REPORT OF SEDIMENTATION
1997 RESURVEY
MARK TWAIN LAKE
UPPER MISSISSIPPI RIVER BASIN
SALT RIVER, MISSOURI

Submitted to

U.S. Army Engineer District, St. Louis
Corps of Engineers
St. Louis, Missouri

Submitted by

Resource Technology, Inc.
1720-B Randolph Rd. SE
Albuquerque, New Mexico 87106

RTI Project Number 00-130

September 2000

Resource Technology, Inc.

Civil Engineering - Environmental Sciences - Water Resources - Landscape Architecture - Planning

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CONVERSION FACTORS, U.S. CUSTOMARY TO METRIC (SI) UNITS OF MEASUREMENT

U.S. Customary units of measurement used in this report can be converted to metric (SI) units as follows:

Multiply	By	To Obtain
inches	25.4	millimeters
feet	0.3048	meters
miles (U.S. statute)	1.609344	kilometers
square miles	2.589988	square kilometers
cubic yards	0.7645549	cubic meters
acre-feet	1233.482	cubic meters
feet per second	0.3048	meters per second
cubic feet per second	0.02831685	cubic meters per second

PERTINENT DATA SUMMARY
MARK TWAIN LAKE

Reservoir storage and area values (below Elevation 638.0) are based on the results of the 1987 sedimentation resurvey. Not enough data in 1997 Resurvey to determined.

Item	Unit	
DRAINAGE AREA	sq mi	2318
INACTIVE STORAGE POOL		
Elevation	feet NGVD	520-567.2
Top Surface Area	acres	5,741
Storage	acre-feet	83,699
Storage (runoff)	inches	0.68
JOINT-USE POOL		
Elevation	feet NGVD	567.2-606.0
Top Surface Area	acres	18,283
Storage	acre-feet	449,601
Storage (runoff)	inches	3.64
Regulated Discharge		
Maximum	cfs	12,000
Minimum	cfs	0
HYDROELECTRIC POWER POOL		
Elevation	feet NGVD	592.0-606.0
FLOOD CONTROL POOL (LOWER ZONE)		
Elevation	feet NGVD	606.0-624.8
Top Surface Area	acres	28,361
Storage	acre-feet	441,475
Storage (runoff)	inches	3.57
Regulated Discharge		
Maximum	cfs	12,000
Minimum	cfs	0

PERTINENT DATA SUMMARY
MARK TWAIN LAKE (Continued)

Item	Unit	
FLOOD CONTROL POOL (UPPER ZONE)		
Elevation	feet NGVD	624.8-638.0
Top Surface Area	acres	38,580
Storage	acre-feet	436,212
Storage (runoff)	inches	3.53
Regulated Discharge		
Mississippi River below flood stage from Louisiana to St. Louis, Missouri		
Maximum	cfs	12,000
Minimum	cfs	12,000
INDUCED SURCHARGE POOL		
Elevation	feet NGVD	638.0-642.0
Top Surface Area	acres	42,000
Storage	acre-feet	164,700
Storage (runoff)	inches	1.33
Maximum Discharge	cfs	217,000
SURCHARGE POOL (TOTAL)		
Elevation	feet NGVD	638.0-648.0
Top Surface Area	acres	47,800
Storage	acre-feet	433,800
Storage (runoff)	inches	3.51
Maximum Discharge	cfs	267,500
FREEBOARD		
Elevation	feet NGVD	648.0-653.0
Top Surface Area	acres	53,200
Storage	acre-feet	257,120
Storage (runoff)	inches	2.08
Height	feet	5.0

PERTINENT DATA SUMMARY
MARK TWAIN LAKE (Continued)

Item	Unit	
STANDARD PROJECT FLOOD		
Peak Flowrate (damsite)	cfs	210,560
Peak Inflow (reservoir)	cfs	295,000
Maximum Discharge	cfs	12,000
Maximum Pool Elevation	feet NGVD	638.0
Design Storm	inches	12.19
Runoff	inches	7.93
Runoff	acre-feet	980,360
Runoff (above 12,000 cfs)	inches	7.00
Runoff (above 12,000 cfs)	acre-feet	865,400
CANNON DAM		
Elevation, Top of Dam	feet NGVD	653.0
Height above Streambed	feet	138.0
Length of Crest	feet	1,940
Spillway		
Gross Width	feet	230
Crest elevation	feet NGVD	600.0
Tainter Gates		
Number	each	4
Size	feet	50(W)x39(H)
Top Elevation, Closed	feet NGVD	639.0
Outlet Structure		
Number of Sluices	each	1
Size (diameter)	inches	24

REPORT ON 1997 RESURVEY OF SEDIMENTATION
MARK TWAIN LAKE
SALT RIVER, MISSOURI

1. INTRODUCTION

This report is prepared according to instructions in EM 1110-2-4000, Sedimentation Investigations of Rivers and Reservoirs dated December 15, 1989, and represents the results of the 1997 resurvey of the Mark Twain Lake sedimentation ranges. The purpose of this investigation was to analyze the 1997 resurvey data to determine the distribution of sediment depletion of storage in the reservoir and trap efficiency of the reservoir. Initial operation of the reservoir began in September 1983.

2. LOCATION OF RESERVOIR

Mark Twain Lake is located in the Counties of Ralls, Monroe, Audrain and Shelby in northeastern Missouri, on the Salt River. Clarence Cannon Dam is approximately 63 miles* above the confluence of the Salt River and the Mississippi River, and approximately 27 miles upstream of the Town of New London. The watershed for the reservoir is 2,318 square miles, or about 79 percent of the total Salt River Basin. The basin is shown on Figure 1.

3. PURPOSE OF RESERVOIR

Mark Twain Lake is part of a general comprehensive plan for flood control on the Upper Mississippi Basin. As part of this plan, Mark Twain Lake and Clarence Cannon Dam provide flood control, hydroelectric power generation, water supply, recreation, fish and wildlife conservation, and water quality enhancement. Incidental navigation benefits on the Mississippi River will occur as the result of releases from the lake during low flow periods.

4. RESERVOIR PERTINENT DATA - DAM AND APPURTENANT STRUCTURES

The Pertinent Data Summary, shown on pages vi - vii, contains pertinent data concerning the dam, outlet, and spillway structures; and the elevations, areas, and capacities of the inactive, joint-use, hydroelectric power, flood control, and surcharge pools.

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* A table of factors for converting U.S. customary units of measurement to metric (SI) units is presented on page v.

5. WATERSHED CHARACTERISTICS

The Mark Twain Lake watershed has a total area of 2,318 square miles. The reservoir occupies approximately 60.3 square miles of this area at the top of the flood control pool (elevation 638.0**). North Fork is the major drainage channel, draining 626 square miles. North Fork is 88.0 miles in length, has an average gradient of 4.5 feet per mile, and has a maximum elevation of approximately 1,000 feet.

Middle Fork, Elk Fork and South Fork are the other major tributaries to Mark Twain Lake. Middle Fork drains 356 square miles, is 65.4 miles in length, has an average gradient of 5.1 feet per mile, and has a maximum elevation of approximately 940 feet. Elk Fork drains 262 square miles, is 34.8 miles in length, has an average gradient of 7.9 feet per mile and has a maximum elevation of approximately 880 feet. South Fork drains 298 square miles, is 38.0 miles in length, has an average gradient of 7.2 feet per mile, and has a maximum elevation of 880 feet. North Fork, Middle Fork, Elk Fork and South Fork drain a total of 1,542 square miles, which is 66 percent of the Mark Twain Lake watershed.

The Mark Twain Lake watershed is a gently undulating plain in the upstream portion and it becomes more rolling and hilly in the downstream reaches. High rock bluffs border the streams at various locations. The river valleys are characterized by fairly narrow, tortuous courses interspersed by areas of widened bottomlands. Hickory and oak groves are scattered among crop and grazing lands. Strip mining in the South Fork watershed may produce acid runoff. Several clay pits, in the southwestern portion of the Mark Twain Lake watershed, account for some colloidal suspension, which increases the turbidity of the lake.

6. CLIMATE

The climate in the area is relatively moderate. The summers are usually mild with occasional temperatures of 100°F or higher. The winters are generally short and moderate, although temperatures below zero are not uncommon. The minimum and maximum temperatures of record are -21°F during the winter and 108°F during the summer. The average annual temperature is about 55°F. The average monthly temperature ranges from a maximum of 79°F during July to a minimum of 26°F during January. Summaries of the monthly and annual precipitation and runoff for the watershed are given in Tables 1 and 2.

7. RESERVOIR OPERATION

The objective of regulating Clarence Cannon Dam is to provide flood control, hydroelectric power generation, water supply, minimum releases for downstream water quality control, water temperature control for fish and wildlife, and recreation. There are also incidental

** All elevations cited herein are in feet referred to National Geodetic Vertical Datum (NGVD).

benefits to Mississippi River navigation. The pool at elevation 606.0 feet retains one hundred percent of the joint-use storage for the project purposes, not including flood control.

The major physical constraint is that some of the agricultural land downstream of the project floods at a flow rate below 12,000 cfs. The lower 16 miles of the Salt River is greatly affected by Mississippi River backwater and the project has very little capability to provide flood protection in that reach.

Normal drawdown of the conservation pool resulting from power production will be limited throughout the year, with a more significant limitation during the recreation season. A minimum release will be maintained at all times from the Re-regulation Pool, regardless of the Mark Twain Lake pool elevation, so as to insure satisfactory water quality downstream primarily for fish life. When the lake level is within the lower part of the flood control pool (elevation 606.0 to 624.8), the total release from Cannon Dam will be limited to the seasonal channel capacity downstream of the Re-regulation Dam, less local runoff. The monthly reservoir pool hydrograph for the period 1984 through 1997 is shown in Figure 2.

8. RESERVOIR INFLOW

Summaries of the monthly and annual precipitation and runoff data for the watershed are given in Tables 1 and 2. One inch of runoff equals 123,619 acre-feet. Average annual precipitation and inflow for the sediment survey period are tabulated in Items 34 and 35 of ENG Form 1787, a data summary of reservoir sediment. The average monthly inflow hydrograph for the period 1984 through 1997 is shown in Figure 3.

9. ORIGINAL RESERVOIR SURVEY

Reservoir area and volume were determined from U.S. Geological Survey quadrangle sheets. A tabulation of the reservoir storage for 5-foot intervals is shown in Table 3. Item 46 of ENG Form 1787 gives an area and storage (capacity) tabulation at 5-foot intervals for the 1997 resurvey. Elevation versus area and capacity curves are shown on Figure 4.

10. TYPE AND SCOPE OF THE INITIAL SEDIMENT SURVEY

There were 49 sediment ranges established and surveyed by direct leveling during the period of April through July 1982 for the purpose of observing sediment distribution and the approximate rate of reservoir storage depletion. Exhibit 1 shows the location of the sediment ranges. The cross sections of the ranges for the original survey and the 1997 resurvey are shown in Appendix A. Appendix B shows detailed locations of the 49 sediment ranges.

11. TYPE AND SCOPE OF SEDIMENT RESURVEYS

The second sedimentation survey of Mark Twain Lake was conducted in September and

October 1987. Cross sections were rerun on all 49 sedimentation ranges. The average pool elevation during the measurements was 603.8.

The third sedimentation survey of Mark Twain Lake was made in 1996, referred to hereinafter as the 1997 resurvey. Due to accessibility difficulties and the resultant high cost of gaining access, resulting from low water surface elevations, a detailed sediment resurvey of all 49 sediment ranges was not possible. This resurvey included a partial hydrographic survey and overbank survey of 24 sediment ranges and 2 additional overbank surveys. Direct leveling by a Raytheon Recording Depth Sounder was used in the 1987 and the 1997 resurveys. The average pool elevation during the 1997 resurvey was 606.1. Plates 1 through 16 show the cross sections resurveyed in 1997 and their corresponding cross-sections from 1982 and 1987.

12. METHODS OF SEDIMENT COMPUTATIONS

The previous resurvey in 1987 used the prismoidal formula developed by the U.S. Soil Conservation Service (SCS).

This study however used the average end area method to determine the volume of sediment deposition for the period of 1982 to 1997. For this period calculation, common cross sections (sedimentation ranges) were compared. The area of sediment, in square feet, was determined for each resurveyed cross section at each one-foot elevation interval and the volume of sediment in each horizontal slice was determined by the average of the end area multiplied by the average length between the sections.

13. SEDIMENT QUANTITIES

All quantitative volumetric data is given to the nearest whole acre-foot to maintain continuity with the original survey and the resurvey. Therefore, this data presents more significant figures than should be confidently accepted.

Table 3 presents the elevation-capacity curves for Mark Twain Lake corresponding to the two survey periods. Two capacities are listed for the 1997 resurvey. Elevation versus capacity data corresponds to the capacity of the lake bounded by the sedimentation ranges that were resurveyed. Additional capacity from sedimentation ranges not surveyed in 1997 was computed utilizing the total cross sectional area from the 1987 study and their reach lengths; this was determined to be 333,156 acre-feet. The capacity bounded by the 1997 resurvey sedimentation ranges is 1,005,684 acre-feet, and the additional capacity is 333,156 acre-feet for a total capacity of 1,338,840 acre-feet. This capacity is 94 percent of the original 1982 capacity and 95 percent of the 1987 capacity. This variance may be attributed to sedimentation as well as the different computational method used to determine volumes and also the variance between the three surveys.

The 1997 resurvey data show that only 4,054 acre-feet of deposition occurred between 1982 and 1997 within the bounded resurvey area. This indicates a 0.3 percent reduction in this storage volume and an average depletion rate of 0.02 percent per year. These results are in stark contrast to the 1987 resurvey which indicated 17,068 acre-feet of sedimentation resulting in a total depletion of 1.2 percent of capacity or a 0.3 percent reduction per year.

The 1997 resurvey data show that of the 4,054 acre-feet of sediment calculated to be deposited from 1983 to 1987 (period of operation), about 2,059 acre-feet was deposited within the inactive pool (below elevation 567.2). This decreased the amount of storage in the inactive pool by 2.5 percent. In the joint-use pool (elevation 567.2 to 606.0), about 3,077 acre-feet of sediment accumulated. This reduced the joint-use pool capacity by 0.7 percent. The flood control pool experienced an increase in storage of about 1,082 acre-feet, or 0.1 percent over the same period. The following table summarizes the sediment deposition in Mark Twain Lake based on the 1987 and the 1997 resurveys.

Summary of Mark Twain Lake Sedimentation.

Reservoir Portion	Amount of Sediment Deposited (acre-feet)		Average Annual Rate of Deposition (acre-feet/year)	
	1983-1987	1983-1997	1983-1987*	1983-1997**
Entire Reservoir	17,068	4,054	4,183	290
Inactive Storage	3,328	2,059	816	147
Joint-use Storage	7,366	3,077	1,805	220
Flood Control Storage	6,374	-1,082	1,562	-77

* Based on 4.08 years, ENG Form 1787, Item 27.
** Based on 14 years, ENG Form 1787, Item 27.

The 1997 resurvey also showed that, for the entire reservoir, the greatest amount of sediment was deposited between Ranges 19A, 20A, and 21B (South Fork tributary); Ranges 1A, 9A, and 11A (downstream reservoir reach); and Ranges 17A, 18A and 26A (Middle Fork Tributary). These sections accounted for about 84 percent of the total sediment accumulation.

14. TRAP EFFICIENCY OF THE RESERVOIR

For the period of operation from 1983 to 1997, Mark Twain Lake has a trap efficiency of 97 percent. This value was determined using Gunnar M. Brune's median curve of Figure F-2 presented in EM 1110-2-4000, Sedimentation Investigations of Rivers and Reservoirs, pg. F-2, F-4. A capacity-inflow ratio of 0.96 was computed (Item 33, ENG Form 1787) using a reservoir capacity of 1,338,840 and an average annual inflow of 1,380,282 acre-feet. Table 6 presents descriptions of the sampling site locations. Appendix C provides the sediment size

distributions based on sediment samples collected 29 April 1988. No sediment samples were collected in 1997.

15. DOWNSTREAM CHANNEL AND RESERVOIR OPERATION

A separate study is ongoing concerning changes in the downstream regime. Nine ranges have been established in the re-regulation pool, and an additional twelve ranges have been established from the re-regulation dam to the Mississippi River.

Inspection trips are made on an annual basis, and the ranges surveyed periodically. Information concerning this downstream data may be obtained by contacting the Engineering Division, Potamology Section, of the St. Louis District.

16. EFFECT ON WATER SUPPLY CONTRACT

The joint-use pool originally had 457,000 acre-feet of storage, of which 20,000 acre-feet was allocated for water supply. Of the total joint-use storage, only 3,077 acre-feet had been depleted by 1997, a reduction of 0.7 percent. Due to the small amount of storage depleted, the existing water supply contract should not be changed. In the future, if sediment distribution decreases the amount of joint-use storage to the extent that any project purpose is affected, the District Engineer shall make an equitable redistribution of the storage allocation served by the project. Information concerning future sedimentation and any redistribution of storage allocations shall be made available to the Missouri State Water Resources Board.

17. SUMMARY

The computed rate of sediment deposition, 290 acre-feet per year, is substantially lower than the predicted rate of 11,500 acre-feet per year, which was the expected yearly sedimentation rate computed before the operation of the project. In addition, the rate computed in this study is also substantially lower than the rate of 4,183 acre-feet per year computed in the 1987 study. This large variation may be explained by not having surveyed all ranges in 1997, and also by changing the method volume calculations. However, it is apparent from visual inspection of the range data plots that significant, detrimental, or unexpected deposition is not occurring.

18. RECOMMENDATION

For this study, only 24 of the 49 ranges were available for comparison with previous surveys, which limits the accuracy of the results generated.

Current sedimentation ranges slightly underestimate the capacity of Mark Twain Lake especially in the tributaries. For example, there are several thousand feet downstream of SR-

37A2 that is unaccounted because a downstream cross section, at the confluence, is missing. Therefore, survey of additional cross sections at all confluences and upstream cross sections may be appropriate in the future.

Since the two resurveys of Mark Twain Lake have indicated significantly different rates of sedimentation, it is impossible to define a definite trend at this time. The next survey should be completed in the 2007 to 2012 time frame and should include all of the ranges as originally surveyed. If funds are not available at that time to complete every range, then based on the previous experience of inconclusive results with partial surveys, the resurvey should not be carried out until sufficient fund are available to do them all. In the meantime, no significant impacts to the storage allocations are occurring due to sedimentation, as is evident by the cross section plots of the ranges.

TABLE 1. Monthly Precipitation and Runoff for Mark Twain Lake (Sept. 1983 - July 1997).

Month	Maximum Rainfall (inches)	Minimum Rainfall (inches)	Average Rainfall (inches)	Average Runoff (inches)	Runoff (percent)
January	2.43	0.05	0.77	0.43	55.8
February	4.28	0.11	1.47	1.23	83.7
March	4.77	0.61	1.87	1.26	67.4
April	6.05	0.79	2.33	1.47	63.1
May	6.24	0.52	3.44	2.09	60.8
June	5.71	0.31	2.57	0.60	23.3
July	5.95	0.28	2.77	0.82	29.6
August	5.87	1.04	3.67	0.40	10.9
September	9.58	0.60	3.08	0.59	19.2
October	7.47	0.44	2.32	0.52	22.4
November	11.29	0.36	3.34	0.95	28.4
December	3.95	0.09	1.90	0.67	35.3

July average rainfall based on seven years; January and December rainfall averages based on eight years; February, April, August, September, and November rainfall averages based on nine years; and March, May, June, and October rainfall averages based on ten years.

TABLE 2. Annual Precipitation and Runoff for Mark Twain Lake (Sept. 1983 - July 1997).

Year	No. of Months (Missing Months)	Rainfall (inches)	Runoff (inches)	Runoff (percent)	Average Daily Runoff (cfs)
1984‡	-- --	48.34	15.31	31.7	2,615
1985‡	-- --	48.85	14.74	30.2	2,518
1986‡	-- --	46.89	15.26	32.5	2,606
1987‡	-- --	41.11	10.05	24.4	1,715
1988	11 (July)	14.23	2.50	17.6	433
1989	11 (Dec.)	19.22	3.00	15.6	479
1990	12 --	25.45	12.11	47.6	2,068
1991	11 (July)	23.16	10.09	43.6	1,712
1992	12 --	18.95	7.40	39.1	1,267
1993	12 --	30.46	25.33	83.2	4,314
1994*	9 (July, Nov., Dec.)	10.43	8.79	84.3	1,520
1995	11 (Jan.)	22.55	15.80	70.1	2,687
1996*	10 (Jan., Feb.)	19.18	8.72	45.5	1,470
1997*	7 (**)	9.78	8.92	91.2	1,588
Maximum		48.85	25.33	83.2	4,314
Minimum		14.23	2.50	15.6	433
Average		30.84	11.29	46.9	1,928

* Data from 1994, 1996, and 1997 are not used as the minimum or in the computation of the average.
** 1997 Precipitation data extends through July only.
‡ Data from "Report of Sedimentation, 1987 Resurvey." Table 2 identified column as Water Year.

TABLE 3. Elevation Versus Capacity for Mark Twain Lake.

Elevation (feet, NGVD)	Original Capacity (acre-feet)	1987 Capacity (acre-feet)	Revised 1982 Capacity Resurveyed Sections Only (acre-feet)	1997 Capacity Resurveyed Sections Only (acre-feet)
520	0	0	0	0
525	172	0	43	73
530	743	210	493	434
535	1,985	927	1,677	1,690
540	4,285	2,875	5,332	5,449
545	9,035	7,272	11,836	12,166
550	17,867	15,752	23,012	22,953
555	31,406	28,938	39,730	39,170
560	50,150	47,330	61,944	60,729
565	74,448	71,275	87,684	85,795
567.2	87,027	83,699	98,703	97,609
570	104,716	100,856	115,500	112,644
575	141,508	136,699	148,081	144,150
580	185,196	179,438	188,888	184,280
585	236,332	229,625	236,082	230,458
590	295,388	287,732	290,561	284,775
595	362,886	354,280	350,695	345,323
600	439,401	429,846	415,663	410,305
605	525,560	515,056	485,224	480,048
606.0	543,994	533,300	499,473	494,527
610	622,607	611,783	557,463	552,443
615	732,139	721,152	632,186	627,205
620	854,997	843,849	710,030	705,148
624.8	986,079	975,775	787,200	782,509
625	991,779	980,388	790,413	785,732
630	1,145,045	1,131,470	872,981	868,598
635	1,316,103	1,300,345	957,779	953,657
638.0	1,428,055	1,410,987	1,009,737	1,005,684
Additional Capacity from Sedimentation Ranges Not Surveyed in 1997			333,156	333,156
Total Capacity			1,342,893	1,338,840

TABLE 3A. Additional Capacity from Sedimentation Ranges Not Surveyed in 1997 for Mark Twain Lake.

Reaches Not Resurveyed in 1997	Additional Capacity (acre-feet)
40AB-41AB	20,721
41AB-42AB	16,671
42AB-43B	19,783
43B-44B	8,795
44B-45B	8,284
45B-46B	4,213
46B-END	4,101
4AB-5B	11,430
5B-END	9,474
7A-8B	10,249
8B-END	3,385
10AB-END	6,701
13B-END	5,397
14A-15B	28,901
15B-END	2,786
28A-31AB	48,825
31AB-32B	12,625
32B-END	13,670
21B-22B	18,447
22B-23B	5,906
23B-END	122
24B-END	1,912
25B-END	1,064
27B-END	3,735
29AB-30B	18,903
30B-END	5,836
33AB-END	7,488
37A2-38B	19,332
38B-39B	7,238
39B-END	1,396
47B-48B	3,733
48B-END	2,036
TOTAL	333,156

TABLE 3B. Elevation Versus Change in Capacity for Mark Twain Lake.

Elevation (feet, NGVD)	Cumulative Change in Capacity* 1987-1982 (acre-feet)	Change in Capacity 1997-1982 (acre-feet)	Cumulative Change in Capacity 1997-1982 (acre-feet)
520		0	0
525		31	31
530		-90	-59
535		72	13
540		104	117
545		213	330
550		-389	-59
555		-501	-560
560		-655	-1,215
565		-675	-1,890
567.2	-3,328	-169	-2,059
570		-967	-2,857
575		-1,075	-3,932
580		-677	-4,609
585		-1,016	-5,625
590		-162	-5,787
595		414	-5,373
600		14	-5,359
605		182	-5,177
606.0	-10,694	41	-5,136
610		156	-5,021
615		40	-4,981
620		99	-4,882
624.8	-11,304	47	-4,835
625		201	-4,681
630		297	-4,384
635		261	-4,123
638.0	-17,068	69	-4,054

* From Report of Sedimentation, 1987 Resurvey.

TABLE 4. Change in Range With by Elevation for Mark Twain Lake, 1997-1982. Values in feet.

ELEV. NGVD	1A	2A	3A	4AB	6A	7A	9A	10 AB	11A	12A	13A	14A	16A	17A
523	44	-3	--	--	--	--	-13	--	--	--	--	--	--	--
524	126	-7	--	--	--	--	-1	--	--	--	--	--	--	--
525	30	18	--	--	--	--	-8	--	--	--	--	--	--	--
526	2	-7	--	--	--	--	-17	--	--	--	--	--	--	--
527	-10	-52	--	--	--	--	-27	--	--	--	--	--	--	--
528	-7	-26	--	--	--	--	-43	--	--	--	--	--	--	--
529	-49	-16	--	--	16	--	-53	--	-5	--	--	--	--	--
530	-90	-8	--	--	9	--	-79	--	-30	--	--	--	--	--
531	-133	3	--	--	-8	--	-50	--	-20	--	--	--	--	--
532	4	2	--	--	-11	--	-58	--	30	--	--	--	--	--
533	122	2	-12	--	-5	--	-63	--	66	--	--	--	92	--
534	134	-25	14	--	36	--	-65	--	41	--	--	--	264	--
535	102	-12	1	--	-54	--	-75	--	13	--	--	--	309	--
536	109	-158	-2	--	-153	--	-47	--	-10	--	--	--	215	--
537	162	-19	12	--	-47	--	-93	--	-17	--	--	--	85	--
538	189	-17	6	--	78	--	-112	--	-19	--	--	--	73	--
539	195	-33	-2	--	40	--	-120	--	-19	--	--	--	89	--
540	131	-147	3	--	82	--	-98	--	-16	--	--	--	96	--
541	130	-176	-43	--	114	--	-35	--	-12	--	--	--	81	-17
542	87	-174	-38	--	123	--	-42	--	-5	--	--	--	84	-47
543	115	-36	89	--	112	--	32	--	-23	--	--	--	80	-53
544	68	7	252	--	97	--	-68	--	-25	--	--	--	122	-55
545	31	2	119	--	76	--	-95	--	-31	--	--	--	129	-60
546	-25	-6	76	--	60	--	-156	--	-195	-7	--	--	128	-46
547	-17	-5	133	--	45	--	-232	--	-342	-20	--	--	147	-51
548	-38	1	16	--	27	--	-114	--	-376	15	--	--	159	-55
549	-78	0	8	--	-12	--	-86	-13	-423	-7	--	--	151	-59
550	45	1	-1	--	-14	--	-55	-4	-660	-26	--	--	159	-63
551	9	2	-5	--	-15	--	-41	-15	-690	-13	--	-12	-38	-64
552	-4	1	-5	--	-16	--	-40	-13	-733	-32	--	-19	-118	-61
553	-32	0	-4	--	-18	--	-64	-43	47	-32	--	-17	123	-60
554	7	-2	-2	--	-21	--	-88	-14	57	28	--	-1	230	-60
555	-1	-4	0	--	-23	--	-118	-9	61	302	--	1	177	-60

SR13B and SR21B Assume 1997 Data Matches 1987 Data

TABLE 4 (Continued). Change in Range With by Elevation for Mark Twain Lake, 1997-1982. Values in feet.

ELEV. NGVD	1A	2A	3A	4AB	6A	7A	9A	10 AB	11A	12A	13A	14A	16A	17A
556	3	-6	0	--	-24	--	-145	-7	66	-4	--	-30	418	-60
557	17	-7	0	--	-27	--	-153	-14	70	-28	--	-222	-170	-60
558	11	-6	0	--	-27	--	-126	-21	107	-20	--	-30	-92	-61
559	8	-5	1	--	-28	--	-151	-22	-374	12	--	-23	-77	-62
560	4	-5	2	--	-29	--	-143	-25	-39	13	--	1	-84	-62
561	0	-5	2	--	-29	--	-152	-47	52	21	--	25	-88	-62
562	-4	-5	2	--	-29	--	-162	-16	52	30	--	20	-97	-62
563	-7	-6	2	--	-28	--	-179	-21	57	29	--	16	-96	-69
564	-12	-6	3	--	-29	--	-184	-23	56	22	--	19	-98	-64
565	-15	-5	2	--	-29	--	-195	-24	55	18	--	19	-65	-65
566	-20	-6	2	--	-28	--	-181	-24	55	19	--	-31	-47	-65
567	-23	-3	2	--	-28	--	-179	-22	55	18	--	-26	-46	-59
568	-26	-3	2	--	-29	--	-161	-24	53	16	--	6	-42	-55
569	-28	-4	2	--	-30	--	-141	-22	51	16	--	2	-41	-50
570	-31	-5	2	--	-31	--	-146	-20	50	16	--	10	-41	-94
571	-34	-7	3	--	-31	--	-138	-20	50	15	--	20	-41	33
572	-36	-7	4	-25	-32	-38	-102	-21	49	16	--	7	-70	282
573	-38	-7	4	-61	-33	-51	29	-23	47	17	--	-18	-41	148
574	-41	-10	4	-83	-33	-19	42	-27	45	16	--	-10	-32	208
575	-42	-11	5	-80	-34	-20	83	-28	43	9	--	-20	-23	766
576	-22	-12	7	-62	-34	-21	104	-32	41	9	17	-17	-15	328
577	-16	-13	7	-56	-35	-57	138	-31	41	8	37	-17	-9	-115
578	-16	-15	7	-42	-36	-77	250	-29	39	8	5	-8	10	-130
579	-16	-17	10	-29	-37	-93	287	-25	38	9	5	-12	24	-138
580	-15	-16	9	-3	-38	-36	-66	-34	36	9	1	-14	39	-196
581	-16	-15	9	1	-35	16	-45	-45	33	8	-5	-22	118	-227
582	-17	-13	8	2	-34	-30	-16	-48	33	8	-2	-30	71	-242
583	-14	-13	9	2	-32	-2	3	-103	31	7	16	-19	-42	-242
584	-15	-11	9	3	-30	172	28	-94	29	7	12	-16	-29	-263
585	-15	-10	9	3	-29	7	46	-56	29	7	8	-14	-26	-293
586	-15	-10	8	-120	-27	15	68	-1	27	8	3	-17	-23	-301
587	-15	-9	8	-44	-26	17	96	3	26	7	-1	-25	-19	-272

SR13B and SR21B Assume 1997 Data Matches 1987 Data

TABLE 4 (Continued). Change in Range With by Elevation for Mark Twain Lake, 1997-1982. Values in feet.

ELEV. NGVD	1A	2A	3A	4AB	6A	7A	9A	10 AB	11A	12A	13A	14A	16A	17A
589	-13	-10	7	1	-23	13	133	13	24	9	-6	6	-12	-18
590	-12	-10	8	88	-21	3	131	13	22	9	-8	22	-8	-12
591	-11	-10	8	78	-19	-3	128	13	21	9	-6	35	-4	-6
592	-10	-8	8	123	-18	24	-4	14	19	9	-7	13	0	0
593	-10	-8	8	113	-15	2	-3	14	18	9	-6	6	4	3
594	-9	-6	7	63	-14	9	-2	16	17	9	-8	25	8	2
595	-8	-5	7	58	-12	14	-2	18	16	8	-9	25	12	6
596	-8	-5	8	47	-11	8	-1	20	14	7	-9	16	14	6
597	-7	-3	7	37	-9	-46	0	21	13	6	-10	31	15	8
598	-6	-2	7	31	-8	-20	1	22	11	5	-9	20	17	13
599	-4	-1	7	24	-6	-25	2	20	11	14	-9	18	16	9
600	-4	0	6	15	-5	-13	3	19	9	14	-9	14	10	17
601	-3	1	6	5	-3	-10	3	17	8	11	-9	17	5	20
602	-2	2	6	0	-1	-9	4	13	6	9	-7	-10	-1	20
603	-1	3	5	16	0	-7	6	8	5	7	-5	-27	-2	18
604	0	4	6	33	3	1	8	5	4	4	-2	-3	6	16
605	1	5	9	27	7	4	8	4	3	3	-1	7	10	19
606	2	7	9	19	9	4	7	3	1	6	1	15	12	32
607	1	6	8	15	11	4	6	1	0	7	2	20	13	41
608	1	5	8	19	12	2	7	0	0	7	5	20	15	42
609	2	3	7	12	13	1	7	2	0	7	8	22	18	42
610	2	2	7	1	14	2	8	4	0	6	0	22	20	62
611	2	2	6	2	15	6	7	5	1	3	-2	19	20	23
612	2	1	7	2	15	8	5	3	1	-1	-2	10	19	23
613	1	1	6	2	79	7	3	1	1	-1	-3	11	19	26
614	1	1	6	-271	79	-3	4	1	1	0	-4	49	20	30
615	1	-1	5	2	63	6	5	1	1	1	-3	23	19	43
616	0	-1	5	2	46	-6	9	-2	2	1	-7	9	18	56
617	-1	-1	6	1	30	-8	8	-4	2	2	-16	-1	17	64
618	-1	0	6	1	2	-2	7	-19	2	2	-11	-9	16	46
619	-3	0	5	1	1	6	7	-6	2	3	-6	56	15	31
620	-3	0	5	1	1	12	6	5	2	3	-4	-3	14	26

SR13B and SR21B Assume 1997 Data Matches 1987 Data

TABLE 4 (Continued). Change in Range With by Elevation for Mark Twain Lake, 1997-1982. Values in feet.

ELEV. NGVD	1A	2A	3A	4AB	6A	7A	9A	10 AB	11A	12A	13A	14A	16A	17A
621	-4	1	6	-2	1	11	6	10	2	3	-3	-56	14	24
622	-3	2	5	-3	1	9	5	11	3	3	-3	-41	14	19
623	-4	1	5	-2	1	8	5	11	3	3	-3	-35	13	16
624	-4	2	5	-1	1	3	4	4	3	4	-6	-29	13	18
625	-5	3	5	0	1	-3	3	10	3	4	-7	-26	14	20
626	-5	2	4	2	2	-3	3	11	4	4	-8	-24	16	19
627	-5	3	5	2	2	-2	2	9	5	4	-14	-19	18	20
628	-5	3	5	4	1	-3	1	8	4	4	-1	-18	20	23
629	-5	4	4	3	1	-2	0	7	3	4	1	-17	21	25
630	-5	3	4	2	1	-2	0	8	3	2	-1	-16	21	25
631	-5	3	3	3	1	0	-1	7	1	0	-4	-16	22	28
632	-5	3	2	2	2	0	-1	7	1	-2	-2	-12	22	23
633	-5	3	1	3	1	2	-1	6	0	-5	-1	-10	21	17
634	-5	2	0	2	2	2	-1	6	-1	-7	0	-7	21	18
635	-5	2	-2	2	2	1	-1	6	-2	-7	2	-5	21	19
636	-6	1	-3	2	4	2	-1	6	0	-5	2	-2	22	20
637	-6	0	-5	1	4	1	-2	6	2	-3	-3	-3	25	18
638	-6	-1	-5	2	3	0	-7	5	1	-2	-8	-4	21	13

SR13B and SR21B Assume 1997 Data Matches 1987 Data

TABLE 4 (Continued). Change in Range With by Elevation for Mark Twain Lake, 1997-1982. Values in feet.

ELEV. NGVD	18A	19A	20A	21B	26A	28A	34A	35A	36A	37 A1	37 A2	40 AB
523	--	--	--	--	--	--	--	--	--	--	--	--
524	--	--	--	--	--	--	--	--	--	--	--	--
525	--	--	--	--	--	--	--	--	--	--	--	--
526	--	--	--	--	--	--	--	--	--	--	--	--
527	--	--	--	--	--	--	--	--	--	--	--	--
528	--	--	--	--	--	--	--	--	--	--	--	--
529	--	--	--	--	--	--	--	--	--	--	--	--
530	--	--	--	--	--	--	--	--	--	--	--	--
531	--	--	--	--	--	--	--	--	--	--	--	--
532	--	--	--	--	--	--	--	--	--	--	--	--
533	--	--	--	--	--	--	--	--	--	--	--	--
534	--	--	--	--	--	--	--	--	--	--	--	--
535	--	--	--	--	--	--	--	--	--	--	--	--
536	--	--	--	--	--	--	--	--	--	--	--	--
537	--	--	--	--	--	--	--	--	--	--	--	--
538	--	--	--	--	--	--	--	--	--	--	--	--
539	--	--	--	--	--	--	--	--	--	--	--	--
540	--	--	--	--	--	--	--	--	--	--	--	--
541	--	--	--	--	--	--	--	--	--	--	--	--
542	--	--	--	--	--	--	--	--	--	--	--	--
543	--	--	--	--	--	--	--	--	--	--	--	--
544	--	--	--	--	--	--	--	--	--	--	--	--
545	--	--	--	--	--	--	-8	--	--	--	--	--
546	--	--	--	--	--	--	-43	--	--	--	--	--
547	--	--	--	--	--	--	70	--	--	--	--	--
548	--	--	--	--	--	--	73	--	--	--	--	--
549	-34	--	--	--	--	--	71	--	--	--	--	--
550	-88	--	--	--	--	--	69	--	--	--	--	--
551	-34	--	--	--	--	--	73	--	--	--	--	--
552	-8	--	--	--	--	--	70	-45	--	--	--	--
553	-10	--	--	--	--	--	62	-115	--	--	--	--
554	-14	--	--	--	--	--	38	-41	--	--	--	--
555	-11	--	--	--	--	--	25	-38	--	--	--	--

SR13B and SR21B Assume 1997 Data Matches 1987 Data

TABLE 4 (Continued). Change in Range With by Elevation for Mark Twain Lake, 1997-1982. Values in feet.

ELEV. NGVD	18A	19A	20A	21B	26A	28A	34A	35A	36A	37 A1	37 A2	40 AB
556	-7	--	--	--	--	--	30	-21	-16	--	--	--
557	-4	-169	--	--	--	--	-387	-6	-40	--	--	--
558	-1	-183	--	--	--	--	-86	7	-12	--	--	--
559	2	-115	--	--	--	--	-300	7	-29	--	--	--
560	5	-65	--	--	--	--	-314	6	-61	--	--	--
561	8	-54	--	--	--	--	-33	6	-62	--	--	--
562	7	-40	--	--	-29	--	-4	6	-56	--	--	--
563	9	-33	--	--	-63	--	30	6	-37	-42	--	--
564	7	-27	--	--	-97	--	23	5	-31	-111	--	--
565	6	-25	--	--	-105	--	17	-11	-28	-143	--	--
566	4	-23	-54	--	-78	--	-19	-6	-22	-68	--	--
567	-21	-22	-114	--	-29	--	-44	-6	-28	-33	--	--
568	-27	-24	-171	--	-27	--	-34	-177	-12	-29	--	--
569	12	-26	-201	--	-22	--	-44	-136	-9	-25	--	--
570	5	-29	-226	--	-21	--	-58	-363	-10	-23	--	--
571	-12	-34	-210	--	-20	--	-56	-128	-61	-20	--	--
572	-38	-169	-160	--	-18	--	-64	-86	-133	-18	--	--
573	-62	-371	-149	--	-17	--	-66	-248	-131	-15	--	--
574	-170	-385	-141	--	-16	--	-42	-275	-5	-13	--	-37
575	-229	-199	-68	--	-15	--	-37	-73	7	-11	-11	-97
576	-389	-130	-55	--	-19	--	-22	17	13	-7	-43	-135
577	-131	-93	-49	--	-34	--	-28	5	22	-4	-59	-148
578	-66	-65	-48	--	-52	--	-37	53	48	-123	-12	-143
579	-191	-136	-58	--	-73	-52	-44	-18	47	-180	-6	-52
580	-146	-192	-92	-2	-91	-77	-44	-3	58	-126	-6	-29
581	-47	-226	-265	-21	-65	-102	-63	-2	60	-61	-6	-15
582	-51	-173	-301	-40	-6	-8	-41	3	54	45	-28	-12
583	-124	1	-390	-59	-4	-4	-49	10	59	44	-157	-10
584	-239	19	-285	-118	-3	0	-49	27	195	44	-139	-8
585	-201	28	-182	-49	-95	3	-45	32	99	42	-130	-6
586	-43	22	-240	-63	-665	5	14	41	72	40	-76	-4
587	-25	40	-233	-70	132	-1	10	47	359	39	-50	-1

SR13B and SR21B Assume 1997 Data Matches 1987 Data

TABLE 4 (Continued). Change in Range With by Elevation for Mark Twain Lake, 1997-1982. Values in feet.

ELEV. NGVD	18A	19A	20A	21B	26A	28A	34A	35A	36A	37 A1	37 A2	40 AB
589	-16	38	155	-27	21	-8	8	50	228	31	-26	-48
590	-8	37	84	-22	48	-14	-8	53	42	21	-17	-125
591	11	36	22	-17	-112	-15	64	47	26	18	-14	-93
592	18	35	-23	-3	14	3	171	38	33	13	-10	-131
593	20	33	-77	24	44	-10	122	29	39	-1	-4	-157
594	23	33	-37	46	4	67	76	15	39	-9	13	-25
595	25	34	-24	9	66	96	92	1	37	24	34	-38
596	27	36	-20	-48	110	10	80	-4	34	8	52	-48
597	24	38	-15	-55	34	-27	69	-8	30	7	61	-52
598	21	39	-11	-319	-84	-2	60	-11	24	7	62	-36
599	18	41	-9	8	-35	-405	54	-11	20	7	64	29
600	14	39	-10	8	17	-213	70	-9	17	8	54	36
601	11	35	-20	9	27	-116	84	-3	14	13	39	40
602	10	32	-35	7	101	-221	75	-5	12	42	24	61
603	8	27	-51	8	45	-111	62	-11	11	28	8	40
604	8	21	-53	8	37	1	32	-14	10	15	-6	22
605	6	20	-54	6	16	1	15	-15	11	40	-5	15
606	5	19	-42	21	17	-21	29	-14	14	40	-4	8
607	3	19	-23	-5	21	-4	22	-13	12	37	-5	1
608	2	20	-12	-8	17	1	-5	-12	11	33	-6	-3
609	4	22	-17	-12	21	1	-14	-13	10	27	-5	-3
610	2	23	-25	-16	14	-1	-9	-13	9	23	-4	-3
611	0	23	-25	-23	-7	-7	-3	-15	9	22	-2	-5
612	-1	8	-23	-19	9	-6	0	-16	10	20	-2	-12
613	0	-5	-18	3	12	-2	3	-18	9	18	-1	-21
614	-1	-5	-17	2	17	-1	8	-18	9	16	-1	-22
615	-2	-5	-14	3	23	-1	4	-19	9	13	-1	-5
616	-2	-6	-8	-1	52	-8	-35	-19	9	10	0	-6
617	-3	-6	-21	-5	39	8	-49	-15	11	8	0	-20
618	-1	-6	-21	-8	-35	4	-18	-11	11	5	1	-8
619	-1	-6	-7	-8	37	11	4	-8	12	4	2	5
620	1	-7	-5	-7	38	24	-3	-4	12	3	4	11

SR13B and SR21B Assume 1997 Data Matches 1987 Data

TABLE 4 (Continued). Change in Range With by Elevation for Mark Twain Lake, 1997-1982. Values in feet.

ELEV. NGVD	18A	19A	20A	21B	26A	28A	34A	35A	36A	37 A1	37 A2	40 AB
621	4	-7	-10	-5	43	49	-34	8	11	0	0	9
622	5	-6	-12	1	50	89	2	6	10	-2	-2	9
623	5	-6	-14	3	66	61	-22	3	10	-3	-3	10
624	5	-4	-17	4	81	58	-27	8	10	-4	-4	12
625	6	-2	-18	6	96	61	-20	16	9	-4	-3	13
626	6	1	-18	2	109	67	-24	16	9	-3	-1	14
627	6	3	-17	-2	111	76	-26	8	9	-4	1	11
628	4	-1	-13	-6	109	78	-17	5	9	-2	-1	6
629	4	0	-7	-7	108	74	-10	7	9	-1	-1	2
630	3	2	-7	-7	111	76	5	10	9	-2	-2	1
631	1	4	-9	-7	100	84	-7	16	9	-2	1	-7
632	0	4	-8	-7	79	112	-1	23	10	-2	-1	-9
633	0	6	-7	-7	59	102	-2	20	9	0	-1	-7
634	0	7	-7	-4	44	90	0	19	7	-4	-2	-8
635	-1	6	-6	-4	37	105	-1	20	6	-4	-1	-14
636	-2	4	-8	-2	32	95	-2	17	2	2	-2	-12
637	-3	0	-15	-2	27	33	-2	10	-2	0	-3	-5
638	-4	1	-21	0	35	-15	1	1	-4	0	-3	2

SR13B and SR21B Assume 1997 Data Matches 1987 Data

TABLE 5. Change in Cross Sectional Area by Elevation for Mark Twain Lake, 1997-1982. Values in Square feet.

ELEV. NGVD	1A	2A	3A	4AB	6A	7A	9A	10 AB	11A	12A	13A	14A	16A	17A
523	22	-2	--	--	--	--	-7	--	--	--	--	--	--	--
524	85	-5	--	--	--	--	-7	--	--	--	--	--	--	--
525	78	6	--	--	--	--	-5	--	--	--	--	--	--	--
526	16	6	--	--	--	--	-13	--	--	--	--	--	--	--
527	-4	-30	--	--	--	--	-22	--	--	--	--	--	--	--
528	-9	-39	--	--	--	--	-35	--	--	--	--	--	--	--
529	-28	-21	--	--	8	--	-48	--	-3	--	--	--	--	--
530	-70	-12	--	--	13	--	-66	--	-18	--	--	--	--	--
531	-112	-3	--	--	1	--	-65	--	-25	--	--	--	--	--
532	-65	3	--	--	-10	--	-54	--	5	--	--	--	--	--
533	63	2	-6	--	-8	--	-61	--	48	--	--	--	46	--
534	128	-12	1	--	16	--	-64	--	54	--	--	--	178	--
535	118	-19	8	--	-9	--	-70	--	27	--	--	--	287	--
536	106	-85	-1	--	-104	--	-61	--	2	--	--	--	262	--
537	136	-89	5	--	-100	--	-70	--	-14	--	--	--	150	--
538	176	-18	9	--	16	--	-103	--	-18	--	--	--	79	--
539	192	-25	2	--	59	--	-116	--	-19	--	--	--	81	--
540	163	-90	1	--	61	--	-109	--	-18	--	--	--	93	--
541	131	-162	-20	--	98	--	-67	--	-14	--	--	--	89	-9
542	109	-175	-41	--	119	--	-39	--	-9	--	--	--	83	-32
543	101	-105	26	--	118	--	-5	--	-14	--	--	--	82	-50
544	92	-15	171	--	105	--	-18	--	-24	--	--	--	101	-54
545	50	5	186	--	87	--	-82	--	-28	--	--	--	126	-58
546	3	-2	98	--	68	--	-126	--	-113	-4	--	--	129	-53
547	-21	-6	105	--	53	--	-194	--	-269	-14	--	--	138	-49
548	-28	-2	75	--	36	--	-173	--	-359	-3	--	--	153	-53
549	-58	1	12	--	8	--	-100	-7	-400	4	--	--	155	-57
550	-17	1	4	--	-13	--	-71	-9	-542	-17	--	--	155	-61
551	27	2	-3	--	-15	--	-48	-10	-675	-20	--	-6	61	-64
552	3	2	-5	--	-16	--	-41	-14	-712	-23	--	-16	-78	-63
553	-18	1	-5	--	-17	--	-52	-28	-343	-32	--	-18	3	-61
554	-13	-1	-3	--	-20	--	-76	-29	52	-2	--	-9	177	-60
555	3	-3	-1	--	-22	--	-103	-12	59	165	--	0	204	-60

SR13B and SR21B Assume 1997 Data Matches 1987 Data

TABLE 5 (Continued). Change in Cross Sectional Area by Elevation for Mark Twain Lake, 1997-1982. Values in Square feet.

ELEV. NGVD	1A	2A	3A	4AB	6A	7A	9A	10 AB	11A	12A	13A	14A	16A	17A
556	1	-5	0	--	-24	--	-132	-8	64	149	--	-15	298	-60
557	10	-7	0	--	-26	--	-149	-11	68	-16	--	-126	124	-60
558	14	-7	0	--	-27	--	-140	-18	89	-24	--	-126	-131	-61
559	10	-6	1	--	-28	--	-139	-22	-134	-4	--	-27	-85	-62
560	6	-5	2	--	-29	--	-147	-24	-207	13	--	-11	-81	-62
561	2	-5	2	--	-29	--	-148	-36	7	17	--	13	-86	-62
562	-2	-5	2	--	-29	--	-157	-32	52	26	--	23	-93	-62
563	-6	-6	2	--	-29	--	-171	-19	55	30	--	18	-97	-66
564	-10	-6	3	--	-29	--	-182	-22	57	26	--	18	-97	-67
565	-14	-6	3	--	-29	--	-190	-24	56	20	--	19	-82	-65
566	-18	-6	2	--	-29	--	-188	-24	55	19	--	-6	-56	-65
567	-22	-5	2	--	-28	--	-180	-23	55	19	--	-29	-47	-62
568	-25	-3	2	--	-29	--	-170	-23	54	17	--	-10	-44	-57
569	-27	-4	2	--	-30	--	-151	-23	52	16	--	4	-42	-53
570	-30	-5	2	--	-31	--	-144	-21	51	16	--	6	-41	-72
571	-33	-6	3	--	-31	--	-142	-20	50	16	--	15	-41	-31
572	-35	-7	4	-13	-32	-19	-120	-21	50	16	--	14	-56	158
573	-37	-7	4	-43	-33	-45	-37	-22	48	17	--	-6	-56	215
574	-40	-9	4	-72	-33	-35	36	-25	46	17	--	-14	-37	178
575	-42	-11	5	-82	-34	-20	63	-28	44	13	--	-15	-28	487
576	-32	-12	6	-71	-34	-21	94	-30	42	9	9	-19	-19	547
577	-19	-13	7	-59	-35	-39	121	-32	41	9	27	-17	-12	107
578	-16	-14	7	-49	-36	-67	194	-30	40	8	21	-13	1	-123
579	-16	-16	9	-36	-37	-85	269	-27	39	9	5	-10	17	-134
580	-16	-17	10	-16	-38	-65	111	-30	37	9	3	-13	32	-167
581	-16	-16	9	-1	-37	-10	-56	-40	35	9	-2	-18	79	-212
582	-17	-14	9	2	-35	-7	-31	-47	33	8	-4	-26	95	-235
583	-16	-13	9	2	-33	-16	-7	-76	32	8	7	-25	15	-242
584	-15	-12	9	3	-31	85	16	-99	30	7	14	-18	-36	-253
585	-15	-11	9	3	-30	90	37	-75	29	7	10	-15	-28	-278
586	-15	-10	9	-59	-28	11	57	-29	28	8	6	-16	-25	-297
587	-15	-10	8	-82	-27	16	82	1	27	8	1	-21	-21	-287

SR13B and SR21B Assume 1997 Data Matches 1987 Data

TABLE 5 (Continued). Change in Cross Sectional Area by Elevation for Mark Twain Lake, 1997-1982. Values in Square feet.

ELEV. NGVD	1A	2A	3A	4AB	6A	7A	9A	10 AB	11A	12A	13A	14A	16A	17A
589	-15	-10	8	-33	-25	16	115	6	25	8	-3	-21	-18	-239
590	-14	-10	7	-10	-24	14	134	11	24	9	-6	-5	-14	-112
591	-13	-10	8	45	-22	8	132	13	23	9	-7	14	-10	-15
592	-12	-10	8	83	-20	0	130	13	22	9	-7	29	-6	-9
593	-11	-9	8	101	-19	11	62	14	20	9	-7	24	-2	-3
594	-10	-8	8	118	-17	13	-4	14	19	9	-7	10	2	2
595	-10	-7	8	88	-15	6	-3	15	18	9	-7	16	6	3
596	-9	-6	7	61	-13	12	-2	17	17	9	-9	25	10	4
597	-8	-5	8	53	-12	11	-2	19	15	8	-9	21	13	6
598	-8	-4	8	42	-10	-19	-1	21	14	7	-10	24	15	7
599	-7	-3	7	34	-9	-33	1	22	12	6	-10	26	16	11
600	-5	-2	7	28	-7	-23	2	21	11	10	-9	19	17	11
601	-4	-1	7	20	-6	-19	3	20	10	14	-9	16	13	13
602	-4	1	6	10	-4	-12	3	18	9	13	-9	16	8	19
603	-3	2	6	3	-2	-10	4	15	7	10	-8	4	2	20
604	-2	3	6	8	-1	-8	5	11	6	8	-6	-19	-2	19
605	-1	4	6	25	2	-3	7	7	5	6	-4	-15	2	17
606	1	5	8	30	5	3	8	5	4	4	-2	2	8	18
607	2	6	9	23	8	4	8	4	2	5	0	11	11	26
608	2	7	9	17	10	4	7	2	1	7	2	18	13	37
609	1	6	8	17	12	3	7	1	0	7	4	20	14	42
610	2	4	8	16	13	2	7	1	0	7	7	21	17	42
611	2	3	7	7	14	2	8	3	0	7	4	22	19	52
612	2	2	7	2	15	4	8	5	1	5	-1	21	20	43
613	2	2	7	2	15	7	6	4	1	1	-2	15	20	23
614	2	1	7	2	47	8	4	2	1	-1	-3	11	19	25
615	1	1	6	-135	79	2	4	1	1	-1	-4	30	20	28
616	1	0	6	-135	71	2	5	1	1	1	-4	36	20	37
617	1	-1	5	2	55	0	7	-1	2	1	-5	16	19	50
618	-1	-1	6	2	38	-7	9	-3	2	2	-12	4	18	60
619	-1	-1	6	1	16	-5	8	-12	2	2	-14	-5	17	55
620	-2	0	6	1	2	2	7	-13	2	3	-9	24	16	39

SR13B and SR21B Assume 1997 Data Matches 1987 Data

TABLE 5 (Continued). Change in Cross Sectional Area by Elevation for Mark Twain Lake, 1997-1982. Values in Square feet.

ELEV. NGVD	1A	2A	3A	4AB	6A	7A	9A	10 AB	11A	12A	13A	14A	16A	17A
621	-4	1	6	-1	1	12	6	8	2	3	-4	-30	14	25
622	-4	2	6	-3	1	10	6	11	3	3	-3	-49	14	22
623	-4	2	5	-3	1	9	5	11	3	3	-3	-38	14	18
624	-4	2	5	-2	1	6	5	8	3	4	-5	-32	13	17
625	-5	3	5	-1	1	0	4	7	3	4	-7	-28	14	19
626	-5	3	5	1	2	-3	3	11	4	4	-8	-25	15	20
627	-5	3	5	2	2	-3	3	10	5	4	-11	-22	17	20
628	-5	3	5	3	2	-3	2	9	5	4	-8	-19	19	22
629	-5	4	5	4	1	-3	1	8	4	4	0	-18	21	24
630	-5	4	4	3	1	-2	0	8	3	3	0	-17	21	25
631	-5	3	4	3	1	-1	-1	8	2	1	-3	-16	22	27
632	-5	3	3	3	2	0	-1	7	1	-1	-3	-14	22	26
633	-5	3	2	3	2	1	-1	7	1	-4	-2	-11	22	20
634	-5	3	1	3	2	2	-1	6	-1	-6	-1	-9	21	18
635	-5	2	-1	2	2	2	-1	6	-2	-7	1	-6	21	19
636	-6	2	-3	2	3	2	-1	6	-1	-6	2	-4	22	20
637	-6	1	-4	2	4	2	-2	6	1	-4	-1	-3	24	19
638	-6	-1	-5	2	4	1	-5	6	2	-3	-6	-4	23	16

SR13B and SR21B Assume 1997 Data Matches 1987 Data

TABLE 5 (Continued). Change in Cross Sectional Area by Elevation for Mark Twain Lake, 1997-1982. Values in Square feet.

ELEV. NGVD	18A	19A	20A	21B	26A	28A	34A	35A	36A	37 A1	37 A2	40 AB
523	--	--	--	--	--	--	--	--	--	--	--	--
524	--	--	--	--	--	--	--	--	--	--	--	--
525	--	--	--	--	--	--	--	--	--	--	--	--
526	--	--	--	--	--	--	--	--	--	--	--	--
527	--	--	--	--	--	--	--	--	--	--	--	--
528	--	--	--	--	--	--	--	--	--	--	--	--
529	--	--	--	--	--	--	--	--	--	--	--	--
530	--	--	--	--	--	--	--	--	--	--	--	--
531	--	--	--	--	--	--	--	--	--	--	--	--
532	--	--	--	--	--	--	--	--	--	--	--	--
533	--	--	--	--	--	--	--	--	--	--	--	--
534	--	--	--	--	--	--	--	--	--	--	--	--
535	--	--	--	--	--	--	--	--	--	--	--	--
536	--	--	--	--	--	--	--	--	--	--	--	--
537	--	--	--	--	--	--	--	--	--	--	--	--
538	--	--	--	--	--	--	--	--	--	--	--	--
539	--	--	--	--	--	--	--	--	--	--	--	--
540	--	--	--	--	--	--	--	--	--	--	--	--
541	--	--	--	--	--	--	--	--	--	--	--	--
542	--	--	--	--	--	--	--	--	--	--	--	--
543	--	--	--	--	--	--	--	--	--	--	--	--
544	--	--	--	--	--	--	--	--	--	--	--	--
545	--	--	--	--	--	--	-4	--	--	--	--	--
546	--	--	--	--	--	--	-26	--	--	--	--	--
547	--	--	--	--	--	--	14	--	--	--	--	--
548	--	--	--	--	--	--	72	--	--	--	--	--
549	-17	--	--	--	--	--	72	--	--	--	--	--
550	-61	--	--	--	--	--	70	--	--	--	--	--
551	-61	--	--	--	--	--	71	--	--	--	--	--
552	-21	--	--	--	--	--	72	-23	--	--	--	--
553	-9	--	--	--	--	--	66	-80	--	--	--	--
554	-12	--	--	--	--	--	50	-78	--	--	--	--
555	-13	--	--	--	--	--	32	-40	--	--	--	--

SR13B and SR21B Assume 1997 Data Matches 1987 Data

TABLE 5 (Continued). Change in Cross Sectional Area by Elevation for Mark Twain Lake, 1997-1982. Values in Square feet.

ELEV. NGVD	18A	19A	20A	21B	26A	28A	34A	35A	36A	37 A1	37 A2	40 AB
556	-9	--	--	--	--	--	28	-30	-8	--	--	--
557	-6	-85	--	--	--	--	-179	-14	-28	--	--	--
558	-3	-176	--	--	--	--	-237	1	-26	--	--	--
559	1	-149	--	--	--	--	-193	7	-21	--	--	--
560	4	-90	--	--	--	--	-307	7	-45	--	--	--
561	7	-60	--	--	--	--	-174	6	-62	--	--	--
562	8	-47	--	--	-15	--	-19	6	-59	--	--	--
563	8	-37	--	--	-46	--	13	6	-47	-21	--	--
564	8	-30	--	--	-80	--	27	6	-34	-77	--	--
565	7	-26	--	--	-101	--	20	-3	-30	-127	--	--
566	5	-24	-27	--	-92	--	-1	-9	-25	-106	--	--
567	-9	-23	-84	--	-54	--	-32	-6	-25	-51	--	--
568	-24	-23	-143	--	-28	--	-39	-92	-20	-31	--	--
569	-8	-25	-186	--	-25	--	-39	-157	-11	-27	--	--
570	9	-28	-214	--	-22	--	-51	-250	-10	-24	--	--
571	-4	-32	-218	--	-21	--	-57	-246	-36	-22	--	--
572	-25	-102	-185	--	-19	--	-60	-107	-97	-19	--	--
573	-50	-270	-155	--	-18	--	-65	-167	-132	-17	--	--
574	-116	-378	-145	--	-17	--	-54	-262	-68	-14	--	-19
575	-200	-292	-105	--	-16	--	-40	-174	1	-12	-6	-67
576	-309	-165	-62	--	-17	--	-30	-28	10	-9	-27	-116
577	-260	-112	-52	--	-27	--	-25	11	18	-6	-51	-142
578	-99	-79	-49	--	-43	--	-33	29	35	-64	-36	-146
579	-129	-101	-53	--	-63	-26	-41	18	48	-152	-9	-98
580	-169	-164	-75	-1	-82	-65	-44	-11	53	-153	-6	-41
581	-97	-209	-179	-12	-78	-90	-54	-3	59	-94	-6	-22
582	-49	-200	-283	-31	-36	-55	-52	1	57	-8	-17	-14
583	-88	-86	-346	-50	-5	-6	-45	7	57	45	-93	-11
584	-182	10	-338	-89	-4	-2	-49	19	127	44	-148	-9
585	-220	24	-234	-84	-49	2	-47	30	147	43	-135	-7
586	-122	25	-211	-56	-380	4	-16	37	86	41	-103	-5
587	-34	31	-237	-67	-267	2	12	44	216	40	-63	-3

SR13B and SR21B Assume 1997 Data Matches 1987 Data

TABLE 5 (Continued). Change in Cross Sectional Area by Elevation for Mark Twain Lake, 1997-1982. Values in Square feet.

ELEV. NGVD	18A	19A	20A	21B	26A	28A	34A	35A	36A	37 A1	37 A2	40 AB
589	-21	39	-39	-49	77	-5	9	49	294	35	-38	-25
590	-12	38	120	-25	35	-11	0	52	135	26	-22	-87
591	2	37	53	-20	-32	-15	28	50	34	20	-16	-109
592	15	36	-1	-10	-49	-6	118	43	30	16	-12	-112
593	19	34	-50	11	29	-4	147	34	36	6	-7	-144
594	22	33	-57	35	24	29	99	22	39	-5	5	-91
595	24	34	-31	28	35	82	84	8	38	8	24	-32
596	26	35	-22	-20	88	53	86	-2	36	16	43	-43
597	26	37	-18	-52	72	-9	75	-6	32	8	57	-50
598	23	39	-13	-187	-25	-15	65	-10	27	7	62	-44
599	20	40	-10	-156	-60	-204	57	-11	22	7	63	-4
600	16	40	-10	8	-9	-309	62	-10	19	8	59	33
601	13	37	-15	9	22	-165	77	-6	16	11	47	38
602	11	34	-28	8	64	-169	80	-4	13	28	32	51
603	9	30	-43	8	73	-166	69	-8	12	35	16	51
604	8	24	-52	8	41	-55	47	-13	11	22	1	31
605	7	21	-54	7	27	1	24	-15	11	28	-6	19
606	6	20	-48	14	17	-10	22	-15	13	40	-5	12
607	4	19	-33	8	19	-13	26	-14	13	39	-5	5
608	3	20	-18	-7	19	-2	9	-13	12	35	-6	-1
609	3	21	-15	-10	19	1	-10	-13	11	30	-6	-3
610	3	23	-21	-14	18	0	-12	-13	10	25	-5	-3
611	1	23	-25	-20	4	-4	-6	-14	9	23	-3	-4
612	-1	16	-24	-21	1	-7	-2	-16	10	21	-2	-9
613	-1	2	-21	-8	11	-4	2	-17	10	19	-2	-17
614	-1	-5	-18	3	15	-2	6	-18	9	17	-1	-22
615	-2	-5	-16	3	20	-1	6	-19	9	15	-1	-14
616	-2	-6	-11	1	38	-5	-16	-19	9	12	-1	-6
617	-3	-6	-15	-3	46	0	-42	-17	10	9	0	-13
618	-2	-6	-21	-7	2	6	-34	-13	11	7	1	-14
619	-1	-6	-14	-8	1	8	-7	-10	12	5	2	-2
620	0	-7	-6	-8	38	18	1	-6	12	4	3	8

SR13B and SR21B Assume 1997 Data Matches 1987 Data

TABLE 5 (Continued). Change in Cross Sectional Area by Elevation for Mark Twain Lake, 1997-1982. Values in Square feet.

ELEV. NGVD	18A	19A	20A	21B	26A	28A	34A	35A	36A	37 A1	37 A2	40 AB
621	4	-7	-9	-6	42	43	-19	5	11	1	2	10
622	5	-7	-11	-2	47	69	-16	7	11	-1	-1	9
623	5	-6	-13	2	58	75	-10	5	10	-3	-3	10
624	5	-5	-16	4	74	60	-25	6	10	-4	-4	11
625	6	-3	-18	5	89	60	-24	12	10	-4	-4	13
626	6	-1	-18	4	103	64	-22	16	9	-4	-2	14
627	6	2	-18	0	110	72	-25	12	9	-4	0	13
628	5	1	-15	-4	110	77	-22	7	9	-3	0	9
629	4	-1	-10	-7	109	76	-14	6	9	-2	-1	4
630	4	1	-7	-7	110	75	-3	9	9	-2	-2	2
631	2	3	-8	-7	106	80	-1	13	9	-2	-1	-3
632	1	4	-9	-7	90	98	-4	20	10	-2	0	-8
633	0	5	-8	-7	69	107	-2	22	10	-1	-1	-8
634	0	7	-7	-6	52	96	-1	20	8	-2	-2	-8
635	-1	7	-7	-4	41	98	-1	20	7	-4	-2	-11
636	-2	5	-7	-3	35	100	-2	19	4	-1	-2	-13
637	-3	2	-12	-2	30	64	-2	14	0	1	-3	-9
638	-4	1	-18	-1	31	9	-1	6	-3	0	-3	-2

SR13B and SR21B Assume 1997 Data Matches 1987 Data

TABLE 6. Descriptive Locations of Sediment Sampling Sites (29 April 1988).*

SITE IDENTIFICATION	DESCRIPTION
MT EM	Near the confluence of the Elk and Middle Forks. Near Range 28A.
MT FF	North Fork at Highway FF. Near Range 43B.
MT IC	Upper End of Indian Creek near Range 8B.
MT LC	Upper End of Lick Creek on Range 5B.
MT LI	Extreme upper end of Little Indian Creek. No range nearby.
MT 22	Near center of main body of lake, opposite from Spalding Recreation Area (Old Joanna Bridge Site). Between Ranges 1A and 6A.
MT 33	Upstream side of Route J bridge (Lick Creek) near Black Jack Marina. Near Range 3A.
MT 66	On South Fork, upstream of Highway 107 bridge. Near Range 18A.
MT 77	On North Fork, upstream of Highway 107 bridge. Near Range 34A.
MT 88	On South Fork, upstream of Highway 154 bridge. Near Range 20A.
MT 99	On North Fork, upstream of Highway 24 bridge. Near Range 40AB.

* From Report of Sedimentation, 1987 Resurvey.
Note: No sediment samples were collected in 1997.

DEPARTMENT OF THE ARMY CORPS OF ENGINEERS

RESERVOIR SEDIMENT DATA SUMMARY

Mark Twain Lake (Clarence Cannon Dam)

NAME OF RESERVOIR

1

DATA SHEET NO.

DAM	1. OWNER D.A. Corps of Engineers	2. STREAM Salt River	3. STATE Missouri
	4. SEC. 23&26 TWP. 55N RANGE 7W	5. NEAREST P.O. Center	6 COUNTY Ralls
	7. LAT 39° 31' 29" LONG. 91° 38' 36"	8. TOP OF DAM ELEVATION 653.0	9. SPILLWAY CREST ELEV. 639.0 1/

RESERVOIR	10. STORAGE ALLOCATION	11. ELEVATION TOP OF POOL	12. ORIGINAL SURFACE AREA, ACRES	13. ORIGINAL CAPACITY, ACRE-FEET	14 GROSS STORAGE, ACRE-FEET	15. DATE STORAGE BEGAN
	a. FLOOD CONTROL	638.0	38,580	884,061	1,428,055	Sept. 1983
	b. MULTIPLE USE	606.0	18,650	456,967 2/	543,994	
	c. POWER	---	---	---	---	
	d. WATER SUPPLY	---	---	---	---	16. DATE NORMAL OPER. BEGAN
	e. IRRIGATION	---	---	---	---	
	f. CONSERVATION	---	---	---	---	Sept. 1983
	g. INACTIVE	567.2	5,970	87,027	87,027	
	17. LENGTH OF RESERVOIR 134.9 3/ MILES			AV. WIDTH OF RESERVOIR MILES 0.45		

WATERSHED			
	18. TOTAL DRAINAGE AREA 2,318 SQ. MI.		22. MEAN ANNUAL PRECIPITATION 37.05 (46) INCHES
	19. NET SEDIMENT CONTRIBUTING AREA 2,258 SQ.MI.		23. MEAN ANNUAL RUNOFF 9.57 (73) INCHES
	20. LENGTH 129 MILES	AV. WIDTH 18 MILES	24. MEAN ANNUAL RUNOFF 1,193,958 (76) AC.FT.
	21. MAX. ELEVATION 1000	MIN. ELEV. 515	25. ANNUAL TEMP. MEAN 54.6° RANGE -21° to 108°

SURVEY DATA	26. DATE OF SURVEY	27. PERIOD YEARS	28. ACCL. YEARS	29. TYPE OF SURVEY	30.NO. OF RANGES OR CONTOUR INT.	31. SURFACE AREA, ACRES	32. CAPACITY, ACRE-FEET	33. C/I. RATIO, AC-FT PER AC-FT
	Sept. 1983 (date of operation)	4.08	4.08	Range (D)	49	38,580	1,428,055	1.23
	Sept.-Oct.1987			Range (D)	49	38,580	1,410,987	1.21
	Sept. 1996	9.83	13.91	Range (D)	24	38,580	1,338,840	0.96

	26. DATE OF SURVEY	34. PERIOD ANNUAL PRECIPITATION	35. PERIOD WATER INFLOW, ACRE-FEET			36. WATER INFL. TO DATE, AC.-FT.	
			a. MEAN ANNUAL	b. MAX. ANNUAL	c. PERIOD TOTAL	a. MEAN ANNUAL	b. TOTAL TO DATE
	Sept. 1983	46.1	1,714,942 4/	1,898,303 4/	6,859,768 4/	1,714,942 4/	6,859,768 4/
	Sept.-Oct.1987 Sept. 1996	21.49	1,380,282	3,130,887	12,689,131	1,405,385	19,548,899

	26. DATE OF SURVEY	37. PERIOD CAPACITY LOSS ACRE-FEET			38. TOTAL SED. DEPOSITS TO DATE, ACRE-FEET		
		a. PERIOD TOTAL	b. Av. ANNUAL	c. PER SQ. MI-YEAR	a. TOTAL TO DATE	b. AV. ANNUAL	c.PER SQ. MI-YEAR
	Sept. 1983	17,068 4/	4,183 4/	1.85 4/	17,068 4/	4,183 4/	1.85 4/
	Sept.-Oct.1987 Sept. 1996	4,054 5/	290 5/	0.13 5/	4,054 5/	290 5/	0.13 5/

	26. DATE OF SURVEY	39. AV. DRY WGT. LBS. PER CU. FT.	40. SED. DEP. TONS PER SQ. MI.-YR.		41. STORAGE LOSS, PCT.		42. SED. INFLOW, PPM	
			a. PERIOD	b. TOTAL TO DATE	a. AV. ANN.	b. TOT. TO DATE	a. PERIOD	b. TOT.TO DATE
	Sept. 1983	29.1	1,174	1,174	0.29	1.20	1,160	1,160
	Sept.-Oct.1987							

ENG FORM 1787

NOV 66 PREVIOUS EDITIONS ARE OBSOLETE.

*Assumed **Estimated

26. DATE OF SURVEY	43. DEPTH OF DESIGNATION RANGE IN FEET BELOW, AND ABOVE, CREST ELEVATION											
	Bottom-100	100-85	85-70	70-55	55-40	40-25	25-10	10-Crest				
	PERCENT OF TOTAL SEDIMENT LOCATED WITHIN DEPTH DESIGNATION											
Sept. 1983												
Sept.-Oct.1987	7.4	6.2	6.8	16.7	16.7	10.2	10.4	25.6				
Sept. 1996	6/											

26. DATE OF SURVEY	44. REACH DESIGNATION PERCENT OF TOTAL ORIGINAL LENGTH OF RESERVOIR														
	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	-105	-110	-115	-120	-125
	PERCENT OF TOTAL SEDIMENT LOCATED WITHIN DEPTH DESIGNATION														
Sept. 1983															
Sept.-Oct.1987	26.3	22.0	12.5	8.0	15.3	8.7	5.0	0.9	0.3	1.0					
Sept. 1996	6/														

45. RANGE IN RESERVOIR OPERATION

WATER YEAR	MAX. ELEV.	MIN. ELEV.	INFLOW, AC.-FT.	WATER YEAR	MAX. ELEV.	MIN. ELEV.	INFLOW, AC.-FT.
1984	643.18	596.88	1,898,303	1989	609.14	598.02	370,665
1985	629.87	596.60	1,832,823	1990	622.73	601.53	1,497,144
1986	630.56	600.22	1,886,852	1991	620.34	603.30	1,246,869
1987	627.12	600.12	1,241,790	1992	615.27	600.76	914,354
1988	608.58	597.93	309,297	1993	636.77	605.21	3,130,887
				1994	621.35	600.21	1,086,720
				1995	636.22	599.74	1,952,928
				1996	327.55	600.60	1,077,685
							1,102,582

46. ELEVATION-AREA-CAPACITY DATA

ELEVATION	AREA	CAPACITY	ELEVATION	AREA	CAPACITY	ELEVATION	AREA	CAPACITY
7/ 520	0	0	565	5,208	71,275	605	17,866	515,056
525	0	0	567.2	5,741	83,699	606.0	18,283	533,300
530	46	210	570	6,434	100,856	610	20,251	611,783
535	163	927	575	7,752	136,699	615	22,872	721,152
540	395	2,875	580	9,180	179,438	620	25,601	843,849
545	1,079	7,272	585	10,688	229,625	624.8	28,361	974,775
550	1,948	15,752	590	12,298	287,732	625	28,479	980,388
555	2,958	28,938	595	14,034	354,280	630	31,996	1,131,470
560	4,039	47,330	600	15,897	429,846	635	35,673	1,300,345
						638.0	38,580	1,410,987

47. REMARKS AND REFERENCES

1/ Elevation of top of gates in closed position. Flood control pool (638.0) was used in Items 19, 31, 32, 33, 41, 43.
2/ Includes 20,000 acre-feet for water supply.
3/ 50.8 miles, Salt River and North Fork; 20.0 miles, South Fork; 29.3 miles, Middle Fork; 12.2 miles, Elk Fork; 13.3 miles, Lick Creek; 9.3 miles, Indian Creek.
4/ For period 10/1/83 through 9/30/87.
5/ Current survey only.
6/ Insufficient data to determine.
7/ Insufficient data to revise. Volumes listed here reflect 1987 resurvey results.

48. AGENCY MAKING SURVEY
49. AGENCY SUPPLYING DATA U.S. Army Corps of Engineers, SLD
50. DATE September, 2000

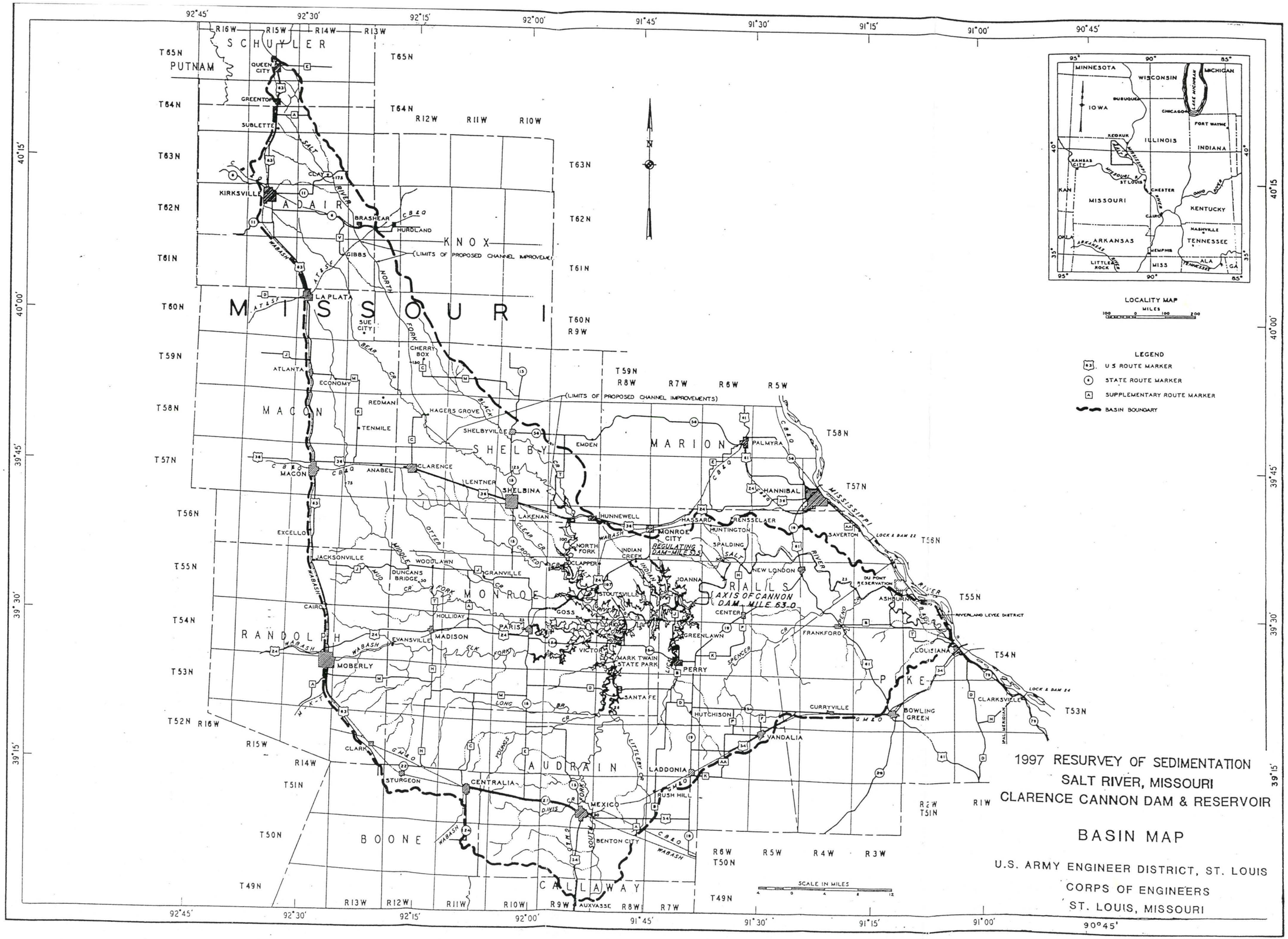


FIGURE 1. MARK TWAIN LAKE BASIN MAP

FIGURE 2. MARK TWAIN LAKE MONTHLY POOL ELEVATIONS
SALT RIVER, MISSOURI

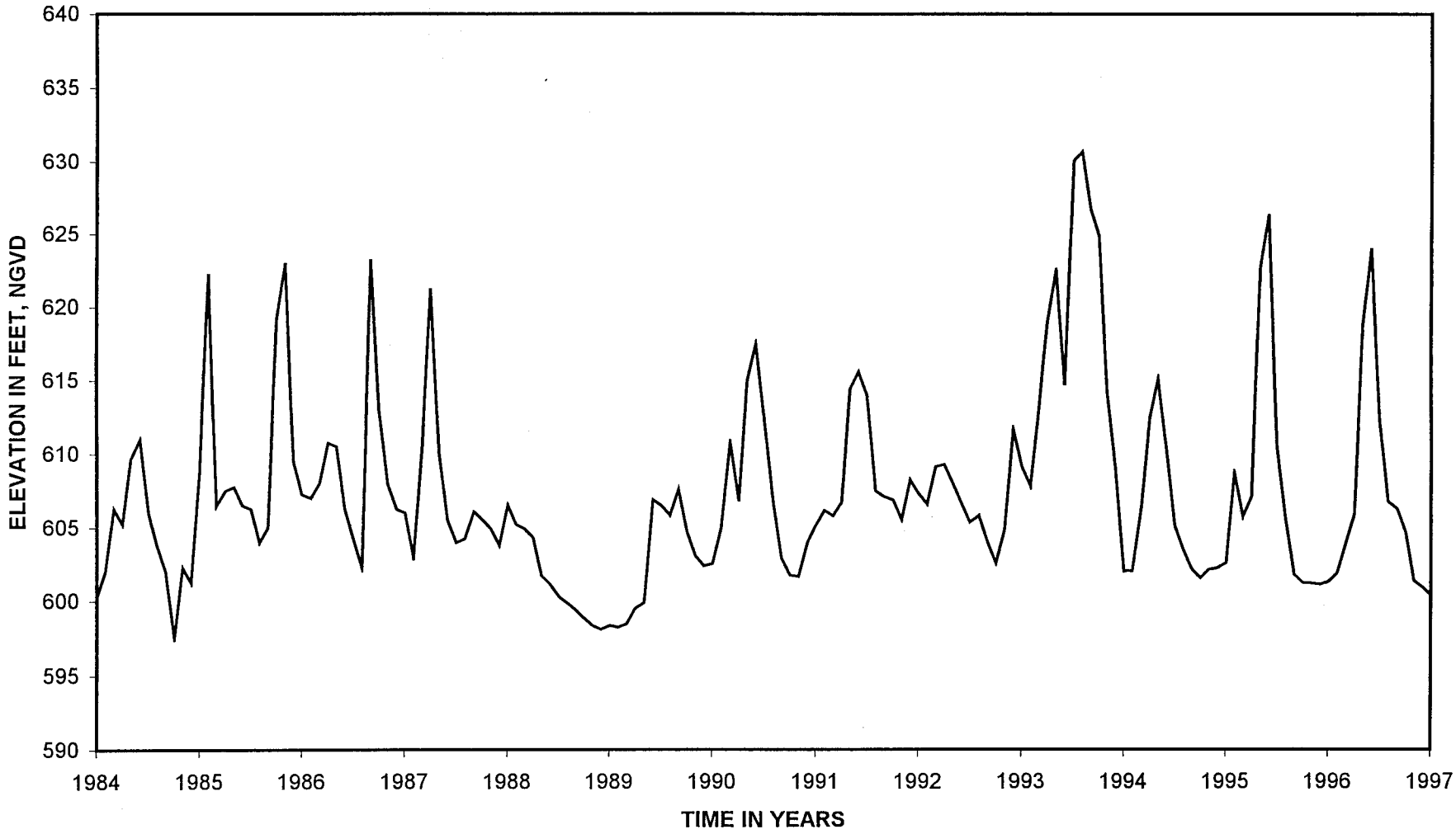
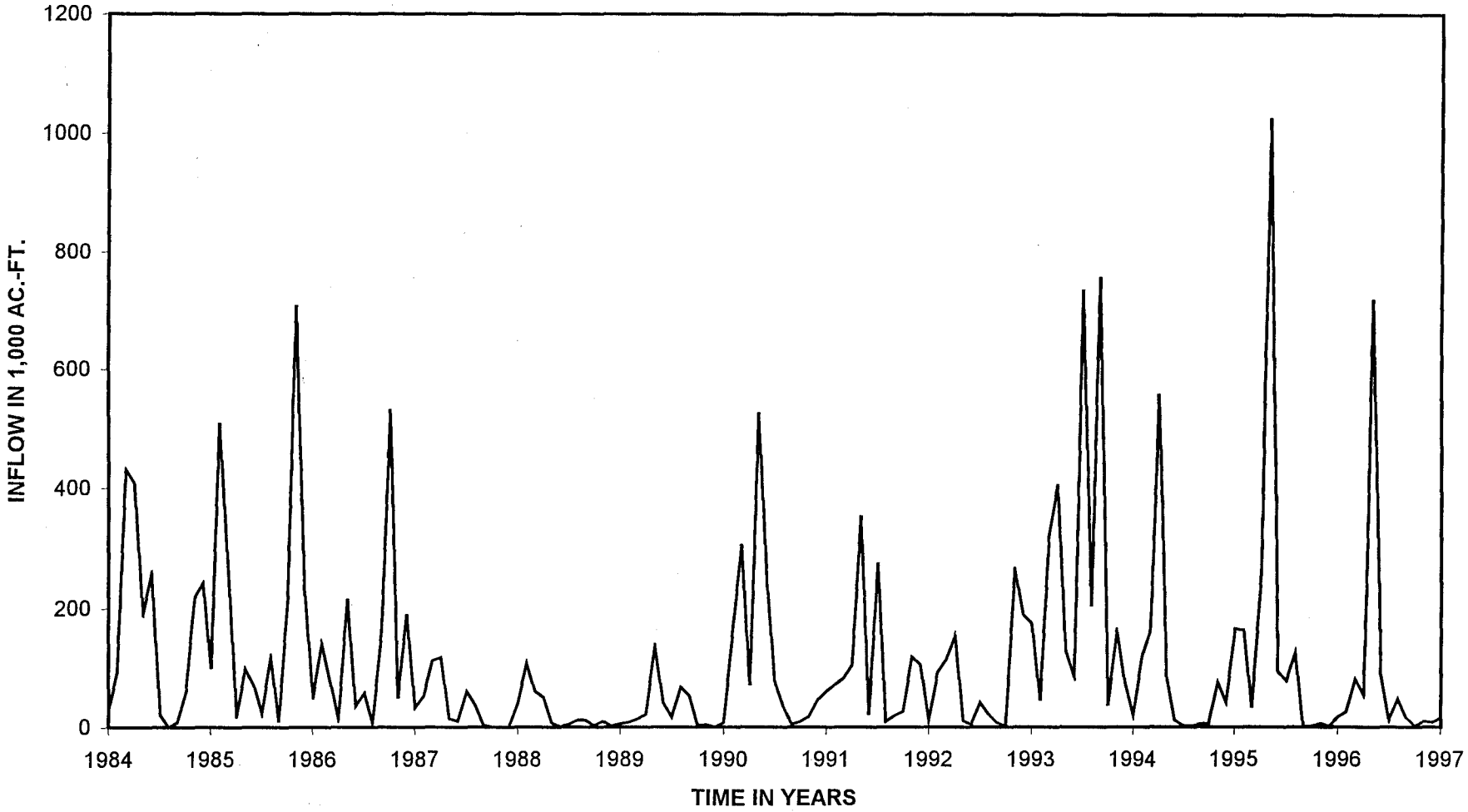
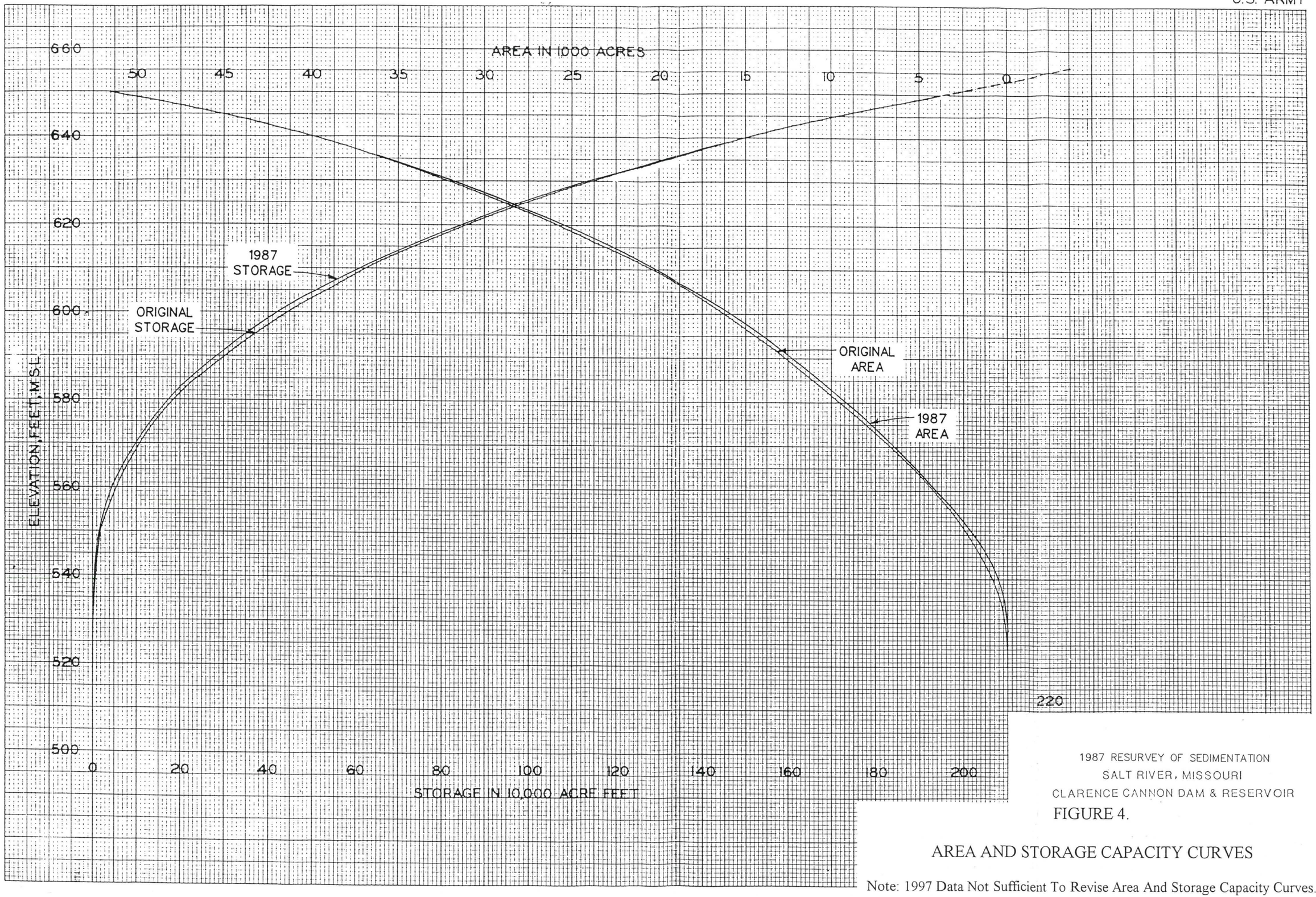


FIGURE 3. MARK TWAIN LAKE MONTHLY INFLOW
SALT RIVER, MISSOURI
PEAK INFLOW 1,026,800



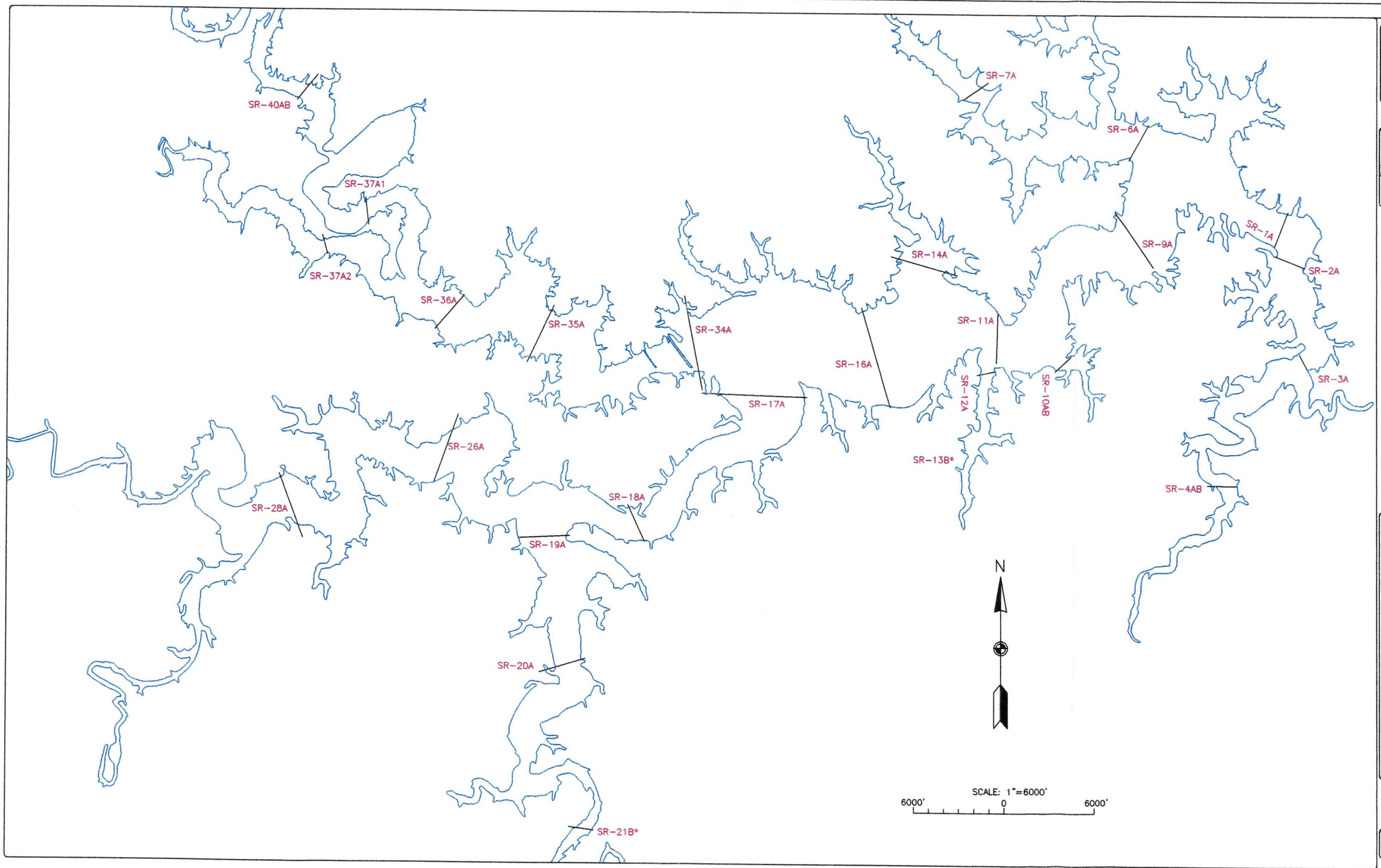


1987 RESURVEY OF SEDIMENTATION
SALT RIVER, MISSOURI
CLARENCE CANNON DAM & RESERVOIR

FIGURE 4.

AREA AND STORAGE CAPACITY CURVES

Note: 1997 Data Not Sufficient To Revise Area And Storage Capacity Curves.



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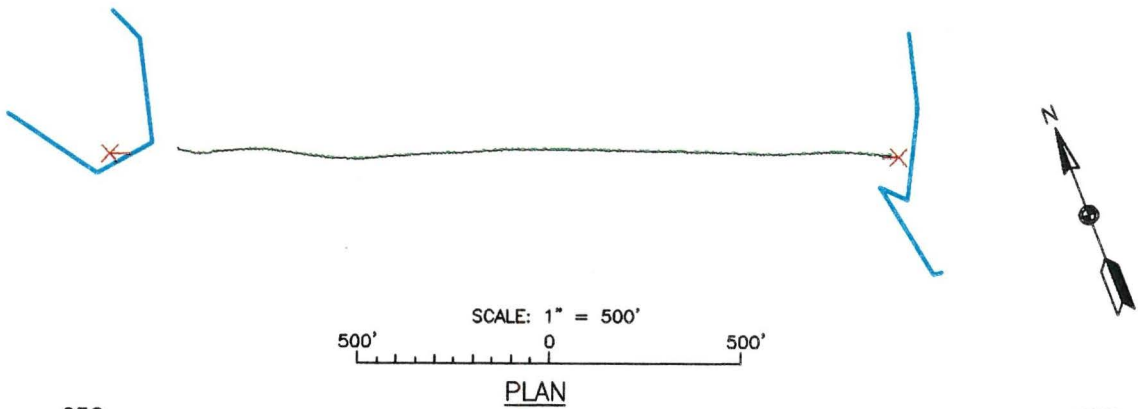
UPPER MISSISSIPPI RIVER BASIN

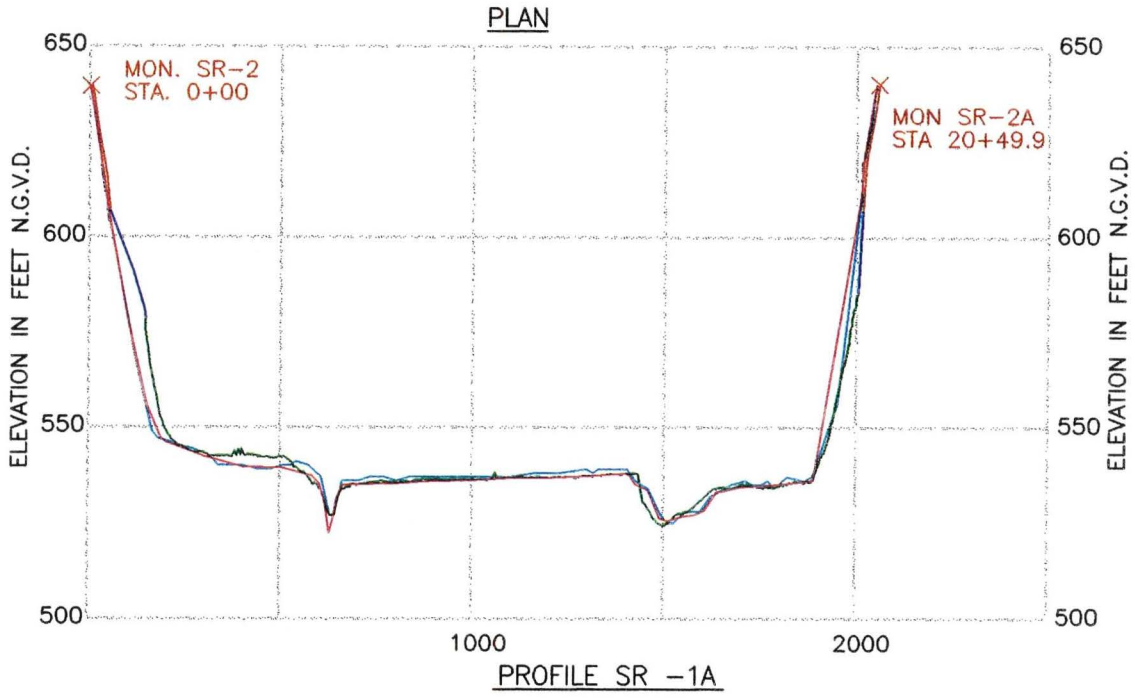
SALT RIVER, MISSOURI

MARK TWAIN LAKE
REPORT OF SEDIMENTATION, 1997 RESURVEY

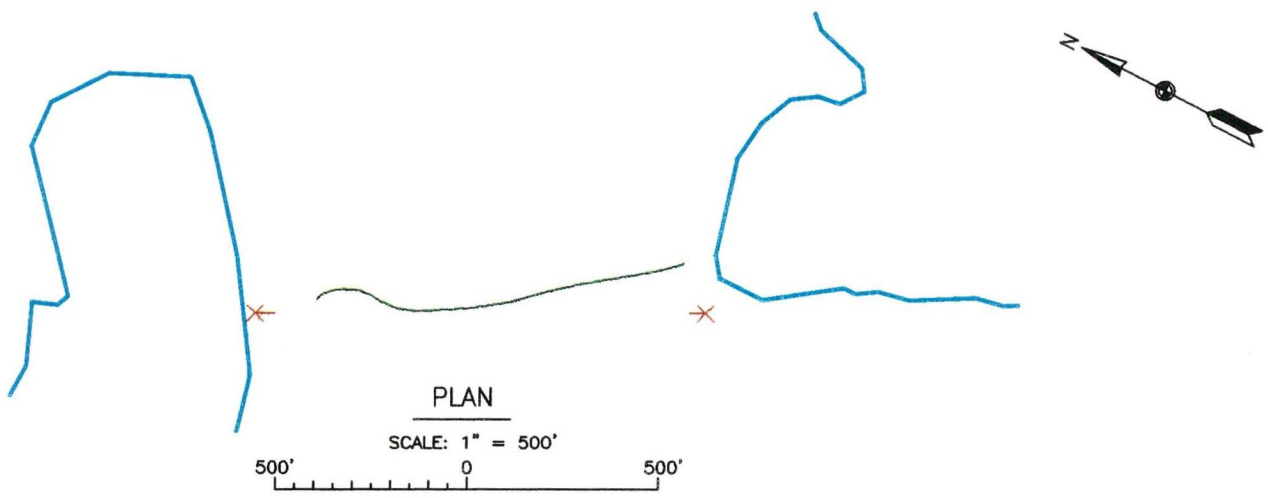
PLATE NO.
1

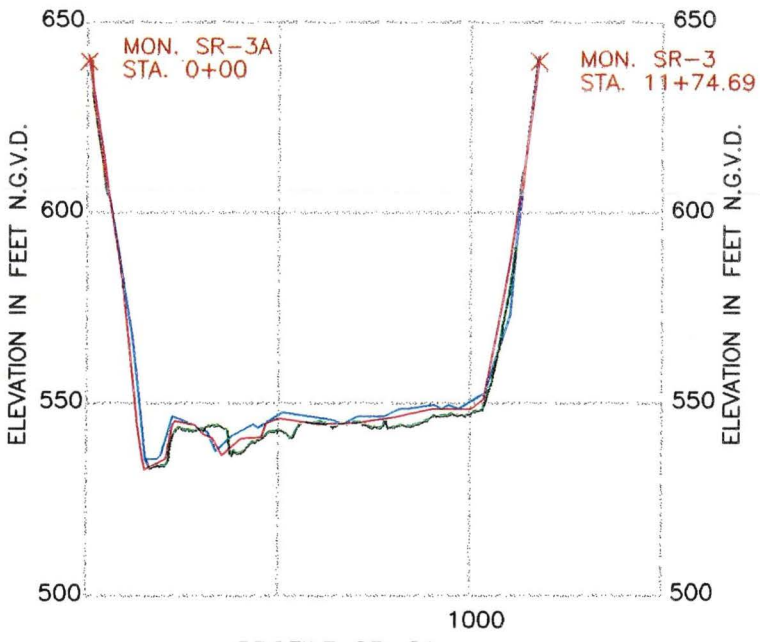


PLAN



PROFILE SR -1A





PROFILE SR-2A

LEGEND

- OVERBANK SURVEY
- HYDRO SURVEY, 1996 (W.E. 606.10)
- × OVERBANK SURVEY MONUMENT
- INDICATES 1982 SURVEY
- INDICATES 1987 SURVEY
- ASSUMED PROFILE, 1996
- WATER SURFACE EDGE

PLATE NO. 2

SR-1A
SR-2A

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MARK TWAIN LAKE
REPORT OF SEDIMENTATION, 1997 RESURVEY

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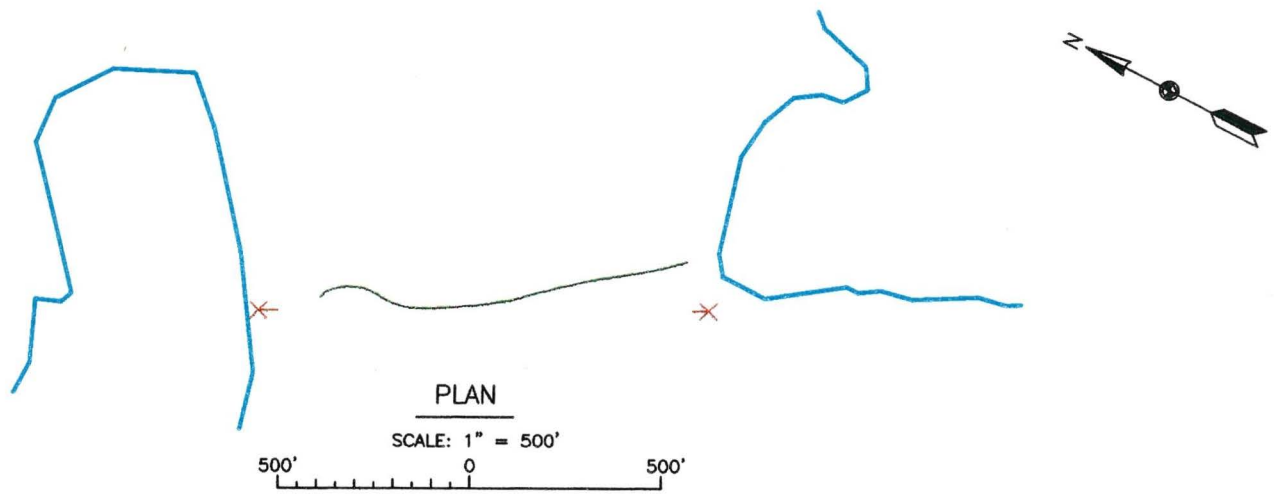

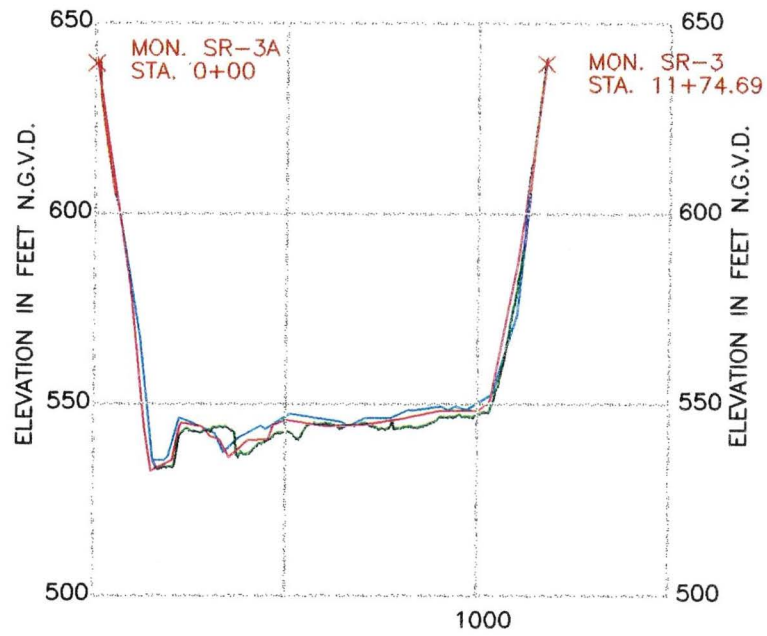

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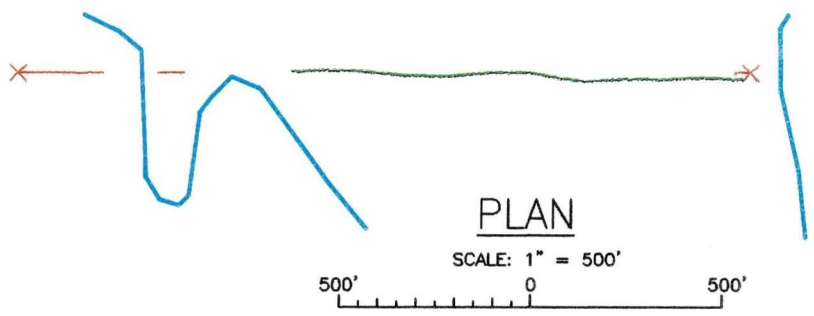

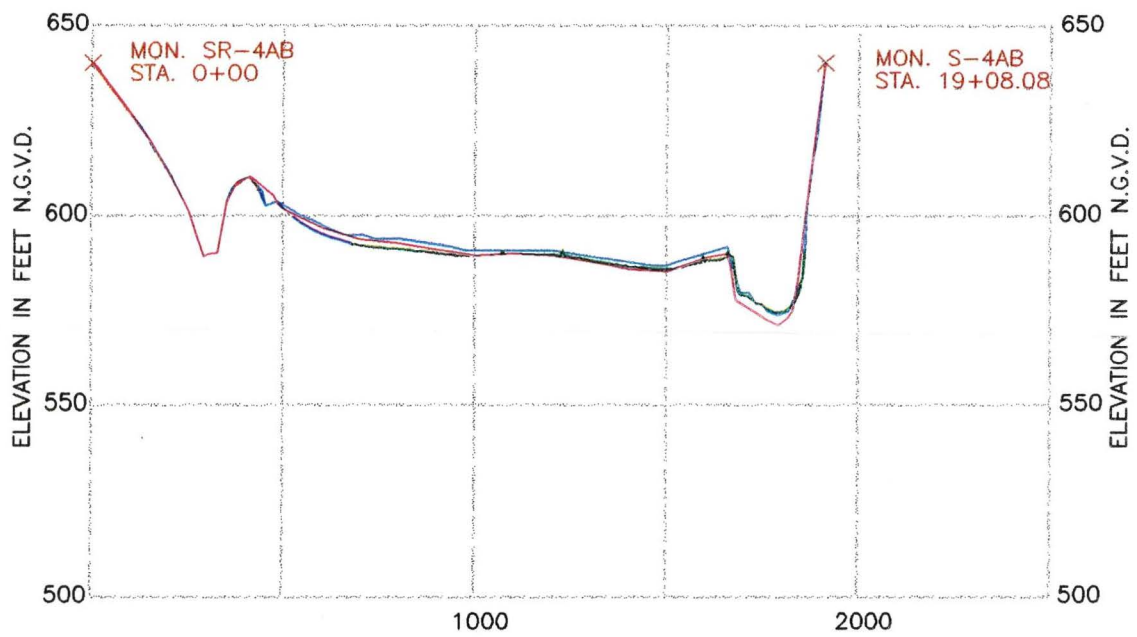

PROFILE SR-4ab

LEGEND

- OVERBANK SURVEY
- HYDRO SURVEY, 1996 (W.E. 606.10)
- × OVERBANK SURVEY MONUMENT
- INDICATES 1982 SURVEY
- INDICATES 1987 SURVEY
- ASSUMED PROFILE, 1996
- WATER SURFACE EDGE

PLATE NO. 3

SR-3a
SR-4ab

UPPER MISSISSIPPI RIVER BASIN — SALT RIVER, MISSOURI

MARK TWAIN LAKE
REPORT OF SEDIMENTATION, 1997 RESURVEY

Resource Technology, Inc.

File Name:
Plot Scale: Shown | Plot Date: 6/2000

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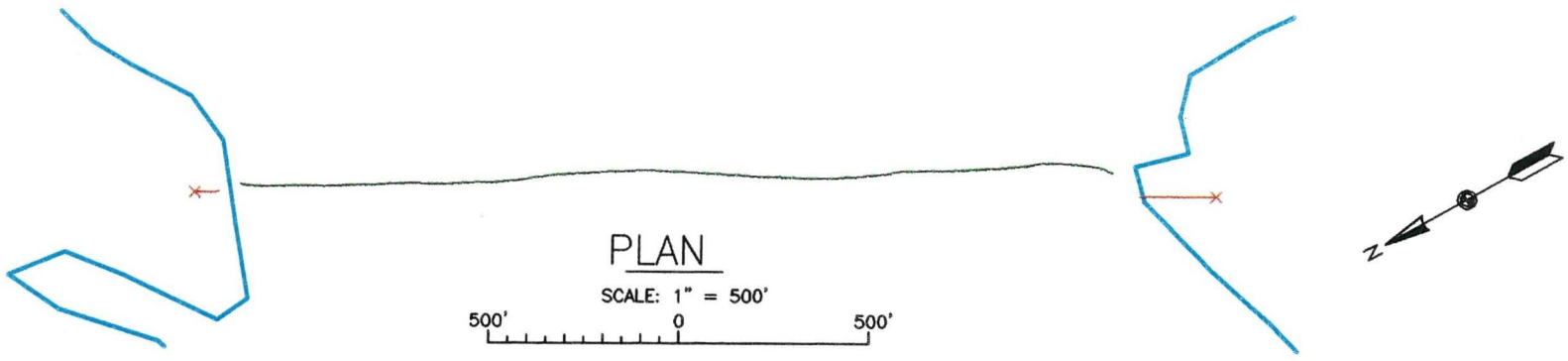
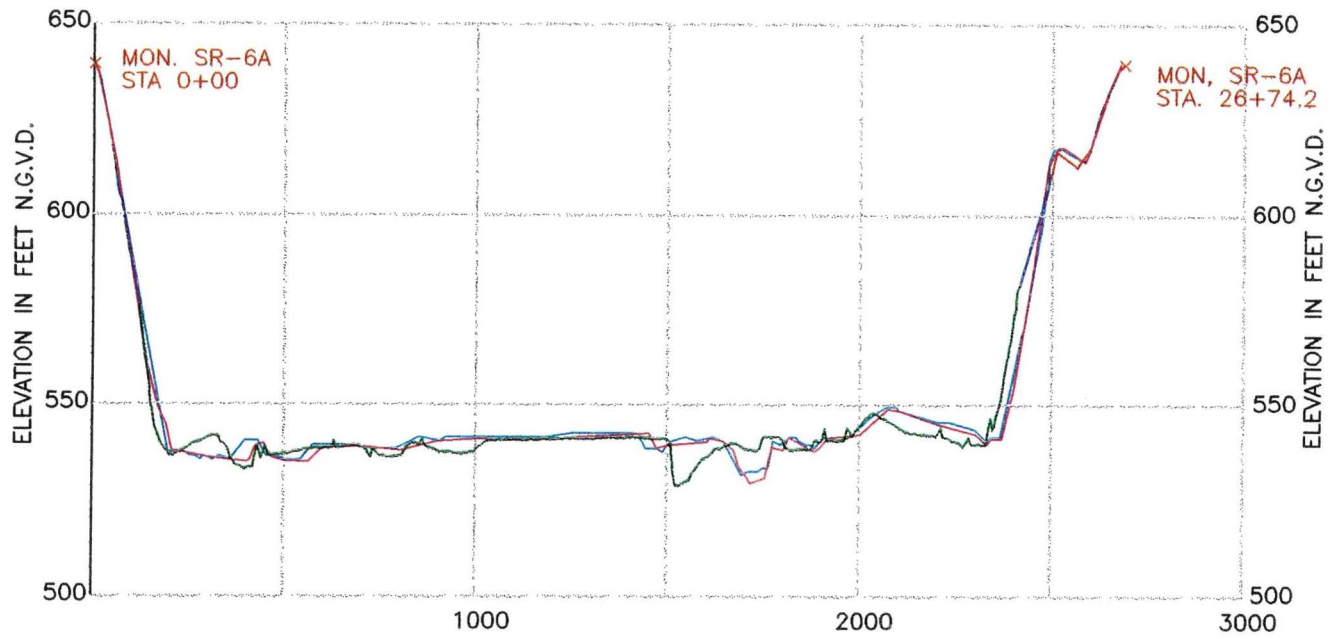
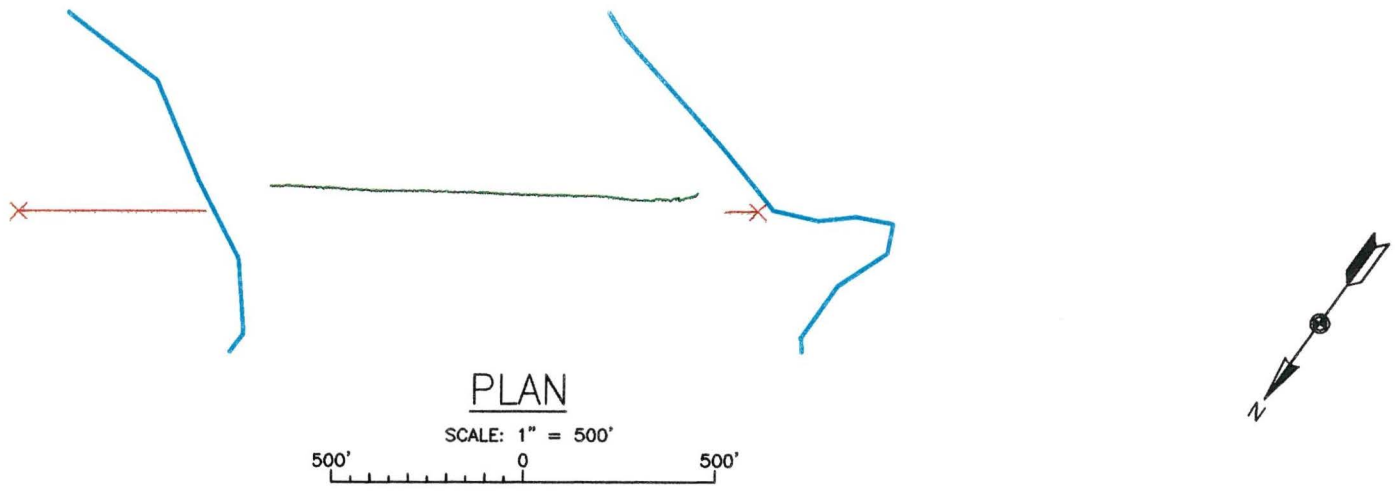
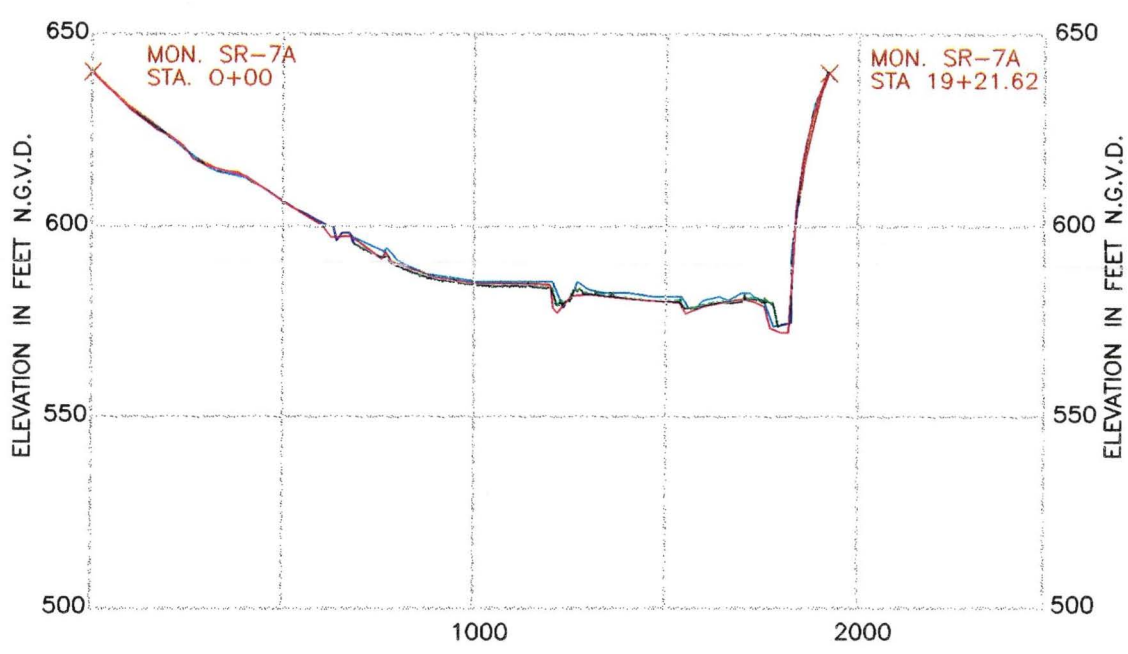




PROFILE SR-6a





PROFILE SR-7a

LEGEND

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- HYDRO SURVEY, 1996 (W.E. 606.10)
- × OVERBANK SURVEY MONUMENT
- INDICATES 1982 SURVEY
- INDICATES 1987 SURVEY
- ASSUMED PROFILE, 1996
- WATER SURFACE EDGE

PLATE NO. 4

SR-6a
SR-7a

UPPER MISSISSIPPI RIVER BASIN — SALT RIVER, MISSOURI

MARK TWAIN LAKE
REPORT OF SEDIMENTATION, 1997 RESURVEY

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Plot Scale: Shown | Plot Date: 6/2000

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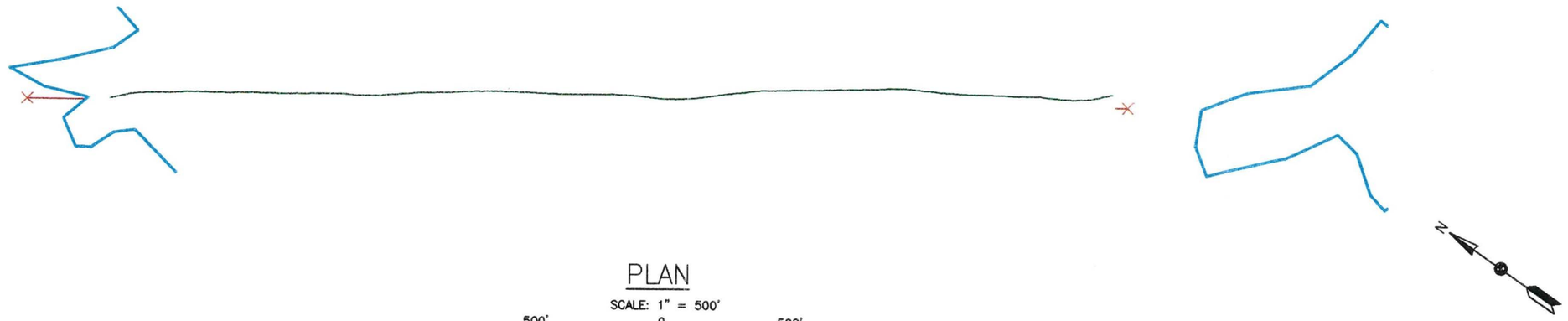

PLAN

SCALE: 1" = 500'

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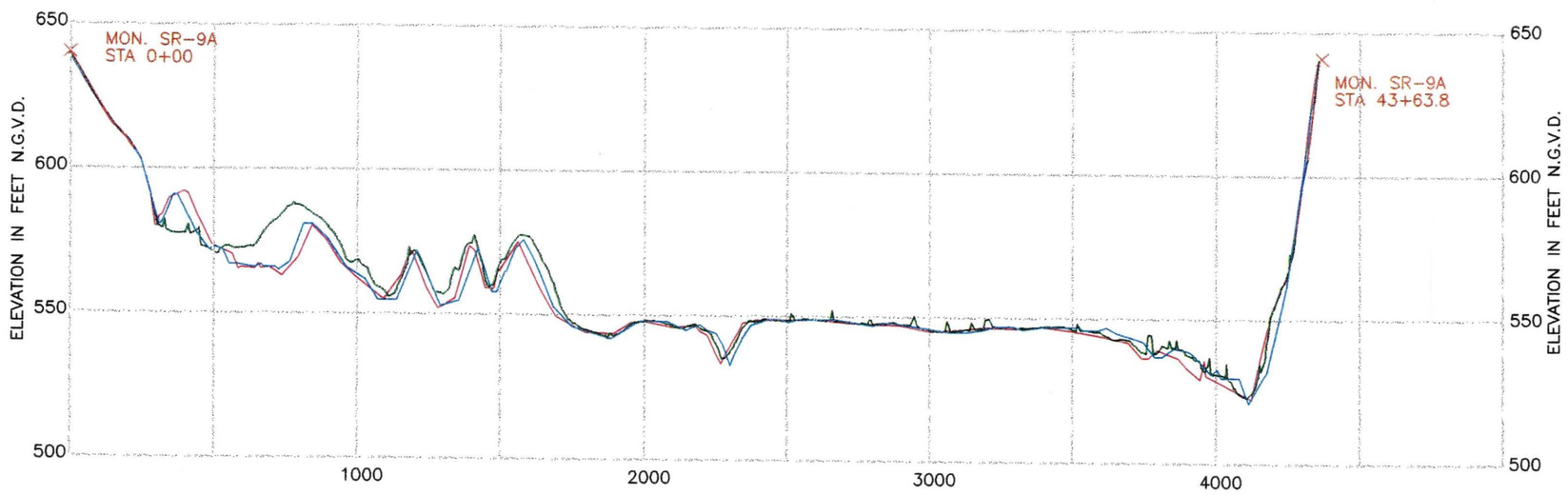

PROFILE

LEGEND

- OVERBANK SURVEY
- HYDRO SURVEY, 1996 (W.E. 606.10)
- × OVERBANK SURVEY MONUMENT
- INDICATES 1982 SURVEY
- INDICATES 1987 SURVEY
- ASSUMED PROFILE, 1996
- WATER SURFACE EDGE

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File Name:
Plot Scale: Shown | Plot Date: 6/2000
Zero Accidents Zero Tolerance

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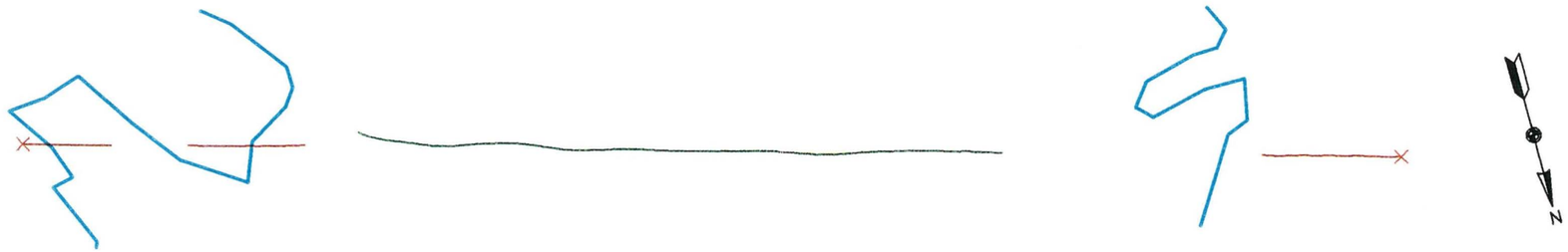
UPPER MISSISSIPPI RIVER BASIN
SALT RIVER, MISSOURI

MARK TWAIN LAKE
REPORT OF SEDIMENTATION, 1997 RESURVEY

SR-9a

PLATE NO.
5



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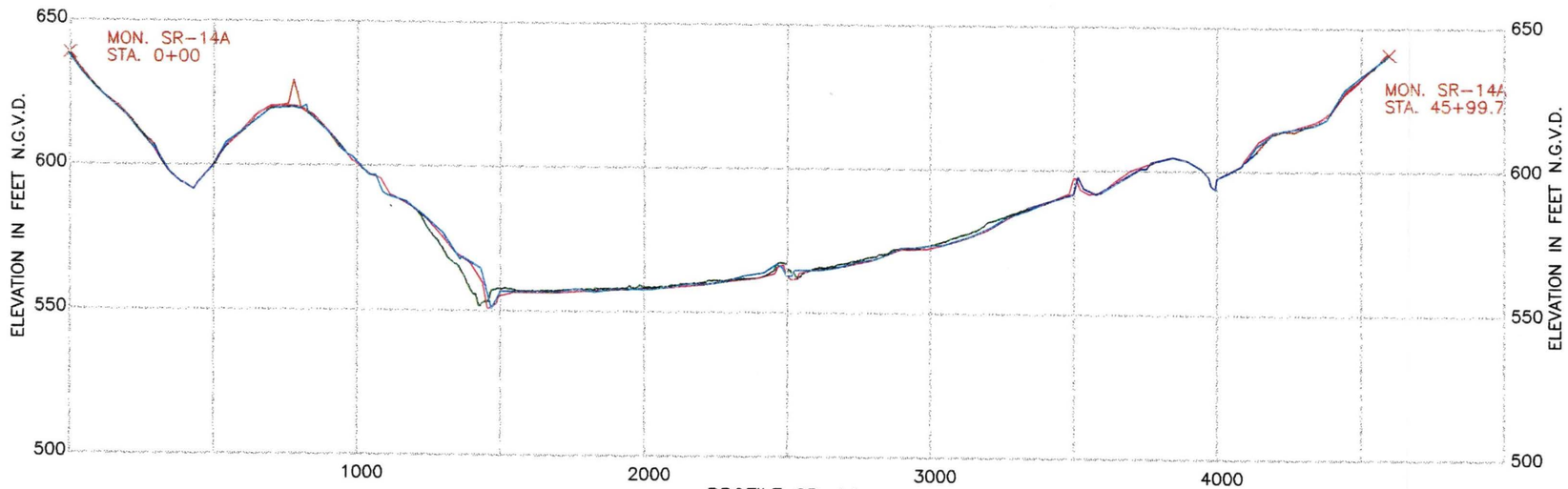

PROFILE SR-14a

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- × OVERBANK SURVEY MONUMENT
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- INDICATES 1987 SURVEY
- ASSUMED PROFILE, 1996
- WATER SURFACE EDGE

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File Name:
Plot Scale: Shown | Plot Date: 6/2000
Aero Accidents
Aero Tolerance

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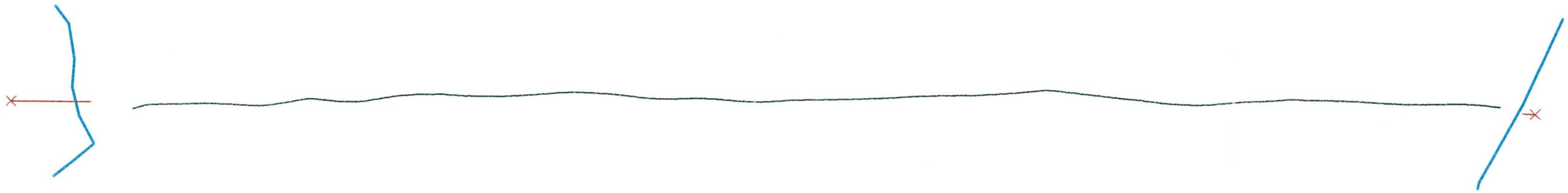
UPPER MISSISSIPPI RIVER BASIN
SALT RIVER, MISSOURI
MARK TWAIN LAKE
REPORT OF SEDIMENTATION, 1997 RESURVEY

SR-14a

PLATE NO.
6



PLAN

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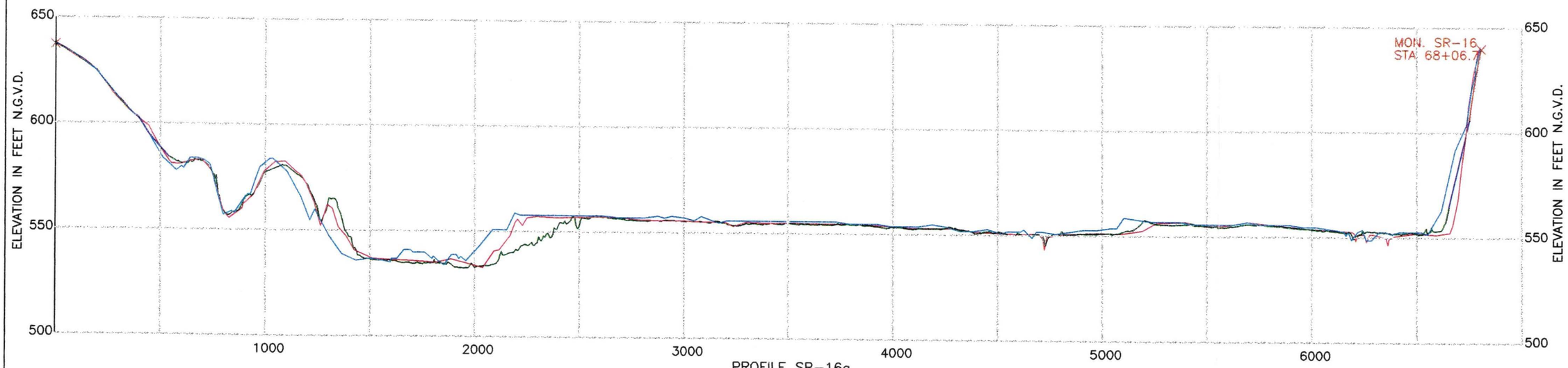

PROFILE SR-16a

LEGEND

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- HYDRO SURVEY, 1996 (W.E. 606.10)
- × OVERBANK SURVEY MONUMENT
- INDICATES 1982 SURVEY
- INDICATES 1987 SURVEY
- ASSUMED PROFILE, 1996
- WATER SURFACE EDGE

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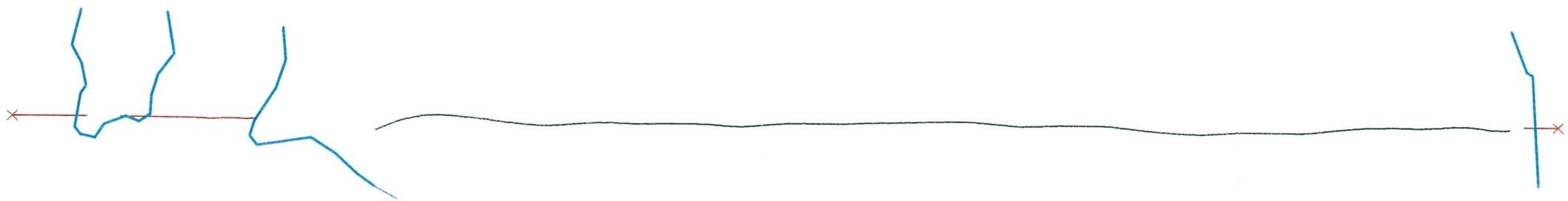
UPPER MISSISSIPPI RIVER BASIN
SALT RIVER, MISSOURI

MARK TWAIN LAKE
REPORT OF SEDIMENTATION, 1997 RESURVEY

SR-16a

PLATE NO.
7



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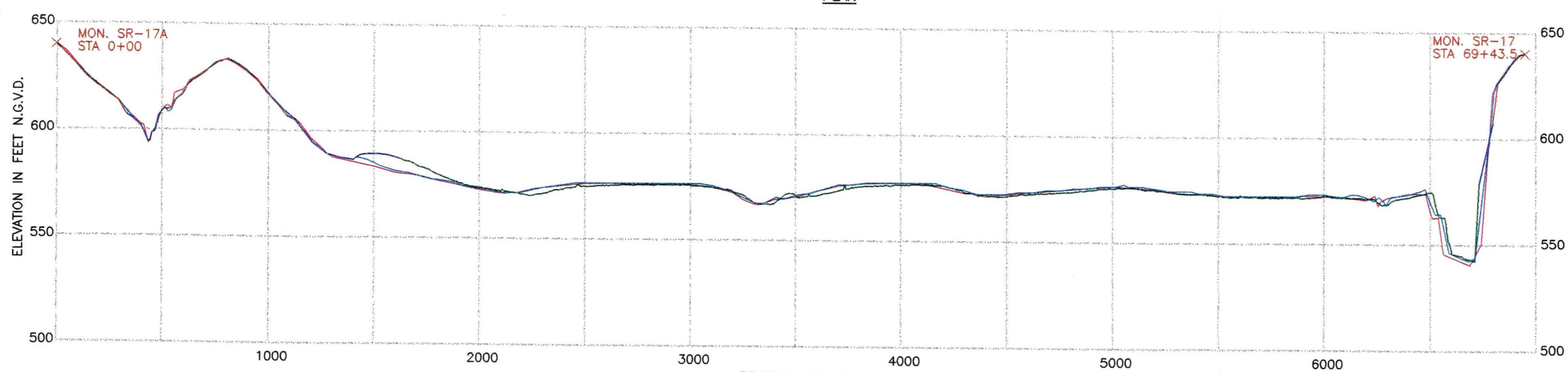
PLAN



PROFILE SR-17a

LEGEND

- OVERBANK SURVEY
- HYDRO SURVEY, 1996 (W.E. 606.10)
- × OVERBANK SURVEY MONUMENT
- INDICATES 1982 SURVEY
- INDICATES 1987 SURVEY
- ASSUMED PROFILE, 1996
- WATER SURFACE EDGE

US Army Corps of Engineers
ST. LOUIS DISTRICT
St. Louis, Missouri

File Name:
Plot Date: 4/8/00
Plot Scale: Shown
zero Accidents
zero Tolerance

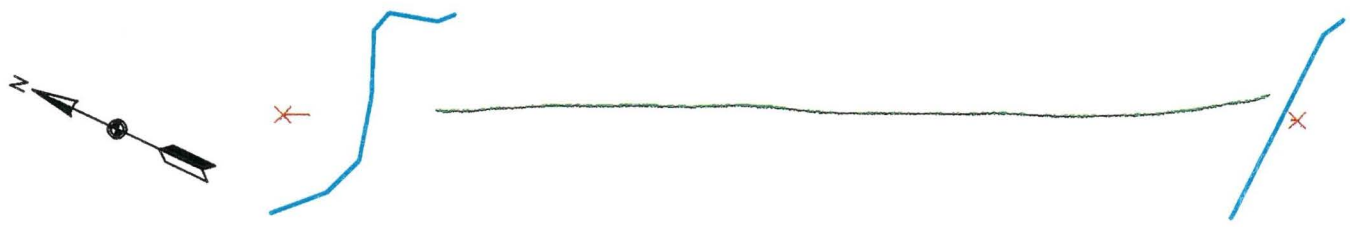
Resource Technology, Inc.

UPPER MISSISSIPPI RIVER BASIN
SALT RIVER, MISSOURI

MARK TWAIN LAKE
REPORT OF SEDIMENTATION, 1997 RESURVEY

SR-17a

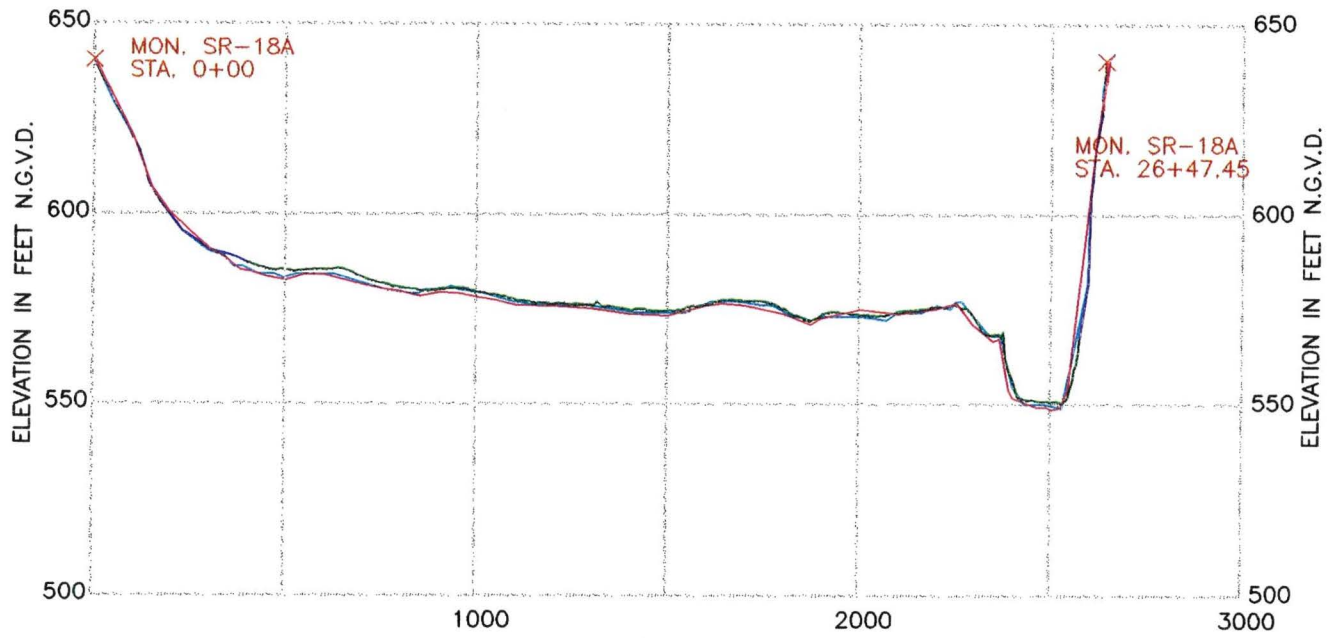
PLATE NO.
8



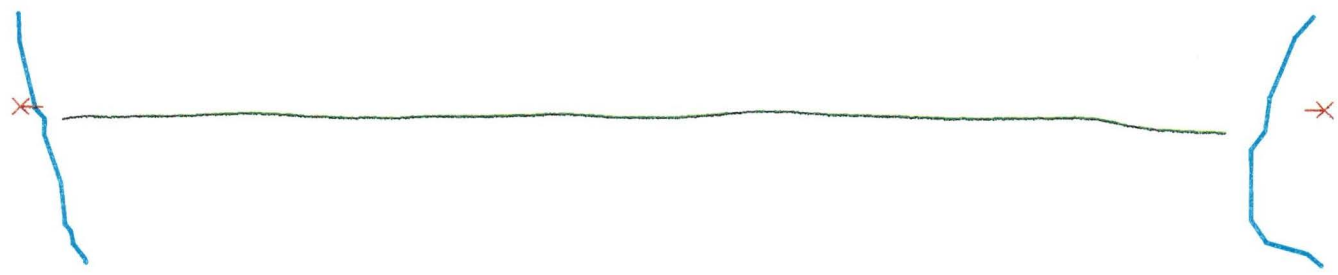
PLAN

SCALE: 1" = 500'

500' 0 500'



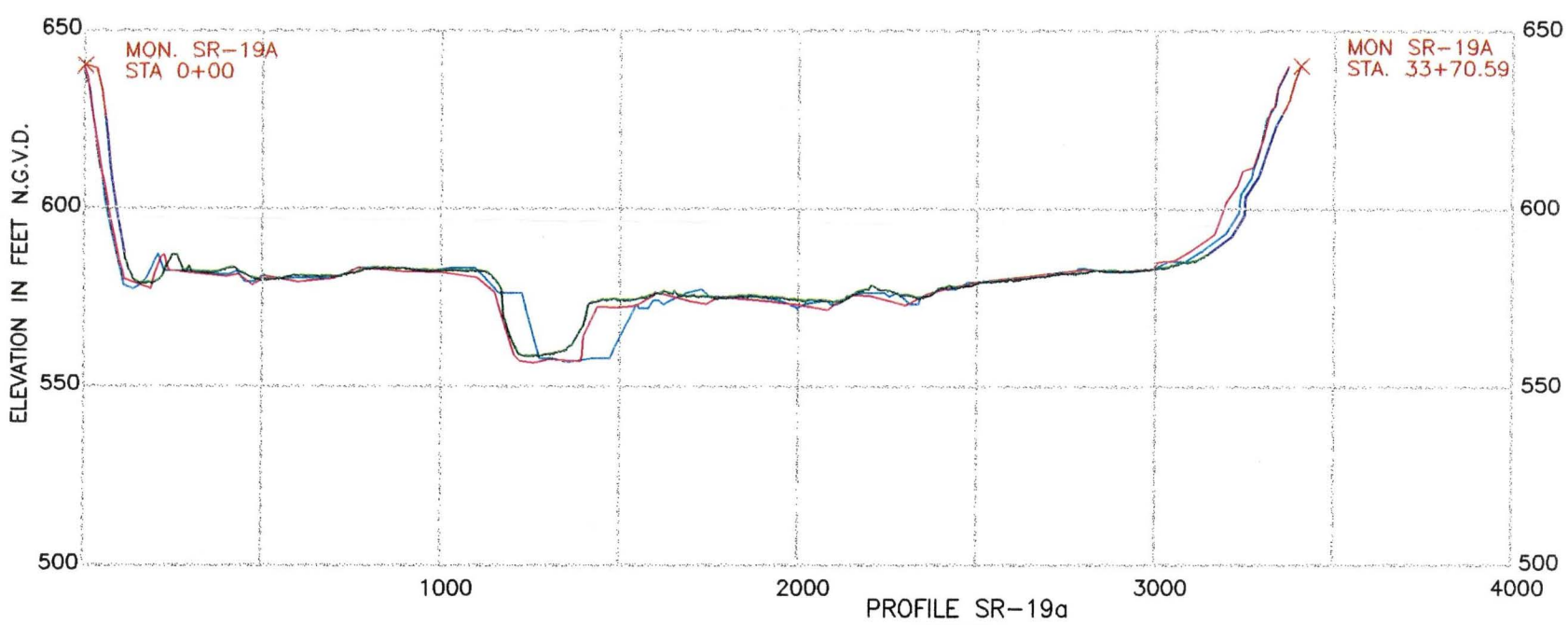
PROFILE SR-18a



PLAN

SCALE: 1" = 500'

500' 0 500'



PROFILE SR-19a

LEGEND

- OVERBANK SURVEY
- HYDRO SURVEY, 1996 (W.E. 606.10)
- × OVERBANK SURVEY MONUMENT
- INDICATES 1982 SURVEY
- INDICATES 1987 SURVEY
- ASSUMED PROFILE, 1996
- WATER SURFACE EDGE

PLATE NO. 9

SR-18A
SR-19A

UPPER MISSISSIPPI RIVER BASIN — SALT RIVER, MISSOURI

MARK TWAIN LAKE

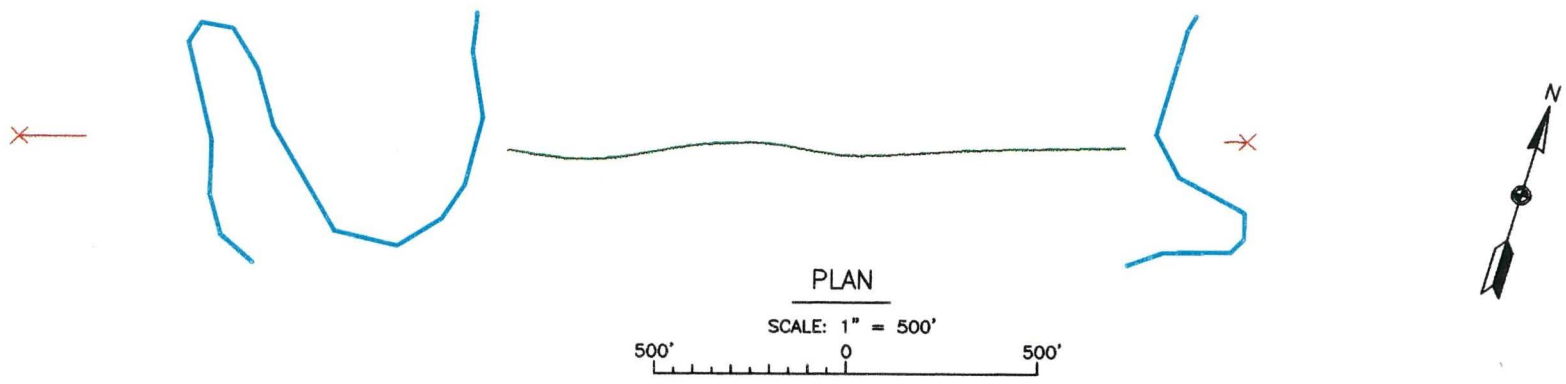
REPORT OF SEDIMENTATION, 1997 RESURVEY

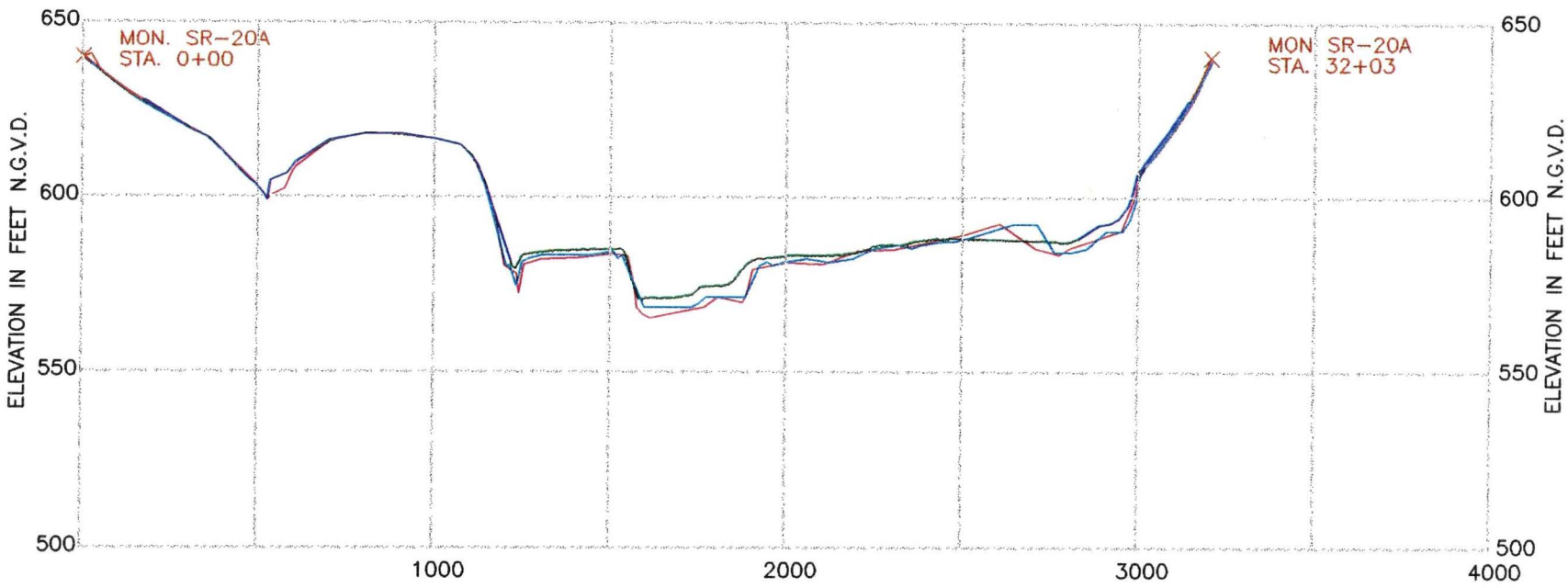
Resource Technology, Inc.

File Name:
Plot Scale: Shown | Plot Date: 6/2000

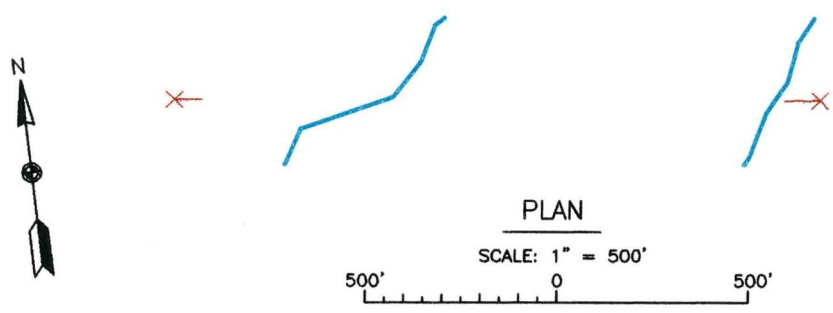
Zero Accidents
Zero Tolerance

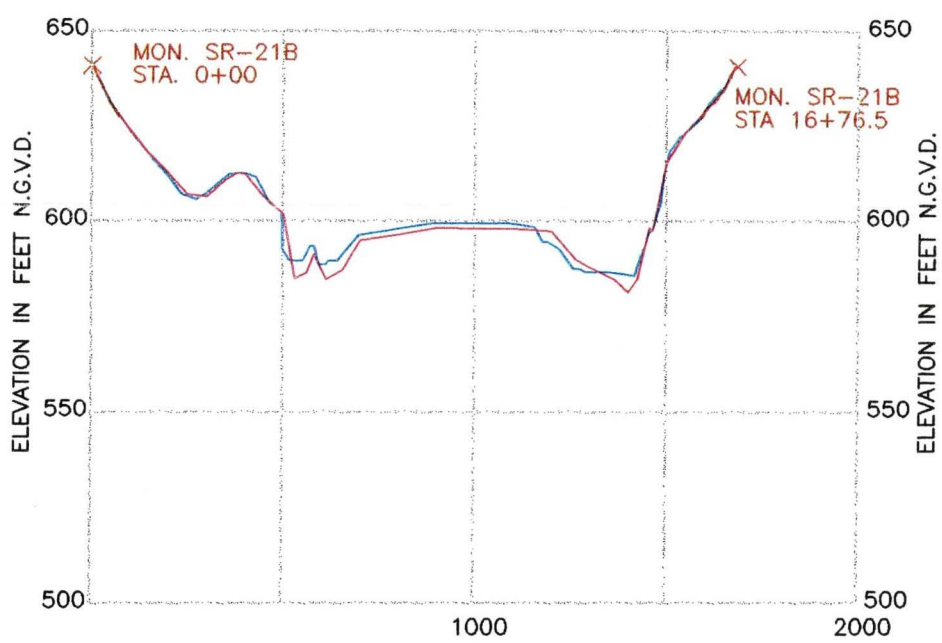
US Army Corps of Engineers
ST. LOUIS DISTRICT
St. Louis, Missouri





PROFILE SR-20a





PROFILE SR-21a

LEGEND

- OVERBANK SURVEY
- HYDRO SURVEY, 1996 (W.E. 606.10)
- × OVERBANK SURVEY MONUMENT
- INDICATES 1982 SURVEY
- INDICATES 1987 SURVEY
- ASSUMED PROFILE, 1996
- WATER SURFACE EDGE

PLATE NO. 10

SR-20a
SR-21a

UPPER MISSISSIPPI RIVER BASIN — SALT RIVER, MISSOURI

MARK TWAIN LAKE
REPORT OF SEDIMENTATION, 1997 RESURVEY

Resource Technology, Inc.

File Name:
Plot Scale: Shown | Plot Date: 6/2000

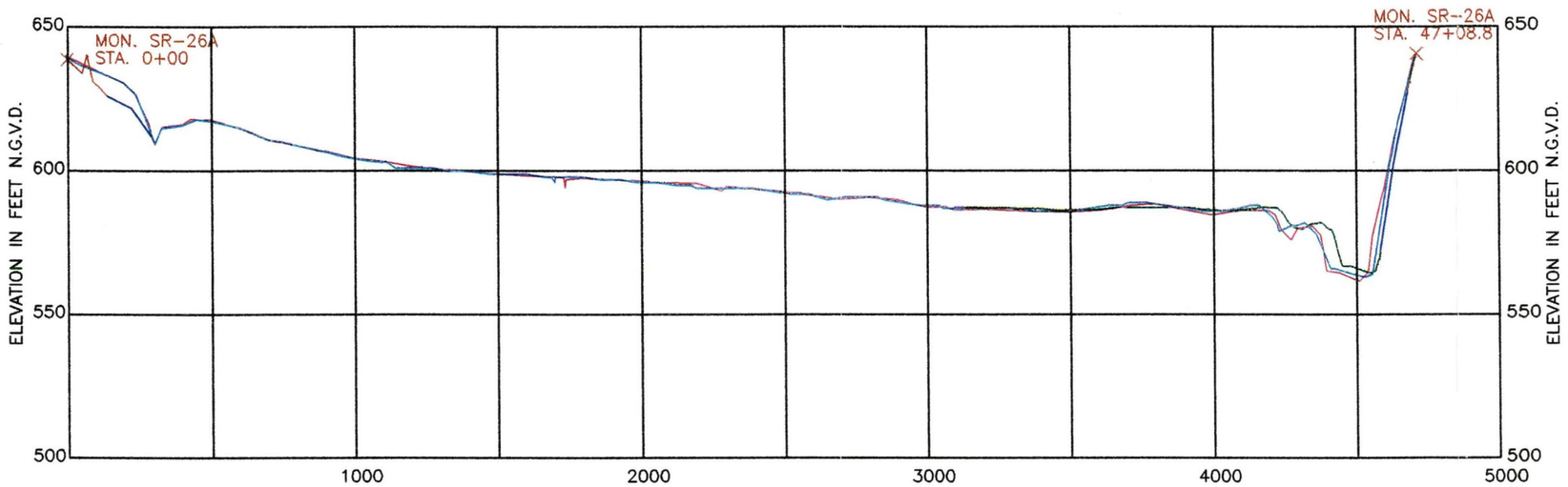
Zero Accidents
Zero Tolerance

US Army Corps of Engineers
ST. LOUIS DISTRICT
St. Louis, Missouri

PLAN

SCALE: 1" = 500'

500' 0 500'



PROFILE SR-26a

LEGEND

- OVERBANK SURVEY
- HYDRO SURVEY, 1996 (W.E. 606.10)
- × OVERBANK SURVEY MONUMENT
- INDICATES 1982 SURVEY
- INDICATES 1987 SURVEY
- ASSUMED PROFILE, 1996
- WATER SURFACE EDGE

US Army Corps of Engineers
ST. LOUIS DISTRICT
St. Louis, Missouri

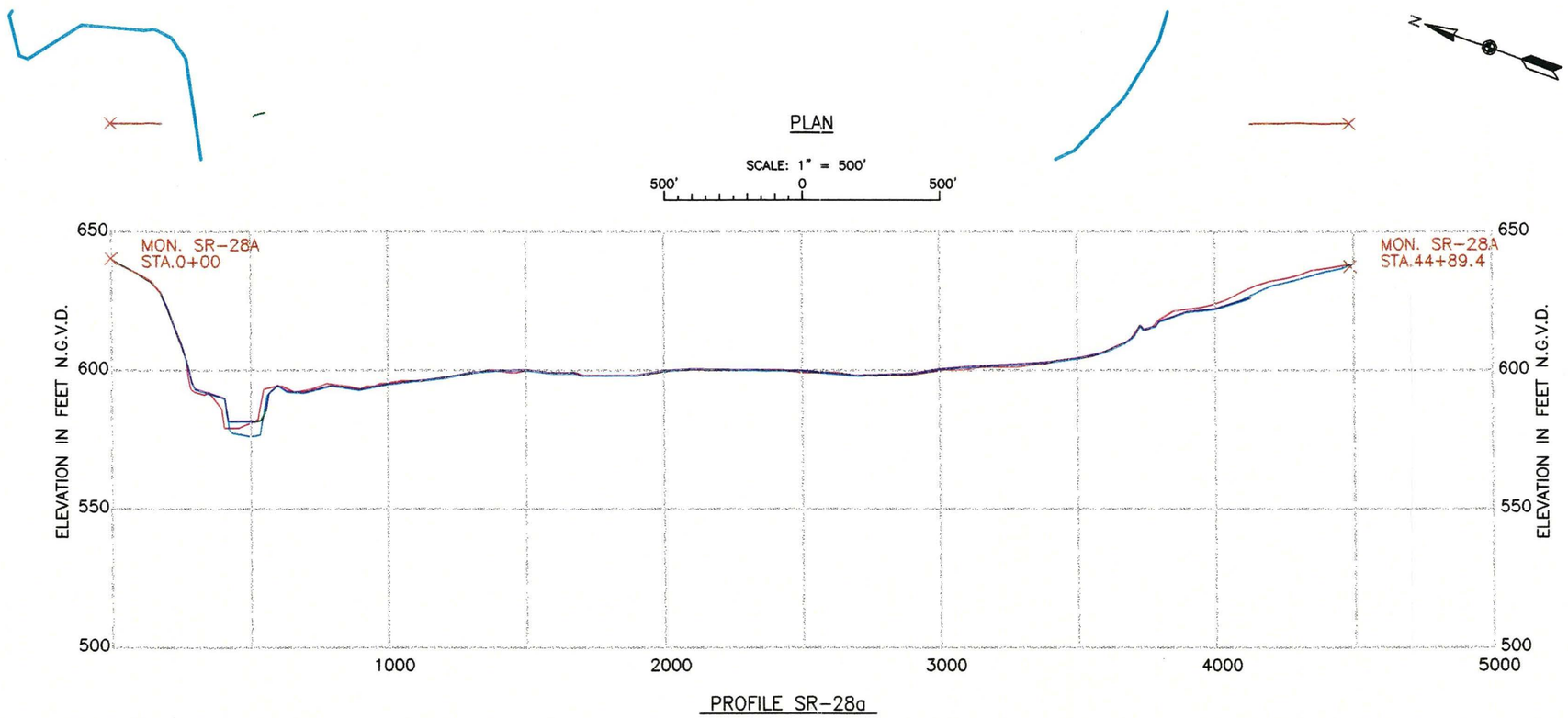
Resource Technology, Inc.

UPPER MISSISSIPPI RIVER BASIN
SALT RIVER, MISSOURI

MARK TWAIN LAKE
REPORT OF SEDIMENTATION, 1997 RESURVEY

SR-26a

PLATE NO.
11



LEGEND

- OVERBANK SURVEY
- HYDRO SURVEY, 1996 (W.E. 606.10)
- × OVERBANK SURVEY MONUMENT
- INDICATES 1982 SURVEY
- INDICATES 1987 SURVEY
- ASSUMED PROFILE, 1996
- WATER SURFACE EDGE

US Army Corps of Engineers
ST. LOUIS DISTRICT
St. Louis, Missouri

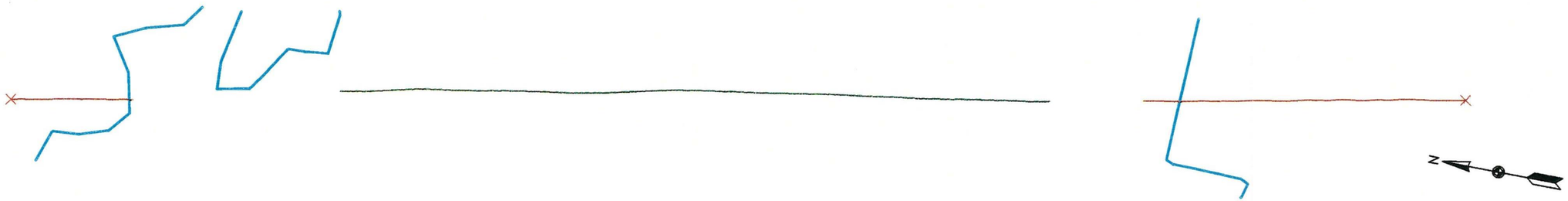
File Name
Plot Date: 8/8/2000
Plot Scale: Shown
are Accidents
are Tolerance

Resource Technology, Inc.

UPPER MISSISSIPPI RIVER BASIN
SALT RIVER, MISSOURI
MARK TWAIN LAKE
REPORT OF SEDIMENTATION, 1997 RESURVEY

SR-28a

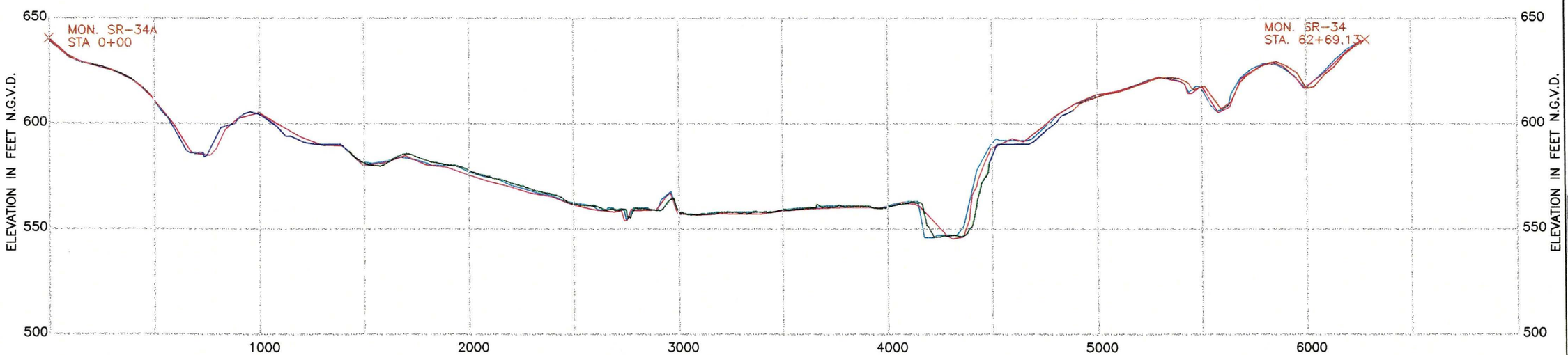
PLATE NO.
12



PLAN

SCALE: 1" = 500'

500' 0 500'



PROFILE SR-34a

LEGEND

- OVERBANK SURVEY
- HYDRO SURVEY, 1996 (W.E. 606.10)
- × OVERBANK SURVEY MONUMENT
- INDICATES 1982 SURVEY
- INDICATES 1987 SURVEY
- ASSUMED PROFILE, 1996
- WATER SURFACE EDGE

US Army Corps of Engineers
ST. LOUIS DISTRICT
St. Louis, Missouri

File Name:
Plot Scale Shown | Plot Date: 9/2000
Zero Accidents
Zero Tolerance

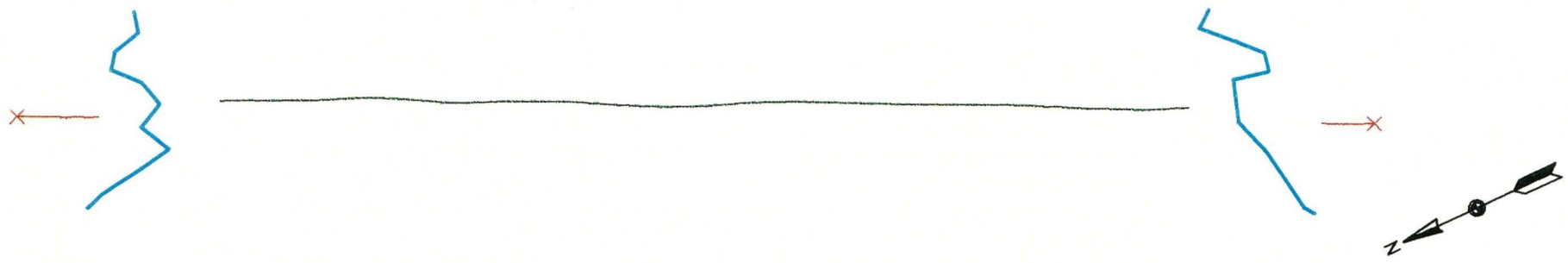
Resource Technology, Inc.

UPPER MISSISSIPPI RIVER BASIN
SALT RIVER, MISSOURI

MARK TWAIN LAKE
REPORT OF SEDIMENTATION, 1997 RESURVEY

SR-34a

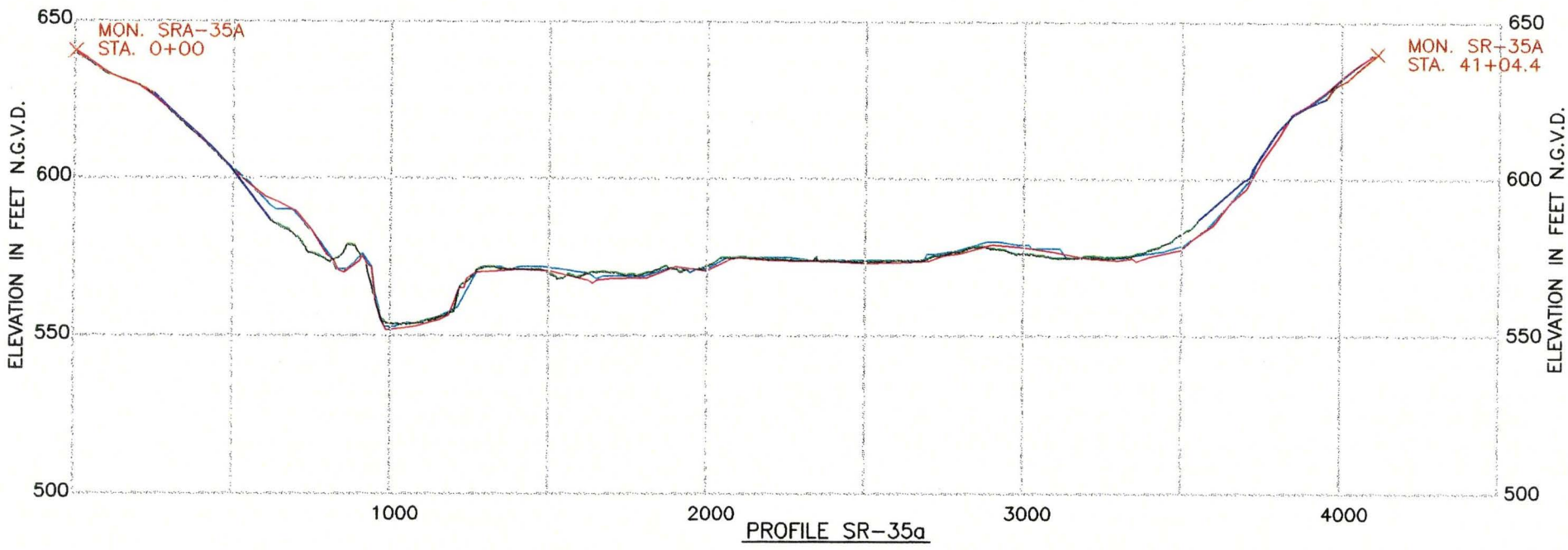
PLATE NO.
13



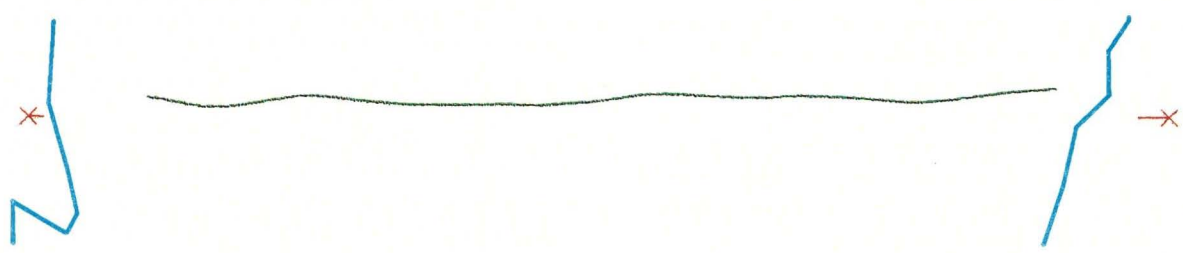
PLAN

SCALE: 1" = 500'

500' 0 500'



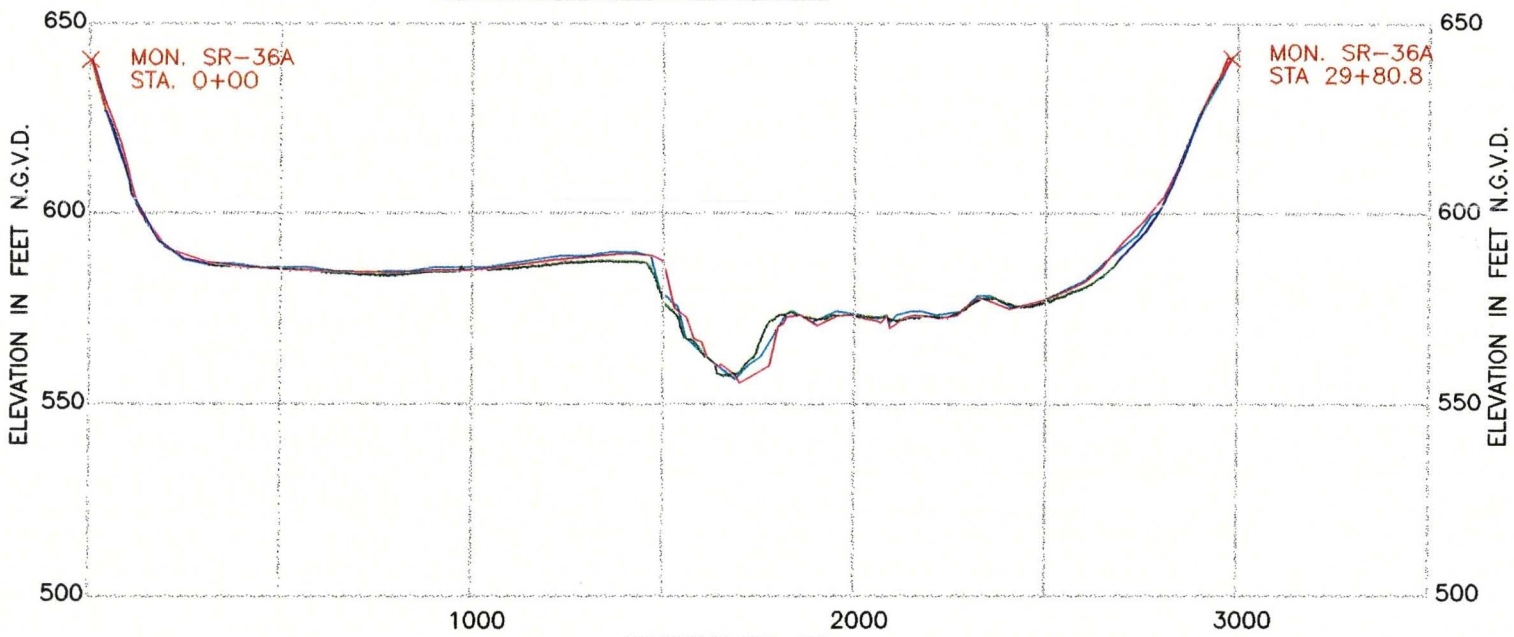
PROFILE SR-35a



PLAN

SCALE: 1" = 500'

500' 0 500'



PROFILE SR-36a

LEGEND

- OVERBANK SURVEY
- HYDRO SURVEY, 1996 (W.E. 606.10)
- × OVERBANK SURVEY MONUMENT
- INDICATES 1982 SURVEY
- INDICATES 1987 SURVEY
- ASSUMED PROFILE, 1996
- WATER SURFACE EDGE

PLATE NO. 14

SR-35a
SR-36a

UPPER MISSISSIPPI RIVER BASIN — SALT RIVER, MISSOURI

MARK TWAIN LAKE

REPORT OF SEDIMENTATION, 1997 RESURVEY

Resource Technology, Inc.

File Name:
Plot Scale: Shown | Plot Date: 8/2000

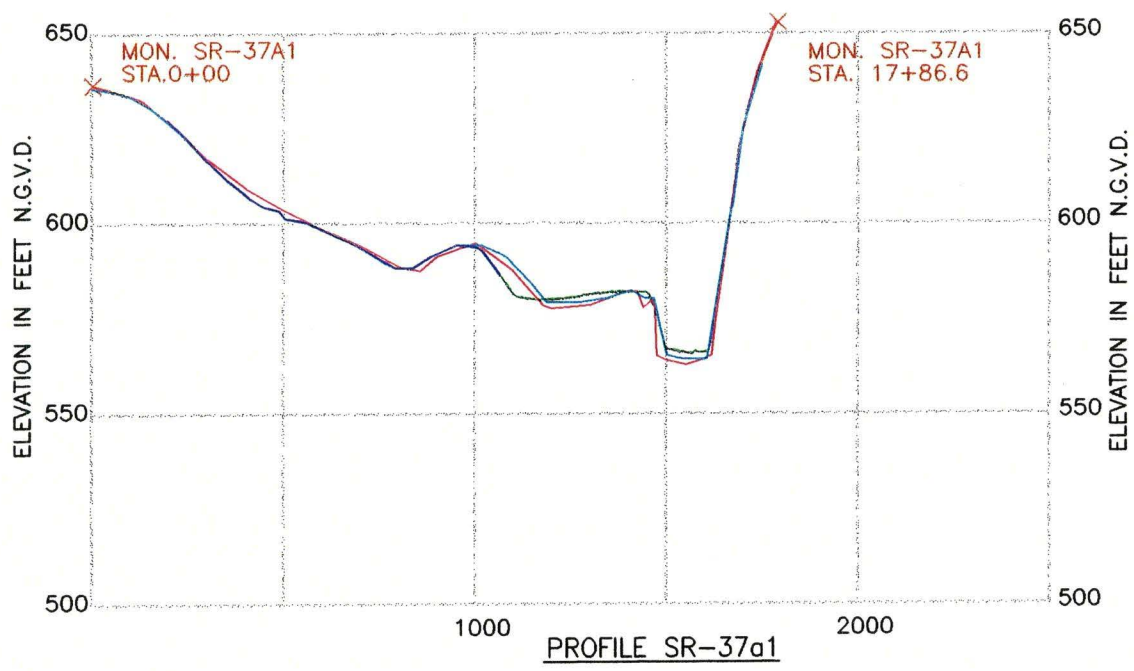
Zero Accidents
Zero Tolerance

US Army Corps of Engineers
ST. LOUIS DISTRICT
St. Louis, Missouri

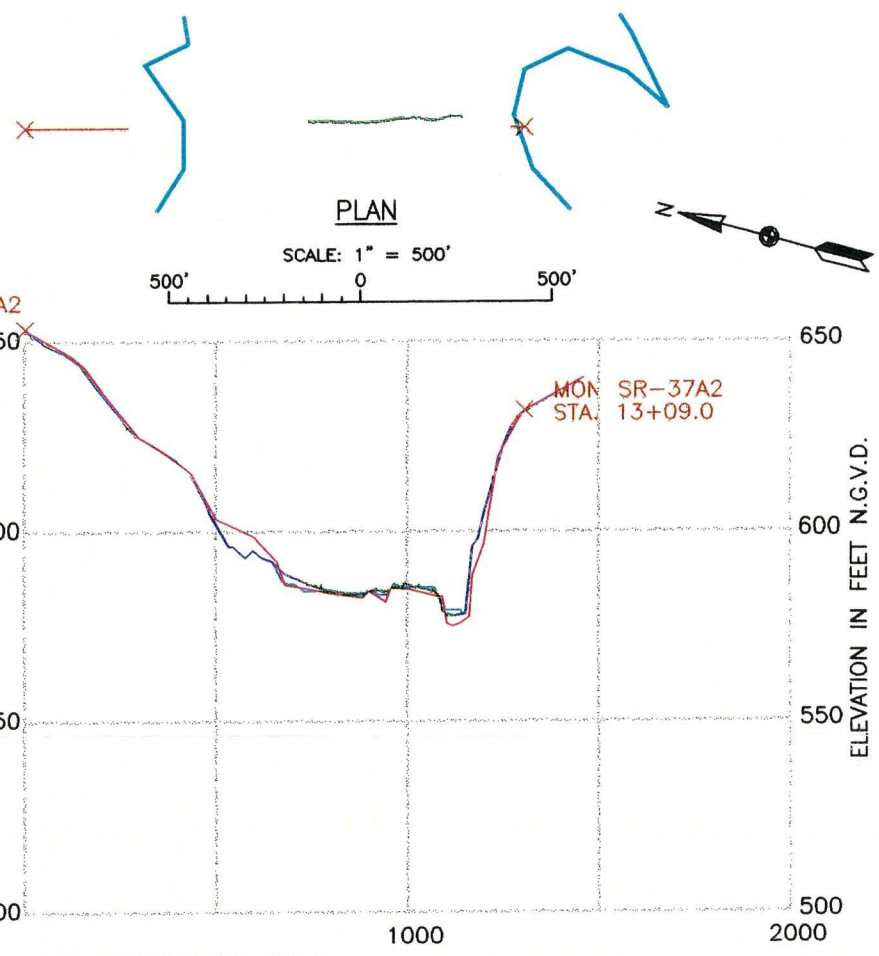
PLAN

SCALE: 1" = 500'

500' 0 500'



PROFILE SR-37a1



PROFILE SR-37a2

LEGEND

- OVERBANK SURVEY
- HYDRO SURVEY, 1996 (W.E. 606.10)
- × OVERBANK SURVEY MONUMENT
- INDICATES 1982 SURVEY
- INDICATES 1987 SURVEY
- ASSUMED PROFILE, 1996
- WATER SURFACE EDGE

PLATE NO. 15

SR-37a1
SR-37a2

UPPER MISSISSIPPI RIVER BASIN — SALT RIVER, MISSOURI

MARK TWAIN LAKE

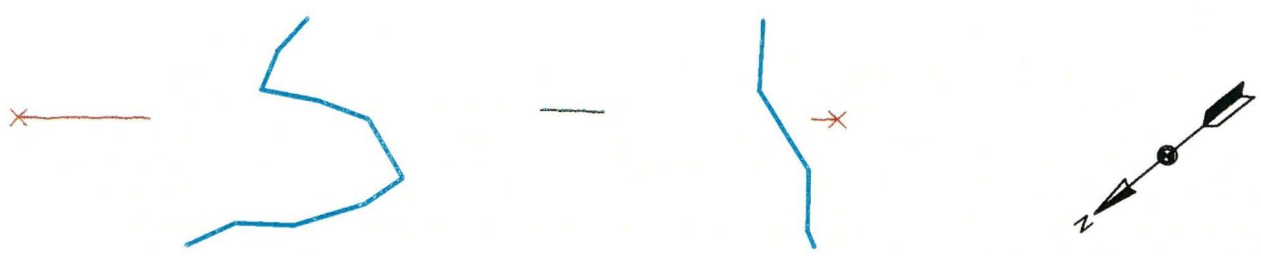
REPORT OF SEDIMENTATION, 1997 RESURVEY

Resource Technology, Inc.

File Name:
Plot Scale: Shown | Plot Date: 6/2000

Zero Accidents
Zero Tolerance

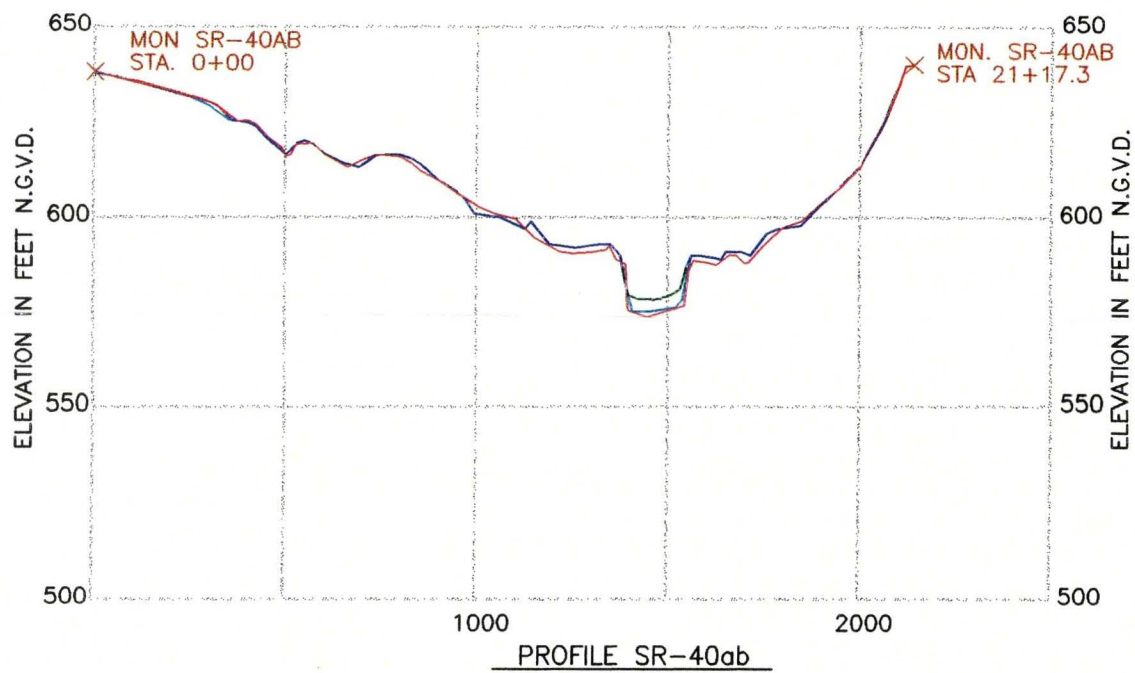
US Army Corps of Engineers
ST. LOUIS DISTRICT
St. Louis, Missouri



PLAN

SCALE: 1" = 500'

500' 0 500'



PROFILE SR-40ab

LEGEND

- OVERBANK SURVEY
- HYDRO SURVEY, 1996 (W.E. 606.10)
- × OVERBANK SURVEY MONUMENT
- INDICATES 1982 SURVEY
- INDICATES 1987 SURVEY
- ASSUMED PROFILE, 1996
- WATER SURFACE EDGE

PLATE NO. 16

SR-40ab

UPPER MISSISSIPPI RIVER BASIN — SALT RIVER, MISSOURI

MARK TWAIN LAKE

REPORT OF SEDIMENTATION, 1997 RESURVEY

Resource Technology, Inc.

File Name:

Plot Scale: Shown | Plot Date: 6/2000

Zero Accidents
Zero Tolerance

US Army Corps of Engineers
ST. LOUIS DISTRICT
St. Louis, Missouri

CLARENCE CANNON DAM & MARK TWAIN LAKE

US Army Corps of Engineers
St. Louis District

All Public lands shown in this brochure are governed by the regulations set forth in Title 36, Section 327, U.S. Federal Code of Regulations. Copies of the "Rules and Regulations" brochure are available from park rangers and at the Visitor Center. All local, state and federal regulations are applicable.

ATTENTION SEAPLANE OPERATORS

Seaplane takeoff and landing operations are prohibited in no-wake zones and the re-regulation pool, and 600 feet from the dam and the shoreline. Seaplane operations are restricted in the waterfowl refuge during the period October 15 through December 31. Operation of a seaplane is at the risk of the plane's owner, operator and/or passengers.

LEGEND

- Mark Twain Lake Normal Pool Elev. (606.0 msl)
- Mark Twain Lake Flood Pool Elev. (638.0 msl)
- Lands Managed by the Corps of Engineers
- Corps of Engineers Recreation Areas
- Lands Managed by the Missouri Dept. of Natural Resources
- Towns
- Hard-Surfaced Roads
- Gravel Roads
- Recreation Area Road System
- Hiking Trails
- Hunter/Fisherman Parking Lots
- Hunter/Fisherman Boat Ramps
- Day Navigation Marker
- 22B Sedimentation Range

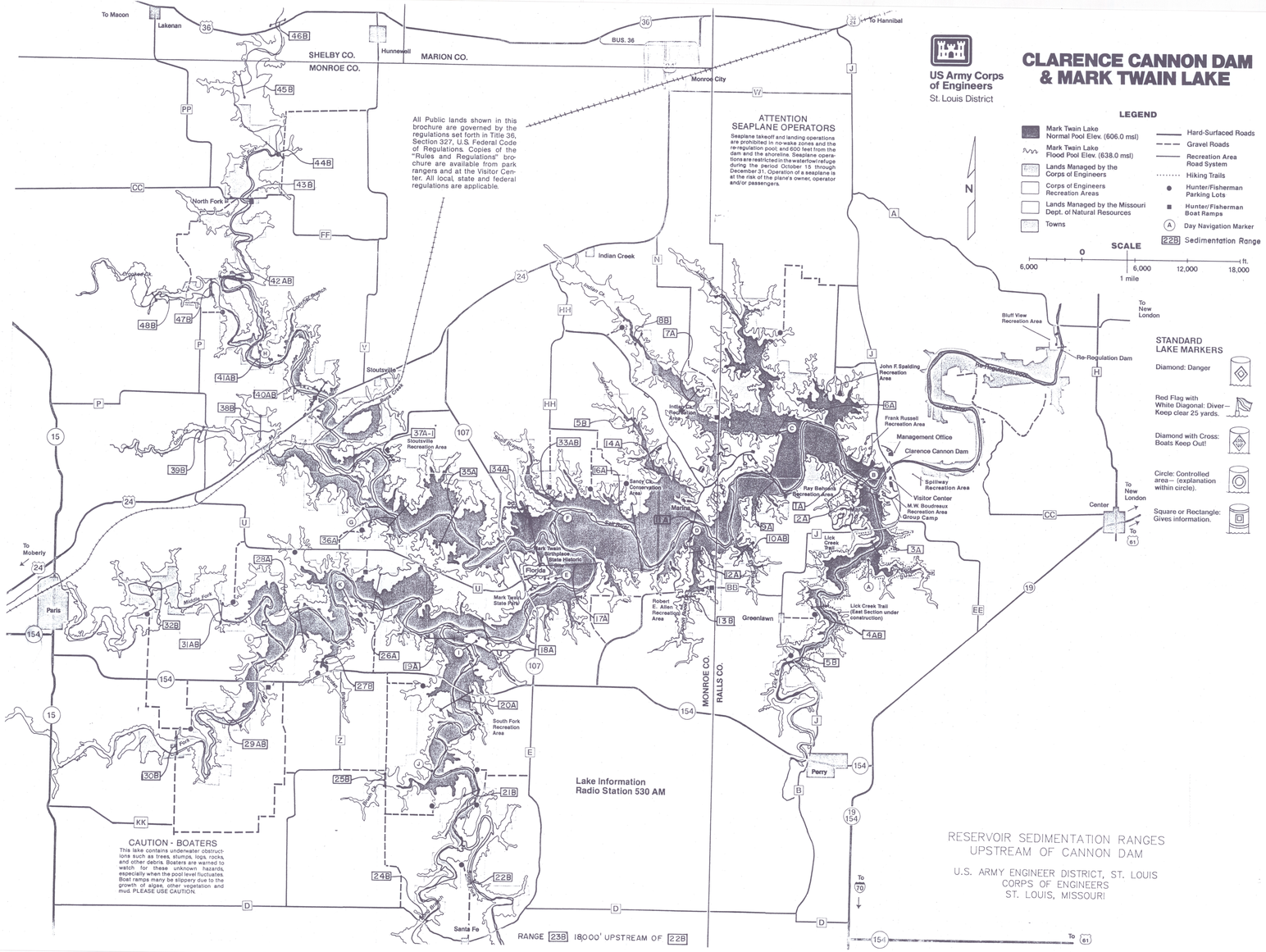
SCALE

6,000 0 6,000 12,000 18,000 ft.

1 mile

STANDARD LAKE MARKERS

- Diamond: Danger
- Red Flag with White Diagonal: Diver – Keep clear 25 yards.
- Diamond with Cross: Boats Keep Out!
- Circle: Controlled area – (explanation within circle).
- Square or Rectangle: Gives information.



CAUTION - BOATERS

This lake contains underwater obstructions such as trees, stumps, logs, rocks, and other debris. Boaters are warned to watch for these unknown hazards, especially when the pool level fluctuates. Boat ramps many be slippery due to the growth of algae, other vegetation and mud. PLEASE USE CAUTION.

RESERVOIR SEDIMENTATION RANGES
UPSTREAM OF CANNON DAM

U.S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

APPENDIX A

1982 AND 1987 SEDIMENTATION RANGES

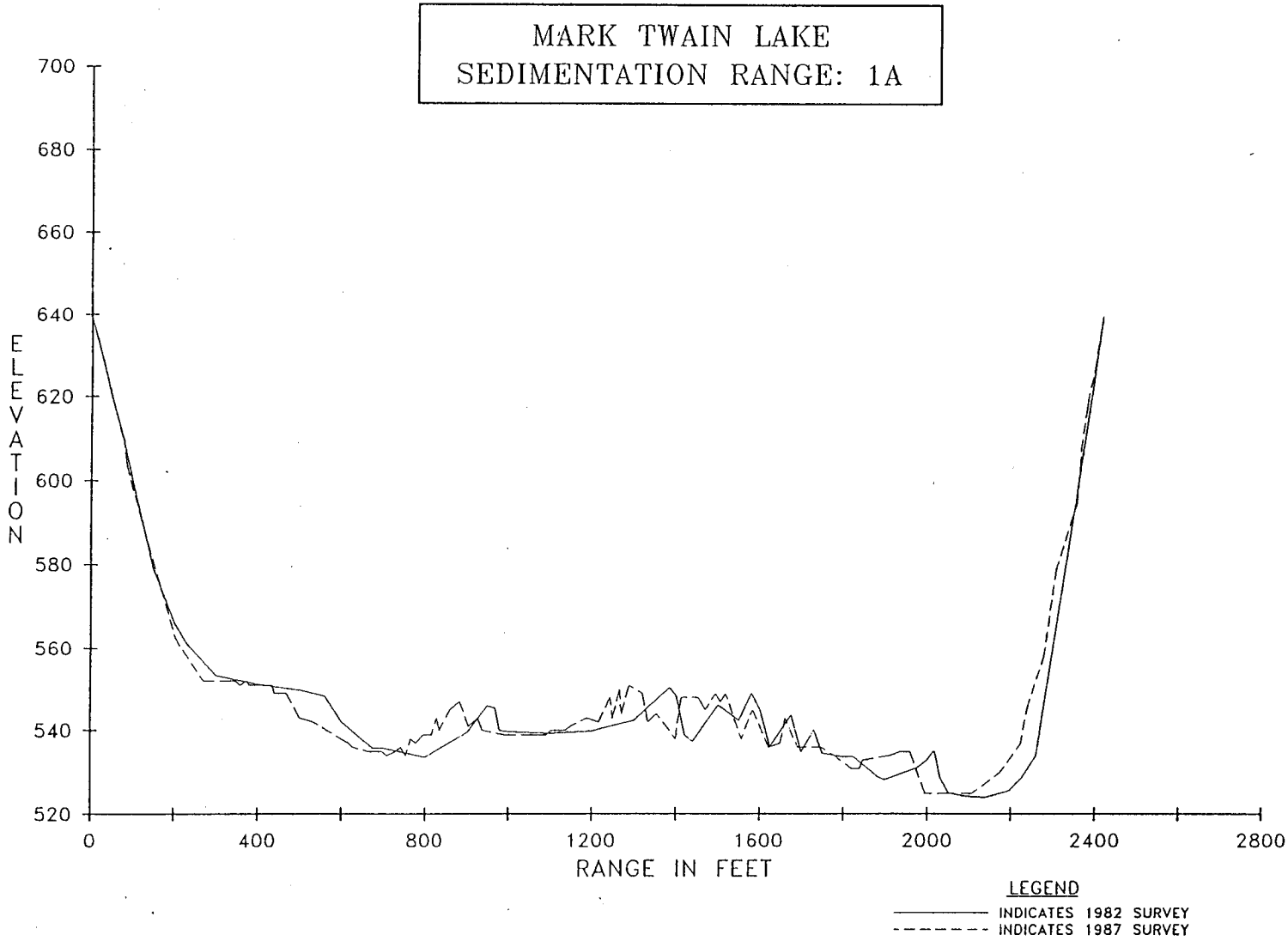

MARK TWAIN LAKE
SEDIMENTATION RANGE: 1A
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 6

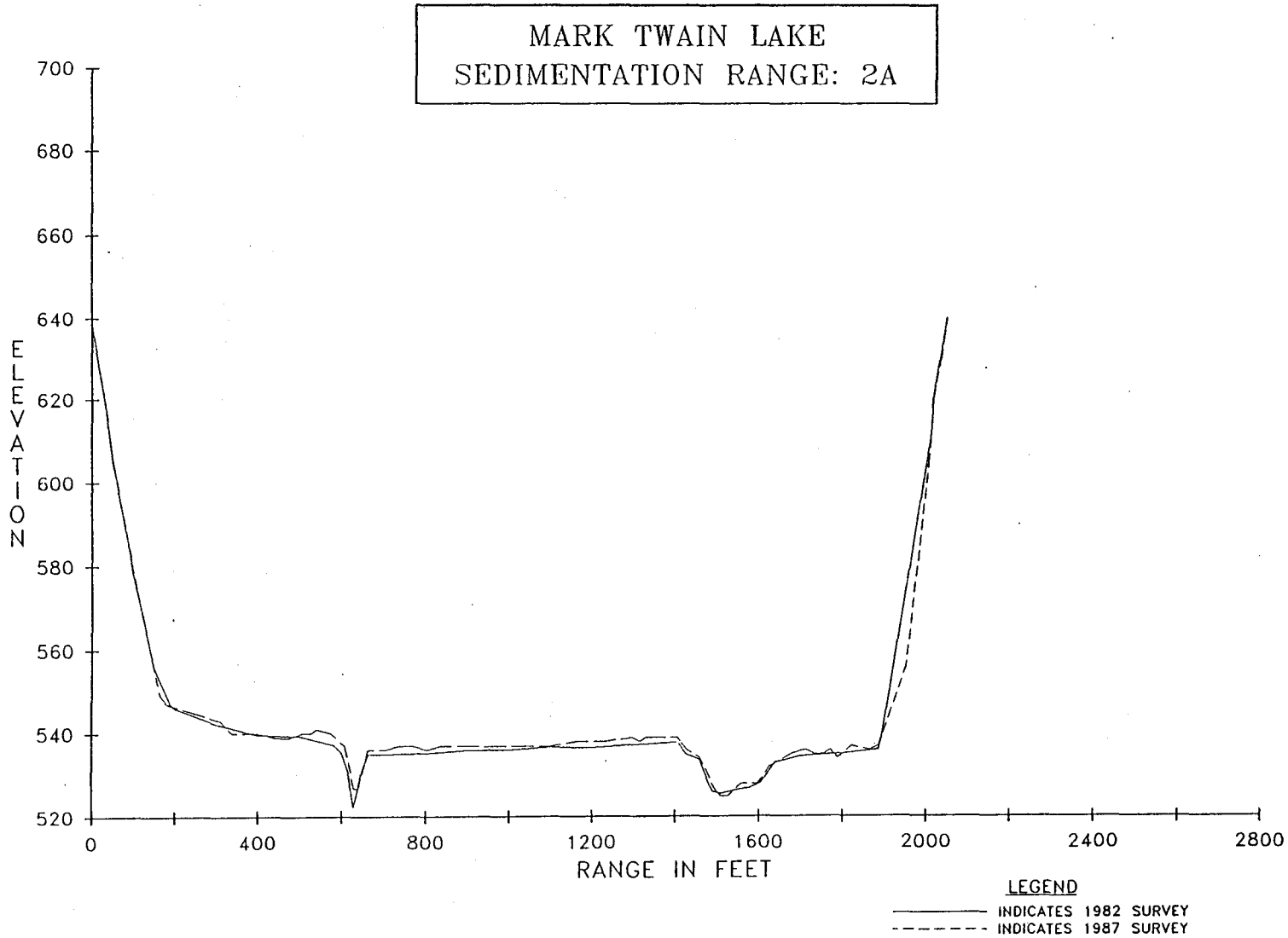

MARK TWAIN LAKE
SEDIMENTATION RANGE: 2A
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 7

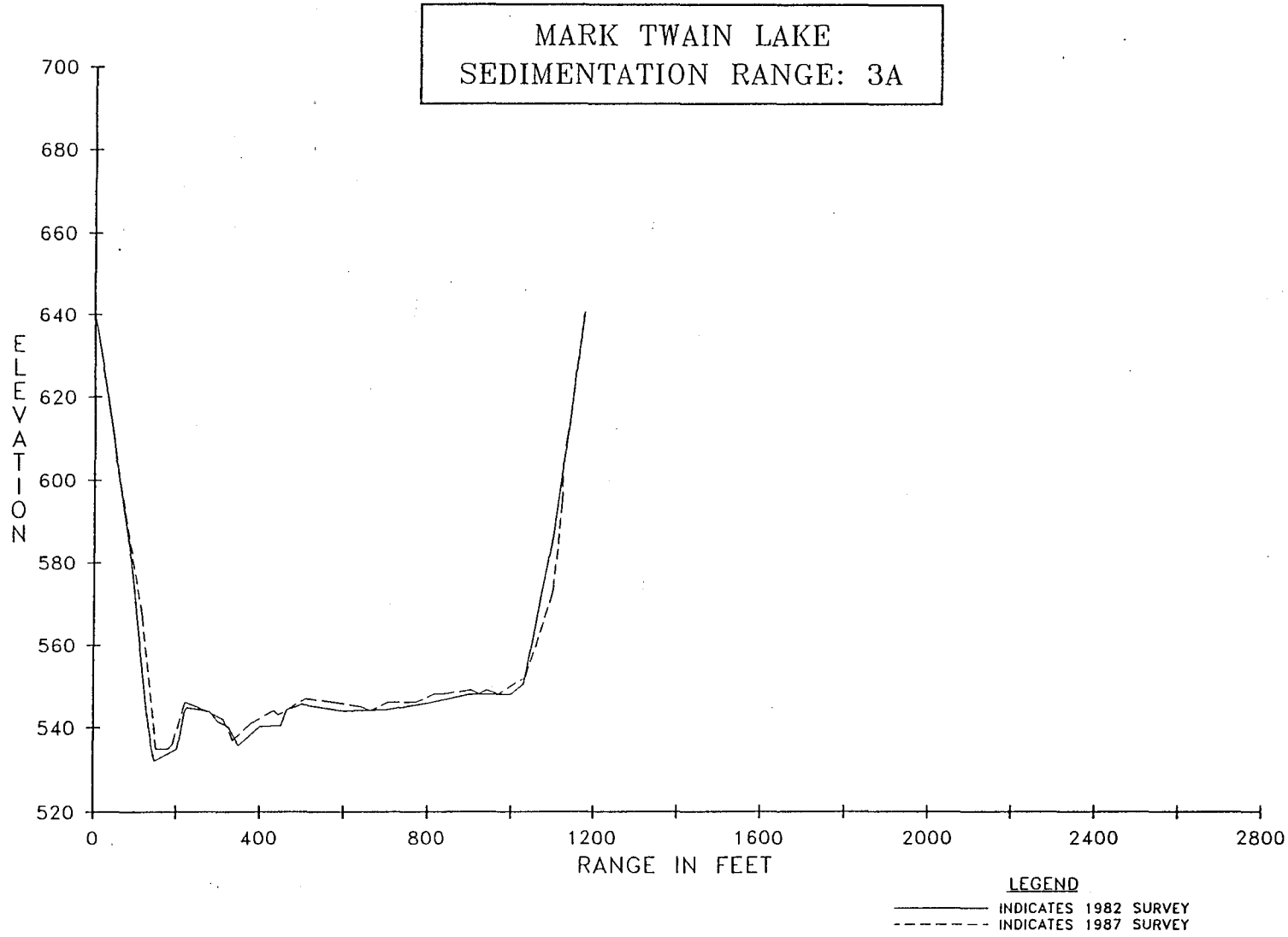

MARK TWAIN LAKE
SEDIMENTATION RANGE: 3A
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 8

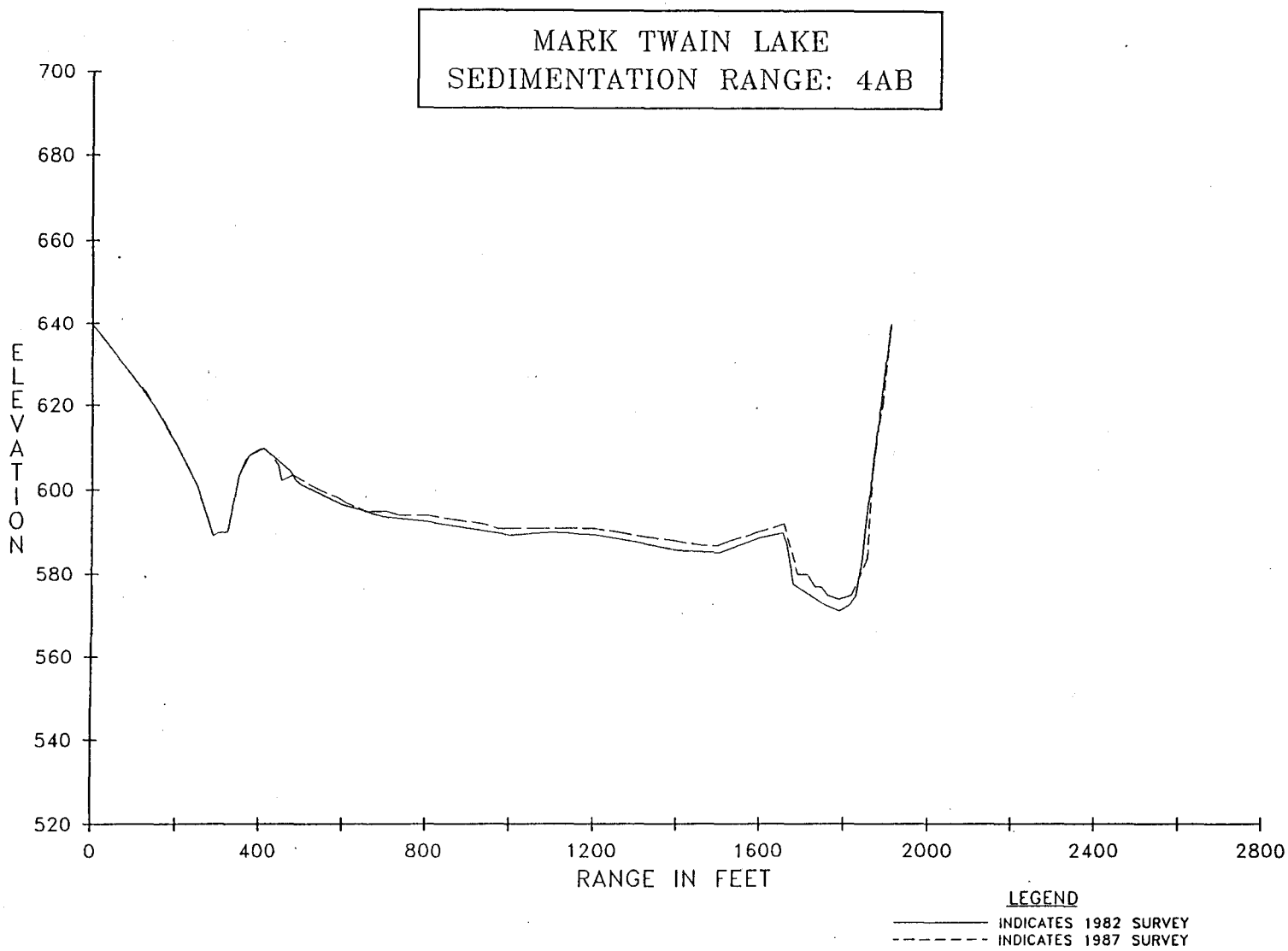

MARK TWAIN LAKE
SEDIMENTATION RANGE: 4AB
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 9

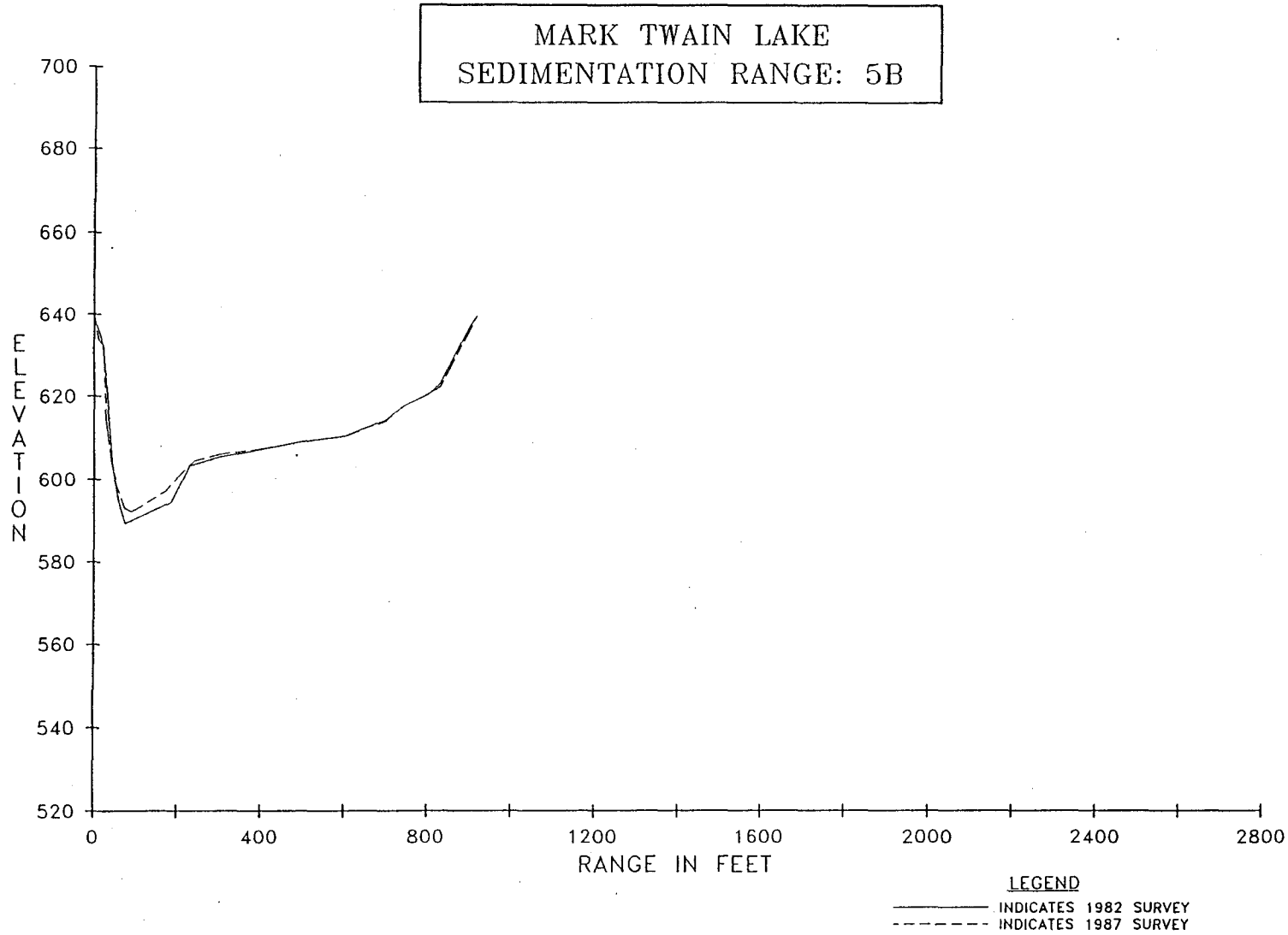

MARK TWAIN LAKE
SEDIMENTATION RANGE: 5B
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 10

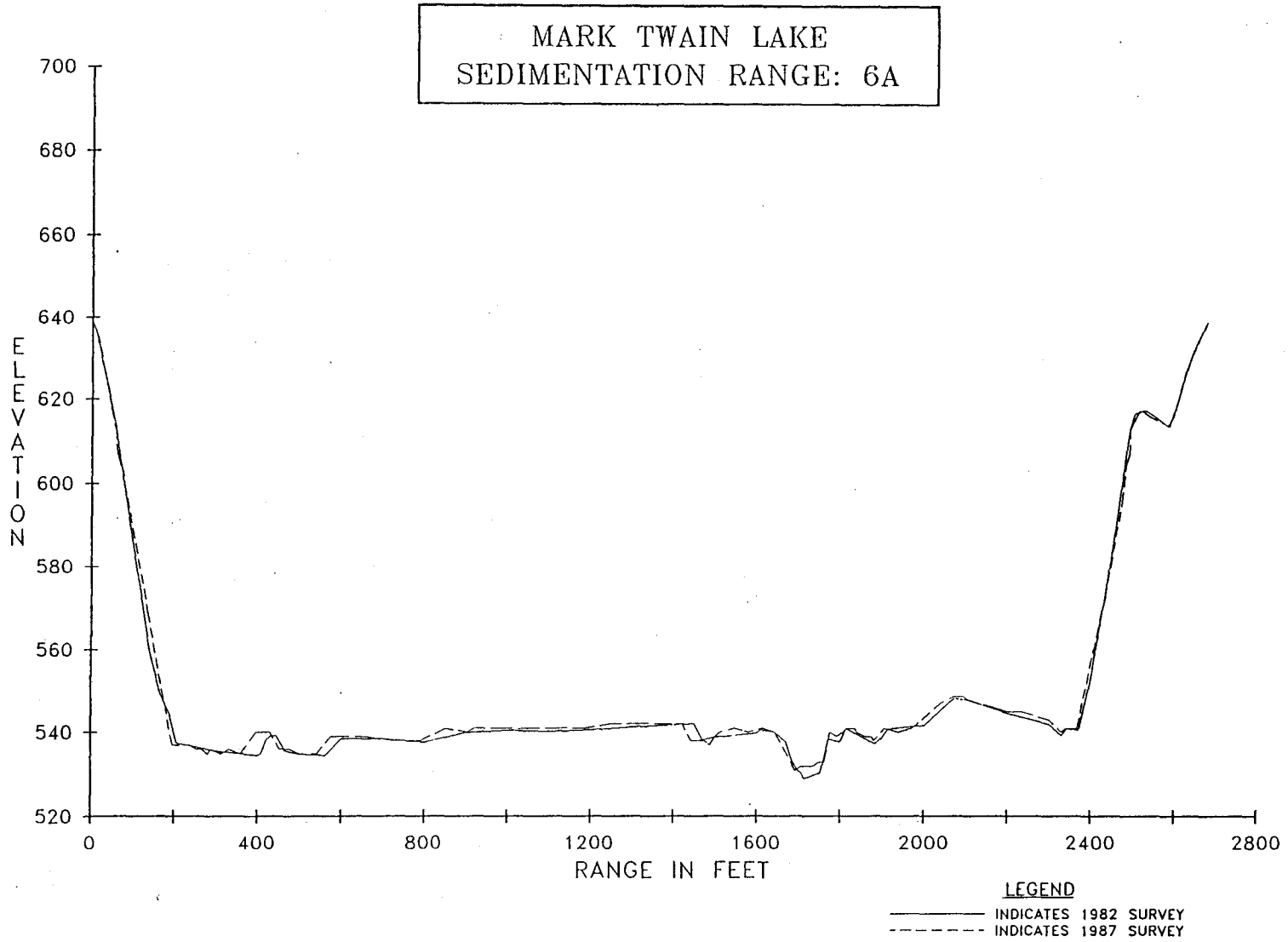

MARK TWAIN LAKE
SEDIMENTATION RANGE: 6A
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 11

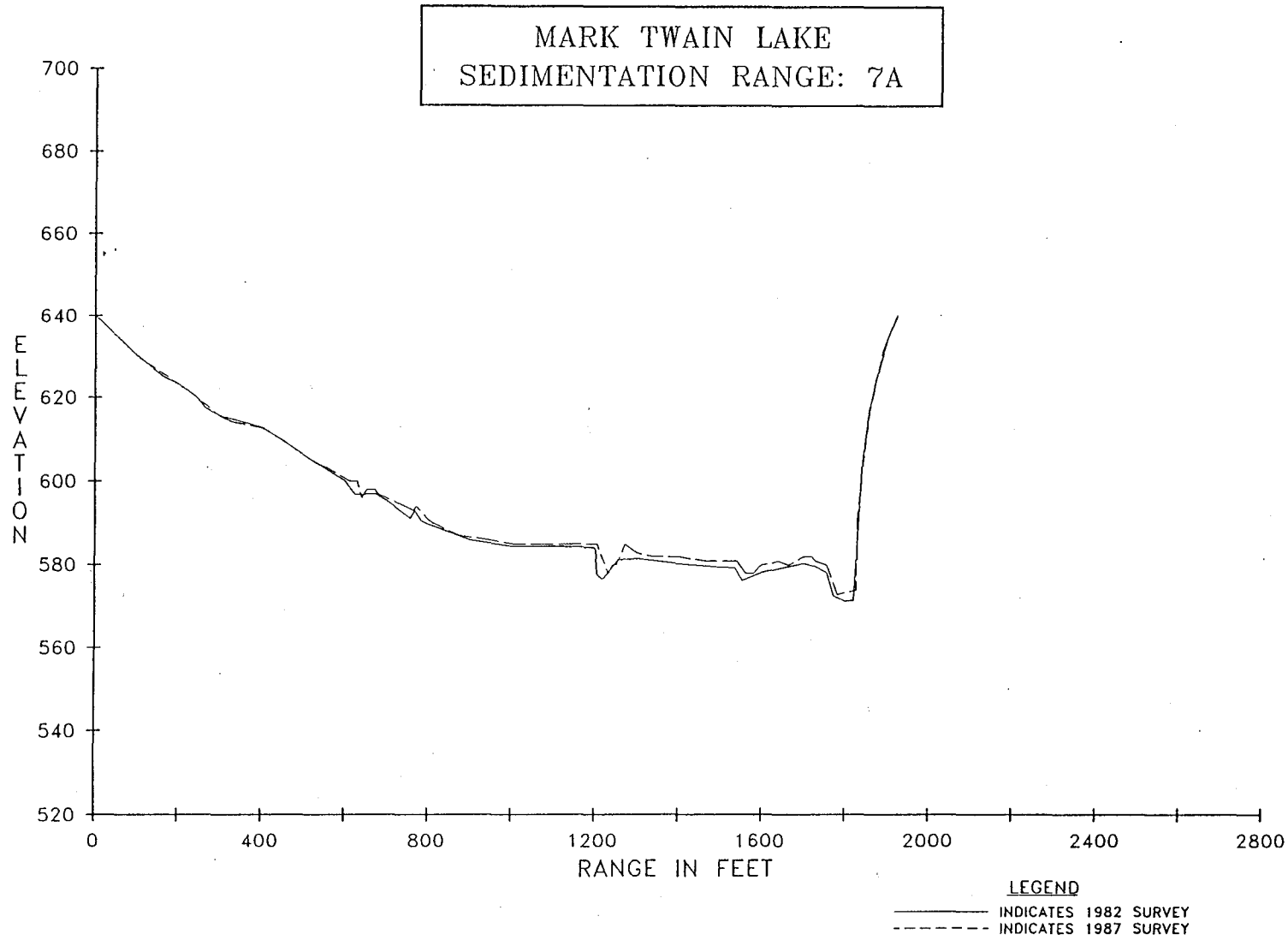

MARK TWAIN LAKE
SEDIMENTATION RANGE: 7A
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 12

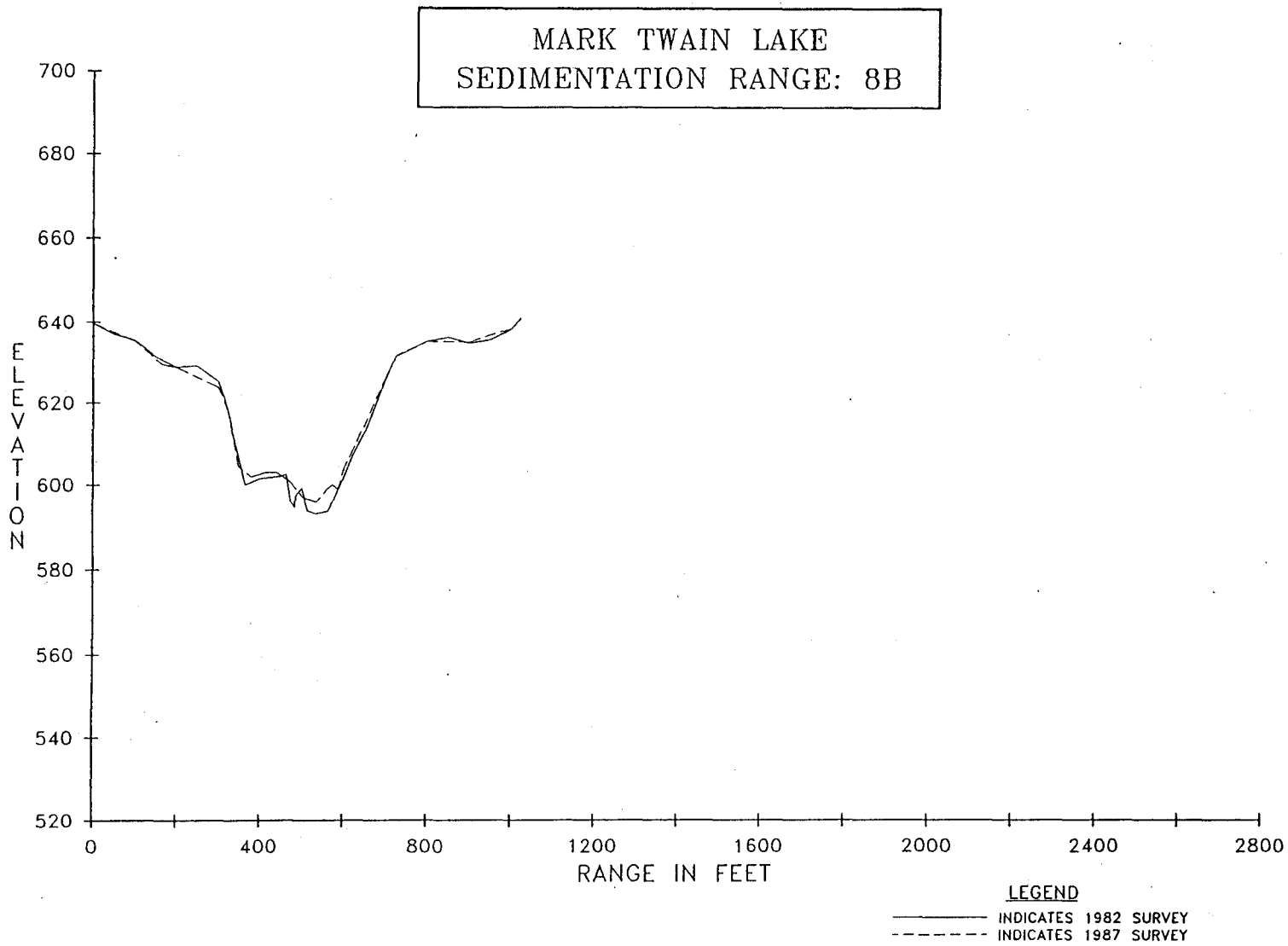

MARK TWAIN LAKE
SEDIMENTATION RANGE: 8B
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 13

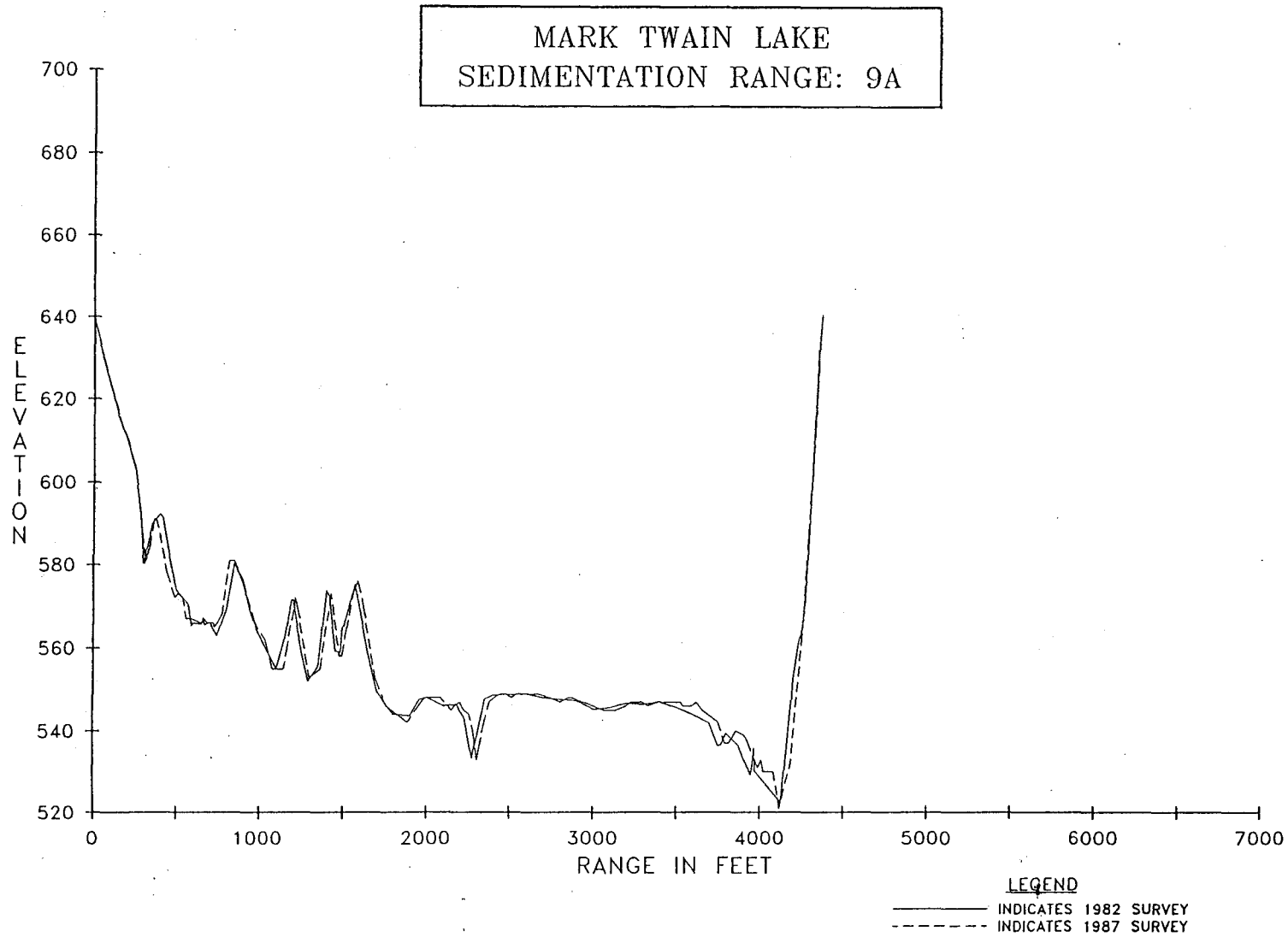

MARK TWAIN LAKE
SEDIMENTATION RANGE: 9A
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
1000
2000
3000
4000
5000
6000
7000
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 14

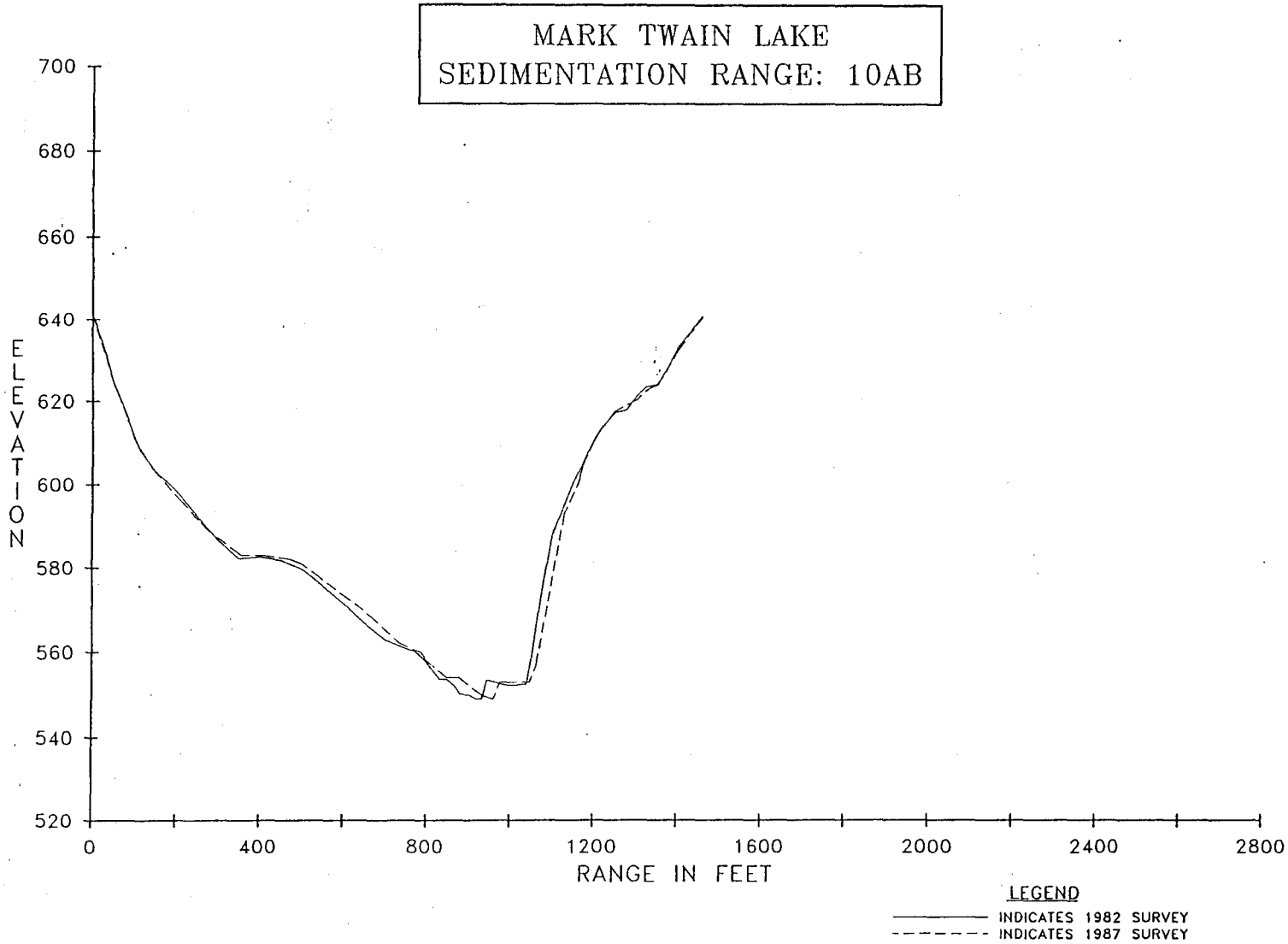

MARK TWAIN LAKE
SEDIMENTATION RANGE: 10AB
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 15

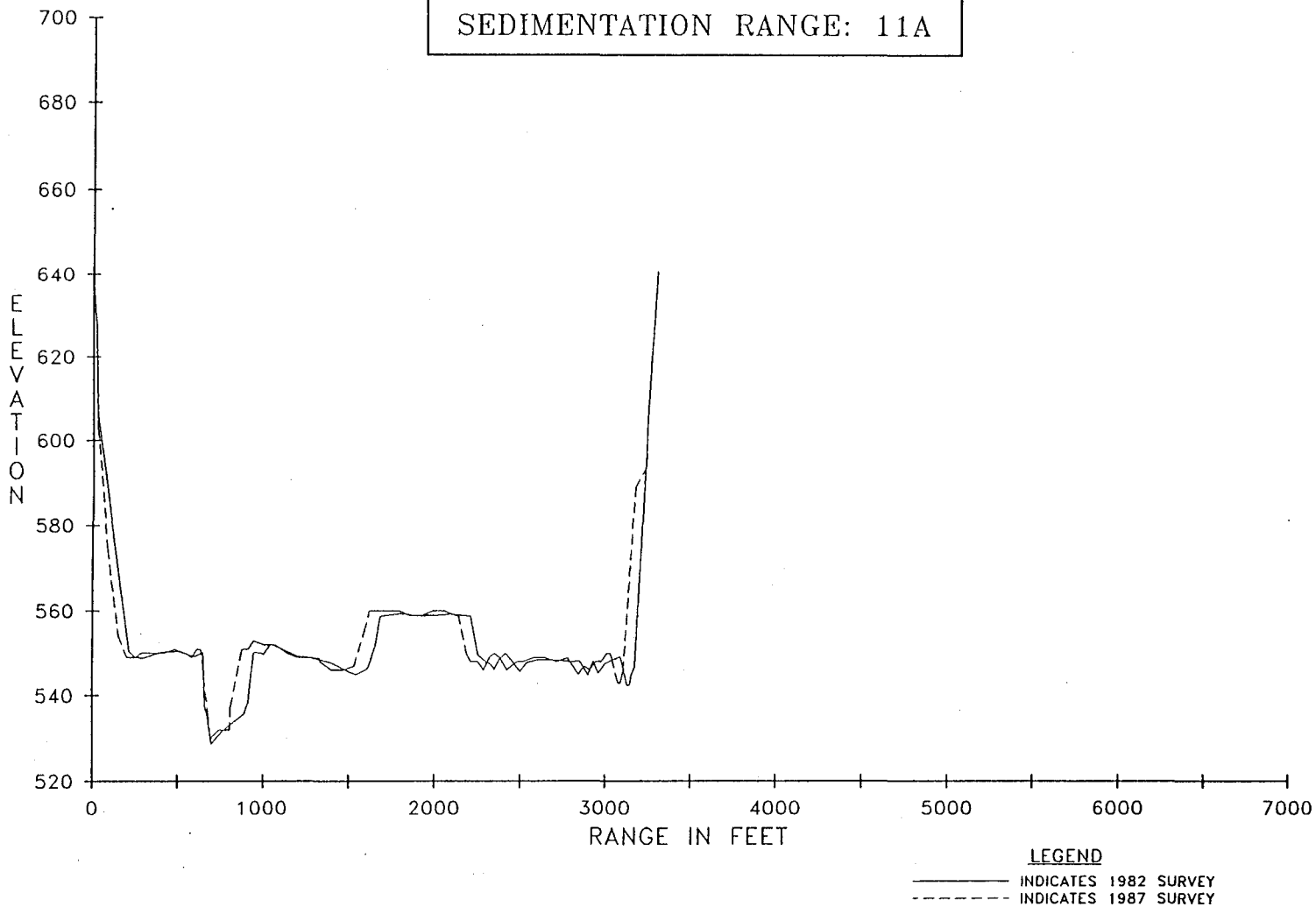

MARK TWAIN LAKE
SEDIMENTATION RANGE: 11A
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
1000
2000
3000
4000
5000
6000
7000
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 16

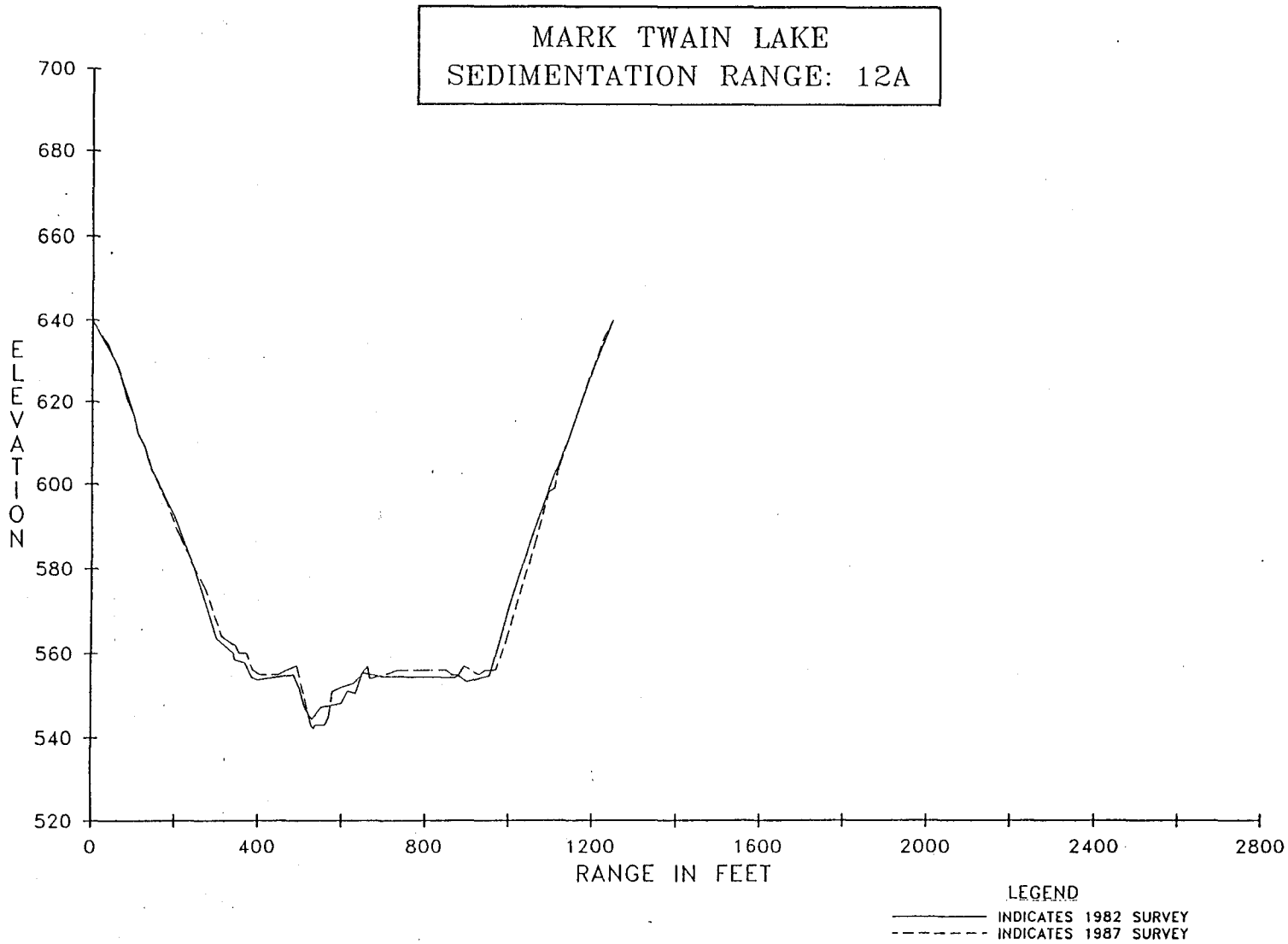

MARK TWAIN LAKE
SEDIMENTATION RANGE: 12A
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 17

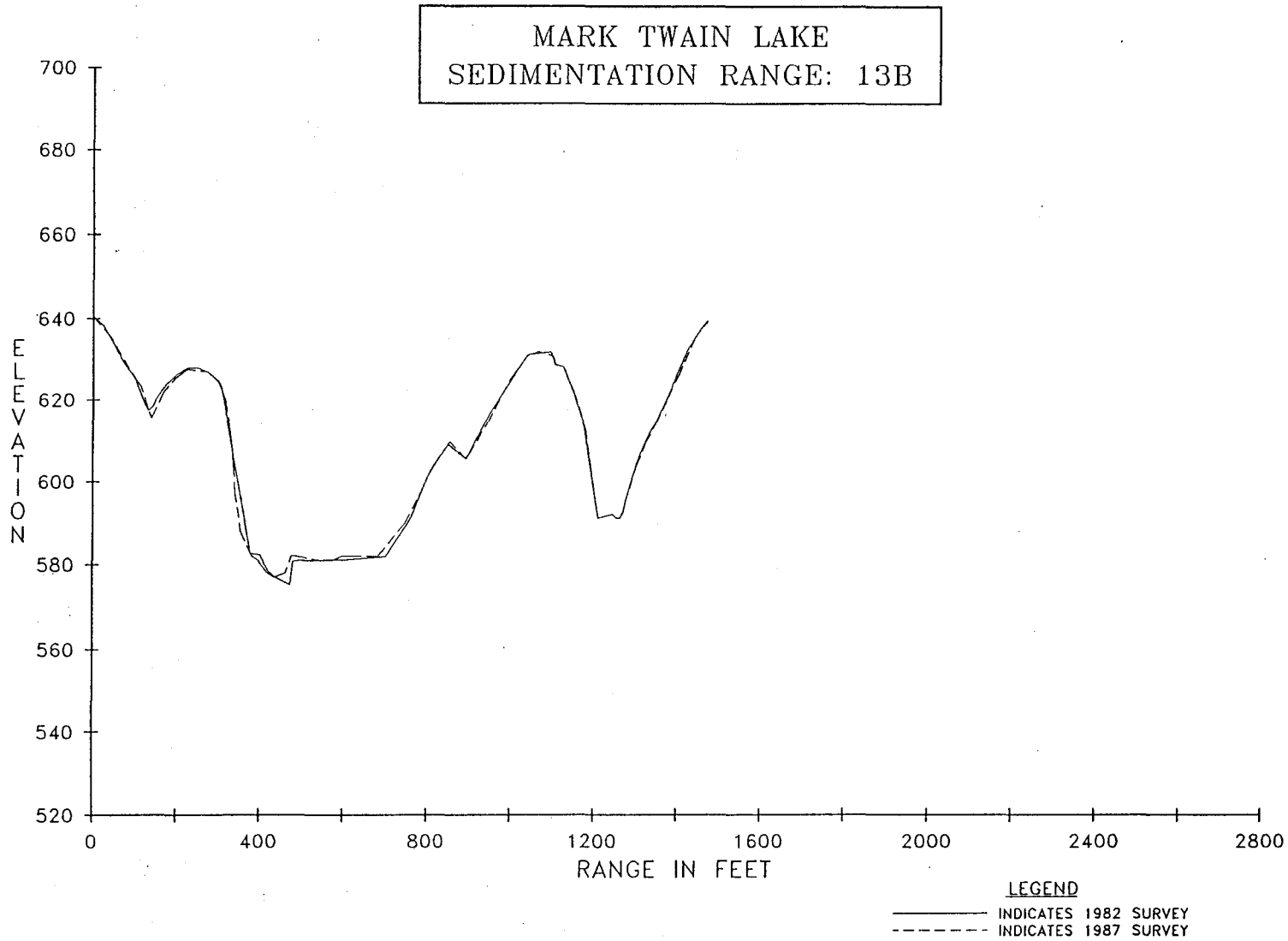

MARK TWAIN LAKE
SEDIMENTATION RANGE: 13B
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 18

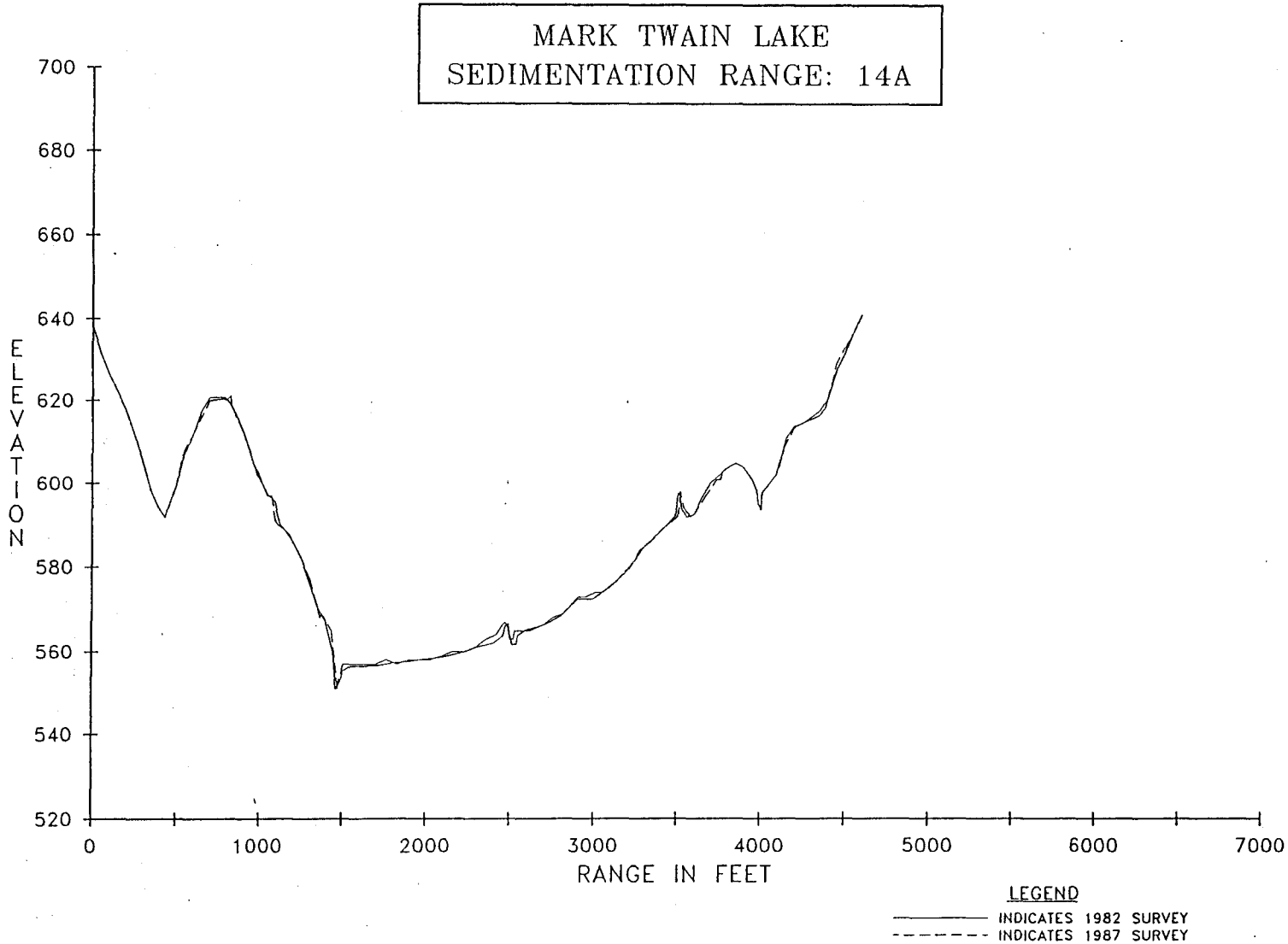

MARK TWAIN LAKE
SEDIMENTATION RANGE: 14A
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
1000
2000
3000
4000
5000
6000
7000
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 19

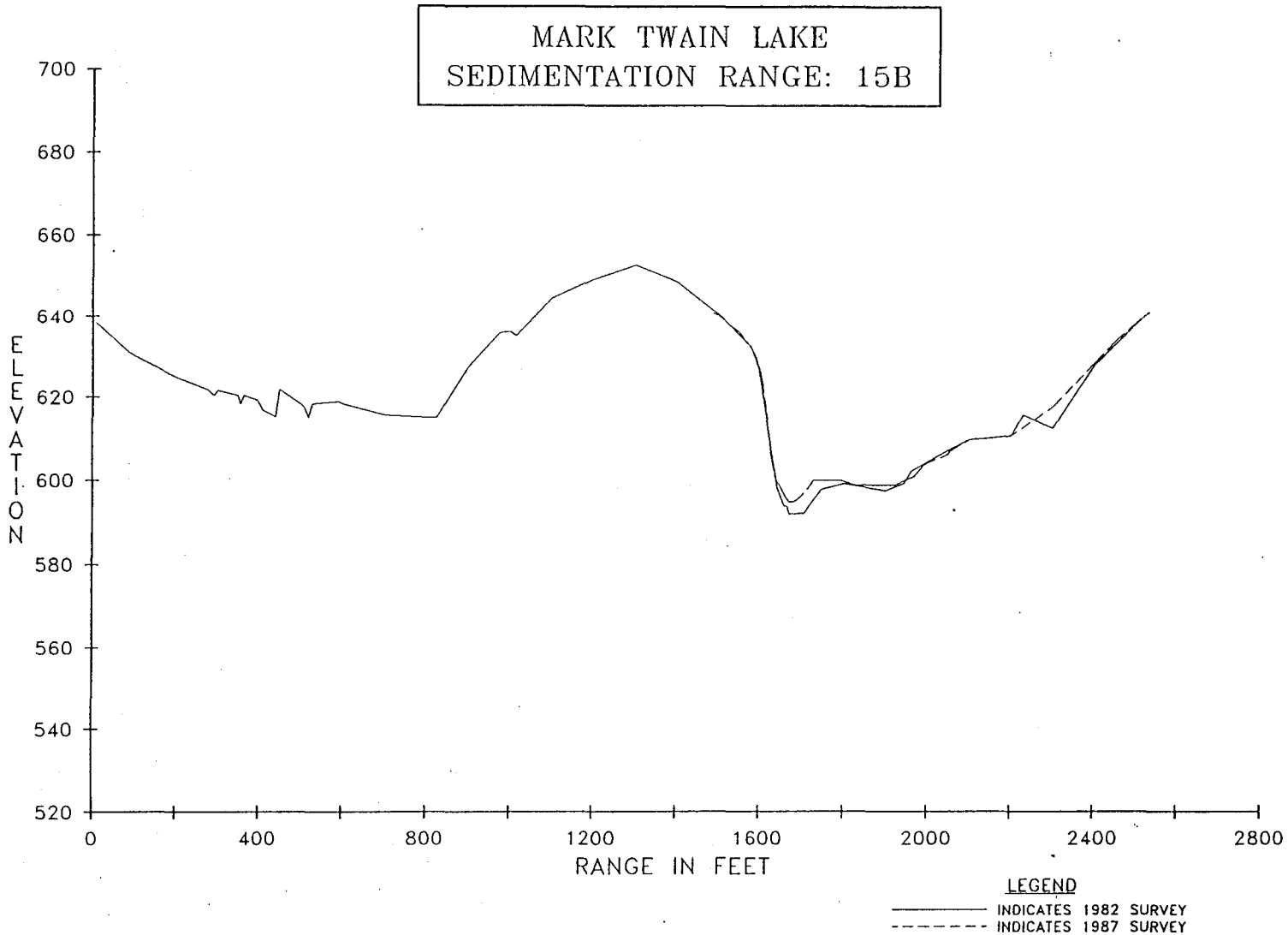

MARK TWAIN LAKE
SEDIMENTATION RANGE: 15B
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 20

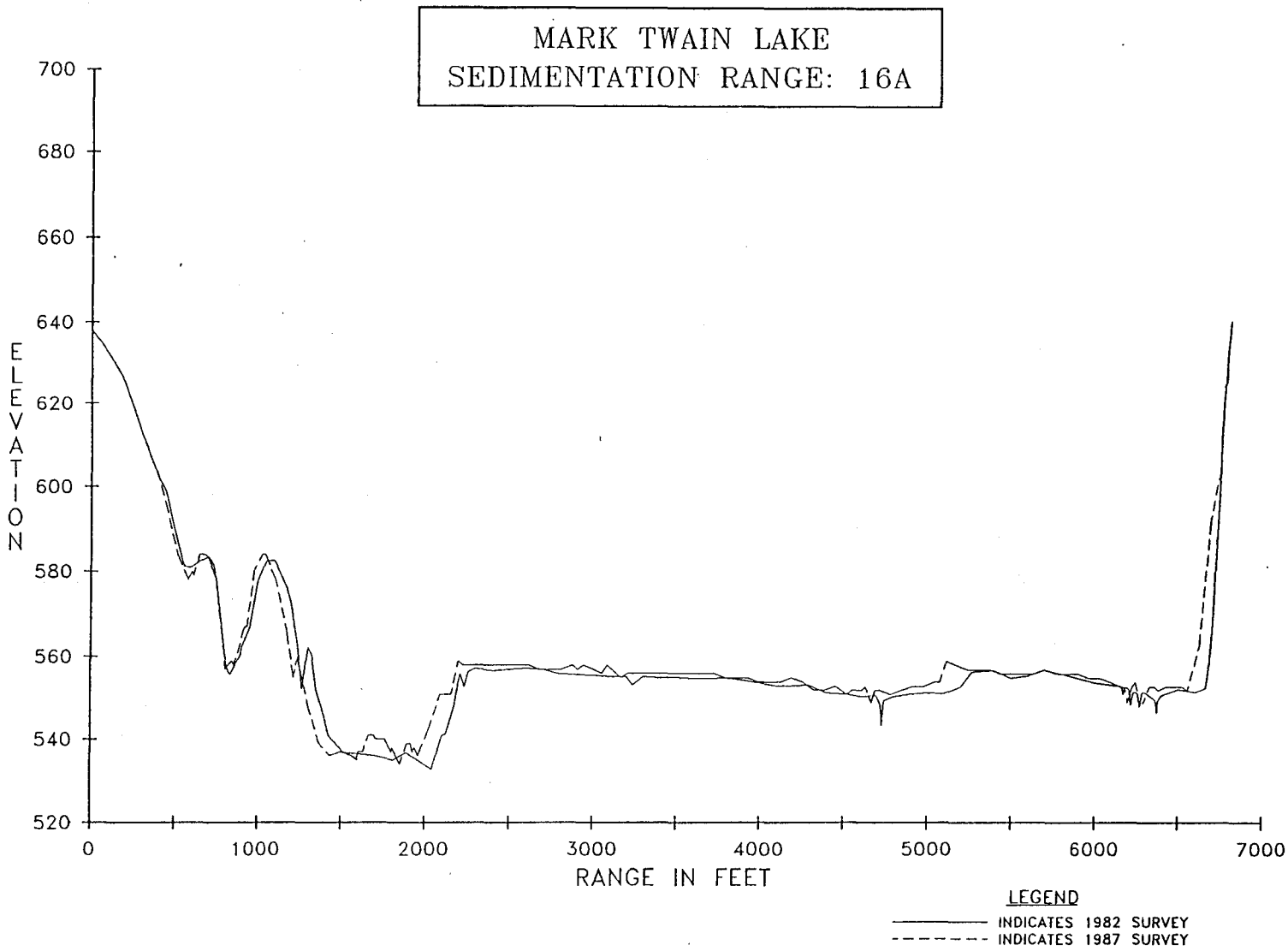

MARK TWAIN LAKE
SEDIMENTATION RANGE: 16A
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
1000
2000
3000
4000
5000
6000
7000
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 21

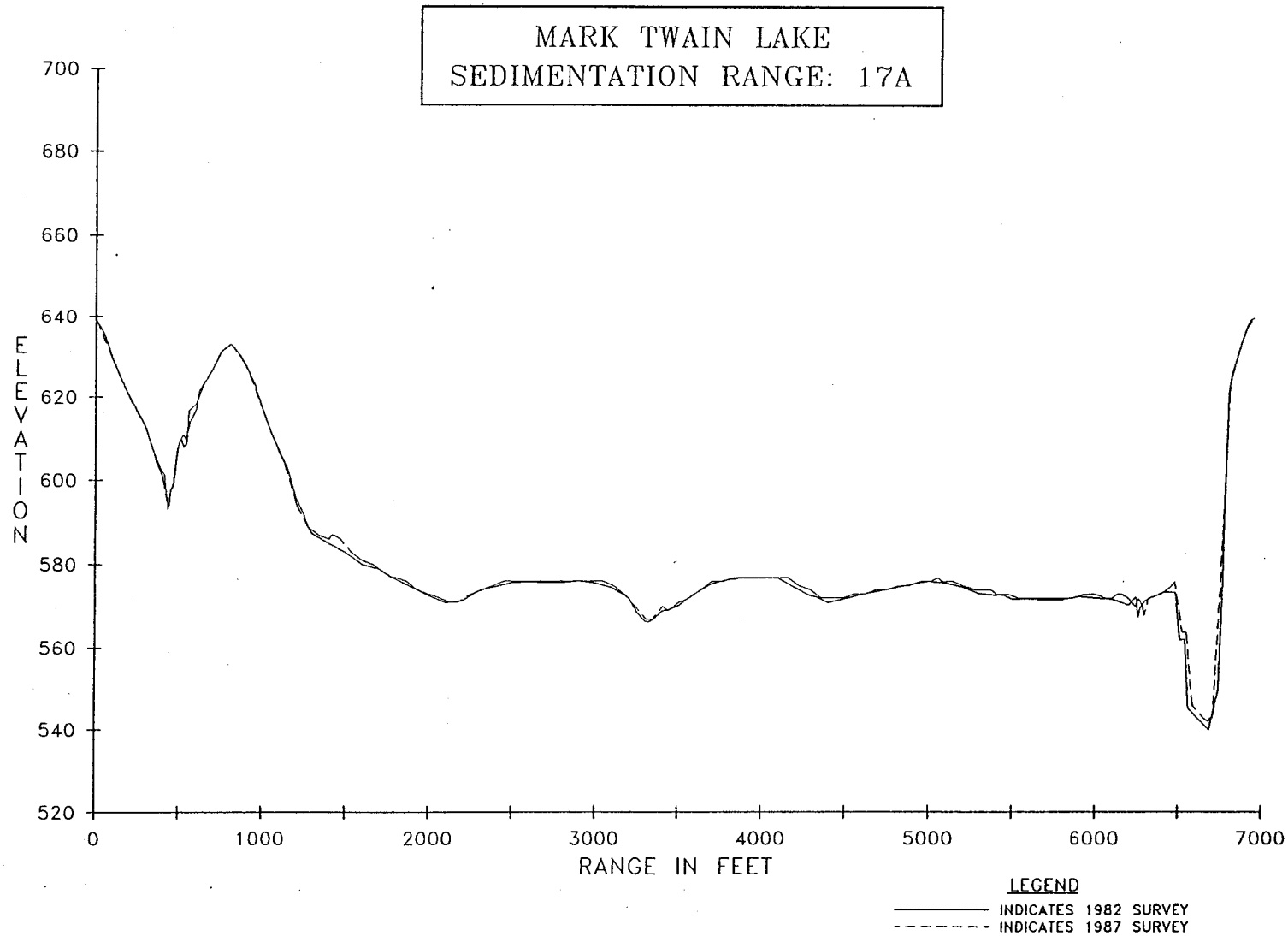

MARK TWAIN LAKE
SEDIMENTATION RANGE: 17A
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
1000
2000
3000
4000
5000
6000
7000
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 22

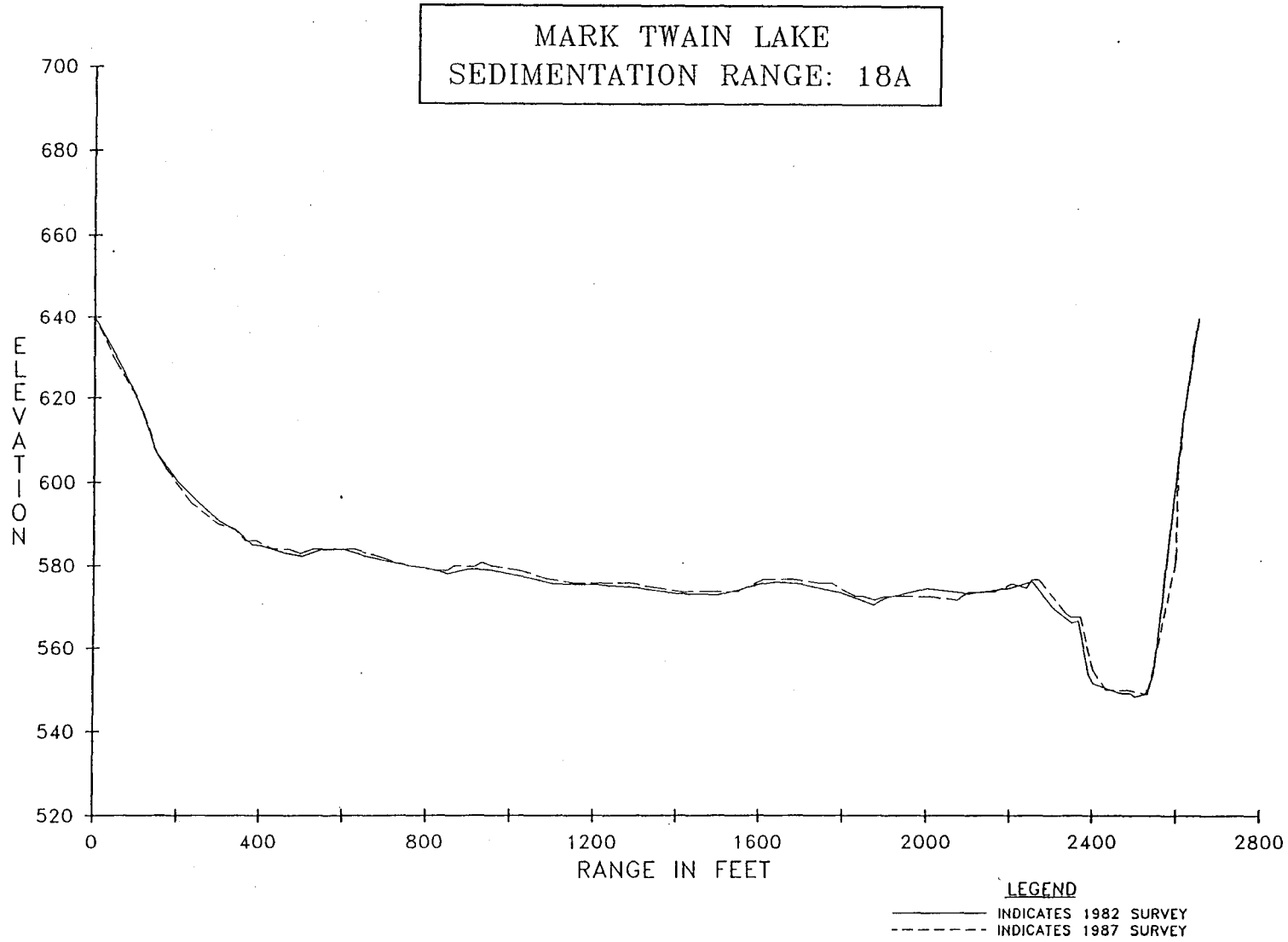

MARK TWAIN LAKE
SEDIMENTATION RANGE: 18A
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 23

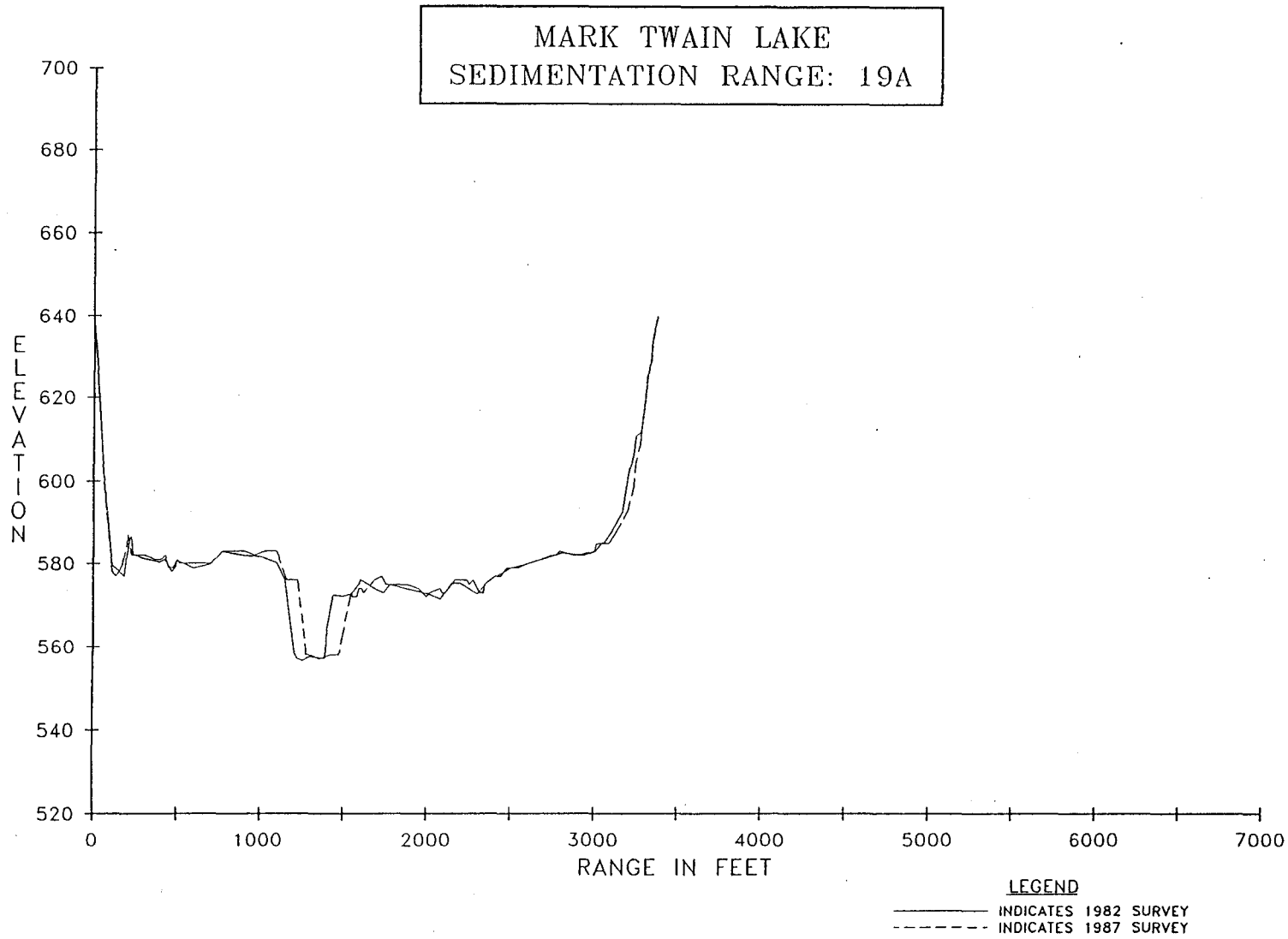

MARK TWAIN LAKE
SEDIMENTATION RANGE: 19A
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
1000
2000
3000
4000
5000
6000
7000
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 24

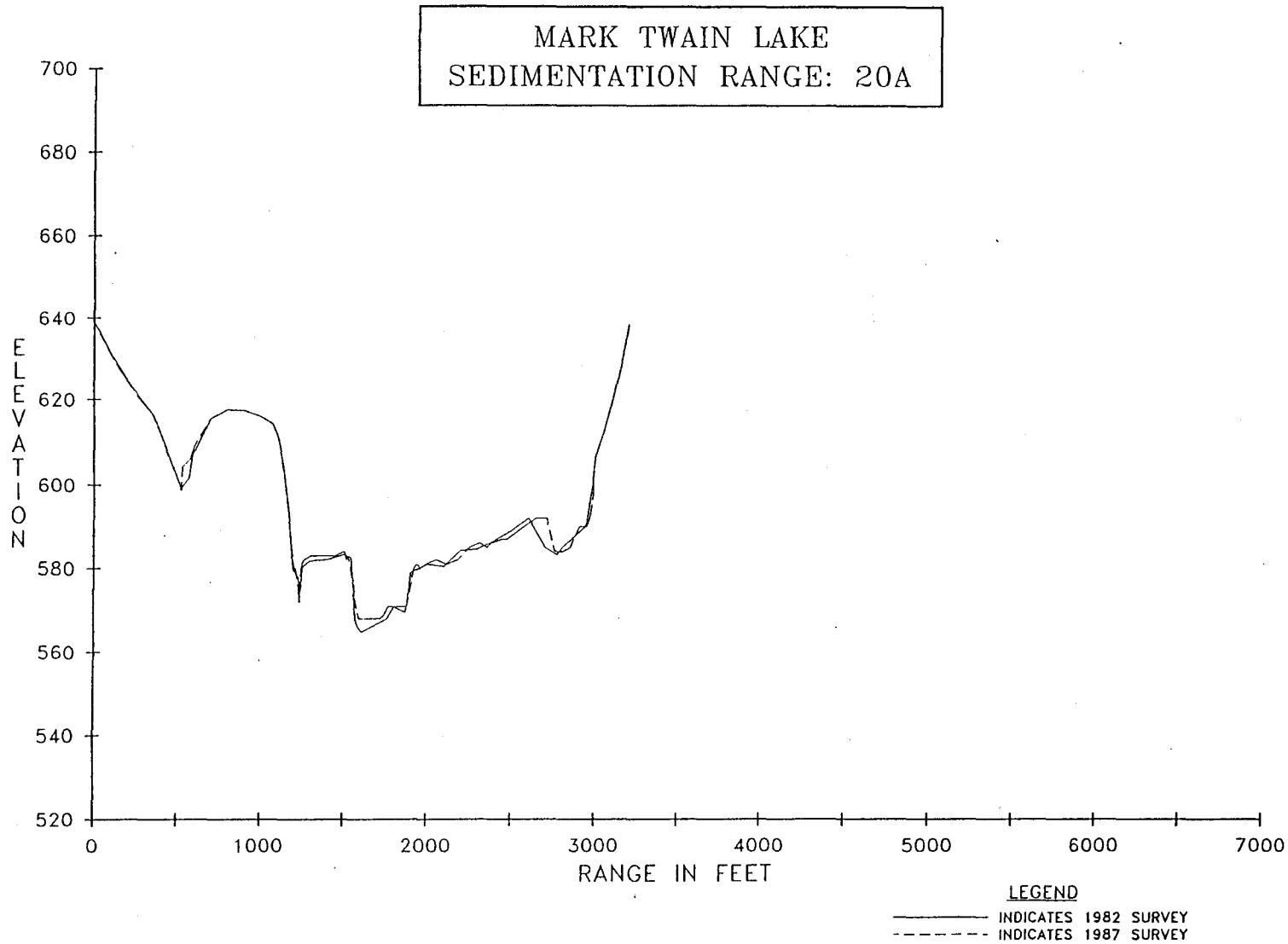

MARK TWAIN LAKE
SEDIMENTATION RANGE: 20A
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
1000
2000
3000
4000
5000
6000
7000
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 25

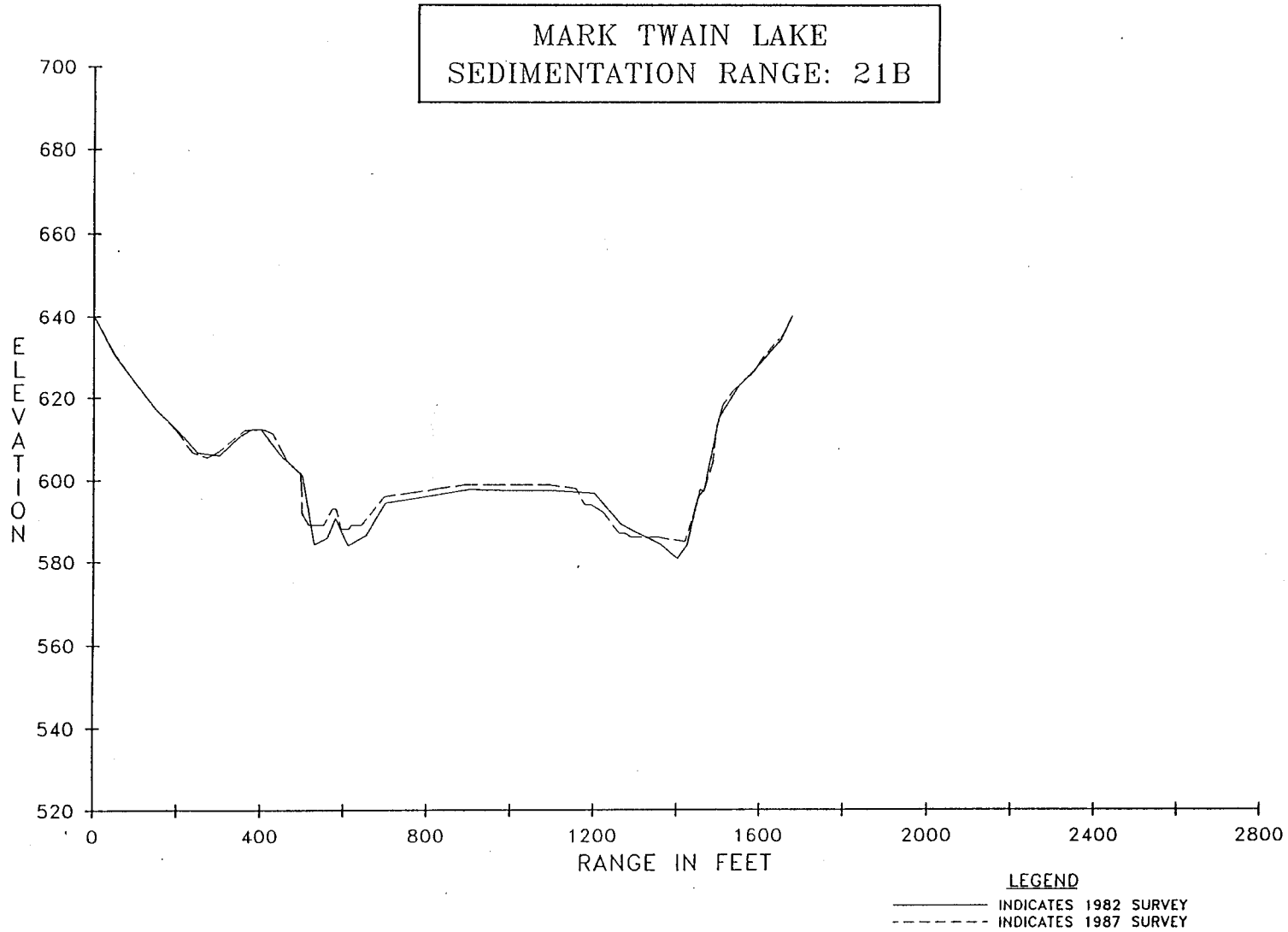

MARK TWAIN LAKE
SEDIMENTATION RANGE: 21B
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 26

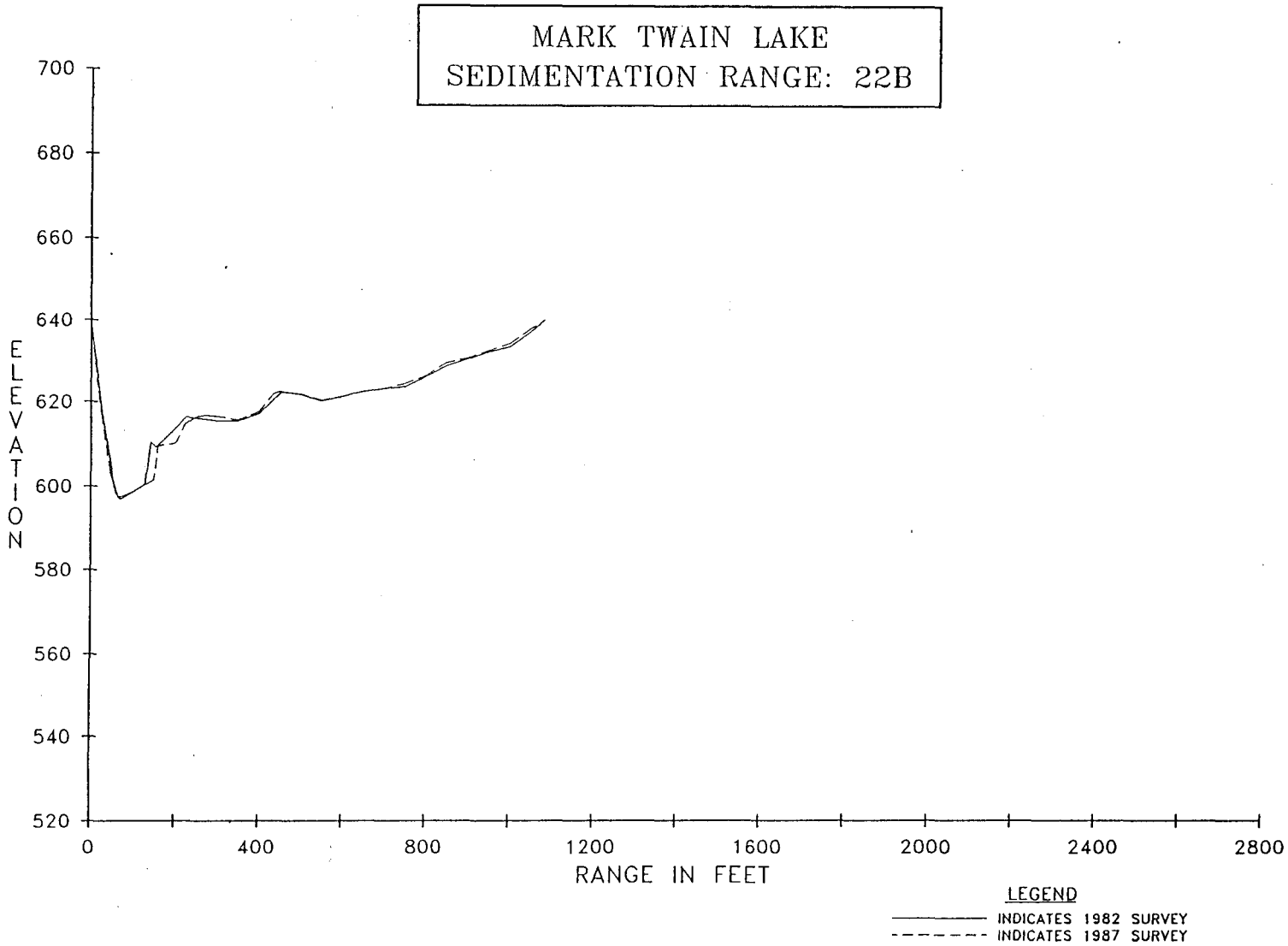

MARK TWAIN LAKE
SEDIMENTATION RANGE: 22B
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 27

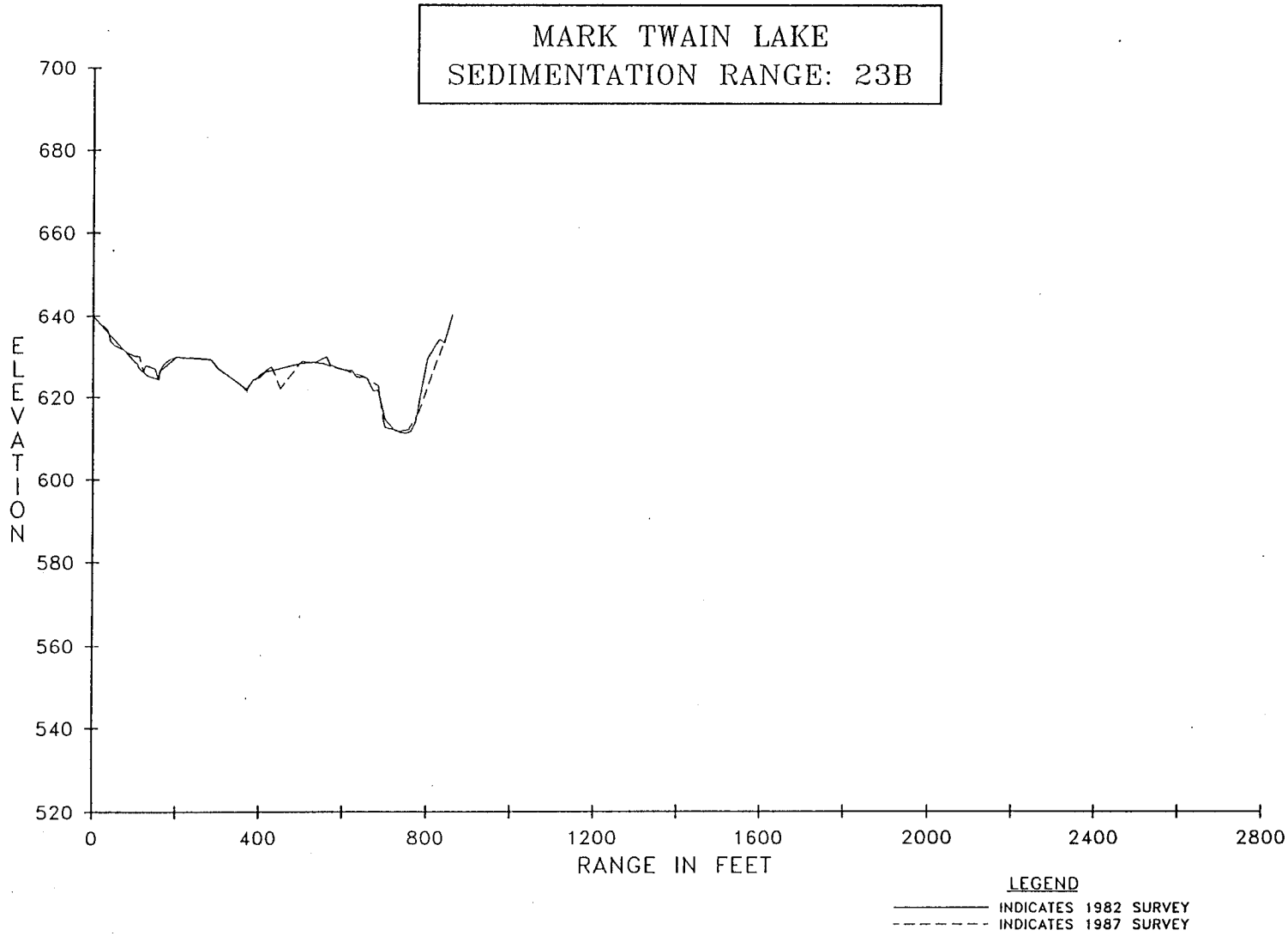

MARK TWAIN LAKE
SEDIMENTATION RANGE: 23B
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 28

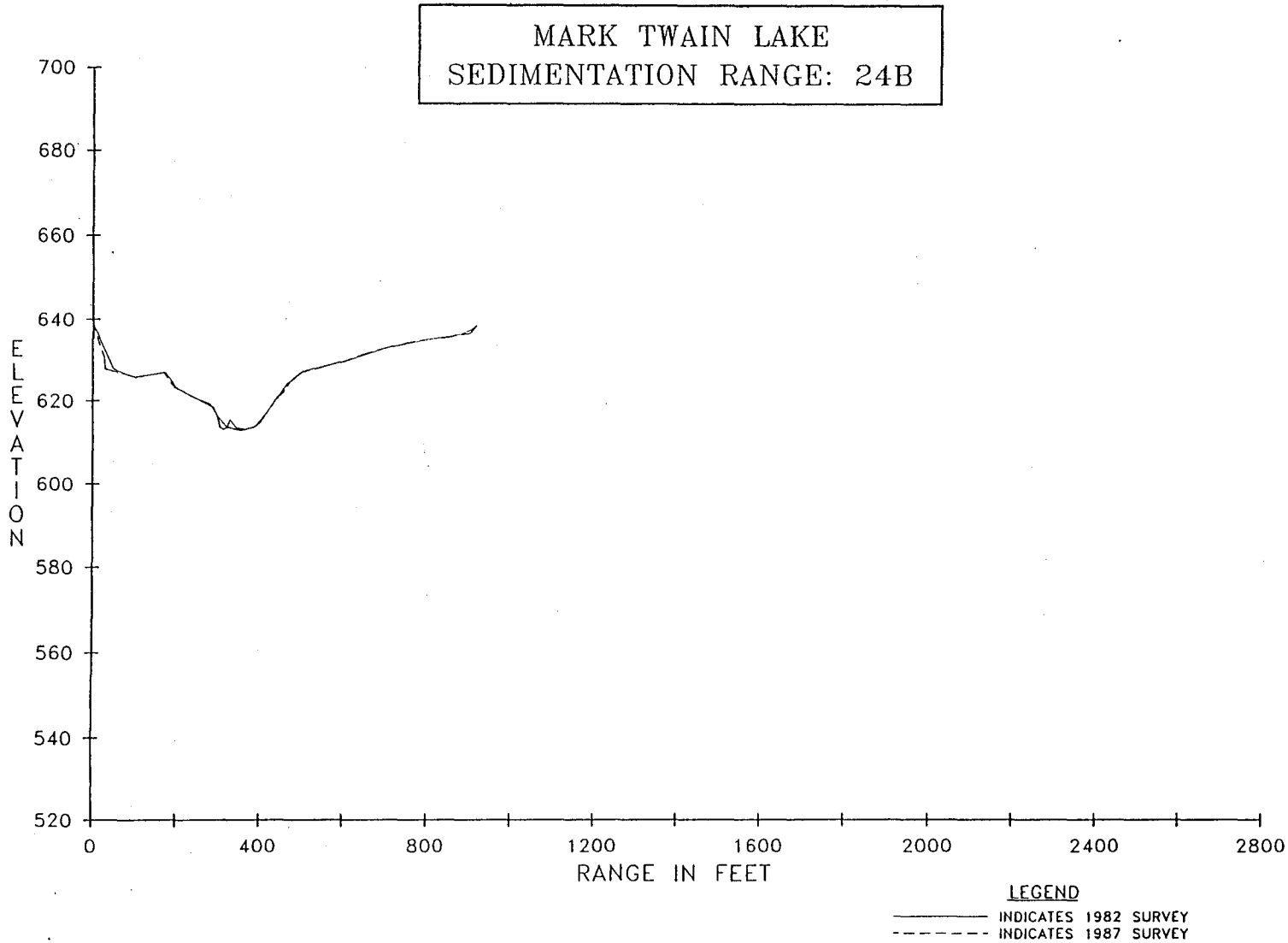

MARK TWAIN LAKE
SEDIMENTATION RANGE: 24B
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 29

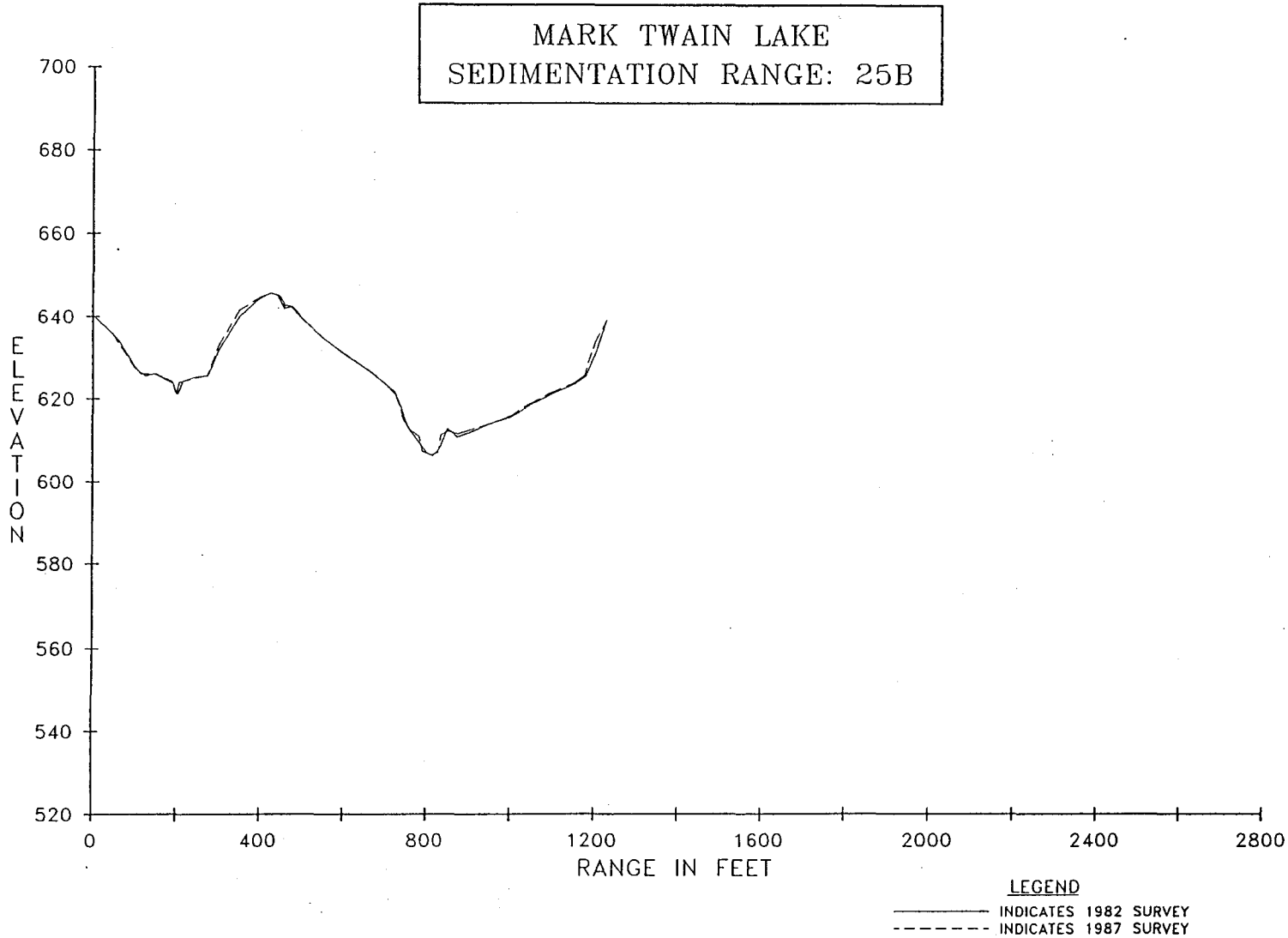

MARK TWAIN LAKE
SEDIMENTATION RANGE: 25B
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 30

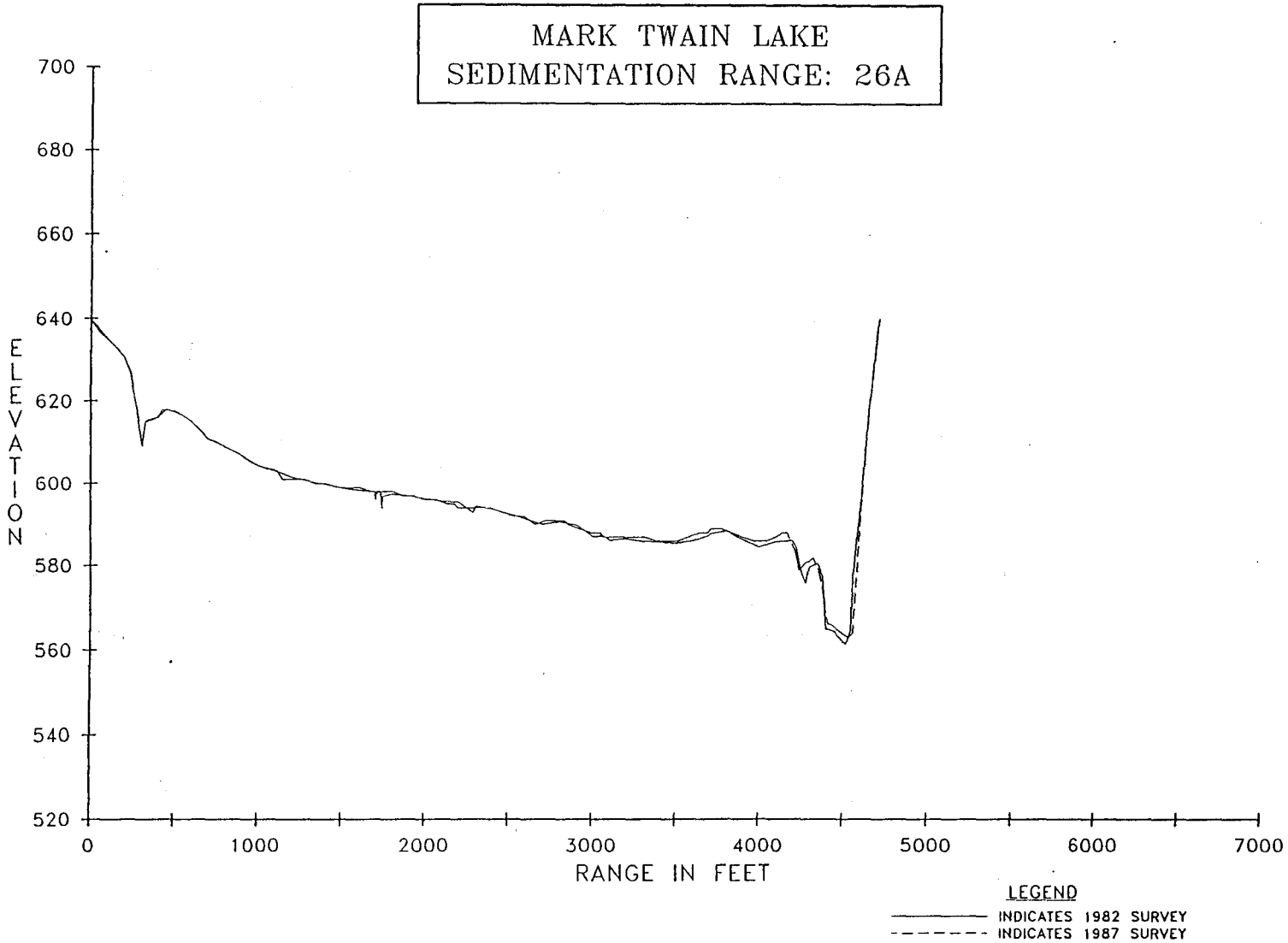

MARK TWAIN LAKE
SEDIMENTATION RANGE: 26A
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
1000
2000
3000
4000
5000
6000
7000
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 31

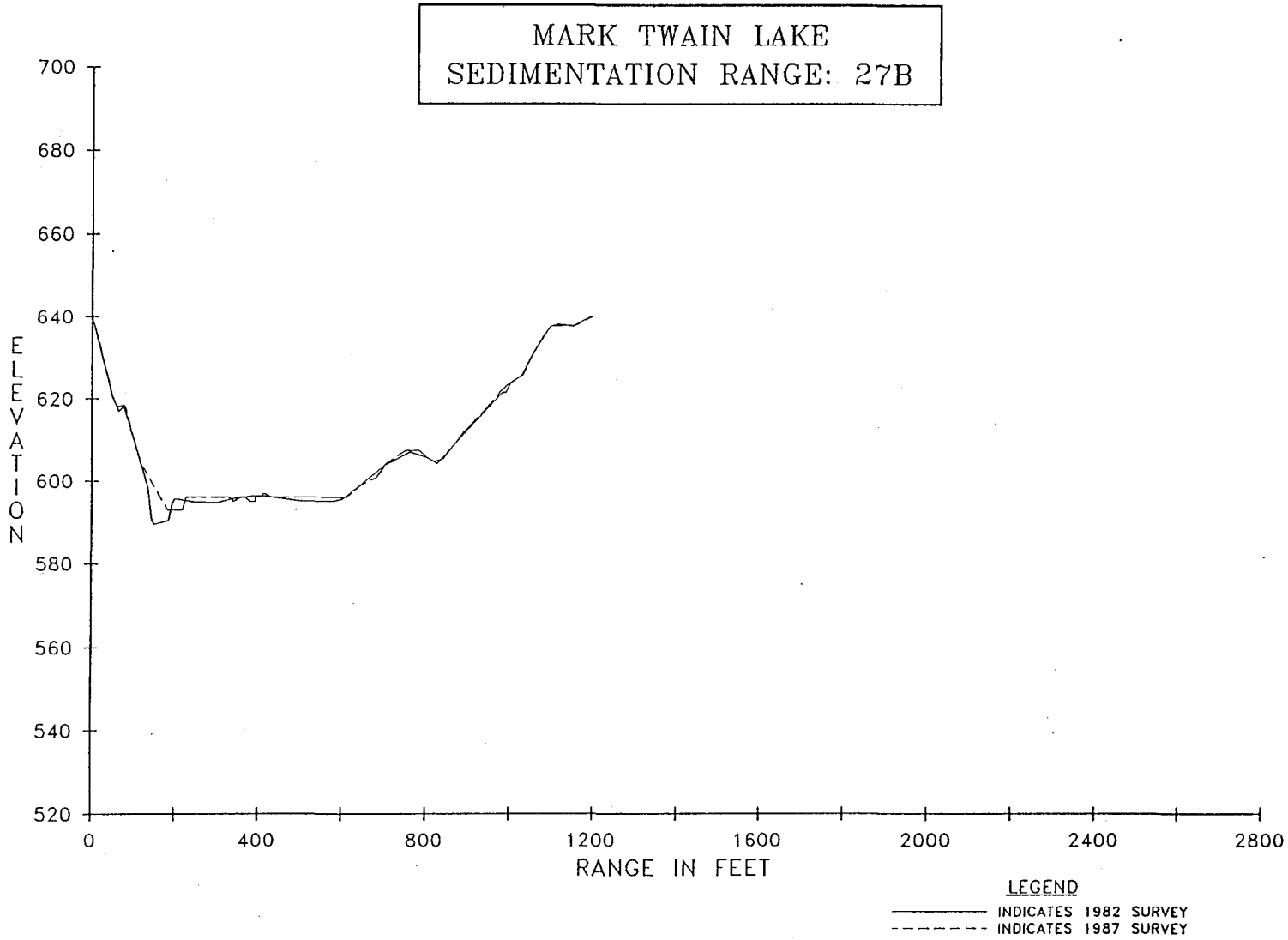

MARK TWAIN LAKE
SEDIMENTATION RANGE: 27B
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 32

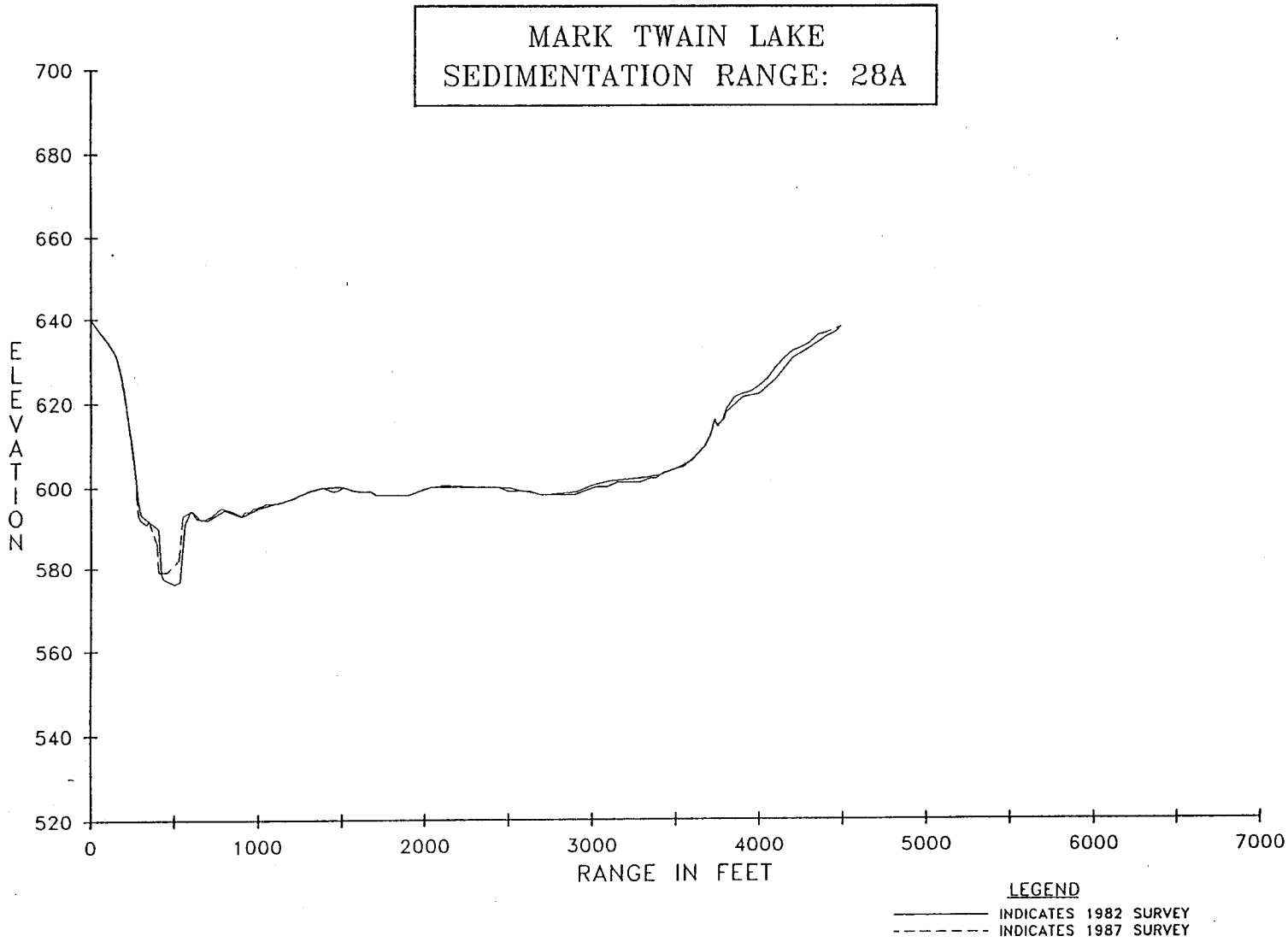

MARK TWAIN LAKE
SEDIMENTATION RANGE: 28A
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
1000
2000
3000
4000
5000
6000
7000
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 33

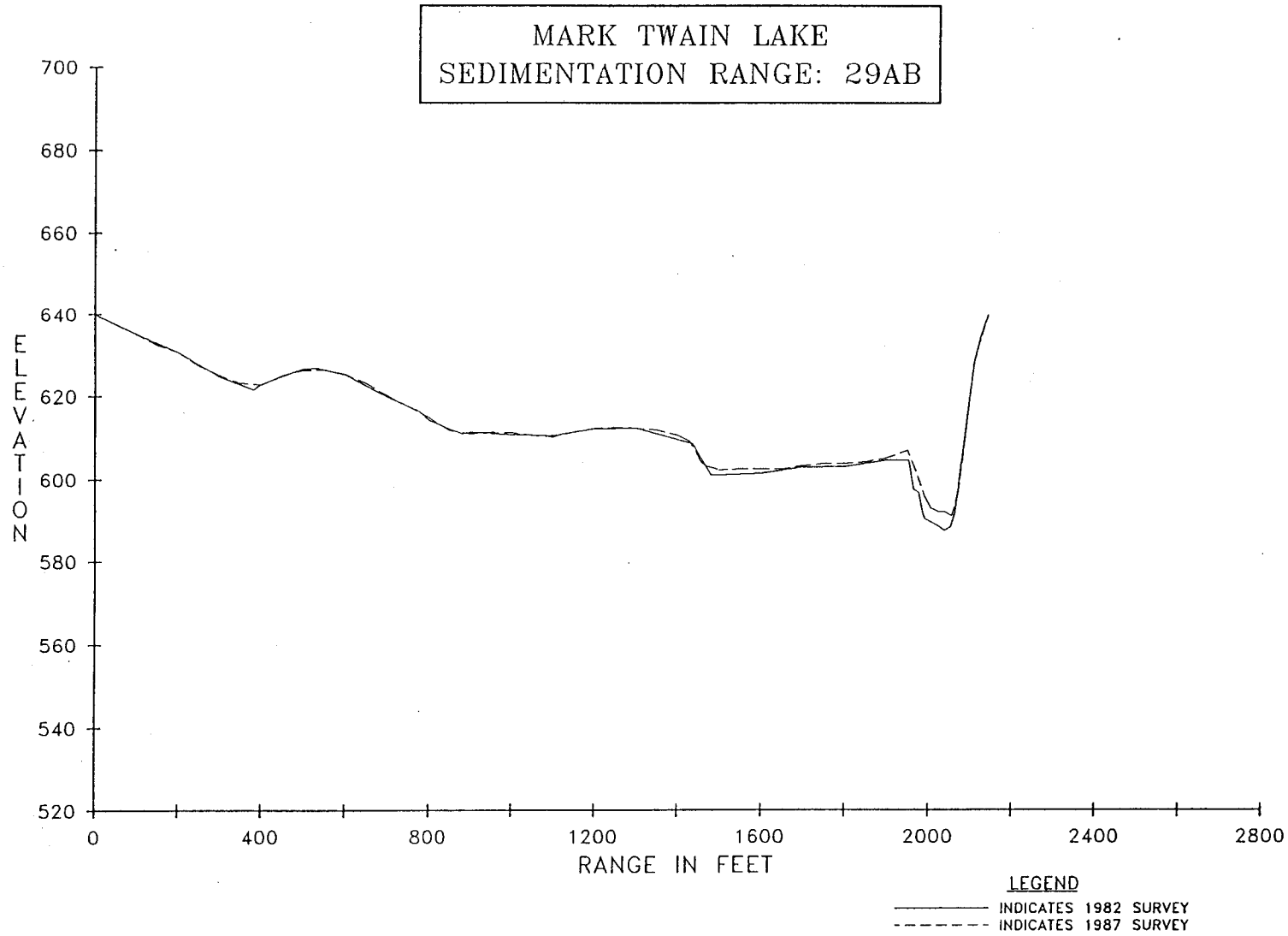

MARK TWAIN LAKE
SEDIMENTATION RANGE: 29AB
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 34

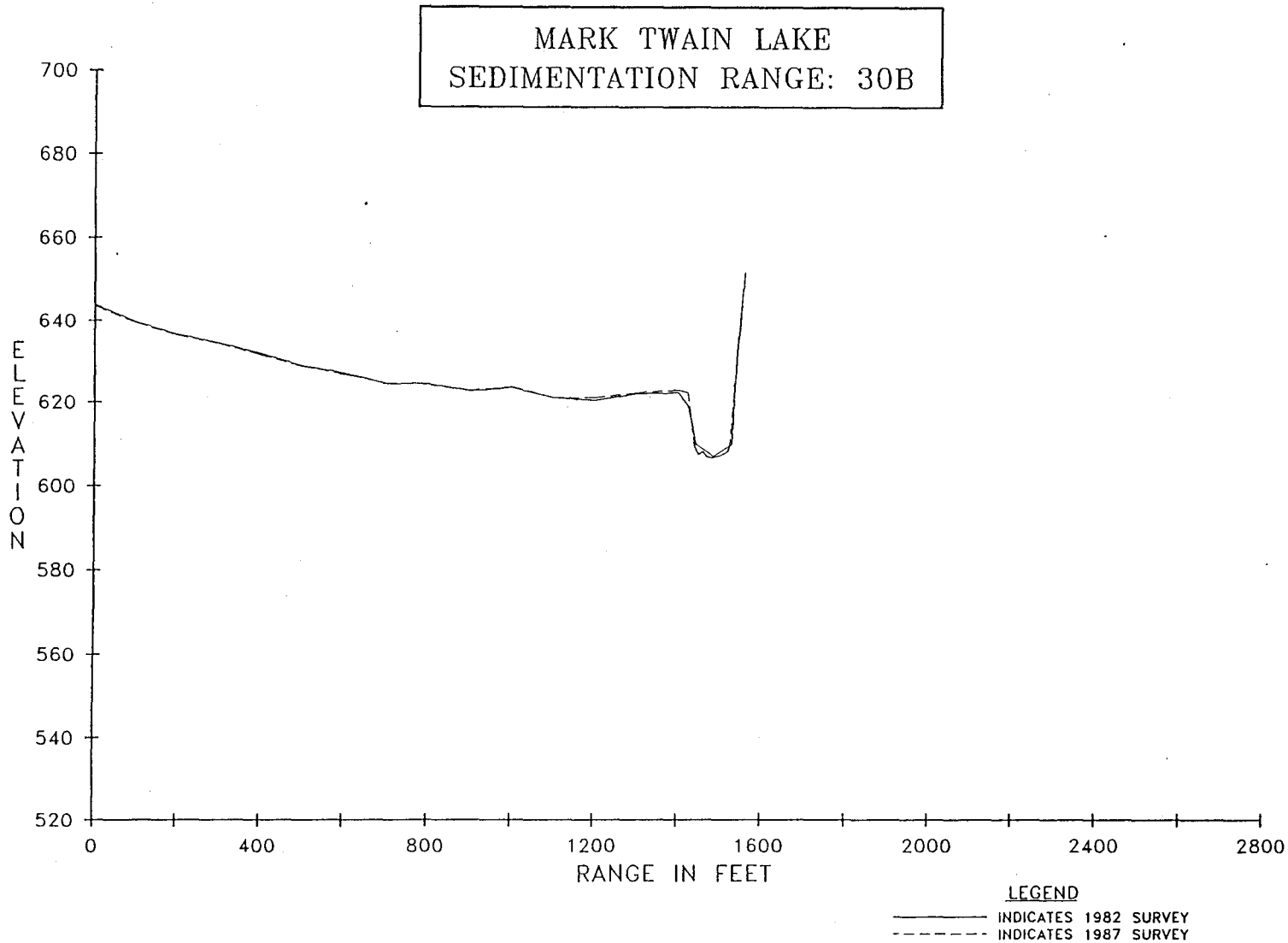

MARK TWAIN LAKE
SEDIMENTATION RANGE: 30B
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 35

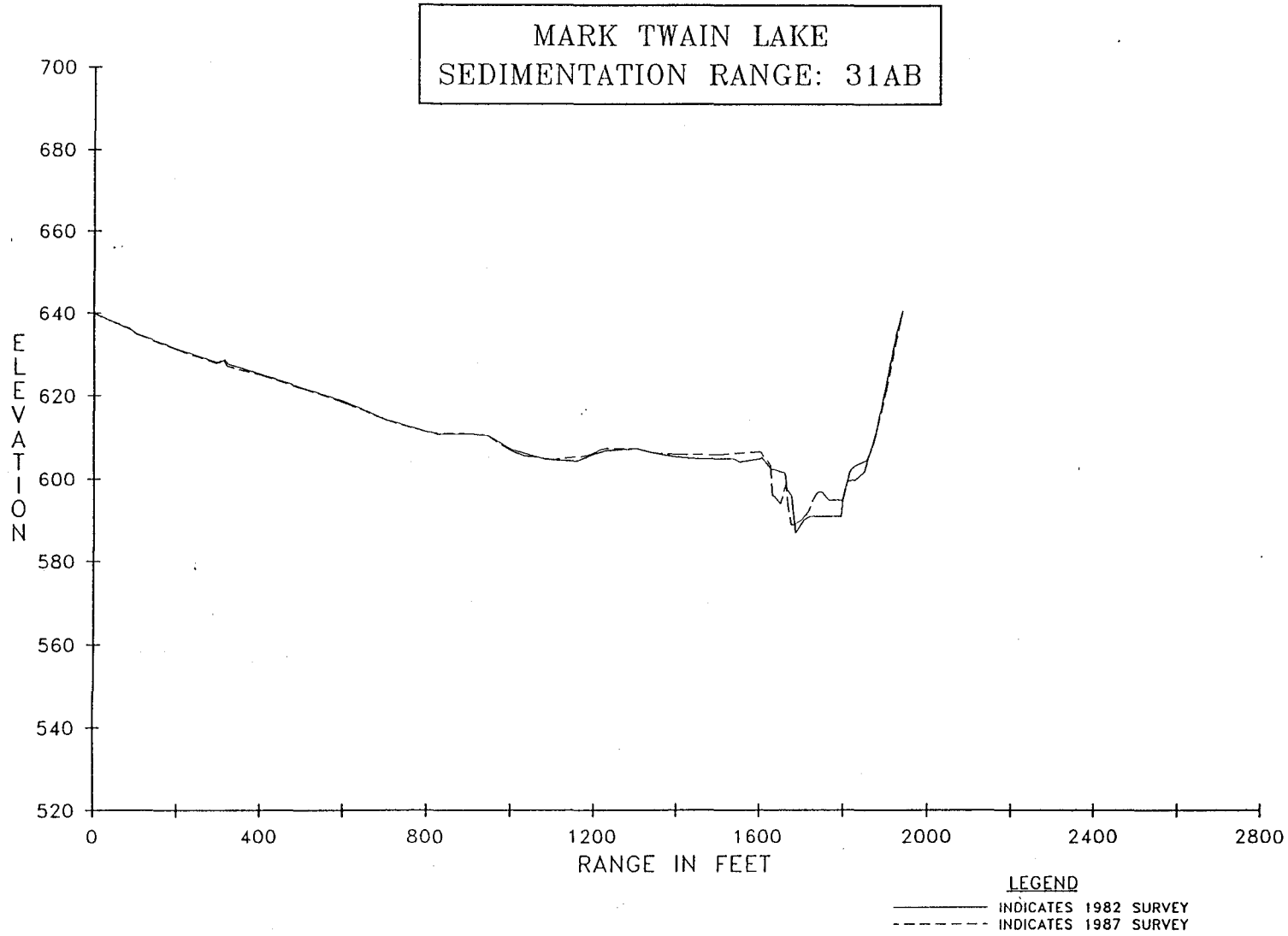

MARK TWAIN LAKE
SEDIMENTATION RANGE: 31AB
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 36

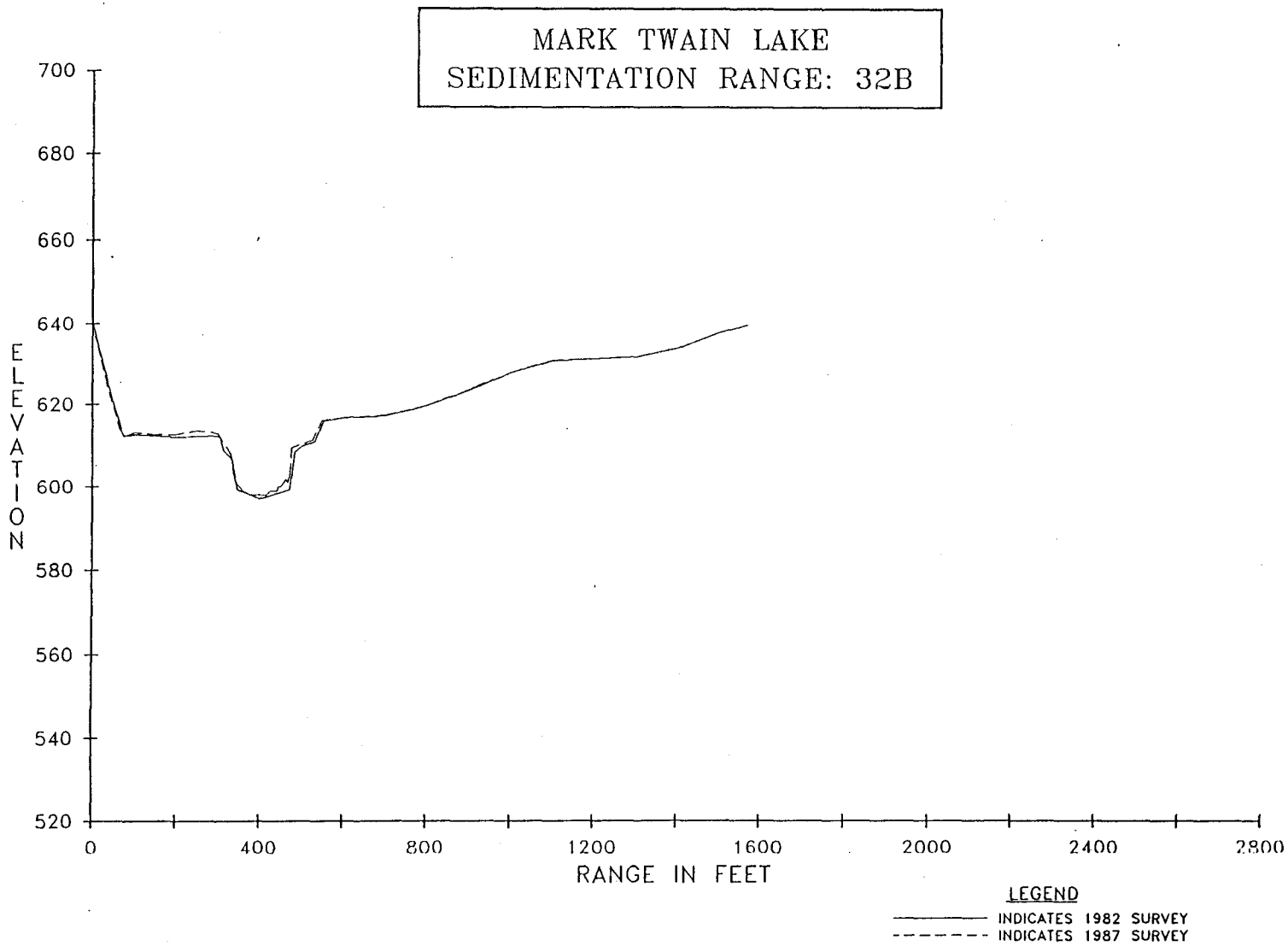

MARK TWAIN LAKE
SEDIMENTATION RANGE: 32B
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 37

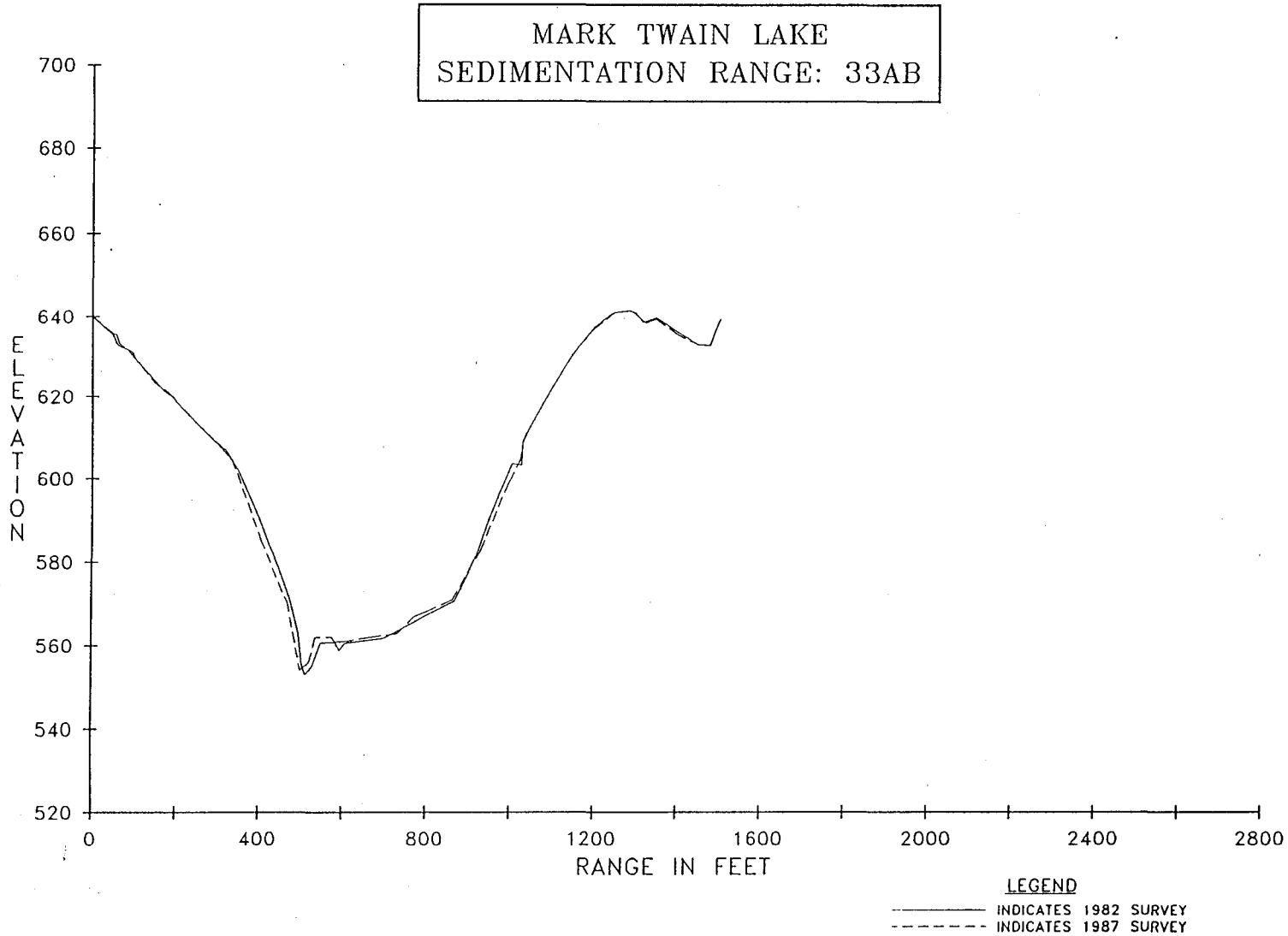
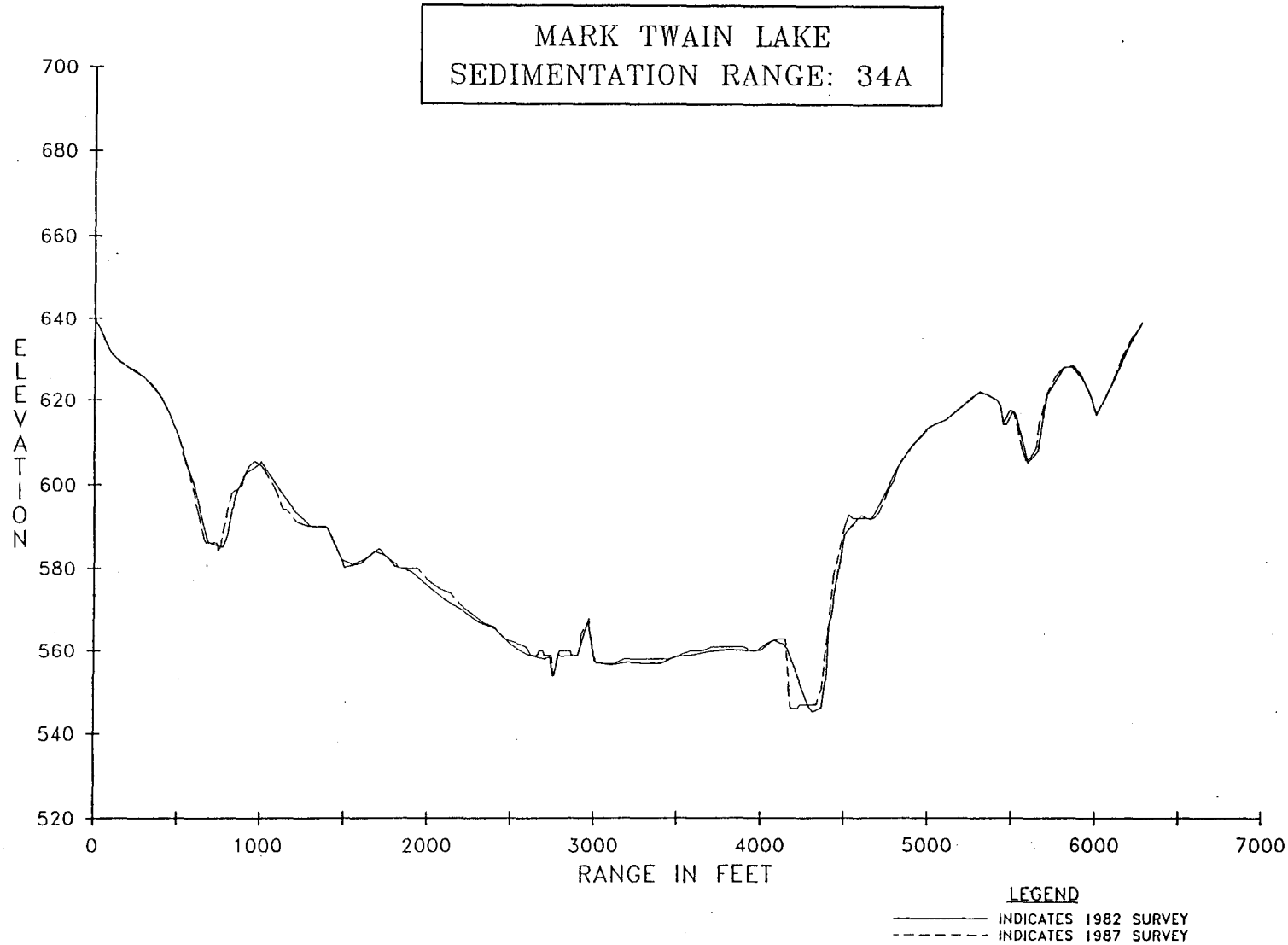

MARK TWAIN LAKE
SEDIMENTATION RANGE: 33AB
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 38


MARK TWAIN LAKE
SEDIMENTATION RANGE: 34A
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
1000
2000
3000
4000
5000
6000
7000
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

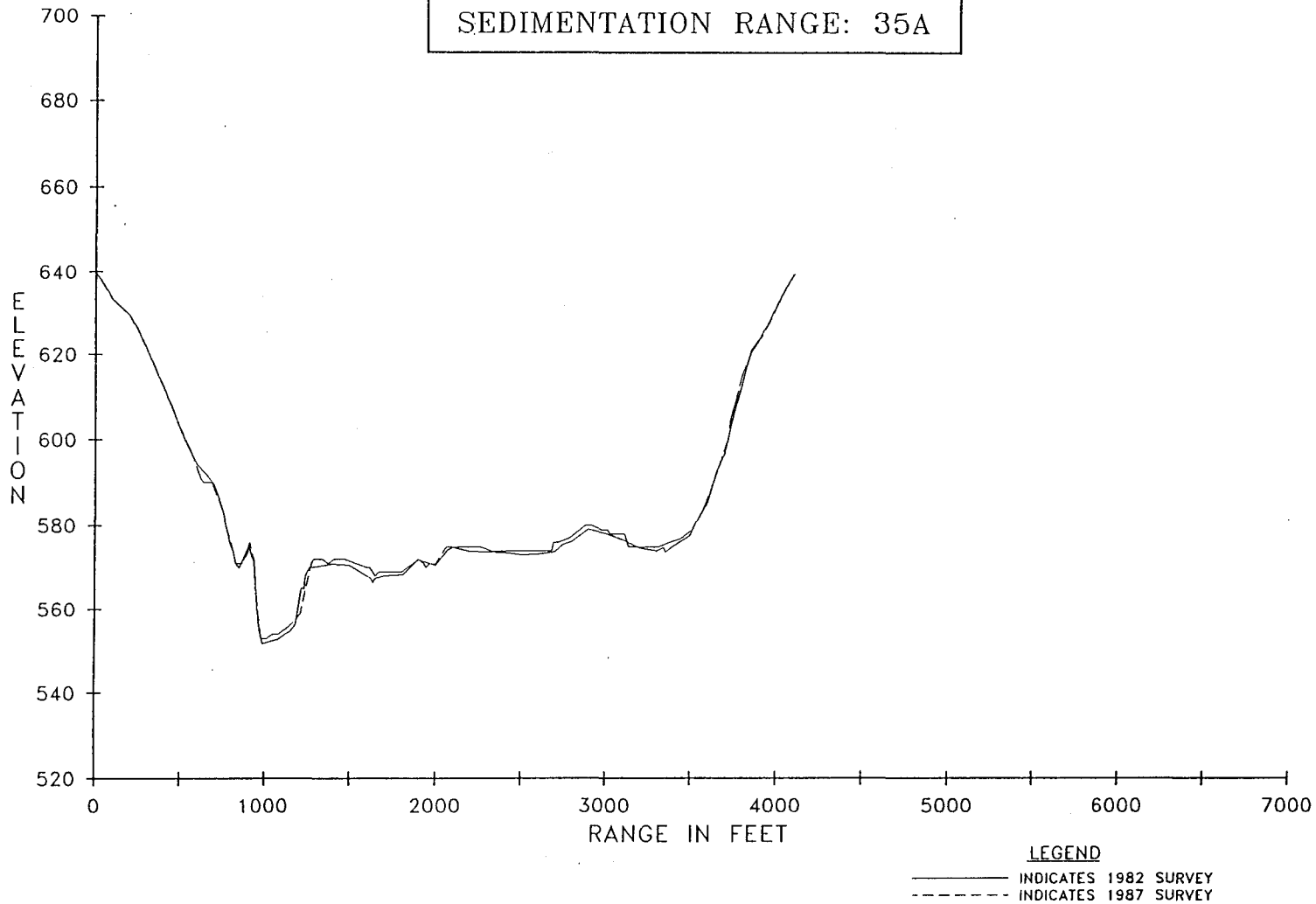

MARK TWAIN LAKE
SEDIMENTATION RANGE: 35A
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
1000
2000
3000
4000
5000
6000
7000
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 40

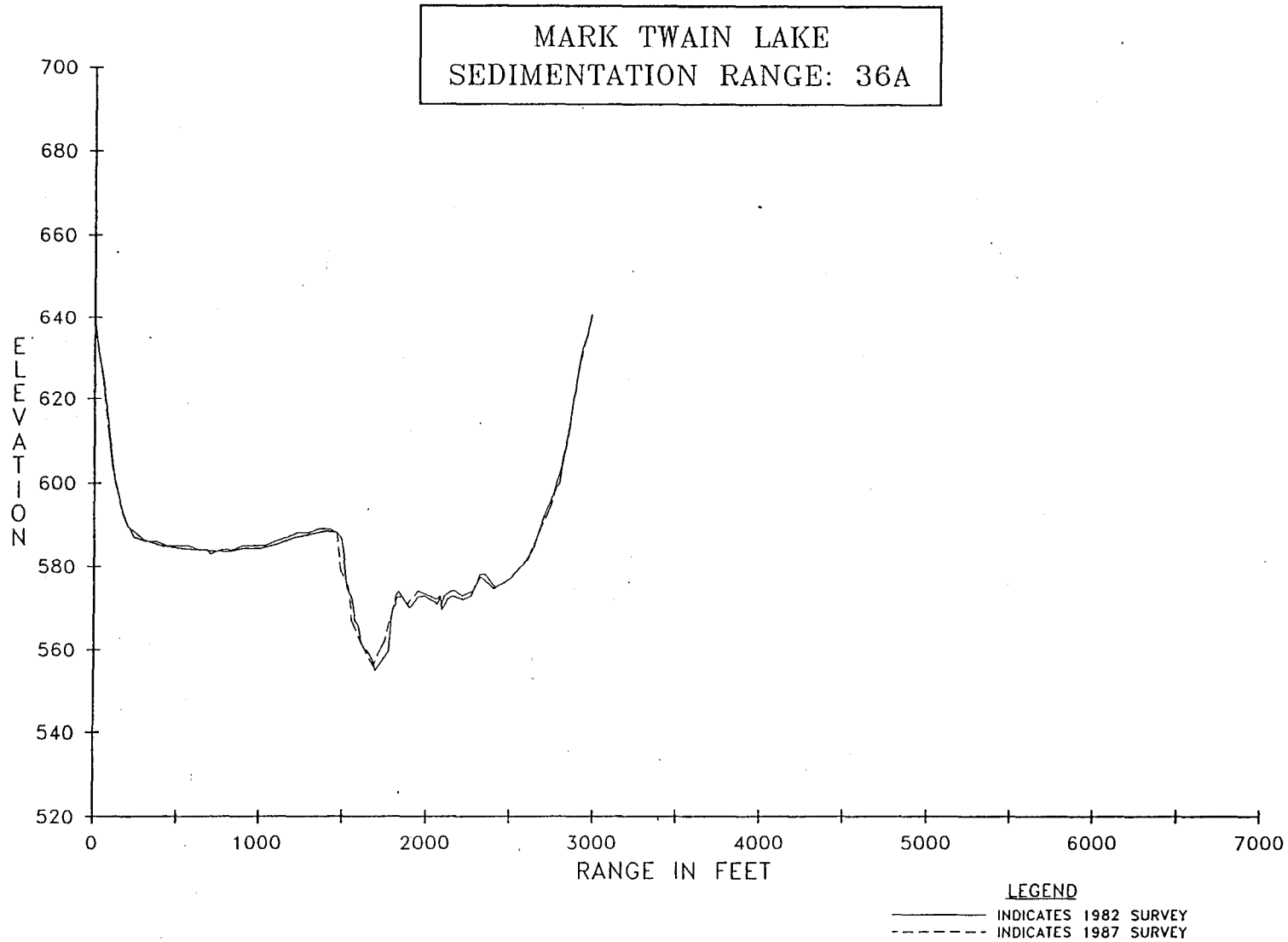

MARK TWAIN LAKE
SEDIMENTATION RANGE: 36A
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
1000
2000
3000
4000
5000
6000
7000
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 41

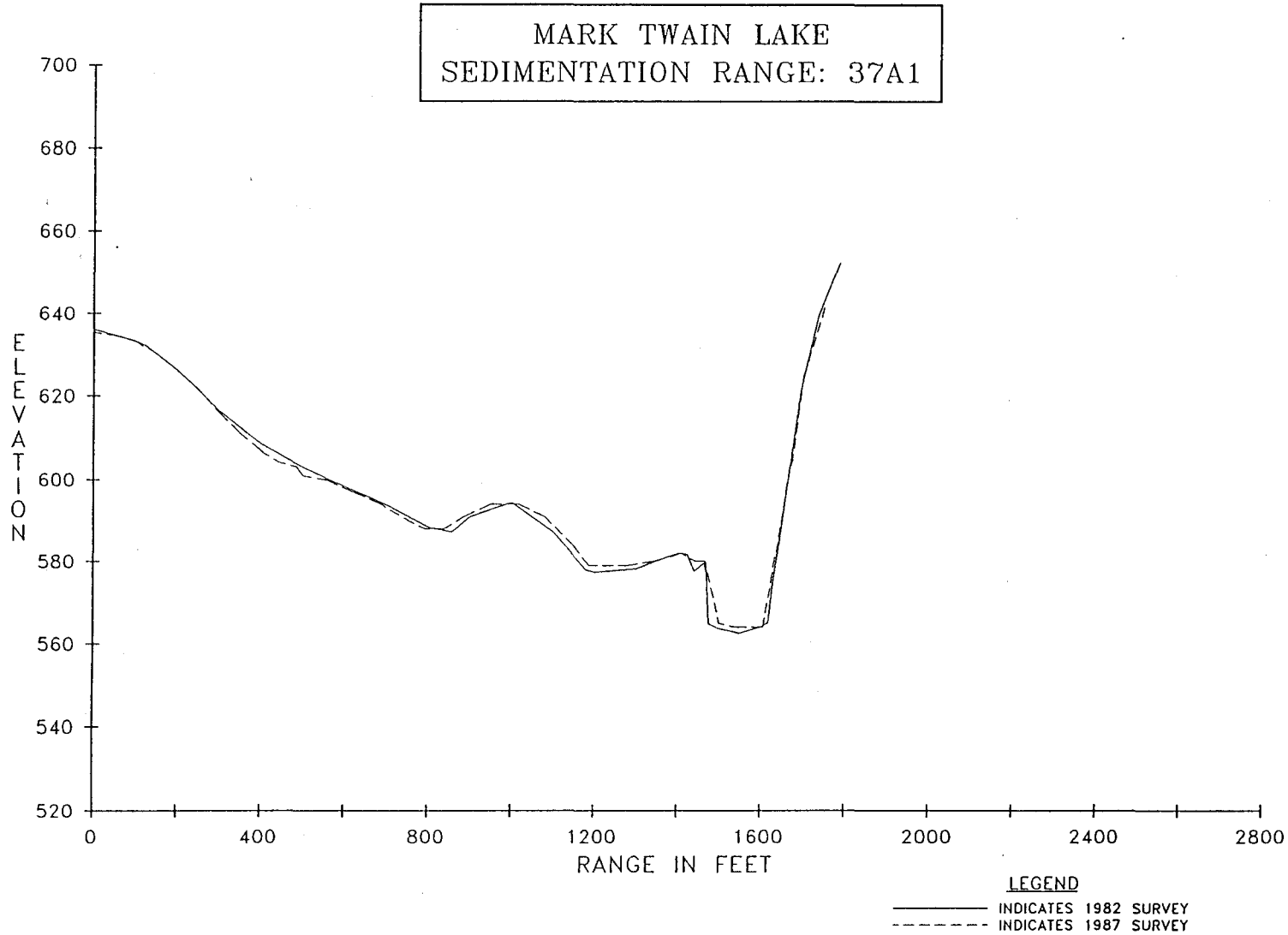

MARK TWAIN LAKE
SEDIMENTATION RANGE: 37A1
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 42

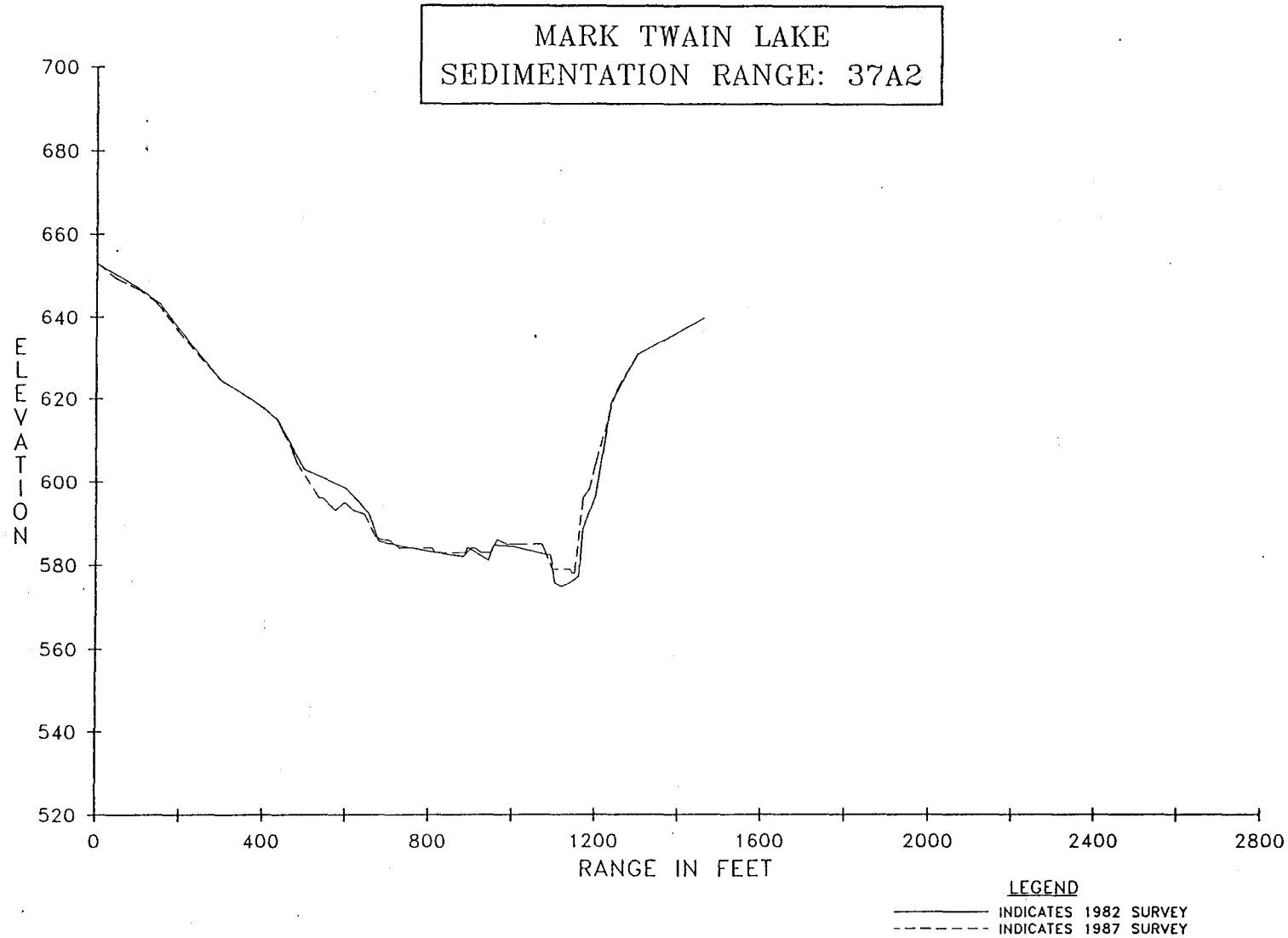

MARK TWAIN LAKE
SEDIMENTATION RANGE: 37A2
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 43

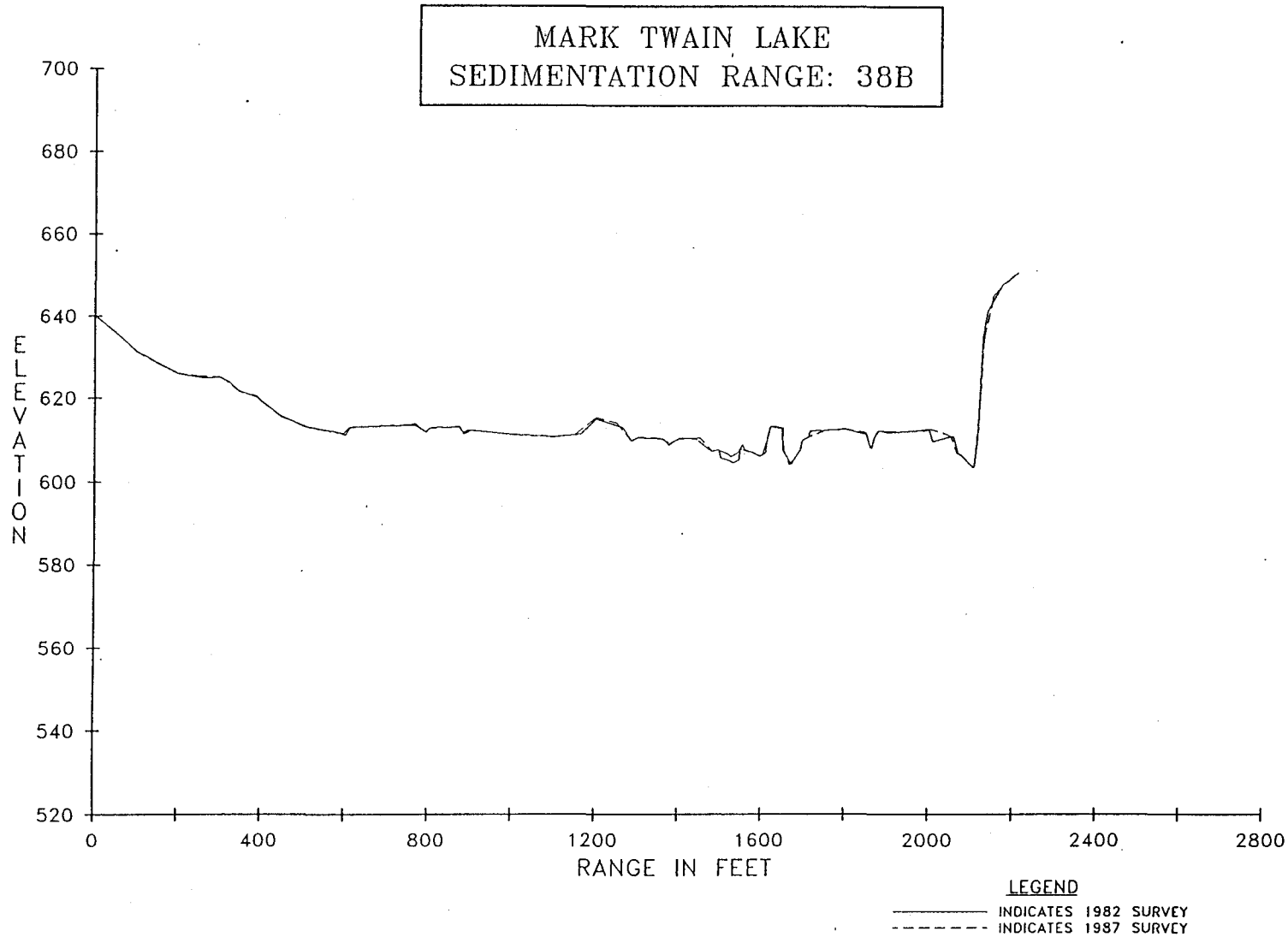

MARK TWAIN LAKE
SEDIMENTATION RANGE: 38B
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 44

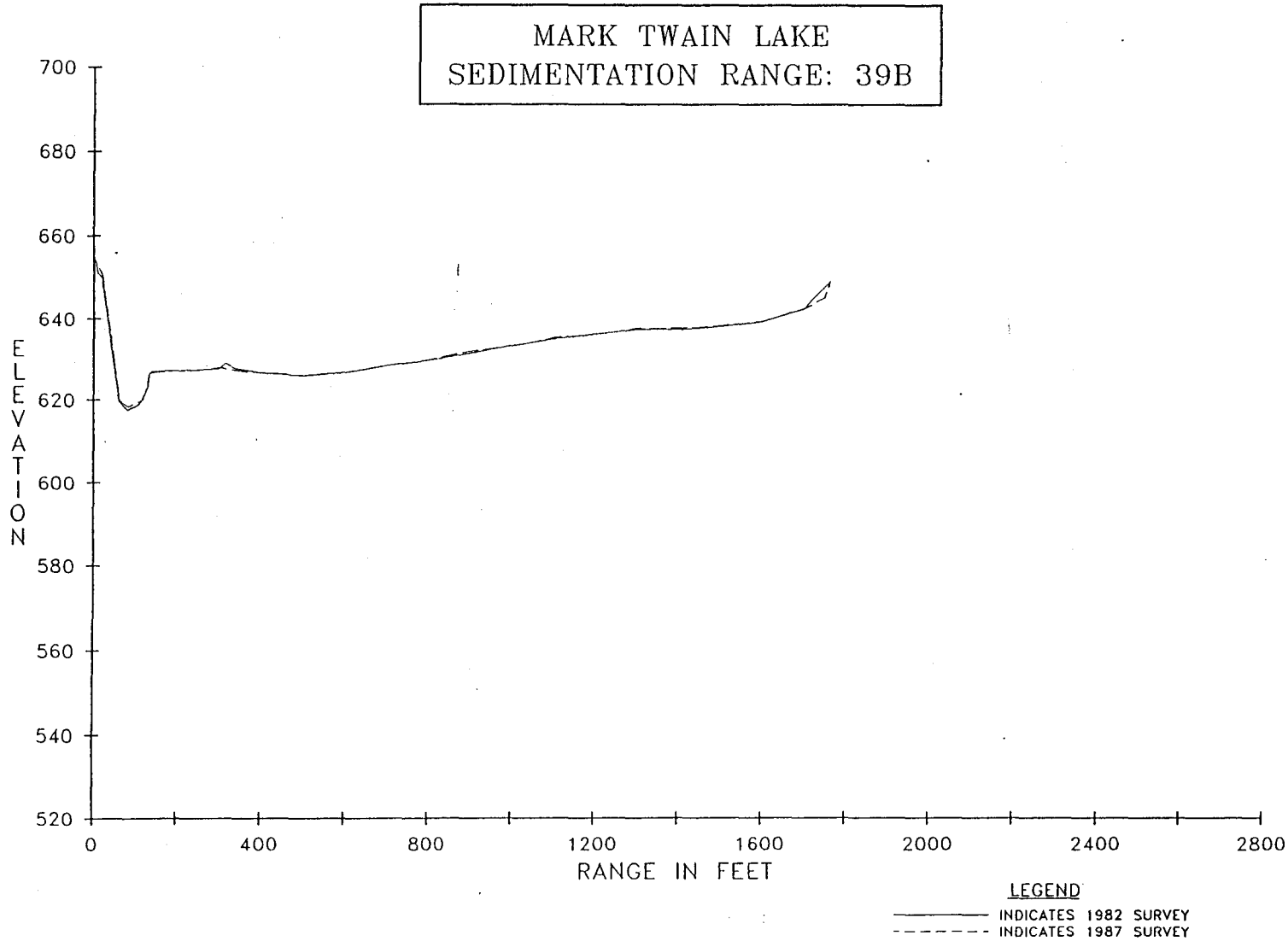

MARK TWAIN LAKE
SEDIMENTATION RANGE: 39B
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 45

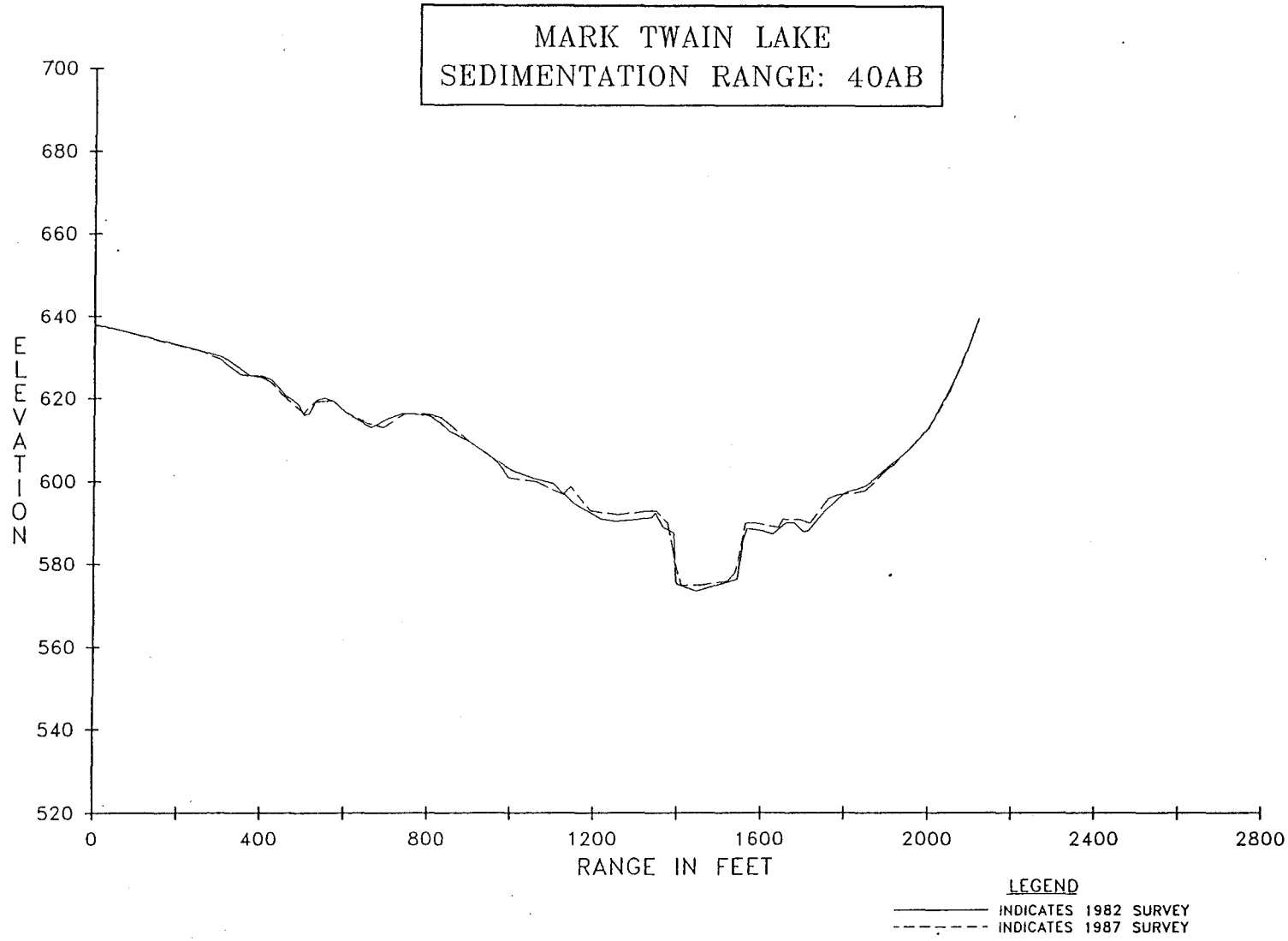

MARK TWAIN LAKE
SEDIMENTATION RANGE: 40AB
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 46

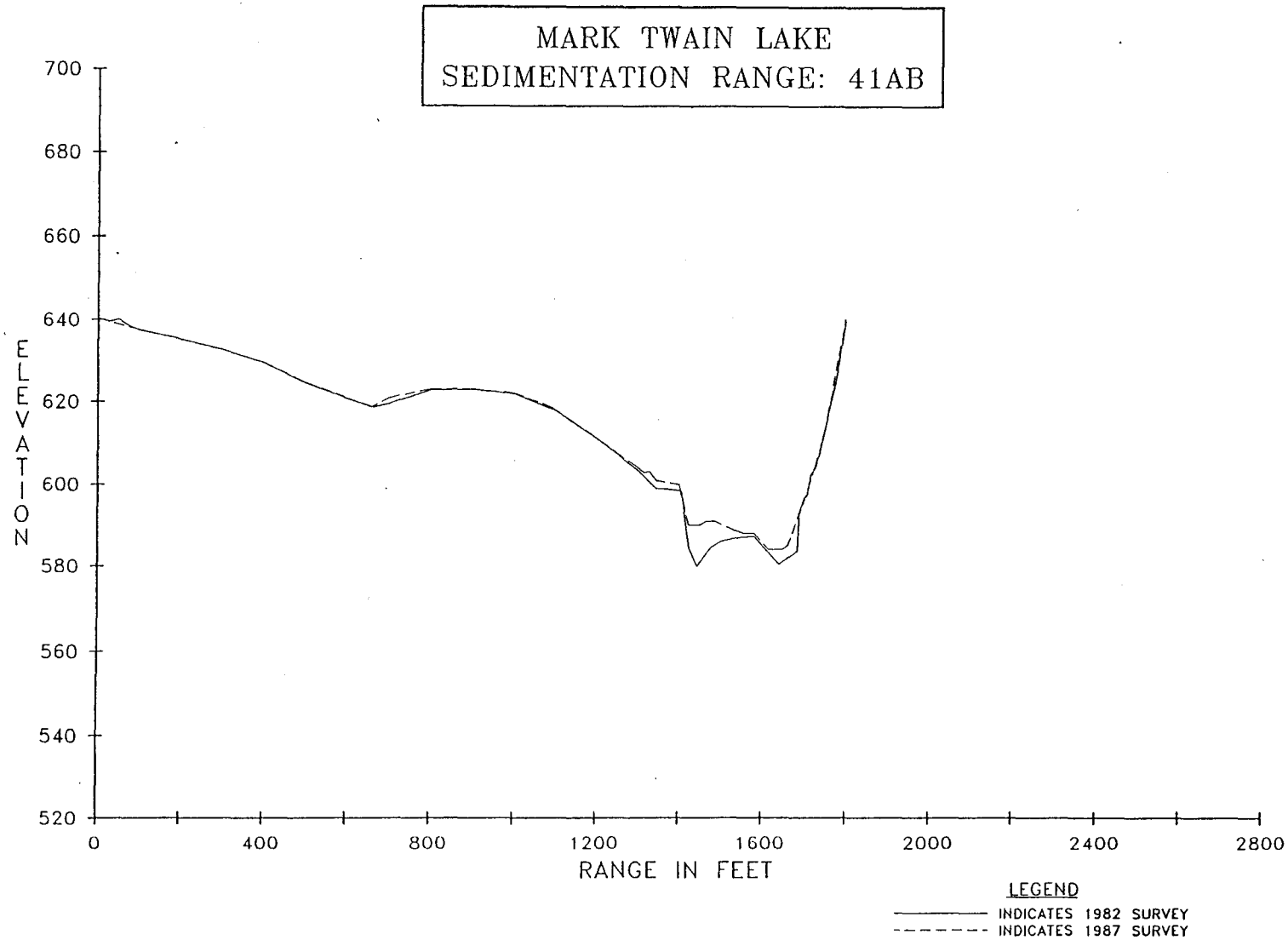

MARK TWAIN LAKE
SEDIMENTATION RANGE: 41AB
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 47

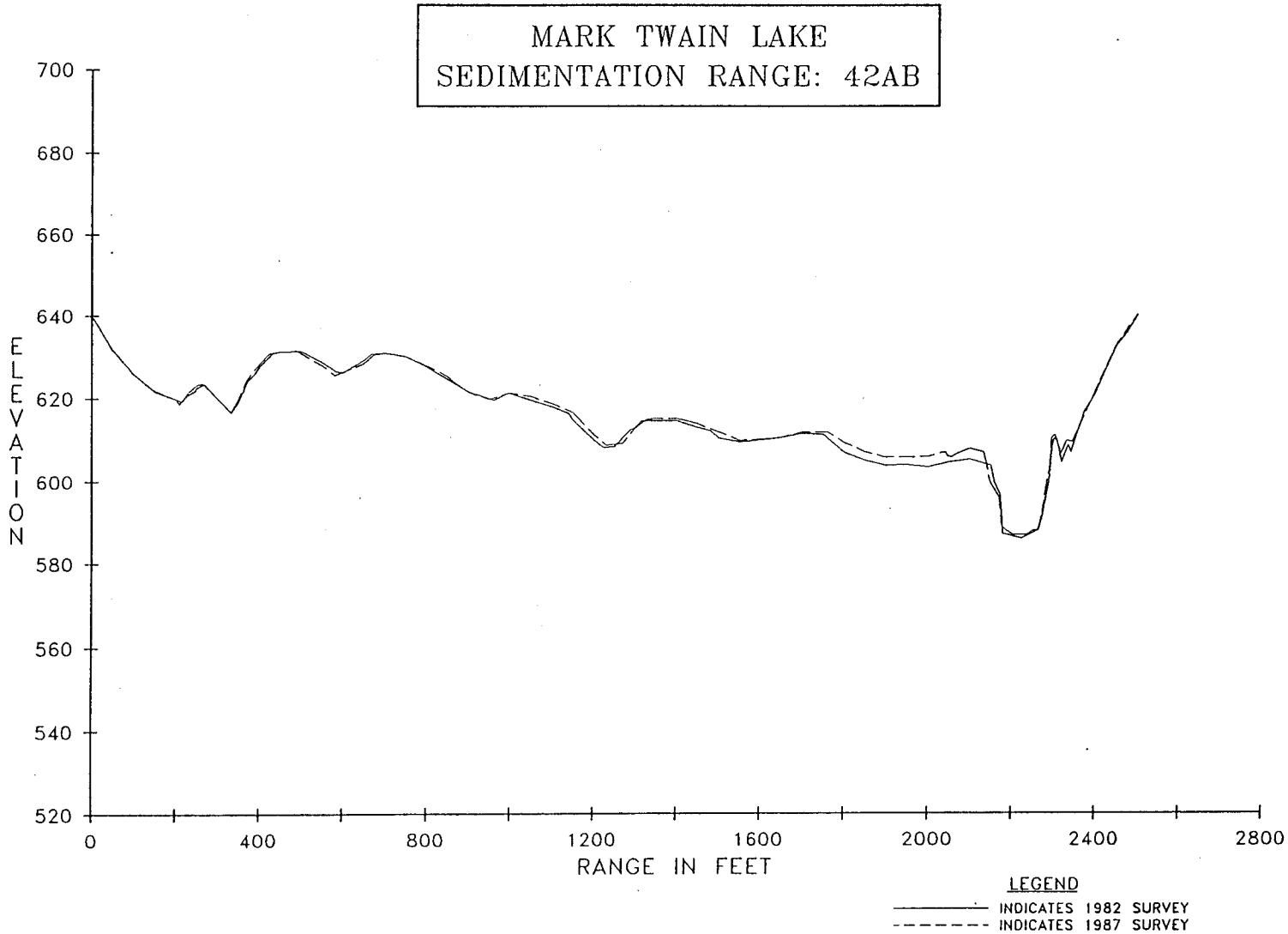

MARK TWAIN LAKE
SEDIMENTATION RANGE: 42AB
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 48

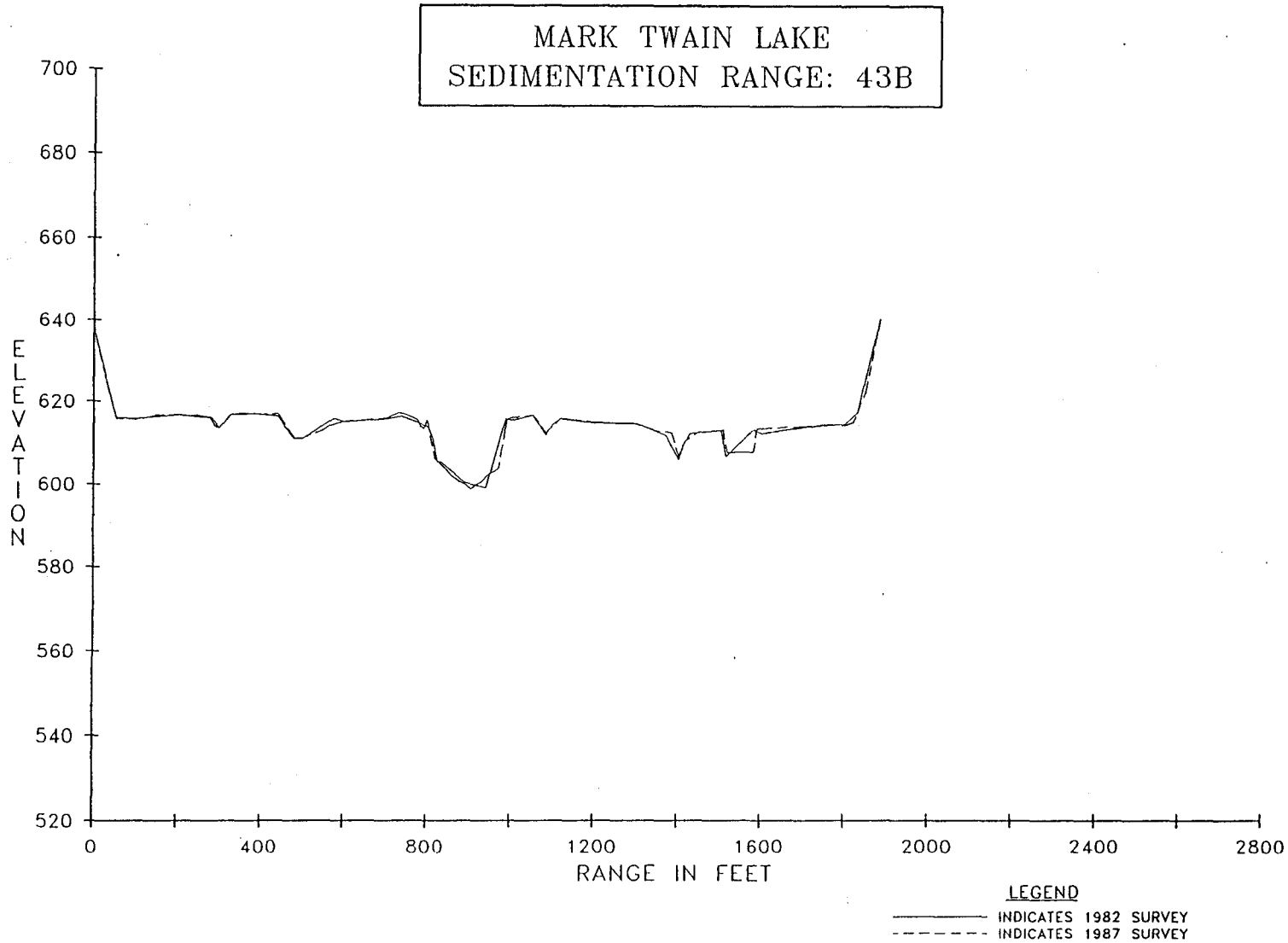

MARK TWAIN LAKE
SEDIMENTATION RANGE: 43B
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 49

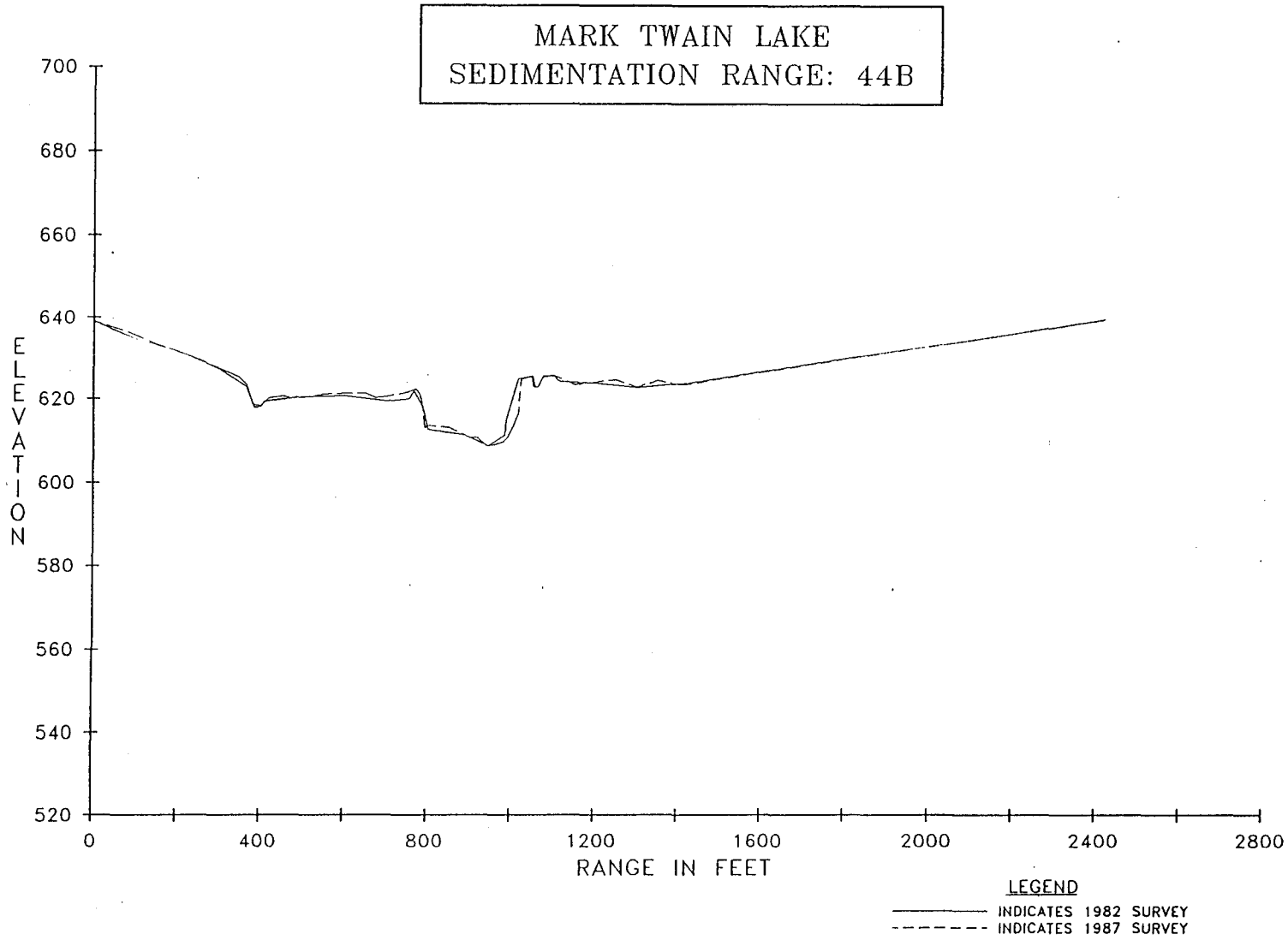

MARK TWAIN LAKE
SEDIMENTATION RANGE: 44B
700
680
660
640
620
600
580
560
540
520
ELEVATION
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 50

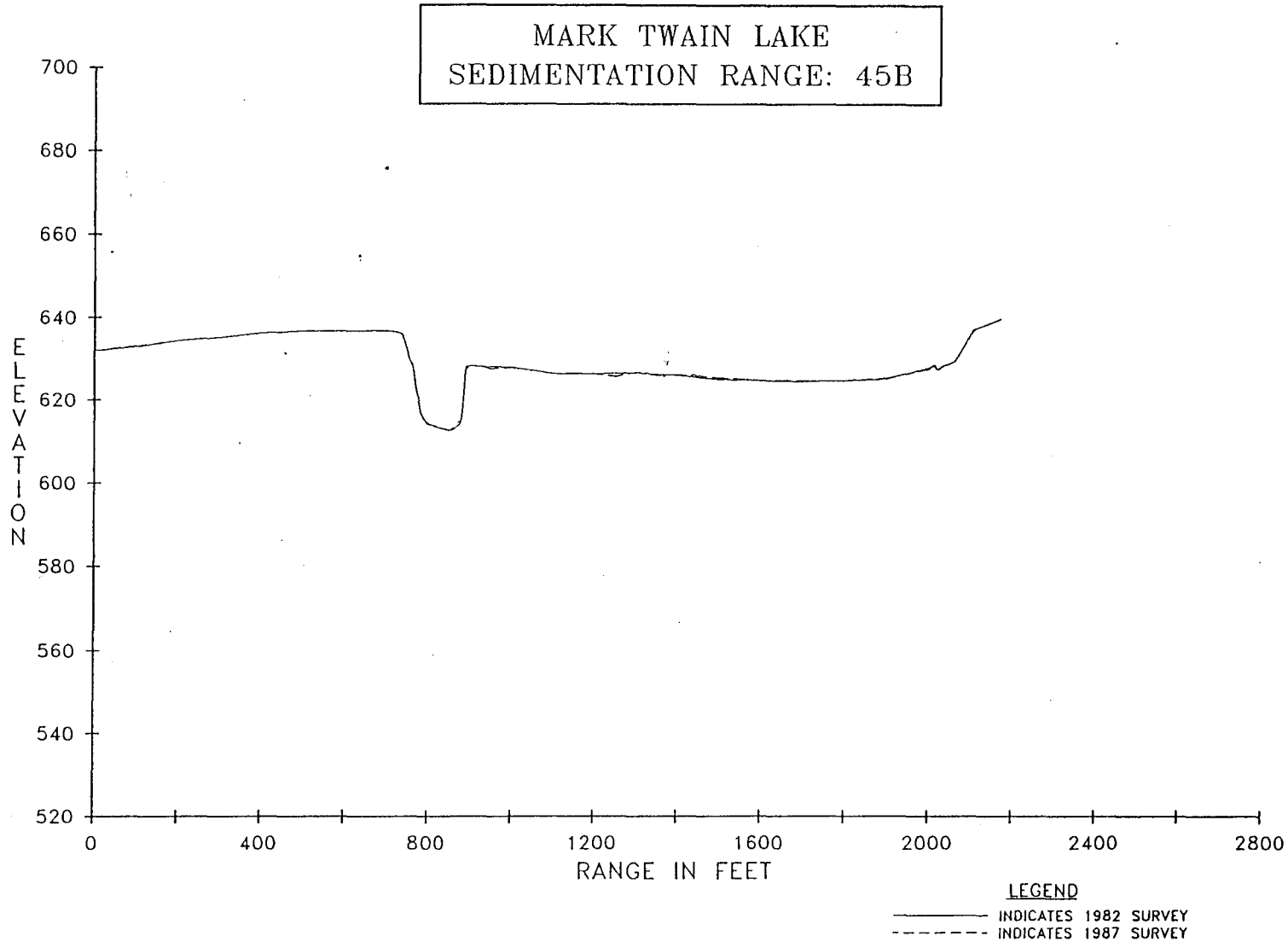

MARK TWAIN LAKE
SEDIMENTATION RANGE: 45B
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 51

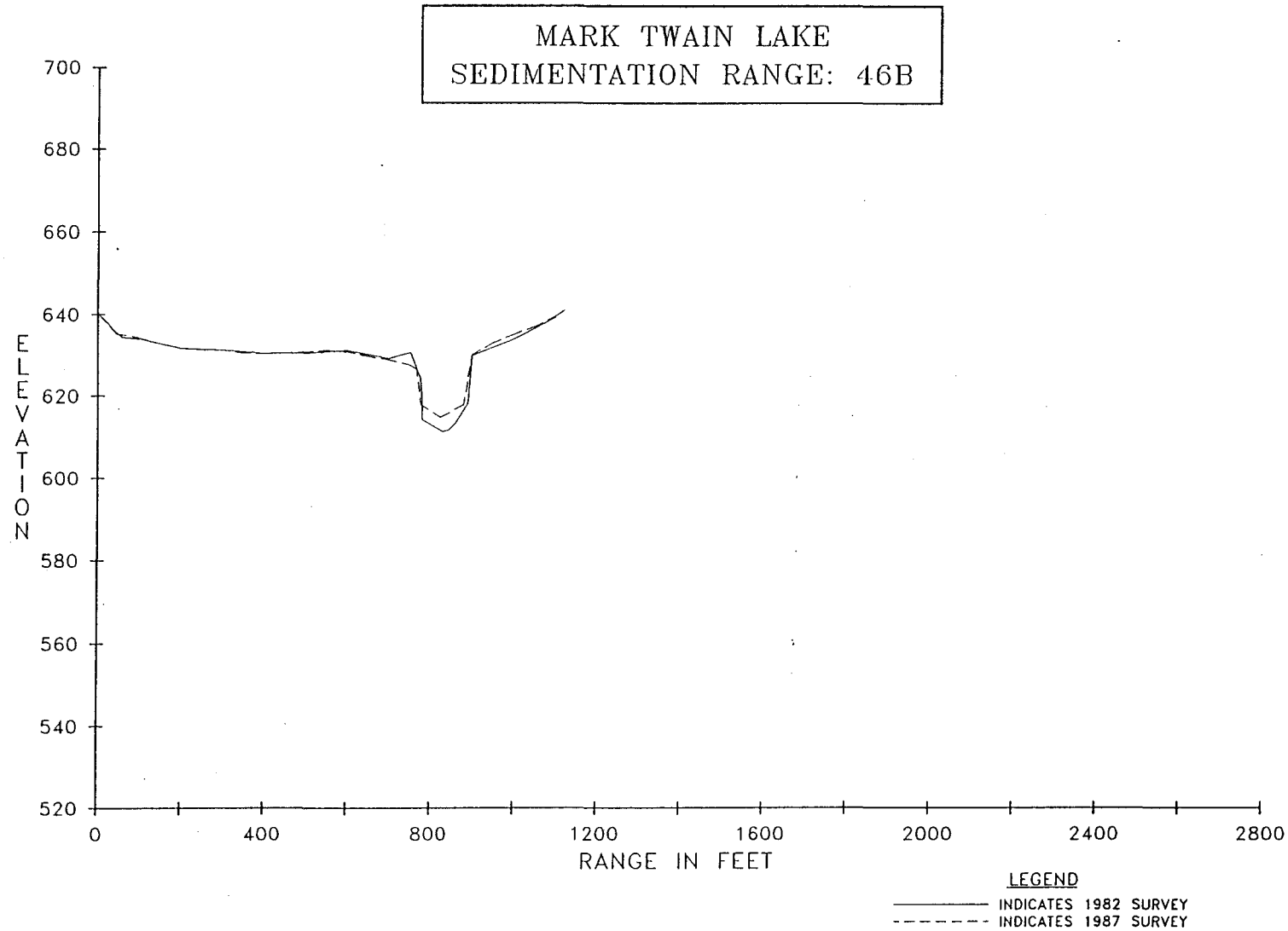

MARK TWAIN LAKE
SEDIMENTATION RANGE: 46B
700
680
660
640
620
600
580
560
540
520
ELEVATION
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 52

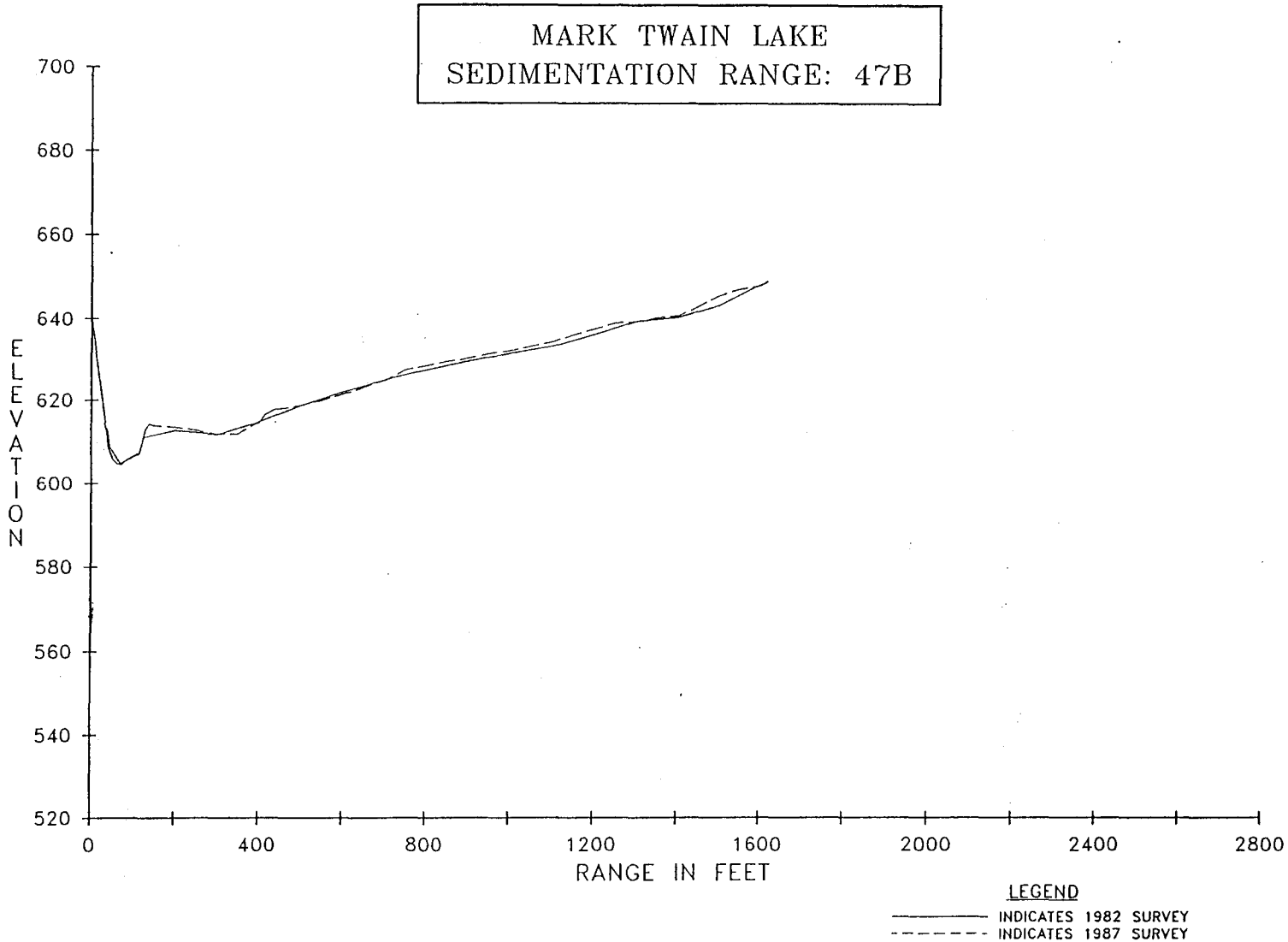
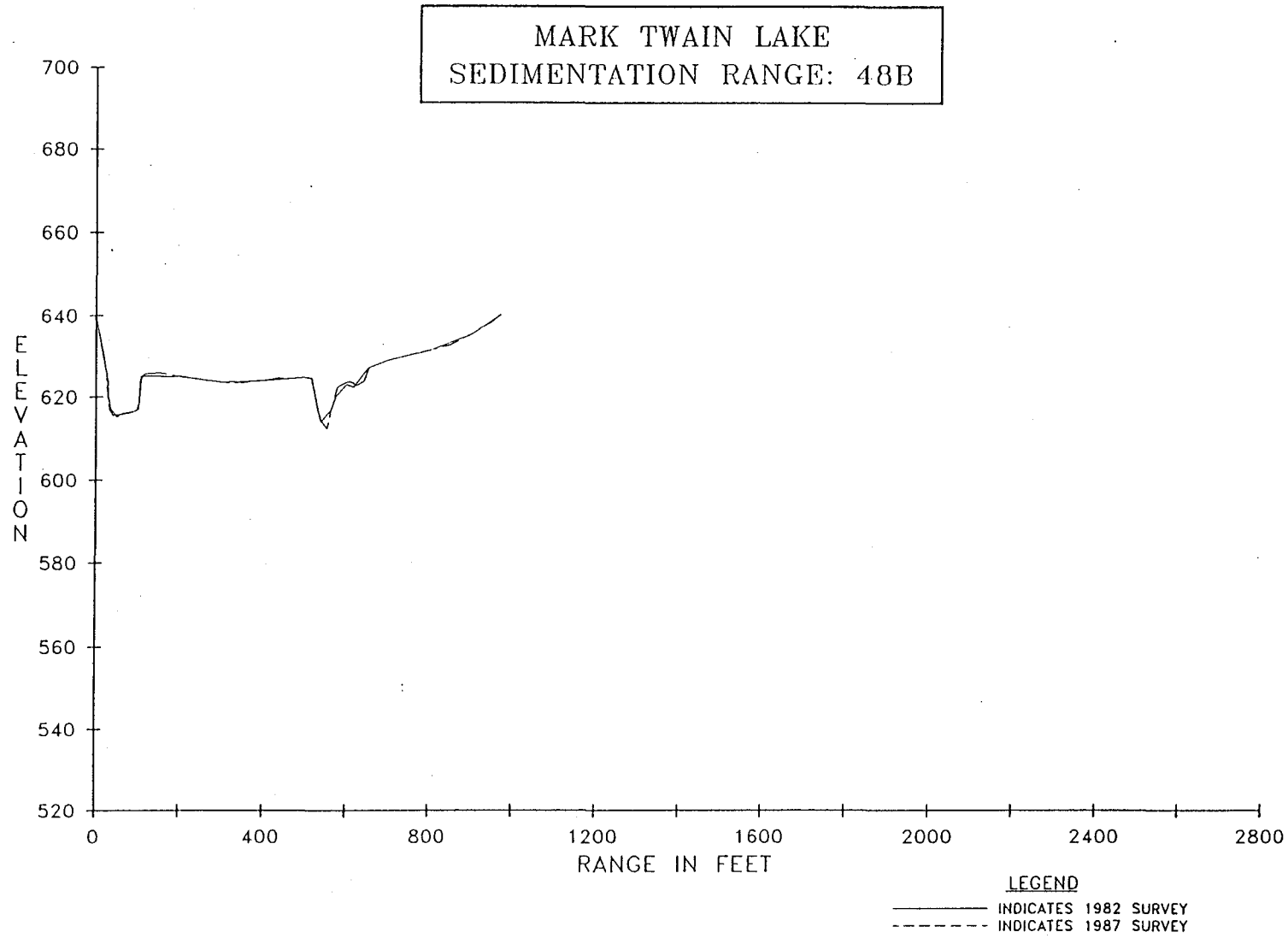

MARK TWAIN LAKE
SEDIMENTATION RANGE: 47B
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

PLATE 53


MARK TWAIN LAKE
SEDIMENTATION RANGE: 48B
ELEVATION
700
680
660
640
620
600
580
560
540
520
0
400
800
1200
1600
2000
2400
2800
RANGE IN FEET
LEGEND
INDICATES 1982 SURVEY
INDICATES 1987 SURVEY

APPENDIX B

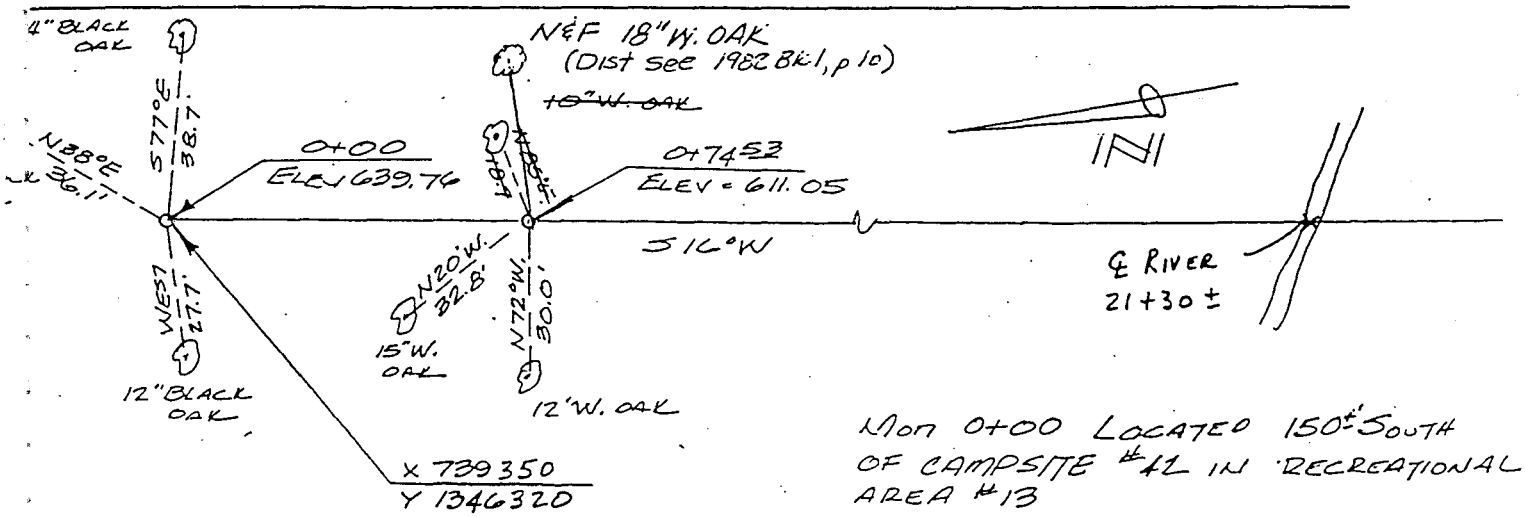
SEDIMENTATION RANGE LOCATIONS

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR. 1-A BY: G. BUDDE DATE: 6/10/82

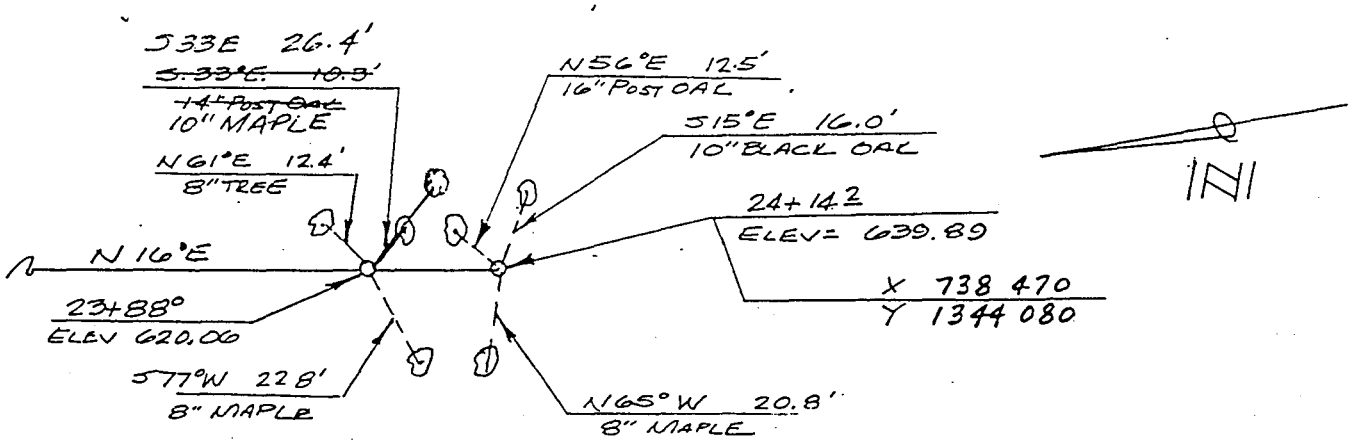
NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1.
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.

TOPO 9



MON 0+00 LOCATED 150± SOUTH OF CAMPSITE #42 IN RECREATIONAL AREA #13

BM SR 1 AY LOCATED N70°E AND 70' FROM 0+00



B.M SR 1AX LOCATED SOUTH 180' FROM MON 24+14.2

MON 24+14.2 LOCATED 280' NE OF CAMPSITE #134 IN REC. AREA 2

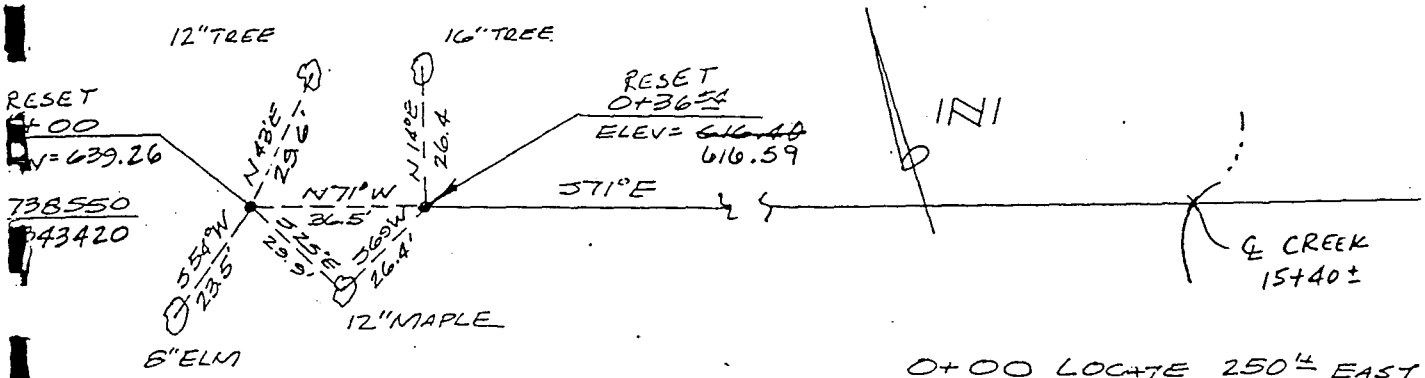
ORIGINAL

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR-2A BY: G. BUDDE DATE: 6/11/82

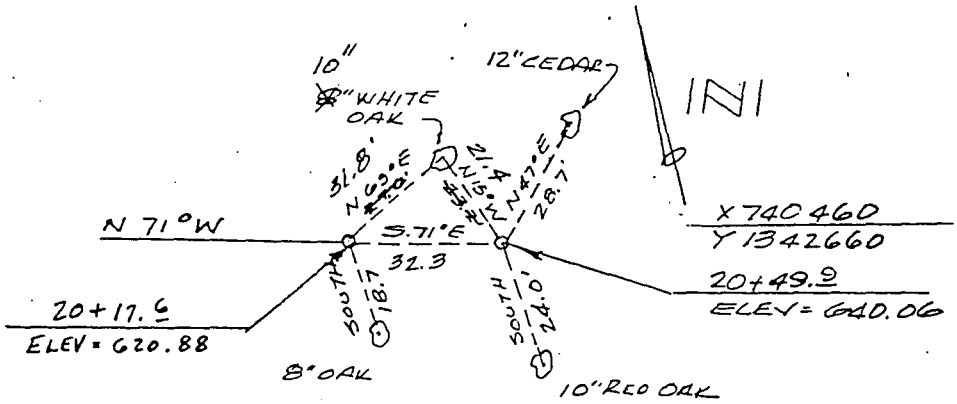
TOPO. 4 & 9

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1.
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.



0+00 LOCATE 250'± EAST OF CUL-DE-SAC ROAD "D" OF REC AREA #2

BM SR 2AX ELEV= 662.58
LOCATED S 60°W 150'± FROM 0+00



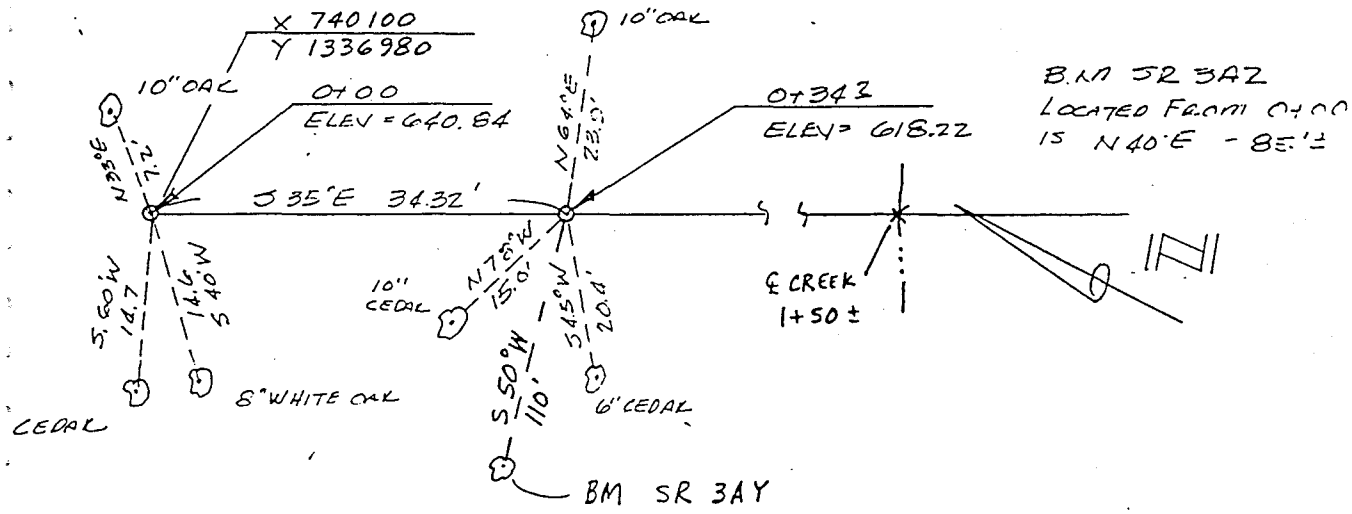
B.M SR 2A-2 LOCATED N 69°W 80'± FROM MON 20+49.9

MON 20+49.9 LOCATED 400'± WEST OF C.O.E PARKING AND STORAGE COMPOUND

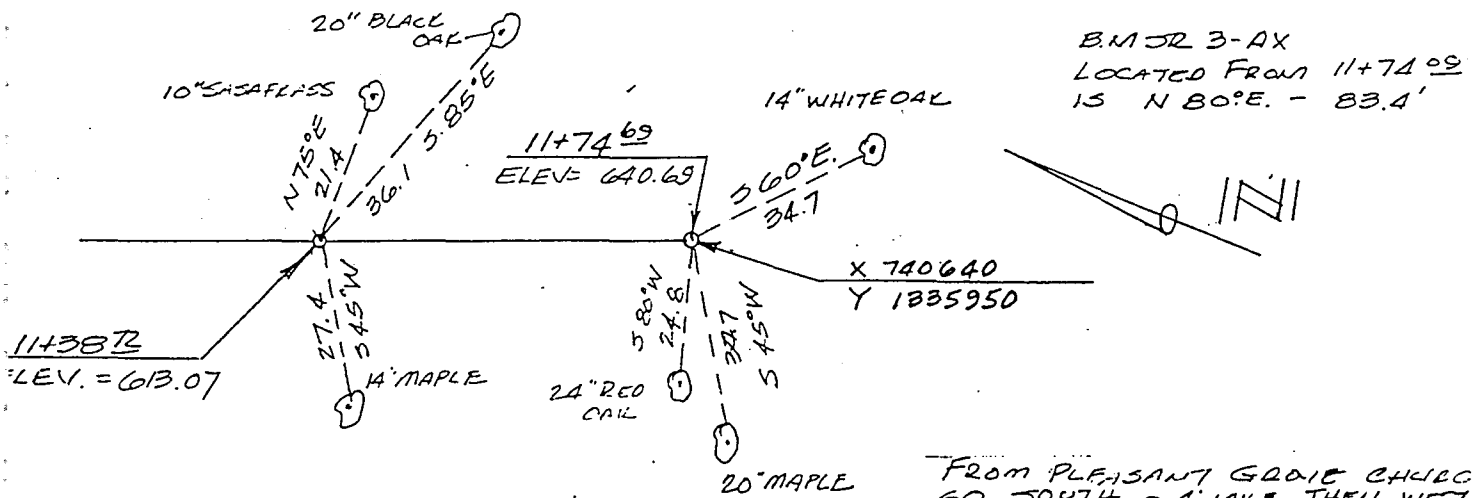
CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR 3A BY: G. BUDDE DATE: 6/21/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1. TOPO 5
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.



FROM MT. HOPE CHURCH ON HWY "J" GO SOUTH 0.6 MILE, THEN EAST 1.0 MILE AND SOUTH 0.8 MILE ON COUNTY ROAD, THEN WALK 0.5' MILE TO 0+00



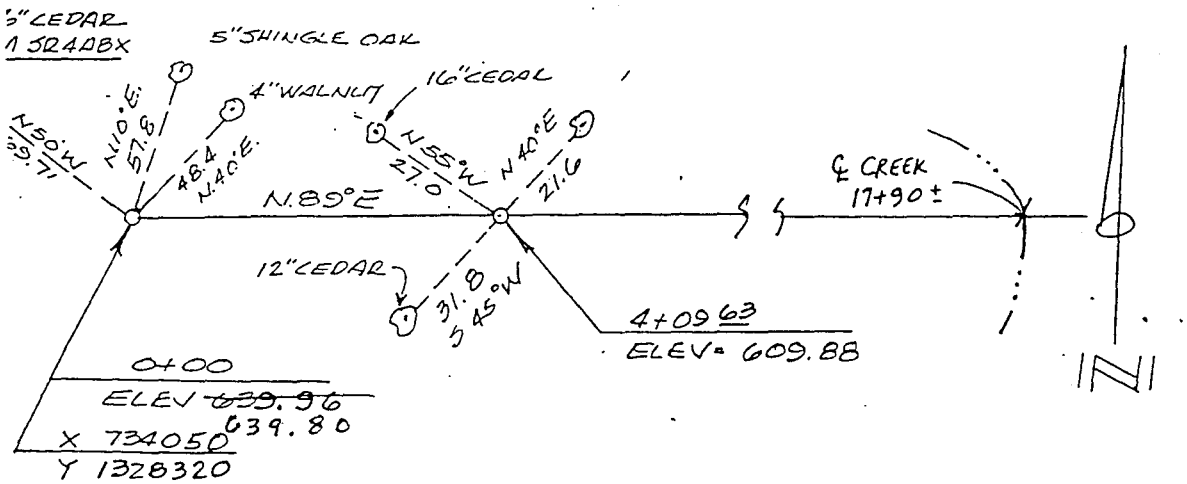
FROM PLEASANT GROVE CHURCH GO SOUTH 0.4' MILE THEN WEST 0.3 THEN SOUTH 0.1' MILE, THEN SOUTH AND WEST ON DIRT ROAD 0.6' MILE THEN WALK, THEN WALK 1700± TO SOUTH END OF RANGE

DACW43-82-D-0011

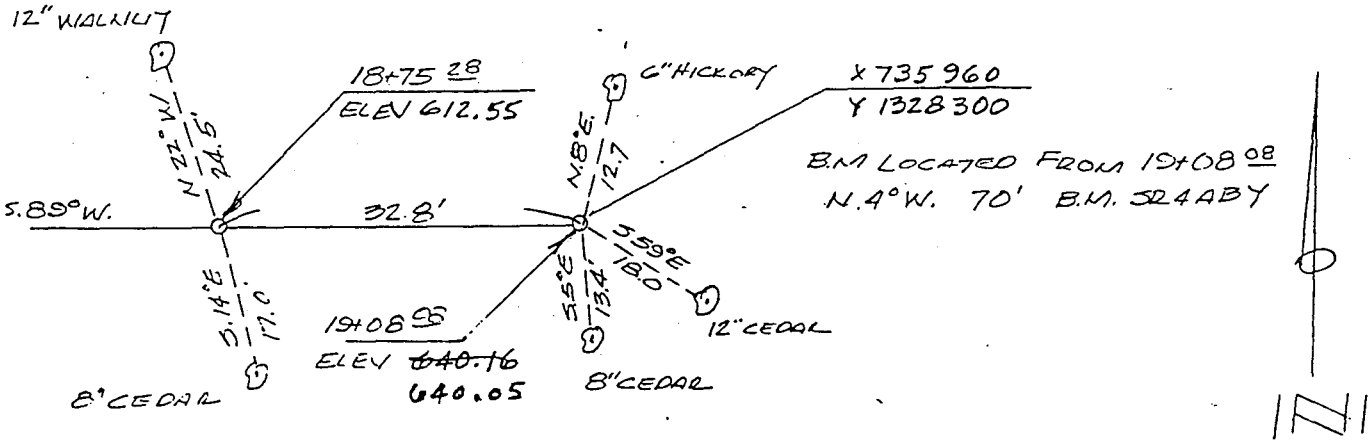
CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. 4-AB BY: G. BUDDE DATE: 6/21/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1. TOPO 11
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.



FROM GREENLAWN CEMETARY GO 1.0 MILE ON DIRT ROAD THEN 700'± NORTH TO RANGE



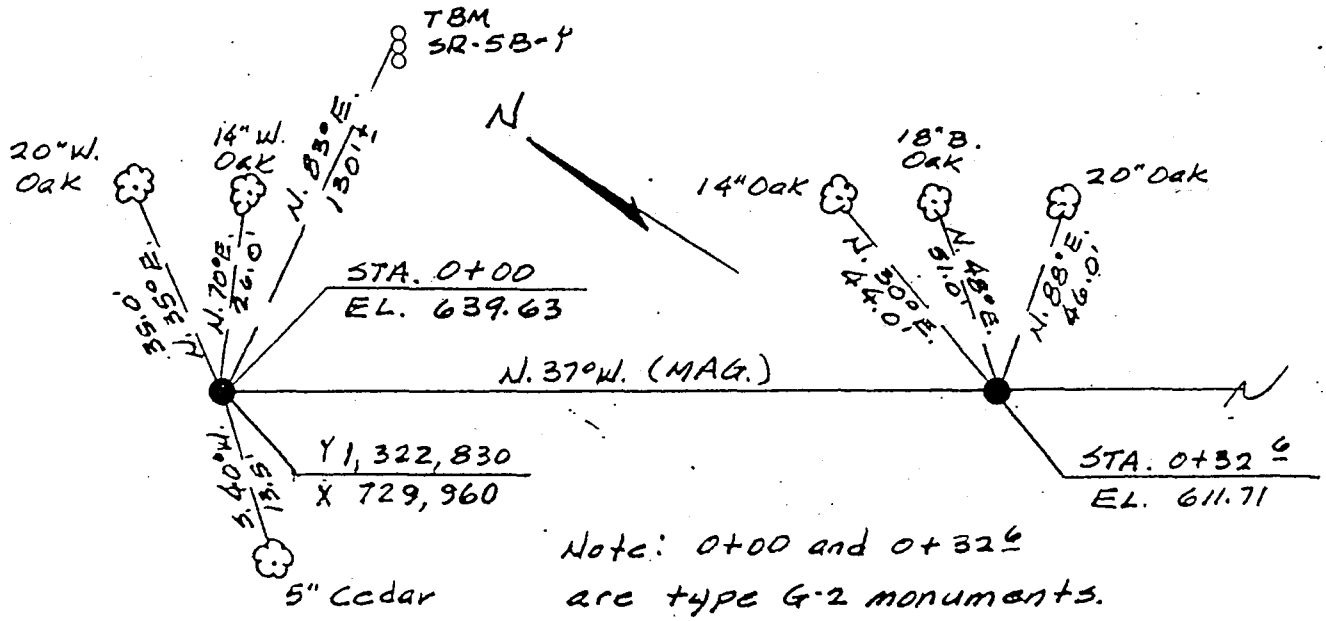
ACCESS SAME AS FROM WEST END OF RANGE

KENNETH BALK AND ASSOCIATES, ST. LOUIS, MO. SHEET NO. _____ ORIGINAL

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

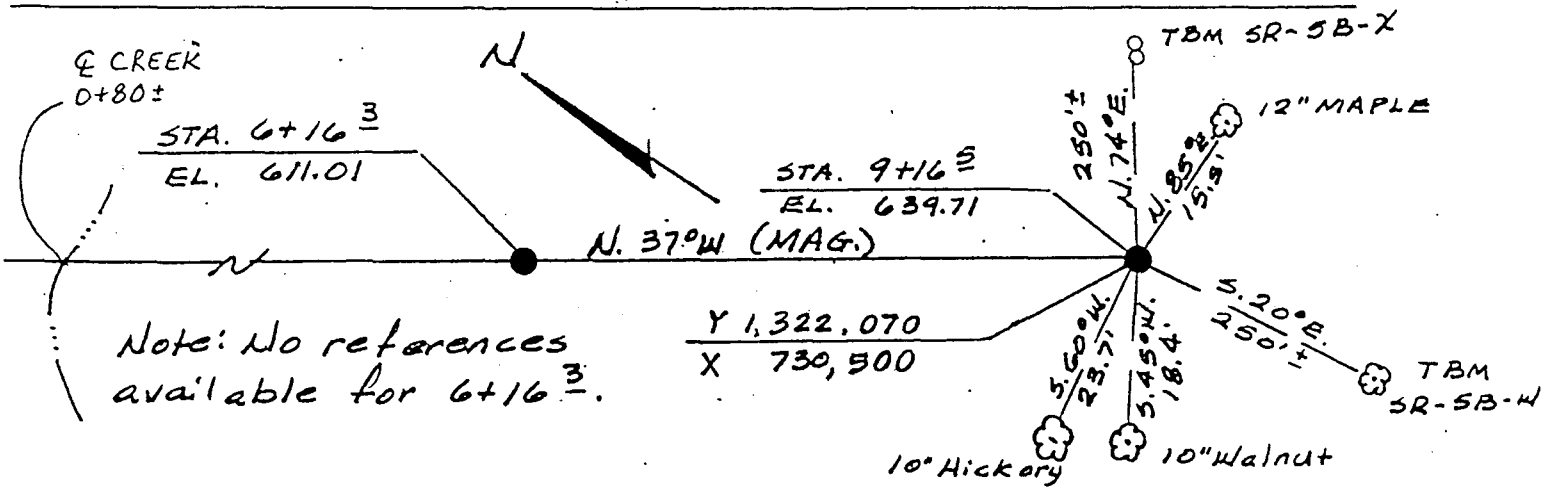
RANGE NO. SR-5B BY: Owen Zuroweste DATE: 7/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1. TOPO 11
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.



Note: 0+00 and 0+32 6 are type G-2 monuments.

From South end of guard rail of Hwy "J" bridge over Lick Creek, pack West 300'± along tree line to Range.



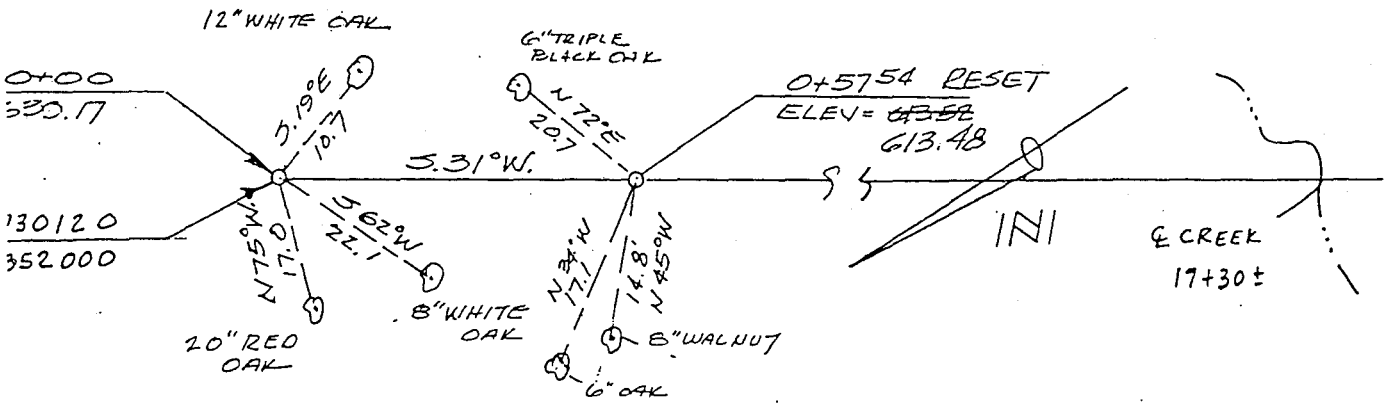
Note: No references available for 6+16 3.

From North end of guard rail of Hwy "J" bridge over Lick Creek, pack West 300'± along top of bluff to Range 100'± West of power lines.

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

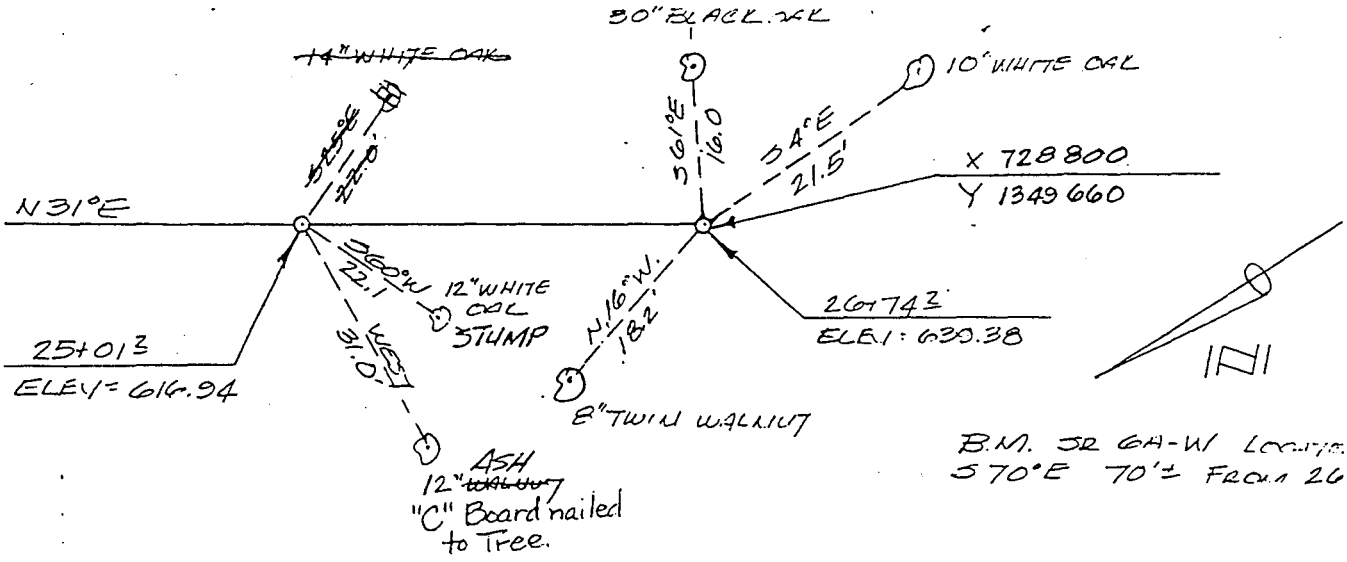
RANGE NO. SR 6A BY: G. BUDDE DATE: 6/21/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1. TOPO 9
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.



B.M SR 6A Y LOCATED
N 83°W 500'± FROM 0+00

FROM OLD HWY "J" BRIDGE GO 1.0 MILE
N.E. ON DIRT ROAD THEN WALK 1100'± S.W
THROUGH FIELD TO 0+00



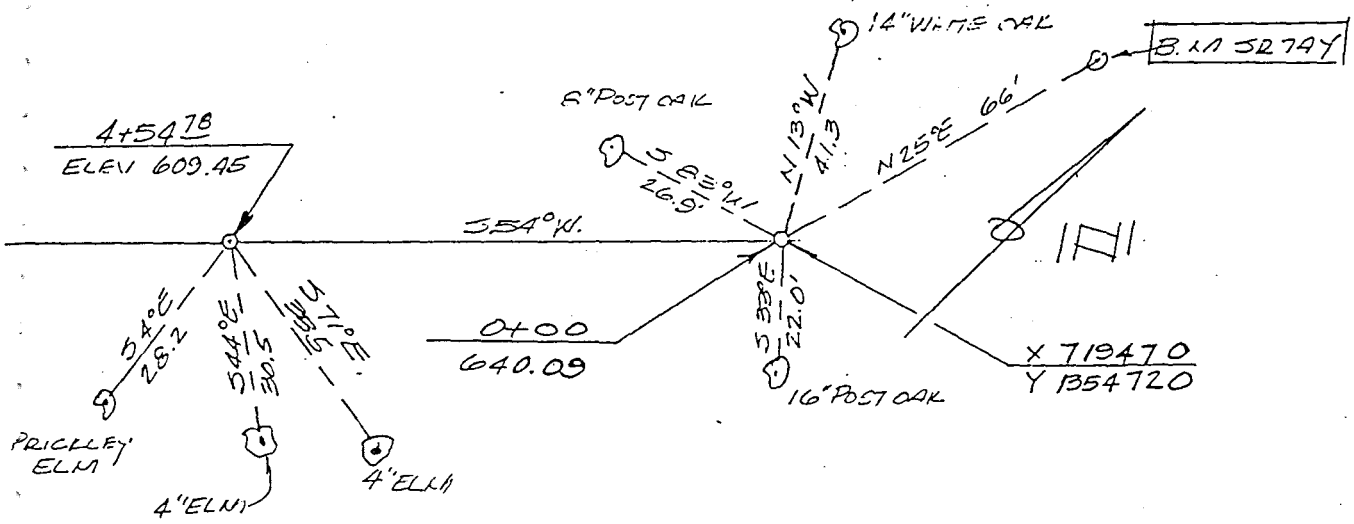
B.M. SR 6A-W LOCATED
S 70°E 70'± FROM 26+74.3

ACCESS WALK FROM NORTH END OF RANGE

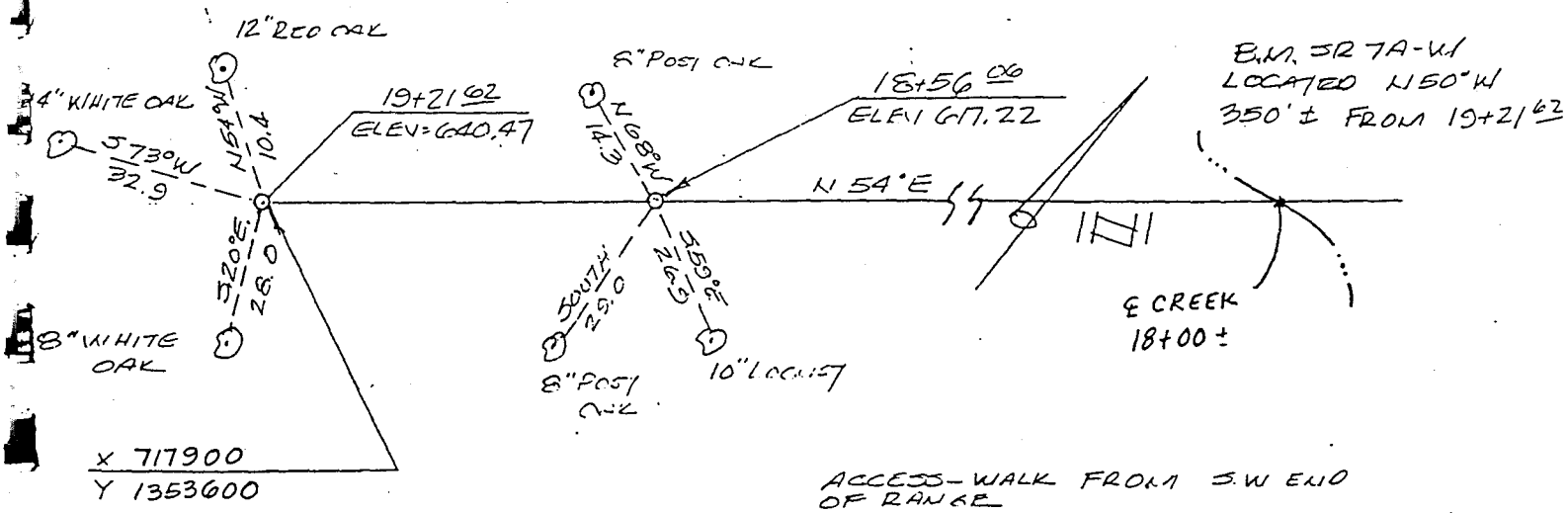
CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR 7A BY: G. BUDDE DATE: 6/21/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1. TOPO 16
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.



0.5 MILE WEST OF N.E COR SEC 18 T 55 N R 7E
ON HWY 'N' WALK SOUTH ON CENTER SECTION LINE
0.5 MILE TO RANGE



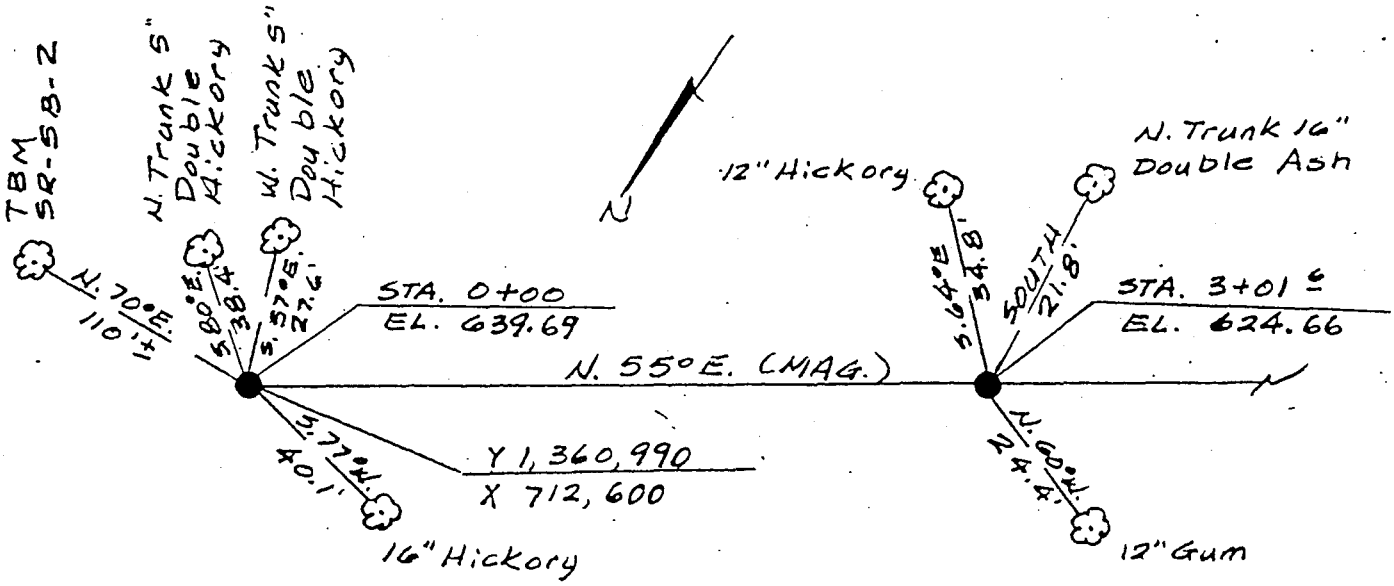
ACCESS-WALK FROM S.W END OF RANGE

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

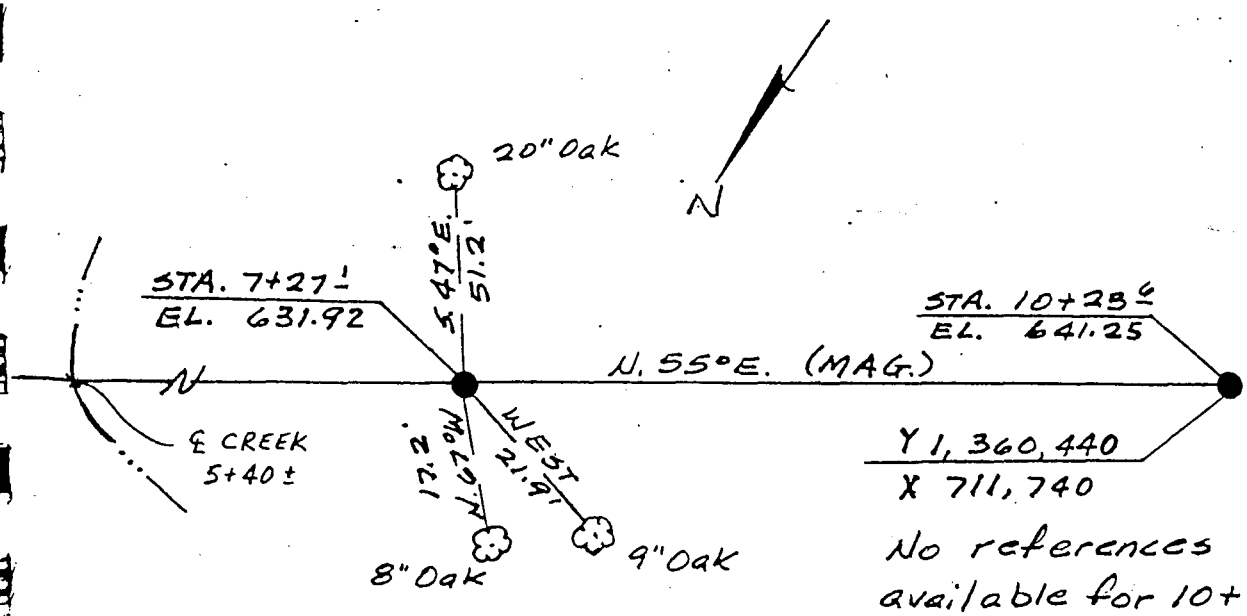
RANGE NO. SR-8B BY: Owen Zuroweste DATE: 7/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1.
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.

TOPO 15, 20



From intersection of Hwy 24 and Hwy "HH", travel South on Hwy "HH" 1.75 mi± to intersection of County Road. Then turn left on paved road and travel 1.25 mi± passed 2nd curve to right. Then pack N-E .25 mi.± to Range.



No references available for 10+23 ℄.

All monuments are alum. type G-2.

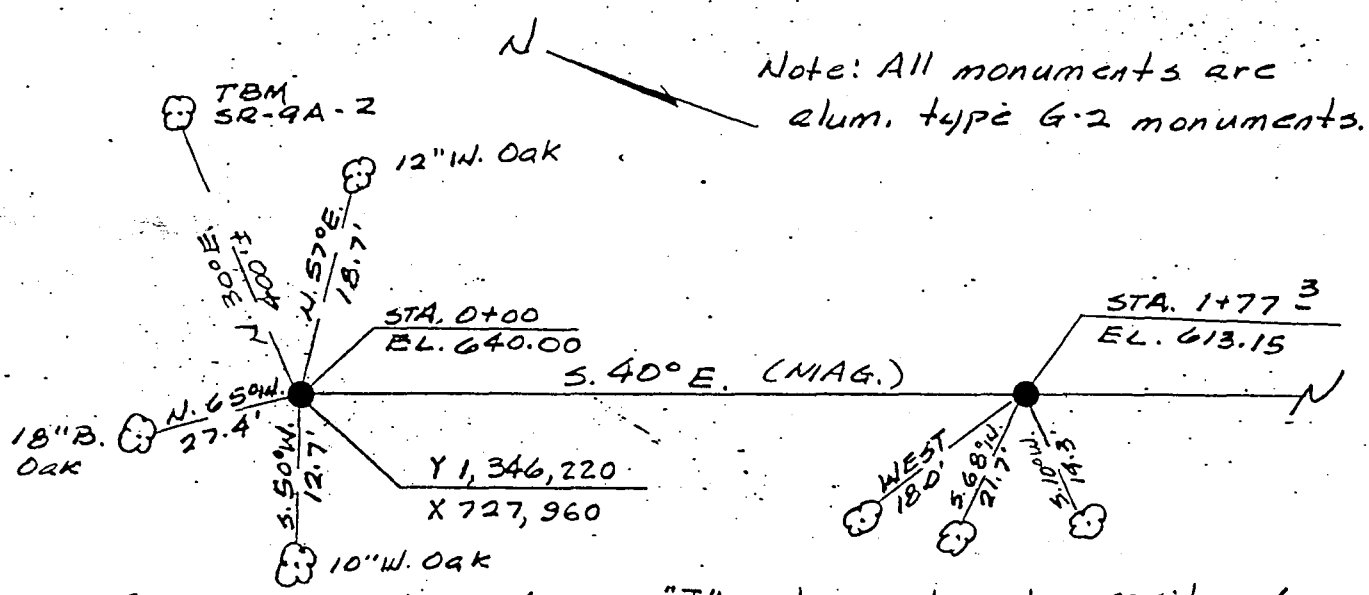
KENNETH BALK AND ASSOCIATES, ST. LOUIS, MO. SHEET NO.

ORIGINAL

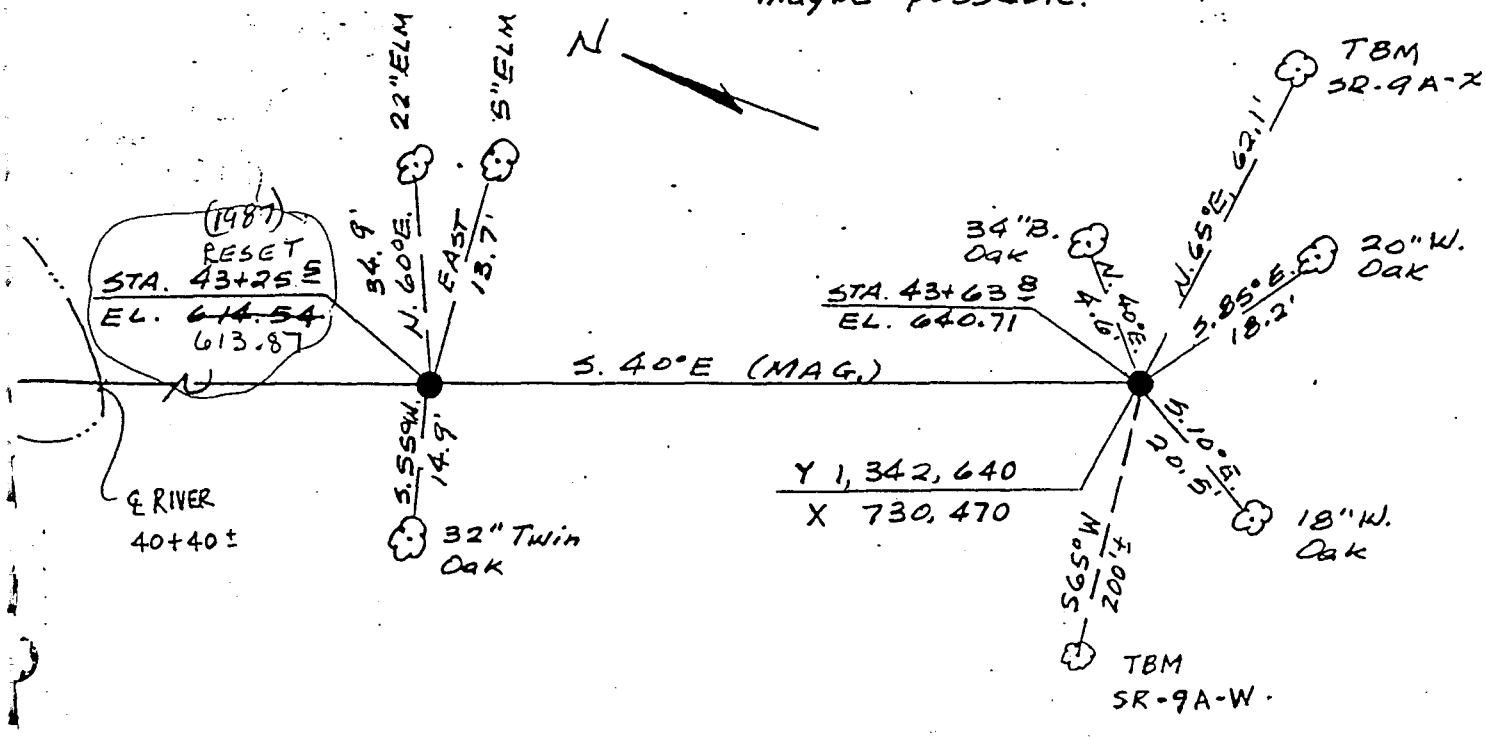
CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR-9A BY: Owen Zurowieste DATE: 6/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1. TOPO 9
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.



From intersection of Hwy. "J" and gravel road opposite of Mt. Hope Church, travel West on gravel road 500'±. then travel North across private property with permission of land owner, .25 mi.±. Then pack North 200'± to 43+63 8. Crossed river in boat and packed North 4000'± to 0+00. Other access maybe possable.

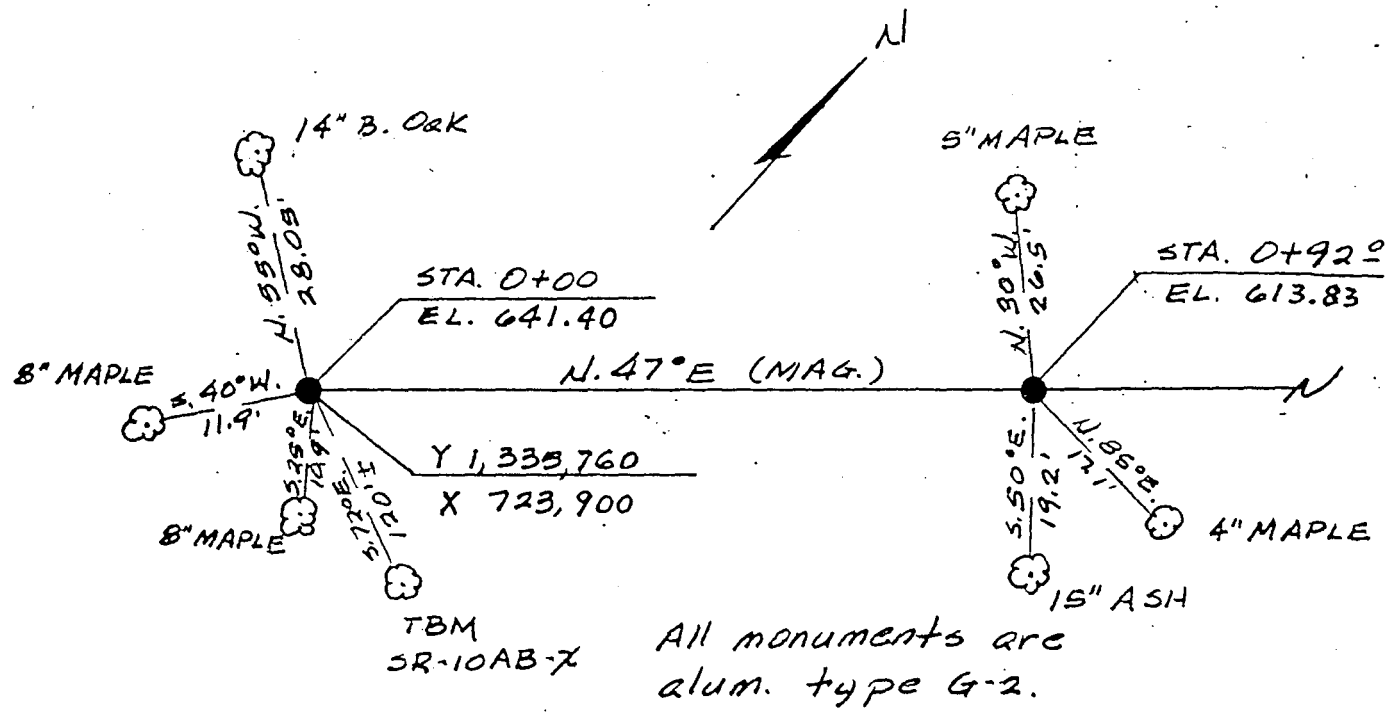


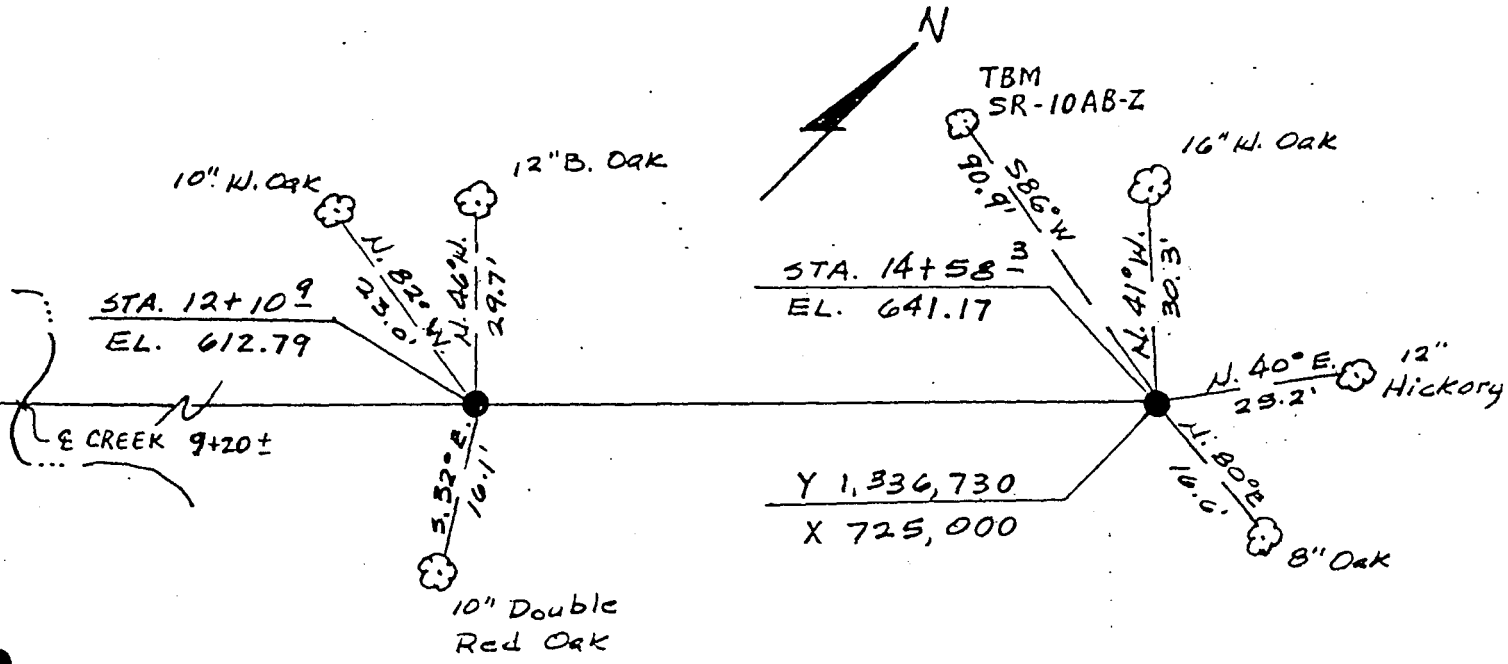
KENNETH BALK AND ASSOCIATES, ST. LOUIS, MO. SHEET NO. _____ ORIGINAL

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR-10AB BY: Owen Zuroweste DATE: 7/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1. TOPO 18
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.





CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR-10AB BY: Owen Zurowesta DATE: 7/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1.
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.

Station 0+00:
From intersection of Hwy "J" and Hwy "BB", travel West on Hwy "BB" 1.25 ± mi. Then pack North 0.75 ± mi. to range.

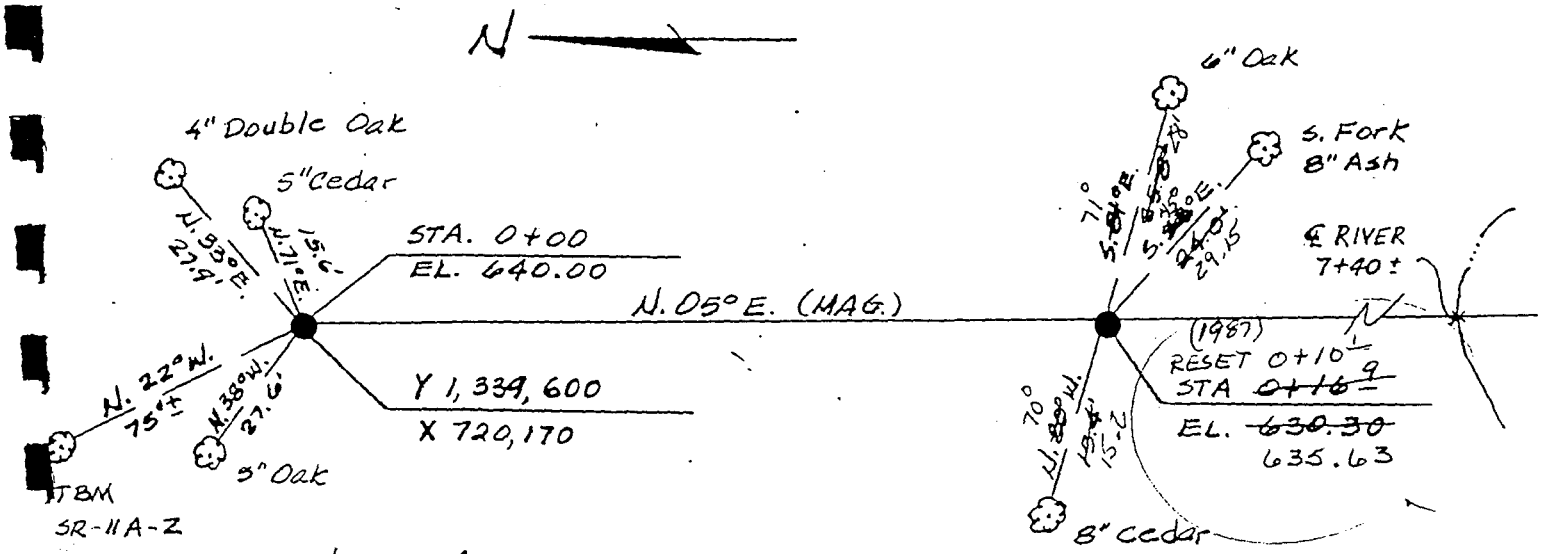
Station 14+58 ±:
Same as above.

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

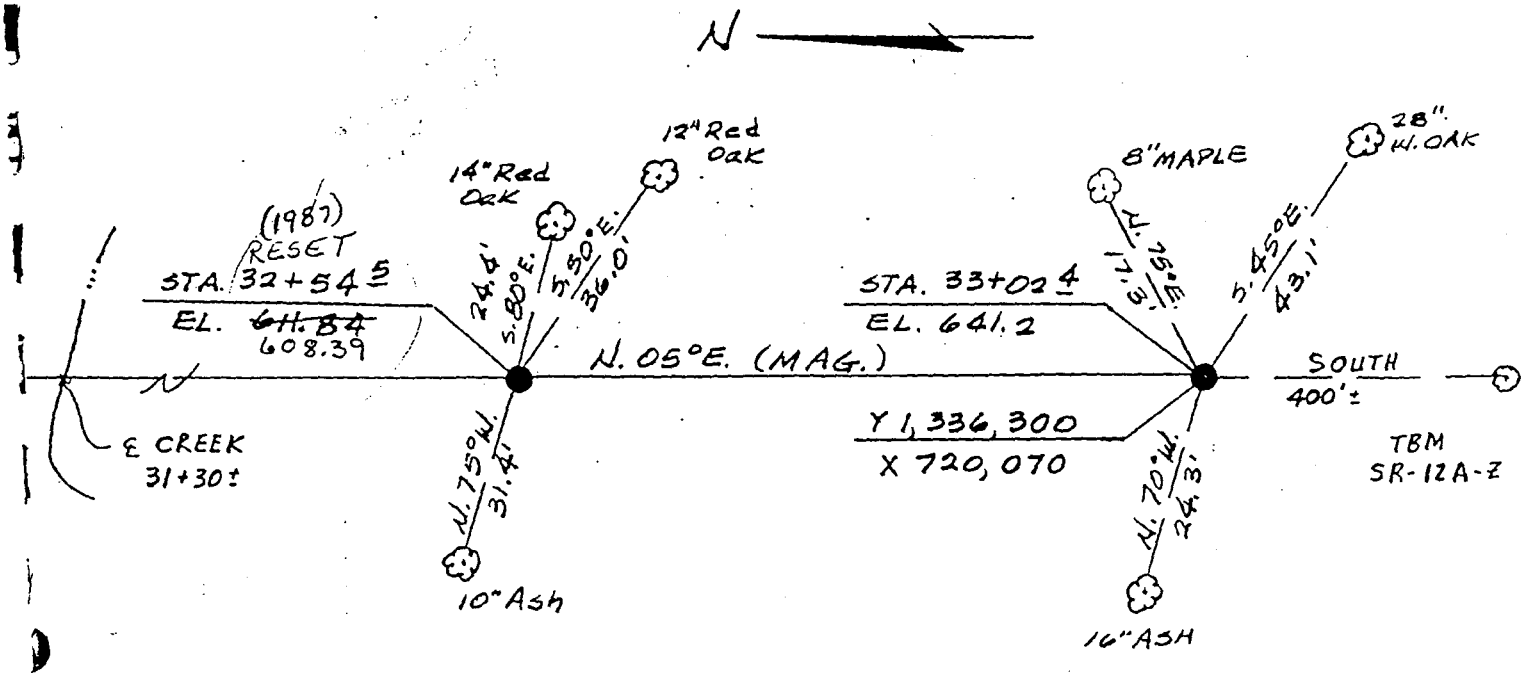
RANGE NO. SR-11A BY: Owen Zurowleste DATE: 6/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1.
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.

TOPO 17, 18



Note: All monuments are type G-2.



KENNETH BALK AND ASSOCIATES, ST. LOUIS, MO. SHEET NO.

ORIGINAL

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR-11A BY: Owen Zurowleste DATE: 6/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1.
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.

Station 0+00:
From intersection of Hwy "J" and Hwy "BB", travel West on Hwy "BB" 2.75± mi. to gravel road on right at end of pavement. Then travel North on gravel road 1.8± mi. Then turn East for 300'± to middle of range. Then pack North 1900'± across river.
4WD and boat need.
Possable access thru Indian Creek Access Area.

Station 33+02±:
Same access as for 0+00 except pack South 1500'±.

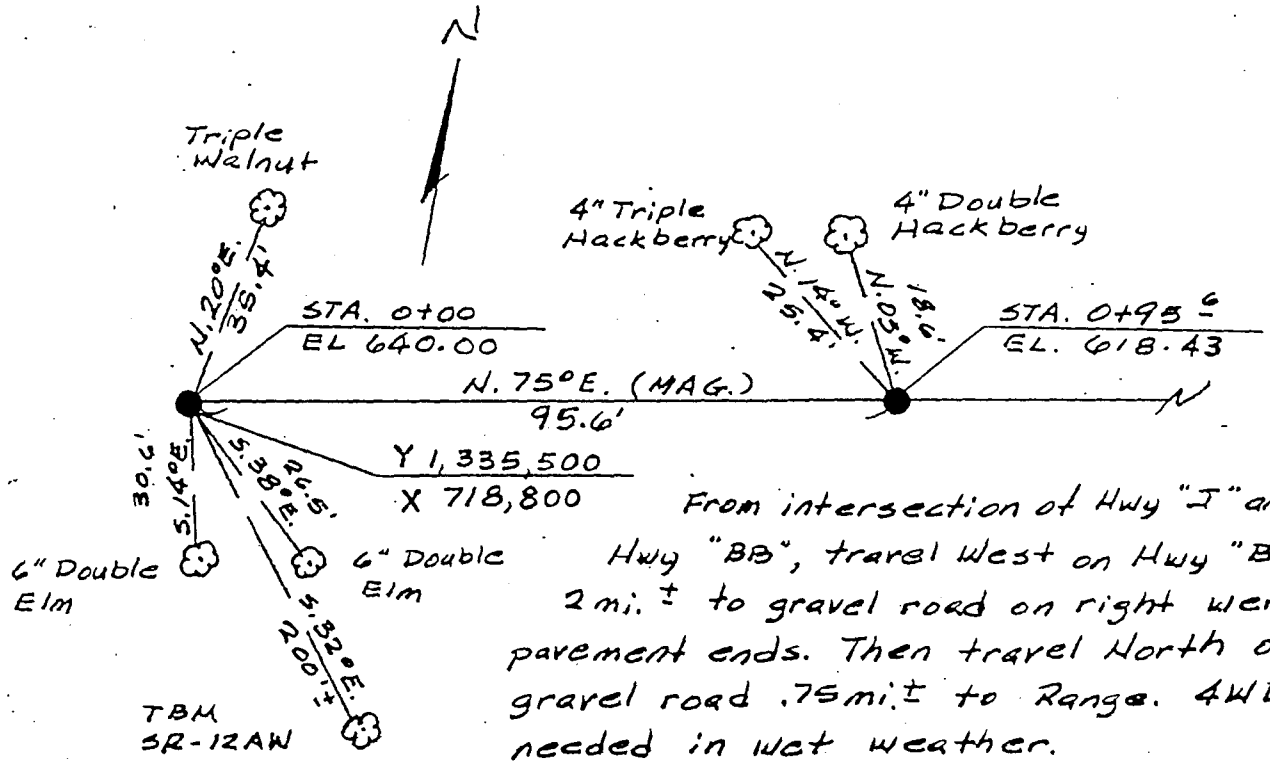
ORIGINAL

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

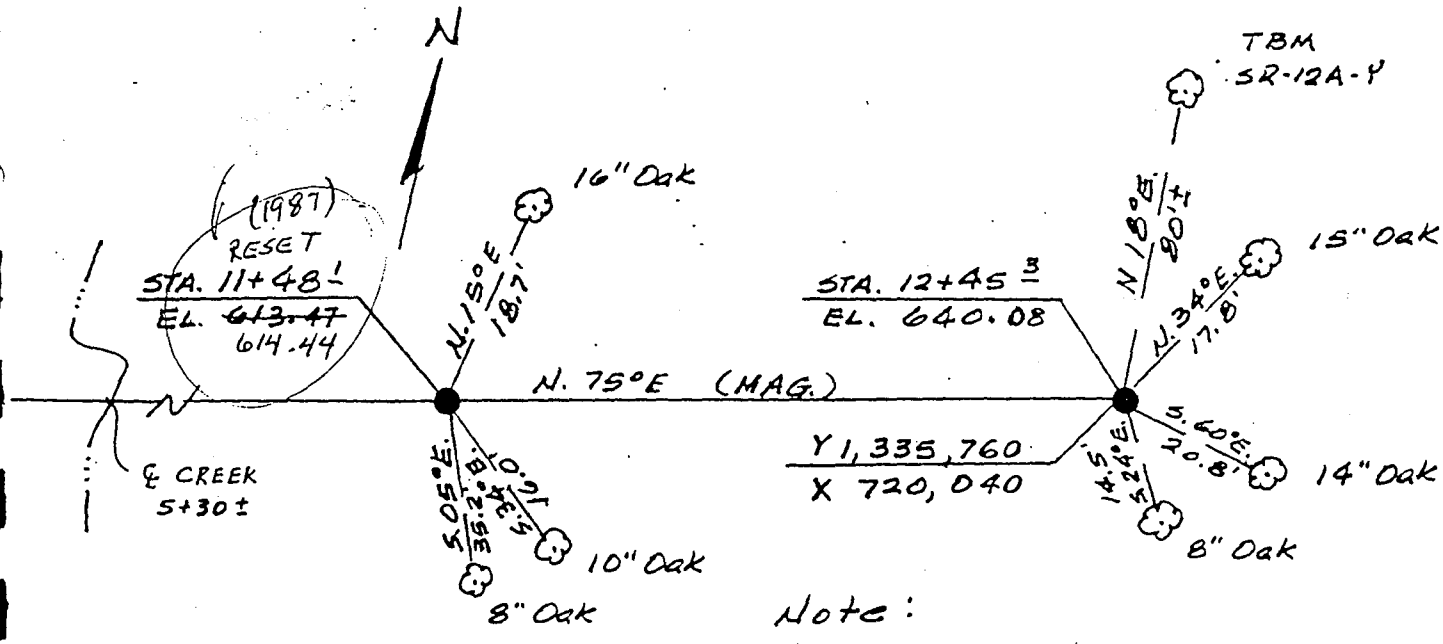
RANGE NO. SR-12A BY: Owen Zuroweste DATE: 5/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1.
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.

TOPO 18



From intersection of Hwy "I" and Hwy "BB", travel West on Hwy "BB" 2 mi. ± to gravel road on right were pavement ends. Then travel North on gravel road .75 mi. ± to Range. 4WD needed in wet weather.



Note:
All monuments are alum. type G-2.

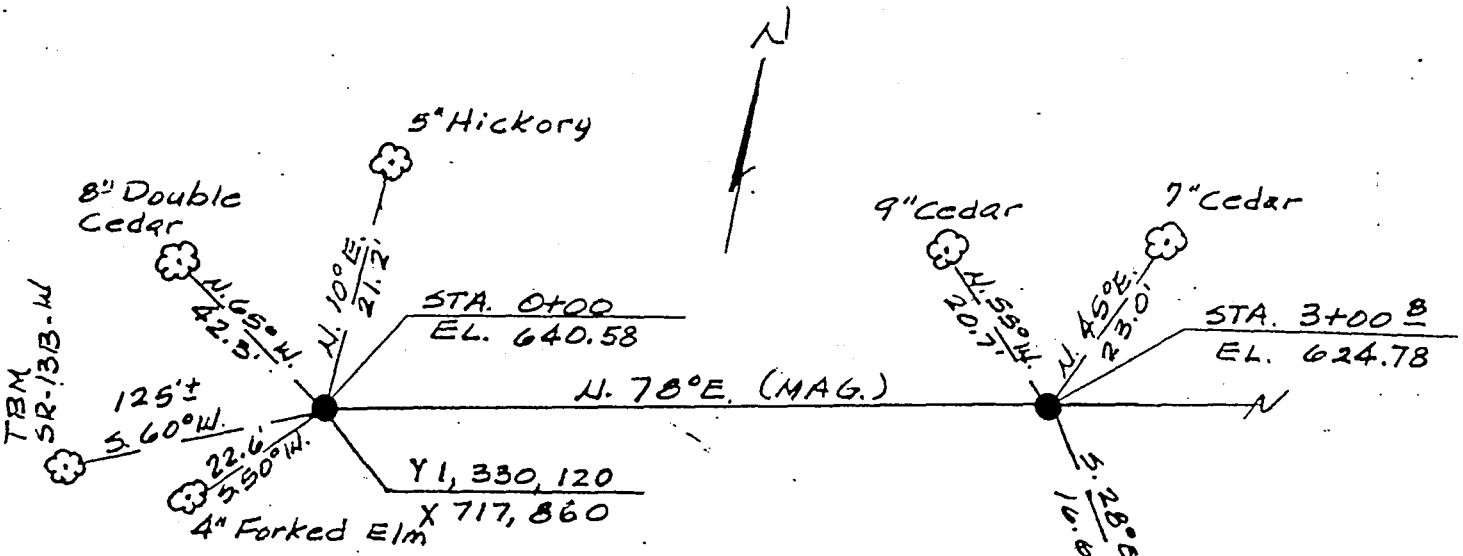
KENNETH BALK AND ASSOCIATES, ST. LOUIS, MO. SHEET NO. _____

ORIGINAL

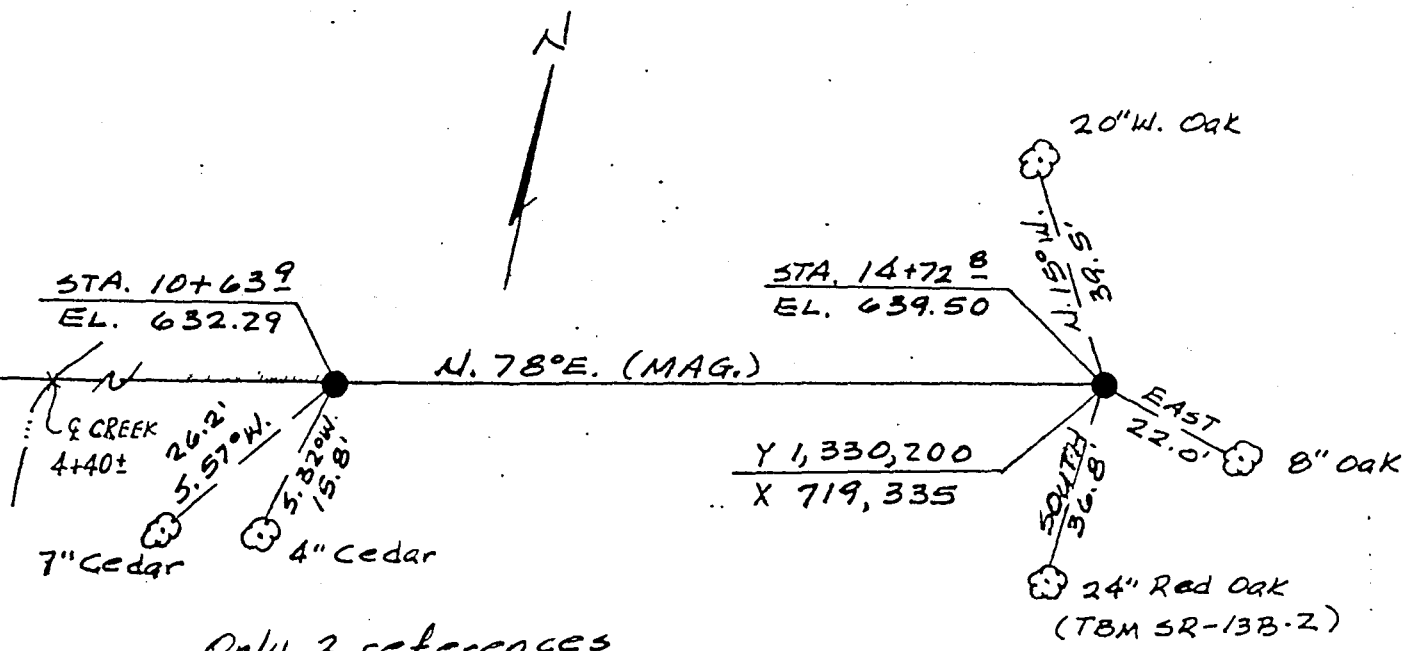
CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR-13B BY: Owen Zuroweste DATE: 7/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1. TOPO 18
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.



From intersection of Hwy. "I" and Hwy "BB", travel west on Hwy. "BB" 2.1 mi.± to 100'± East of Pigeon Roost Creek. Then turn South on old road (4WD only) and travel South 400'± to range.

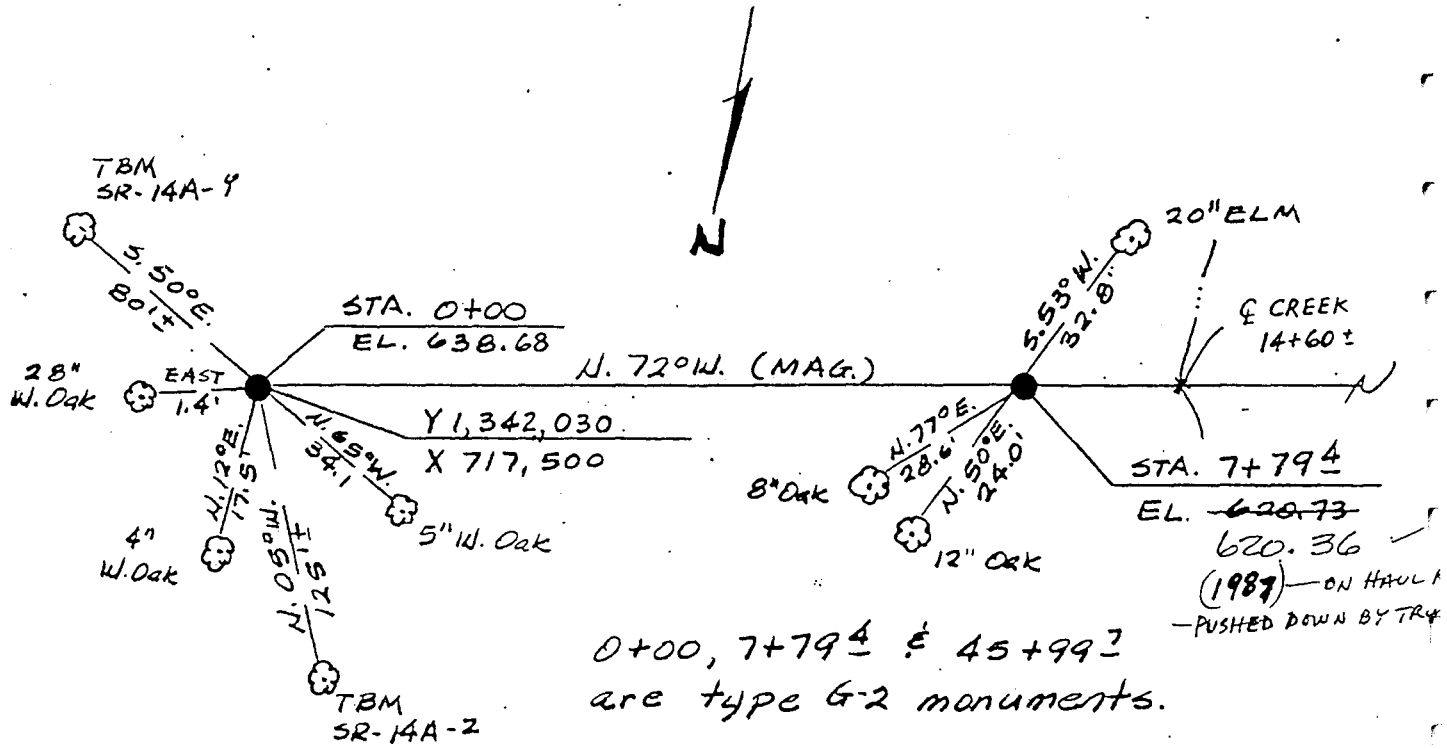


Only 2 references available for 10+63 9

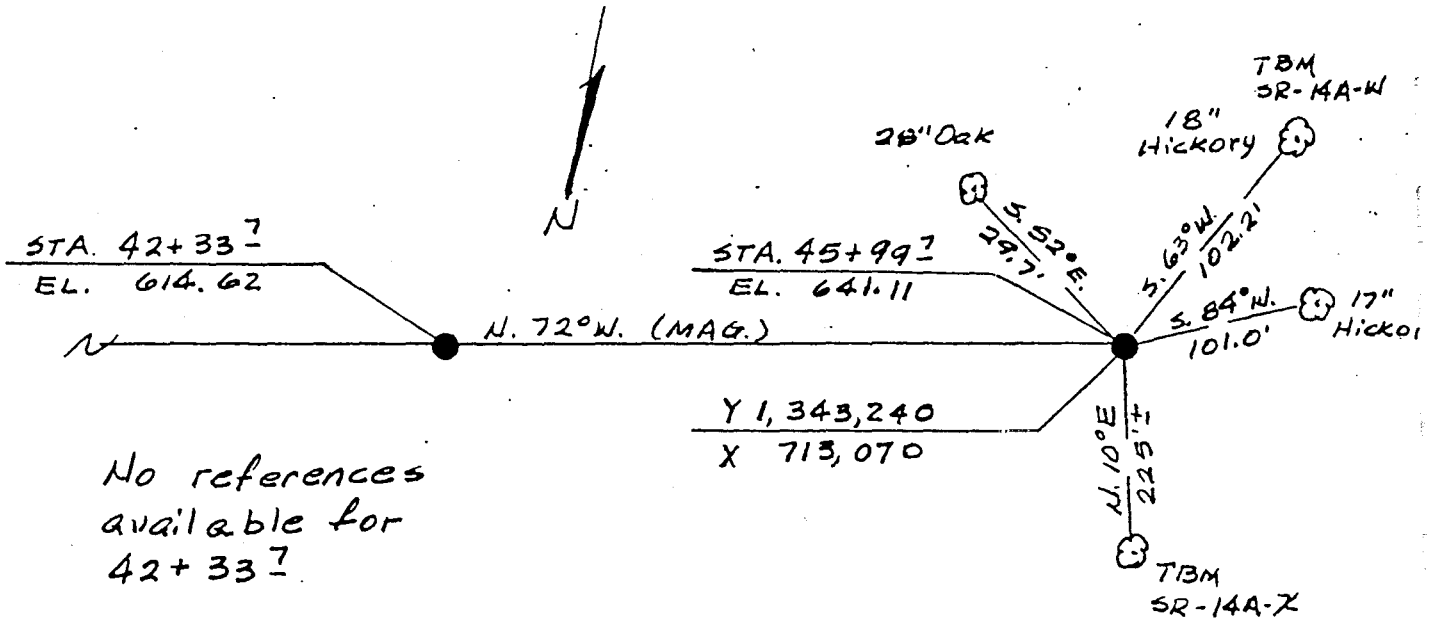
CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR-14A BY: Owen Zuroweste DATE: 7/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1. TOPO 17
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.



0+00, 7+79.4 & 45+99.7 are type G-2 monuments.



No references available for 42+33.7

KENNETH BALK AND ASSOCIATES, ST. LOUIS, MO. SHEET NO. _____

ORIGINA

DACW43-82-D-0011

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR-14A BY: Owen Zuroweste DATE: 7/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1.
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.

Station 0+00:
From Main Road of India Creek Access Area, turn West on Concessionaire Rd and travel West to West parking Area. Then pack South 50' ± to range.

Station 45+99 ?:
From intersection of Hwy 24 and Hwy "HH", travel South on "HH" 1.75 mi. ± to intersection of County Road. Then turn left on paved road and travel 3 mi ± to gravel road on right 300' ± North of "Indian Creek Access Area" sign. Take gravel road South-West 2.5 mi. ± to "T" intersection of gravel roads. Take gravel road to South-West 2 mi. ±. Then pack East 1/4 mi ± to Range, 500' ± North of Bannister-Mecker Cem.

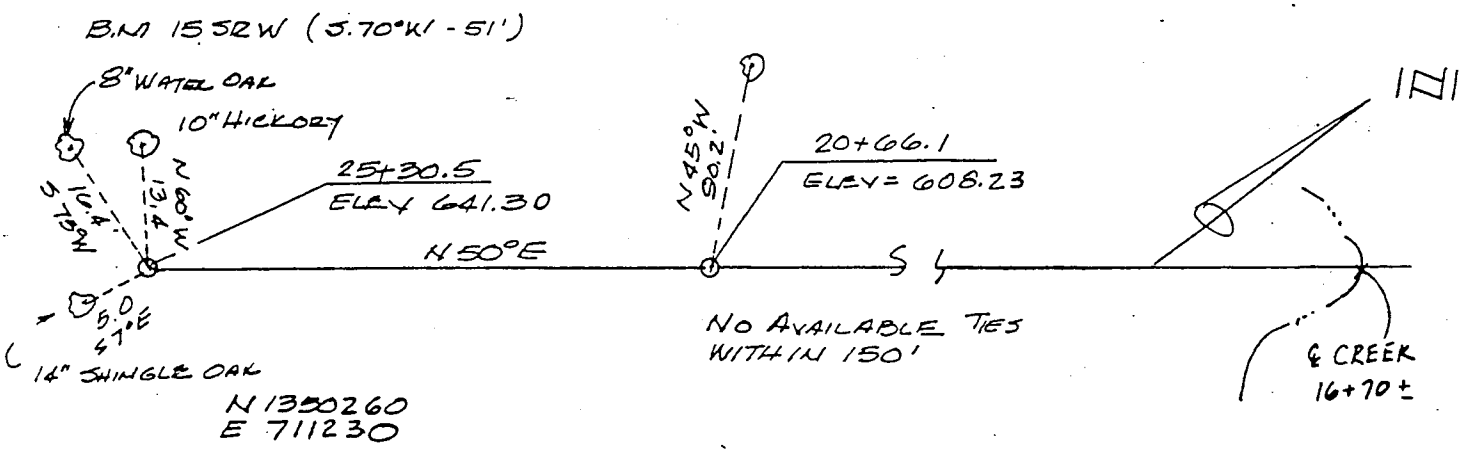
ORIGINAL

KENNETH BALK AND ASSOCIATES, ST. LOUIS, MO. SHEET NO.

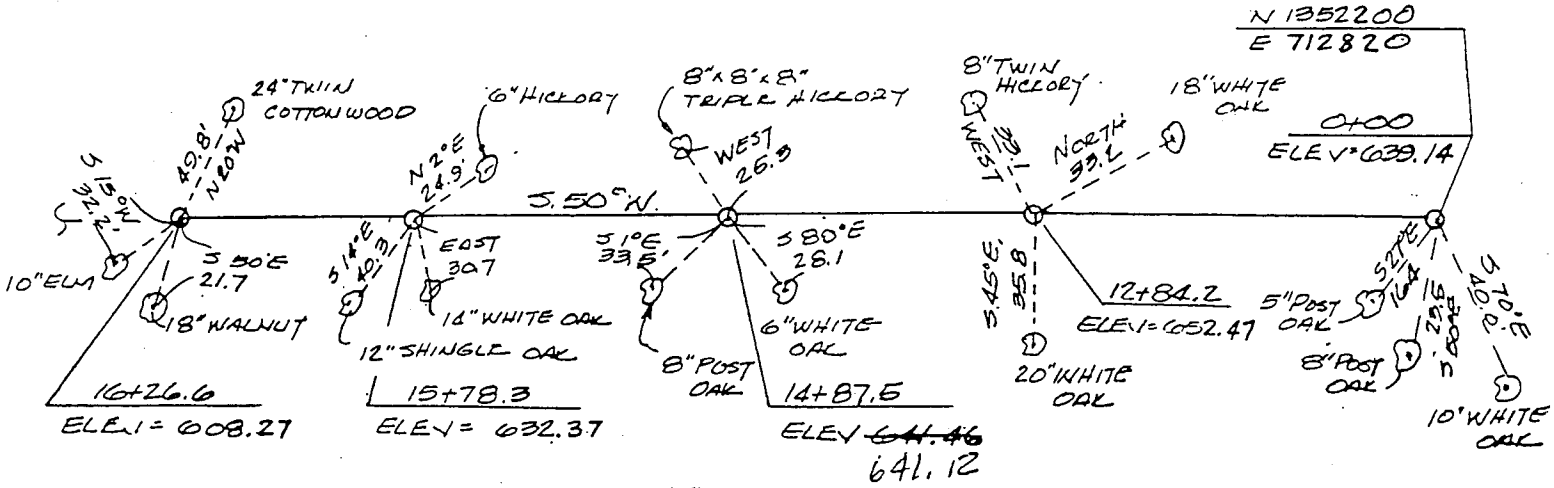
CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. 15-B BY: GENE BUDDE DATE: 10/5/82

NOTE: ALL MONUMENTS ARE 3" DIA. ALUM. TYPE B-1 OR G-2 TOPO 16, 21
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.



FROM CORNER OF SECTIONS 14-13-23-24 T.55N., R8W DRIVE SOUTH ON COUNTY ROAD 800'±, THEN EAST ON FIELD ROAD ALONG TREE LINE 300'± TO RANGE AT STA 23+0±



ACCESS TO 0+00 THROUGH INDIAN CREEK RECREATIONAL AREA NEED 4WD VEHICLE

TBM SR-15B-Z (N 74°E, 230'± OF 0+00)

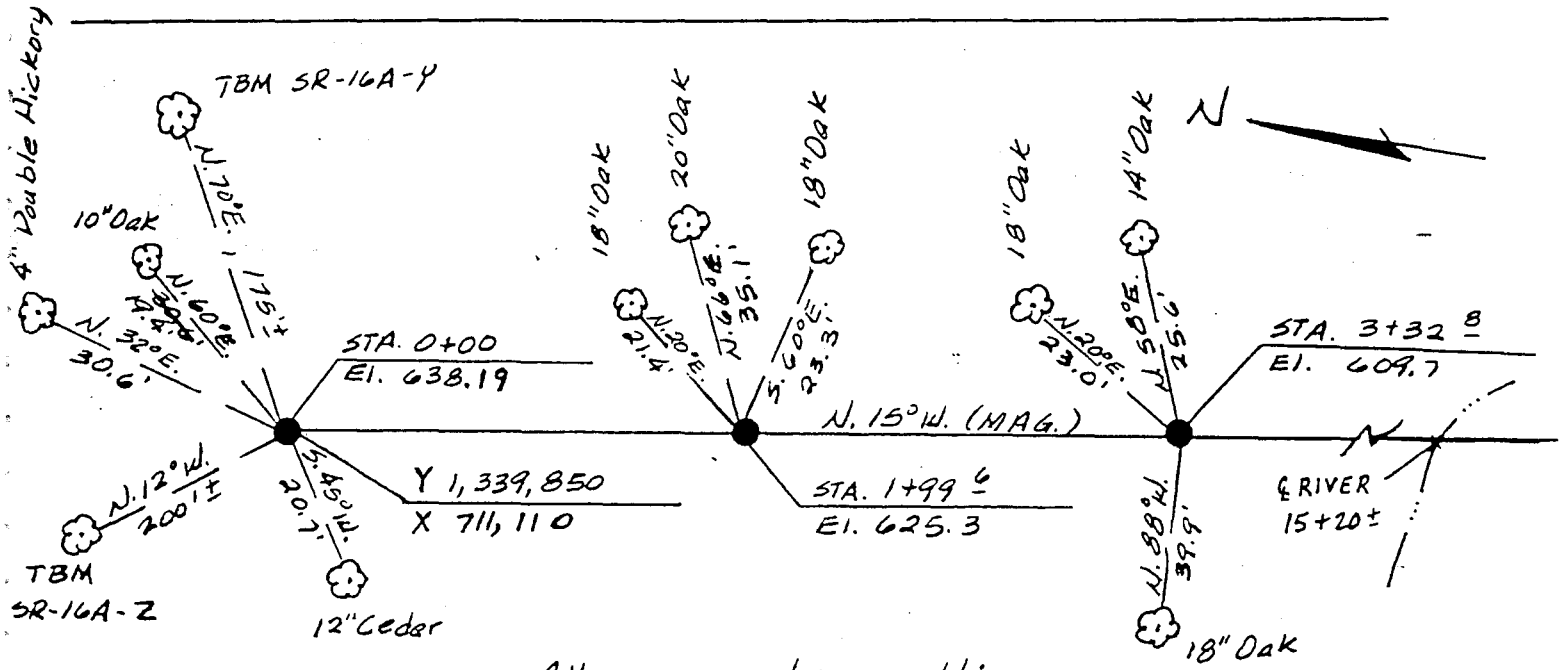
ORIGINAL

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

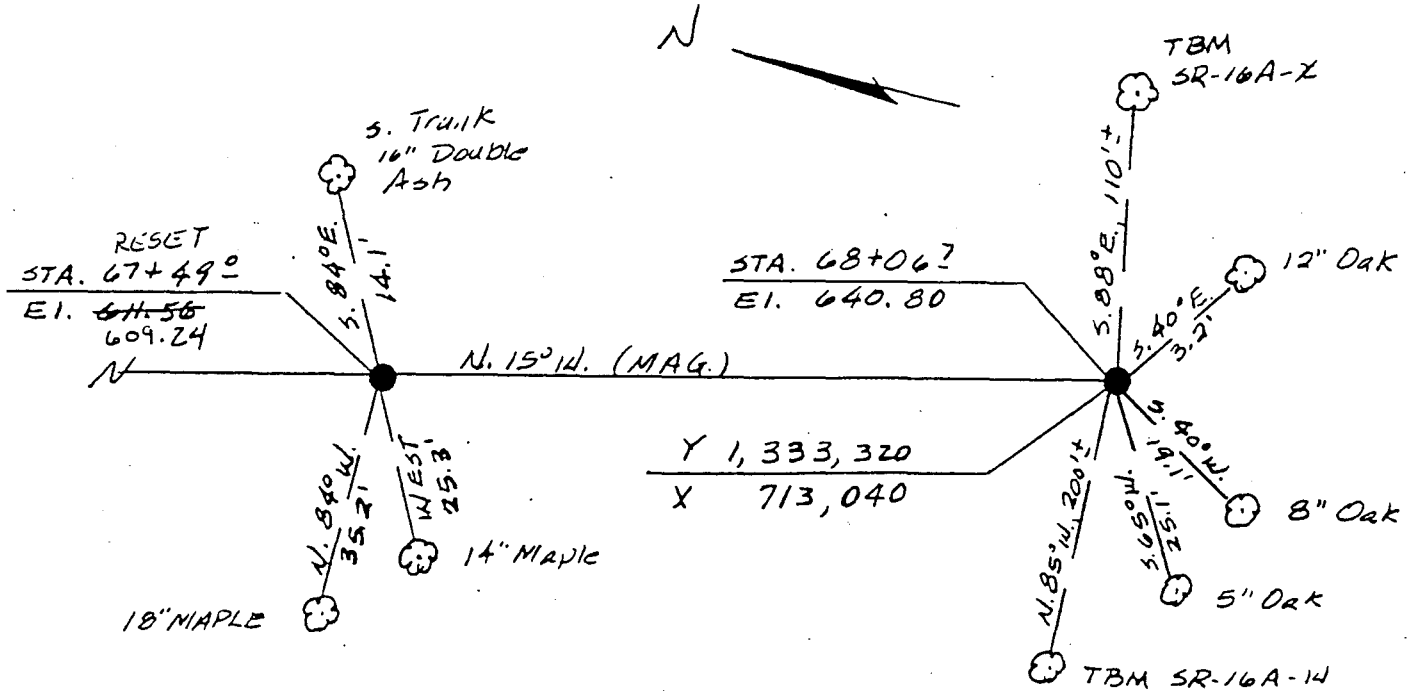
RANGE NO. SR-16A BY: Owen Zuroweste DATE: 6/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1.
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.

TOPO 18, 23



All monuments on this Range are Alum. type G-2



KENNETH BALK AND ASSOCIATES, ST. LOUIS, MO. SHEET NO. _____

ORIGINAL

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR-16A BY: Owen Zurowieste DATE: 6/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1.
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.

Station 0+00:
From intersection of Hwy 24 and Hwy HH, travel South on HH 1 3/4 mi ± to intersection of County Road. Then turn left on paved road and travel 3 mi ± to gravel road on right 300' ± North of "Indian Creek Access Area" sign. Take gravel road South-West 2.5 mi ± to "T" intersection of gravel roads. Take gravel road to South-West 2 3/4 mi ± to old Indian Burial Grounds known as Crigler Mounds. Then pack South 400' ± to Range.

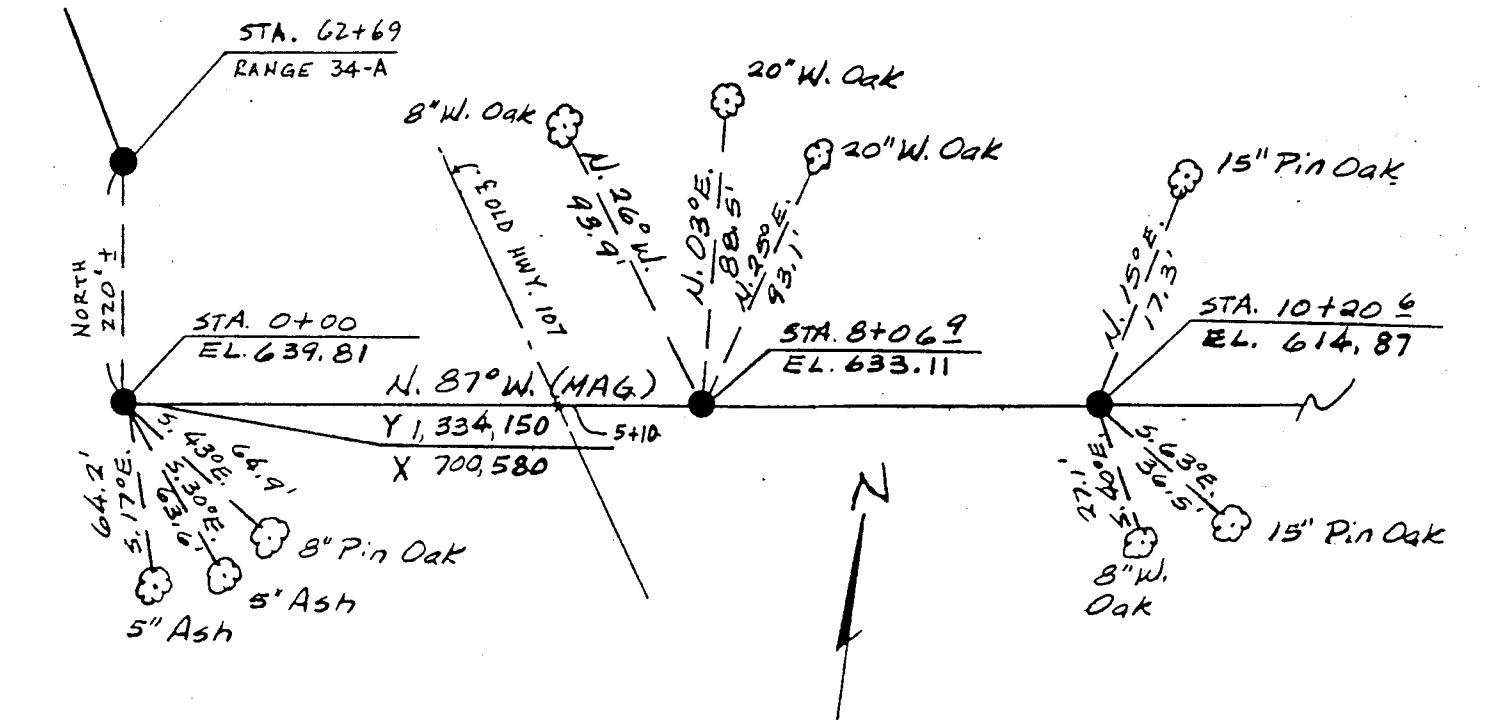
Station 68+06 ?:
From intersection of Hwy 107 and Hwy 154, travel East on Hwy 154 to intersection of gravel road (County Road C-29). Then North on gravel road 3 mi ± to intersection of East-West gravel road. Then West on gravel road 200' ± to old field road on right. Then North on old field 1/2 mi ± to North-West corner of field. Then pack North 150' ± to range.
4WD needed on field road.

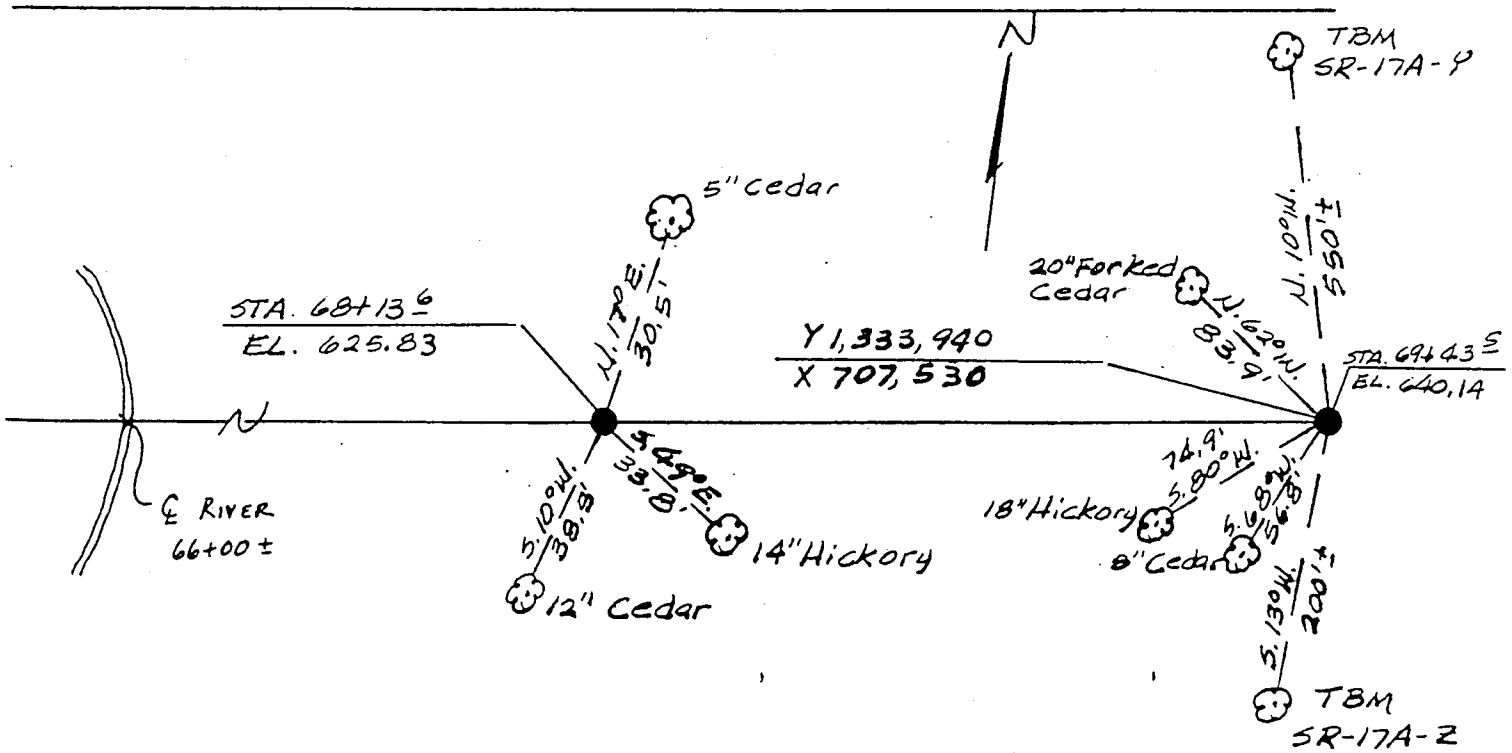
CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR-17A BY: Owen Zurowleste DATE: 5/82

TOPO 23

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1.
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.





ORIGINAL

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR-17A BY: Owen Zurowaste DATE: 5/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1.
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.

Station 0+00:
From intersection of Old Hwy U & Old Hwy 107 in the town of Florida, travel North on Old Hwy 107 1/4 mi.± to where pavement of Old Hwy 107 ends. The pack West 500'± to station 0+00.

STATION 69+43±:
From "T" intection of gravel road and County Road 3-29 at S. 1/4 cor SEC. 1, T. 55N., R. 7W., travel West on gravel road 1 mi.± to Old gravel road on right (500'± East of County Road C-29W.). Then North on old gravel road 3/4 mi.± to Range.

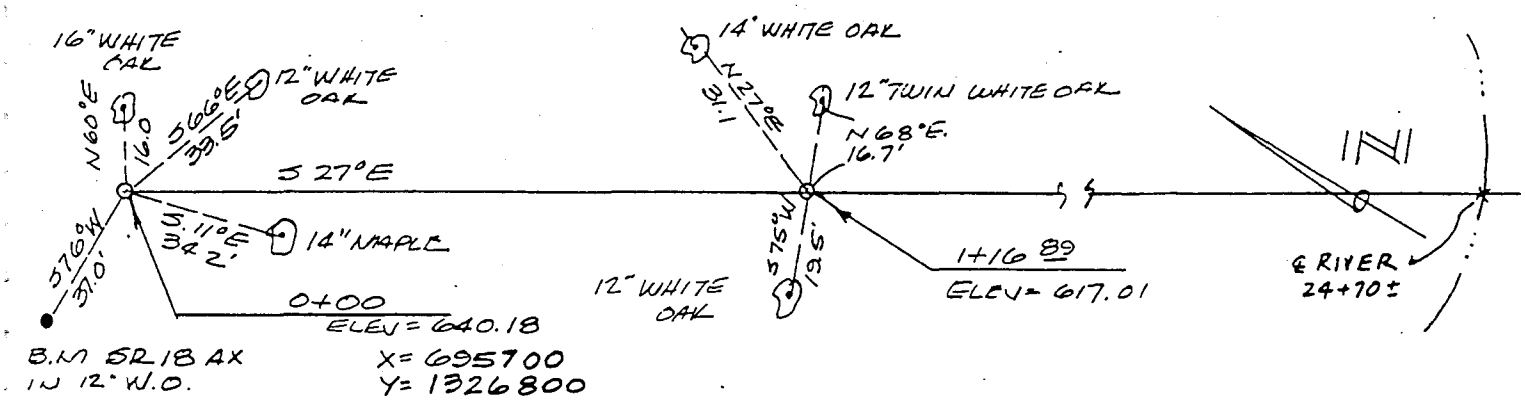
ORIGINAL

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

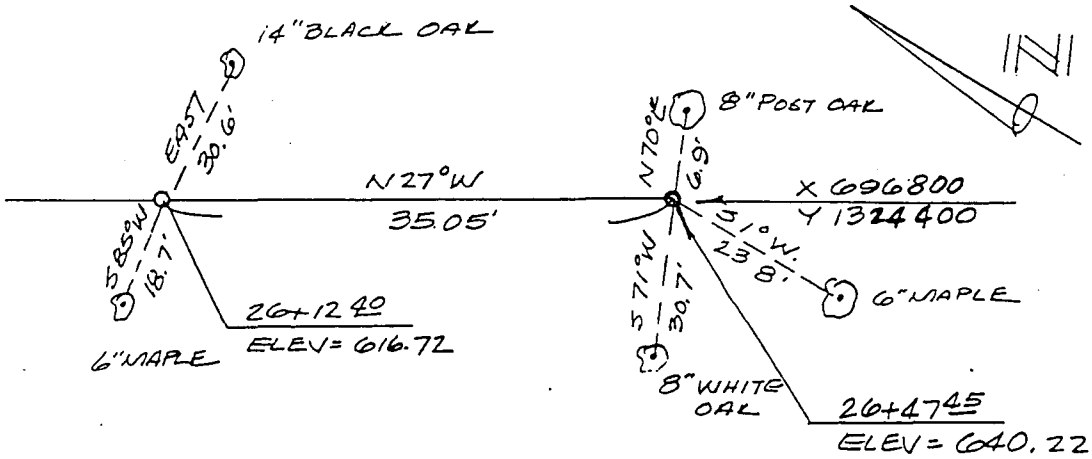
RANGE NO. SR 18-A BY: G. BUDDE DATE: 6/11/82

TOPO 30

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1.
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.



FROM INTERSECTION OF CAMPGROUND ROAD SOUTH OF BUZZARD'S ROOST AND HWY #107 DRIVE WEST ON CAMPGROUND ROAD 0.5 MI. THEN WALK NORTH 1000'± TO 0+00



B.M SR 18A Y
LOCATED S 62°E
110'± FROM 26+47

FROM INTERSECTION OF HWY #107 AND HWY "U" DRIVE 0.8' MIL EAST TO ASPHALT ROAD. THEN SOUTH TO GRAVEL ROAD, THEN SOUTH ON GRAVEL ROAD 0.3' MIL TO "T" INTERSECTION THEN WALK S.W ON DIRT ROAD 0.5 MIL THEN LEAVING ROAD WALK THRU WOODS IN S.W DIRECTION 800'± TO 26+47 45

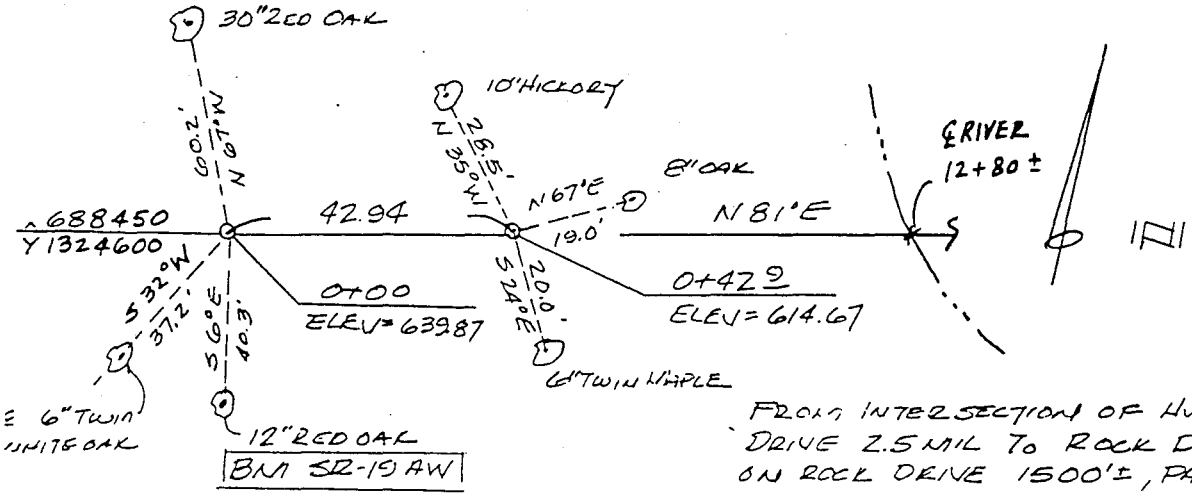
ORIGINAL

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

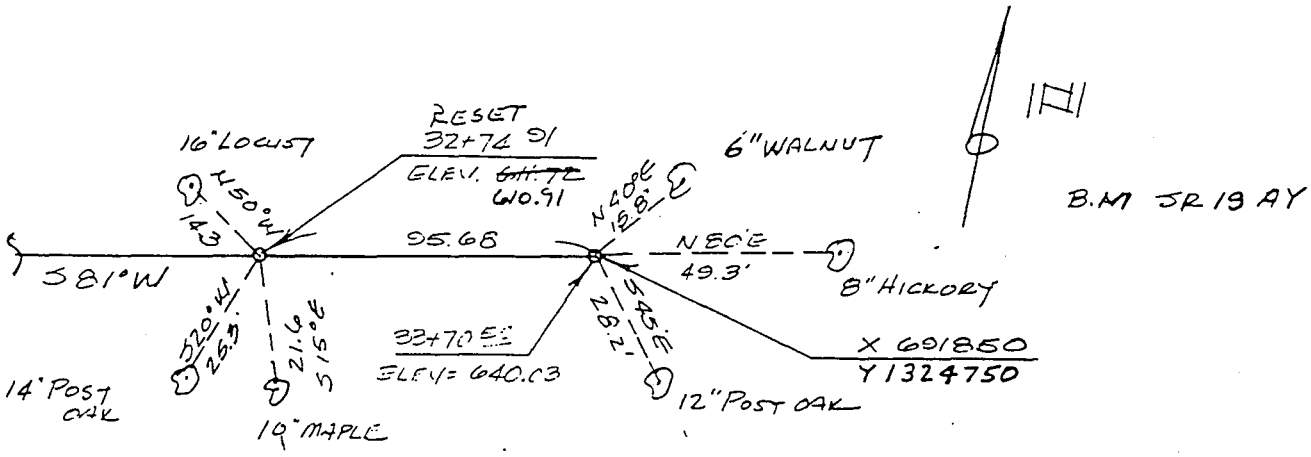
RANGE NO. SR-19A BY: G. BUDDE DATE: 6/11/82

TOPO 30

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1.
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.



FROM INTERSECTION OF HWY # 154 & HWY 107 DRIVE 2.5 MIL TO ROCK DRIVE THEN NORTH ON ROCK DRIVE 1500'±, PARK AT HOUSE THEN WALK N 12°E 2200' THEN EAST 900' TO 0+00



FROM BOAT RAMP ROAD IN MARK TWAIN STATE PARK WALK 1.0 MIL N.W ON DIRT TRAIL TO RANGE LINE

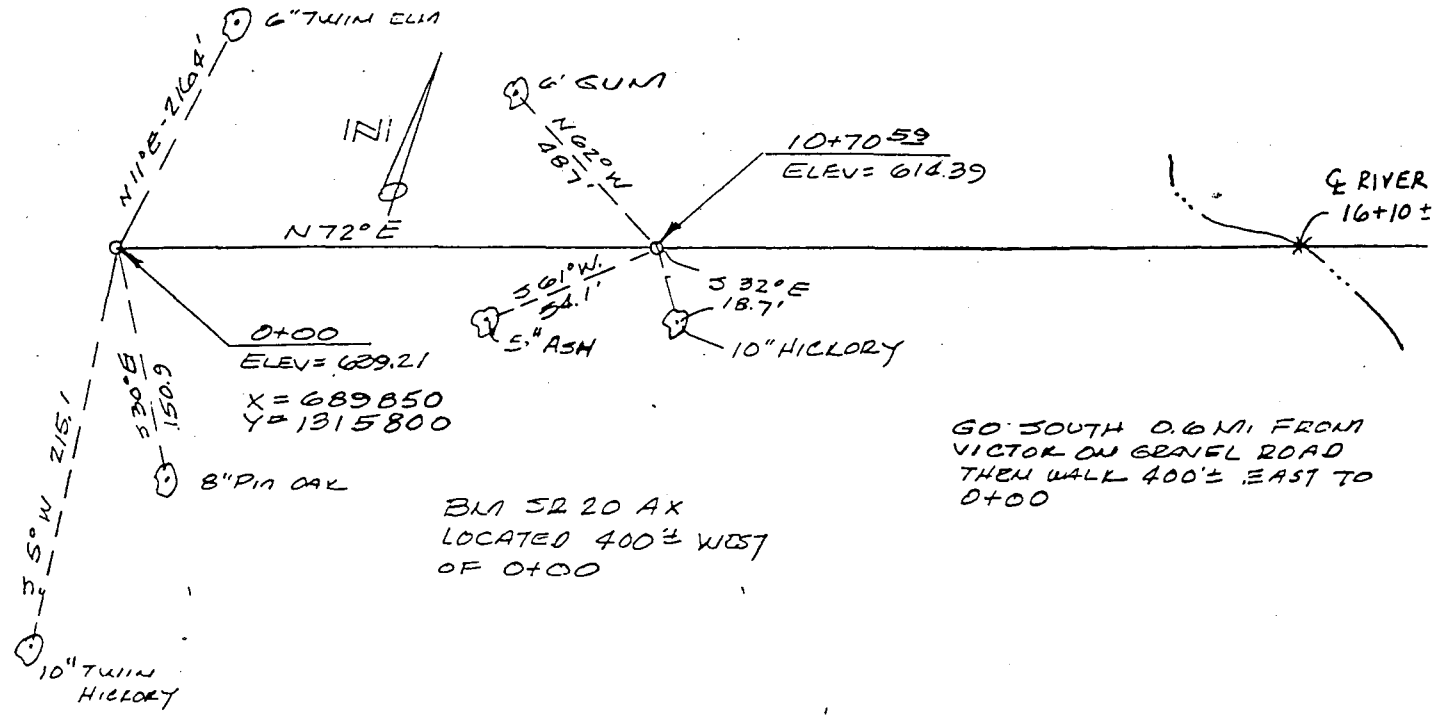
ORIGINAL

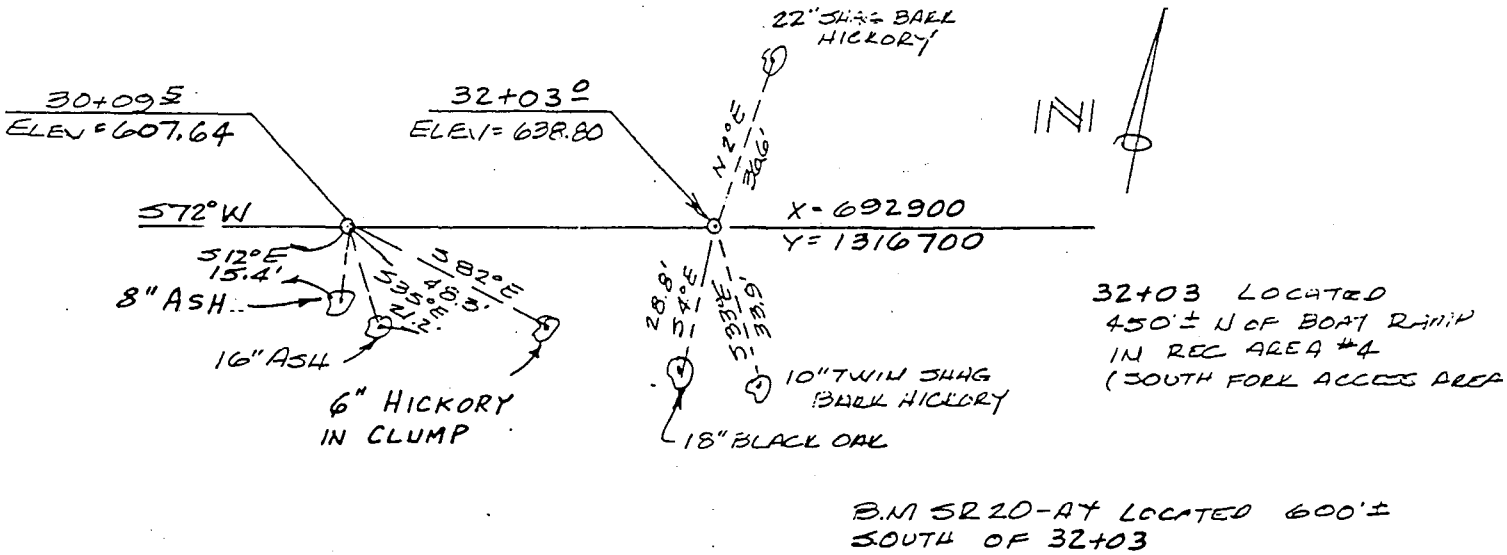
KENNETH BALK AND ASSOCIATES, ST. LOUIS, MO. SHEET NO.

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR 20 A BY: G. Buoor DATE: 6/11/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1. TOPO 31
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.





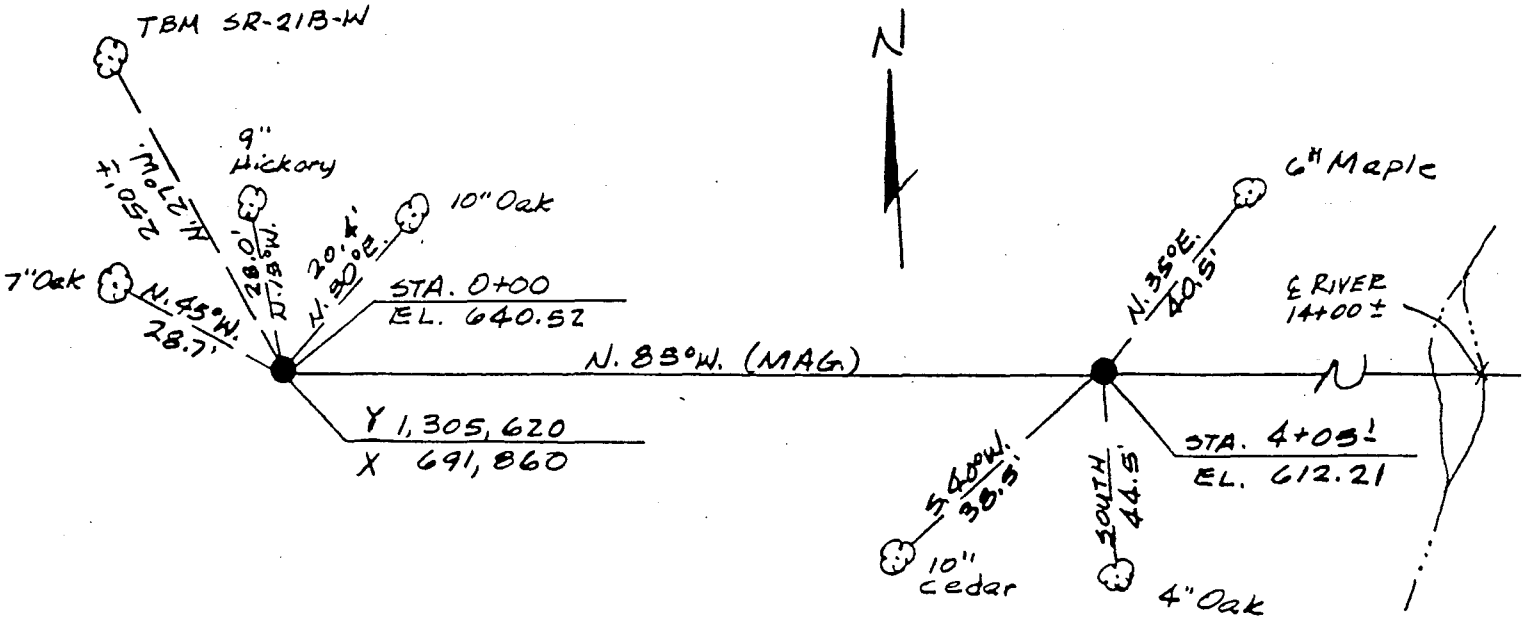
ORIGINAL

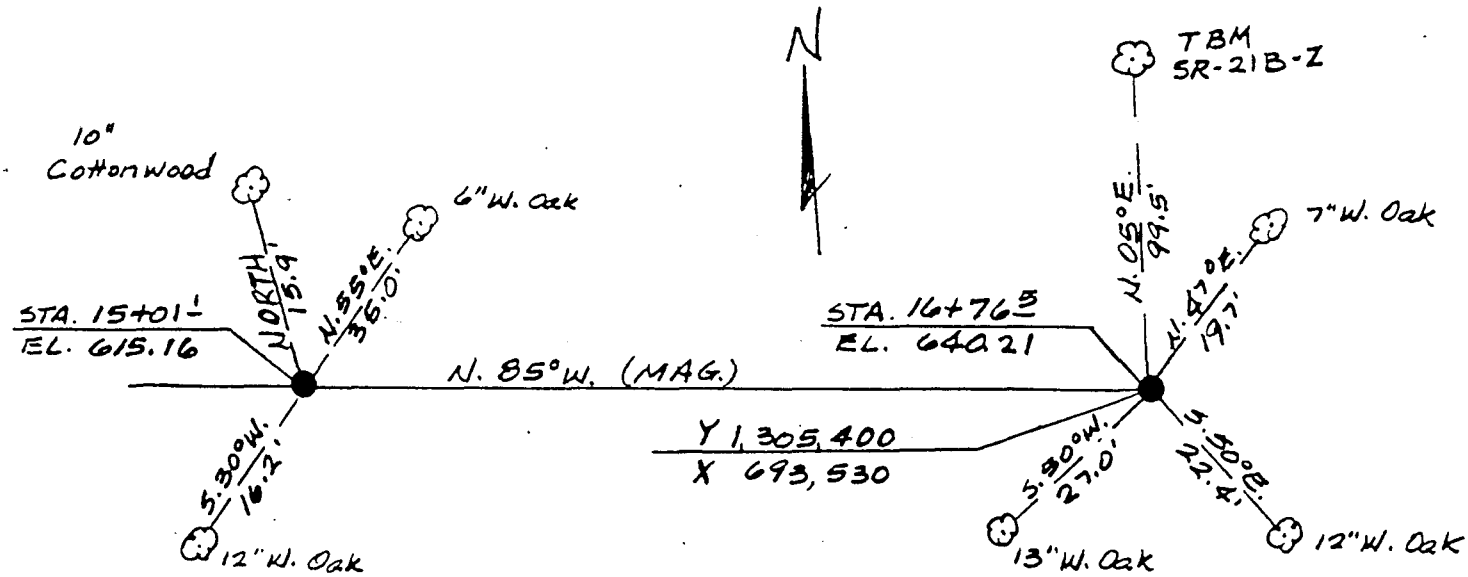
CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR-21B BY: Owen Zurowieste DATE: 7/82

TOPO 32

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1.
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.





ORIGINAL

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR-21B BY: Owen Zuroweste DATE: 7/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1.
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.

STATION 0+00:
From intersection of Hwy 107 and Hwy 154, travel West on Hwy 154 3.25 mi.± to gravel road on left. Then travel South on gravel road 3.25 mi.± to gravel road on left. Then travel North-East on gravel road 2.1 mi.± to point were road turns due North. Then pack south 200'± to range.

Station 16+76 S:
From intersection of Hwy 154 and Hwy "E", travel South on Hwy "E" 2 mi.± to intersection of gravel road. Then travel West on gravel road 1 mi.± to "T" intersection of gravel roads. Then travel South on gravel road 0.5 mi.±. Then pack West 150'± to Range.

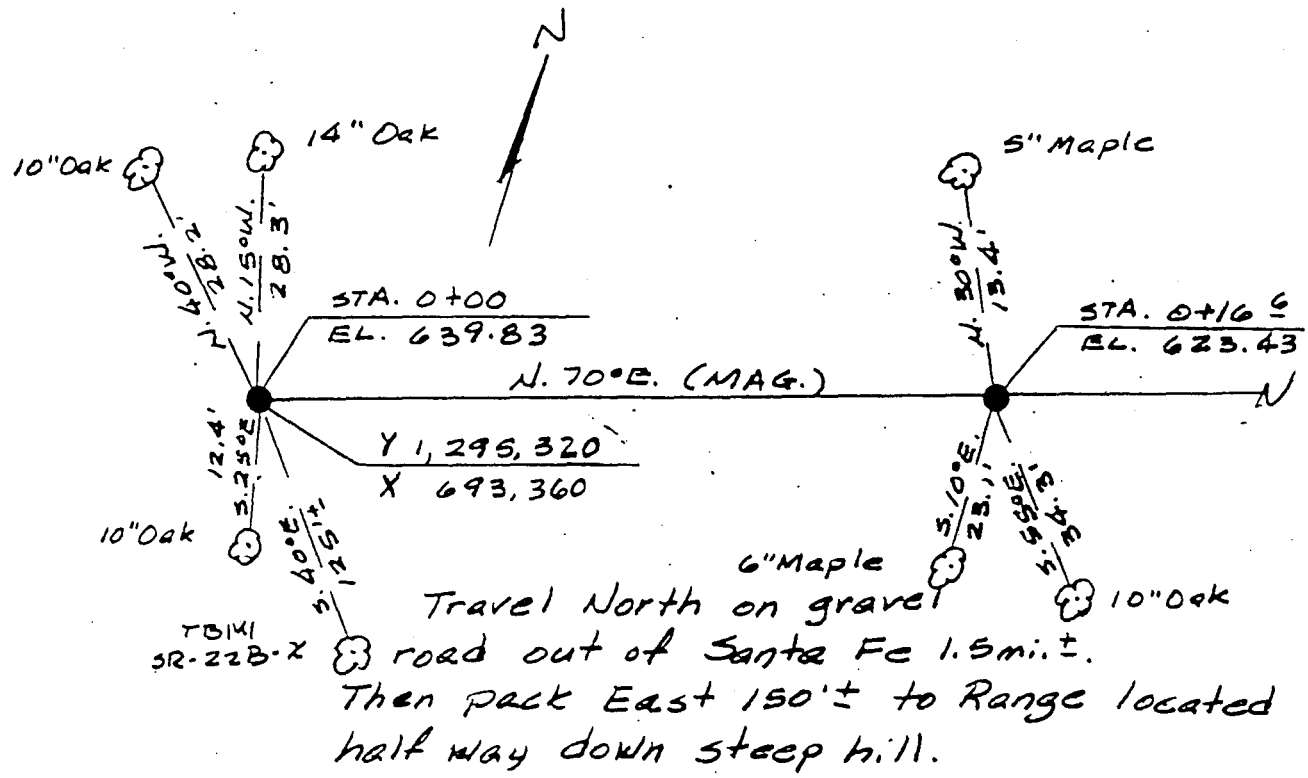
ORIGINAL

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

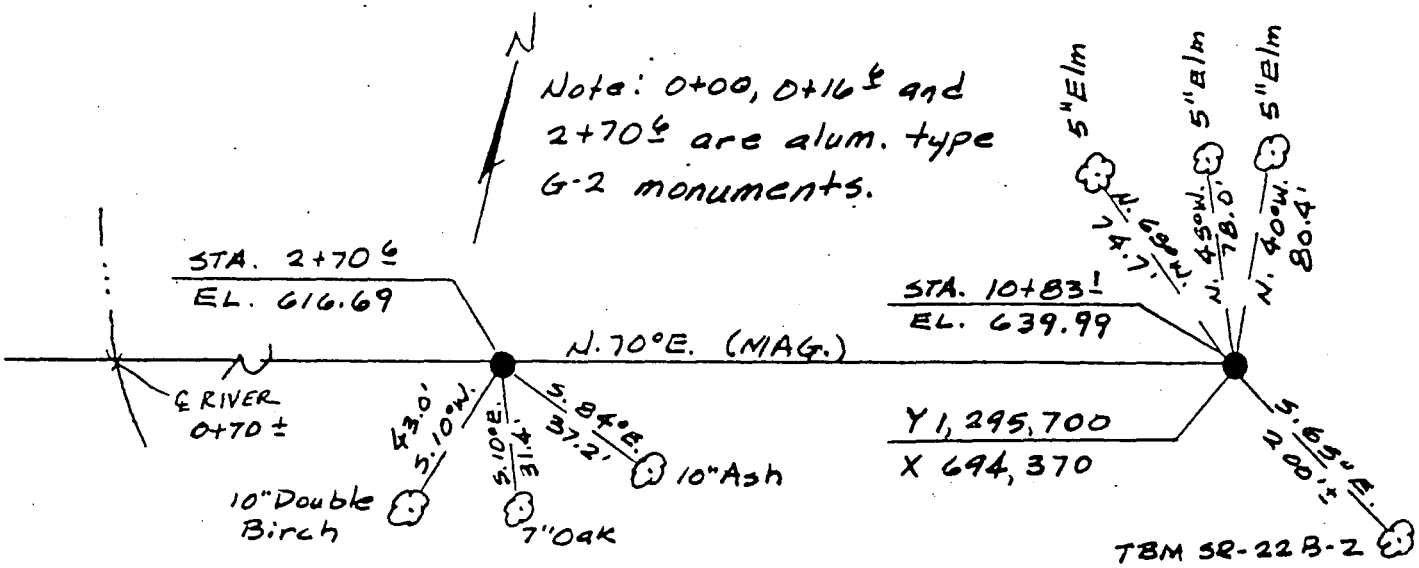
RANGE NO. SR-22B BY: Owen Zurowesta DATE: 7/82

TOPO 33

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1.
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.



Travel North on gravel road out of Santa Fe 1.5mi.±. Then pack East 150'± to Range located half way down steep hill.

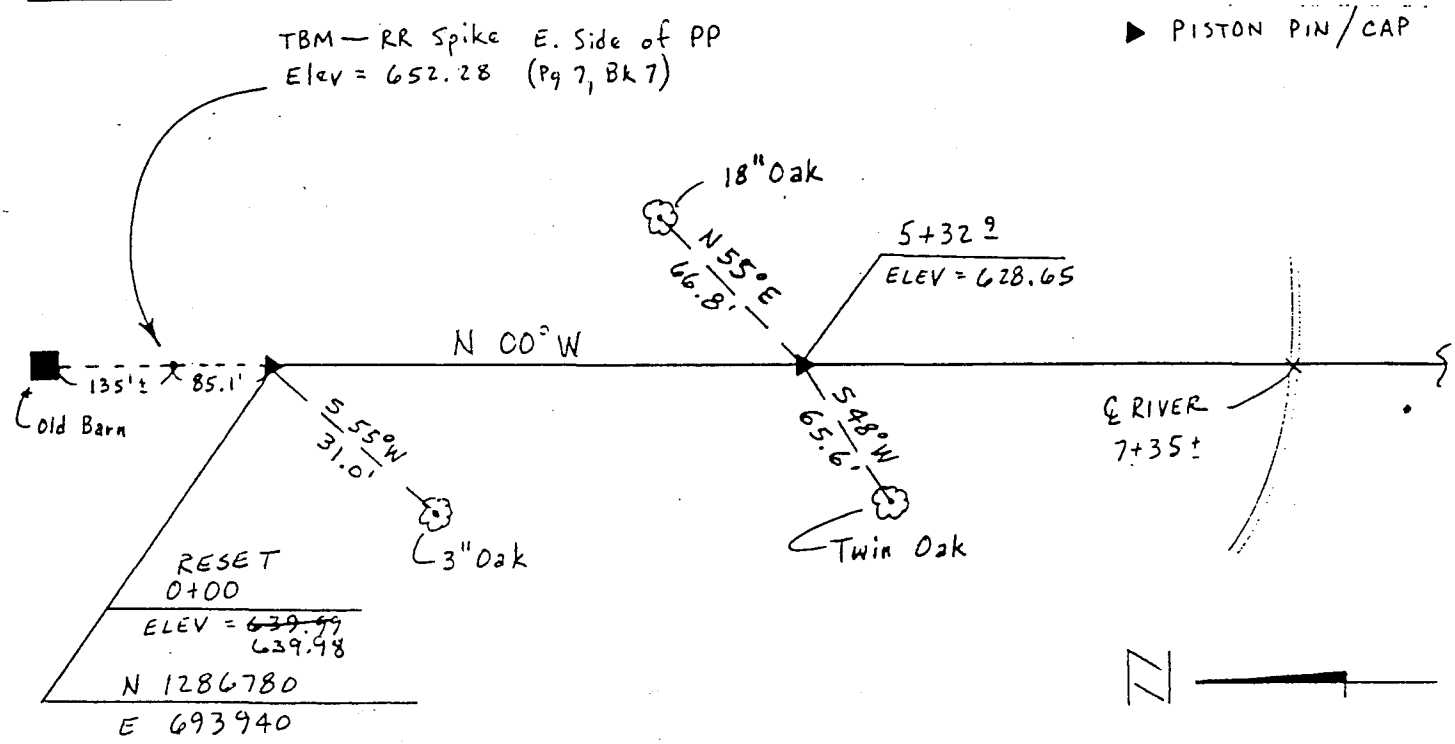


CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

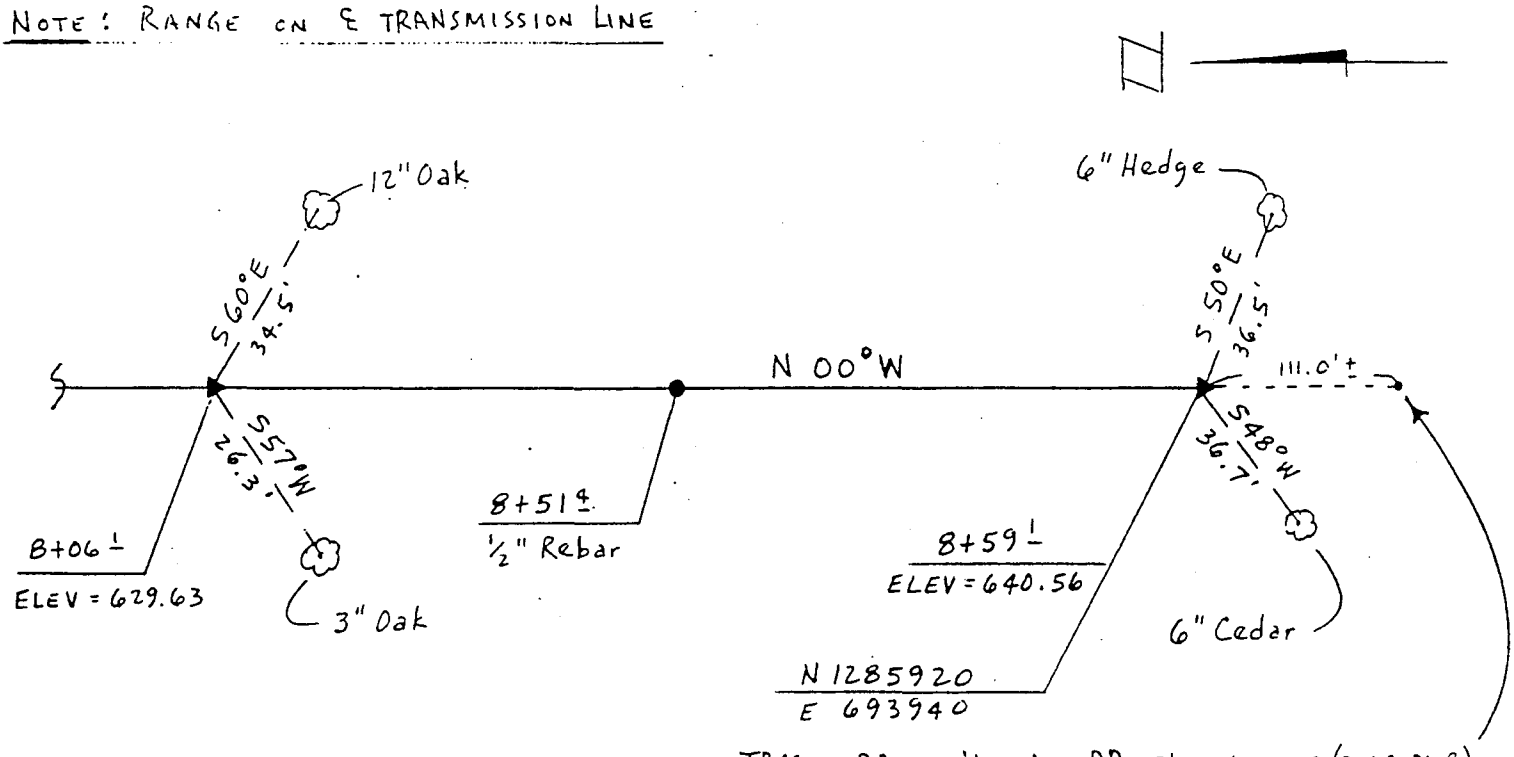
RANGE NO. SR 23-B BY: JIM CAIN / WFM DATE: 5/83

TOPO 26

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1.
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.



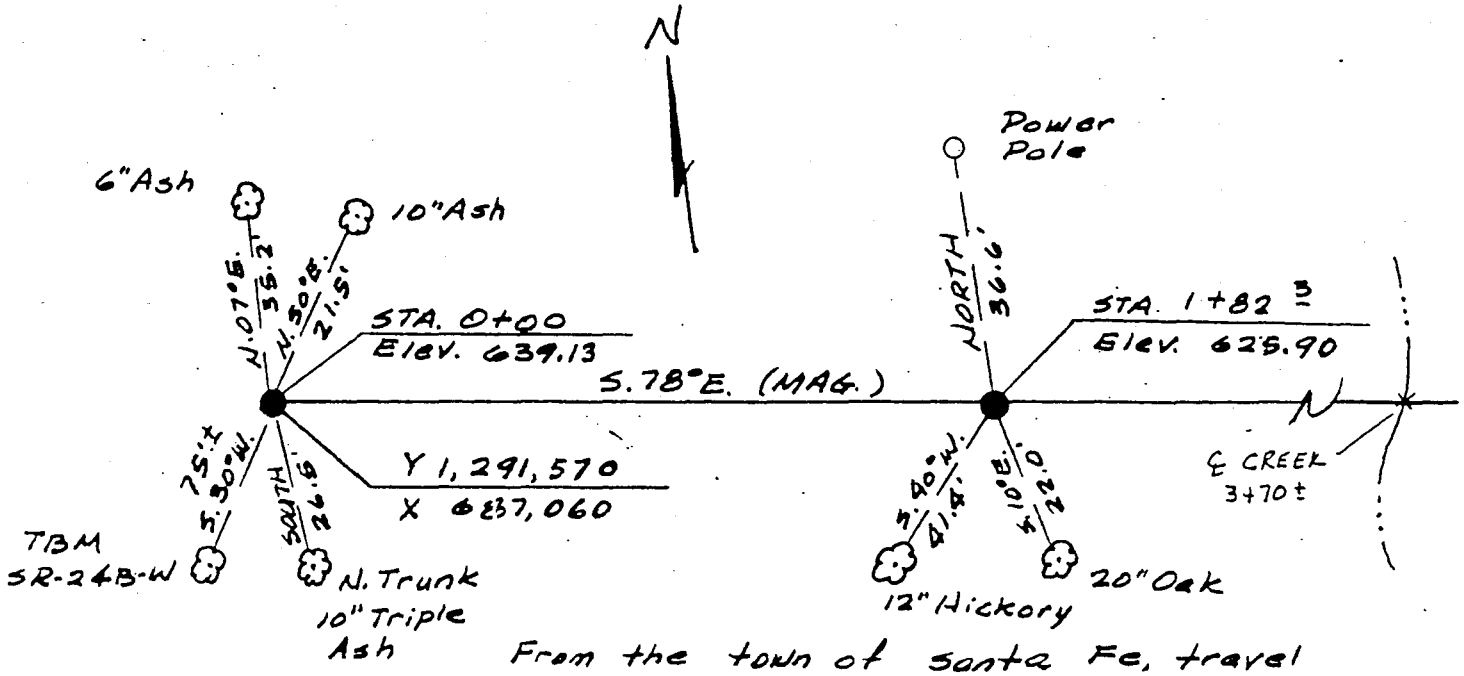
NOTE: RANGE ON ℄ TRANSMISSION LINE



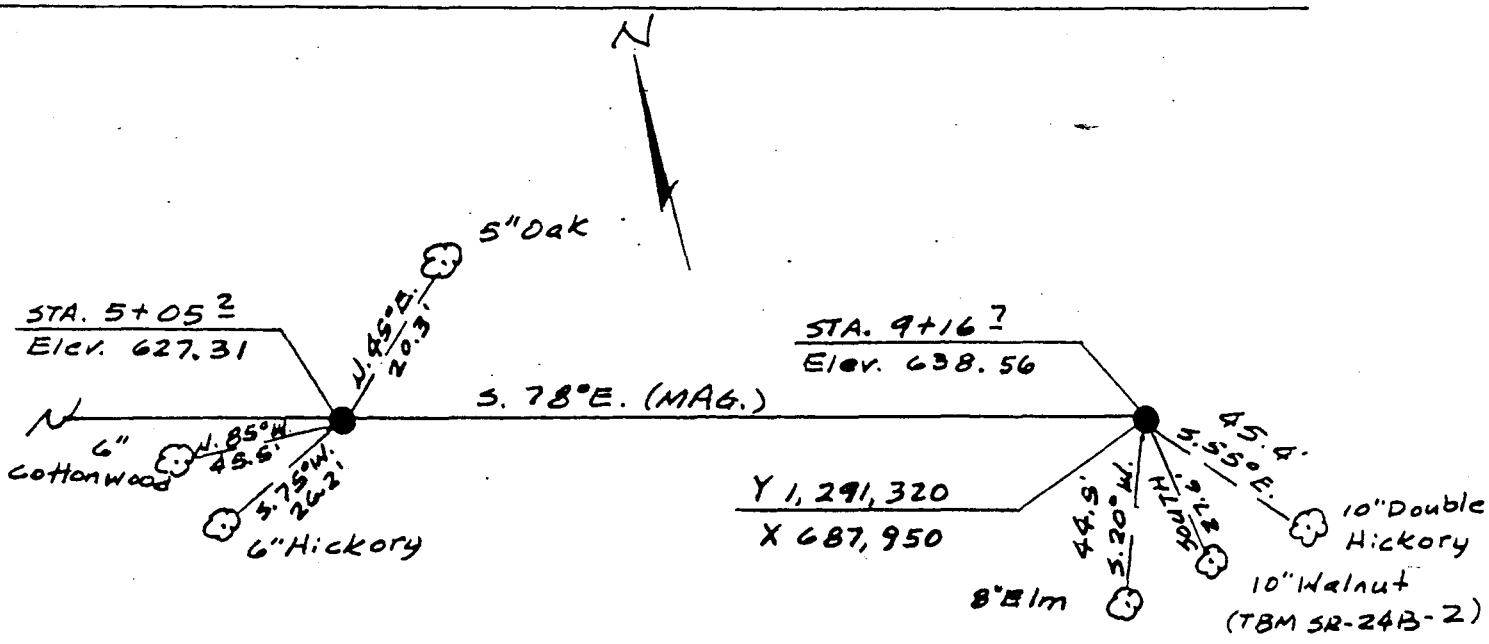
CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR-24B BY: Owen Zurowestc DATE: 7/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1. TOPO 34
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.



From the town of Santa Fe, travel North West on Hwy. "D" 1.25 mi. ± to Long Branch Creek. Then pack North 150'± to Range.

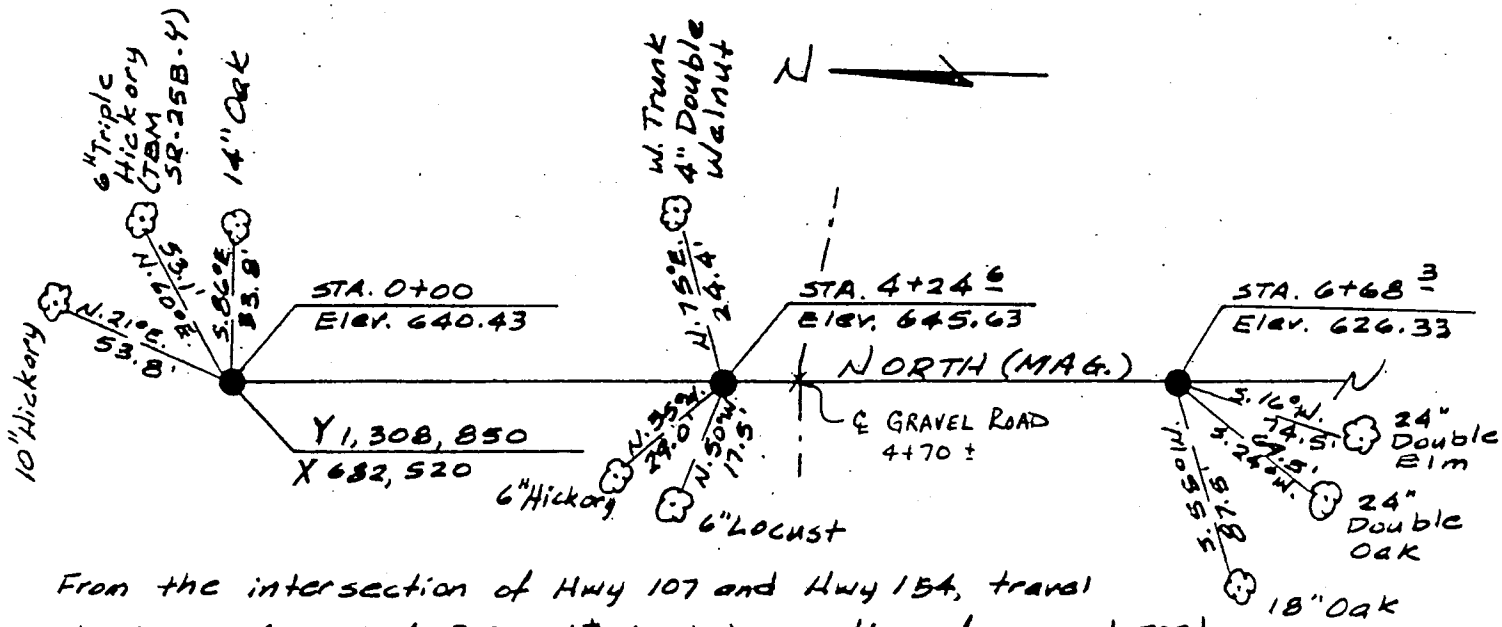


CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

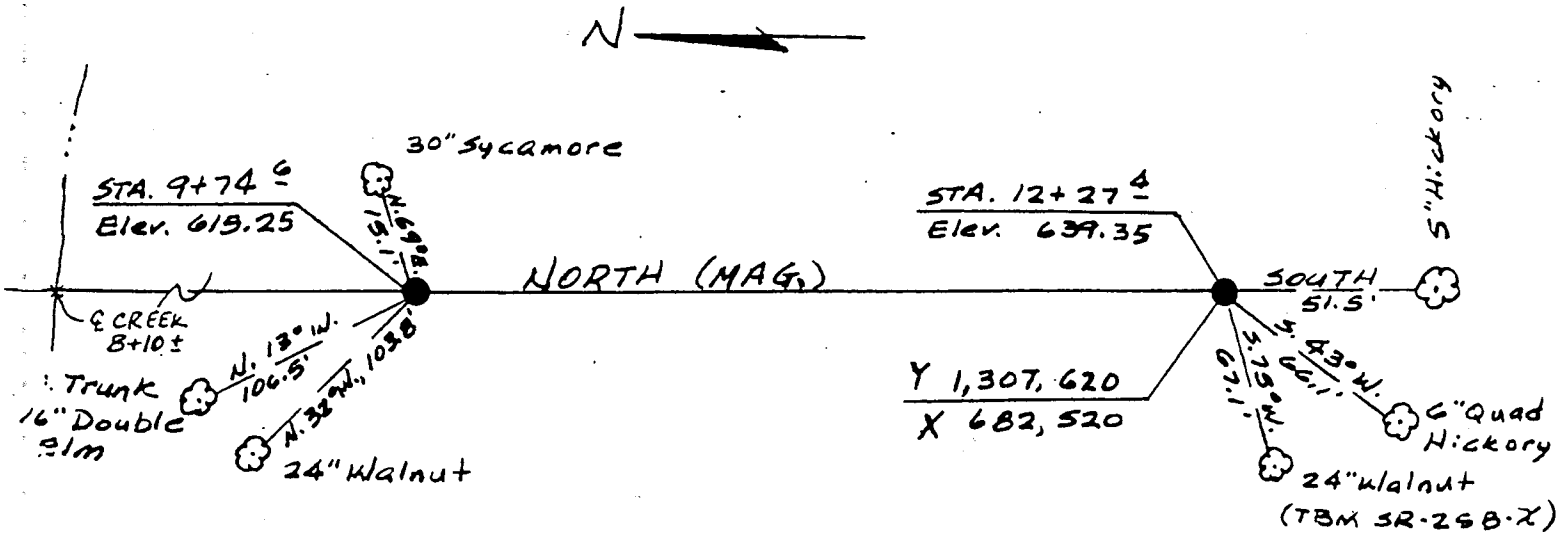
RANGE NO. SR-25B BY: Owen Zuroweste DATE: 7/82

TOPO 42

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1.
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.



From the intersection of Hwy 107 and Hwy 154, travel West on Hwy 154 3.25 mi.± to intersection of gravel road on Range Line 8 and 9 W. Then travel South on gravel road 2.5 mi.± to bridge over Brush Creek. 0+00 is 100'± W. of North end of guard rail. 12+27 4 is 100'± west of South end of guard rail.

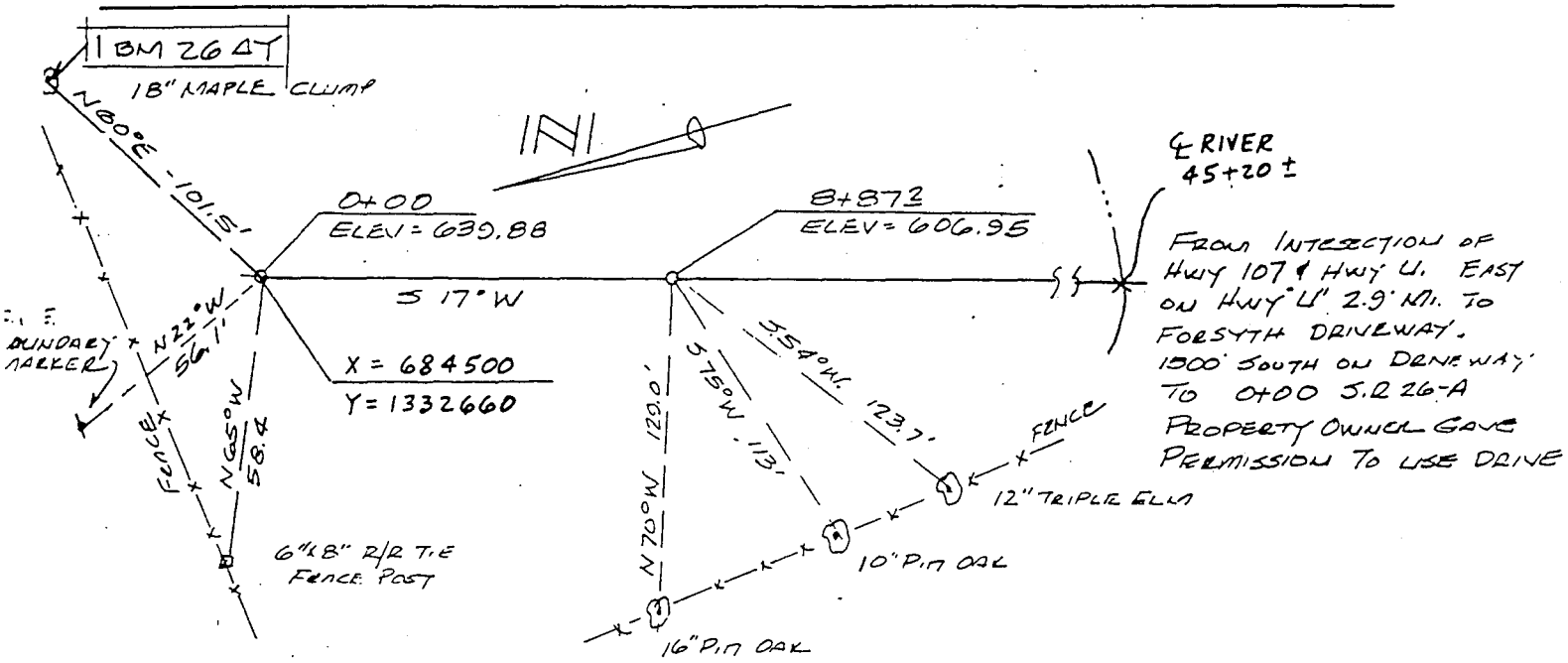


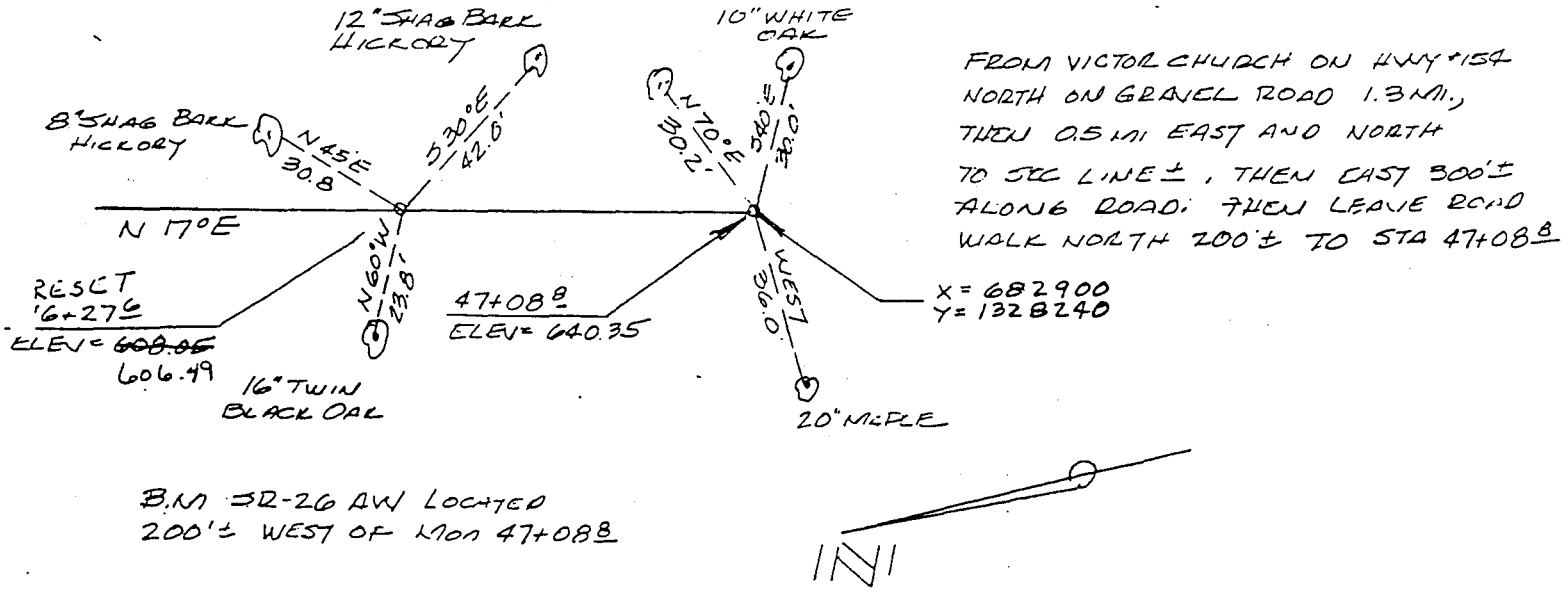
KENNETH BALK AND ASSOCIATES, ST. LOUIS, MO. SHEET NO. ORIGINAL

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR 26-A BY: G. BUDDE DATE: 6/11/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1. TOPO 29, 30, 40
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.



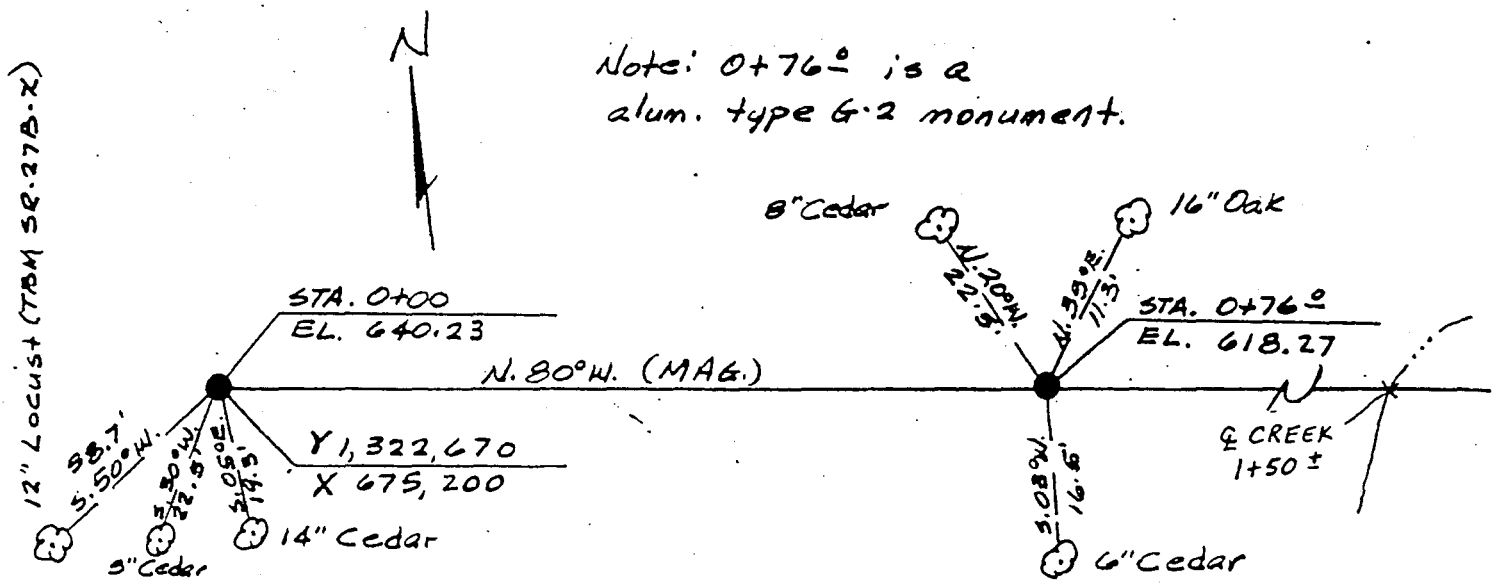


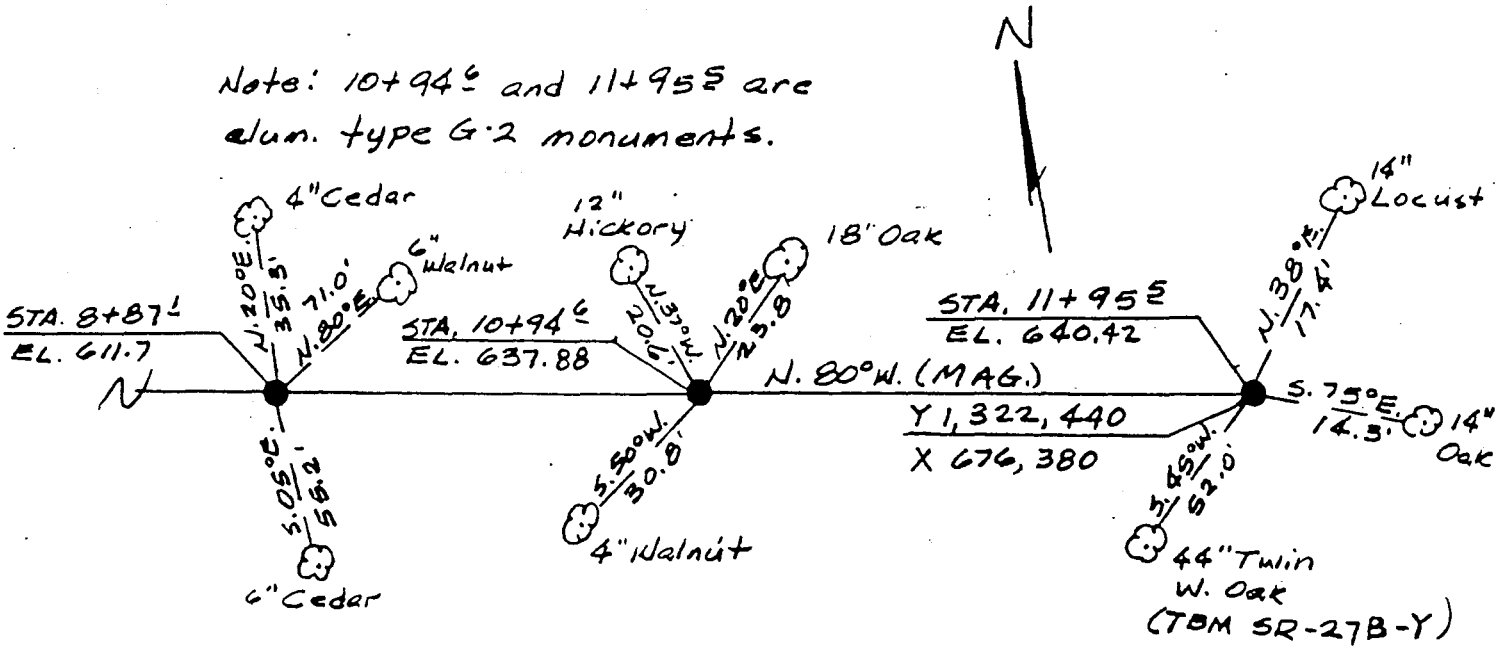
CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR-27B BY: Owen Zuroweste DATE: 7/82

TOPO 40

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1.
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.





ORIGINAL

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR-27B BY: Owen Zurowestc DATE: 7/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1.
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.

Station 0+00:
From intersection of Old Hwy 154 and Hwy "Z", travel West on Old Hwy 154 0.25 mi.± to gravel road on right. Then travel North on gravel road 0.35 mi.±, then West 0.17 mi.± then South 225'±. Then pack East 79'±.

Station 11+95±
From intersection of Old Hwy 154 and Hwy "Z", travel West on Old Hwy 154 0.25 mi.± to gravel road on right. Then travel North on gravel road 0.29 mi.±. Then pack East 150'±.

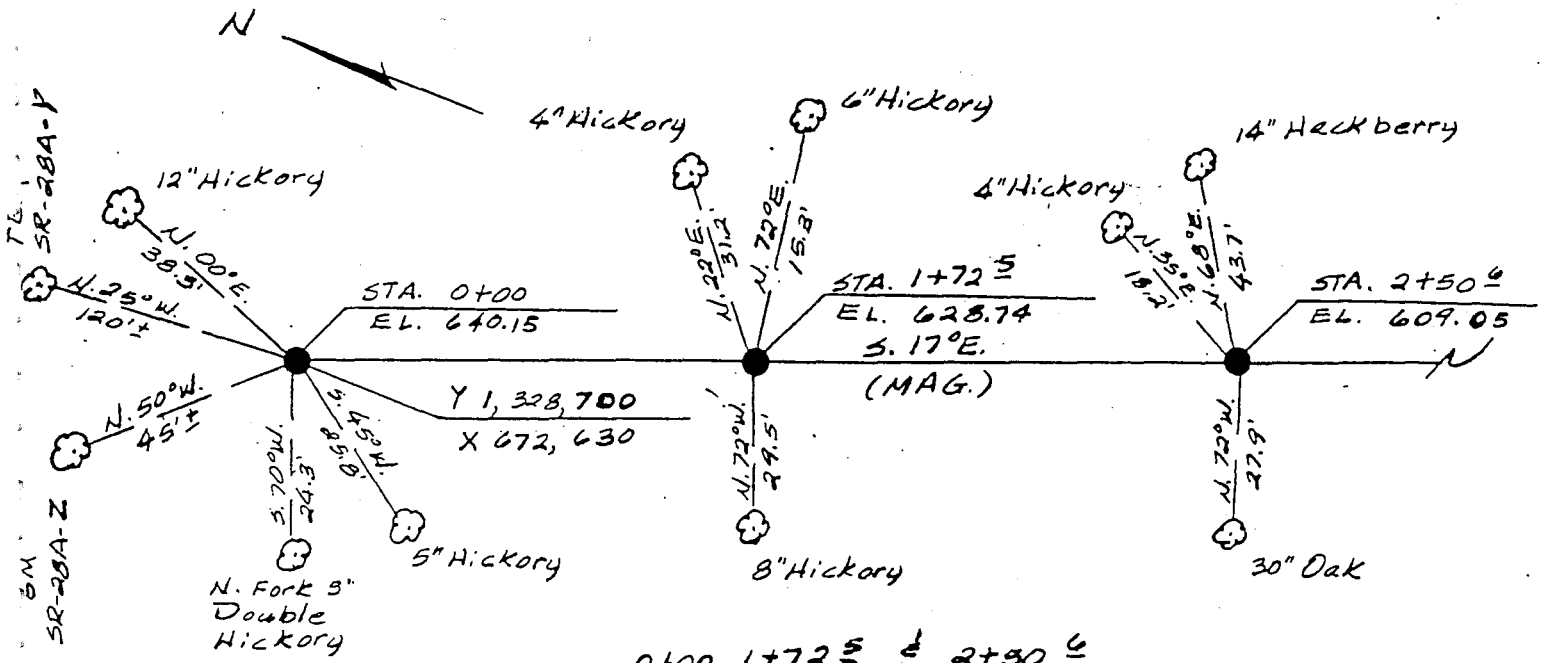
ORIGINAL

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

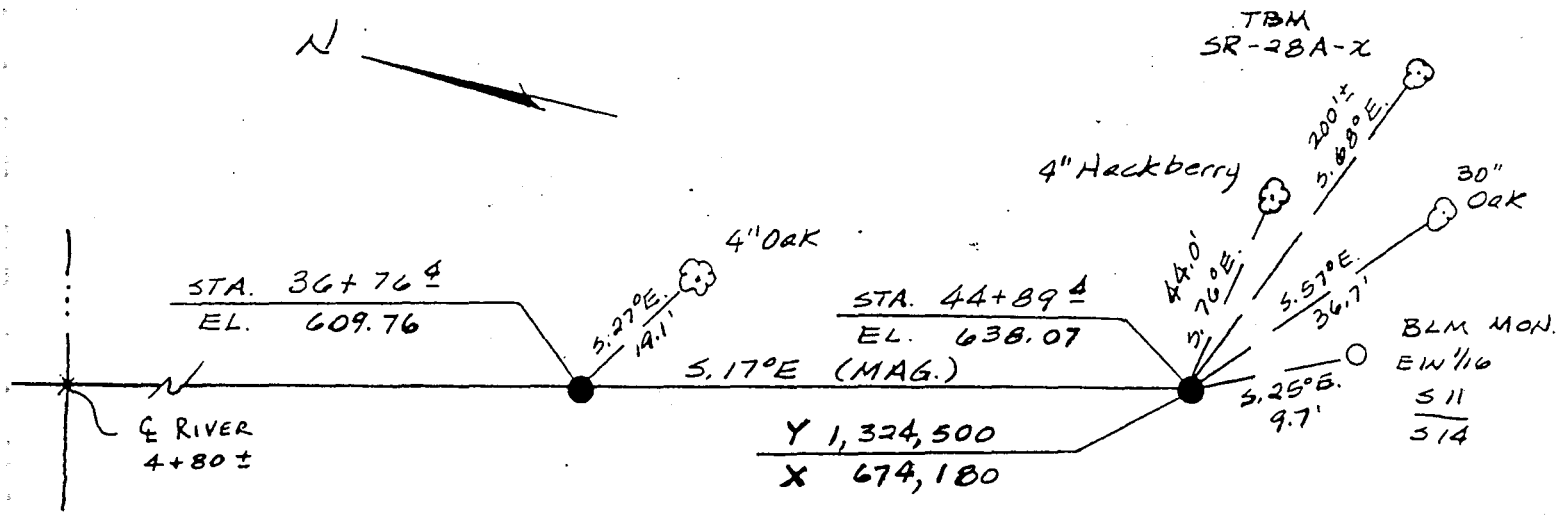
RANGE NO. SR-28A BY: Owen Zurowceste DATE: 6/82

TOPO 40

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1.
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.



0+00, 1+72 5 & 2+50 6 are G-2 Monuments.



No other references available for 36+76 4.

KENNETH BALK AND ASSOCIATES, ST. LOUIS, MO. SHEET NO. _____ ORIGINAL

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR-28A BY: Owen Zurowieste DATE: 6/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1.
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.

Station 0+00:
From the intersection of Hwy 107 and Hwy U, travel West on Hwy U 5mi ± to gravel road on left. Then travel South on gravel road 1mi ± to point where road turns to East. Then pack South-East 500' ± to Range.

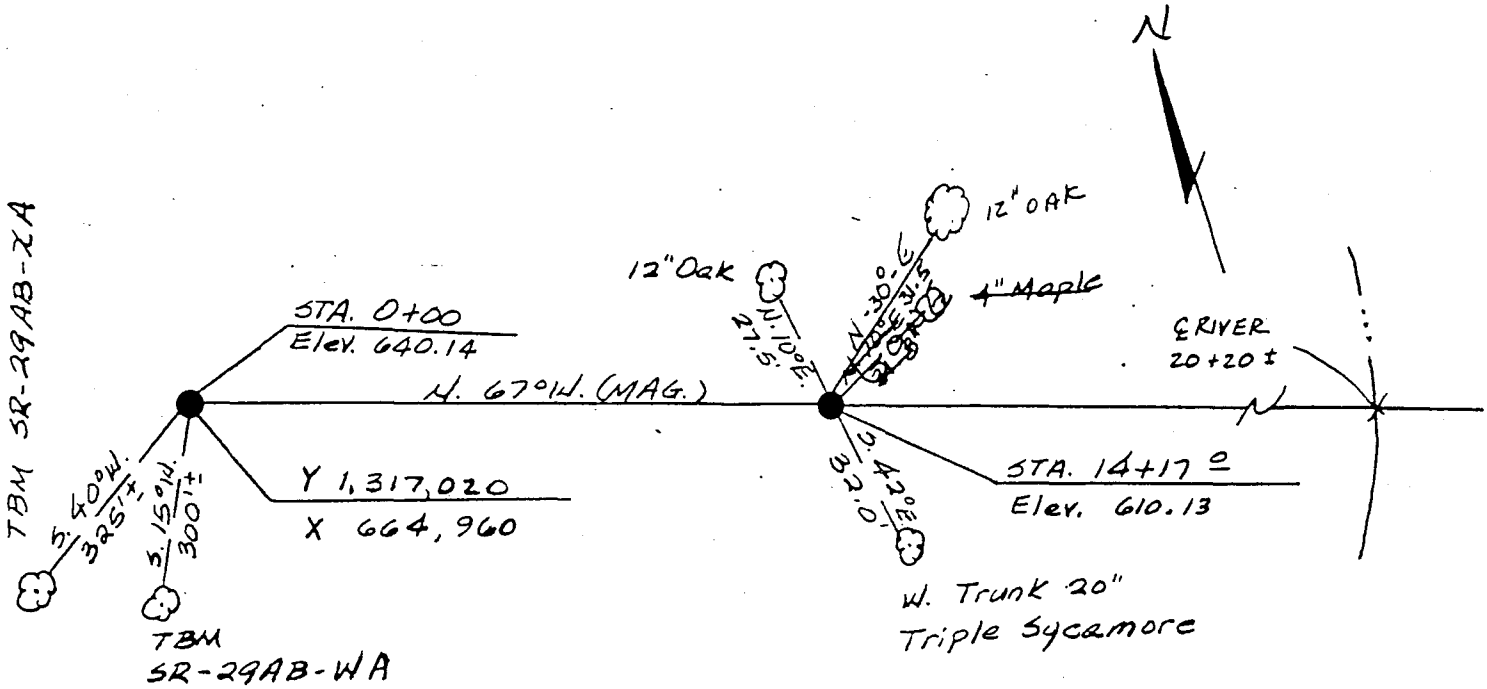
Station 44+89 ±:
From the intersection of Hwy 107 and Hwy 154, travel West on Hwy 154 5 1/4 mi ± to road on right. Then travel back East 1/4 mi ± on Old Hwy 154 to gravel road on left. Then travel North 1/2 mi ± to point where road turn West. Then pack North 1/2 mi ± to range.

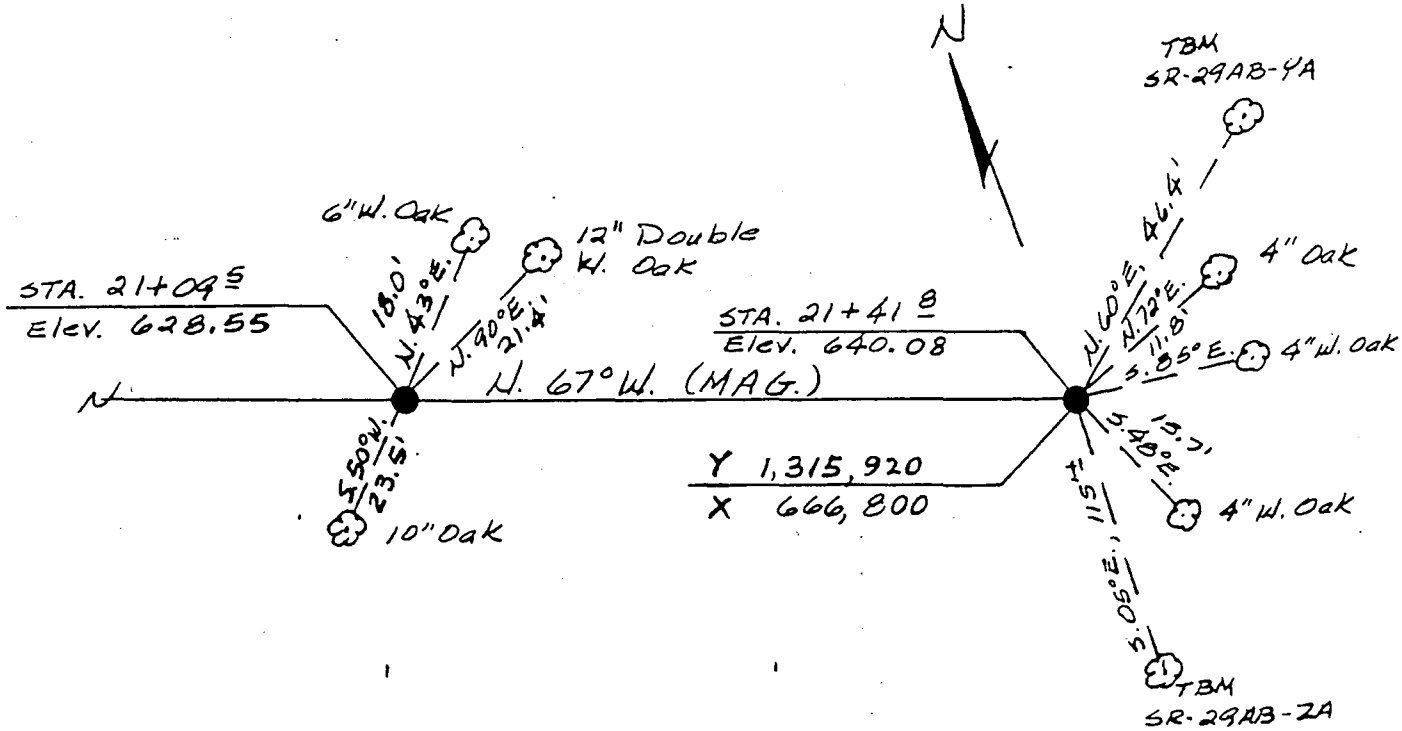
ORIGINAL

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR-29AB BY: Owen Zurowieste DATE: 6/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1. TOPO 52, 53
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.





ORIGINAL

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR-29AB BY: Owen Zuroweste DATE: 6/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1.
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.

STATION 0+00:
From intersection of Hwy 154 and Elk Fork Salt River, travel West on Hwy 154 1/2 mi ± to intersection of Hwy 154 and gravel road. Then South on gravel road .4 mi.± across creek to top of hill. Then pack East 400'± to Range.

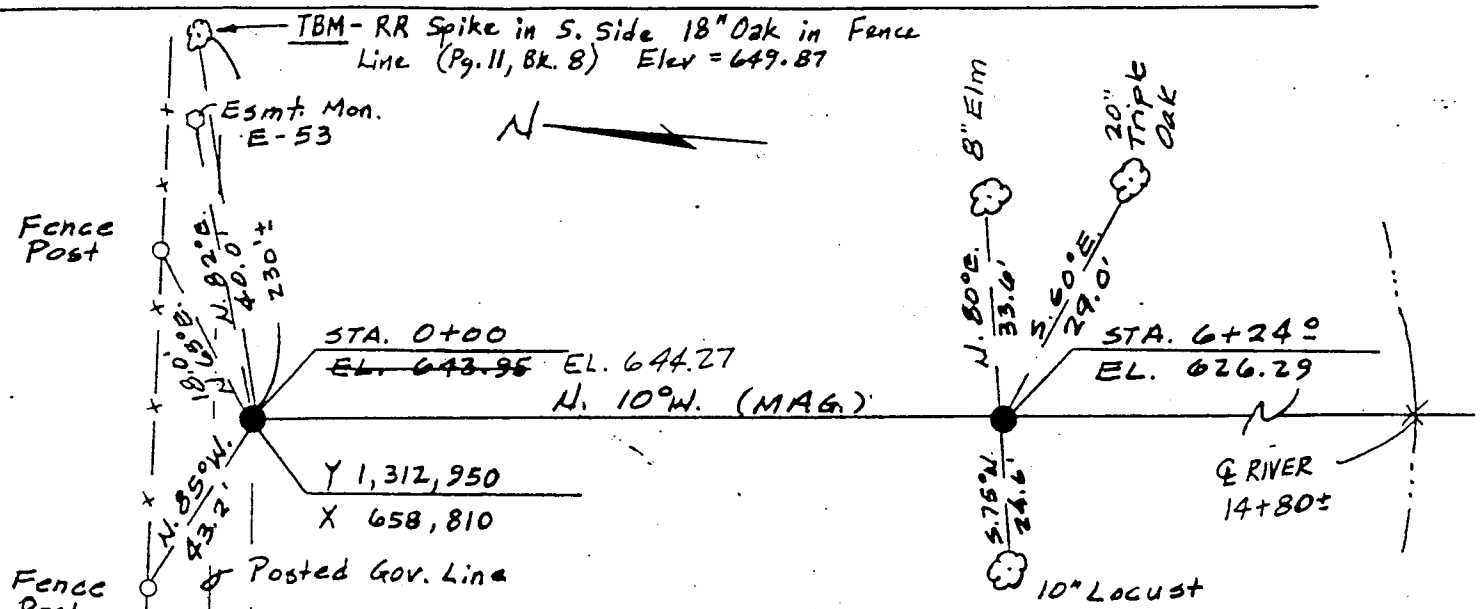
STATION 21+41 B:
From intersection of Hwy 154 and Elk Fork Salt River, travel East on Hwy 154 2000'± to gravel road on right. Then South on gravel road .6 mi. Then pack West 1/2 mi ± through gully and over hill to Range.

ORIGINAL

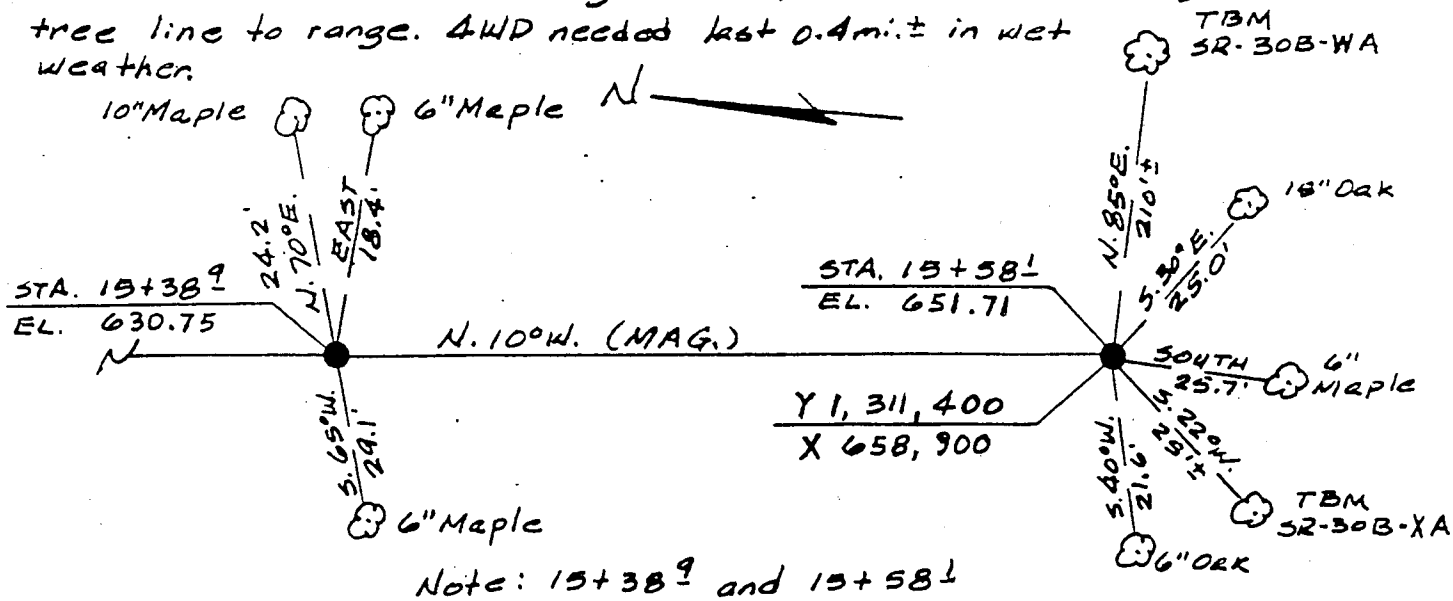
CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR-30B BY: Owen Zuroweste DATE: 7/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1. TOPO 53
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.



From intersection of Elk Fork and Hwy 154, travel West on Hwy 154 1.6 mi.± to intersection with gravel road. Then travel South on gravel road 0.5 mi.±, then East 0.25 mi.±, then South 0.5 mi.±, then West 0.5 mi.± to "T" intersection with gravel road. Then South on gravel road 0.5 mi.± to gov. line. Then travel North-East along boundary line 0.4 mi.± through tree line to range. 4WD needed last 0.4 mi.± in wet weather.



Note: 15+38° and 15+58± are alum. type G-2 monuments.

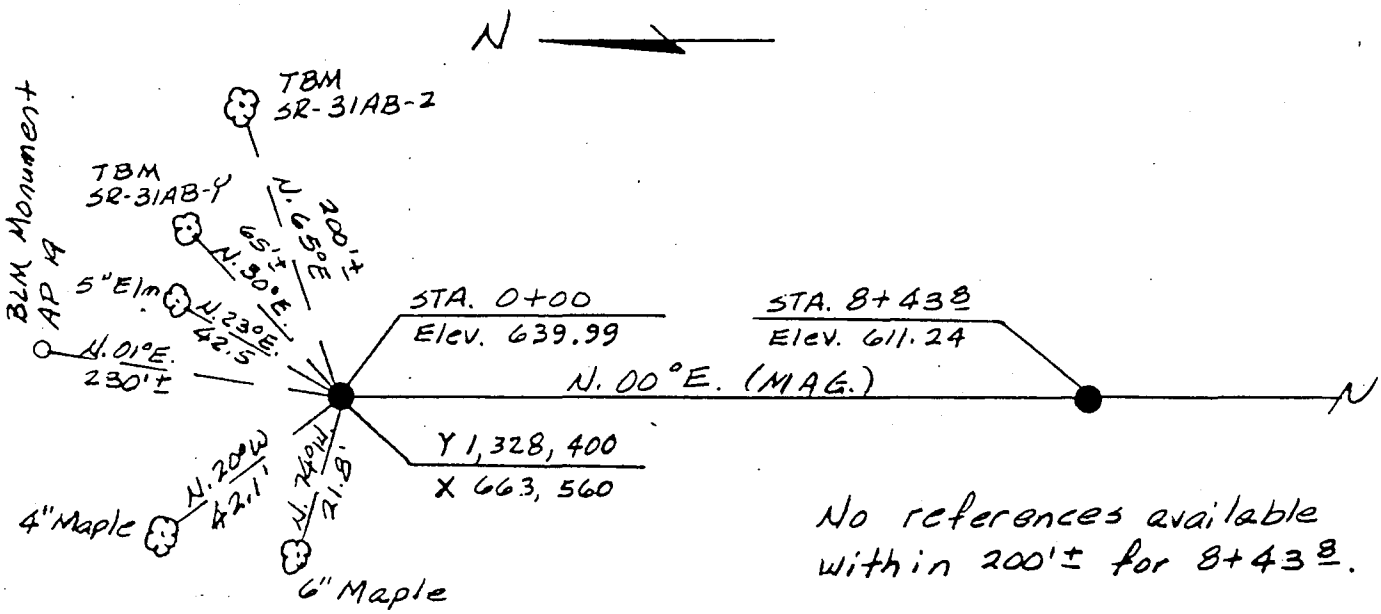
DACW43-82-D-0011

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

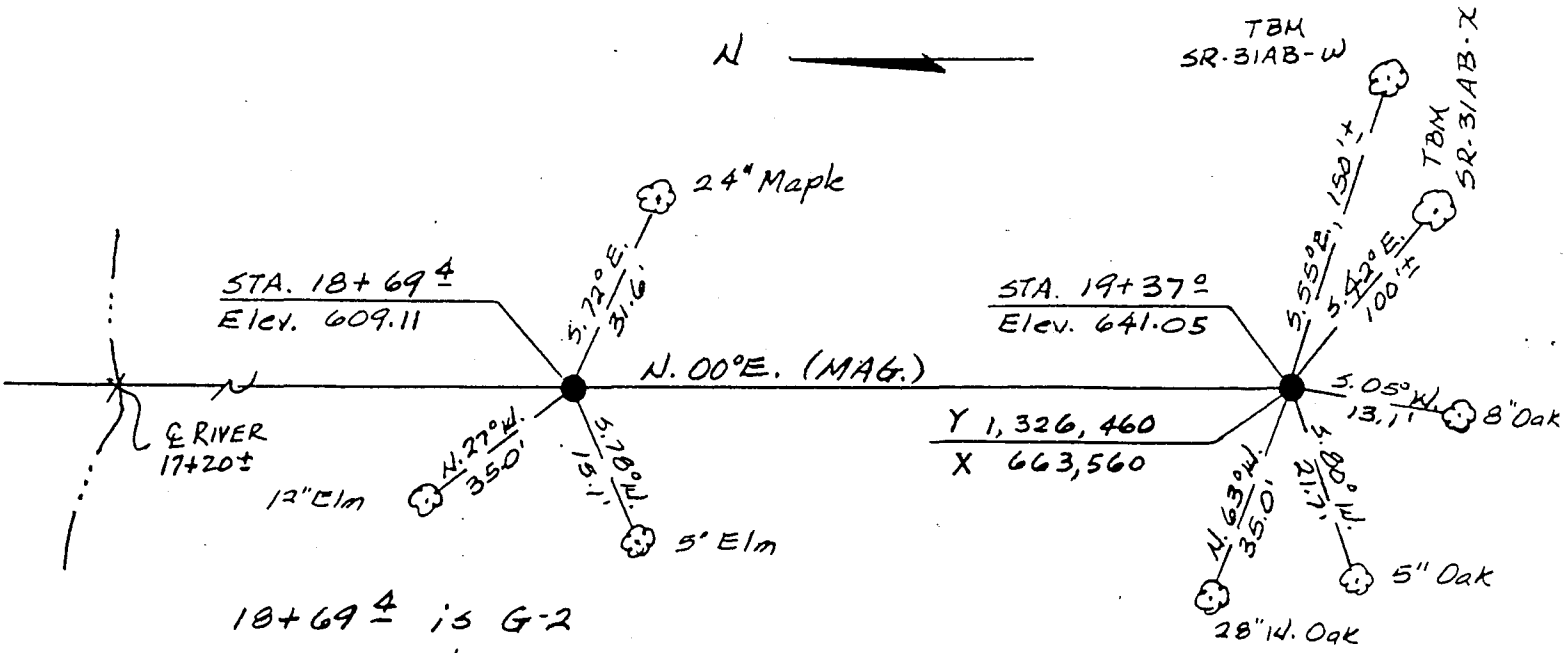
RANGE NO. SR-31AB BY: Owen Zuroweste DATE: 6/82

TOPO 51

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1.
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.



No references available within 200'± for 8+43.8.



18+69.4 is G-2 monument.

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR-31AB BY: Owen Zuroweste DATE: 6/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1.
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.

Station 0+00:
From intersection of Hwy U and gravel road on North line of SEC 4, T. 54 N., R. 9 W., travel gravel road West 1600'± to "T" intersection of gravel roads. Then South on gravel road 1 mi. to where it turns East. Then South-West on field road 1600'± to Range.

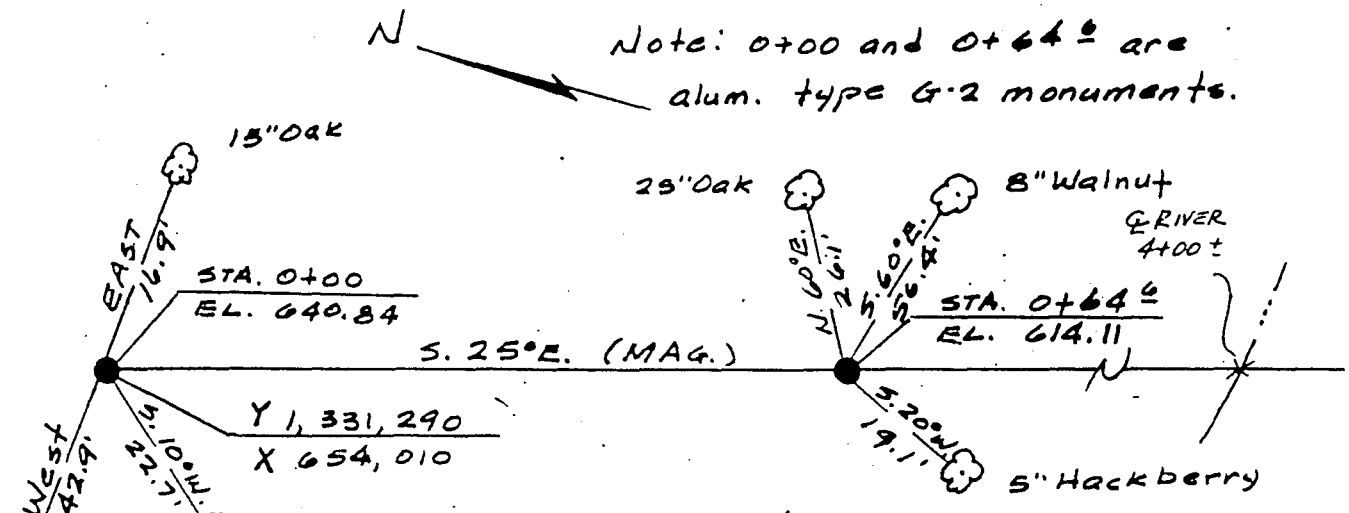
Station 29+80 B:
From the South 1/4 cor. SEC. 9, T. 54N., R. 9 W. on gravel road on South line of SEC. 9, pack North 800'± along fence line to old logging road. Then pack North-West on logging road 800'± to Range.

ORIGINAL

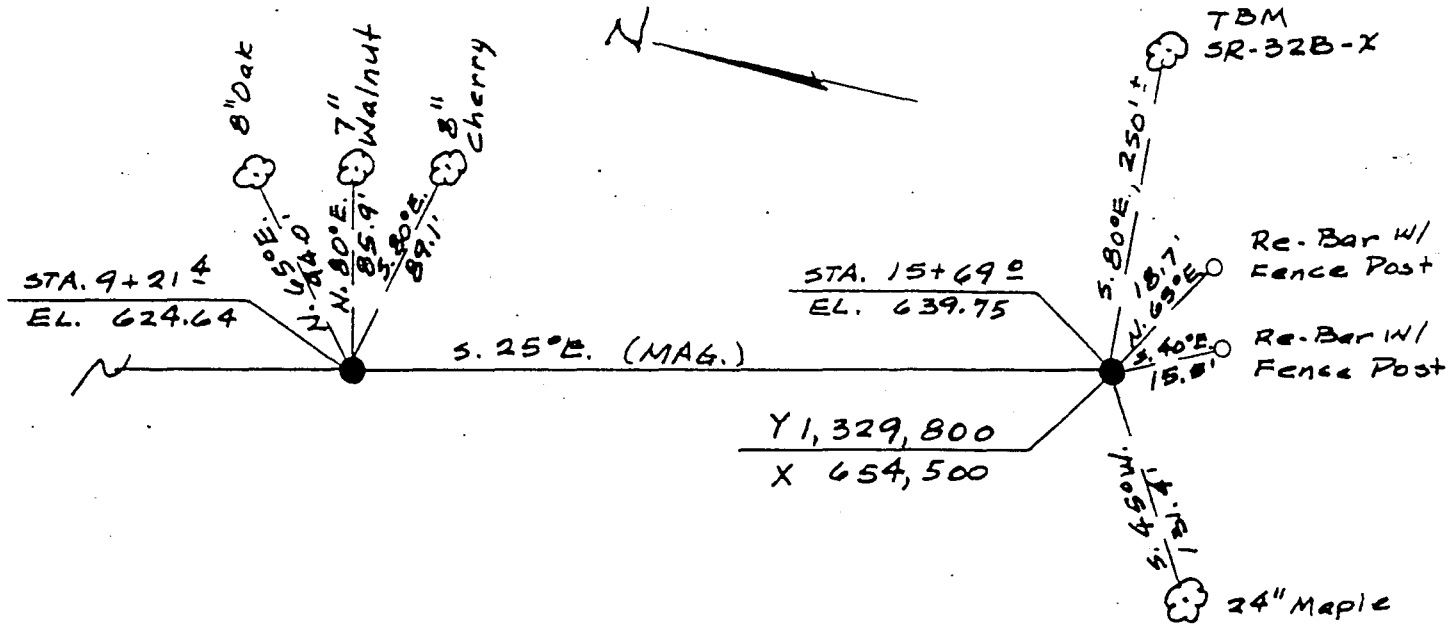
CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR. 32 B BY: Owen Zurowieste DATE: 7/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1. TOPO 59
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.



From intersection of Elk Fork and Hwy 154, travel West on Hwy 2.6 mi.± to intersection with gravel road. Then travel North on gravel road 1.5 mi.± to old gravel road on right. Then travel East through gate on old gravel road 0.45 mi.± then North 0.75 mi.± through gate then West 0.3 mi.± to Range.

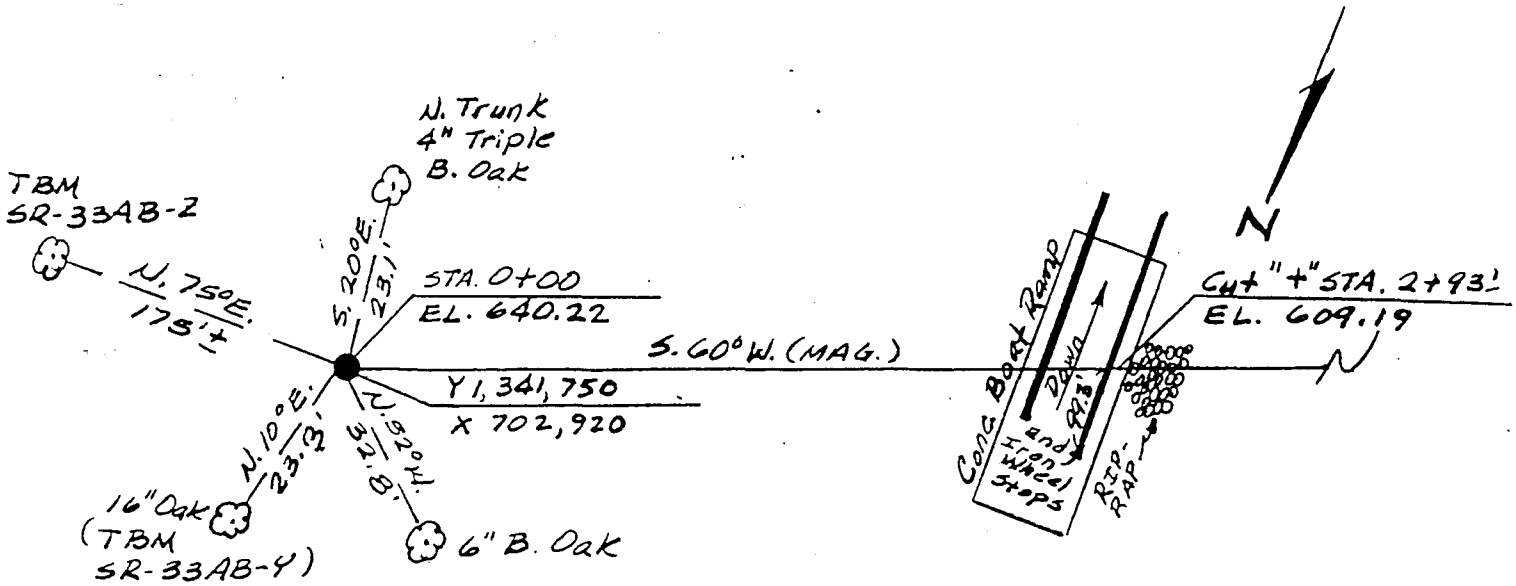


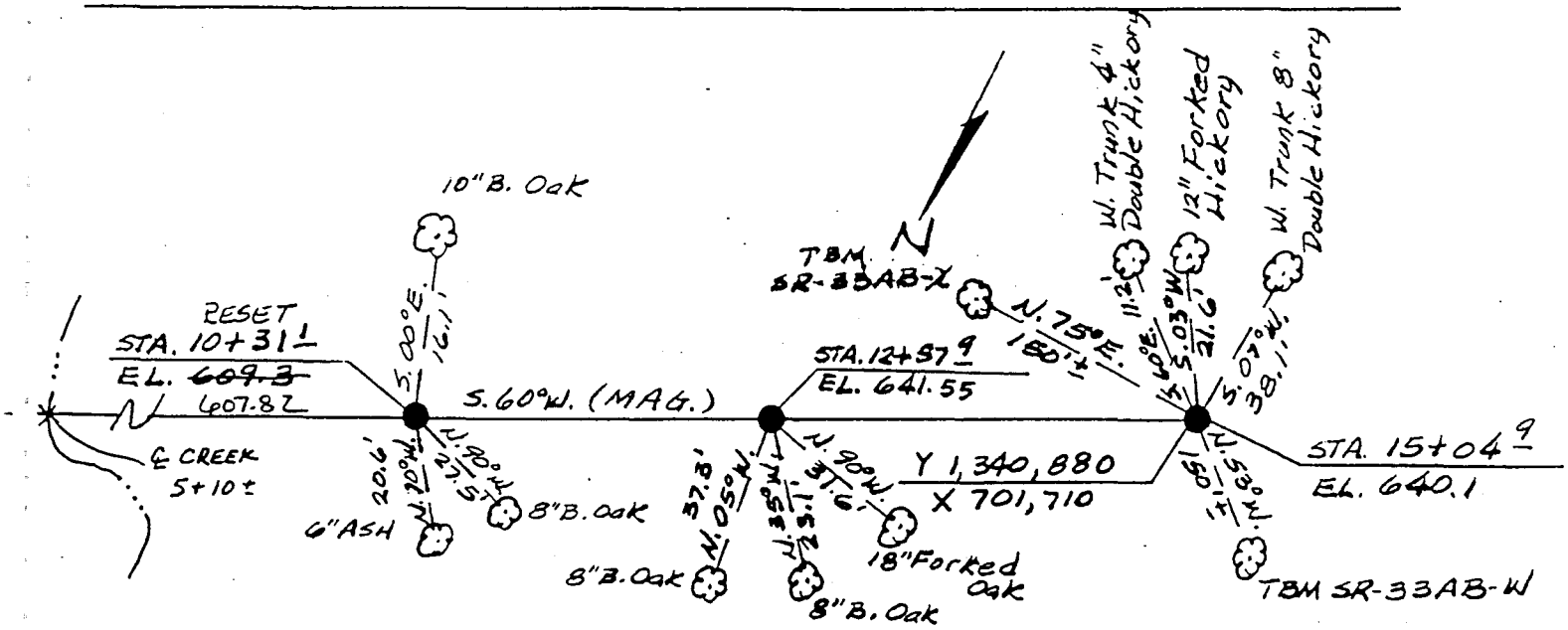
ORIGINAL

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR-33AB BY: Owen Zurowieste DATE: 5/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1. TOPO 22
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.

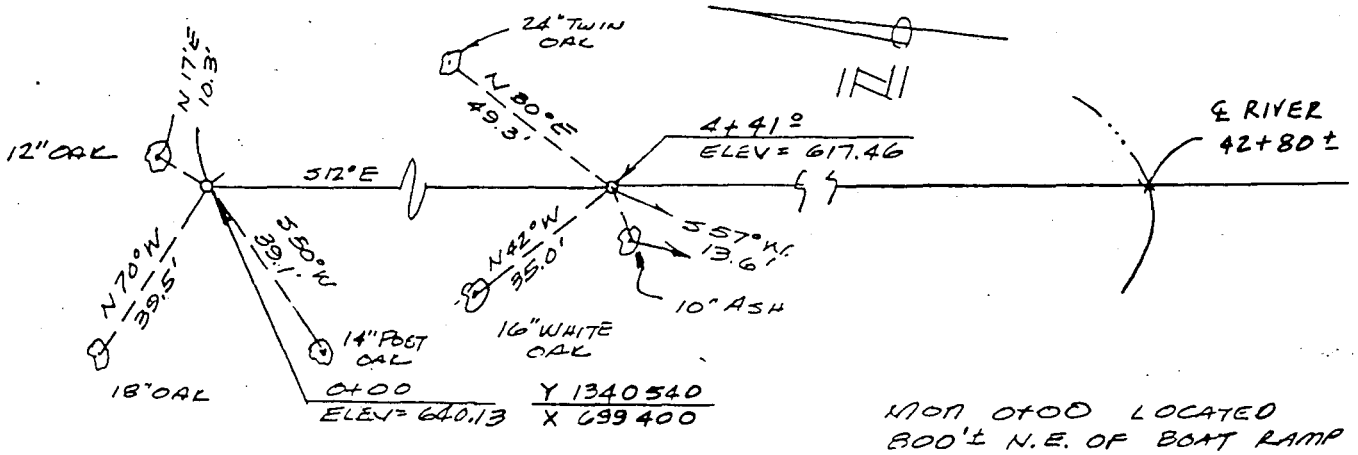




CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

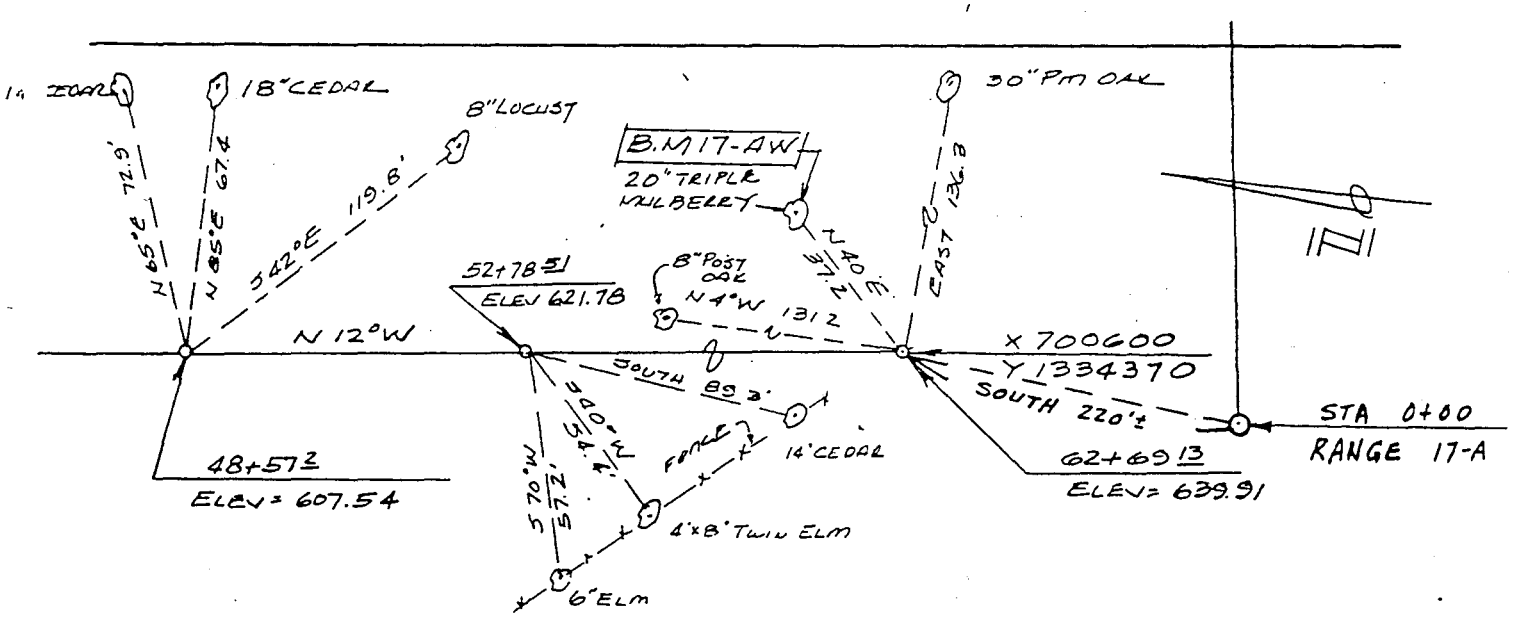
RANGE NO. 5R 34-A BY: G. BUODE DATE: 6/11/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1. TOPO 22, 23
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.



B.M 34 A-ZA LOCATED
N 81°W 120' FROM 0+00

MON 0+00 LOCATED
800'± N.E. OF BOAT RAMP IN
SHELL BRANCH ACCESS AREA

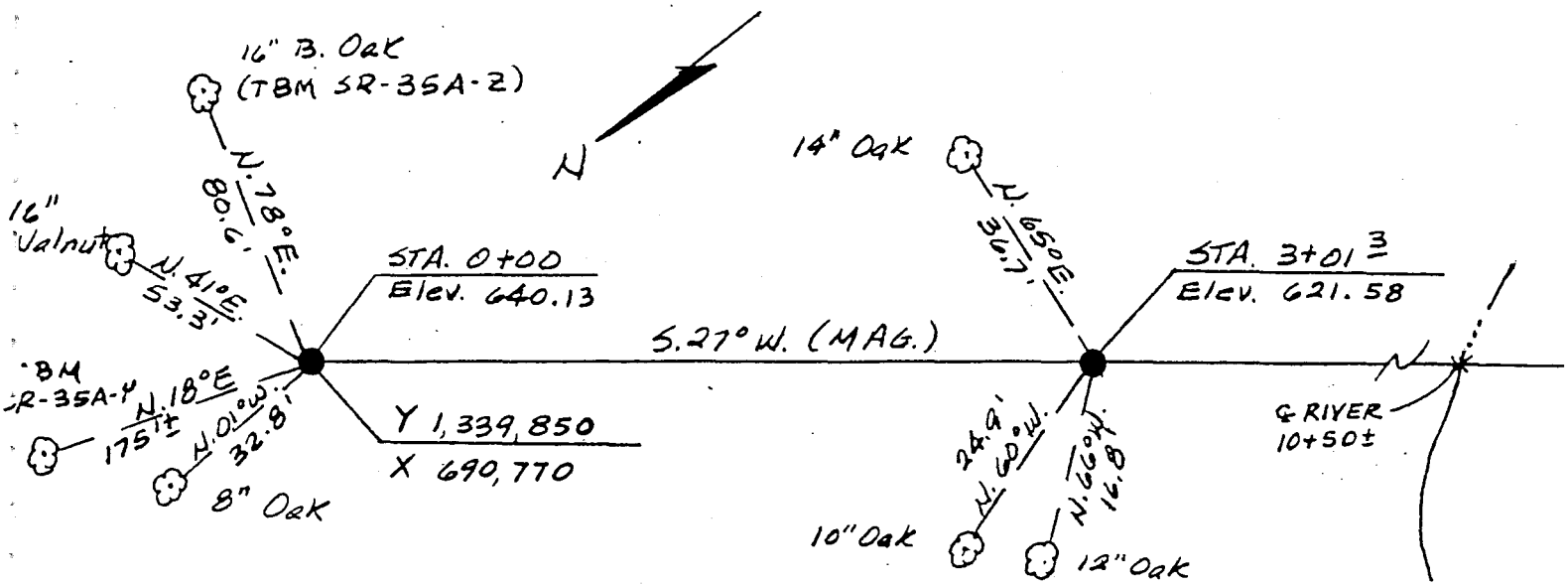


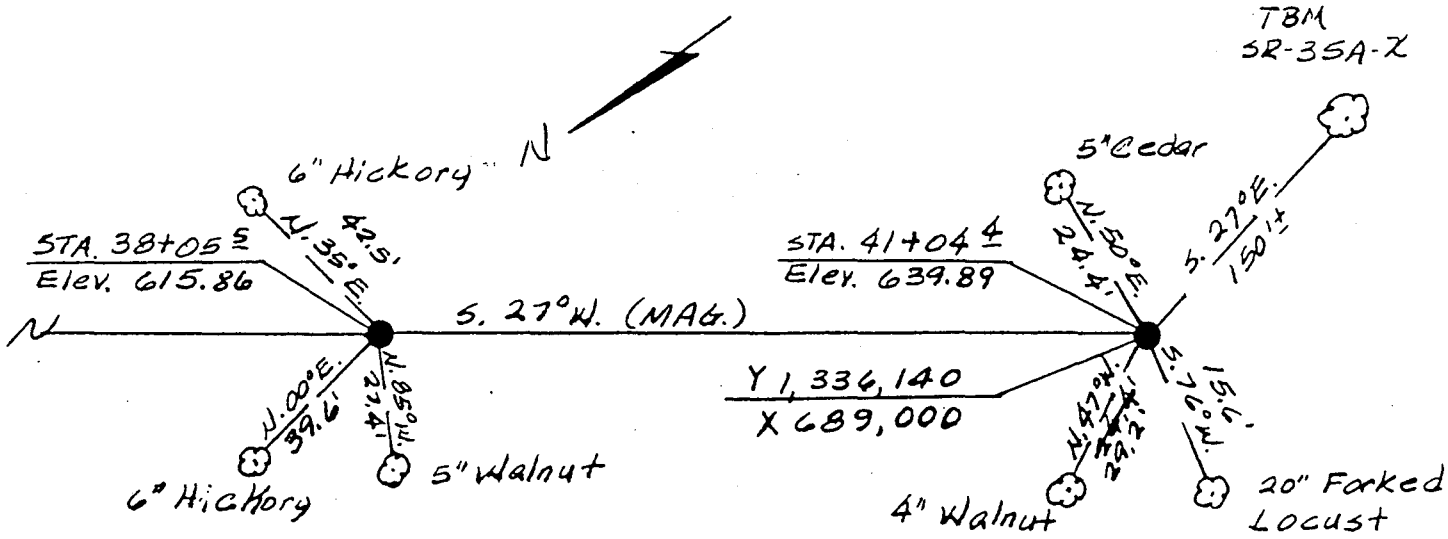
MON 62+69 13 LOCATED 800'±
N.W. OF THE END OF OLD PAVE OF OLD
HWY #107 AT NORTH EDGE OF FLORDA

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR-35A BY: Owen Zuroweste DATE: 6/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1. TOPO 29
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.





CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR-33AB BY: Owen Zurowaste DATE: 5/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1.
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.

Station 0+00:
From intersection of Hwy 24 and Hwy. HH travel South on Hwy HH 5.5 mi± to "T" intersection of gravel roads. Then West on gravel road 500'±. Range 500'± North.

Station 15+04.9:
From intersection of gravel roads (see above description) travel West on gravel road across creek 2000'±. Range 150'± to North.

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR-35A BY: Owen Zuroweste DATE: 6/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1.
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.

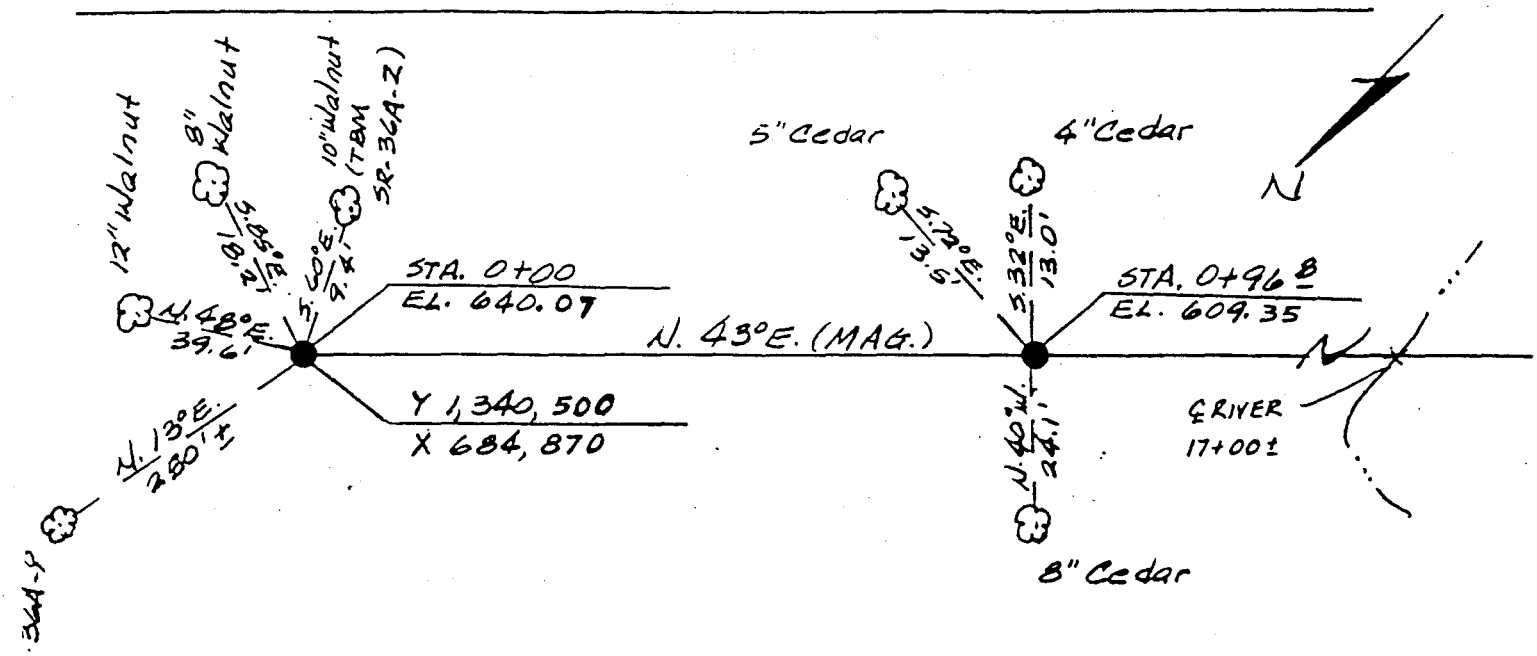
Station 0+00:
From the "T" intersection of gravel roads 150'± North of SEC. COR. 29|28 / 32|33 T. 55N., R. 8W., travel West on gravel road 3000'± to where gravel road turns into field road. Then South-West on field road 1000'± to where field road goes into woods. Then pack South 200'± along tree line, Range 100'± into woods.
4WD needed on field road in wet weather.

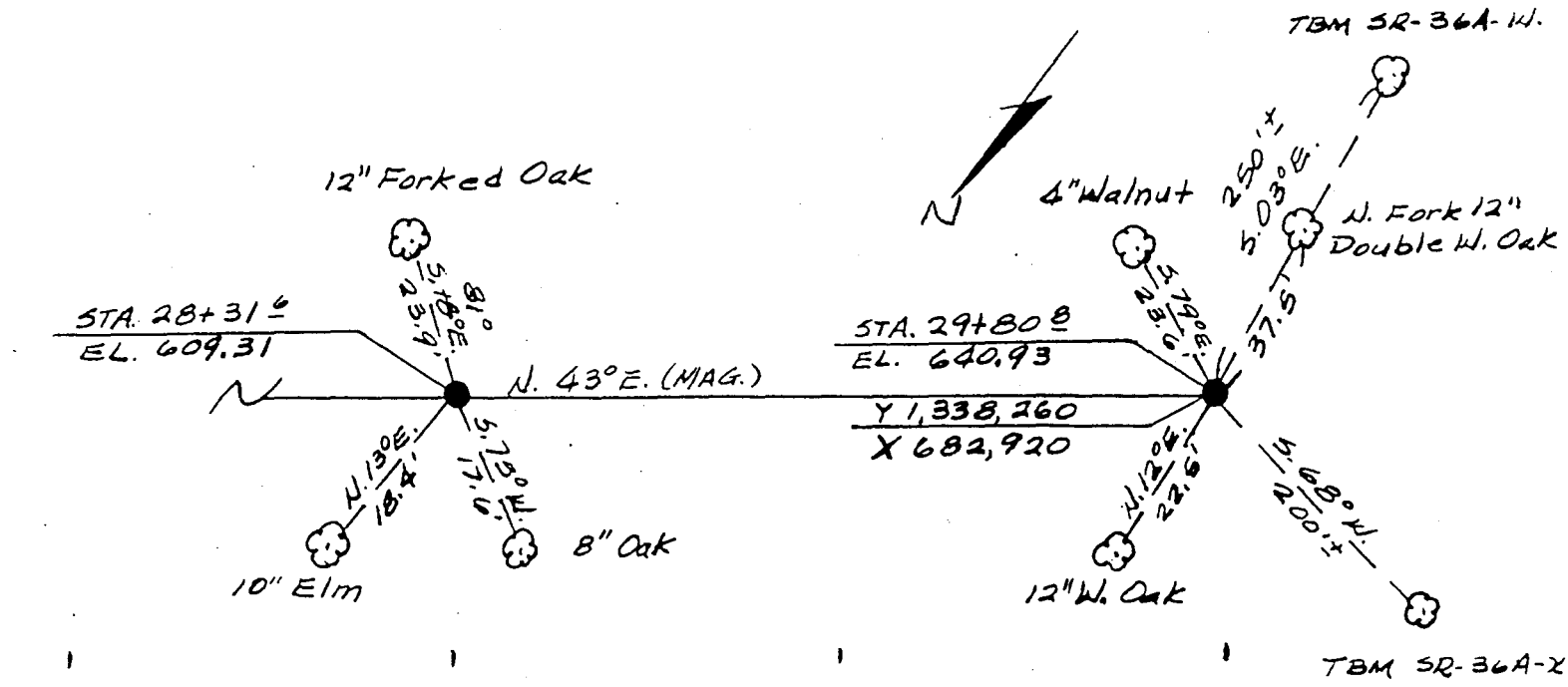
Station 41+04 ±
From the intersection of Hwy 107 & Hwy U travel West on Hwy U 2 mi ±, 1/4 mi ± past C.O.E. main. compound to dirt road on right. Then North on dirt road along West side tree line 1/4 mi ± to point where dirt road turns North-East through tree line. Then North-East on dirt road 1900'± to point where road starts going down hill. Then pack North 800'± to range
4WD needed on dirt road in wet weather.

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR-36A BY: Owen Zurowcste DATE: 5/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1. TOPO 29, 39
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.





KENNETH BALK AND ASSOCIATES, ST. LOUIS, MO. SHEET NO. ORIGINAL

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR-36A BY: Owen Zuroweste DATE: 5/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1.
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.

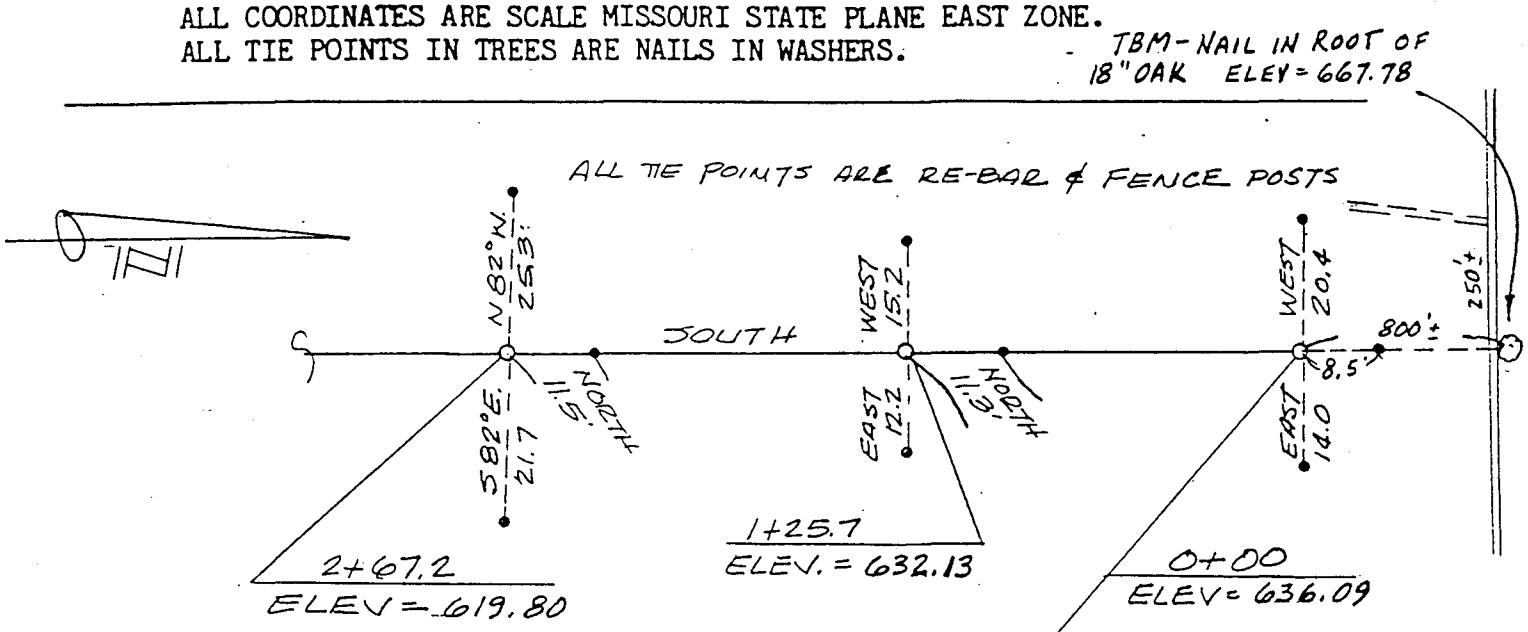
STATION 0+00:
From the intersection of Hwy 24 & Hwy 107 travel South on Hwy 107 2 mi.± to intection of gravel road. Then West on gravel road 1mi ± to gravel road on left. Then South on gravel road 1 mi± to left turn in road. Then East on gravel road 1/4 mi ± to gravel road on right. Then South on gravel road 1 mi ± to River Bottoms. Then West on field road along toe-of slope of River Bottoms 1/4 mi ± to Range.
4 WD needed on field road in wet weather.

Station 29+30 ±:
From the intersection of Hwy 107 & Hwy U travel West on Hwy U 3 3/4 mi ± to intersection of gravel road at the S. 1/4 corner of SEC. 36, T. 55N., R. 9W. Then North on gravel road 1/2 mi. ± to intersection of gravel road. Then West on gravel road 1/2 mi. to E. 1/4 corner of SEC. 36, T. 55N., R. 9W. Then pack North 300'± along fence line to Range.
4 WD needed last 1/2 mi.

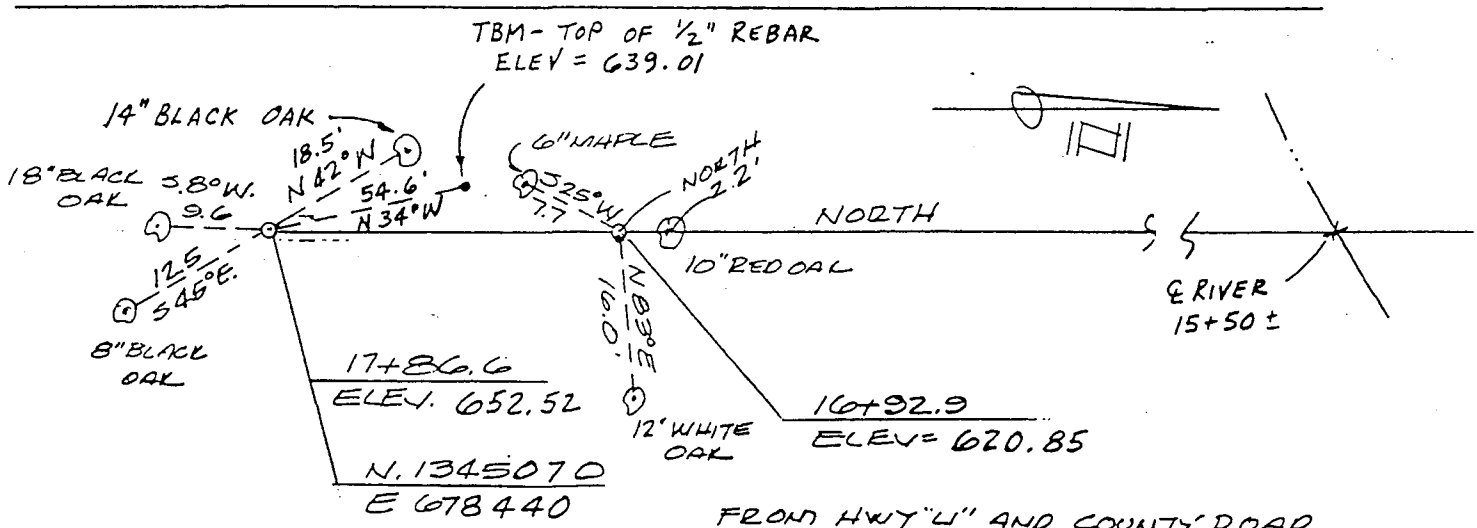
CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. 37-A1 BY: GENE BUDDE DATE: 10/9/82

NOTE: ALL MONUMENTS ARE 3" DIA. ALUM. TYPE B-1 OR E-2 TOPO 38
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.



FROM THE END OF COUNTY ROAD C-38 NEAR ENTRANCE TO ACCESS AREA GO WEST ON COUNTY (GRAVEL) ROAD 1.0 MILE THEN SOUTH ON DIRT ROAD 1000'± THEN WALK EAST IN FIELD 300' TO 0+00
- 4WD VEHICLE WOULD BE HELPFUL

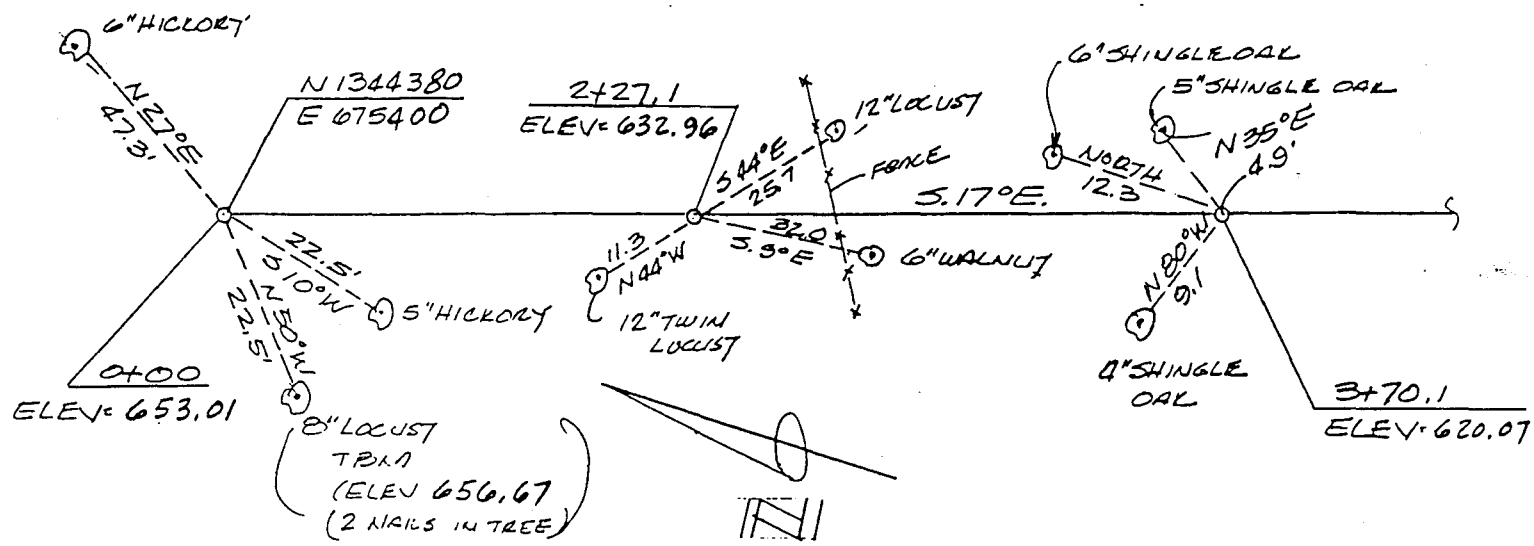


FROM HWY "U" AND COUNTY ROAD SW CORNER OF SE 1/4 SEC 36 T.55N, R.9W. GO NORTH 1.8 MILE ON GRAVEL ROAD THEN ON DIRT ROAD EAST 1100'± THEN NORTH 1000'± THEN N.E. AND EAST TO TOP OF RIDGE 300' SOUTH OF STA 17+86.6
4WD VEHICLE IS NEEDED

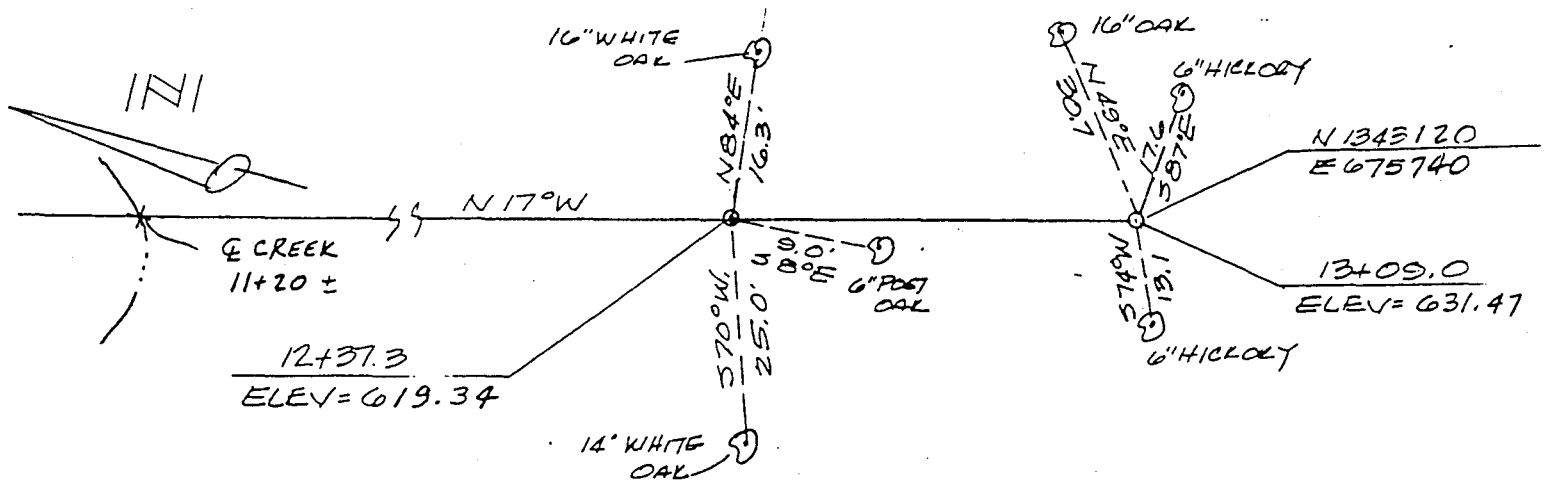
CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. 37-A2 BY: GENE BUDDE DATE: 10/9/82

NOTE: ALL MONUMENTS ARE 3" DIA. ALUM. TYPE B-1 OR G-2 TOPO 38
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.



FROM A "T" INTESECTION OF DIRT ROADS 800' SOUTH OF SEC CORNER SEC. 22, 23, 27, & 26 T55N, R9W, GO 1200'± EAST THEN 700' SOUTH TO FORD. (AND FORD) NEED TRACTOR TO CROSS. FROM FORD FOLLOW FIELD ROAD 1/2 MILE TO 0+00. 4WD VEHICLE IS NEEDED TO GET TO FORD IN DRY CONDITIONS FORD MAY BE CROSSED WITH 4WD VEHICLE

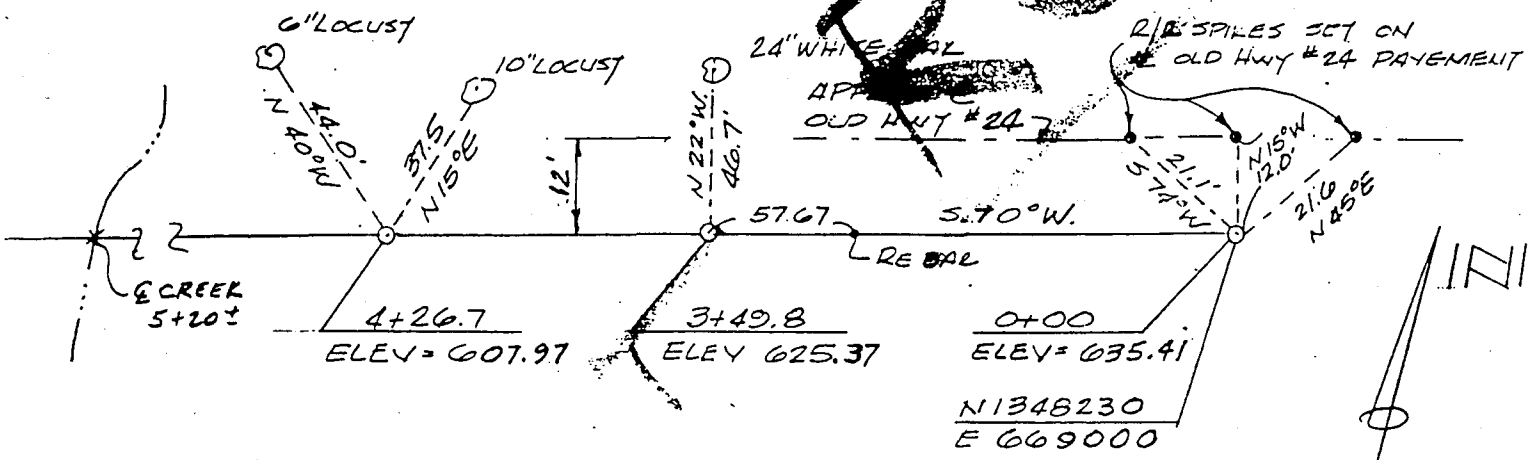


ACCESS IS FROM NORTH END OF RANGE ON FOOT

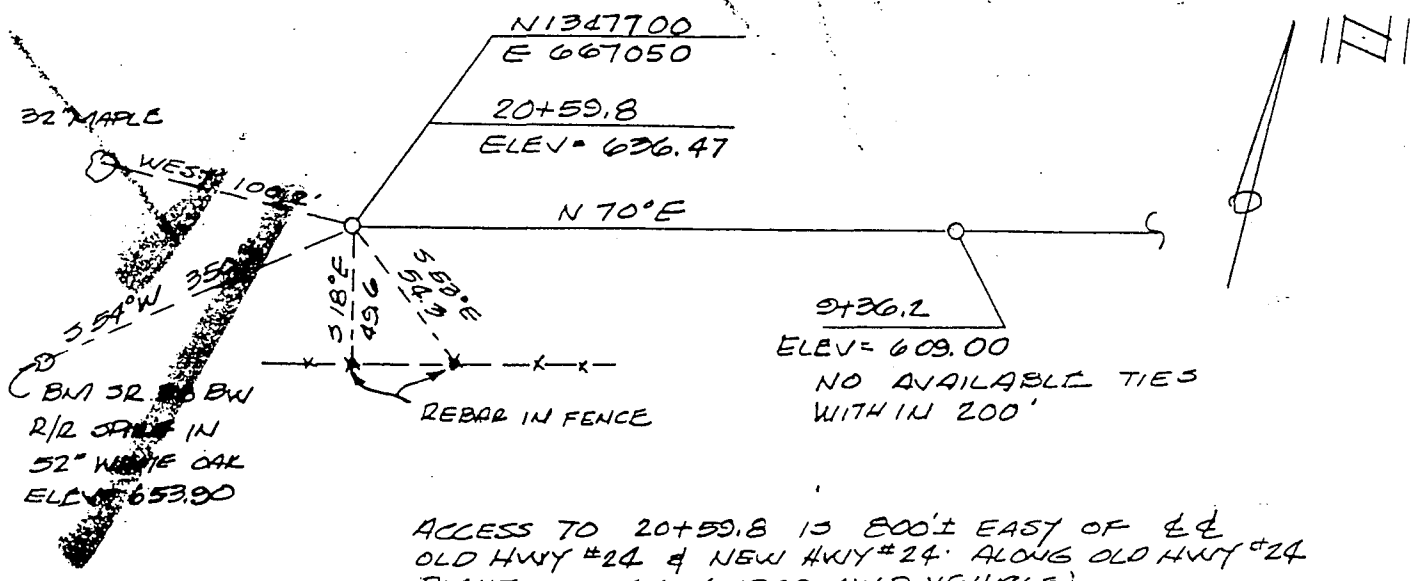
CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES. (ORIGINAL LOCATION — SEE NEW LOCATION)

RANGE NO. SR 38-B BY: GENE BUDDE DATE: 9/3/82

NOTE: ALL MONUMENTS ARE 3" DIA. ALUM. TYPE B-1 OR G-2.
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.



ACCESS TO 0+00 IS 500' EAST OF OTTER CREEK ON OLD HWY #24 PAVEMENT



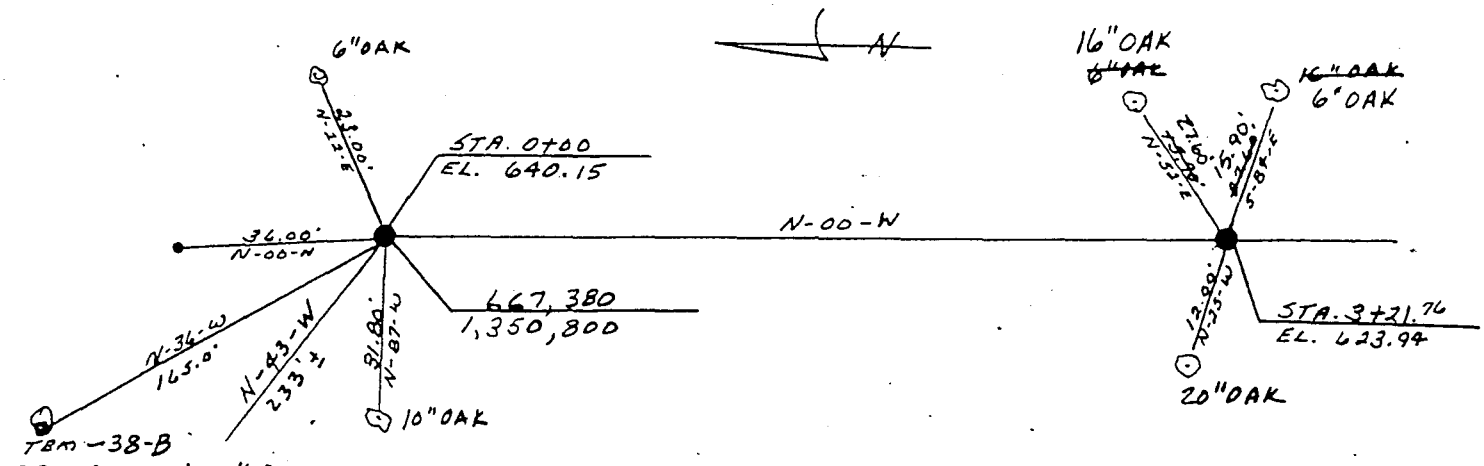
ACCESS TO 20+59.8 IS 800'± EAST OF ℄℄ OLD HWY #24 & NEW HWY #24 ALONG OLD HWY #24 RIGHT OF WAY (NEED 4WD VEHICLE)

DACW43-82-D-0011 1-2848-22.35

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES. NEW LOCATION

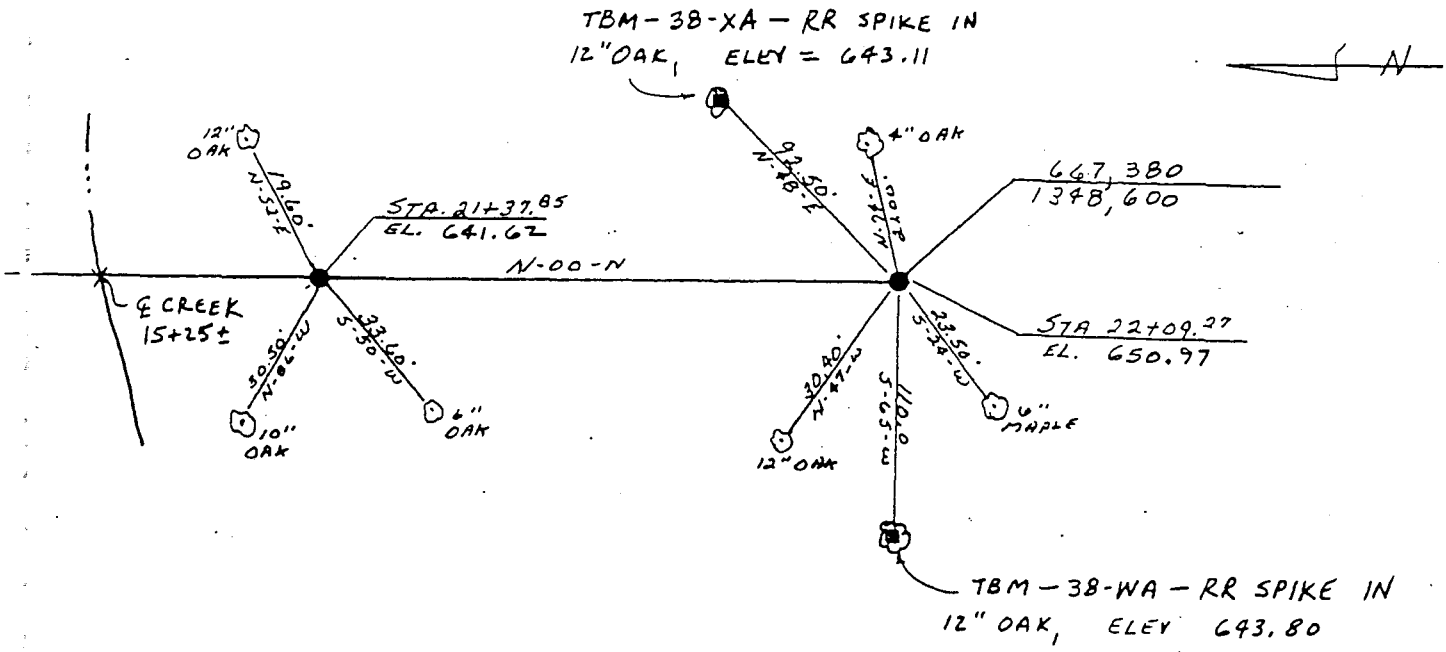
RANGE NO. SR-38B BY: J. CAIN DATE: 5-11-83

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1. TOPO 50
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.



FROM INTERSECTION OF A COUNTY RD. + HWY 24 (1.5 MILES EAST OF GOSS) GO TO 1ST GRAVEL RT. + GO TO BRIDGE ON DALE BRANCH CREEK + FOLLOW CREEK ± 2,000 FT. THEN GO EAST ± 300' TO 0+00

TBM — RR SPIKE IN 15" WHITE OAK, ELEV = 654.77



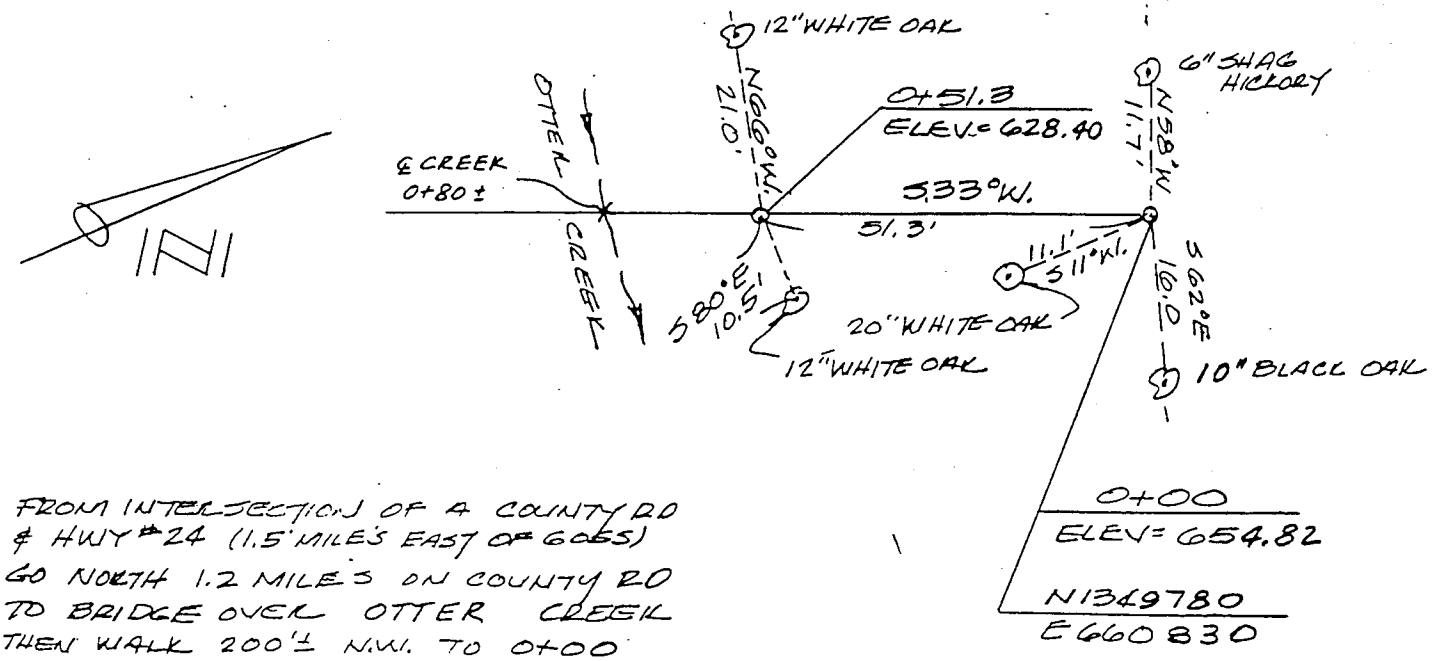
ACCESS GO WEST ON NEW HWY 24 ± 2,000 FT. PAST OTTER CREEK THEN ~~± 1100 FT~~ NORTH TO STA. 22+09 ± 1,600 FT.

KENNETH BALK AND ASSOCIATES, ST. LOUIS, MO. SHEET NO. ORIGINAL

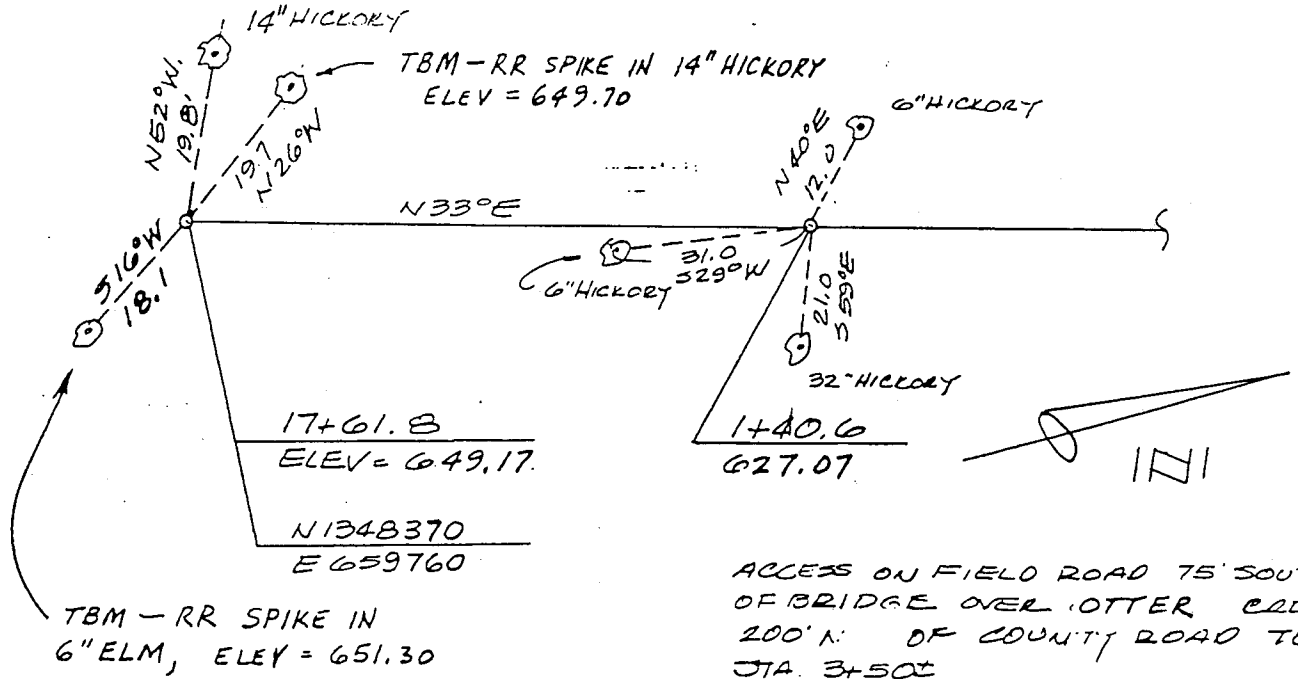
CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. 39-B BY: GENE BUDDE DATE: 10/9/82

NOTE: ALL MONUMENTS ARE 3" DIA. ALUM. TYPE B-1 OR G-2 TOPO 50
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.



FROM INTERSECTION OF A COUNTY RD & HWY #24 (1.5 MILES EAST OF GOES) GO NORTH 1.2 MILES ON COUNTY RD TO BRIDGE OVER OTTER CREEK THEN WALK 200'± N.W. TO 0+00

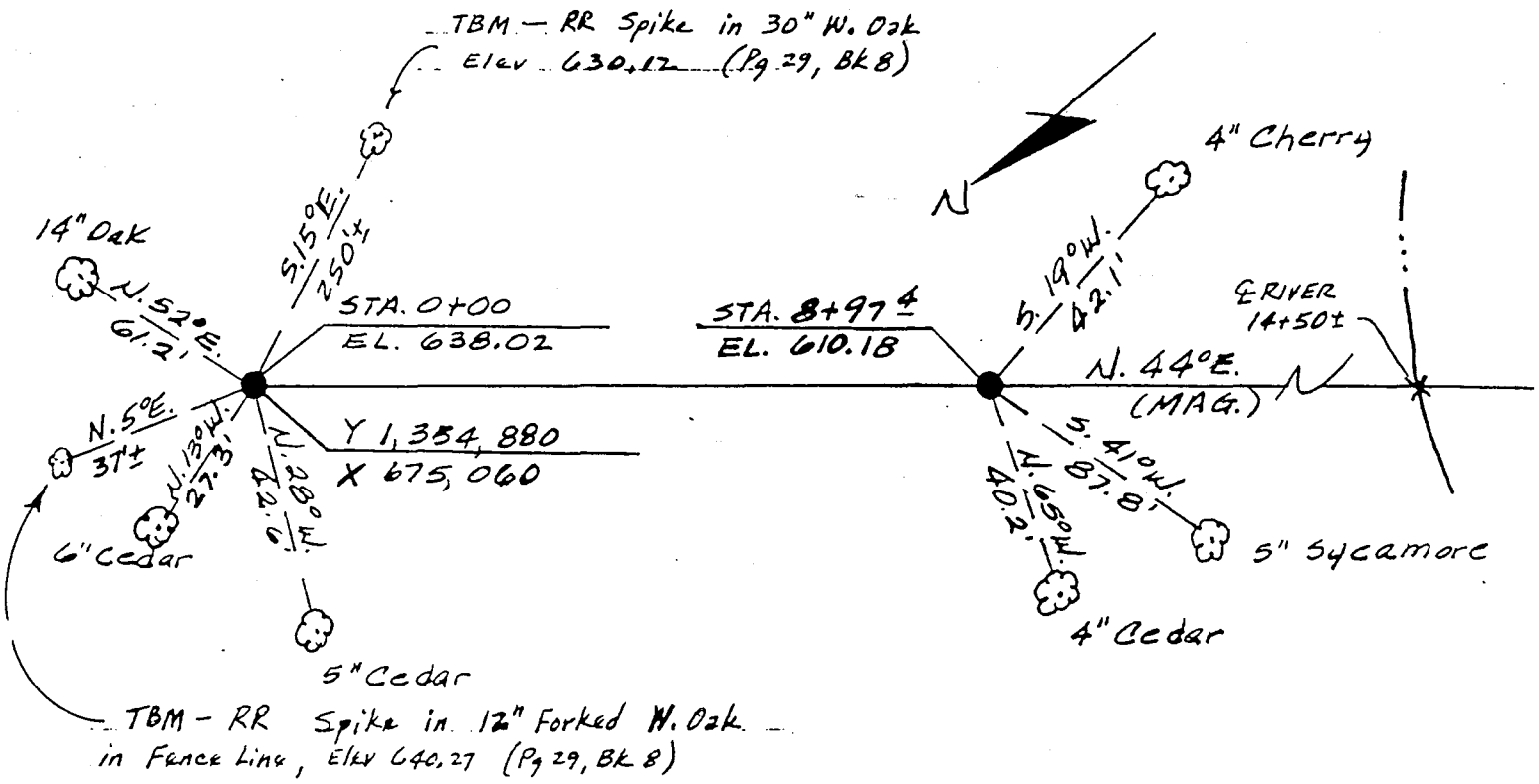


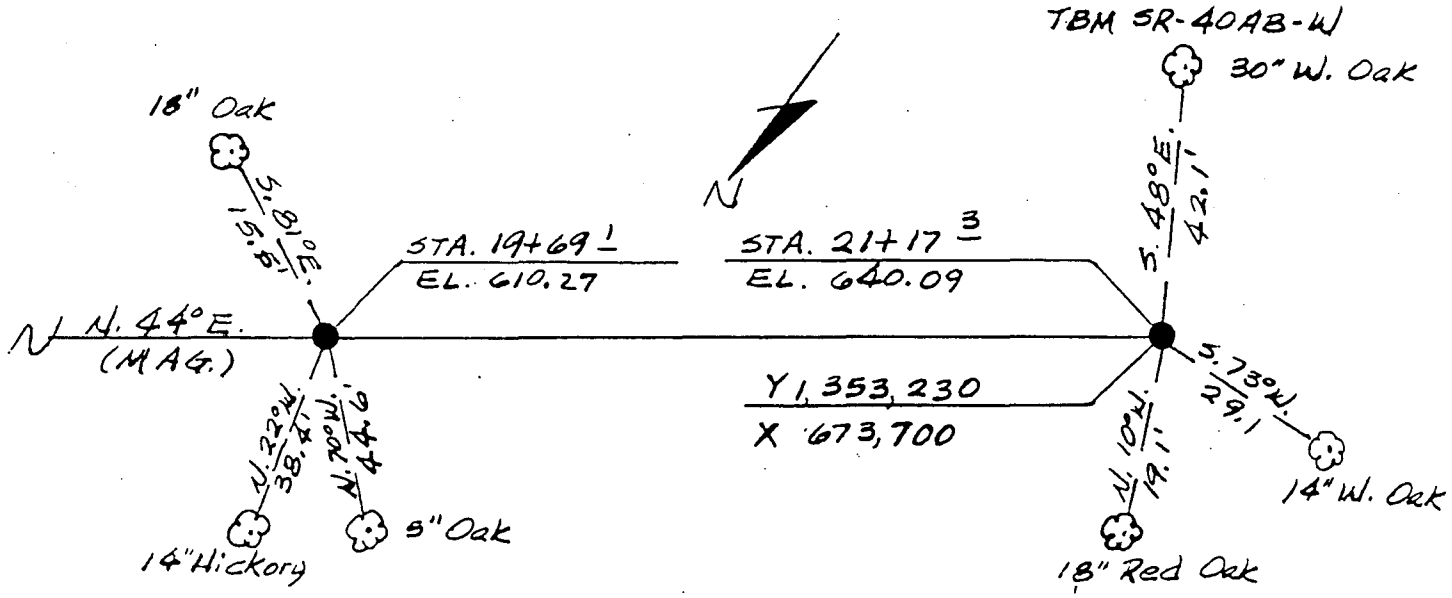
ACCESS ON FIELD ROAD 75' SOUTH OF BRIDGE OVER OTTER CREEK 200' N. OF COUNTY ROAD TO STA. 3+50±

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR-40AB BY: Owen Zurowieste DATE: 5/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1. TOPO 37
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.





ORIGINAL

DACW43-82-D-0011

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR-40AB BY: Owen Zurowieste DATE: 5/92

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1.
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.

Station 0+00:
Take first gravel road, East of intersection of Hwy 24 and North Fork Salt River, North then West across creek 1/4 mi ± to where gravel road turns North. Then North on gravel road 1/4 mi ±. Range 150 ± to West.
Creek floods during heavy rains and lake will back up into creek.

Station 21+17 ±:
From East end of Old Hwy 24 on West side of North Fork of Salt River, pack North 300' ± to Range.

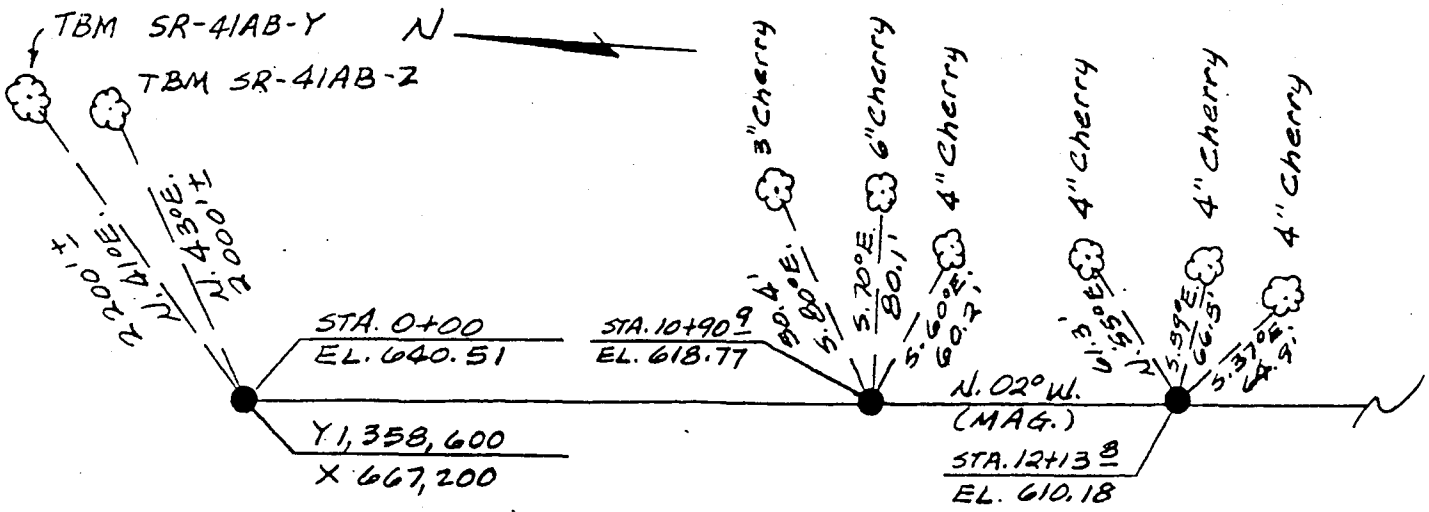
KENNETH BALK AND ASSOCIATES, ST. LOUIS, MO. SHEET NO.

ORIGINAL

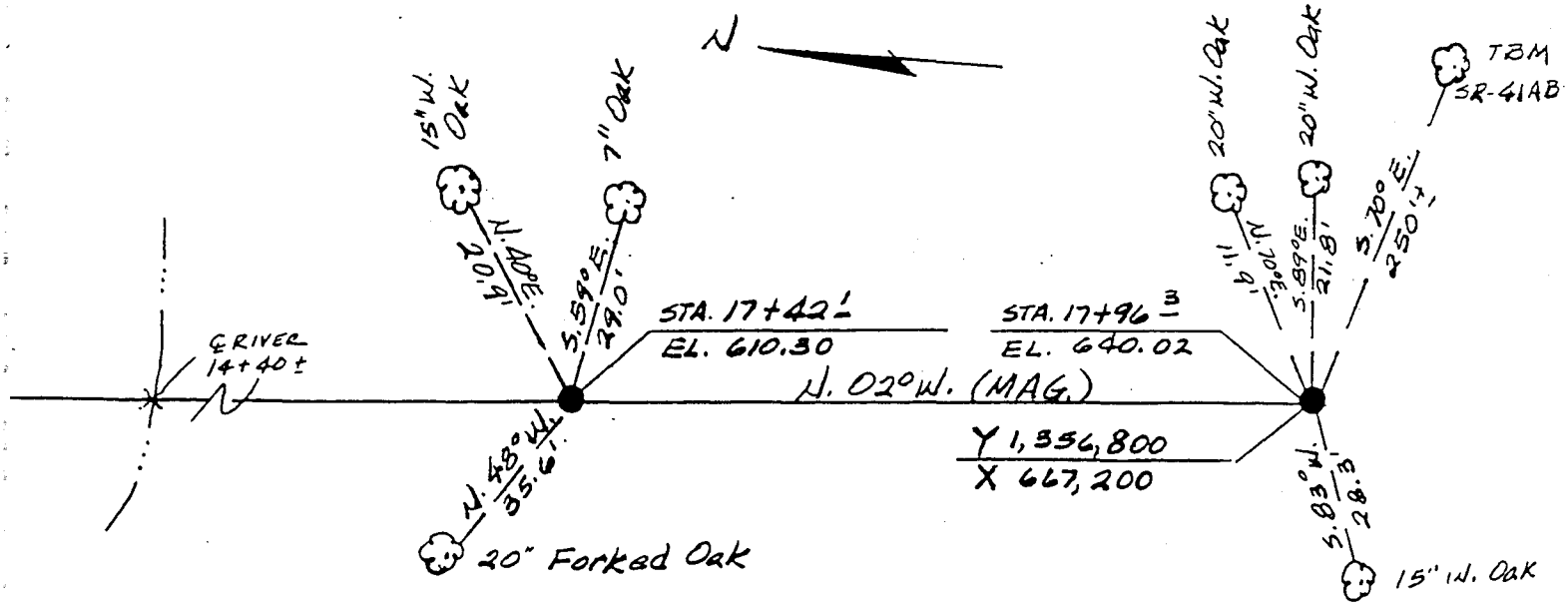
CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR-41AB BY: Owen Zuroweste DATE: 5/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1. TOPO 49
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.



No references available within 300'± for point 0+00 (Mon in cultivated field, may be knocked-out)



ORIGINAL

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR-41AB BY: Owen Zurowieste DATE: 3/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1.
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.

Station 0+00:
From intersection of Hwy 24 and Hwy V, travel North on Hwy V 2 mi ± to gravel road on left. Then West on gravel road 2 mi ± to "T" intersection of gravel roads. Then South on gravel road ½ mi ± to field road at end of gravel road. Then South-West on field past pond to West. Then back South 500' ± to Range.
Field road continues around to cross Range 400' ± North of North Fork Salt River.

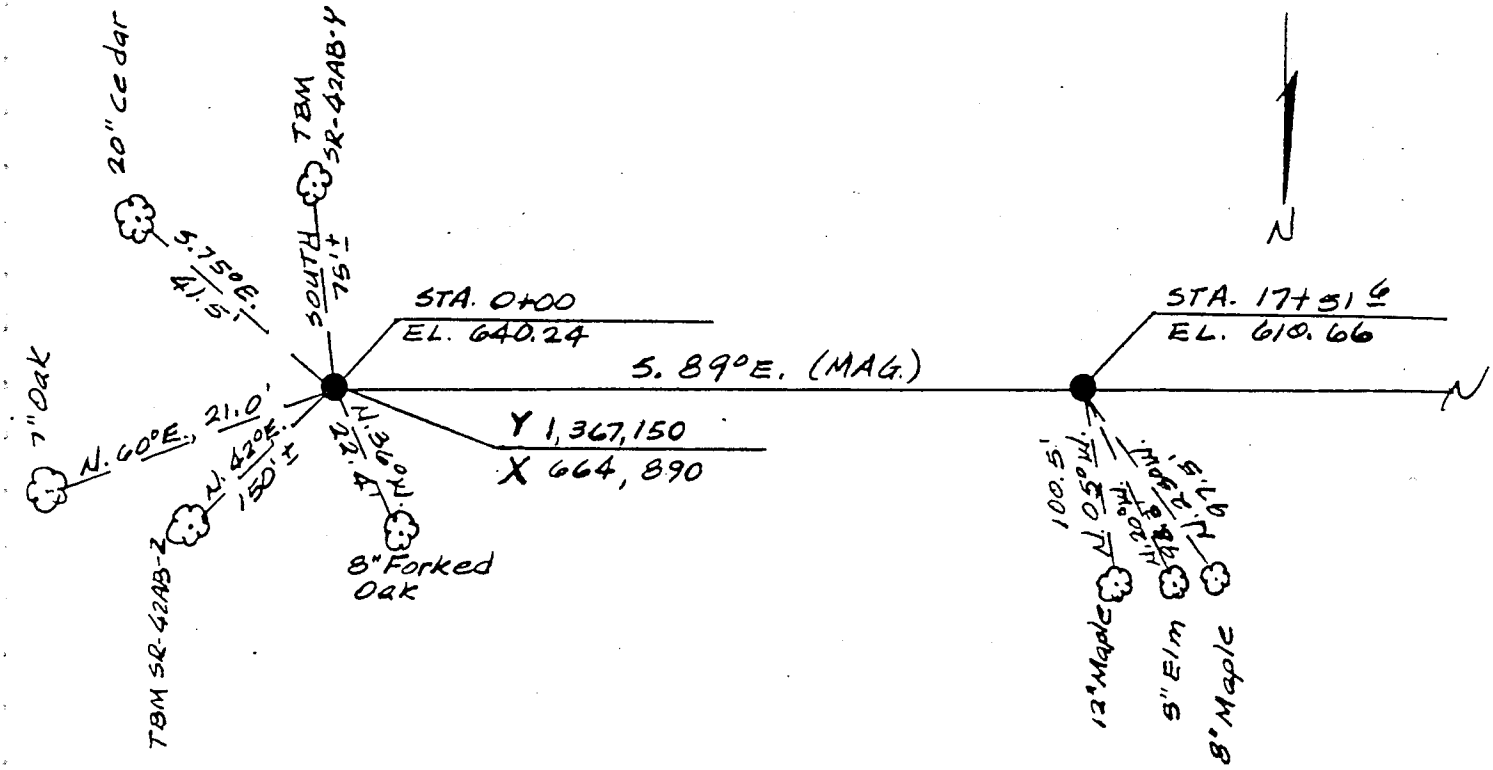
Station 17+29 ±:
From where field road crosses Range 400' ± North of River (see description above), back West 200' ± where River is 2-3' deep during normal stage, then 200' ± East to Range.

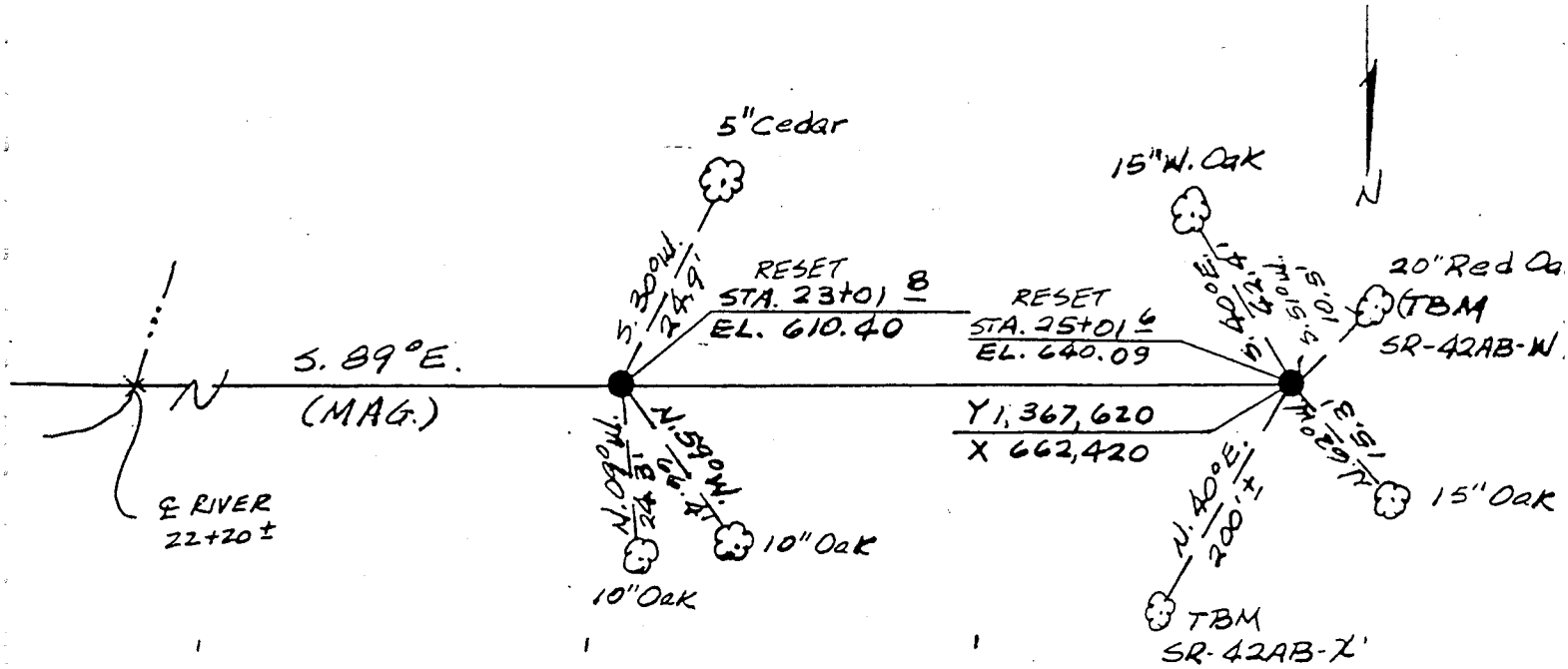
ORIGINAL

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR-42AB BY: Owen Zuroweste DATE: 5/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1. TOPO 48
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.





CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. SR-42AB BY: Owen Zuroviesta DATE: 5/82

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1.
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.

Station 0+00:
From intersection of Hwy 24 and Hwy. V, travel North on Hwy V 2 mi± to gravel road on left. Then West on gravel road 2 mi± to "T" intersection of gravel roads. Then North on gravel road 3/4 mi± to first farm on left. Stop here and talk to Mr. Lillie for permission and key to cross private property. Then North-West on old road through pasture and woods to toe of slope of hill. Range is 50'± North.
Road through pasture and woods passable only with 4WD during wet weather.

Station 2+01.2:
From 0+00 (see above description) drive or pack west during wet weather 1/2 mi± to East bank of North Fork Salt River. Then pack North-East 700'± along River to where it is 3'± deep during normal stage. Then pack South West 700'± to Range.

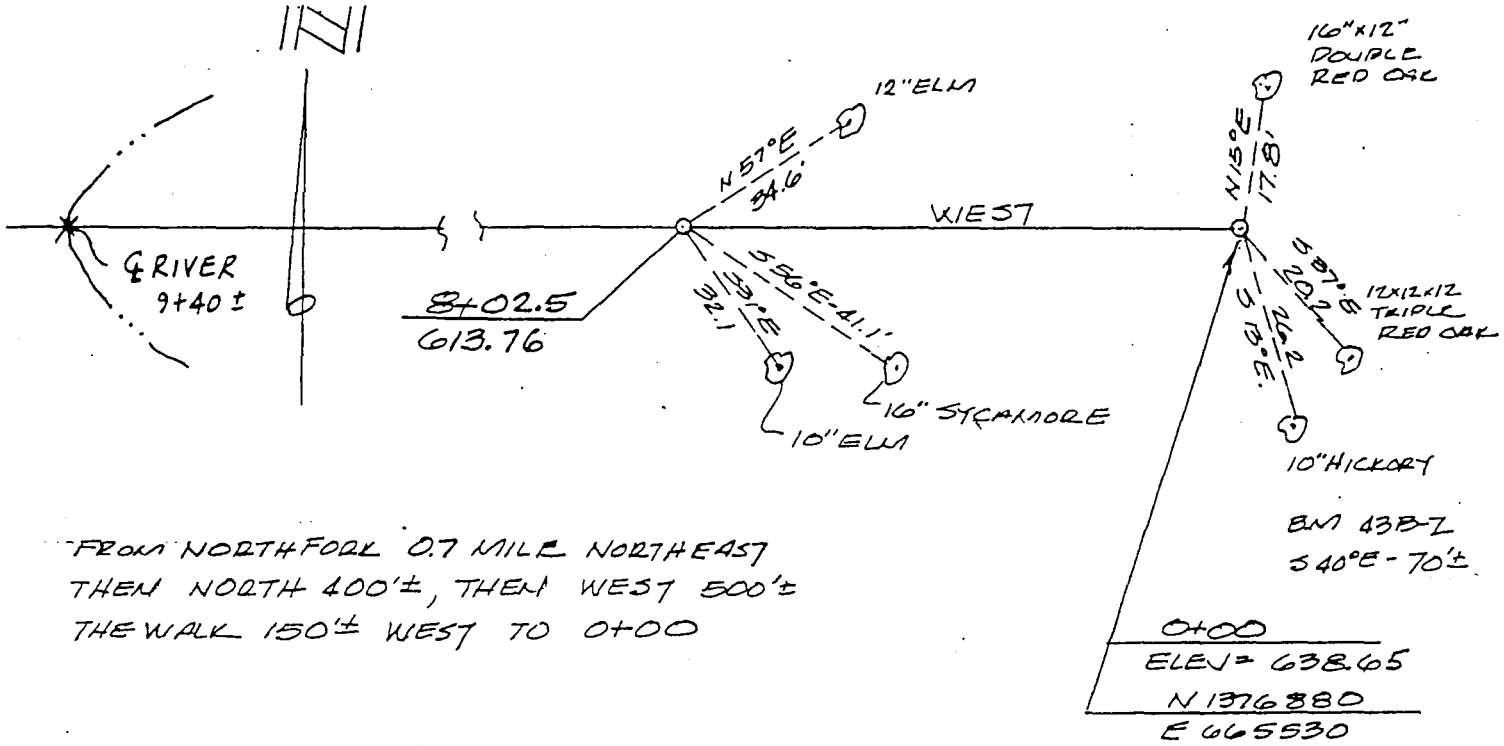
DACW43-82-D-0011 1-2757-22.18-S

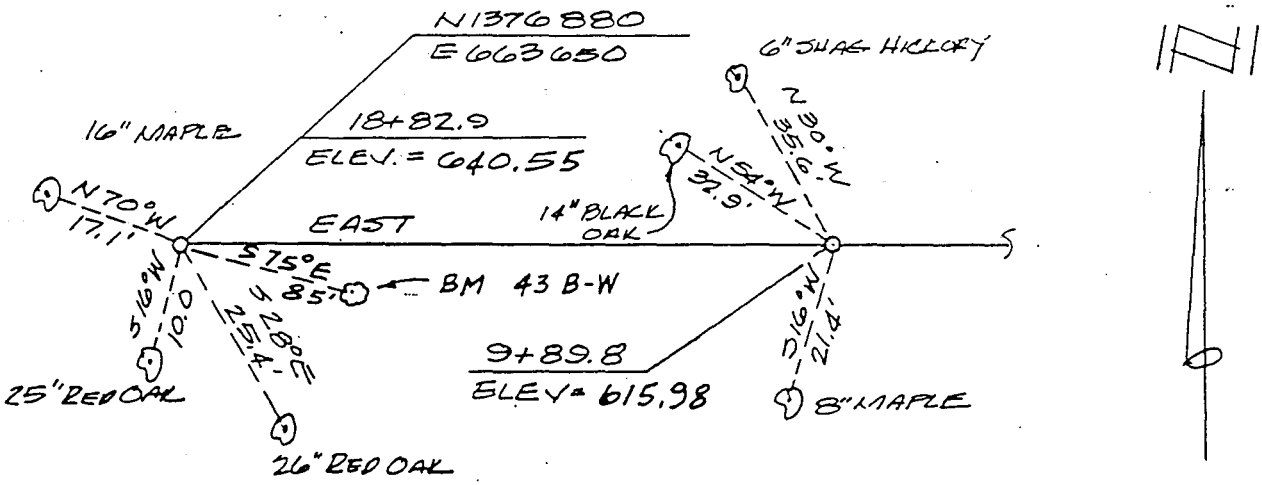
CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. 43-B BY: GENE BUDDE DATE: 10/6/82

TOPO 47

NOTE: ALL MONUMENTS ARE 3" DIA. ALUM. TYPE D-1 OR G-2
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.





ACCESS 100'± EAST OF THE N.E. CORNER OF THE CEMETARY AT THE N.E. CORNER OF NORTH FORK

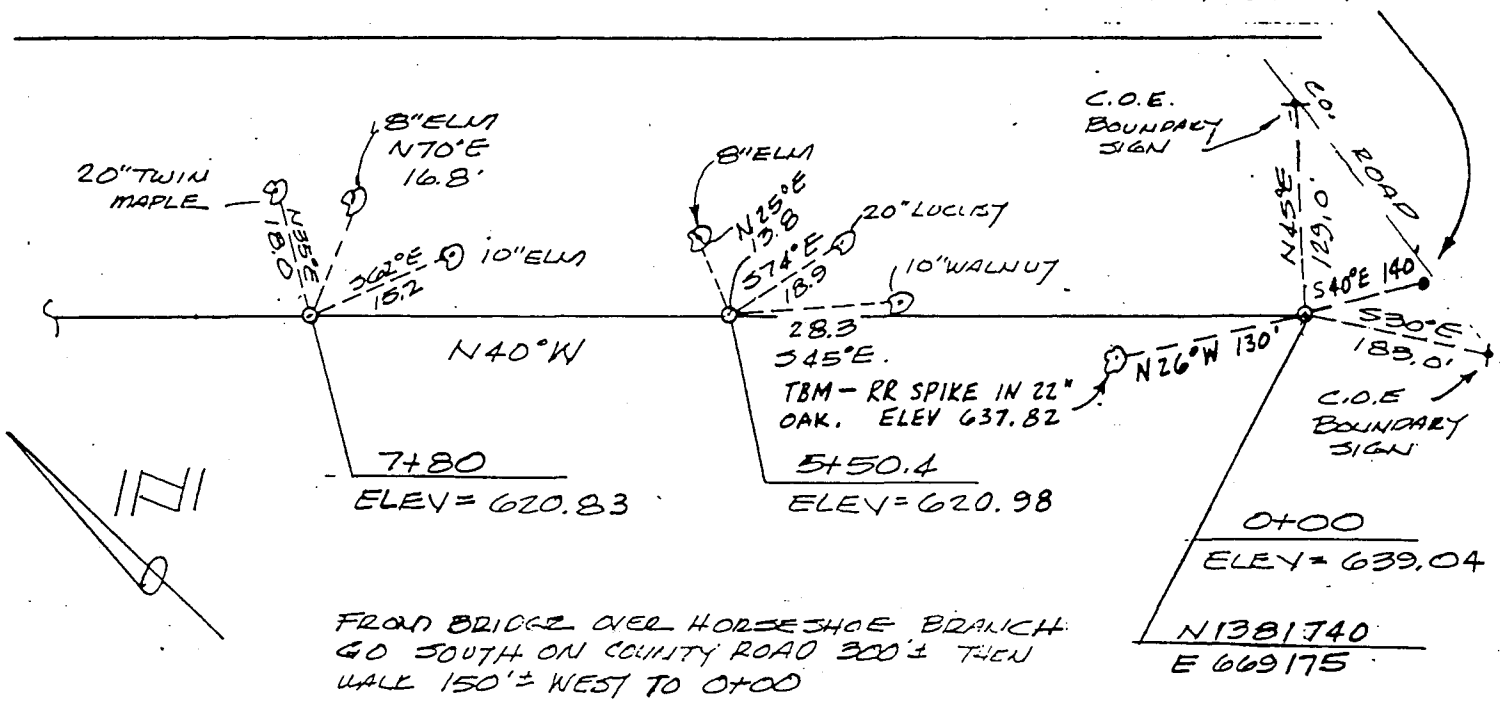
ORIGINAL

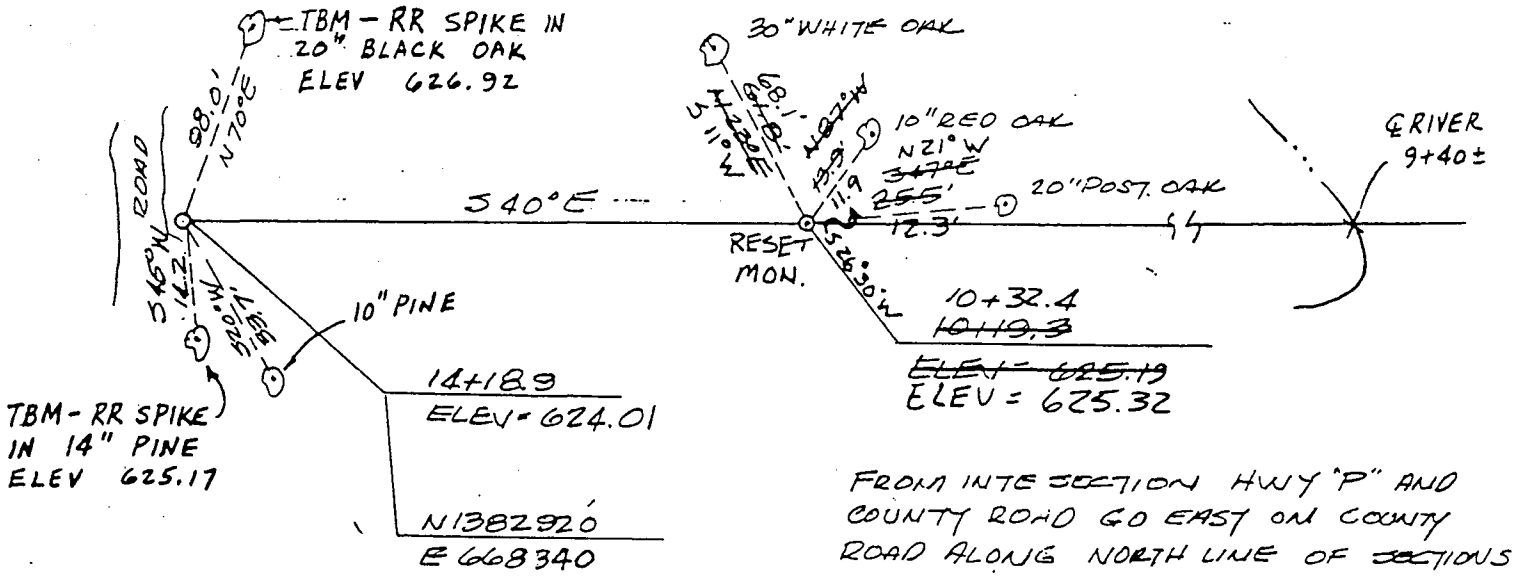
CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. 44-B BY: GENE BUDDE DATE: 10/6/82

NOTE: ALL MONUMENTS ARE 3" DIA. ALUM. TYPE B-1 OR G-2
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.

TOPO 46, 47
TBM - RR SPIKE IN PP
ELEV 645.04





NOTE — RANGE NOT EXTENDED NORTH TO 640 ELEV DUE TO UNFRIENDLY LANDOWNER.

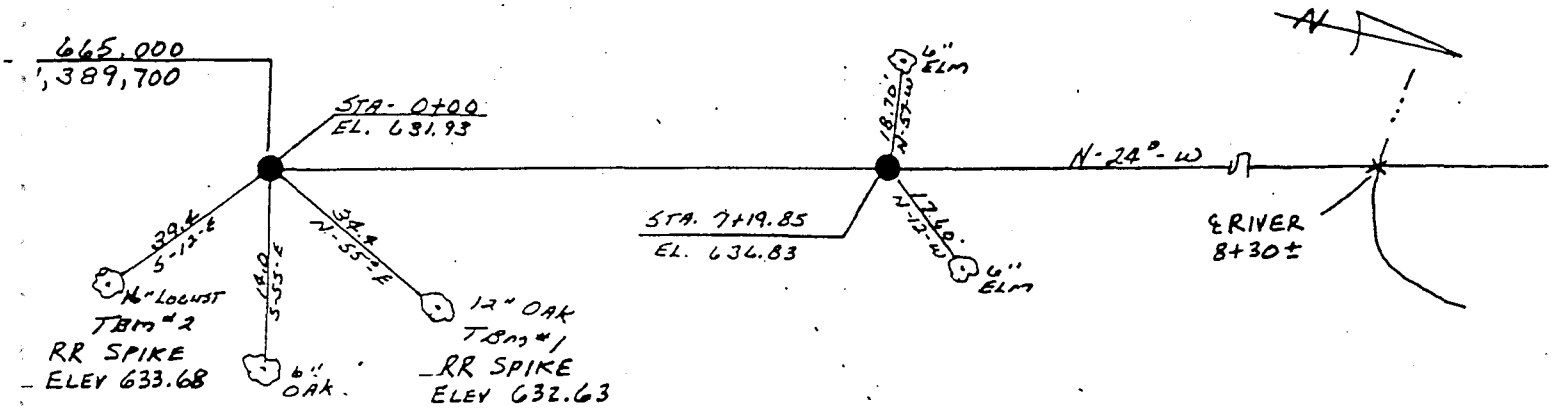
DACW43-82-D-0011 1-2848-22.35

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

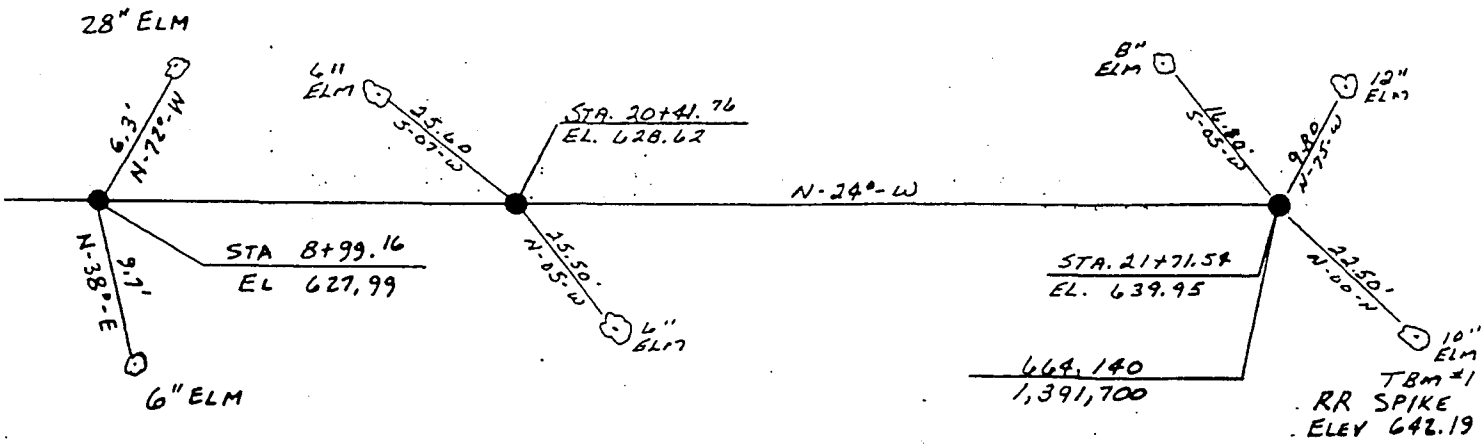
RANGE NO. SP-45-B BY: J. CAIN DATE: 5-5-83

TOPO 46

NOTE: ALL MONUMENTS ARE 2-3/8" DIA. ALUM. TYPE B-1.
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.



GO 3.3 MI. N. OF "FF" RD. ON GRAVEL RD. N.W. COR. SEC. 15 TO HOME OF A.L. SCHIRDMACHER ~~IN HOME~~ THEN W. ON FLD. RD. ± 3300' FT. THEN S.W. 2,500' FT. TO 0+00



ACCESS FROM 0+00

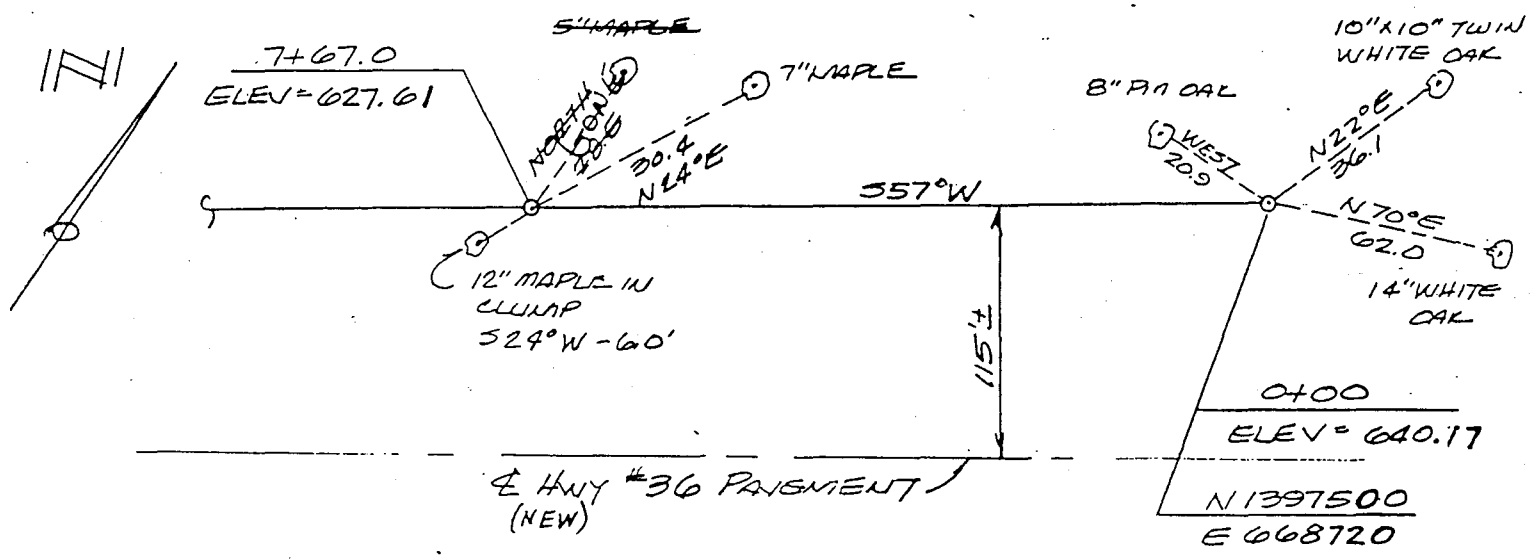
KENNETH BALK AND ASSOCIATES, ST. LOUIS, MO. SHEET NO. ORIGINAL

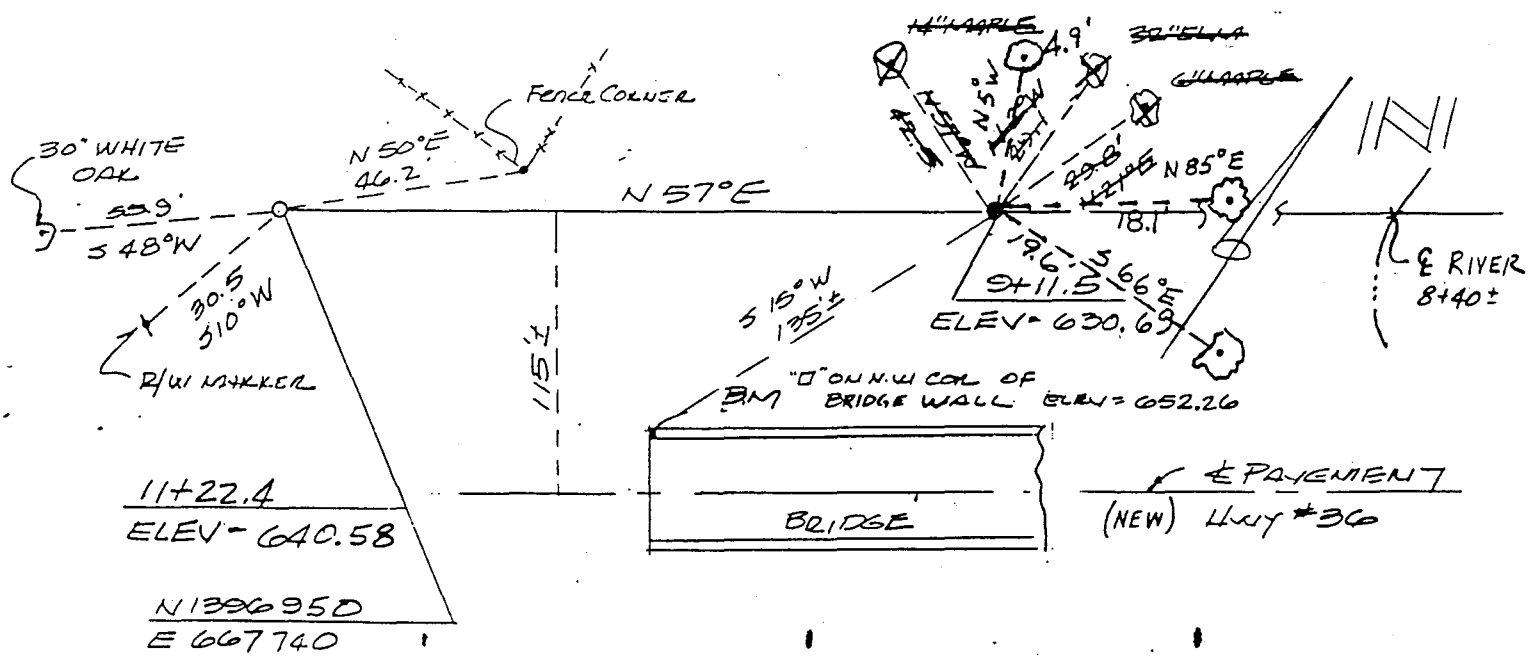
CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. 46-B BY: GENE BUDDE DATE: 10/6/82

TOPO 45

NOTE: ALL MONUMENTS ARE 3" DIA. ALUM. TYPE B-1 OR G-2
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.





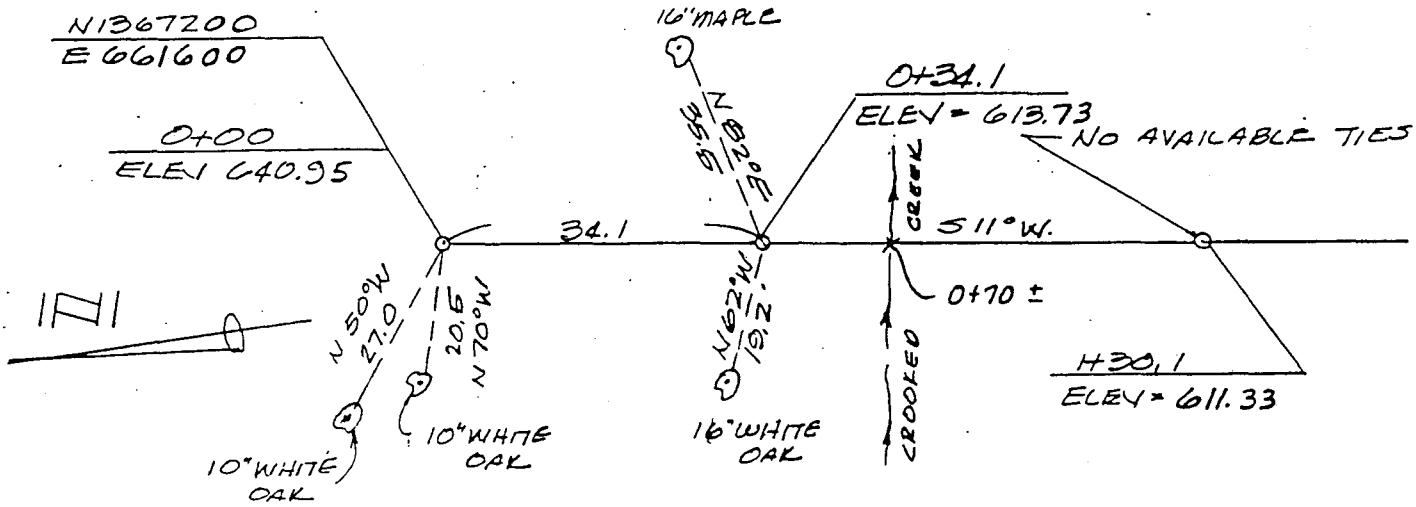
ORIGINAL

CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

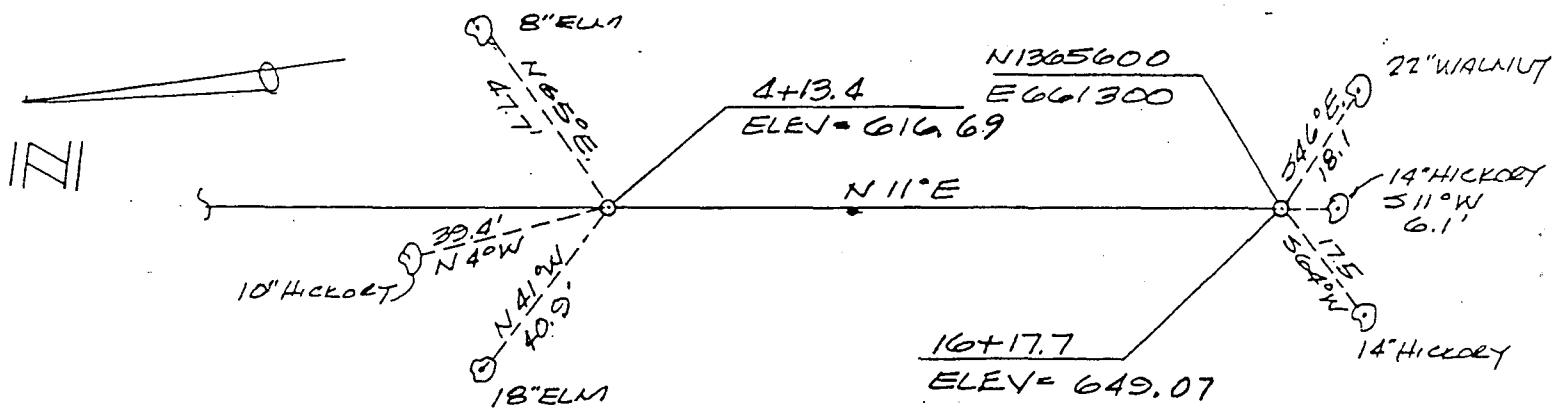
RANGE NO. 47-B BY: GENE BUDDE DATE: 10/9/82

TOPO 48

NOTE: ALL MONUMENTS ARE 3" DIA. ALUM. TYPE B-1 OR G-2
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.



FROM HERBERT HUNTER PROPERTY GO SOUTH 0.7 MILE TO FENCE @ C.O.E RL THEN WALK 1700'± TO 0+00 4WD VEHICLE NEEDED



ACCESS IS FROM NORTH END OF RANGE (0+00)

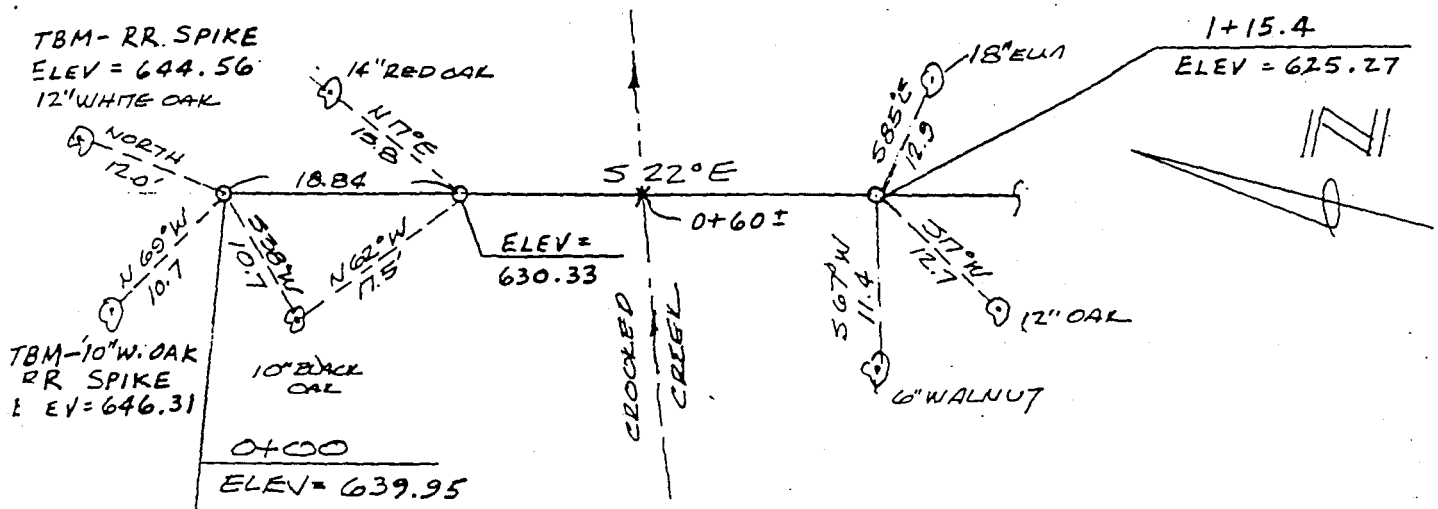
B.M. SR 47 B-W
LOCATED FROM 16+17.7
S 59°E - 280'

ORIGINAL

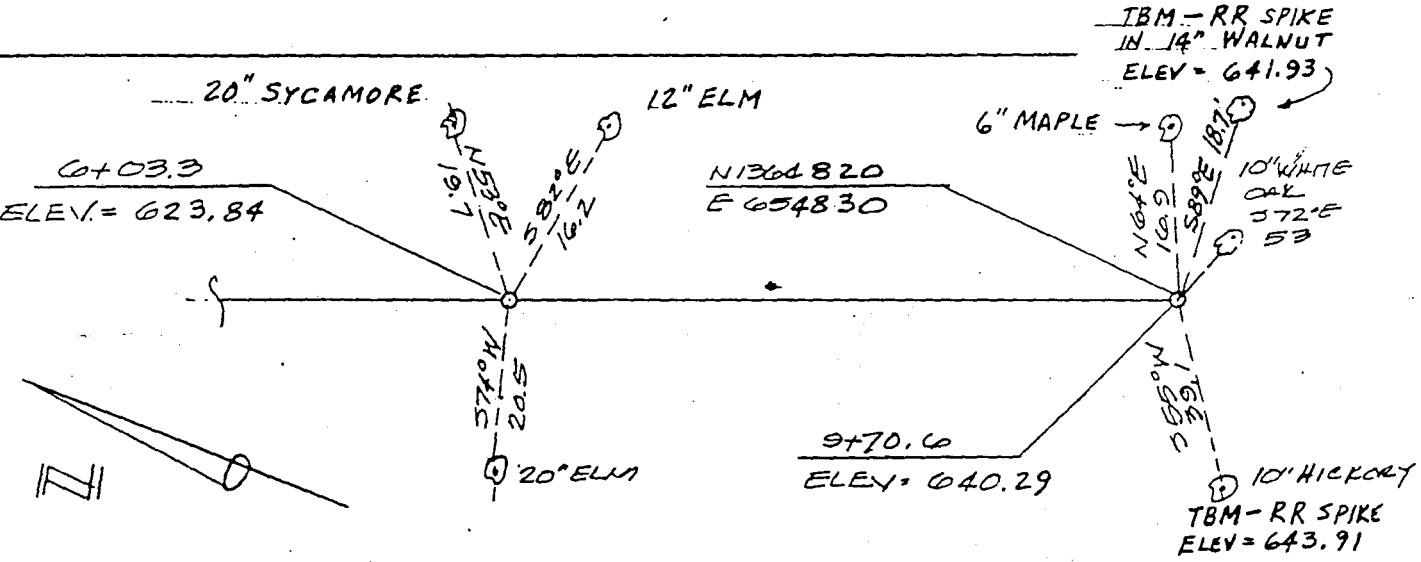
CLARENCE CANNON DAM AND MARK TWAIN RESERVOIR MONUMENTATION OF THE SEDIMENTATION RANGES.

RANGE NO. 48-B BY: GENE BUDDE DATE: 10/6/82

NOTE: ALL MONUMENTS ARE 3" DIA. ALUM. TYPE B-1 OR 6-2 TOPO 57
ALL COORDINATES ARE SCALE MISSOURI STATE PLANE EAST ZONE.
ALL TIE POINTS IN TREES ARE NAILS IN WASHERS.



FROM INTERSECT OF A COUNTY RD AND THE WEST PROPERTY LINE OF DONALD DODGE PROPERTY GO SOUTH ALONG DONALD DODGE WEST LINE 1.0 MILE THEN WALK 300' EAST TO 0+00 - 4WD NEEDED



ACCESS IS FROM NORTH END OF RANGE

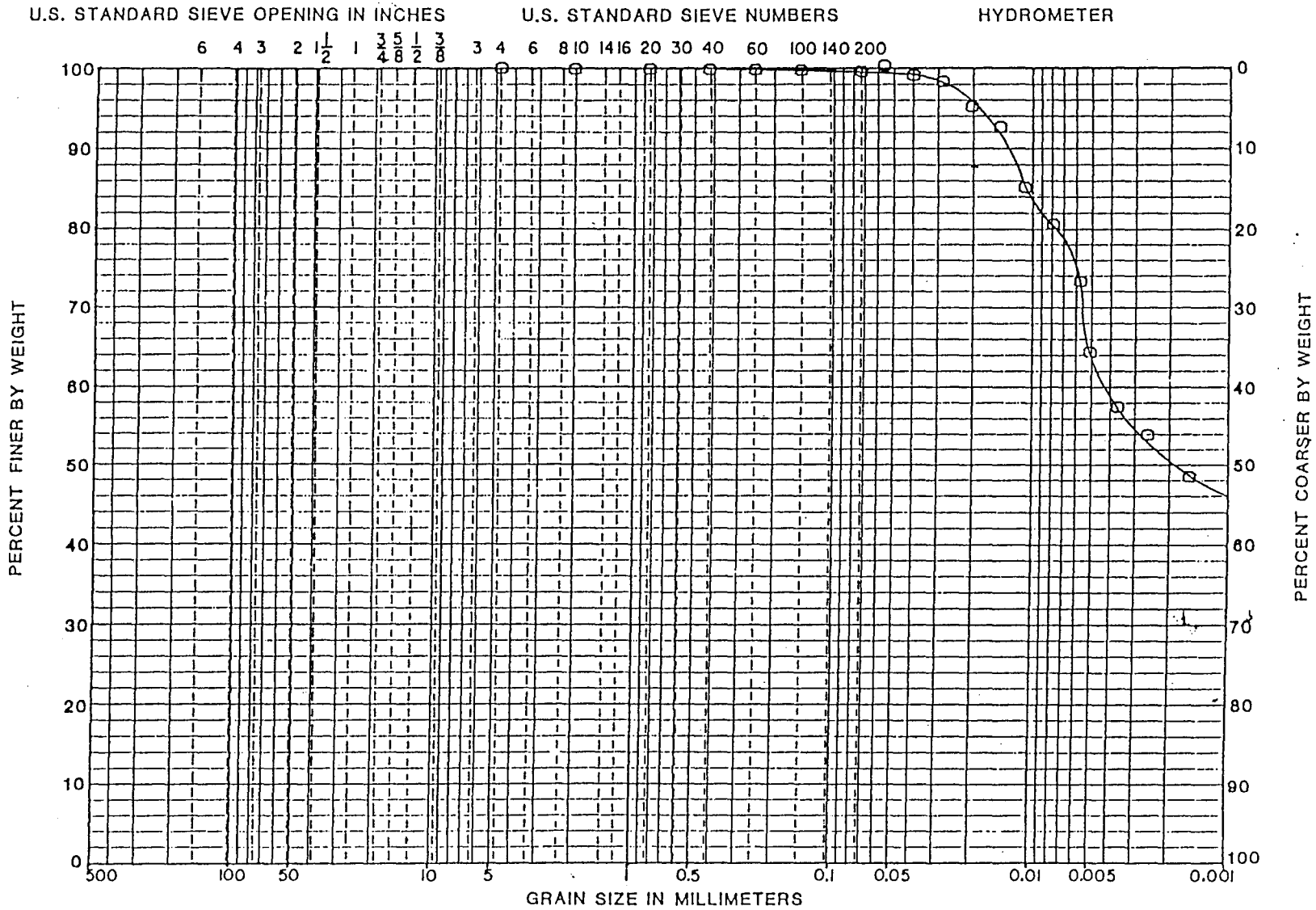
ORIGINAL

KENNETH BALK AND ASSOCIATES, ST. LOUIS, MO. SHEET NO.

APPENDIX C

SEDIMENT SIZE DISTRIBUTIONS

GRADATION CURVES

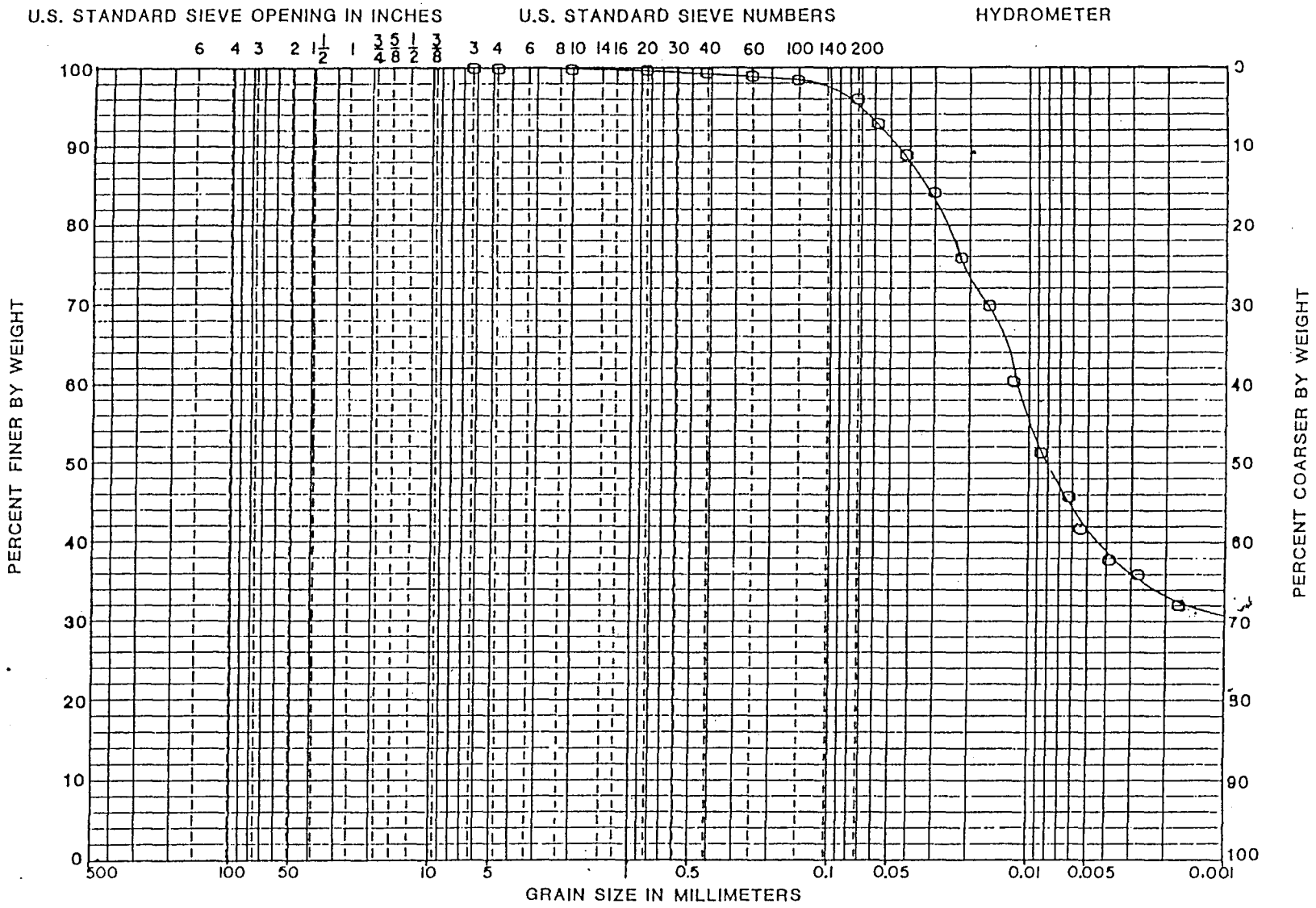


COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

SAMPLE NO.	EL. or DEPTH	CLASSIFICATION	NAT.WT.%	LL	PL	PI	PROJECT US CORPS OF ENGINEERS
MT EM		Gray CLAY	153.3				
							BORING NO.
		Dry Weight = 27.9 pcf					DATE 6-28-88
							GEOTECHNOLOGY ENGINEERING AND ENVIRONMENTAL SERVICES SAINT LOUIS, MISSOURI

PLATE 57

GRADATION CURVES

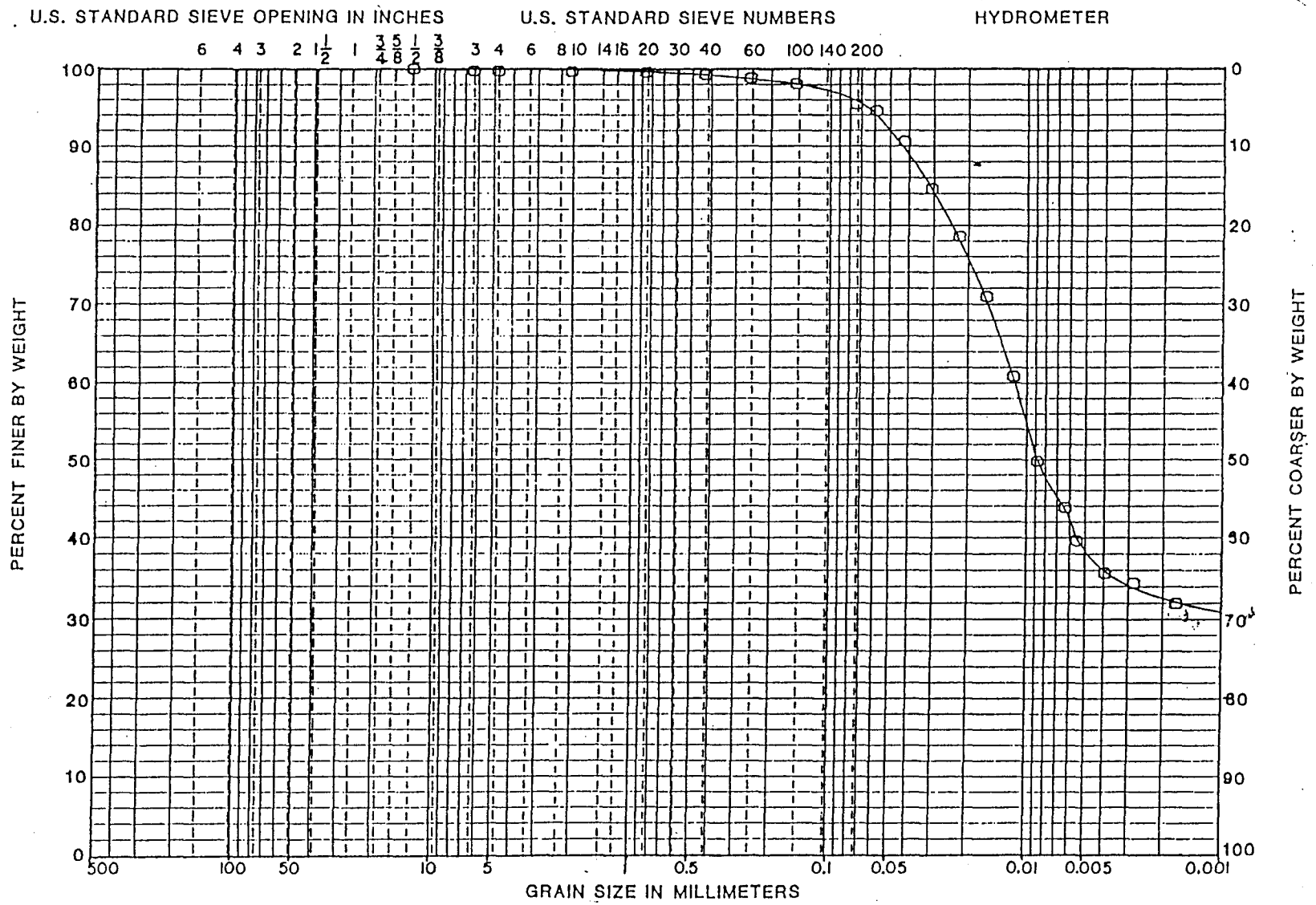


COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

SAMPLE NO.	EL. or DEPTH	CLASSIFICATION	NAT.WT.%	LL	PL	PI	
MT FF		Brown CLAY, trace sand	73.2				PROJECT US CORPS OF ENGINEERS
							BORING NO.
		Dry Weight = 35.2 pcf					DATE 6-30-88
							GEOTECHNOLOGY ENGINEERING AND ENVIRONMENTAL SERVICES SAINT LOUIS, MISSOURI

PLATE 58

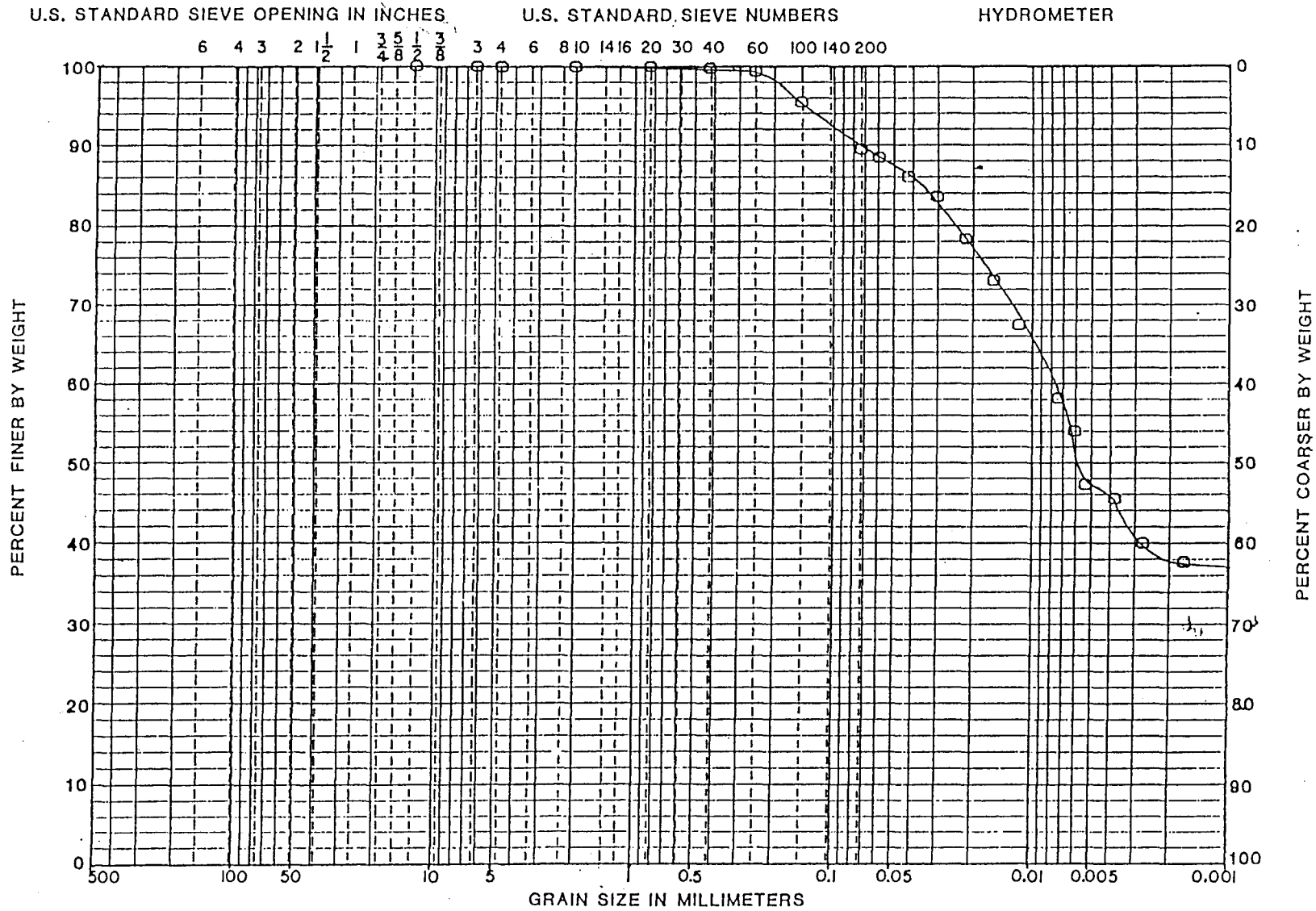
GRADATION CURVES



SAMPLE NO.	EL. or DEPTH	CLASSIFICATION	NAT.WT.%	LL	PL	PI	PROJECT US CORPS OF ENGINEERS
MT IC		Gray CLAY, trace sand	110.8				
							BORING NO.
		Dry Weight = 53.1 pcf					DATE 7-1-88
							GEOTECHNOLOGY ENGINEERING AND ENVIRONMENTAL SERVICES SAINT LOUIS, MISSOURI

PLATE 59

GRADATION CURVES

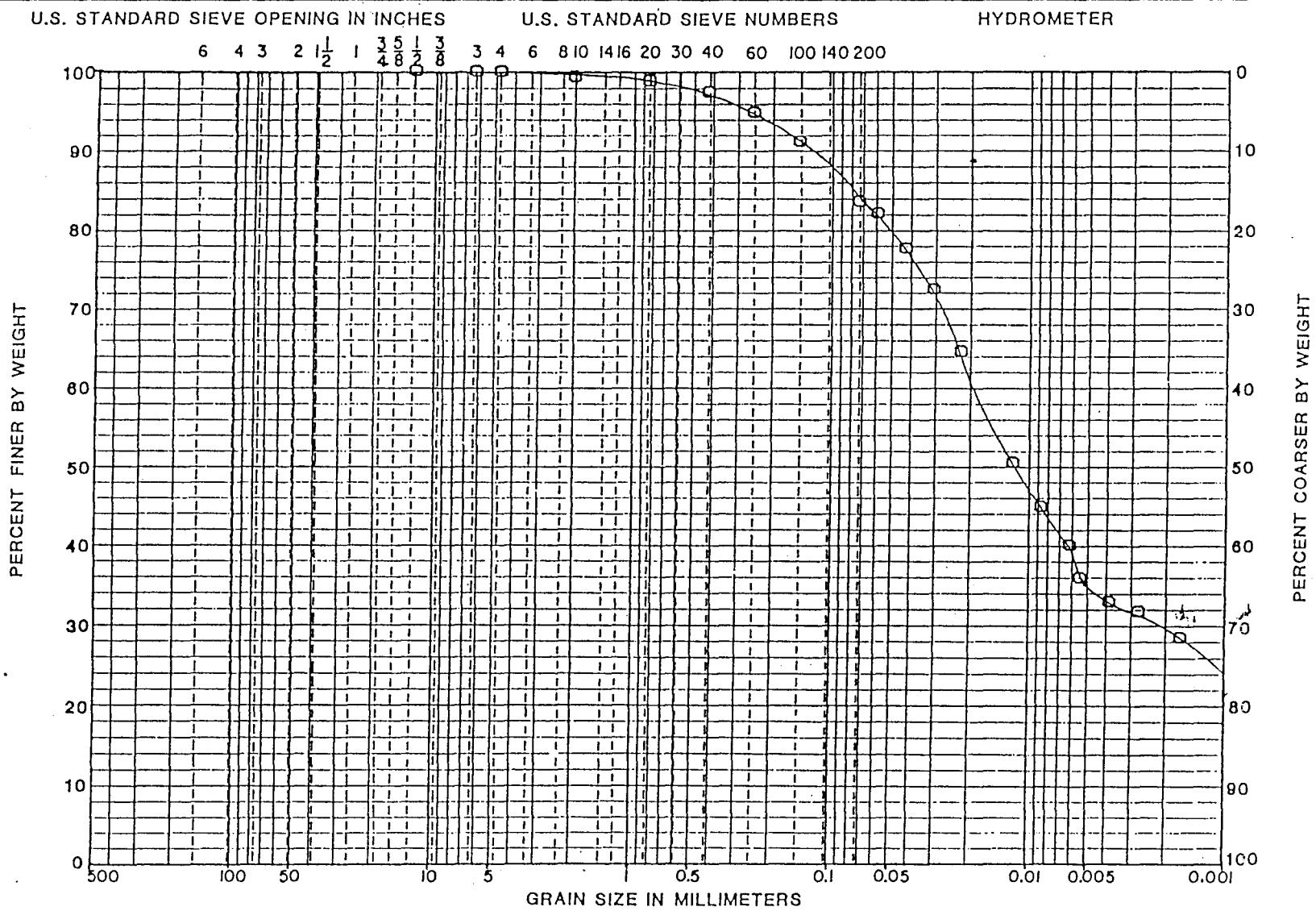


COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

SAMPLE NO.	EL. or DEPTH	CLASSIFICATION	NAT.WT.%	LL	PL	PI	PROJECT US CORPS OF ENGINEERS
MT LC		Gray CLAY, trace sand	104.7				
							BORING NO.
		Dry Weight = 41.0 pcf					DATE 7-1-88
							GEOTECHNOLOGY ENGINEERING AND ENVIRONMENTAL SERVICES SAINT LOUIS, MISSOURI

PLATE 60

GRADATION CURVES

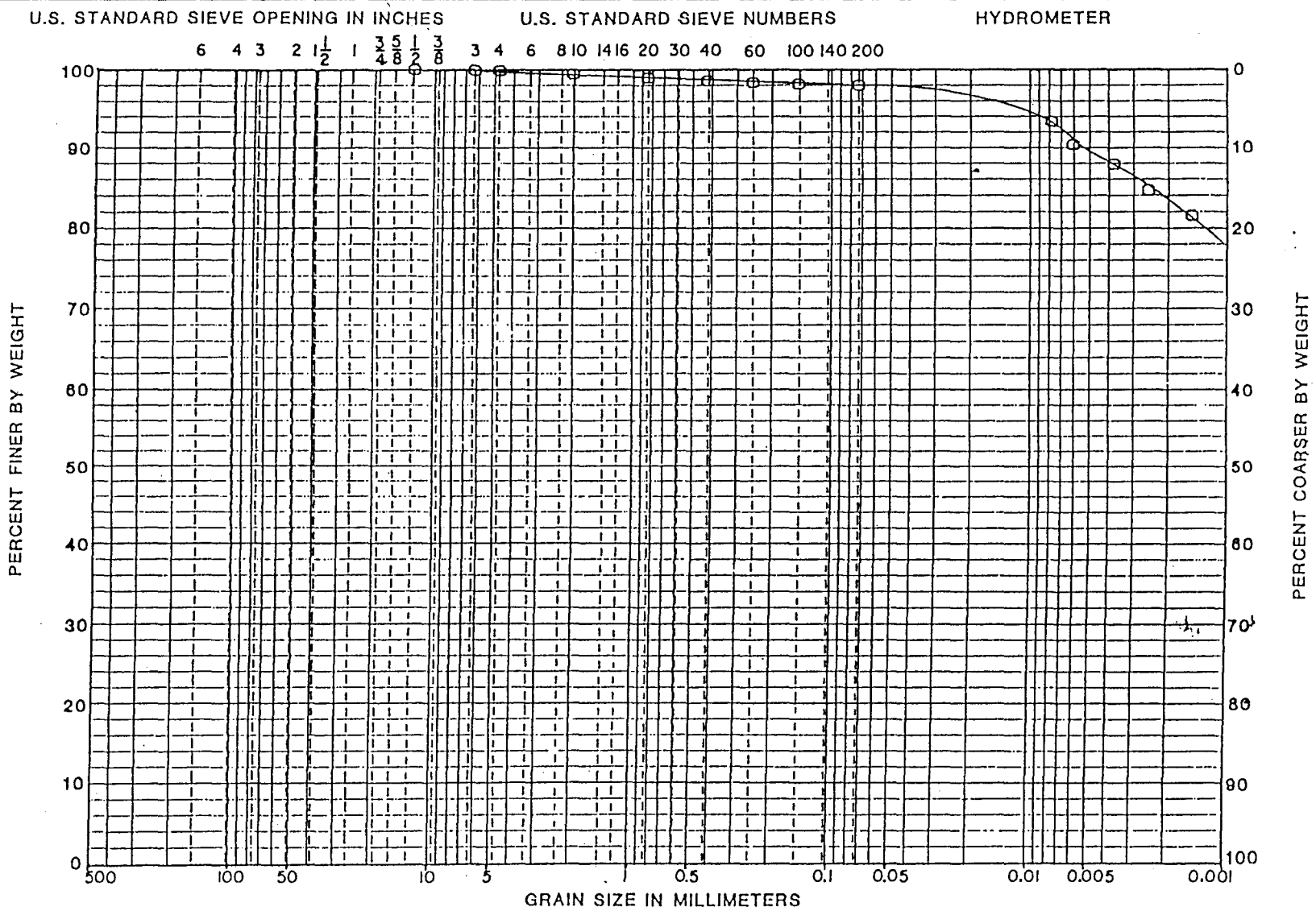


COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

SAMPLE NO.	EL. or DEPTH	CLASSIFICATION	NAT.WT.%	LL	PL	PI	PROJECT US CORPS OF ENGINEERS
MT LI		Gray CLAY, trace sand	117.4				
							BORING NO.
		Dry Weight = 38.4 pcf					DATE 7-1-88
							GEOTECHNOLOGY ENGINEERING AND ENVIRONMENTAL SERVICES SAINT LOUIS, MISSOURI

PLATE 61

GRADATION CURVES



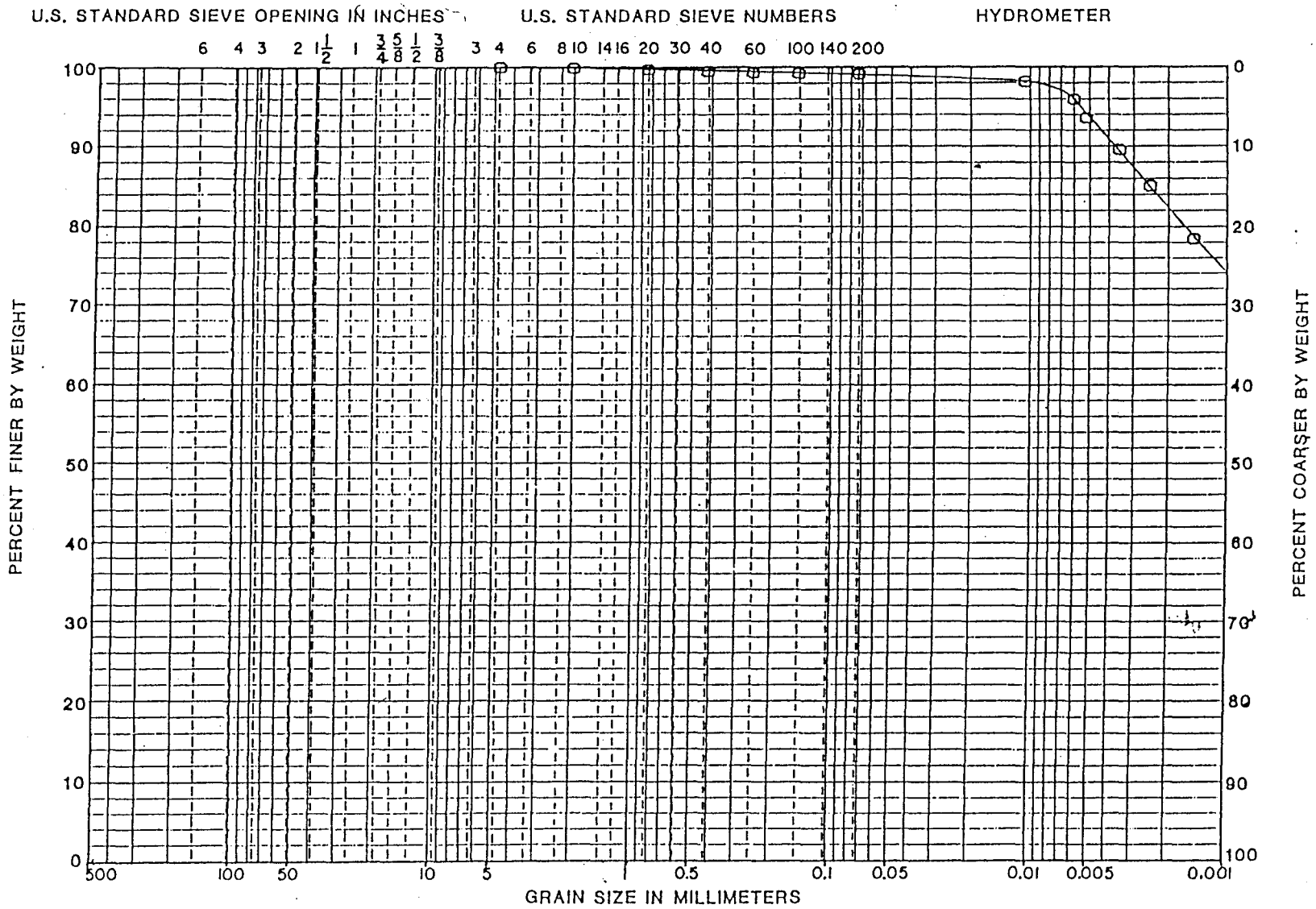
COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

SAMPLE NO.	EL. or DEPTH	CLASSIFICATION	NAT.WT.%	LL	PL	PI	PROJECT US CORPS OF ENGINEERS
MT 22		Gray CLAY with organics	434.5				
							BORING NO.
		Dry Weight = 12.9 pcf					DATE 7-1-88
							GEOTECHNOLOGY ENGINEERING AND ENVIRONMENTAL SERVICES SAINT LOUIS, MISSOURI

10689

PLATE 62

GRADATION CURVES



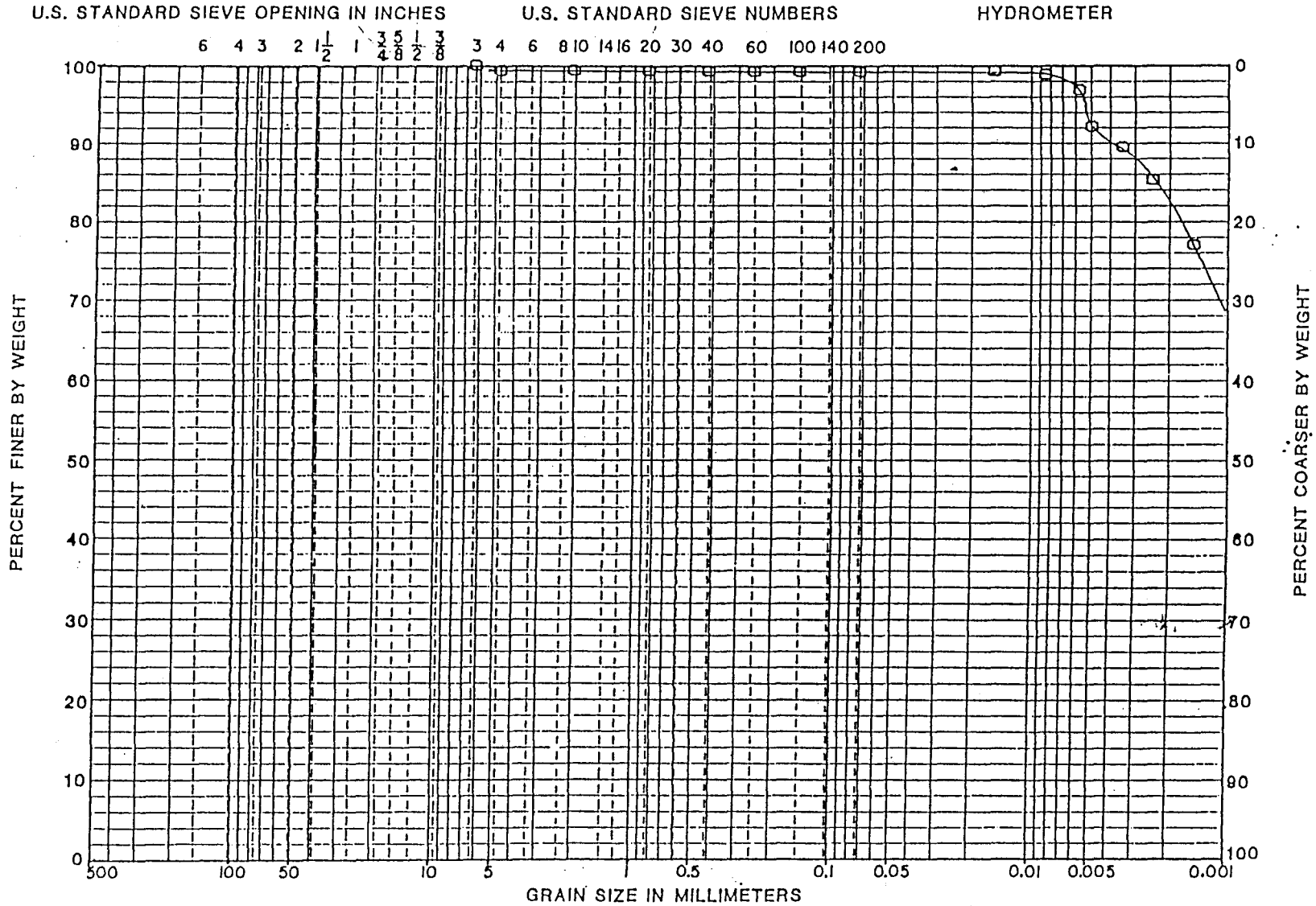
COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

SAMPLE NO.	EL. or DEPTH	CLASSIFICATION	NAT.WT.%	LL	PL	PI	PROJECT US CORPS OF ENGINEERS
MT 33		Gray CLAY	335.4				
							BORING NO.
		Dry Weight = 16.8 pcf					DATE 7-1-88
							GEOTECHNOLOGY ENGINEERING AND ENVIRONMENTAL SERVICES SAINT LOUIS, MISSOURI

PI ATF 63

10989

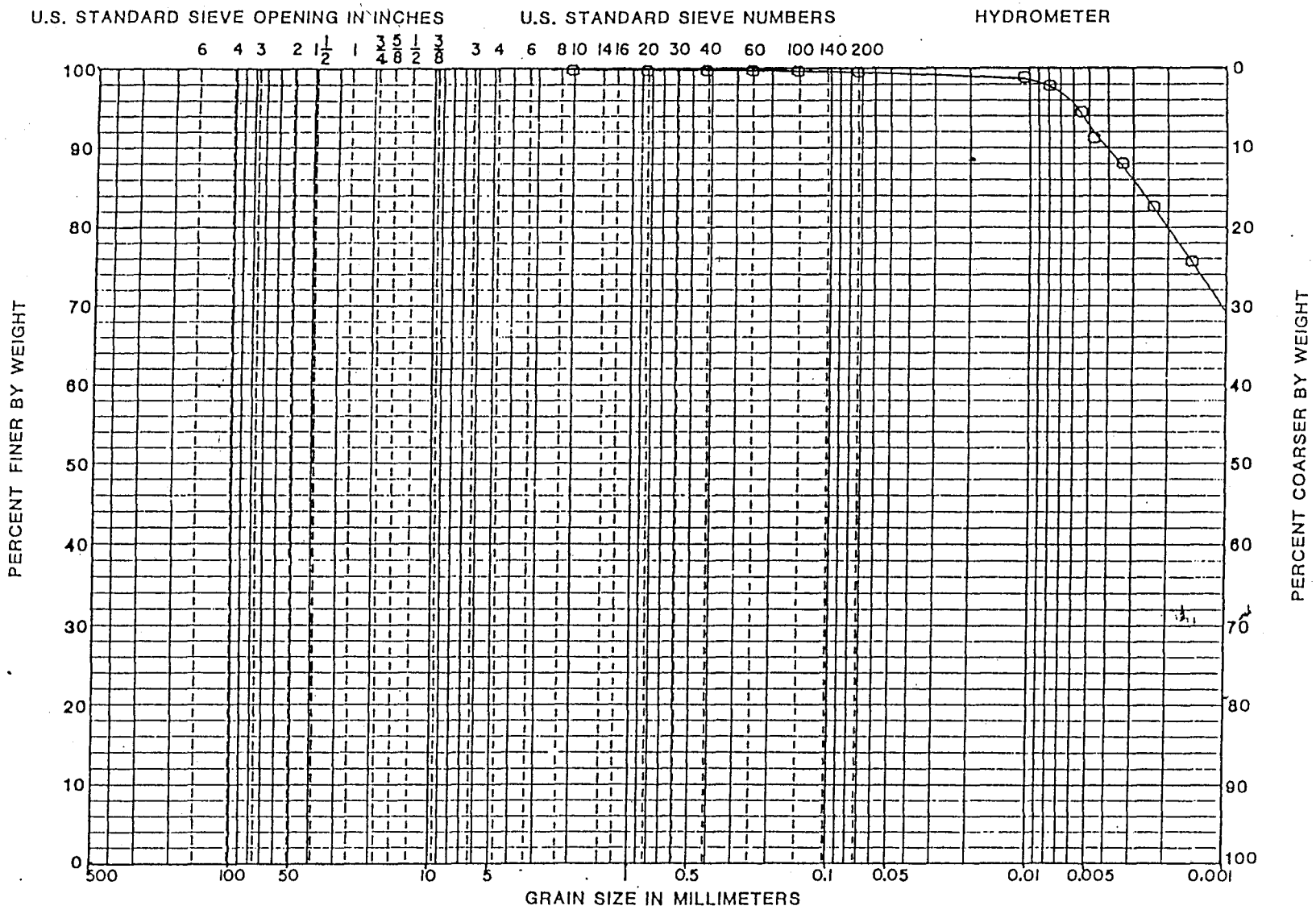
GRADATION CURVES



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

SAMPLE NO.	EL. or DEPTH	CLASSIFICATION	NAT.WT.%	LL	PL	PI	PROJECT US CORPS OF ENGINEERS
MT 66		Gray CLAY	254.3				
							BORING NO.
		Dry Weight = 21.0 pcf					DATE 6-28-88
							GEOTECHNOLOGY ENGINEERING AND ENVIRONMENTAL SERVICES SAINT LOUIS, MISSOURI

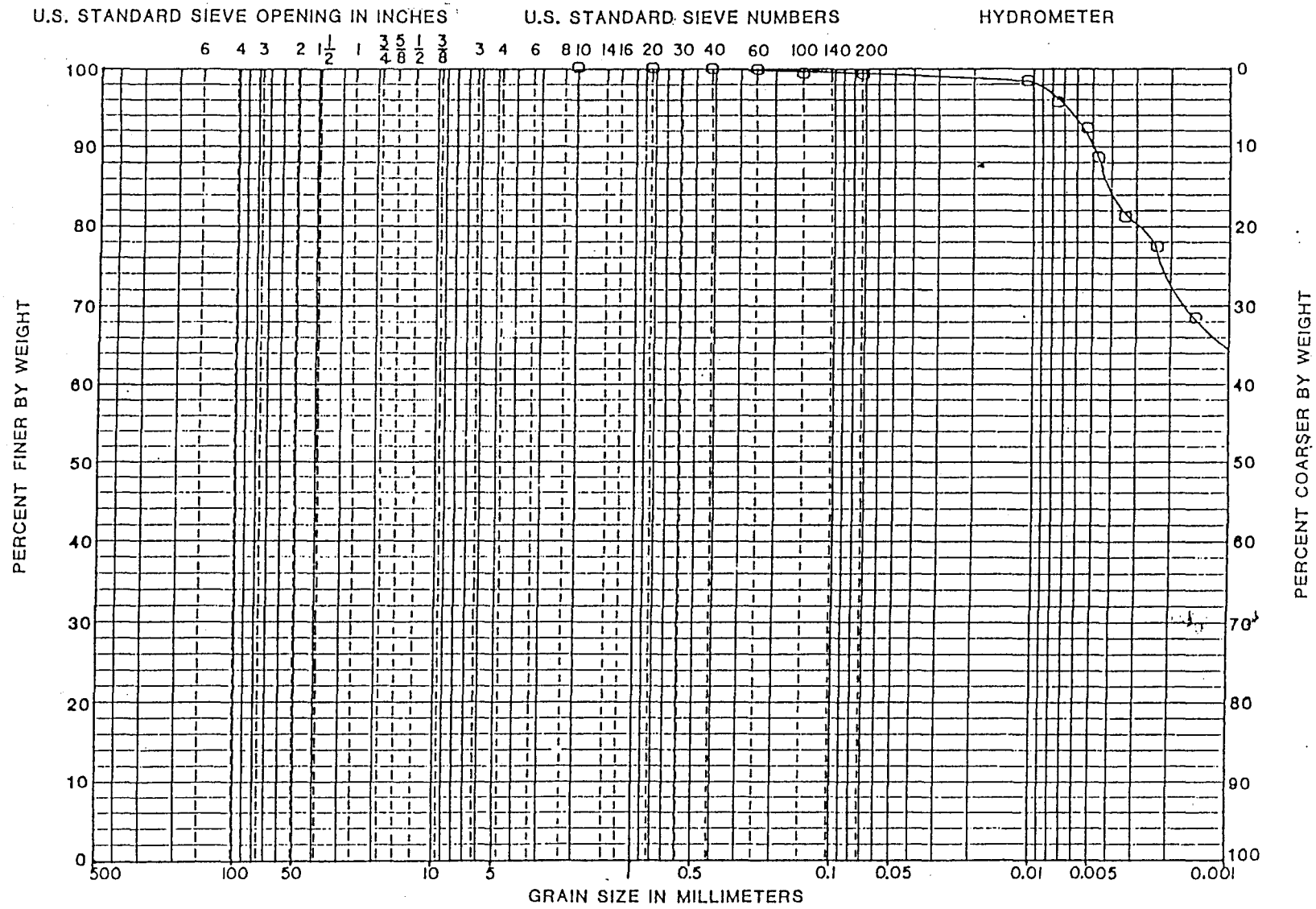
GRADATION CURVES



SAMPLE NO.	EL. or DEPTH	CLASSIFICATION	NAT.WT.%	LL	PL	PI	PROJECT US CORPS OF ENGINEERS
MT 77		Gray CLAY	257.8				
							BORING NO.
		Dry Weight = 19.7 pcf					DATE 7-1-88
							GEOTECHNOLOGY ENGINEERING AND ENVIRONMENTAL SERVICES SAINT LOUIS, MISSOURI
		Specific Gravity = 2.69					

PLATE 65

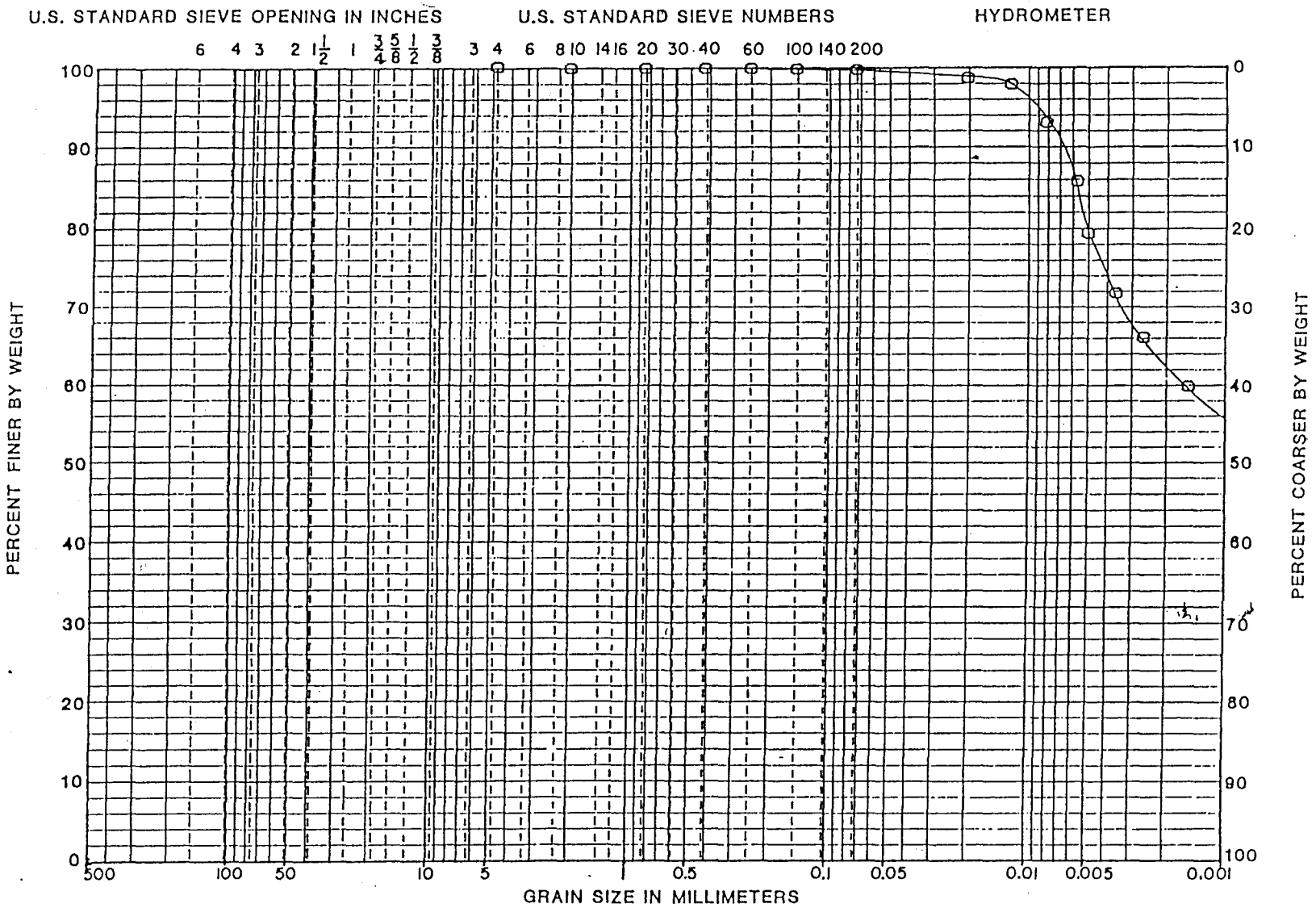
GRADATION CURVES



SAMPLE NO.	EL. or DEPTH	CLASSIFICATION	NAT.WT.%	LL	PL	PI	PROJECT US CORPS OF ENGINEERS
MT 88		Gray CLAY	200.0				
							BORING NO.
		Dry Weight = 26.3 pcf					DATE 6-28-88
							GEOTECHNOLOGY ENGINEERING AND ENVIRONMENTAL SERVICES SAINT LOUIS, MISSOURI

PLATE 66

GRADATION CURVES



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

SAMPLE NO.	EL. or DEPTH	CLASSIFICATION	NAT.WT.%	LL	PL	PI	PROJECT US CORPS OF ENGINEERS
MT 99		Gray CLAY	171.0				
							BORING NO.
		Dry Weight = 28.2 pcf					DATE 7-1-88
							GEOTECHNOLOGY ENGINEERING AND ENVIRONMENTAL SERVICES SAINT LOUIS, MISSOURI

PLATE 67