REPORT OF SEDIMENTATION
2017 Resurvey

LAKE SHELBYVILLE
Upper Mississippi River Basin

KASKASKIA RIVER, ILLINOIS

Submitted to:

US Army Corps of Engineers®

Saint Louis District
1222 Spruce St.
St. Louis, MO 63103

Submitted by:

CDG ENGINEERS

One Campbell Plaza
St. Louis, Missouri 63139
(314) 781-7770
www.cdgengineers.com

CDG Project No. 17078
Submitted March 13, 2020

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF PLATES

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

U.S. customary units of measurements used in this report can be converted to metric (SI) units using the following conversion factors:

Multiply	By	To Obtain
inches	25.4	millimeters
feet	0.3048	meters
miles (U.S. statue)	1.609344	kilometers
square miles	3.589988	square kilometers
cubic yards	0.7645549	cubic meters
acre-feet	1,233.482	cubic meters
feet per second	0.3048	meters per second
cubic feet per second	0.02831685	cubic meters per second

Survey data from previous studies were converted from the National Geodetic Vertical Datum of 1929 (NGVD29) to the North American Vertical Datum of 1988 (NAVD88) using the following conversion: $ELEV_{NAVD88} = ELEV_{NGVD29} - 0.269$ feet.

PERTINENT DATA SUMMARY – LAKE SHELBYVILLE

Item	Unit	
DRAINAGE AREA	sq. mi.	1,054
INACTIVE STORAGE POOL		
Elevation	feet NAVD88	572.7
Area at Top of Pool*	acres	2,153
Storage*	acre-feet	19,855
Storage (runoff)	inches	0.36
JOINT–USE POOL		
Elevation	feet NAVD88	572.7-599.4
Area at Top of Pool*	acres	10,242
Storage*	acre-feet	158,148
Storage (runoff)	inches	2.81
Regulated Outflow (min.)	cfs	10
Regulated Outflow (max.)		
Crop Season	cfs	1,800
Non-Crop Season	cfs	4,500
FLOOD-CONTROL POOL		
Top Elevation	feet NAVD88	599.4-626.2
Area at Top of Pool*	acres	23,543
Storage*	acre-feet	439,584
Storage (runoff)	inches	7.82
Regulated Outflow (min.)	cfs	10
Regulated Outflow (max.)		
Elevation < 609.7 ft NAVD88		
Crop Season	cfs	1,800
Non-Crop Season	cfs	4,500
Elevation 609.7 – 626.2 ft NAVD88	cfs	4,500
INDUCED-SURCHARGE POOL		
Elevation	feet NAVD88	626.2-630.2
Area at Top of Pool*	acres	26,059
Storage*	acre-feet	102.282
Storage (runoff)	inches	1.82
Outflow (max.)	cfs	116,300

*All reservoir storage and area values are based on the results of the 2017 sedimentation resurvey.

PERTINENT DATA SUMMARY – LAKE SHELBYVILLE (Continued)

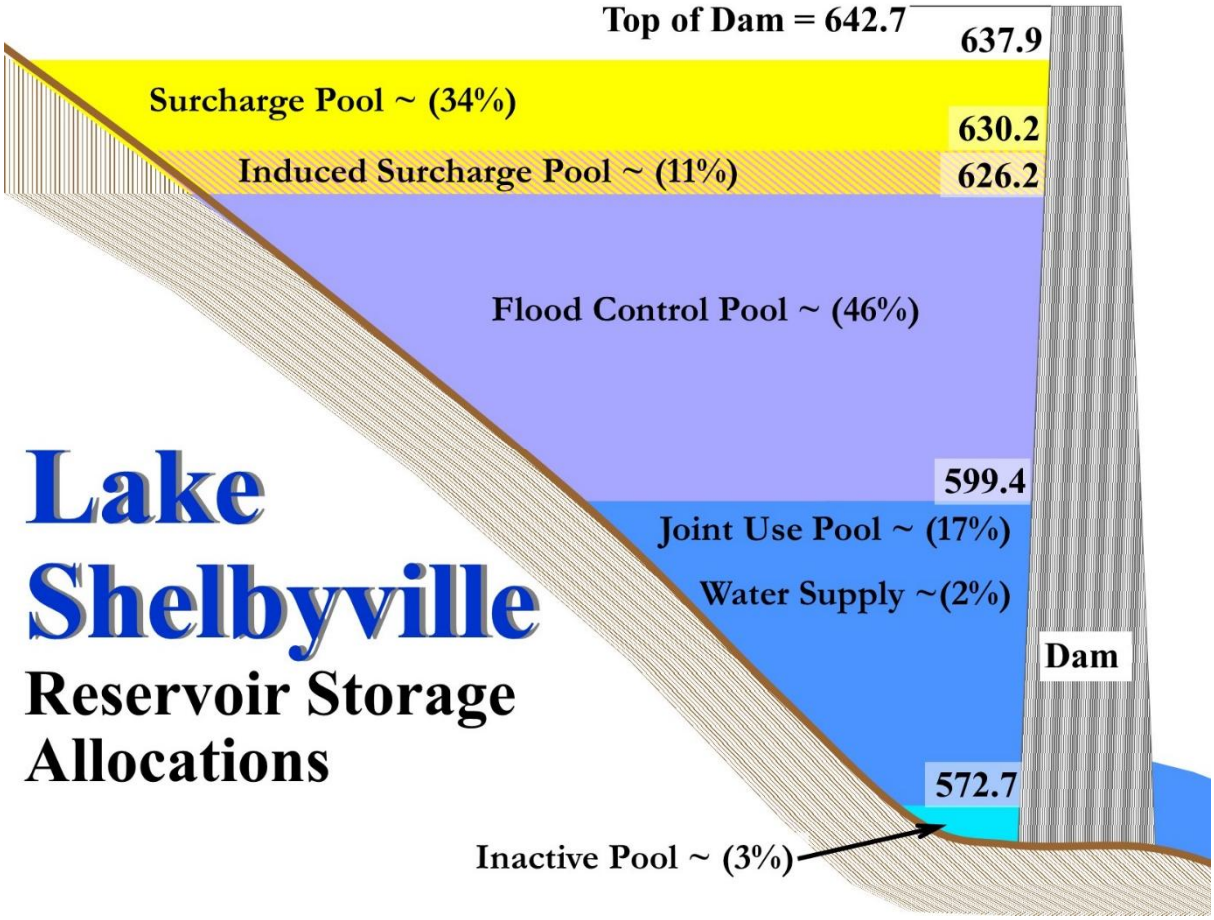
Item	Unit	
SURCHARGE POOL (TOTAL)		
Elevation	feet NAVD88	626.2-637.9
Area at Top of Pool*	acres	33,740
Storage*	acre-feet	445,850
Storage (runoff)	inches	7.93
Outflow (max.)	cfs	162,500
FREEBOARD**		
Elevation	feet NAVD88	637.9-642.7
Area at Top of Pool*	acres	42,700
Storage*	acre-feet	191,100
Storage (runoff)	inches	3.4
Height	feet	4.8
STANDARD PROJECT FLOOD		
Peak (natural conditions)	cfs	77,040
Peak Inflow (reservoir)	cfs	164,490
Peak Outflow (reservoir)	cfs	4,500
Design Storm	inches	13.16
Runoff (includes base flow)	acre-feet	541,160
Runoff (includes base flow)	inches	9.85
SPILLWAY		
Width		
Gross	feet	156
Net	feet	136
Elevation of Crest	feet NAVD88	592.7
Number of Tainter Gates	each	3
Size	feet	45.33’W x 36.92’H
Top Elevation (closed)	feet NAVD88	627.2
DAM		
Elevation Top of Dam	feet NAVD88	642.7
Height Above Streambed	feet	108
Length of Crest	feet	3,025

*All reservoir storage and area values are based on the results of the 2017 sedimentation resurvey.

**Data from 1984 Sedimentation resurvey.

PERTINENT DATA SUMMARY – LAKE SHELBYVILLE (Continued)

Item	Unit	
OUTLET STRUCTURE		
Number of Sluices	each	2
Size	feet	5.5W x 11.0H
Minimum Opening	feet	10.8
Intake Invert Elevation	feet NAVD88	549.7
Outlet Invert Elevation	feet NAVD88	548.7
1-inch runoff = 54,933 acre-feet (USACE, 2008)		



1. INTRODUCTION

The basic purpose of this sedimentation resurvey is to serve as an indicator for changes that may affect authorized project purposes, operation of the project, lake facilities, and future planning at the project. Limited hydrographic and topographic data (41 ranges) are collected to develop an estimate of lake capacity, sedimentation rates, and rate change for the entire lake. Data and results from this resurvey are not intended to answer specific questions (due in part to previous limitations on data collection and analysis), but to identify general trends that may indicate the need for more detailed analysis around specific objectives or areas of the lake. If changes are observed, additional analysis will be recommended.

A sedimentation resurvey and report of Lake Shelbyville was initiated in 2017 and completed in 2020. The dataset from the 2017 resurvey of Lake Shelbyville was analyzed to estimate the amount and distribution of sedimentation in the reservoir and the reservoir trap efficiency. The initial results showed unexpectedly high levels of deposition above the joint use pool leading to significantly higher rates of deposition. Upon recognizing these changes, engineers reviewed the collection and processing methodology and found the subsequent issues that led to these results.

- A combination of 2011 LiDAR topographic survey and 2017 bathymetric survey datasets for 40 rangeline cross sections were analyzed to determine the latest sedimentation rate for Lake Shelbyville using the prismoidal method. Previous resurveys used direct leveling to collect the dry land portions of the resurveys and more extensive bathymetric collections in the upstream portion of the reservoir. The 2017 resurvey was the first that LiDAR was used. LiDAR was used in place of direct leveling and in locations where bathymetric collection was no longer possible due to shallow depths.

- The coverage of the LiDAR data in the dry land portions of the cross sections was more extensive than the previous surveys done with direct leveling. This resulted in portions of the cross sections used in calculation in 2017 that were not analyzed in previous sedimentation resurveys. The comparison of measured values to a zero data baseline biased the results towards greater volumes of sedimentation and higher sedimentation rates. This bias had the most impact on the results. The increased coverage from the 2017 resurvey will be used as a baseline for subsequent surveys, effectively eliminating this bias in the future.

- Of the 40 rangeline cross sections, 10 are missing sounding data and were developed exclusively from the LiDAR datasets. These 10 rangelines were mostly located in the upstream segments of the reservoir, generally with insufficient water depths for collecting soundings at the time of the survey. In seven of the rangelines, the results from the LiDAR survey captured the water surface rather than the channel bed. Calculations of sedimentation for these rangelines were biased towards greater volumes of sedimentation and higher sedimentation rates due to the lack of bathymetric data in the main channel portion. Subsequent surveys should reduce or remove this bias through collection of additional bathymetry or removal of significantly biased cross sections from the analysis.

- The LiDAR data were collected in North American Vertical Datum 88 (NAVD88). The bathymetric survey data and all historical data from prior resurveys were collected in National Geodetic Vertical Datum 29 (NGVD29). A universal vertical datum shift was applied to convert data collected and/or presented in NGVD29 to NAVD88 rather than accounting for localized differences in datum conversion. At the time of contracting for the study, localized differences in data conversion were not available. This resulted in a bias towards less sedimentation, which varies dependent on the cross-section location. With additional datum conversions now available, a conversion plane that better accounts for localized differences can be used to remove this bias from subsequent resurveys.

- The biases resulting from the LiDAR data were generally reflected in the portions of the cross sections at higher elevations (generally, above joint-use pool). The biases resulting from 10 missing cross sections were reflected in all cross sections where LiDAR was used in place of bathymetry. The biases resulting from the different datums were reflected in all cross sections to varying degrees.

In addition, the original calculations for the 1970 data were unavailable to use in the preparation of the 2017 sedimentation re-survey report. This required the 1970 data to be recalculated by digitizing the topographic survey maps from before the lake was constructed (15-minute USGS quadrangle maps) and processing the plan area data for use in the prismoidal method. Also, the cross-sectional information was obtained using the original 1970 plots along rangelines. This work was performed utilizing AutoCAD version 2018 software. Due to modern digitizing capabilities, the original 1970 data and the recalculated 1970 data were slightly different, but the differences were within acceptable limits.

The dataset from the 2017 resurvey of Lake Shelbyville was analyzed to estimate the amount and distribution of sedimentation in the reservoir and the reservoir trap efficiency. Lake Shelbyville initially began operation on August 1, 1970. Results of the analysis were compared to initial available survey data from 1970 and results from previous sedimentation analyses of resurvey data from 1974, 1980, and 1984 (SLA, 1985).

The primary results provided by this study are:

- change in reservoir storage that has occurred since the original 1970 survey (recalculated 1970 survey);
- reservoir-storage changes for elevations 572.7 ft NAVD88 (top of inactive storage pool), 599.4 ft NAVD88 (top of joint-use pool), 626.2 ft NAVD88 (top of flood-control pool), and 630.2 ft NAVD88 (top of induced surcharge pool);
- reservoir elevation-capacity-storage table;
- comparison plots for each range including the data from each survey year; and
- completion of the Reservoir Sediment Data Summary Form (Engineering Form 1787).

2. LOCATION OF RESERVOIR

Lake Shelbyville is located on the Kaskaskia River, one-fourth mile north and one-half mile east of the town of Shelbyville, Illinois. The main dam is located at River Mile 221.8 and extends upstream to River Mile 280. A table of factors for converting U.S. customary units of measurement to metric (SI) units is provided on page v. The watershed upstream of Lake Shelbyville has an area of 1,054 square miles. A map of the Kaskaskia River Basin with the location of Lake Shelbyville identified is shown in Plate 1.

3. PURPOSE OF RESERVOIR

Lake Shelbyville is a flood control reservoir that also provides recreational opportunities, fish and wildlife conservation, supplementary water supplies, water quality enhancement, and supplementary flows for navigation (U.S. Army Corps of Engineers, 2008).

4. RESERVOIR PERTINENT DATA – DAM AND APPURTENANT STRUCTURES

The Pertinent Data Summary and graphic, shown on page vi, provides data for the dam, outlet, and spillway structures; and the elevations, areas, and capacities of the inactive, joint use, flood control, and surcharge pools.

5. WATERSHED CHARACTERISTICS

The watershed upstream of Lake Shelbyville has a total area of 1,054 square miles, and the lake occupies approximately 39.5 square miles of this area at the top of flood control pool (el. 626.2) as shown in Plate 1. All elevations (el.) cited herein are in feet referred to the North American Vertical Datum of 1988 (NAVD88). The watershed has a length of 58 miles, an extreme width of 35 miles, and an average width of 18 miles (SLA, 1985).

6. CLIMATE

The climate near Lake Shelbyville is usually relatively moderate, with mild summers and short and moderate winters. The average summer temperature for the period of record ranged from 69.2 to 76.0°. The summers are usually mild with occasional temperatures of 100° F or slightly higher. The winters are usually short and moderate, although the temperatures below zero are periodically experienced. The average annual temperature in this area is 53.6° Fahrenheit and the average monthly temperatures vary from a maximum of 83.6° Fahrenheit (July 2012) to 12.2° Fahrenheit (January 1977).

7. RESERVOIR OPERATION

The reservoir is operated to provide downstream flood control and navigation, and to maintain seasonal pool elevations for water supply storage, pollution reduction, fish and wildlife conservation, and recreation. During the growing season (May through October), the maximum release rate is 1,800 cfs for pool elevations less than the 609.7 ft NAVD88; for higher pool elevations, the maximum release rate is 4,500 cfs. For November through April, the maximum release rate is 4,500 cfs and is independent of pool elevation. A minimum of 10 cfs must be maintained at all times for water quality purposes. Additional

details regarding the operation of Lake Shelbyville are provided in the Lake Shelbyville Water Control Manual (USACE, 2008).

8. RESERVOIR INFLOW

A summary of monthly precipitation and runoff data from the Lake Shelbyville Pool Gage for the watershed is provided in Table 1 including maximum, minimum, average rainfall, and average runoff. Table 2 provides a summary of the annual precipitation and runoff data including yearly rainfall, runoff, and average daily runoff. One inch of runoff equals to 54,933 acre-feet for the basin draining into Lake Shelbyville (USACE, 2008). Average annual precipitation and inflow for the sediment resurvey period are tabulated in Items 34 and 35 of the Engineering Form 1787 shown in Plate 49. The average monthly inflow hydrograph and average monthly pool elevation for the period of 1970 through 2017 are provided as Plate 2 and Plate 3, respectively.

9. ORIGINAL RESERVOIR SURVEY

Table 3 tabulates the lake capacity by elevation on 5-foot intervals. It includes tabulations for all six surveys. Also, the recalculated 1970 capacity is shown in Plate 5. Elevation-area-capacity data in 10-ft intervals for the recalculated 1970 survey are provided by Item 46 in the Engineering Form 1787 located in Plate 51. The corresponding elevation-capacity curve is shown on Plate 4.

10. TYPE AND SCOPE OF INITIAL SEDIMENT SURVEY

Forty sediment ranges were established and surveyed by direct leveling during the period of March 1969 to June 1971. These ranges were created to monitor sediment distribution and the approximate rate of reservoir storage depletion. The locations of the pool sediment ranges are detailed in Plate 6. Cross sections for the original survey and the subsequent 1974, 1980, 1984, and 2017 resurveys for each of the 40 ranges are provided in Plates 9 through 48.

11. TYPE AND SCOPE OF SEDIMENT RESURVEYS

Resurveys of the original established rangelines were made during 1974, 1980, 1984, and 2017. For the 1974, 1980, and 1984 resurveys, direct leveling was used to perform the dry-land portions of the resurveys. The bathymetric soundings were conducted using a Raytheon, Model 719B, depth recorder and a Motorola Miniranger distance-measuring unit that constantly updated the distance between the vessel and the shore station. The depth recorder was attached to an 18-foot flat-bottomed boat with a 20-horsepower outboard motor. Walkie-talkies were used to communicate between the boat operator and a person on the shore to maintain horizontal alignment. The person on the shore was located at one end of the sedimentation range with a transit sighted on the opposite end for alignment purposes. The person located on the shore was able to notify the boat operator via walkie-talkie if the soundings varied off the range.

The 1974 resurvey was conducted from February to April in 1974. The average pool elevation during the 1974 measurements was 603.1 ft. The 1980 sediment resurvey was conducted during November and December of 1980. The average pool elevation during the 1980 measurements was 596.3 ft. Reservoir

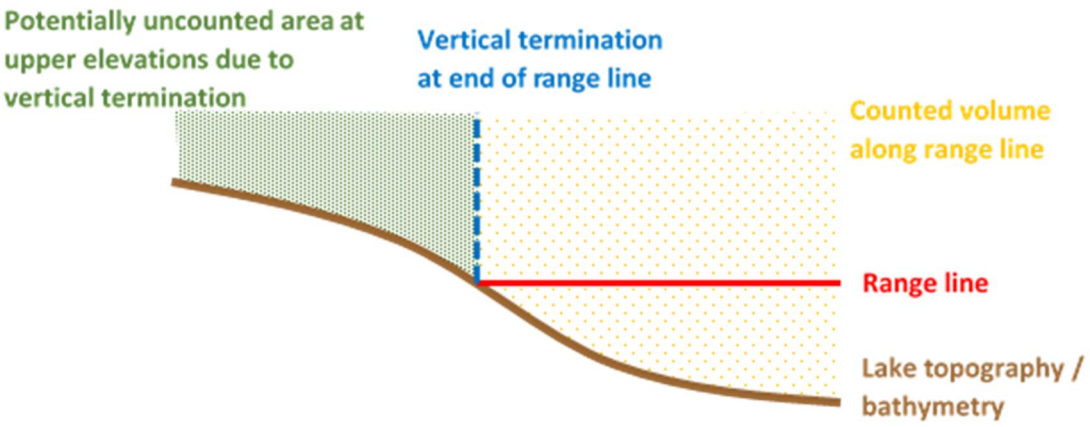
capacities by elevation based on the results of both resurveys are provided in Table 3 and change in capacity by elevation is tabulated in Table 4. The 1984 resurvey conducted in May of 1984, with the exception of the five upstream-most ranges from the dam, which were resurveyed in February of 1984. The average pool elevation during the 1984 measurements was 608.0 ft.

The 2017 resurvey was conducted during August 23-24, 2017. The soundings for the 2017 resurvey were performed using the USACE's Mini Boyer survey vessel. The positioning System/Method was Omnistar, with a System/Method Single Beam Echosounder and a transducer beam angle of 3° (single beam). Point positioning was the shot selection method used, and the Heave Applied Method POS MV 320 was used for post processing of the data. The 2017 resurvey was not performed for eight of the forty ranges: 23A, 24A, 35B, 36A, 37B, 38A, 39B, and 40B. The average pool elevation during the 2017 measurements was 599.35 feet on August 23, and 599.34 on August 24. The data collected in the field were transformed using the Data Transformation Method/Value of Point to Point Software.

A combination of 2011 LiDAR topographic survey and 2017 bathymetric survey datasets for the 40 rangeline cross sections were analyzed. Previous resurveys used direct leveling to collect the dry land portions of the resurveys and more extensive bathymetric collections in the upstream portion of the reservoir. The 2017 resurvey was the first that LiDAR was used. LiDAR was used in place of direct leveling and in locations where bathymetric collection was no longer possible due to shallow depths. The LiDAR topographic survey dataset was used to supplement the bathymetric data for elevations higher than the water level during collection of the soundings, approximately 595.00 feet NAVD88. The LiDAR dataset was collected in 2011 and was supplied by USACE. Cross sections of the 2017 rangelines provided in Plates 9 through 48 identify which portions of the sections are from the soundings dataset and which are from the 2011 LiDAR dataset.

12. METHOD OF SEDIMENT COMPUTATIONS

Previous sedimentation resurveys utilized the same range lines but terminated them at different elevations or elevations below desired pool limits. As such, some elevation data did not extend high enough to calculate storage for the desired upper pool elevations. Storage calculation for these values required extrapolation. Without a record of how previous extrapolations were done, the decision was made to assume a vertical wall at the limit of the previous resurvey's range data to be used in the 2017 resurvey. This assumption is inherently the most conservative for calculating the volume at an elevation, and grows more conservative (and thus, more incorrect) the higher the elevation calculated. The figure below provides a profile showing area (and thus volume) potentially not counted by the assumption of vertical termination. The lowest point for which vertical termination begins to effect calculations is for range line 35B at elevation 618.5. To limit erroneous results, capacity calculations were limited to elevation 626.2 (the top of flood control pool); Due to this, capacity calculations for the induced-surcharge or surcharge pools were removed from report results.



Volume calculations were performed using the prismoidal method, which was developed by the U.S. Soil Conservation Services and is detailed in Eakin and Brown (1939). A schematic illustrating the variables used in the prismoidal method is provided in Figure 1. This schematic includes a reservoir segment with two tributary arms, therefore bound by four ranges. Volume capacities for a given elevation were computed using Equation 1, which is the formula for the prismoidal method:

$$V = \frac{A'}{3}\left(\frac{E_1 + E_2}{W_1 + W_2}\right) + \frac{A}{3}\left(\frac{E_1}{W_1} + \frac{E_2}{W_2}\right) + \frac{h_3 E_3 + h_4 E_4 + \ldots}{130{,}680} \qquad \text{Eq. 1}$$

where:

V = volume capacity (acre-feet);

A' = area of the quadrilateral formed by connecting the points of range intersection with a given contour (acres);

A = lake area of the segment (acres);

E = cross-sectional area of original capacity or sediment volume cut by a bounding range (ft^2);

W = width (length of bounding range) at crest elevation (ft); and

h = perpendicular distance from the range on a tributary to the junction of the tributary with the mainstream, or if this junction is outside the segment, to the point where the thalweg of the tributary intersects the downstream range (ft).

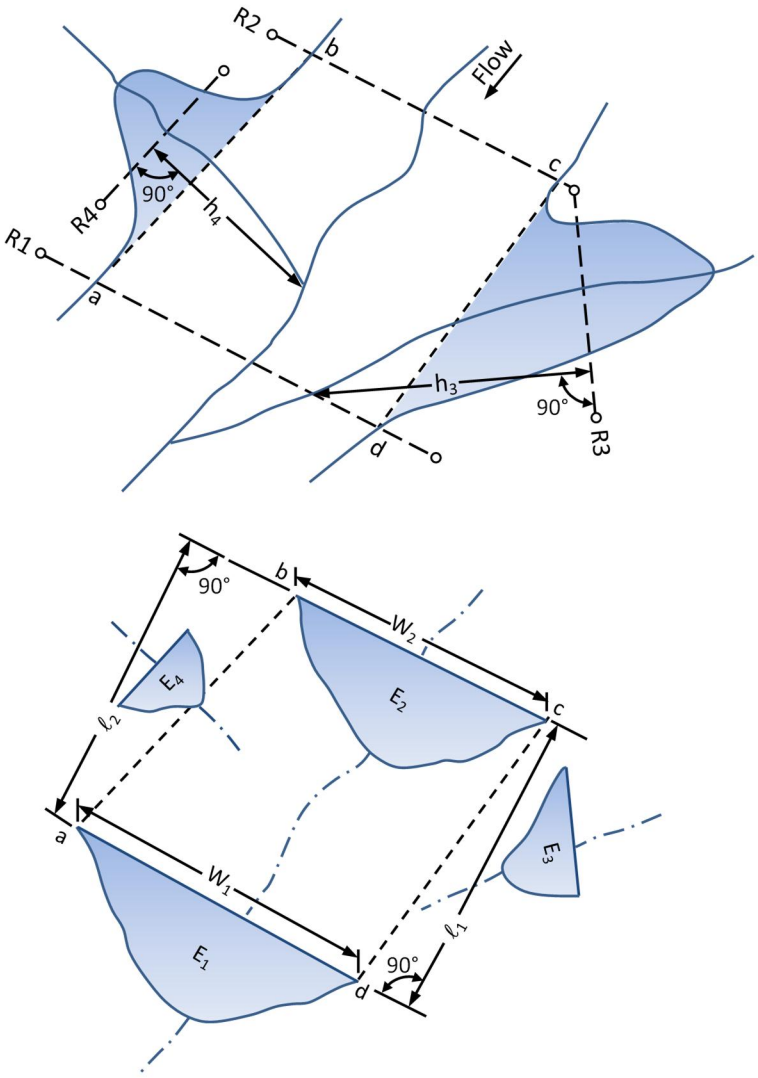


Figure 1. Terms of Range-end Formula for Determining Capacity of Reservoir

Equation 1 is suitable for all reservoir segments except the one closet to the dam. When computing the volume for the reservoir segment closest to the dam, the volume occupied by the dam face must be accounted for in the calculation. Volume capacities for the segment closest to the dam are computed using Equation 2:

$$V = A\frac{E}{W} - \frac{L\left(2B - \frac{E}{W}S\right)\frac{E}{W}}{3(43{,}560)} \qquad \text{Eq. 2}$$

where: L = dam length (ft);
B = base width of the dam (ft);
S = slope of the upstream face of the dam;

and all other variables have been previously defined. The length, L, and base width, B, are distances on the dam relating to the volume of water displaced by the upstream face of the dam, and thus for this application, they vary with reservoir stage. The slope of the upstream face of the dam is not constant; it has three separate sections with different slopes. For volume calculations using Equation 2, the average slope value for the face of the dam (1:3.34 V:H) was used.

A triangular surface area, instead of a quadrilateral, was used for volume computations upstream of the upstream-most rangelines within each branch. The computed lengths for the upstream triangular segments for the 2017 data were notably larger than those reported in the 1984 resurvey study. This discrepancy is likely because the 2011 LiDAR dataset has a much higher spatial resolution than the USGS topographic maps used for the 1984 resurvey study; and thus, the lower elevations were more accurately captured with LiDAR. For consistency with the previous surveys and sediment calculations, the upstream segment lengths were limited to the maximum values reported, which corresponds to an elevation of 624.7 NAVD88, in the 1984 resurvey sedimentation study (SLA, 1985). For any 2017 computed length values that were lower than the maximum reported in the 1984 study, the 2017 value was used.

For each reservoir segment, values for A', A, E, and W were computed at five-foot elevation intervals in addition to the following elevations: 572.7, 574.7, 599.4, 599.7, 624.7, 626.2, and 630.2 feet NAVD88. The elevations 572.7, 599.4, 626.2, and 630.2 feet correspond to the top of inactive storage pool, top of joint-use pool, top of flood-control pool, and top of induced surcharge pool, respectively. The remaining unique elevations were those analyzed in the 1984 sedimentation resurvey study, which corresponded to contour elevation on USGS topographic maps (SLA, 1985).

All area calculations were performed in AutoCAD. A three-dimensional (3-D) surface was created by combining the 2011 LiDAR data, the 2017 rangeline data, and USGS 15-minute quadrangle 1939 topographic maps from prior to construction of the reservoir. The rangeline soundings were collected at an elevation of 599.35 ft NAVD88; the LiDAR dataset was used for elevations above 595.00 feet NAVD88. The topographic maps were digitized and used only in bathymetric areas between rangelines where LiDAR data were unavailable. Surface areas between each rangeline, A, for the seven elevations of interest were determined using the composite 3-D surface. A tabulation of surface area by elevation for the 1970, 1980, 1984, and 2017 surveys is provided in Table 5. These area-elevation data are provided in Item 46 of the Engineering Form 1787 (Plate 51) and are plotted on Plate 5. Quadrilateral and surface areas between ranges and approximate distances between ranges from the 2017 resurvey are provided in Table 6, Table 7, Table 8, Table 9, Table 10, Table 11 for the elevations 572.7, 574.7, 599.4, 599.7, 624.7, and 626.2 feet NAVD88, respectively.

Cross sectional areas, E, for each of the seven elevations of interest were computed for each rangeline using the survey data and AutoCAD. Range cross section data are shown in Table 12, Table 13, Table 14, Table 15, Table 16, and Table 17 for the elevations 572.7, 574.7, 599.4, 599.7, 624.7, and 626.2 feet NAVD88, respectively. Each table provides the original 1970 cross section data, the recalculated 1970 cross section data, all data available from the previous 1984 resurvey report (SLA, 1985), the 2017 data, and the change in area between recalculated 1970 and 2017. 1980 data was used where elevations matched, and

the information was available. Cross sections for the original survey and the subsequent 1974, 1980, 1984, and 2017 resurveys for each of the 40 ranges are provided in Plates 9 through 48. Some of the 2017 resurvey cross sections are shifted laterally from the locations of the previous rangeline surveys due to differences in survey techniques.

In reviewing the original 2017 Resurvey, it was generally felt that there was a "Coverage Bias". The coverage of the LiDAR data in the dry land portions of the cross sections was more extensive than the previous surveys done with direct leveling and extended to a higher elevation than previous surveys. This resulted in portions of the cross sections used in calculation in 2017 that were not analyzed in previous sedimentation resurveys. The comparison of measured values to a zero data baseline biased the results towards greater volumes of sedimentation and higher sedimentation rates. This bias had the most impact on the results. The increased coverage from the 2017 resurvey will be used as a baseline for subsequent surveys, effectively eliminating this bias in the future. In this re-analysis, the cross sections were truncated at a point equal to the limits of previous surveys. In Plates 9 through 48, the truncated cross sections are shown with a "Range Limit Line" for those cross sections that were modified.

For the re-analysis of the Lake Shelbyville 2017 Sedimentation Re-survey, a modified prismoidal method was used. When cross sections were truncated, new *W* cross section widths were obtained, as well as *A'*, which is the quadrilateral areas, and *E*, which is the cross-sectional area at a given elevation. It was generally felt that the *A*, which is the lake area of the segment would only vary slightly, therefore, these values were not revised. These variables were then put into the prismoidal equation and the results are what follows in this report.

13. SEDIMENT QUANTITIES

Volume capacities were computed at five-foot elevation intervals for the 2017 data in addition to the following elevations: 572.7, 574.7, 599.4, 599.7, 624.7, 626.2, and 630.2 feet NAVD88. The elevations 572.7, 599.4, 626.2, and 630.2 feet correspond to the top of inactive storage pool, top of joint-use pool, top of flood-control pool, and top of induced surcharge pool, respectively. The remaining unique elevations were those analyzed in the 1984 sedimentation resurvey study. The capacity-elevation data available from all reservoir surveys (1970, Recalculated 1970, 1980, 1984, and 2017) are provided in Table 3 and changes in capacity by elevation are tabulated in Table 4. The corresponding elevation-capacity curves are shown on Plate 4. Summaries of volume of sediment deposited by reach for elevations 572.7, 574.7, 599.4, 599.7, 624.7, 626.2, and 630.2 feet NAVD88 are provided in Table 18, Table 19, Table 20, Table 21, Table 22, and Table 23 respectively. Accuracies in survey data and application of the prismoidal formula only provide data accurate to three significant digits (SLA, 1985). However, reservoir and sediment volumes are reported to the nearest acre-foot for relative comparisons within the study and comparisons with previous Lake Shelbyville sedimentation studies.

Calculations using data from the 2017 resurvey indicate approximately 40,649 acre-feet of sediment had deposited within the reservoir between the initial operation in April 1970 and June 2017, resulting in a decrease of approximately 7 percent in the total storage (at elev. 624.7) as compared to the recalculated

1970 capacity. Approximately 6,241 acre-feet deposited in the inactive pool (top elevation of 572.7 NAVD88) reducing the storage by 24 percent. Within the joint-use pool (elevation 572.7 to 599.4 ft NAVD88), approximately 10,469 acre-feet deposited reducing the storage capacity by 6 percent. The flood-control pool (top elevation of 626.2 NAVD88) had approximately 14,439 acre-feet of sediment reducing the storage by 3 percent. The following table summarizes the amount of sediment deposited as determined from each resurvey and the corresponding annual rate of deposition.

Summary of Lake Shelbyville Sedimentation

Reservoir Stages by Elevation	Amount of Sediment Deposited 1970-1980 [1/] (acre-ft)	Amount of Sediment Deposited 1970-1984 [1/] (acre-ft)	Amount of Sediment Deposited 1970-2017 [4/] (acre-ft)	Annual Rate of Deposition 1970-1984 [2/] (acre-ft/year)	Rate of Change 1970-2017 [2/] (%)
Entire Reservoir [3/] (Bottom to 624.7 feet NAVD88)	7,205	10,087	40,649	859	7%
Inactive Pool Storage (Bottom to 572.7 feet NAVD88)	2,610	1,870	6,241	132	24%
Joint-Use Pool Storage (572.7-599.4 feet NAVD88)	3,610	8,480	10,469	221	6%
Flood-Control Pool Storage (599.4-626.2 feet NAVD88)	985	-263	14,439	305	3%

[1/] Values from the 1984 Sedimentation Resurvey Report (SLA, 1985).

[2/] Based on 47.3 years of data

[3/] Volume capacity and annual rate of deposition for entire reservoir computed below elevation 624.7 feet to be consistent with reporting from previous studies.

[4/] Based on recalculated 1970 data.

14. TRAP EFFICIENCY OF THE RESERVOIR

Trap efficiency calculations were made using the Brune (1953) method. Reservoir capacity, mean annual inflow, and sediment grain-size distributions are required for the method. Sediment samples for several ranges were collected and analyzed in 1984. The resulting grain-size distributions are provided in the 1984 Lake Shelbyville Resurvey Report (SLA, 1985). The median particle sizes for the distributions were primarily fine sand with some samples exhibiting median sizes in the silt and clay range. Thus, the medium curve from Brune (1953) was used. Sultana and Naik (2015) provided the following equation for the Brune (1953) trap efficiency curve for median-grained sediment:

$$T_e = \frac{(C/I)}{0.00013 + 0.01(C/I) + 0.0000166\sqrt{C/I}} \qquad \text{Eq. 3}$$

where: T_e = trap efficiency (%);
C = reservoir capacity (acre-ft); and
I = mean annual inflow (acre-ft).

A reservoir trap efficiency of 98.4% was computed using Equation 3 with the reservoir capacity to mean annual inflow ratio (C/I) of 0.93 provided in Item 33 of the Engineering Form 1787 (Plate 49).

15. SUMMARY

As detailed in the Introduction, this sedimentation resurvey was conducted to identify general trends that may require more study (such as the depositional rates of specific areas).

The results of the 2017 resurvey analysis indicate a deposition rate that is somewhat comparable to those reported in the previous resurvey studies. The average annual deposition rate for the entire reservoir from 1970 to 2017 was found to be 860 acre-feet per year, which is higher than both the 1980 and 1984 resurvey estimates of 681 and 715 acre-feet per year, respectively. The table below summarizes observed changes in pool stage capacity. However, based on these numbers, we do not anticipate these sedimentation rates to impact the flood control storage capacity of the lake.

Summary of Observed Capacity

Reservoir Pool Stage	Capacity		Change in Capacity			
	1970*	2017	Capacity Lost 1970-2017	Percent Lost 1970-2017	Design Rate**	Actual loss Rate*** 1970-2017
	(ac-ft)	(ac-ft)	(ac-ft)	(%)	(ac-ft/yr)	(ac-ft/yr)
Inactive Pool	26,096	19,855	6,241	4%		132
Joint-Use Pool	168,618	158,149	10,469	6.2%		221
Flood Control	454,023	439,583	14,439	3.2%		305
Entire Reservoir****	615,710	575,061	40,649	6.6%	288	859

*Uses the 1970 Re-Calculated data.

**Rate of change based on original design memorandum, which assumed 0.28 ac-ft per mi^2 per year and a drainage area of 1,030 mi^2

***Rate of change based on 47.3 years of lake operation (1970-2017)

****Below 624.7 ft NAVD88

The table below summarizes projected changes in capacity through the year 2067.

Summary of Projected Capacity

Reservoir Pool Stage	Capacity			Change in Capacity			
	1970*	2017	2067**	Projected Lost Capacity 2017-2067	Lost Percent 2017-2067	Lost Capacity 1970-2067	Lost Percent 1970-2067
	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(%)	(ac-ft)	(%)
Inactive Pool	26,096	19,855	13,255	6,600	33%	12,841	49%
Joint-Use Pool	168,618	158,149	147,049	11,100	7.0%	21,569	13%
Flood Control	454,023	439,584	424,284	15,300	3.5%	29,739	6.9%
Entire Reservoir***	615,710	575,061	532,061	43,000	7.5%	83,649	13.3%

*Uses the 1970 Re-Calculated data
**Used "Actual Rate" of change from "Summary of Observed Capacity" table for projections
***Below 624.7 ft NAVD88

In summary:

- From 1970 to 2017, the inactive pool lost 6,241 ac-ft (24%) of its total capacity. Its capacity in 2017 was 19,855 ac-ft; it is expected to reduce at a rate of 132 ac-ft per year, leaving 13,255 ac-ft of capacity 50 years from now (2067), with 49% of its total capacity lost.

- From 1970 to 2017, the joint-use pool lost 10,469 ac-ft (6.2%) of its total capacity. Its capacity in 2017 was 158,149 ac-ft; it is expected to reduce at a rate of 222 ac-ft per year, leaving 147,099 ac-ft of capacity 50 years from now (2067), with 13% of its total capacity lost.

- From 1970 to 2017, the flood control pool lost approximately 14,440 ac-ft (3.2%) of its capacity. Its capacity in 2017 was approximately 439,584 ac-ft; it is expected to reduce at a rate of approximately 306 ac-ft per year, leaving 424,284 ac-ft of capacity 50 years from now (2067), with 6.9% of its total capacity lost.

- From 1970 to 2017, the entire reservoir below the top of flood control pool lost approximately 40,649 ac-ft (6.6%) of its capacity. Its capacity in 2017 was approximately 575,061 ac-ft; it is expected to reduce at a rate of approximately 860 ac-ft per year, leaving 532,061 ac-ft of capacity 50 years from now (2067), with 13.3% of its total capacity lost.

- The original design memorandum defined the design fill-rate for the entire reservoir as 288 acre-feet per year. The actual fill-rate is about 860 acre-feet per year, which is 198% higher than design. This could be due to a variety of factors including, but not limited to: sediment unit weight, hydrology, land use or land cover changes, and wave-induced erosion.

16. RECOMMENDATIONS

Based on trends shown in this sedimentation resurvey, it is recommended that a detailed re-calculation of lake capacity be performed using more robust hydrographic and land survey data. An analysis with the additional survey data will present a more accurate picture of true lake capacity and reduce the errors and uncertainty found in the results of this sediment resurvey. It is also recommended that a duplication of the original computation of the lake capacity curve using an electronic version of the quad sheet(s) used in the original calculations be undertaken. This would help verify the spatial extents used for the original curves so they can be matched in future analyses.

The results of the 2017 resurvey analysis indicate that the total sediment deposition rate is somewhat higher than the rates computed in the 1980 and 1984 resurvey analyses. The sedimentation deposition rates of the various reservoir stages fluctuate over time. Conducting another resurvey within the next 10 to 15 years is recommended to monitor the progression of sedimentation and corresponding effect on reservoir functions.

17. REFERENCES

ASTM. (2005). "Standard Guide for Measurement of Morphologic Characteristics of Surface Water Bodies." ASTM D4581, West Conshohocken, PA.

Brune, G.M. (1953). "Trap Efficiency of Reservoirs." Transactions of the American Geophysical Union, 34(3):407-418.

Simons, Li & Associates (SLA) (1985). "Report of Sedimentation 1984 Resurvey Lake Shelbyville Upper Mississippi River Basin Kaskaskia River, Illinois." Submitted to the U.S. Army Corps of Engineers, St. Louis District. pp. 171.

Sultana, Q., and Naik, M.G. (2015). "Estimation of Trap Efficiency of Sriramsagar Reservoir." International Journal of Research in Engineering and Technology, 04(11): 116-122.

U.S. Army Corps of Engineers (USACE) (2008). "Lake Shelbyville – Water Control Manual – Appendix A to Master Reservoir Regulation Manual." St. Louis District, MVD approval date: October 27, 2008, pp. 216.

Table 1. Monthly Precipitation and Runoff for Drainage Above Lake Shelbyville Gage (1970-2017)

Month	Maximum Rainfall (inches)	Minimum Rainfall (inches)	Average Rainfall (inches)	Average Runoff (inches)	Runoff (percent)
January	6.9	0.02	2.00	1.22	59.5
February	4.4	0.12	2.04	1.34	64.4
March	6.2	0.66	2.95	1.49	49.3
April	9.0	0.85	3.97	1.78	43.8
May	11.5	0.43	4.09	1.97	47.0
June	11.3	0.45	4.26	1.41	32.4
July	10.3	0.42	3.87	0.56	14.2
August	10.2	0.31	3.21	0.18	5.4
September	7.8	0.12	3.17	0.24	7.3
October	10.2	0.36	3.34	0.33	9.5
November	7.1	0.53	3.34	0.74	21.7
December	8.9	0.16	2.86	1.26	43.2

Note: Data extends to June 30, 2017.

Table 2. Annual Precipitation and Runoff for Drainage Above Lake Shelbyville Gage (1970-2017)

Year	Rainfall (inches)	Runoff (inches)	Runoff (percent)	Average Daily Runoff (cfs)
1970[1/]	34.52	10.1	29.3	767
1971	40.24	9.25	23.0	702
1972	41.27	11.45	27.7	923
1973	48.68	18.61	38.2	1,633
1974	47.65	23.63	49.6	1,793
1975	45.26	14.61	32.3	1,109
1976	27.16	5.65	20.8	429
1977	41.52	8.84	21.3	664
1978	38.6	13.77	35.7	1,045
1979	37.93	14.86	39.2	1,128
1980	30.54	5.44	17.8	413
1981	44.07	10.63	24.1	825
1982	45.35	17.9	39.5	1,389
1983[1/]	42.11	15.21	36.1	1,151
1984	36.78	14.33	38.9	1,084
1985	-	17.22	-	1,307
1986	16.93	6.75	39.9	512
1987	19.31	8.52	44.1	646
1988	32.66	6.97	21.3	527
1989	-	9.32	-	707
1990	-	13.31	-	1,010
1991	-	9.11	-	691
1992	-	11.23	-	849
1993	-	23.45	-	1,779
1994	-	11.87	-	901
1995	-	9.07	-	689
1996	-	13.38	-	1,013
1997	32.53	8.63	26.5	655
1998	41.3	15.53	37.6	1,178
1999	27.97	9.94	35.5	754
2000	37.02	8.51	23.0	644
2001	32.2	10.94	34.0	830
2002	42.8	16.90	39.5	1,282
2003	37.73	5.33	14.1	404
2004	42.3	13.39	31.7	1,013
2005	35.84	11.27	31.4	855
2006	37.98	9.37	24.7	711

Year	Rainfall (inches)	Runoff (inches)	Runoff (percent)	Average Daily Runoff (cfs)
2007	39.13	9.34	23.9	709
2008	-	26.39	-	1,997
2009	-	25.64	-	1,946
2010	43.76	14.11	32.2	1,071
2011	47.89	14.62	30.5	1,110
2012	39.11	3.87	9.9	292
2013	42.6	15.16	35.6	1,150
2014	41.11	9.90	24.1	751
2015	43.35	15.09	34.8	1,145
2016	44.13	11.34	25.7	858
2017 [2/]	-	9.83	-	746
Maximum	48.68	26.39	49.6	1,997
Minimum	16.93	5.44	9.9	292
Average	38.31	12.68	30.4	992

- Missing Data

[1/] 1970-1983 data from 1984 Survey.

[2/] Data extends to June 30, 2017.

Table 3. Tabulation of Capacity by Elevation for Lake Shelbyville (1970 – 2017)

Elevation (Feet, NAVD88)	1970 Original Capacity* (acre-feet)	Re-Calculated 1970 Capacity (acre-feet)	1974 Capacity* (acre-feet)	1980 Capacity* (acre-feet)	1984 Capacity* (acre-feet)	2017 Capacity (acre-feet)
534.7	0	0	0	0	0	0
539.7	99	58	76	0	50	0
544.7	421	1,214	366	183	100	0
549.7	1,105	2,370	1,163	470	500	58
554.7	2,818	4,194	2,892	1,468	1,500	1,361
559.7	6,305	6,017	6,660	4,479	5,100	2,665
564.7	12,428	12,251	12,869	8,855	10,600	8,596
569.7	22,238	18,484	22,786	16,618	20,300	14,527
572.7	--	26,096	--	--	--	19,855
574.7	36,721	31,446	37,419	30,210	34,643*	26,784
579.7	56,906	50,272	58,116	49,594	53,700	47,391
584.7	83,796	77,940	85,478	76,375	79,100	71,510
589.7	118,383	105,608	120,655	110,446	113,000	95,629
594.7	161,329	145,089	164,320	153,330	154,200	136,816
599.4	--	194,714	--	--	--	178,004
599.7	212,980	197,882	216,329	204,921	202,609*	178,097
604.7	274,565	262,967	278,526	266,471	260,400	240,163
609.7	347,959	328,053	352,205	339,829	333,900	302,229
614.7	433,927	412,775	438,303	425,768	420,600	387,691
619.7	532,310	497,497	536,770	524,096	518,200	473,154
624.7	644,969	615,710	649,249	636,755	634,882*	575,061
626.2	--	648,737	--	--	--	617,588
629.7	775,118	**	779,578	766,904	765,100	**
630.2	--	**	--	--	--	**
634.7	914,370	**	918,830	906,156	--	**
639.7	1,056,120	**	1,065,358	1,047,906	--	**

* As reported in Report on Sedimentation, 1984 Resurvey only these were computed values, the rest were estimated values.

** To limit erroneous results, capacity calculations were limited to elevation 626.2 and below.

-- Missing Data from Previous Surveys

Table 4. Elevation Versus Change in Capacity for Lake Shelbyville

Elevation (Feet NAVD88)	Change in Volume [1/] 1970-1980 (acre-feet)	Change in Volume [1/] 1970-1984 (acre-feet)	Change in Volume [2/] 1970-2017 (acre-feet)	Change in Volume [3/] 1970-2017 (acre-feet)	Change in Volume 1984-2017 (acre-feet)
574.7	-2,810	-2,078	-9,937	-4,662	-7,859
599.7	-6,217	-10,371	-31,800	-19,784	-24,512
624.7	-7,205	-10,087	-77,721	-40,649	-59,821

[1/] As reported in Report on Sedimentation, 1984 Resurvey.

[2/] Compared to 1970 volume reported in previous studies.

[3/] Compared to Re-Calculated 1970 Volume.

Table 5. Tabulation of Surface Area by Elevation for Lake Shelbyville (1970 – 2017)

Elevation (Feet NAVD88)	1970 Area (acres)	Re-Calculated 1970 Area (acres)	1980 Area (acres)	1984 Area (acres)	2017 Area (acres)
539.7	41	25	0	17	0
544.7	126	242	59	101	0
549.7	210	460	117	184	67
554.7	565	781	435	539	506
559.7	919	1,103	753	893	945
564.7	1,656	1,554	1,357	1,626	1,434
569.7	2,393	2,004	1,960	2,358	1,923
572.7	--	2,550	--	--	2,153
574.7	3,534	2,841	3,269	3,482	2,292
579.7	4,674	4,181	4,578	4,605	4,020
584.7	6,213	5,742	6,165	6,179	5,876
589.7	7,752	7,304	7,752	7,752	6,822
594.7	9,493	8,731	9,493	9,346	8,876
599.4	--	10,158	--	--	10,242
599.7	11,233	11,183	11,233	10,940	10,348
604.7	13,595	13,488	13,587	13,446	11,000
609.7	15,956	15,792	15,941	15,952	15,302
614.7	18,451	17,895	18,444	18,449	16,473
619.7	20,946	19,997	20,946	20,946	19,971
624.7	24,443	23,103	24,443	23,620	22,396
626.2	--	23,750	--	--	23,543

* As reported in Report on Sedimentation, 1984 Resurvey.

-- Missing data from previous surveys

Table 6. Area Data by Reach for Lake Shelbyville, Elevation 572.7 feet NAVD88 (2017)

Reach	Distance Between Ranges (feet)	Quadrilateral Area (acres)	Surface Area (acres)
Dam-1A	2900	0	86
1A-3A	4900	169	342
2B	12500	45	41
3A-4A	4100	131	170
4A-5A	4000	159	137
5A-6A	5600	197	212
6A-7A	3800	124	160
7A-11A	4200	56	239
8B-9B	3900	3	5
9B-10B	9000	0	0
10B	11700	0	0
11A-12A	5500	197	174
12A-14A	5600	186	154
13B	9600	9	13
14A-15A	6500	169	167
15A-17A	4800	189	131
16B	13700	0	0
17A-18A	5800	20	123
18A-19A	7300	0	0
19A-20A	6000	0	0
20A-21A	8700	0	0
21A-23A	10200	0	0
22B	5000	0	0
23A-24A	2600	0	0
24A-40B	7500	0	0
39B	10800	0	0
40B	17800	0	0
25A-26A	3100	0	0
26A-27A	5500	0	0
27A-28A	4300	0	0
28A-29A	5000	0	0
29A-30A	3700	0	0
30A-31A	5600	0	0
31A-33A	4300	0	0
32B	17000	0	0
33A-34A	4200	0	0
34A-36A	9400	0	0
35B	9100	0	0
365A-38A	8800	0	0
37B	11800	0	0
38A	8500	0	0

Table 7. Area Data by Reach for Lake Shelbyville, Elevation 574.7 feet NAVD88 (2017)

Reach	Distance Between Ranges (feet)	Quadrilateral Area (acres)	Surface Area (acres)
Dam-1A	2900	0	90
1A-3A	4900	200	348
2B	12500	48	45
3A-4A	4100	160	181
4A-5A	4000	164	145
5A-6A	5600	202	219
6A-7A	3800	126	171
7A-11A	4200	57	252
8B-9B	3900	5	7
9B-10B	9000	0	0
10B	11700	0	0
11A-12A	5500	202	186
12A-14A	5600	193	170
13B	9600	9	15
14A-15A	6500	174	179
15A-17A	4800	201	147
16B	13700	0	0
17A-18A	5800	23	138
18A-19A	7300	0	0
19A-20A	6000	0	0
20A-21A	8700	0	0
21A-23A	10200	0	0
22B	5000	0	0
23A-24A	2600	0	0
24A-40B	7500	0	0
39B	10800	0	0
40B	17800	0	0
25A-26A	3100	0	0
26A-27A	5500	0	0
27A-28A	4300	0	0
28A-29A	5000	0	0
29A-30A	3700	0	0
30A-31A	5600	0	0
31A-33A	4300	0	0
32B	17000	0	0
33A-34A	4200	0	0
34A-36A	9400	0	0
35B	9100	0	0
365A-38A	8800	0	0
37B	11800	0	0
38A	8500	0	0

Table 8. Area Data by Reach for Lake Shelbyville, Elevation 599.4 feet NAVD88 (2017)

Reach	Distance Between Ranges (feet)	Quadrilateral Area (acres)	Surface Area (acres)
Dam-1A	2900	0	133
1A-3A	4900	218	445
2B	12500	175	139
3A-4A	4100	190	256
4A-5A	4000	204	253
5A-6A	5600	244	290
6A-7A	3800	148	275
7A-11A	4200	85	342
8B-9B	3900	112	169
9B-10B	9000	118	119
10B	11700	0	0
11A-12A	5500	263	310
12A-14A	5600	252	255
13B	9600	39	66
14A-15A	6500	217	306
15A-17A	4800	251	272
16B	13700	19	32
17A-18A	5800	171	377
18A-19A	7300	408	668
19A-20A	6000	295	269
20A-21A	8700	19	137
21A-23A	10200	0	0
22B	5000	0	0
23A-24A	2600	0	0
24A-40B	7500	0	0
39B	10800	0	0
40B	17800	0	0
25A-26A	3100	119	191
26A-27A	5500	170	218
27A-28A	4300	286	362
28A-29A	5000	370	532
29A-30A	3700	97	309
30A-31A	5600	26	96
31A-33A	4300	0	0
32B	17000	0	0
33A-34A	4200	0	0
34A-36A	9400	0	0
35B	9100	0	0
365A-38A	8800	0	0
37B	11800	0	0
38A	8500	0	0

Table 9. Area Data by Reach for Lake Shelbyville, Elevation 599.7 feet NAVD88 (2017)

Reach	Distance Between Ranges (feet)	Quadrilateral Area (acres)	Surface Area (acres)
Dam-1A	2900	0	153
1A-3A	4900	240	541
2B	12500	210	203
3A-4A	4100	208	316
4A-5A	4000	223	343
5A-6A	5600	263	343
6A-7A	3800	164	329
7A-11A	4200	93	395
8B-9B	3900	157	231
9B-10B	9000	179	258
10B	11700	0	0
11A-12A	5500	279	374
12A-14A	5600	287	306
13B	9600	51	98
14A-15A	6500	244	385
15A-17A	4800	295	342
16B	13700	32	78
17A-18A	5800	272	493
18A-19A	7300	515	760
19A-20A	6000	342	444
20A-21A	8700	600	681
21A-23A	10200	362	394
22B	5000	11	29
23A-24A	2600	0	0
24A-40B	7500	0	0
39B	10800	0	0
40B	17800	0	0
25A-26A	3100	135	260
26A-27A	5500	193	263
27A-28A	4300	308	438
28A-29A	5000	414	653
29A-30A	3700	193	422
30A-31A	5600	143	234
31A-33A	4300	115	345
32B	17000	0	0
33A-34A	4200	84	226
34A-36A	9400	16	14
35B	9100	0	0
365A-38A	8800	0	0
37B	11800	0	0
38A	8500	0	0

Table 10. Area Data by Reach for Lake Shelbyville, Elevation 624.7 feet NAVD88 (2017)

Reach	Distance Between Ranges (feet)	Quadrilateral Area (acres)	Surface Area (acres)
Dam-1A	2900	0	219
1A-3A	4900	372	797
2B	12500	421	410
3A-4A	4100	262	512
4A-5A	4000	303	646
5A-6A	5600	361	491
6A-7A	3800	190	500
7A-11A	4200	104	503
8B-9B	3900	191	451
9B-10B	9000	360	484
10B	11700	25	366
11A-12A	5500	326	492
12A-14A	5600	336	432
13B	9600	106	286
14A-15A	6500	291	553
15A-17A	4800	366	450
16B	13700	175	322
17A-18A	5800	395	740
18A-19A	7300	618	896
19A-20A	6000	432	606
20A-21A	8700	749	860
21A-23A	10200	933	931
22B	5000	285	429
23A-24A	2600	65	214
24A-40B	7500	254	703
39B	10800	160	336
40B	17800	307	840
25A-26A	3100	148	344
26A-27A	5500	226	352
27A-28A	4300	345	556
28A-29A	5000	438	916
29A-30A	3700	251	494
30A-31A	5600	293	455
31A-33A	4300	217	637
32B	17000	334	588
33A-34A	4200	142	388
34A-36A	9400	295	977
35B	9100	26	115
365A-38A	8800	439	1,078
37B	11800	104	426
38A	8500	85	600

Table 11. Area Data by Reach for Lake Shelbyville, Elevation 626.2 feet NAVD88 (2017)

Reach	Distance Between Ranges (feet)	Quadrilateral Area (acres)	Surface Area (acres)
Dam-1A	2900	0	222
1A-3A	4900	375	818
2B	12500	440	428
3A-4A	4100	263	531
4A-5A	4000	303	666
5A-6A	5600	362	515
6A-7A	3800	191	514
7A-11A	4200	105	513
8B-9B	3900	192	470
9B-10B	9000	362	498
10B	11700	29	416
11A-12A	5500	327	502
12A-14A	5600	338	446
13B	9600	113	305
14A-15A	6500	292	569
15A-17A	4800	368	460
16B	13700	228	379
17A-18A	5800	398	771
18A-19A	7300	622	905
19A-20A	6000	434	618
20A-21A	8700	751	869
21A-23A	10200	934	962
22B	5000	302	484
23A-24A	2600	66	221
24A-40B	7500	257	727
39B	10800	203	397
40B	17800	312	926
25A-26A	3100	148	352
26A-27A	5500	227	359
27A-28A	4300	345	572
28A-29A	5000	439	953
29A-30A	3700	256	502
30A-31A	5600	297	489
31A-33A	4300	219	702
32B	17000	403	659
33A-34A	4200	144	398
34A-36A	9400	297	1,001
35B	9100	29	140
365A-38A	8800	442	1,153
37B	11800	126	508
38A	8500	86	622

Table 12. Range Cross Section Data for Lake Shelbyville, Elevation 572.7 feet NAVD88

Range	Re-calculated 1970 Cross-Sectional Area (sq. ft.)	2017 Resurvey Cross-Sectional Area (sq. ft.)	Change in Cross-Sectional Area 1970-2017 (sq. ft.)
1A	32,784	28,504	-4,279
2B	24,255	20,048	-4,207
3A	35,160	30,096	-5,064
4A	23,081	20,163	-2,918
5A	20,185	18,558	-1,627
6A	23,797	19,971	-3,826
7A	14,324	12,986	-1,339
8B	5,486	2,756	-2,731
9B	81	0	-81
10B	0	0	0
11A	14,942	10,709	-4,233
12A	18,000	13,309	-4,692
13B	4,337	1,728	-2,609
14A	8,859	5,591	-3,268
15A	15,275	7,746	-7,529
16B	60	0	-60
17A	6,974	2,922	-4,052
18A	4,024	1,558	-2,466
19A	494	0	-494
20A	19	0	-19
21A	0	0	0
22B	0	0	0
23A	0	0	0
24A	0	0	0
25A	1,036	342	-694
26A	427	0	-427
27A	551	0	-551
28A	321	0	-321
29A	0	0	0
30A	0	0	0
31A	0	0	0
32B	0	0	0
33A	0	0	0
34A	0	0	0
35B	0	0	0
36A	0	0	0
37B	0	0	0
38A	0	0	0
39B	0	0	0
40B	0	0	0

Notes: Negative sign indicates decrease on range sectional area.
Missing Data for 1974, 1980 & 1984 on previous resurvey reports.

Table 13. Range Cross Section Data for Lake Shelbyville, Elevation 574.7 feet NAVD88

Range	Re-calculated 1970 Cross-Sectional Area (sq. ft)	Change in Cross-Sectional Area 1970-1974 (sq. ft)	Change in Cross-Sectional Area 1970-1980 (sq. ft)	Change in Cross-Sectional Area 1970-1984 (sq. ft)	Change in Cross-Sectional Area 1970-2017 (sq. ft)
1A	36,110	250	-3,493	-964	-4,283
2B	28,603	1,047	-2,179	-1,146	-4,340
3A	39,398	-12	-2,073	-414	-5,218
4A	26,515	423	-2,654	-1,852	-2,634
5A	23,283	907	-1,833	-62	-1,623
6A	27,848	624	-2,106	-1,189	-3,808
7A	16,453	861	-1,471	-68	-1,324
8B	7,234	330	-833	Table	-2,768
9B	158	-79	0	-166	-158
10B	0	0	-1,959	0	0
11A	17,839	90	-4,007	-2,431	-4,376
12A	22,137	-665	-1,065	-2,211	-4,694
13B	5,748	-111	-1,016	-821	-2,663
14A	10,759	-262	-4,502	-926	-3,300
15A	19,815	-126	-131	-5,159	-7,439
16B	133	-2	-1,582	-131	-133
17A	9,349	256	-1,226	-1,890	-4,222
18A	5,523	467	-744	-1,426	-2,475
19A	944	590	-134	-565	-944
20A	87	-29	0	-134	-87
21A	0	0	0	0	0
22B	0	0	0	0	0
23A	0	0	0	0	0
24A	0	0	0	0	0
25A	1,803	695	-216	-756	-1,054
26A	1,095	702	-163	-356	-828
27A	1,114	-90	-746	-803	-1,114
28A	515	-38	-254	-326	-515
29A	121	-37	-118	-118	-121
30A	0	0	0	0	0
31A	0	0	0	0	0
32B	0	0	0	0	0
33A	0	0	0	0	0
34A	0	0	0	0	0
35B	0	0	0	0	0
36A	0	0	0	0	0
37B	0	0	0	0	0
38A	0	0	0	0	0
39B	0	0	0	0	0
40B	0	0	0	0	0

Note: Negative sign indicates decrease on range sectional area.

Table 14. Range Cross Section Data for Lake Shelbyville, Elevation 599.4 feet NAVD88

Range	Re-calculated 1970 Cross-Sectional Area (sq. ft)	2017 Resurvey Cross-Sectional Area (sq. ft)	Change in Cross-Sectional Area 1970-2017 (sq. ft)
1A	85,092	79,456	-5,637
2B	87,454	84,056	-3,398
3A	97,963	91,156	-6,808
4A	86,637	80,567	-6,069
5A	74,153	69,514	-4,639
6A	86,608	82,762	-3,846
7A	45,189	44,784	-405
8B	35,560	30,509	-5,052
9B	44,113	37,436	-6,677
10B	2,376	0	-2,376
11A	71,494	67,495	-3,999
12A	77,032	72,479	-4,553
13B	24,757	21,811	-2,945
14A	50,189	46,093	-4,095
15A	82,406	75,157	-7,249
16B	16,524	14,036	-2,488
17A	53,759	50,380	-3,379
18A	39,542	38,428	-1,114
19A	45,101	44,779	-322
20A	18,860	16,175	-2,685
21A	52,239	45,145	-7,094
22B	7,253	3,378	-3,875
23A	1,443	0	-1,443
24A	398	0	-398
25A	33,896	30,757	-3,139
26A	43,500	42,628	-872
27A	26,384	23,119	-3,265
28A	96,151	89,005	-7,146
29A	27,292	25,030	-2,261
30A	26,625	22,900	-3,725
31A	12,705	8,713	-3,992
32B	2,659	0	-2,659
33A	10,086	6,170	-3,916
34A	5,143	3,908	-1,235
35B	28	0	-28
36A	1,046	0	-1,046
37B	0	0	0
38A	0	0	0
39B	1	0	-1
40B	56	0	-56

Notes: Negative sign indicates decrease on range sectional area.
Missing Data for 1974, 1980 & 1984 on previous resurvey reports.

Table 15. Range Cross Section Data for Lake Shelbyville, Elevation 599.7 feet NAVD88

Range	Re-calculated 1970 Cross-Sectional Area (sq. ft)	Change in Cross-Sectional Area 1970-1974 (sq. ft)	Change in Cross-Sectional Area 1970-1980 (sq. ft)	Change in Cross-Sectional Area 1970-1984 (sq. ft)	Change in Cross-Sectional Area 1970-2017 (sq. ft)
1A	85,787	-869	-4,454	-1,167	-5647
2B	88,201	1008	-2,032	-1,415	-3362
3A	98,754	-264	-1,418	335	-6823
4A	87,465	-177	-3,933	-1,909	-6086
5A	74,891	1375	-2,205	-1,624	-4595
6A	87,414	813	1,878	-1,848	-3844
7A	45,567	966	-1,249	700	-370
8B	36,053	477	-47	-2,701	-5084
9B	44,910	683	-1,017	-2,591	-6674
10B	2,572	77	-727	-864	-2572
11A	72,277	346	-1,624	-2,885	-3970
12A	77,736	-477	-4,054	-2,057	-4536
13B	25,004	-121	-1,420	-315	-2941
14A	50,836	-941	-1,533	-1,987	-4120
15A	83,245	-214	-	-6,404	-7256
16B	16,822	123	-1,606	-2,765	-2504
17A	54,529	947	-44	-1,688	-3383
18A	40,265	1407	-576	-1,606	-1096
19A	45,925	3400	-1,208	-967	-309
20A	19,303	421	-833	-1,643	-2766
21A	54,065	110	-1,343	-7,762	-7094
22B	7,623	-132	-818	-1,985	-4019
23A	1,650	-134	-159	-648	-1650
24A	423	-59	97	-27	-423
25A	34,433	2,265	325	-232	-3108
26A	44,113	1,683	672	-65	-855
27A	26,770	-164	-1,508	-2,174	-3262
28A	97,707	5,964	3,503	-5,055	-7151
29A	27,991	593	-303	-2,301	-2245
30A	27,352	856	-120	-3,072	-3682
31A	13,079	-485	-917	-2,426	-3985
32B	2,916	354	-313	-1,208	-2916
33A	10,478	-10	-871	-2,161	-3934
34A	5,454	-277	-384	-1,449	-1235
35B	36	-42	-25	-41	-36
36A	1,148	71	-159	-323	-1148
37B	0	8	-1	-1	0
38A	0	2	22	11	0
39B	2	14	39	48	-2
40B	81	-21	-10	-39	-81

Note: Negative sign indicates decrease on range sectional area.
Missing Data for 1974, 1980 & 1984 on previous resurvey reports.

Table 16. Range Cross Section Data for Lake Shelbyville, Elevation 624.7 feet NAVD88

Range	Re-calculated 1970 Cross-SectionalArea(sq. ft)	Change in Cross-Sectional Area 1970-1974 (sq. ft)	Change in Cross-Sectional Area 1970-1980 (sq. ft)	Change in Cross-Sectional Area 1970-1984 (sq. ft)	Change in Cross-Sectional Area 1970-2017 (sq. ft)
1A	157,177	-54	-3,317	319	6,773
2B	154,483	948	-1,937	-1,467	-249
3A	172,733	-187	-890	641	-8,754
4A	162,364	-138	-3,723	-1,589	-2,865
5A	140,634	1649	-1,878	-1,072	-553
6A	161,946	1125	-1,876	-1,799	-4,048
7A	80,077	1161	-913	1,041	1,470
8B	81,281	398	-62	-2,401	-4,603
9B	120,186	777	-1,086	-2,559	-6,095
10B	22,066	133	-968	-1,052	-2,674
11A	142,943	326	-1,368	-2,713	-2,365
12A	143,533	-452	-4,032	-2,327	-4,306
13B	47,419	-129	-1,387	-223	-2,571
14A	108,282	-1019	-1,876	-2,343	-5,471
15A	158,789	-186	-5,360	-6,346	-5,781
16B	44,261	786	-1,764	-2,705	-2,982
17A	132,762	1130	268	-910	-2,287
18A	122,057	1998	-209	-1,195	-444
19A	126,067	3582	-1,245	-396	379
20A	71,228	518	-735	-2,066	-2,330
21A	219,539	191	-1,030	-7,672	-8,007
22B	51,397	-9	-959	-2,385	-2,811
23A	35,554	143	-58	-830	-874
24A	19,365	-195	24	-75	-93
25A	82,782	2,359	431	11	-1,775
26A	98,256	1,595	792	115	390
27A	67,301	-502	-1,732	-2,271	-3,535
28A	230,431	7,975	3,735	-4,926	-6,735
29A	92,999	1,706	792	-1,061	-486
30A	97,838	1,167	137	-2,757	-1,700
31A	69,544	163	-648	-1,745	-5,019
32B	33,552	224	-415	-1,336	-2,940
33A	46,894	43	-734	-1,831	-5,117
34A	45,102	-159	-433	-1,451	-4,425
35B	10,522	-74	-154	-113	523
36A	65,720	569	-1,384	-1,392	1,034
37B	12,700	152	-46	-209	-467
38A	18,928	313	12	301	-1,578
39B	13,251	-151	339	577	1,500
40B	27,204	173	232	-271	-1,338

Note: Negative sign indicates decrease on range sectional area.

Table 17. Range Cross Section Data for Lake Shelbyville, Elevation 626.2 feet NAVD88

Range	Re-calculated 1970 Cross-Sectional Area (sq. ft)	2017 Resurvey Cross-Sectional Area (sq. ft.)	Change in Cross-Sectional Area 1970-2017 (sq. ft)
1A	162,227	170,176	7,949
2B	158,748	158,697	-51
3A	177,848	169,016	-8,832
4A	167,360	164,506	-2,855
5A	145,134	144,567	-566
6A	166,698	162,642	-4,056
7A	82,385	83,953	1,567
8B	84,183	79,661	-4,521
9B	125,163	119,197	-5,966
10B	23,408	20,742	-2,666
11A	147,538	145,135	-2,402
12A	147,883	143,512	-4,371
13B	48,905	46,520	-2,384
14A	111,962	106,443	-5,518
15A	163,553	157,923	-5,630
16B	46,336	43,260	-3,077
17A	138,007	135,761	-2,246
18A	127,640	127,154	-486
19A	131,626	131,975	349
20A	74,959	72,753	-2,207
21A	230,063	221,842	-8,221
22B	54,373	51,571	-2,802
23A	39,095	38,744	-351
24A	20,952	20,886	-66
25A	85,889	84,111	-1,778
26A	101,678	102,105	427
27A	70,021	66,471	-3,550
28A	238,567	231,836	-6,730
29A	97,392	97,284	-108
30A	103,327	101,934	-1,393
31A	73,620	68,712	-4,908
32B	36,178	33,211	-2,967
33A	49,397	44,127	-5,270
34A	48,511	44,074	-4,438
35B	11,432	11,962	530
36A	70,259	71,409	1,151
37B	14,012	13,493	-519
38A	21,000	19,454	-1,546
39B	14,879	16,432	1,553
40B	30,166	28,887	-1,278

Notes: Negative sign indicates decrease on range sectional area.
Missing Data for 1974,1980 & 1984 on previous resurvey reports.

Table 18. Sediment Deposition by Reach for Lake Shelbyville, Elevation 572.7 feet NAVD88

Reach	Sediment Deposited 1970-1980 (acre-feet)	Sediment Deposited 1970-1984 (acre-feet)	Sediment Deposited 1970-2017 (acre-feet)
Dam-1A			241
1A-3A			685
2B			-31
3A-4A			381
4A-5A			229
5A-6A			265
6A-7A			224
7A-11A			409
8B-9B			16
9B-10B			-
10B			-
11A-12A			335
12A-14A			391
13B			33
14A-15A			544
15A-17A			460
16B			-
17A-18A			691
18A-19A			611
19A-20A			30
20A-21A			-
21A-23A			-
22B			-
23A-24A			-
24A-40B			-
39B			-
40B			-
25A-26A			136
26A-27A			296
27A-28A			186
28A-29A			-
29A-30A			-
30A-31A			-
31A-33A			-
32B			-
33A-34A			-
34A-36A			-
35B			-
36A-38A			-
37B			-
38A			-
TOTALS:			6,133

Notes: Negative sign indicates an increase in storage.
Deposited Sediment Data were compared to re-calculated 1970 study.
Deposited Sediment Data for 1980 & 1984 were not in previous studies at this elevation. Missing values mean the range bottom elevation is above the referenced elevation in this table.

Table 19. Sediment Deposition by Reach for Lake Shelbyville, Elevation 574.7 feet NAVD88

Reach	Sediment Deposited 1970-1980 (acre-feet)	Sediment Deposited 1970-1984 (acre-feet)	Sediment Deposited 1970-2017 (acre-feet)	Sediment Deposited 1984-2017 (acre-feet)
Dam-1A	131	11	216	205
1A-3A	418	147	-923	-1,070
2B	39	17	38	21
3A-4A	167	185	390	205
4A-5A	81	100	219	119
5A-6A	87	29	302	273
6A-7A	152	75	249	174
7A-11A	246	206	-145	-351
8B-9B	104	140	24	-116
9B-10B	-	-	-	-
10B	-	-	-	-
11A-12A	272	183	354	171
12A-14A	228	160	437	277
13B	25	24	44	20
14A-15A	261	258	573	315
15A-17A	248	257	514	257
16B				-
17A-18A	237	280	978	698
18A-19A	216	57	813	756
19A-20A	24	1	38	37
20A-21A	-	-	-	-
21A-23A	-	-	-	-
22B	-	-	-	-
23A-24A	-	-	-	-
24A-40B	-	-	-	-
39B	-	-	-	-
40B	-	-	-	-
25A-26A	14	22	152	130
26A-27A	-86	-70	192	262
27A-28A	-61	-15	195	210
28A-29A	7	11	-	-11
29A-30A	-	-	-	-
30A-31A	-	-	-	-
31A-33A	-	-	-	-
32B	-	-	-	-
33A-34A	-	-	-	-
34A-36A	-	-	-	-
35B	-	-	-	-
36A-38A	-	-	-	-
37B	-	-	-	-
38A	-	-	-	-
TOTALS:	2,810	2,078	4,662	2,584

Notes: Negative sign indicates an increase in storage.
Deposited Sediment Data for 1980 & 1984 were from previous studies.
Deposited Sediment Data were compared to re-calculated 1970 study.
Missing values mean the range bottom elevation is above the referenced elevation in this table.

Table 20. Sediment Deposition by Reach for Lake Shelbyville, Elevation 599.4 feet NAVD88

Reach	Sediment Deposited 1970-1980 (acre-feet)	Sediment Deposited 1970-1984 (acre-feet)	Sediment Deposited 1970-2017 (acre-feet)
Dam-1A			-603
1A-3A			-353
2B			295
3A-4A			161
4A-5A			-768
5A-6A			-827
6A-7A			540
7A-11A			360
8B-9B			453
9B-10B			-245
10B			-
11A-12A			658
12A-14A			429
13B			333
14A-15A			827
15A-17A			625
16B			64
17A-18A			111
18A-19A			284
19A-20A			-230
20A-21A			-1,113
21A-23A			1,104
22B			106
23A-24A			53
24A-40B			-
39B			-
40B			-
25A-26A			207
26A-27A			438
27A-28A			512
28A-29A			1,002
29A-30A			406
30A-31A			372
31A-33A			624
32B			-
33A-34A			468
34A-36A			271
35B			-
36A-38A			-
37B			-
38A			-
TOTALS:			6,565

Notes: Negative sign indicates an increase in storage.

Deposited Sediment Data were compared to re-calculated 1970 study.

Deposited Sediment Data for 1980 & 1984 were not in previous studies at this elevation.

Table 21. Sediment Deposition by Reach for Lake Shelbyville, Elevation 599.7 feet NAVD88

Reach	Sediment Deposited 1970-1980 (acre-feet)	Sediment Deposited 1970-1984 (acre-feet)	Sediment Deposited 1970-2017 (acre-feet)	Sediment Deposited 1984-2017 (acre-feet)
Dam-1A	105	204	-305	-509
1A-3A	467	468	538	70
2B	167	150	1187	1037
3A-4A	408	233	386	153
4A-5A	426	315	1166	851
5A-6A	202	218	579	361
6A-7A	232	148	1075	927
7A-11A	370	391	483	92
8B-9B	44	234	982	748
9B-10B	181	291	1368	1077
10B	23	27	156	129
11A-12A	493	480	780	300
12A-14A	299	161	557	396
13B	120	53	993	940
14A-15A	356	303	917	614
15A-17A	384	541	611	70
16B	52	65	249	184
17A-18A	163	421	291	-130
18A-19A	286	364	-93	-457
19A-20A	343	351	-207	-558
20A-21A	453	914	-257	-1171
21A-23A	130	649	2063	1414
22B	16	41	329	288
23A-24A	4	38	193	155
24A-40B	-	23	131	108
39B	-	-	-	-
40B	-	-	5	5
25A-26A	6	63	255	192
26A-27A	44	237	400	163
27A-28A	-73	503	482	-21
28A-29A	-74	548	1178	630
29A-30A	79	415	441	26
30A-31A	102	381	472	91
31A-33A	241	565	943	378
32B	2	9	122	113
33A-34A	128	332	486	154
34A-36A	38	235	749	514
35B	-	-	2	2
36A-38A	-	--	78	78
37B	-	-	-	-
38A	-	-	-	-
TOTALS:	6,217	10,371	19,785	9,414

Notes: Negative sign indicates an increase in storage.

Deposited Sediment Data were compared to re-calculated 1970 study.

Deposited Sediment Data for 1980 & 1984 were not in previous studies at this elevation.

Table 22. Sediment Deposition by Reach for Lake Shelbyville, Elevation 624.7 feet NAVD88

Reach	Sediment Deposited 1970-1980 (acre-feet)	Sediment Deposited 1970-1984 (acre-feet)	Sediment Deposited 1970-2017 (acre-feet)	Sediment Deposited 1984-2017 (acre-feet)
Dam-1A	206	-2	985	987
1A-3A	507	-5	3,412	3,417
2B	269	172	526	354
3A-4A	326	98	767	669
4A-5A	648	395	1,373	978
5A-6A	449	364	1,486	1,122
6A-7A	280	48	1,824	1,776
7A-11A	233	158	622	464
8B-9B	76	425	2,372	1,947
9B-10B	283	469	2,180	1,711
10B	147	189	876	687
11A-12A	454	174	1,142	968
12A-14A	455	144	1,213	1,069
13B	191	4	4,070	4,066
14A-15A	595	719	2,610	1,891
15A-17A	423	608	1,518	910
16B	173	183	271	88
17A-18A	9	207	404	197
18A-19A	150	144	327	183
19A-20A	163	238	421	183
20A-21A	183	858	218	-640
21A-23A	165	785	-763	-1,548
22B	51	126	792	666
23A-24A	17	54	1,206	1152
24A-40B	-54	59	898	839
39B	-56	34	-291	-325
40B	-52	-65	580	645
25A-26A	-80	-8	212	220
26A-27A	91	161	589	428
27A-28A	37	498	381	-117
28A-29A	-290	588	1,997	1,409
29A-30A	8	230	-37	-267
30A-31A	80	229	1,024	795
31A-33A	211	534	2,717	2,183
32B	79	213	22	-191
33A-34A	109	276	523	247
34A-36A	247	384	689	305
35B	8	15	-	-15
365A-38A	313	296	1,048	752
37B	37	52	-204	-256
38A	64	36	650	614
TOTALS:	7,205	10,087	40,649	30,562

Notes: Negative sign indicates an increase in storage.
Deposited Sediment Data for 1980 & 1984 were from previous studies.
Deposited Sediment Data were compared to re-calculated 1970 study.
Missing values mean the range bottom elevation is above the referenced elevation in this table.

Table 23. Sediment Deposition by Reach for Lake Shelbyville, Elevation 626.2 feet NAVD88

Reach	Sediment Deposited 1970-1980 (acre-feet)	Sediment Deposited 1970-1984 (acre-feet)	Sediment Deposited 1970-2017 (acre-feet)
Dam-1A	--	--	1,016
1A-3A	--	--	3,327
2B	--	--	1,169
3A-4A	--	--	357
4A-5A	--	--	437
5A-6A	--	--	860
6A-7A	--	--	1,690
7A-11A	--	--	392
8B-9B	--	--	2,345
9B-10B	--	--	2,120
10B	--	--	656
11A-12A	--	--	1,063
12A-14A	--	--	1,059
13B	--	--	4,082
14A-15A	--	--	2,465
15A-17A	--	--	1,370
16B	--	--	-446
17A-18A	--	--	61
18A-19A	--	--	184
19A-20A	--	--	320
20A-21A	--	--	101
21A-23A	--	--	104
22B	--	--	396
23A-24A	--	--	1,243
24A-40B	--	--	722
39B	--	--	-637
40B	--	--	48
25A-26A	--	--	177
26A-27A	--	--	622
27A-28A	--	--	135
28A-29A	--	--	628
29A-30A	--	--	-147
30A-31A	--	--	1,256
31A-33A	--	--	1,950
32B	--	--	-888
33A-34A	--	--	507
34A-36A	--	--	776
35B	--	--	-93
365A-38A	--	--	-9
37B	--	--	-571
38A	--	--	303
TOTALS:	--	--	31,150

Notes: Negative sign indicates an increase in storage.
Deposited Sediment Data were compared to re-calculated 1970 study.
Deposited Sediment Data for 1980 & 1984 were not in previous studies at this elevation.

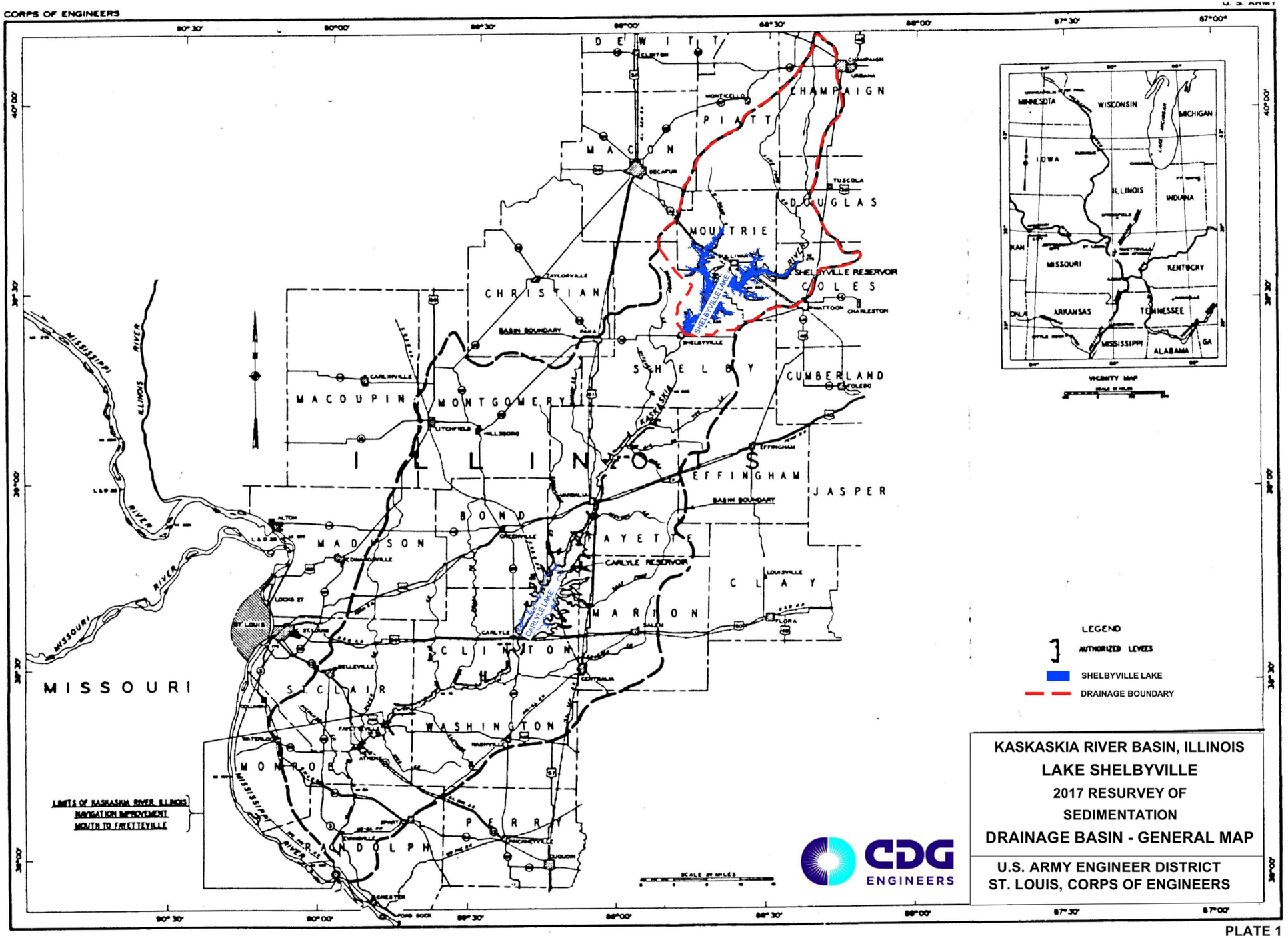
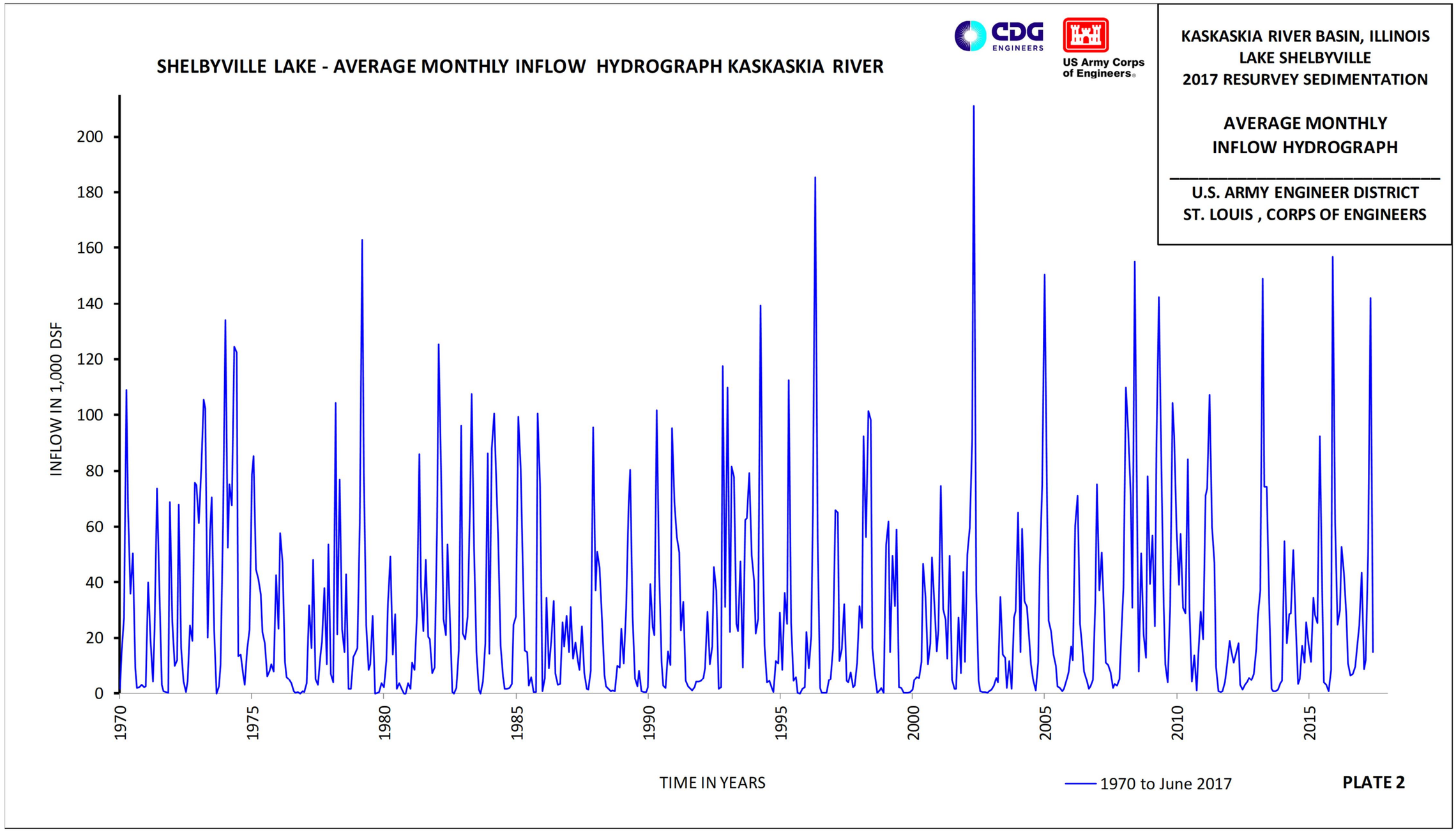

CORPS OF ENGINEERS
U.S. ARMY
DEWITT
CHAMPAIGN
PIATT
MACON
DOUGLAS
MOULTRIE
SHELBYVILLE RESERVOIR
SHELBYVILLE LAKE
CHRISTIAN
COLES
SHELBY
CUMBERLAND
MACOUPIN
MONTGOMERY
EFFINGHAM
JASPER
BOND
FAYETTE
CLAY
MADISON
CARLYLE RESERVOIR
CARLYLE LAKE
MARION
CLINTON
MISSOURI
ST. CLAIR
WASHINGTON
MONROE
PERRY
RANDOLPH
MISSISSIPPI RIVER
ILLINOIS RIVER
MISSOURI RIVER
BASIN BOUNDARY
LIMITS OF KASKASKIA RIVER, ILLINOIS NAVIGATION IMPROVEMENT MOUTH TO FAYETTEVILLE
VICINITY MAP
MINNESOTA
WISCONSIN
MICHIGAN
IOWA
ILLINOIS
INDIANA
MISSOURI
KENTUCKY
ARKANSAS
TENNESSEE
MISSISSIPPI
ALABAMA
LEGEND
AUTHORIZED LEVEES
SHELBYVILLE LAKE
DRAINAGE BOUNDARY
KASKASKIA RIVER BASIN, ILLINOIS
LAKE SHELBYVILLE
2017 RESURVEY OF
SEDIMENTATION
DRAINAGE BASIN - GENERAL MAP
U.S. ARMY ENGINEER DISTRICT
ST. LOUIS, CORPS OF ENGINEERS
CDG ENGINEERS
90° 30'
90° 00'
89° 30'
89° 00'
88° 30'
88° 00'
87° 30'
87° 00'
40° 00'
39° 30'
39° 00'
38° 30'
38° 00'

PLATE 1


SHELBYVILLE LAKE - AVERAGE MONTHLY INFLOW HYDROGRAPH KASKASKIA RIVER
CDG ENGINEERS
US Army Corps of Engineers
KASKASKIA RIVER BASIN, ILLINOIS
LAKE SHELBYVILLE
2017 RESURVEY SEDIMENTATION
AVERAGE MONTHLY INFLOW HYDROGRAPH
U.S. ARMY ENGINEER DISTRICT
ST. LOUIS , CORPS OF ENGINEERS
INFLOW IN 1,000 DSF
0
20
40
60
80
100
120
140
160
180
200
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
TIME IN YEARS
1970 to June 2017
PLATE 2

CDG ENGINEERS

US Army Corps of Engineers

KASKASKIA RIVER BASIN, ILLINOIS
LAKE SHELBYVILLE
2017 RESURVEY SEDIMENTATION

AVERAGE MONTHLY POOL ELEVATION

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

SHELBYVILLE LAKE - AVERAGE MONTHLY POOL ELEVATIONS

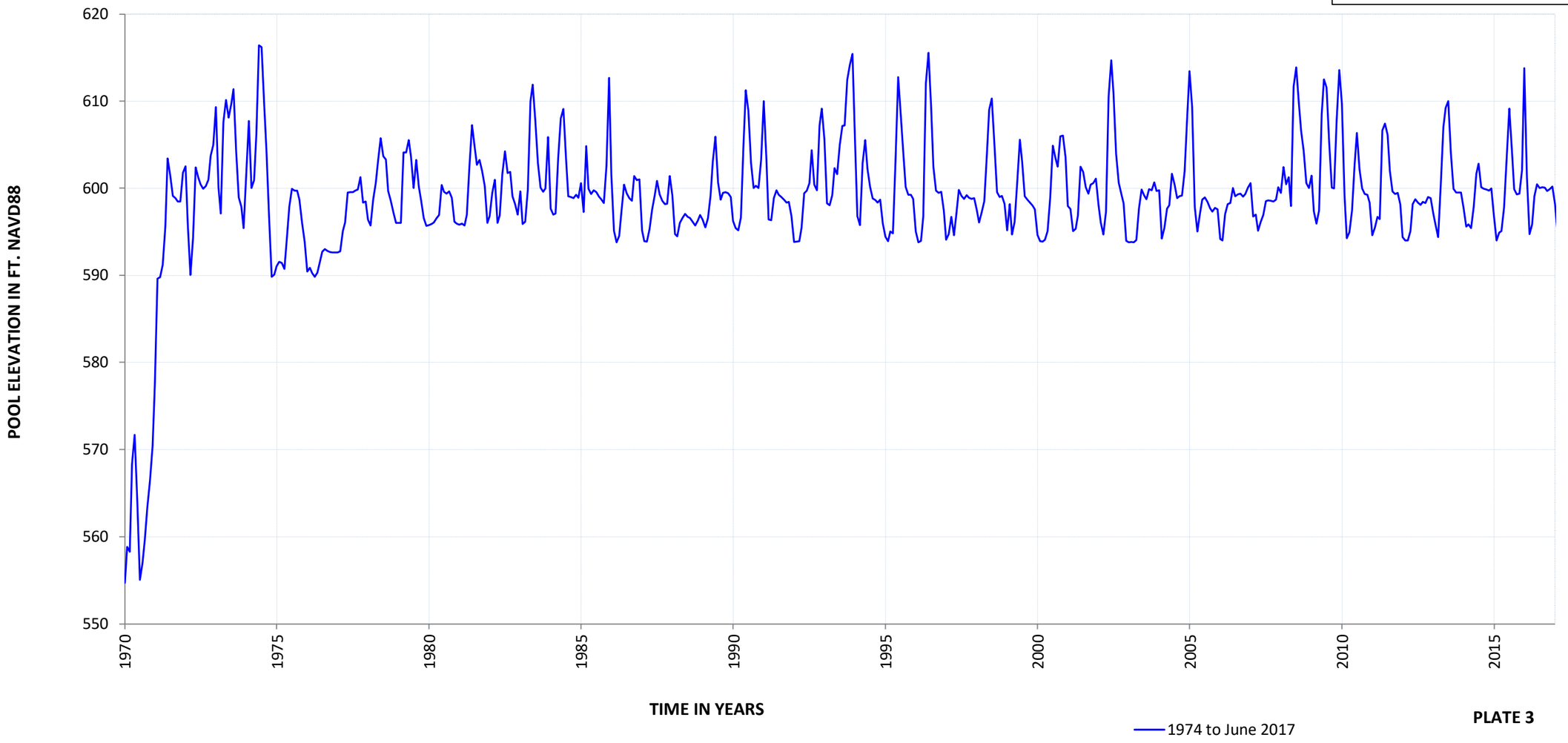


PLATE 3

LAKE SHELBYVILLE
CAPACITY VS. ELEVATION
1970, 1974, 1980, 1984 and 2017 SURVEYS

CDG ENGINEERS

US Army Corps of Engineers

KASKASKIA RIVER BASIN, ILLINOIS
LAKE SHELBYVILLE
2017 RESURVEY SEDIMENTATION

CAPACITY VS. ELEVATION

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

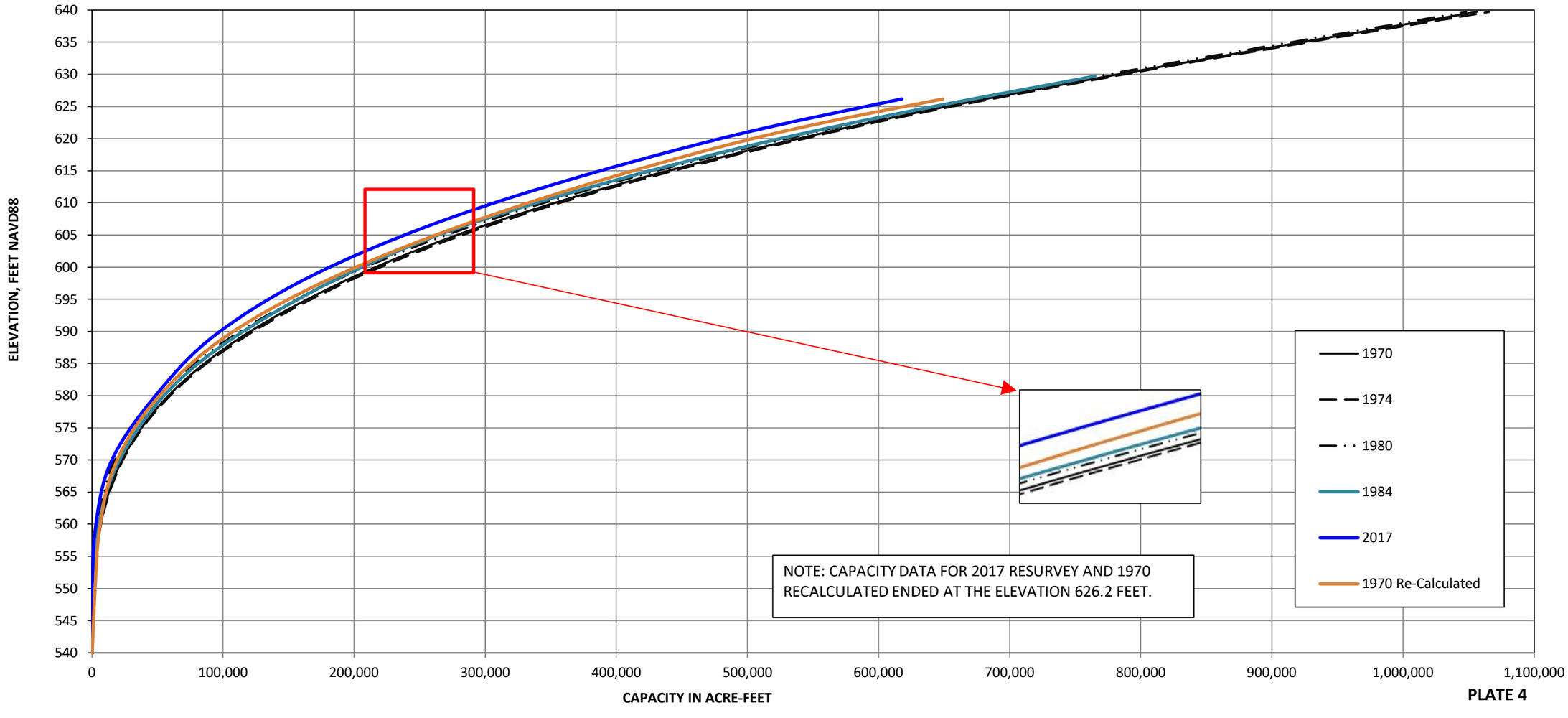


PLATE 4

LAKE SHELBYVILLE
AREA VS. ELEVATION
1970, 1980, 1984 and 2017 SURVEYS

CDG ENGINEERS

US Army Corps of Engineers®

KASKASKIA RIVER BASIN, ILLINOIS
LAKE SHELBYVILLE
2017 RESURVEY SEDIMENTATION

AREA VS. ELEVATION

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

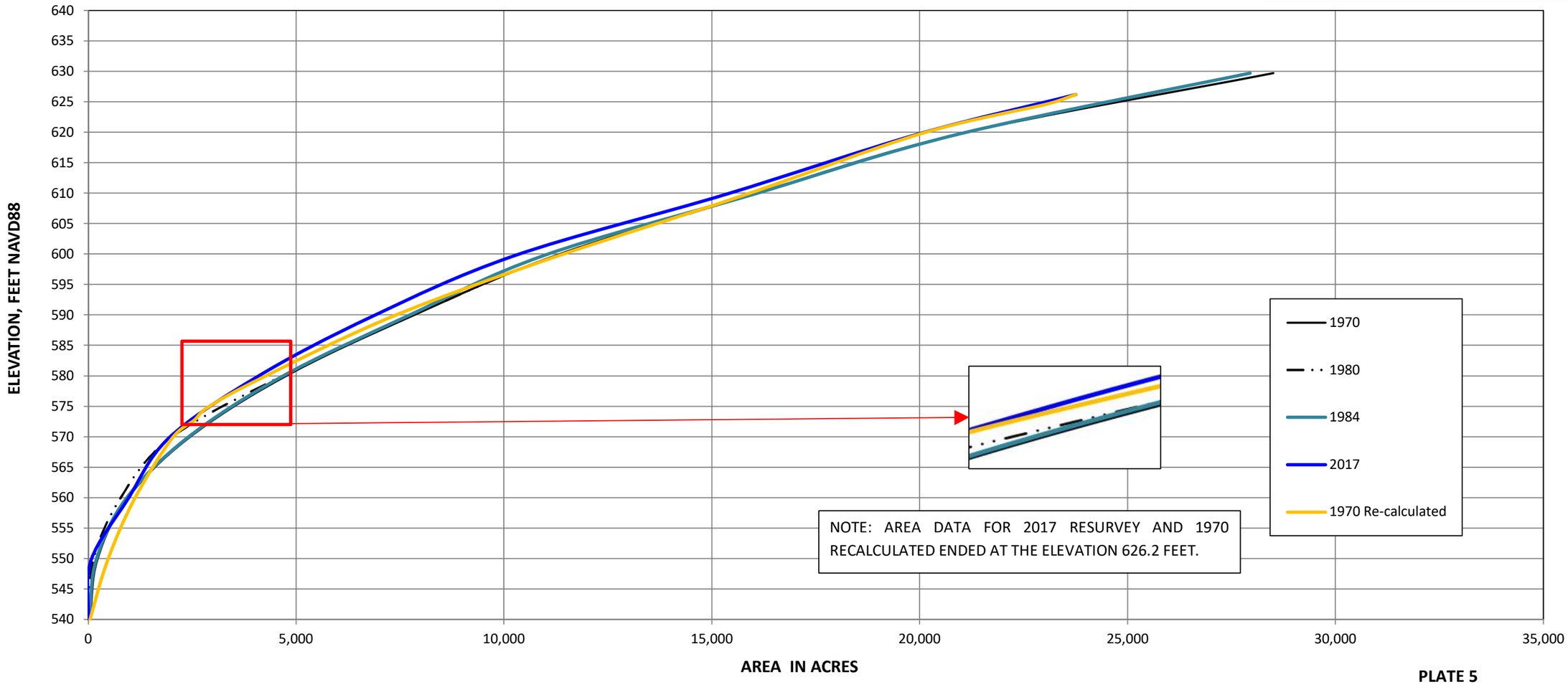
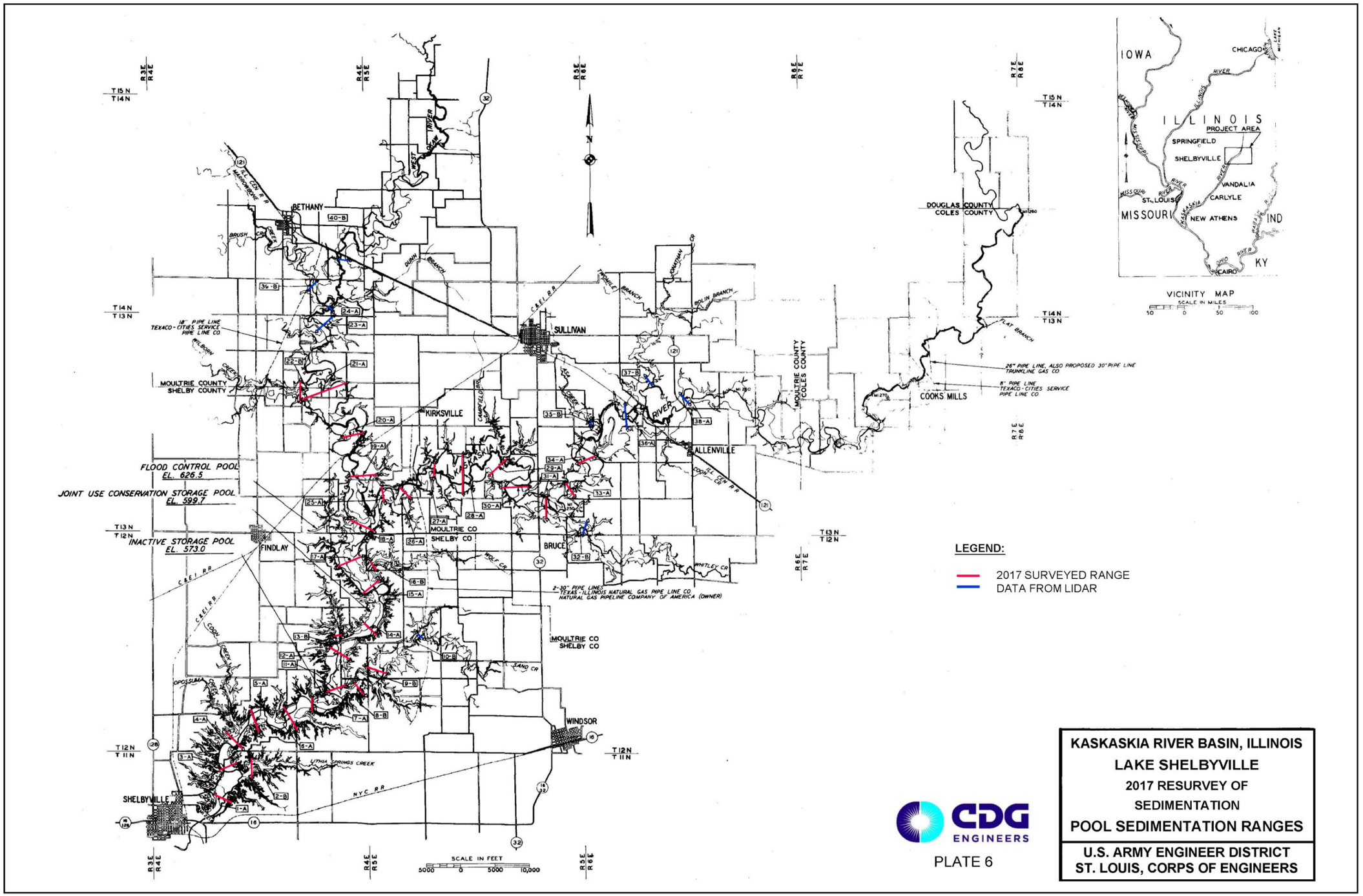


PLATE 5

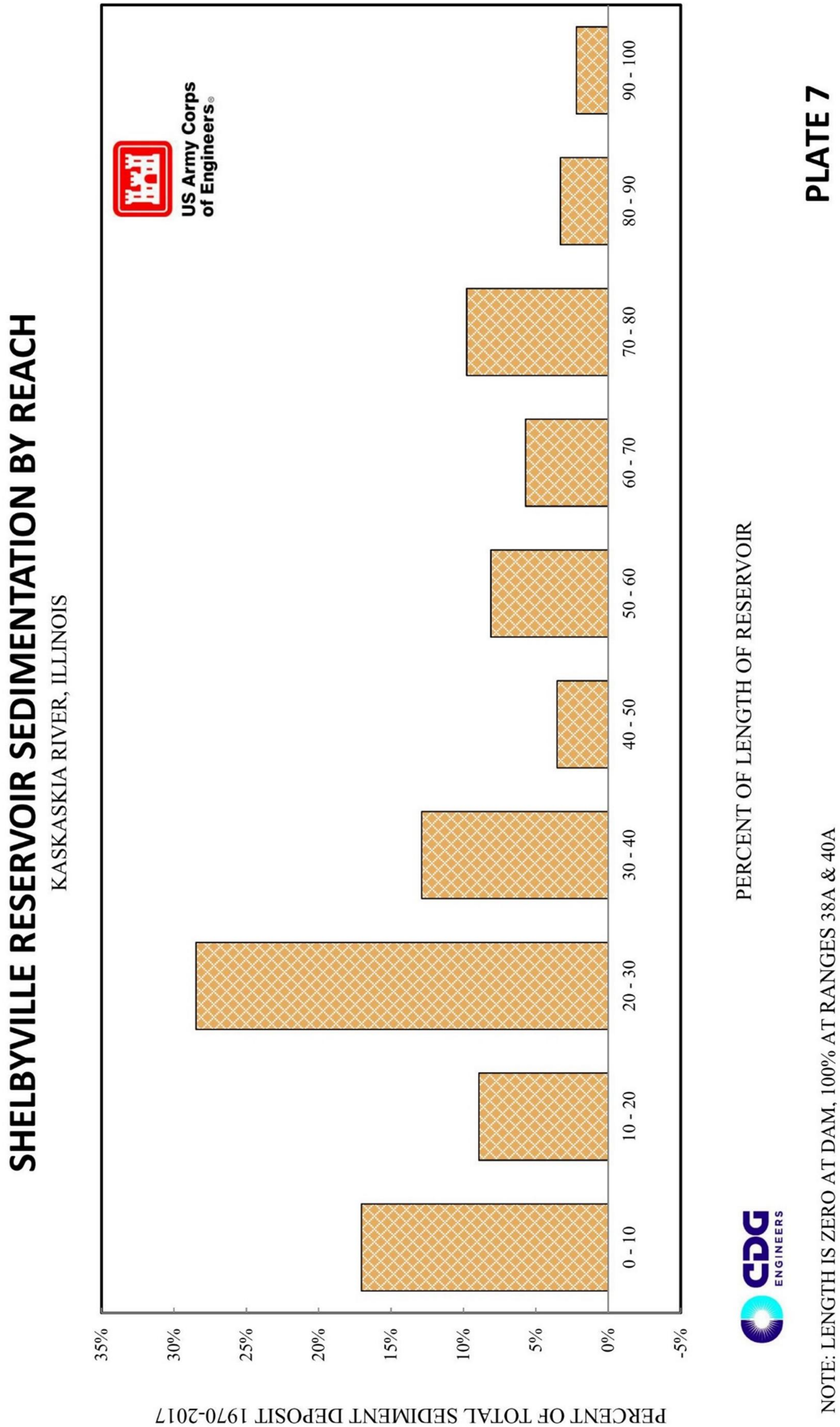


CDG ENGINEERS

PLATE 6

KASKASKIA RIVER BASIN, ILLINOIS
LAKE SHELBYVILLE
2017 RESURVEY OF
SEDIMENTATION
POOL SEDIMENTATION RANGES

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

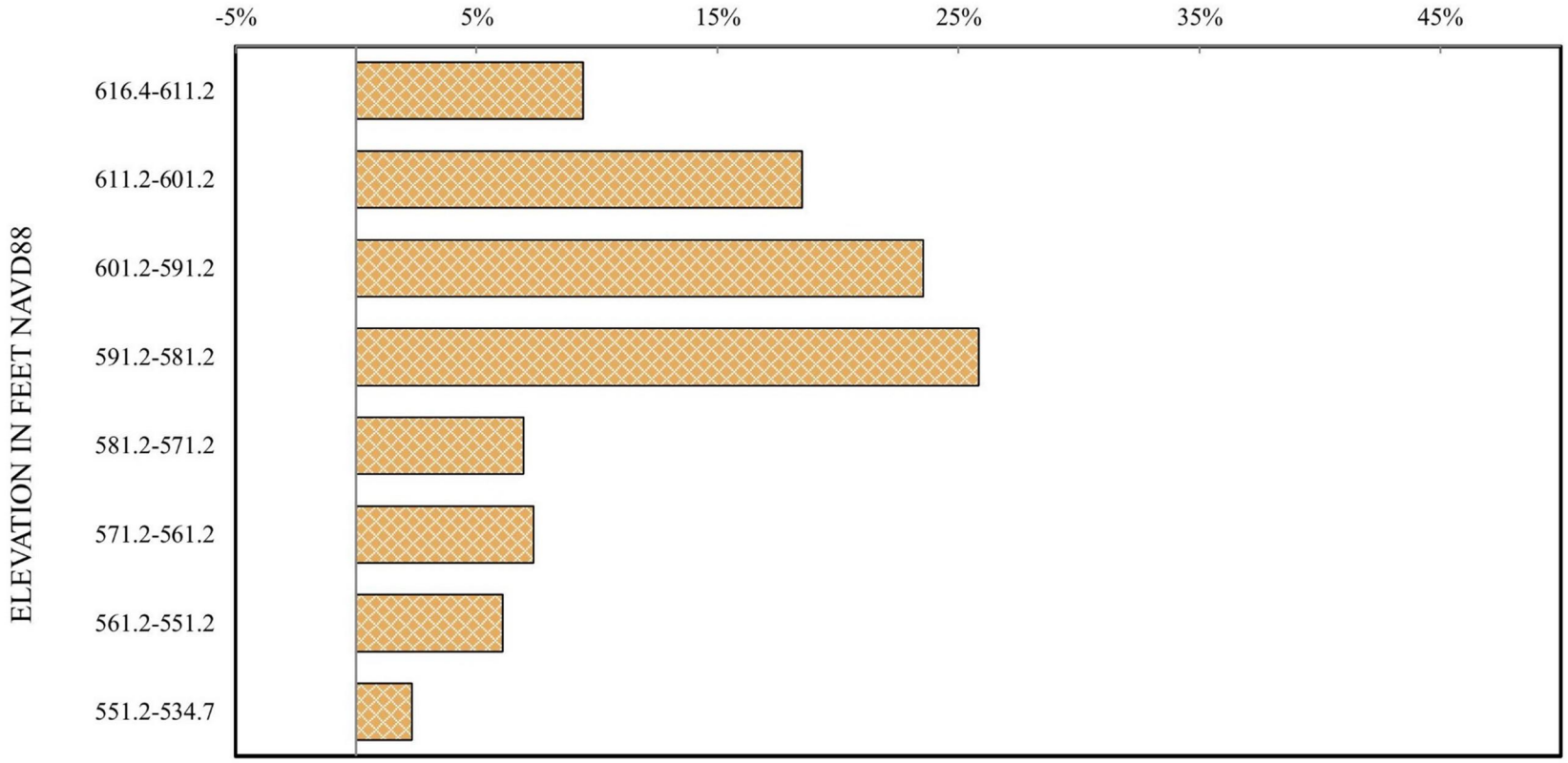

SHELBYVILLE RESERVOIR SEDIMENTATION BY REACH
KASKASKIA RIVER, ILLINOIS
US Army Corps of Engineers
PERCENT OF TOTAL SEDIMENT DEPOSIT 1970-2017
35%
30%
25%
20%
15%
10%
5%
0%
-5%
0 - 10
10 - 20
20 - 30
30 - 40
40 - 50
50 - 60
60 - 70
70 - 80
80 - 90
90 - 100
PERCENT OF LENGTH OF RESERVOIR
CDG ENGINEERS
NOTE: LENGTH IS ZERO AT DAM, 100% AT RANGES 38A & 40A
PLATE 7

SHELBYVILLE RESERVOIR SEDIMENTATION BY ELEVATION

KASKASKIA RIVER, ILLINOIS

PERCENT OF TOTAL SEDIMENT LOCATED WITHIN DEPTH DESIGNATION, 1970-2017

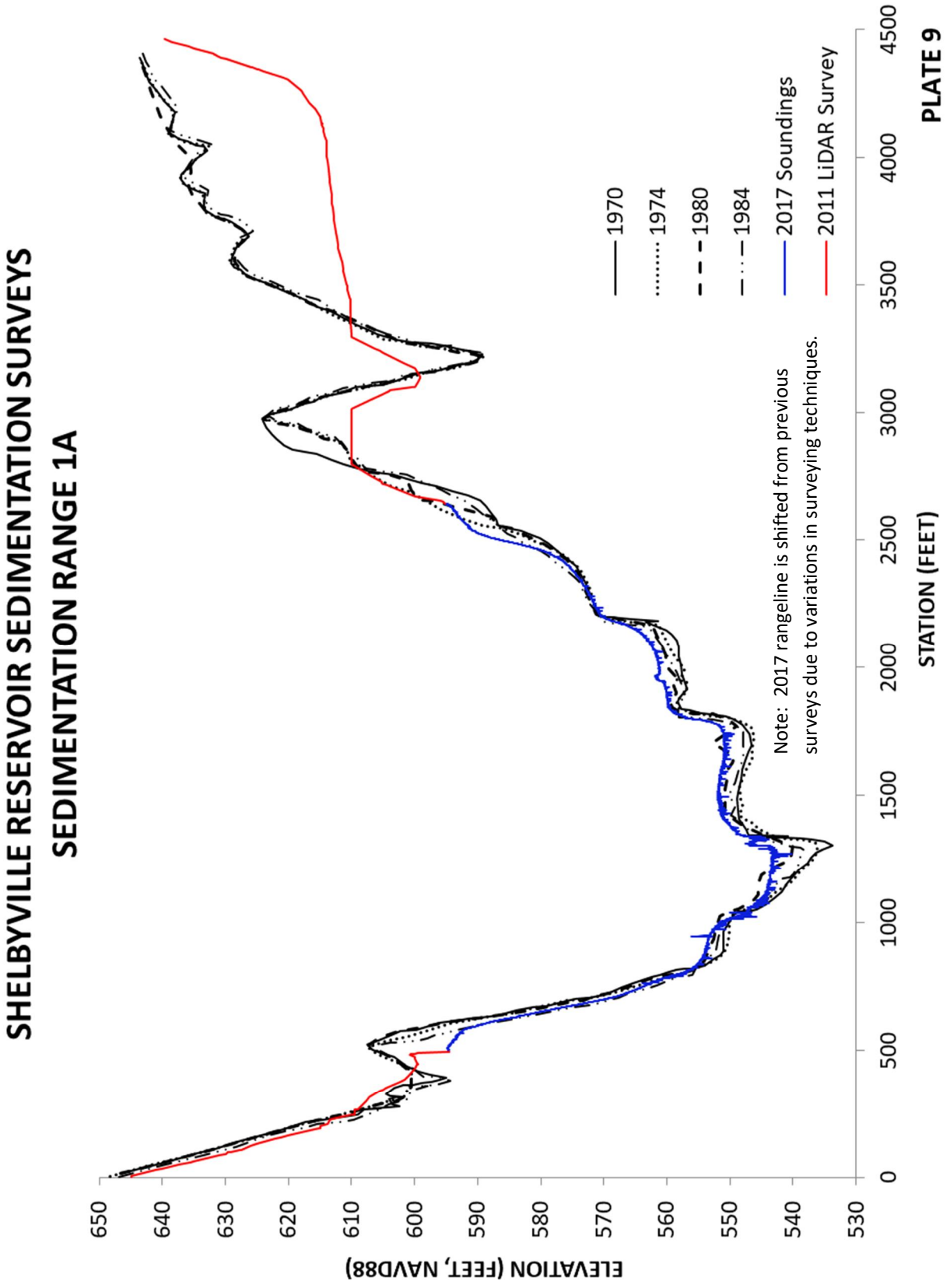
US Army Corps of Engineers

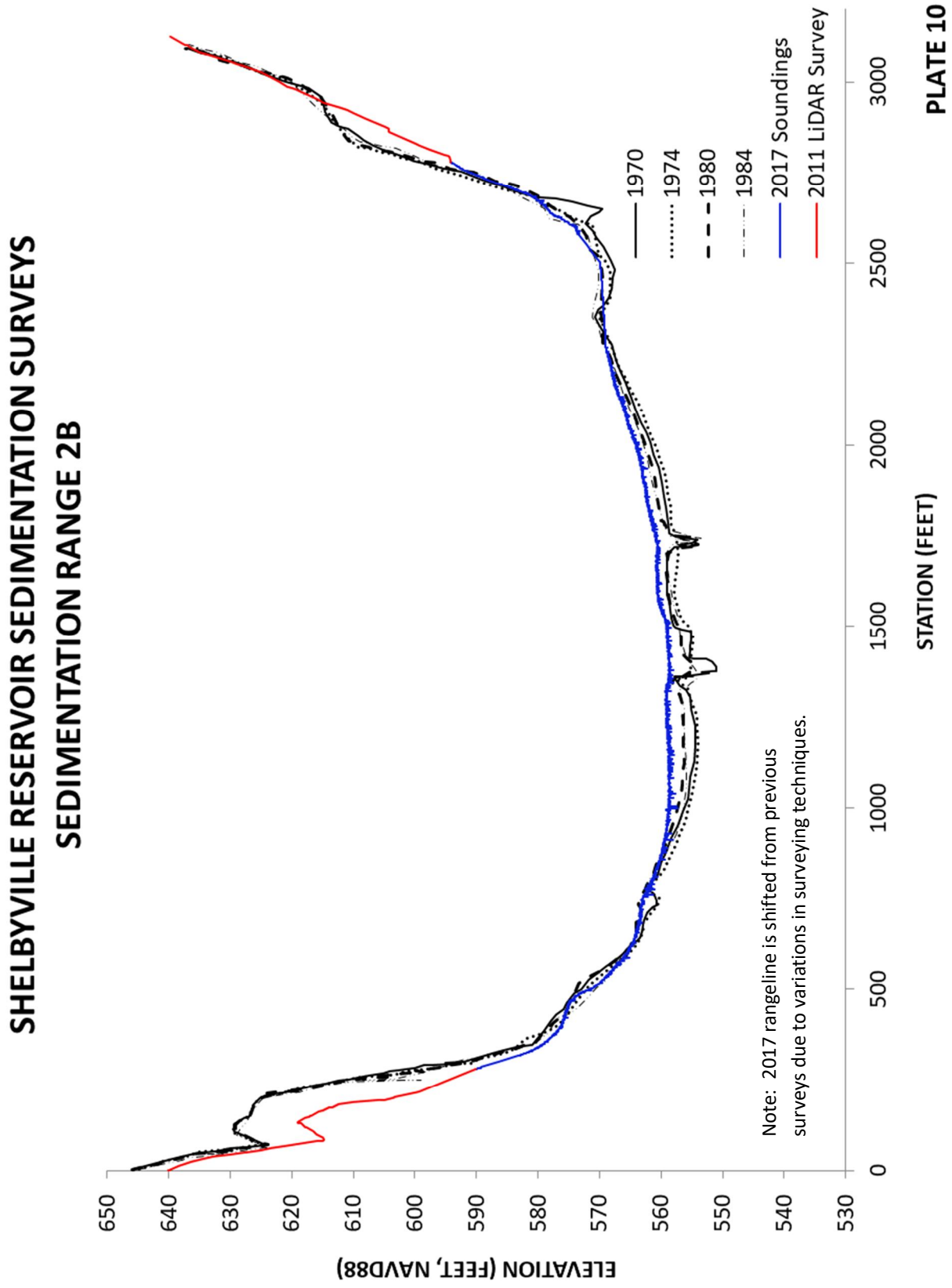


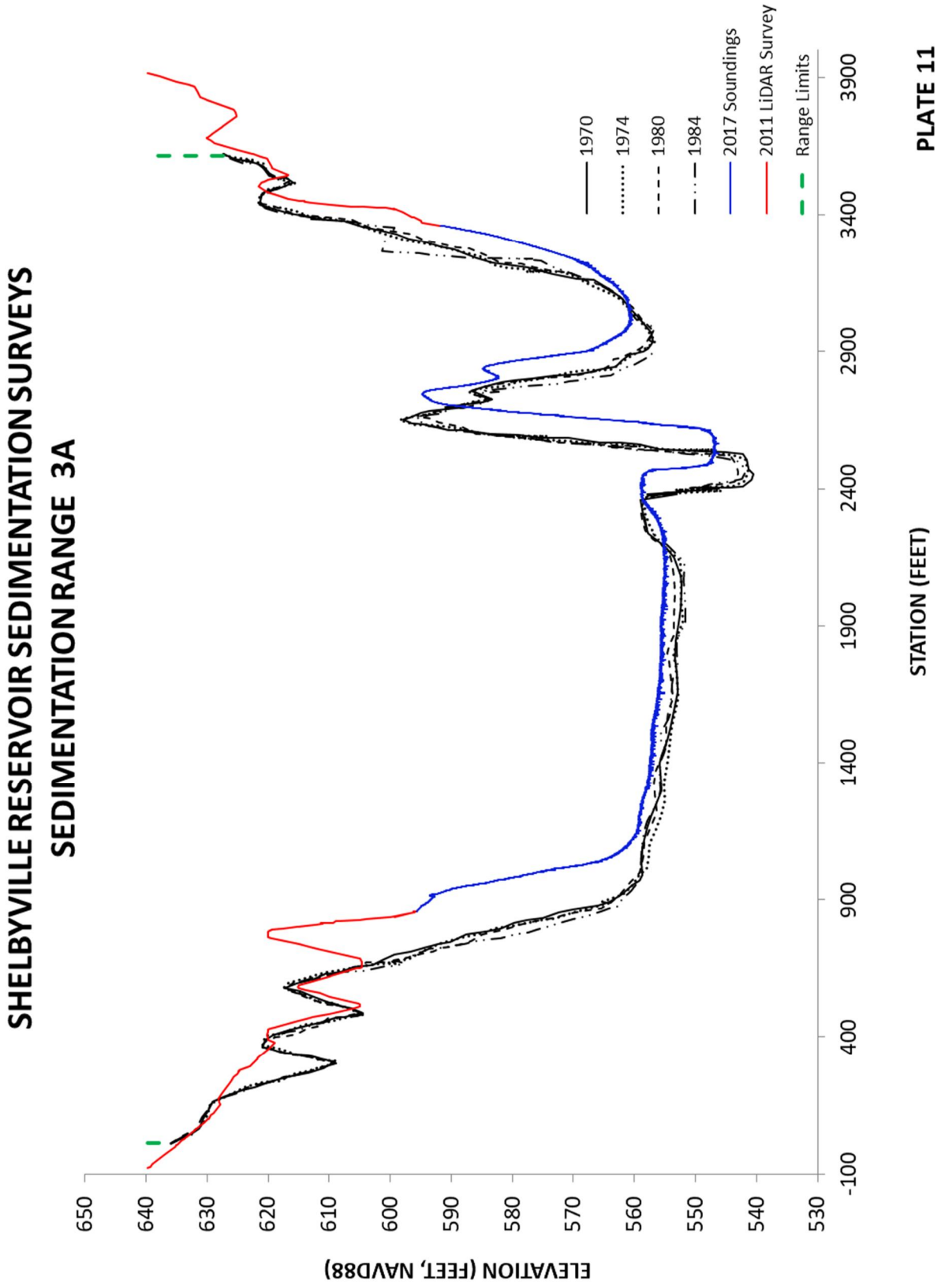
CDG ENGINEERS

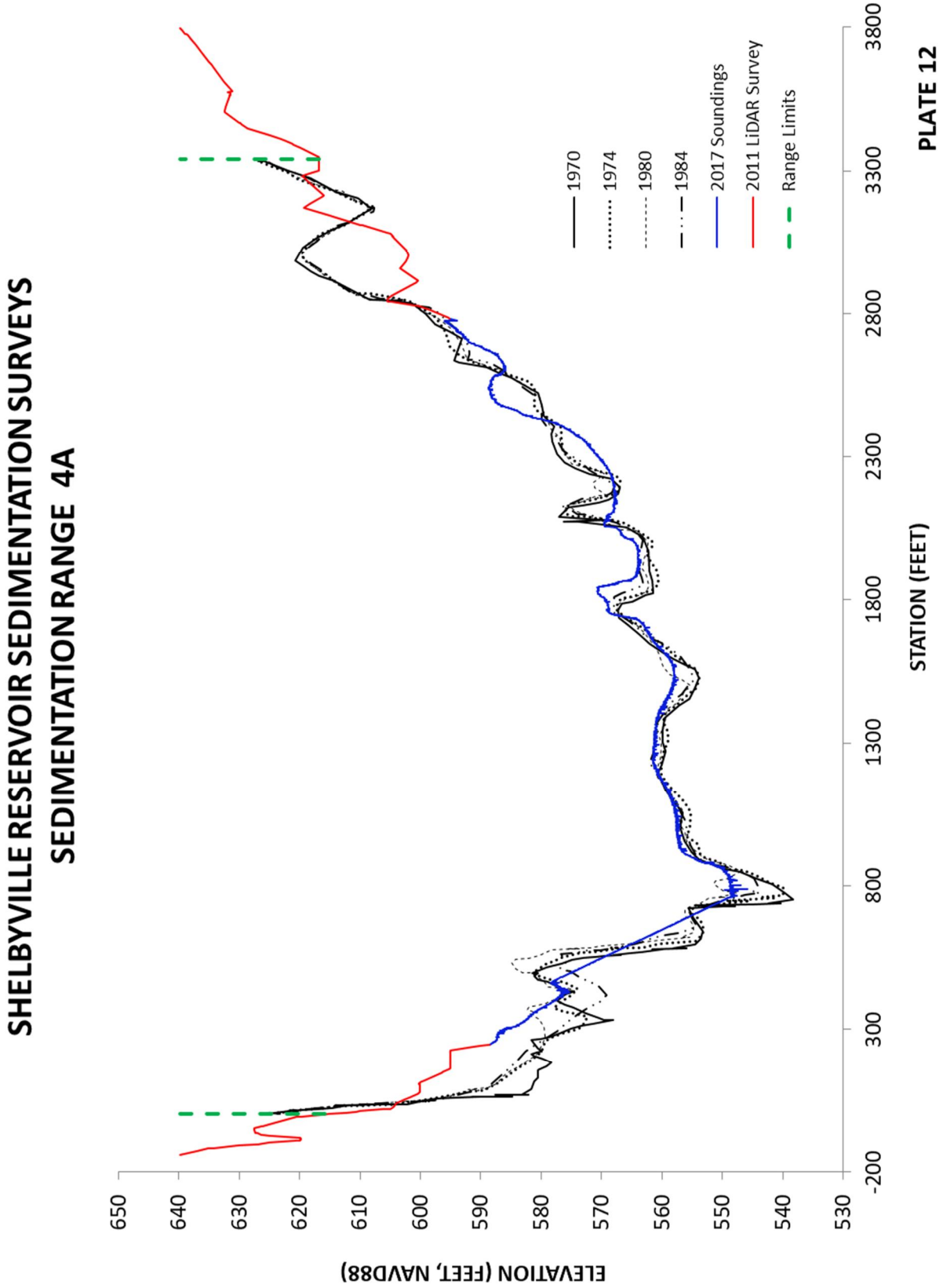
Notes: Analysis conducted using only sedimentation data below maximum observed pool elevation of 616.4 ft NAVD88.

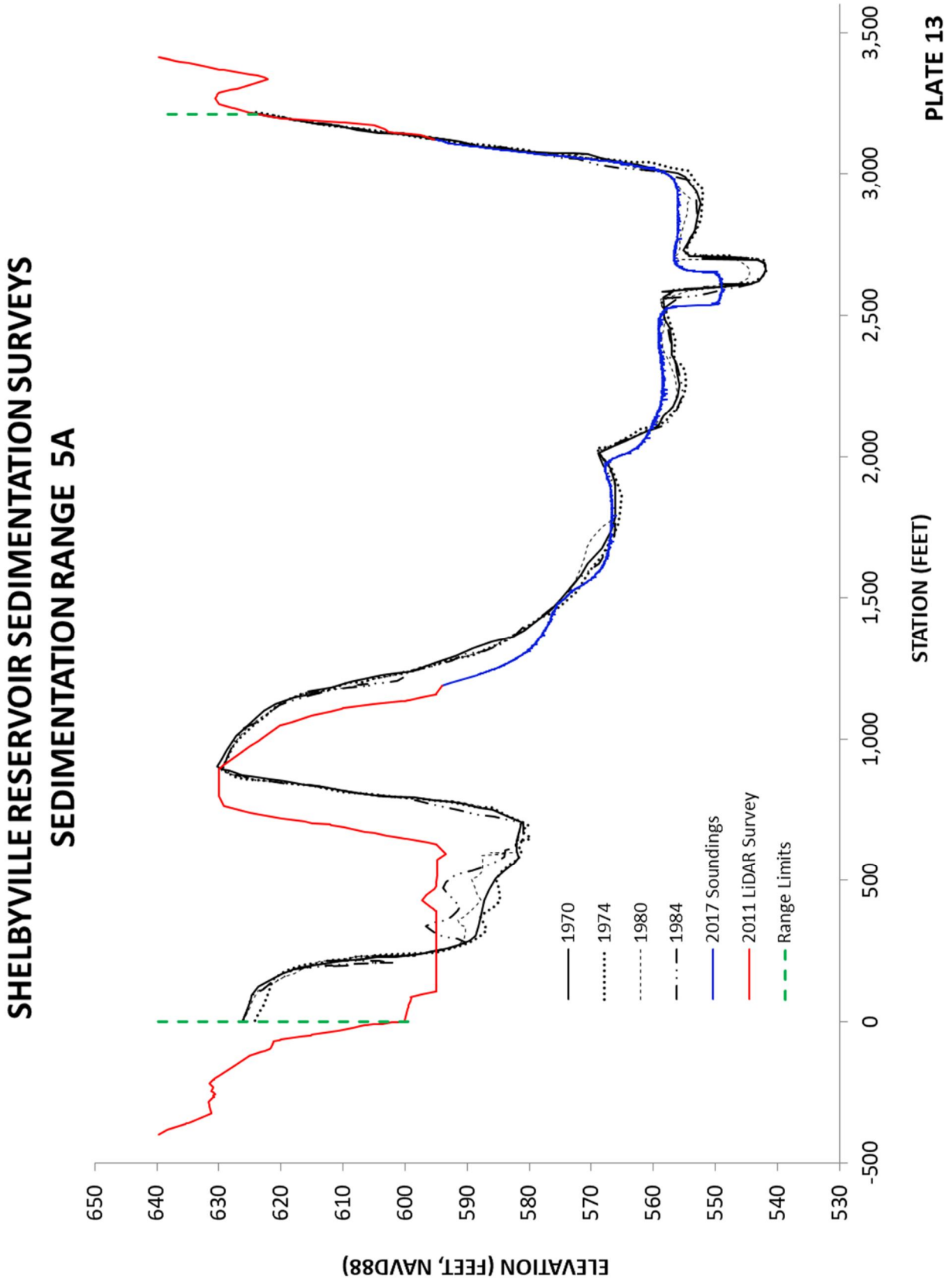
PLATE 8

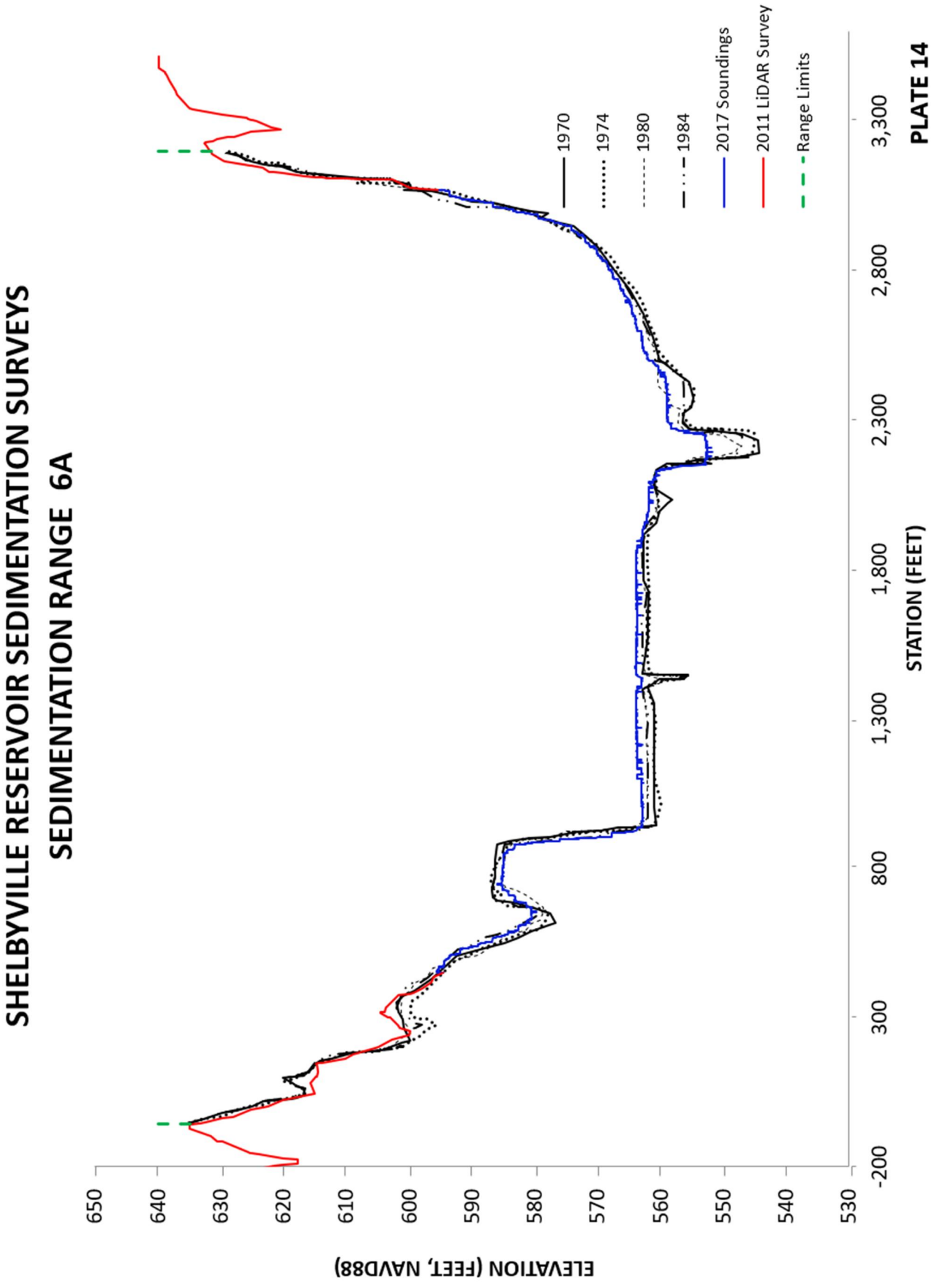

SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 1A
PLATE 9
ELEVATION (FEET, NAVD88)
650
640
630
620
610
600
590
580
570
560
550
540
530
STATION (FEET)
0
500
1000
1500
2000
2500
3000
3500
4000
4500
1970
1974
1980
1984
2017 Soundings
2011 LiDAR Survey
Note: 2017 rangeline is shifted from previous surveys due to variations in surveying techniques.

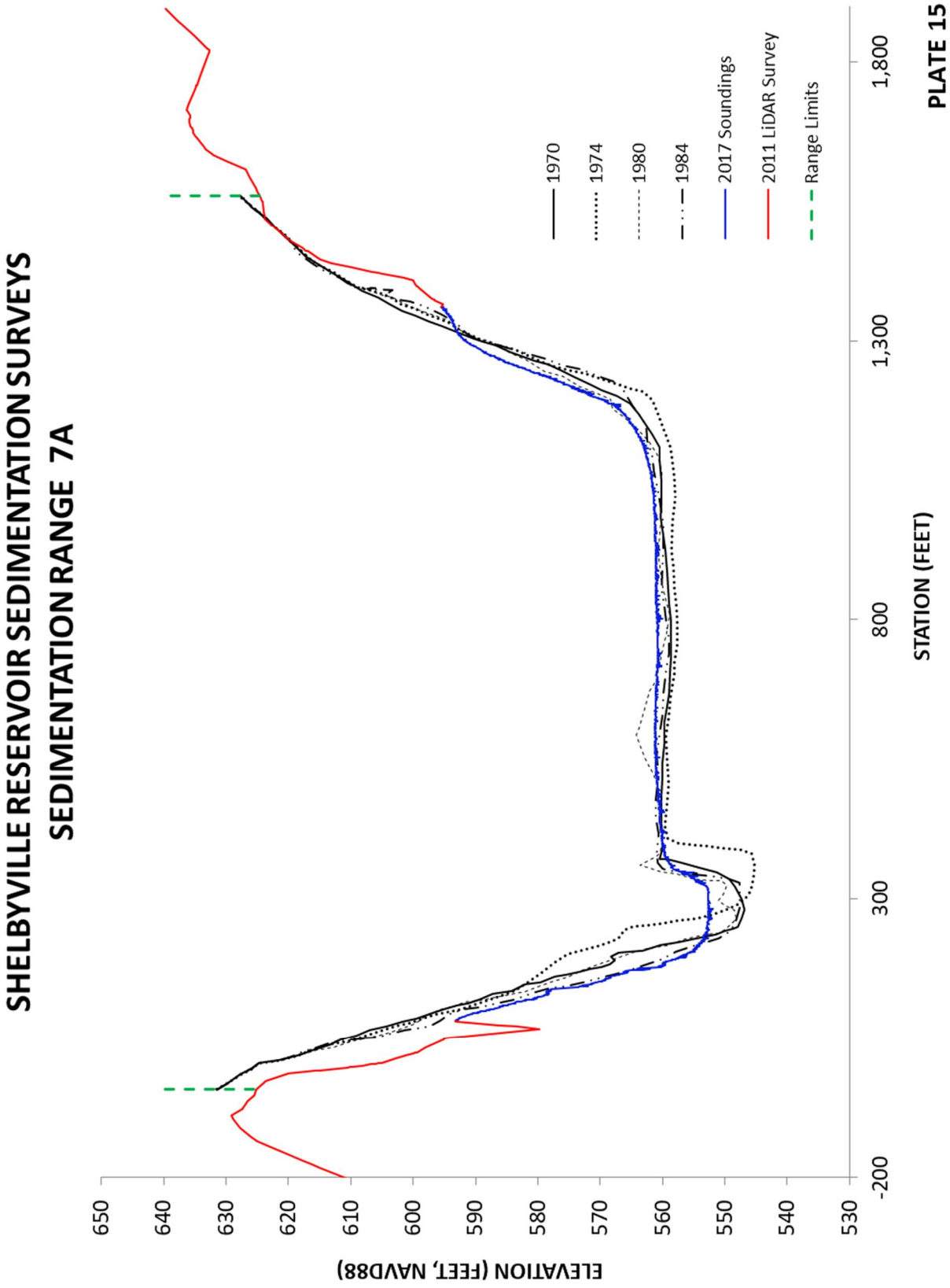

SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 2B
PLATE 10
ELEVATION (FEET, NAVD88)
650
640
630
620
610
600
590
580
570
560
550
540
530
STATION (FEET)
0
500
1000
1500
2000
2500
3000
1970
1974
1980
1984
2017 Soundings
2011 LiDAR Survey
Note: 2017 rangeline is shifted from previous surveys due to variations in surveying techniques.

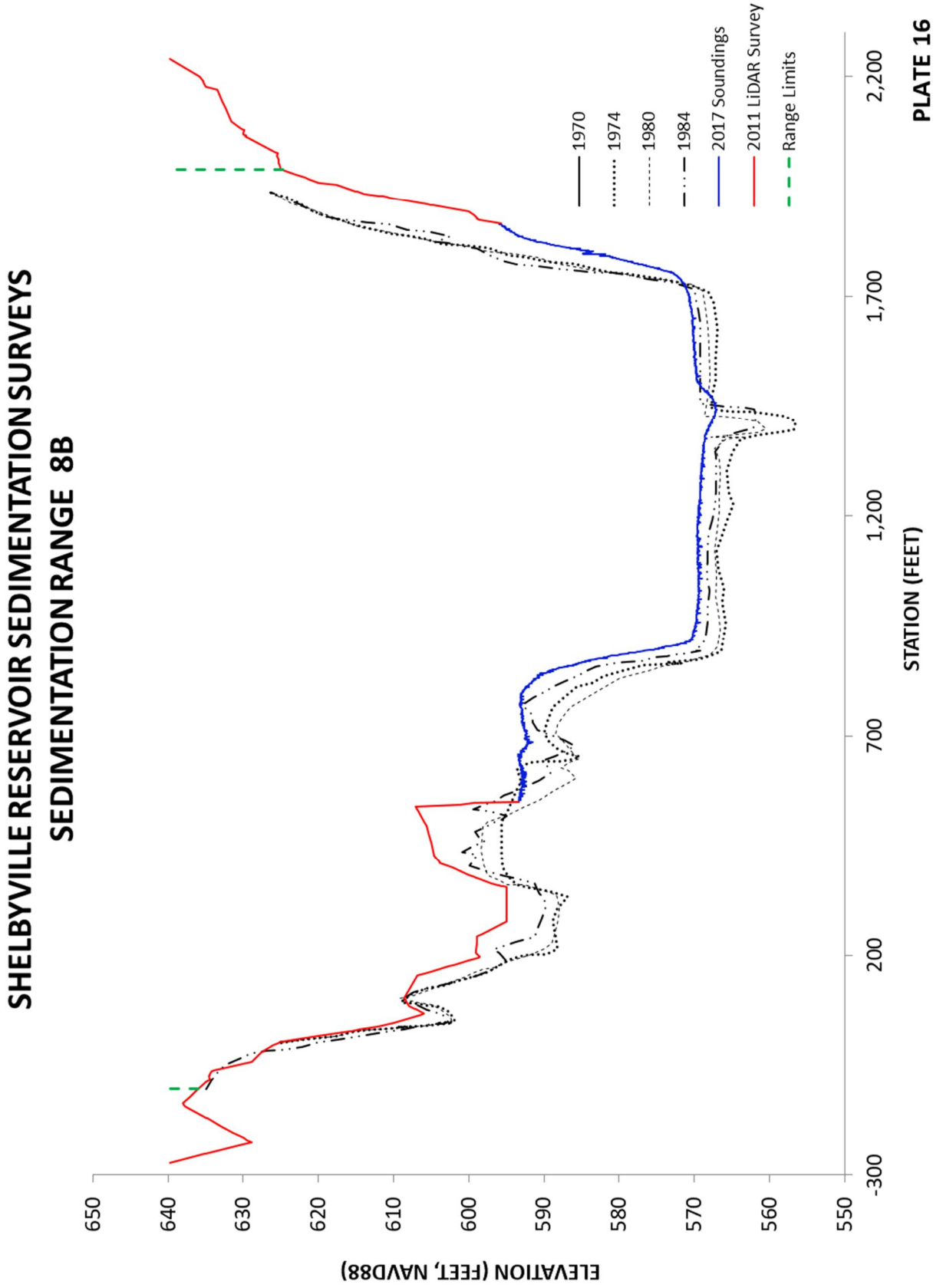

SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 3A
PLATE 11
1970
1974
1980
1984
2017 Soundings
2011 LiDAR Survey
Range Limits
ELEVATION (FEET, NAVD88)
650
640
630
620
610
600
590
580
570
560
550
540
530
-100
400
900
1400
1900
2400
2900
3400
3900
STATION (FEET)

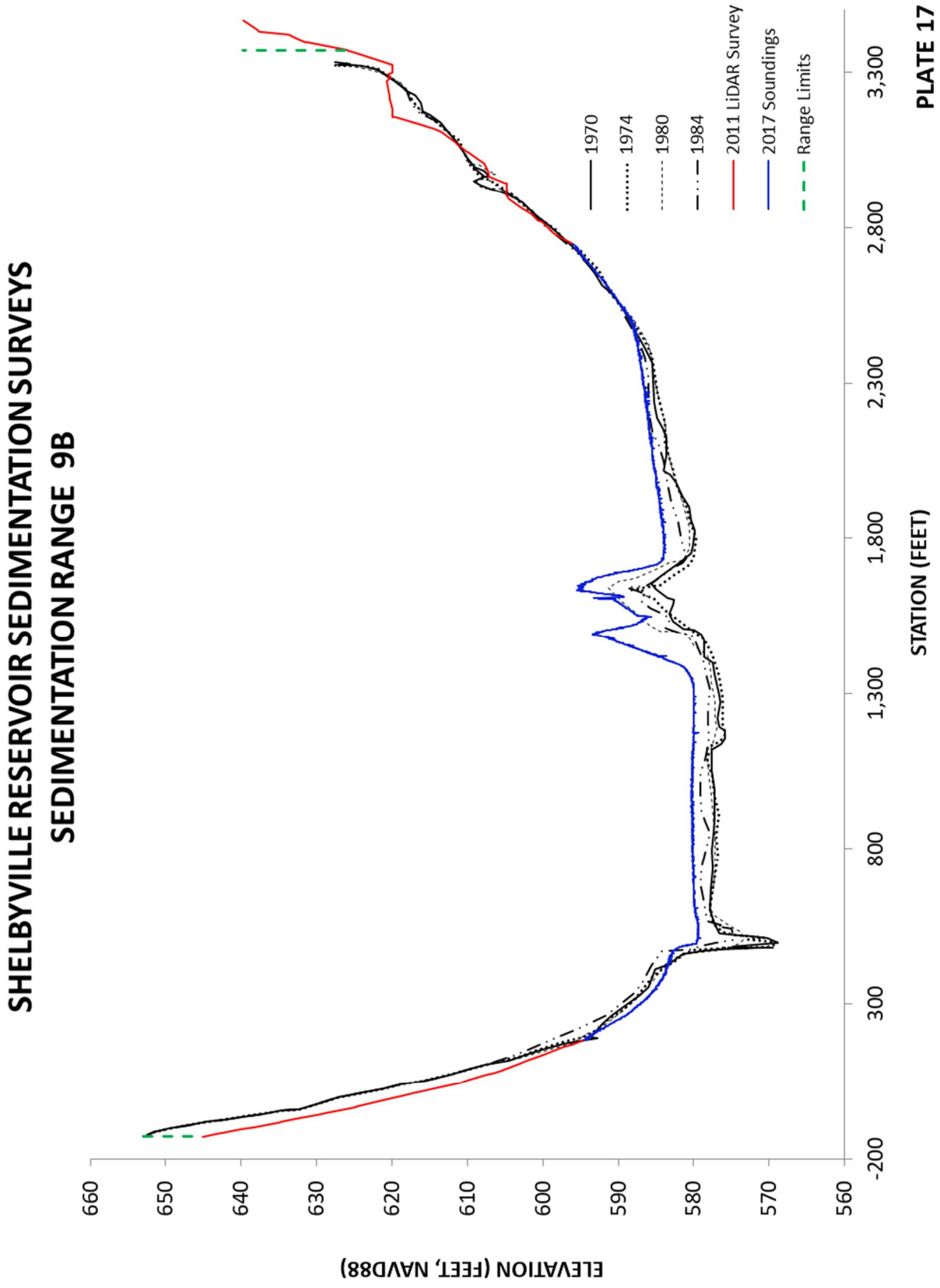

SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 4A
PLATE 12
1970
1974
1980
1984
2017 Soundings
2011 LiDAR Survey
Range Limits
ELEVATION (FEET, NAVD88)
650
640
630
620
610
600
590
580
570
560
550
540
530
-200
300
800
1300
1800
2300
2800
3300
3800
STATION (FEET)

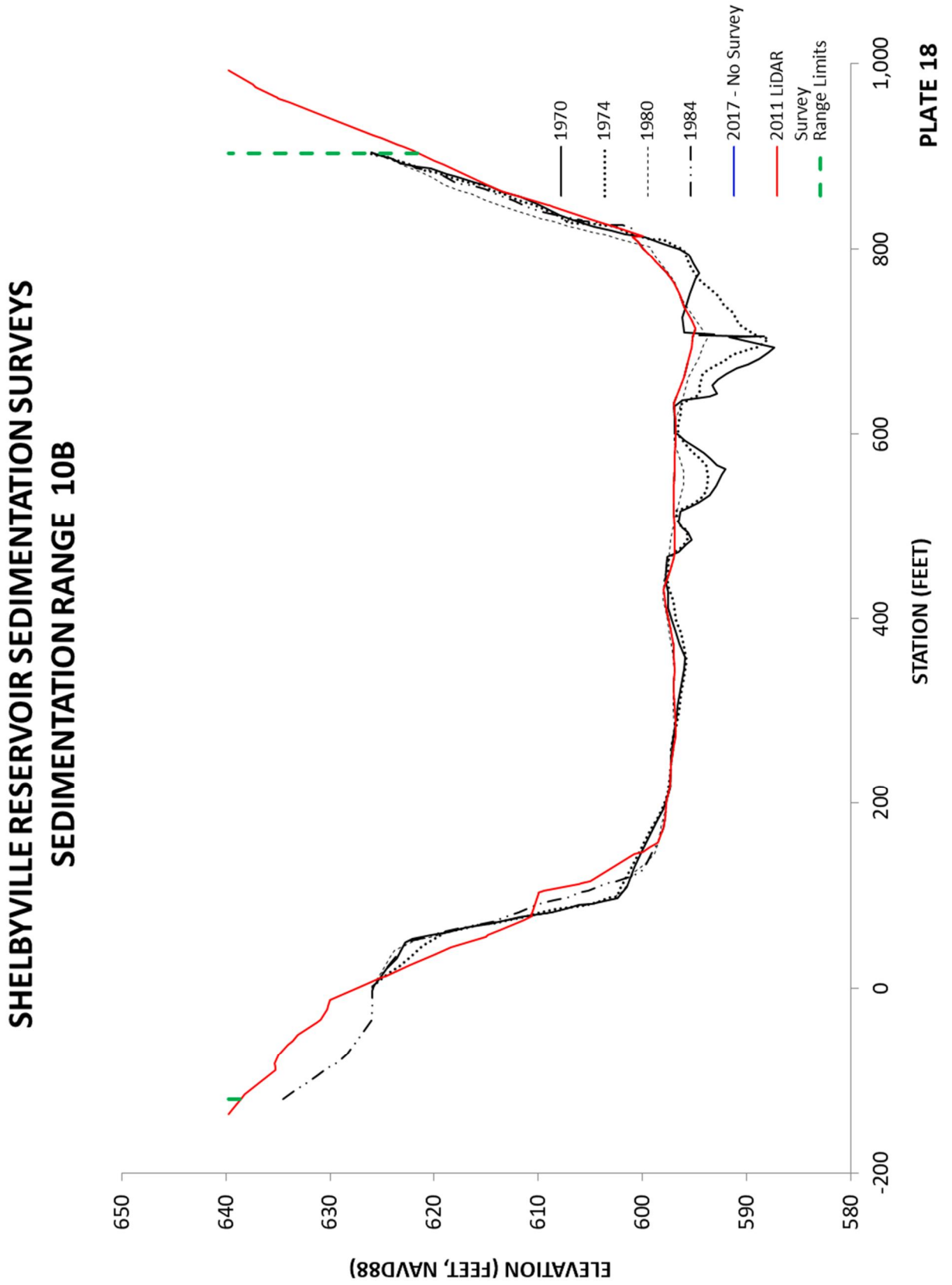

SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 5A
PLATE 13
ELEVATION (FEET, NAVD88)
650
640
630
620
610
600
590
580
570
560
550
540
530
-500
0
500
1,000
1,500
2,000
2,500
3,000
3,500
STATION (FEET)
1970
1974
1980
1984
2017 Soundings
2011 LiDAR Survey
Range Limits

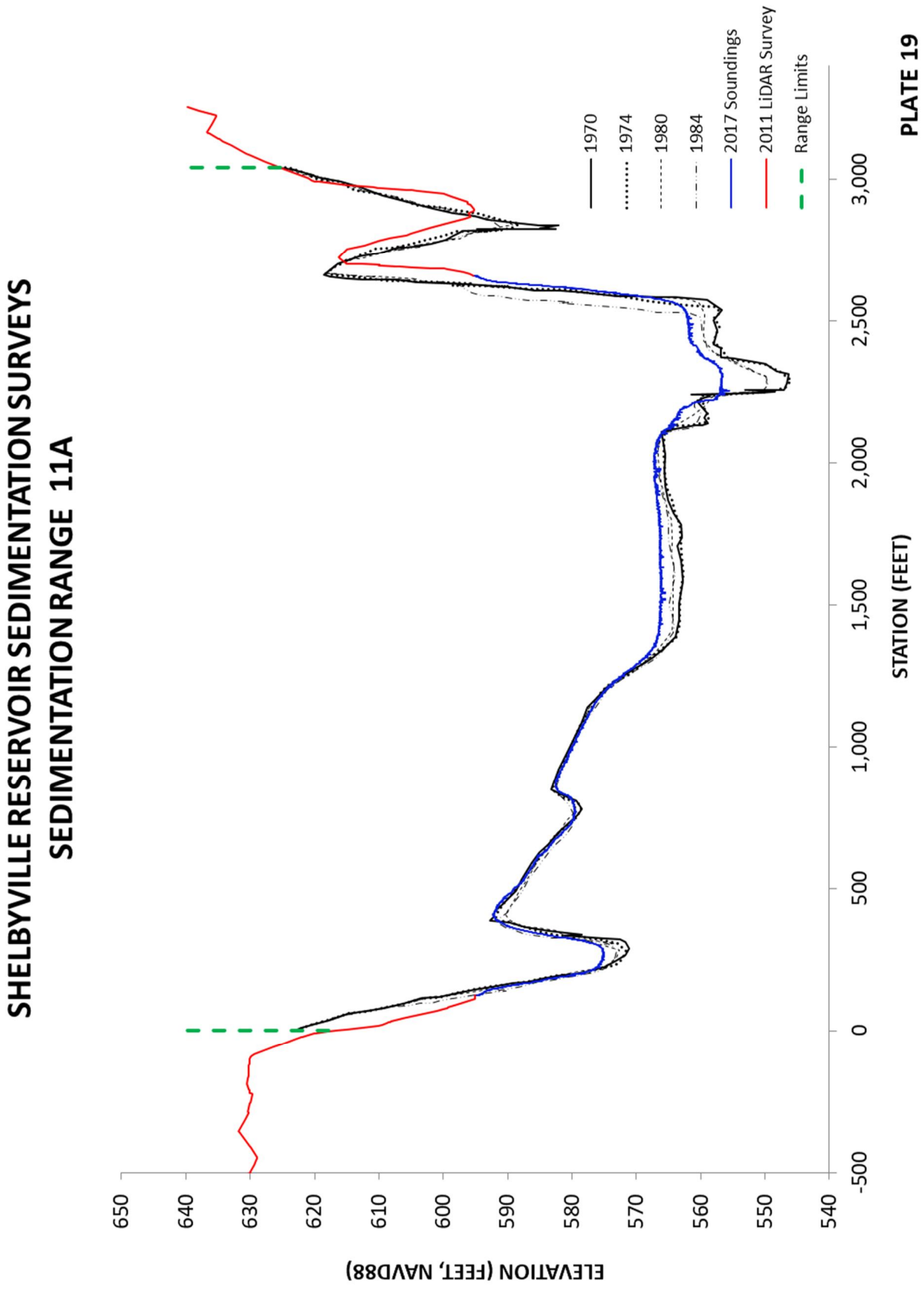

SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 6A
PLATE 14
1970
1974
1980
1984
2017 Soundings
2011 LiDAR Survey
Range Limits
STATION (FEET)
-200
300
800
1,300
1,800
2,300
2,800
3,300
ELEVATION (FEET, NAVD88)
650
640
630
620
610
600
590
580
570
560
550
540
530

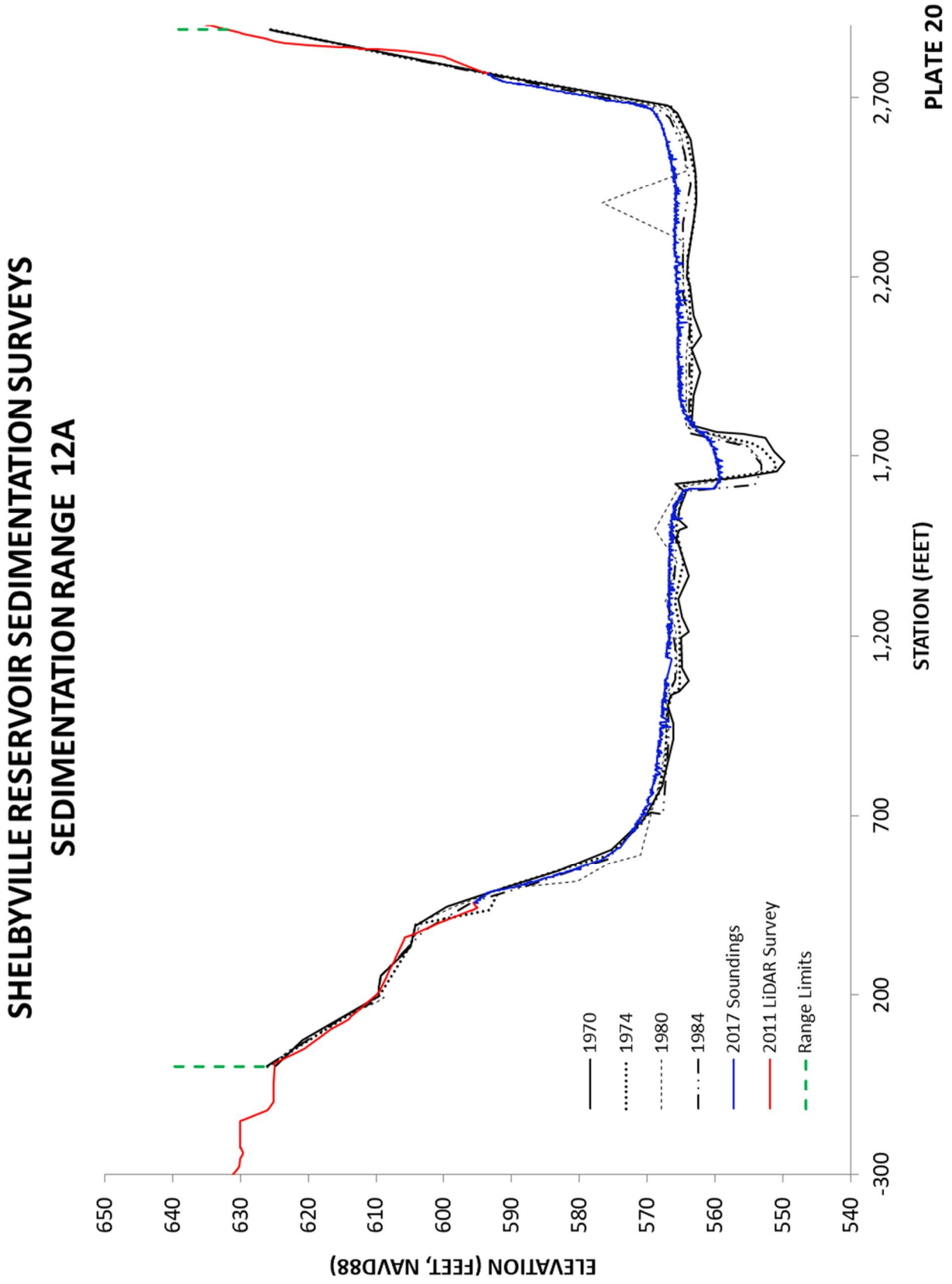

SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 7A
PLATE 15
1970
1974
1980
1984
2017 Soundings
2011 LiDAR Survey
Range Limits
ELEVATION (FEET, NAVD88)
650
640
630
620
610
600
590
580
570
560
550
540
530
-200
300
800
1,300
1,800
STATION (FEET)

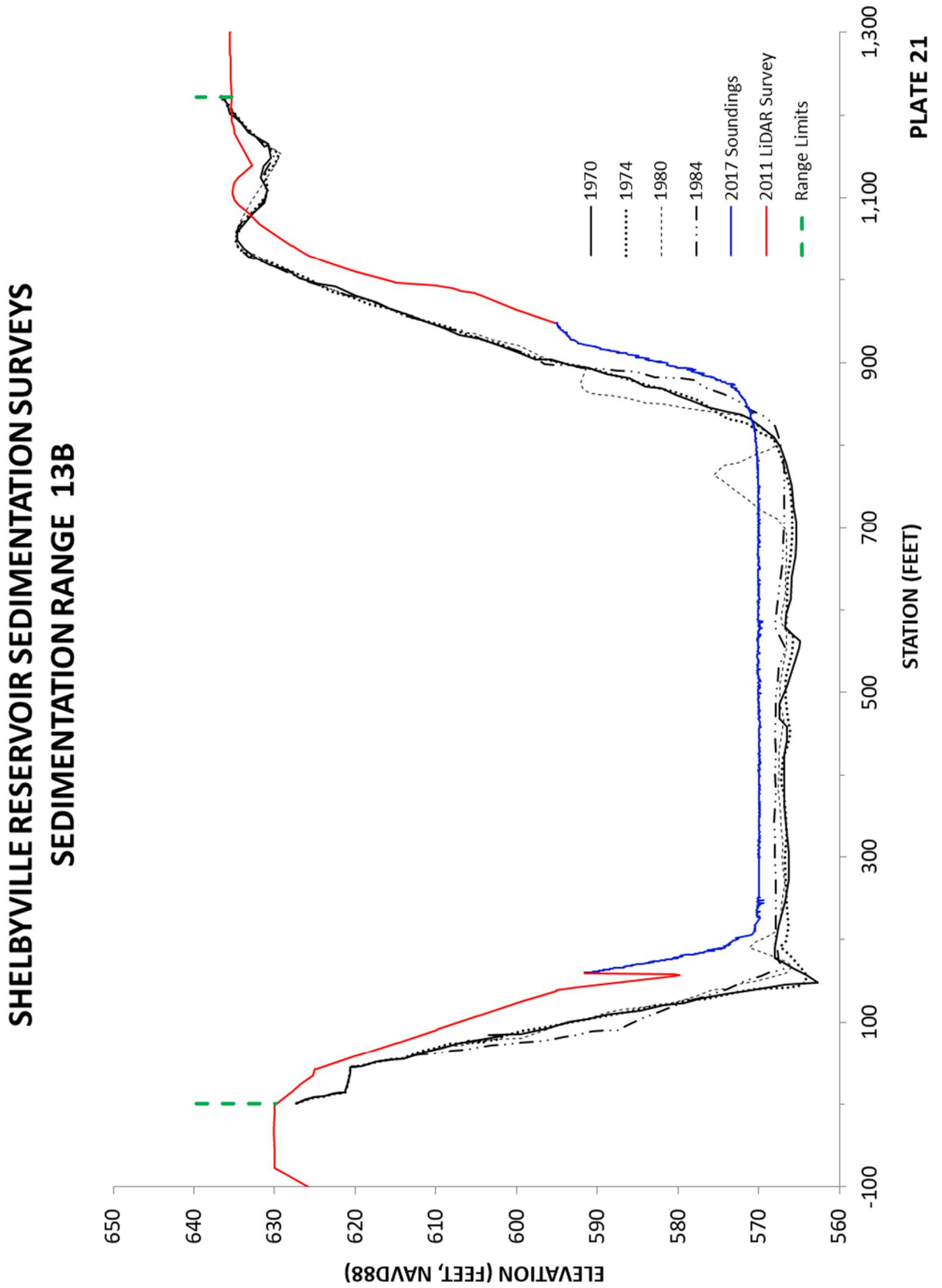

SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 8B
PLATE 16
1970
1974
1980
1984
2017 Soundings
2011 LiDAR Survey
Range Limits
ELEVATION (FEET, NAVD88)
650
640
630
620
610
600
590
580
570
560
550
-300
200
700
1,200
1,700
2,200
STATION (FEET)

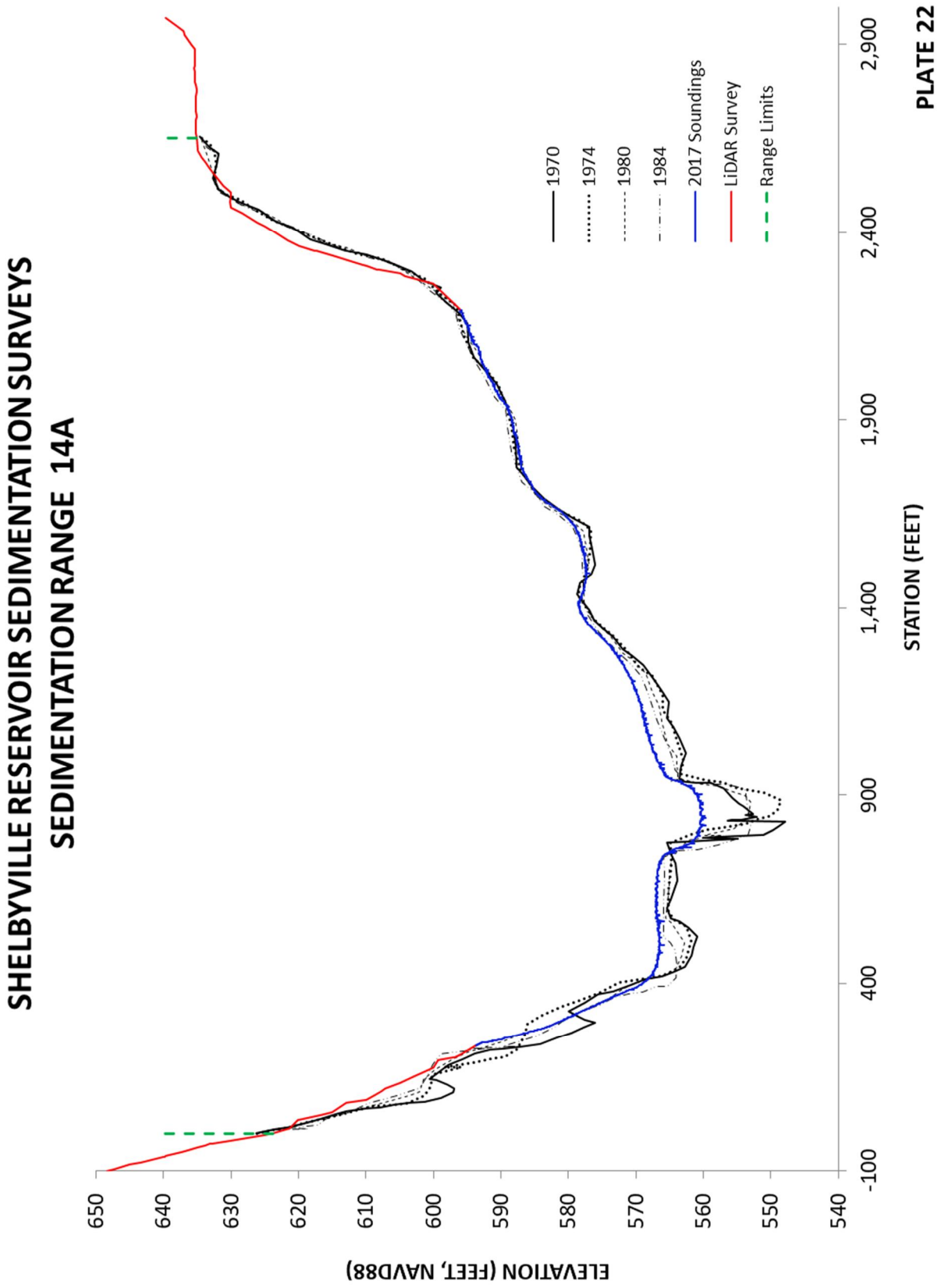

SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 9B
PLATE 17
1970
1974
1980
1984
2011 LiDAR Survey
2017 Soundings
Range Limits
ELEVATION (FEET, NAVD88)
660
650
640
630
620
610
600
590
580
570
560
-200
300
800
1,300
1,800
2,300
2,800
3,300
STATION (FEET)

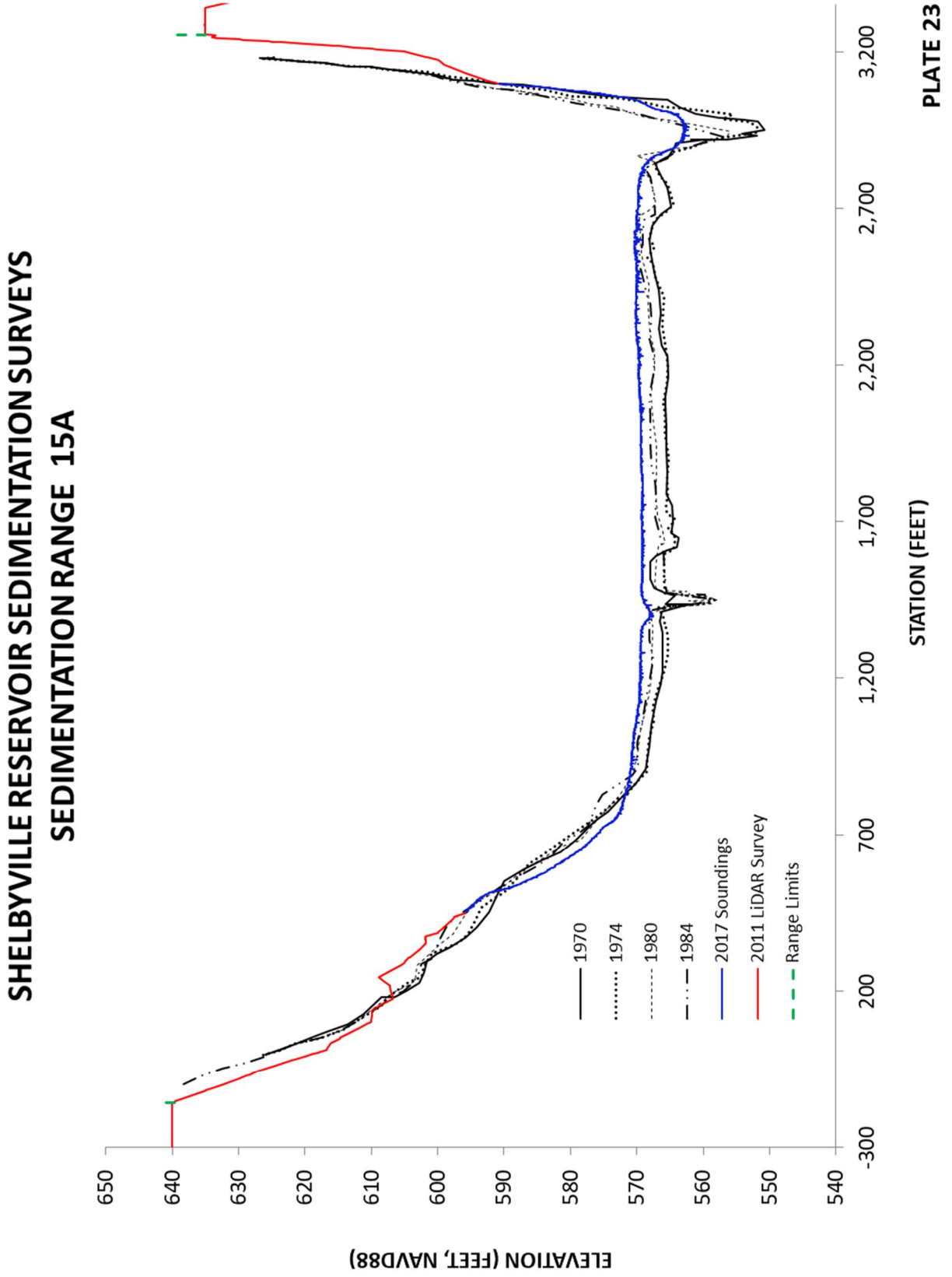

SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 10B
PLATE 18
1970
1974
1980
1984
2017 - No Survey
2011 LiDAR
Survey
Range Limits
ELEVATION (FEET, NAVD88)
650
640
630
620
610
600
590
580
-200
0
200
400
600
800
1,000
STATION (FEET)

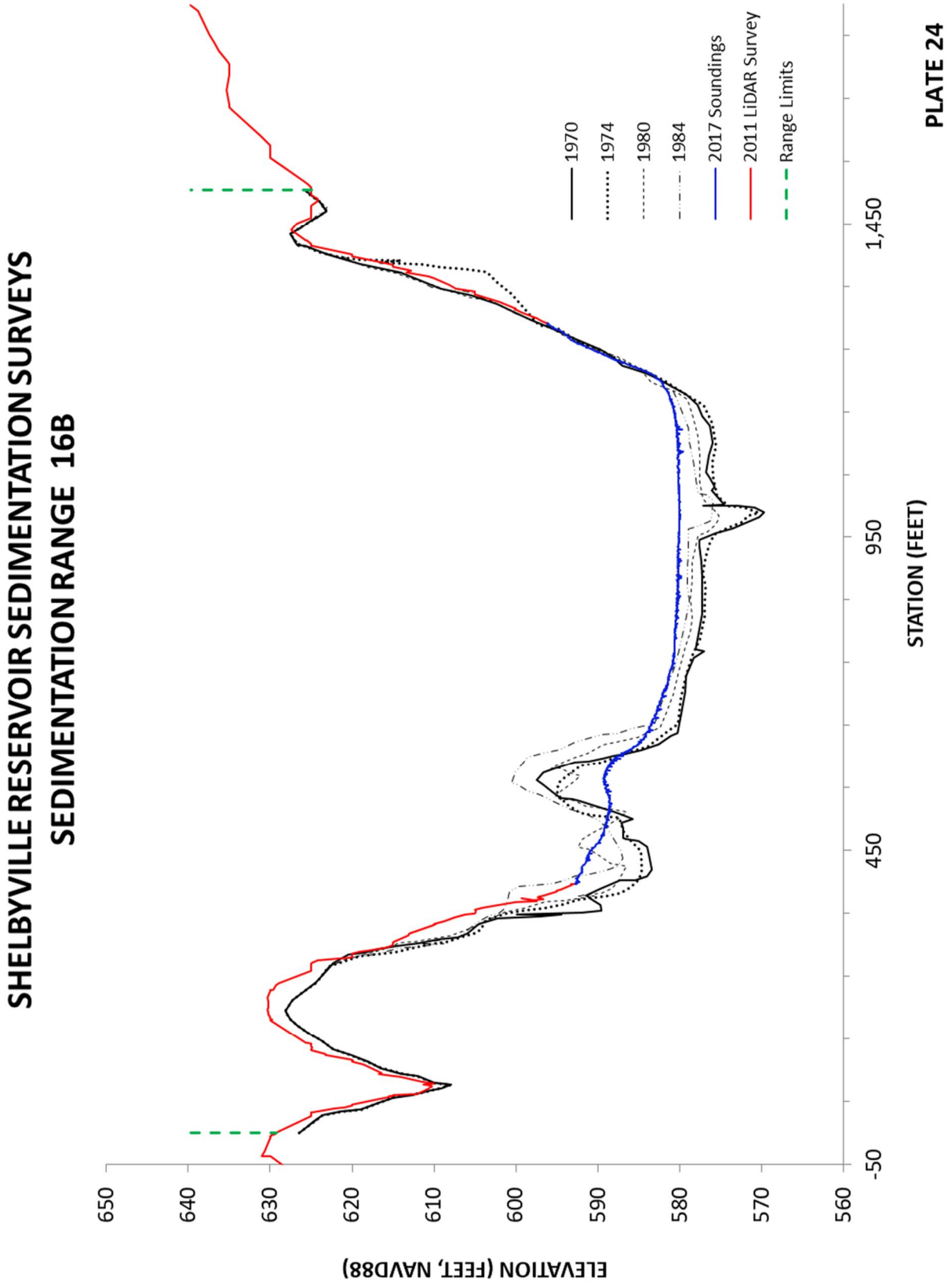

SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 11A
PLATE 19
1970
1974
1980
1984
2017 Soundings
2011 LiDAR Survey
Range Limits
STATION (FEET)
-500
0
500
1,000
1,500
2,000
2,500
3,000
ELEVATION (FEET, NAVD88)
650
640
630
620
610
600
590
580
570
560
550
540

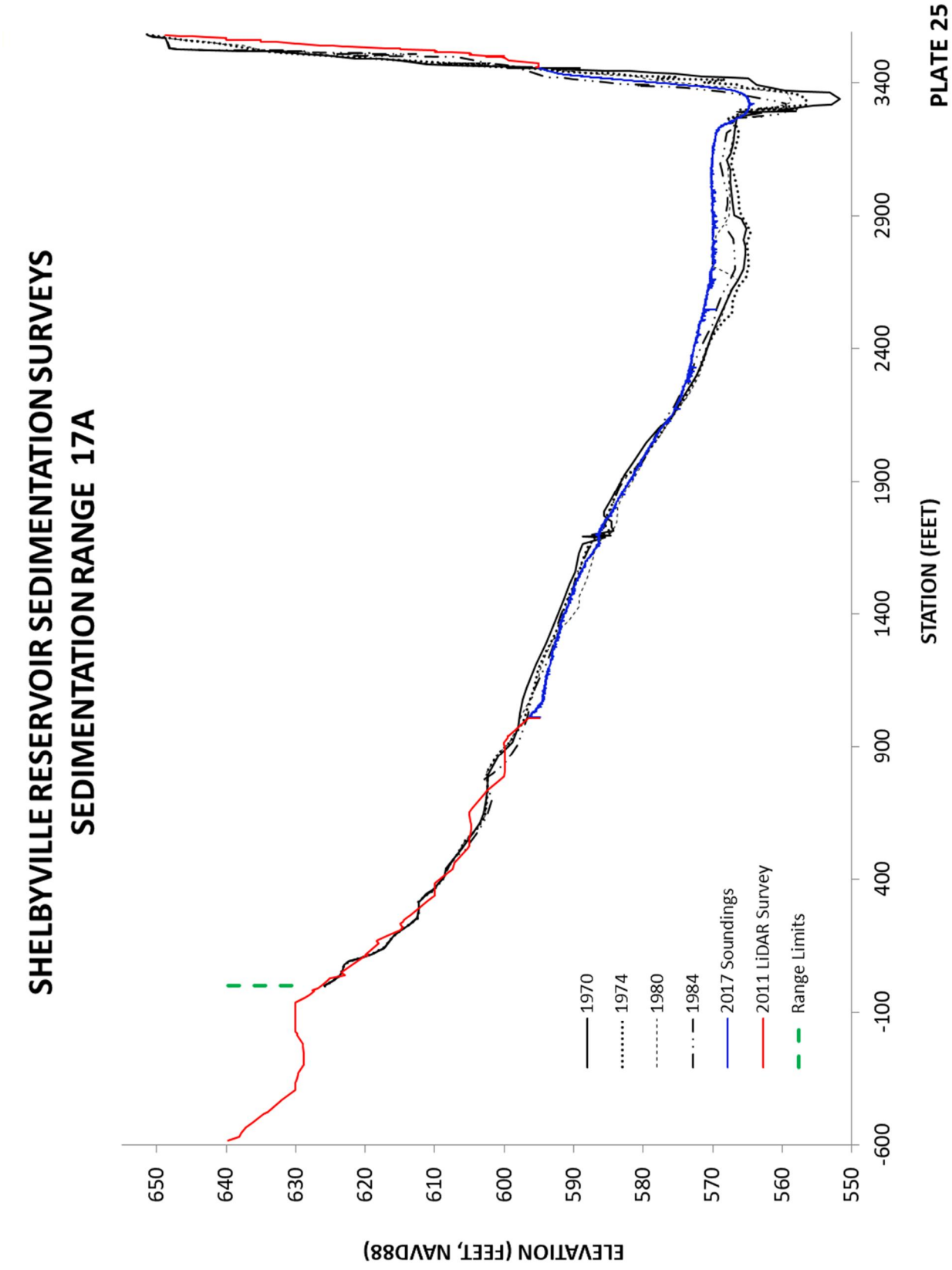

SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 12A
PLATE 20
ELEVATION (FEET, NAVD88)
650
640
630
620
610
600
590
580
570
560
550
540
-300
200
700
1,200
1,700
2,200
2,700
STATION (FEET)
1970
1974
1980
1984
2017 Soundings
2011 LiDAR Survey
Range Limits

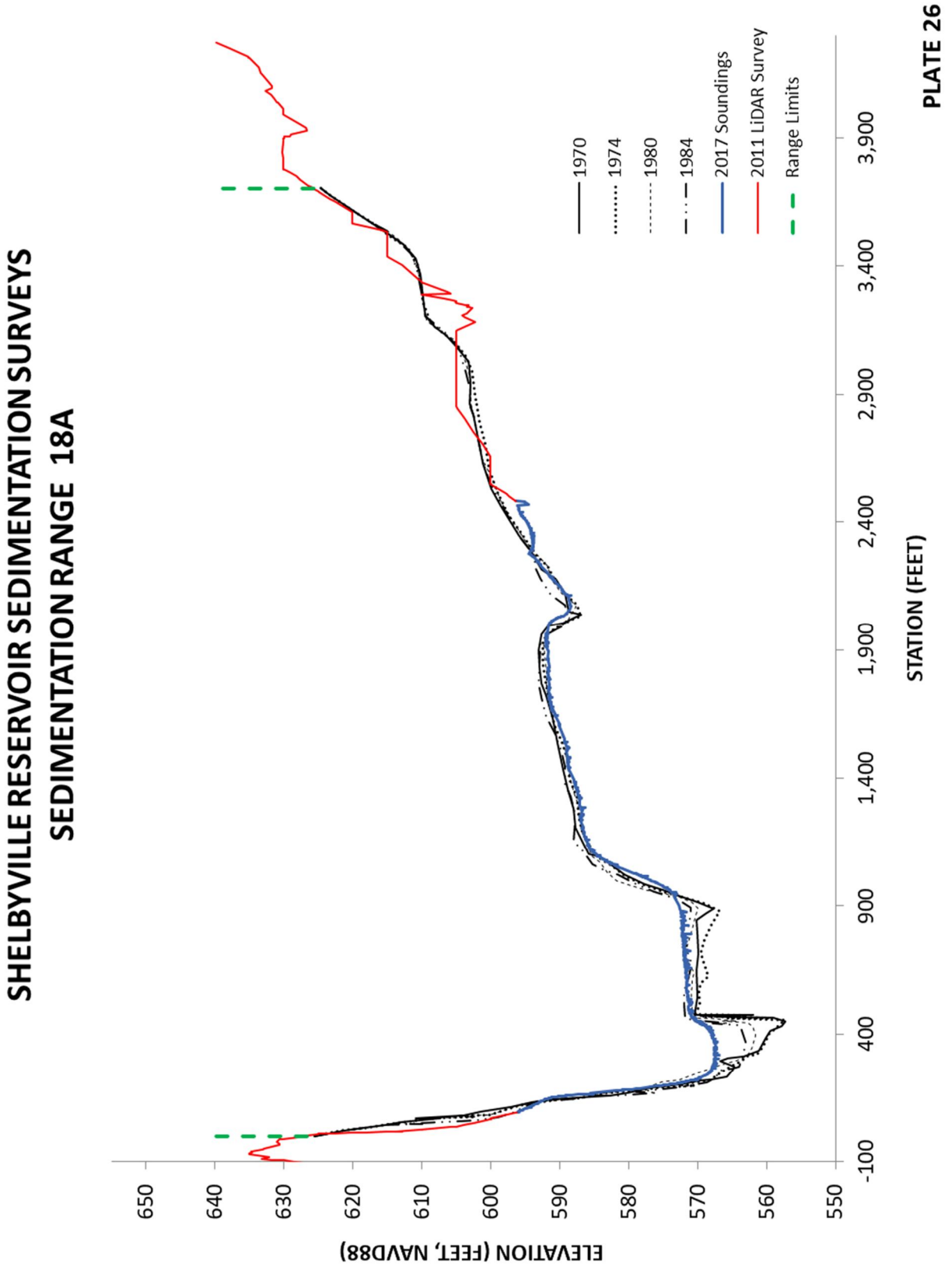

SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 13B
PLATE 21
1970
1974
1980
1984
2017 Soundings
2011 LiDAR Survey
Range Limits
ELEVATION (FEET, NAVD88)
650
640
630
620
610
600
590
580
570
560
-100
100
300
500
700
900
1,100
1,300
STATION (FEET)

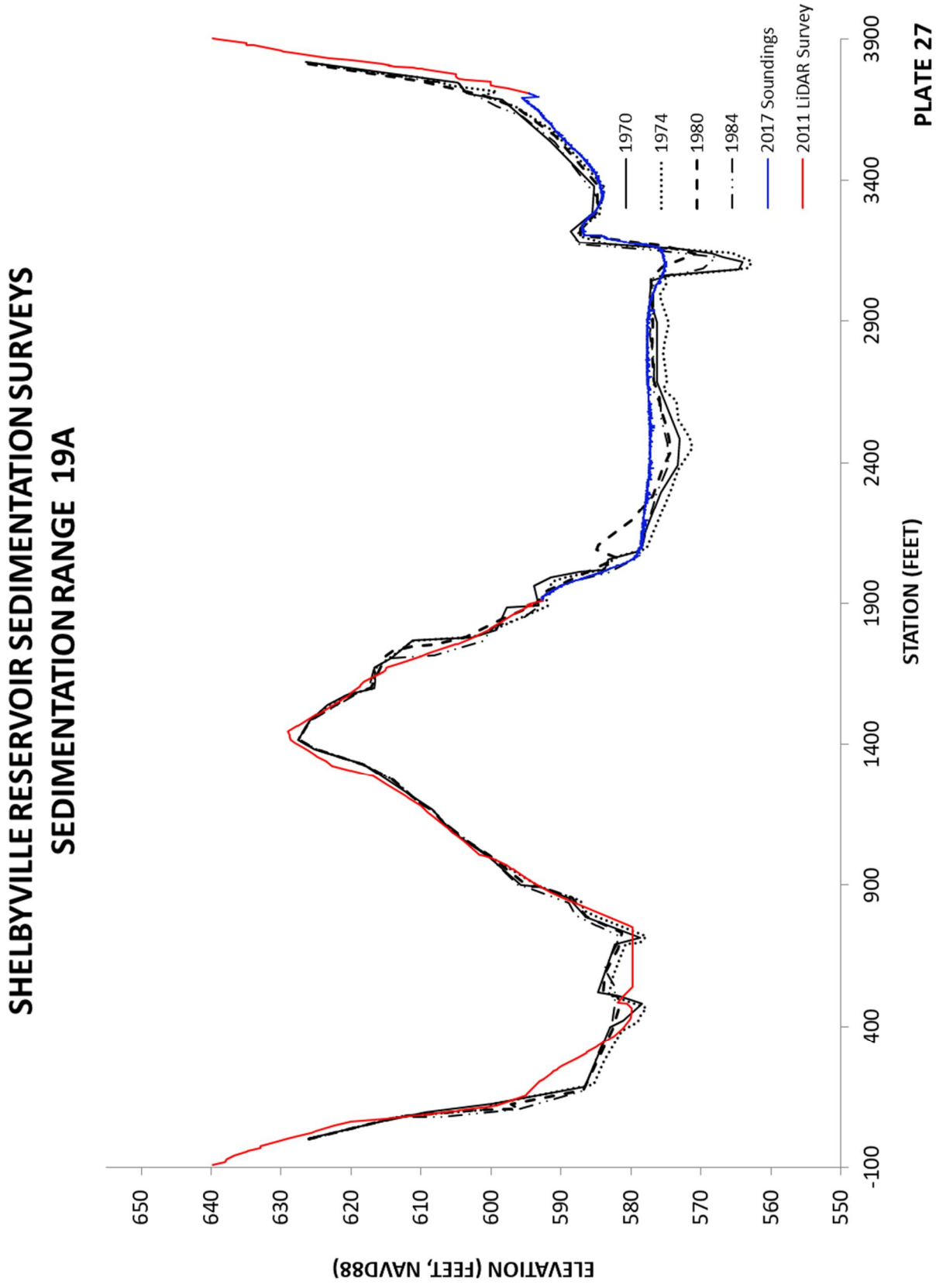

SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 14A
PLATE 22
1970
1974
1980
1984
2017 Soundings
LiDAR Survey
Range Limits
ELEVATION (FEET, NAVD88)
650
640
630
620
610
600
590
580
570
560
550
540
-100
400
900
1,400
1,900
2,400
2,900
STATION (FEET)

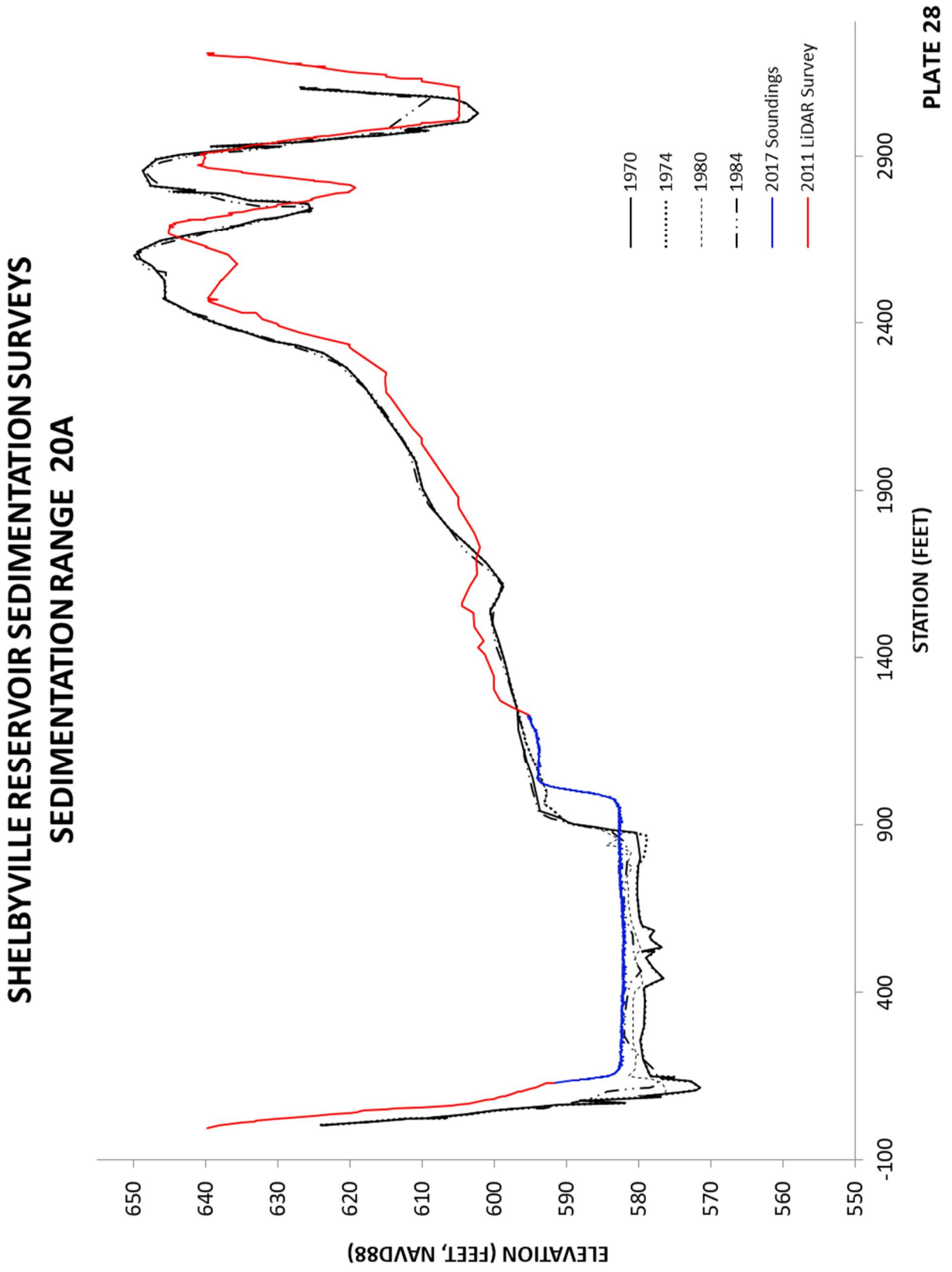

SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 15A
PLATE 23
ELEVATION (FEET, NAVD88)
650
640
630
620
610
600
590
580
570
560
550
540
-300
200
700
1,200
1,700
2,200
2,700
3,200
STATION (FEET)
1970
1974
1980
1984
2017 Soundings
2011 LiDAR Survey
Range Limits

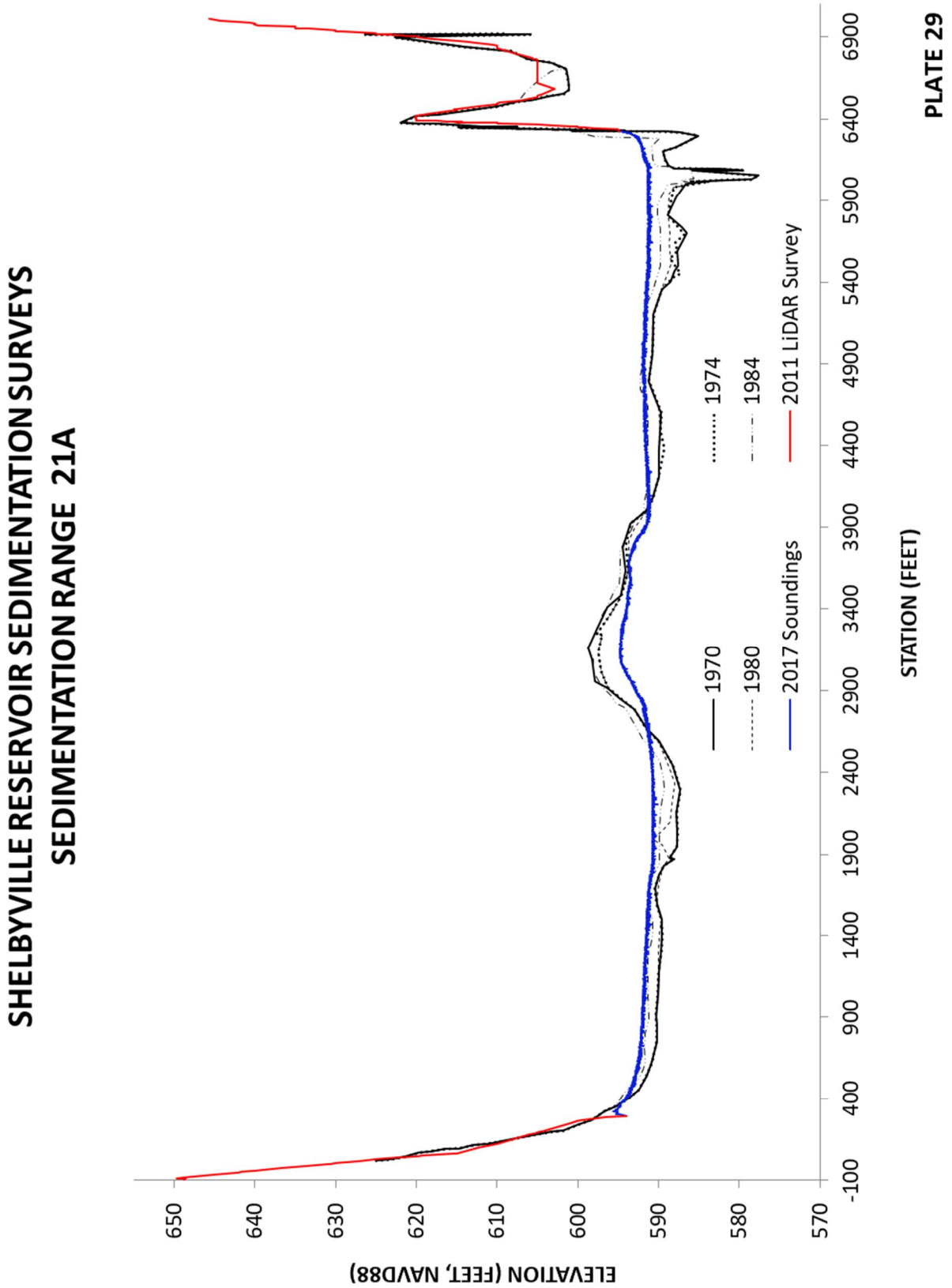

SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 16B
PLATE 24
1970
1974
1980
1984
2017 Soundings
2011 LiDAR Survey
Range Limits
ELEVATION (FEET, NAVD88)
650
640
630
620
610
600
590
580
570
560
-50
450
950
1,450
STATION (FEET)

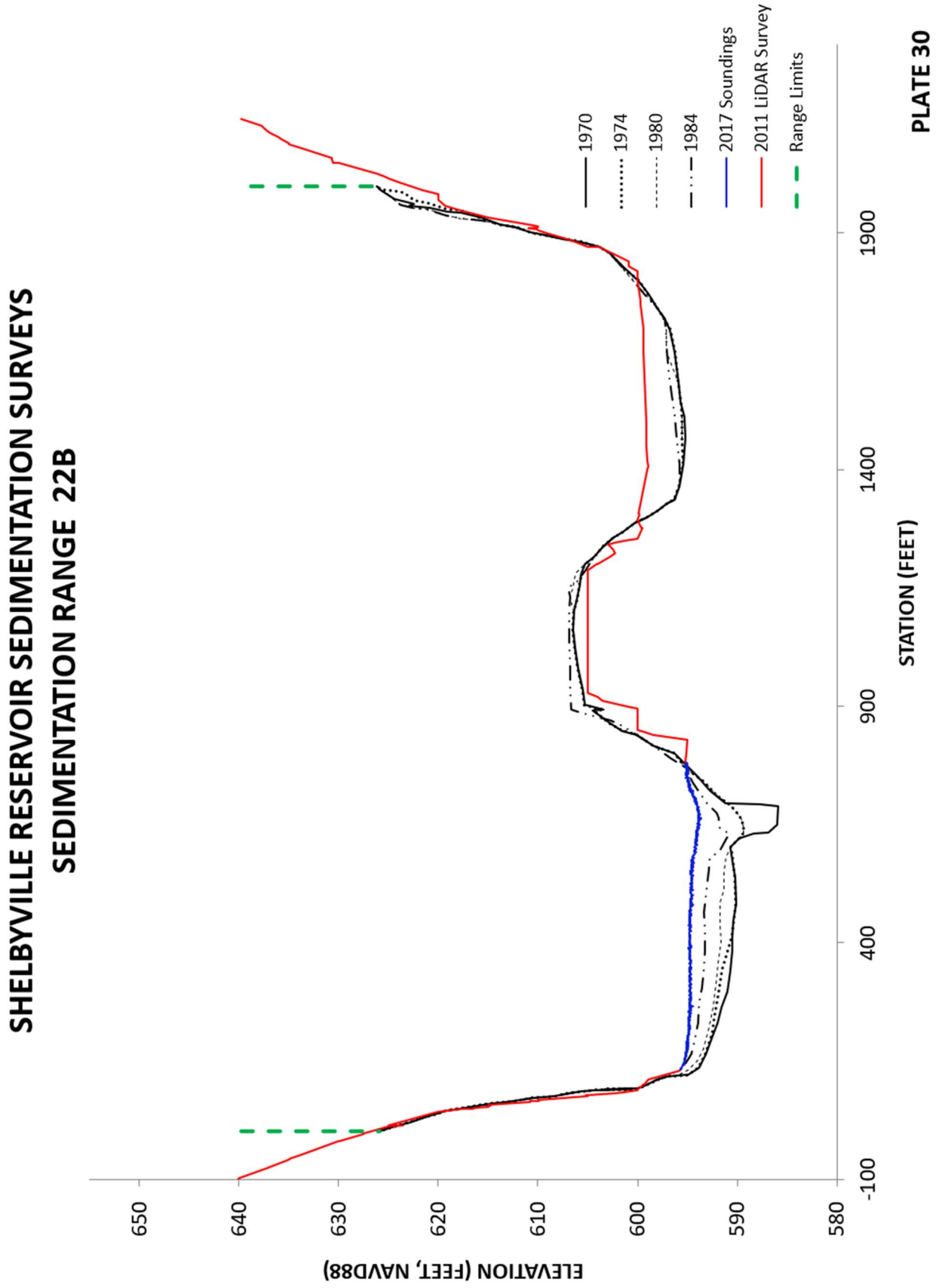

SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 17A
PLATE 25
ELEVATION (FEET, NAVD88)
650
640
630
620
610
600
590
580
570
560
550
STATION (FEET)
-600
-100
400
900
1400
1900
2400
2900
3400
1970
1974
1980
1984
2017 Soundings
2011 LiDAR Survey
Range Limits

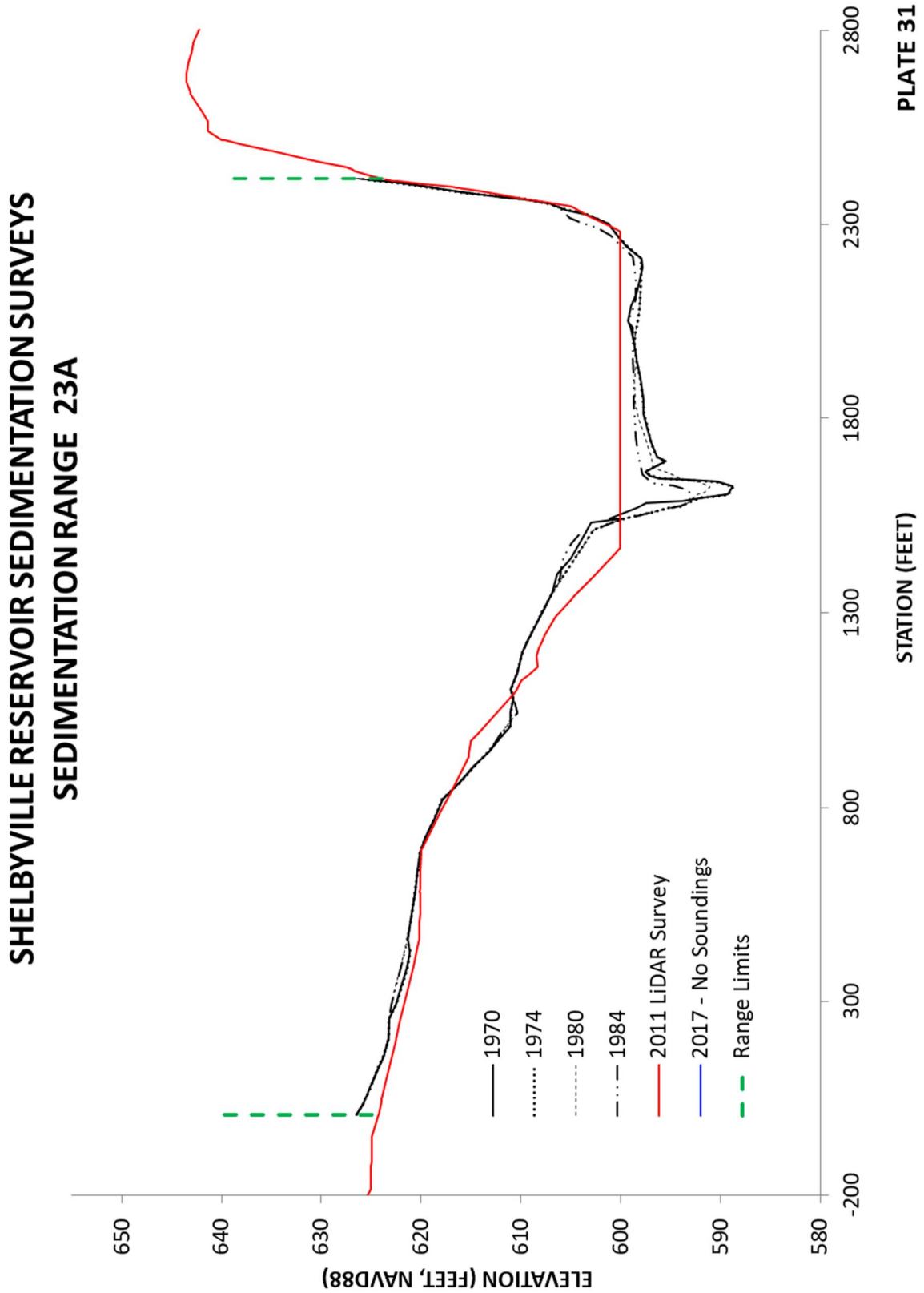

SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 18A
PLATE 26
1970
1974
1980
1984
2017 Soundings
2011 LiDAR Survey
Range Limits
ELEVATION (FEET, NAVD88)
650
640
630
620
610
600
590
580
570
560
550
-100
400
900
1,400
1,900
2,400
2,900
3,400
3,900
STATION (FEET)

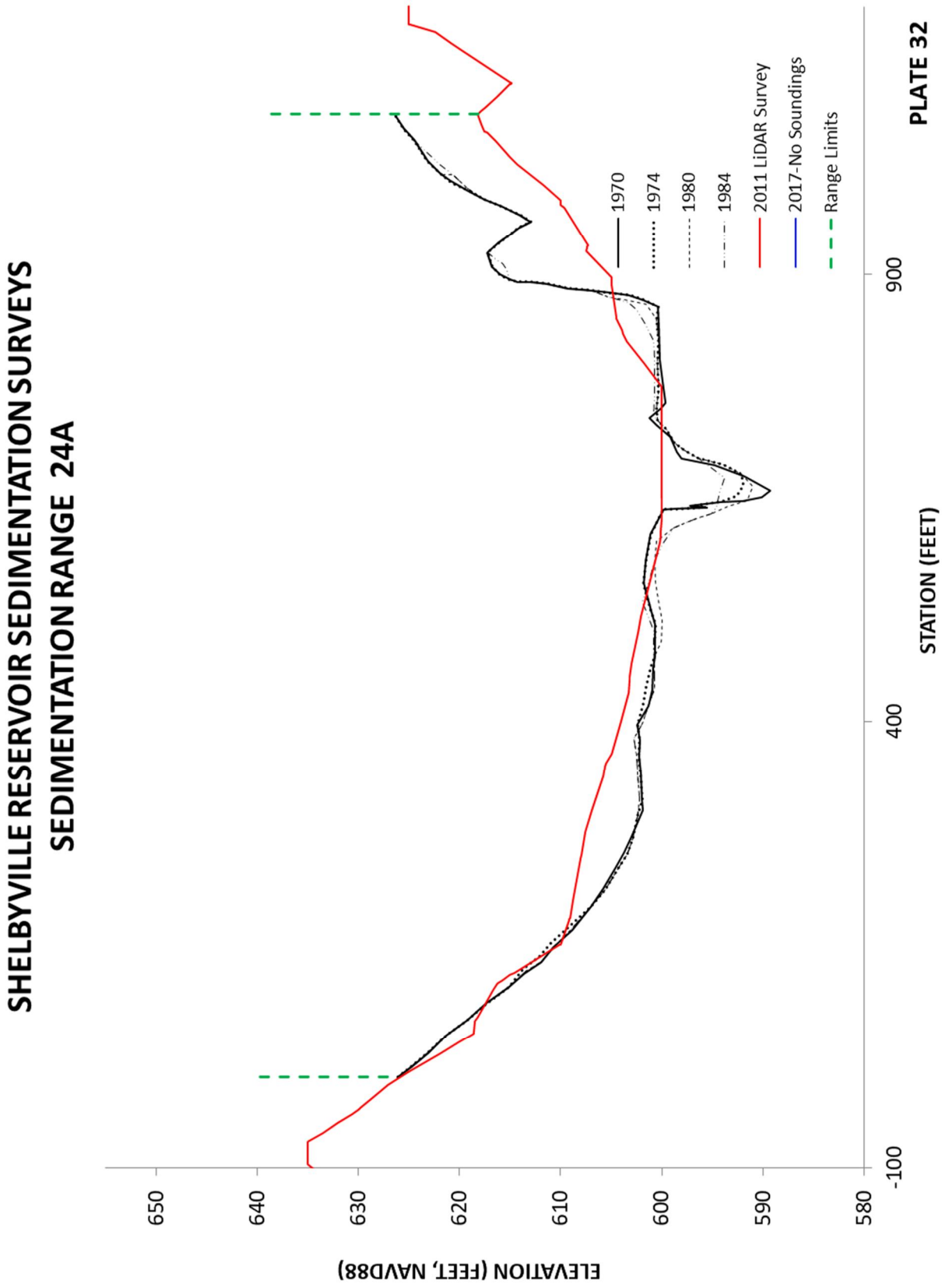

SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 19A
PLATE 27
1970
1974
1980
1984
2017 Soundings
2011 LiDAR Survey
STATION (FEET)
-100
400
900
1400
1900
2400
2900
3400
3900
ELEVATION (FEET, NAVD88)
650
640
630
620
610
600
590
580
570
560
550

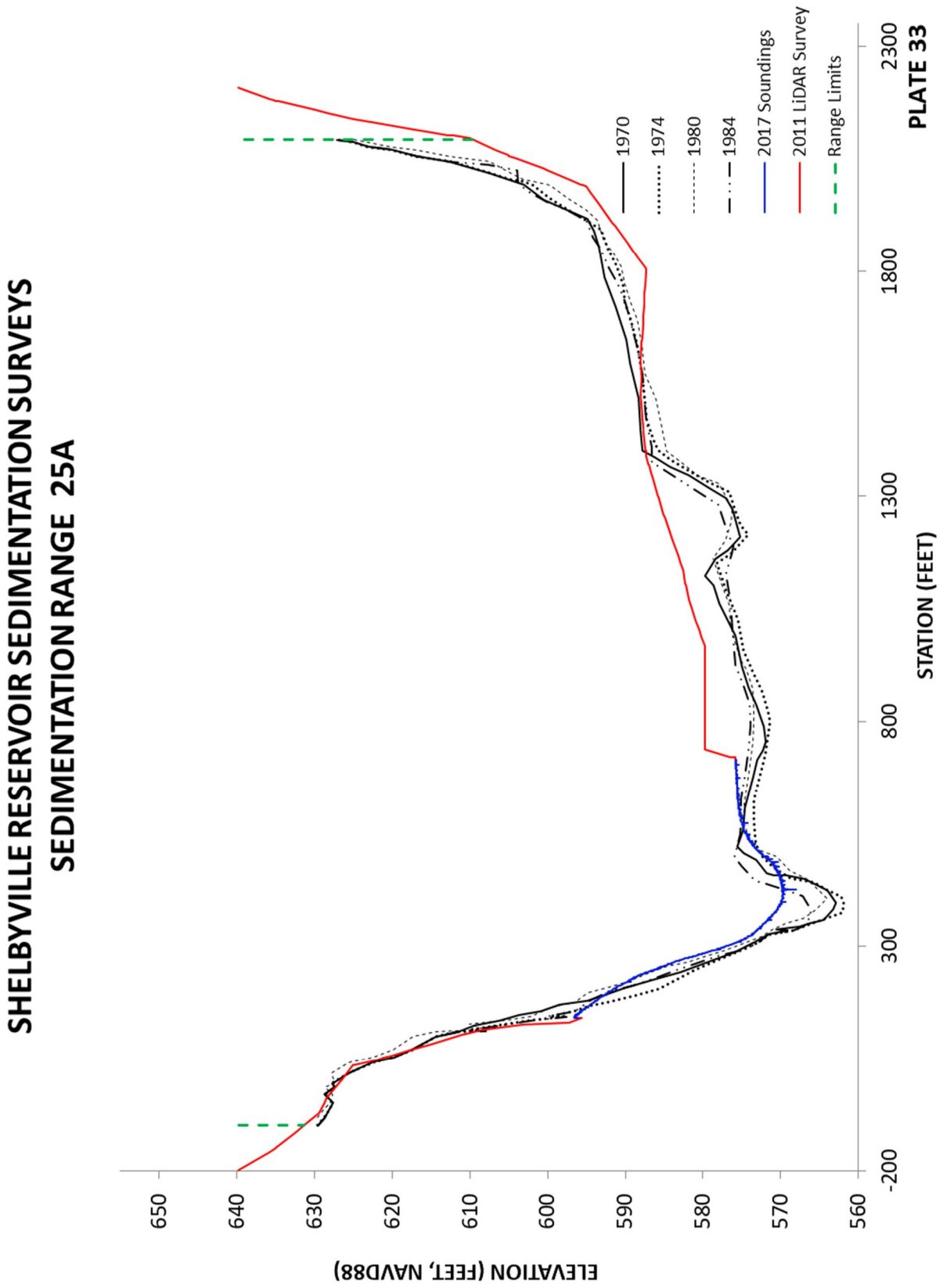

SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 20A
PLATE 28
1970
1974
1980
1984
2017 Soundings
2011 LiDAR Survey
STATION (FEET)
-100
400
900
1400
1900
2400
2900
ELEVATION (FEET, NAVD88)
650
640
630
620
610
600
590
580
570
560
550

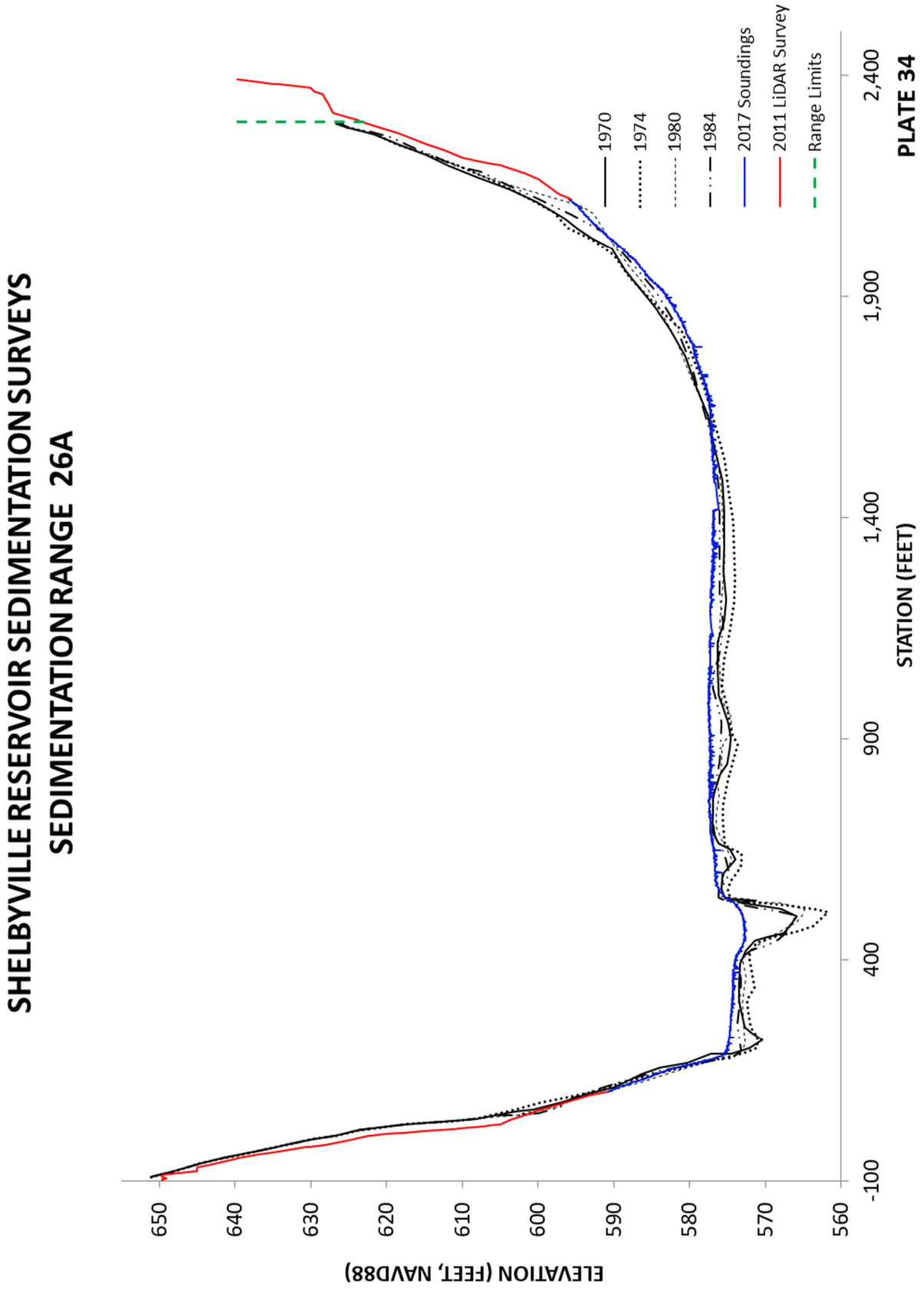

SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 21A
PLATE 29
ELEVATION (FEET, NAVD88)
650
640
630
620
610
600
590
580
570
-100
400
900
1400
1900
2400
2900
3400
3900
4400
4900
5400
5900
6400
6900
STATION (FEET)
1970
1974
1980
1984
2017 Soundings
2011 LiDAR Survey

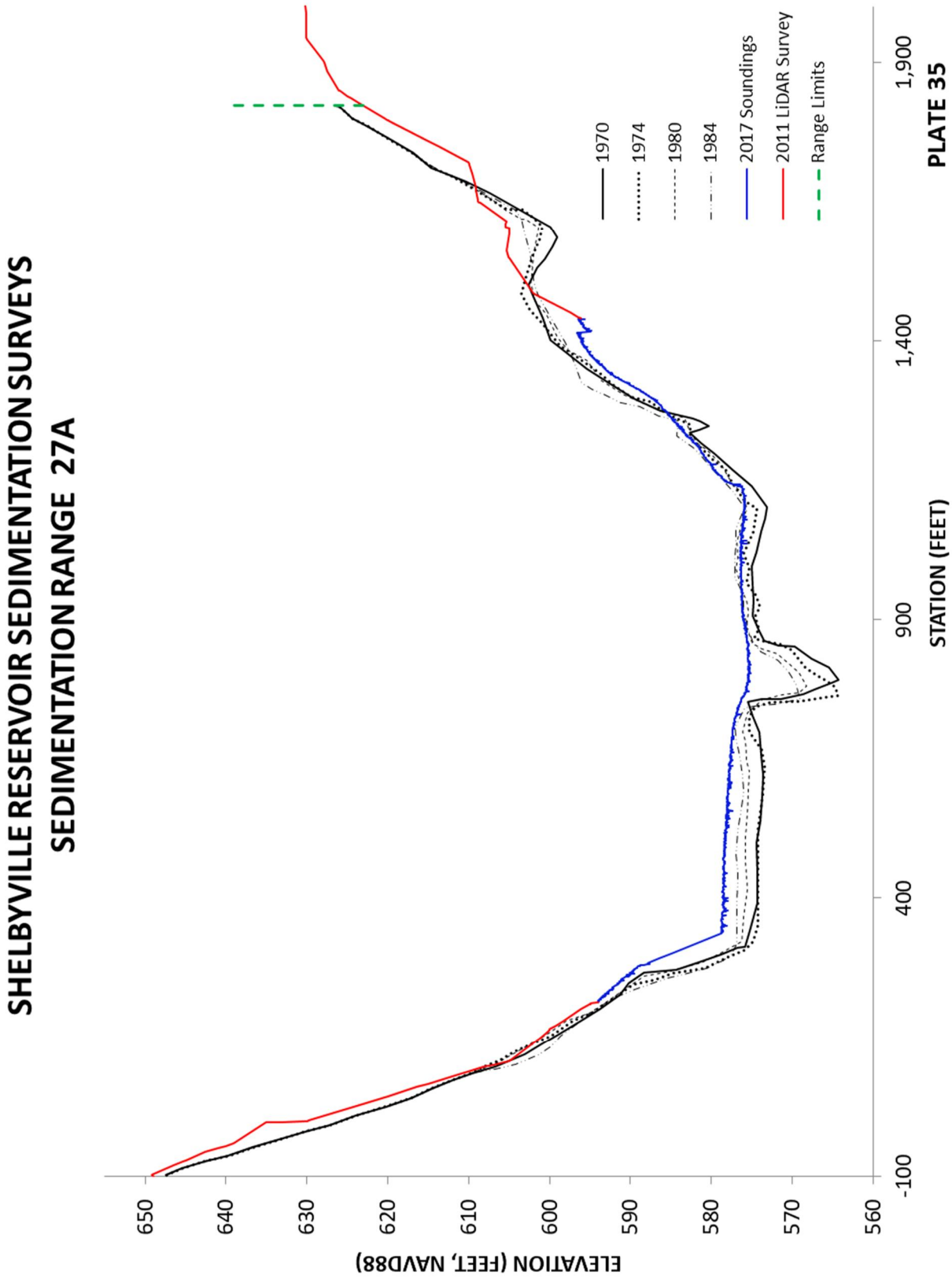

SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 22B
PLATE 30
1970
1974
1980
1984
2017 Soundings
2011 LiDAR Survey
Range Limits
STATION (FEET)
-100
400
900
1400
1900
ELEVATION (FEET, NAVD88)
580
590
600
610
620
630
640
650

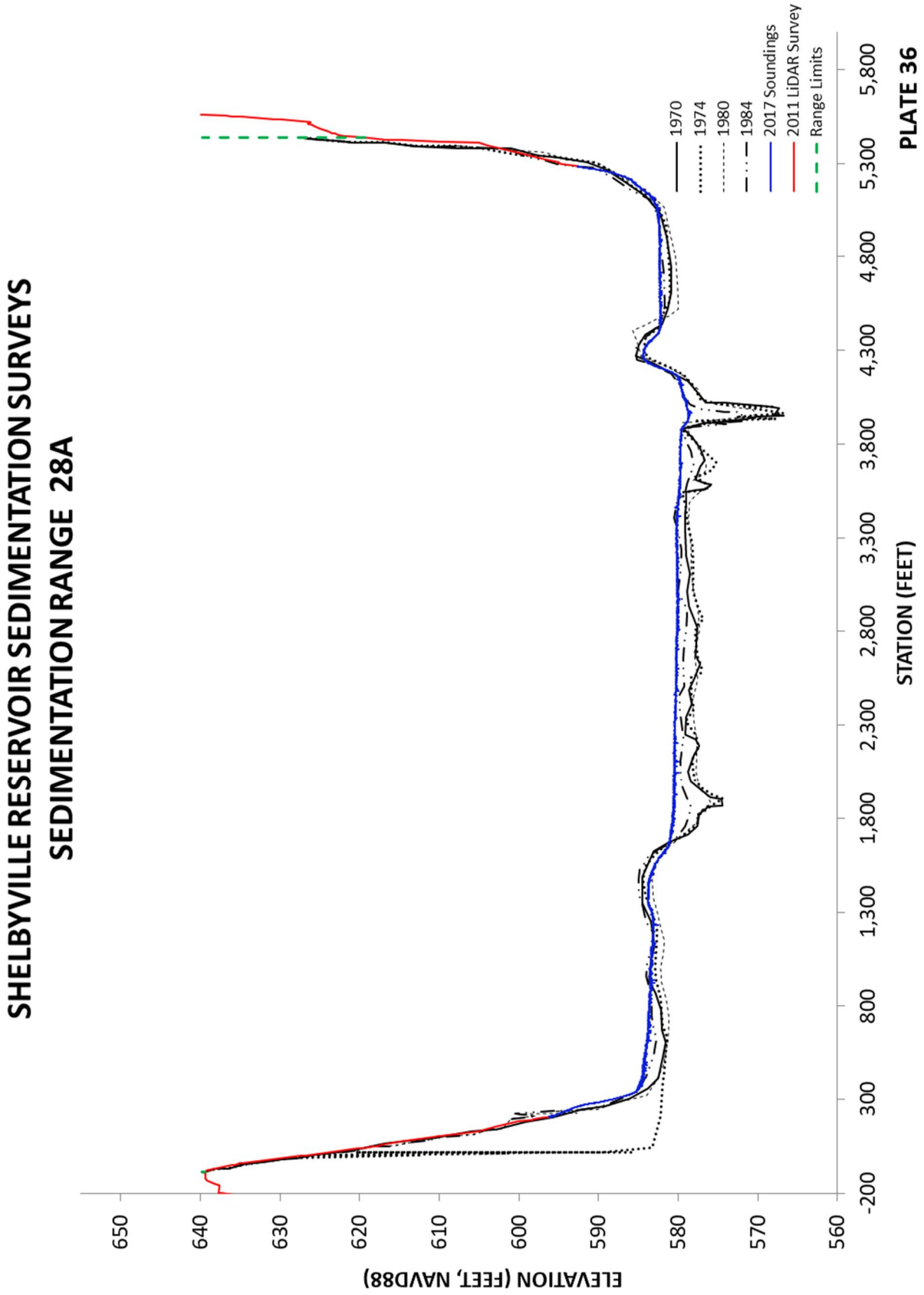

SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 23A
PLATE 31
ELEVATION (FEET, NAVD88)
650
640
630
620
610
600
590
580
-200
300
800
1300
1800
2300
2800
STATION (FEET)
1970
1974
1980
1984
2011 LiDAR Survey
2017 - No Soundings
Range Limits

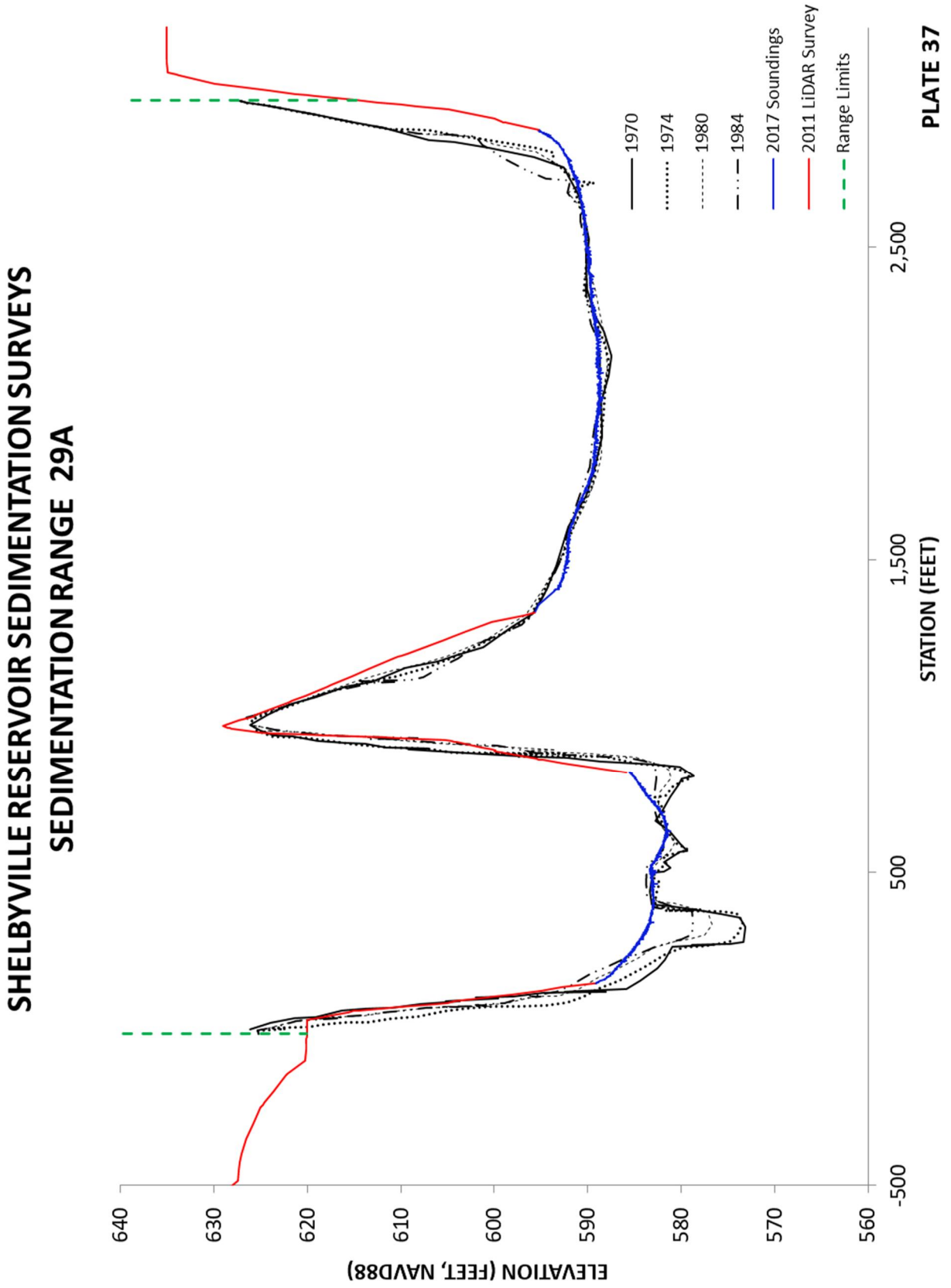

SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 24A
PLATE 32
1970
1974
1980
1984
2011 LiDAR Survey
2017-No Soundings
Range Limits
ELEVATION (FEET, NAVD88)
650
640
630
620
610
600
590
580
-100
400
900
STATION (FEET)

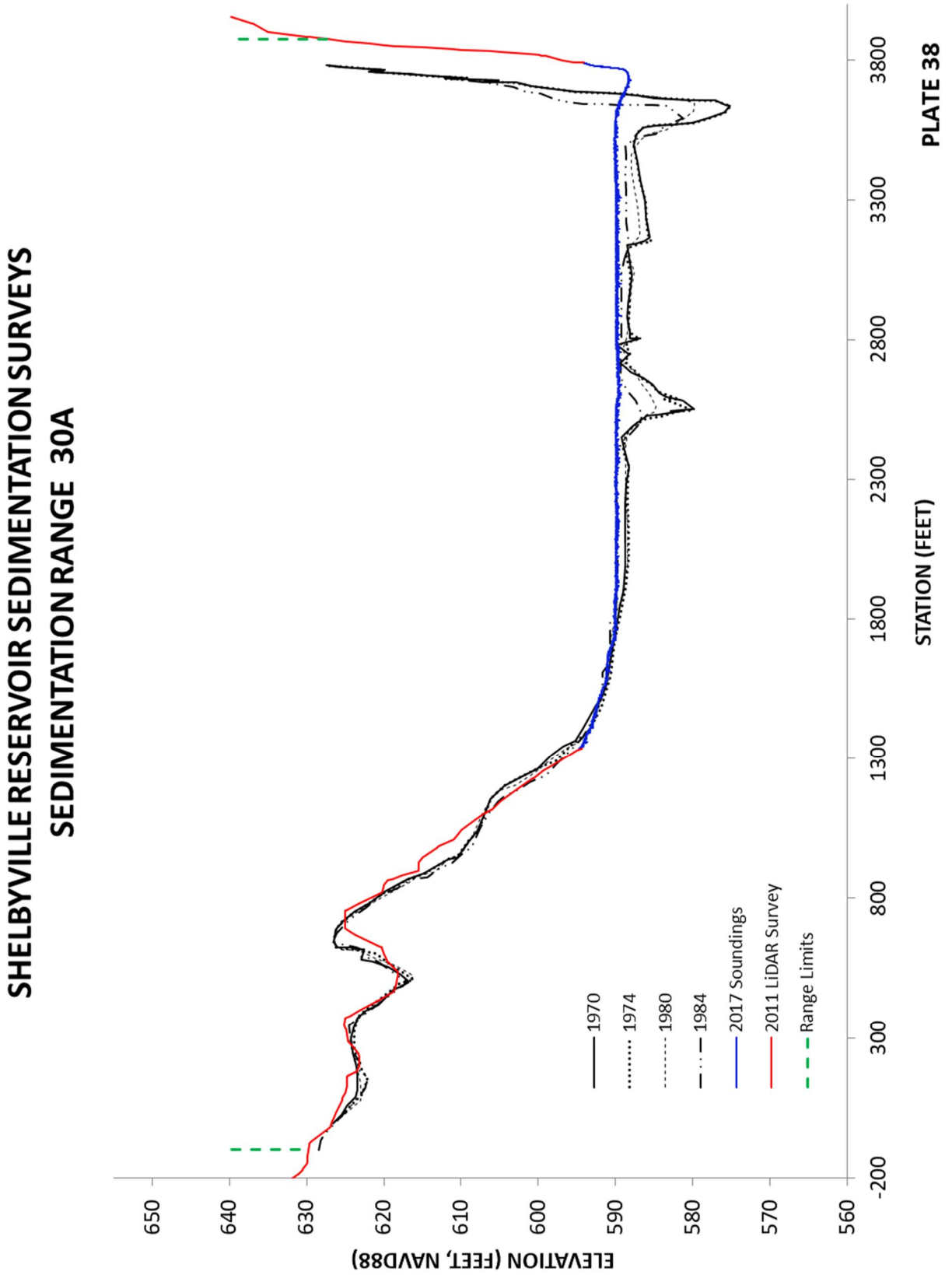

SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 25A
PLATE 33
1970
1974
1980
1984
2017 Soundings
2011 LiDAR Survey
Range Limits
STATION (FEET)
-200
300
800
1300
1800
2300
ELEVATION (FEET, NAVD88)
560
570
580
590
600
610
620
630
640
650

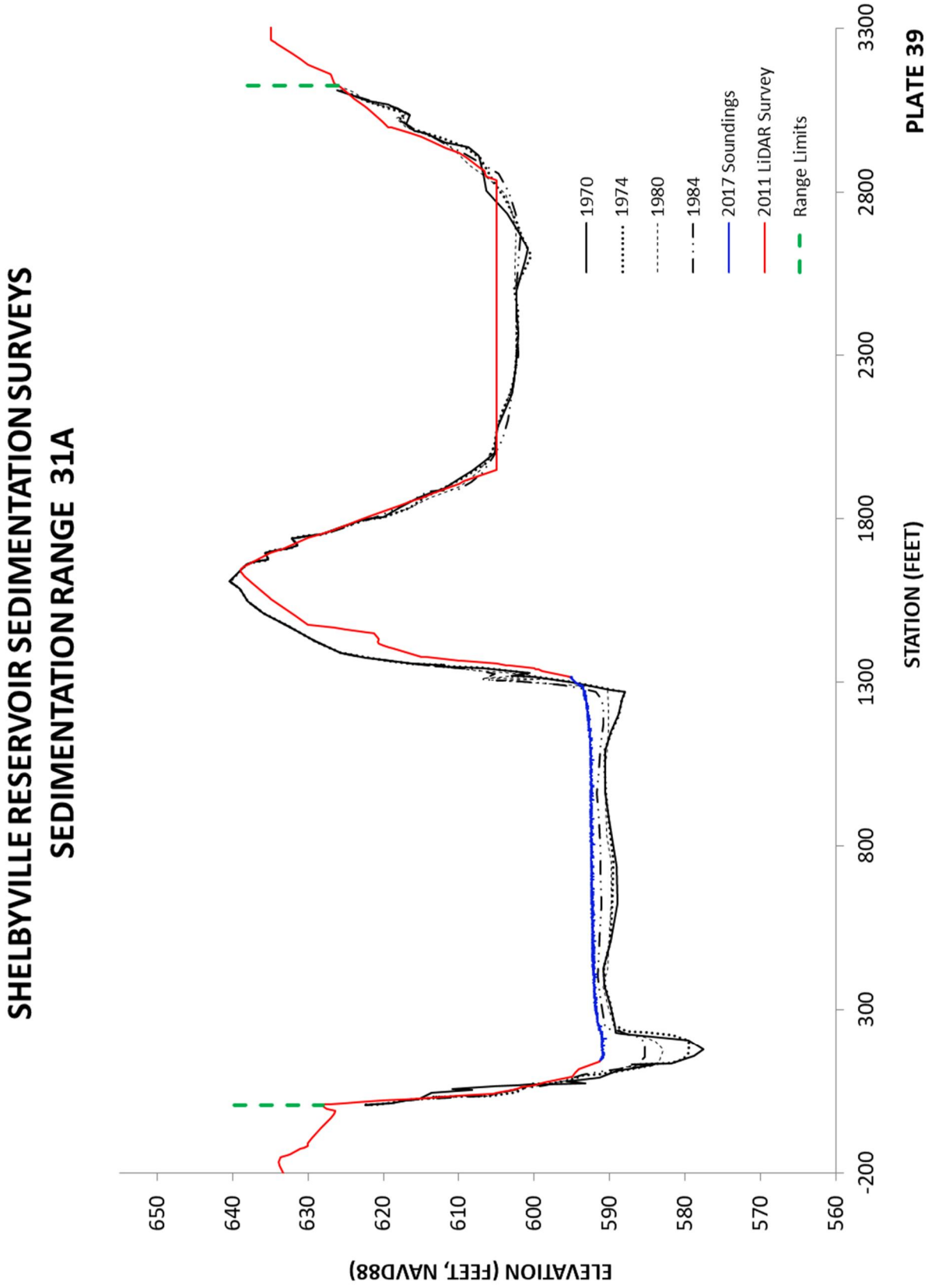

SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 26A
PLATE 34
1970
1974
1980
1984
2017 Soundings
2011 LiDAR Survey
Range Limits
ELEVATION (FEET, NAVD88)
650
640
630
620
610
600
590
580
570
560
-100
400
900
1,400
1,900
2,400
STATION (FEET)

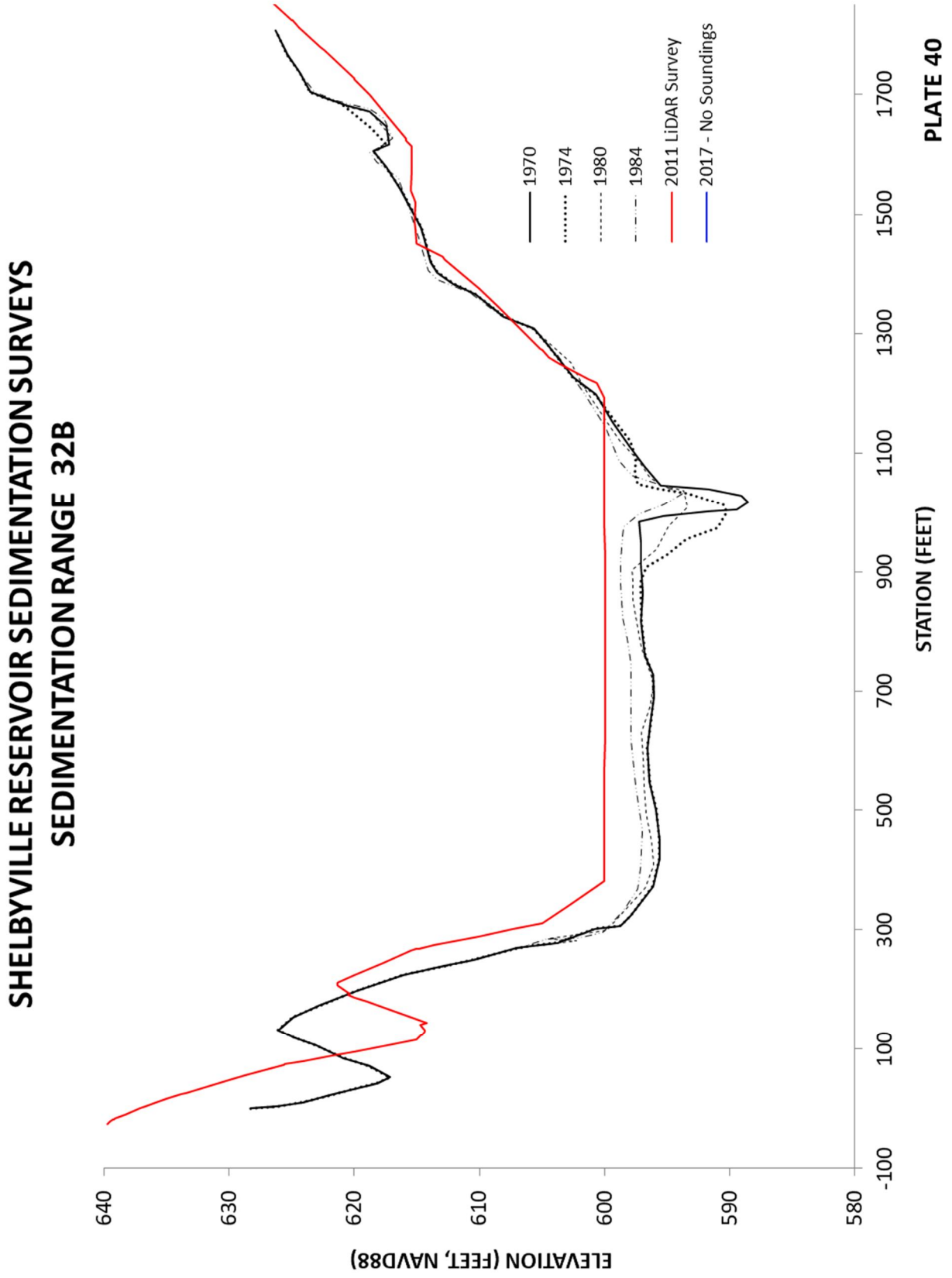

SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 27A
PLATE 35
1970
1974
1980
1984
2017 Soundings
2011 LiDAR Survey
Range Limits
ELEVATION (FEET, NAVD88)
650
640
630
620
610
600
590
580
570
560
-100
400
900
1,400
1,900
STATION (FEET)

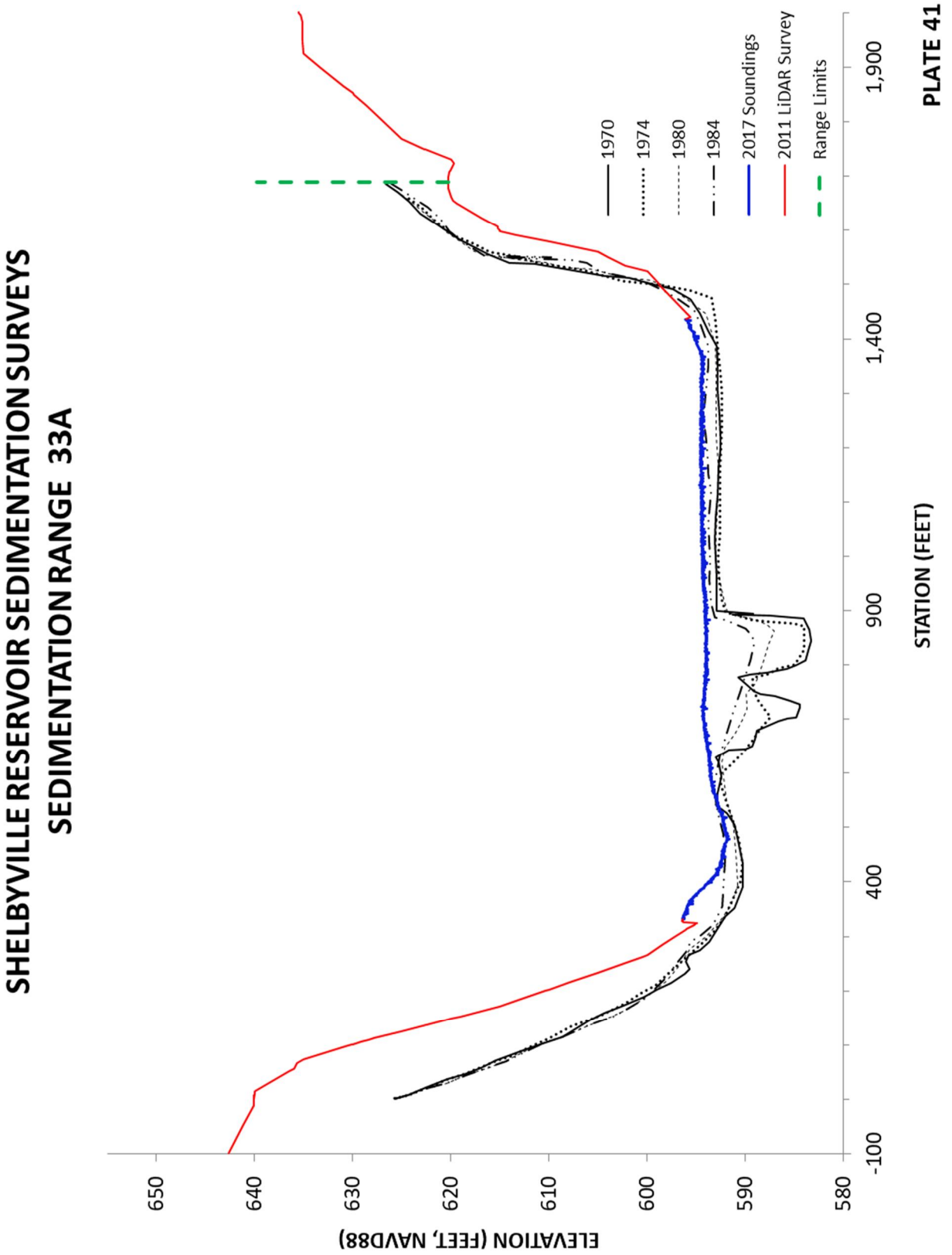

SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 28A
PLATE 36
1970
1974
1980
1984
2017 Soundings
2011 LiDAR Survey
Range Limits
ELEVATION (FEET, NAVD88)
650
640
630
620
610
600
590
580
570
560
STATION (FEET)
-200
300
800
1,300
1,800
2,300
2,800
3,300
3,800
4,300
4,800
5,300
5,800


SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 29A
PLATE 37
1970
1974
1980
1984
2017 Soundings
2011 LiDAR Survey
Range Limits
STATION (FEET)
-500
500
1,500
2,500
ELEVATION (FEET, NAVD88)
640
630
620
610
600
590
580
570
560


SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 30A
PLATE 38
ELEVATION (FEET, NAVD88)
650
640
630
620
610
600
590
580
570
560
-200
300
800
1300
1800
2300
2800
3300
3800
STATION (FEET)
1970
1974
1980
1984
2017 Soundings
2011 LiDAR Survey
Range Limits


SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 31A
PLATE 39
1970
1974
1980
1984
2017 Soundings
2011 LiDAR Survey
Range Limits
STATION (FEET)
-200
300
800
1300
1800
2300
2800
3300
ELEVATION (FEET, NAVD88)
560
570
580
590
600
610
620
630
640
650


SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 32B
PLATE 40
1970
1974
1980
1984
2011 LiDAR Survey
2017 - No Soundings
ELEVATION (FEET, NAVD88)
640
630
620
610
600
590
580
-100
100
300
500
700
900
1100
1300
1500
1700
STATION (FEET)


SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 33A
PLATE 41
1970
1974
1980
1984
2017 Soundings
2011 LiDAR Survey
Range Limits
ELEVATION (FEET, NAVD88)
650
640
630
620
610
600
590
580
-100
400
900
1,400
1,900
STATION (FEET)

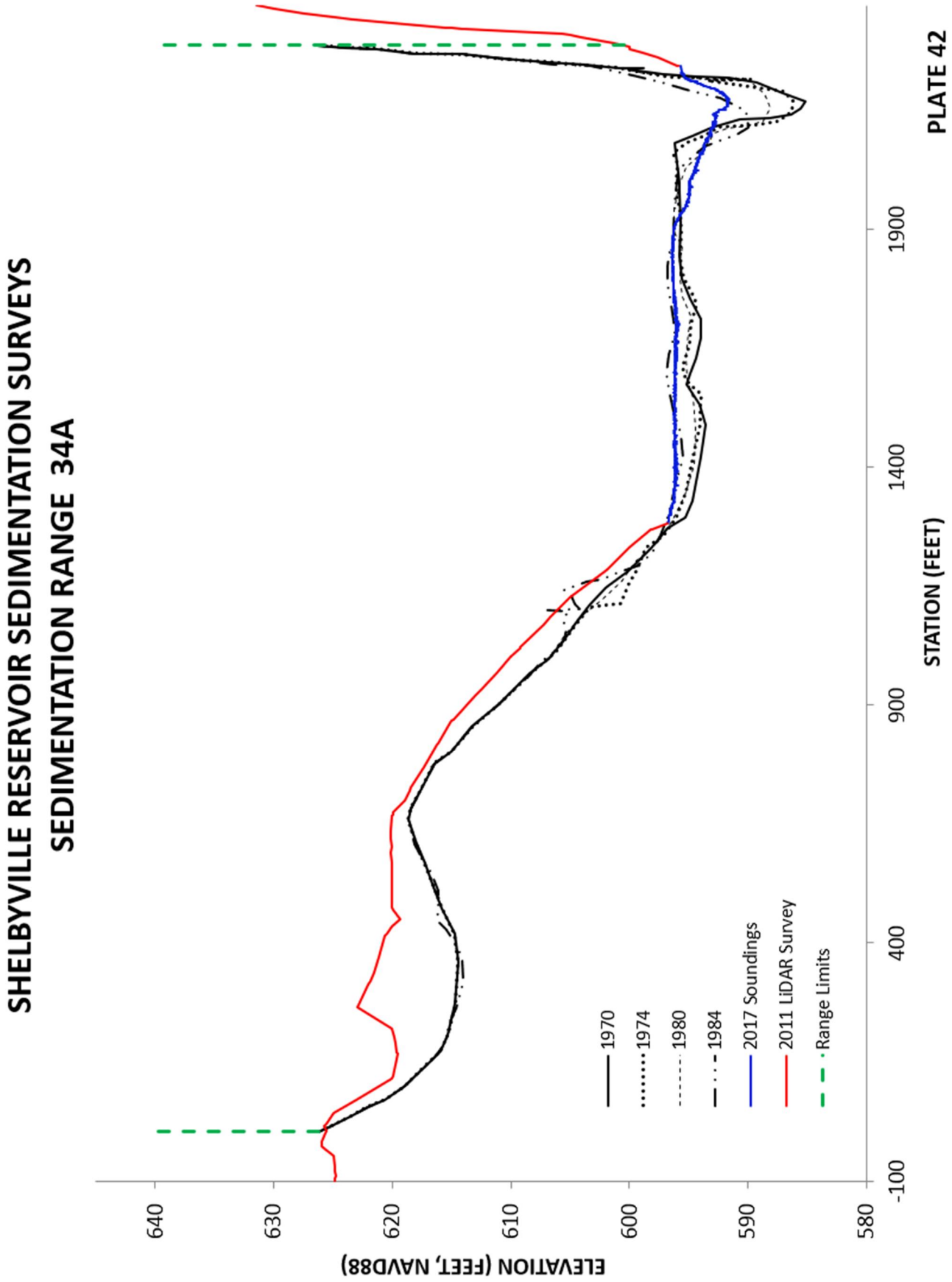
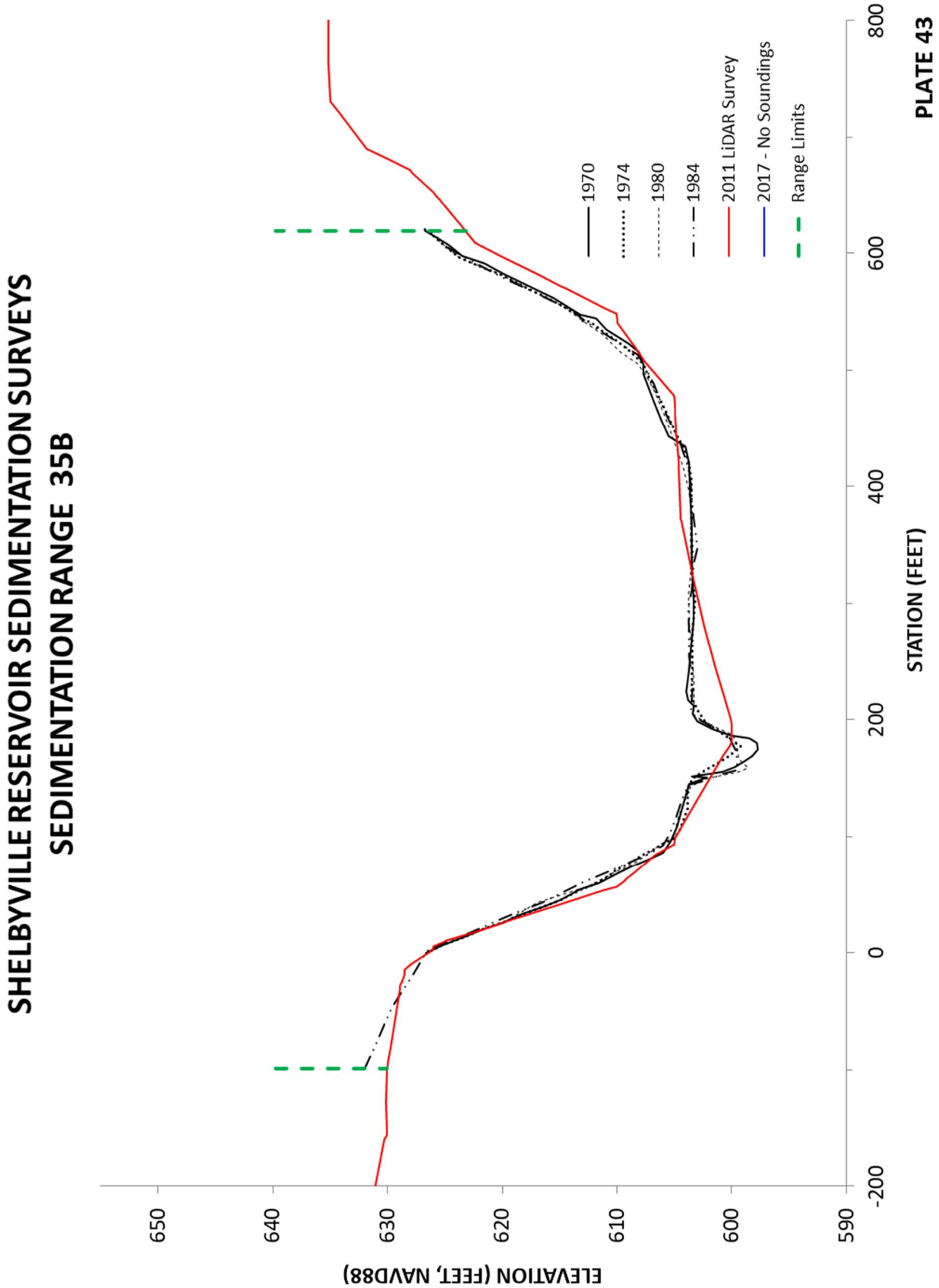
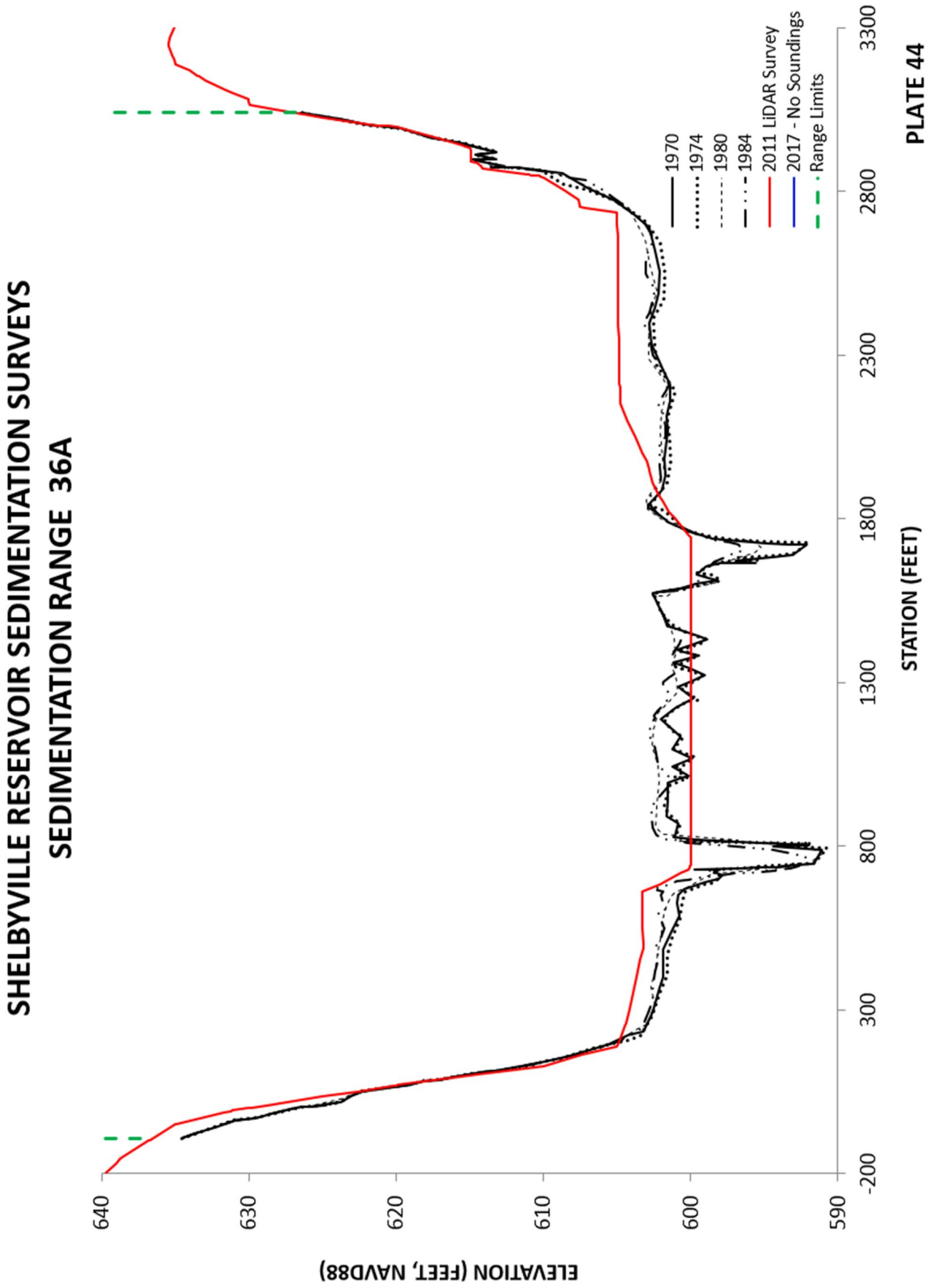
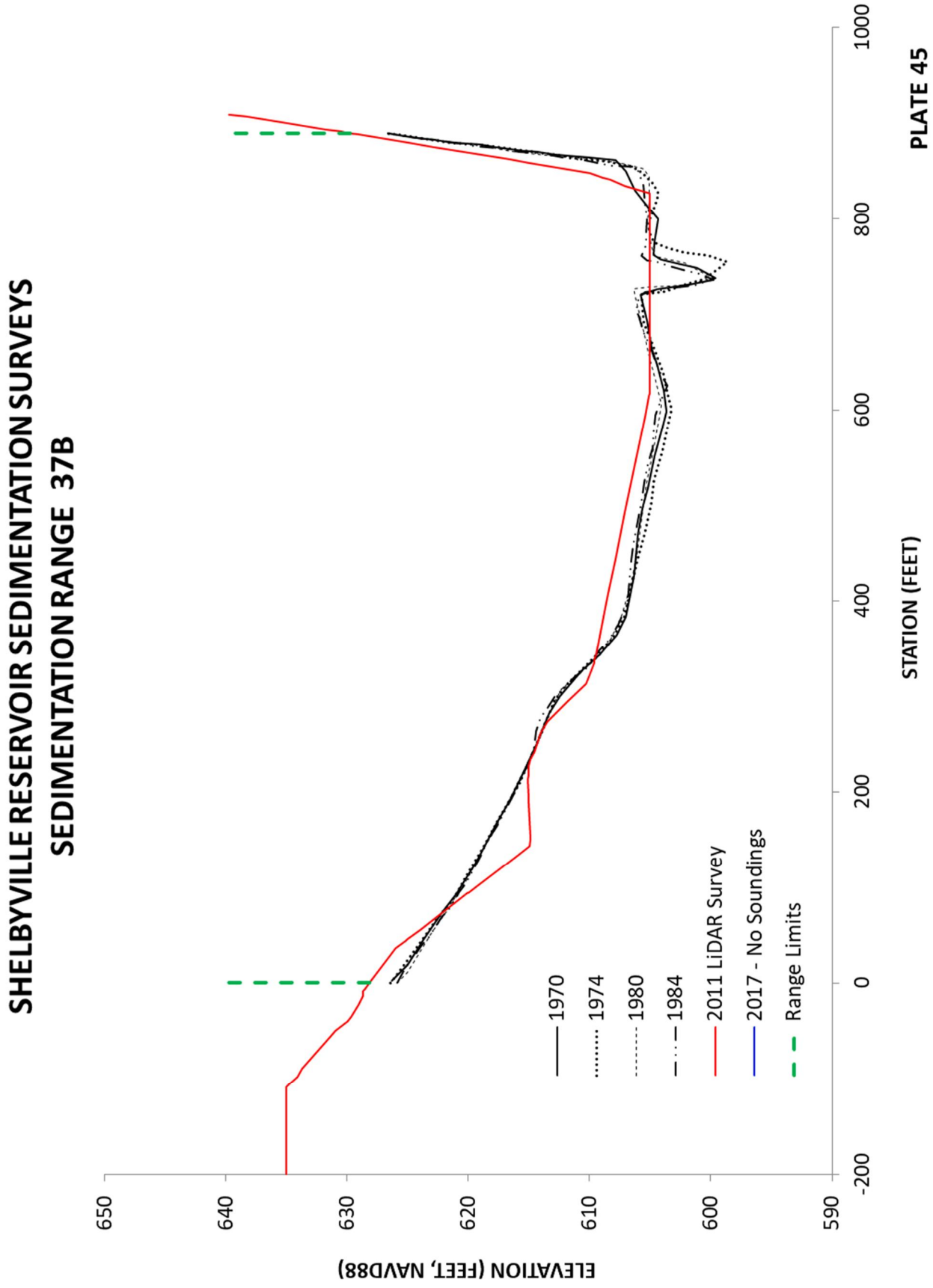

SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 34A
PLATE 42
ELEVATION (FEET, NAVD88)
640
630
620
610
600
590
580
-100
400
900
1400
1900
STATION (FEET)
1970
1974
1980
1984
2017 Soundings
2011 LiDAR Survey
Range Limits

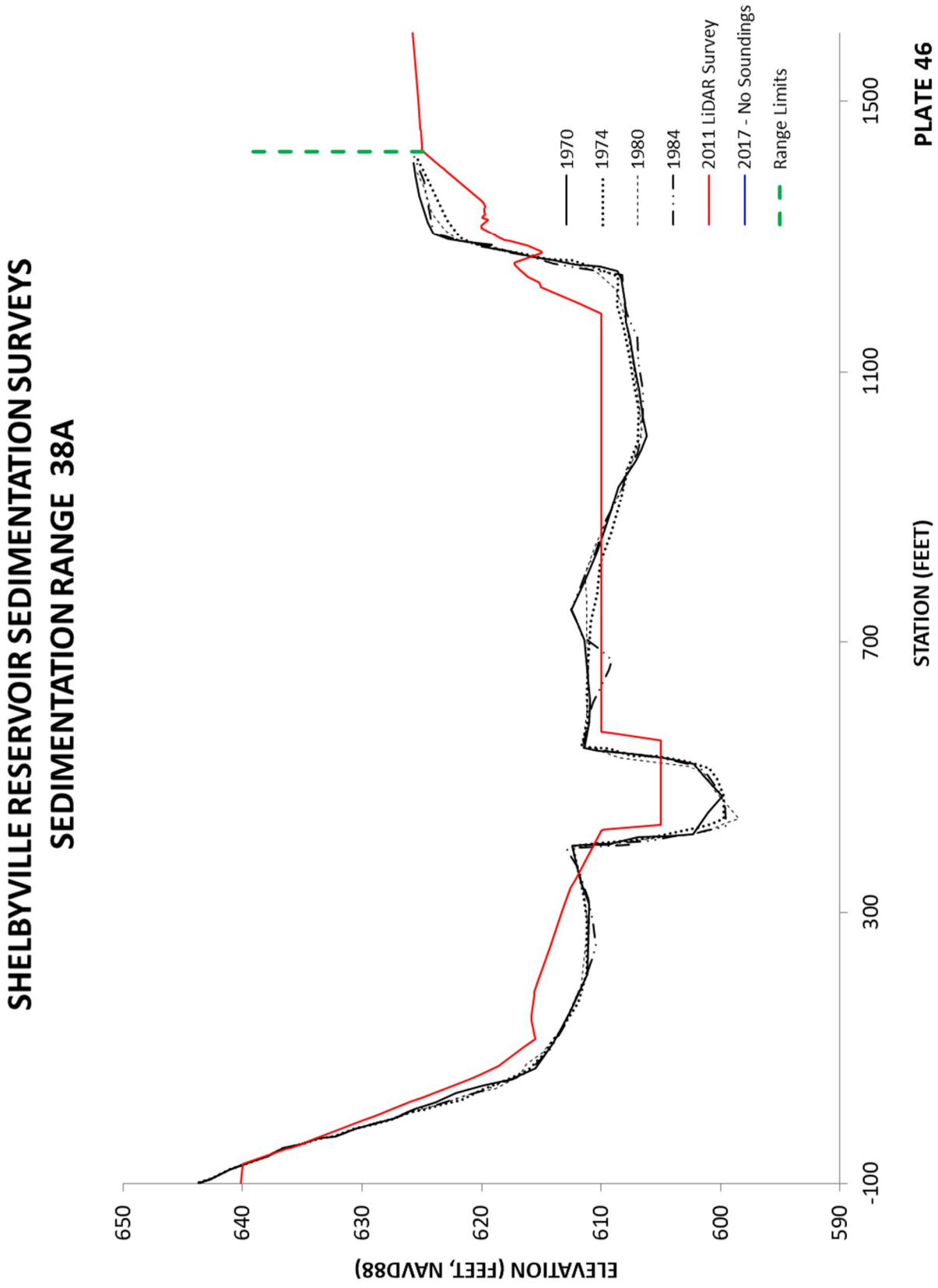
Plate 43. Cross-sectional Plot of Sedimentation Range 35B

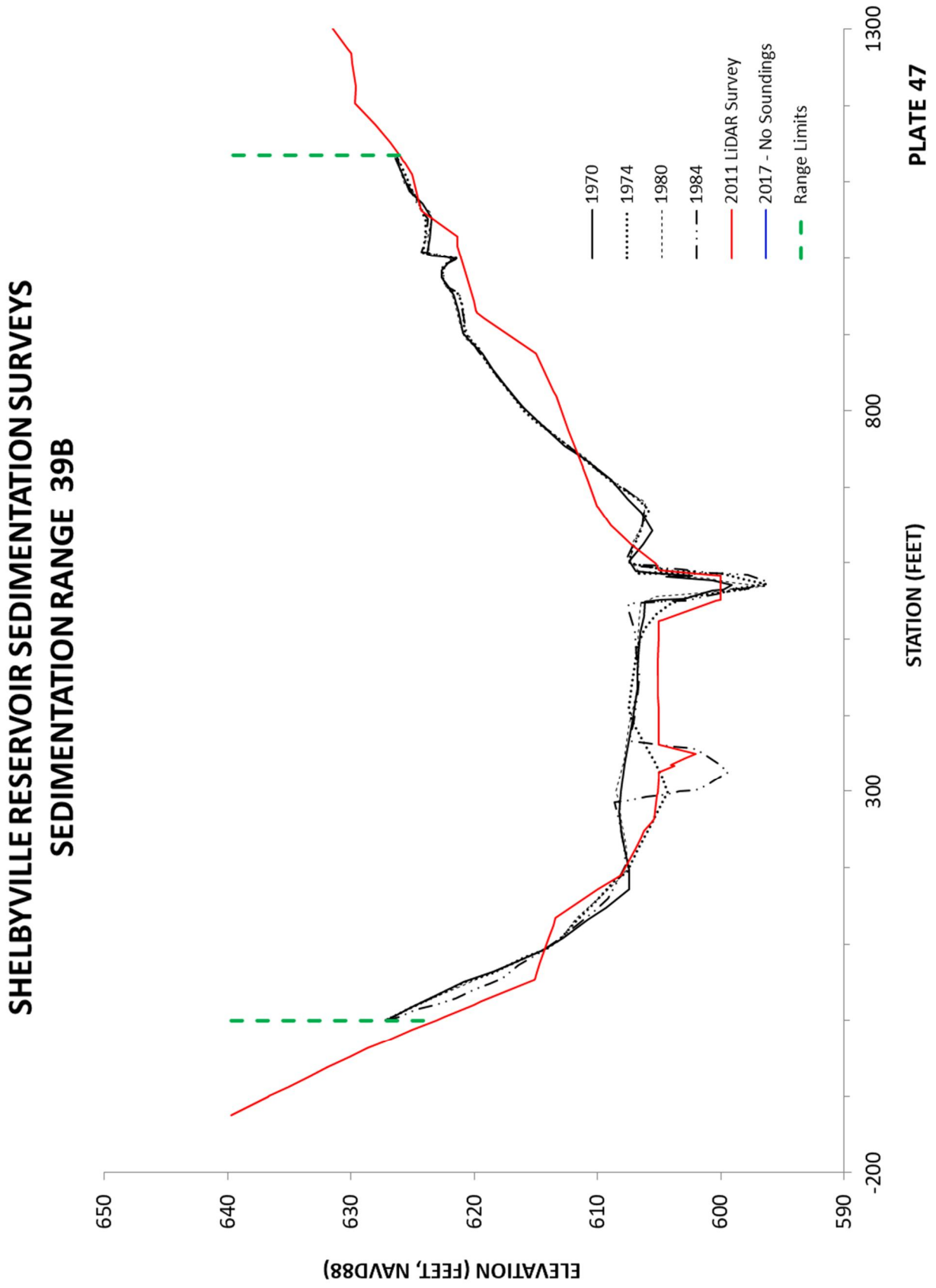


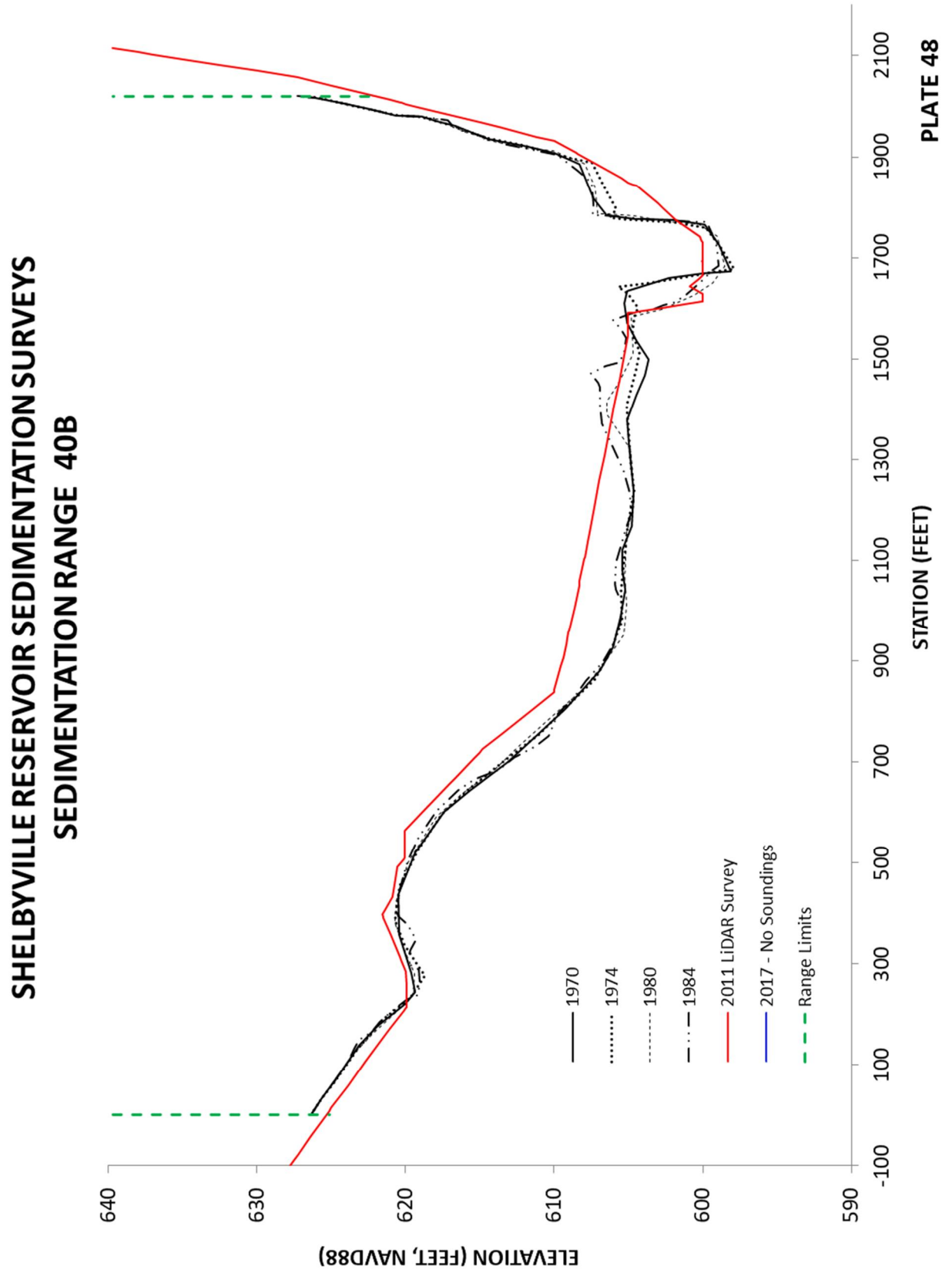
Note: 2017 rangeline is shifted from previous surveys due to variations in surveying techniques.


SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 36A
PLATE 44
1970
1974
1980
1984
2011 LiDAR Survey
2017 - No Soundings
Range Limits
STATION (FEET)
-200
300
800
1300
1800
2300
2800
3300
ELEVATION (FEET, NAVD88)
640
630
620
610
600
590


SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 37B
PLATE 45
ELEVATION (FEET, NAVD88)
650
640
630
620
610
600
590
-200
0
200
400
600
800
1000
STATION (FEET)
1970
1974
1980
1984
2011 LiDAR Survey
2017 - No Soundings
Range Limits


SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 38A
PLATE 46
1970
1974
1980
1984
2011 LiDAR Survey
2017 - No Soundings
Range Limits
ELEVATION (FEET, NAVD88)
650
640
630
620
610
600
590
-100
300
700
1100
1500
STATION (FEET)


SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 39B
PLATE 47
1970
1974
1980
1984
2011 LiDAR Survey
2017 - No Soundings
Range Limits
ELEVATION (FEET, NAVD88)
650
640
630
620
610
600
590
STATION (FEET)
-200
300
800
1300


SHELBYVILLE RESERVOIR SEDIMENTATION SURVEYS
SEDIMENTATION RANGE 40B
PLATE 48
ELEVATION (FEET, NAVD88)
640
630
620
610
600
590
-100
100
300
500
700
900
1100
1300
1500
1700
1900
2100
STATION (FEET)
1970
1974
1980
1984
2011 LiDAR Survey
2017 - No Soundings
Range Limits

RESERVOIR SEDIMENT DATA SUMMARY

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS

Lake Shelbyville

NAME OF RESERVOIR

DATA SHEET NO.

DAM

1. OWNER Corps of Engineers	2. STREAM Kaskaskia River	3. STATE Illinois
4. SEC. 8 TWP. 11N RANGE 3E	5. NEAREST P.O. Shelbyville	6. COUNTY Shelby
7. LAT. 39 °24 '30 " LONG 88 °45 '30 "	8. TOP OF DAM ELEVATION 642.7	9. SPILLWAY CREST ELEV. 627.2 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	626.2	25,269	468,385	676,203	
b. MULTIPLE USE	599.4	11,118	177,795	207,818	1 Aug 1970
c. POWER					
d. WATER SUPPLY					16. DATE NORMAL OPER. BEGAN
e. IRRIGATION					
f. CONSERVATION					
g. INACTIVE	572.7	2,992	30,023	30,023	1 Aug 1970

17. LENGTH OF RESERVOIR 47 2/ MILES — AV. WIDTH OF RESERVOIR 0.84 MILES

WATERSHED

18. TOTAL DRAINAGE AREA 1,054 SQ. MI.		22. MEAN ANNUAL PRECIPITATION 38.3	INCHES
19. NET SEDIMENT CONTRIBUTING AREA 1,015 SQ. MI.		23. MEAN ANNUAL RUNOFF 12.7	INCHES
20. LENGTH 58 MILES	AV. WIDTH 18.2 MILES	24. MEAN ANNUAL RUNOFF 696,326	AC.-FEET
21. MAX ELEV. 703 FEET	MIN. ELEV. 534.7 FEET	25. ANNUAL TEMP. MEAN 53.5° F	RANGE -21° to 104°

SURVERY DATA

26. DATE OF SURVERY	27. PERIOD YEARS	28. ACCL. YEARS	29. TYPE OF SURVEY	30. NO. OF RANGES OR CONTOR INT.	31. SURFACE AREA, ACRES	32. CAPACITY, ACRE-FEET	33. C/I. RATIO, AC.-FT. PER AC.-FT.
April 1970			Range (D)	46	25,269	676,203	0.94
November 1980	10.6	10.6	Range (D)	46	25.269	668,428	0.93
May 1984	3.5	14.1	Range (D)	46	25.269	664,031	0.92
June 2017	33.2	47.3	Range (D)	40	23.543	617,588 3/	0.93

26. DATE OF SURVERY	34. PERIOD ANNUAL PERCIPITATION	35. PERIOD WATER INTERFLOW, 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
April 1970						
November 1980	40.4	700,119	1,298,023	7,421,256	700,119	7,421,256
May 1984	42.9	852,363	1,005,894	2,983,271	738,783	10,404,527
June 2017	35.1	674,652	1,449,501	22,376,183	693,522	32,780,715

26. DATE OF SURVERY	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
April 1970						
November 1980	7,205	681	0.67	7,205	681	0.67
May 1984	2,882	823	0.81	10,087	716	0.71
June 2017	59,821 4/	1,801	1.70	40,649	859	0.81

26. DATE OF SURVERY	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
April 1970							
November 1980	47.4	692	692	0.1	1.07	738	738
May 1980	51.4	1,085	795	0.11	1.49	951	799
June 2017	51.4 5/	2,247	1,812	0.24	11.49	1,784	1,953

ENG FORM 1787, NOV 1966 PREVIOUS EDITIONS ARE OBSOLETE (Proponent: CECW-EH-Y)

26. DATE OF SURVEY	43. DEPTH DESIGNATION RANGE IN FEET BELOW, AND ABOVE, CREST ELEVATION										
	Bottom-75	75-65	65-55	55-45	45-35	35-25	25-15	15-5	5-Crest		
	PERCENT OF TOTAL SEDIMENT LOCATED WITIN DEPTH DESIGNATION										
April 1970											
Nov. 1980	6.5	14.5	46.5	20.4	7.6	1.5	0.9	1.0			
May 1984	4.3	5.4	8.5	19.0	50.1	22.7	-6.2	-3.6	-0.2		
June 2017	2.31	6.08	7.37	6.95	25.8	23.4	18.5	9.4			

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 REACH DESIGNATION														
April 1970															
Nov. 1980	23.8	13.2	27.6	18.5	1.4	2.4	3.8	0.5	6.7	2.1					
May 1984	3.2	7.3	14.5	12.1	6.8	12.2	20.7	16.9	4.6	1.7					
June 2017	17.1	8.9	28.5	12.9	3.5	8.1	5.7	9.8	3.3	2.2					

45. RANGE IN RESERVOIR OPERATION

WATER YEAR	MAX. ELEV.	MIN. ELEV.	INFLOW, AC.-FT.	WATER YEAR	MAX. ELEV.	MIN. ELEV.	INFLOW, AC.-FT.
See attached							

46. ELEVATION-AREA-CAPACITY DATA

ELEVATION	AREA	CAPACITY	ELEVATION	AREA	CAPACITY	ELEVATION	AREA	CAPACITY
See attached								

47. REMARKS AND REFERENCES

See attached.

48. AGENCY MAKING SURVEY

49. AGENCY SUPPLYING DATA

50. DATE

ENG FORM 1787, NOV 1966

ENG FORM 1787 ITEM 45 (Continuation)

45. RANGE IN RESERVOIR OPERATION

WATER YEAR	MAX. ELEV. (feet)	MIN. ELEV. (feet)	INFLOW (acre-feet)	WATER YEAR	MAX. ELEV. (feet)	MIN. ELEV. (feet)	INFLOW (acre-feet)
1970	571.9	554.5	554,189	1994	605.8	596.0	652,187
1971	603.6	570.7	507,826	1995	613.0	594.2	498,496
1972	605.1	590.2	667,974	1996	615.8	594.1	735,174
1973	611.6	595.6	937,186	1997	600.1	594.4	474,218
1974	616.6	590.0	1,297,715	1998	610.6	596.3	853,190
1975	600.1	590.9	975,461	1999	605.8	594.9	545,990
1976	593.2	590.0	304,648	2000	606.3	594.1	467,345
1977	601.5	592.8	480,937	2001	602.7	595.3	600,813
1978	605.9	595.9	649,042	2002	615.0	594.2	928,185
1979	605.7	596.2	816,580	2003	600.9	594.1	292,830
1980	600.6	596.0	298,620	2004	608.6	594.5	735,590
1981	607.5	596.0	531,590	2005	613.7	595.3	618,883
1982	604.5	596.3	852,008	2006	600.3	594.3	514,453
1983	612.2	596.2	836,719	2007	600.8	595.4	512,985
1984	609.4	597.2	786,922	2008	614.1	598.2	1,449,501
1985	597.5	597.3	945,937	2009	613.9	596.2	1,408,740
1986	601.8	594.1	370,780	2010	609.9	594.5	775,021
1987	601.6	594.2	468,020	2011	607.7	594.9	803,286
1988	599.4	594.8	382,907	2012	599.3	594.3	212,331
1989	606.2	595.8	512,174	2013	610.3	594.7	832,859
1990	611.5	596.5	731,266	2014	603.1	595.7	543,590
1991	610.2	596.6	500,291	2015	609.4	594.3	829,131
1992	609.4	594.1	616,681	2016	614.0	595.0	622,929
1993	615.7	598.3	1,288,046	2017*	610.4	594.4	540,218

Plate 50

ENG FORM 1787 ITEM 46 (Continuation)

ENG FORM 1787 ITEM 46 (Continuation)

46. ELEVATION-AREA-CAPACITY DATA

ELEVATION (feet)	AREA (acre)	CAPACITY (acre-feet)
1970 Original Survey Data		
539.7	41	99
549.7	210	1,105
559.7	919	6,305
569.7	2,393	22,238
579.7	4,674	56,906
589.7	7,752	118,383
599.7	11,233	212,980
609.7	15,956	347,959
619.7	20,946	532,310
626.2	23,750	648,737
2017 SURVEY DATA		
539.7	0	0
549.7	67	58
559.7	945	2,665
569.7	1,923	14,527
579.7	4,020	47,391
589.7	6,822	95,629
599.7	10,348	178,097
609.7	15,302	302,229
619.7	19,971	473,154
626.2	23,543	617,588

ENG FORM 1787 ITEM 47

1/ Elevation of top of gates in closed position. All elevations are in feet referred to the North American Vertical Datum of 1988 (NAVD88)

2/ 25 miles Kaskaskia River and 22 miles West Okaw River.

3/ Flood Control Pool (626.2) was used in items 19, 31, 32, 33, 41 to be consistent with previous reports.

4/ An elevation of 624.7 ft was used in item 37 & 43 to be consistent with previous reports.

5/ No samples were collected in 2017, value used from 1982 data referenced in 1984 Resurvey.

6/ Analysis conducted using only sedimentation data below maximum observed pool elevation of 616.4ft.

Plate 51. Engineering Form 1787 Item 46 Elevation-Area-Capacity Data

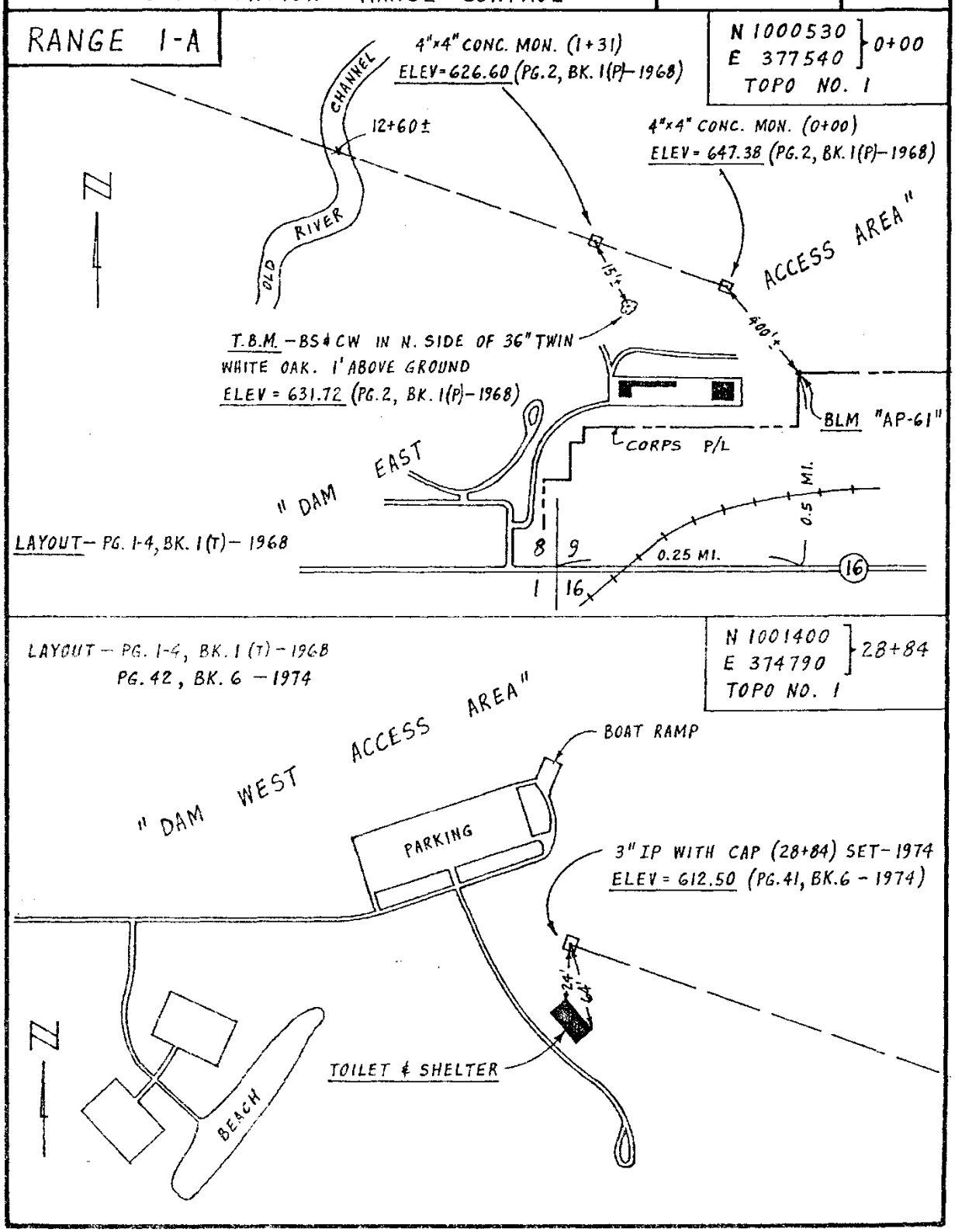
Plate 51

APPENDIX A – SEDIMENT RANGE CONTROLS FROM 1984 RESURVEY

COMPUTATION SHEET

PROJECT	LAKE SHELBYVILLE	PAGE 1 OF 40	COMPUTED BY WJM	DATE 5-19-81
SUBJECT	SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE

RANGE 1-A

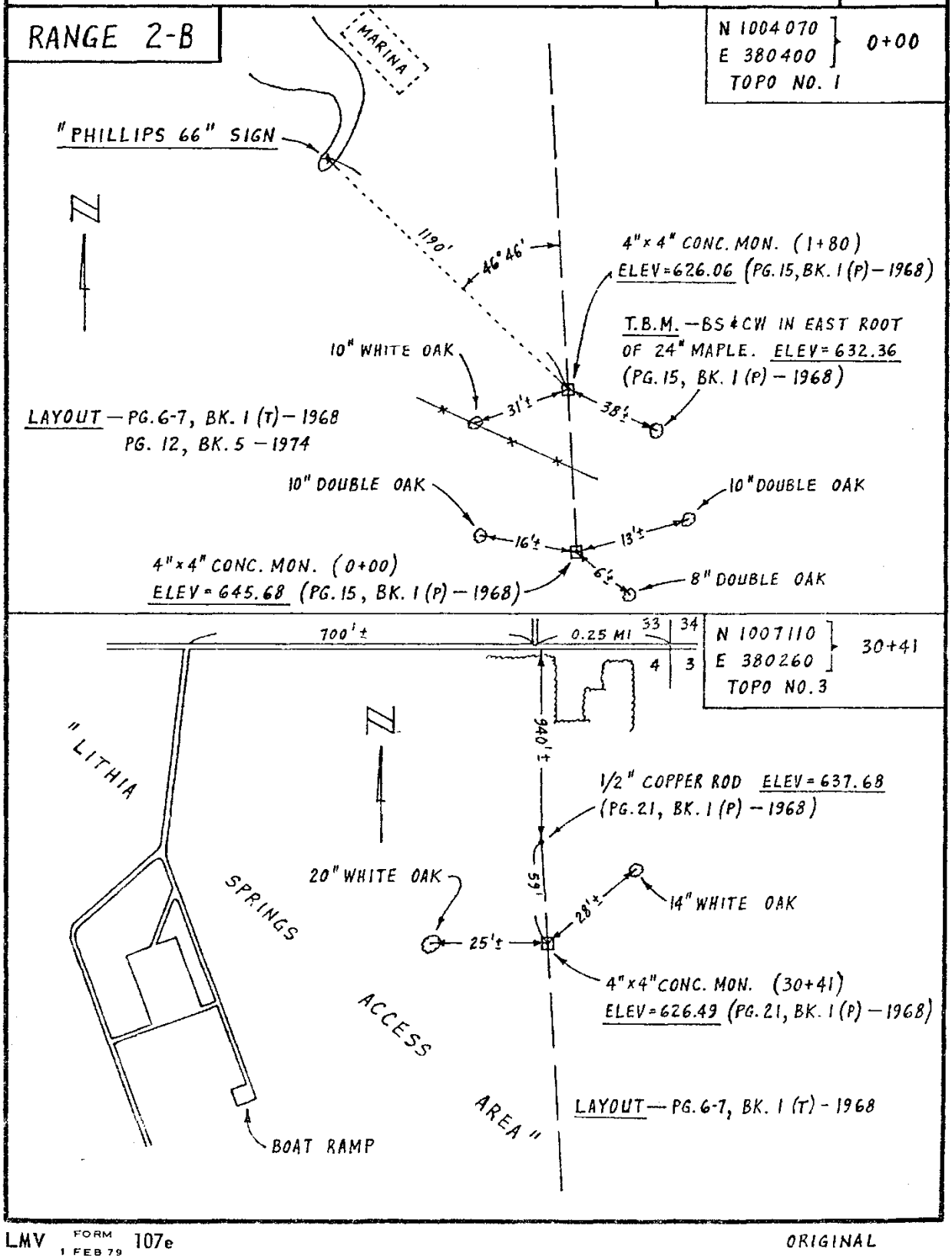


LMV FORM 1 FEB 79 107e ORIGINAL

COMPUTATION SHEET

PROJECT	LAKE SHELBYVILLE	PAGE 2 OF 40	COMPUTED BY W&M	DATE 5-20-81
SUBJECT	SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE

RANGE 2-B



LMV FORM 1 FEB 79 107e ORIGINAL

COMPUTATION SHEET

PROJECT LAKE SHELBYVILLE	PAGE 3 OF 40	COMPUTED BY W&M	DATE 5-20-81
SUBJECT SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE

RANGE 3-A

N 1006450
E 378150
TOPO NO. 3
1+60

"LITHIA SPRINGS ACCESS AREA"

AMPHITHEATER

2100'±

T.B.M. — BS & CW IN SOUTH ROOT OF 34" MAPLE. ELEV = 630.15 (PG. 22, BK. 1 (P) – 1968)

36" GUM

6" PAW-PAW

4"x4" CONC. MON. (1+60) ELEV = 635.92 (PG. 22, BK. 1 (P) – 1968)

50'±

74'

51'±

32'±

RE-BAR

42°

169°40'

31'

4"x4" CONC. MON. (3+30) ELEV = 626.22 (PG. 22, BK. 1 (P) – 1968)

100'±

24" HICKORY

(CAMPING)

TOILET

LAYOUT — PG. 9-12, BK. 1 (T) – 1968
PG. 7, BK. 5 – 1974

N

N 1005130
E 374960
TOPO NO. 1
36+07

CENTER OF SECTION 5

25+00±

OLD RIVER CHANNEL

4" HICKORY

1250'±

33'±

5" OAK

47'±

1/2" COPPER ROD ELEV = 627.48 (PG. 30, BK. 1 (P) – 1968)

4"x4" CONC. MON. (36+07) ELEV = 627.59 (PG. 30, BK. 1 (P) – 1968)

83'

52'±

150'±

T.B.M. — BS IN E. SIDE OF 14" WALNUT ELEV = 634.06 (PG. 28, BK. 1 (P) – 1968)

LAYOUT — PG. 9-12, BK. 1 (T) – 1968

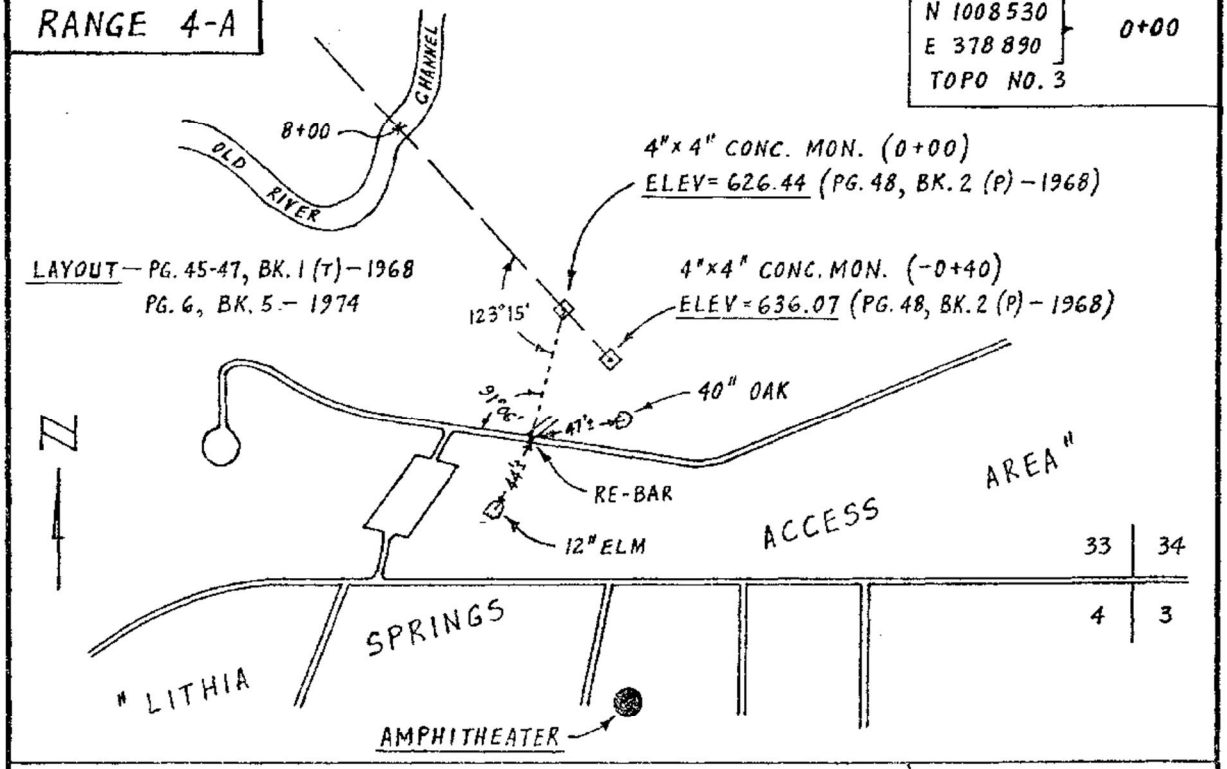
LMV FORM 1 FEB 79 107e ORIGINAL

COMPUTATION SHEET

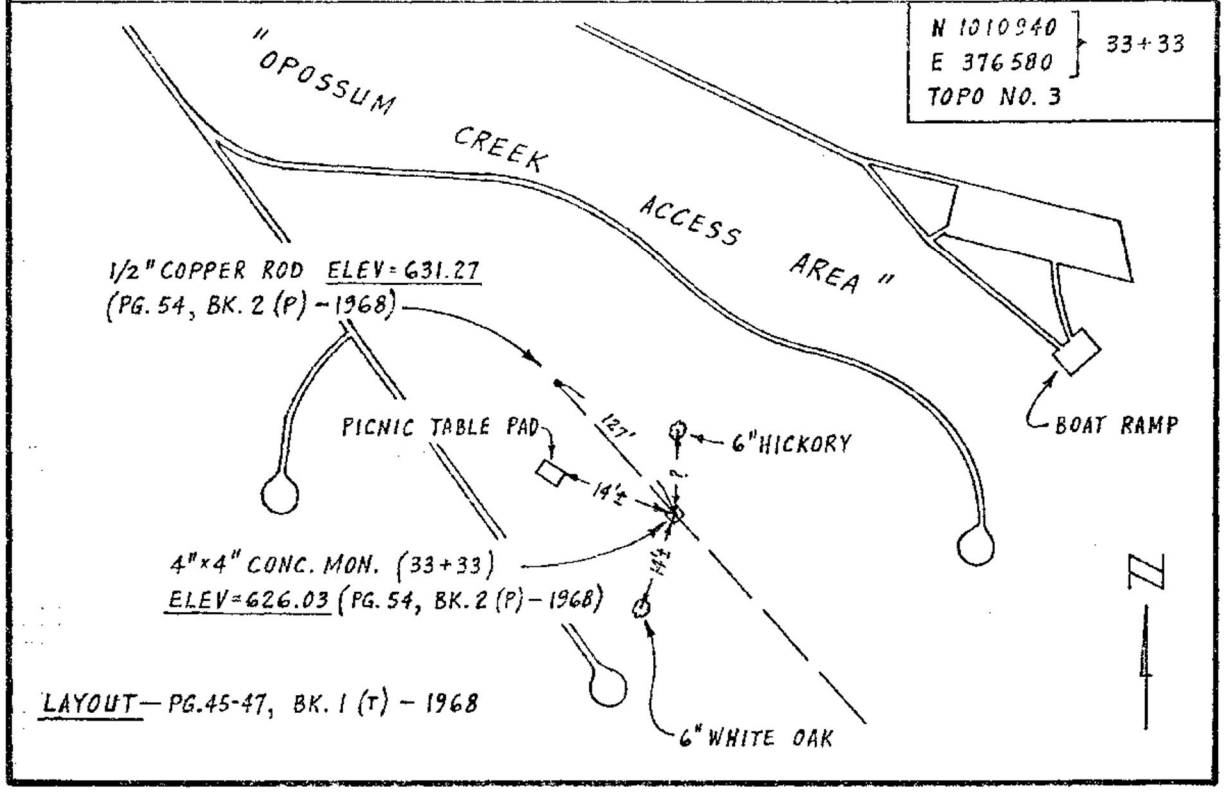
PROJECT	LAKE SHELBYVILLE	PAGE 4 OF 40	COMPUTED BY WJM	DATE 5-21-81
SUBJECT	SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE

RANGE 4-A

N 1008530
E 378890
TOPO NO. 3
0+00



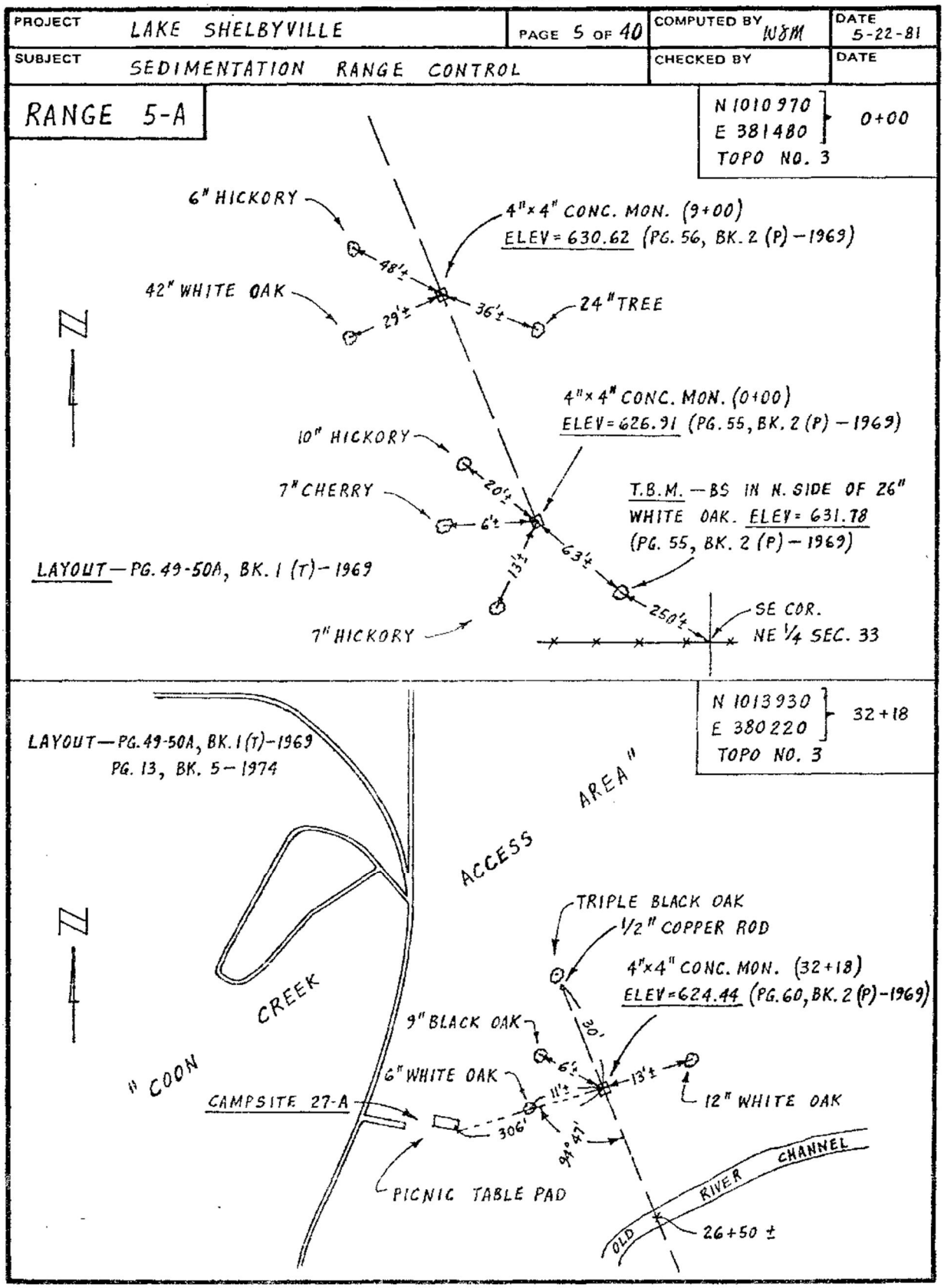
N 1010940
E 376580
TOPO NO. 3
33+33



LMV FORM 1 FEB 79 107e ORIGINAL

COMPUTATION SHEET

PROJECT	LAKE SHELBYVILLE	PAGE 5 OF 40	COMPUTED BY WBM	DATE 5-22-81
SUBJECT	SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE

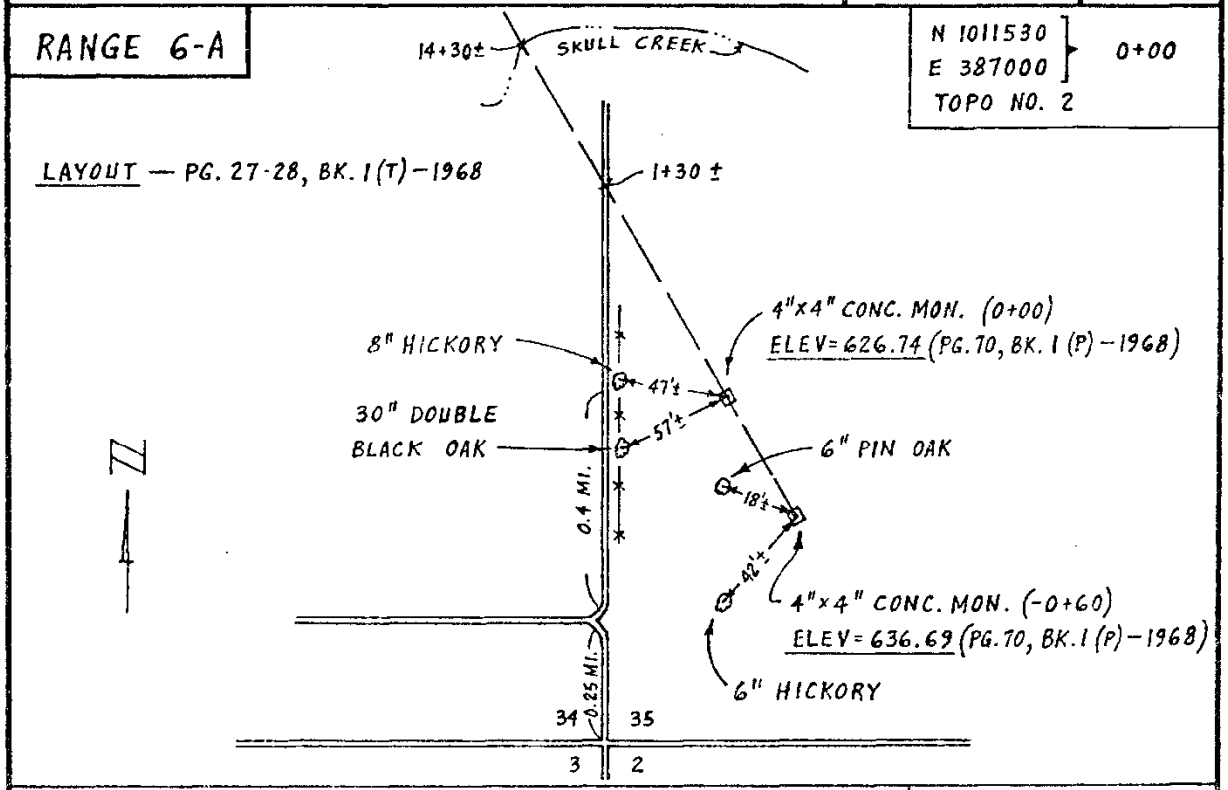


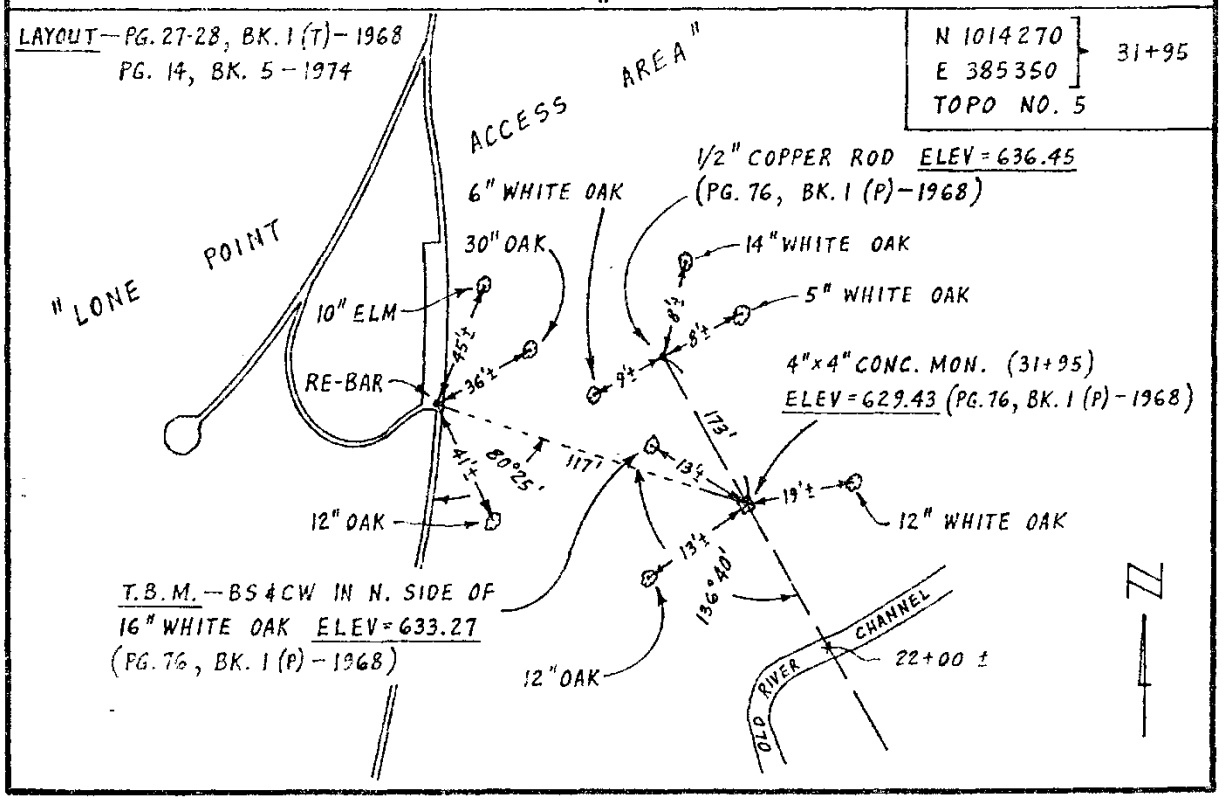
LMV FORM 1 FEB 79 107e ORIGINAL

COMPUTATION SHEET

PROJECT	LAKE SHELBYVILLE	PAGE 6 OF 40	COMPUTED BY WJM	DATE 5-22-81
SUBJECT	SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE

RANGE 6-A



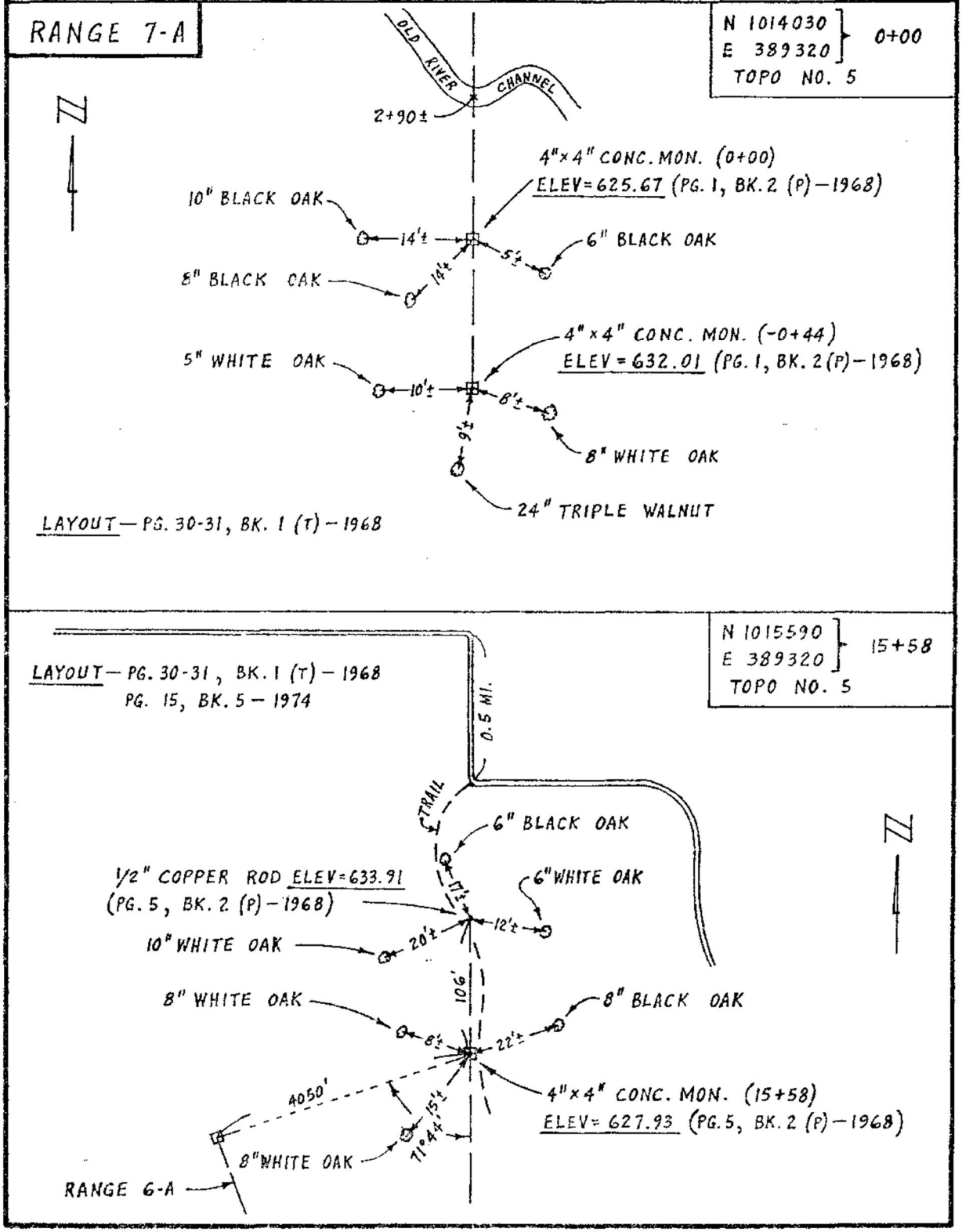


LMV FORM 1 FEB 79 107e ORIGINAL

COMPUTATION SHEET

PROJECT	LAKE SHELBYVILLE	PAGE 7 OF 40	COMPUTED BY WSM	DATE 5-27-81
SUBJECT	SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE

RANGE 7-A

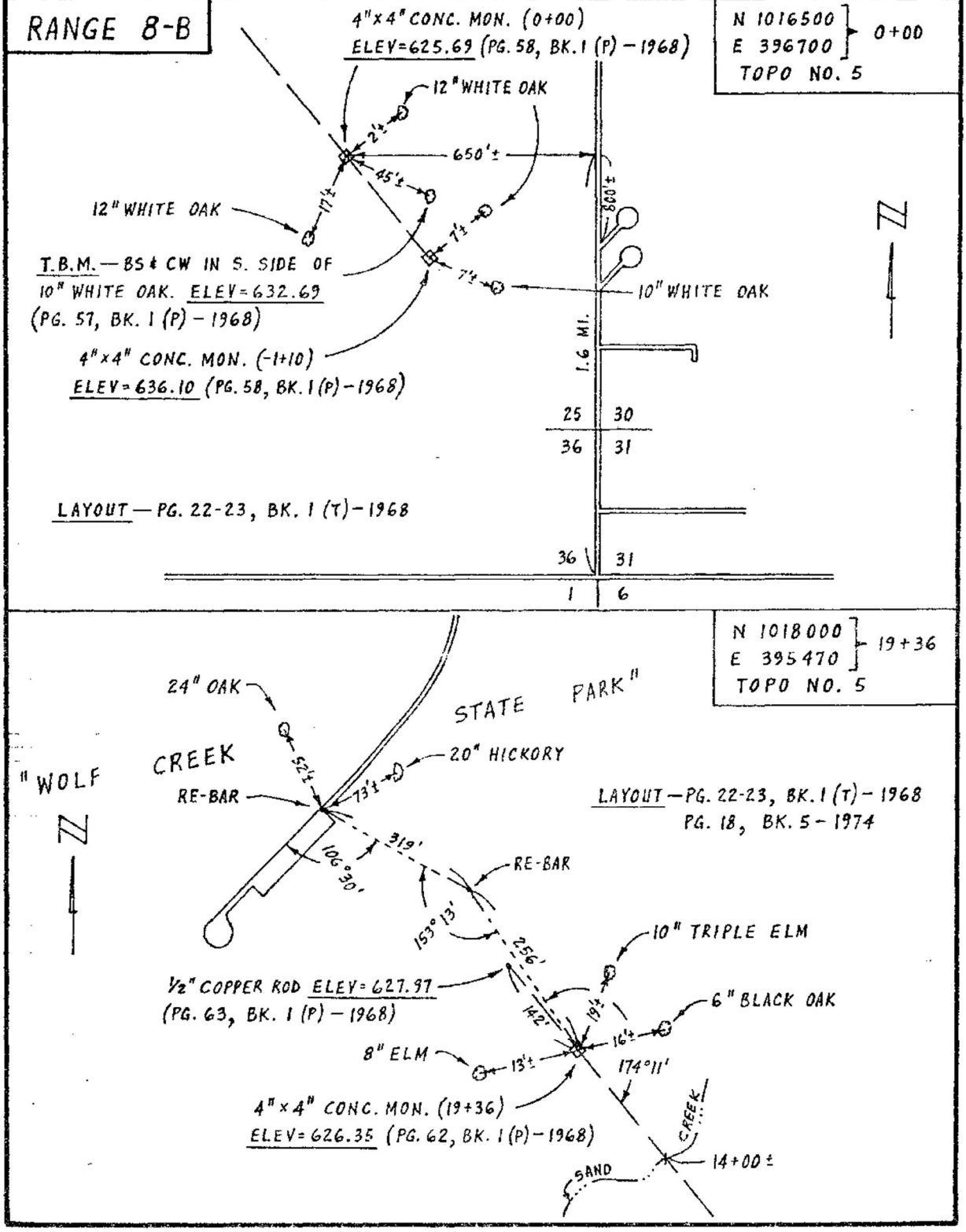


LMV FORM 1 FEB 79 107e ORIGINAL

COMPUTATION SHEET

PROJECT	LAKE SHELBYVILLE	PAGE 8 OF 40	COMPUTED BY WDM	DATE 5-27-81
SUBJECT	SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE

RANGE 8-B



LMV FORM 1 FEB 79 107e

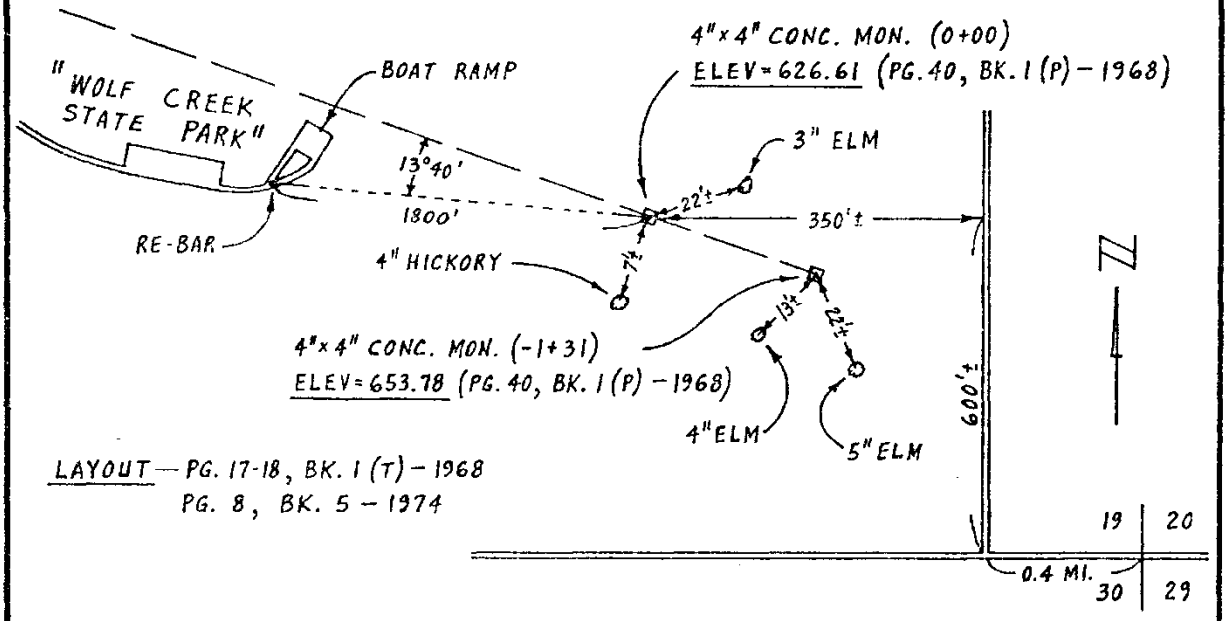
ORIGINAL

COMPUTATION SHEET

PROJECT	PAGE	COMPUTED BY	DATE
LAKE SHELBYVILLE	9 OF 40	WSM	5-28-81
SUBJECT		CHECKED BY	DATE
SEDIMENTATION RANGE CONTROL			

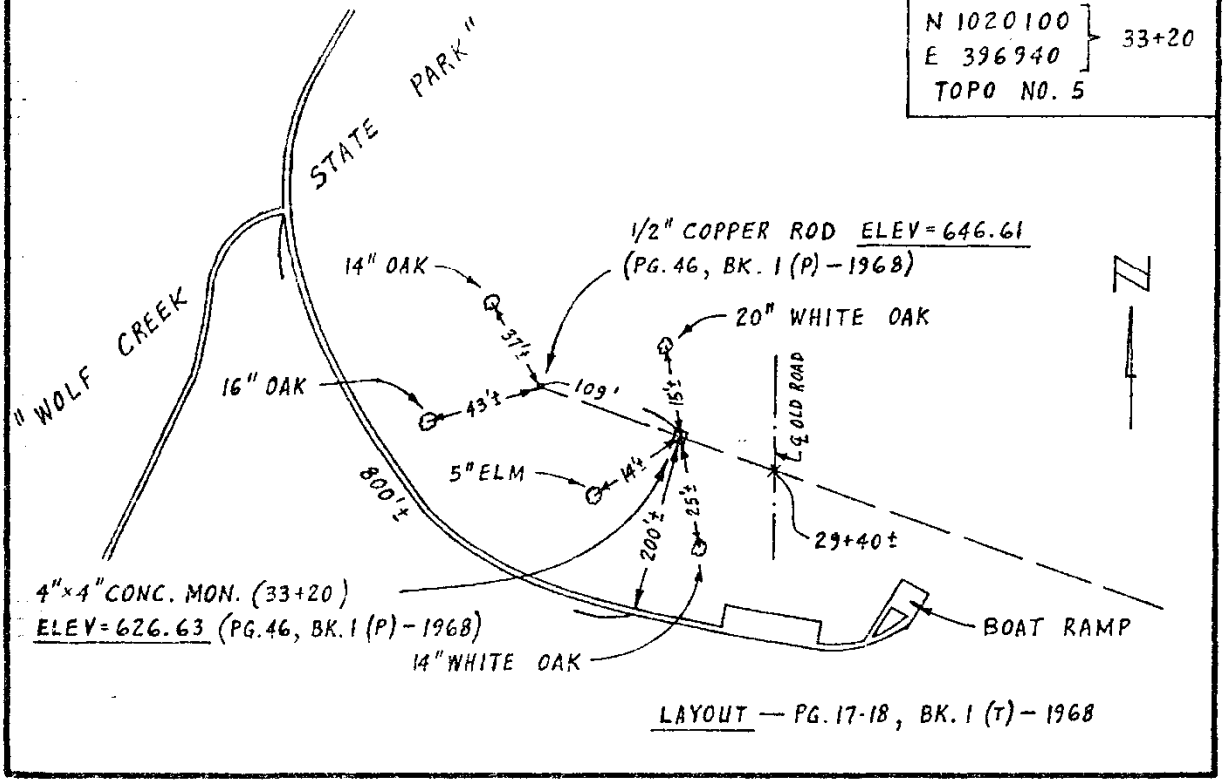
RANGE 9-B

N 1019000
E 400 080 } 0+00
TOPO NO. 6



LAYOUT — PG. 17-18, BK. 1 (T) - 1968
PG. 8, BK. 5 - 1974

N 1020100
E 396940 } 33+20
TOPO NO. 5

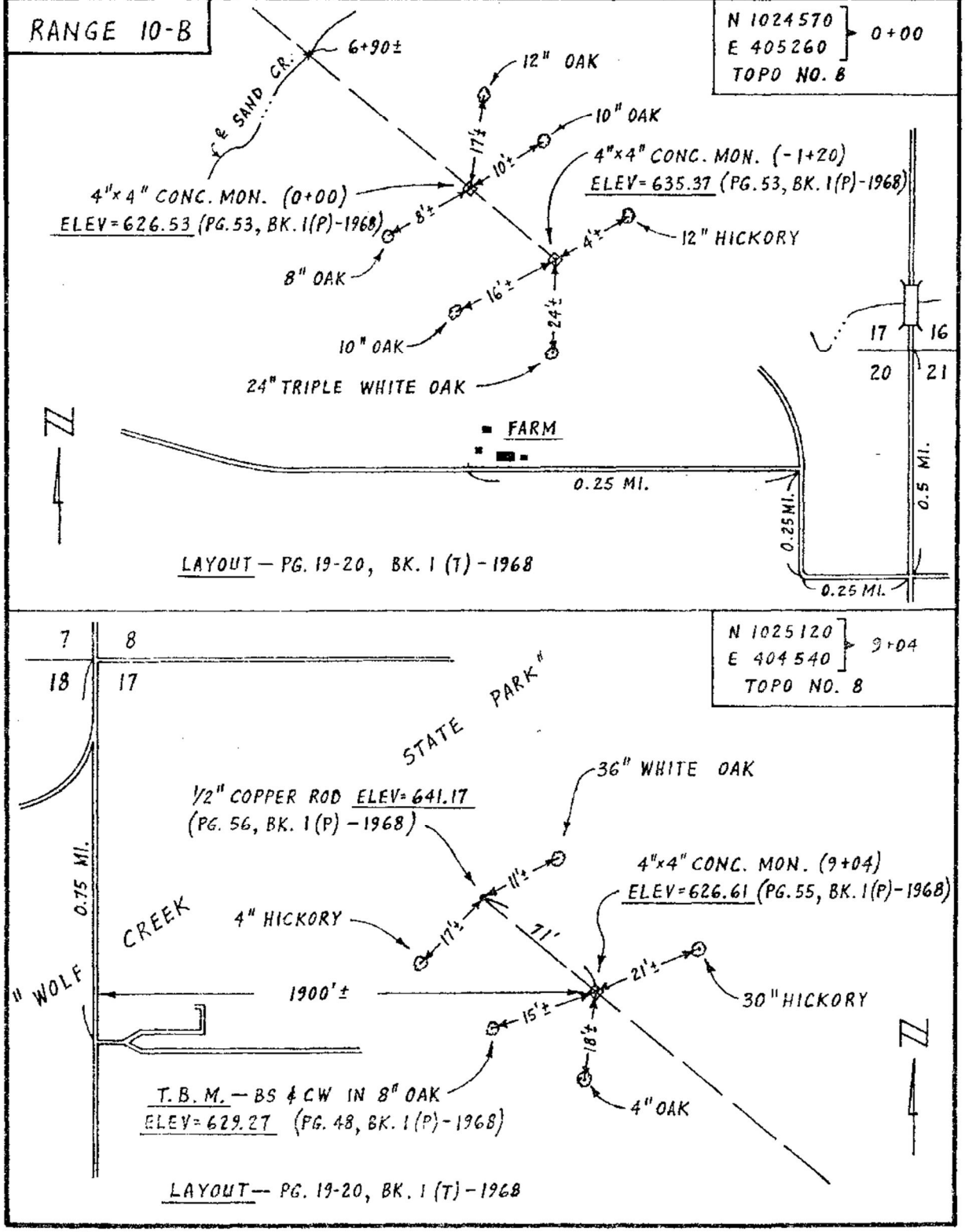


LAYOUT — PG. 17-18, BK. 1 (T) - 1968

LMV FORM 1 FEB 79 107e ORIGINAL

COMPUTATION SHEET

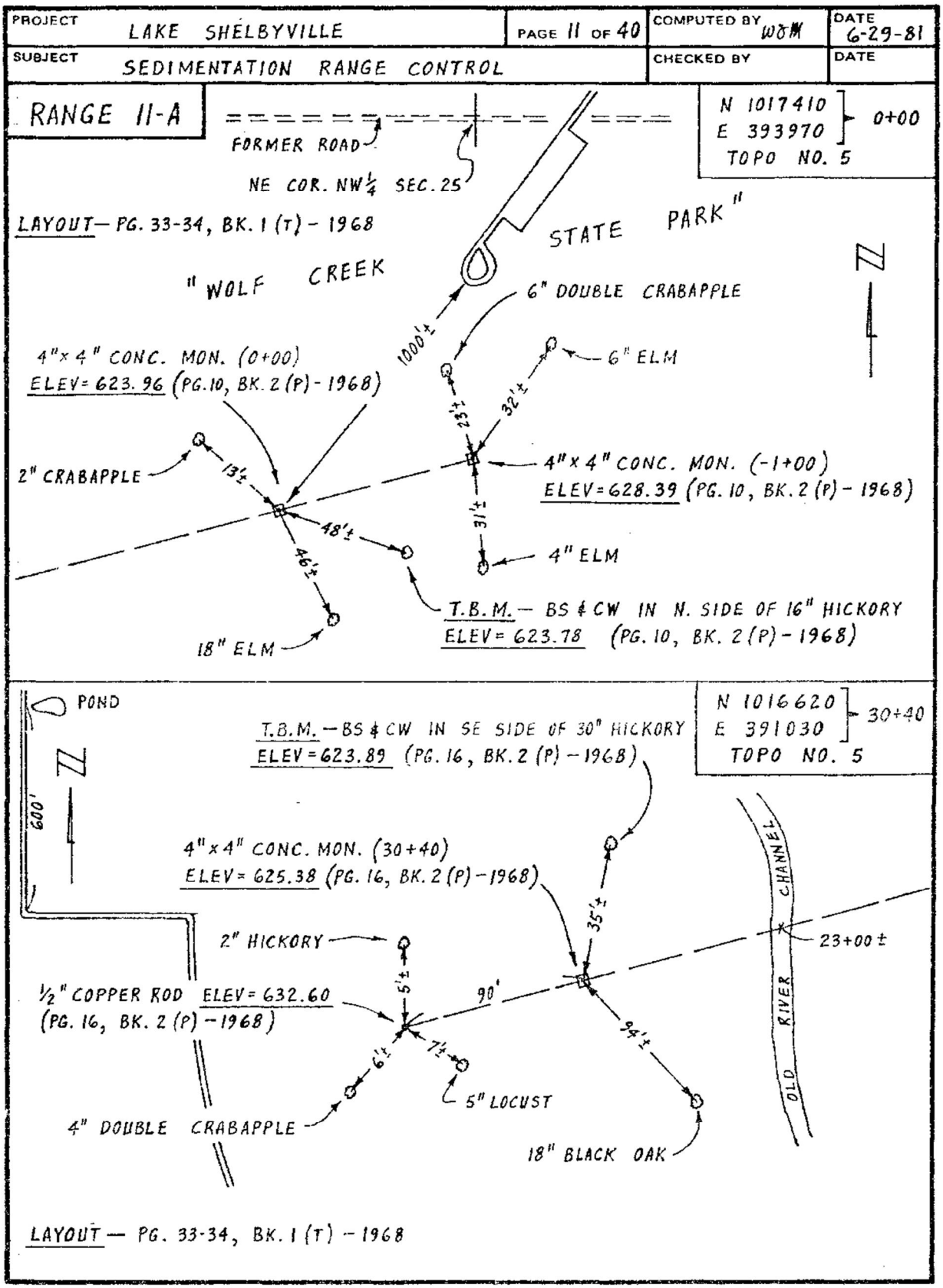
PROJECT LAKE SHELBYVILLE	PAGE 10 OF 40	COMPUTED BY WSM	DATE 5-29-81
SUBJECT SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE



LMV FORM 1 FEB 79 107e ORIGINAL

COMPUTATION SHEET

PROJECT	LAKE SHELBYVILLE	PAGE 11 OF 40	COMPUTED BY WDM	DATE 6-29-81
SUBJECT	SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE



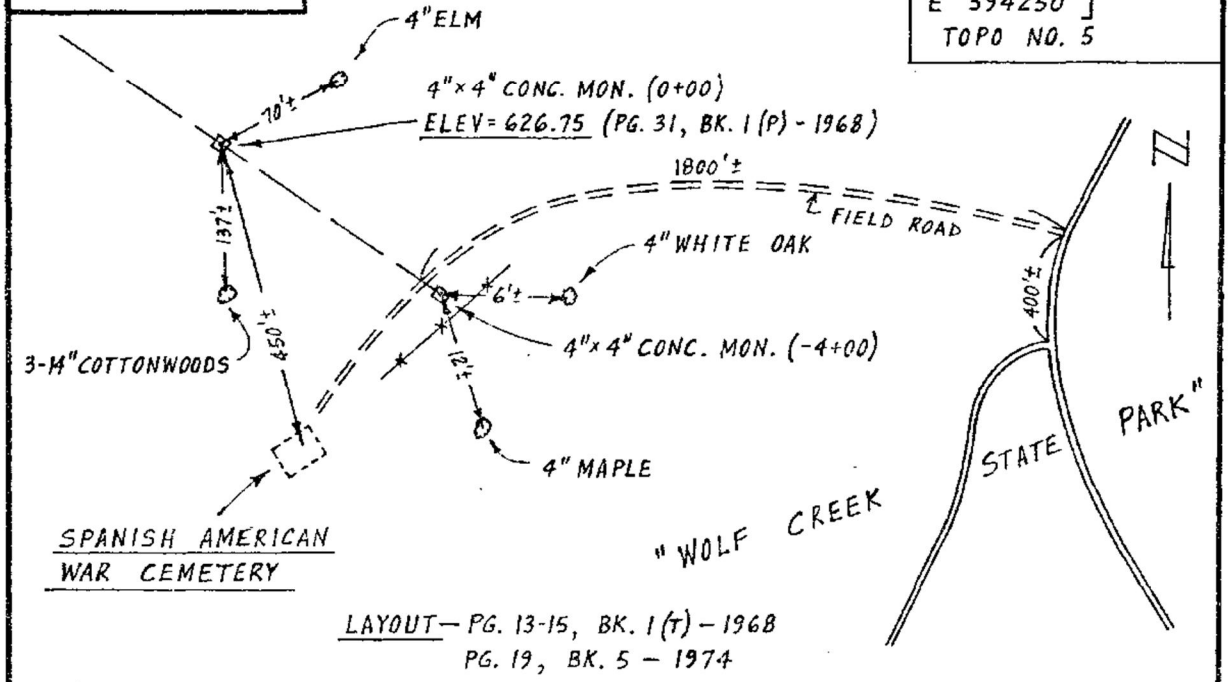
LMV FORM 1 FEB 79 107e ORIGINAL

COMPUTATION SHEET

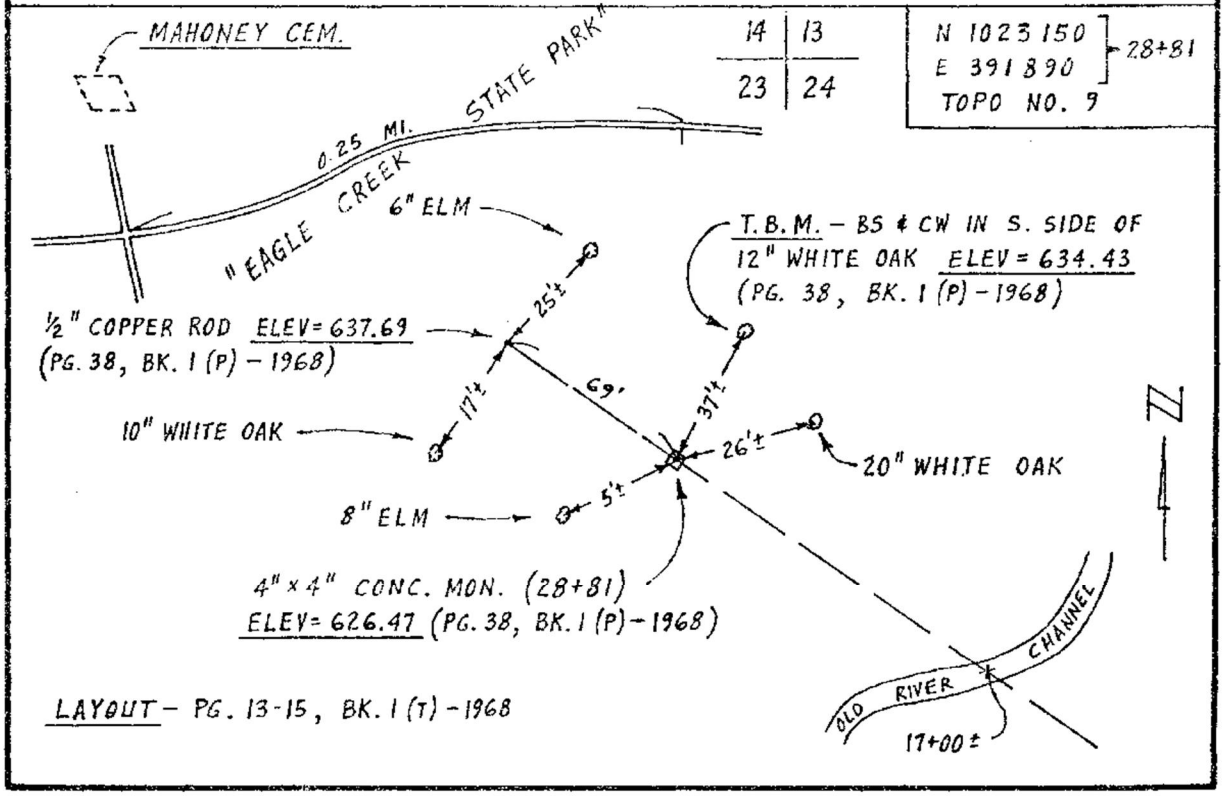
PROJECT	LAKE SHELBYVILLE	PAGE 12 OF 40	COMPUTED BY WDM	DATE 6-30-81
SUBJECT	SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE

RANGE 12-A

N 1021500
E 394250 } 0+00
TOPO NO. 5



LAYOUT — PG. 13-15, BK. 1 (T) - 1968
PG. 19, BK. 5 — 1974

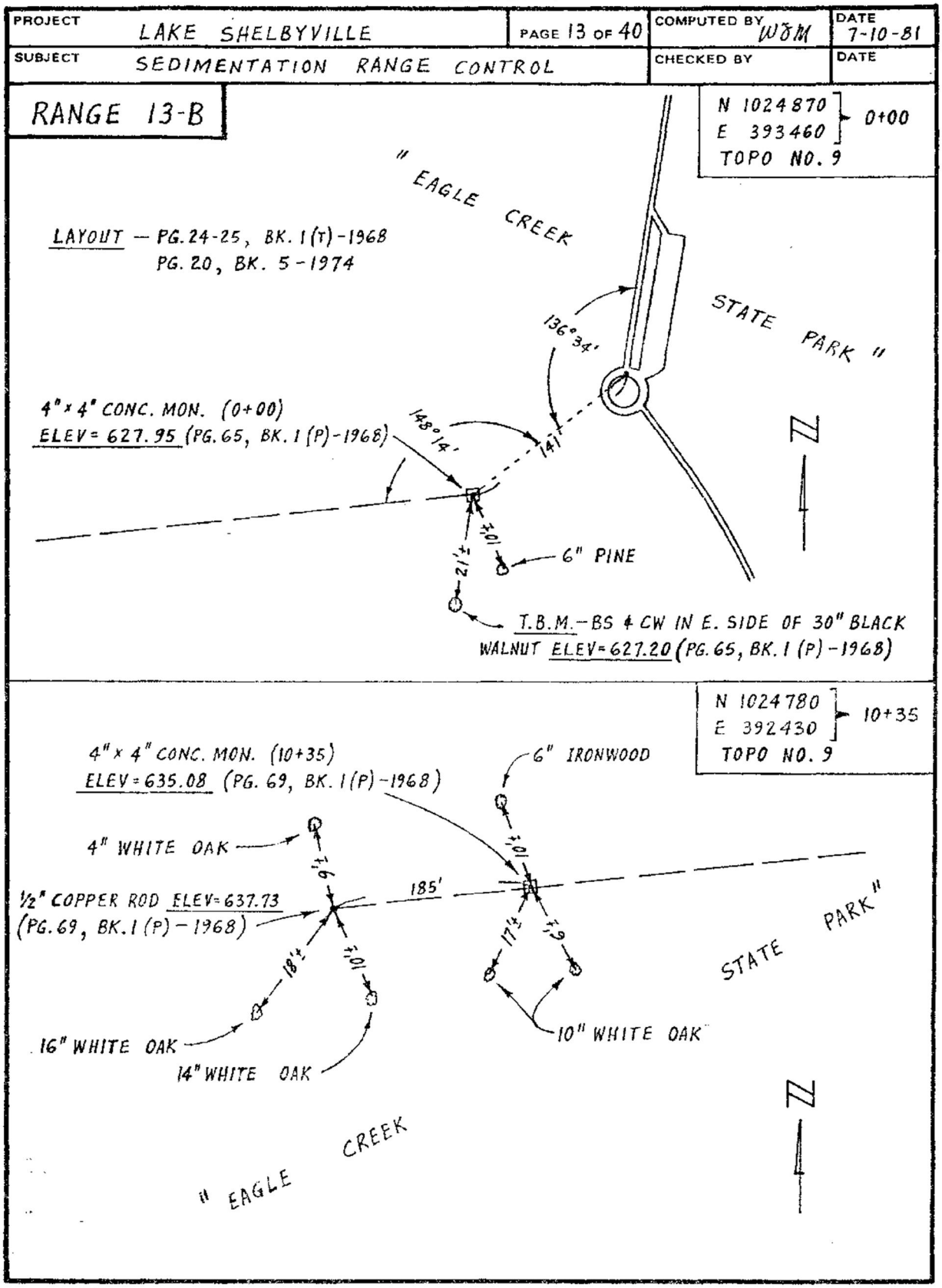


LAYOUT — PG. 13-15, BK. 1 (T) - 1968

LMV FORM 1 FEB 79 107e ORIGINAL

COMPUTATION SHEET

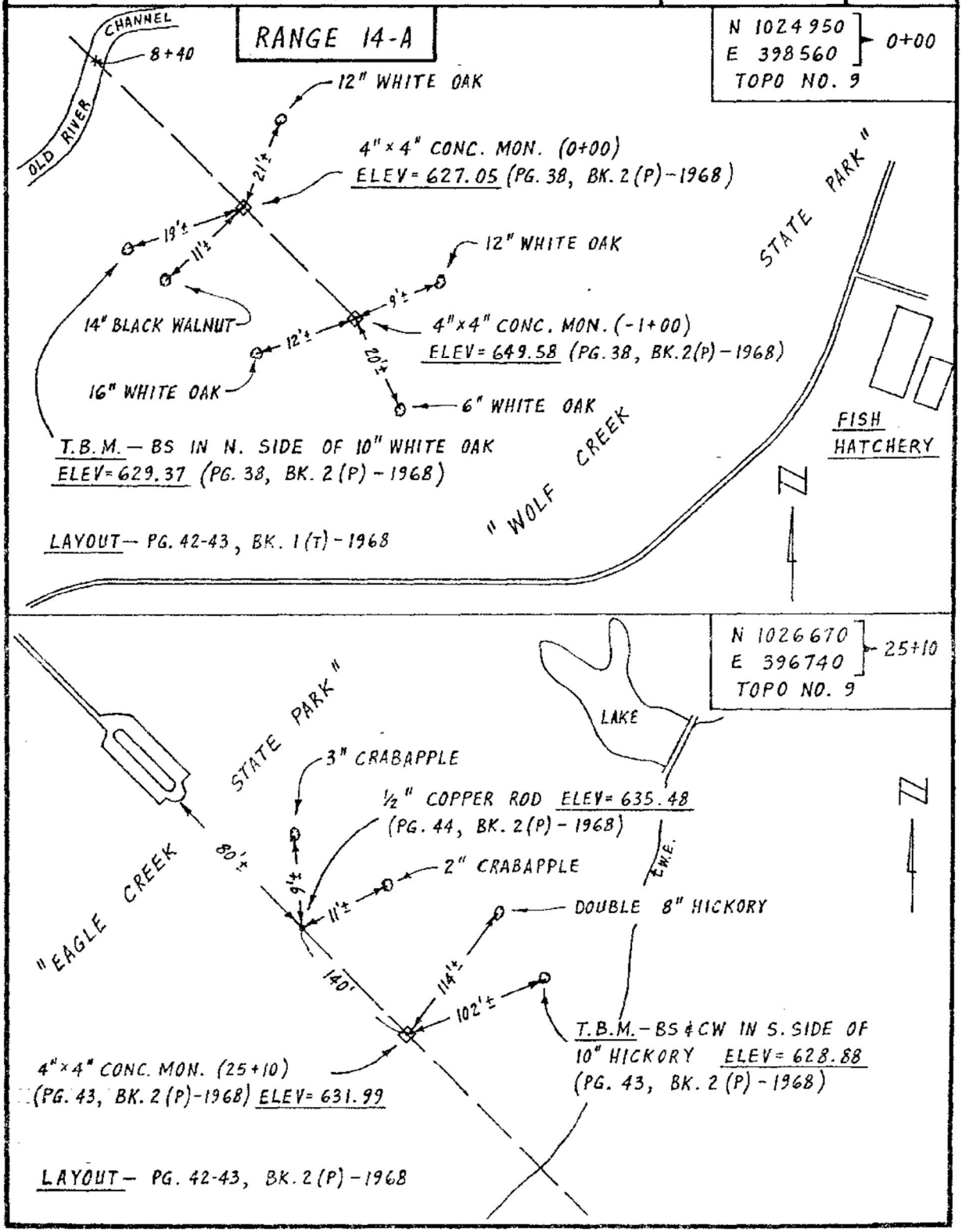
PROJECT	LAKE SHELBYVILLE	PAGE 13 OF 40	COMPUTED BY WBM	DATE 7-10-81
SUBJECT	SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE



LMV FORM 1 FEB 79 107e ORIGINAL

COMPUTATION SHEET

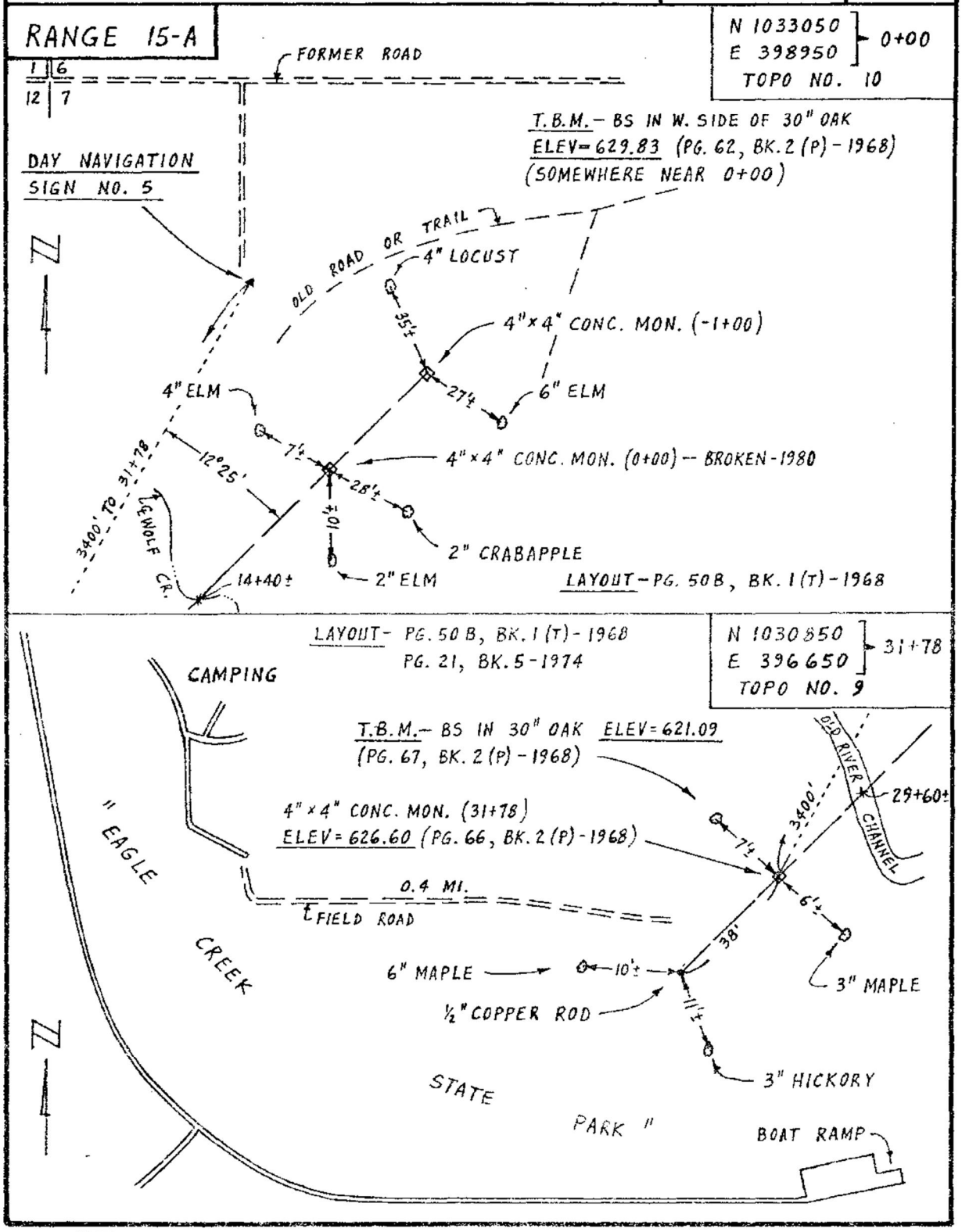
PROJECT	PAGE	COMPUTED BY	DATE
LAKE SHELBYVILLE	14 OF 40	W&M	7-13-81
SUBJECT		CHECKED BY	DATE
SEDIMENTATION RANGE CONTROL			



LMV FORM 1 FEB 79 107e ORIGINAL

COMPUTATION SHEET

PROJECT	LAKE SHELBYVILLE	PAGE 15 OF 40	COMPUTED BY W&M	DATE 7-13-81
SUBJECT	SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE

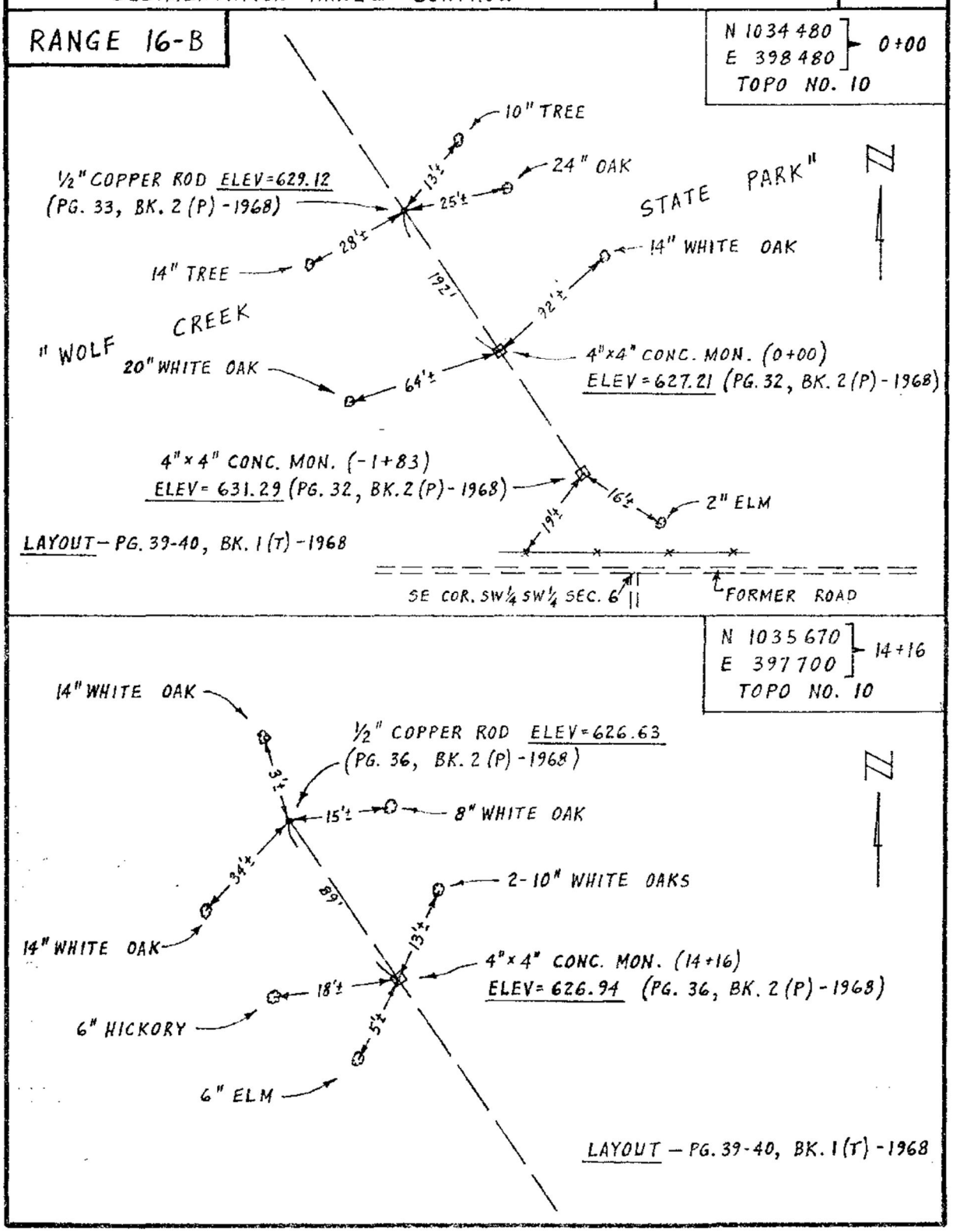


LMV FORM 1 FEB 79 107e ORIGINAL

COMPUTATION SHEET

PROJECT	LAKE SHELBYVILLE	PAGE 16 OF 40	COMPUTED BY W&M	DATE 7-14-81
SUBJECT	SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE

RANGE 16-B



LMV FORM 1 FEB 79 107e ORIGINAL

COMPUTATION SHEET

PROJECT	LAKE SHELBYVILLE	PAGE 17 OF 40	COMPUTED BY W&M	DATE 7-15-81
SUBJECT	SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE

RANGE 17-A

N 1036320
E 396240
TOPO NO. 10
0+00

N

SEC. 1 / SEC. 6

4" ELM

4"x4" CONC. MON. (0+00)
ELEV=626.55 (PG. 24, BK. 2 (P)-1968)

4"x4" CONC. MON. (-1+45)
ELEV=630.27 (PG. 24, BK. 2 (P)-1968)

44'±

12" ELM

64'±

15'±

8" TWIN PEACH

900'±

FORMER ROAD

82'±

30'±

40'±

26" ELM

12" ELM

T.B.M. – BS ¢ CW IN N. SIDE OF 14" TWIN MULBERRY ELEV = 631.49
(PG. 20, BK. 2 (P) - 1968)

LAYOUT – PG. 36-37, BK. 1 (T) - 1968

N 1034830
E 393070
TOPO NO. 10
35+02

"EAGLE CREEK STATE PARK"

N

14" MAPLE

7½'

175°40'

OLD RIVER CHANNEL

33+35±

½" COPPER ROD ELEV=652.09
(PG. 30, BK. 2 (P) - 1968)

200'±

151°48'

209'

75'

21'±

800'±

FIELD ROAD

4"x4" CONC. MON. (35+02)
ELEV = 626.70 (PG. 29, BK. 2 (P)-1968)

T.B.M. – BS IN N. ROOT OF 24" OAK
ELEV= 624.73 (PG. 29, BK. 2 (P)-1968)

LAYOUT – PG. 36-37, BK. 1 (T) - 1968
PG. 22, BK. 5 - 1974

2 | 1
11 | 12

LMV FORM 1 FEB 79 107e

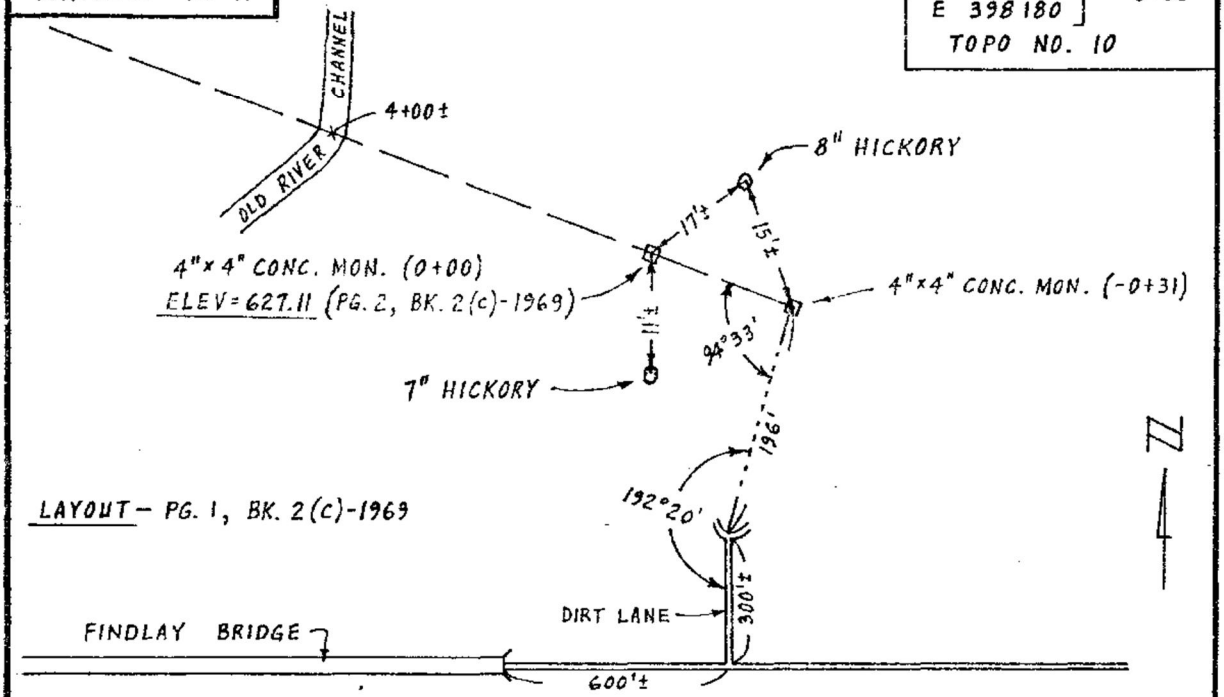
ORIGINAL

COMPUTATION SHEET

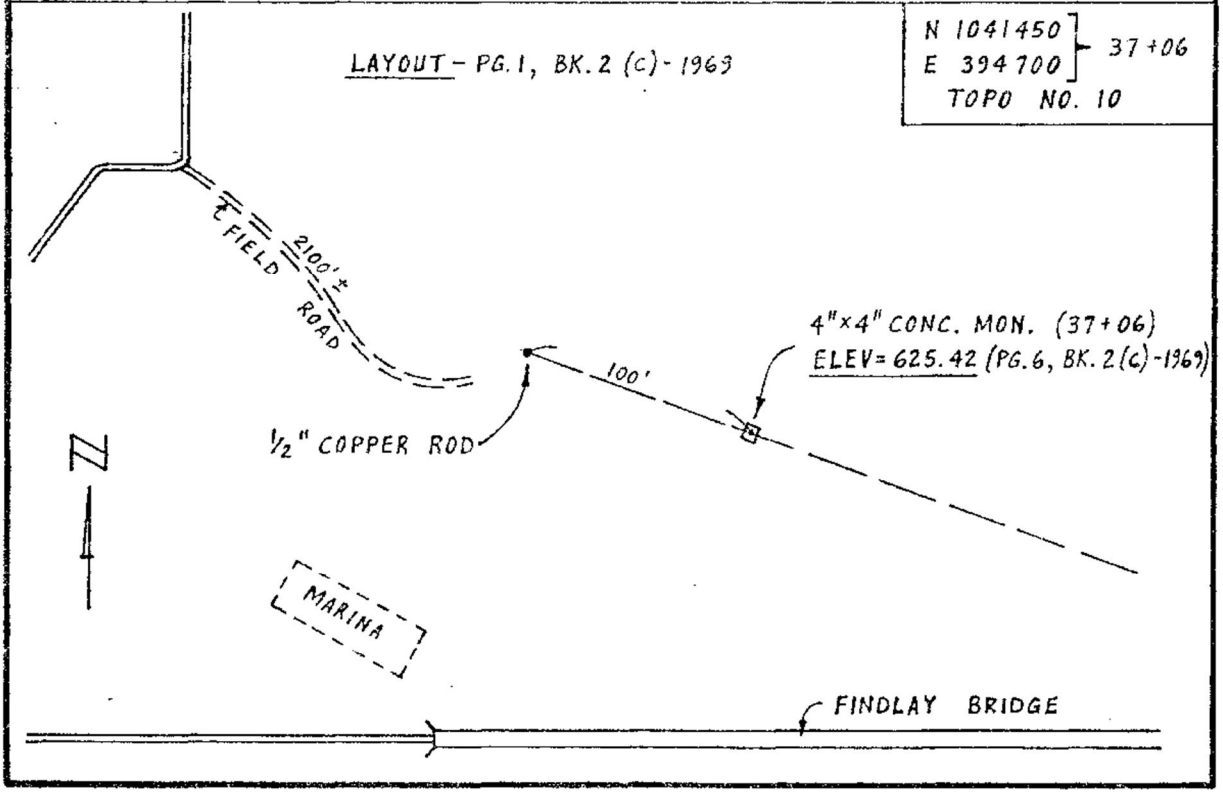
PROJECT	LAKE SHELBYVILLE	PAGE 18 OF 40	COMPUTED BY W&M	DATE 7-16-81
SUBJECT	SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE

RANGE 18-A

N 1040180
E 398180 } 0+00
TOPO NO. 10



N 1041450
E 394700 } 37+06
TOPO NO. 10



LMV FORM 1 FEB 79 107e ORIGINAL

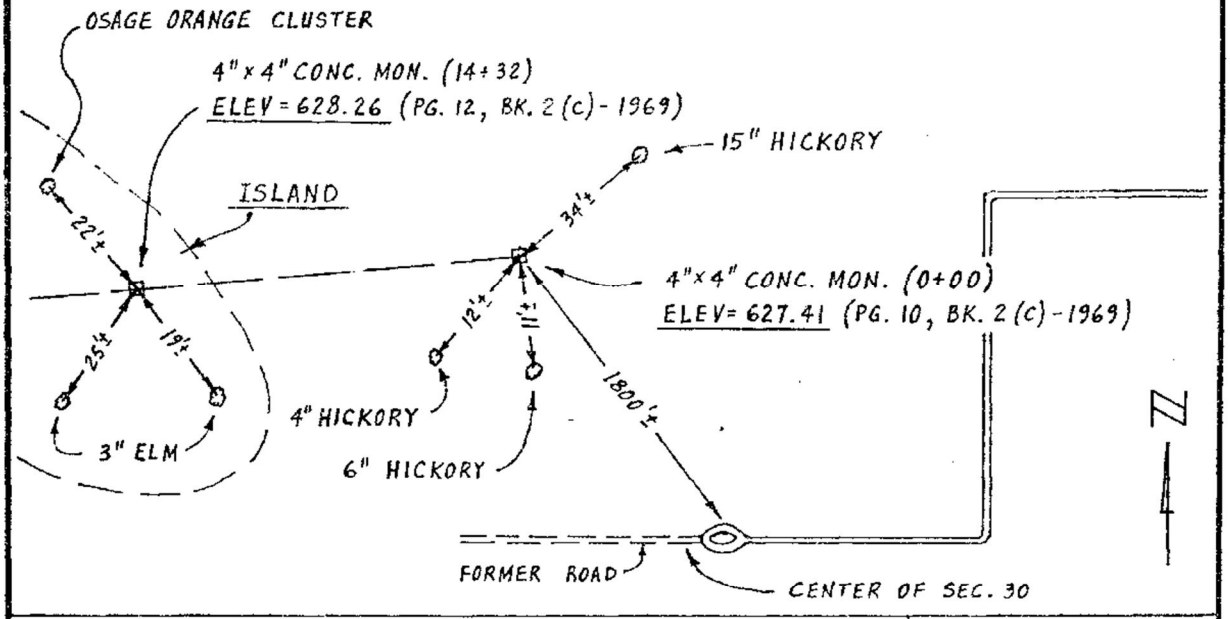
COMPUTATION SHEET

PROJECT	LAKE SHELBYVILLE	PAGE 19 OF 40	COMPUTED BY WBM	DATE 7-17-81
SUBJECT	SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE

RANGE 19-A

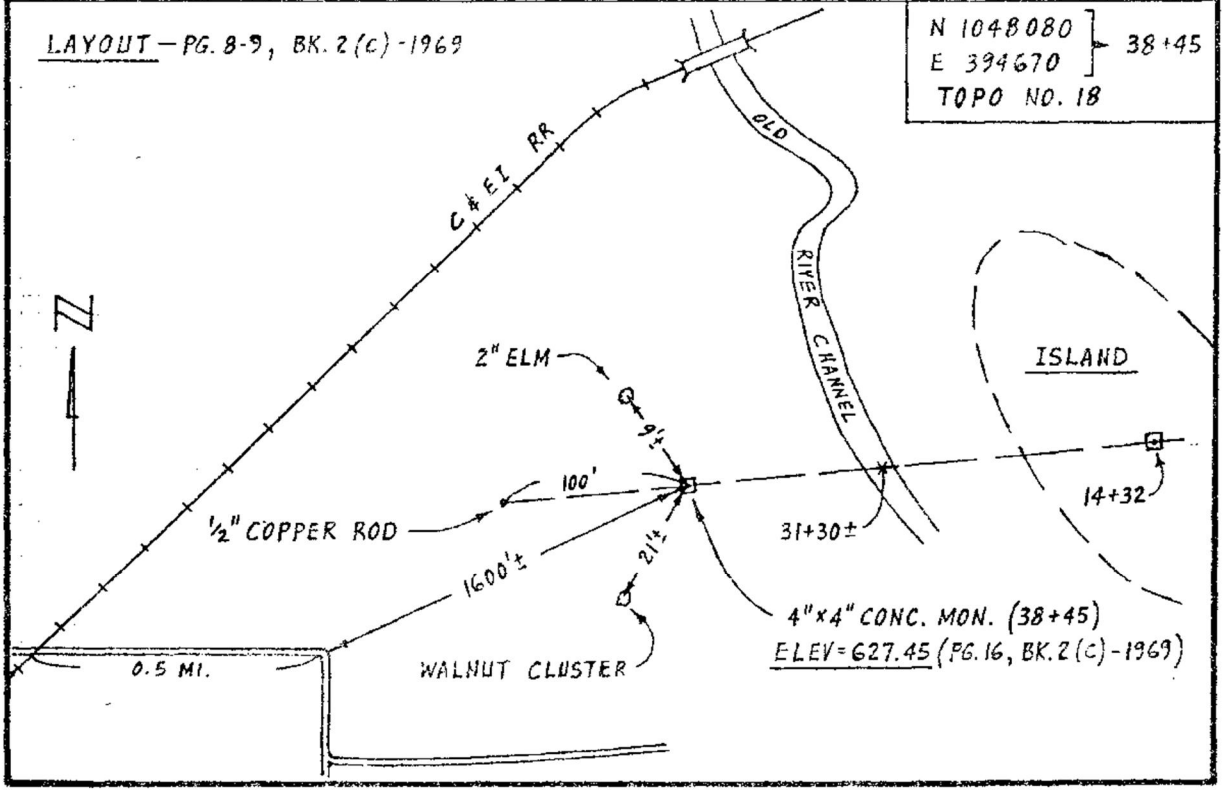
LAYOUT — PG. 8-9, BK. 2(c)-1969

N 1048370
E 398500
TOPO NO. 18
0+00



LAYOUT — PG. 8-9, BK. 2(c)-1969

N 1048080
E 394670
TOPO NO. 18
38+45



LMV FORM 1 FEB 79 107e ORIGINAL

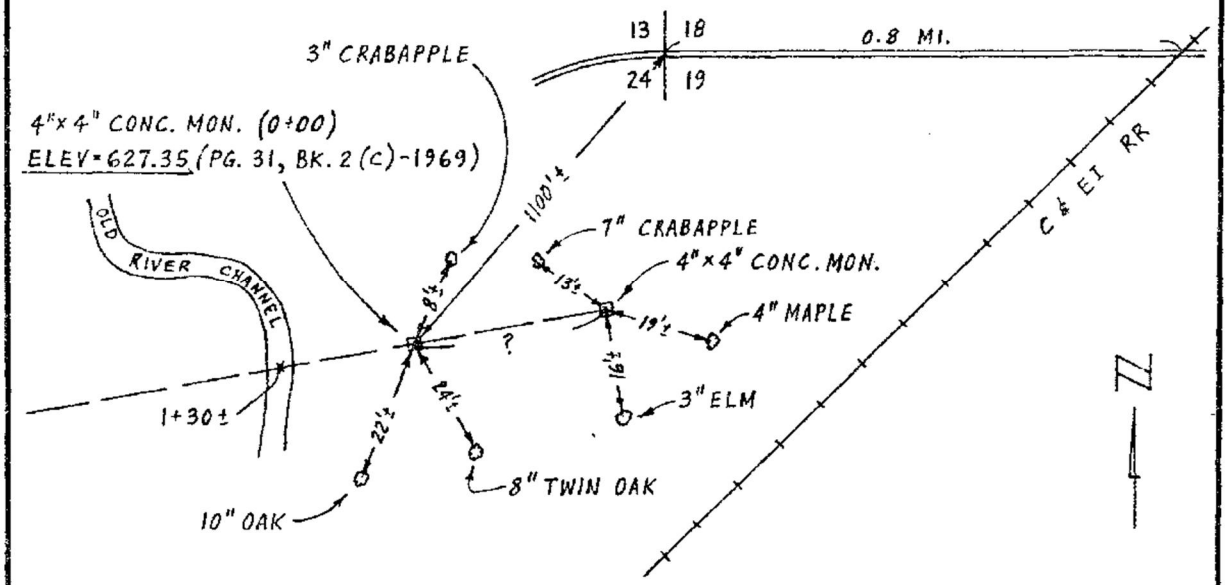
COMPUTATION SHEET

PROJECT	LAKE SHELBYVILLE	PAGE 20 OF 40	COMPUTED BY W&M	DATE 7-17-81
SUBJECT	SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE

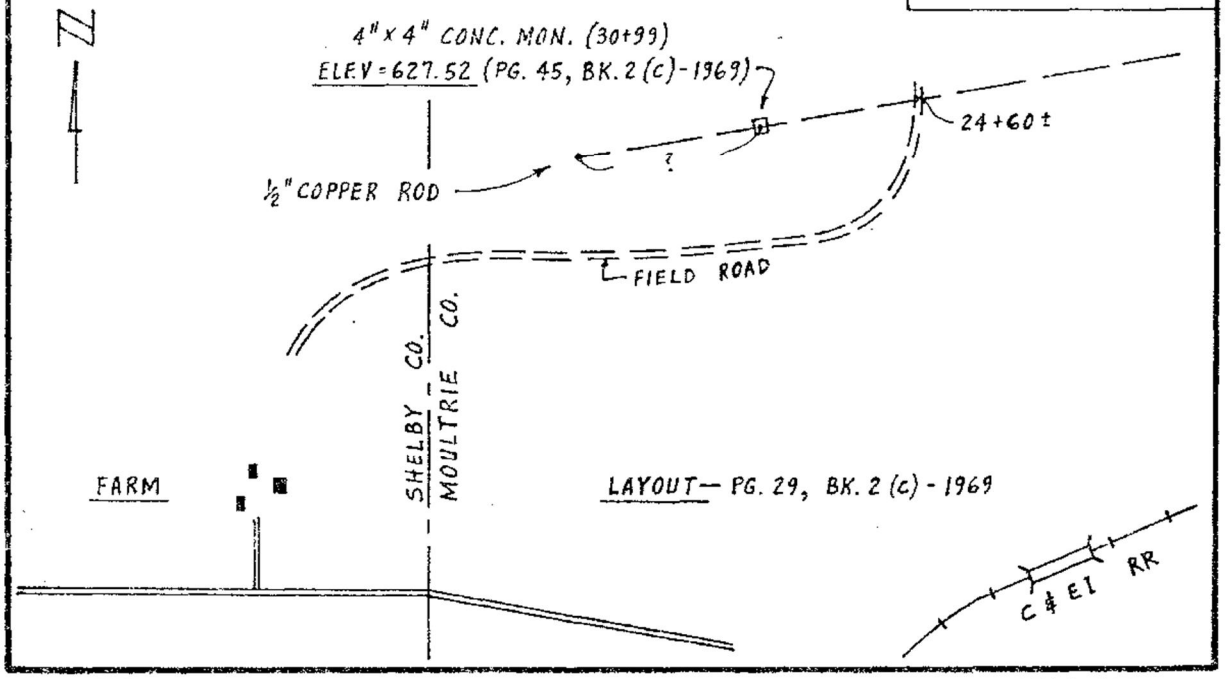
RANGE 20-A

LAYOUT— PG. 29, BK. 2(c)-1969

N 1054500
E 396580
TOPO NO. 20
0+00



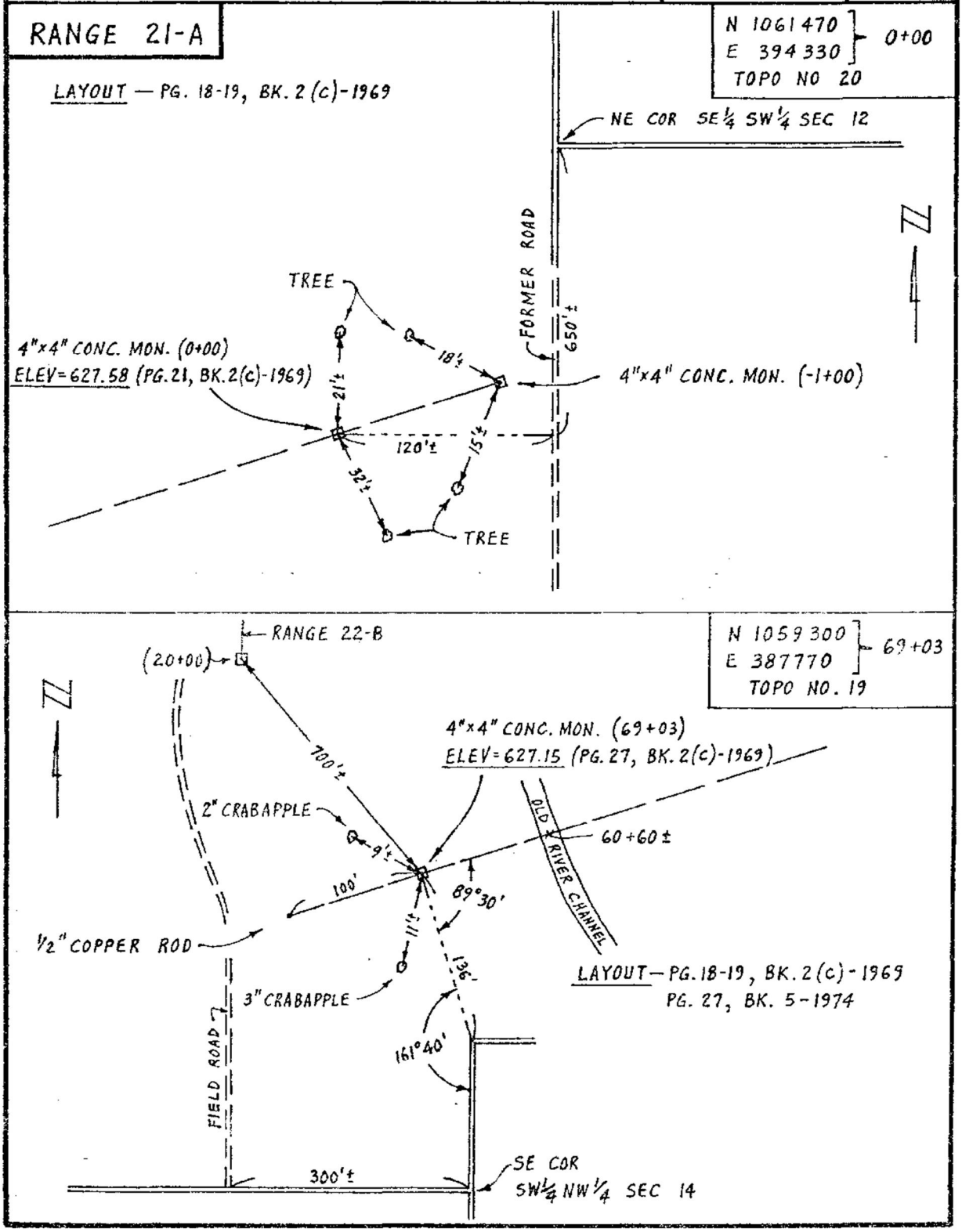
N 1053920
E 393530
TOPO NO. 20
30+99



LMV FORM 1 FEB 79 107e ORIGINAL

COMPUTATION SHEET

PROJECT	LAKE SHELBYVILLE	PAGE 21 OF 40	COMPUTED BY W&M	DATE 7-20-81
SUBJECT	SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE



LMV FORM 1 FEB 79 107e ORIGINAL

COMPUTATION SHEET

PROJECT	LAKE SHELBYVILLE	PAGE 22 OF 40	COMPUTED BY WJM	DATE 7-20-81
SUBJECT	SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE

RANGE 22-B

N 1061900
E 387600 } 0+00
TOPO NO. 19

LAYOUT — PG. 39, BK. 2(c)-1969

0.25 MI.

330'±

NE COR SW¼ SW¼ SEC. 11

200'±

4" WILD PLUM

4"x 4" CONC. MON (-1+00)

26'±

2" WILD PLUM

9'±

4"x 4" CONC. MON. (0+00)
ELEV=627.17 (PG. 35, BK. 2(c)-1969)

℄ WILLBORN CR.

6+70±

N 1059900
E 387420 } 20+00
TOPO NO. 19

4"x 4" CONC. MON. (20+00)
ELEV=627.15 (PG. 38, BK. 2(c)-1969)

100'

700'±

℄ RANGE 21-A

½" COPPER ROD

1500'±

℄ FIELD ROAD

LAYOUT — PG. 39, BK. 2(c)-1969

300'±

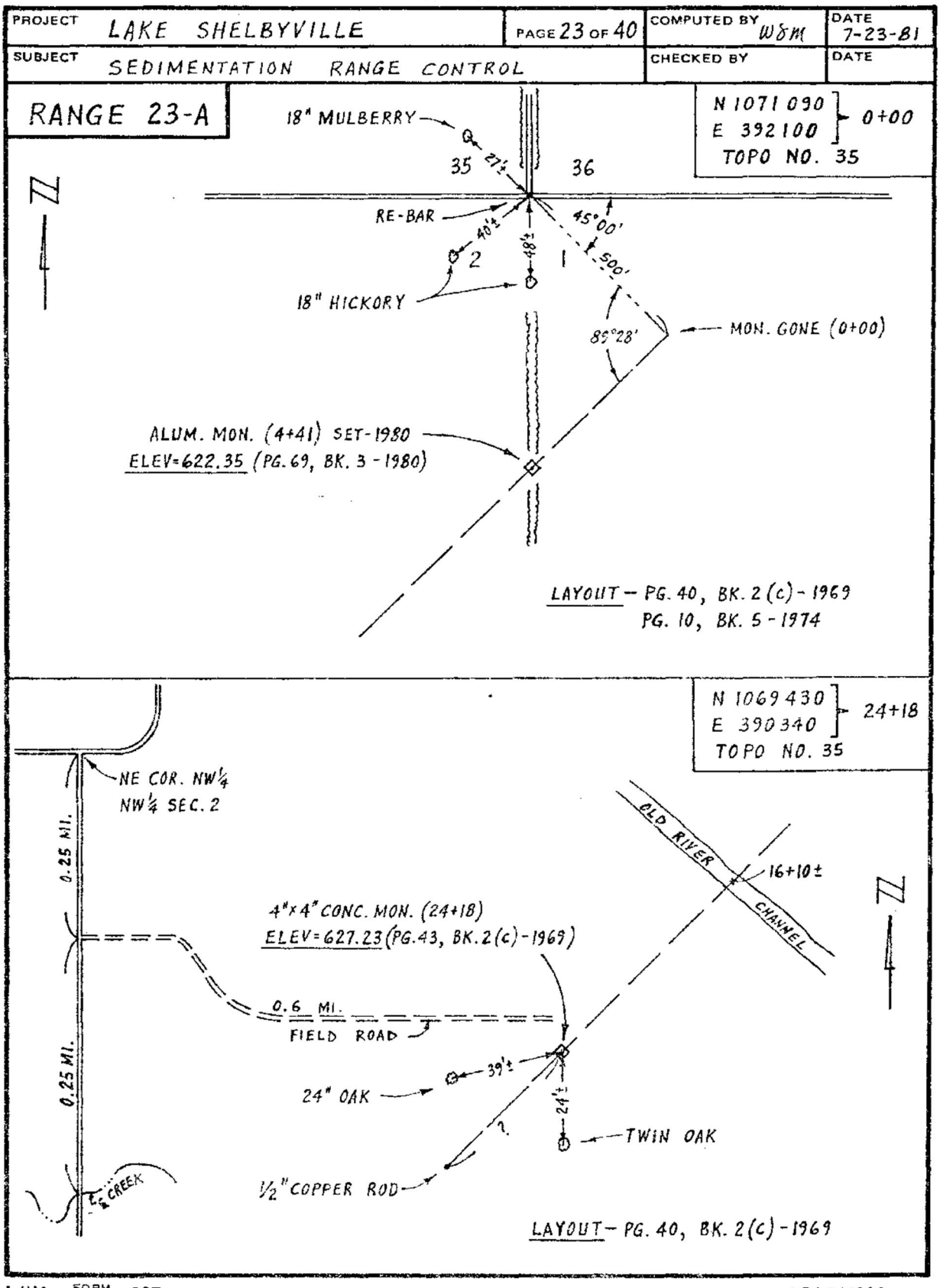
SE COR SW¼ NW¼ SEC 14

LMV FORM 1 FEB 79 107e

ORIGINAL

COMPUTATION SHEET

PROJECT	LAKE SHELBYVILLE	PAGE 23 OF 40	COMPUTED BY W&M	DATE 7-23-81
SUBJECT	SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE

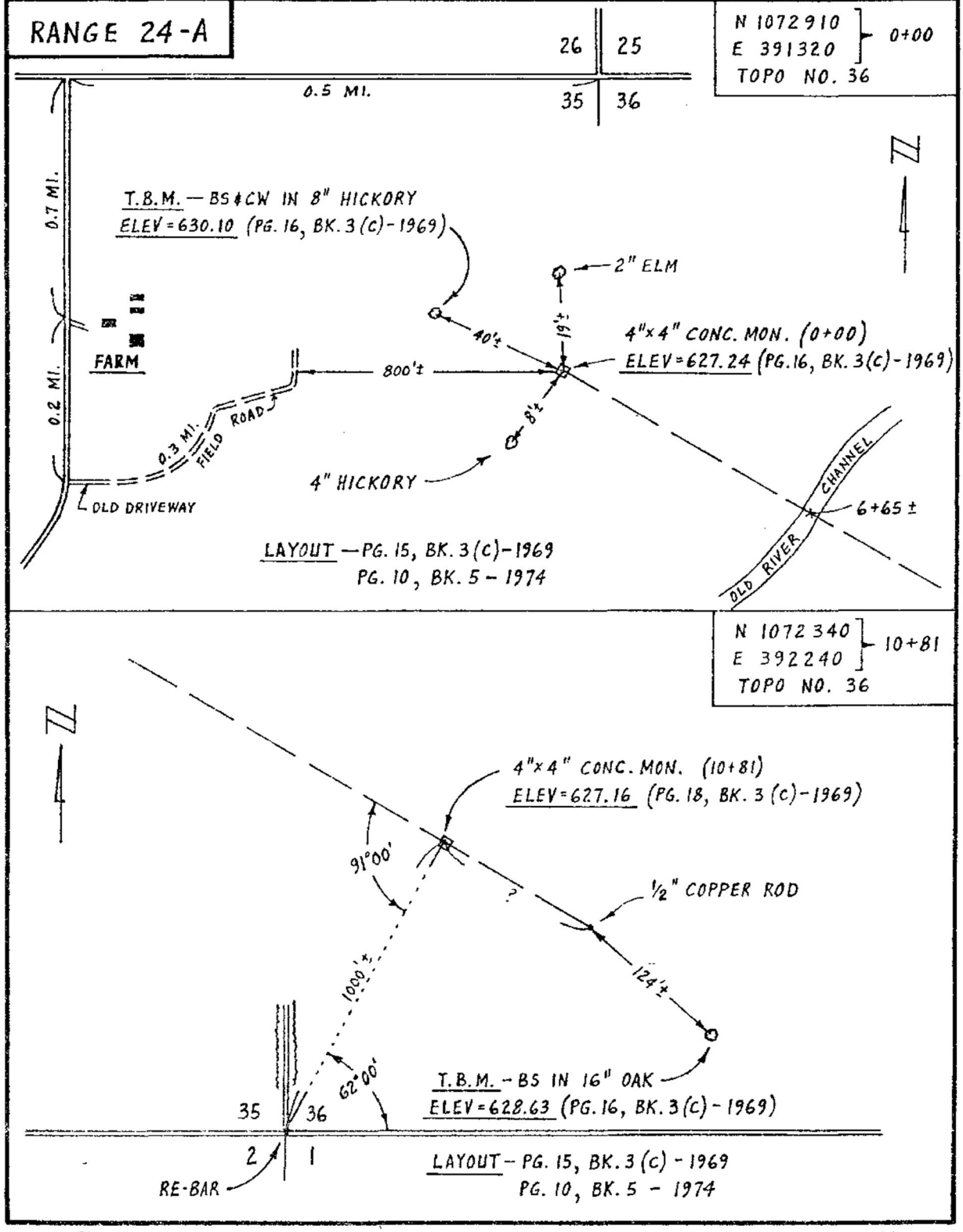


LMV FORM 1 FEB 79 107e ORIGINAL

COMPUTATION SHEET

PROJECT	LAKE SHELBYVILLE	PAGE 24 OF 40	COMPUTED BY WJM	DATE 7-27-81
SUBJECT	SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE

RANGE 24-A



LMV FORM 1 FEB 79 107e ORIGINAL

COMPUTATION SHEET

PROJECT	LAKE SHELBYVILLE	PAGE 25 OF 40	COMPUTED BY WBM	DATE 7-28-81
SUBJECT	SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE

RANGE 25-A

N 1046620
E 399470
TOPO NO. 18
0+00

0.3 MI.
℄ FORMER ROAD

℄ FIELD ROAD

4"x4" CONC. MON. (-1+00)
ELEV=630.47 (PG. 37, BK. 2-1980)

12" OAK

21'±

11'±

4"x4" CONC. MON. (0+00)
ELEV=628.24 (PG. 40, BK. 4(C)-1970)

T.B.M. – SPIKE IN 8" WALNUT
ELEV=629.13 (PG. 39, BK. 4(C)-1970)

OLD RIVER CHANNEL
4+00 ±

LAYOUT – PG. 39, BK. 4(C) - 1970

N

N 1044530
E 399710
TOPO. NO. 18
20+98

N

4"x4" CONC. MON. (20+98)
ELEV=627.64 (PG. 42, BK. 4(C)-1970)

TREE

14'±

6'±

6" OAK

9'±

100'

12" OAK

½" COPPER ROD

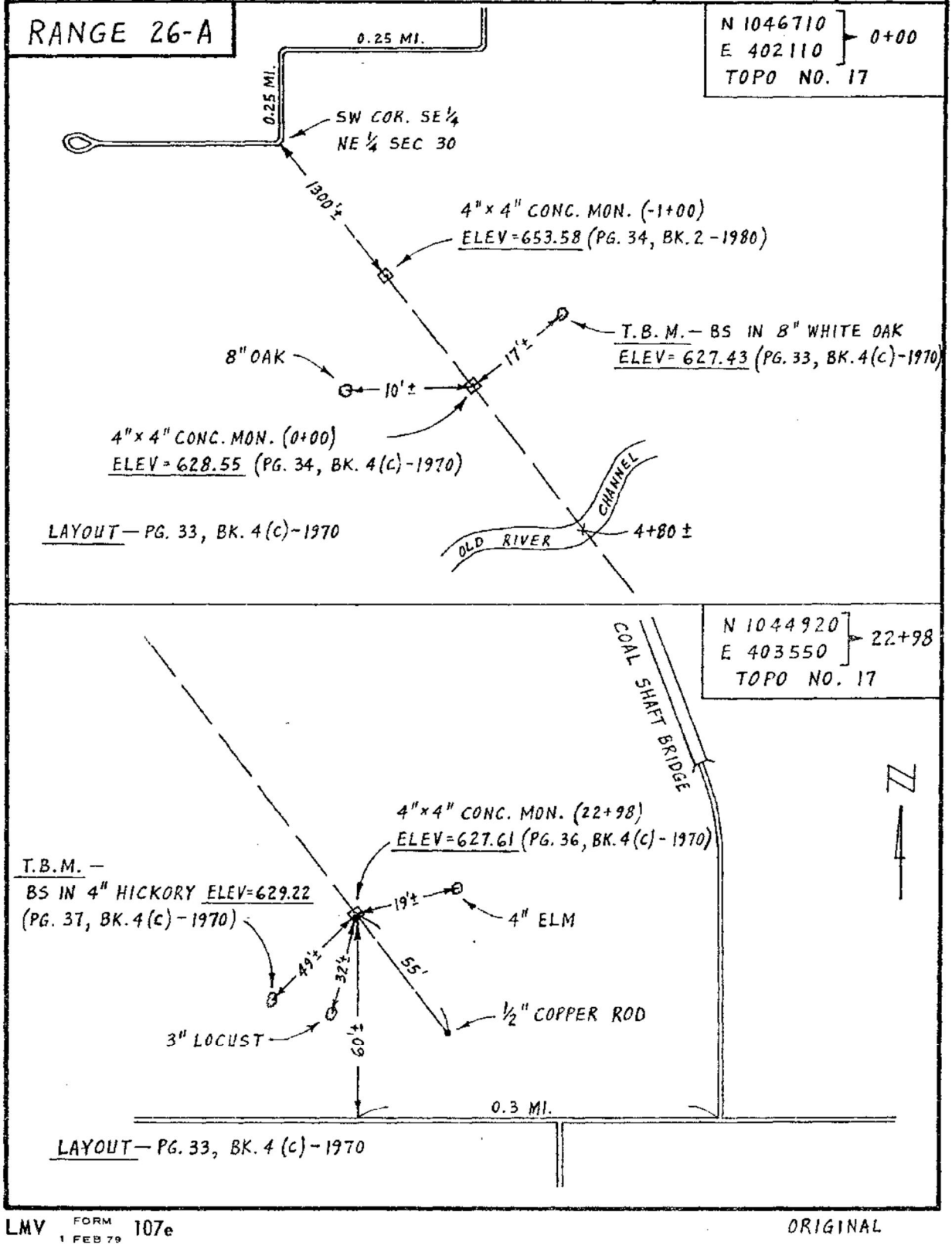
LAYOUT – PG. 39, BK. 4(C) - 1970

LMV FORM 1 FEB 79 107e

ORIGINAL

COMPUTATION SHEET

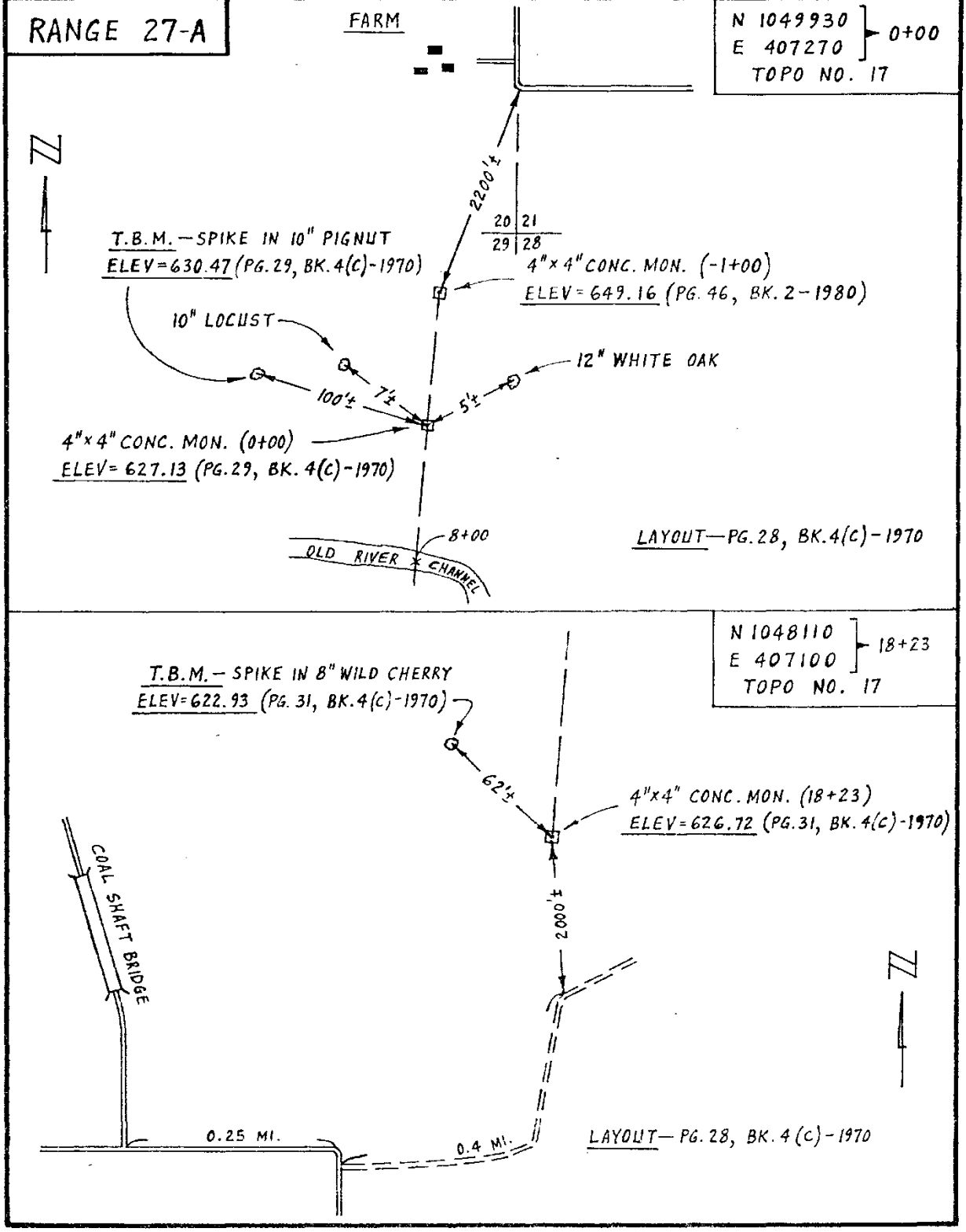
PROJECT LAKE SHELBYVILLE	PAGE 26 OF 40	COMPUTED BY WJM	DATE 7-29-81
SUBJECT SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE



LMV FORM 1 FEB 79 107e ORIGINAL

COMPUTATION SHEET

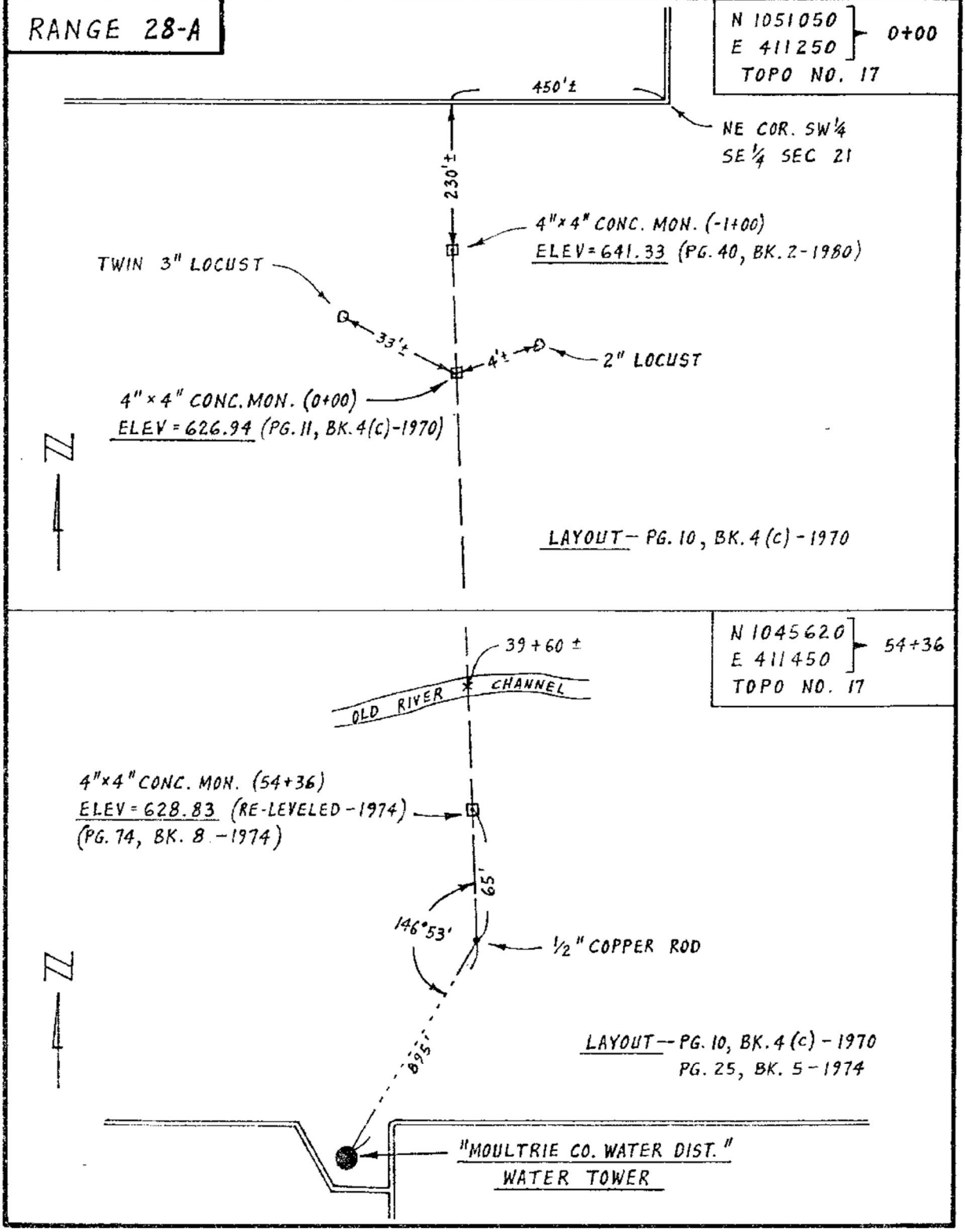
PROJECT	LAKE SHELBYVILLE	PAGE 27 OF 40	COMPUTED BY W&M	DATE 7-30-81
SUBJECT	SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE



LMV FORM 1 FEB 79 107e ORIGINAL

COMPUTATION SHEET

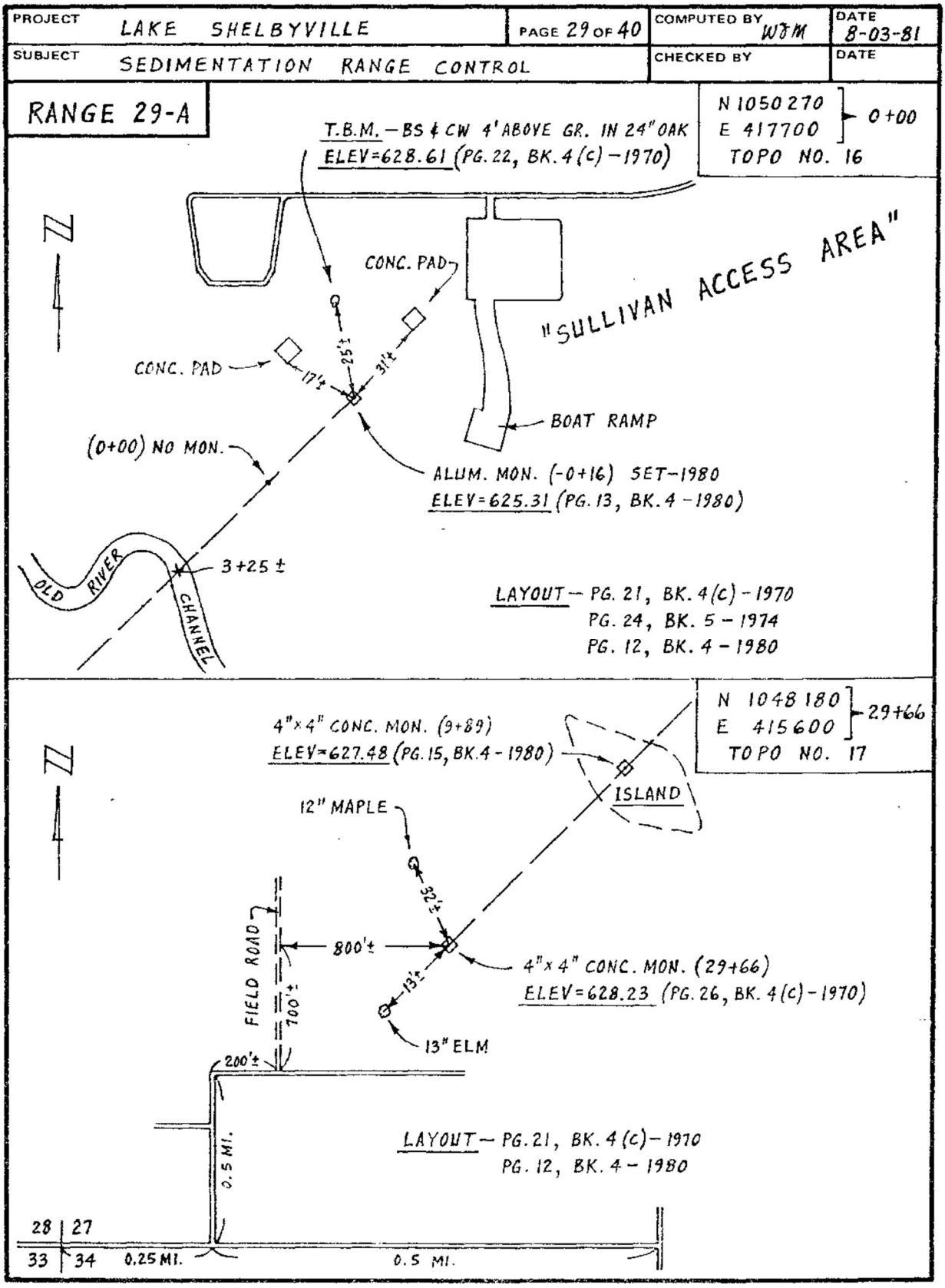
PROJECT	LAKE SHELBYVILLE	PAGE 28 OF 40	COMPUTED BY W&M	DATE 8-03-81
SUBJECT	SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE



LMV FORM 1 FEB 72 107e ORIGINAL

COMPUTATION SHEET

PROJECT	LAKE SHELBYVILLE	PAGE 29 OF 40	COMPUTED BY WJM	DATE 8-03-81
SUBJECT	SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE

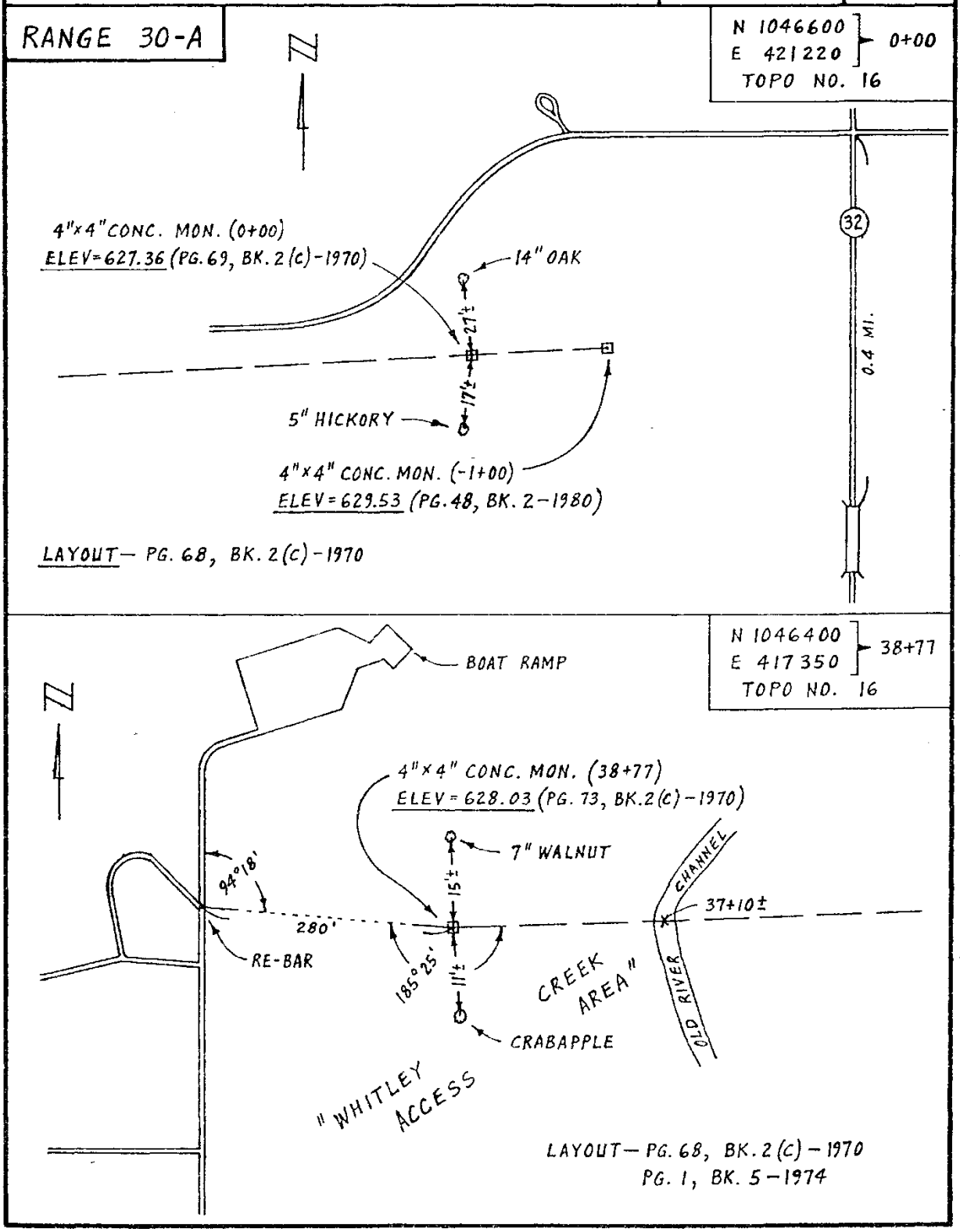


LMV FORM 1 FEB 79 107e ORIGINAL

COMPUTATION SHEET

PROJECT	LAKE SHELBYVILLE	PAGE 30 OF 40	COMPUTED BY WJM	DATE 8-05-81
SUBJECT	SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE

RANGE 30-A



LMV FORM 1 FEB 79 107e ORIGINAL

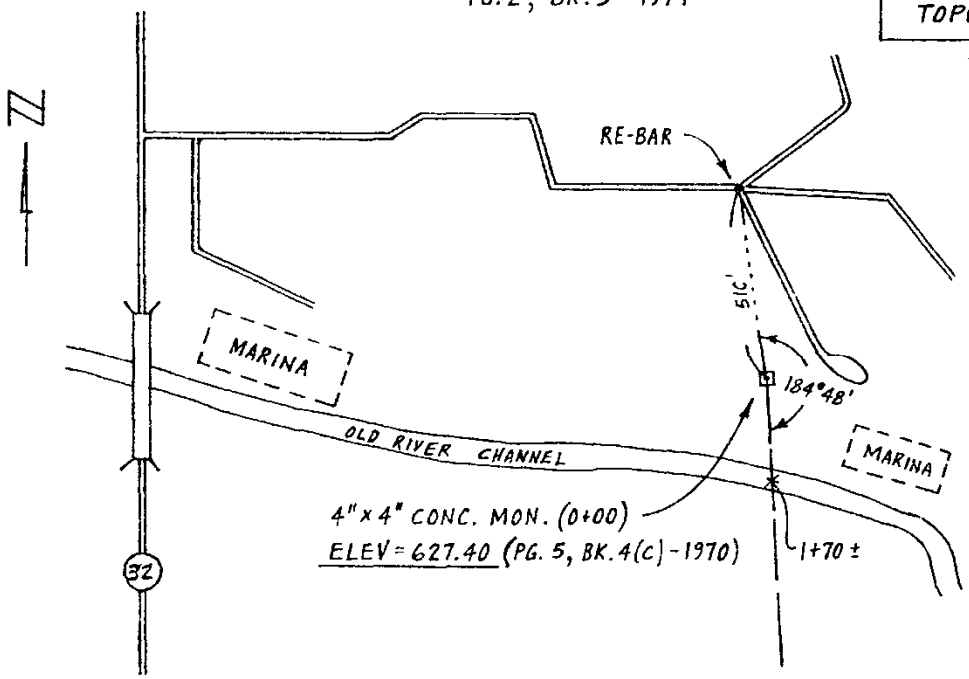
COMPUTATION SHEET

PROJECT	LAKE SHELBYVILLE	PAGE 31 OF 40	COMPUTED BY WSM	DATE 8-06-81
SUBJECT	SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE

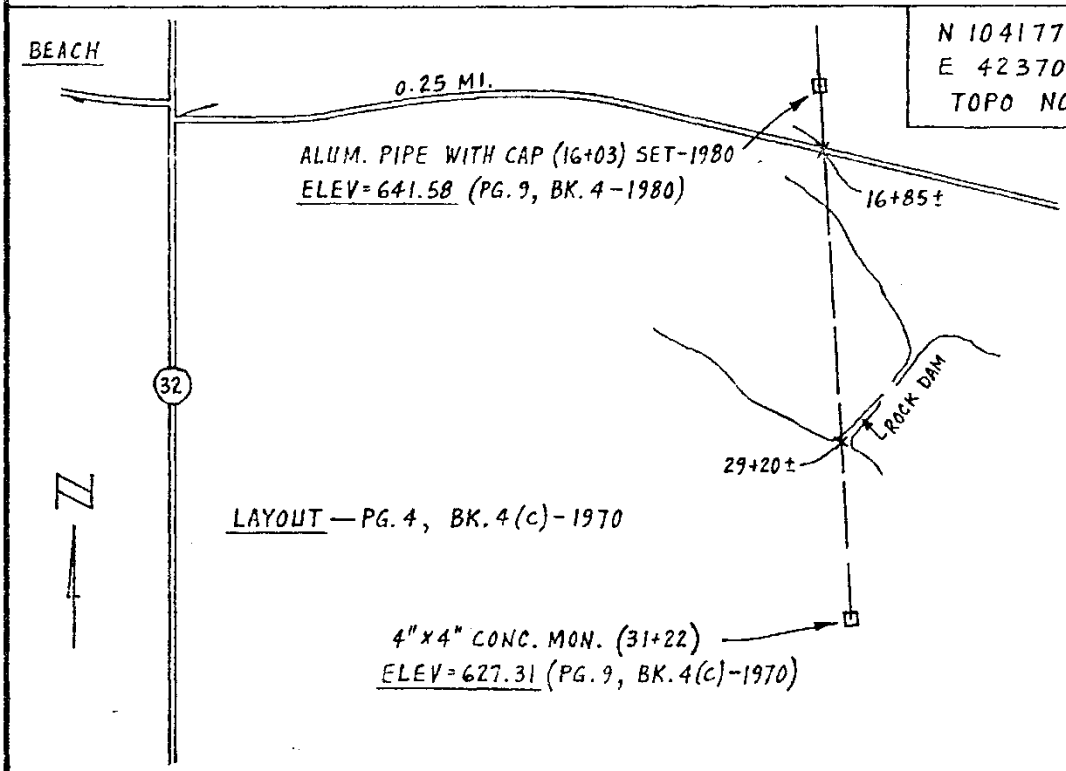
RANGE 31-A

LAYOUT— PG. 4, BK. 4(c)-1970
PG. 2, BK. 5 - 1974

N 1044890
E 423500 → 0+00
TOPO NO. 16



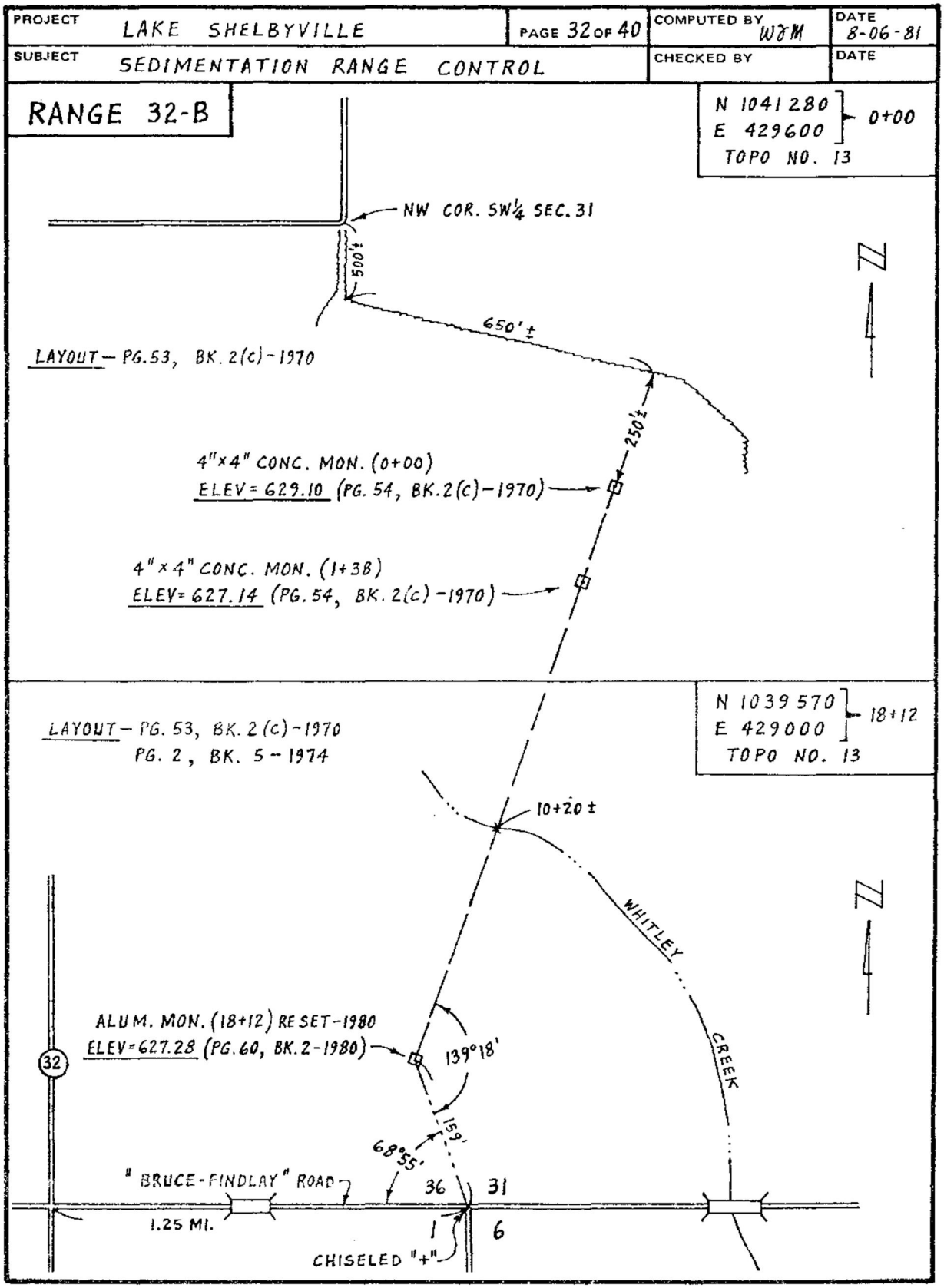
N 1041770
E 423700 → 31+22
TOPO NO. 12



LMV FORM 1 FEB 79 107e ORIGINAL

COMPUTATION SHEET

PROJECT	LAKE SHELBYVILLE	PAGE 32 OF 40	COMPUTED BY WJM	DATE 8-06-81
SUBJECT	SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE

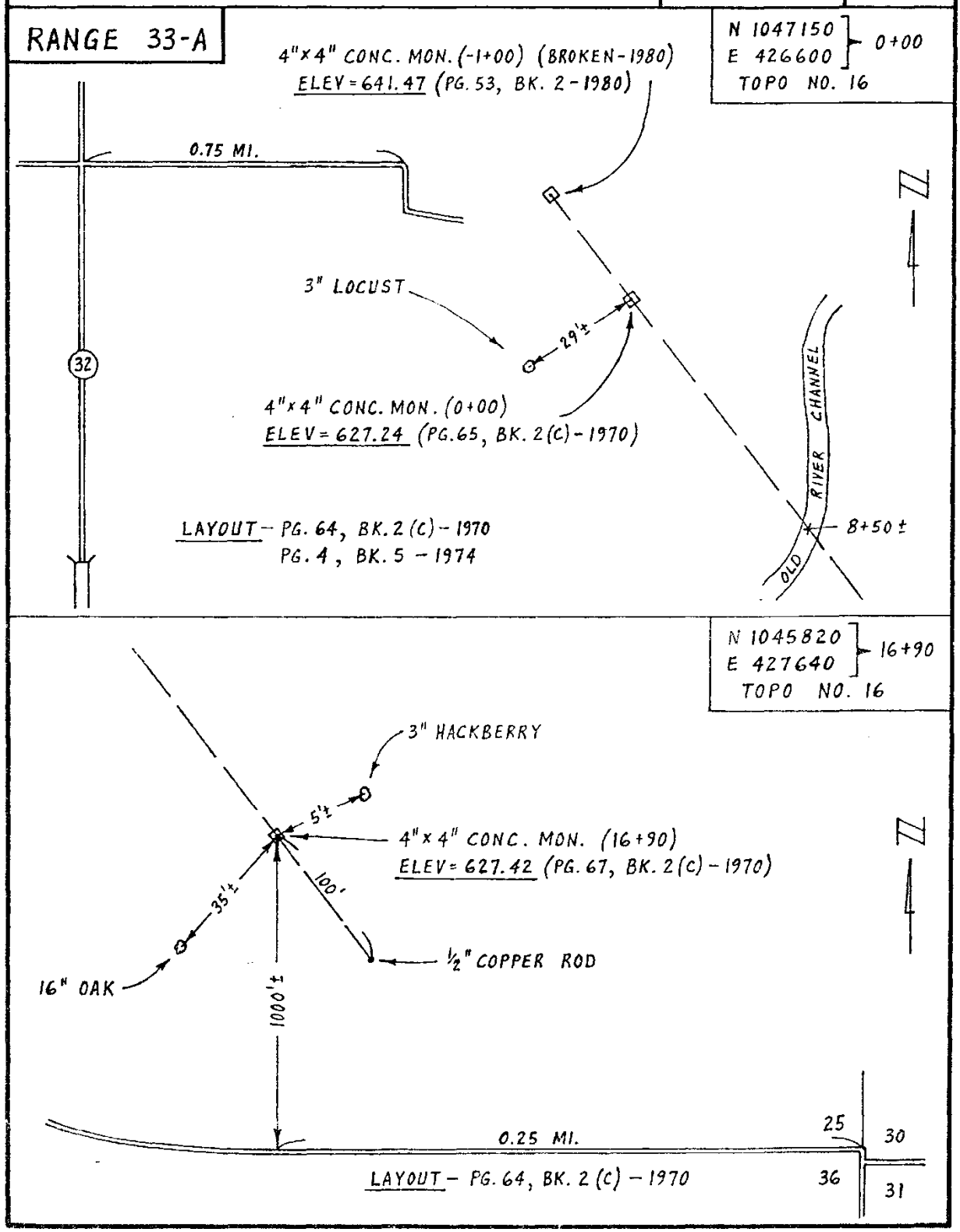


LMV FORM 1 FEB 79 107e ORIGINAL

COMPUTATION SHEET

PROJECT LAKE SHELBYVILLE	PAGE 33 OF 40	COMPUTED BY WBM	DATE 8-07-81
SUBJECT SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE

RANGE 33-A

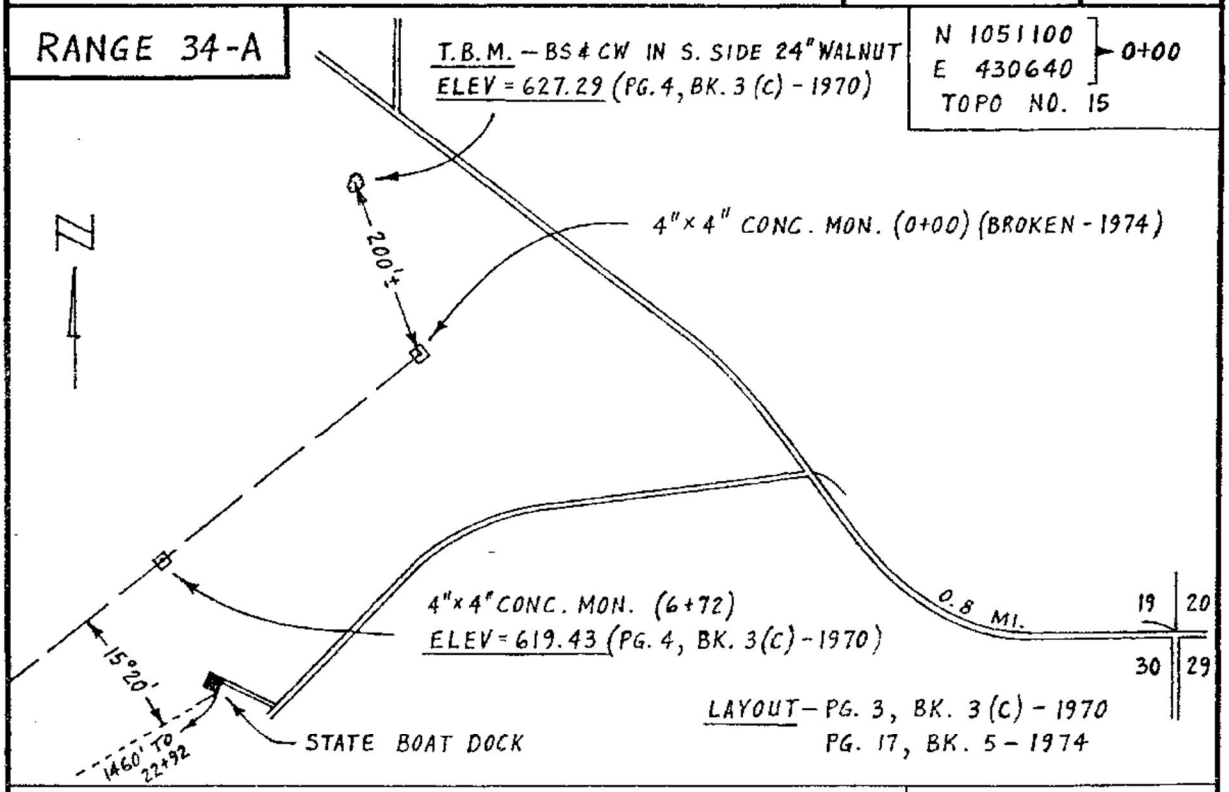


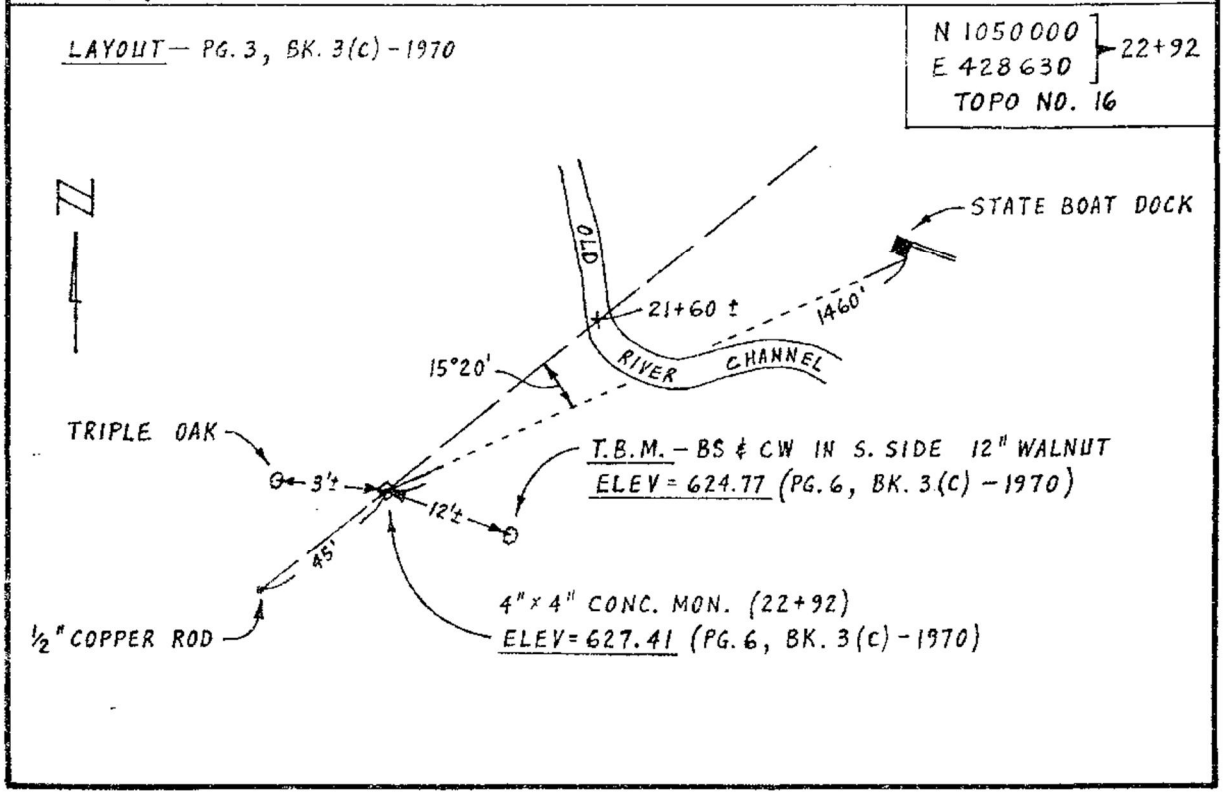
LMV FORM 1 FEB 79 107e ORIGINAL

COMPUTATION SHEET

PROJECT	LAKE SHELBYVILLE	PAGE 34 OF 40	COMPUTED BY W&M	DATE 9-08-81
SUBJECT	SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE

RANGE 34-A

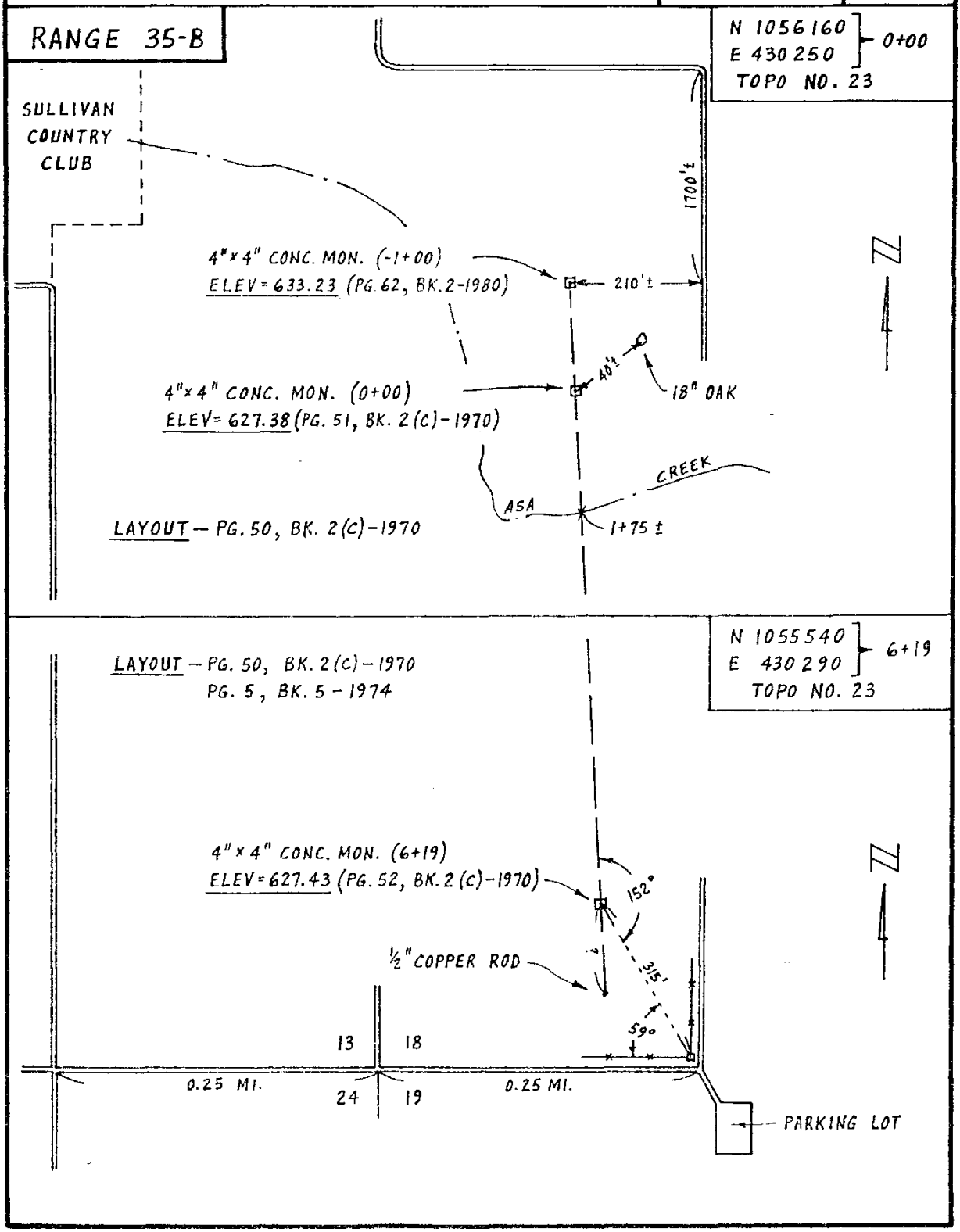




LMV FORM 1 FEB 79 107e ORIGINAL

COMPUTATION SHEET

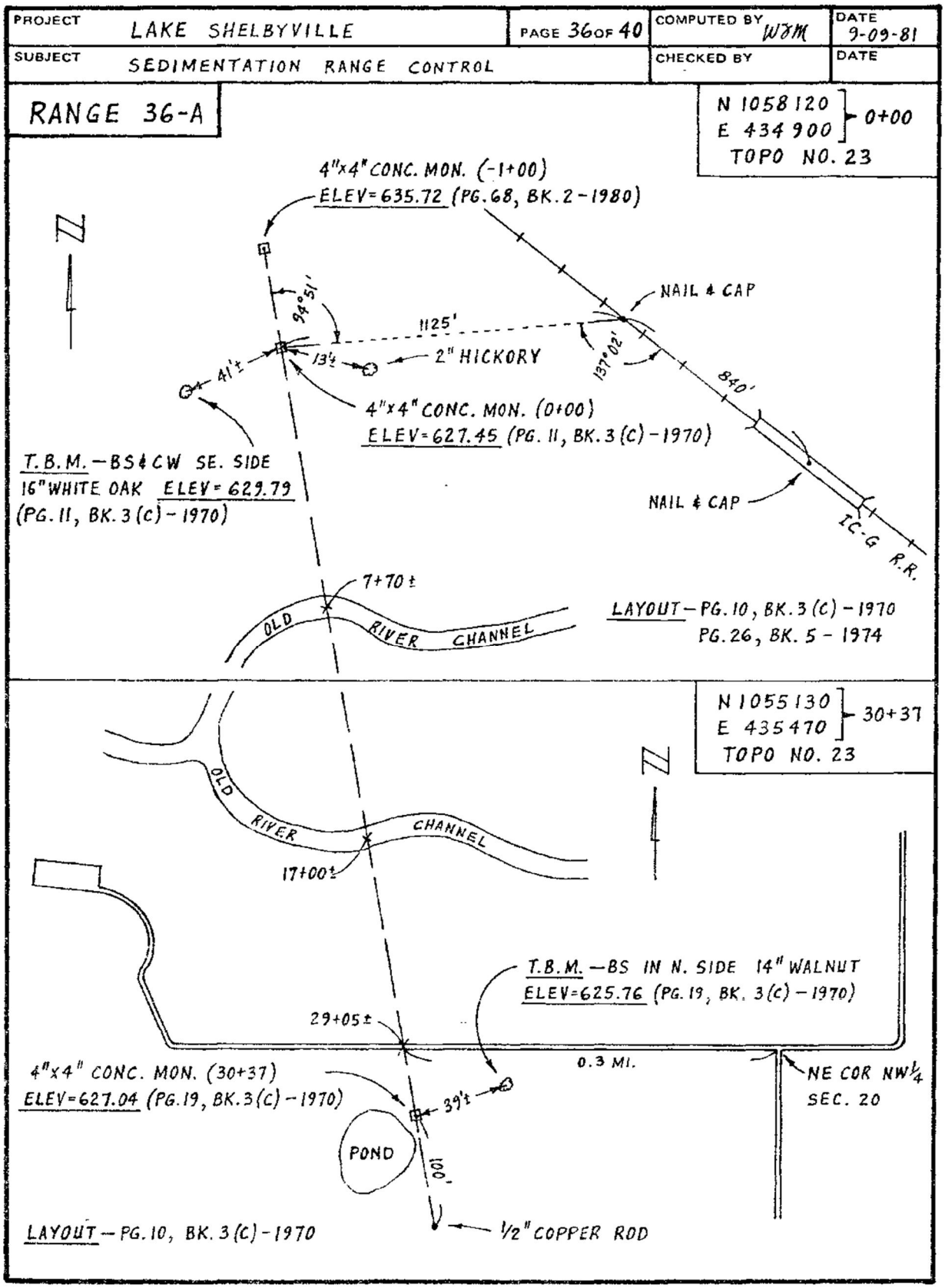
PROJECT	LAKE SHELBYVILLE	PAGE 35 OF 40	COMPUTED BY W&M	DATE 9-08-81
SUBJECT	SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE



LMV FORM 1 FEB 79 107e ORIGINAL

COMPUTATION SHEET

PROJECT	LAKE SHELBYVILLE	PAGE 36 OF 40	COMPUTED BY WJM	DATE 9-09-81
SUBJECT	SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE



LMV FORM 1 FEB 79 107e ORIGINAL

COMPUTATION SHEET

PROJECT	LAKE SHELBYVILLE	PAGE 37 OF 40	COMPUTED BY WJM	DATE 9-16-81
SUBJECT	SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE

RANGE 37-B

N 1062260
E 438470
TOPO NO. 24
0+00

CORPS P/L

BLM "AP-68"

600'±

MON. GONE (0+00)

ALUM. MON. (1+01) SET - 1980
ELEV = 621.40 (PG. 75, BK. 2 - 1980)

LAYOUT - PG. 7, BK. 3(C) - 1970
PG. 74, BK. 2 - 1980

N 1061630
E 439100
TOPO NO. 23
8+89

JONATHAN CREEK

7+35±

4"x4" CONC. MON. (8+89)
ELEV = 627.62 (PG. 9, BK. 3(C) - 1970)

9'±

22'

ALUM PIPE WITH CAP - 1980

T.B.M. - BS & CW IN 12" MAPLE
ELEV = 635.63 (PG. 9, BK. 3(C) - 1970)

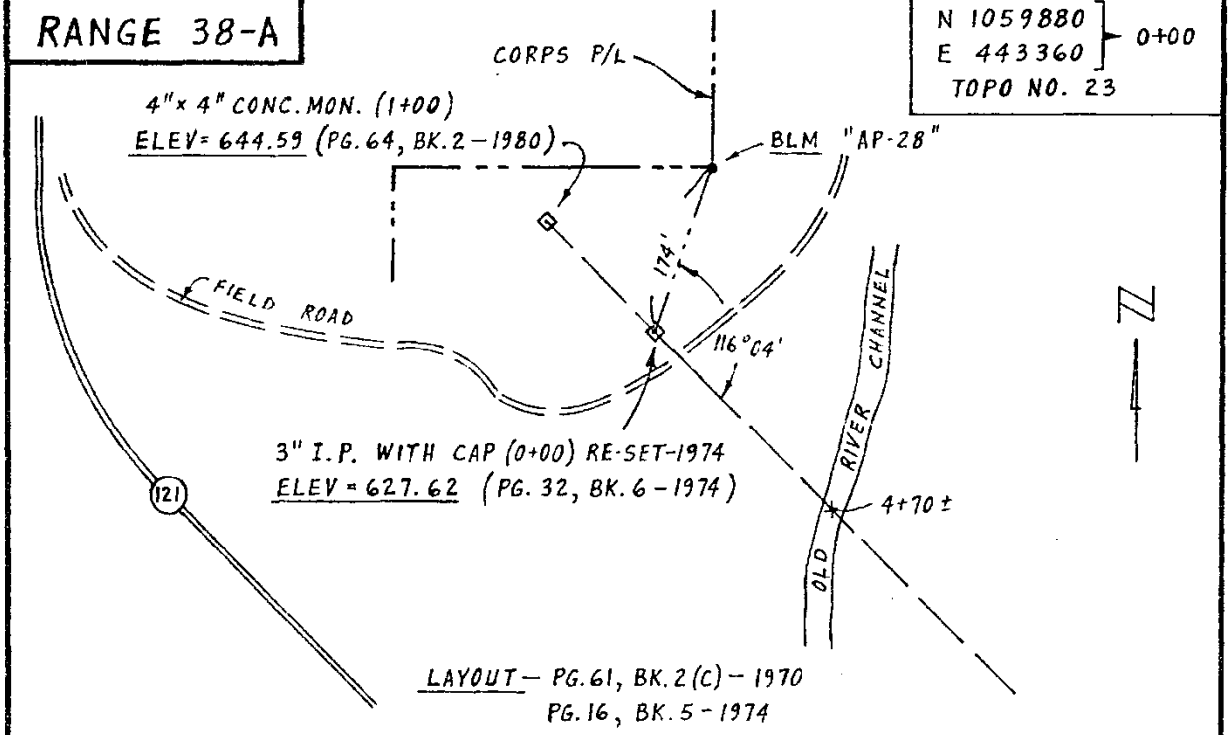
LAYOUT - PG. 7, BK. 3(C) - 1970
PG. 74, BK. 2 - 1980

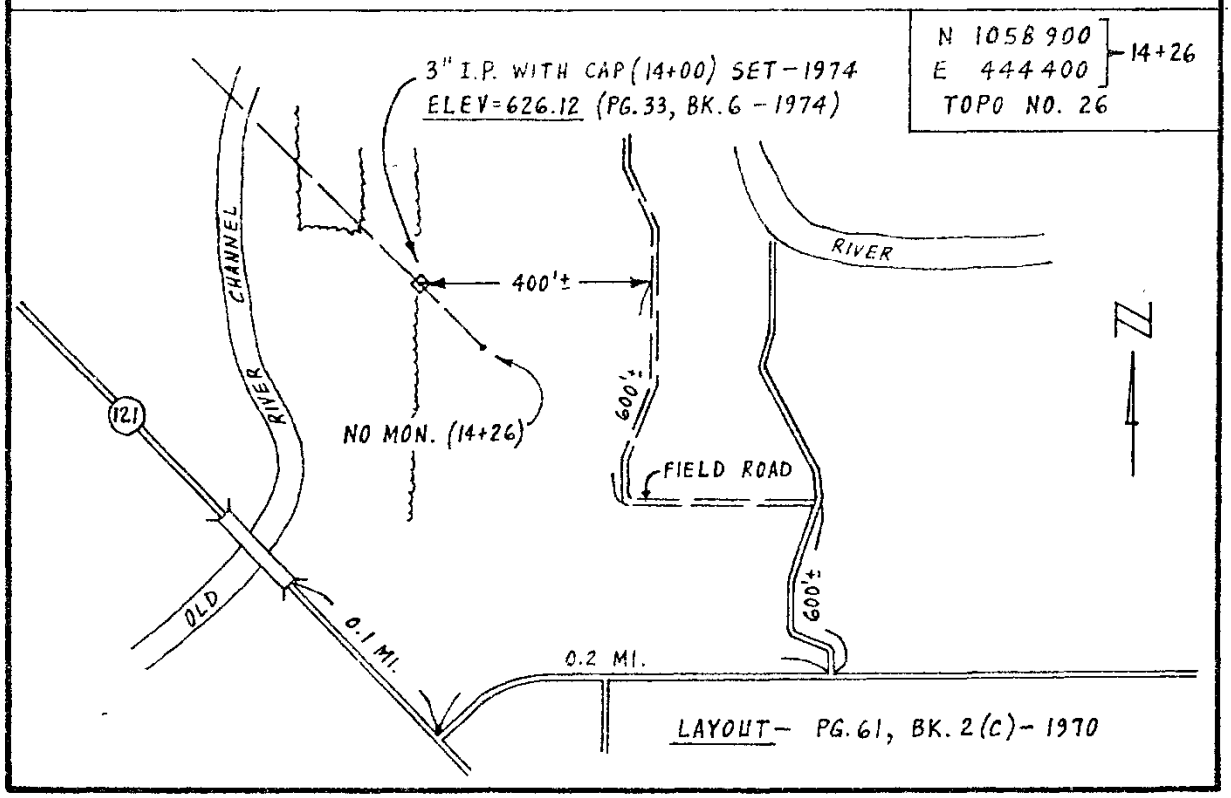
LMV FORM 1 FEB 79 107e ORIGINAL

COMPUTATION SHEET

PROJECT	PAGE	COMPUTED BY	DATE
LAKE SHELBYVILLE	38 OF 40	W&M	9-17-81
SUBJECT		CHECKED BY	DATE
SEDIMENTATION RANGE CONTROL			

RANGE 38-A



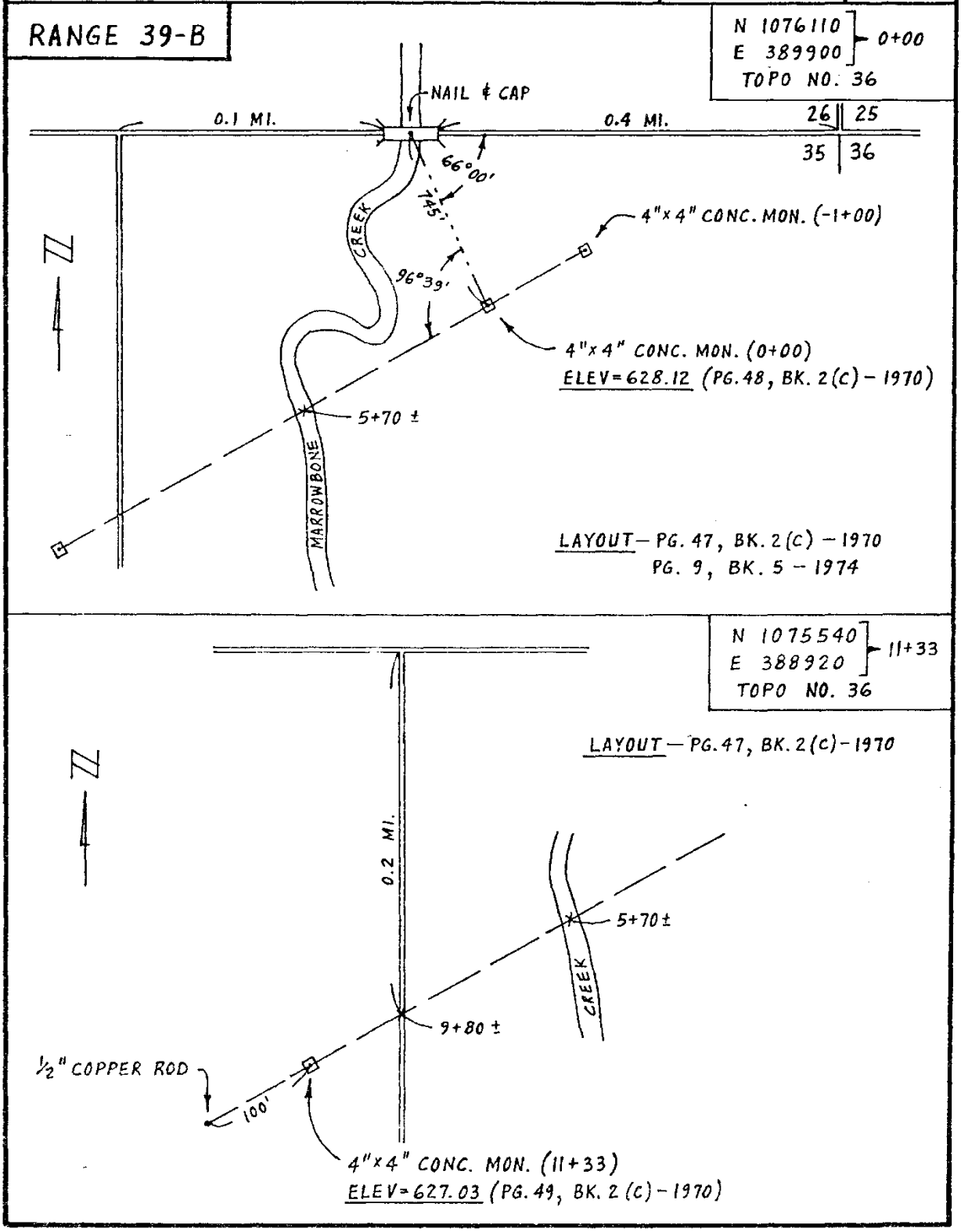


LMV FORM 1 FEB 79 107e ORIGINAL

COMPUTATION SHEET

PROJECT	LAKE SHELBYVILLE	PAGE 39 OF 40	COMPUTED BY W&M	DATE 9-24-81
SUBJECT	SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE

RANGE 39-B



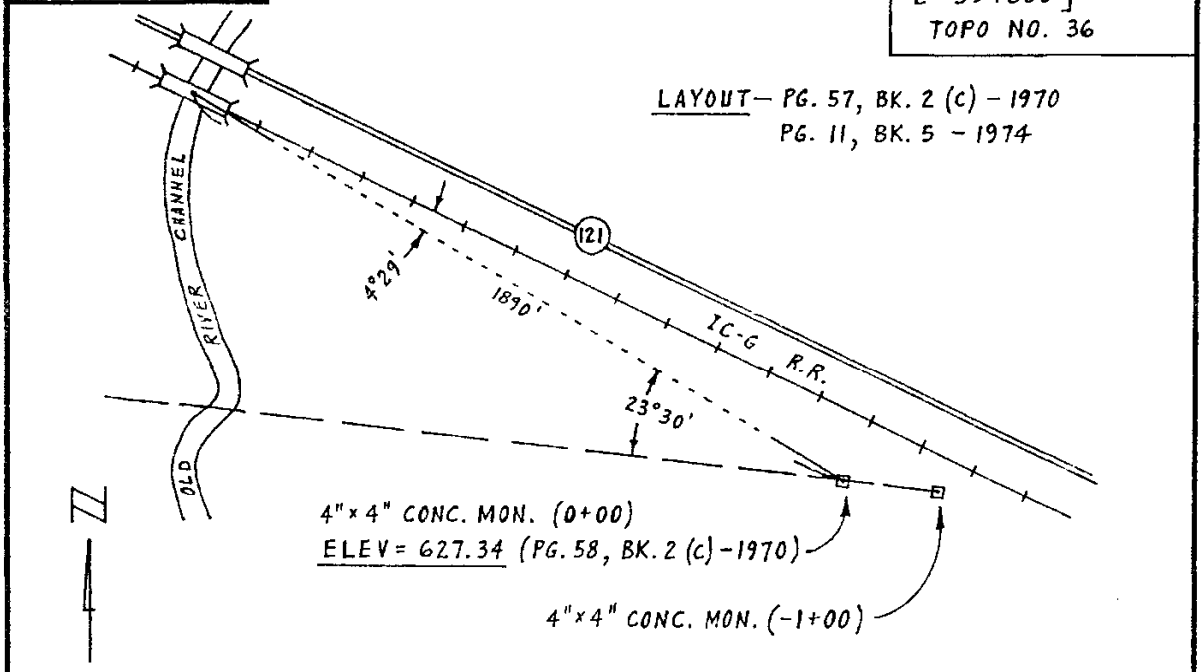
LMV FORM 1 FEB 79 107e ORIGINAL

COMPUTATION SHEET

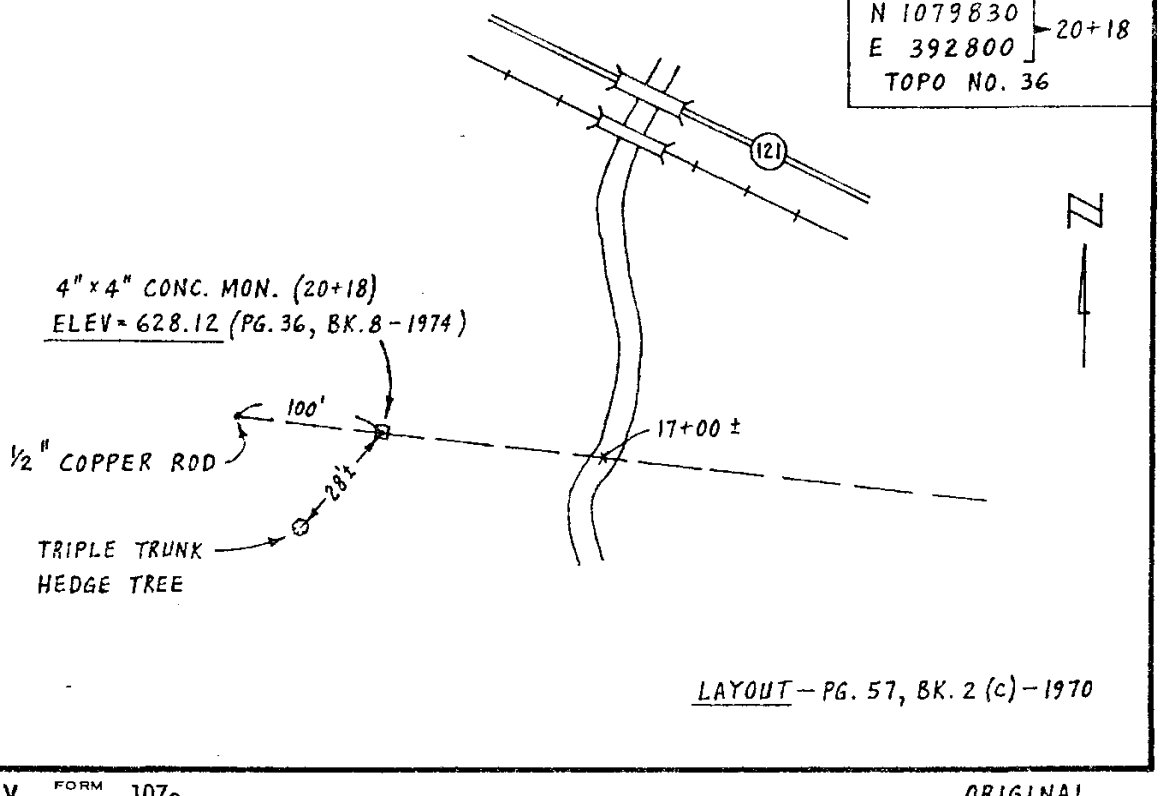
PROJECT	LAKE SHELBYVILLE	PAGE 40 OF 40	COMPUTED BY W&M	DATE 9-30-81
SUBJECT	SEDIMENTATION RANGE CONTROL		CHECKED BY	DATE

RANGE 40-B

N 1079610
E 394800
TOPO NO. 36
→ 0+00



N 1079830
E 392800
TOPO NO. 36
→ 20+18



LMV FORM 1 FEB 79 107e ORIGINAL

APPENDIX B – RECALCULATED 1970

Table 24. Area Data by Reach for Lake Shelbyville, Elevation 572.7 feet NAVD88 (1970)

Reach	Distance Between Ranges (feet)	Quadrilateral Area (acres)	Surface Area (acres)
Dam-1A	2,900	0	86
1A-3A	4,900	174	342
2B	12,500	41	40
3A-4A	4,100	130	172
4A-5A	4,000	146	138
5A-6A	5,600	169	220
6A-7A	3,800	115	162
7A-11A	4,200	52	240
8B-9B	3,900	4	6
9B-10B	9,000	0	0
10B	11,700	0	0
11A-12A	5,500	162	174
12A-14A	5,600	156	155
13B	9,600	9	16
14A-15A	6,500	146	173
15A-17A	4,800	170	132
16B	13,700	0	0
17A-18A	5,800	57	187
18A-19A	7,300	55	134
19A-20A	6,000	6	10
20A-21A	8,700	0	0
21A-23A	10,200	0	0
22B	5,000	0	0
23A-24A	2,600	0	0
24A-40B	7,500	0	0
39B	10,800	0	0
40B	17,800	0	0
25A-26A	3,100	24	41
26A-27A	5,500	51	72
27A-28A	4,300	19	52
28A-29A	5,000	0	0
29A-30A	3,700	0	0
30A-31A	5,600	0	0
31A-33A	4,300	0	0
32B	17,000	0	0
33A-34A	4,200	0	0
34A-36A	9,400	0	0
35B	9,100	0	0
365A-38A	8,800	0	0
37B	11,800	0	0
38A	8,500	0	0

Note: Re-calculated 1970 study.

Table 25. Area Data by Reach for Lake Shelbyville, Elevation 574.7 feet NAVD88 (1970)

Reach	Distance Between Ranges (feet)	Quadrilateral Area (acres)	Surface Area (acres)
Dam-1A	2,900	0	90
1A-3A	4,900	202	352
2B	12,500	45	45
3A-4A	4,100	157	184
4A-5A	4,000	150	147
5A-6A	5,600	177	229
6A-7A	3,800	119	173
7A-11A	4,200	55	254
8B-9B	3,900	4	8
9B-10B	9,000	0	0
10B	11,700	0	0
11A-12A	5,500	176	187
12A-14A	5,600	170	171
13B	9,600	11	19
14A-15A	6,500	153	186
15A-17A	4,800	177	153
16B	13,700	0	0
17A-18A	5,800	70	210
18A-19A	7,300	88	186
19A-20A	6,000	12	17
20A-21A	8,700	0	0
21A-23A	10,200	0	0
22B	5,000	0	0
23A-24A	2,600	0	0
24A-40B	7,500	0	0
39B	10,800	0	0
40B	17,800	0	0
25A-26A	3,100	39	56
26A-27A	5,500	73	96
27A-28A	4,300	27	78
28A-29A	5,000	0	0
29A-30A	3,700	0	0
30A-31A	5,600	0	0
31A-33A	4,300	0	0
32B	17,000	0	0
33A-34A	4,200	0	0
34A-36A	9,400	0	0
35B	9,100	0	0
365A-38A	8,800	0	0
37B	11,800	0	0
38A	8,500	0	0

Note: Re-calculated 1970 study.

Table 26. Area Data by Reach for Lake Shelbyville, Elevation 599.4 feet NAVD88 (1970)

Reach	Distance Between Ranges (feet)	Quadrilateral Area (acres)	Surface Area (acres)
Dam-1A	2900	0	135
1A-3A	4900	234	504
2B	12500	202	195
3A-4A	4100	203	301
4A-5A	4000	205	331
5A-6A	5600	240	332
6A-7A	3800	151	328
7A-11A	4200	90	374
8B-9B	3900	120	231
9B-10B	9000	76	209
10B	11700	0	0
11A-12A	5500	277	370
12A-14A	5600	286	293
13B	9600	54	107
14A-15A	6500	248	390
15A-17A	4800	293	339
16B	13700	31	83
17A-18A	5800	252	474
18A-19A	7300	469	763
19A-20A	6000	328	426
20A-21A	8700	365	578
21A-23A	10200	371	531
22B	5000	41	42
23A-24A	2600	10	19
24A-40B	7500	0	0
39B	10800	0	0
40B	17800	0	0
25A-26A	3100	127	247
26A-27A	5500	184	261
27A-28A	4300	305	413
28A-29A	5000	422	672
29A-30A	3700	190	400
30A-31A	5600	148	206
31A-33A	4300	127	285
32B	17000	0	0
33A-34A	4200	90	238
34A-36A	9400	37	81
35B	9100	0	0
365A-38A	8800	0	0
37B	11800	0	0
38A	8500	0	0

Note: Re-calculated 1970 study.

Table 27. Area Data by Reach for Lake Shelbyville, Elevation 599.7 feet NAVD88 (1970)

Reach	Distance Between Ranges (feet)	Quadrilateral Area (acres)	Surface Area (acres)
Dam-1A	2,900	0	138
1A-3A	4,900	234	531
2B	12,500	259	221
3A-4A	4,100	204	313
4A-5A	4,000	206	369
5A-6A	5,600	240	343
6A-7A	3,800	151	354
7A-11A	4,200	90	381
8B-9B	3,900	155	259
9B-10B	9,000	281	278
10B	11,700	60	60
11A-12A	5,500	278	378
12A-14A	5,600	288	303
13B	9,600	81	146
14A-15A	6,500	248	400
15A-17A	4,800	294	340
16B	13,700	43	94
17A-18A	5,800	253	491
18A-19A	7,300	471	734
19A-20A	6,000	331	437
20A-21A	8,700	589	611
21A-23A	10,200	651	578
22B	5,000	123	68
23A-24A	2,600	16	74
24A-40B	7,500	28	54
39B	10,800	0	0
40B	17,800	6	12
25A-26A	3,100	127	253
26A-27A	5,500	185	265
27A-28A	4,300	305	419
28A-29A	5,000	423	691
29A-30A	3,700	191	407
30A-31A	5,600	149	221
31A-33A	4,300	129	342
32B	17,000	54	54
33A-34A	4,200	91	252
34A-36A	9,400	58	250
35B	9,100	1	3
365A-38A	8,800	15	59
37B	11,800	0	0
38A	8,500	0	0

Note: Re-calculated 1970 study.

Table 28. Area Data by Reach for Lake Shelbyville, Elevation 624.7 feet NAVD88 (1970)

Reach	Distance Between Ranges (feet)	Quadrilateral Area (acres)	Surface Area (acres)
Dam-1A	2,900	0	204
1A-3A	4,900	343	818
2B	12,500	423	457
3A-4A	4,100	249	515
4A-5A	4,000	298	662
5A-6A	5,600	379	513
6A-7A	3,800	202	531
7A-11A	4,200	132	494
8B-9B	3,900	205	492
9B-10B	9,000	374	520
10B	11,700	37	408
11A-12A	5,500	358	502
12A-14A	5,600	345	449
13B	9,600	282	344
14A-15A	6,500	326	590
15A-17A	4,800	399	462
16B	13,700	153	370
17A-18A	5,800	387	750
18A-19A	7,300	635	912
19A-20A	6,000	438	611
20A-21A	8,700	711	850
21A-23A	10,200	972	897
22B	5,000	303	458
23A-24A	2,600	93	295
24A-40B	7,500	279	735
39B	10,800	124	350
40B	17,800	331	854
25A-26A	3,100	152	344
26A-27A	5,500	225	361
27A-28A	4,300	344	541
28A-29A	5,000	470	952
29A-30A	3,700	270	488
30A-31A	5,600	324	482
31A-33A	4,300	257	707
32B	17,000	247	585
33A-34A	4,200	151	384
34A-36A	9,400	312	987
35B	9,100	35	111
365A-38A	8,800	460	1,108
37B	11,800	103	385
38A	8,500	105	625

Note: Re-calculated 1970 study.

Table 29. Area Data by Reach for Lake Shelbyville, Elevation 626.2 feet NAVD88 (1970)

Reach	Distance Between Ranges (feet)	Quadrilateral Area (acres)	Surface Area (acres)
Dam-1A	2,900	0	207
1A-3A	4,900	346	833
2B	12,500	428	471
3A-4A	4,100	253	528
4A-5A	4,000	301	679
5A-6A	5,600	387	524
6A-7A	3,800	209	542
7A-11A	4,200	135	501
8B-9B	3,900	206	507
9B-10B	9,000	377	532
10B	11,700	39	436
11A-12A	5,500	363	511
12A-14A	5,600	350	457
13B	9,600	285	358
14A-15A	6,500	329	602
15A-17A	4,800	402	467
16B	13,700	157	397
17A-18A	5,800	390	767
18A-19A	7,300	640	918
19A-20A	6,000	441	620
20A-21A	8,700	714	858
21A-23A	10,200	988	912
22B	5,000	306	486
23A-24A	2,600	95	309
24A-40B	7,500	286	759
39B	10,800	131	377
40B	17,800	305	885
25A-26A	3,100	154	350
26A-27A	5,500	228	371
27A-28A	4,300	347	551
28A-29A	5,000	479	975
29A-30A	3,700	280	494
30A-31A	5,600	327	500
31A-33A	4,300	260	726
32B	17,000	256	623
33A-34A	4,200	157	391
34A-36A	9,400	327	1,004
35B	9,100	38	123
365A-38A	8,800	474	1,139
37B	11,800	108	420
38A	8,500	109	637

Note: Re-calculated 1970 study.