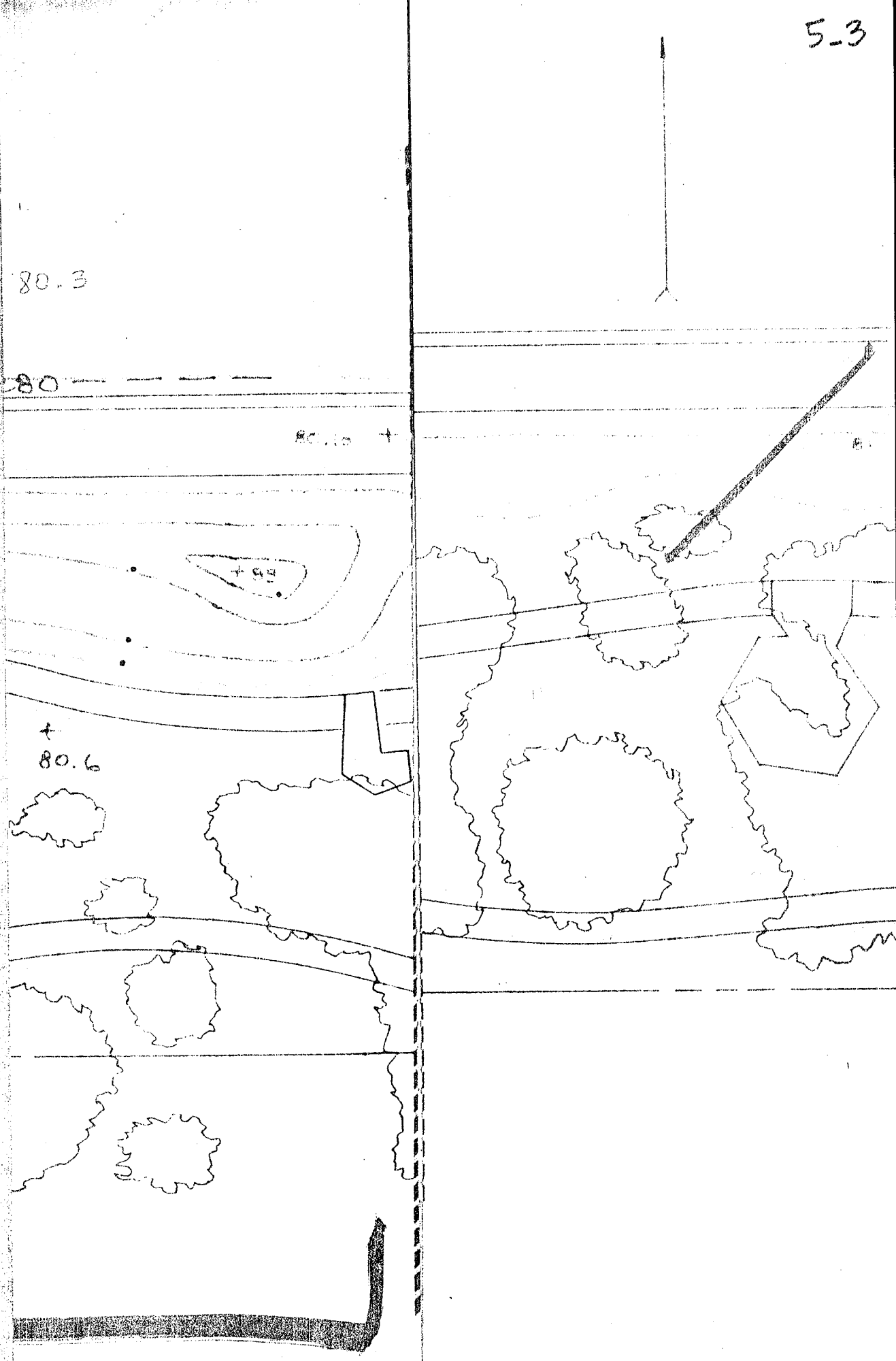
		CUT			FILL			
		Area	Volume CF	Volume CY	Area		Volume CF	Volume CY
50.1		0			6.50	4262		
	0.9					2521	2269	84
51		0			1.19	780		
	1.0					453	453	17
52		0			0.19	125		
	0.5					63	31	1
52.50		0			0	0		
								102
53.2		0			17.91	11 744		
	0.8					8026	6421	238
54		0			0.45 3.97 1.97 0.18 6.57	4308		
	1.0					2744	2744	102
55		0			0.13 1.26 0.41 1.80	1180		
								340
55.8		0			6.22	4079		
	0.7					3040	2128	79
56		0			3.05	2000		
	1.0					1351	1351	50
57		0			1.07	702		
	1.0					394	394	15
58		0			0.13	85		
								144
		Σ ZONE 5		0				586

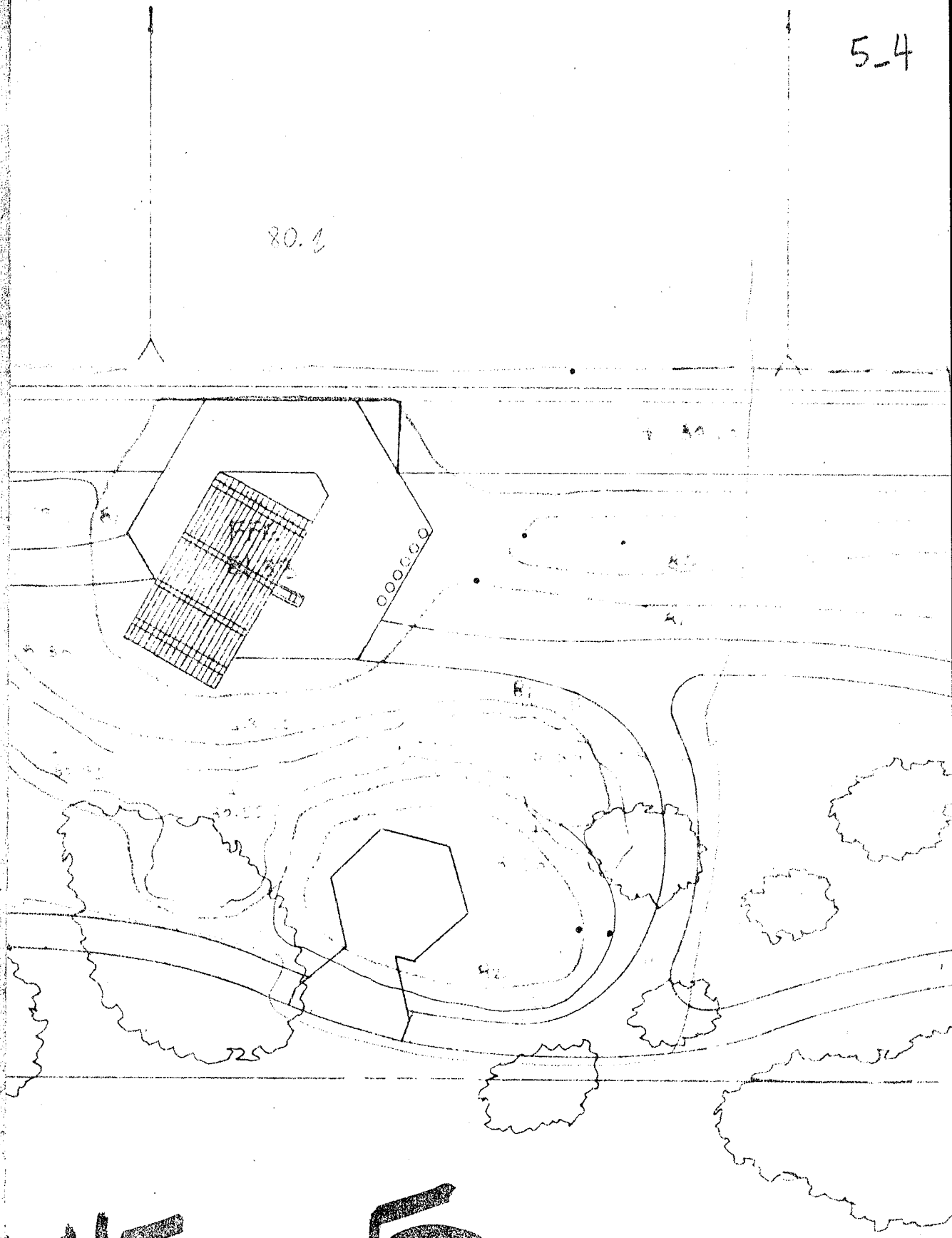
NORM

5-2
2 SEP 1980

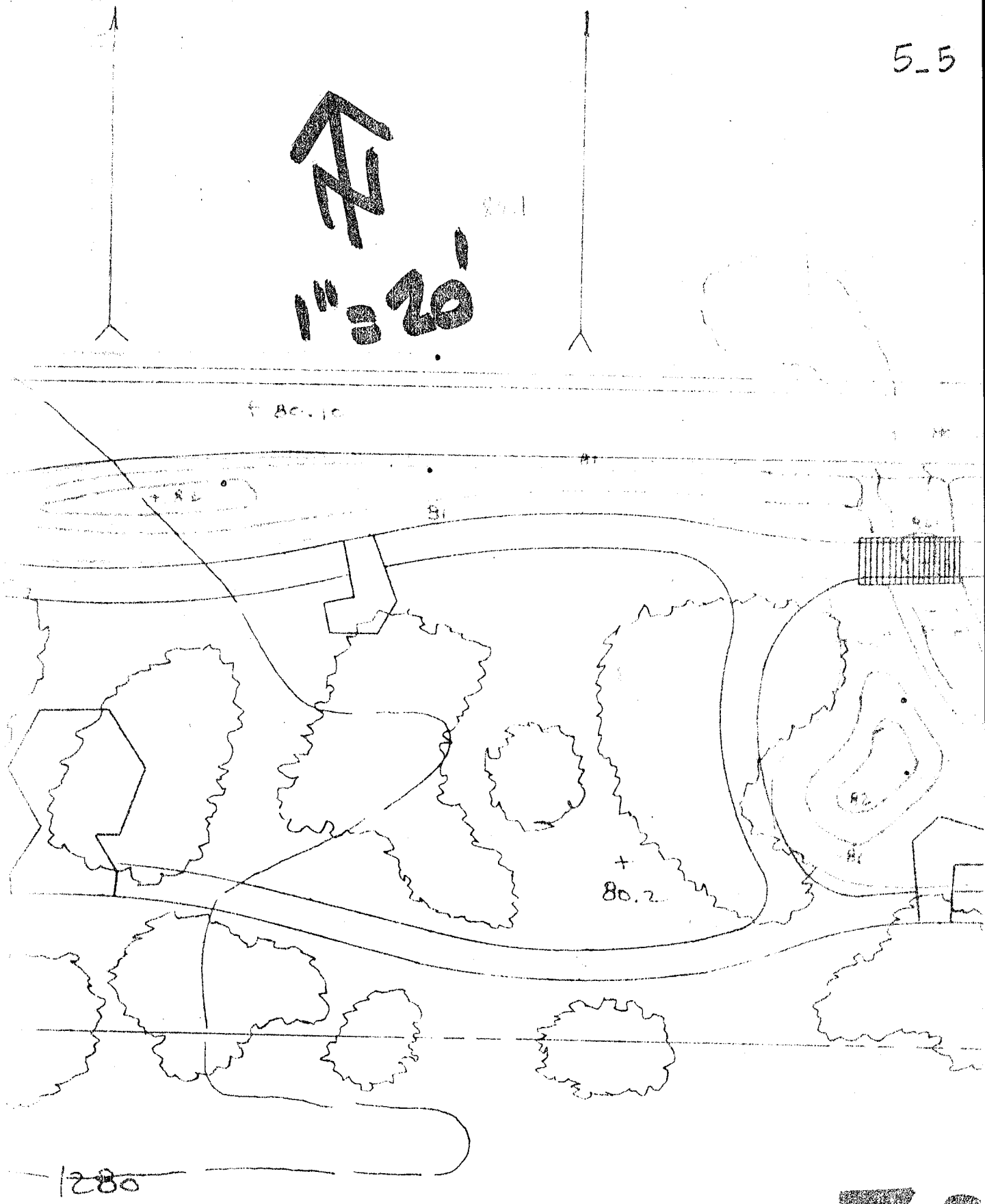


C-6


80.3
80
+99
80.6



NE 5



ZC

COMPUTATION SHEET

PROJECT INDIAN BEND WASH
ITEM EARTHWORK
ZONE 6 – COMFORT STATION
COMPUTED BY JEFL CHECKED BY

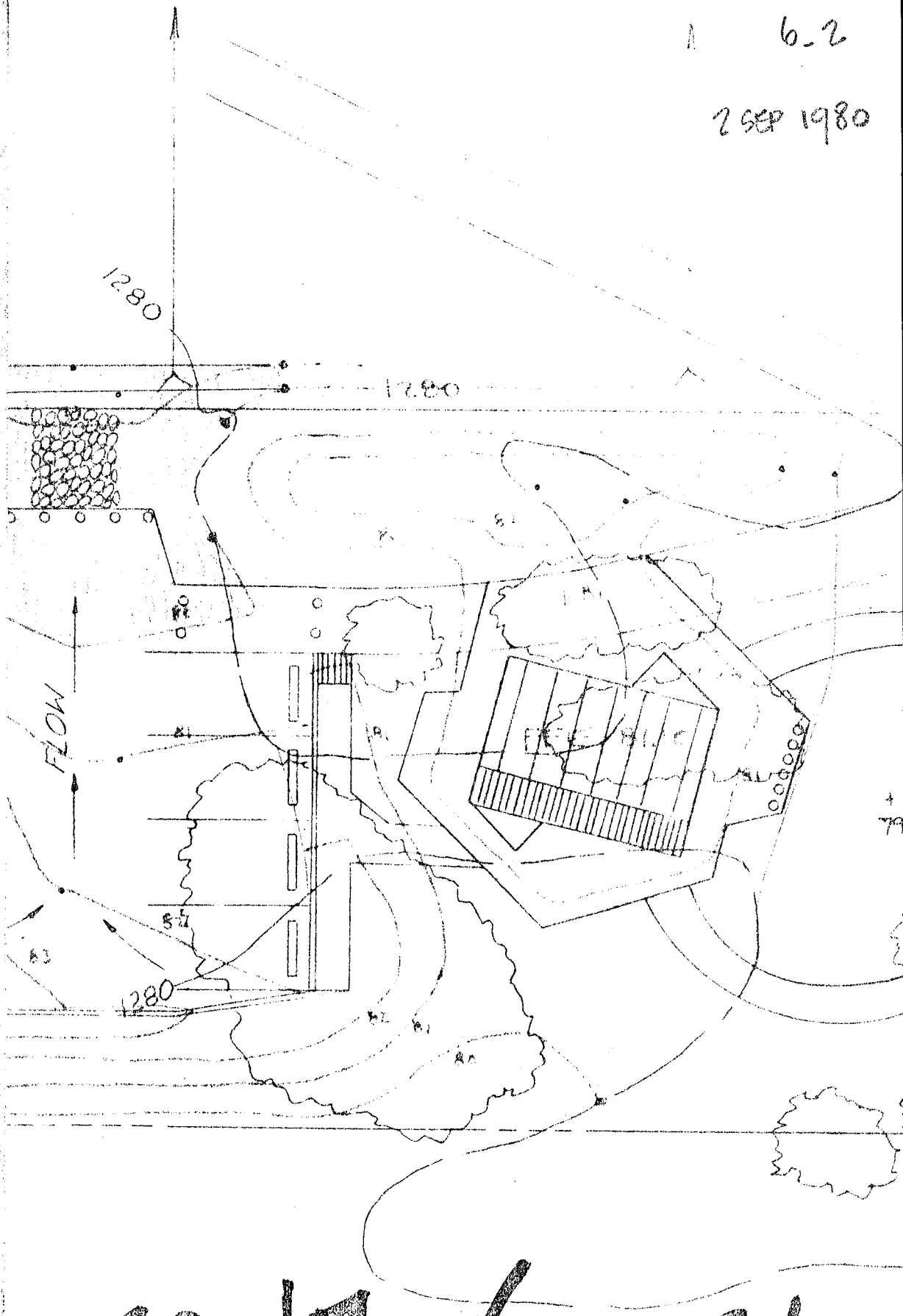
SHEET NO 6-1 OF ___ SHEETS
DATE 02 SEP, 1980
FILE
REF. DRWG. NO. C-6

1.0 – 1.63934 x 400 = 655.74

	CUT				FILL			
		Area	Volume CF	Volume CY		Area	Volume CF	Volume CY
		0.42 275				0		
	1.0	705	705	26				
		1.73 1134				0		
				26				
		0				11.71 7679		
	1.0					7938	7938	294
		0				4.24 8.26 12.50 8197		
	1.0					5689	5689	211
		0				0.80 4.05 4.85 3180		
	1.0					2394	2394	89
		0				0 2.45 1607		
	1.0					1223	1223	45
		0				1.28 839		
	1.0					495	495	18
		0				0.23 151		
								657
		ΣY ZONE 6		26				657

6-2

2 SEP 1980



ZONE 6

C-6

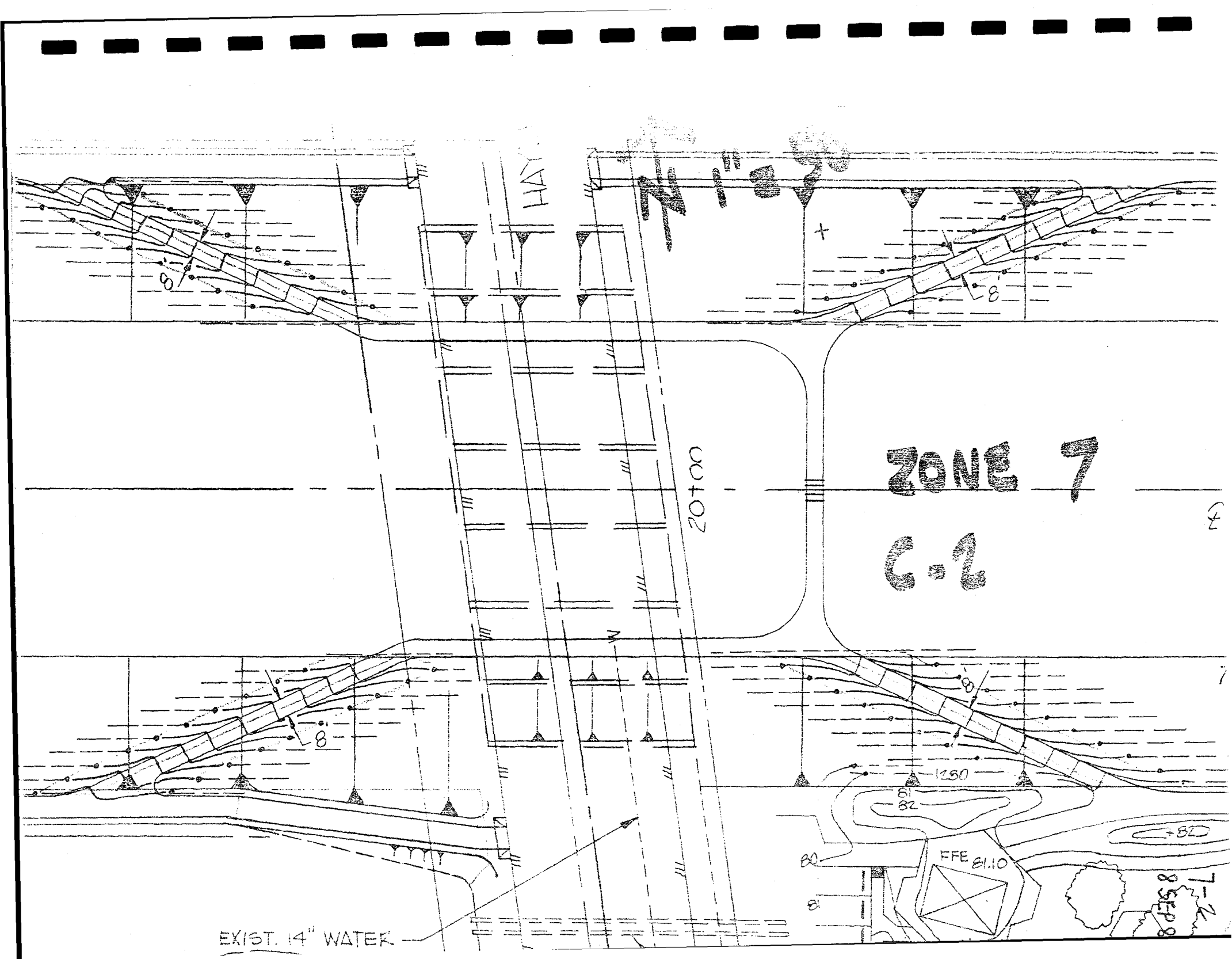
6_3

COMPUTATION SHEET

PROJECT INDIAN BEND WASH
ITEM EARTHWORK
COMPUTED BY JEFL CHECKED BY

SHEET NO. 7-1 OF ___ SHEETS
DATE 8 SEP, 19 80
FILE
REF. DRWG. NO. C-2

		CUT			FILL		
		Area	Volume CF	Volume CY	Area	Volume CF	Volume CY
STAKE OUT BLOCKS				55 55			56 56
TO BALL S/W OF PROJECT	110	0			$\frac{40+16}{2} \times 4 = 112$	12 320	456
		Σ ZONE 7		110			568


ZONE 7
C-2
20+00
8'
8'
8'
8'
1250
81
82
80
81
+82
FFE 81.10
EXIST. 14" WATER

COMPUTATION SHEET

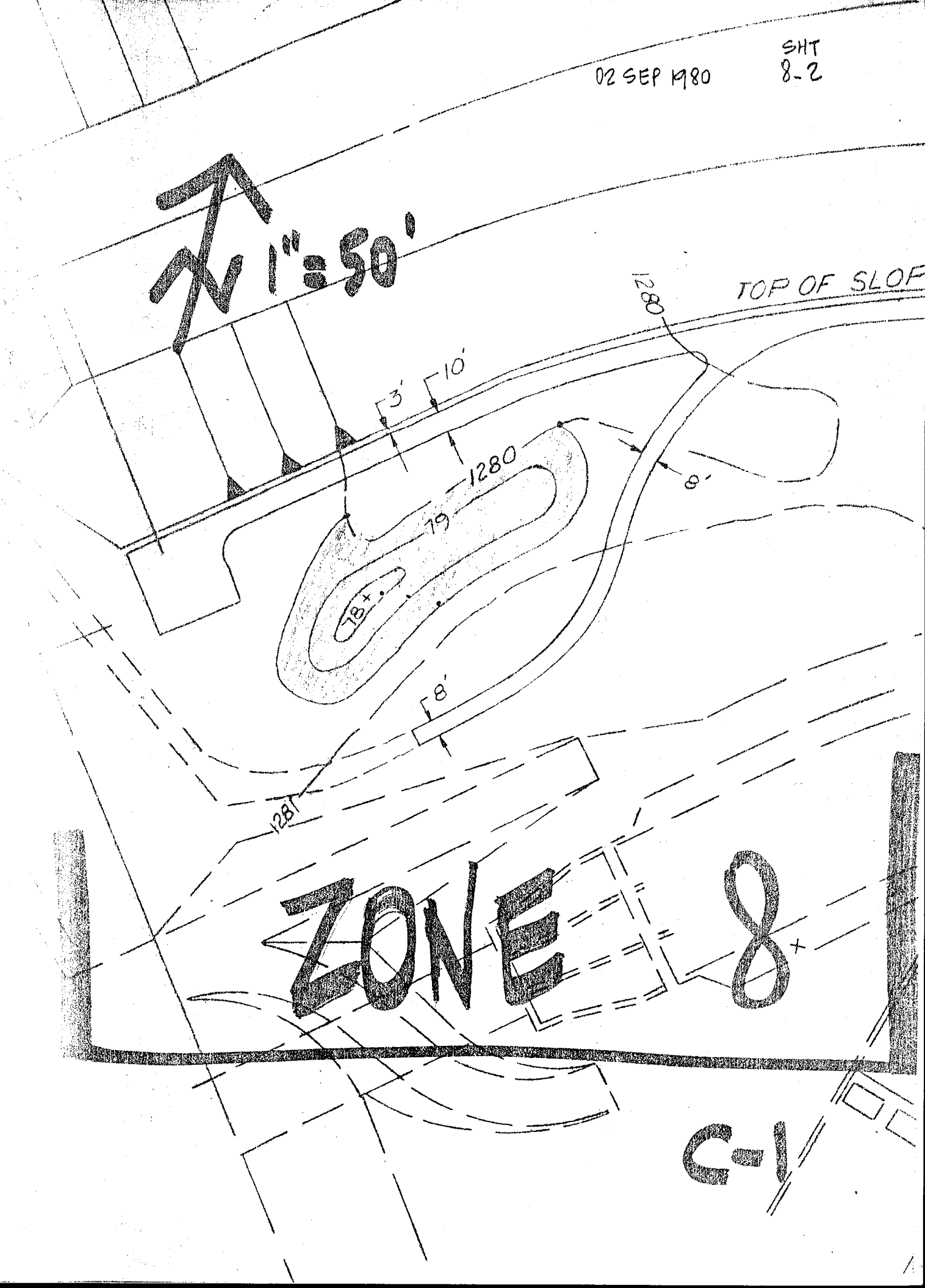
PROJECT INDIAN BEND WASH
ITEM EARTHWORK
ZONE 8
COMPUTED BY JFFL 4098.35 CHECKED BY

SHEET NO. 8-1 OF ___ SHEETS
DATE 02 SEP, 19 80
FILE
REF. DRWG. NO. C-1

	CUT				FILL		
	Area	Volume CF	Volume CY		Area	Volume CF	Volume CY
	0 0				0		
1.0	185	185	7				
	0.09 369				0		
1.0	1558	1558	223				
	0.67 2746				0		
1.0	4734	4734	175				
	1.64 6721				0		
	Σ_V ZONE 8		405				

02 SEP 1980

SHT
8-2



consulting engineers — tucson, arizona

project: INDIAN BEND WASH COMFORT STATION — no. 97497 F
client: CORPS OF ENGRS. — design: JS — date: 12/78
subject: ROOF FRAMING — checked: — date:

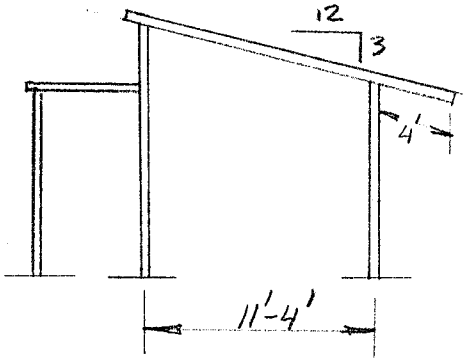
1. ROOF LOADS

A. DEAD LOAD

2" NOMINAL T&G FIR	4.6 PSF
20 GA. COR. METAL SH.	2.4 PSF
FRAMING BEAMS	1.0 PSF
MISC.	2.0 PSF
	10 PSF

B. LIVE LOAD = 20 PSF

2. ROOF BEAMS



MAX SPACING = 4'-8"

$w = 4.67'(10+20) = 140^{\#}/_{1} = 0.14^{K}/_{1}$

$l = 11'-4" = 11.33'$

$M = \frac{(11.68')^2(0.14^{K}/_{1})}{8} = 2.39^{1K}$ (True length)

$S_{REQ} = \frac{2.39(12)}{1.45(1.25)} = 15.81 \text{ in}^3$

TRY 4X8: $S_x = 30.66 \text{ in}^3 > 15.81 \text{ in}^3$, $\Delta = 0.31" = l/451$ } O.K.

$M_{CANT} = \frac{0.14(4)^2}{2} = 1.12^{1K} < 2.39 \therefore$ O.K.

USE 4X8 @ 4'-8" O.C. MINIMUM

consulting engineers — tucson, arizona

project INDIAN BEND WASH COMFORT STATION no. 97479 F
client CORPS OF ENGRS. design date
subject ROOF FRAMING checked date

3. ROOF DECKING

2×8 T&G FIR
MAX SPAN = 4'-8"

$w = \left(\frac{8}{12}\right)(.030) = 0.020^{K/'}$

$M = \frac{0.020\,(4.66)^2}{8} = 0.05^{'K}$

$S_{REQ} = \frac{.05(12)}{(1.45)(1.25)} = 0.36\ in^3$

2×8 : $S_y = 2.719\ in^3 > 0.36\ in^3$
$\Delta = 0.06" = \ell/909$ } O.K.
THIS IS CONSERVATIVE
DUE TO T&G.

4. LATERAL

A SEISMIC

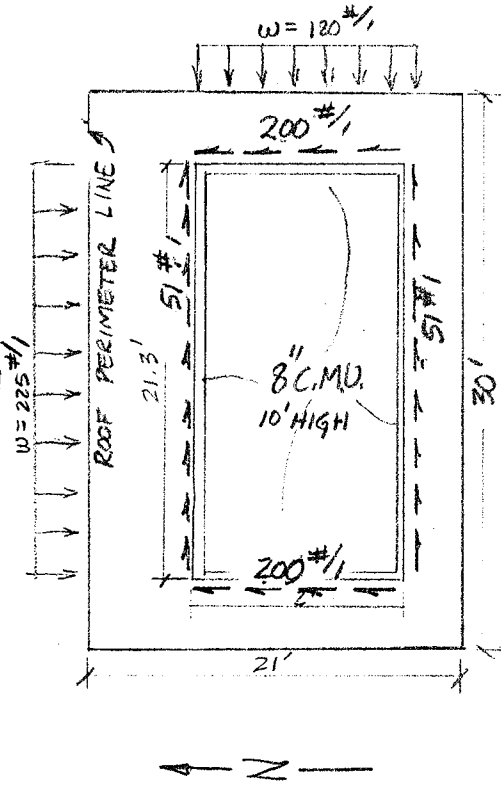
$V = ZICKSW_d = 0.07W_d$

E-W DIRECTION
W_d ROOF : $(21 \times 30')(10\ PSF)$ D.L. $= 6.3^K$
W_d N&S WALLS $(10' \times 21.3')(50\ PSF) = 10.7^K$
MAX $W_d = 17^K = W_d$

$V = 0.07(17) = 1.19^K$

N&S DIRECTION
W_d ROOF :
W_d E&W WALLS : $(10' \times 12')(50\ PSF) = 6.0$
6.3^K
12.3^K

$V = 0.07(12.3) = 0.863^K$



consulting engineers — tucson, arizona

project INDIAN BEND WASH COMFORT STATION no. 97479 F
client CORPS OF ENGRS design JB date 12/79
subject ROOF FRAMING checked ✓ date

4 B. WIND

HIGHEST

N & S WALLS: $(15' \times 21.3')(15 PSF) = 4.8^K > 0.863^K$

$v = \frac{4.8^K}{(2)(12)} = 200\ \#/'$ ON E & W WALLS ∴ WIND RULES IN E-W DIRECTION

AVE H.

E & W WALLS $(12' \times 12')(15 PSF) = 2.16^K > 1.19^K$

$v = \frac{2.16^K}{(2)21.3'} = 51\ \#/'$ ON N & S WALLS ∴ WIND RULES IN N-S. DIRECTION

C. DIAPHRAGM CHORDS:

N & S WALLS:

$w = 4.8^K / 21.3' = .225^{K}/' = 225\ \#/'$

$M = \frac{wl^2}{8} = \frac{.225(21.3)^2}{8} = 12.8^{'K}$

$T = \frac{12.8}{12} = 1.07^K$ 2x8 PLATE ON TOP OF MASONRY IS SUFFICIENT

E & W WALLS:

$w = \frac{2.16^K}{12'} = 0.180^{K}/'$

$M = \frac{0.180(12)^2}{8} = 3.24^{'K}$

$T = \frac{3.24}{21.3} = 0.152^K$

consulting engineers — tucson, arizona

project INDIAN BEND WASH COMFORT STATION no. 97479 F
client CORPS OF ENGRS. design JS date 12/79
subject ROOF FRAMING checked date

4D. SOUTH WALL SHEAR

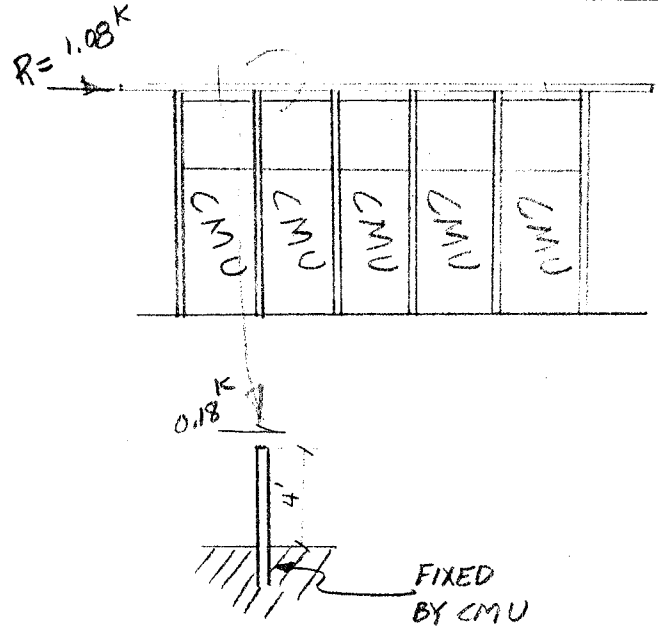
$R = \frac{2.16^K}{2} = 1.08^K$

$V_{8x8} = \frac{1.08}{6} = 0.180^K$

$M_{CANT} = 0.180(4) = 0.72^{'K}$

$S_{REQ} = \frac{0.72(12)}{1.33(1.45)} = 4.48 \text{ in}^3$

8x8: $S_x = 70.31 >> 4.48 \therefore$ O.K.



5. ARCHITECTURAL

a. General: A ramada and a comfort station are part of recreation facilities and native landscape development at the interceptor channel/nature area at Indian Bend Wash, Scottsdale, Arizona. The design of the ramada was supplied by the Corps of Engineers, and will be duplicated for Indian Bend Wash. The Corps also supplied a preferred design for the comfort station, however some modifications were required.

The ramada is a freestanding post-and-beam wood structure with roof and benches of latticed 2 x 4's.

The comfort station is a freestanding wood and masonry building with Men's and Women's rest rooms and a maintenance storage room. A drinking fountain will be provided for common use.

The fixture arrangement in the comfort station has been modified to accommodate the handicapped and to better utilize the space. The clerestory windows shall be glazed with acrylic sheet to minimize vandalism. The spanish tile roof shown on the original design standard will be deleted and replaced with a metal panel roof system as directed to combat vandalism.

Buff colored 8" slump block walls have been selected for use throughout the comfort station. The ceiling will be exposed 2" nominal tongue and groove decking over exposed beams. The floors in the rest rooms will be unglazed quarry tile. The concrete walkway around the building will be wet swept to expose the aggregate which shall be smooth river run gravel.

All three doors shall be hollow core metal doors, 3'-0" wide by 7'-0" high.

Privacy screens shall be as shown on the design standard and shall be constructed of grape-stake slats.

b. Area Tabulation:

(1) Comfort Station:
Overall slab area 21'-8" x 30'-8" = 665 sq. ft.
Total enclosed building area = 12'-8" x 22'-0" = 279 sq. ft.

c. Color Schedule:

Walls - 8" Slump Block w/integral color	Metal Roof Galv. Steel	Exposed wood with linseed oil base stain	Concrete Walk Exposed Aggregate
Buff - Tan	414 Medium Bronze (Smith)	Nordic Walnut (Pittsburg)	Red mix river run aggregate

Doors/Frames Hollow steel	Floor quarry tile
Y0314A Clove Dust (Pratt & Lambert)	Terra Cotta w/walnut grout

d. Physically Handicapped Requirements:

Provisions for the handicapped have been incorporated into this design in accordance with AFM-88-15 and EM-1110-1-103 "Design for the Physically Handicapped". ENG Form 4604-R duplicated below for checklist of items covering design for the physically handicapped.

APPENDIX A
(PART I)

CHECKLIST OF ITEMS GOVERNING DESIGN FOR THE PHYSICALLY HANDICAPPED

Project Indian Bend Wash Installation _____ Spec _____

	Assigned Personnel		Visitors	
	MEN	WOMEN	MEN	WOMEN
NON AMBULATORY				
Wheelchairs	No	No	Yes	Yes
SEMI-AMBULATORY				
Braces or Crutches Amputees, Arthritics Spastics, Pulmonary or Cardiac Ills	No	No	Yes	Yes
MANUAL				
Loss of Upper Extremeties	No	No	No	No
VISUAL				
Total or Near Total Blindness	No	No	No	No
AUDITORY			No	No
COORDINATION				
Faulty or Palsy from brain, spinal, or peripheral nerve injury	No	No	Yes	Yes

(Fill in only "Yes" or "No" in each of the above boxes.

Robert W. Wood
Project Manager

19 December 1979
Date

6. STRUCTURAL

a. Foundation and Floor System:

The foundation system consists of spread footings bearing exclusively on undisturbed earth at a minimum depth of 1'-6" below grade. An allowable bearing pressure of 1000 p.s.f. has been assumed in the design of foundations.

b. Design Loads: (TM 5-809-1/AFM 88-3)

(1) Roof live load = 20 PSF on horizontal projection.

(2) Wind load V90 = 18.5 PSF minimum on vertical projection. Velocity pressure coeff and gust factors as per ANSI A58-1 and TM 5-809-1/AFM 88-3, Chapter 1.

(3) Slab on grade: 150 PSF (4" thick)

(4) Seismic Factors as follows:

V = ZICKCW
Z = Zone II = 0.375
I = Occupancy importance factor: 1.0
C = Response coeff $= \frac{1.0}{15\sqrt{T}}$

T = Period of vibration $= 0.05 \frac{hn}{\sqrt{D}}$

K = Structure response = 1.33
S = Site response

$$= 1.0 + \frac{T}{Ts} - 0.5 \left(\frac{T}{Ts}\right)^2 \quad \text{.... for } \frac{T}{Ts} \leq 1.00$$

$$= 1.2 + 0.6 \frac{T}{Ts} - 0.3 \left(\frac{T}{Ts}\right)^2 \quad \text{.... for } \frac{T}{Ts} > 1.0$$

Ts: not propoerly established
s = 1.5

$c \times s \leq 0.14$

(Refer 1976 Uniform Building Code)

c. Working Stresses: (EM 1110-1-2101)

(1) Concrete, footings and stem walls F'c = 3000 psi

(2) Concrete, slabs on grade f'c = 3000 psi

(3) Reinforcement steel Fy = 40,000 psi (ASTM A615-40)

(4) Concrete masonry units
Standard regular weight ASTM C-90 f'm = 1350 psi
Mortar f'm - 2000 psi

(5) Wood structural members, douglas fir #2 - 1450 psi

(6) Wood, decking, douglas fir, 1800 psi

d. Structural System:

Lateral loads are resisted by 8'-0" high perimeter shear walls of 8" masonry. The roof system consists of 2" nominal tongue and groove decking nailed to timber beams. The roof bears on the masonry wall in back and on 8"x 8"posts in front which are braced by masonry infill panels to 8'-0" above the slab.

7. MECHANICAL

a. Ventilation:

No mechanical means are provided for ventilation of the comfort station. Six 8" x 16" vents located around the base of the walls in each rest room. These vents have louvers and insect screens. In addition, screened vents are provided above the clerestory windows to allow hot air to escape and provide an adequate air movement pattern.

b. Plumbing:

(1) Plumbing fixture schedule.

P-1 Water Closets (WW-P-541/1A)
P-1a Floor mounted, flush valve (1)
P-1b Floor mounted, flush valve, wheelchair (2)

P-2 Urinal (WW-P-541/2A)
Wall hung, washout (1)

P-3 Lavatories (WW-P-541/4A)
Wall hung, wheelchair (2) (no hot water)

P-4 Service Sink (in maintenance/storage room)
Floor mounted cast or molded stone or plastic with rimguard, drain and wall mounted hose bibb type faucet (1).

P-5 Drinking Water Dispenser
Drain mounted for security, wheelchair height (1).

8. ELECTRICAL

No electrical service will be provided.

9. LANDSCAPING

a. Bench:

A total of six benches shall be strategically located along the south bank of the park. The criteria for location was based on areas for potential observation of desert wildlife, interesting arid plant life and where shade from the hot desert sun could be attained.

Larger bench structures shall be located in all three of the group interpretive areas. The larger benches are arranged in an amphitheater fashion to accommodate a classroom situation.

b. Bike Racks:

Three bike rack areas shall be located within the park. The racks shall be constructed of individual timbers (8" x 8" Douglas Fir) which will be concreted into the ground and provide an eye bolt on which to secure a bicycle.

The main bike rack is located next to the comfort station just east of Hayden Road. The other two shall be located at each end of the park. The racks shall provide an opportunity for the rider to safely secure his or her bike and then participate in other park activities.

c. Clearing of Dead Wood:

The existing vegetation shall be cleared of all dead wood in excess of 1" in diameter. Good pruning practices shall be followed so as not to damage live vegetation. Excessive fallen wood shall also be removed from the area. All dead wood shall be run through a chipper and used as a mulch throughout the area. Care must be taken not to destroy the cover for the existing wildlife.

The removal of dead wood will reduce the fire hazard and increase the visual enhancement of the park.

d. Site Clean-Up:

The entire site shall be cleaned of all trash and garbage. This shall be done by hand where damage to existing vegetation may occur.

e. Seeding:

Two seeding methods shall be used. A drilling process shall be used in all areas accessible my machine; and, areas too densily vegetated or too steeply sloped shall be hand seeded and raked. Two separate seed mixes shall be used. One containing large and medium size shrubs, forbs and grasses to be located in the mitigation strip and along parts of the upper half of the channel bank; and, the other containing low lying shrubs, forbs and grasses covering the bottom of the channel and all remaining areas.

The meandering pattern of seed mix distribution is designed to integrate open spaces and tree bosques in a rhythmic sequence. The plant growth will provide cover and food for wildlife, as well as bank stabilization and erosion control.

f. Tree Planting:

Native trees shall be planted in large masses to assimilate the existing tree bosques. Additional native tree types shall be used in the rest areas to create a feeling of change and to add interest.

g. Blind and Visually Impaired:

An exposed aggregate curb shall line both sides of the interpretive pathway system to provide a cueing device and to discourage snakes from crossing the paths. Each substation pull-off area within the interpretive area shall be keyed by 1) placing two large stones within the concrete curb and 2) providing a bright, contrasting color and texture change from asphalt to pressed cobblestone concrete. Research has indicated that this simple cueing and keying of the pathway system in this manner offers the visually impaired and blind maximum ease in enjoying an outdoor experience.

h. Signage:

The information and location guide located at the Comfort Station shall feature trails and observation areas as well as providing information to the handicapped. The pathway signage located throughout the park will identify drinking water, restrooms, handicapped facilities, trail shelter, bicycle trials, hiking trails, interpretative trails and litter receptacles.

i. Trash Receptacles:

Four trash receptacles shall be placed throughout the park. One near the ramada, one near the Comfort Station and one at each end of the site.

10. IRRIGATION

The design of the irrigation system is based on maximum water conservation and minimal impact of the existing delicate desert mesquite bosques. The flood irrigation method in the existing mesquite bosque is to be used only when desert rains are insufficient. The quick coupler spray method in the interpretive area is to supplement the additional water requirements of the introduced upper desert plant materials exhibited. A combination drip emitter, depressed basin and mechanical water truck method will supplement the balance of the parks planting. The drip system places water only at the root ball of trees; its method of distribution reduces erosion and evaporation until plants are established. The depressed earthen areas tend to create the natural desert's way of capturing additional water and it is used as design elements permit. The water truck method will be used on plant material not under mechanical irrigation until plant material is established.

11. INTERPRETIVE AREA

(THIS INFORMATION WILL BE PLACED ON MAP BOARD)

You will be visiting three major plant communities found in the Lower Sonoran Life Zone, the Upper Sonoran Life Zone, and the Transition Life Zone, three of six major Life Zones found in Arizona. Life zones are vertically arranged zones of plant and animal life, ranging from 3000-13,000 feet, which were delineated by C. Merriam in 1890 as an aid in studying the wildlife of an area. The zones are classified by the dominant plant species.

The ability of these zones to support the wildlife is changed by man's impact. Some of the complex interrelationships between the environment and the wildlife of the area, and how man's needs affect the balance, will be explained.

The first plant community is the Mesquite Bosque. Formerly, the mesquite trees grew along many of Arizona's larger drainage ways in dense forest-like stands. Some of the trees reached 40 to 50 feet high, with some having trunks two or three feet in diameter.

We have a fine example of a small Mesquite Bosque. Bosque is a Spanish term meaning wood, forest or thicket. A Mesquite Bosque occurs in the Lower Sonoran and Upper Sonoran Life Zones, which are between 2000-4000 feet elevation.

The Mesquite Bosque is associated with the Riparian Plant Community. The Bosque is located on the edges of the riparian community within the flood plain area. The mesquite tree relies on flowing water to disperse seeds and abraise the seed covering to facilitate growth. It is an important source of food and cover for many animals.

Man's impact, building of dams, roads, buildings and irrigation systems have greatly reduced the number of Mesquite Bosques. This Bosque has been saved for you to enjoy.

The second plant community is the Riparian Woodland. The riparian community is found along streams, rivers and flood plains. It can often be identified as a bright green ribbon cutting across the less dense and lighter colored desert vegetation. It can be found in all of the Life Zones, except the two highest: the Hudsonian and the Alpine Tundra.

The vegetation is composed mostly of broad-leaf trees which are winter deciduous. The trees are ofter large, reaching heights of 50 to 100 feet. The riparian woodland is characterized by a complex of trees, and the plant and animal associations are found only in this community.

Riparian areas are becoming scarce, with the lowering of water tables and construction of the major drainage ways.

The third plant community is the Desert Grassland. It is commonly found in the Lower and the Upper Sonoran Life Zones, with an elevation of

3500-5000 feet. When the name "desert grassland" is used, many people think of rolling hills of grass. This is true in only a few locations of Arizona. Depending on the depth, the soil will determine if the area will have clumps of perennial grasses (deep soil), or the grasses will be in competition with a wide variety of shrub, tree and cacti (rocky, shallow soil).

The nature area site has a moderate soil and you will see a combination of both varieties.

As you go through the nature areas, you may want to make a check list of the more common plants and animals.

Some of the more common plants and animals are listed below for your use:

TREES

Common Names	Scientific Name
1. Hackberry	Celtis reticulata
2. Desert Willow	Chilopsis linearis
3. Velvet Mesquite	Prosopis velutina
4. Fremont Cottonwood	Populus fremontii
5. Blue Paloverde	Cercidium Floridum

SHRUBS

1. Whitehorn Acacia	Acacia constricta
2. Desert Broom	Baccharis sarothroides
3. Four-wing Saltbush	Atriplex Canescens
4. Jojoba	Summondsia chinensis
5. White Brittlebush	Encelia farinoso

CACTUS

1. Saguaro	Cereus giganteus
2. Buckhorn Cholla	Opuntia acanthocarpa
3. Engelmann Prickly Pear	Opuntia discata
4. Barrel Cactus	Ferocactus wisliyeni
5. Jumping Cholla	Opuntia fulgida

GRASS

1. Bush Muhly	Muhlenbergia porteri
2. Brome	Bromus arizonicus
3. Filaree	Erodium circutarium
4. Deer Grass	Muhlenbergia regens
5. Fountain Grass	Pennistum setaceum

AMPHIBIANS

1.	Colorado River Road	Bufo alvarius
2.	Desert Toad	Bufo cognatus
3.	Couch's Spadefoot	Scaphiopus couchi
4.	Giant Road	Bufo marinua

REPTILES

1.	Western Whiptail	Cnemidophous tigris
2.	Collared Lizard	Crotaphytus collaris
3.	Tree Lizard	Urosaurus ornatus
4.	Gopher Snake	Pituophis melanolenaus
5.	Banded Gecko	Colenyx variegatus

MAMMALS

1.	Round-tailed Ground Squirrel	Citellus tereticaudus
2.	Rock Squirrel	Citellus variegatus
3.	Desert Pocket Mouse	Perognathus penicillatus
4.	Desert Cottontail	Sylvilagus andubonii
5.	Brown Bat	Eptesicus fuscus

BIRDS

1.	Cardinal	Richmondena cardinalis
2.	Mourning Dove	Zenaidura macroura
3.	Grackle	Cassidix mexicanus
4.	Roadrunner	Geococcyx califorurianus
5.	Gambels Quail	Lophortyx gambelii

INDIAN BEND NATURE AREA

The Indian Bend Flood Control Project is unique; it combines flood control and recreational use.

The Corps of Engineers and several nonfederal agencies are constructing the Indian Bend Wash Project jointly. Maricopa County Flood Control District will share the cost of flood control features and the cities of Scottsdale and Tempe will share recreational construction costs with the Federal Government on a fifty-fifty basis.

The Nature area has been set aside as a wildlife and native vegetation sanctuary. The area is located on the north by the Interceptor Channel and on the south by the Arizona Canal.

The channel was developed to protect residential, commercial, industrial, and public property in Scottsdale and Tempe against flood damage.

The Nature Area was designed to partially mitigate the loss of vegetation resulting from Interceptor Channel construction and provide additional wildlife habitat.

This has been accomplished by planting and seeding only native Arizona plants common to dry washes and desert areas, for natural food and wildlife cover.

You will walk through three major Arizona plant communities within the site. Approximately in the center of each community there will be a group observation point with benches for your use. Along the nature trail through the nature area are six key nature observation points.

These areas have been set aside to stimulate your quest for knowledge of the Natural Environment.

The nature trails and observation points have been designed to accommodate wheelchairs and walkers. The trail also has special curbing to accommodate the blind.

Please observe these rules during your visit:

1. Stay on trails
2. No littering
3. All dogs on leash
4. Removal of any vegetation or wildlife prohibited

Enjoy your visit!

This site is administered and maintained by the City of Scottsdale Parks and Recreation Department.

1. MESQUITE COMMUNITY

Mesquites are common along washes and lower areas where water collects after rains. After becoming established, mesquites send down long top roots to reach underground water sources. They are an important source of food and shelter for the animal life of the area. Being a member of the legume family, the seeds have a high protein value. In spring, when the trees bloom the vitamins provided by the blossoms help trigger the mating of the animals in the area, such as the Gambels quail.

Gambels quails are ground nesting birds that are associated with the mesquite. They lay their eggs ten-to-sixteen per clutch. The young are able to run after their parents hours after birth. A parade of quail dash from bush to bush looking for food. The birds do not have to have free water to drink; they can survive with the moisture from the plants they eat.

1a. MESQUITE COMMUNITY

In areas where water could collect or "pond", mesquite communities are common. Many forms of wildlife find these areas ideal. The additional shade, shelter and moisture provide ideal homes for many animals.

Arizona has all four species of skunks: hooded, hognosed, striped and spotted. Skunks are omnivorous; they eat both vegetation and animal material. The eggs and young of the many birds nesting in the area, the rodents that live off the seeds and insects, plus the many types of vegetation, provide an excellent diet for a skunk. The skunk gets much of the water it needs from its food. All four species of skunks are protected by their well-known ability to spray. Despite this they are food for great horned owls and other predators.

2. RIPARIAN COMMUNITY

Riparian areas are in association with drainage ways. The elevation of the area determines the vegetation and animal life. In this area, acacias, hackberry, and desert broom are in contrast to the cacti and bursage of the surrounding desert.

The many rodents that find shelter and food in the area provide food for the kit fox. The desert fox is nocturnal and ofter lives in burrows or dens in the side of a wash. The kit fox is disappearing from its habitat due to coyote poisoning programs.

2a. RIPARIAN

Riparian areas contain larger leaved plants, such as net leaf hackberry, alders and cottonwoods. Many areas in Arizona can support this type of growth, even though the surface is dry much of the year. In the later 1800's an earthquake in the area caused many of the rivers to go underground. This loss of surface water was no problem to large trees with deep root systems.

The javelina can often be seen, or his distinctive musk odor detected, in dry wash areas. Javelina usually travel in herds of three to forty animals. They bed down in sheltered areas under shrubs and forage on plant materials. They can eat the prickly pear pods even though the pods contain oxalic acid. The javelina has an undeserved reputation of attacking people. It has very poor eyesight but a keen sense of smell. The illusion of attack comes as the animal moves closer to get a look at what it smells.

3. GRASSLAND COMMUNITY

Desert Grasslands are found between 3500-5000 feet elevation. Most of the desert grasslands in Arizona receive ten-to-fifteen inches of rain annually. The grasses are often bunch-growth perennials.

The Yucca elata is often associated with the desert grassland. It is considered a small tree. The leaves produce a coarse fibre important in Papago basket weaving, and the stems contain a material which can substitute as soap.

An interesting relationship is that the yucca can only be pollinated by the Pronuba or Yucca moth. The Pronuba is approximately half an inch long and powdery white. This camouflages the moth while it does its work in the white yucca blossom.

The moth will climb up the stamen collecting pollen and works this into a tiny ball. This ball may be three times the weight of the moth. She then visits other flowers, laying her eggs in the pistil and depositing some of the pollen in the flower. This insures that the flower is fertile and that the young insects will have a constant food source while growing.

3a. GRASSLAND COMMUNITY

The desert grasslands which are at their best between 4000 and 5000 feet elevation are disappearing.

Grasslands are being invaded by mesquite. Historically, grasslands were burned by natural fires every ten or fifteen years. The growth center of grasses is in the roots and the grass would quickly be ready to make use of the nutrients added to the soil by the ashes. The larger bushes and trees lose much of their stored food and growth areas in a fire, so were slow to make a comeback. Man's control of fire, plus the advent of grazing, has created an opportunity for the mesquites to move into the grassland areas. Overgrazing weakened the grass and the cattle also brought mesquite beans into the areas in their droppings. This provided an excellent opportunity for the mesquite to migrate into these areas.

The animals that are able to live in the area change as the plant life changes.

4. THE ARIZONA CANAL

Construction on Arizona Canal started in 1883 and it first held water in 1885. A private company initially operated the canal and then the U. S. Bureau of Reclamation took over in 1907. In 1916 the Salt River Valley Water Users' Association took over the operation of the canal.

The water brought in by the canal in the early years fostered the growth of mesquite bosques. The concentration of mesquite growth has decreased in recent years, possibly because of the change in water runoff patterns. Also, the removal of mesquites upstream reduced the number of seeds being brought into the area.

The mesquite bosque provides food and protection for migrating birds, such as the White Winged Dove. This bird is dependent on thick mesquite areas for nesting. The reduction of mesquite means less sheltering area for the birds flying through on their way South.

The proximity of water brings many species of animals to the area. Amphibians, such as the Colorado River Toad, will move in to feed on the insects. The Colorado River Toads can live in areas where there are only temporary rain pools, but are active for much longer where there is permanent water. The greater concentration of vegetation brings in insects, which attracts the insect-eating animals, and so on up the food chain, creating a balanced community.

4a. THE ARIZONA CANAL

The Arizona Canal was built in 1883 and first held water in 1885. The canal's primary purpose was, and still is, irrigation. This irrigation water is used for agriculture.

The origianl canal was not concrete lined and water soaked into the soil, allowing vegetation and animal communities to establish. The canal now has been concrete lined top and bottom. Who knows what will happen?

Hopefully, the design of the Interceptor Channel will allow runoff to be absorbed and the plant communities will benefit.

5. THE MESQUITE TREE COMMUNITY

Have you ever taken a close look at a mesquite tree? Did you ever notice how interdependent plant and animal life are?

Notice the smaller plant material undergrowth. These smaller or young plants rely on the "Nurse Plant" for protection from the sun, plant consumers, man, and even slows the velocity of precipitation.

Look carefully at the undergrowth. Here are the rodent homes of the long-tailed ground squirrel. If the growth is thick enough you may see the nest of a Gambels quail, also.

Now look into the branches above you. Here are the nesting areas of the morning dove. Notice the loosely interwoven small sticks in the forked limb of the tree.

Did you notice that dark green clump of plant material high in the branches? That is a parasite. If it spreads, it may kill its host.

This mesquite tree is a community in itself. When we take the tree away - who knows it's gone?

5a. THE MESQUITE TREE COMMUNITY

When you first look at a mesquite tree community it may look like there is not much life. But a closer look will show that there are many animals in and around the tree. Also, a closer look under the tree reveals many small plants, even moss.

If you watch closely you will see tree lizards darting around on the trunk and branches of the tree. The lizard is eating the many insects he finds in the cracks and crevices. The lizards are fed upon by many snakes, birds and mammals. A roadrunner entering the shade of the mesquite would be quick to grasp the lizard in his beak as a snack. The roadrunner scurrying off to seek more food would make an excellent meal for the coyote resting in the shade.

6. THE LIFE CYCLE

The death of a mesquite is a beginning of an energy cycle, as well as the end of the individual tree. The dead tree provides food and shelter to many insects, small reptiles, rodents, and mammals. Bacteria and insects break down the wood, and the nutrients go back into the soil to provide nourishment for the mesquite seed that lodges in the debris. This seedling is partially hidden by the decaying branches. This protection keeps it from being eaten by a passing animal, or drying out in the summer sun.

As the mesquite grows larger, using energy from the sun, it is able to convert into sugars usable by itself and other living things. After many years of growth the mesquite matures. It then can provide nesting and roosting areas for birds. The Phainopipla (a totally black, crested bird, common to the area) may stop in its branches one day after feasting on some nearby mistletoe berries. The sticky berries send out little rootlets into the mesquite branch and soon a mistletoe plant is growing in the tree. The mistletoe will produce fruit and attract more birds to the mesquite.

Under the shade of the mesquite many small shrubs have grown. These shrubs attract insects such as beetles. The insect-eating rodents come to prey upon the insects. The rodents are preyed upon by snakes, and they in turn will provide food for the owls that roost high in the branches of the tree, or perhaps by a coyote that wanders by in the night. Eventually, the mesquite will live out its days only to start the process again.

6a. THE LIFE CYCLE

Each of the areas you have visited, indeed all natural areas, are continuously recycling materials.

When the giant cottonwood is alive it takes nutrients from the water and soil and converts them into food for itself and stores food which is often utilized by others. The tree shelters birds, mammals, reptiles and insects during its lifetime along with providing them with food.

When this cottonwood dies it still provides food and shelter: food for termites and other insects, which are eaten by lizards, the lizard would feed the shrike who stops by, and then the shrike would be a meal for a hawk. The hawk would not be the end of the recycling. Eventually, the hawk would die and these nutrients again would return to the soil so the process could begin again.

Nature's way is to reuse. She does not throw things away.

SECTION B

LIST OF GUIDE SPECIFICATIONS

INDIAN BEND WASH/NATURE AREA

SCOTTSDALE, ARIZONA

CSI Div	Title	Guide Specification Number	Date	Specification Data
5	Miscellaneous Metal Materials	CW-05502	April 1977	Bench Frame Work
2	Irrigation System	2P	---	Tree Irrigation System
6	Finish Carpentry	CE-235.04	July 1972	Bench
2	Excavation, Trenching & Backfilling	CE-500	14 May 1965	Irrigation Trench
2	Trees, Shrubs, Ground C. & Vines	CE-02831	July 1976	Tree Planting
3	Standard Specification for Concrete	CE-1401.01	March 1976	Bench Footers
9	Painting (General)	9A	---	Bench

Section No.	Title	Guide Specification Number	Specification Data
2	Cleaning and Grubbing for Roads	CEGS-02102	Work shall consist of removing trees, stumps, brush, roots, rubbish, debris and other objectionable matter from trail path or other defined areas. Under the direction of the A.E. natural vegetation will be removed and salvaged or hauled away to designated disposal area. Clearing will be confined in trail area to preserve remaining natural vegetation.
2	Grading (Earthwork)	CE-02210	Grading work will be executed in area shown on the drawings. Work include all necessary cutting and filling to construct subgrades, structure pads, and site fine grading. Compaction to following percentage of maximum density at optimum moisture content (ASTM D 1557-70, Method D): Structure pads 98% Trail, road and parking 95% Open spaces 80%
2	Stabilized-Aggregate Base Course	CE-02696	This work consists of furnishing and placing an aggregate material as a base in accordance with details, plans and specifications. Aggregate base material shall conform to following sieve test: 1 inch 100% 3/4 inch 90-100% 1/4 inch 45-75% No. 200 0-8%

Section No.	Title	Guide Specification Number	Specification Data
2	Stabilized-Aggregate Base Course (Continued)	CE-02696	Aggregate base material shall have water added to it, and shall be mixed and processed so as to produce a uniform blend of material before final placement. Compaction shall be to 100% of maximum density (ASTM D 1557-70, Method D). Surface of compacted material shall be finished with leveling equipment. After completion of leveling operations, the aggregate base shall be watered and rolled until the required compaction has been obtained.
2	Bituminous Prime Coat	CE-02672	This work will consist of furnishing and applying bituminous material to a prepared base course, in accordance with these specifications. Bituminous material shall be MC-70. Surface to receive prime coat shall be smooth, firm and reasonably true to grades and cross sections as shown on drawings. Bituminous material shall be applied when surface is either slightly damp or dry; application to be uniform and at the rate of 0.40 Gal/S.Y. (one application). Traffic shall be kept off the bituminous material until it has penetrated the base and cured sufficiently.

Section No.	Title	Guide Specification Number	Specification Data
2	Bituminous Tack Coat	CE-02671	Work consists of furnishing and applying bituminous material to a bituminous primed surface. Bituminous material shall be RC-70. Surface of prime coat shall be clean. Application to be uniform and at the rate of 0.10 Gal/S.Y. (one application).
2	Bituminous Seal Coat	CE-02673	Work consists of furnishing and applying a bituminous mixture for a seal coat of the slurry seal type. Surface to receive seal coat shall be thoroughly cleaned prior to applying the slurry. Proportioning of mixture shall be determined at the time of application. Slurry seal shall be mixed in a continuous pugmill-type mixer. Slurry seal shall not be placed when weather conditions are such that a satisfactory seal cannot be obtained. Slurry mixture shall be uniformly spread by means of a controlled spreader box. Traffic of all types shall be kept off the slurry seal until it has time to set properly.
2	Concrete sidewalks and curbs	CE-02631	Work shall consist of furnishing all materials and constructing portland cement concrete trails and curbs, including fine grading, watering, compacting and backfilling, all in accordance with details, plans and these specifications.

Section No.	Title	Guide Specification Number	Specification Data
2	Concrete sidewalks and curbs (Continued)	CE-02631	Concrete Cement: ASTM C-150 Type II Water: shall be free from all harmful matter. (potable water from public utility distribution system will be acceptable) Fine aggregates: AASHTO - T27 Forms Set to form full depth of slab or curb. Expansion joints formed and placed as shown on plans. Concrete finish broomed or brushed.
15	Water Lines	CEGS-15271	Work shall consist of constructing site piping for potable water supply and shall include trench excavation, backfilling, line installation, furnishing all material, fittings, equipment, tests and disinfection for a complete system as shown on drawings, and ready for operation. Galvanized steel pipe (GS): ASTM A 120-76, Standard weight (Sched. 40) with ANSI B2.1-68 tapered pipe thread joints. Polyvinyl chloride plastic (PVC): ASTM D2241-76, PVC 1120 or 1220, SDR 21, PR200, with seal of approval of NSF. Ductile iron (DI): ANSI A 21.51-71, Class 2.
15	Sewers; Sanitary, Gravity	CEGS-15302	Work shall consist of constructing site piping for gravity sanitary sewer and shall include trench excavation, backfilling, line installation, furnishing all material, fittings, equipment and tests for a complete system as shown on drawings, and ready for operation. Vitrified clay pipe (VCP): ASTM C700-78

CSI Div	Title	Guide Specification Number	Date	Changes
3	Concrete (For Building Construction)	CE-204	September 1970	
5	Miscellaneous Metal	CE-216	30 October 1967	
7	Metal Roofing and Siding, Factory-Color-Finished	CE-222.02	August 1972	
8	Steel Doors and Frames	CE-225.02	June 1968	
6	Rough Carpentry	CE-235.03	July 1972	
6	Finish Carpentry	CE-235.04	July 1972	
15	Plumbing, General Purpose	CE-300.01	June 1974	
2	Excavation, Trenching, and Backfilling for Utilities Systems	CE-500	14 May 1965	1-31 May 1966
2	Joint Sealing in Concrete Pavements, Preformed Elastomeric Type	CE-806.08	April 1973	
2	Grading (Earthwork)	CE-02210	May 1975	
2	Concrete Sidewalks, Curbs, and Gutters	CE-02631	August 1975	
2	Subbase Course	CE-02668	August 1975	
4	Reinforced Masonry	CE-04230	December 1974	

CSI Div	Title	Guide Specification Number	Date	Changes
2	Excavation, Filling and Backfilling for Buildings	CEGS-02201	May 1978	
7	Calking and Sealants	CEGS-07951	April 1978	
8	Hardware; Builders' (General Purpose)	CEGS-08710	February 1977	
8	Acrylic Plastic Glazing	CEGS-08840	April 1978	
9	Ceramic Tile	CEGS-09310	January 1978	
9	Painting, General	CEGS-09910	January 1978	
10	Metal Toilet Partitions	CEGS-10160	March 1977	
10	Toilet Accessories	CEGS-10801	April 1977	
15	Water Lines	CEGS-15271	July 1977	
15	Sewers; Sanitary, Gravity	CEGS-15302	May 1977	

SECTION C

LIST OF DRAWINGS

INDIAN BEND WASH/NATURE AREA

SCOTTSDALE, ARIZONA

Dwg. No.	TITLE		
	CIVIL		
C1	Site and Grading Plan No. 1	Sta. 1+00 to Sta.	16+00
C2	Site and Grading Plan No. 2	Sta. 16+00 to Sta.	29+00
C3	Site and Grading Plan No. 3	Sta. 29+00 to Sta.	43+50
C4	Site and Grading Plan No. 4	Sta. 43+50 to Sta.	58+50
C5	Site and Grading Plan No. 5	Sta. 58+50 to Sta.	75+00
C6	Blow up		
C7	Details		
C8	Details		
G1	Geometric Plan No. 1	Sta. 1+00 to Sta.	16+00
G2	Geometric Plan No. 2	Sta. 16+00 to Sta.	29+00
G3	Geometric Plan No. 3	Sta. 29+00 to Sta.	43+50
G4	Geometric Plan No. 4	Sta. 43+50 to Sta.	58+50
G5	Geometric Plan No. 5	Sta. 58+50 to Sta.	75+00
G6	Geometric Plan No. 6	Blow up	
	LANDSCAPING		
L1	Design Layout Plan	Sta. 1+00 to Sta.	16+00
L2	Design Layout Plan	Sta. 16+00 to Sta.	29+00
L3	Blow-up		
L4	Design Layout Plan	Sta. 29+00 to Sta.	43+50
L5	Design Layout Plan	Sta. 43+50 to Sta.	58+50
L6	Design Layout Plan	Sta. 58+50 to Sta.	75+00
L7&L8	Detail Sheets		
	IRRIGATION		
I1	Irrigation Schematic	Sta. 1+00 to Sta.	16+00
I2	Irrigation Schematic	Sta. 16+00 to Sta.	29+00
I3	Blow-up		
I4	Irrigation Schematic	Sta. 29+00 to Sta.	43+50
I5	Irrigation Schematic	Sta. 43+50 to Sta.	58+50
I6	Irrigation Schematic	Sta. 58+50 to Sta.	75+00
I7	Detail Sheet		
	ARCHITECTURAL		
A1	Ramada - Plans, Elevations and Details		
A2	Comfort Station - Plans and Elevations		
A3	Comfort Station - Details		

SECTION D

PRELIMINARY COST ESTIMATE

INDIAN BEND WASH/NATURE AREA

SCOTTSDALE, ARIZONA

DEPARTMENT OF THE ARMY

LOS ANGELES DISTRICT, CORPS OF ENGINEERS

LOS ANGELES, CALIFORNIA

Date 9-8-80

Reviewed By: RLH

SUMMARY SHEET

Indian Bend Wash/Nature Area
Scottsdale, Arizona

PRELIMINARY COST ESTIMATE

I	SITE WORK	$ 214,403.00
II	UNDERGROUND UTILITIES	
	a. Sanitary Sewer	2,212.00
	b. Water Distribution	8,676.00
III	BUILDINGS	
	a. Earthwork	270.00
	b. Concrete	7,429.00
	c. Masonry	3,600.00
	d. Metals	460.00
	e. Carpentry	9,163.00
	f. Thermal & Moisture Protection	2,725.00
	g. Doors, Windows and Glazing	3,360.00
	h. Finishes	1,368.00
	i. Specialties	2,285.00
	j. Mechanical, plumbing	5,450.00
IV	LANDSCAPING & IRRIGATION	312,149.00
	SUBTOTAL	$ 573,550.00
	CONTINGENCIES 15%	86,032.00
	COST GROWTH (Based on mid-point of construction during July 1981, 10 mo.@ 1.5% per mo.) 15%	98,937.00
	TOTAL	$ 758,519.00

UNIT PRICE SOURCES (Contacted on 18 December 1979)

Tanner Companies (General Contractor)
2606 South 40th Street
Phoenix, Arizona 85031
Tel. (602) 262-1373 Mr. Dave Clifton

Engineered Sales Company
5150 North 16th Street
Phoenix, Arizona 85016
Tel. (602) 264-7946 Mr. Jim Thomas

QUANTITY TAKE-OFF

_____ ESTIMATE

LOCATION & FY PROGRAM: INDIAN BEND WASH - NATURE AREA			JOB NO.
DIRECTIVE JOB NO.: DACW09-78-C-0041	COMPUTED BY: RLH		PREPARED BY
LINE ITEM NO.	CHECKED BY: JFFL		CHECKED BY
DESCRIPTION: I-CIVIL - SITE	DATE: 9-8-80		DATE

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Earthwork				
	Cut, haul & fill				
	incl. compaction	5,853	CY	4.50	26,338.00
	Borrow, haul & fill				
	incl. compaction	5,699	CY	4.00	22,796.00
2	2" Asphalt conc. parking & turnaround	444	SY	4.00	1,776.00
3	2" Asphalt conc. (10' wide)	15,277	SY	5.00	76,385.00
4	2" Asphalt conc. (8' wide)	1,133	SY	6.00	6,798.00
5	2" Asphalt conc. (5' wide w/color coat)	1,792	SY	9.00	16,128.00
6	4" Conc. (8' wide)	822	SY	18.00	14,796.00
7	6" Compacted subbase (nat. ground)	19,468	SY	1.50	29,202.00
8	6" ABC (under 4" Conc)	822	SY	2.00	1,644.00
9	Conc. cutoff wall (4" x 8")	3,205	LF	1.00	3,205.00
10	Conc. curb (6" x 18")	230	LF	7.00	1,610.00
11	Conc. wheel chair ramps	1	EA	200.00	200.00
12	Conc. curb (exposed AG.)	2,400	LF	4.50	10,800.00
13	Wheel stops	4	EA	10.00	40.00
14	Remove 2' wedge curb	128	LF	5.00	640.00
15	Plug exist. R.C.P.	4	LS	1000.00	1,000.00
16	Shape/Fine Grade Stream Bed	1	LS	1000.00	1,000.00
17	Pavement Markings	5	EA	9.00	45.00
	SUBTOTAL				$ 214,403.00

SPD FORM 337 (RULED)
1 AUG 60

QUANTITY TAKE-OFF

_____ ESTIMATE

LOCATION & FY PROGRAM: INDIAN BEND WASH-NATURE AREA			JOB NO.
DIRECTIVE JOB NO.: DACW09-78-C-0041	COMPUTED BY: JFFL		PREPARED BY
LINE ITEM NO.	CHECKED BY: RLH		CHECKED BY
DESCRIPTION: II-CIVIL - UNDERGROUND UTILITIES	DATE: 9-8-80		DATE

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
	(a) Sanitary Sewer				
1	6" Ø VCP Sanitary sewer	125	LF	$ 6.00	750.00
2	Sanitary cleanout w/ plug	1	EA	150.00	150.00
3	Connection to existing MH-complete	1	EA	750.00	750.00
4	Trenching and backfilling	125	LF	4.50	562.50
	SUBTOTAL				$ 2,212.50
	(b) Water Distribution				
5	3" Ø PVC SDR 21 Water line	135	LF	5.50	742.50
6	2" Ø PVC SDR 21 Water line	50	LF	5.00	250.00
7	1" Ø PVC SDR 21 Water line	652	LF	4.50	2,934.00
8	3" x 2" Tee w/ bushings	1	EA	40.00	40.00
9	3" x 2" Red	1	EA	25.00	25.00
10	2" x 1" Red	1	EA	20.00	20.00
11	1" GV w/ VB & C	1	EA	50.00	50.00
12	3" GV w/ VB & C	1	EA	170.00	170.00
13	2" GV w/ VB & C	1	EA	90.00	90.00
14	3" Pressure Red Valve w/ box	1	EA	500.00	500.00
15	1" Magnetic Meter w/ meter box-complete	1	EA	400.00	400.00
16	2" tee w/ bushings	1	EA	25.00	25.00
17	Trenching and backfilling	837	LF	3.50	2,929.50
18	14" x 3" Wet tap-complete	1	EA	250.00	250.00
19	Potable Water System Disinfection	1	EA	250.00	250.00
	SUBTOTAL				$ 8,676.00

SPD FORM 11 AUG 60 337 (RULED)

QUANTITY TAKE-OFF				_____ ESTIMATE	
LOCATION & FY PROGRAM INDIAN BEND WASH-NATURE AREA				JOB NO. 97479F	
DIRECTIVE JOB NO. DACW09-78-C-0041		COMPUTED BY RJM		PREPARED BY	
LINE ITEM NO.		CHECKED BY MFM		CHECKED BY	
DESCRIPTION III BUILDINGS		DATE 9-8-80		DATE	
ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Earthwork				
	Structural Excavation	10	CY	15.00	150.00
	Structural Backfill	6	CY	20.00	120.00
					270.00
2	Concrete				
	Footings (in trench)	8.5	CY	140.00	1,190.00
	Stem Wall	3.7	CY	140.00	518.00
	Reinforcing Steel	600	LBS	.55	330.00
	Slab on Grade	14.5	CY	160.00	2,320.00
	Mesh 6 x 6 x W2.9 x W2.9 WWF	1175	SF	.35	411.00
	finish and cure	1175	SF	.60	705.00
	Construction joints bars	60	EA	2.75	165.00
	Edge finishing	210	LF	.55	115.00
	Form Work	500	SF	3.35	1,675.00
					7,429.00
3	Masonry				
	8" Slump block w/ integral color	800	SF	4.50	3,600.00

ED FORM 1 AUG 60 337 (RULED)

QUANTITY TAKE-OFF

_____ ESTIMATE

LOCATION & FY PROGRAM: INDIAN BEND WASH-NATURE AREA			JOB NO.: 97479F
DIRECTIVE JOB NO.: DACW09-78-C-0041	COMPUTED BY: RJM/JS		PREPARED BY:
LINE ITEM NO.	CHECKED BY: MFM		CHECKED BY:
DESCRIPTION: III BUILDINGS (cont.)	DATE: 9-8-80		DATE:

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
4	Metals				
	24 Ga. metal decic, painted				
	Vent lowers 8" x 16"	12	EA	30.00	360.00
	Insect screen	1	LS	100.00	100.00
					460.00
5	Carpentry				
	Lumber	6,530	BF	1.25	8,163.00
	Chamfering and millwork	1	LS	1000.00	1,000.00
					9,163.00
6	Thermal & Moisture protection				
	Caulking	1	LS	100.00	100.00
	Factory finished metal roof	570	SF	4.50	2,565.00
	2 - #15 ply roof underlayment	6	CSF	10.00	60.00
					2,725.00

QUANTITY TAKE-OFF

_____ ESTIMATE

LOCATION & FY PROGRAM: INDIAN BEND WASH-NATURE AREA		JOB NO. 97479F	
DIRECTIVE JOB NO. DACW09-78-C-0041	COMPUTED BY RJM	PREPARED BY	
LINE ITEM NO.	CHECKED BY RJM	CHECKED BY	
DESCRIPTION III BUILDINGS (cont.)	DATE 9-8-80	DATE	

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
7	Doors, Windows & Glazing				
	Ext. Met. 3 x 7 incl. Fr. & Hdw.	3	EA	700.00	2,100.00
	Fixed clerestory - acrylic	70	SF	18.00	1,260.00
					3,360.00
8	Finishes				
	6" x 6" Quarry tile	200	SF	3.00	600.00
	2 coat wood stain	650	SF	.75	488.00
	Paint doors	3	EA	60.00	180.00
	Paint metal trim	1	LS	100.00	100.00
					1,368.00
9	Specialties				
	Toilet partitions	3	EA	250.00	750.00
	Urinal Screens	1	EA	200.00	200.00
	Mirrors	2	EA	50.00	100.00
	Mop holders (4) on mounting board	1	EA	65.00	65.00

QUANTITY TAKE-OFF

_____ ESTIMATE

LOCATION & FY PROGRAM: INDIAN BEND WASH-NATURE AREA			JOB NO. 97479F
DIRECTIVE JOB NO. DACW09-78-C-0041	COMPUTED BY RJM		PREPARED BY
LINE ITEM NO.	CHECKED BY RJM		CHECKED BY
DESCRIPTION III BUILDINGS (cont)	DATE 9-8-80		DATE

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
	Paper towel dispenser	2	EA	200.00	400.00
	Soap dispenser	2	EA	35.00	70.00
	Handicap grab bars	4	EA	140.00	560.00
	Identification symbols	4	EA	35.00	140.00
					2,285.00
10	Mechanical Plumbing to 5' outside bldg.				
	Fixtures				
	Water closets - flush vlv.	3	EA	600.00	1,800.00
	Urinal - flush vlv.	1	EA	600.00	600.00
	Lavatories - wall hung	2	EA	350.00	700.00
	Service sink	1	EA	500.00	500.00
	Drinking water dispenser	1	EA	350.00	350.00
	Soil, waste & vent system	1	LS		800.00
	Domestic cold water system	1	LS		700.00
					5,450.00
	TOTAL				36,110.00

ED FORM 337 (RULED)
1 AUG 60

QUANTITY TAKE-OFF

_____ ESTIMATE

LOCATION & FY PROGRAM INDIAN BEND WASH-NATURE AREA		JOB NO.
DIRECTIVE JOB NO. DACW09-78-C-0041	COMPUTED BY GW	PREPARED BY
LINE ITEM NO.	CHECKED BY GW	CHECKED BY
DESCRIPTION IV LANDSCAPE & IRRIGATION	DATE 9-8-80	DATE

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Site Furniture				
	a. Bench				
	1. Rest Areas	13	EA	460	5,980.00
	2. Group Interpretive	3	EA	2,250	6,750.00
	b. Bollards	20	EA	125	2,500.00
	c. Bike Racks	3	EA	650	1,950.00
	d. Trash	4	EA	350	1,400.00
	e. Sign Post	22	EA	250	5,500.00
					24,080.00
2	Removal of Dead Wood in Existing				
	Vegetation	200	HR	50	10,000.00
3	Site Clean-up	300	HR	50	15,000.00
4	Seeding (by drilling & by hand)	34.5	ACRE	2,000	69.000.00
5	Trees				
	a. 15 Gal.	500	EA	120	60,000.00
	b. 5 Gal.	624	EA	70	43,680.00
					103,680.00
6	Shrubs				
	a. 5 Gal.	100	EA	70	7,000.00

SPD FORM 337 (RULED)
31 AUG 60

QUANTITY TAKE-OFF

_____ ESTIMATE

LOCATION & FY PROGRAM INDIAN BEND WASH-NATURE AREA		JOB NO.	
DIRECTIVE JOB NO. DACW09-78-C-0041	COMPUTED BY GW	PREPARED BY	
LINE ITEM NO.	CHECKED BY GW	CHECKED BY	
DESCRIPTION IV LANDSCAPE & IRRIGATION	DATE 9-8-80	DATE	

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
	b. 1 Gal.	100	EA	20	2,000.00
					9,000.00
7	Irrigation				
	a. Backflow Device				
	Febco 835 (2")	1	EA	1,000	1,000.00
	b. Filter	4	EA	70	280.00
	c. Controllers Cloud 9 (1" Valve)	4	EA	225	900.00
	d. Quick Couplers (3/4")	16	EA	50	800.00
	e. Valves	7	EA	190	1,330.00
	f. Pressure Regulator	12	EA	67.50	810.00
	g. End of Run-Bubbler	210	EA	2	420.00
	h. Pipe				
	1. 2" PVC Sch. 40	3,500	LF	250/100	8,750.00
	2. 1-1/2" PVC Sch. 40	260	LF	210/100	546.00
	3. 1" PVC Cl. 200	2,550	LF	185/100	4,717.50
	4. Poly .580	13,610	LF	165/100	22,456.50
	i. Emitters	1,824	EA	1	1,824.00
	j. Flood Irrigation Box	8	EA	300	2,400.00
					46,234.00
8	Drinking Fountain	1	EA	675	675.00

SPD FORM 1 AUG 60 337 (RULED)

QUANTITY TAKE-OFF

_____ ESTIMATE

LOCATION & FY PROGRAM INDIAN BEND WASH-NATURE AREA			JOB NO.
DIRECTIVE JOB NO. DACW09-78-C-0041	COMPUTED BY GW		PREPARED BY
LINE ITEM NO.	CHECKED BY GW		CHECKED BY
DESCRIPTION IV LANDSCAPE & IRRIGATION	DATE 9-8-80		DATE

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
9	Foot Bridge	1	EA	8,750	8,750.00
10	Bomanite	3,545	SF	4	14,180.00
11	Concrete Curb on Bomanite	74	LF	5	370.00
12	Dry Stream Bed				
	a. Boulders (90 Total)				
	1. 2' x 2' x 2'	54	EA	75	4,050.00
	2. 3' x 3' x 3'	32	EA	90	2,880.00
	3. 4' x 4' x 4'	4	EA	120	480.00
	b. Sand				
	2100 S.F. - 4" Deep	26	YD	30	780.00
	c, River Run Stone				
	3" Plus	10	YD	50	500.00
					8,690.00
13	Other Boulders on Site (30 Total)				
	a. 2' x 2' x 2'	18	EA	75	1,350.00
	b. 3' x 3' x 3'	10	EA	90	900.00
	c. 4' x 4' x 4'	2	EA	120	240.00
					2,490.00
	TOTAL				$312,149.00

SPD FORM 337 (RULED)
31 AUG 60