AD-A161 288 STE GENEVIEVE MISSOURI FEASIBILITY REPORT (FLOOD CONTROL STUDY FOR HISTOR..(U) ARMY ENGINEER DISTRICT ST LOUIS MO J ZEREGA ET AL. JUN 84 1/1

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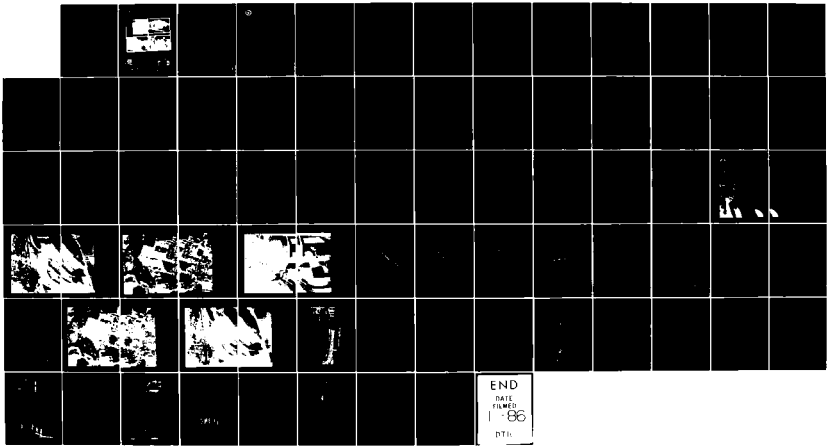

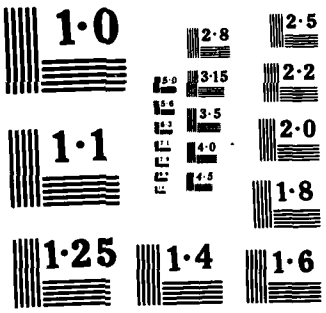
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STE. GENEVIEVE, MISSOURI FEASIBILITY REPORT

(1)

AD-A161 288

FLOOD CONTROL STUDY FOR HISTORIC STE. GENEVIEVE — 80061

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Lower Mississippi Valley Division

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VOLUME THREE
PLATES FOR APPENDICES

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JUNE 1984

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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Report addresses the feasibility of Federal participation in a flood protection project for the historic community of Ste. Genevieve, Missouri. The town was founded in the 1700's by French colonists. Much of the community has been designated a Registered National Historic Landmark. Flooding is primarily from the Mississippi River. The proposed plan includes a major levee and pump station, tributary channel widening and other features, and costs $33,580,000 at October 1984 price levels. Benefits include historic preservation and reduction in flood damages.

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DEPARTMENT OF THE ARMY
ST. LOUIS DISTRICT, CORPS OF ENGINEERS
210 TUCKER BOULEVARD, NORTH
ST. LOUIS, MISSOURI 63101

REPLY TO
ATTENTION OF

STE. GENEVIEVE, MISSOURI
FEASIBILITY REPORT

FLOOD CONTROL STUDY
FOR HISTORIC STE. GENEVIEVE - 80061

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St. Louis District
Lower Mississippi Valley Division

STE. GENEVIEVE, MISSOURI

FEASIBILITY REPORT

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- Final Environmental Impact Statement
- Public Views and Responses

Volume Two - Appendix A - Plan Formulation

- Appendix B - Public Views and Responses
- Appendix C - Hydrology and Hydraulics
- Appendix D - Design and Cost Estimates
- Appendix E - Cultural Resources
- Appendix F - Ecological Resources
- Appendix G - Recreation
- Appendix H - Economics
- Appendix I - Endangered Species Coordination
- Appendix J - U.S. Fish and Wildlife Service Coordination
- Appendix K - Clean Water Act (Section 404 b) Evaluation

Volume Three - Plates for all Appendices

STE. GENEVIEVE, MISSOURI

FEASIBILITY REPORT

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STE. GENEVIEVE, MISSOURI

FEASIBILITY REPORT

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STE. GENEVIEVE, MISSOURI

FEASIBILITY REPORT

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STE. GENEVIEVE, MISSOURI

FEASIBILITY REPORT

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K-1	SECTION 404 JURISDICTION

STE GENEVIEVE, MISSOURI
MEASURE I

400 0 800 1600
SCALE IN FEET

PLATE A-1

STE GENEVIEVE, MISSOURI
MEASURE 2

400 0 800 1600
SCALE IN FEET

PLATE A-2

STE GENEVIEVE, MISSOURI
MEASURE 3

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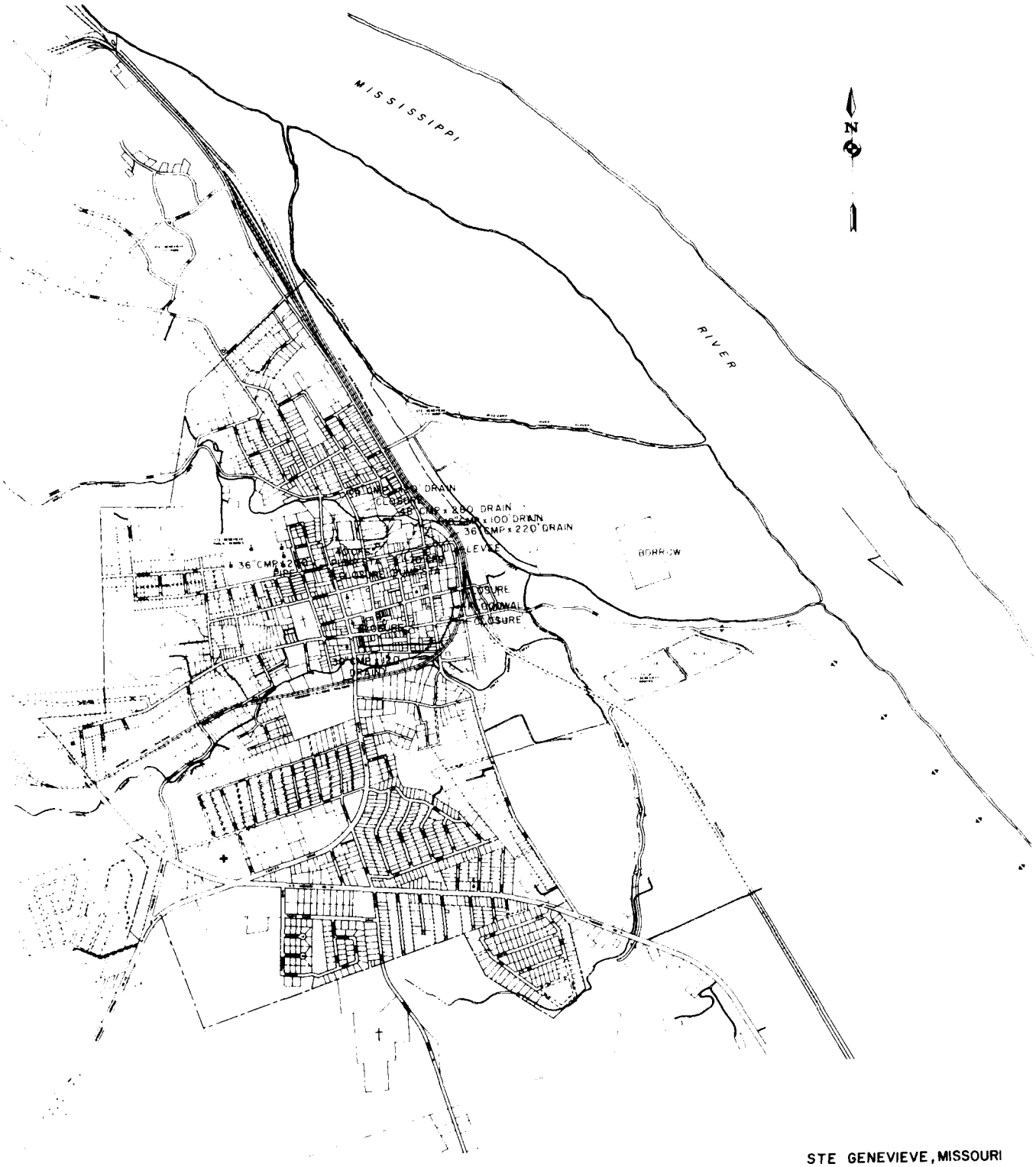
SCALE IN FEET

PLATE A-3



STE GENEVIEVE, MISSOURI
MEASURE 4

400 0 800 1600
SCALE IN FEET

PLATE A-4

STE GENEVIEVE, MISSOURI
MEASURE 5

400 0 800 1600
SCALE IN FEET

PLATE A-5

STE GENEVIEVE, MISSOURI
MEASURE 6

400 0 800 1600
SCALE IN FEET

PLATE A-6

STE GENEVIEVE, MISSOURI
MEASURE 7

400 0 800 1600
SCALE IN FEET

PLATE A-7

STE GENEVIEVE, MISSOURI
MEASURE 8

400 0 800 1600
SCALE IN FEET

PLATE A-8

STE GENEVIEVE, MISSOURI
MEASURE 20

400 0 800 1600
SCALE IN FEET

PLATE A-9

LEGEND

. HISTORIC STRUCTURES TO BE RELOCATED

STE. GENEVIEVE, MISSOURI
MEASURE 21

400 0 800 1600
SCALE IN FEET

PLATE A-10

STE. GENEVIEVE, MISSOURI
MEASURE 9

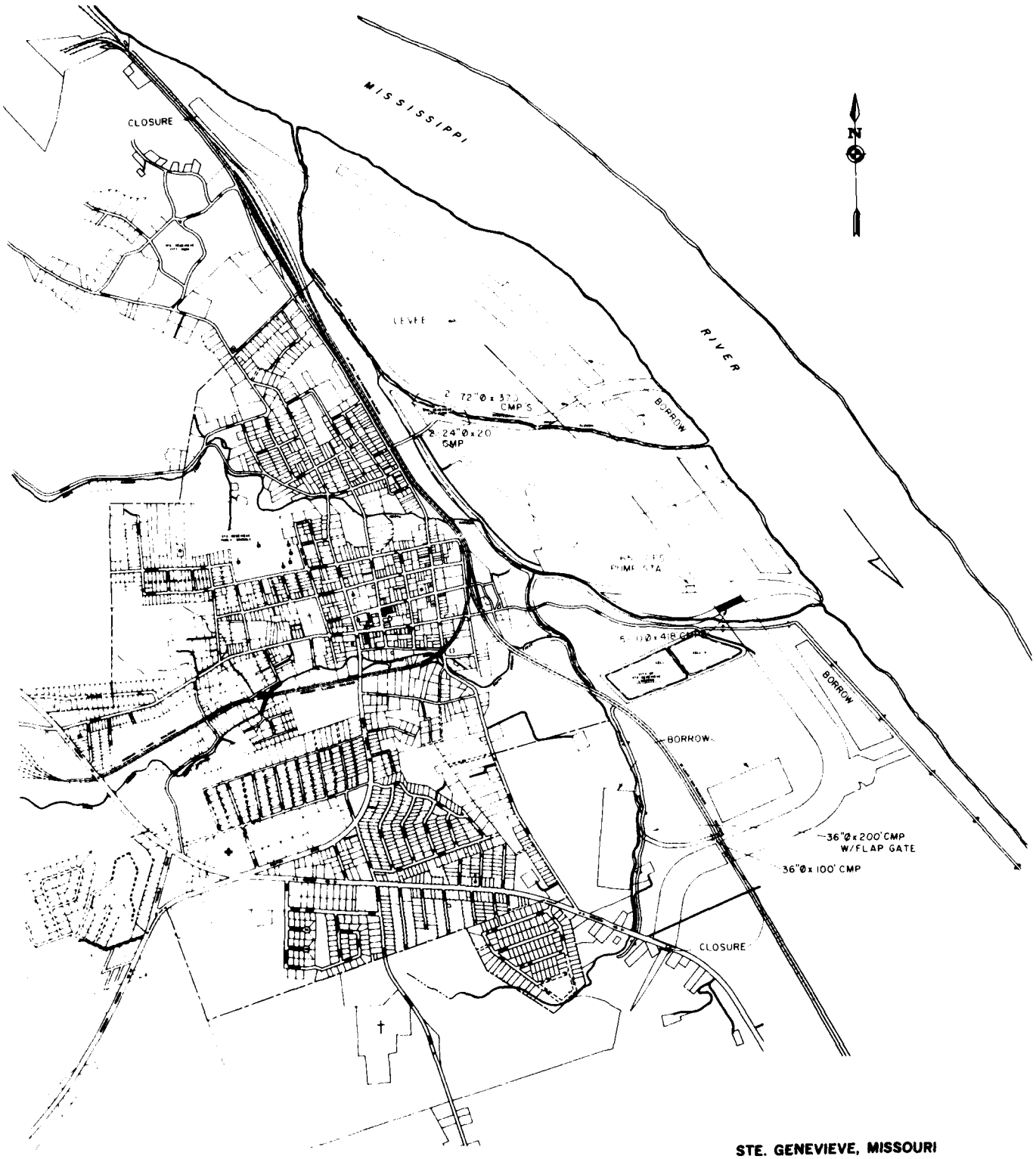
400 0 800 1600
SCALE IN FEET

PLATE A-11

STE. GENEVIEVE, MISSOURI
MEASURE 10

400 0 800 1600
SCALE IN FEET

PLATE A-12



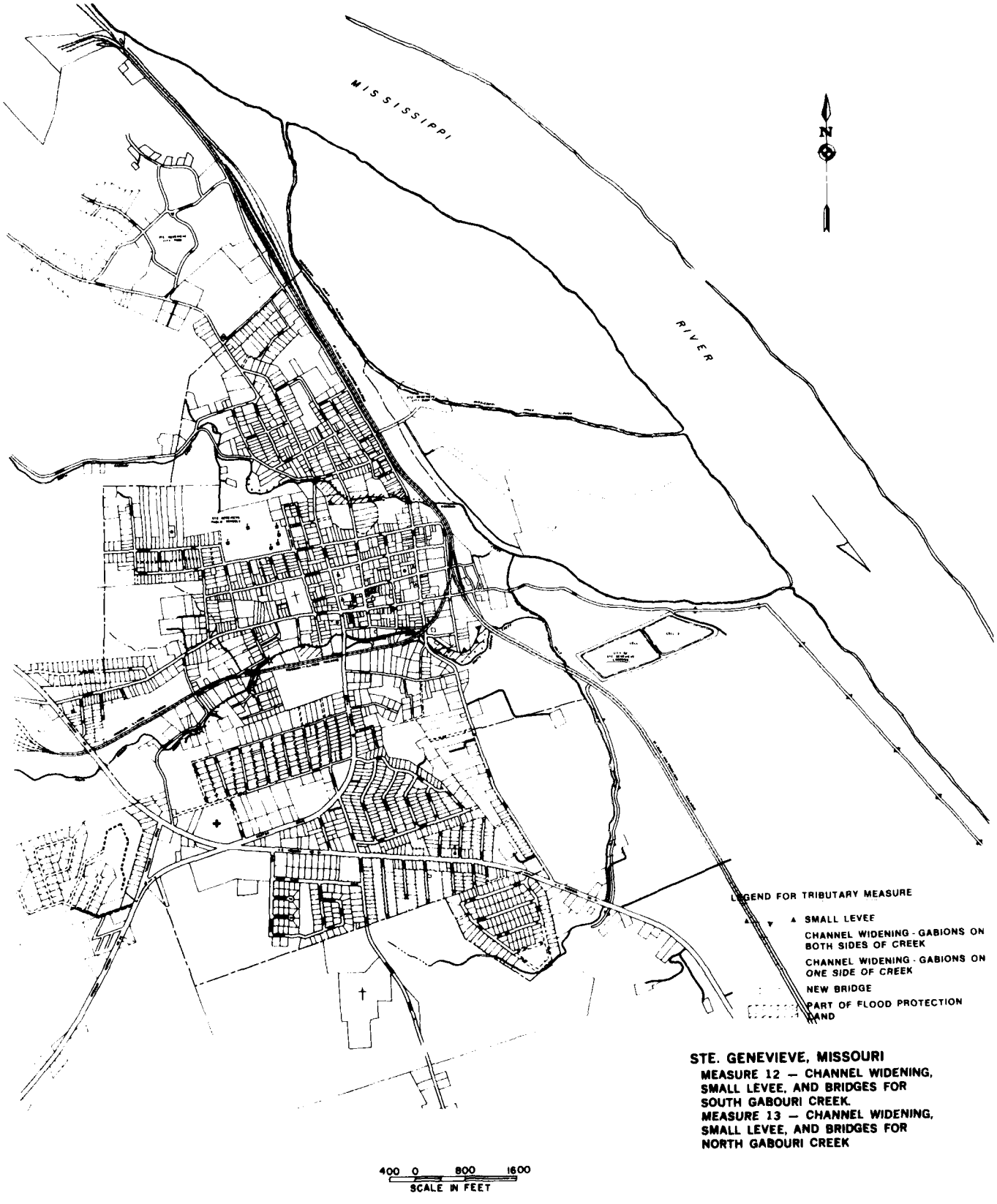
STE. GENEVIEVE, MISSOURI
MEASURE 11

400 0 800 1600
SCALE IN FEET

PLATE A-13

400 0 800 1600
SCALE IN FEET

STE GENEVIEVE, MISSOURI
MEASURE 18 (SOUTH GABOURI CREEK)
MEASURE 19 (NORTH GABOURI CREEK)

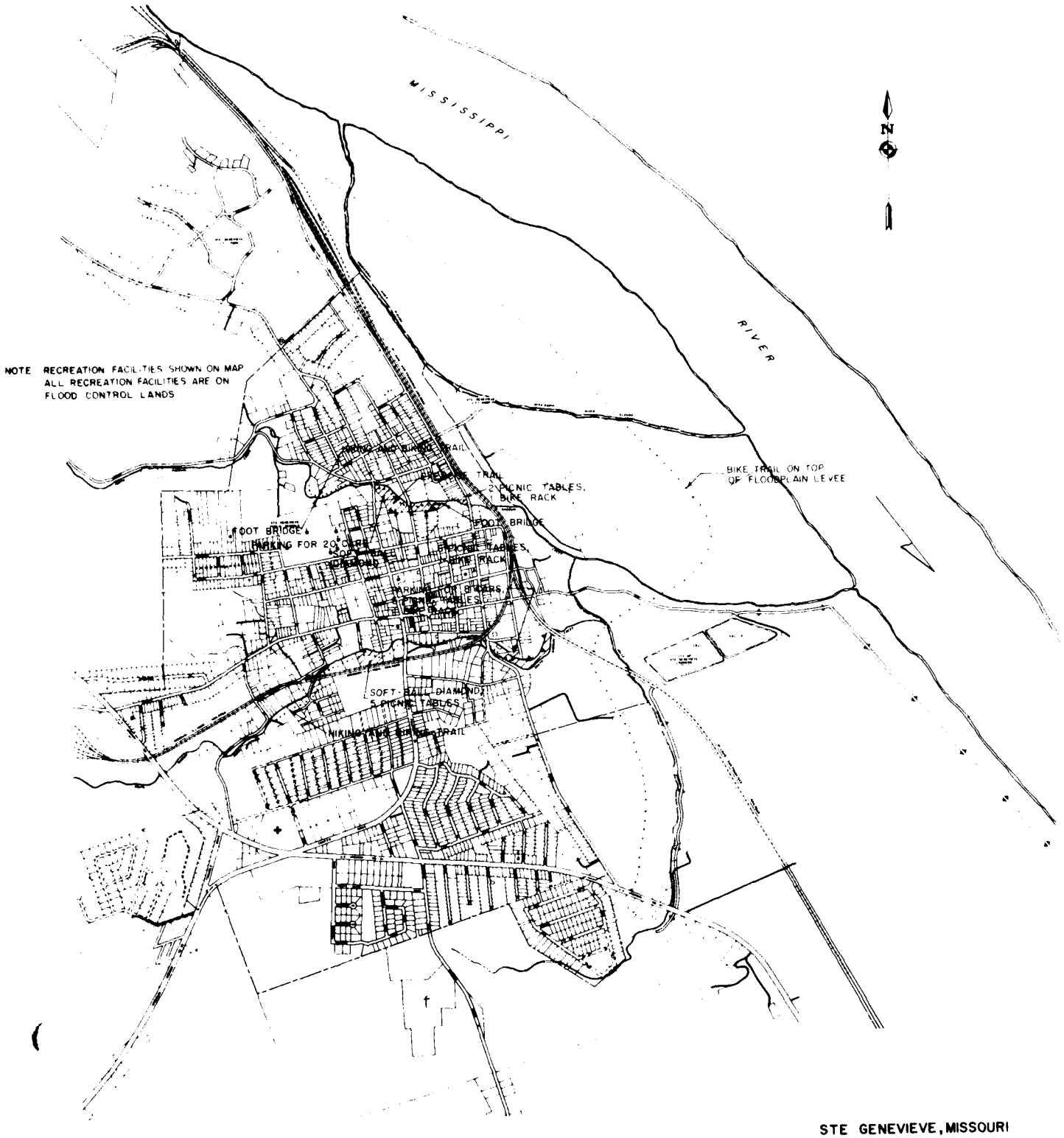


STE. GENEVIEVE, MISSOURI
MEASURE 12 — CHANNEL WIDENING, SMALL LEVEE, AND BRIDGES FOR SOUTH GABOURI CREEK.
MEASURE 13 — CHANNEL WIDENING, SMALL LEVEE, AND BRIDGES FOR NORTH GABOURI CREEK

STE. GENEVIEVE, MISSOURI
MEASURE 22

400 0 800 1600
SCALE IN FEET

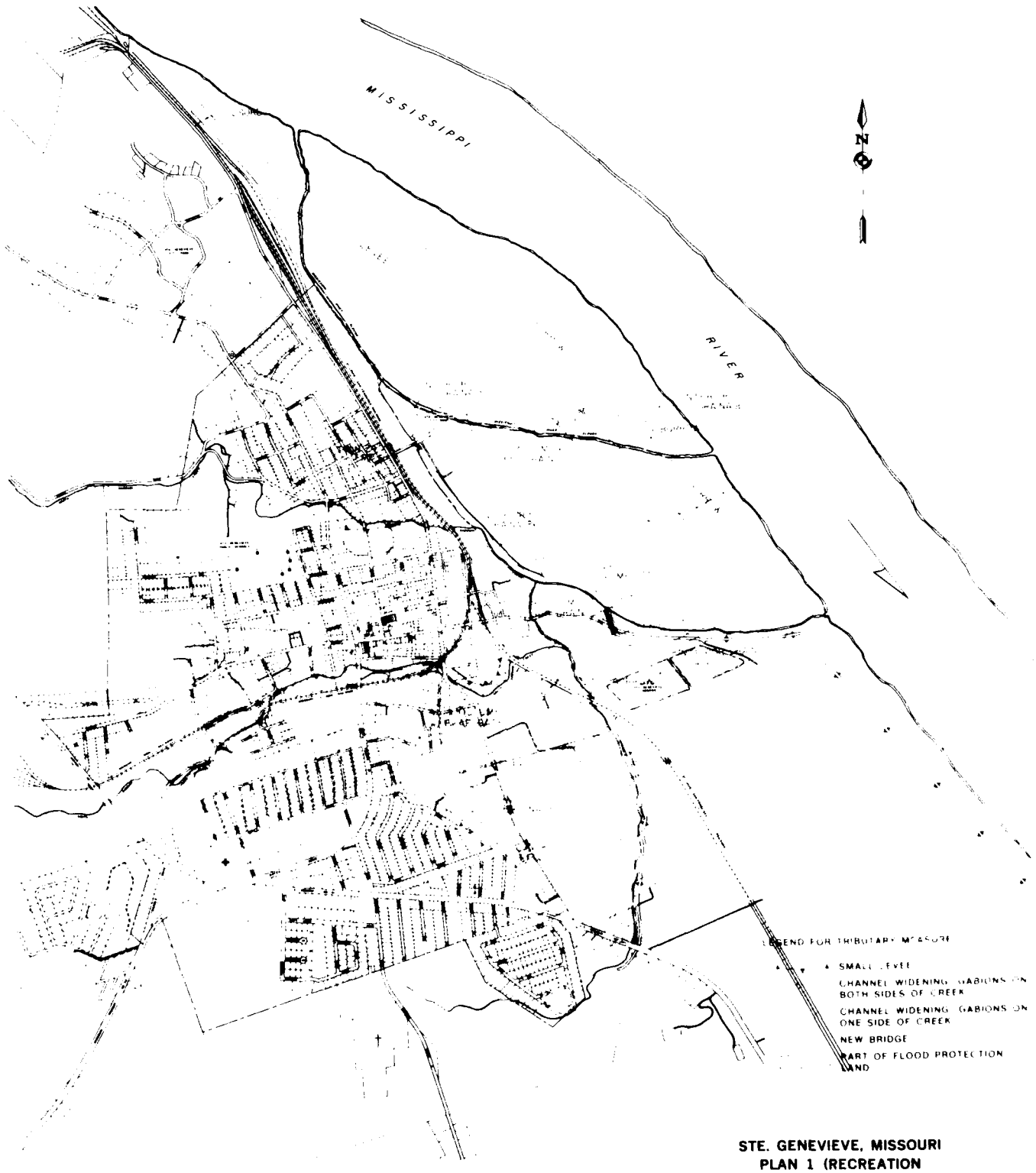
PLATE A-16



STE GENEVIEVE, MISSOURI
MEASURE 16

400 0 800 1600
SCALE IN FEET

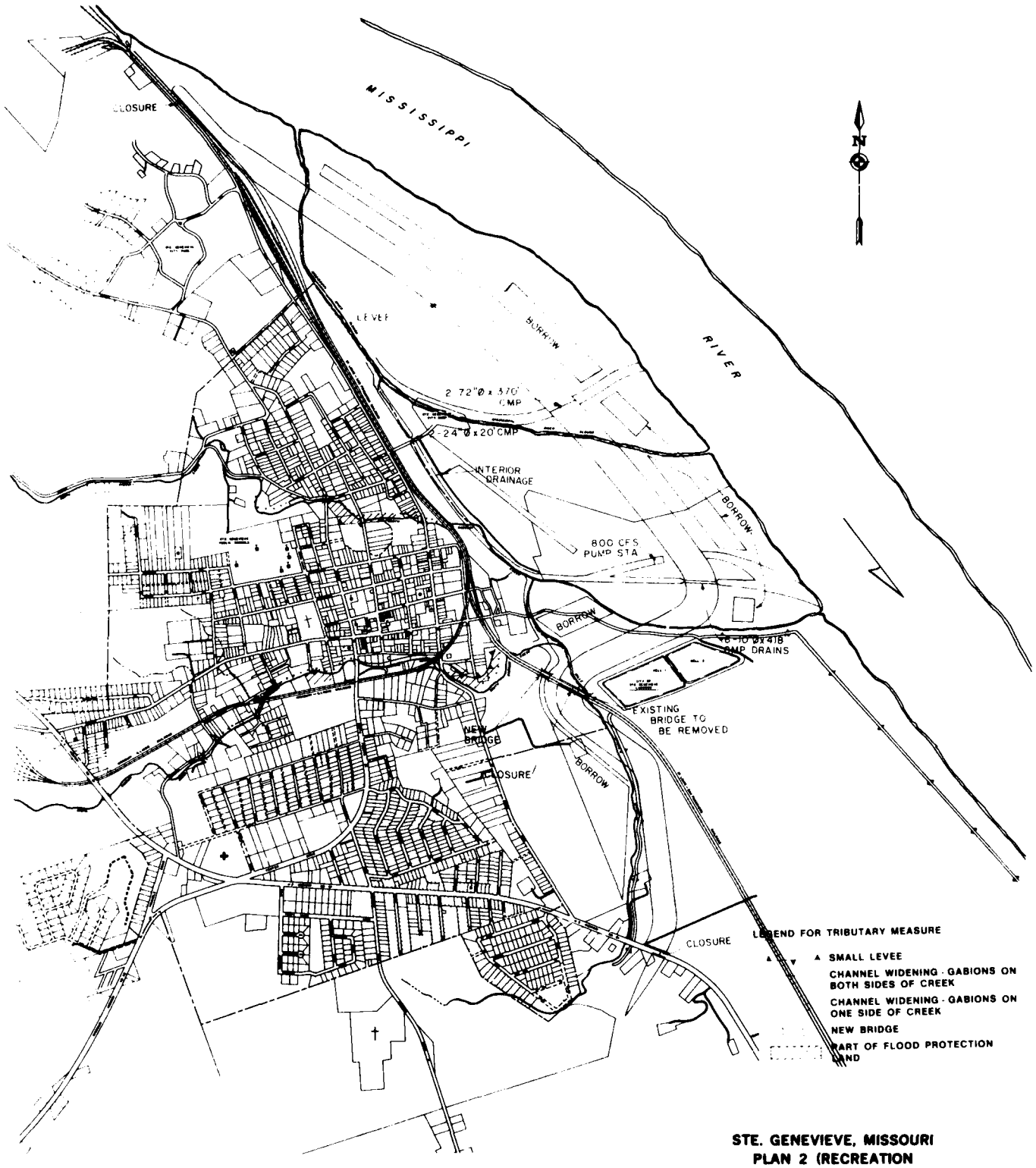
PLATE A-17



STE. GENEVIEVE, MISSOURI
PLAN 1 (RECREATION FACILITIES NOT SHOWN)

400 0 800 1600
SCALE IN FEET

PLATE A-18



STE. GENEVIEVE, MISSOURI
PLAN 2 (RECREATION FACILITIES NOT SHOWN)

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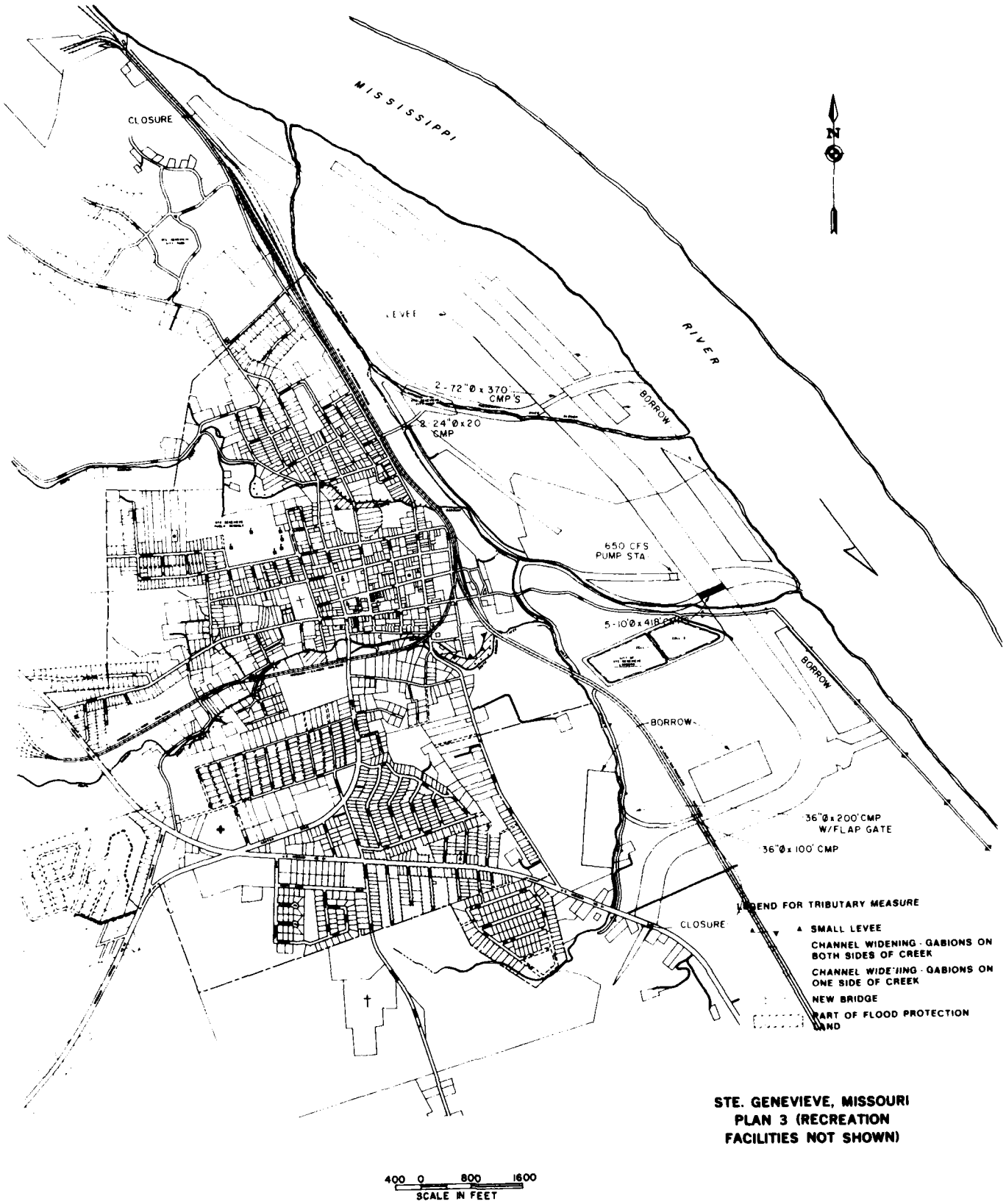
SCALE IN FEET

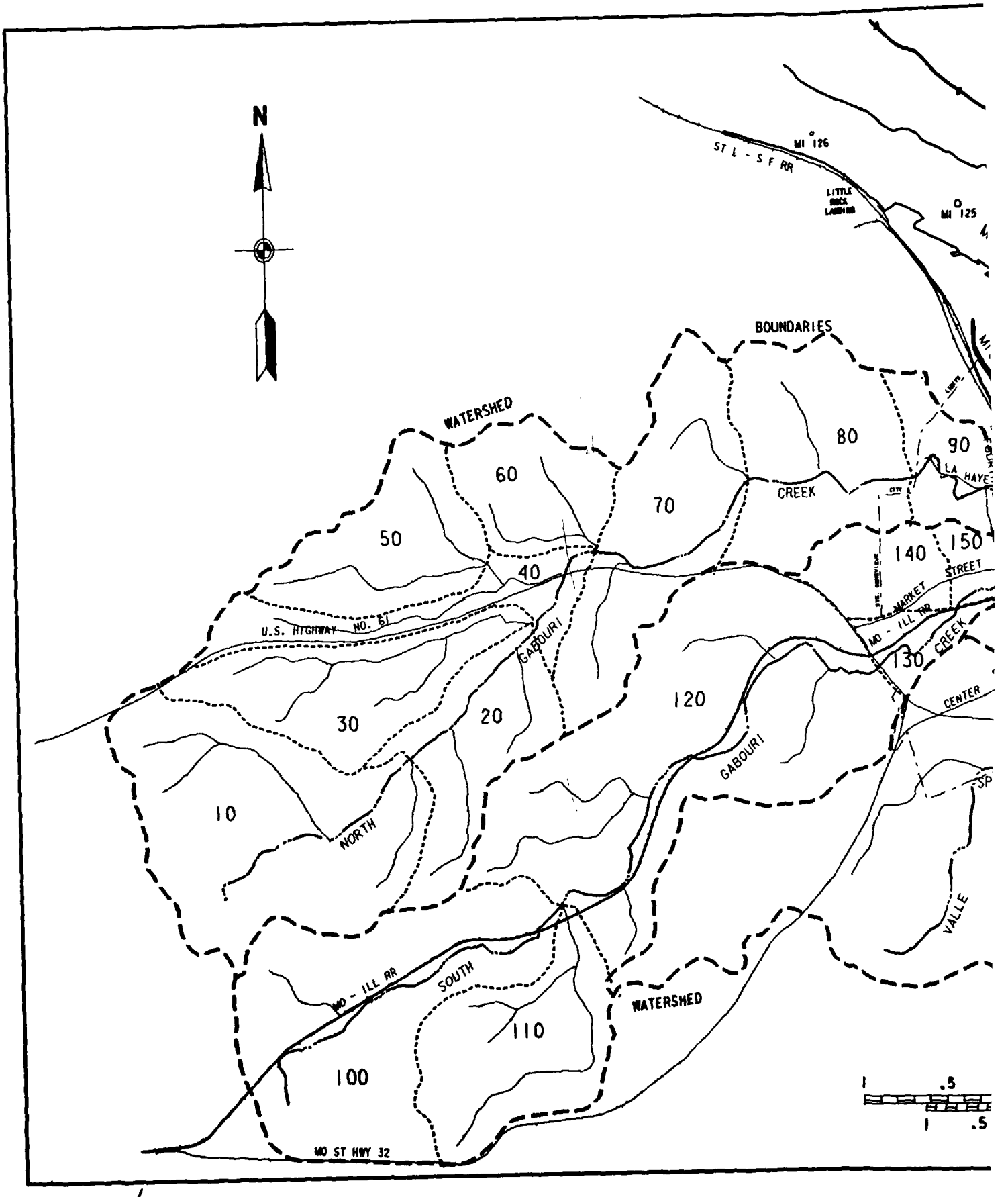


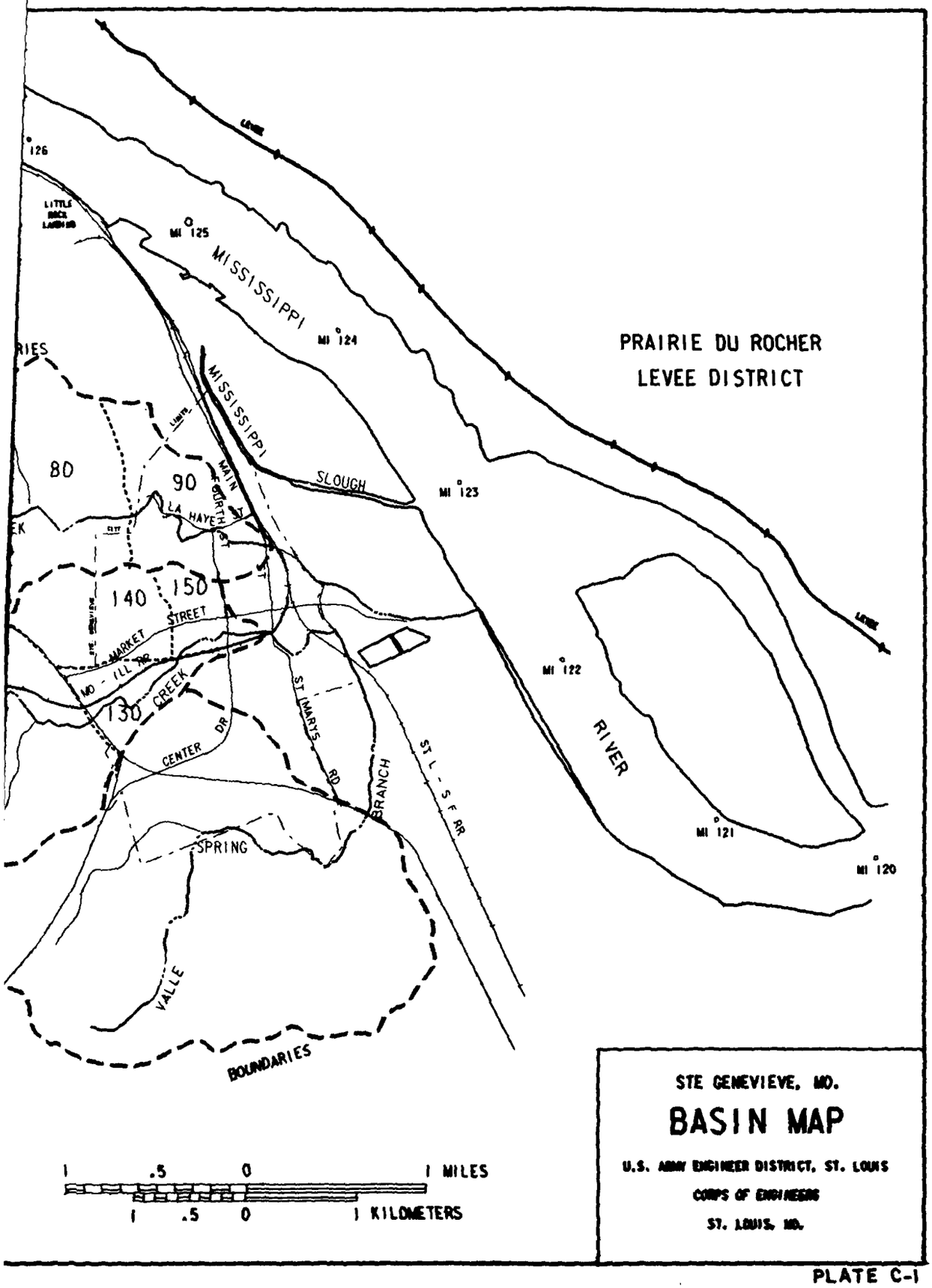
STE. GENEVIEVE, MISSOURI
PLAN 3 (RECREATION FACILITIES NOT SHOWN)

STE. GENEVIEVE, MISSOURI
PLAN 4

400 0 800 1600
SCALE IN FEET

PLATE A-21


N
ST L - S F RR
MI 126
MI 125
LITTLE ROCK LANDING
BOUNDARIES
WATERSHED
CREEK
LA HAYE
STREET
MARKET
MO - ILL RR
CENTER
U.S. HIGHWAY NO. 61
GABOURI
NORTH
SOUTH
VALLE
WATERSHED
MO - ILL RR
MO ST HWY 32
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
1 .5
1 .5



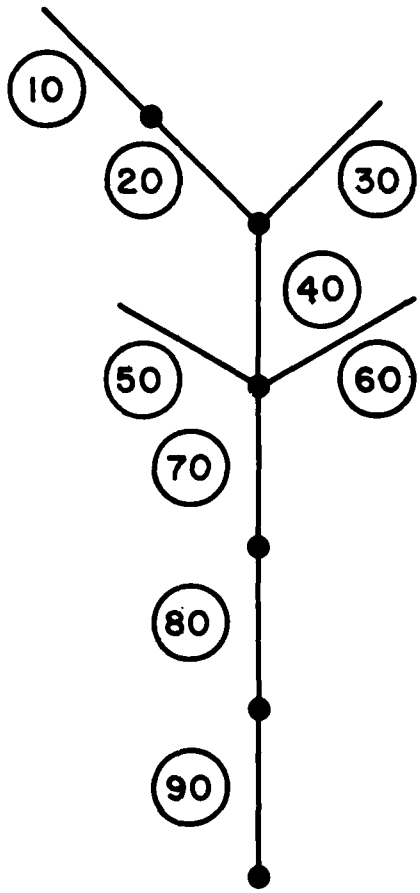
STE GENEVIEVE, MO.

BASIN MAP

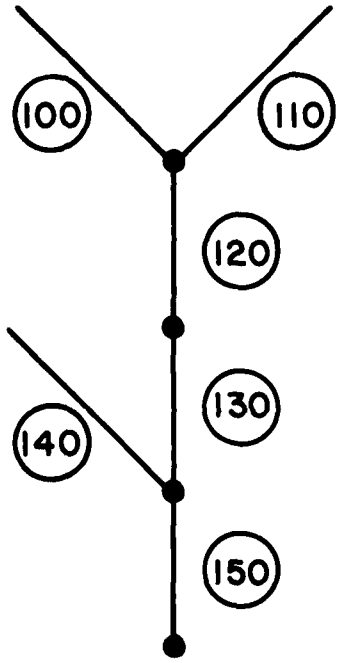
U.S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MO.

2

PLATE C-1



NORTH GABOURI CREEK



SOUTH GABOURI CREEK

LEGEND

50 SUBAREA NO.

ROUTING REACH

STE. GENEVIEVE, MISSOURI
HEC-1 SCHEMATIC
NORTH AND SOUTH GABOURI CREEK BASINS
U.S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MO.

PLATE C-2

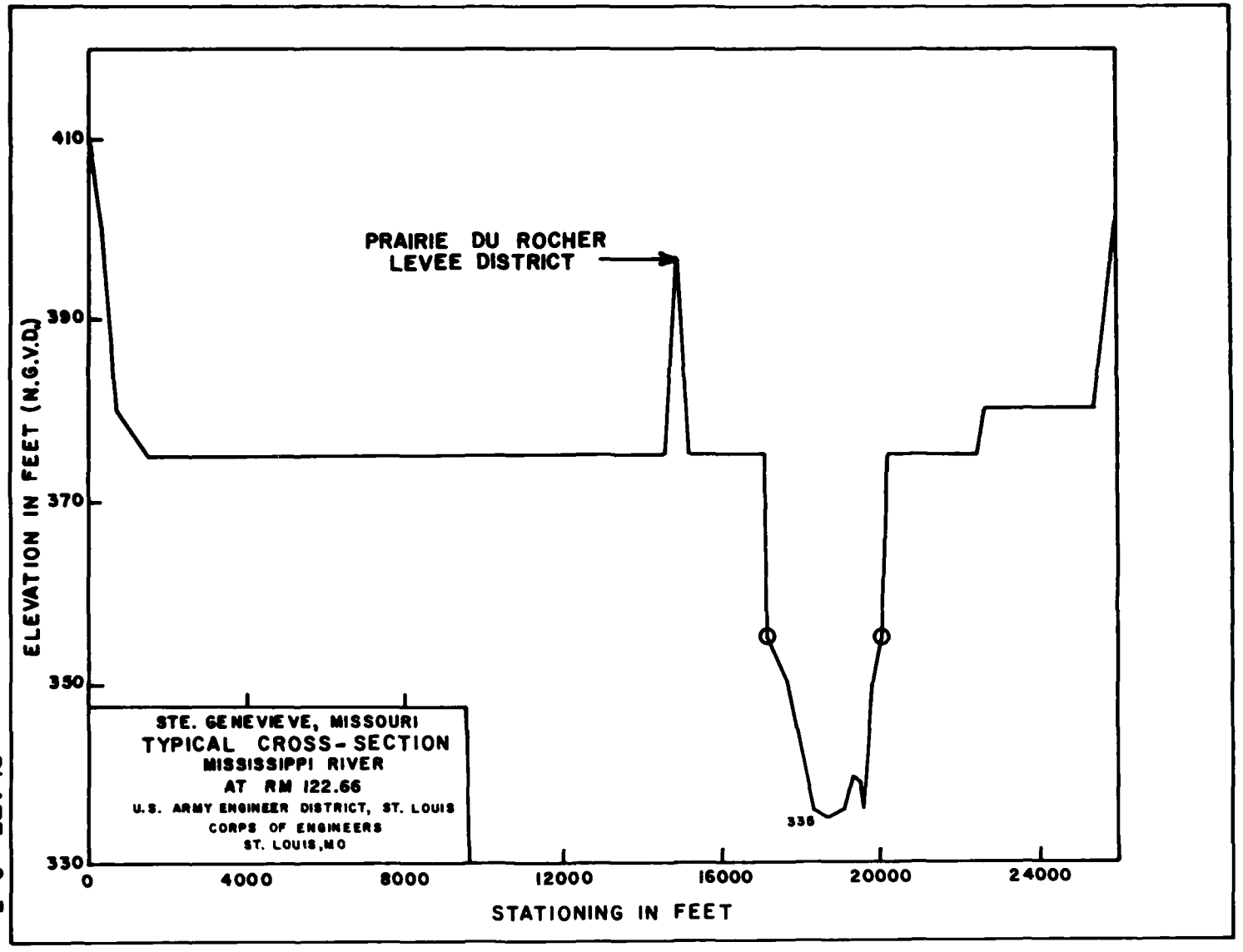

PRAIRIE DU ROCHER
LEVEE DISTRICT
ELEVATION IN FEET (N.G.V.D.)
410
390
370
350
330
338
0
4000
8000
12000
16000
20000
24000
STATIONING IN FEET
STE. GENEVIEVE, MISSOURI
TYPICAL CROSS-SECTION
MISSISSIPPI RIVER
AT RM 122.66
U.S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MO

PLATE C-3

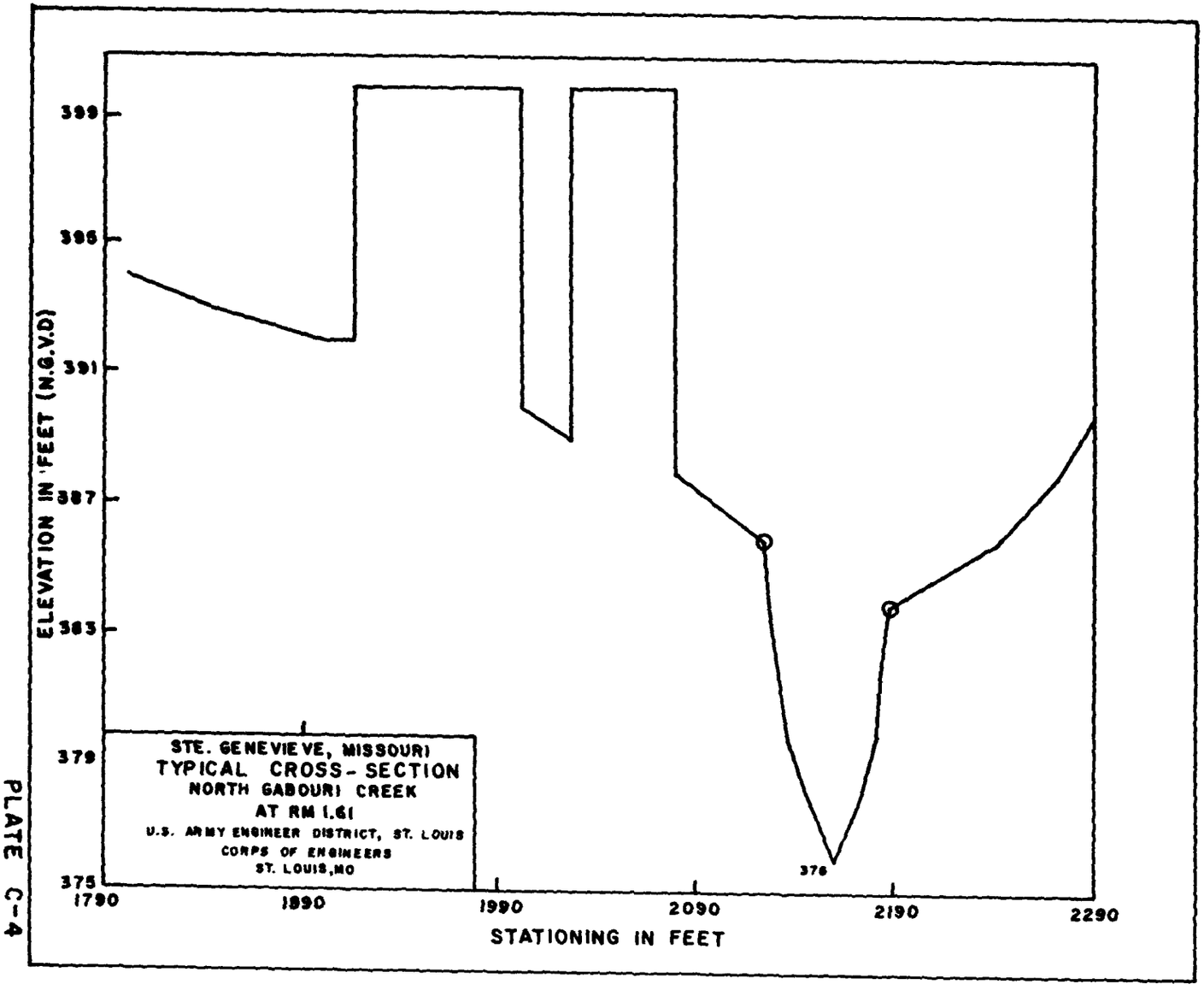

STE. GENEVIEVE, MISSOURI
TYPICAL CROSS-SECTION
NORTH GABOURI CREEK
AT RM 1.61
U.S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MO
ELEVATION IN FEET (N.G.V.D)
399
395
391
387
383
379
375
376
1790
1890
1990
2090
2190
2290
STATIONING IN FEET

PLATE C-4

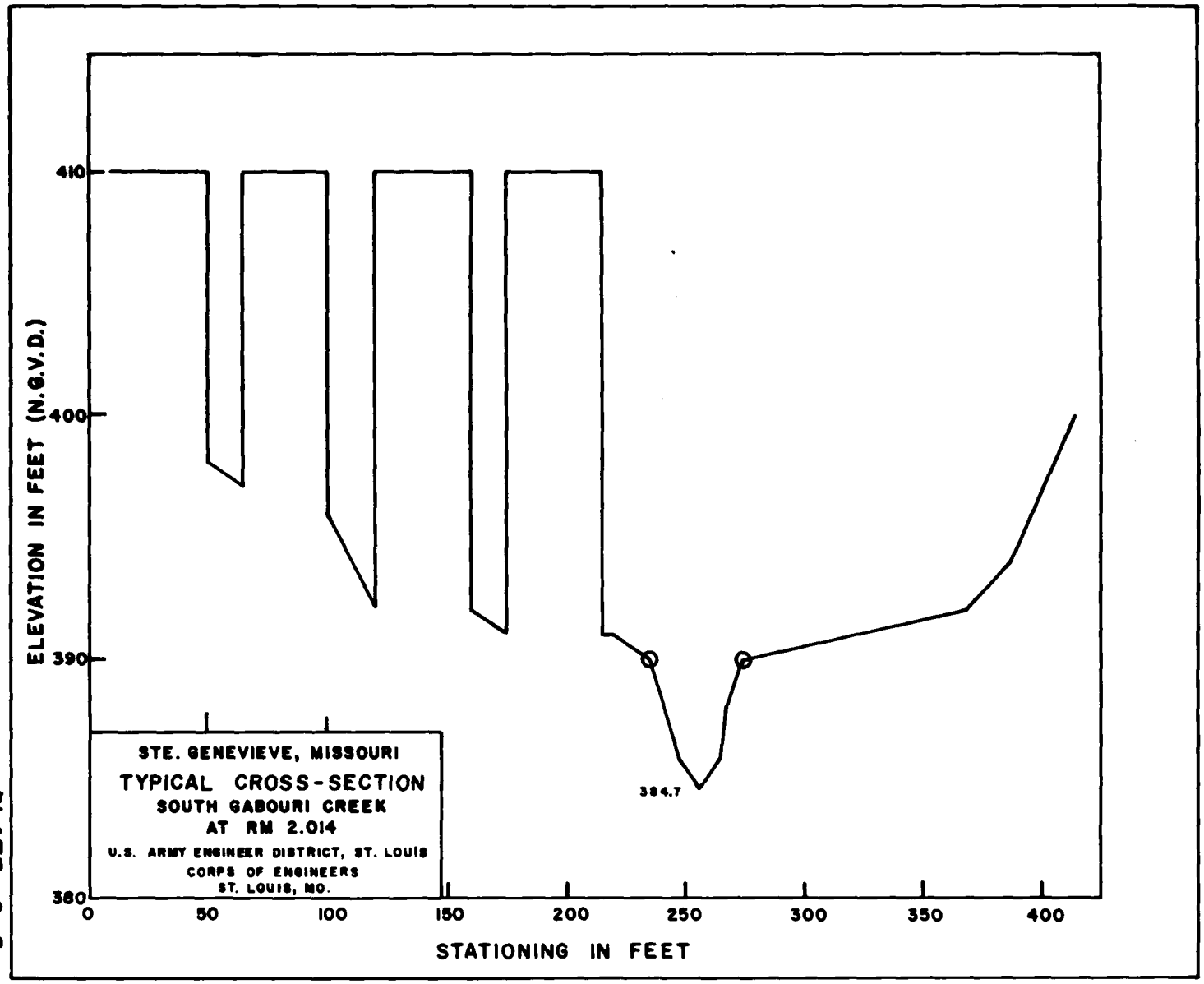
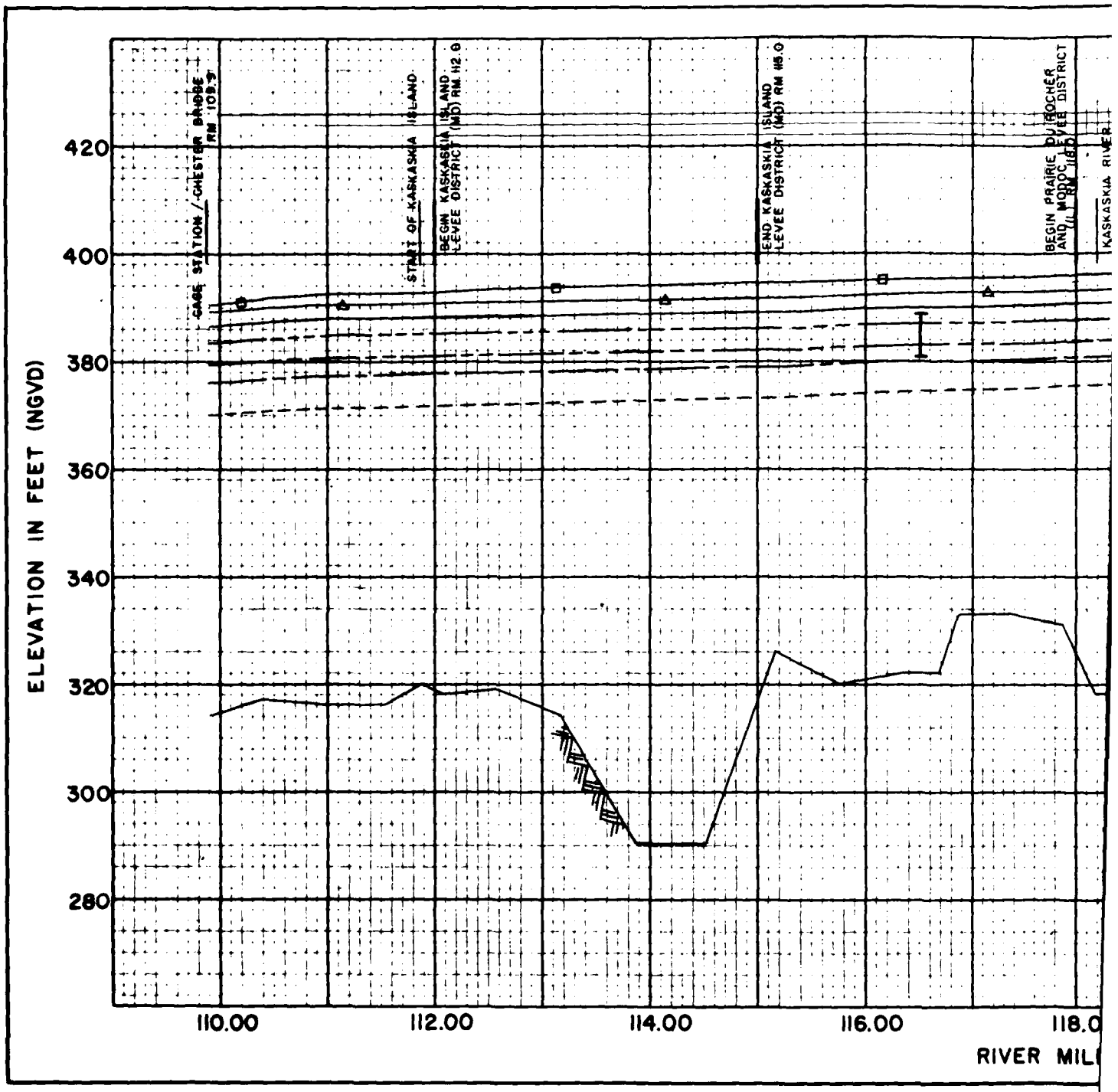
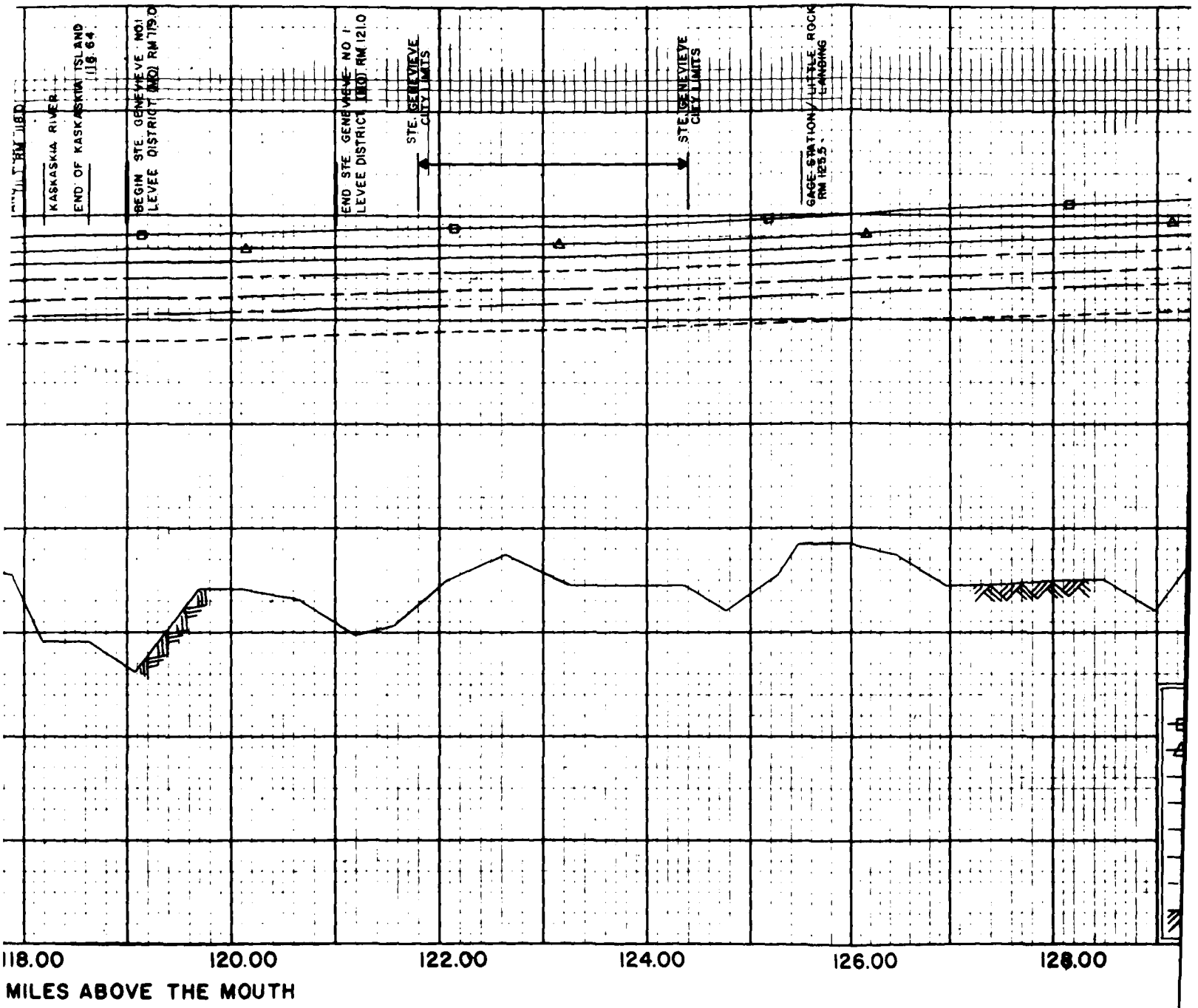

STE. GENEVIEVE, MISSOURI
TYPICAL CROSS-SECTION
SOUTH GABOURI CREEK
AT RM 2.014
U.S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MO.
ELEVATION IN FEET (N.G.V.D.)
410
400
390
380
384.7
0
50
100
150
200
250
300
350
400
STATIONING IN FEET

PLATE C-5


GAGE STATION / CHESTER BRIDGE RM 109.7
START OF KASKASKIA ISLAND
BEGIN KASKASKIA ISLAND LEVEE DISTRICT (MO) RM 112.0
END KASKASKIA ISLAND LEVEE DISTRICT (MO) RM 115.0
BEGIN PRAIRIE DU ROCHER AND MONROE LEVEE DISTRICT (IL) RM 118.0
KASKASKIA RIVER
ELEVATION IN FEET (NGVD)
420
400
380
360
340
320
300
280
110.00
112.00
114.00
116.00
118.0
RIVER MIL


KASKASKIA RIVER
END OF KASKASKIA ISLAND (118.64)
BEGIN STE. GENEVIEVE NO. 1 LEVEE DISTRICT (RIO) RM 119.0
END STE GENEVIEVE NO 1 LEVEE DISTRICT (RIO) RM 121.0
STE. GENEVIEVE CITY LIMITS
STE. GENEVIEVE CITY LIMITS
GAGE STATION/ LITTLE ROCK LANDING RM 125.5
118.00
120.00
122.00
124.00
126.00
128.00
MILES ABOVE THE MOUTH

2

3

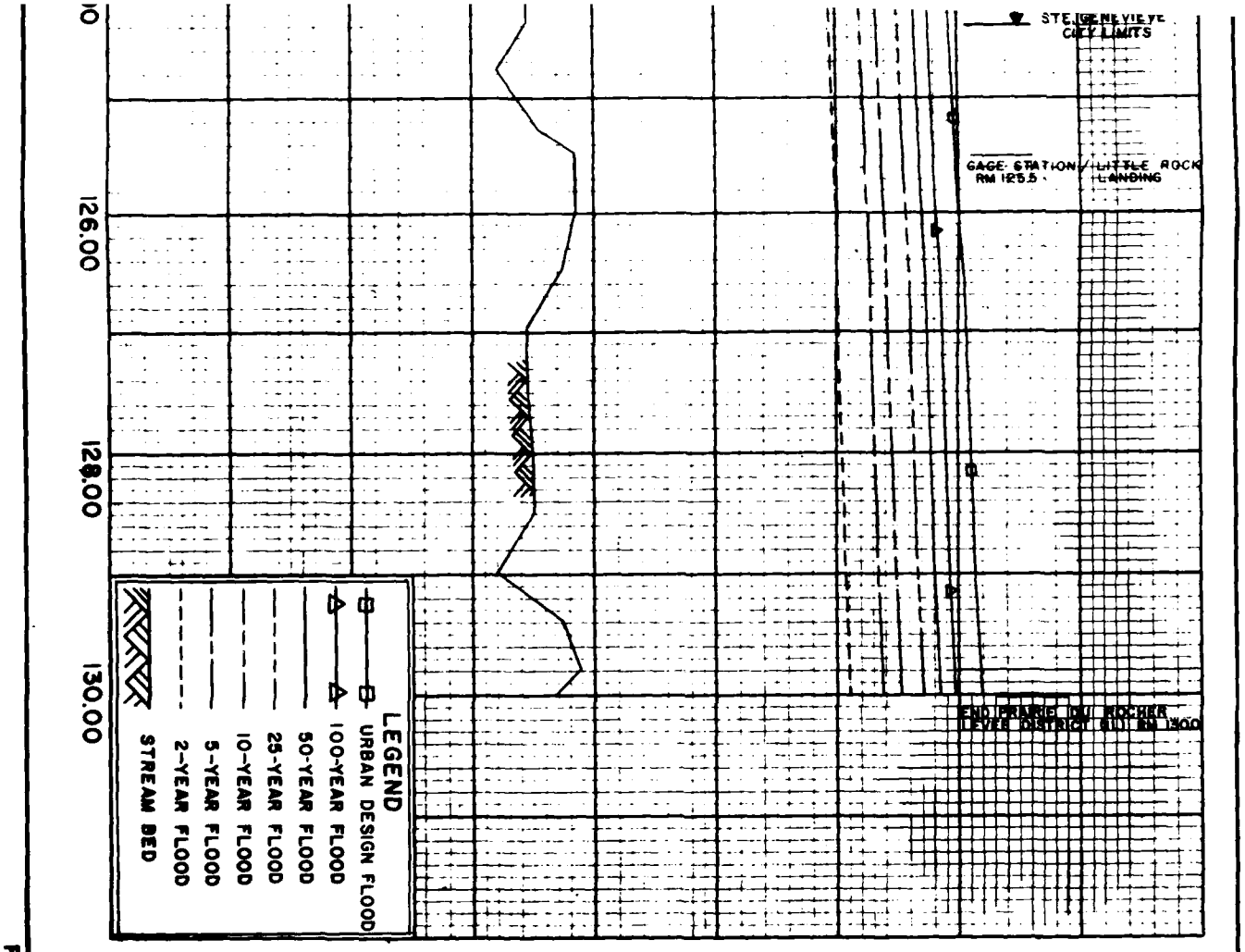


PLATE C-6

STE. GENEVIEVE, MO.
(STE. GENEVIEVE CO.)

WATER SURFACE PROFILE

MISSISSIPPI RIVER (RM 109.9-130.0)

PLATE C-6

MISSISSIPPI
RIVER

MISSISSIPPI RIVER FLOODING

URBAN DESIGN FLOOD LIMITS (500 YEAR FLOOD LIMITS)

100 YEAR FLOOD LIMITS

1973 FLOOD LIMITS

WASHINGTON
NORTH MAIN ST

MISSISSIPPI RIVER FLOODING

URBAN DESIGN FLOOD LIMITS
(500 YEAR FLOOD LIMITS)

100 YEAR FLOOD LIMITS

1973 FLOOD LIMITS

STE. GENEVIEVE, MO & VICINITY

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

IN 21 SHEETS

PLATE 8-8

MISSISSIPPI RIVER FLOODING

URBAN DESIGN FLOOD LIMITS
1500 YEAR FLOOD LIMITS
YEAR FLOOD LIMITS
FLOOD LIMITS

STE. GENEVIEVE, MO & VICINITY

PLATE C-9

2

MISSISSIPPI RIVER FLOODING

URBAN DESIGN FLOOD LIMITS (500 YEAR FLOOD LIMITS)

100 YEAR FLOOD LIMITS

1973 FLOOD LIMITS

STE GENEVIEVE, MO & VICINITY

TOPOGRAPHIC MAPPING

ARMY ENGINEER DISTRICT ST LOUIS

CORPS OF ENGINEERS

ST LOUIS, MISSOURI

N 21 SHEETS SHEET NO 19

PLATE C-10

2

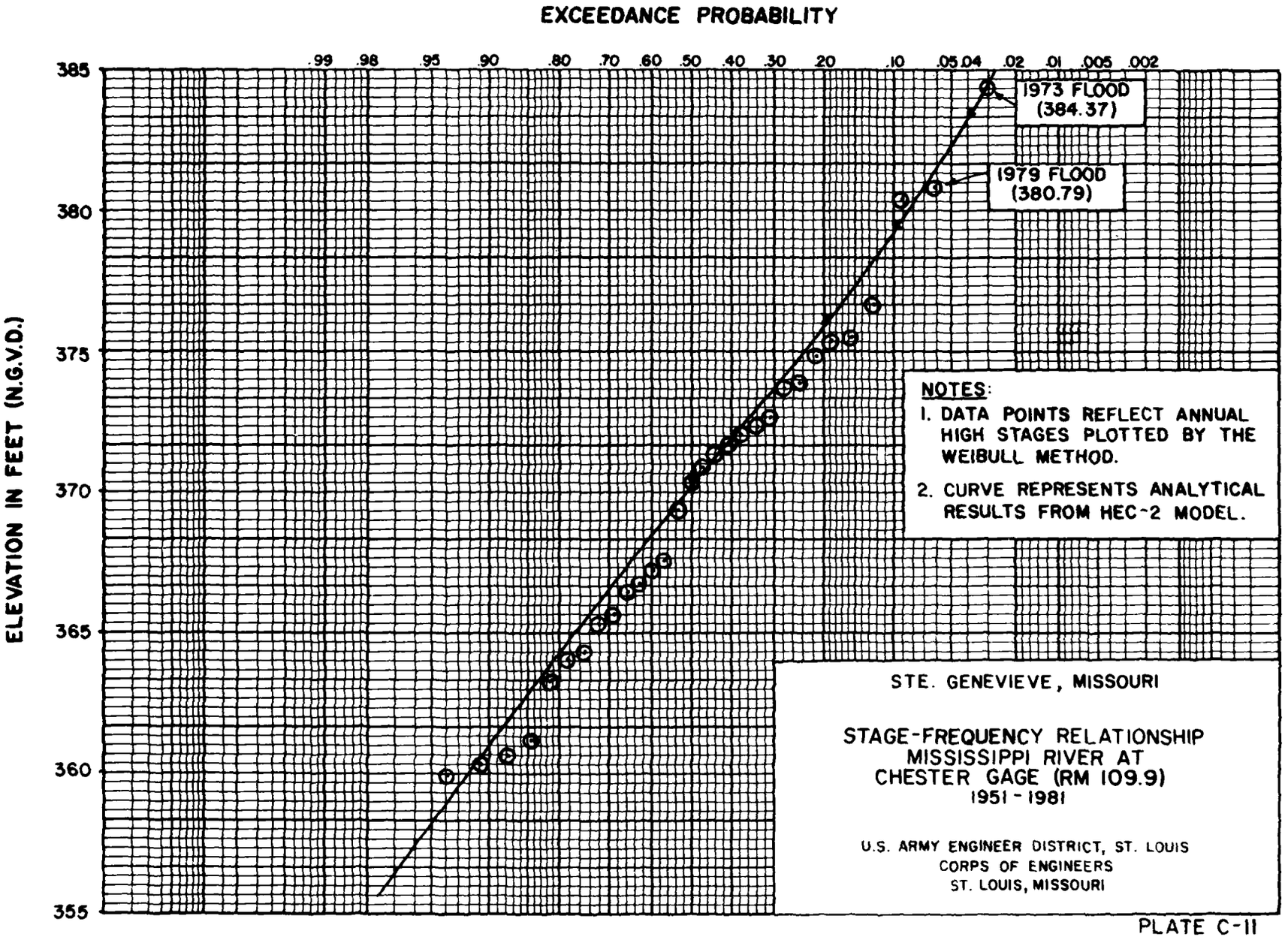


PLATE C-11

PLATE C-11

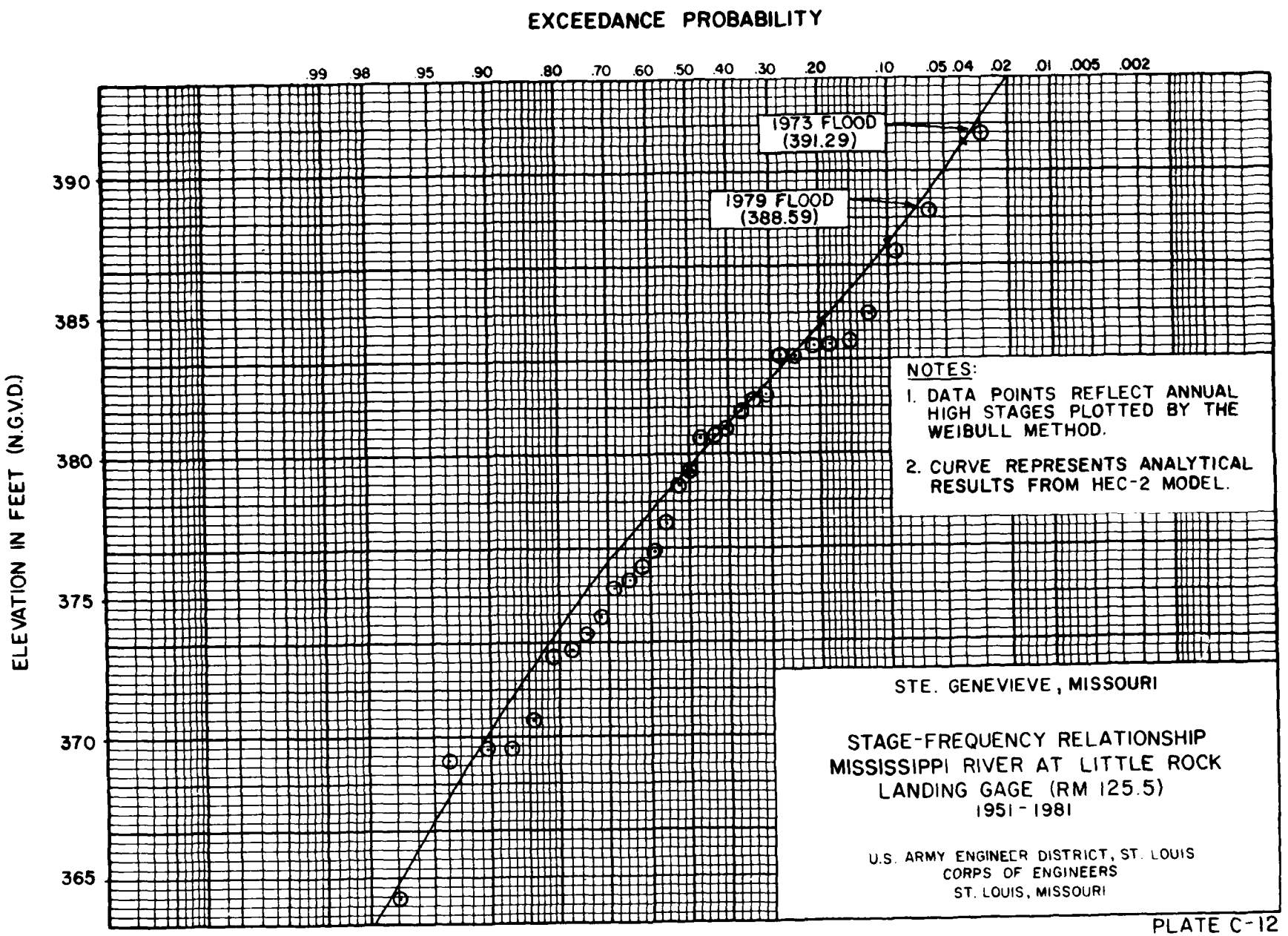

EXCEEDANCE PROBABILITY
.99 .98 .95 .90 .80 .70 .60 .50 .40 .30 .20 .10 .05 .04 .02 .01 .005 .002
ELEVATION IN FEET (N.G.V.D.)
390
385
380
375
370
365
1973 FLOOD (391.29)
1979 FLOOD (388.59)
NOTES:
1. DATA POINTS REFLECT ANNUAL HIGH STAGES PLOTTED BY THE WEIBULL METHOD.
2. CURVE REPRESENTS ANALYTICAL RESULTS FROM HEC-2 MODEL.
STE. GENEVIEVE, MISSOURI
STAGE-FREQUENCY RELATIONSHIP
MISSISSIPPI RIVER AT LITTLE ROCK
LANDING GAGE (RM 125.5)
1951 - 1981
U.S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

PLATE C-12

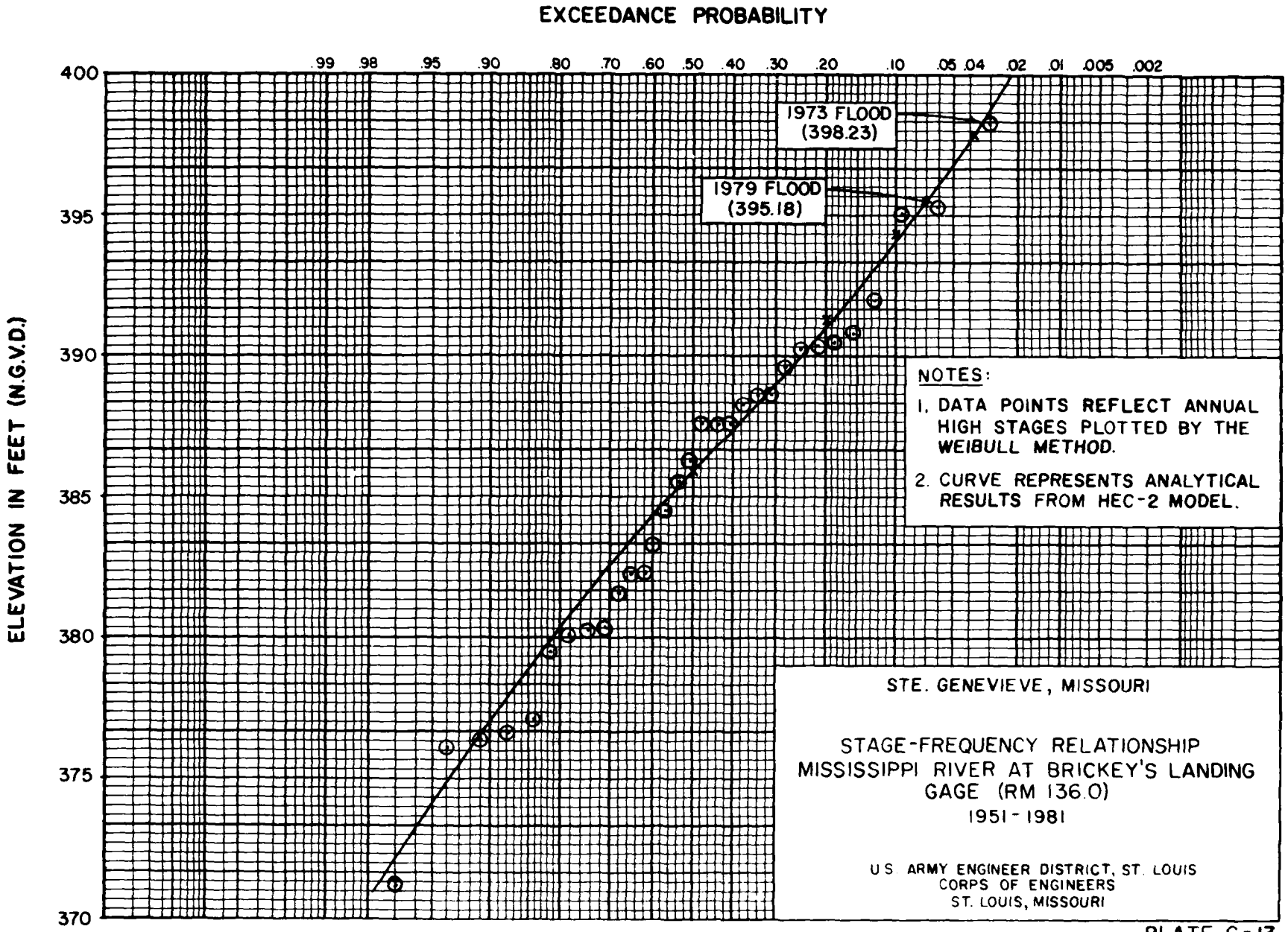
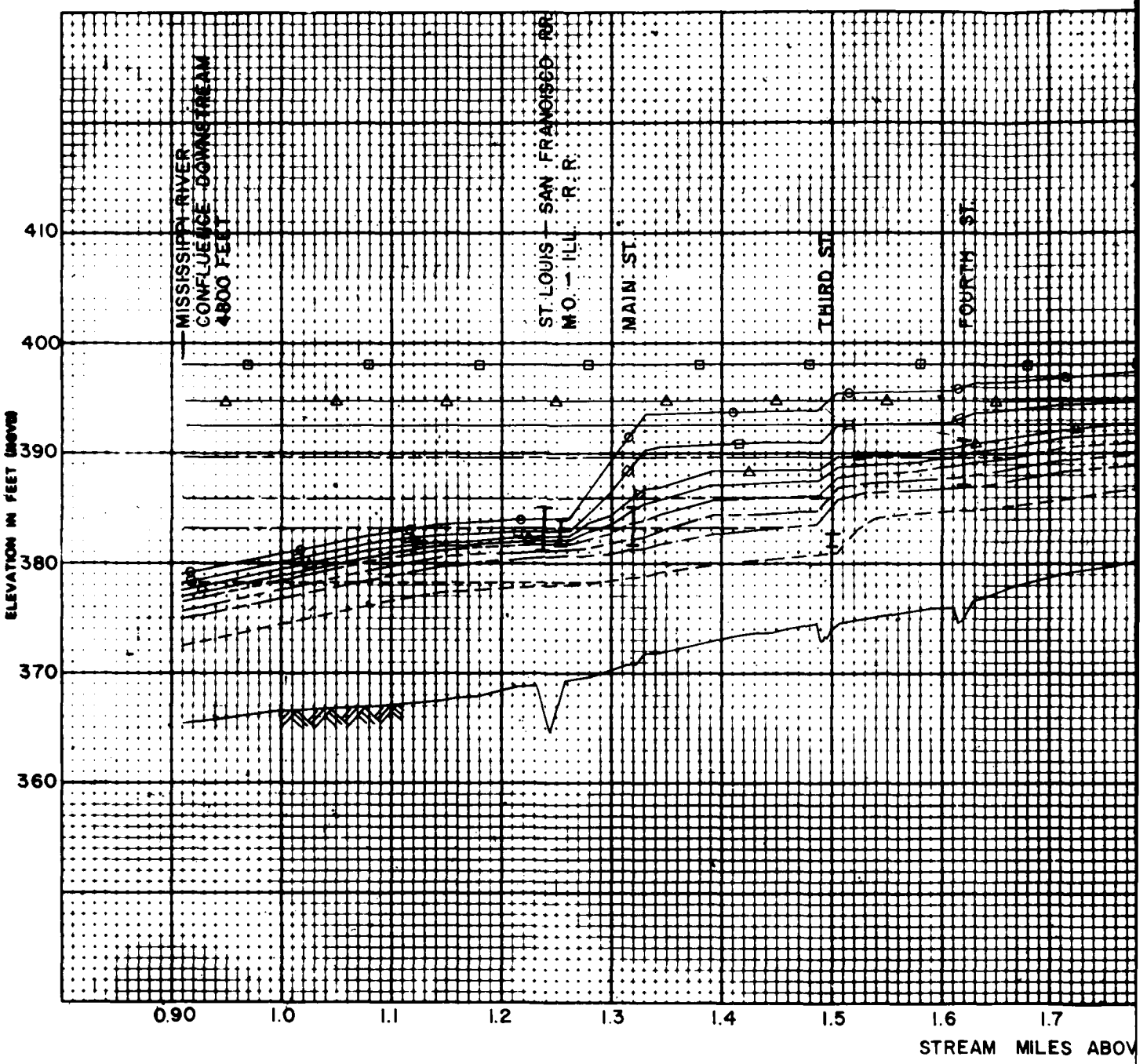
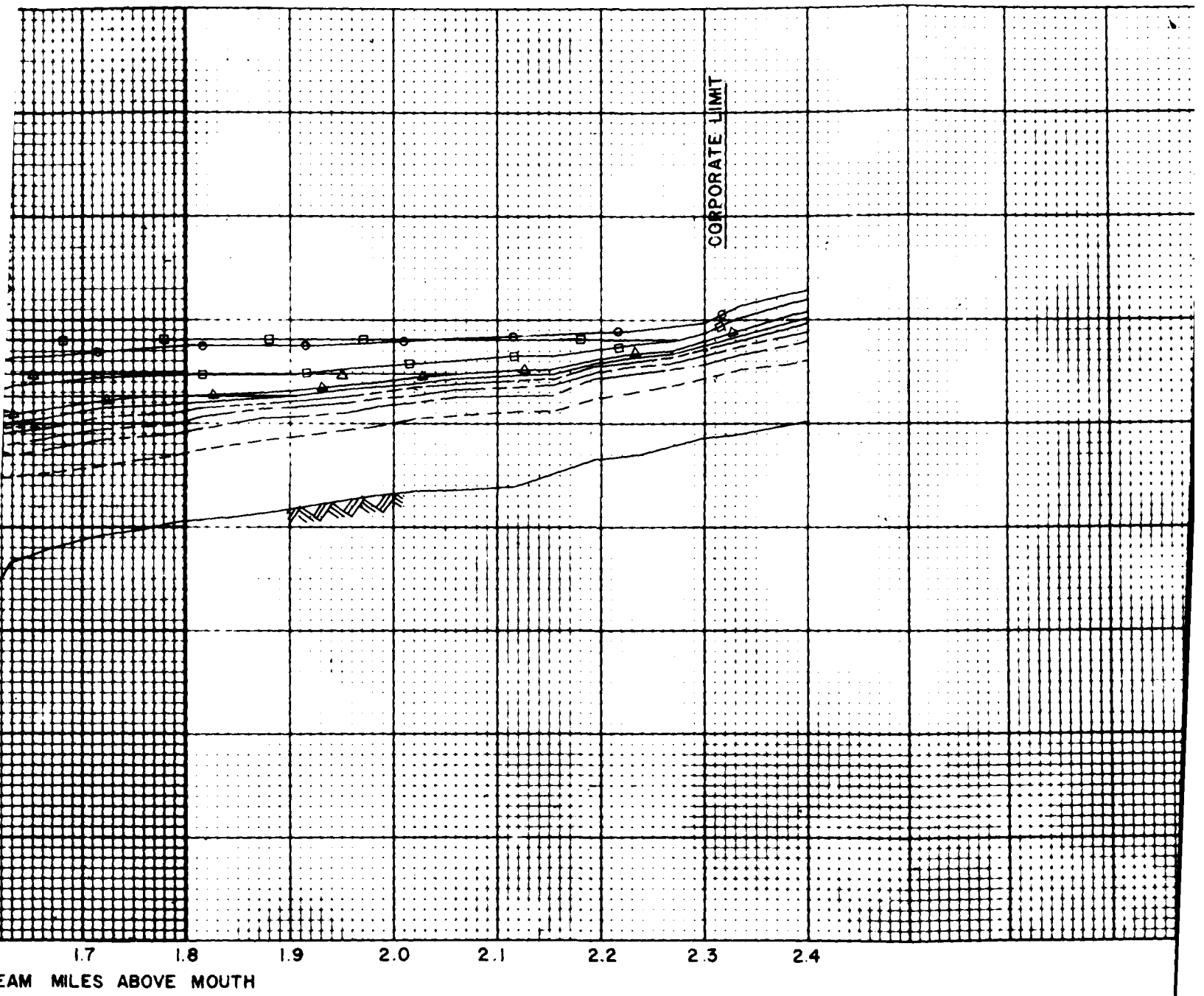
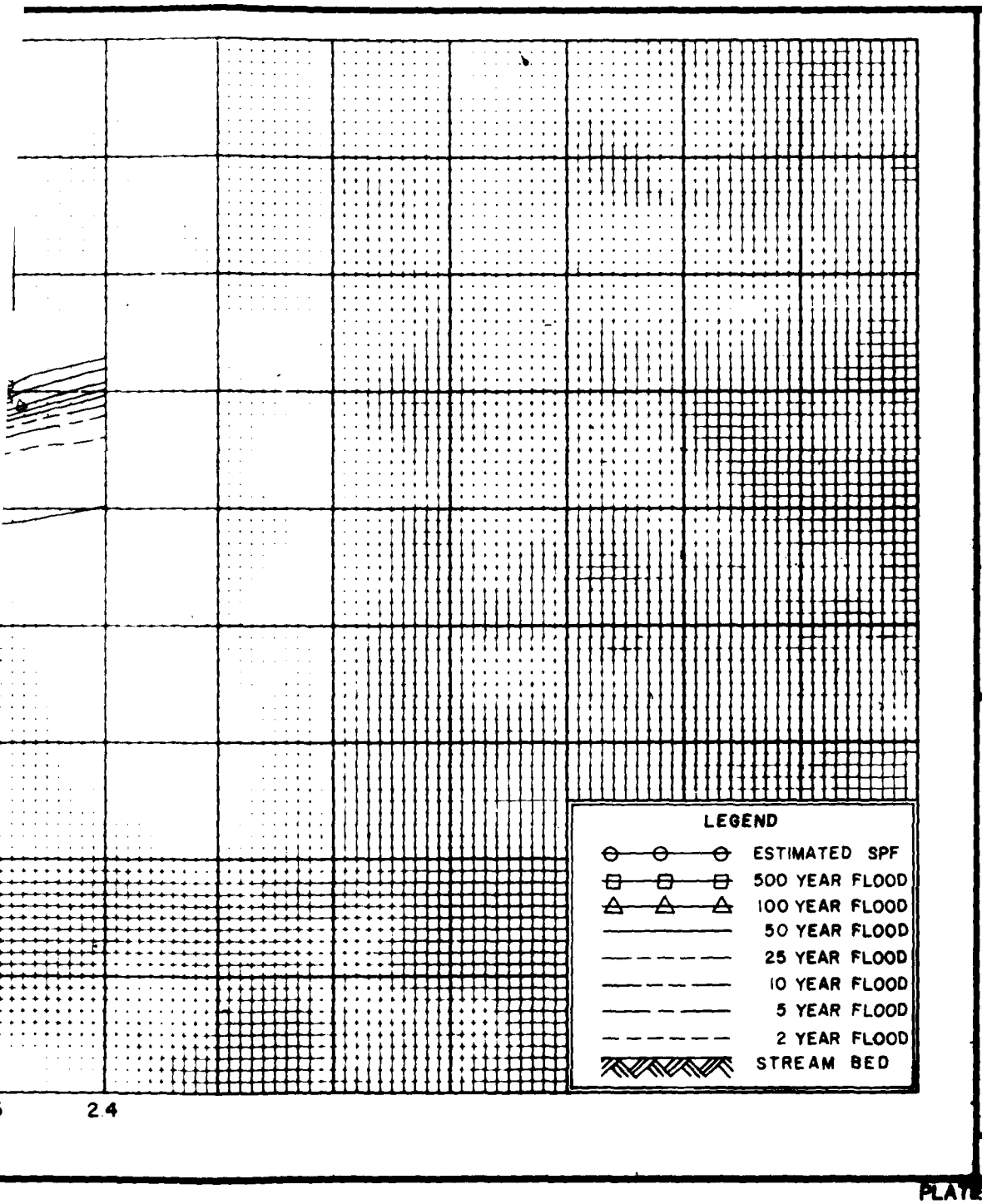


PLATE C-13

PLATE C-13


MISSISSIPPI RIVER
CONFLUENCE DOWNSTREAM
4800 FEET
ST. LOUIS — SAN FRANCISCO RR
MO — ILL. R. R.
MAIN ST.
THIRD ST.
FOURTH ST.
ELEVATION IN FEET (ABOVE)
410
400
390
380
370
360
0.90
1.0
1.1
1.2
1.3
1.4
1.5
1.6
1.7
STREAM MILES ABOV


CORPORATE LIMIT
1.7
1.8
1.9
2.0
2.1
2.2
2.3
2.4
EAM MILES ABOVE MOUTH



FREQUENCY PROFILES — FUTURE 'WITHOUT PROJECT'

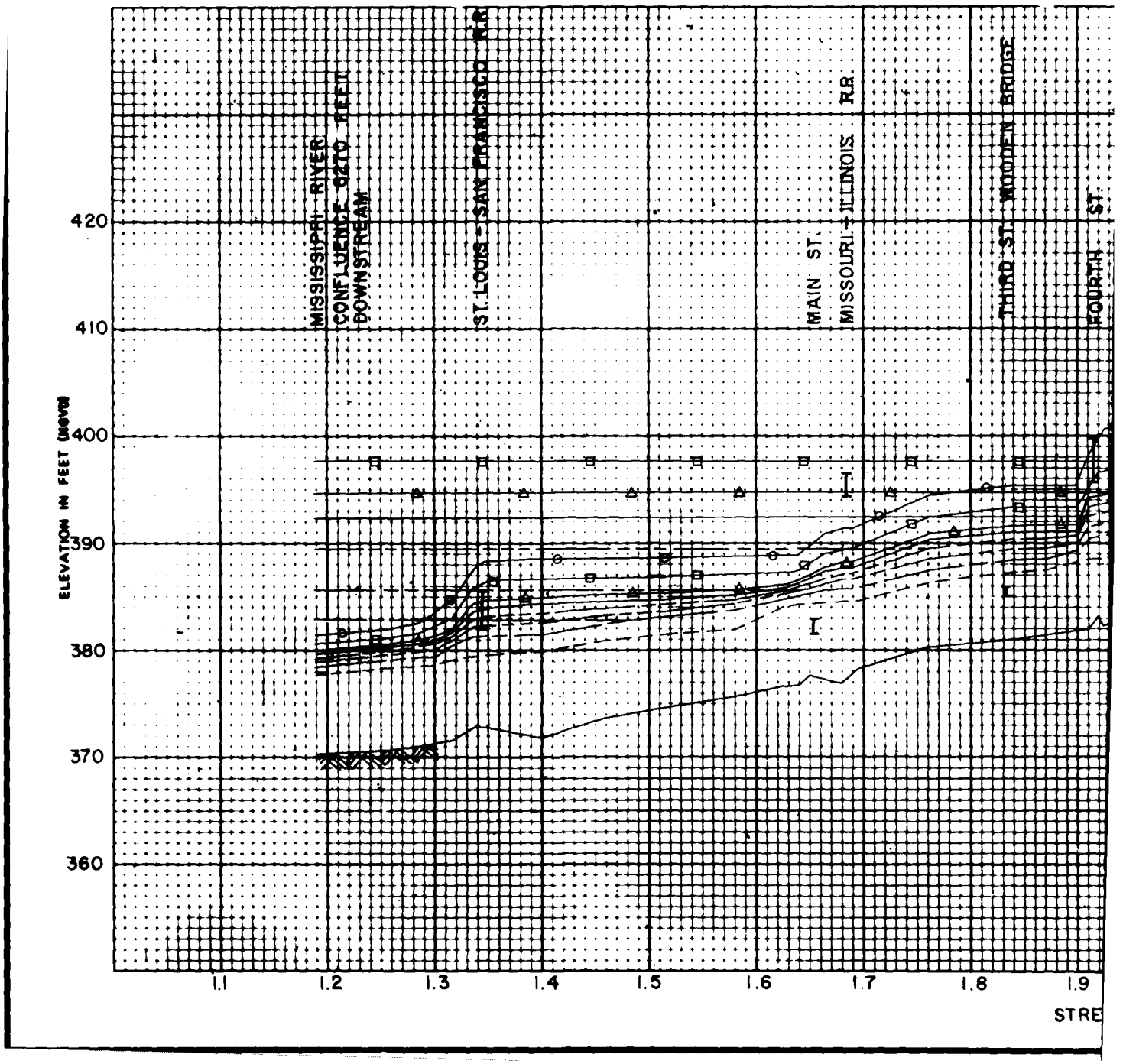
NORTH GABOURI CREEK

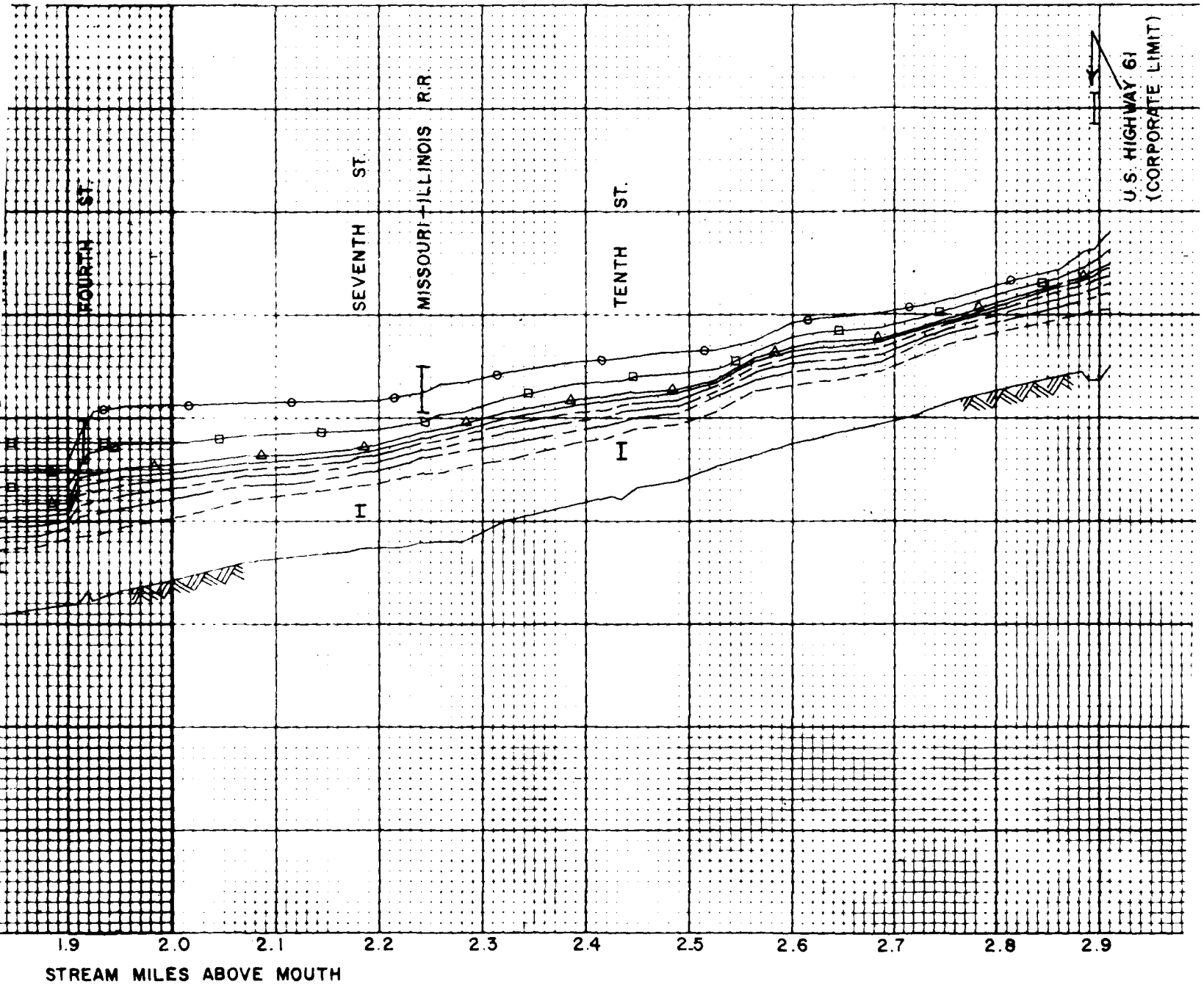
STE. GENEVIEVE, MO.
(STE. GENEVIEVE CO.)

PLATE C-14

PLATE C-14

3


MISSISSIPPI RIVER
CONFLUENCE 8270 FEET
DOWNSTREAM
ST. LOUIS - SAN FRANCISCO RR
MAIN ST.
MISSOURI - ILLINOIS RR
THIRD ST. WOODEN BRIDGE
FOURTH ST.
ELEVATION IN FEET (NGVD)
420
410
400
390
380
370
360
1.1
1.2
1.3
1.4
1.5
1.6
1.7
1.8
1.9
STRE


FOURTH ST.
SEVENTH ST.
MISSOURI-ILLINOIS R.R.
TENTH ST.
U.S. HIGHWAY 61
(CORPORATE LIMIT)
1.9
2.0
2.1
2.2
2.3
2.4
2.5
2.6
2.7
2.8
2.9
STREAM MILES ABOVE MOUTH

FREQUENCY PROFILES — FUTURE 'WITHOUT PROJECT'

SOUTH GABOURI CREEK

STE. GENEVIEVE, MO.
(STE. GENEVIEVE CO.)

PLATE C-15

PLATE C-16

3

TRIBUTARY FLOODING

STANDARD PROJECT FLOOD LIMITS

100 YEAR FLOOD LIMITS

25 YEAR FLOOD LIMITS

NOTE

STE GENEVIEVE, MO & VICINITY

TOPOGRAPHIC MAPPING
US ARMY ENGINEER DISTRICT ST LOUIS
CORPS OF ENGINEERS
ST LOUIS, MISSOURI

PLATE C 17

2

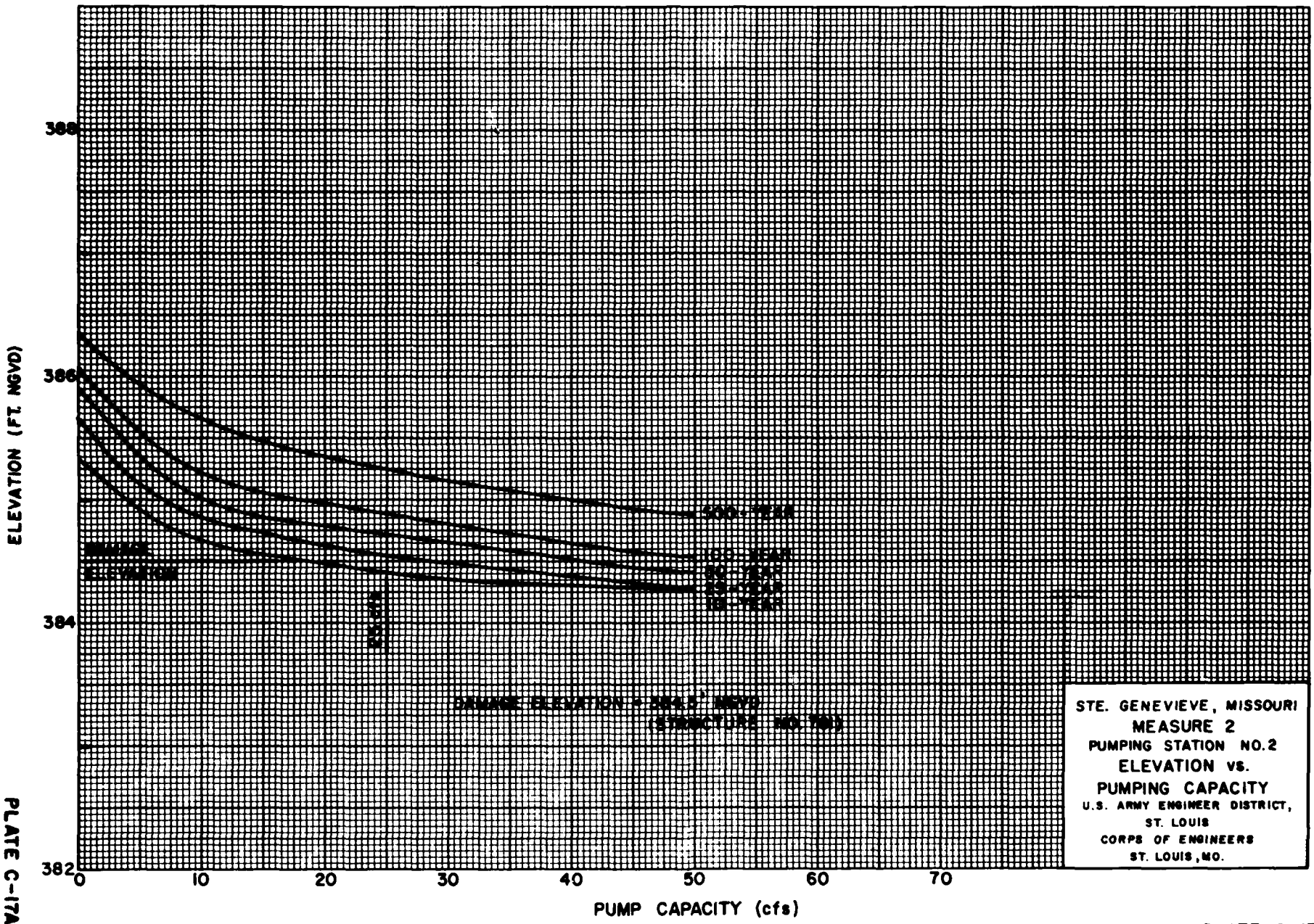
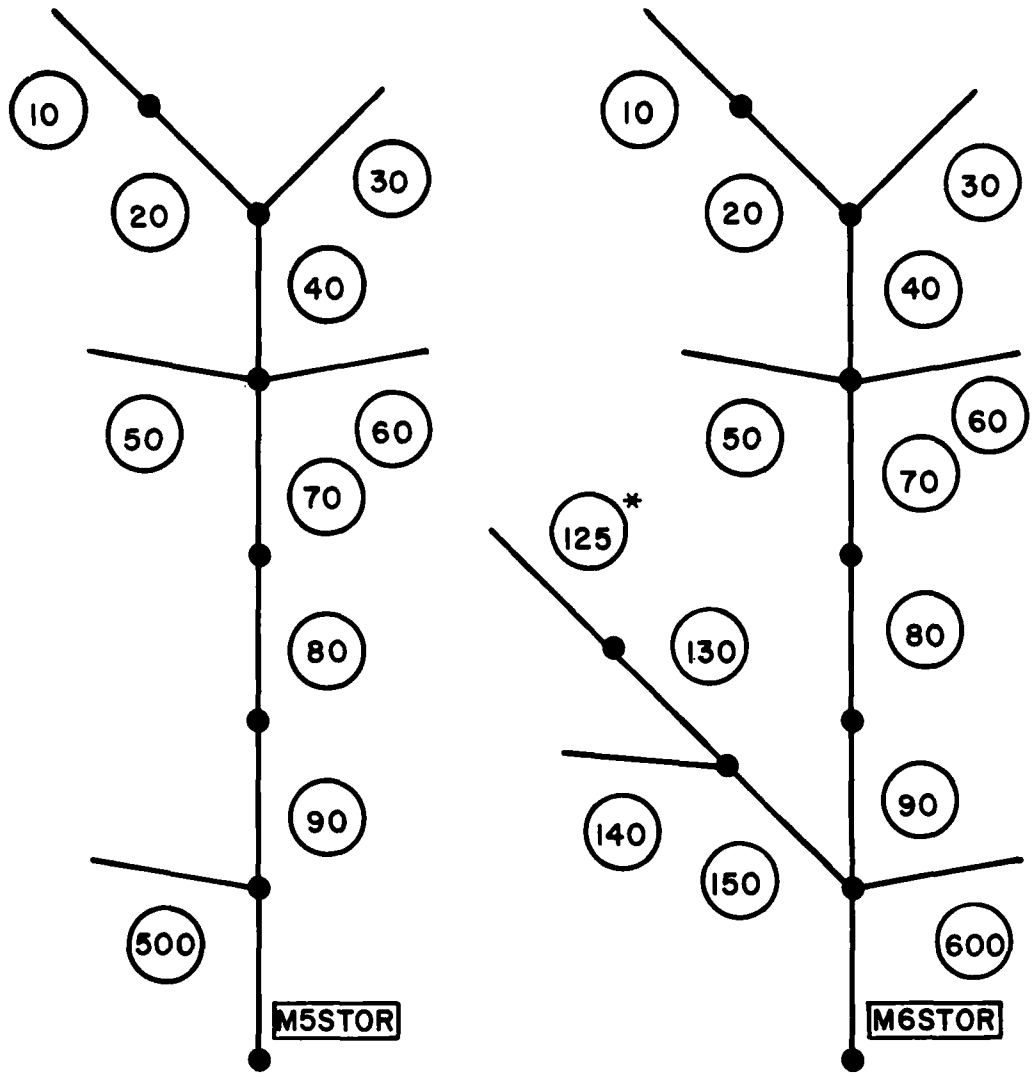

388
386
384
382
ELEVATION (FT. NGVD)
0
10
20
30
40
50
60
70
PUMP CAPACITY (cfs)
500-YEAR
100-YEAR
50-YEAR
25-YEAR
10-YEAR
DAMAGE ELEVATION = 384.5' NGVD
(STRUCTURE NO. 193)
STE. GENEVIEVE, MISSOURI
MEASURE 2
PUMPING STATION NO. 2
ELEVATION VS.
PUMPING CAPACITY
U.S. ARMY ENGINEER DISTRICT,
ST. LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MO.

PLATE C-17A



MEASURE 5

MEASURE 6

* UNIT HYDROGRAPH (125) REPRESENTS COMBINED HYDROGRAPH OF (100), (110), AND (120).

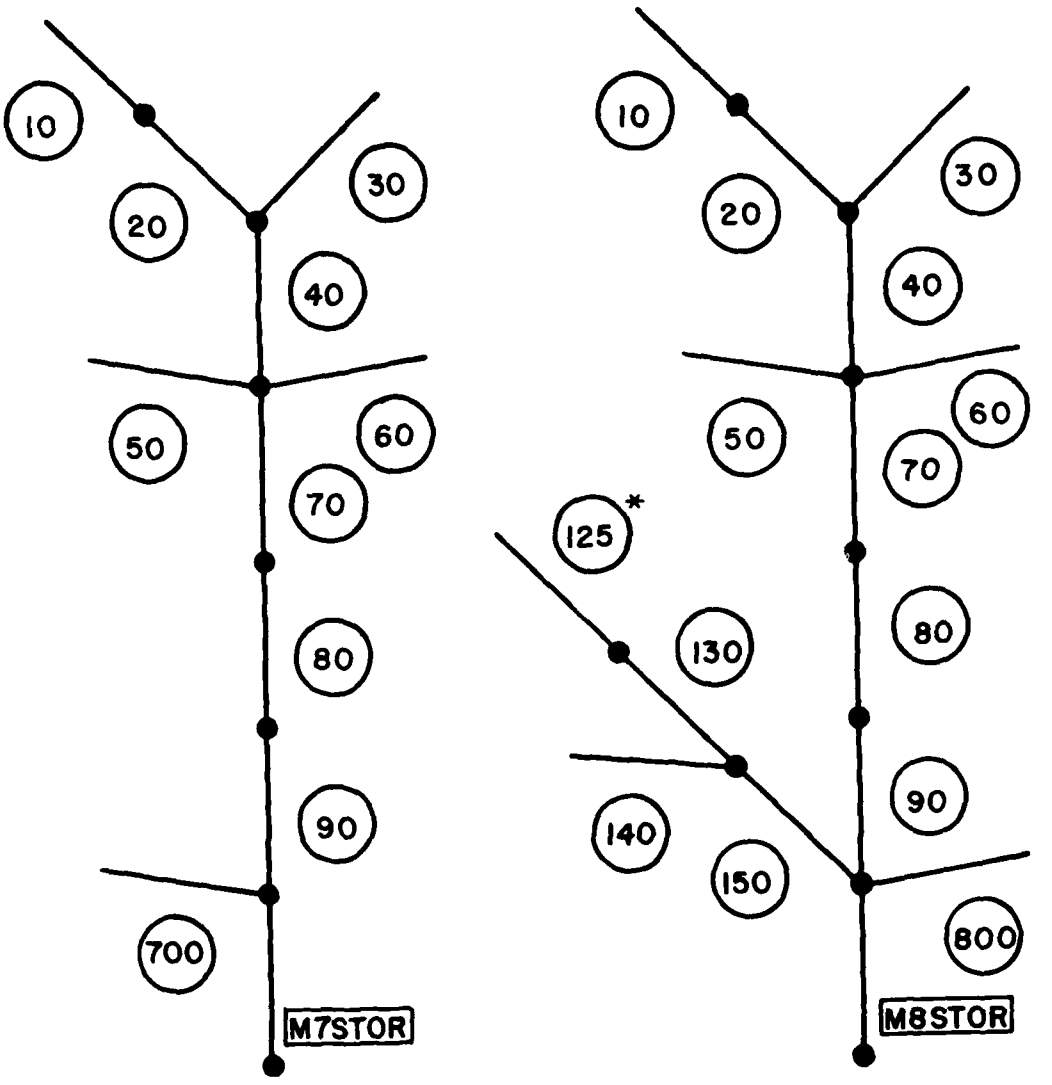
LEGEND

(50) SUBAREA NO.

ROUTING REACH

M5STOR AVAILABLE INTERIOR STORAGE

STE. GENEVIEVE, MISSOURI
HEC-1 SCHEMATIC
FOR MEASURES 5 AND 6
U.S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MO.



MEASURE 7

MEASURE 8

* UNIT HYDROGRAPH (125) REPRESENTS COMBINED HYDROGRAPH OF (100), (110), AND (120).

LEGEND

(50) SUBAREA NO.

ROUTING REACH

M7STOR AVAILABLE INTERIOR STORAGE

STE. GENEVIEVE, MISSOURI
HEC-1 SCHEMATIC
FOR MEASURES 7 AND 8
U.S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MO.

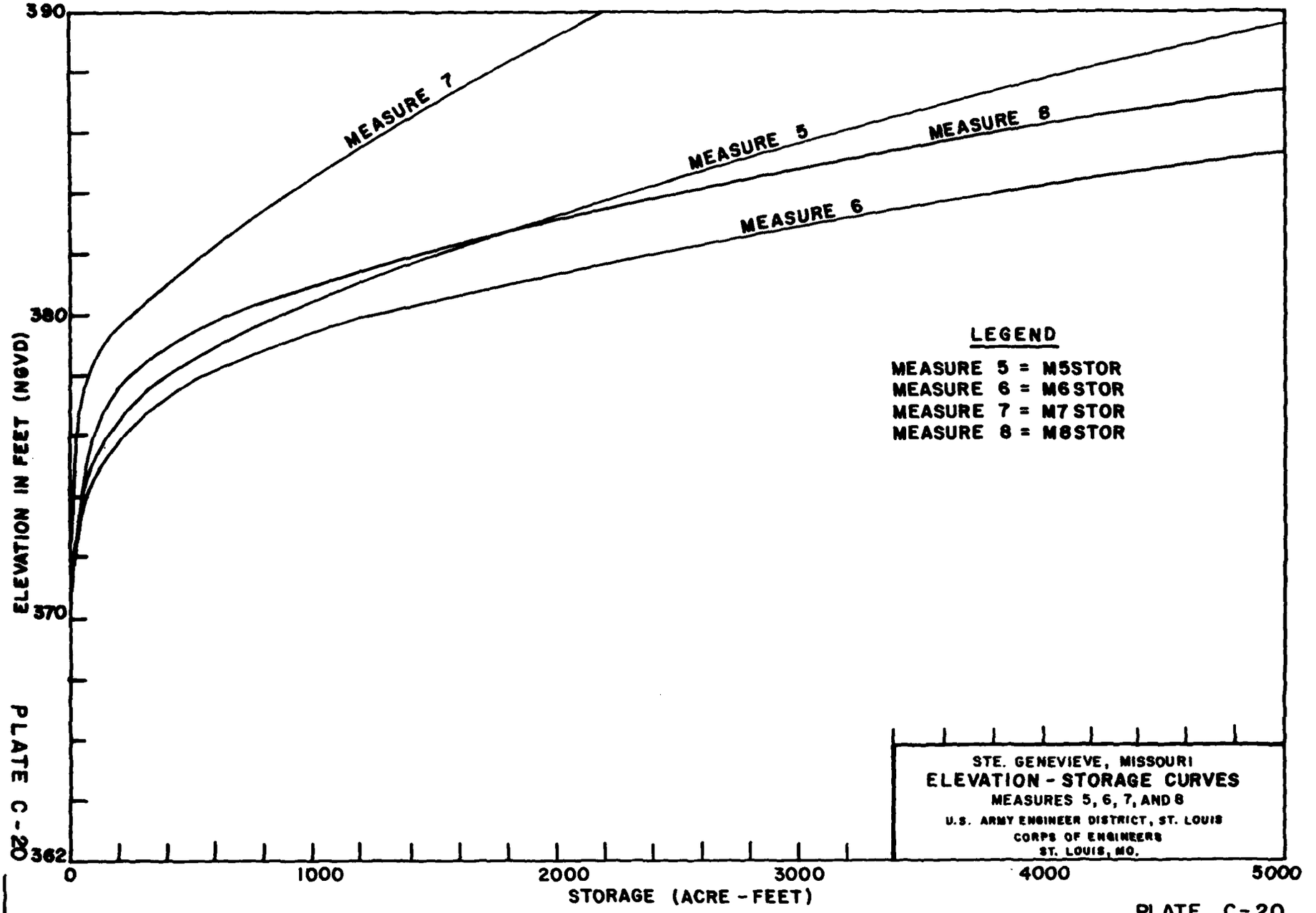
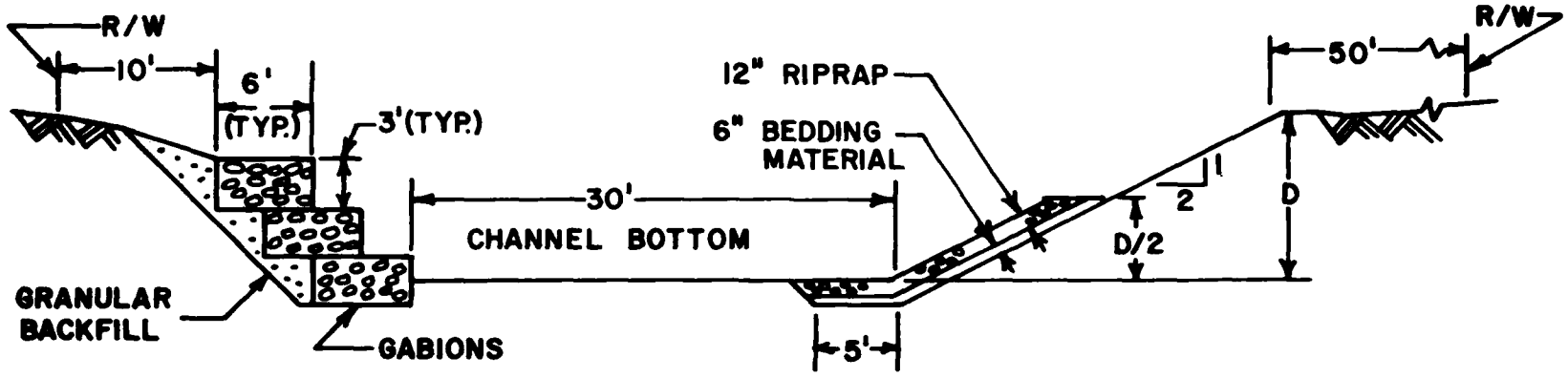

390
380
370
362
ELEVATION IN FEET (NGVD)
0
1000
2000
3000
4000
5000
STORAGE (ACRE - FEET)
MEASURE 7
MEASURE 5
MEASURE 8
MEASURE 6
LEGEND
MEASURE 5 = M5STOR
MEASURE 6 = M6STOR
MEASURE 7 = M7STOR
MEASURE 8 = M8STOR
STE. GENEVIEVE, MISSOURI
ELEVATION - STORAGE CURVES
MEASURES 5, 6, 7, AND 8
U.S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MO.

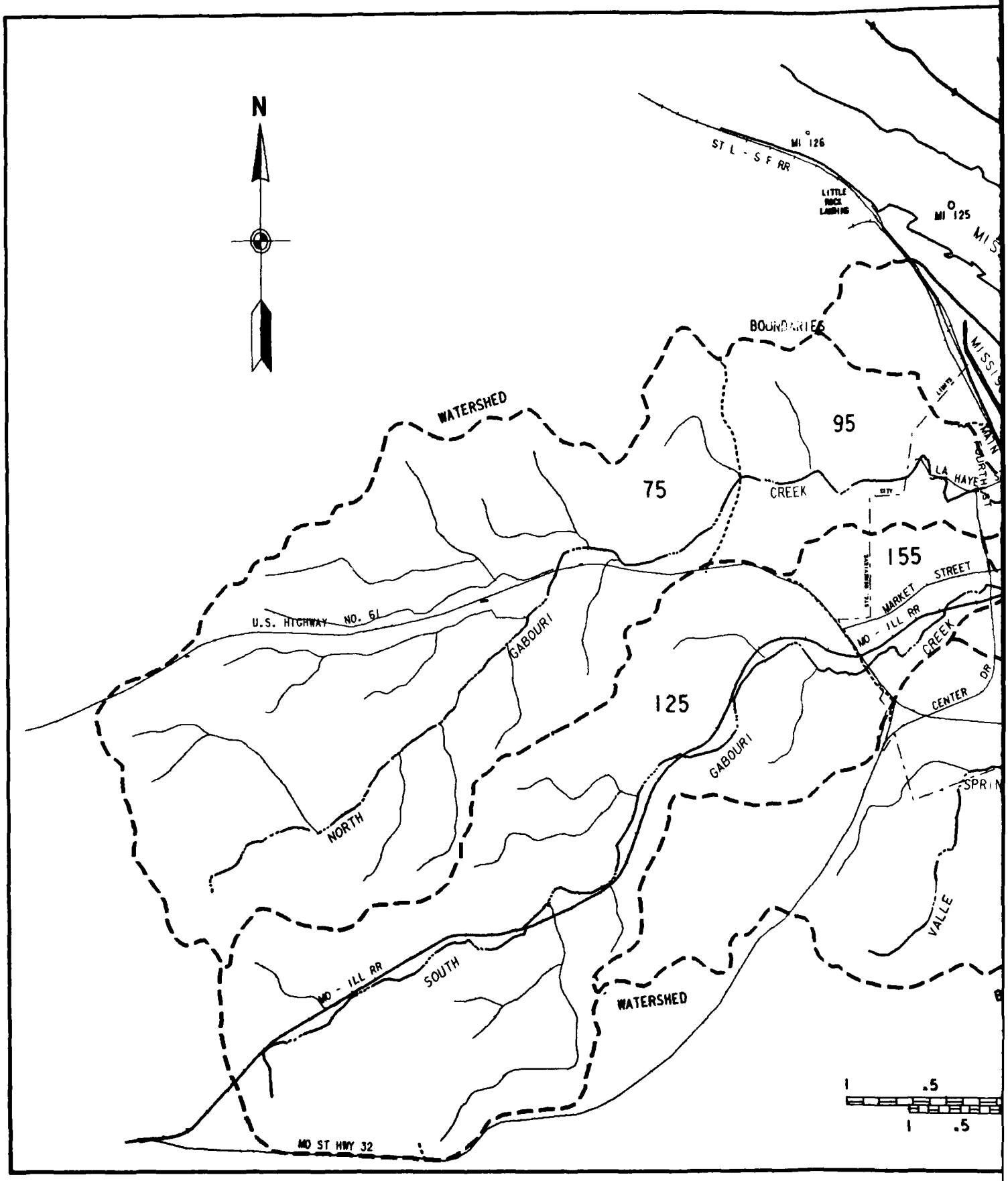
PLATE C-20

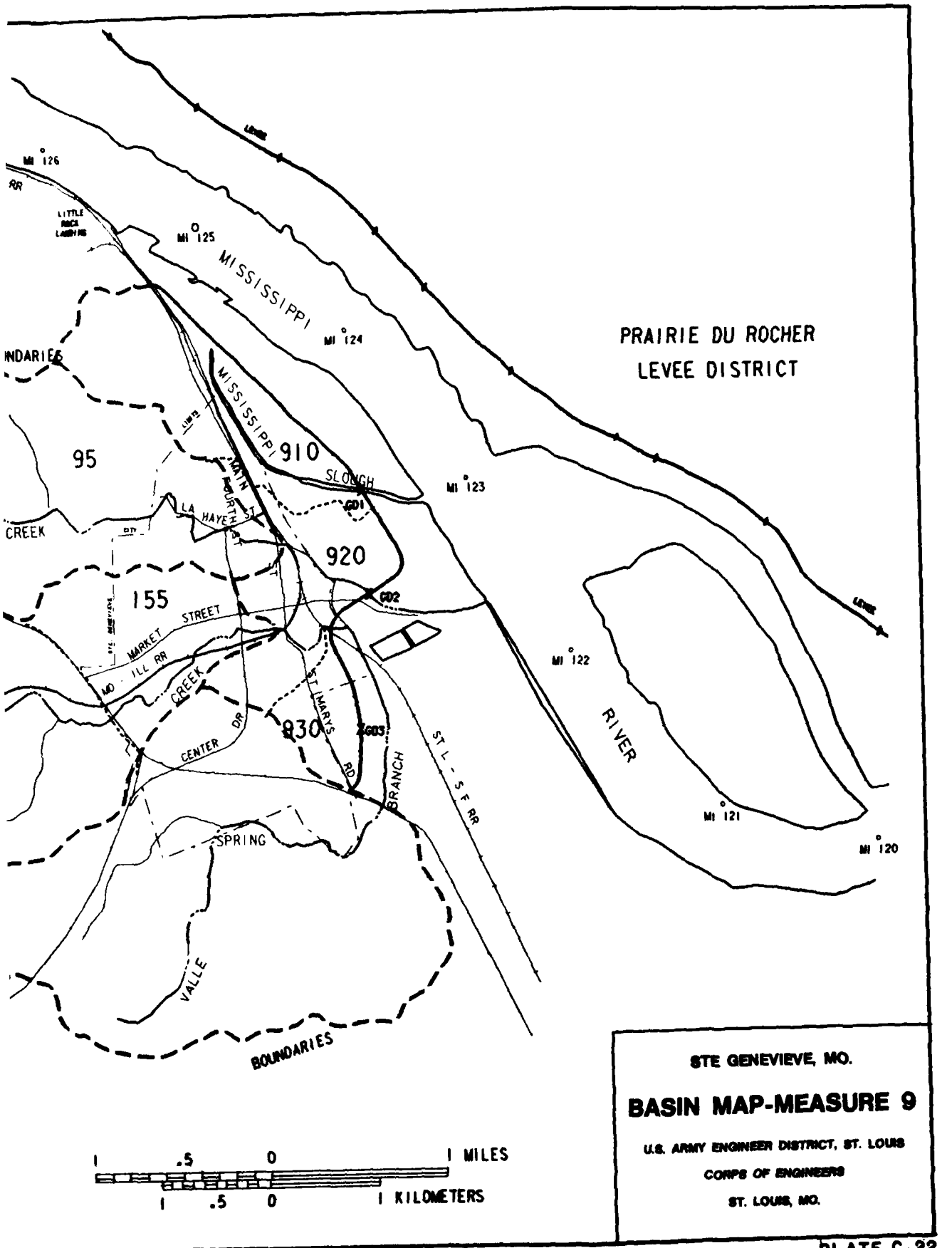


STE. GENEVIEVE, MISSOURI
TYPICAL CROSS-SECTION
FOR MEASURE 12 AND 13

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

PLATE C-21


N
ST L - S F RR
MI 126
LITTLE ROCK LANDING
MI 125
BOUNDARIES
WATERSHED
95
75
CREEK
LA HAYE
155
MARKET STREET
U.S. HIGHWAY NO. 61
GABOURI
MO - ILL RR
CREEK
125
CENTER DR
GABOURI
NORTH
VALLE
MO - ILL RR
SOUTH
WATERSHED
MO ST HWY 32
1 .5
1 .5



STE GENEVIEVE, MO.

BASIN MAP-MEASURE 9

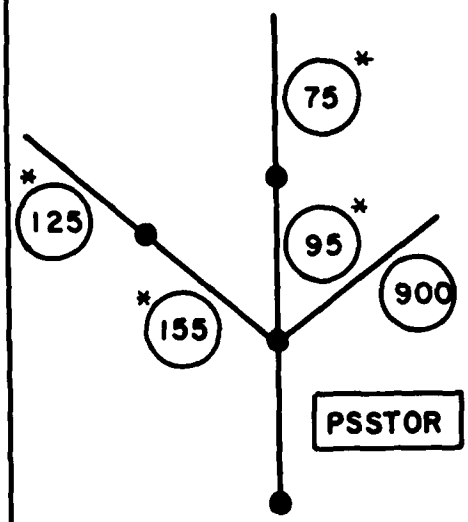
U.S. ARMY ENGINEER DISTRICT, ST. LOUIS

CORPS OF ENGINEERS

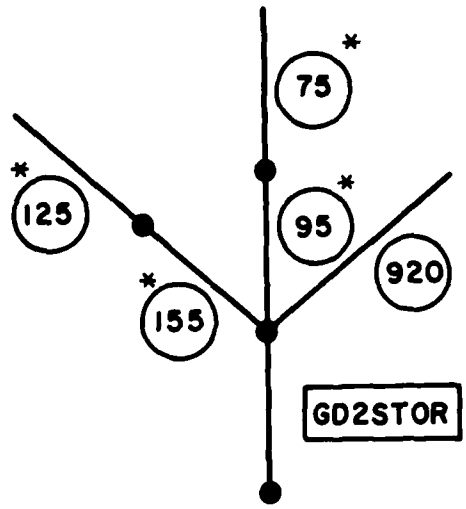
ST. LOUIS, MO.

PLATE C-22

2



PUMPING STATION
AT GD2



GRAVITY DRAIN
AT GD2

* NOTE:

UNIT HYDROGRAPH (75) REPRESENTS COMBINED HYDROGRAPHS OF (10) THROUGH (70)

UNIT HYDROGRAPH (95) REPRESENTS COMBINED HYDROGRAPHS OF (80) AND (90)

UNIT HYDROGRAPH (125) REPRESENTS COMBINED HYDROGRAPHS OF (100), (110), AND (120)

UNIT HYDROGRAPH (155) REPRESENTS COMBINED HYDROGRAPHS OF (130), (140), AND (150)

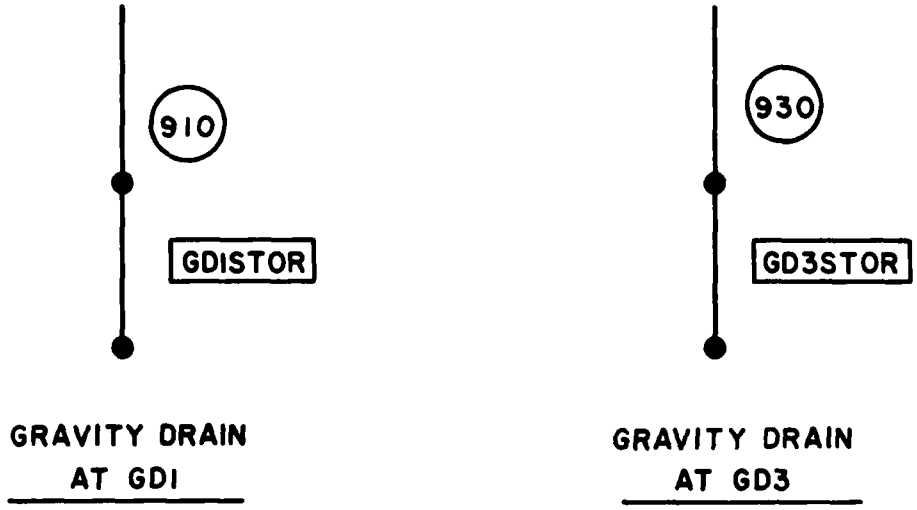
LEGEND

(95) SUBAREA NO.

ROUTING REACH

PSSTOR INTERIOR STORAGE AREA

STE. GENEVIEVE, MISSOURI
HEC-1 SCHEMATIC
FOR MEASURE 9
PUMPING STATION AND GRAVITY DRAIN AT GD2
U.S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MO.



LEGEND

910 SUBAREA NO

ROUTING REACH

GDISTOR INTERIOR STORAGE AR' A

STE. GENEVIEVE, MISSOURI
HEC-1 SCHEMATIC
FOR MEASURE 9
GRAVITY DRAINS AT GDI AND GD3
U.S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MO.

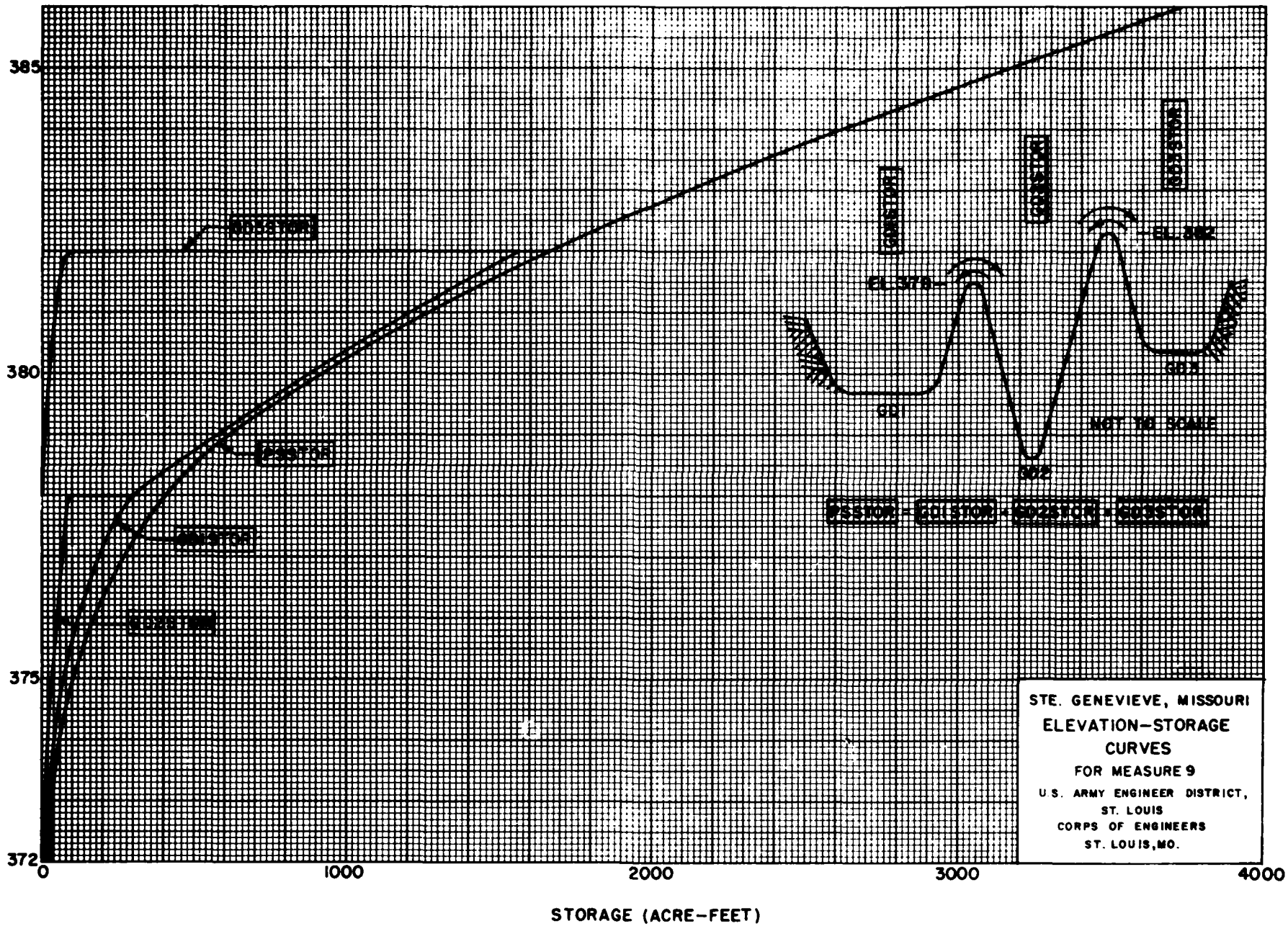
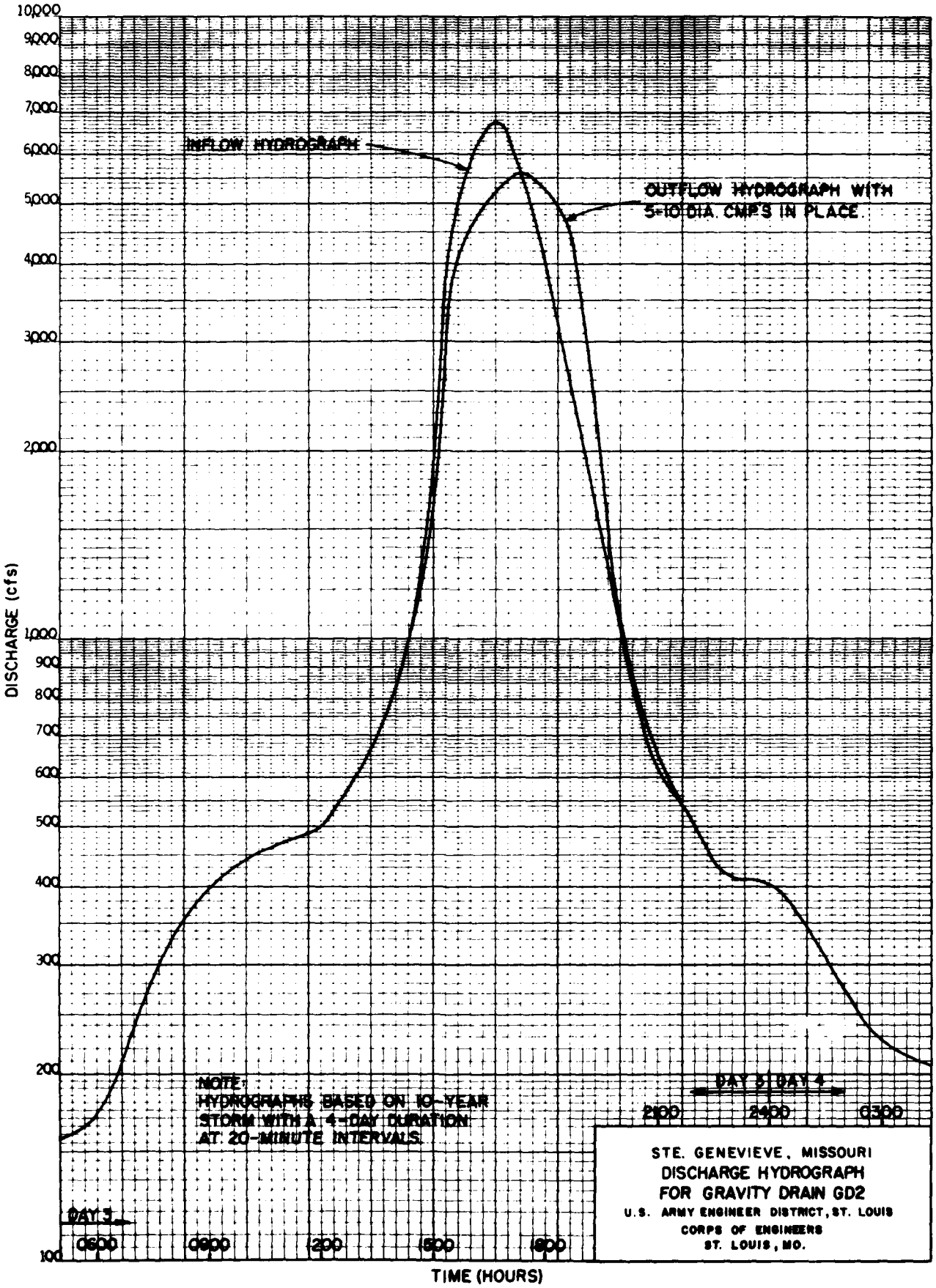

385
380
375
372
ELEVATION (FT. NGVD)
0
1000
2000
3000
4000
STORAGE (ACRE-FEET)
EL 376
EL 382
92
362
383
NOT TO SCALE
STE. GENEVIEVE, MISSOURI
ELEVATION–STORAGE
CURVES
FOR MEASURE 9
U.S. ARMY ENGINEER DISTRICT,
ST. LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MO.

PLATE C-25



STE. GENEVIEVE, MISSOURI
DISCHARGE HYDROGRAPH
FOR GRAVITY DRAIN GD2
U.S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MO.

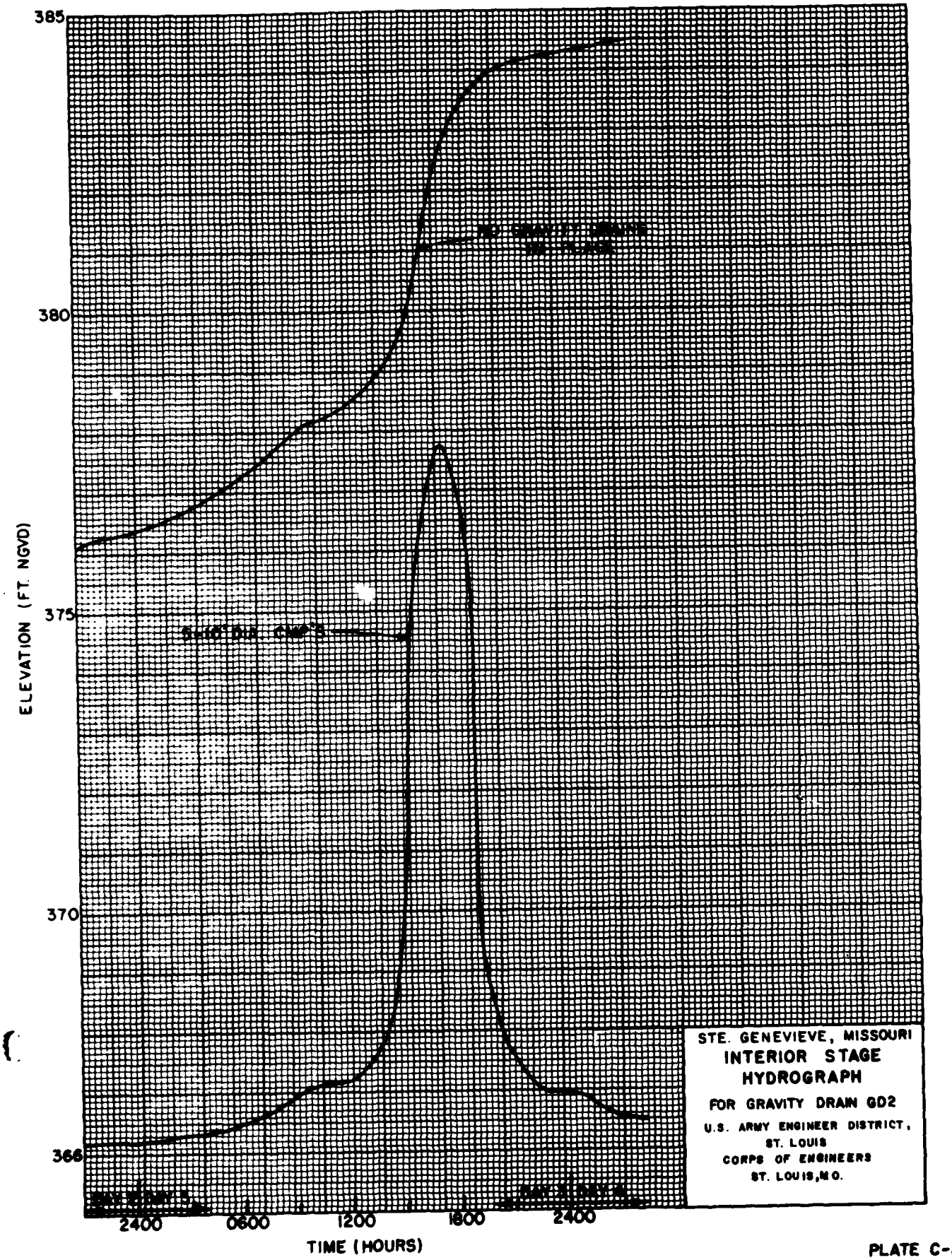
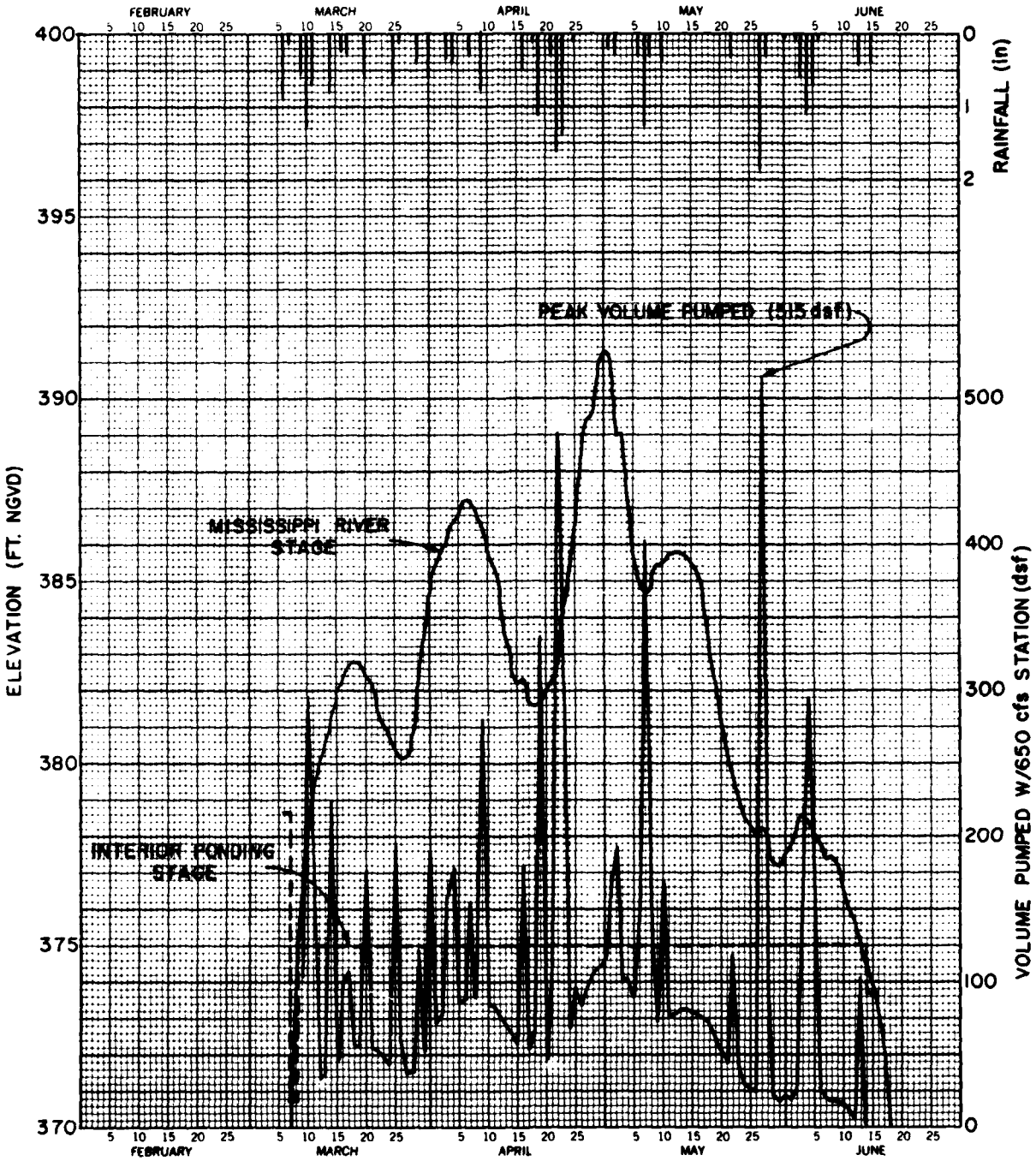

385
380
375
370
366
ELEVATION (FT. NGVD)
NO GRAVITY DRAINS IN PLACE
5-16" DIA. CMP'S
2400
0600
1200
1800
2400
TIME (HOURS)
STE. GENEVIEVE, MISSOURI
INTERIOR STAGE HYDROGRAPH
FOR GRAVITY DRAIN GD2
U.S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MO.

PLATE C-25B



STE. GENEVIEVE, MISSOURI
STAGE-HYDROGRAPH AT GD2
1973 FLOOD
U.S. ARMY ENGINEER DISTRICT, SAINT LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MO.

PLATE C-25C

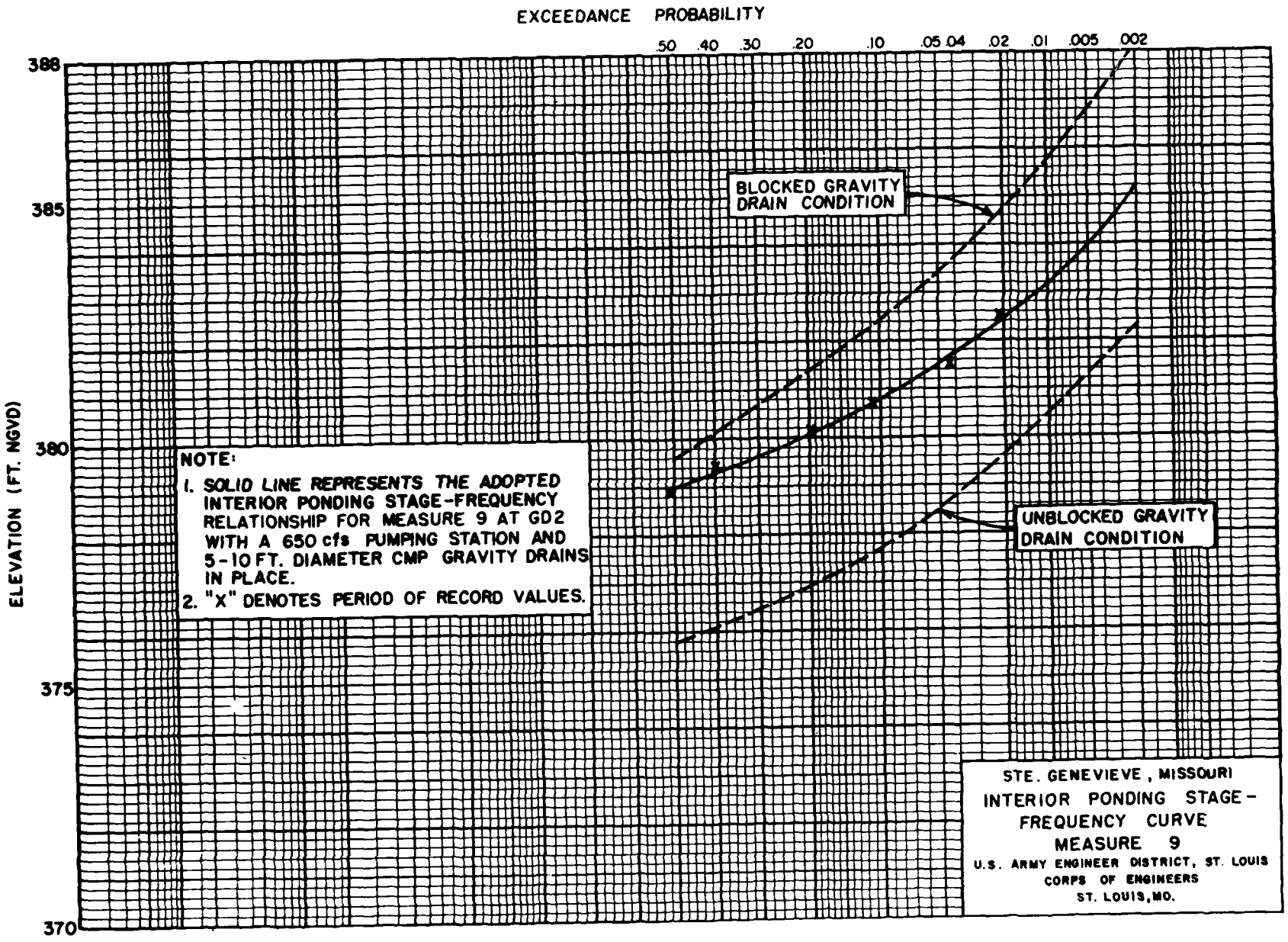
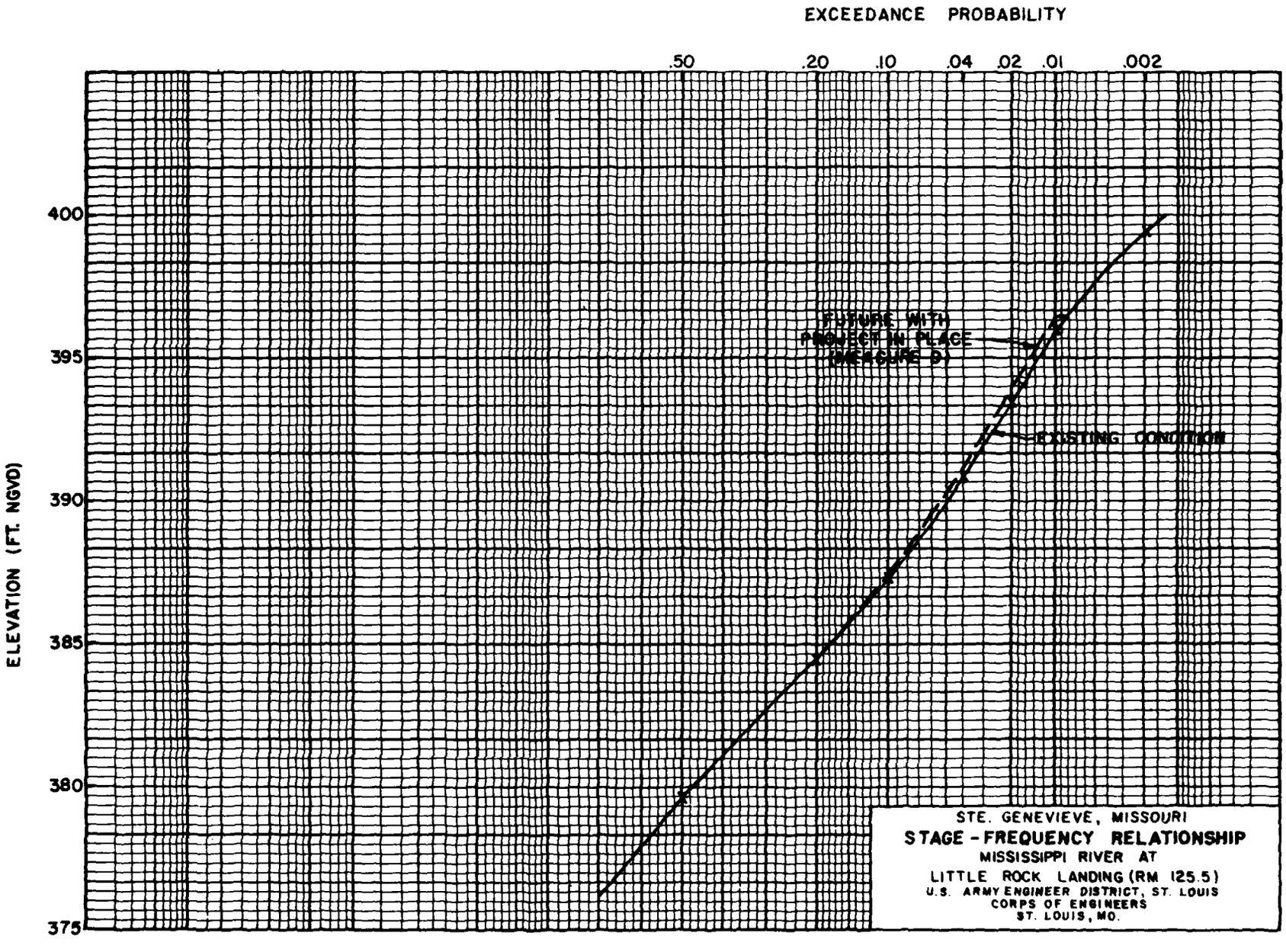
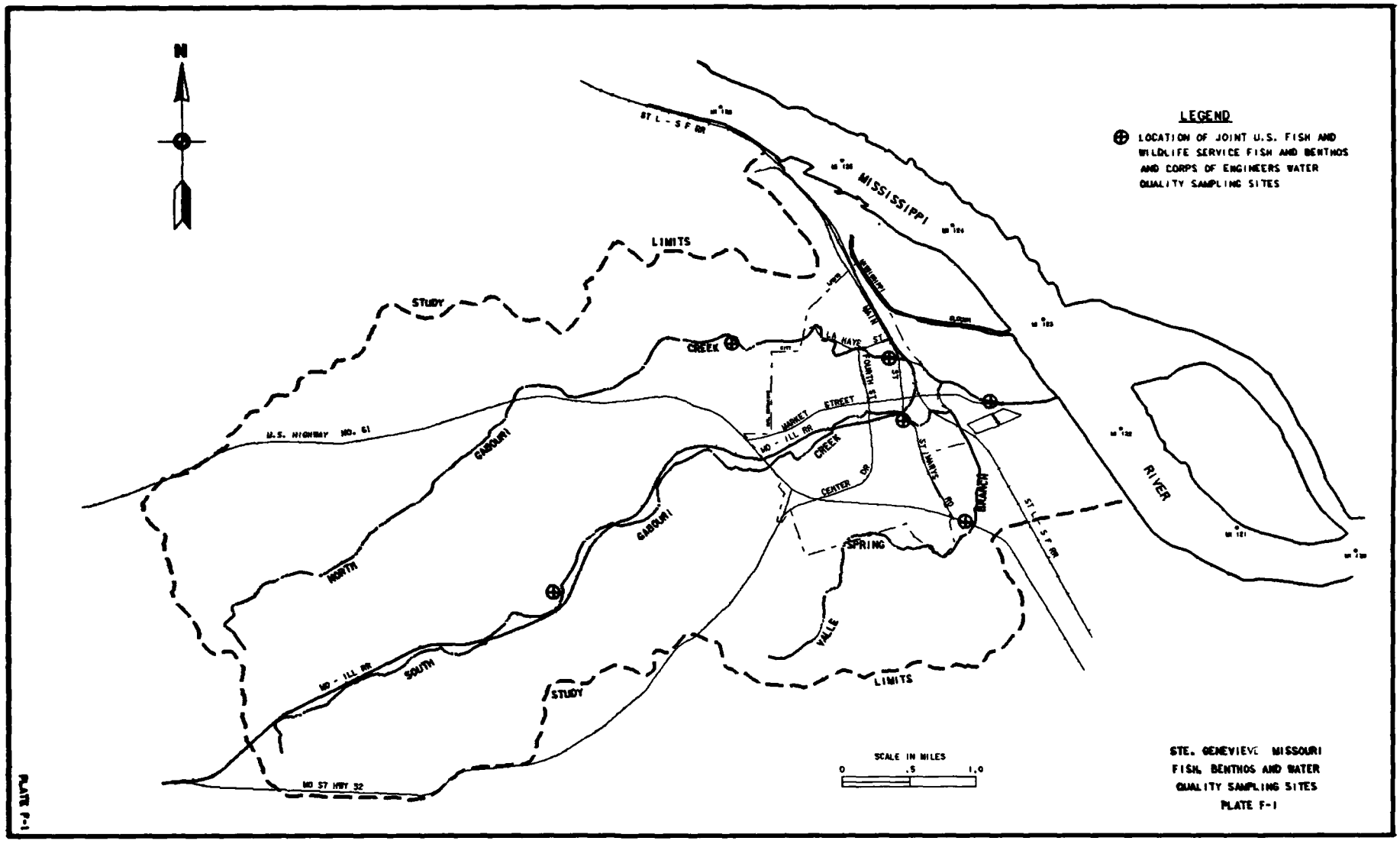

EXCEEDANCE PROBABILITY
.50 .40 .30 .20 .10 .05 .04 .02 .01 .005 .002
388
385
380
375
370
ELEVATION (FT. NGVD)
BLOCKED GRAVITY DRAIN CONDITION
UNBLOCKED GRAVITY DRAIN CONDITION
NOTE:
1. SOLID LINE REPRESENTS THE ADOPTED INTERIOR PONDING STAGE-FREQUENCY RELATIONSHIP FOR MEASURE 9 AT GD2 WITH A 650 cfs PUMPING STATION AND 5-10 FT. DIAMETER CMP GRAVITY DRAINS IN PLACE.
2. "X" DENOTES PERIOD OF RECORD VALUES.
STE. GENEVIEVE, MISSOURI
INTERIOR PONDING STAGE-FREQUENCY CURVE
MEASURE 9
U.S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MO.

PLATE C-26

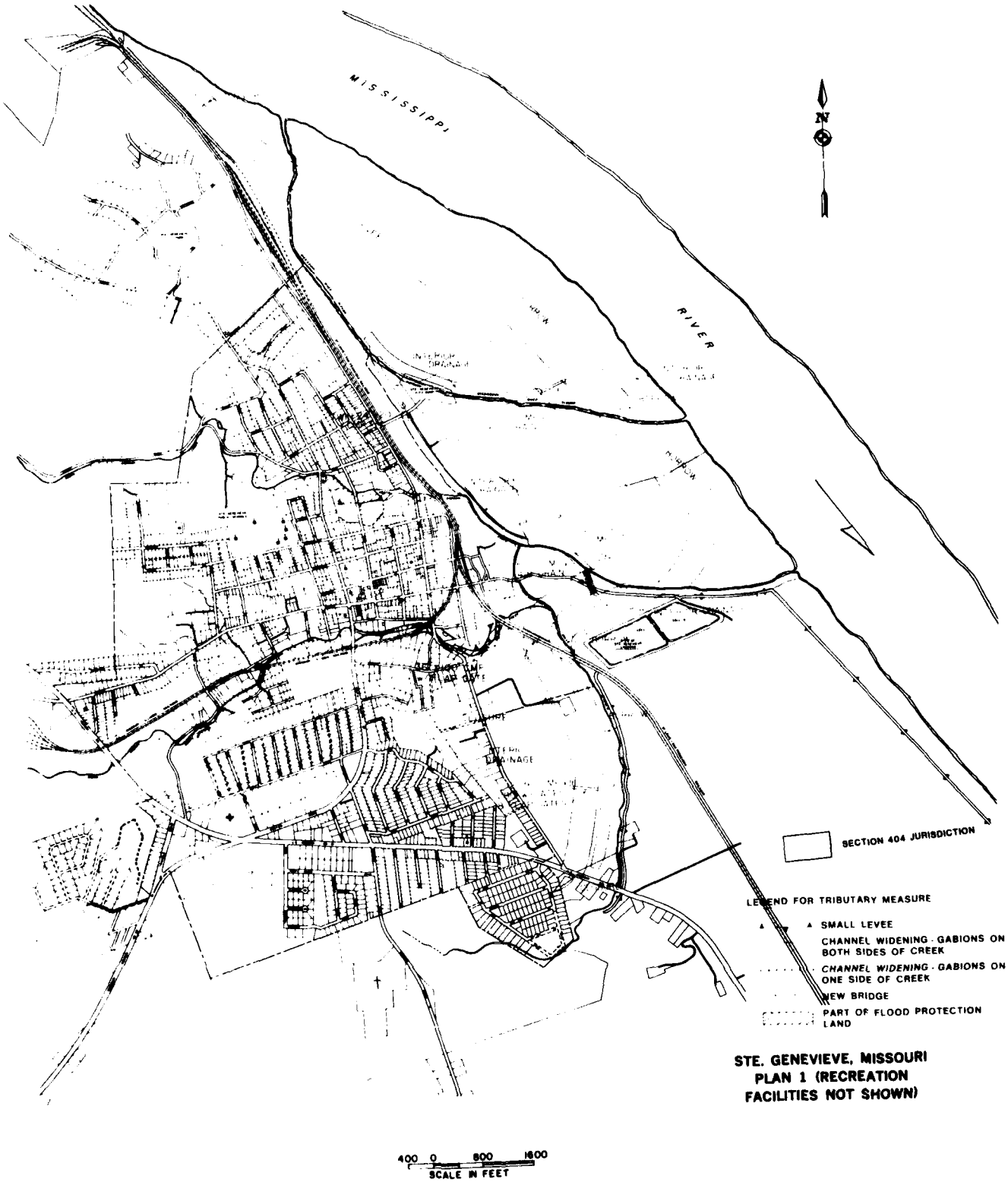


STE. GENEVIEVE, MISSOURI
STAGE - FREQUENCY RELATIONSHIP
MISSISSIPPI RIVER AT
LITTLE ROCK LANDING (RM 125.5)
U.S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MO.



STE. GENEVIEVE MISSOURI
FISH, BENTHOS AND WATER
QUALITY SAMPLING SITES
PLATE F-1

PLATE F-1



STE. GENEVIEVE, MISSOURI
PLAN 1 (RECREATION FACILITIES NOT SHOWN)

PLATE K-1

DATE
FILMED
-8