CITY OF SCOTTSDALE
DESERT GREENBELT PROJECT

Reata Pass / Beardsley Wash
CLOMR

by: The Greiner Team

The Desert Greenbelt

Registered Professional Engineer (Civil)
CERTIFICATE NO.
17756
SHI-EN
SHIAU
Date Signed 6-1-95
ARIZONA, U. S. A.

May 1995

VOLUME VI

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CITY OF SCOTTSDALE
DESERT GREENBELT PROJECT

Manning's "n" Value Calculation Procedure

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by: The Greiner Team

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The Desert Greenbelt
SCOTTSDALE, ARIZONA

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ARIZONA, U.S.A.

JANUARY 1995

MANNING'S "n" VALUE CALCULATION PROCEDURE

INTRODUCTION

As part of the Scottsdale Desert Greenbelt Project, hydraulic analyses are to be performed for modeling of the Rawhide Wash, Pima Road Channel, Upper Reata Pass Wash and Reata/ Beardsley Wash. Included in the hydraulic analyses is the determination of channel roughness. The Manning's "n" value report will define the appropriate roughness values to be used in the HEC-2 and HEC-6 analyses of the washes.

METHODOLOGY

Initially, the Manning's "n" value computation procedure as outlined in *Estimated Manning's Roughness Coefficients for Stream Channels and Flood Plains in Maricopa County, Arizona* by U.S. Geological Survey for the Flood Control District of Maricopa County (FCDMC) was used to compute the appropriate Manning's "n" value for the representative cross-sections for the channels. This calculation procedure involves summing several numeric terms which have been assigned to different physical components of the channel geometry or surface cover and multiplying the result by a meander factor. The channel components include: bed material, surface irregularities, a value for obstruction and cross-section variance. The results from this procedure were found to be excessively high when compared to recommended Manning's "n" values from *Open Channel Hydraulics* by Ven Te Chow and *Drainage Design Manual for Maricopa County, Arizona Volume II Hydraulics* by the FCDMC.

Through a collaborative effort between the City of Scottsdale (COS) Staff and Greiner Staff, an alternate method of computing the Manning's "n" values was developed which produces results similar to those found in the above sources. However, for the preliminary HEC-2 runs, composite "n" values taken from the initial calculations were used to define beginning parameters for proposed channel alignments.

The first step in the alteration of the Manning's "n" value calculation procedure was to reassess the assigned Manning's "n" values. Table 1 contains these new values. It was decided that only the predominate surface cover would be used in assigning an "n" value to each subsection of the total cross-section; i.e., if the subsection has a ground cover of trees not trimmed, then the only component considered for the "n" value for that subsection will be the value for trees not trimmed.

All cross-sections from HEC-2 will be projected onto the appropriate aerial photos so that each cross-section will be divided into measurable segments having the same surface cover. The surface cover will be measured. Using Manning's "n" values for the appropriate surface cover from Table 1, HEC-2 models will be modified to use "NH" cards and the model changed to print the flow distribution results. These distribution results from the HEC-2 runs will analyze velocity and depths of flow across the cross-section as the "NH" values change. The channel improvement option (CHIMP) will be employed and "NH" card values varied depending on the results from the individual runs. HEC-2 will also compute a composite "n" value for each cross-section. Once the final CHIMP has been identified, the HEC-6 model will be formulated by modifying the "GR" cards to reflect the recommended channel improvements. The composite "n" value will be input into the HEC-6 model on the "NC" card as HEC-6 cannot use the "NH" card.

Each cross-section will be divided into subsections based on the following criteria: the low-flow channel (usually termed sandy soil or exposed rock material sections for natural channels), sandy soil, exposed rock, trees, desert shrub and embankments. Care was taken to include only areas of inundation in the subsection analysis for "n" value.

TABLE 1

Manning's Roughness Coefficient and Source

Scottsdale Desert Greenbelt – Project No. E029102 ***January 5, 1995***

Channel Condition/ Material Grain Size	*Manning's 'n' Value*	*Description*	*Example/Source/Location*
Loffel Blocks With Vegetation	0.029		SCS Silver Creek Report
Loffel Blocks Without Vegetation	.025		SCS Silver Creek Report
Asphalt Bike Path	0.016	Tables 5-6	Chow, Pg 111, Rough
Small Riprap	0.035	$n = 0.0395\ (d50)^{1/6}$ or $n = 0.036\ (d90)^{1/6}$ d50 = 0.5' d90 = .90'	HEC-15, Pg 9
Medium Riprap	0.040	$n = 0.0395\ (d50)^{1/6}$ or $n = 0.036\ (d90)^{1/6}$ d50 = 1.0' d90 = 1.8'	HEC-15, Pg 9
Large Riprap	0.042	$n = 0.0395\ (d50)^{1/6}$ or $n = 0.036\ (d90)^{1/6}$ d50 = 1.5' d90 = 2.70'	HEC-15, Pg 9
Gabions	0.028		Maccaferri Gabions
Soil Cement	0.020	Table 5.11	FCDMC, Volume II, Pg 56
Concrete	0.015	Tables 5 – 6	Chow, Pg 111, Float Finish
Concrete Path	0.015	Tables 5 – 6	Chow, Pg 111, Float Finish
0.08-0.5mm	0.020	Sandy Silt or Clay	Chow/FCDMC **
0.5-2.0mm	0.022	Medium Sand	Chow/FCDMC **
2.0-5.0mm	0.024	Coarse Sand	Chow/FCDMC **
5.0-20.0mm	0.026	Fine Gravel	Chow, Pg 109, Table 5-5
20.0-80.0mm	0.028	Coarse Gravel	Chow, Pg 109, Table 5-5
80.0-500.0mm	0.040	Cobbles	Chow, Pg 113, Table 5-6
>500.0mm	0.050	Boulders	Chow, Pg 113, Table 5-6
Trees Trimmed	0.040	Tree foliage trimmed so that only the trunk will affect the flow. Table 3	FCDMC, Pg 11, Tbl 3 Trees **
Trees Not Trimmed	0.065	Tree foliage not trimmed; foliage can hang into the flow. Table 2	FCDMC, Pg 75-A, Pg 75-C, Pg 73 Overbank A, Pg 72 Subsection A **
Desert Shrub	0.050	Shrubs separated, low lying and easily flattened by flow. Chow, Pg 107 (1) low	FCDMC, Pg 102-F, Pg 99 Section C, Pg 98 Subsection C **

* For Manning's values having a range, the appropriate value was computed by interpolation.

** From "Estimated Manning's Roughness Coefficients for Stream Channels and Flood Plains in Maricopa County, Arizona." Note that d90 was computed from d50 using the procedure in "Highways in a River Environment." d90 = 1.8, d50 refers to V-26 Table 5.2.2 (Column for Sieve Diameter)

EXAMPLE CROSS-SECTION LOCATIONS

Analyses were performed to determine subsectional "n" values to be used in the preliminary HEC-2 analysis on an example cross-section location for each of the Desert Greenbelt channel systems: the Rawhide Wash Channel, proposed Pima Channel, Upper Reata Pass Wash Channel and South Beardsley Wash Channel. Appendix 1 has an example of final condition analysis for each of the washes. Proposed condition analysis could include the overbank with varying amounts of trees, either trimmed or untrimmed, to determine a best and worst condition of velocities, water surface elevations and flow. The channel banks will be examined with armoring ranging from concrete or Loffel, to soil with desert grasses.

The Rawhide Wash Channel cross-section is located about 920 feet north of Los Portones Drive and about 1,430 feet south of Alameda Road. A proposed lowflow channel will follow the existing sandy-bottom wash. With additional capacity the wash channel can contain the full flow and provide the minimum 3 feet of freeboard with a wall on the east side. After construction, and appreciable portion of the channel will retain its natural characteristics. Appendix 1 contains the aerial photo, topographic map, cross-section and sieve analysis data for this cross-section location.

The Pima Wash Channel has been analyzed for the prismoidal section with a low-flow channel and overbanks consisting of revegetation with desert grass, shrubs and trees. The low-flow subsection has been analyzed as an open sandy bottom with slightly sloped sides constructed of Loffel Blocks which are both vegetated and non-vegetated. The total channel top width ranges from 100 feet to 175 feet. Refer to Appendix 1 for "n" value calculations, cross-section, aerial photo and location map showing the reach.

The Upper Reata Pass Wash Channel has been preliminarily analyzed for existing and proposed conditions (Appendix 2). The proposed conditions include a low-flow section with overbanks analyzed for trees trimmed and not trimmed, as well as trees replaced with desert brush. A proposed CHIMP was evaluated and the appropriate "n" values applied. Appendix 2 also contains the cross-section, aerial photo, location map and Manning's "n" value analysis.

The South Beardsley Wash Channel was analyzed to determine the appropriate existing and improved conditions and subsectional "n" values for the preliminary HEC-2 study. The cross-section location map, "n" value calculations, cross-section and aerial photo can be found in Appendix 3.

TYPICAL MANNING'S REACHES

Typical reaches for Manning's "n" values will be determined based on channel reaches of similar hydraulic characteristics for use in HEC-6. Verification of these characteristics will come from the HEC-2 runs with NH cards which compute composite "n" values. Reaches will be defined based on similar hydraulic response and computed composite "n" value. These characteristics are: extent of natural containment, vegetation, sediment size, channel width and degree of braiding. When reach locations have been determined, the effects of the computed Manning's "n" value for each cross-section will extend upstream and downstream to the half-way point between cross-sections.

Cross-sections will be taken below the apex for the Rawhide Wash Channel and evaluated as the natural wash (refer to Appendix 1 for the map with cross-section locations and subsectional and subsectional "n" value assignments with associated cross-sections and aerial photograph). For the preliminary HEC-2 study, the improved Rawhide Wash Channel is sufficiently similar to the existing channel so that the composite "n" results will be nearly the same for both improved and existing conditions.

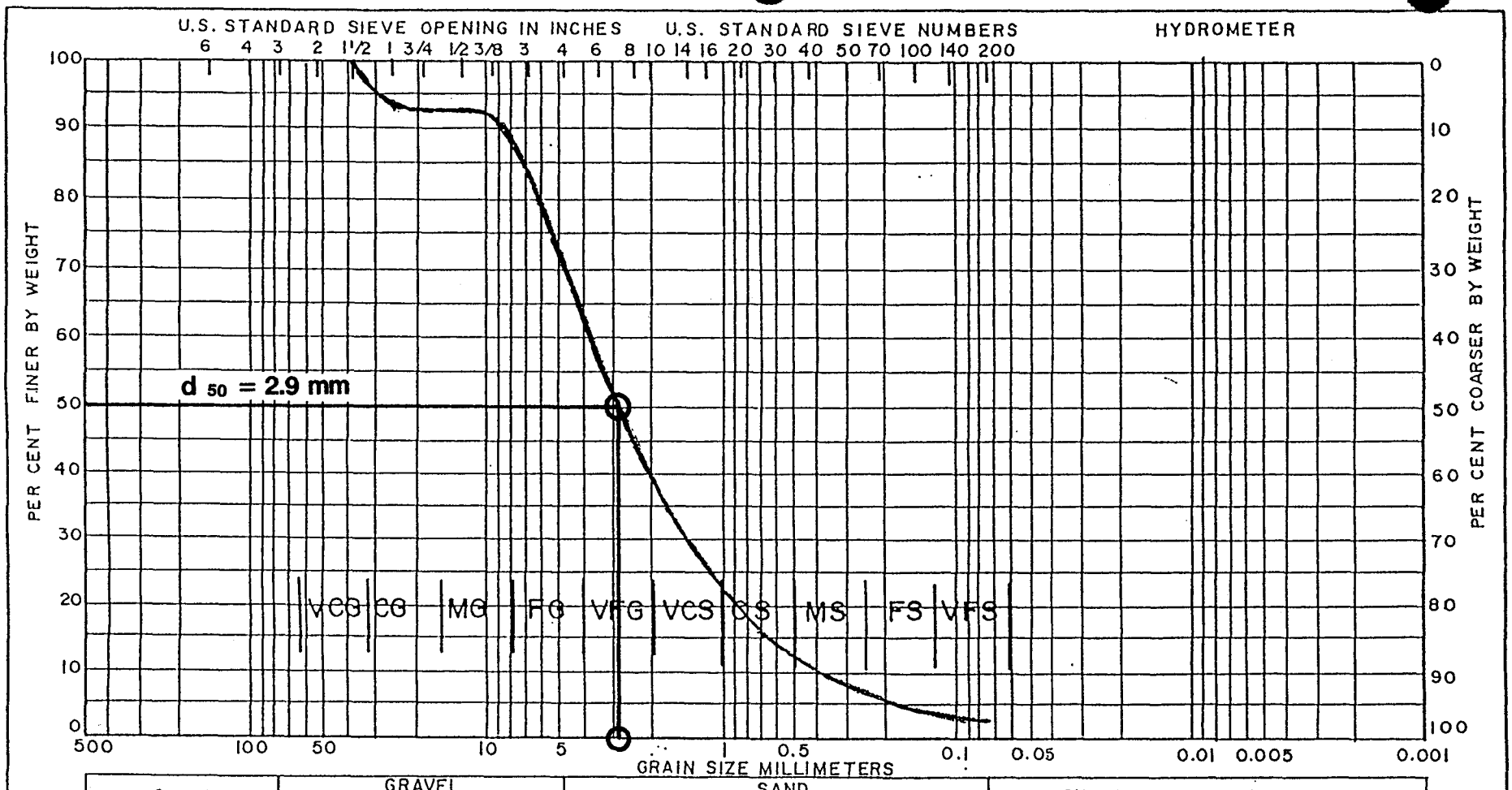
The Pima Wash Channel will be a new constructed channel. The proposed cross-section was evaluated for several improved conditions. The results are included in Appendix 1, which discusses the Pima Wash Channel.

The Reata Pass Wash Channel was evaluated for existing and proposed conditions. Several different improved sections were evaluated to determine their Manning's "n" value. The results can be found in Appendix 2.

The South Beardsley Wash Channel has been evaluated for existing and improved conditions. The results for both conditions are included in Appendix 3.

MANNINGS.GRE

Appendix 1



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

SAMPLE NO.	ELEV OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PL

PROJECT REALTA – [illegible] TRUNKFIT PROPERTY

SAMPLE E2.

AREA

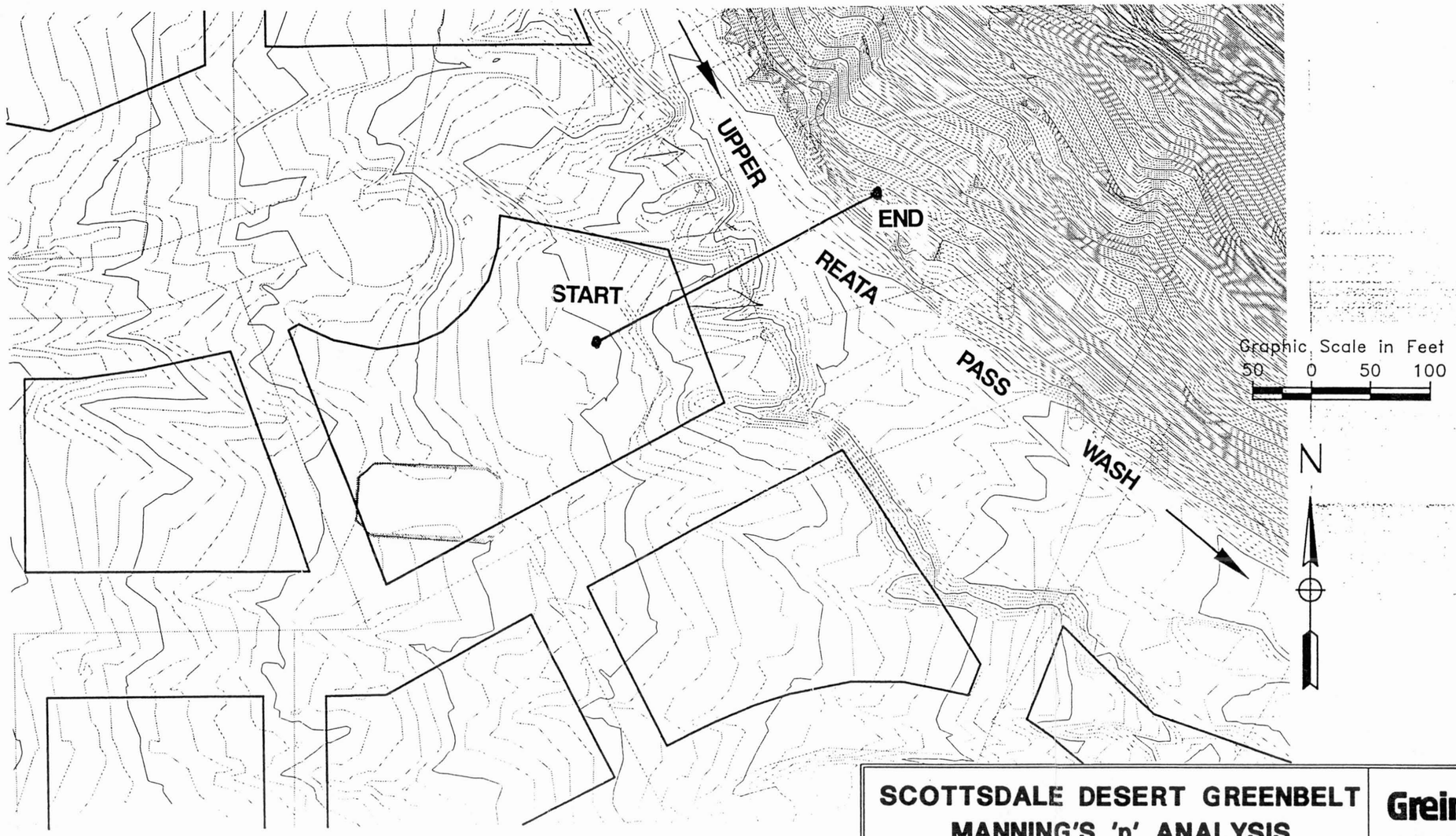
BORING NO.

DATE

GRADATION CURVES [illegible]

ENG FORM 2087

Greiner



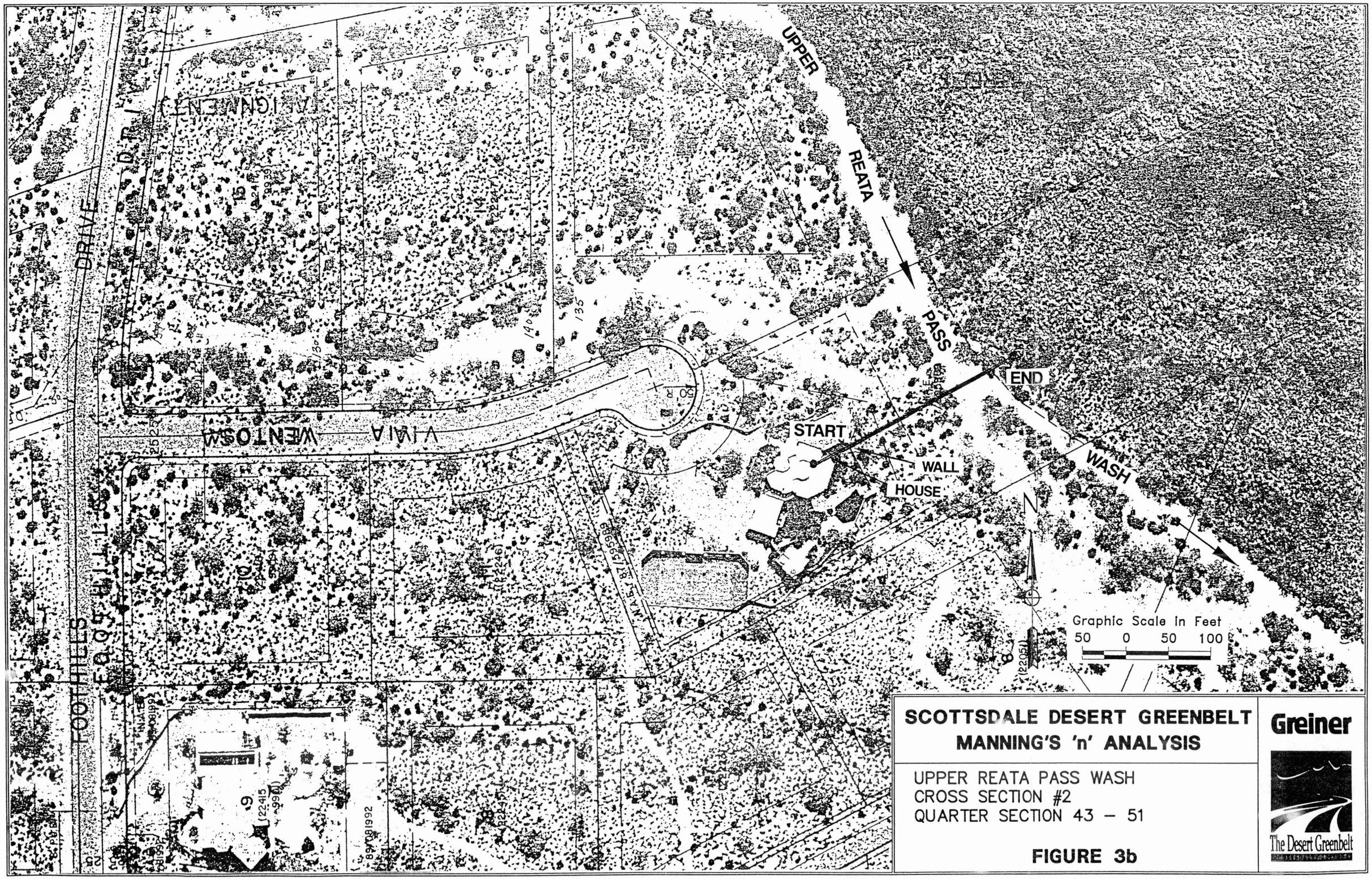
SCOTTSDALE DESERT GREENBELT
MANNING'S 'n' ANALYSIS

UPPER REATA PASS WASH
CROSS SECTION #2
QUARTER SECTION 43 – 51

FIGURE 3a

Greiner

The Desert Greenbelt



SCOTTSDALE DESERT GREENBELT
MANNING'S 'n' ANALYSIS

UPPER REATA PASS WASH
CROSS SECTION #2
QUARTER SECTION 43 – 51

FIGURE 3b

Greiner

The Desert Greenbelt

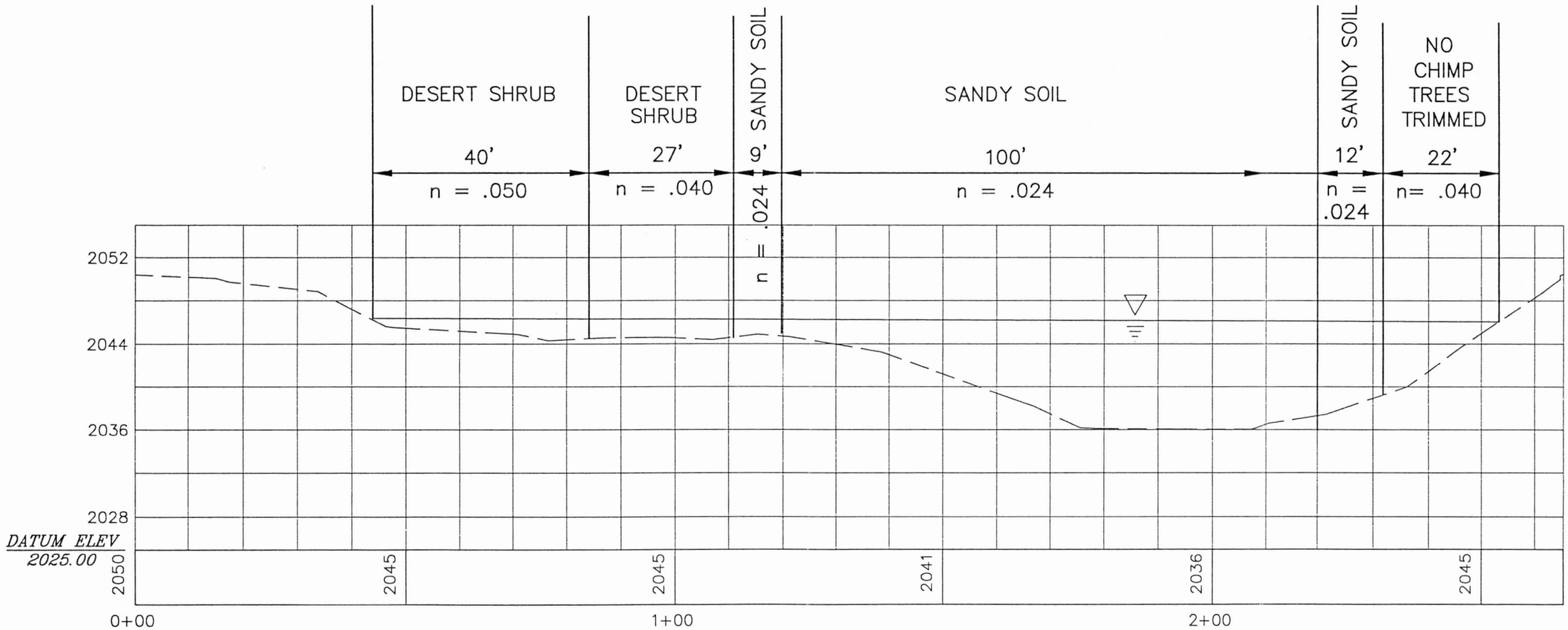


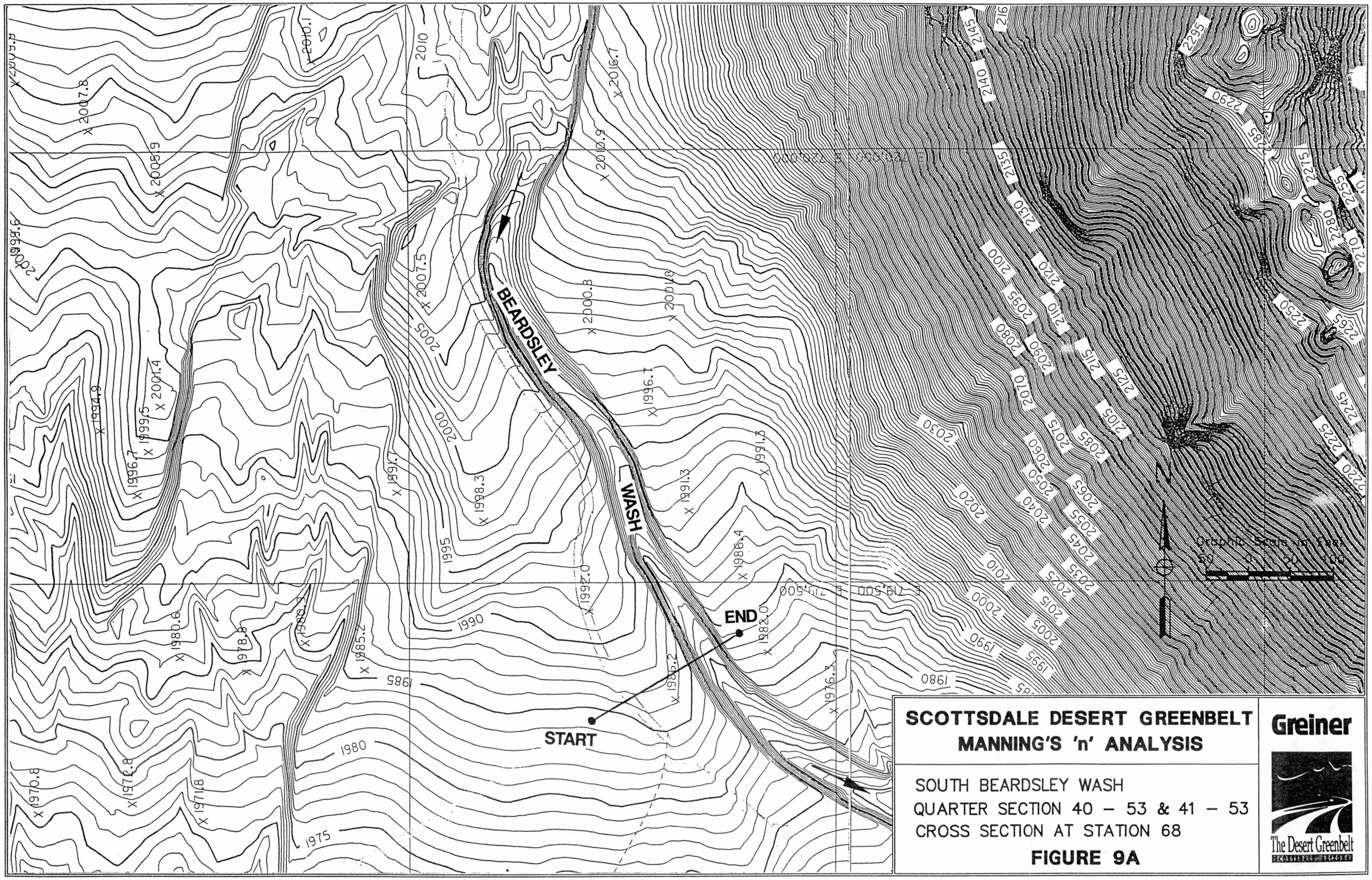
FIGURE 4

SCOTTSDALE DESERT GREENBELT
MANNING'S 'n' ANALYSIS

UPPER REATA PASS WASH
CROSS SECTION #2
TREES TRIMMED
QUARTER SECTION 43 – 51

Greiner

The Desert Greenbelt



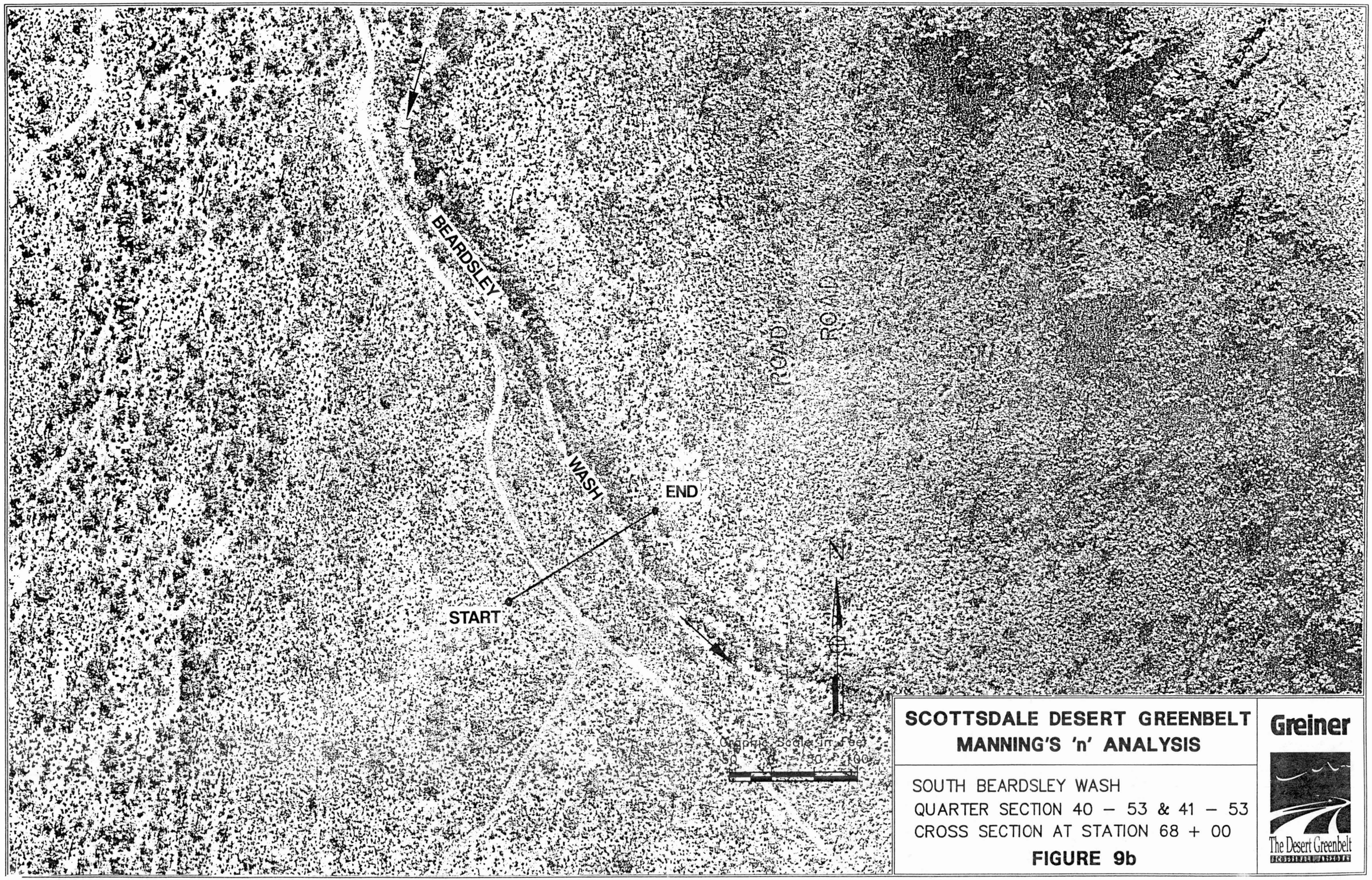
SCOTTSDALE DESERT GREENBELT
MANNING'S 'n' ANALYSIS

SOUTH BEARDSLEY WASH
QUARTER SECTION 40 – 53 & 41 – 53
CROSS SECTION AT STATION 68

FIGURE 9A

Greiner

The Desert Greenbelt



SCOTTSDALE DESERT GREENBELT
MANNING'S 'n' ANALYSIS

SOUTH BEARDSLEY WASH
QUARTER SECTION 40 – 53 & 41 – 53
CROSS SECTION AT STATION 68 + 00

FIGURE 9b

Greiner

The Desert Greenbelt
ECOLOGICAL ASSETS

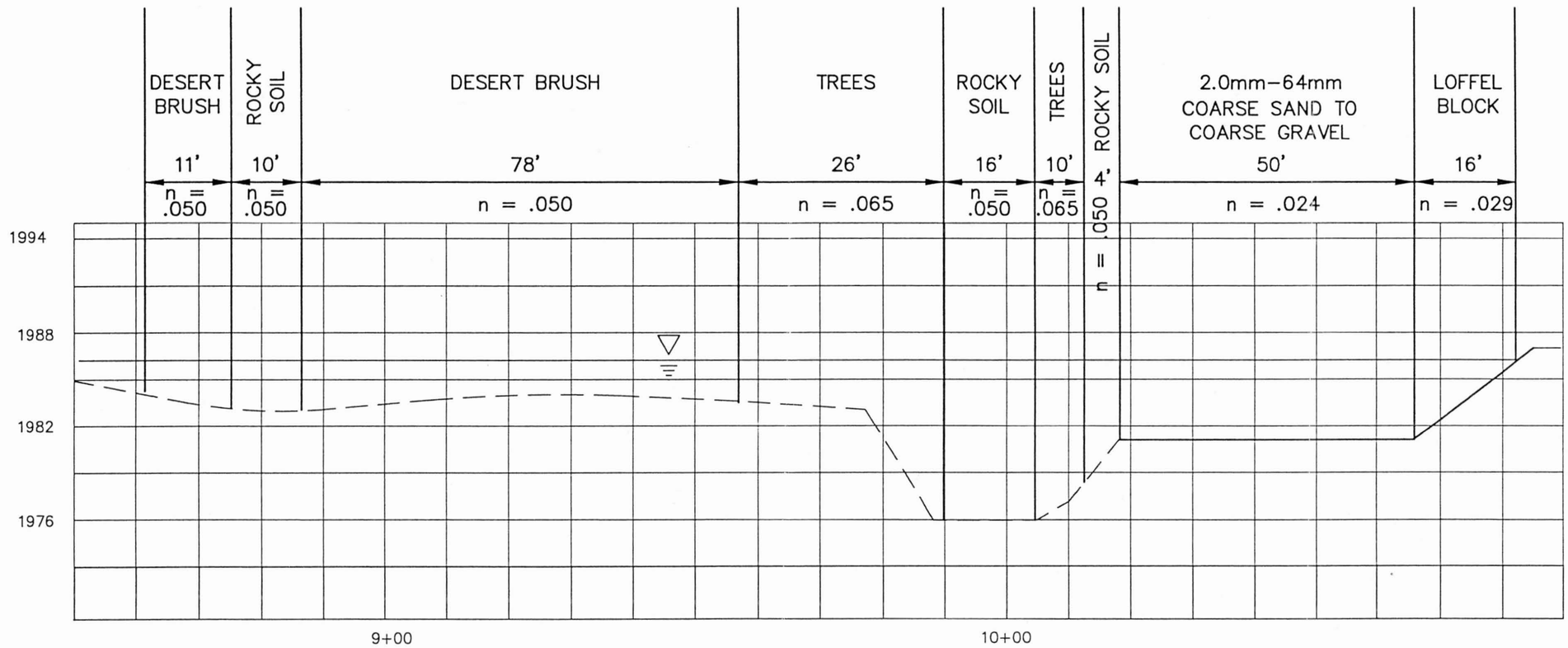


FIGURE 10

SCOTTSDALE DESERT GREENBELT
MANNING'S 'n' ANALYSIS

SOUTH BEARDSLEY
IMPROVED CONDITIONS
QUARTER SECTION 40 – 53 & 41 – 53

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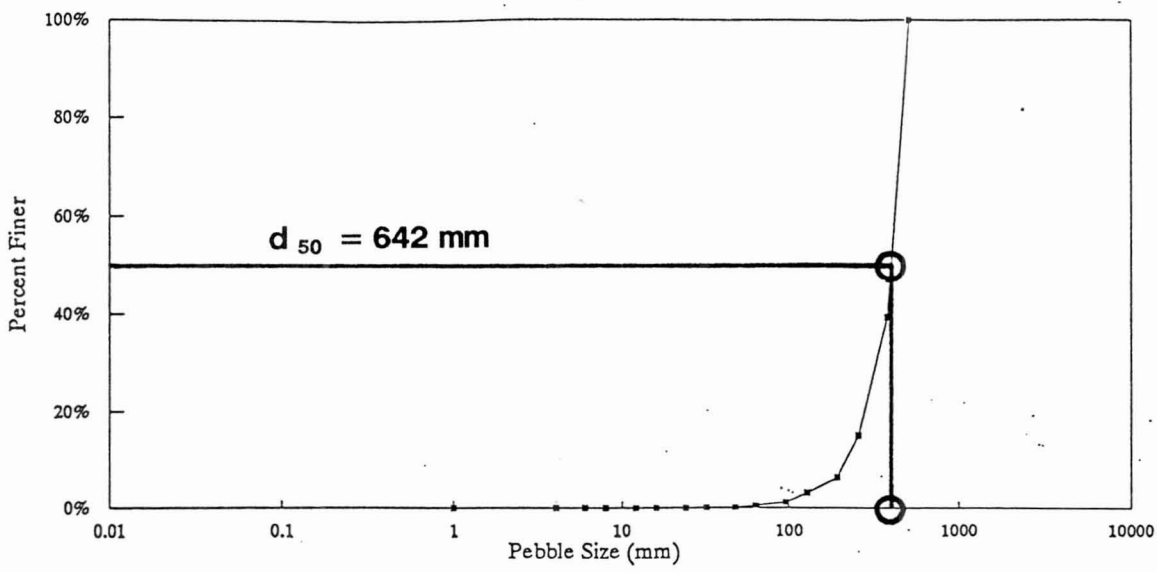
The Desert Greenbelt

Conversion from Percentage by size to Percentage by weight
09/27/94

Reata
Section 3

Scottsdale Desert Greenbelt Sediment Sample Data

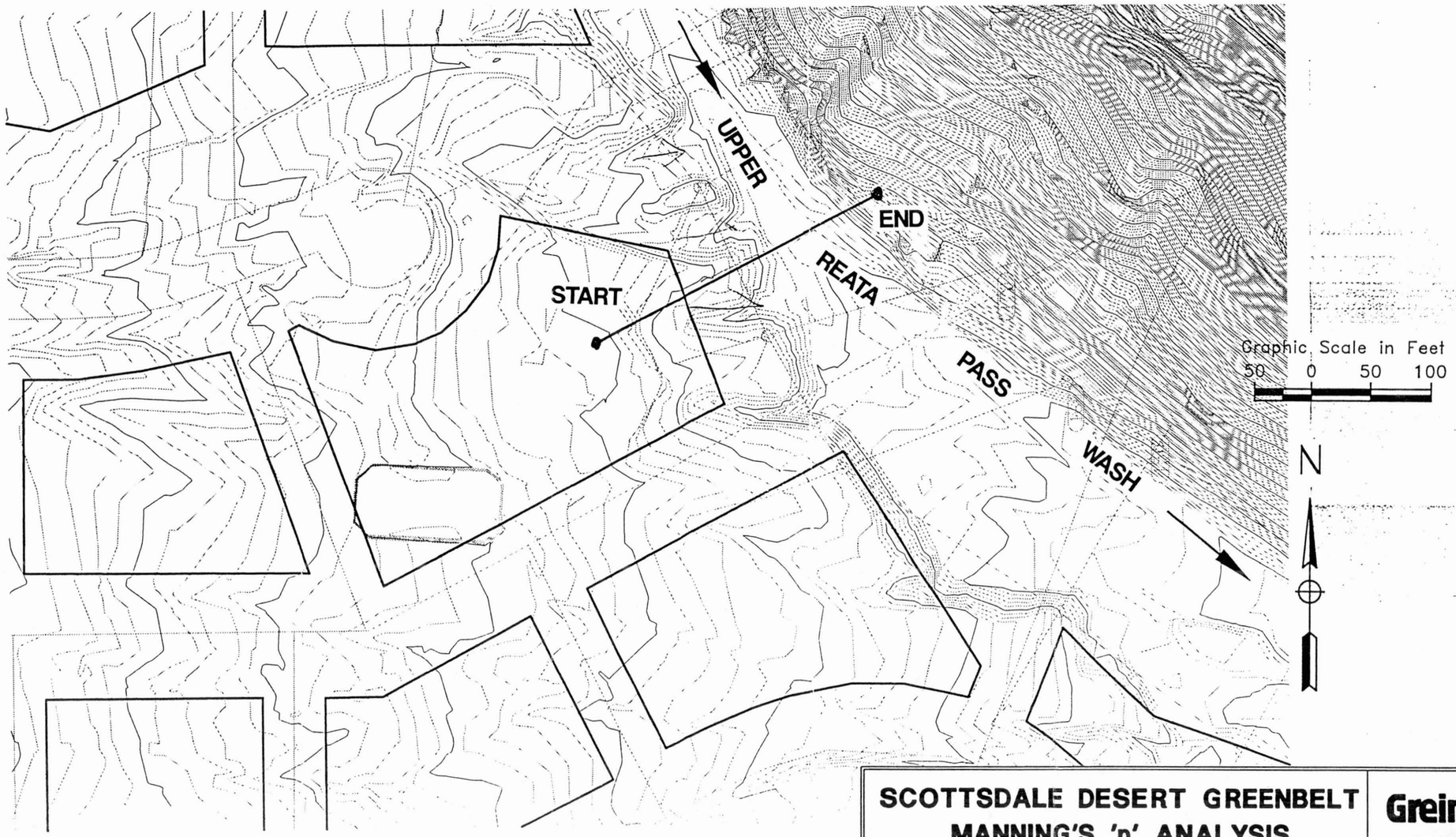


Particle Type		Seive diameter (mm)	Average diameter (mm)	Pebble Size mm	Pebble Size inches	Number of Items Sampled per size Category	Percent Smaller by number	assumed spherical Volume per item (mm^3)	Combined Volume per Sediment Size (mm^3)	% in each category (by weight)	Percent Smaller (by weight)
	SILT/CLAY		0.031	< 0.062				0.000016			
	Vry FINE	0.062	0.0935	0.062 – 0.125				0.000428			NA
	FINE	0.125	0.1875	0.125 – 0.25				0.003451			NA
Sands	MEDIUM	0.25	0.375	0.25 – 0.5				0.027612			NA
	COARSE	0.5	0.75	0.5 – 1				0.220893			NA
	Vry CRSE	1	1.5	1 – 2	0.04 – 0.08	60	60.00%	1.767146	106.0287521	0.00%	0.00%
	Vry FINE	2	3	2 – 4	0.08 – 0.16		60.00%	14.137167			NA
		4	5	4 – 6	0.16 – 0.24	2	62.00%	65.45	130.8996939	0.00%	0.00%
	FINE	6	7	6 – 8	0.24 – 0.31	2	64.00%	179.59	359.1887601	0.00%	0.00%
		8	10	8 – 12	0.31 – 0.7	5	69.00%	523.60	2617.993878	0.00%	0.00%
Gravels	MEDIUM	12	14	12 – 16	0.47 – 0.63	1	70.00%	1436.76	1436.75504	0.00%	0.00%
		16	20	16 – 24	0.63 – 0.94	1	71.00%	4188.79	4188.790205	0.00%	0.00%
	COARSE	24	28	24 – 32	0.94 – 1.26	2	73.00%	11494.04	22988.08064	0.01%	0.01%
		32	40	32 – 48	1.26 – 1.9	3	76.00%	33510.32	100530.9649	0.03%	0.03%
	Vry CRSE	48	56	48 – 64	1.9 – 2.5	3	79.00%	91952.32	275856.9677	0.07%	0.10%
		64	80	64 – 96	2.5 – 3.8	6	85.00%	268082.57	1608495.439	0.41%	0.52%
	SMALL	96	112	96 – 128	3.8 – 5	4	89.00%	735618.58	2942474.322	0.75%	1.27%
Cobbles		128	160	128 – 192	5 – 7.6	4	93.00%	2144660.58	8578642.339	2.19%	3.46%
	LARGE	192	224	192 – 256	7.6 – 10	2	95.00%	5884948.64	11769897.29	3.01%	6.47%
		256	320	256 – 384	10 – 15	2	97.00%	17157284.68	34314569.36	8.78%	15.25%
	SMALL	384	448	384 – 512	15 – 20	2	99.00%	47079589.16	94159178.32	24.08%	39.33%
Boulders	MEDIUM	512	768	512 – 1024	20 – 40	1	100.00%	237182303.40	237182303.4	60.67%	100.00%
	LARGE	1024	1536	1024 – 2048	40 – 80		100.00%	1897458427.20			NA
	Vry LARGE	2048	3072	2048 – 4096	80 – 160		100.00%	15179667417.59			NA
					Total Sampled	100		Total Area	390963776.1		

Summary of Columns, and Definitions of Results	
Assumed Spherical Volume per item =	4/3*@pi*(0.5*[item diameter])^3
Combined Volume for each Sediment Size =	[number of items]*[Volume per item]
Percent per by weight =	[Volume of items in each sediment size category]/[Volume of all items in all categories]
	The volume all samples of a given sample size is directly proportional to the weight of the samples. In other words, volume was used throughout the calculations in place of the weight, to determine the percentage of each sediment size by weight.

w:\123r3\sediment\Reata3.wk3

Appendix 2



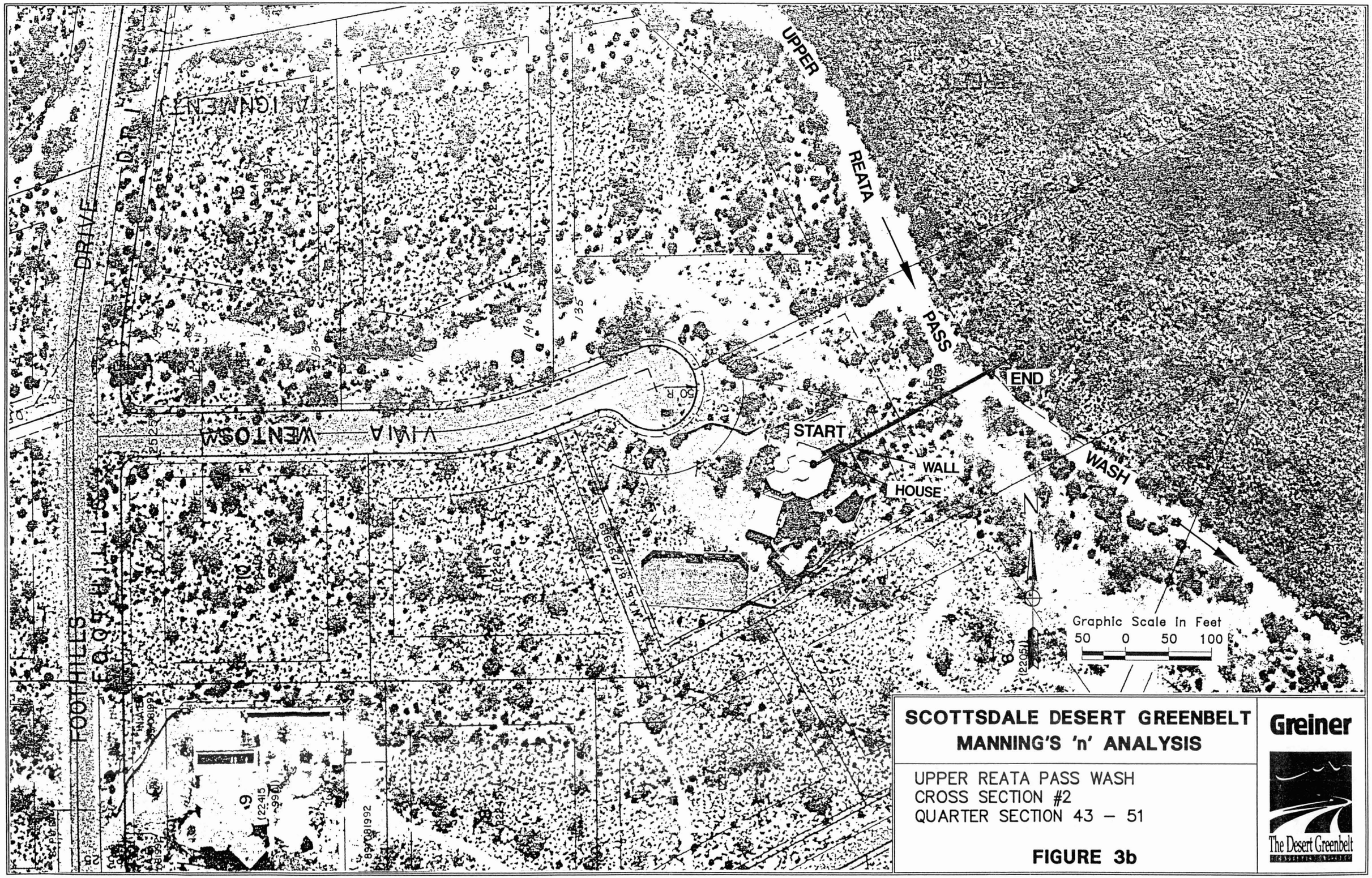
SCOTTSDALE DESERT GREENBELT
MANNING'S 'n' ANALYSIS

UPPER REATA PASS WASH
CROSS SECTION #2
QUARTER SECTION 43 – 51

FIGURE 3a

Greiner

The Desert Greenbelt



SCOTTSDALE DESERT GREENBELT
MANNING'S 'n' ANALYSIS

UPPER REATA PASS WASH
CROSS SECTION #2
QUARTER SECTION 43 – 51

FIGURE 3b

Greiner

The Desert Greenbelt

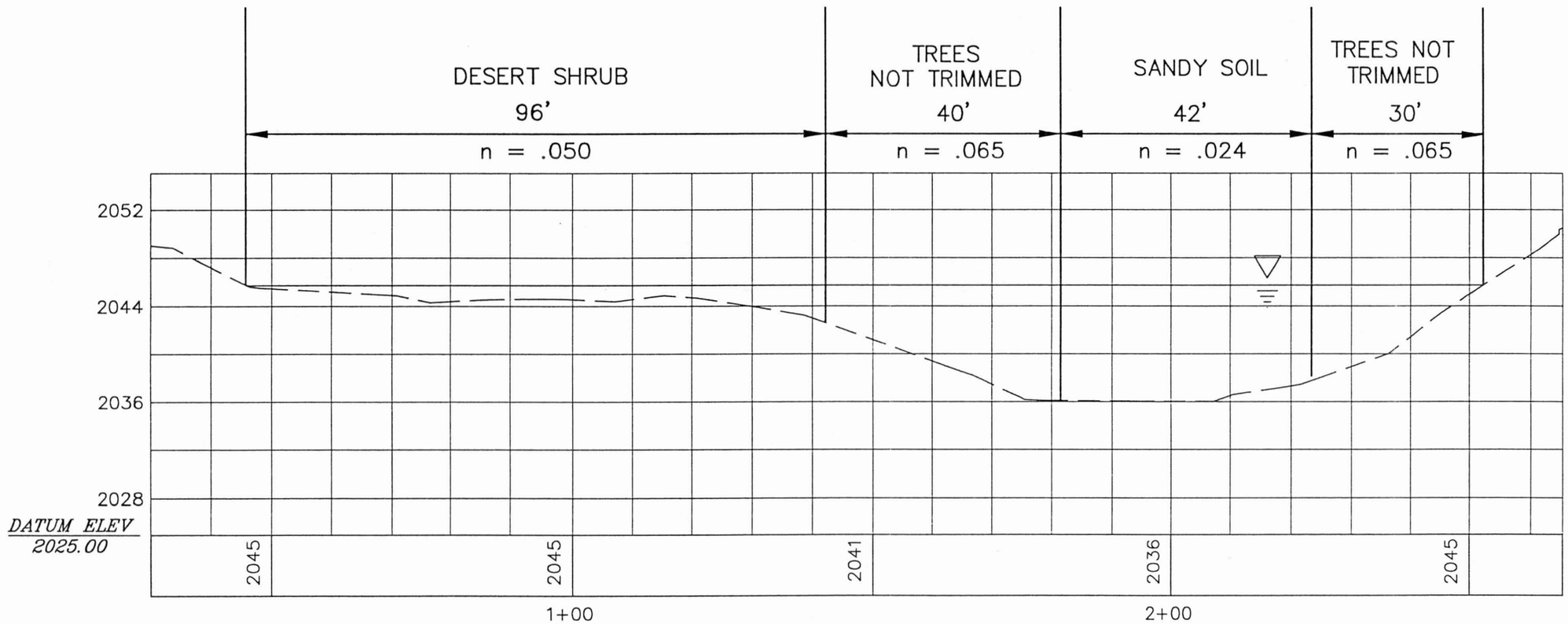


FIGURE 3

SCOTTSDALE DESERT GREENBELT
MANNING'S 'n' ANALYSIS

UPPER REATA PASS WASH
EXISTING CONDITIONS
CROSS SECTION #2
QUARTER SECTION 43 – 51

Greiner

The Desert Greenbelt

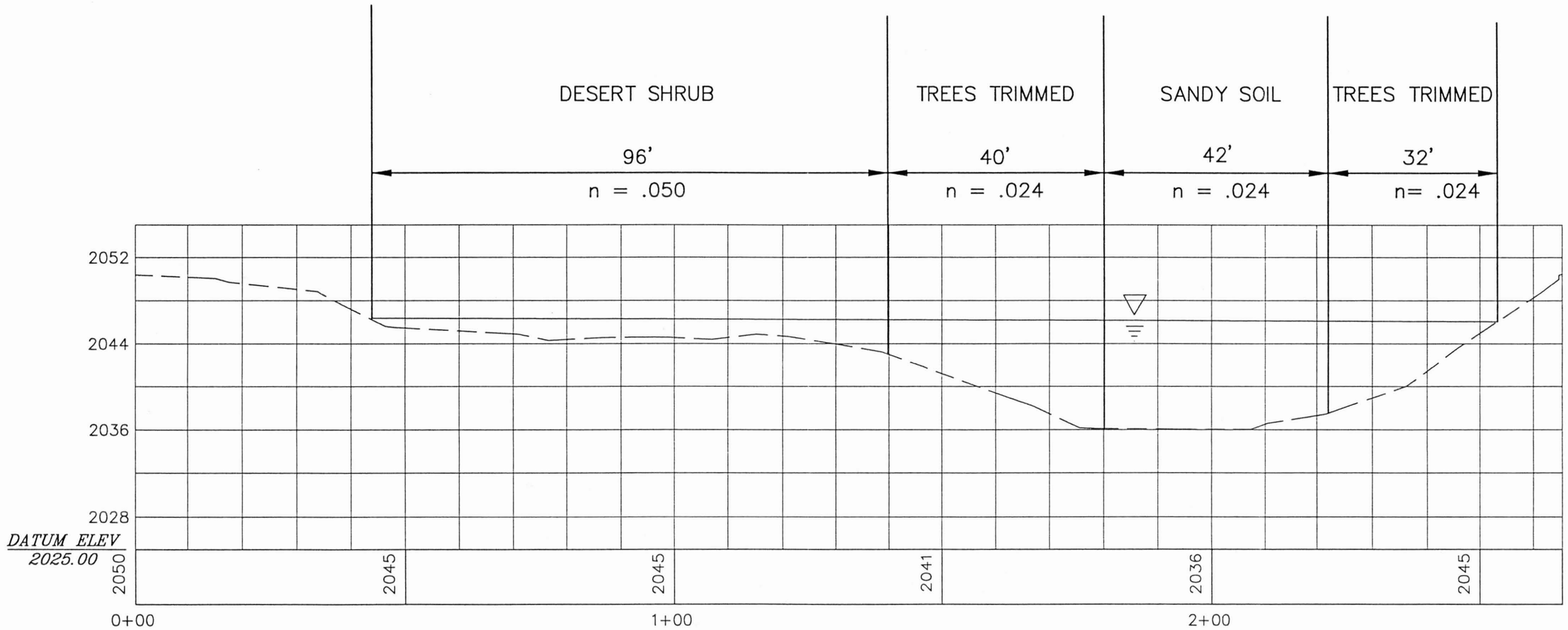


FIGURE 4

SCOTTSDALE DESERT GREENBELT
MANNING'S 'n' ANALYSIS

UPPER REATA PASS WASH
CROSS SECTION #2
NO CHIMP – TREES TRIMMED
QUARTER SECTION 43 – 51

Greiner

The Desert Greenbelt

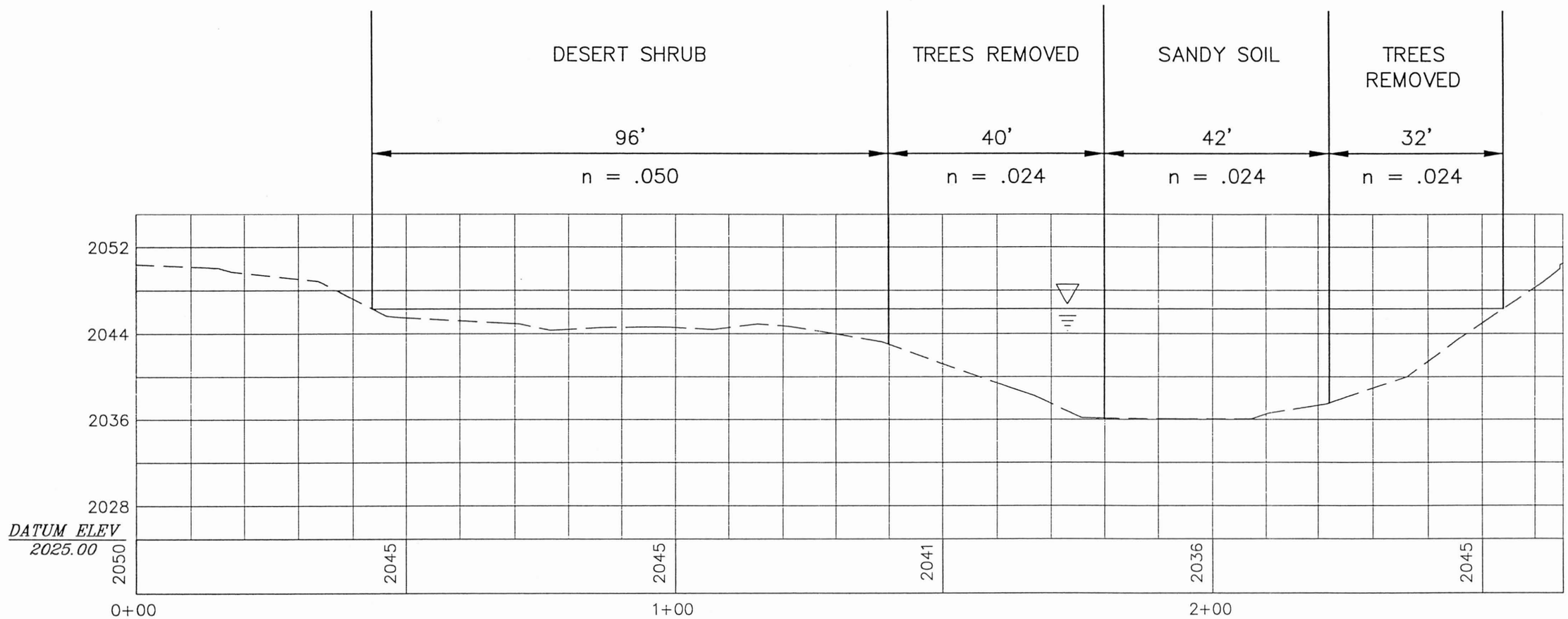


FIGURE 5

SCOTTSDALE DESERT GREENBELT
MANNING'S 'n' ANALYSIS

UPPER REATA PASS WASH
CROSS SECTION #2
NO CHIMP – TREES REMOVED
QUARTER SECTION 43 – 51

Greiner

The Desert Greenbelt

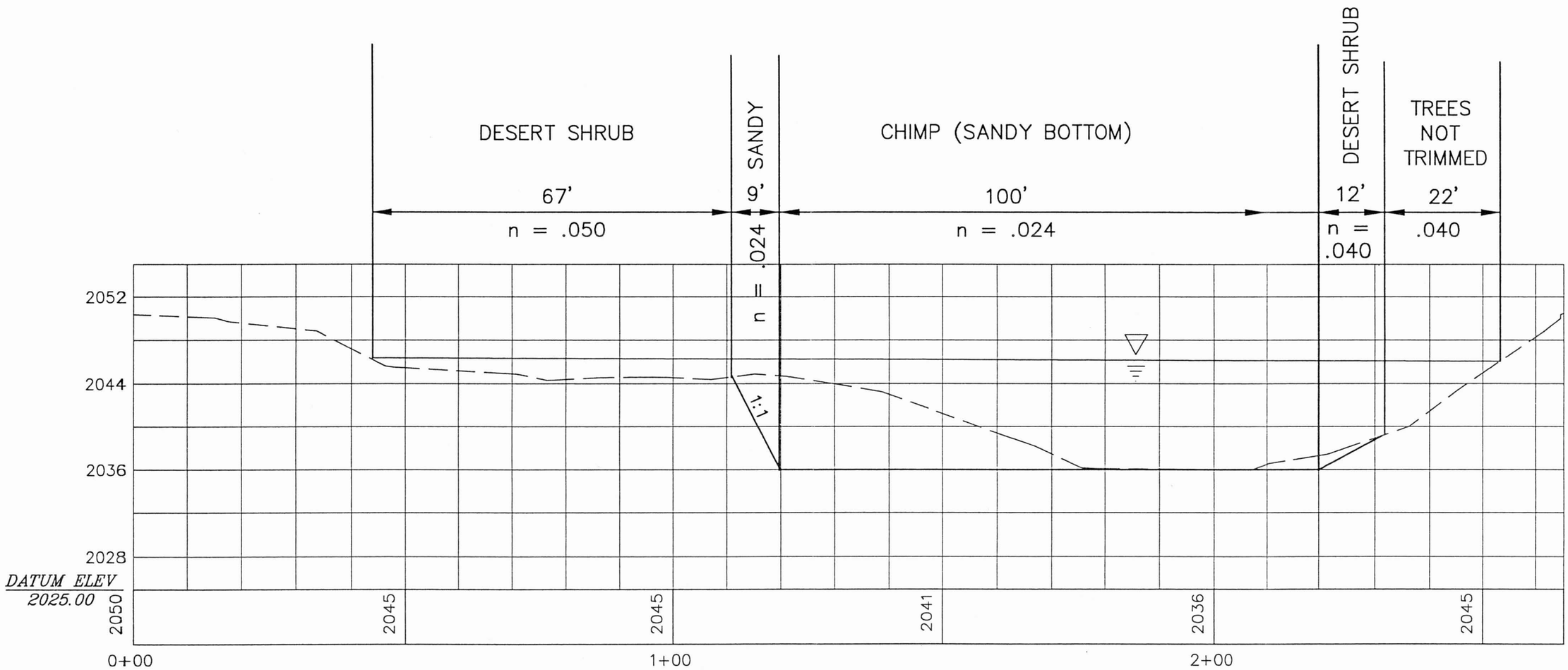


FIGURE 6

SCOTTSDALE DESERT GREENBELT
MANNING'S 'n' ANALYSIS

UPPER REATA PASS WASH
CROSS SECTION #2
CHIMP – TREES NOT TRIMMED
QUARTER SECTION 43 – 51

Greiner

The Desert Greenbelt

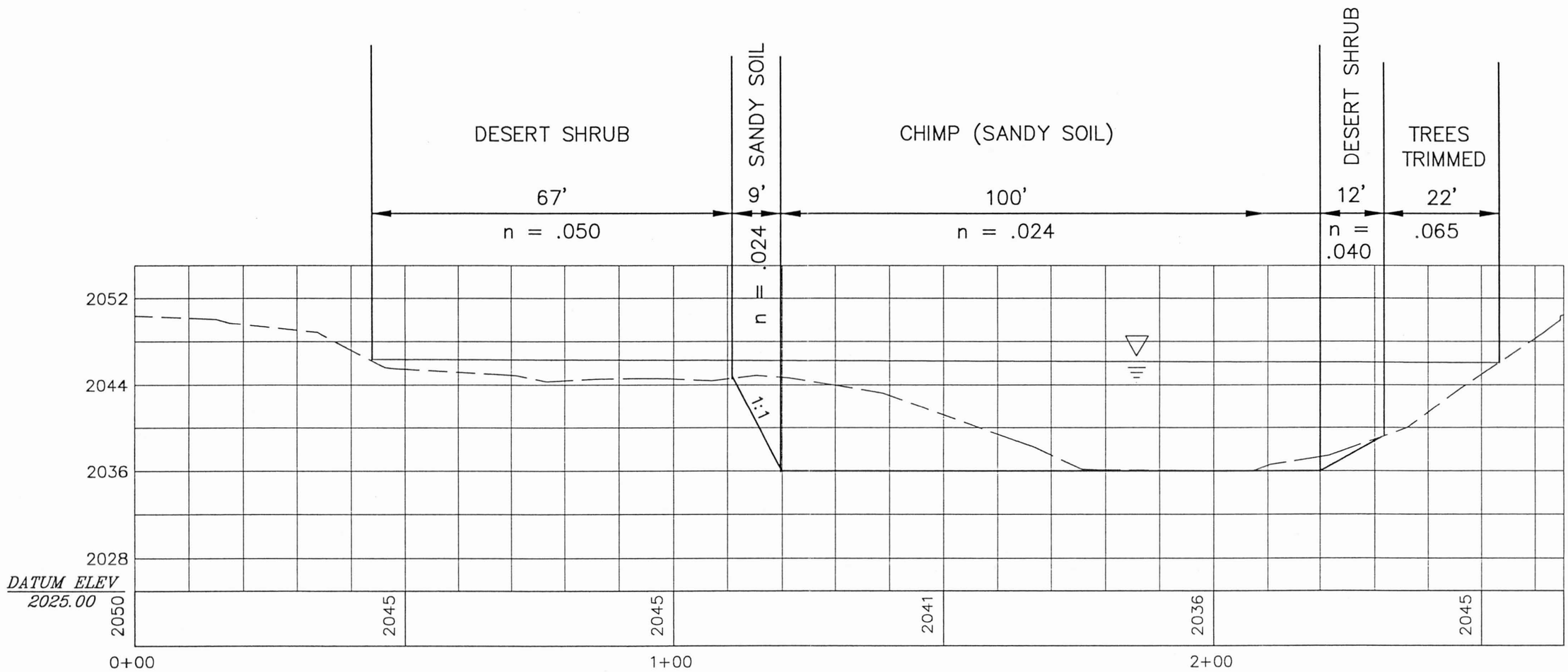


FIGURE 7

SCOTTSDALE DESERT GREENBELT
MANNING'S 'n' ANALYSIS

UPPER REATA PASS WASH
CROSS SECTION #2
CHIMP – TREES TRIMMED
QUARTER SECTION 43 – 51

Greiner

The Desert Greenbelt

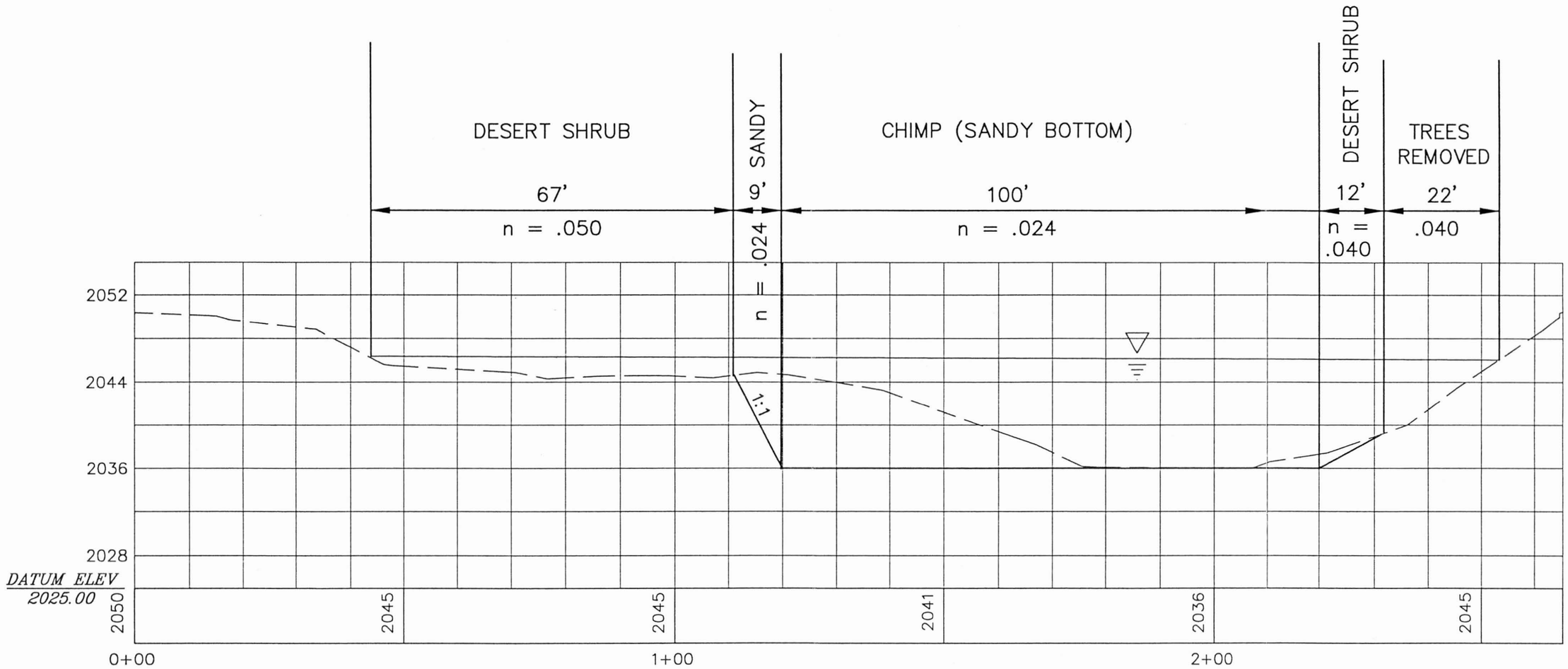


FIGURE 8

SCOTTSDALE DESERT GREENBELT
MANNING'S 'n' ANALYSIS

UPPER REATA PASS WASH
CROSS SECTION #2
CHIMP WITH TREES REMOVED
QUARTER SECTION 43 – 51

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The Desert Greenbelt

Appendix 3

SCOTTSDALE DESERT GREENBELT
MANNING'S 'n' ANALYSIS

SOUTH BEARDSLEY WASH
QUARTER SECTION 40 – 53 & 41 – 53
CROSS SECTION AT STATION 68

FIGURE 9A

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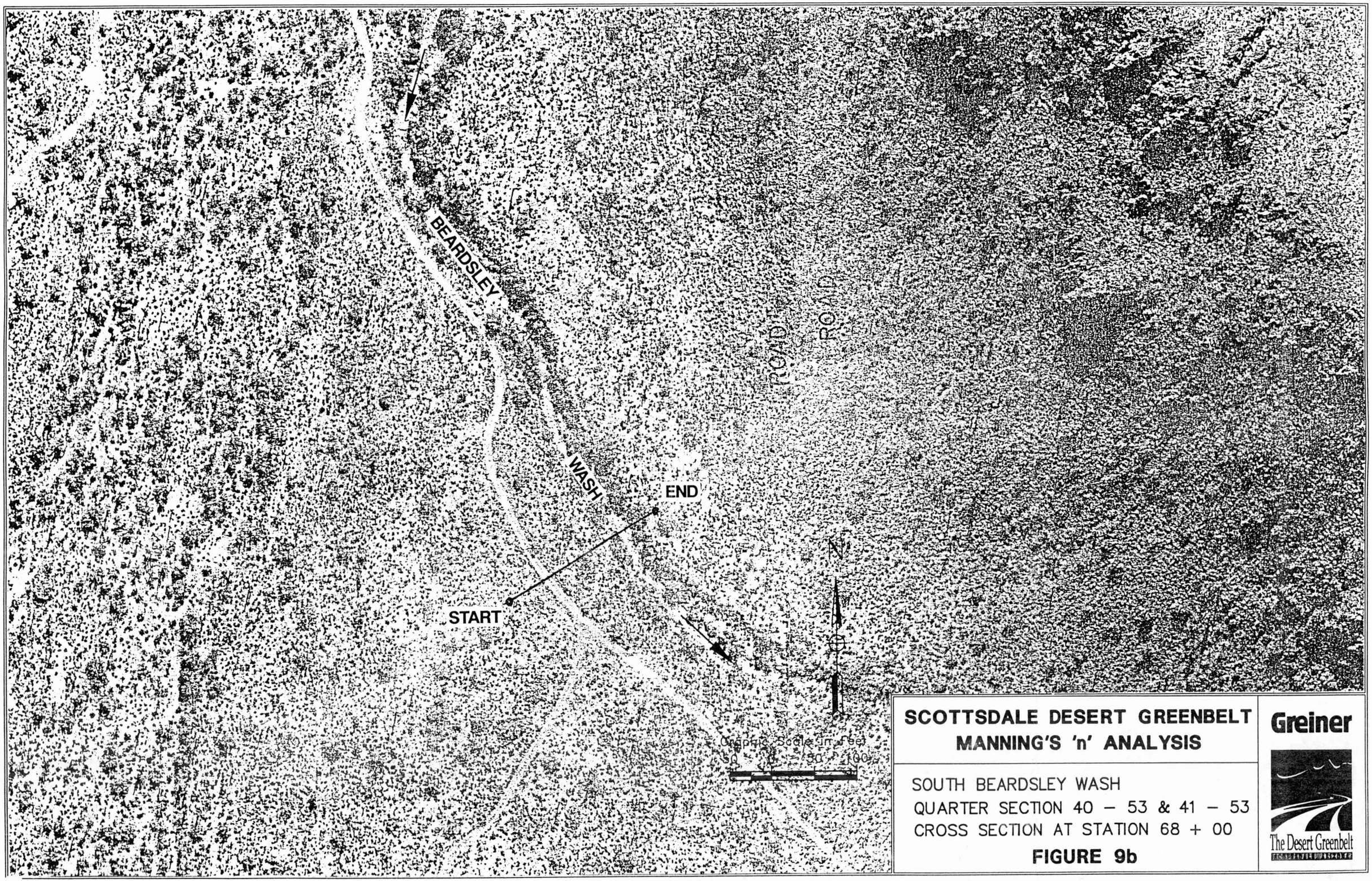
The Desert Greenbelt



SCOTTSDALE DESERT GREENBELT
MANNING'S 'n' ANALYSIS

SOUTH BEARDSLEY WASH
QUARTER SECTION 40 – 53 & 41 – 53
CROSS SECTION AT STATION 68 + 00

FIGURE 9b

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The Desert Greenbelt

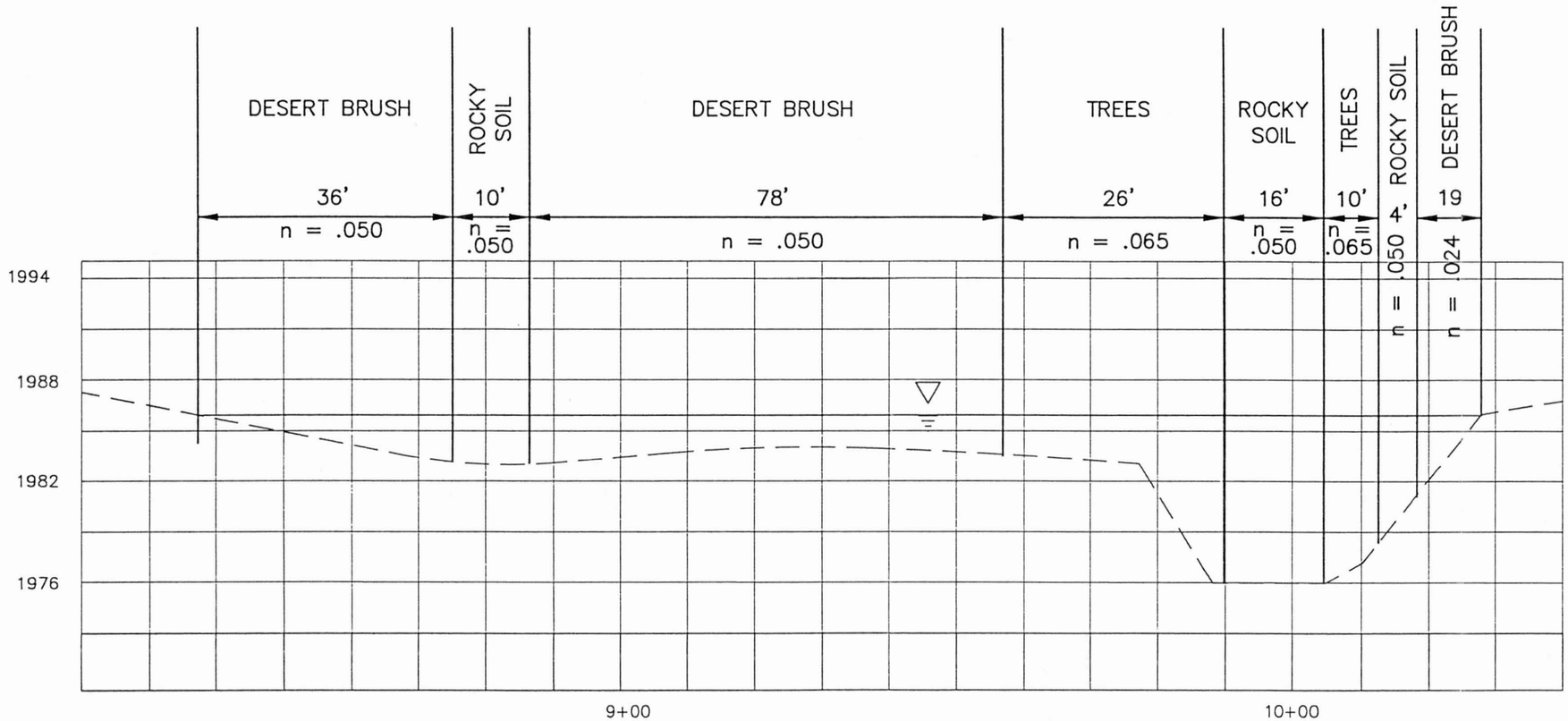


FIGURE 9

SCOTTSDALE DESERT GREENBELT
MANNING'S 'n' ANALYSIS

SOUTH BEARDSLEY
EXISTING CONDITIONS
QUARTER SECTION 40 – 53 & 41 – 53

Greiner

The Desert Greenbelt

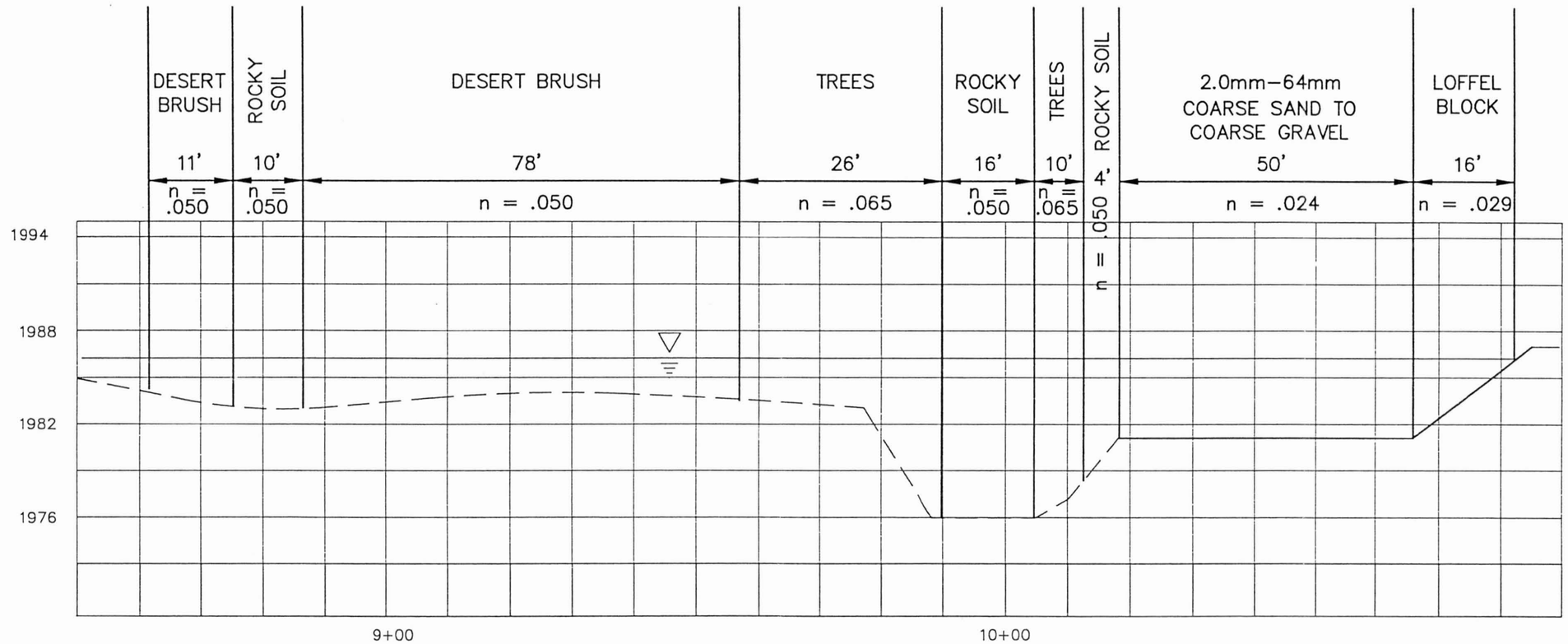


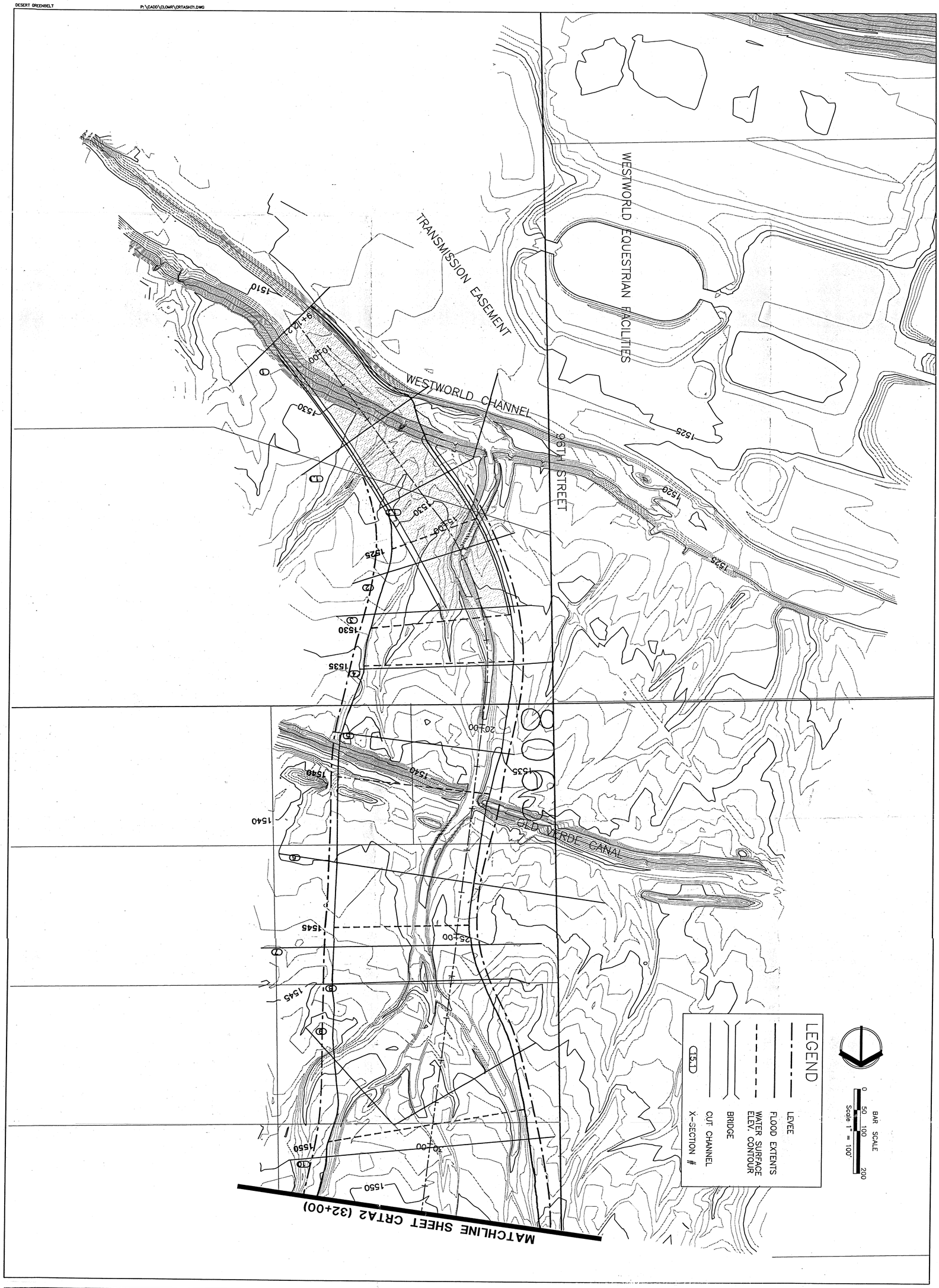
FIGURE 10

SCOTTSDALE DESERT GREENBELT
MANNING'S 'n' ANALYSIS

SOUTH BEARDSLEY
IMPROVED CONDITIONS
QUARTER SECTION 40 – 53 & 41 – 53

Greiner

The Desert Greenbelt



The Desert Greenbelt SCOTTSDALE, ARIZONA

DRAWING NO. CRTA1 of CRTA11

PROJECT NAME

Reata Pass Wash FEMA CLOMR Report

DRAWING TITLE

FLOODPLAIN MAP

Cross-Sections 1-10

Greiner
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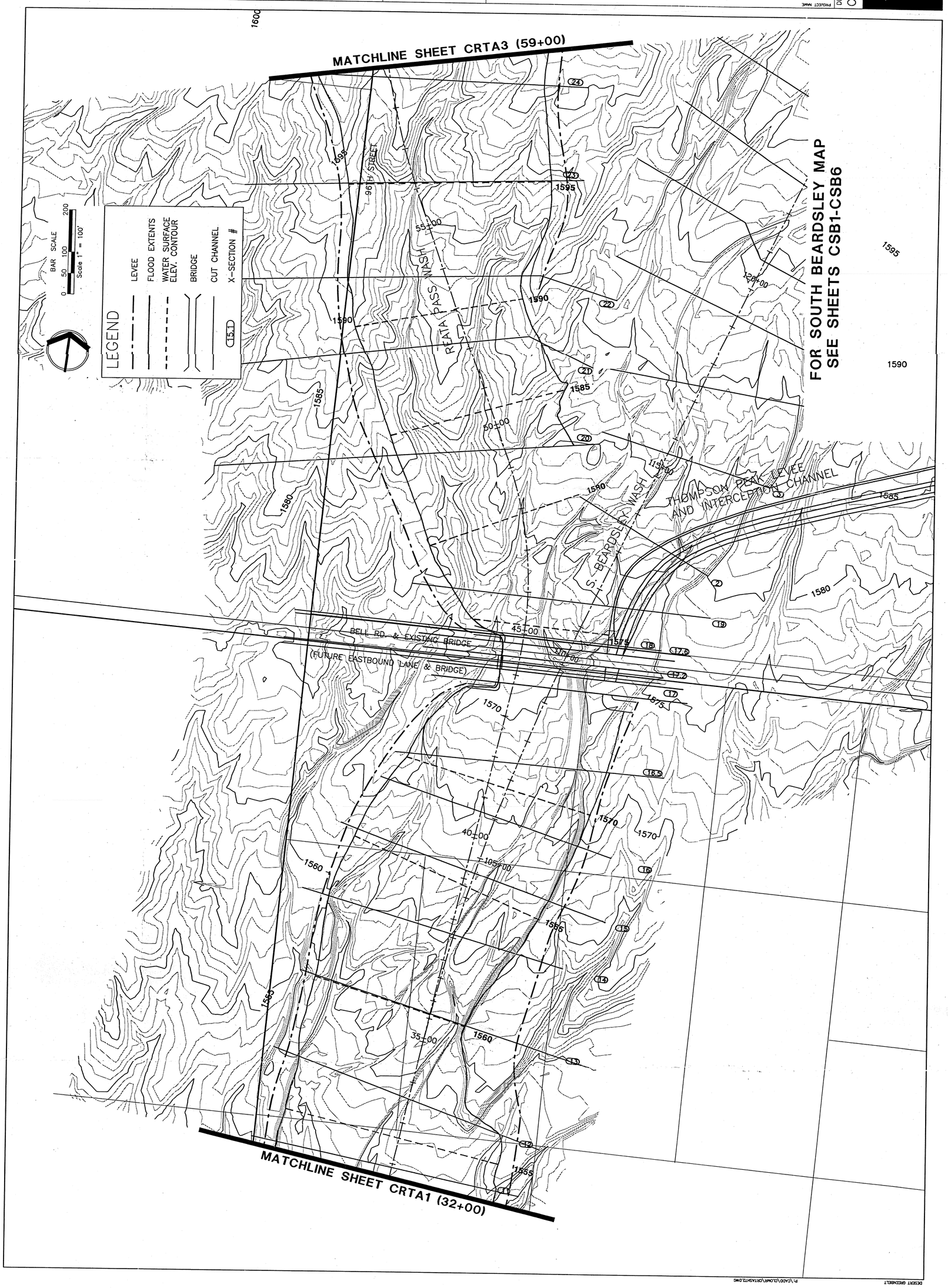
Phoenix, AZ
Engineers, Architects and Planners

CITY OF SCOTTSDALE ARIZONA

PROJ. NO. E029102
JOB NO.
DESIGN W.C.L.
DRAWN M.T.C.
CHECKED S.E.S.
SCALE: AS NOTED

DATE	REVISIONS	BY	AUTH.



PROJECT NAME: Reata Pass Wash FEMA CLOMR Report

DRAWING TITLE: FLOODPLAIN MAP Cross-Sections 11-24

DRAWING NO. CRTA2 of CRTA11

The Desert Greenbelt

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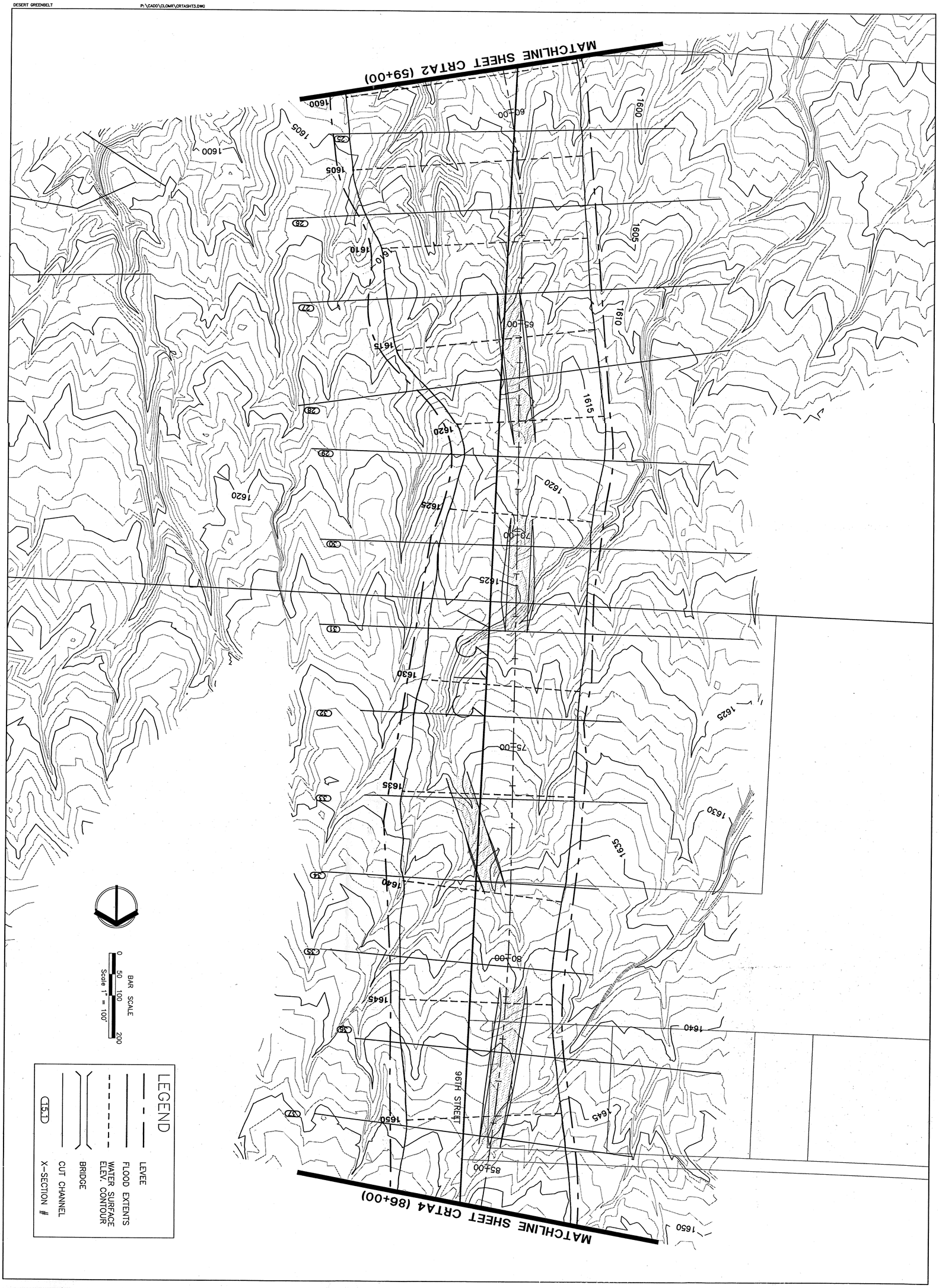
DATE	REVISIONS	BY	AUTH.

DESERT GREENBELT P:\CADD\CLOMR\CRTASHT2.DWG

06/19/95 08:28PM CRTASHT2



The Desert Greenbelt

DRAWING NO. CRTA3 of CRTA11

PROJECT NAME

Reata Pass Wash FEMA CLOMR Report

DRAWING TITLE

FLOODPLAIN MAP

Cross-Sections 25-37

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DRAWN M.T.C.
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DATE	REVISIONS	BY	AUTH.

The Desert Greenbelt
SCOTTSDALE, ARIZONA

DRAWING NO. CRTA4 of CRTA11

PROJECT NAME
Reata Pass Wash FEMA CLOMR Report

DRAWING TITLE
FLOODPLAIN MAP

Cross-Sections 38-51

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JOB NO.
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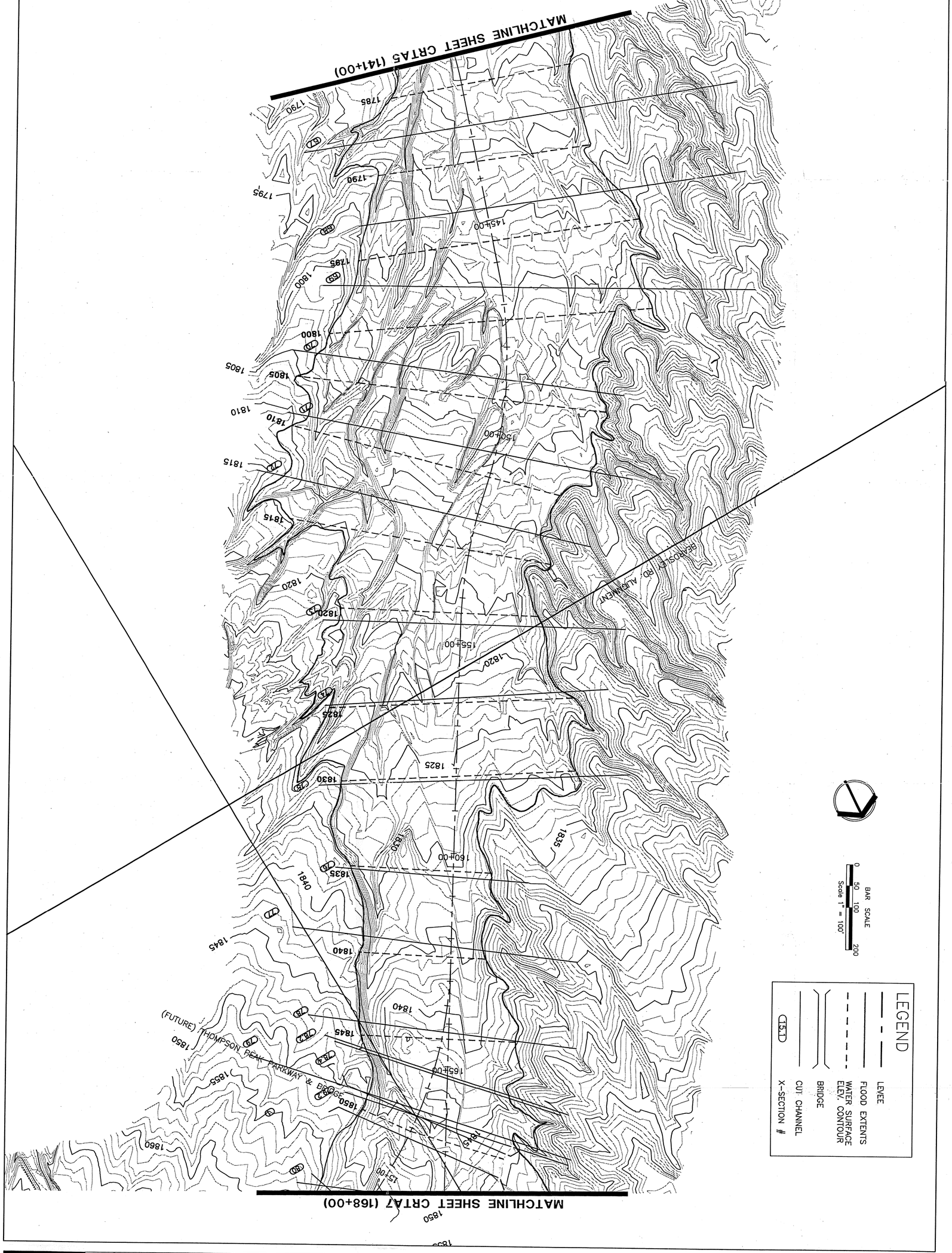
SCALE: AS NOTED

DATE	REVISIONS	BY	AUTH.

06/19/95 09:46PM CRTASHT4

MATCHLINE SHEET CRTA4 (113+00)
MATCHLINE SHEET CRTA6 (141+00)
HUALAPAI DRIVE ALIGNMENT
96TH STREET
BLIMOCK DR.
LEGEND
LEVEE
FLOOD EXTENTS
WATER SURFACE ELEV. CONTOUR
BRIDGE
CUT CHANNEL
X-SECTION #
BAR SCALE
Scale 1" = 100'



The Desert Greenbelt
SCOTTSDALE, ARIZONA

DRAWING NO. CRTA6 of CRTA11

PROJECT NAME
Reata Pass Wash FEMA CLOMR Report

DRAWING TITLE
FLOODPLAIN MAP

Cross-Sections 67-80

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Engineers, Architects and Planners

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JOB NO.
DESIGN W.C.L.
DRAWN M.T.C.
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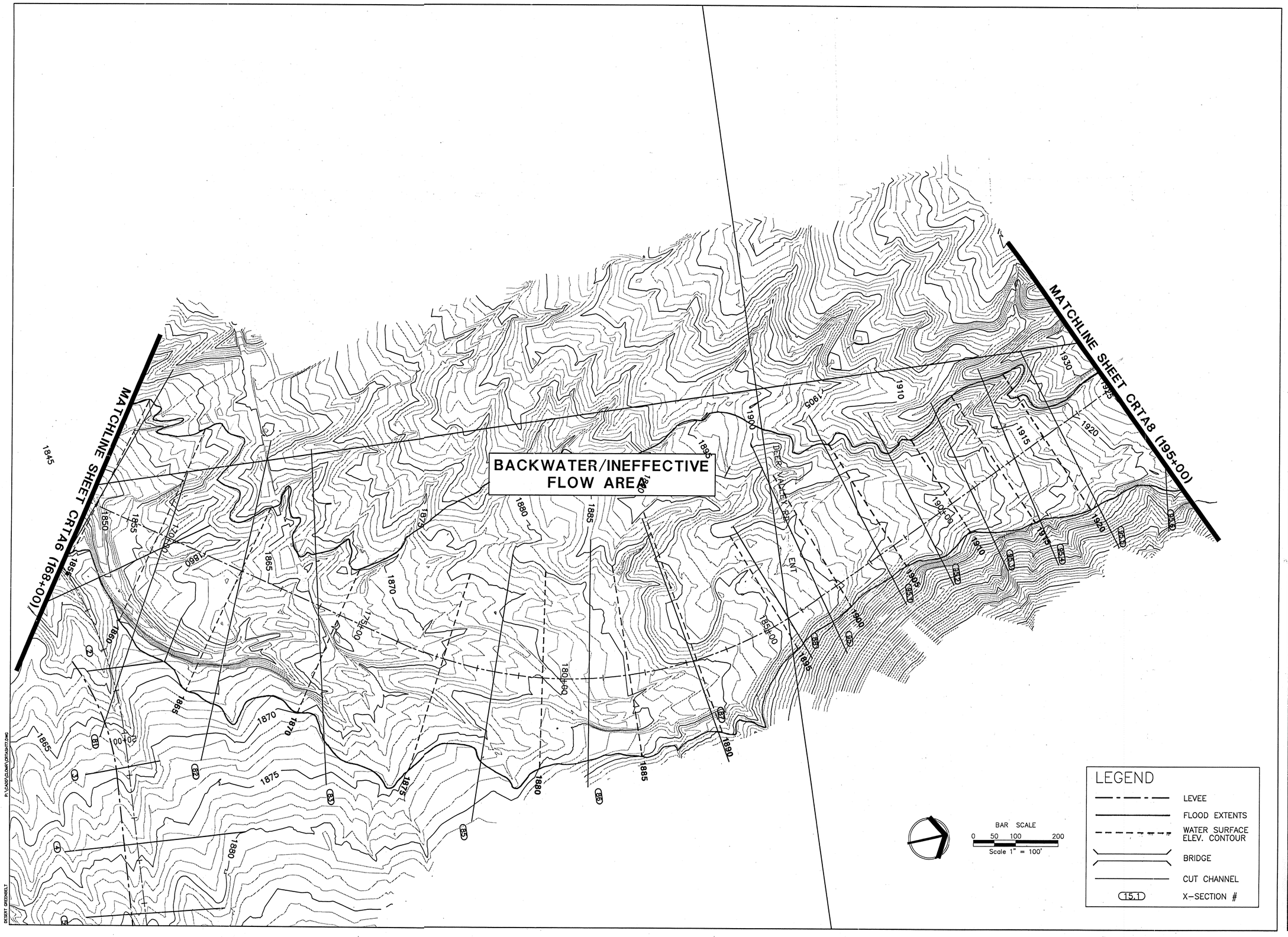
SCALE: AS NOTED

DATE	REVISIONS	BY	AUTH.



PROJ. NO. E029102	DATE	REVISIONS	BY	AUTH.
JOB NO.				
DESIGN W.C.L.				
DRAWN M.T.C.				
CHECKED S.E.S.				
SCALE: AS NOTED				

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DRAWING TITLE: FLOODPLAIN MAP Cross-Sections 81-95.6

DRAWING NO. CRTA7 of CRTA11

The Desert Greenbelt

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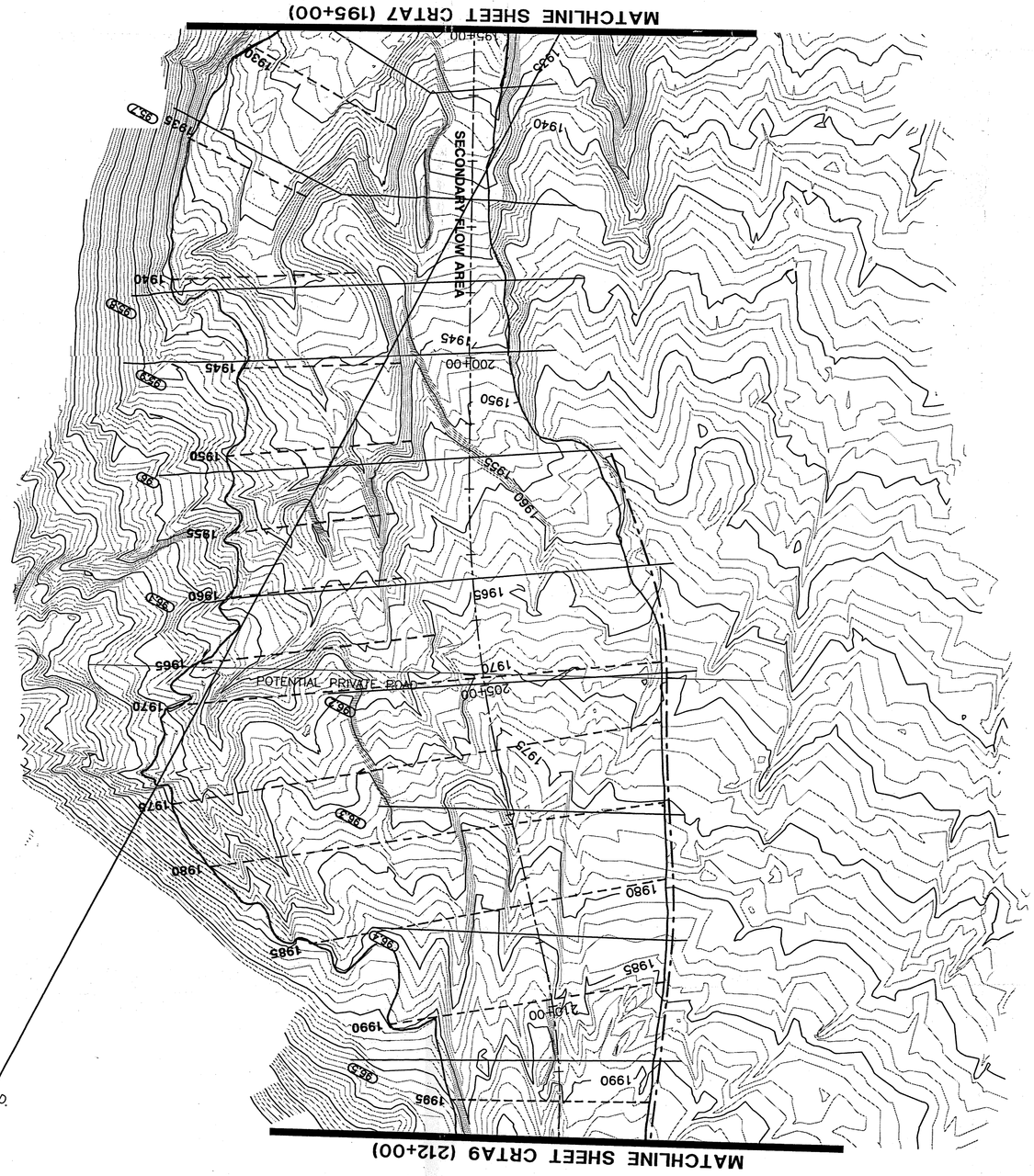
DESERT GREENBELT



LEGEND

- LEVEE
- FLOOD EXTENTS
- WATER SURFACE ELEV. CONTOUR
- BRIDGE
- CUT CHANNEL
- X-SECTION #

The Desert Greenbelt

DRAWING NO. CRTA8 of CRTA11

PROJECT NAME

Reata Pass Wash FEMA CLOMR Report

DRAWING TITLE

FLOODPLAIN MAP

Cross-Sections 95.7-96.5

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SCALE: AS NOTED

DATE	REVISIONS	BY	AUTH.

The Desert Greenbelt
SCOTTSDALE, ARIZONA

DRAWING NO. CRTA9 of CRTA11

PROJECT NAME
Reata Pass Wash FEMA CLOMR Report

DRAWING TITLE
FLOODPLAIN MAP

Cross-Sections
96.6-150

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SCALE: AS NOTED

DATE	REVISIONS	BY	AUTH.

06/27/95 12:56PM CRTASHT9

DESERT GREENBELT P:\CADD\CLOMR\CRTSHT10.DWG

06/27/95 09:13AM CRTSHT10

The Desert Greenbelt SCOTTSDALE, ARIZONA

DRAWING NO. CRTA10 of CRTA11

PROJECT NAME

Reata Pass Wash FEMA CLOMR Report

DRAWING TITLE

FLOODPLAIN MAP

Cross-Sections 160-290

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JOB NO.
DESIGN W.C.L.
DRAWN M.T.C.
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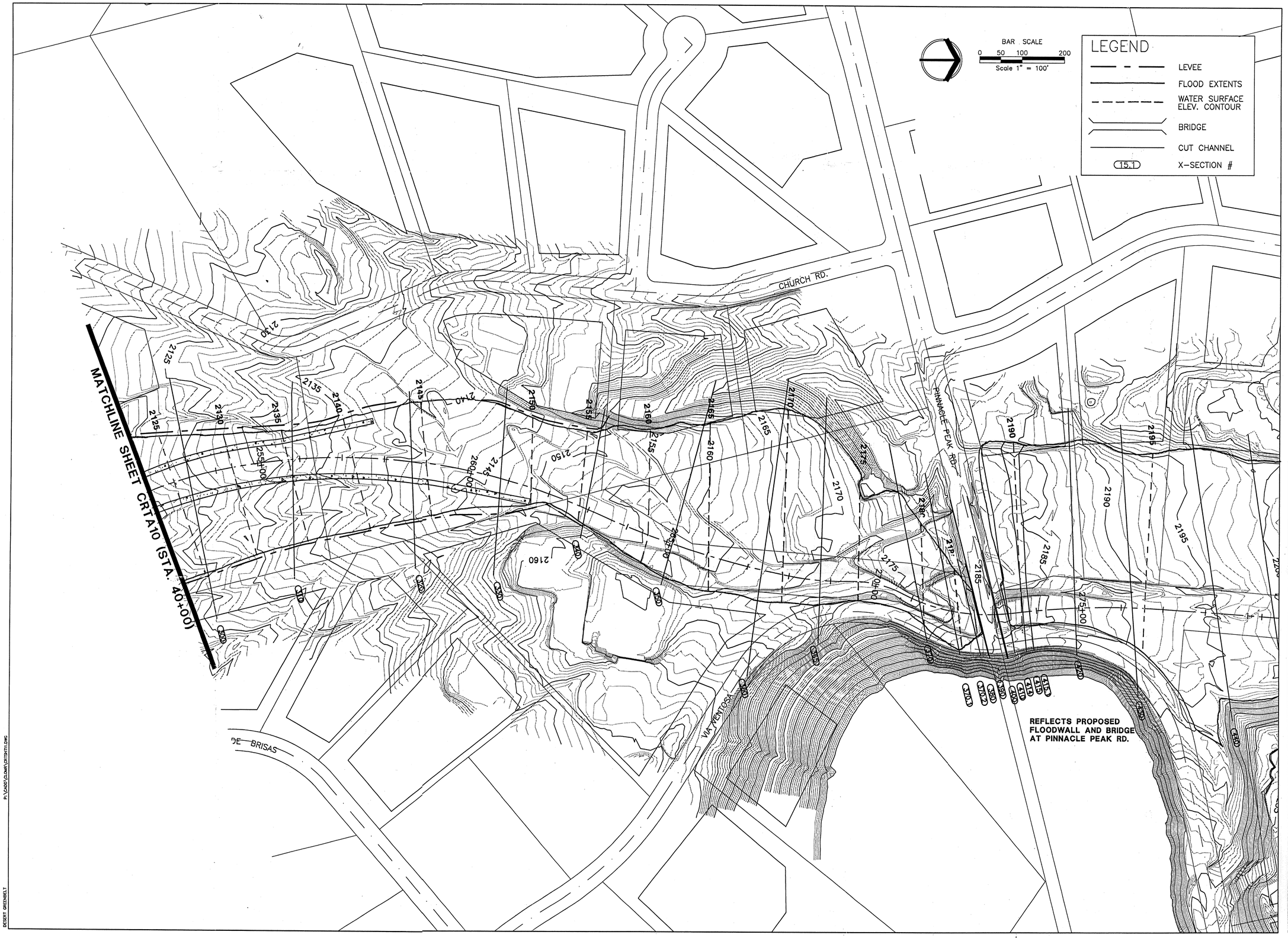
SCALE: AS NOTED

DATE	REVISIONS	BY	AUTH.



REVISIONS	BY	AUTH.

	DATE
PROJ. NO. E029102	
JOB NO.	
DESIGN W.C.L.	
DRAWN M.T.C.	
CHECKED S.E.S.	
SCALE: AS NOTED	

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Reata Pass Wash FEMA CLOMR Report

DRAWING TITLE
FLOODPLAIN MAP
Cross-Sections 300-440

DRAWING NO.
CRTA11 of CRTA11

The Desert Greenbelt

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DESERT GREENBELT

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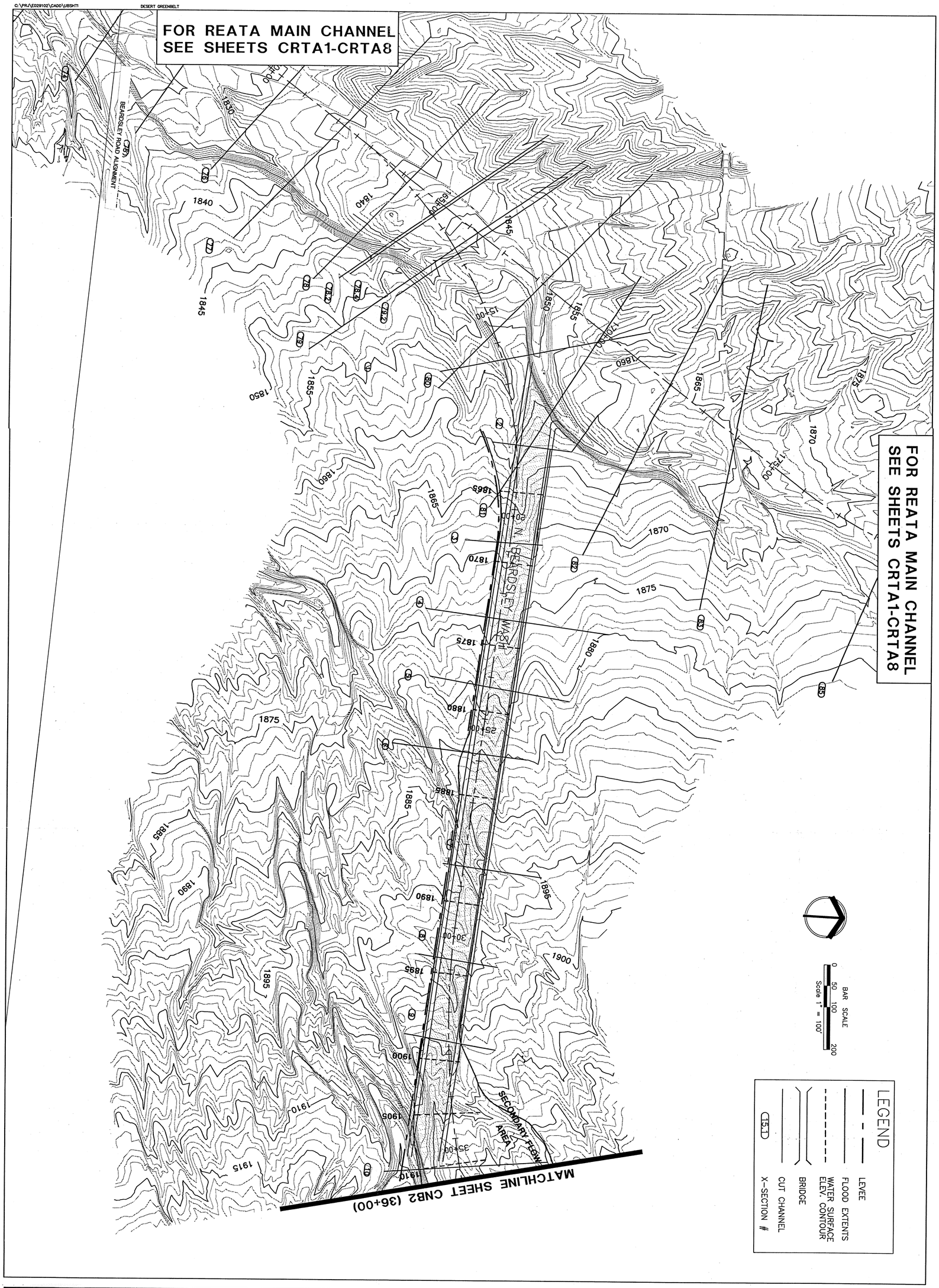

The Desert Greenbelt
SCOTTSDALE, ARIZONA

DRAWING NO. CNB1 of CNB2

PROJECT NAME
North Beardsley Wash FEMA CLOMR Report

DRAWING TITLE
FLOODPLAIN MAP
Cross-Sections 1-10

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PROJ. NO. E029102
JOB NO.
DESIGN W.C.L.
DRAWN M.T.C.
CHECKED S.E.S.
SCALE: AS NOTED

DATE	REVISIONS	BY	AUTH.

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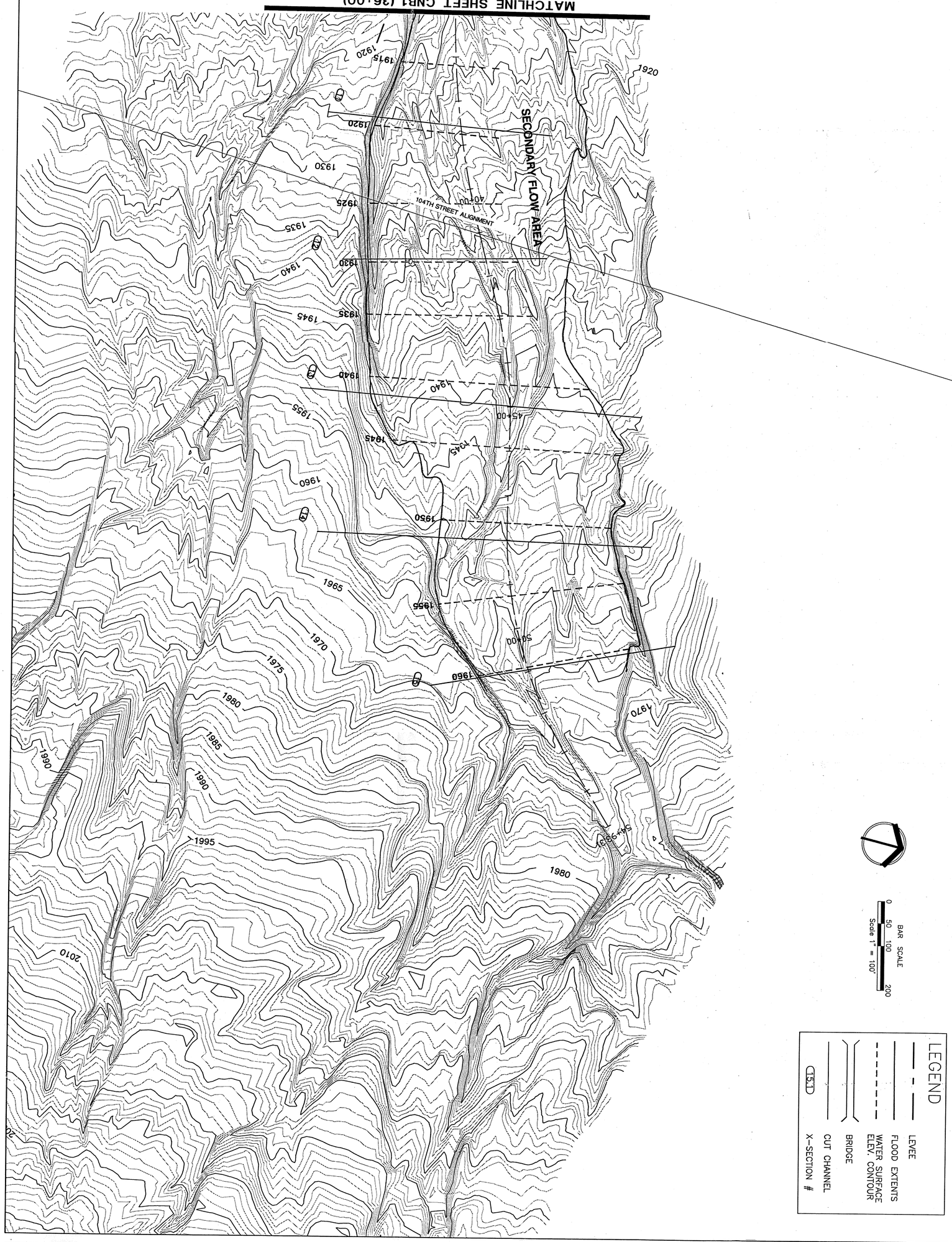

The Desert Greenbelt
SCOTTSDALE, ARIZONA

DRAWING NO. CNB2 of CNB2

PROJECT NAME
North Beardsley Wash FEMA CLOMR Report

DRAWING TITLE
FLOODPLAIN MAP

Cross-Sections 11-15

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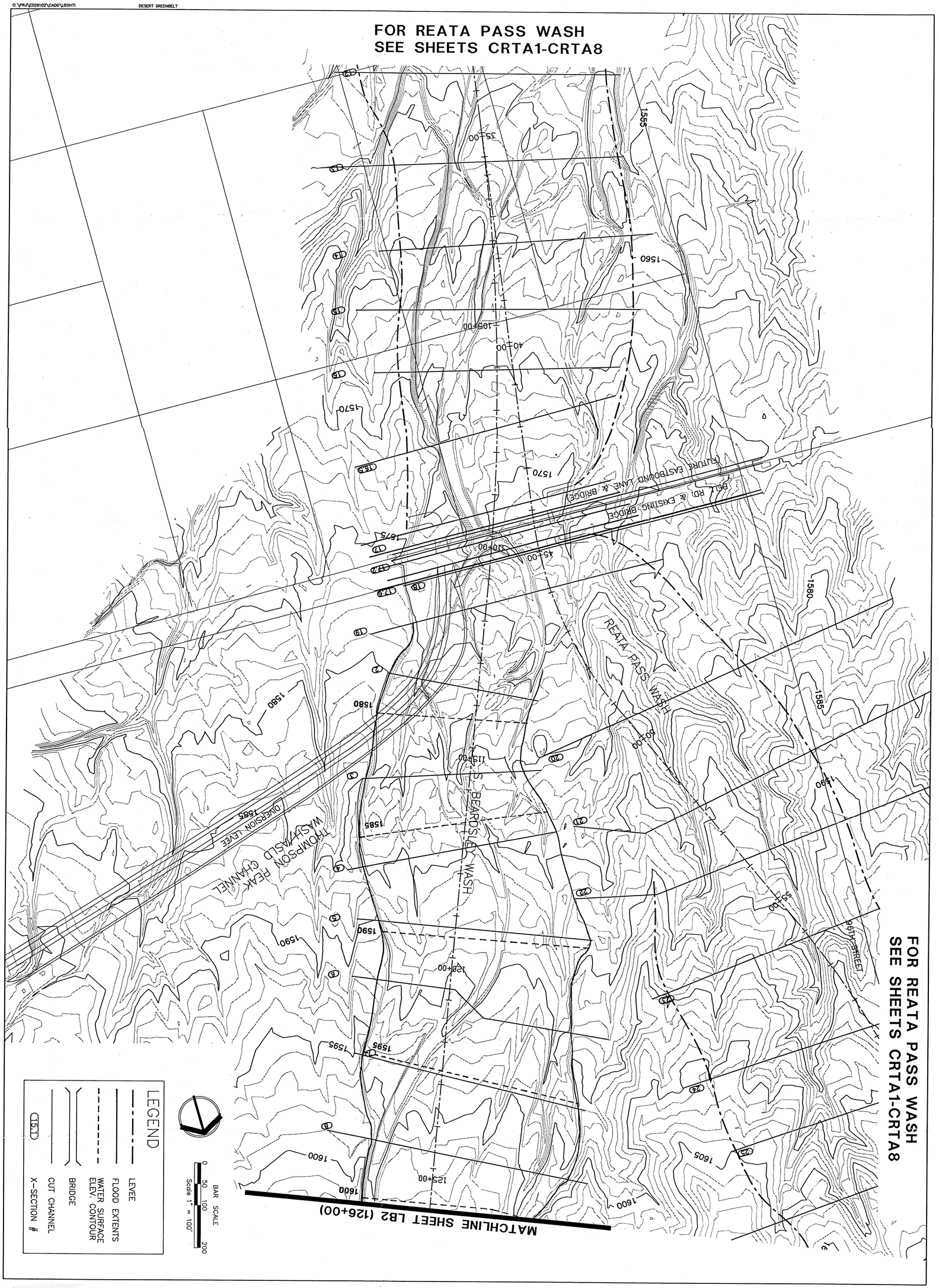
SCALE: AS NOTED

DATE	REVISIONS	BY	AUTH.

C:\PRJ\E029102\CADD\LBSHT1 DESERT GREENBELT

06/20/95 01:01 AM CLBSHT1



PROJECT NAME

South Beardsley Wash FEMA CLOMR Report

DRAWING TITLE

FLOODPLAIN MAP

Cross-Sections 2-8

DRAWING NO. CSB1 of CSB6

The Desert Greenbelt SCOTTSDALE, ARIZONA

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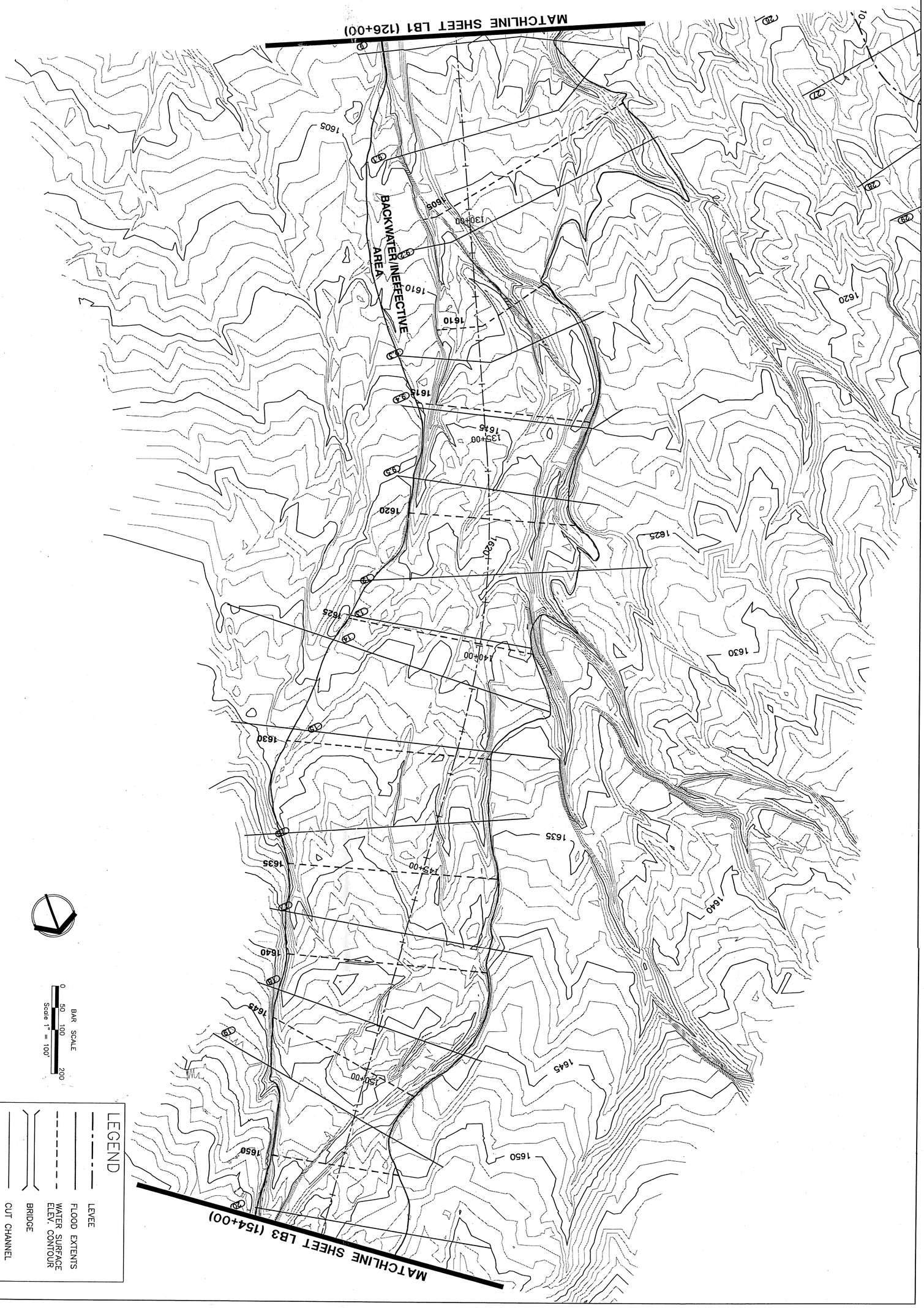
CITY OF SCOTTSDALE ARIZONA

PROJ. NO.	E029102
JOB NO.	
DESIGN	W.C.L.
DRAWN	M.T.C.
CHECKED	S.E.S.
SCALE:	AS NOTED

DATE	REVISIONS	BY	AUTH.



The Desert Greenbelt
SCOTTSDALE, ARIZONA

DRAWING NO. CSB2 of CSB6

PROJECT NAME
South Beardsley Wash FEMA CLOMR Report

DRAWING TITLE
FLOODPLAIN MAP

Cross-Sections 9-20

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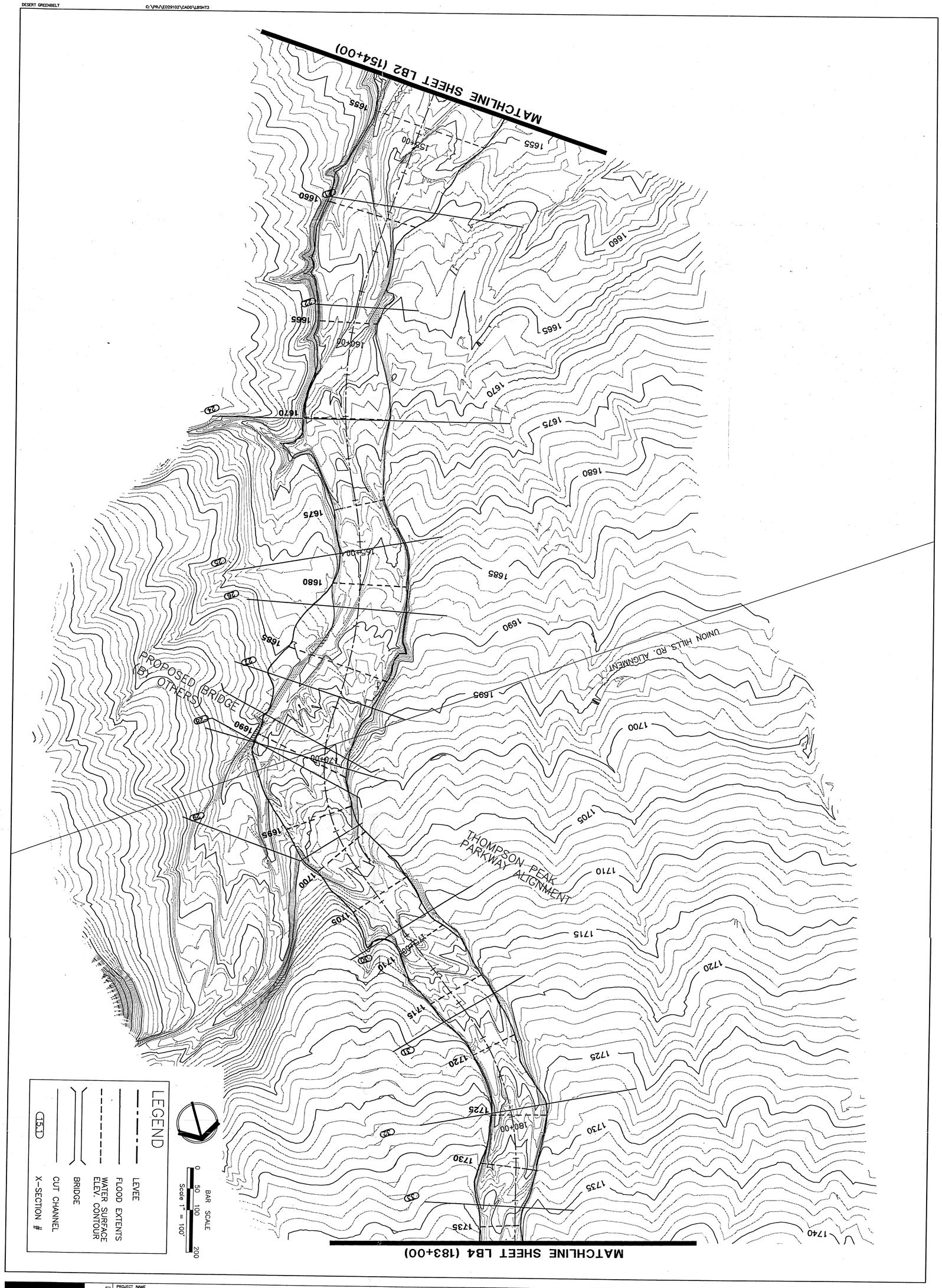
JOB NO.	
DESIGN	W.C.L.
DRAWN	M.T.C.
CHECKED	S.E.S.
SCALE:	AS NOTED

DATE	REVISIONS	BY	AUTH.



The Desert Greenbelt SCOTTSDALE, ARIZONA

DRAWING NO. CSB3 of CSB6

PROJECT NAME

North Beardsley Wash FEMA CLOMR Report

DRAWING TITLE

FLOODPLAIN MAP

Cross-Sections 21-33

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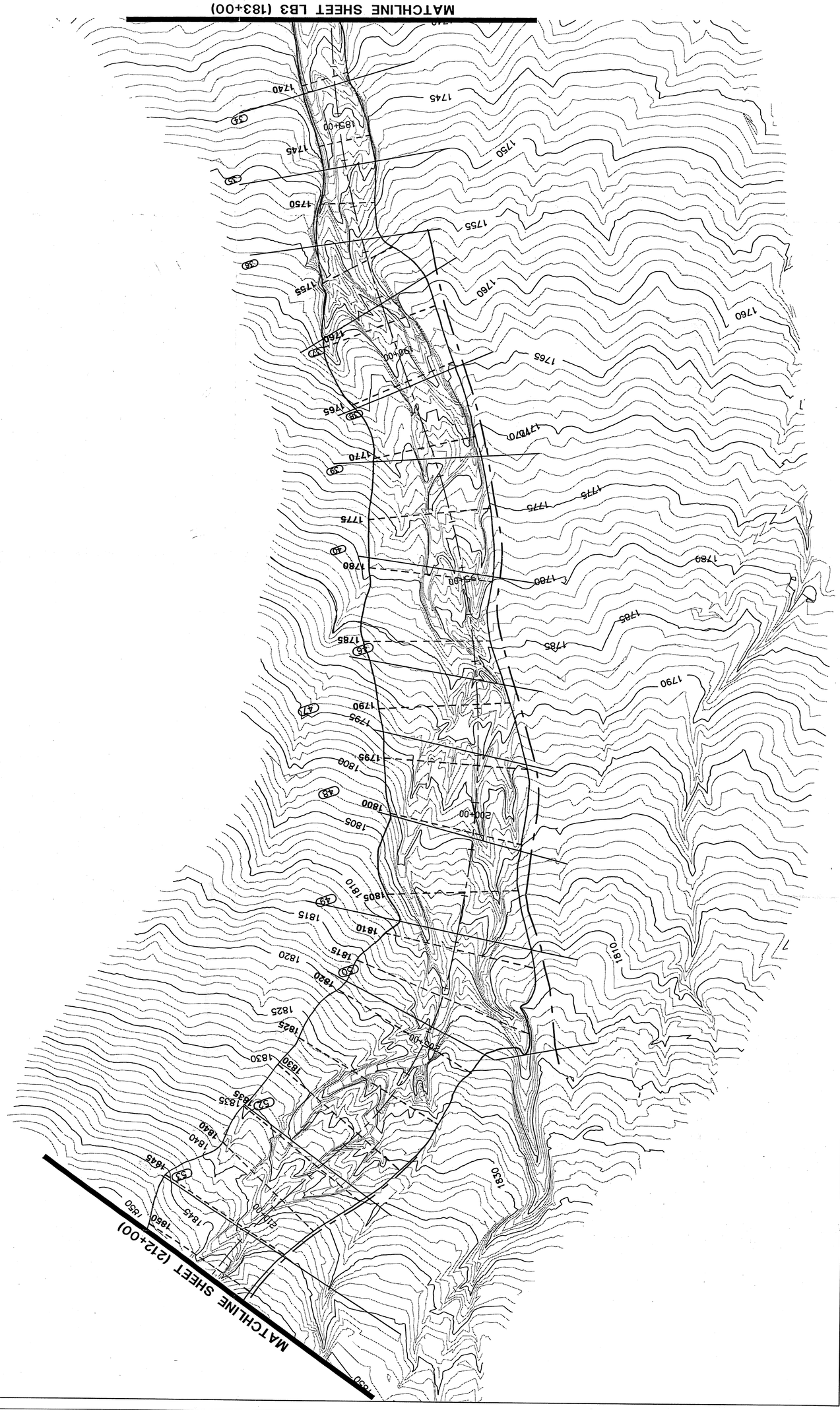
JOB NO.
DESIGN W.C.L.
DRAWN M.T.C.
CHECKED S.E.S.
SCALE: AS NOTED

DATE	REVISIONS	BY	AUTH.



The Desert Greenbelt
SCOTTSDALE, ARIZONA

DRAWING NO. CSB4 of CSB6

PROJECT NAME
South Beardsley Wash FEMA CLOMR Report

DRAWING TITLE
FLOODPLAIN MAP

Cross-Sections 34-53

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CITY OF SCOTTSDALE ARIZONA

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JOB NO.
DESIGN W.C.L.
DRAWN M.T.C.
CHECKED S.E.S.
SCALE: AS NOTED

DATE	REVISIONS	BY	AUTH.

DESERT GREENBELT C:\PR/\E029102\CADD

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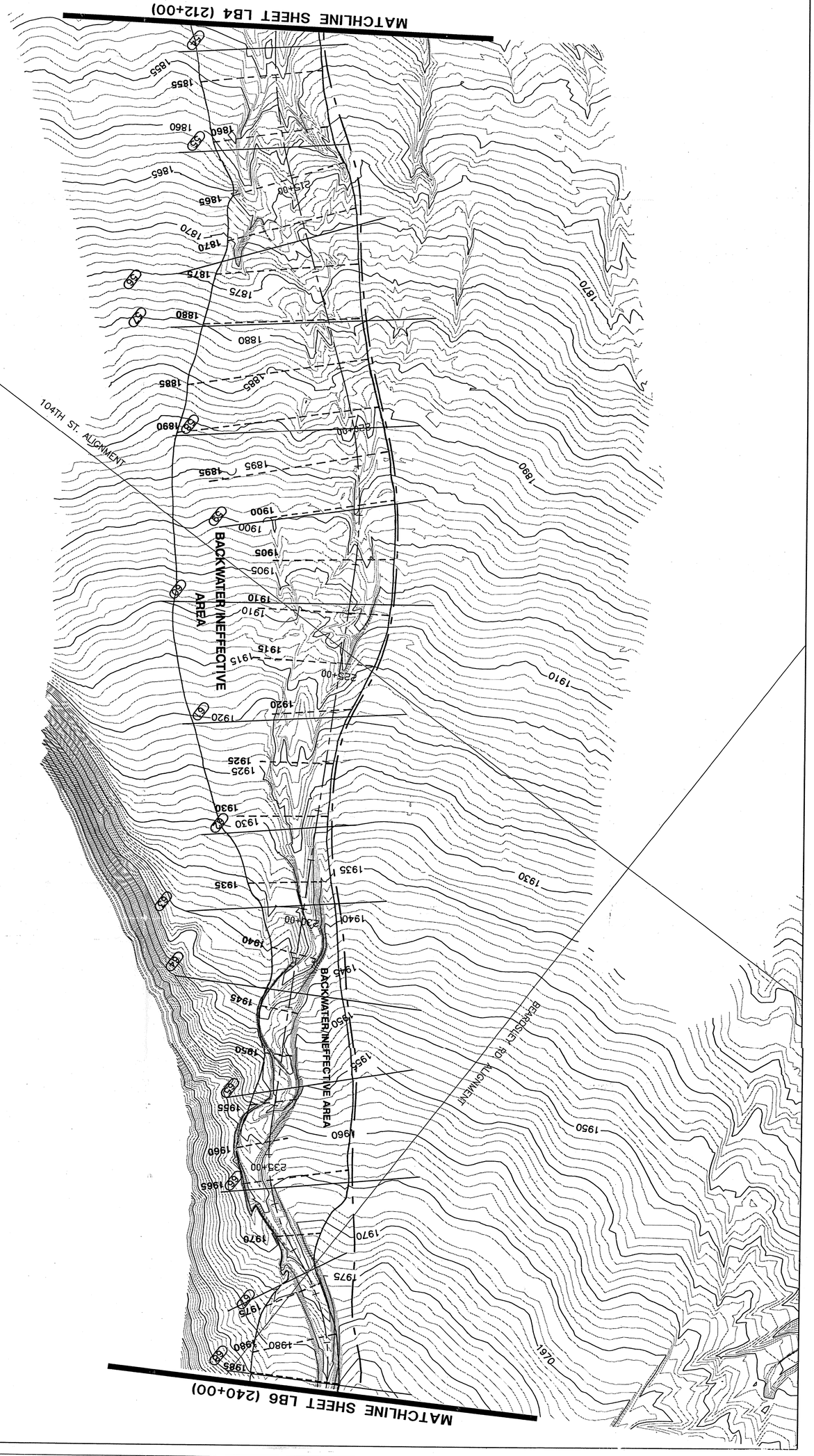

PROJECT NAME

South Beardsley Wash FEMA CLOMR Report

DRAWING TITLE

FLOODPLAIN MAP

Cross-Sections 54-68

DRAWING NO. CSB5 of CSB6

The Desert Greenbelt SCOTTSDALE, ARIZONA

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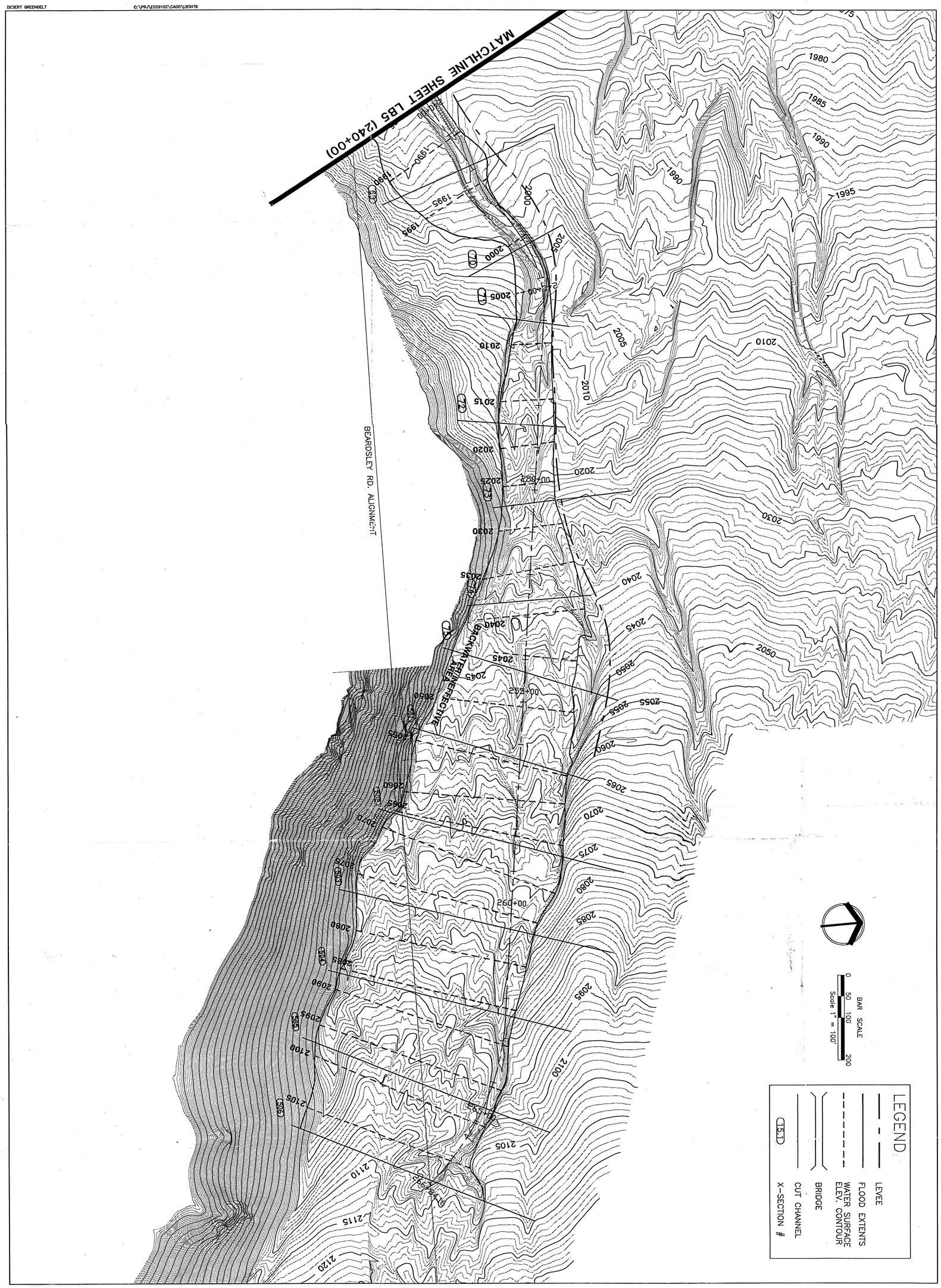
JOB NO.
DESIGN W.C.L.
DRAWN M.T.C.
CHECKED S.E.S.
SCALE: AS NOTED

DATE	REVISIONS	BY	AUTH.



PROJECT NAME

South Beardsley Wash FEMA CLOMR Report

DRAWING TITLE

FLOODPLAIN MAP

Cross-Sections 69-506

DRAWING NO. CSB6 of CSB6

The Desert Greenbelt SCOTTSDALE, ARIZONA

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JOB NO.
DESIGN W.C.L.
DRAWN M.T.C.
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