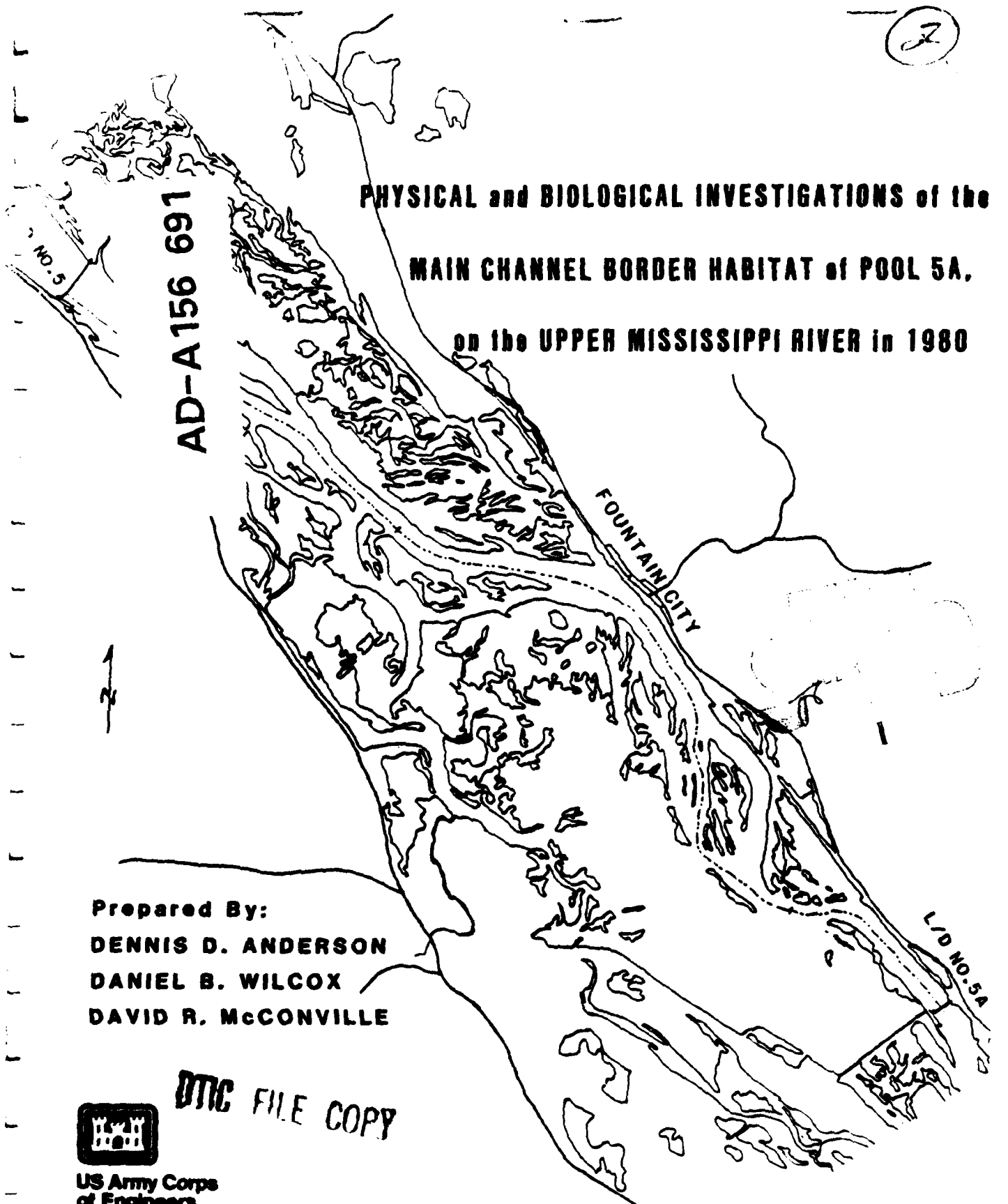


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AD-A156 691

**PHYSICAL and BIOLOGICAL INVESTIGATIONS of the
 MAIN CHANNEL BORDER HABITAT of POOL 5A,
 on the UPPER MISSISSIPPI RIVER in 1980**

Prepared By:
DENNIS D. ANDERSON
DANIEL B. WILCOX
DAVID R. McCONVILLE

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**US Army Corps
 of Engineers**
 St. Paul District

DECEMBER 1983

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The purpose of the 1980 main channel border (MCB) investigations was to provide basic information on the physical and biological characteristics of habitat in the Upper Mississippi River. This information was needed to assess the St. Paul District, Corps of Engineers, operation and maintenance activities associated with the 9-foot navigation channel project. (Current velocity and direction, substrate type, and water depths) were measured for the entire MCB of pool 5A. The MCB of pool 5A was selected

Unclassified

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for pool 5A because pool 5A was one of the shorter pools under the jurisdiction of the St. Paul District, because it has a diversity of MCB habitat types, and because a Corps of Engineers service base in Fountain City, Wisconsin, provided easy access and work areas.

From the results of the physical survey, a physical habitat classification system was developed that considered general substrate type, general habitat, current velocity, and water depths. From the intersections of these four factors, 18 physical habitat types were determined to be present in sufficient abundance to warrant further study. Macroinvertebrate and fisheries surveys were conducted at 18 study areas in August and September. Each of the 18 areas represented one of the 18 habitat types.

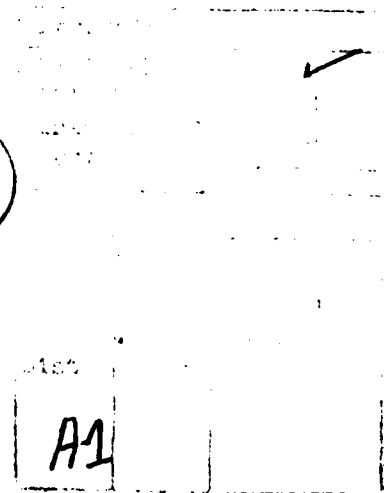
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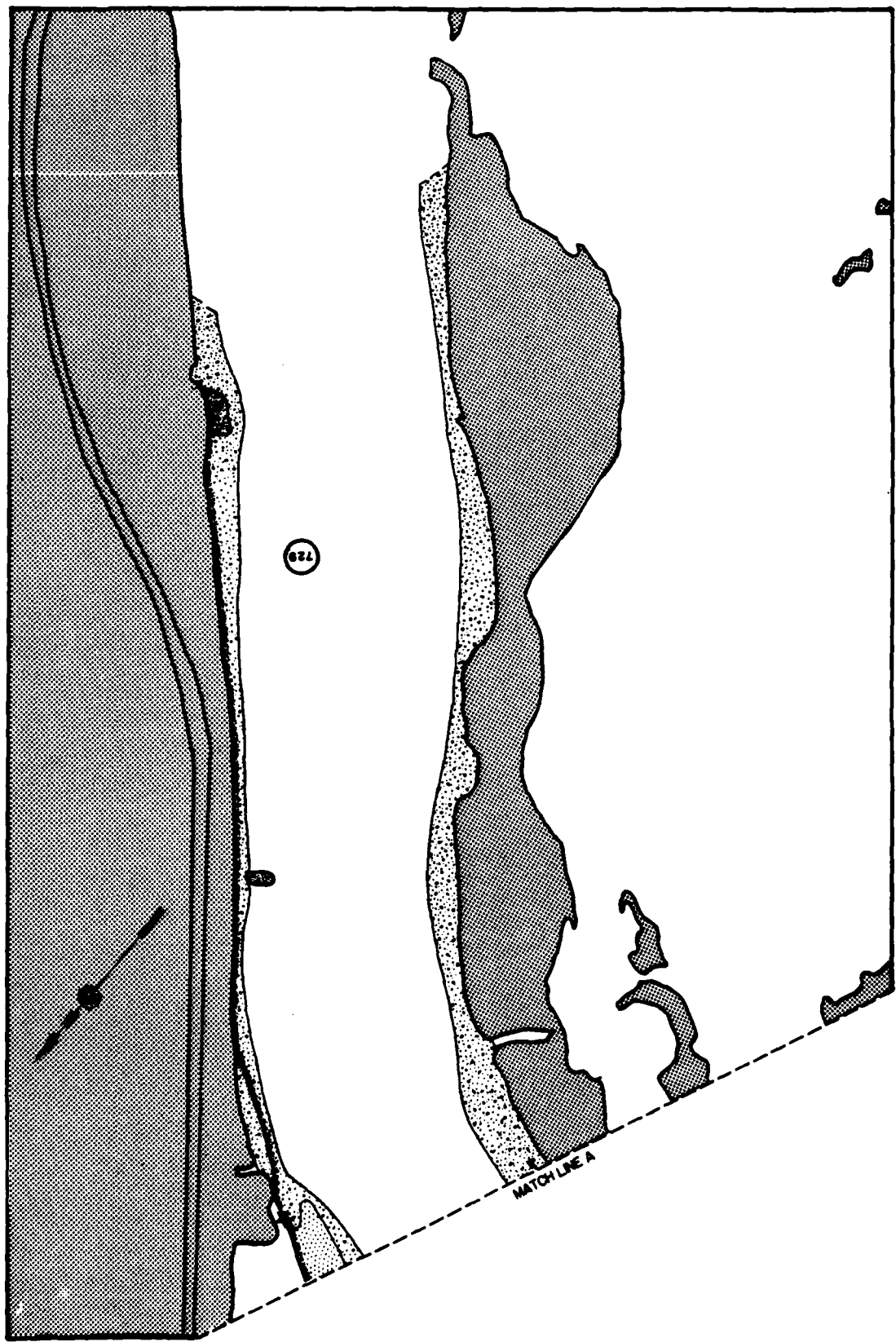
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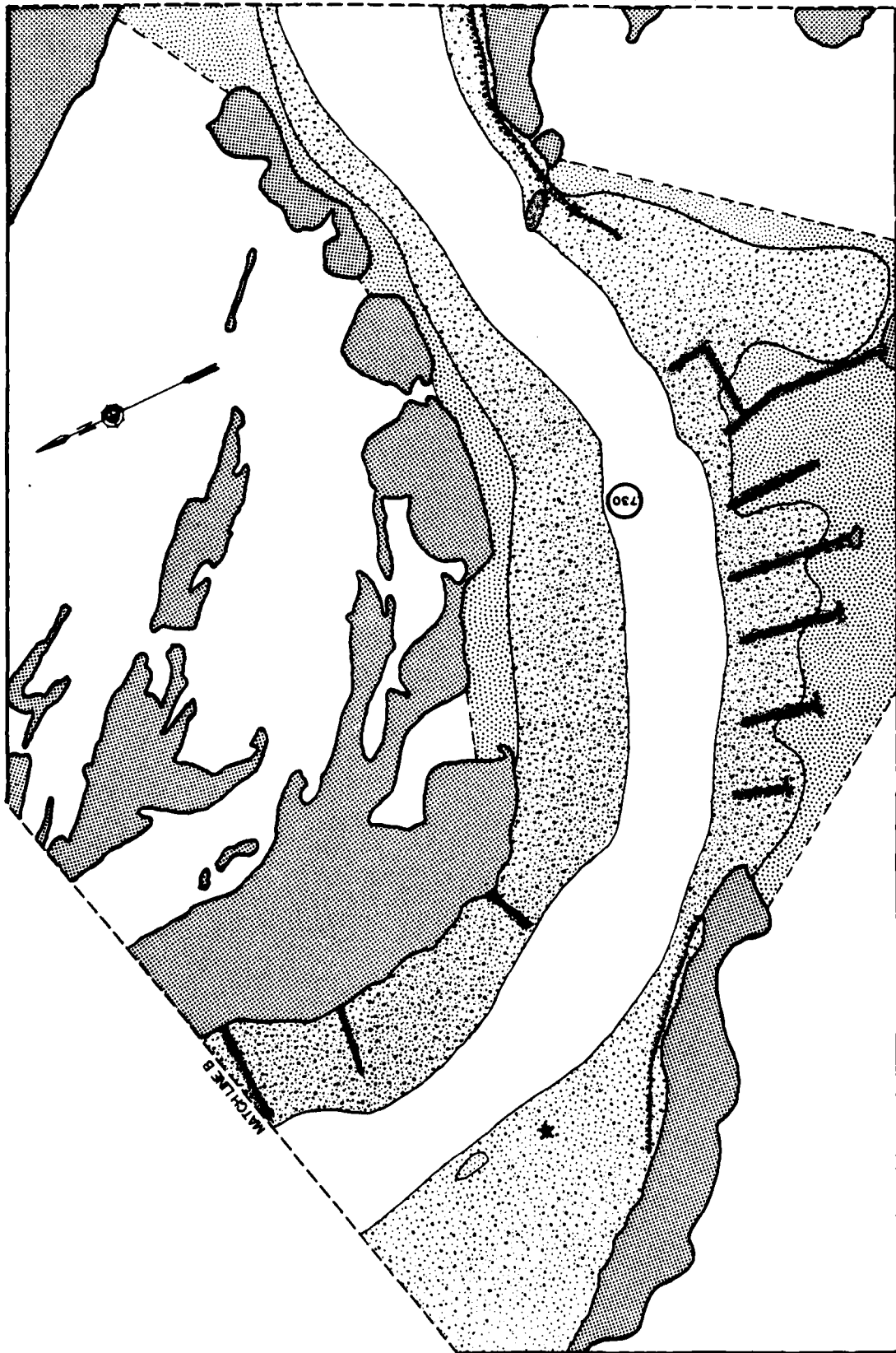


MAIN CHANNEL BORDER STUDY **POOL 5A** **RIVER MILE: 728.55 - 729.55**
SUBSTRATE MAP

SCALE: 1 in. = 630ft.

ROCK SAND SILT STRUCTURES DAYMARK ★

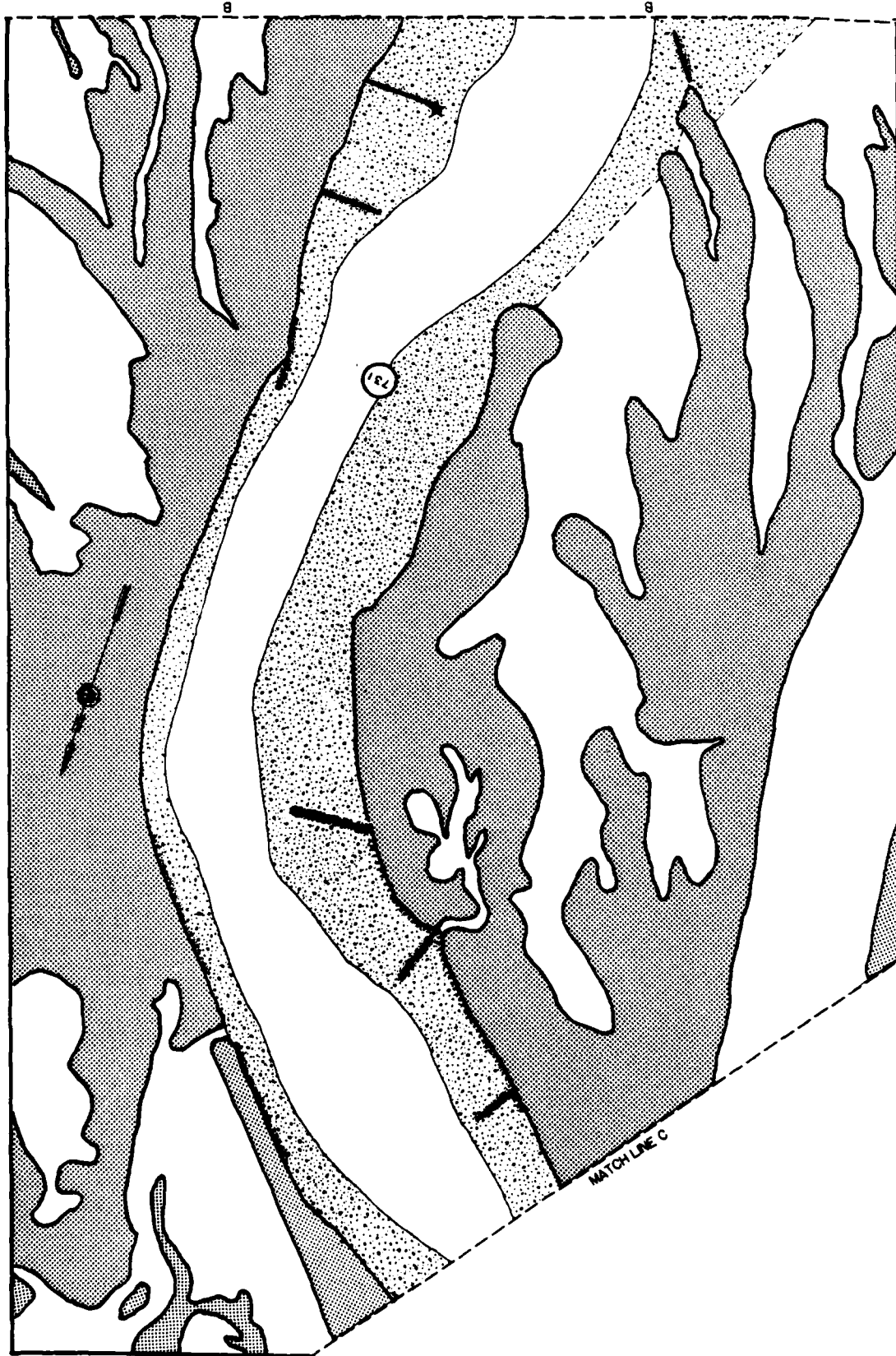
Figure A-1 General Substrate Map of River Mile 728.55 - 729.55



MAIN CHANNEL BORDER STUDY **POOL 5A** **RIVER MILE: 729.55 - 730.65**
SCALE: 1 in. = 630 ft. **SUBSTRATE MAP**

ROCK SAND SILT STRUCTURES DAYMARK ★

Figure A-2 General Substrate Map of River Mile 729.55 - 730.65



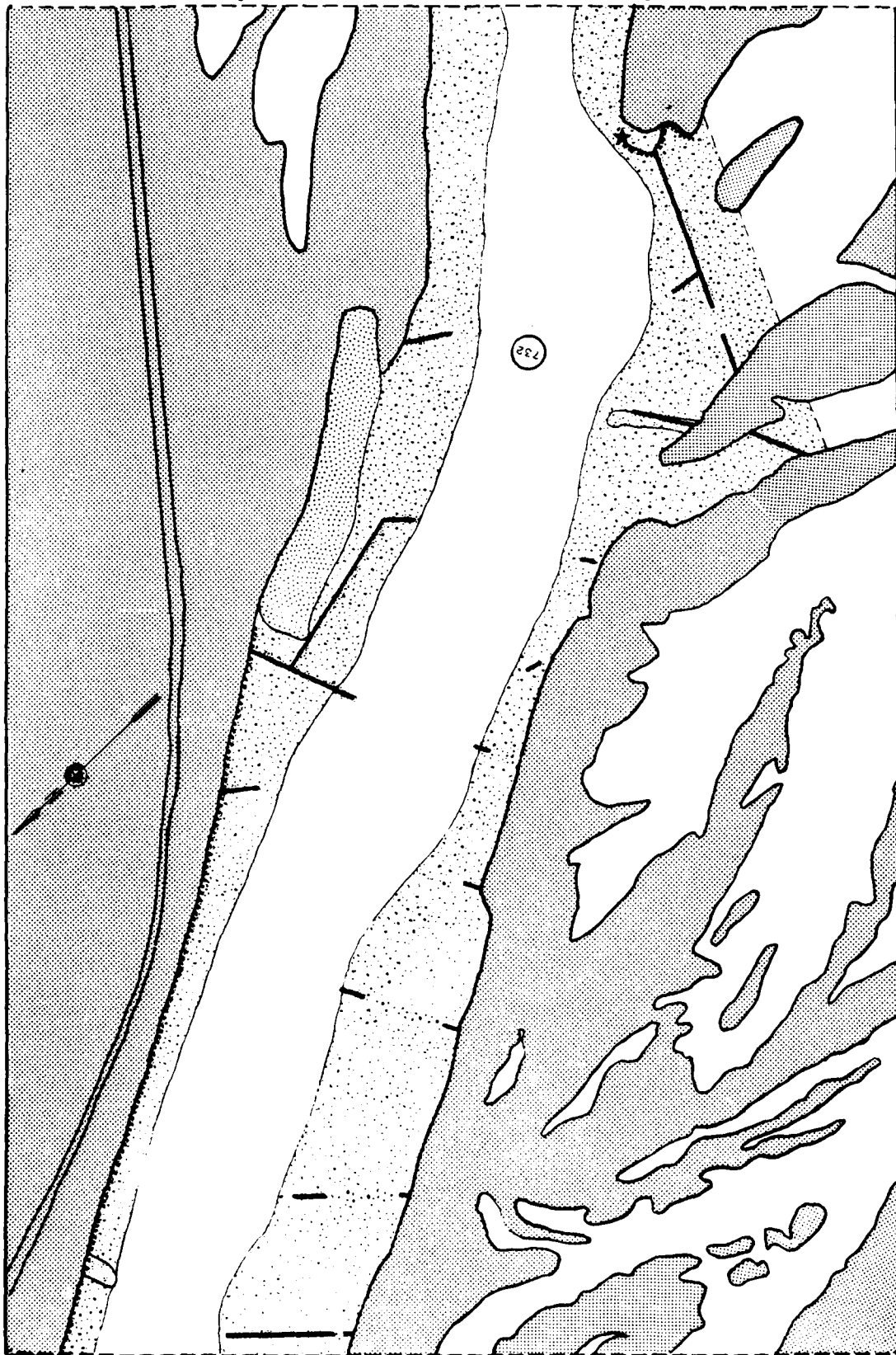
MAIN CHANNEL BORDER STUDY POOL 5A RIVER MILE: 730.65 - 731.75
SUBSTRATE MAP

SCALE: 1 in. = 630ft.

STRUCTURES — DAYMARK ★

ROCK SAND SILT

Figure A-3 General Substrate Map of River Mile 730.65 - 731.75



MAIN CHANNEL BORDER STUDY POOL 5A RIVER MILE: 731.75 - 732.80

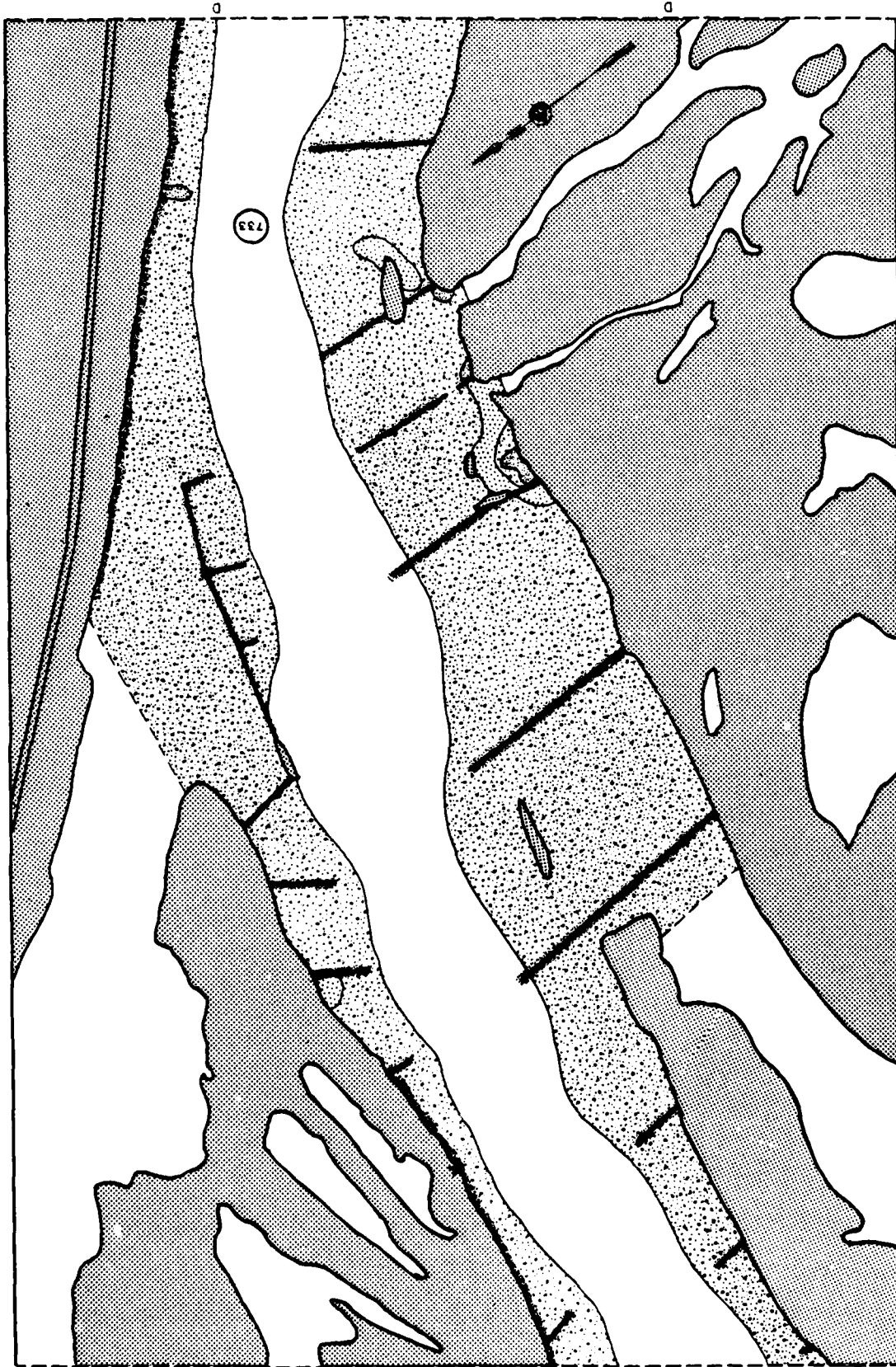
SCALE: 1 in. = 630ft.

SUBSTRATE MAP

ROCK SAND SILT

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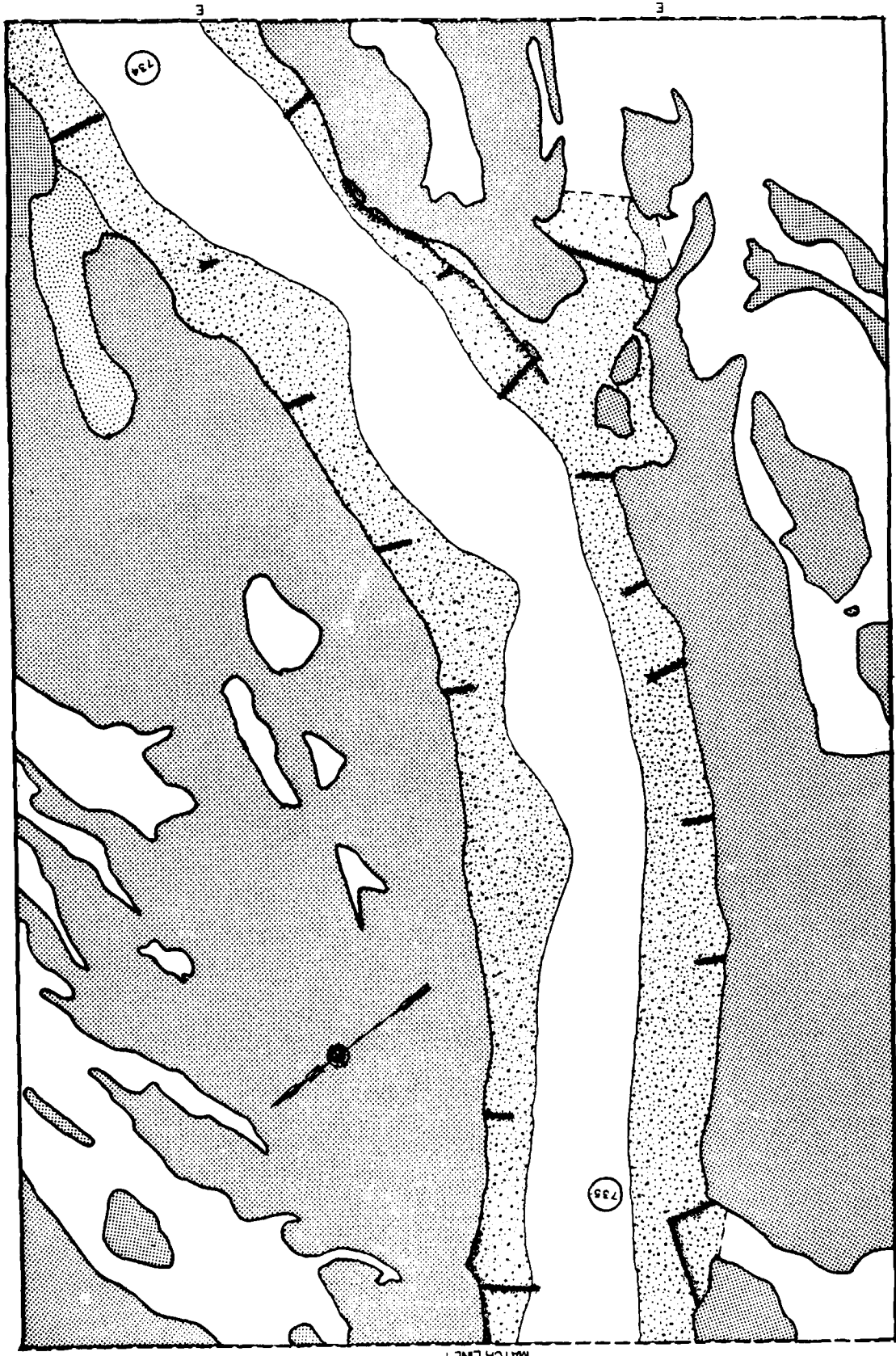
Figure A-4 General Substrate Map of River Mile 731.75 - 732.80



MAIN CHANNEL BORDER STUDY POOL 5A RIVER MILE: 732.80 - 733.95
SUBSTRATE MAP
 SCALE: 1 in. = 630 ft.

ROCK SAND SILT
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Figure A-5 General Substrate Map of River Mile 732.80 - 733.95



MAIN CHANNEL BORDER STUDY **POOL 5A** **RIVER MILE: 733.95 - 735.10**

SUBSTRATE MAP

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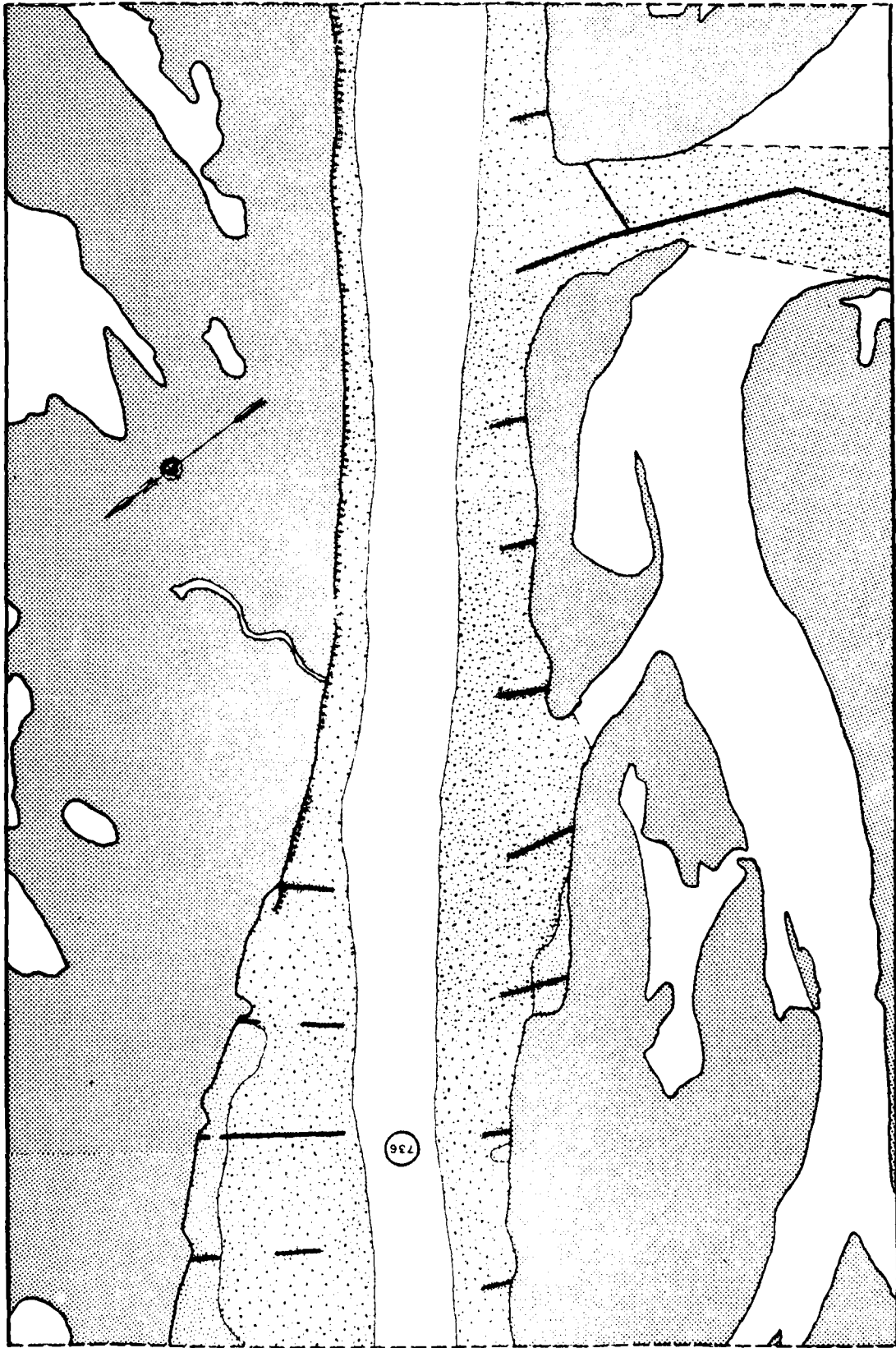
ROCK [stippled pattern]

SAND [coarse stippled pattern]

SILT [fine stippled pattern]

SCALE: 1 in. = 630ft.

Figure A-6 General Substrate Map of River Mile 733.95 - 735.10

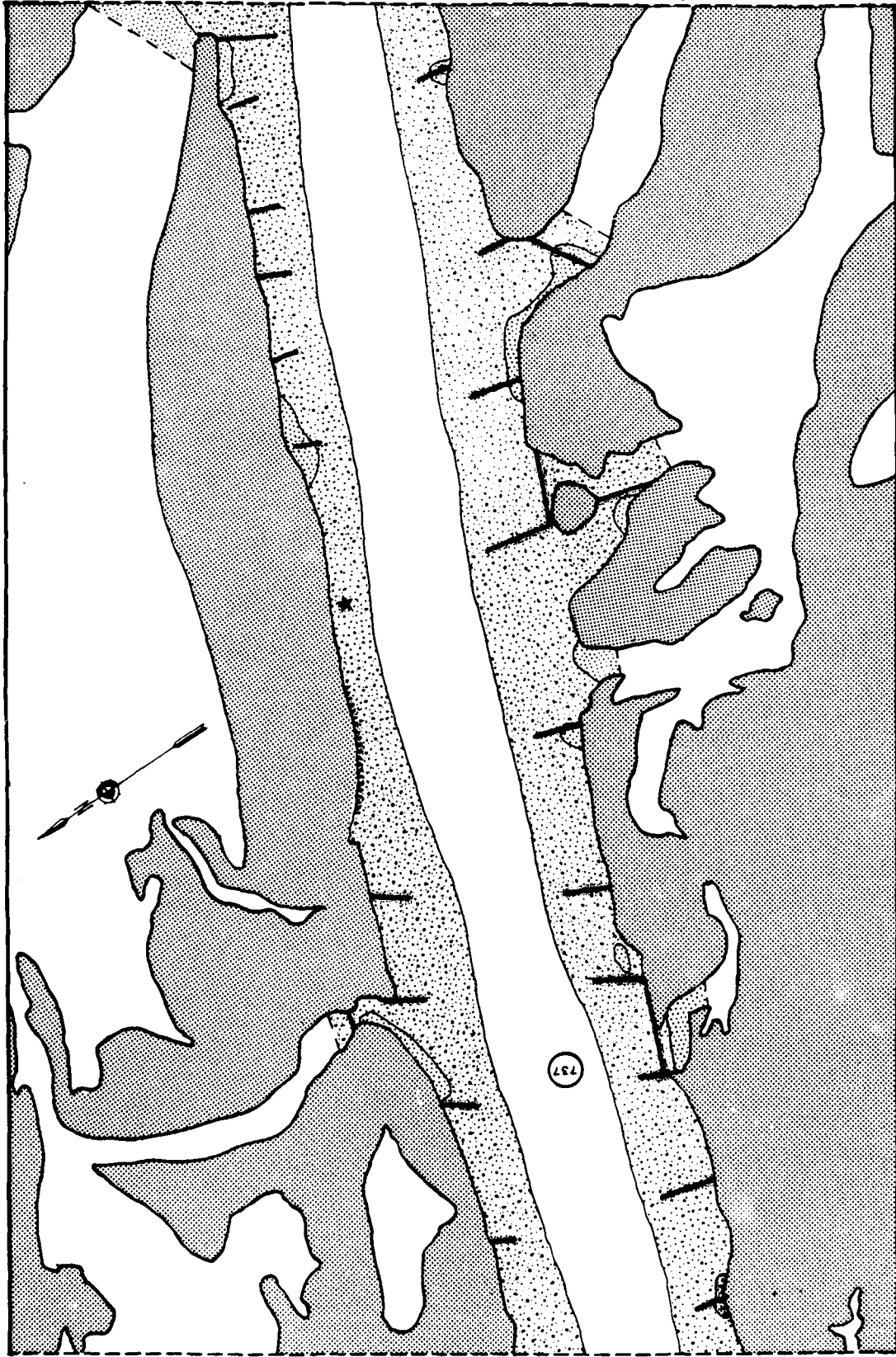


MAIN CHANNEL BORDER STUDY **POOL 5A** **RIVER MILE: 735.10 - 736.15**
SCALE: 1 in. = 630 ft. **SUBSTRATE MAP** **STRUCTURES** —

DAYMARK ★

ROCK [vertical line symbol] **SAND** [stippled symbol] **SILT** [grey symbol]

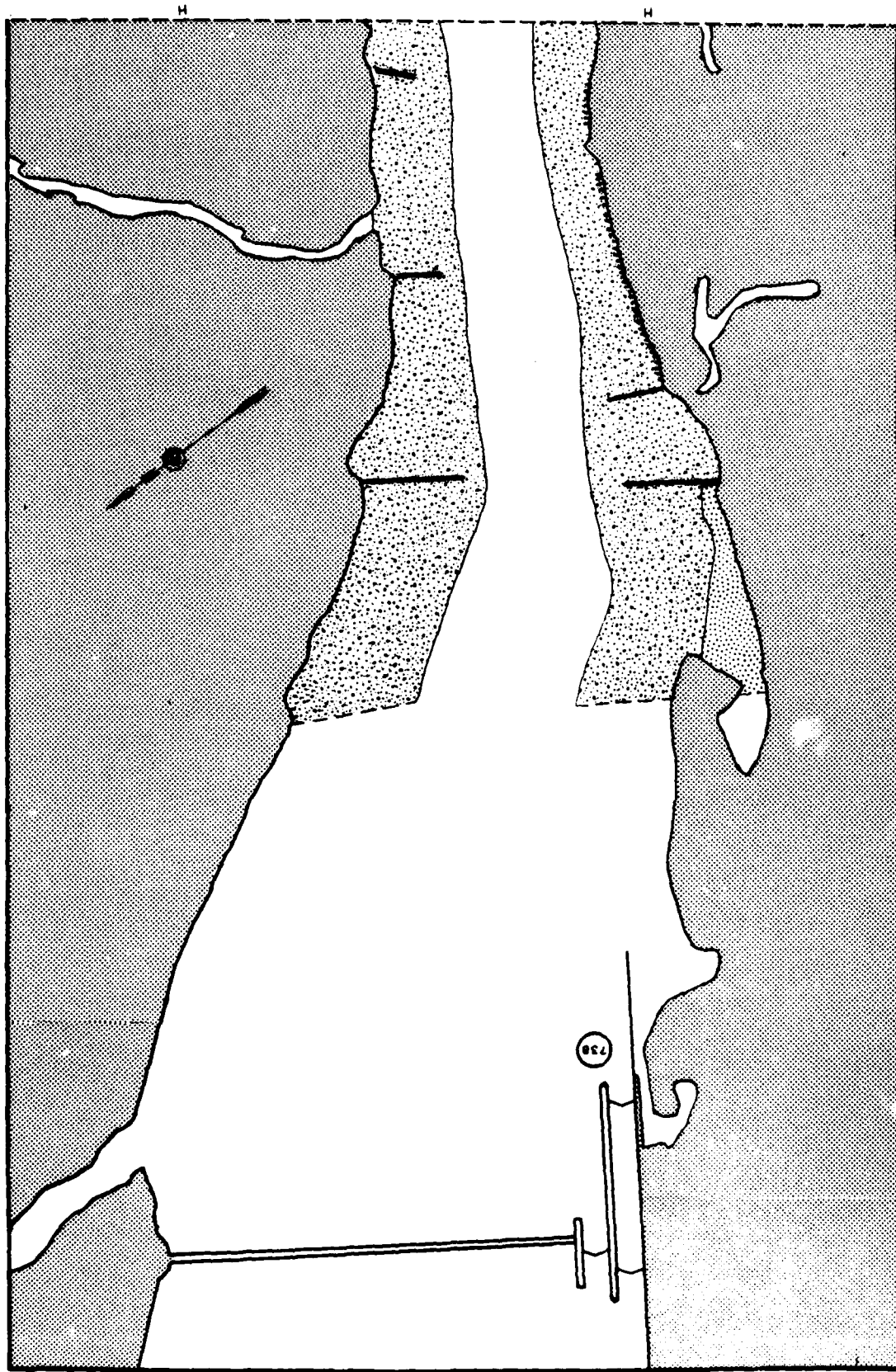
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MAIN CHANNEL BORDER STUDY **POOL 5A** **RIVER MILE: 736.15 - 737.25**
SCALE: 1 in. = 630 ft. **SUBSTRATE MAP** **STRUCTURES** ———

ROCK [stippled pattern] **SAND** [dotted pattern] **SILT** [cross-hatched pattern] **DAYMARK** ★

Figure A-8 General Substrate Map of River Mile 736.15 - 737.25



MAIN CHANNEL BORDER STUDY **POOL 5A** **RIVER MILE: 737.25 - 738.25**
SUBSTRATE MAP
 SCALE: 1 in. = 630ft.

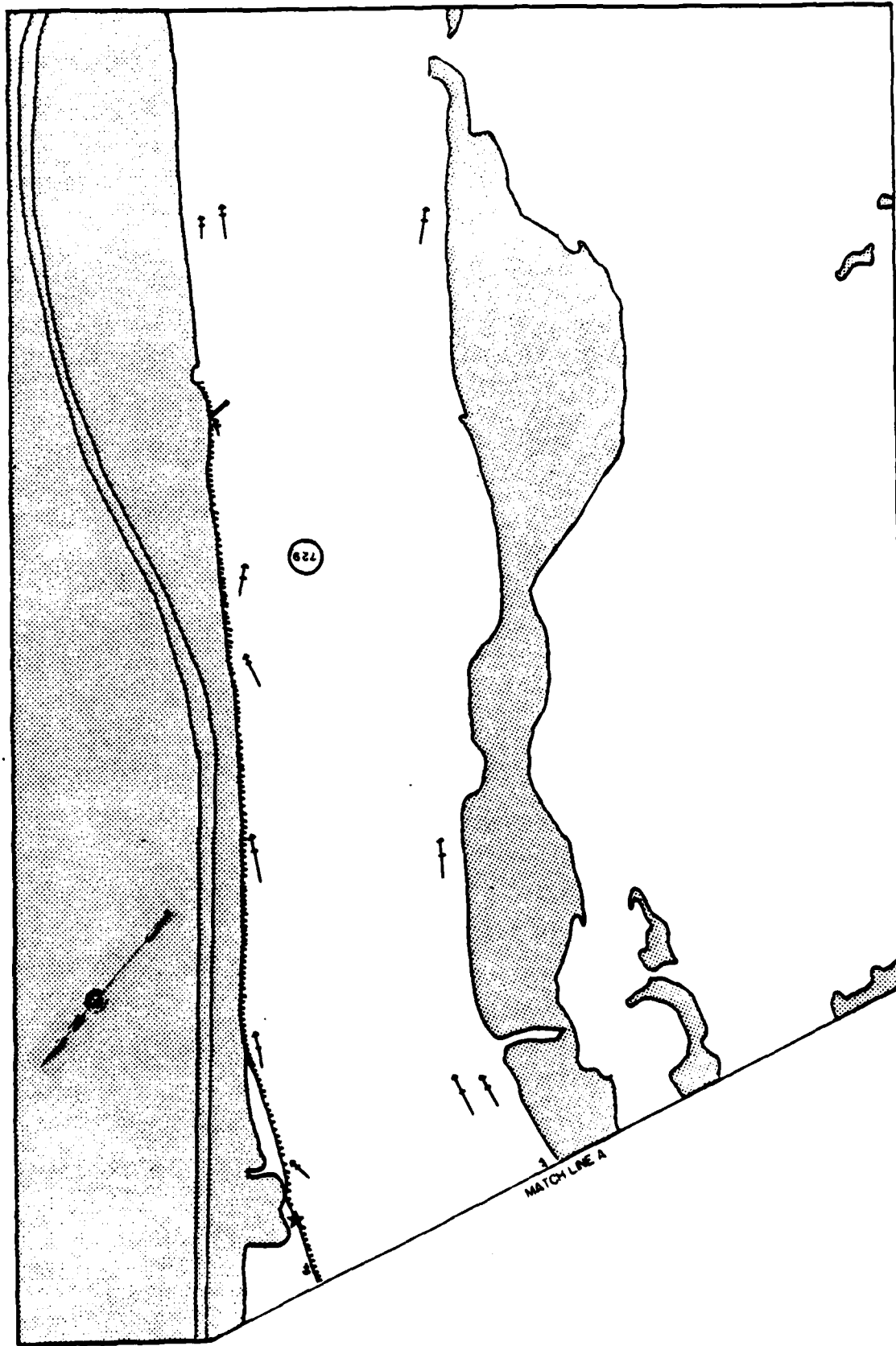
ROCK SAND SILT STRUCTURES DAYMARK ★

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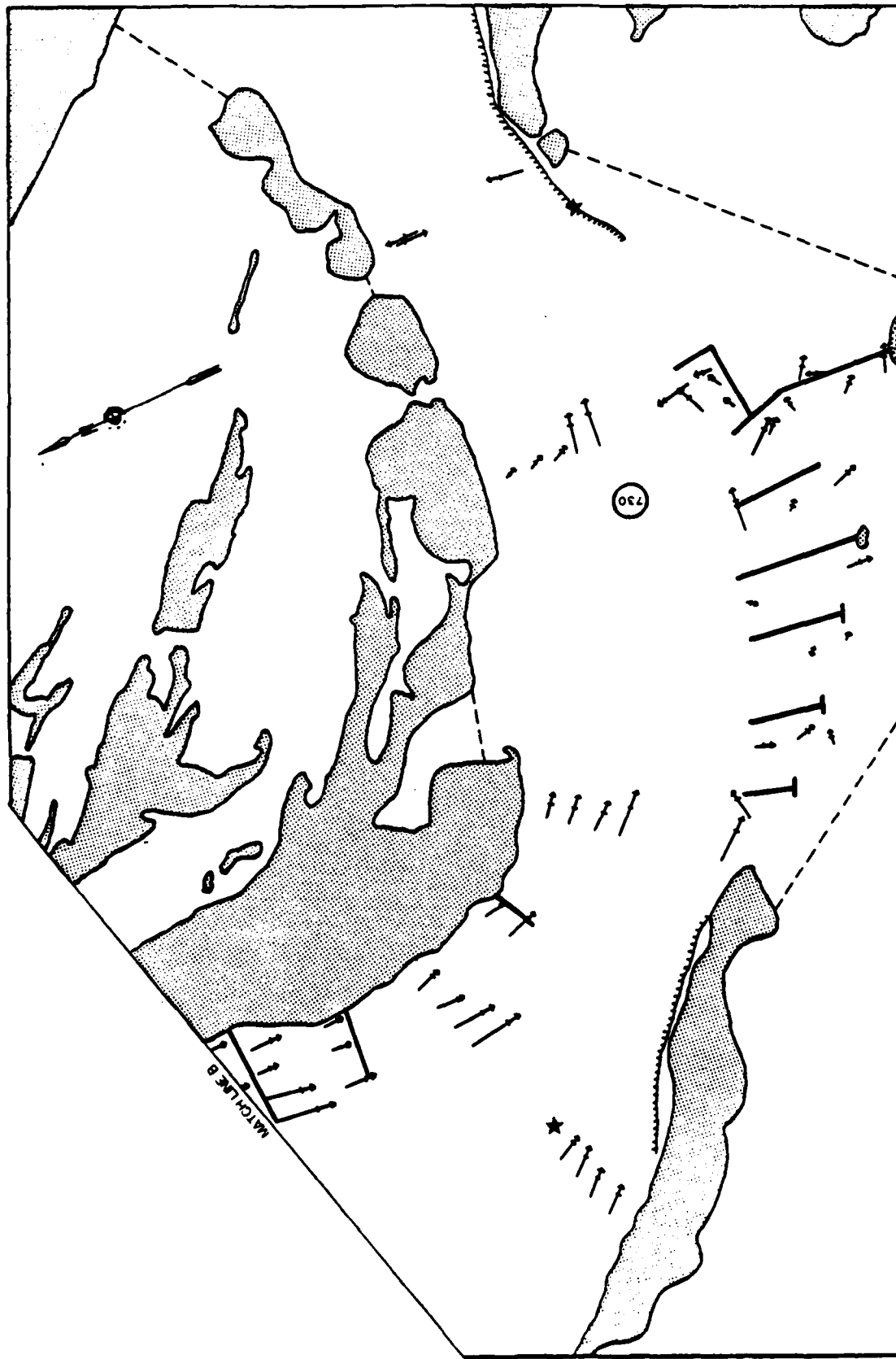
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MAIN CHANNEL BORDER STUDY POOL 5A RIVER MILE: 728.55 - 729.55
CURRENT DIRECTION & VELOCITY
 SCALE: 1 in. = 630ft.

CURRENT DIRECTION & VELOCITY →→→ .25 in. = 1 fps
 STRUCTURES ———
 DAYMARK ★

Figure B-1 General Current Velocity and Direction Patterns - River Mile 728.55 - 729.55



MAIN CHANNEL BORDER STUDY POOL 5A RIVER MILE: 729.55 - 730.65
CURRENT DIRECTION & VELOCITY

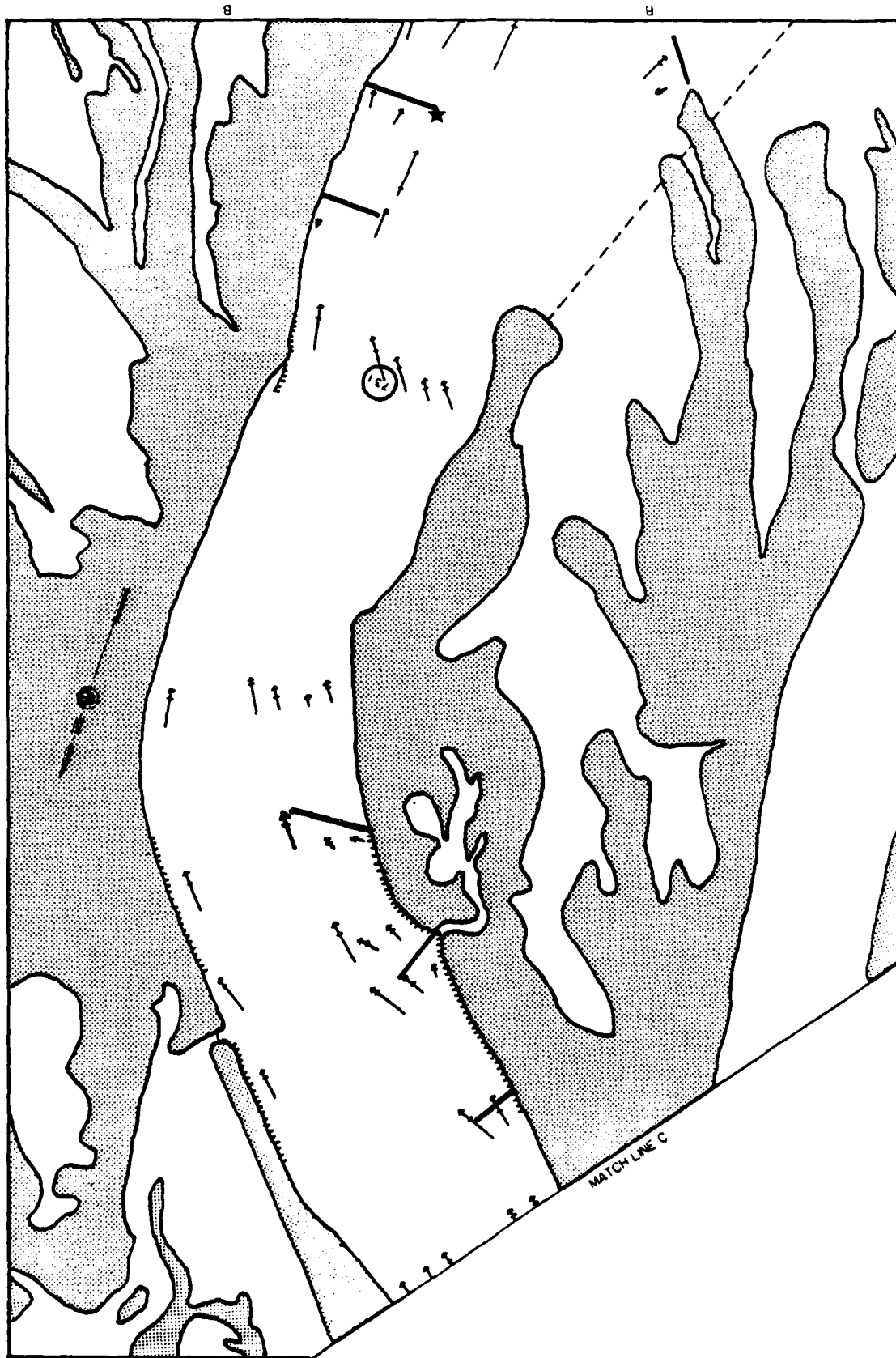
SCALE: 1 in. = 630 ft.

CURRENT DIRECTION & VELOCITY \rightarrow : .25 in. = 1 fps

STRUCTURES —

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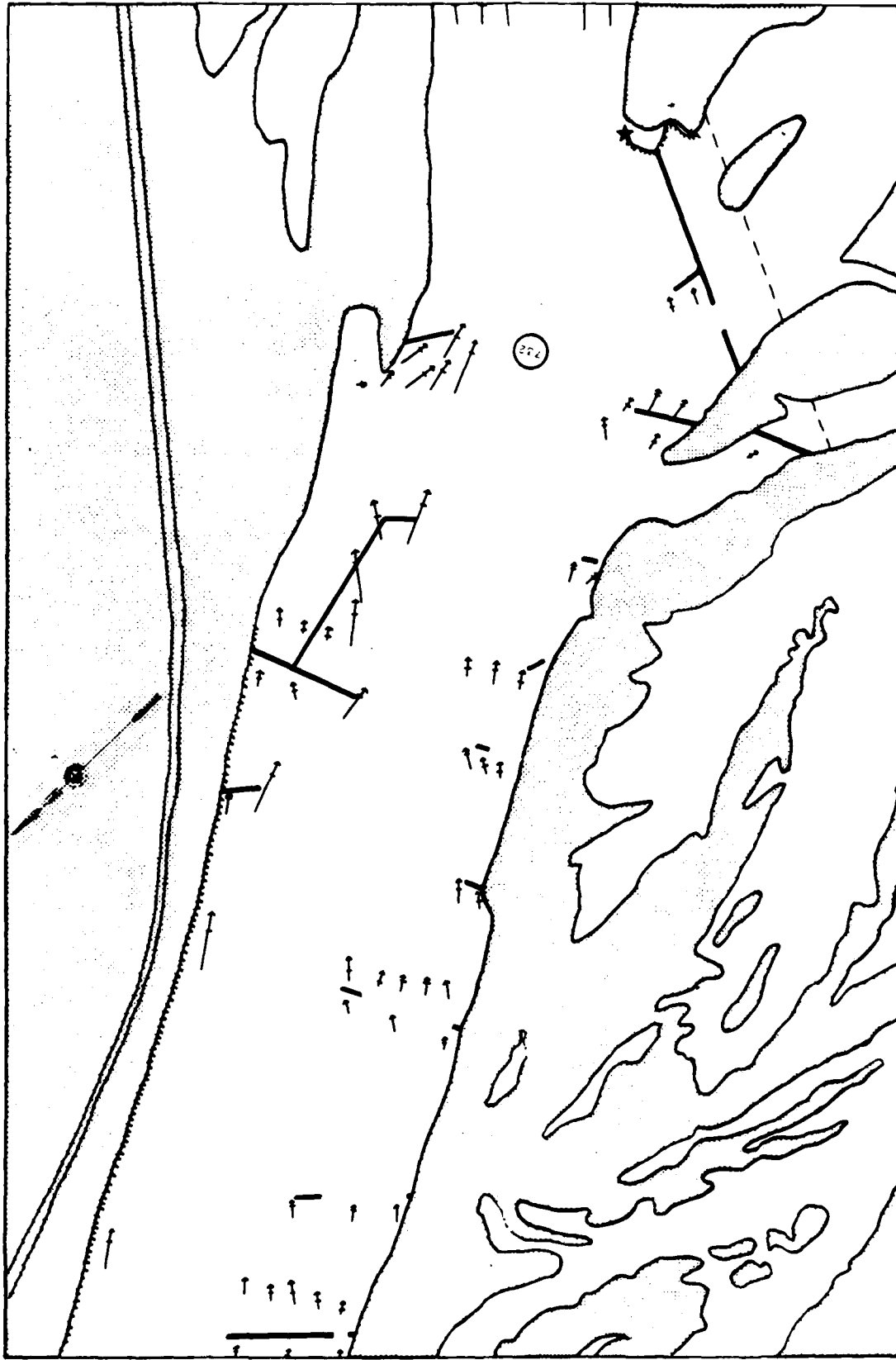
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MAIN CHANNEL BORDER STUDY POOL 5A RIVER MILE: 730.65 - 731.75
CURRENT DIRECTION & VELOCITY
 SCALE: 1 in. = 630ft.

CURRENT DIRECTION & VELOCITY : .25 in. = 1 fps
 STRUCTURES DAYMARK

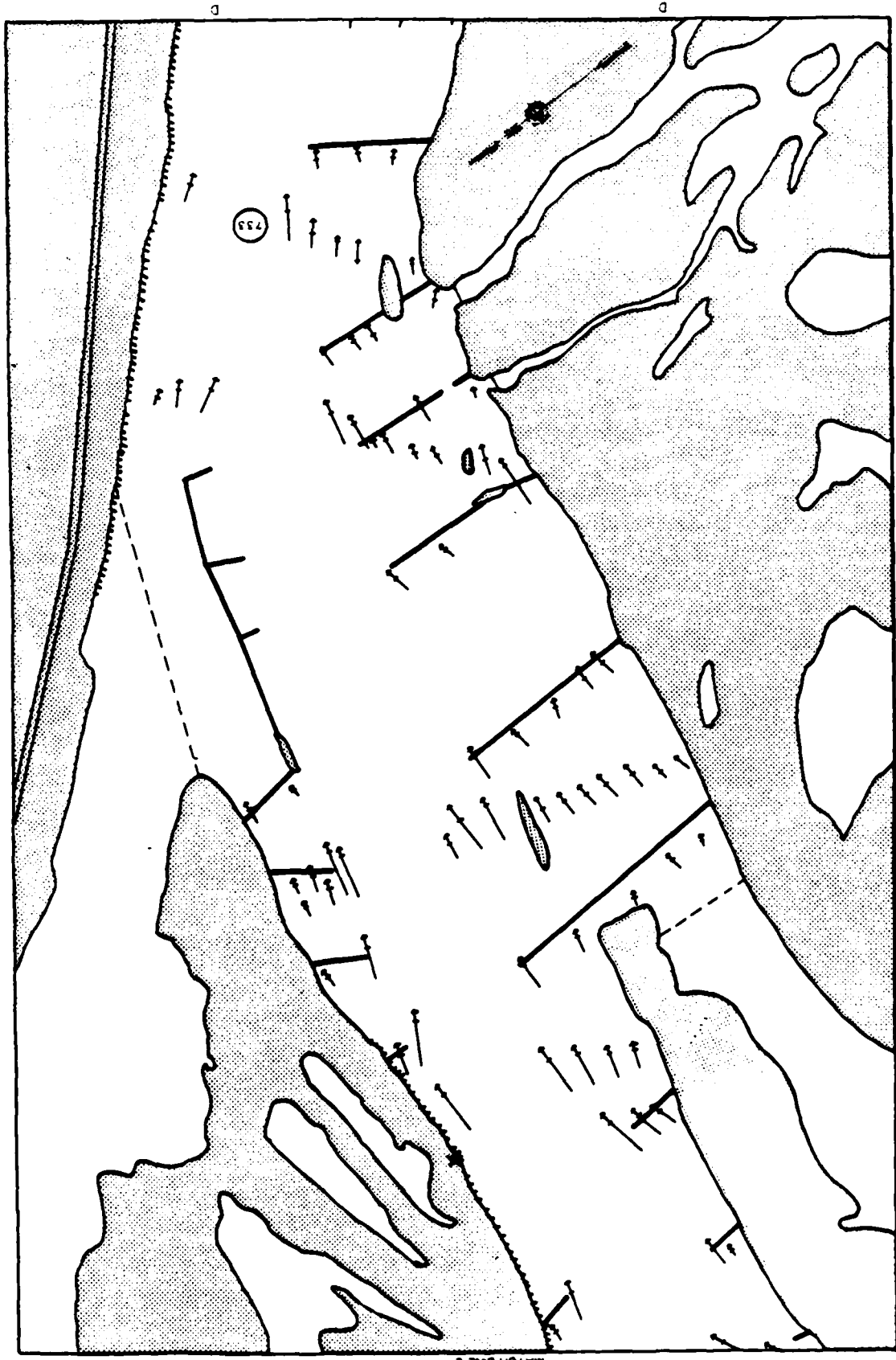
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MAIN CHANNEL BORDER STUDY POOL 5A RIVER MILE: 731.75 - 732.80
CURRENT DIRECTION & VELOCITY
 SCALE: 1 in. = 630 ft.

CURRENT DIRECTION & VELOCITY \rightarrow : .25 in. = 1 fps
 STRUCTURES ———
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Figure B-4 General Current Velocity and Direction Patterns - River Mile 731.75 - 732.80



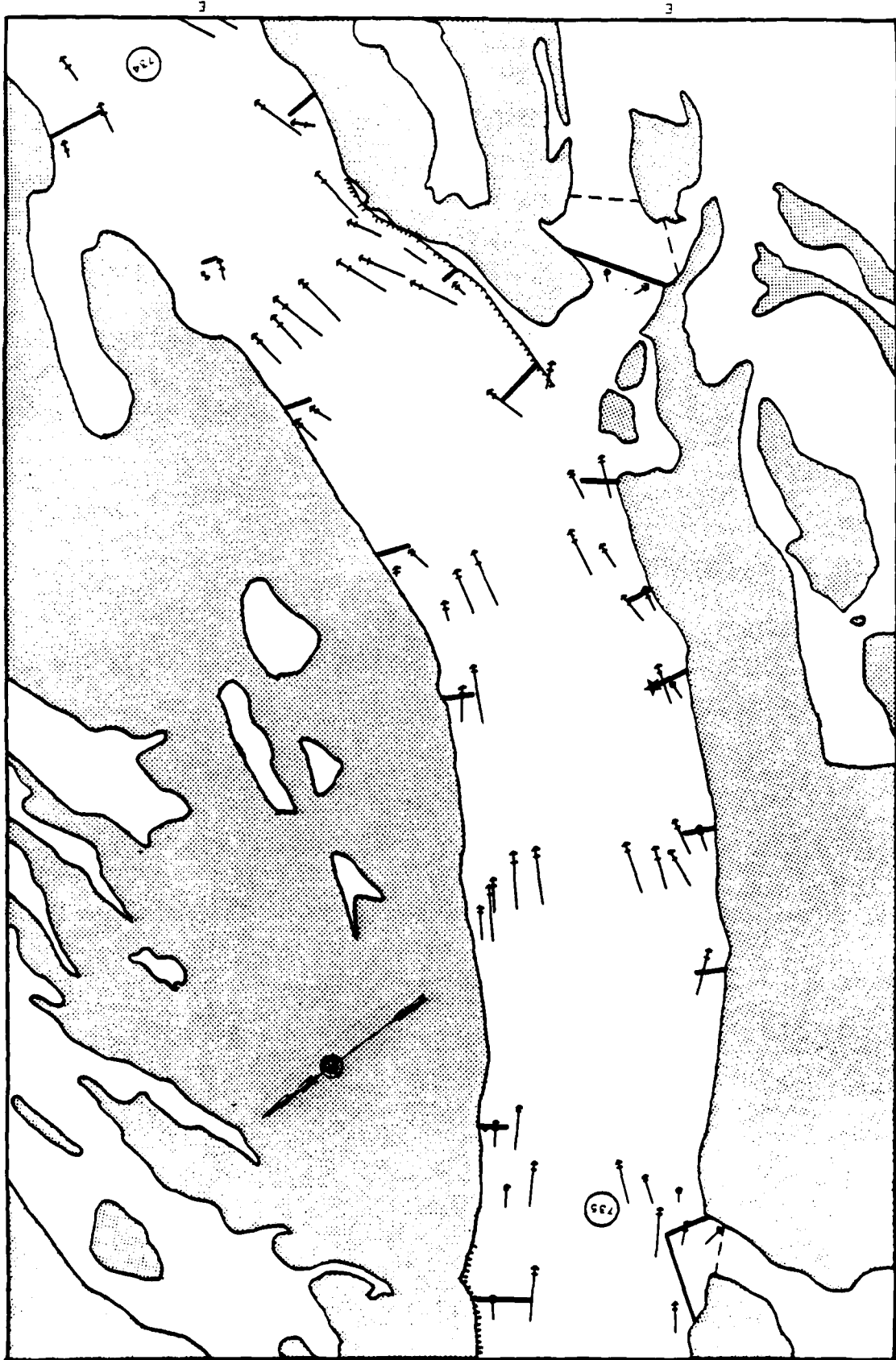
MAIN CHANNEL BORDER STUDY POOL 5A RIVER MILE: 732.80 - 733.95
CURRENT DIRECTION & VELOCITY
 SCALE: 1 in. = 630 ft.

CURRENT DIRECTION & VELOCITY \rightarrow : .25 in. = 1 fps

STRUCTURES —

DAYMARK ★

Figure B-5 General Current Velocity and Direction Patterns - River Mile 732.80 - 733.95



MAIN CHANNEL BORDER STUDY POOL 5A RIVER MILE: 733.95 - 735.10
CURRENT DIRECTION & VELOCITY
 SCALE: 1 in. = 630 ft.

CURRENT DIRECTION & VELOCITY \longleftrightarrow : .25 in. = 1 fps
 STRUCTURES —
 DAYMARK ★

Figure B-6 General Current Velocity and Direction Patterns - River Mile 733.95 - 735.10

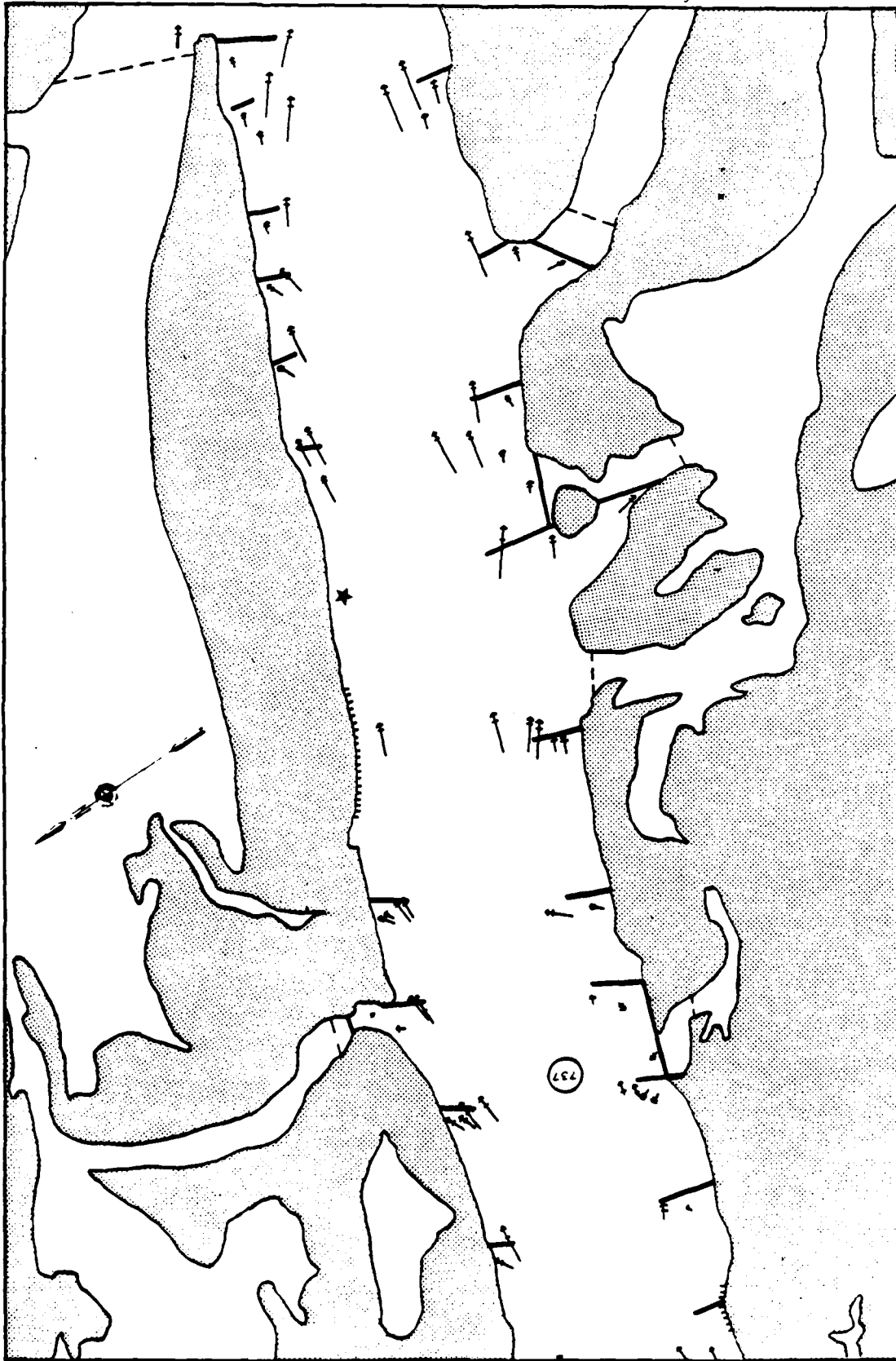


MAIN CHANNEL BORDER STUDY POOL 5A RIVER MILE: 735.10 - 736.15
CURRENT DIRECTION & VELOCITY
 SCALE: 1 in. = 630 ft.

CURRENT DIRECTION & VELOCITY → : .25 in. = 1 f.p.s.

STRUCTURES —
 DAYMARK ★

Figure B-7 General Current Velocity and Direction Patterns - River Mile 735.10 - 736.15

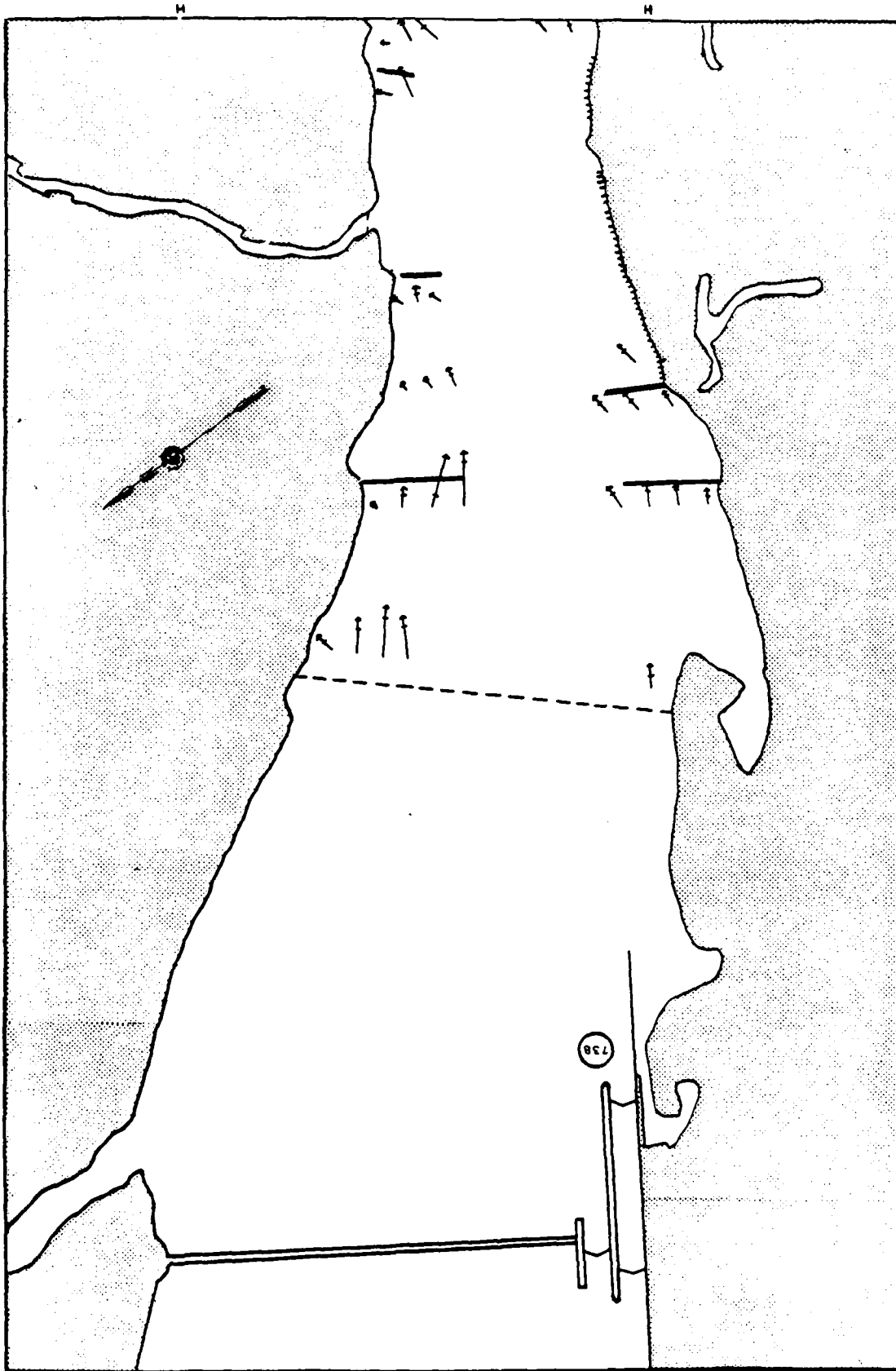


MAIN CHANNEL BORDER STUDY POOL 5A RIVER MILE: 736.15 - 737.25
CURRENT DIRECTION & VELOCITY
 SCALE: 1 in. = 630ft.

CURRENT DIRECTION & VELOCITY \rightarrow : .25 in. = 1 fps

STRUCTURES —
 DAYMARK ★

Figure B-8 General Current Velocity and Direction Patterns - River Mile 736.15 - 737.25



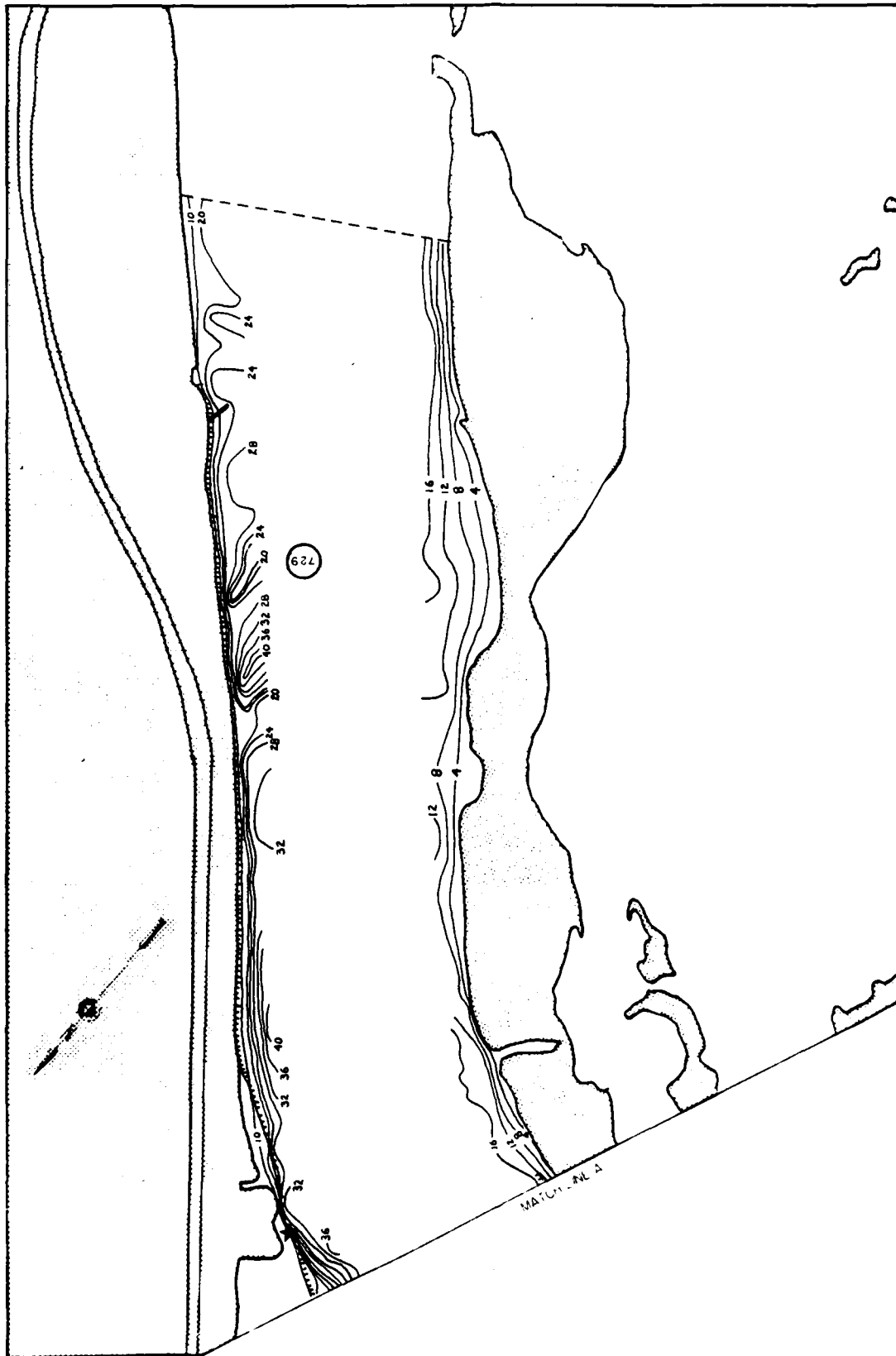
MAIN CHANNEL BORDER STUDY POOL 5A RIVER MILE: 737.25 - 738.25
 SCALE: 1 in. = 630ft.
 CURRENT DIRECTION & VELOCITY .25 in. = 1 fps
 STRUCTURES DAYMARK

Figure B-9 General Current Velocity and Direction Patterns - River Mile 737.25 - 738.25

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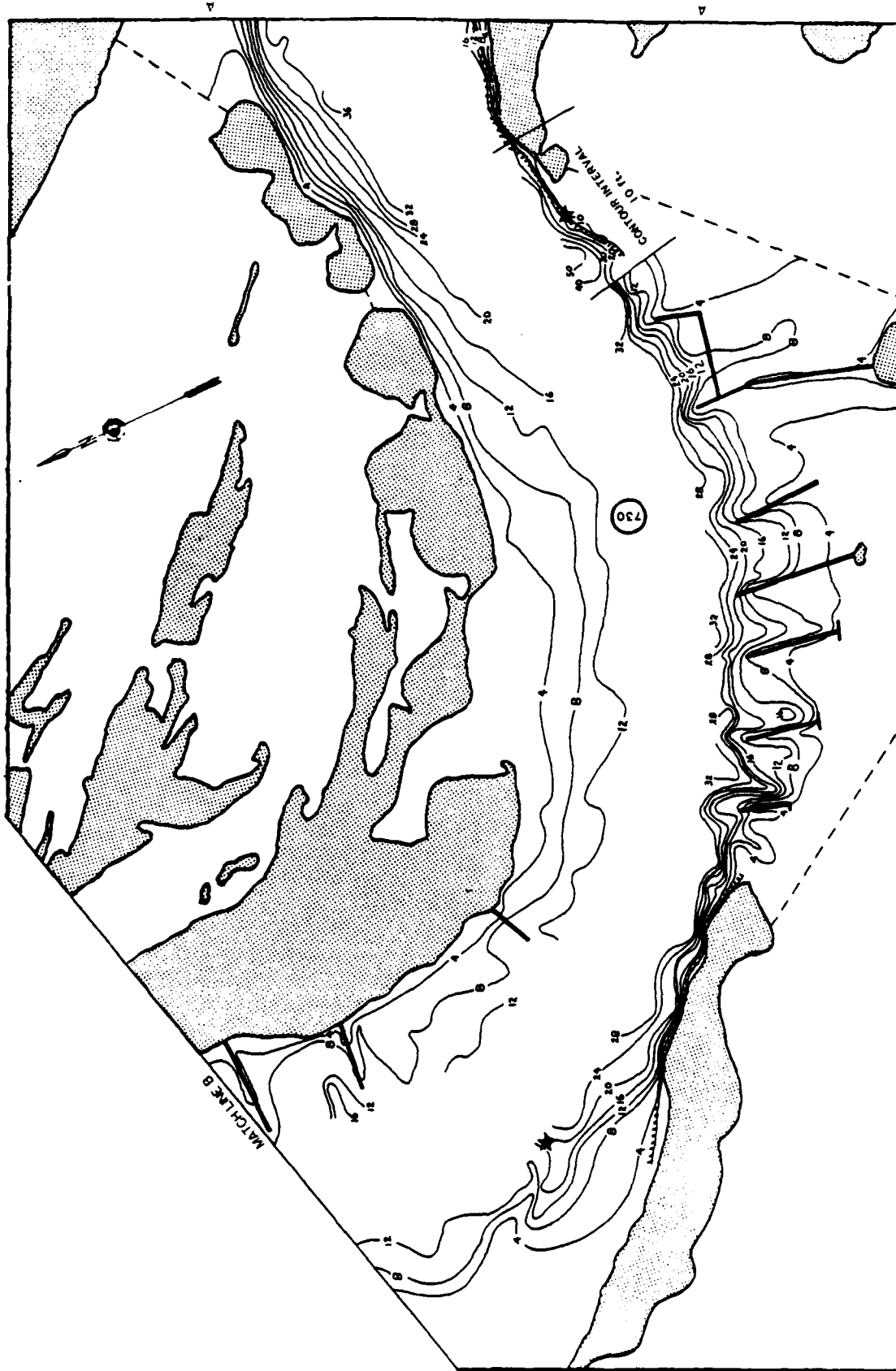
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MAIN CHANNEL BORDER STUDY POOL 5A RIVER MILE: 728.55 - 729.55
 BATHYMETRIC MAP
 SCALE: 1 in. = 630ft.
 STRUCTURES ———
 DAYMARK ★

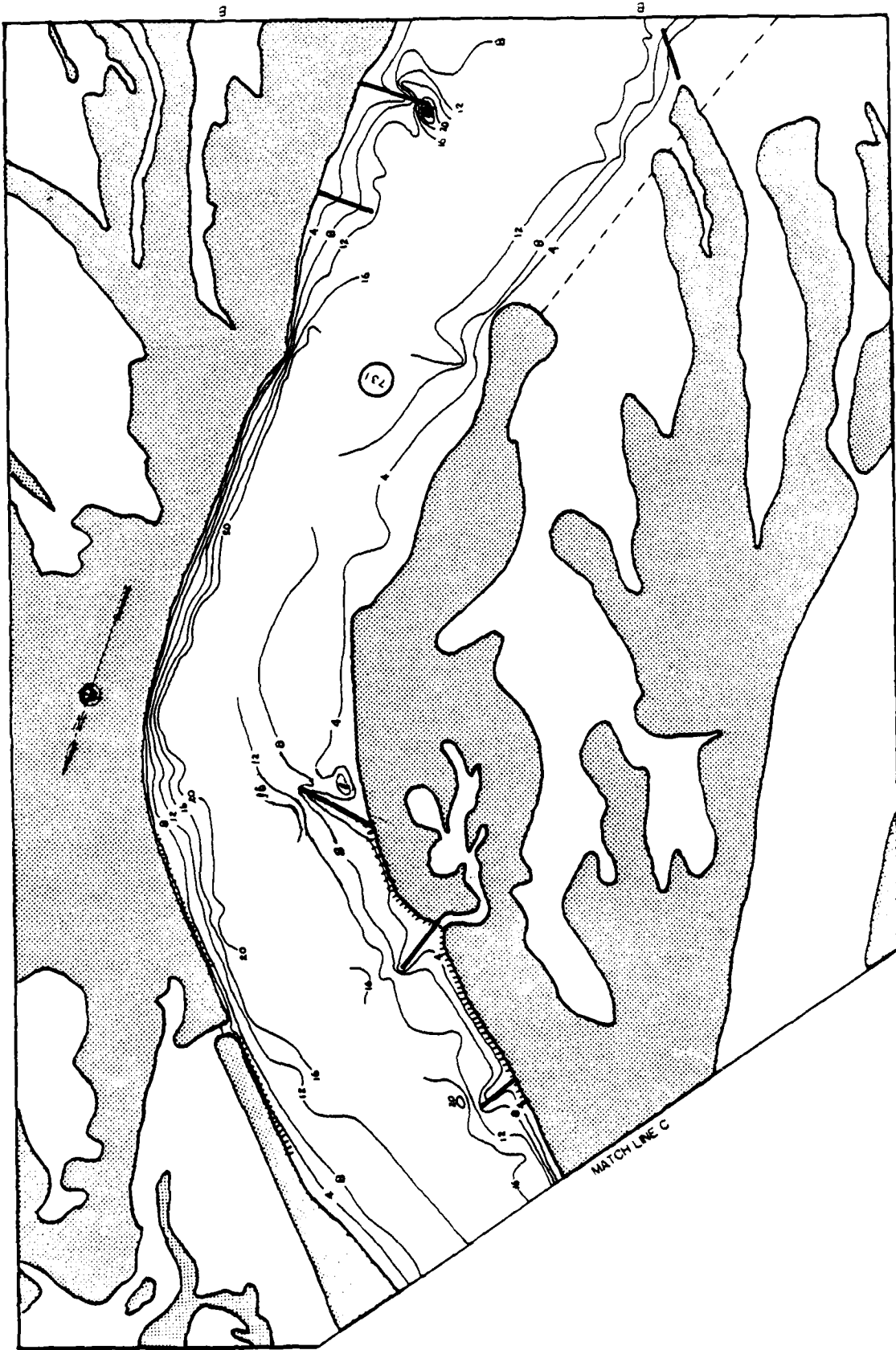
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MAIN CHANNEL BORDER STUDY **POOL 5A** **RIVER MILE: 729.55 - 730.65**
BATHYMETRIC MAP
 SCALE: 1 in. = 630 ft. STRUCTURES —

DAYMARK ★

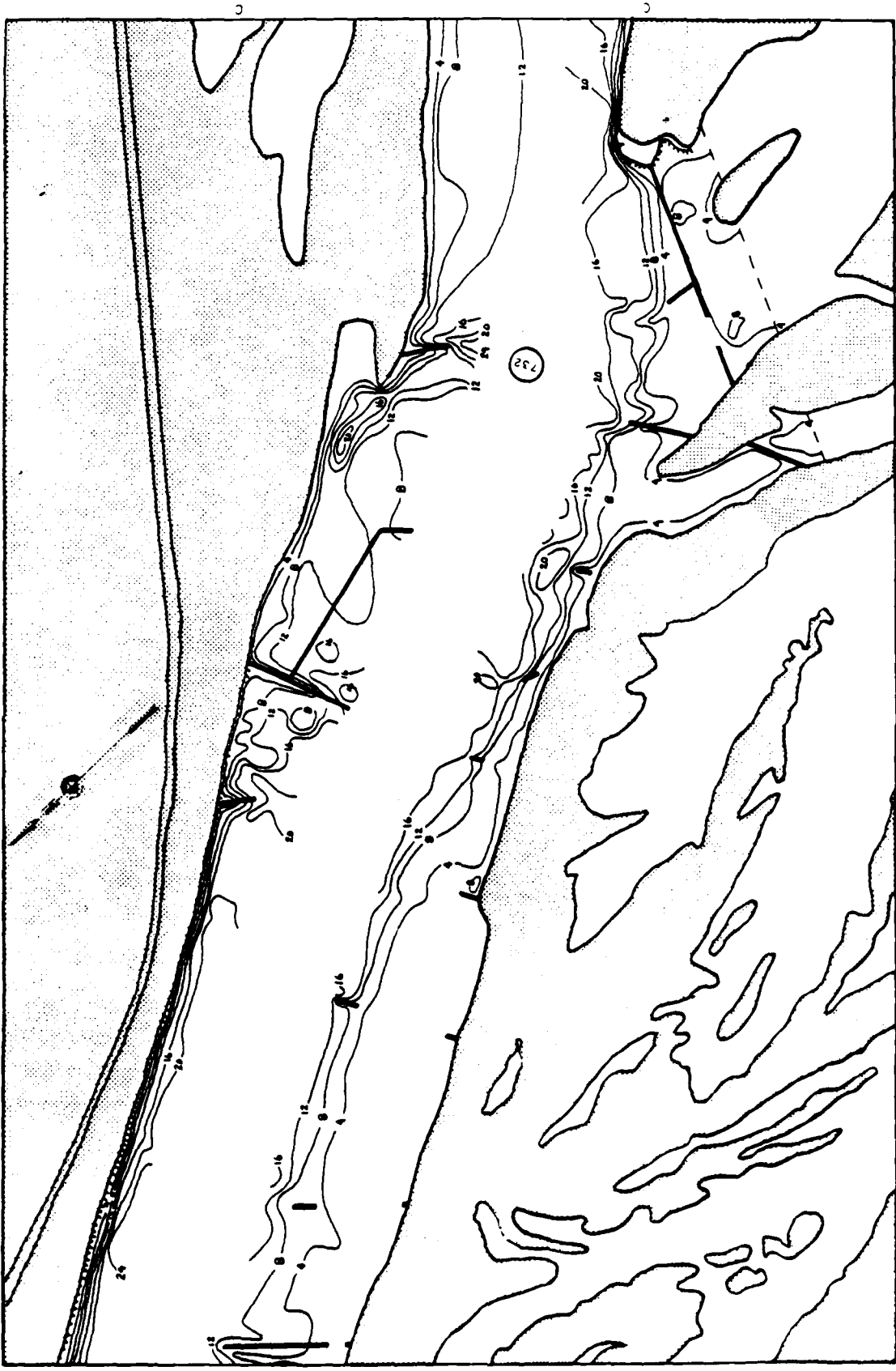
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MAIN CHANNEL BORDER STUDY POOL 5A RIVER MILE: 730.65 - 731.75
 BATHYMETRIC MAP
 SCALE: 1 in. = 630 ft.

STRUCTURES —
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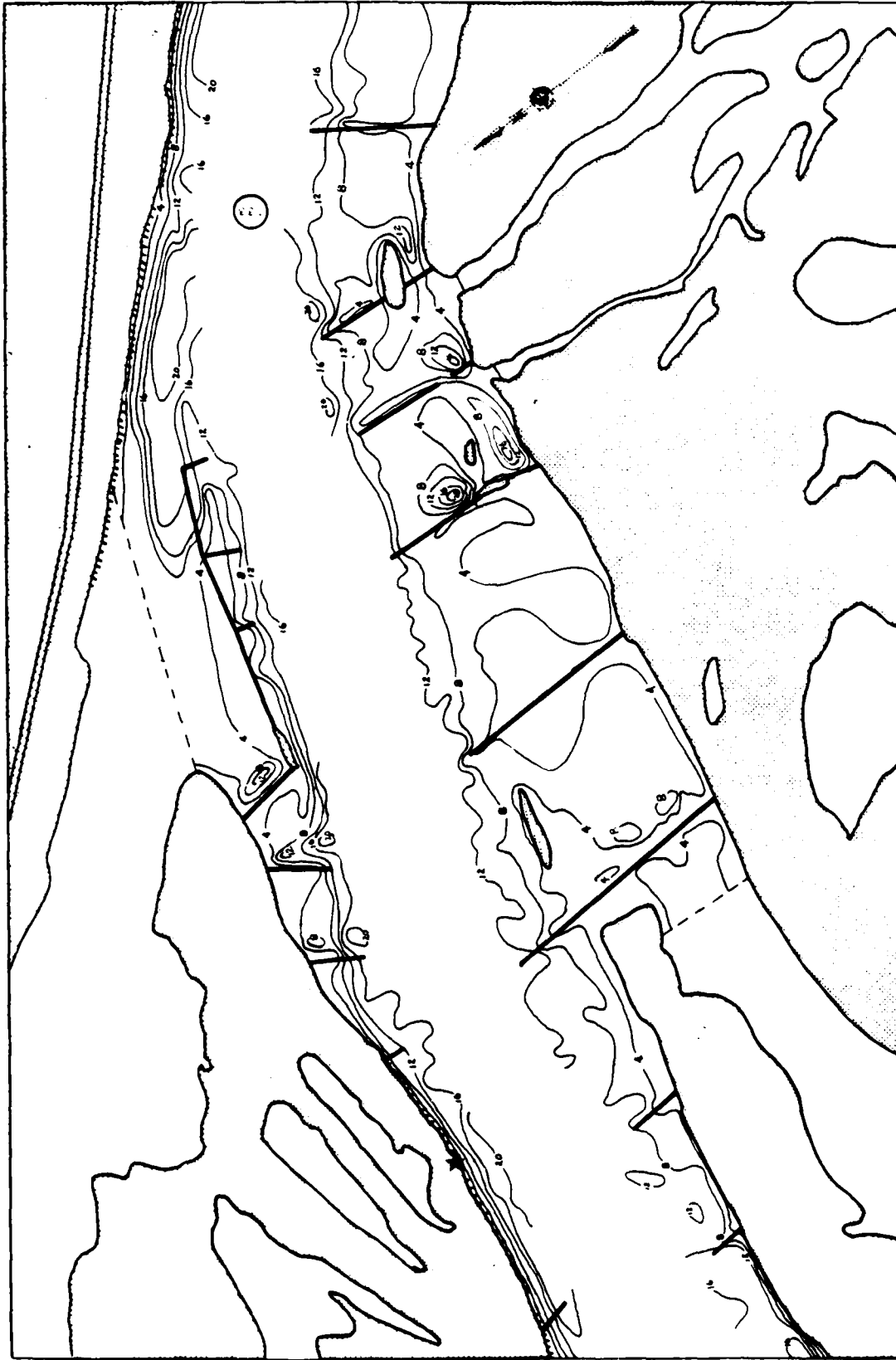
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MAIN CHANNEL BORDER STUDY **POOL 5A** **RIVER MILE: 731.75 - 732.80**
BATHYMETRIC MAP
 SCALE: 1 in. = 630 ft.

STRUCTURES ———
 DAYMARK ★

Figure C-4 General Bathymetric Map River Mile 731.75 - 732.80



MAIN CHANNEL BORDER STUDY **POOL 5A** **RIVER MILE: 732.80 - 733.95**
BATHYMETRIC MAP **STRUCTURES** ———

SCALE: 1 in. = 630ft.

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Figure C-5 General Bathymetric Map River Mile 732.80 - 733.95



MAIN CHANNEL BORDER STUDY POOL 5A RIVER MILE: 733.95 - 735.10

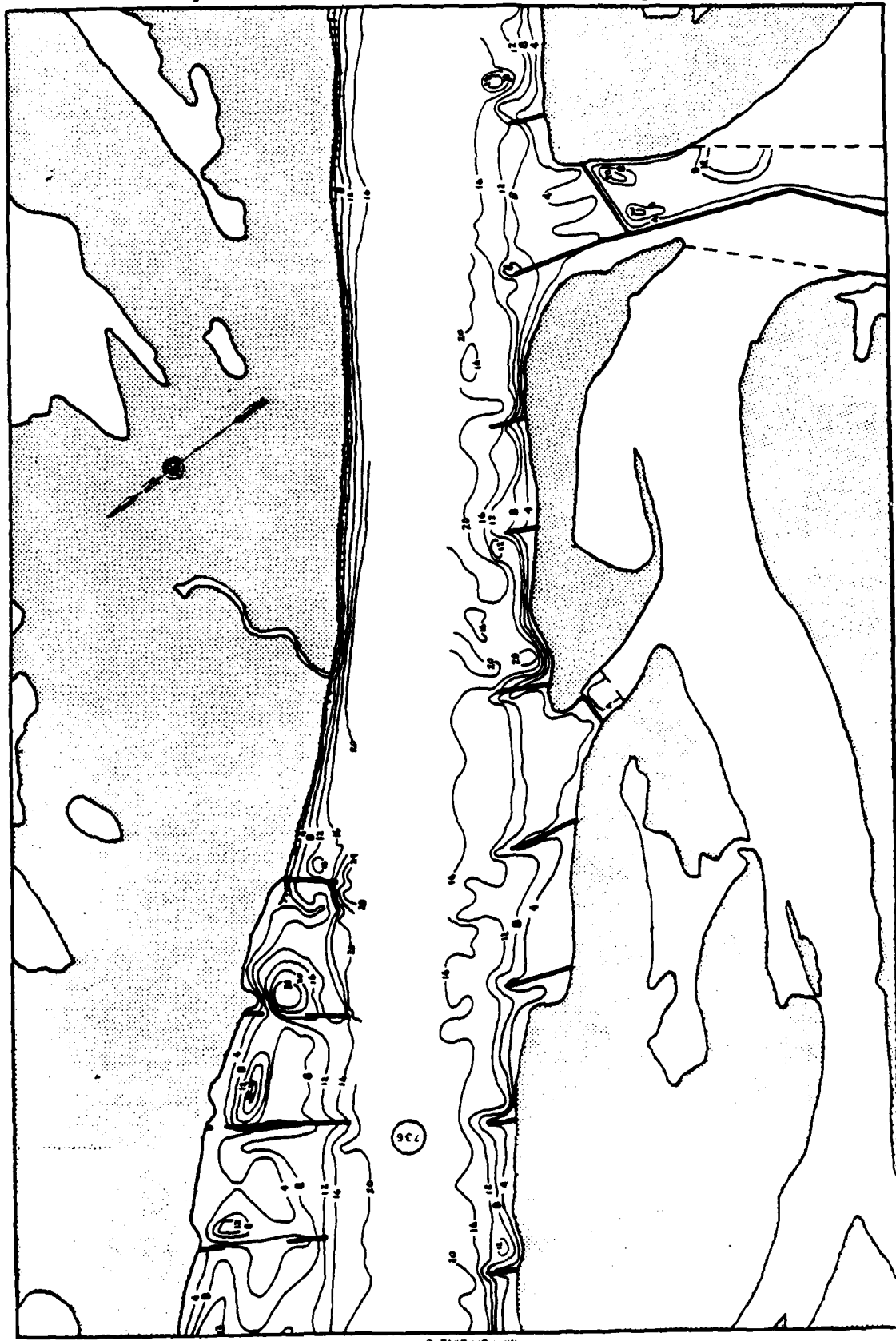
BATHYMETRIC MAP

SCALE: 1 in. = 630 ft.

STRUCTURES —

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Figure C-6 General Bathymetric Map River Mile 733.95 - 735.10

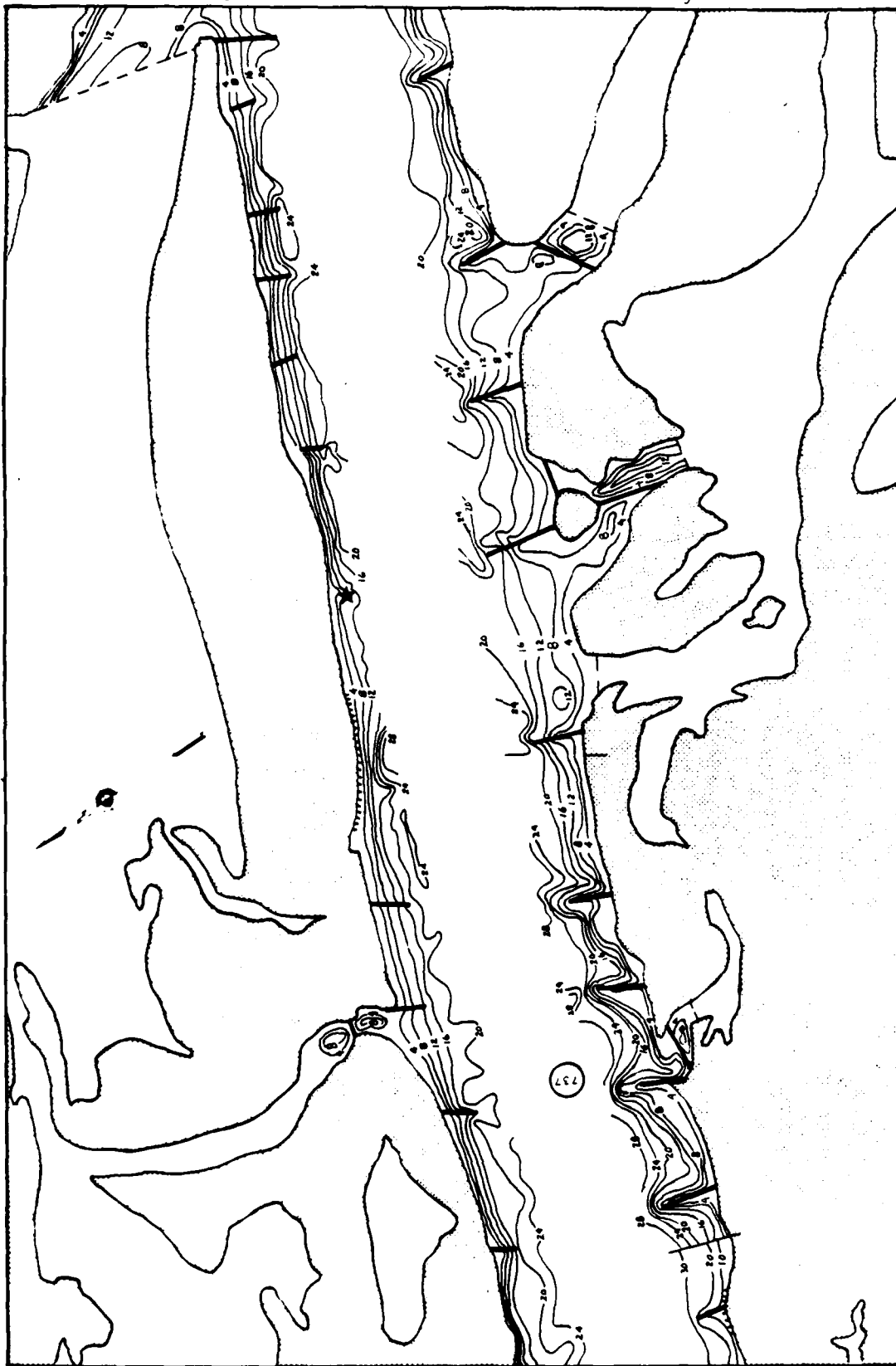


MAIN CHANNEL BORDER STUDY **POOL 5A** **RIVER MILE: 735.10 - 736.15**
BATHYMETRIC MAP

STRUCTURES —
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SCALE: 1 in. = 630ft.

Figure C-7 General Bathymetric Map River Mile 735.10 - 736.15

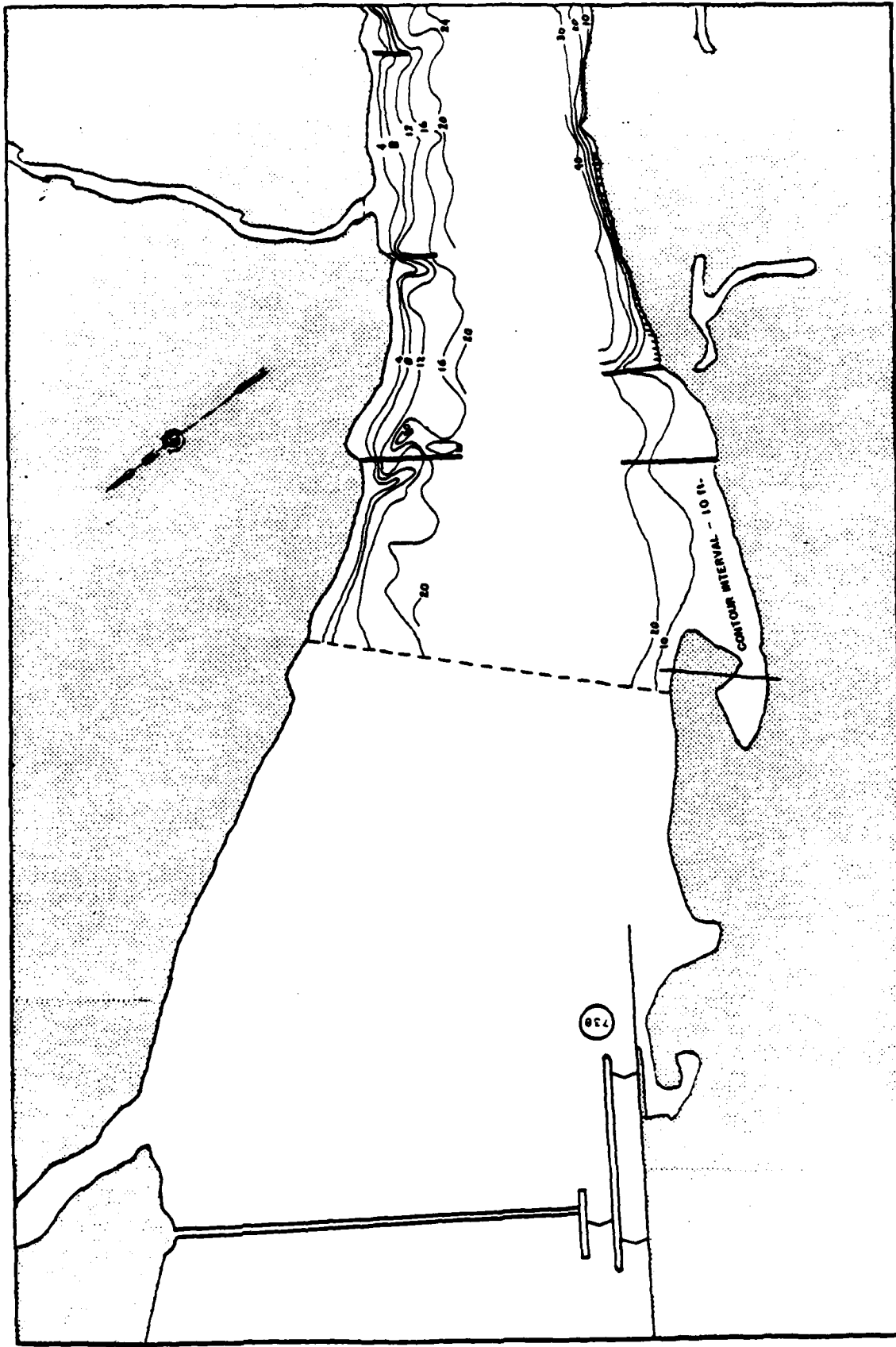


MAIN CHANNEL BORDER STUDY
POOL 5A RIVER MILE: 736.15 - 737.25
BATHYMETRIC MAP

SCALE: 1 in. = 630 ft.

STRUCTURES —
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Figure C-8 General Bathymetric Map River Mile 736.15 - 737.25



MAIN CHANNEL BORDER STUDY POOL 5A RIVER MILE: 737.25 - 738.25
 BATHYMETRIC MAP
 SCALE: 1 in. = 630 ft.
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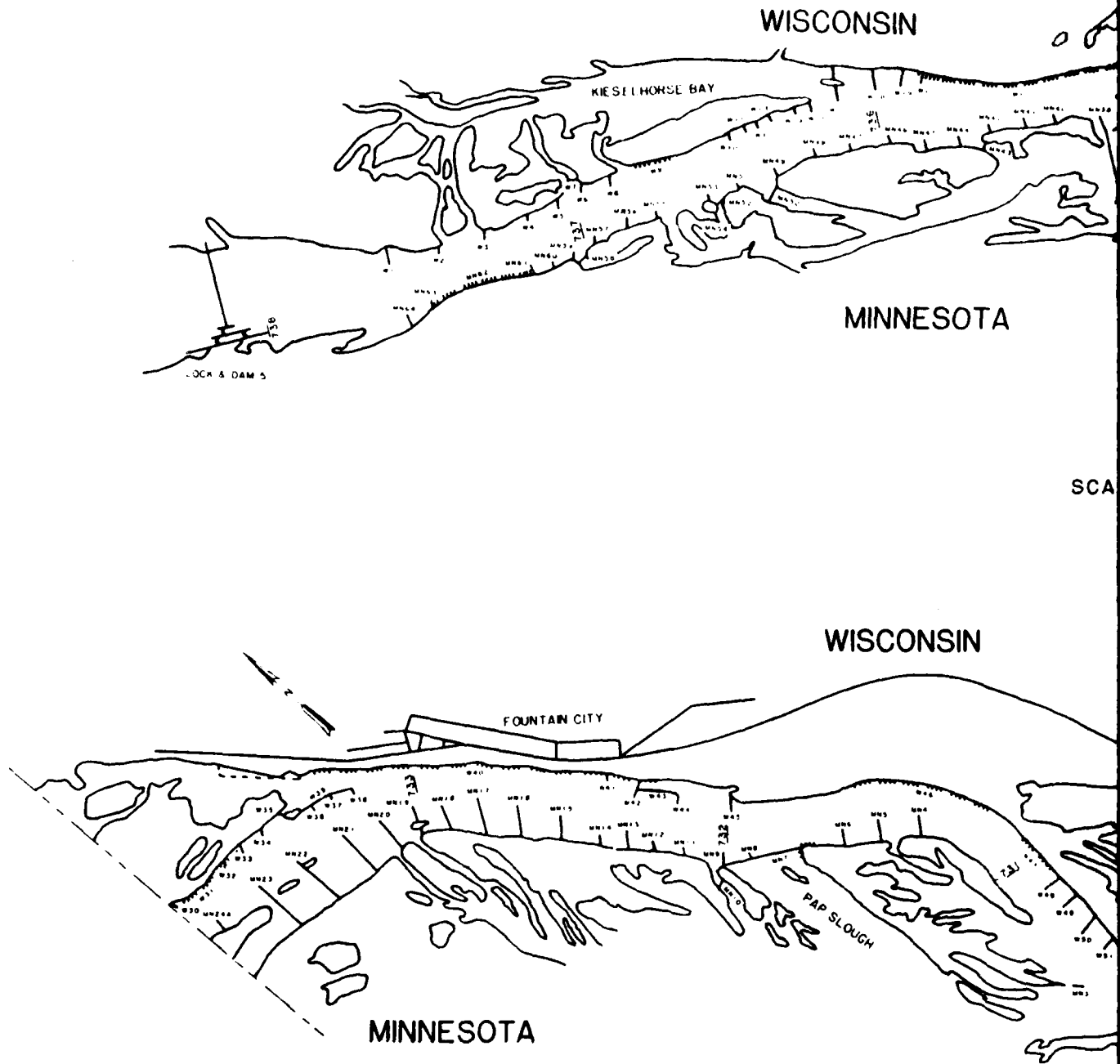
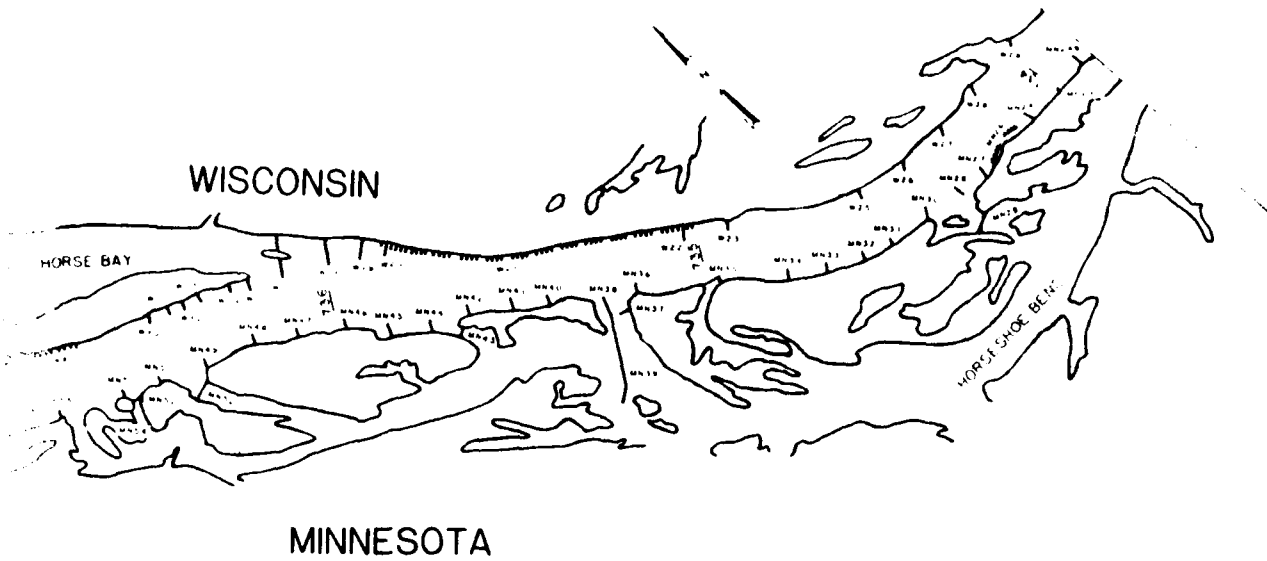
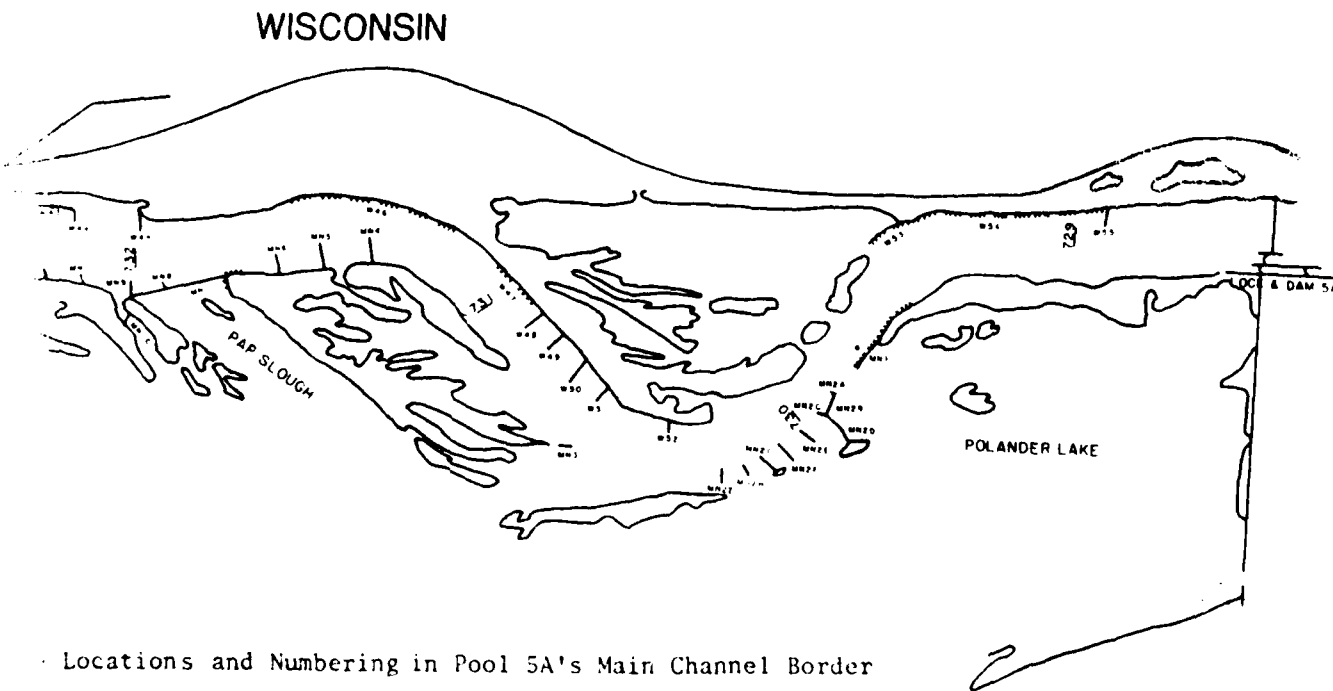


Figure D-1 General Map of Rock Control Structure Locations and Numbering in Pool SA's M

10/2

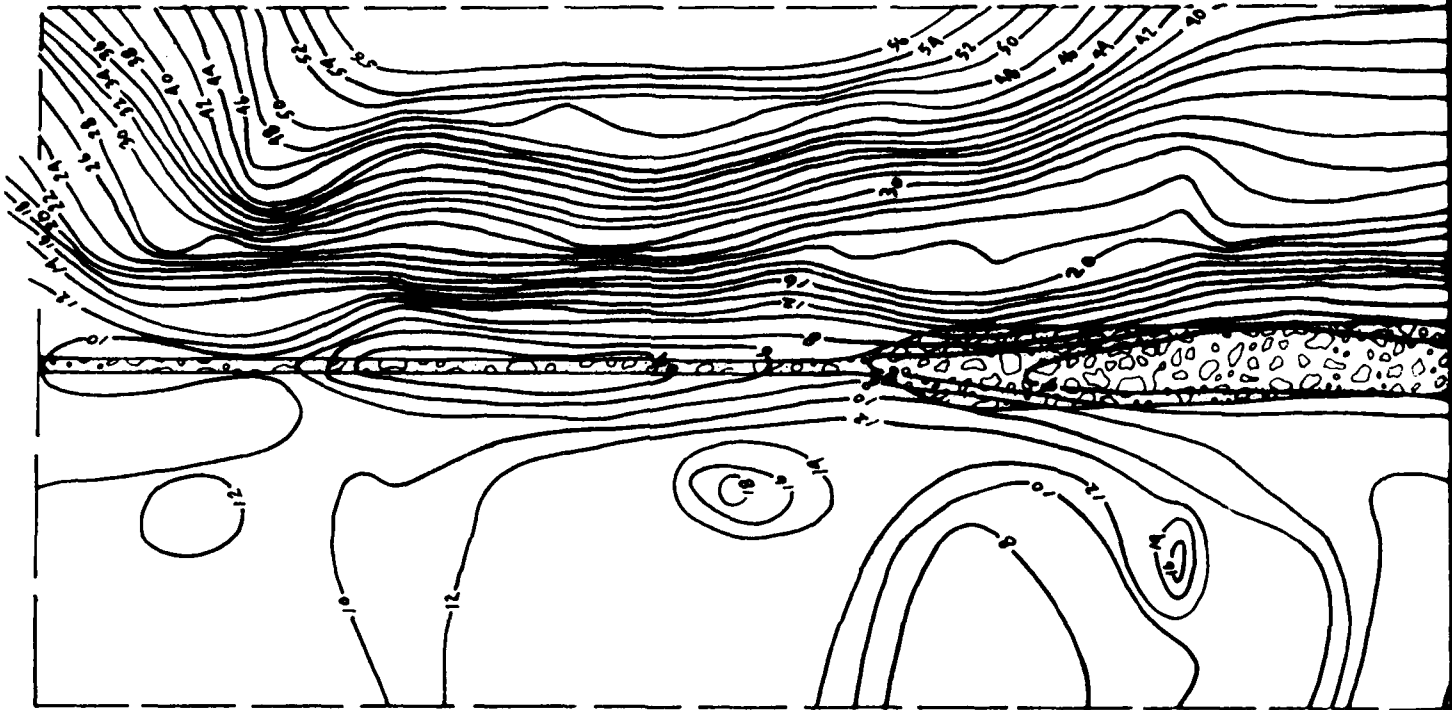
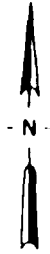


SCALE: 1 in. = 2,400 ft.



Locations and Numbering in Pool 5A's Main Channel Border

30/2



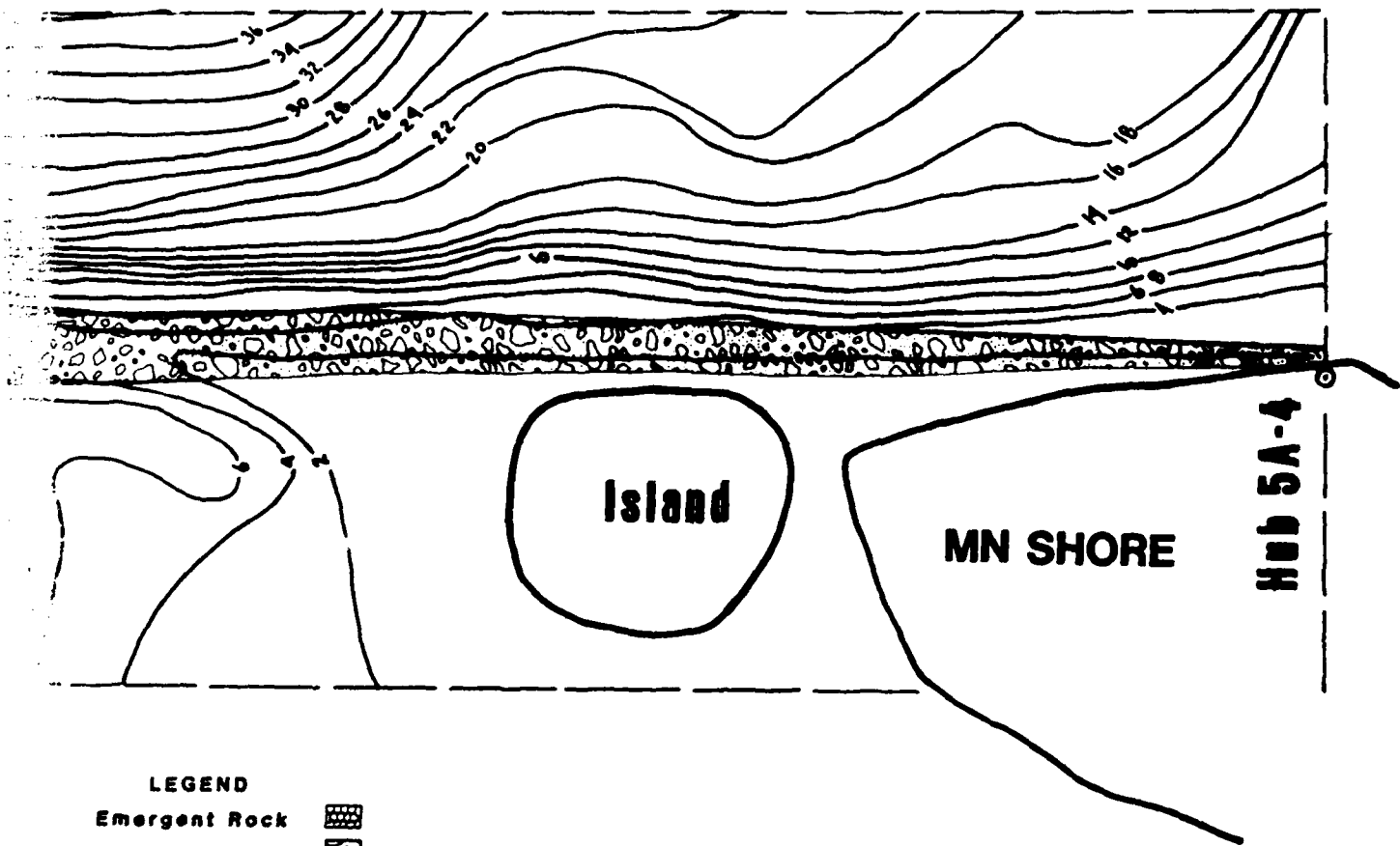
M 1




Polander Lake

E
S
S

Figure D-2 General Bathymetric and Substrate Map of Wing Dam M1

10/2



LEGEND
Emergent Rock 
Submerged Rock 
Sand/Silt 

1" = 50'

25
21-

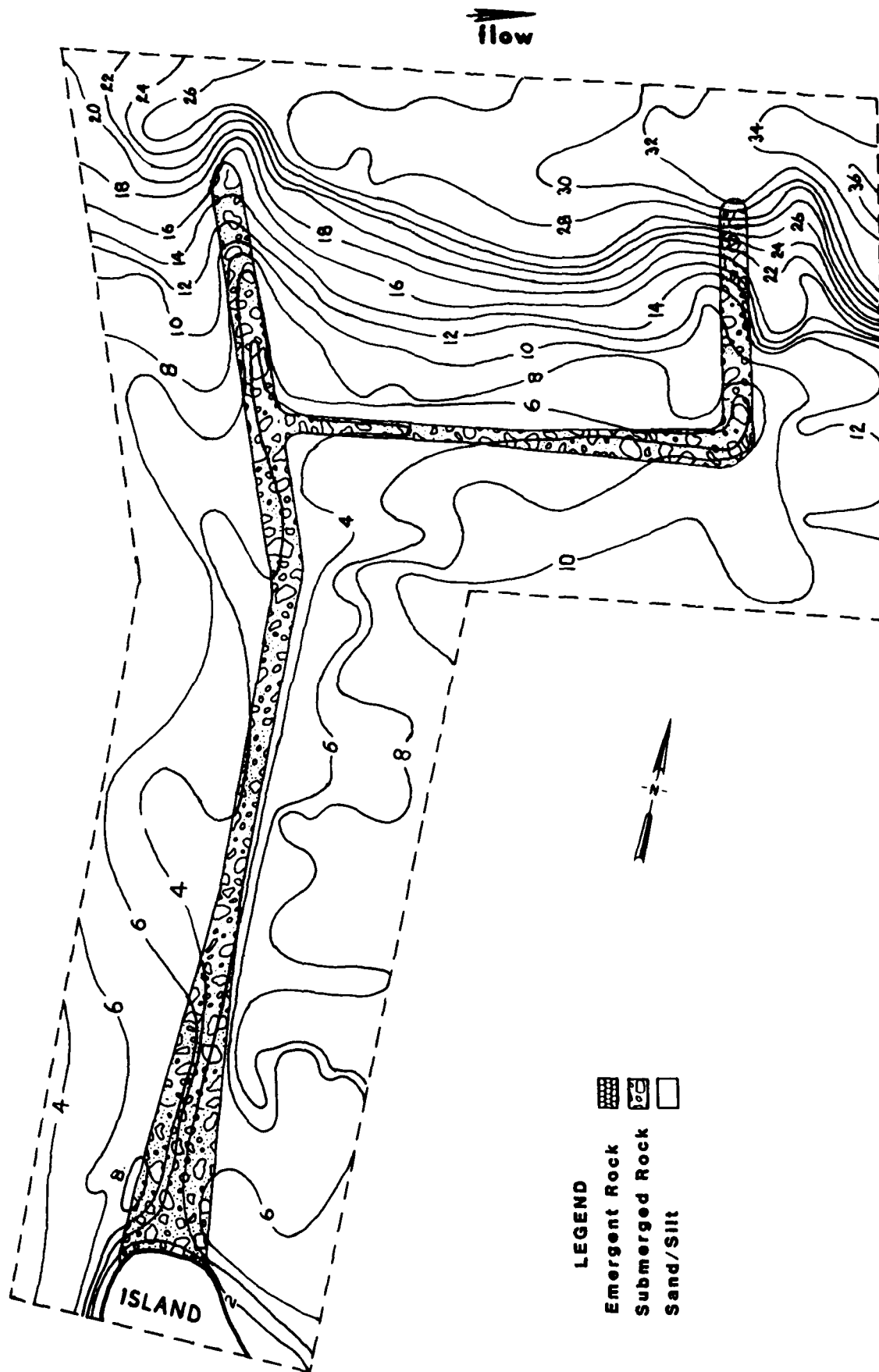
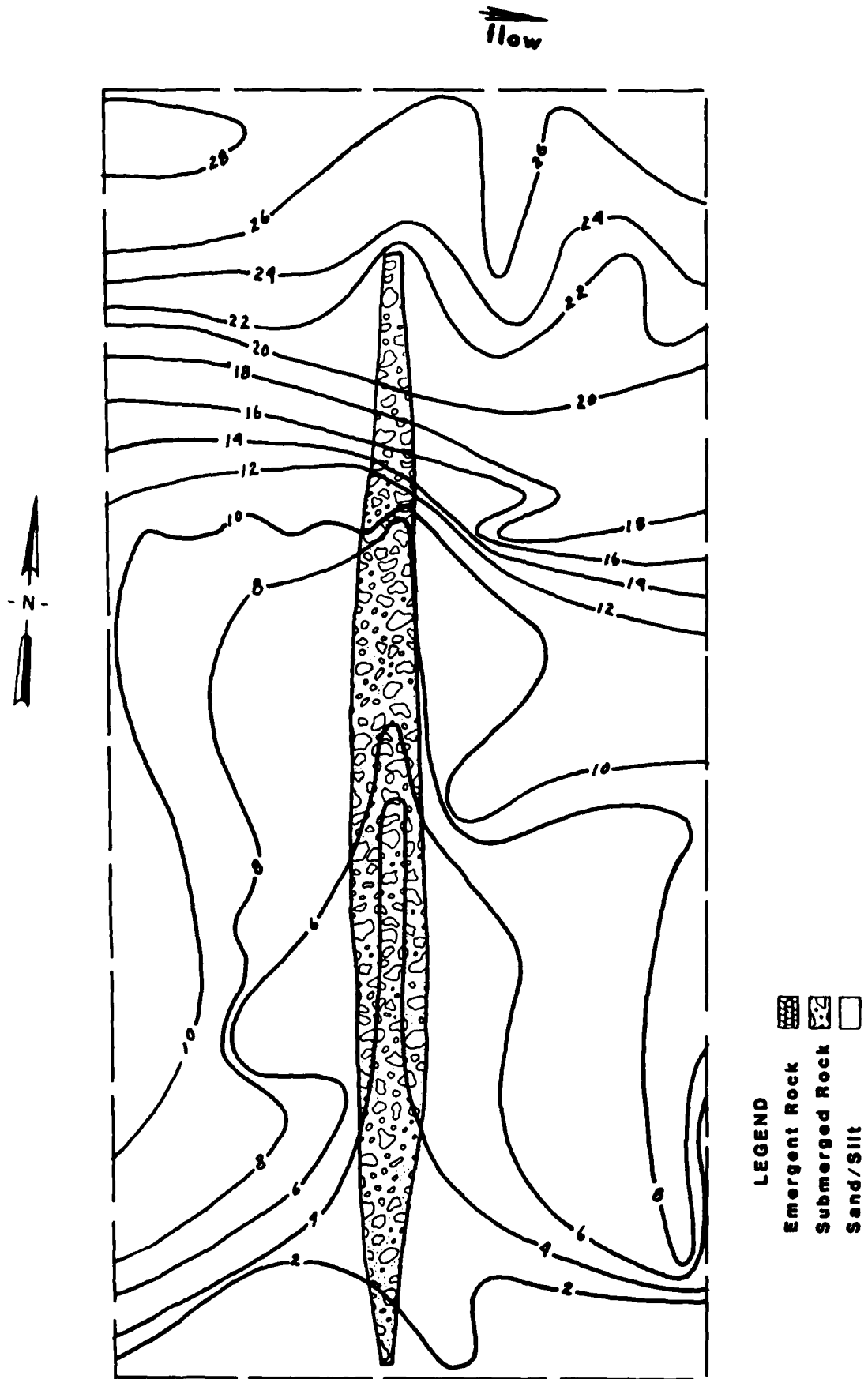
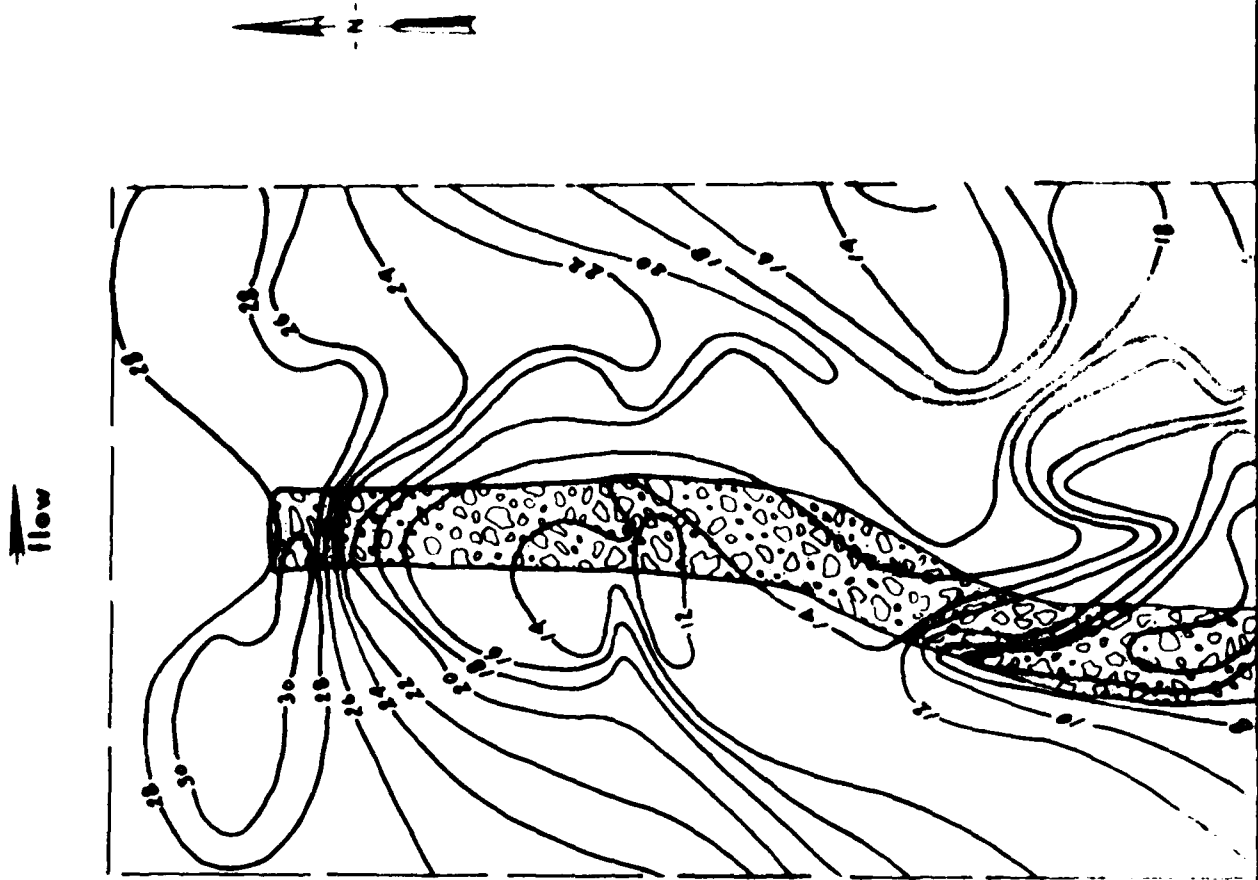


Figure D-3 General Bathymetric and Substrate Map of Wing Dam M2A, B, D, and Closing Dam C



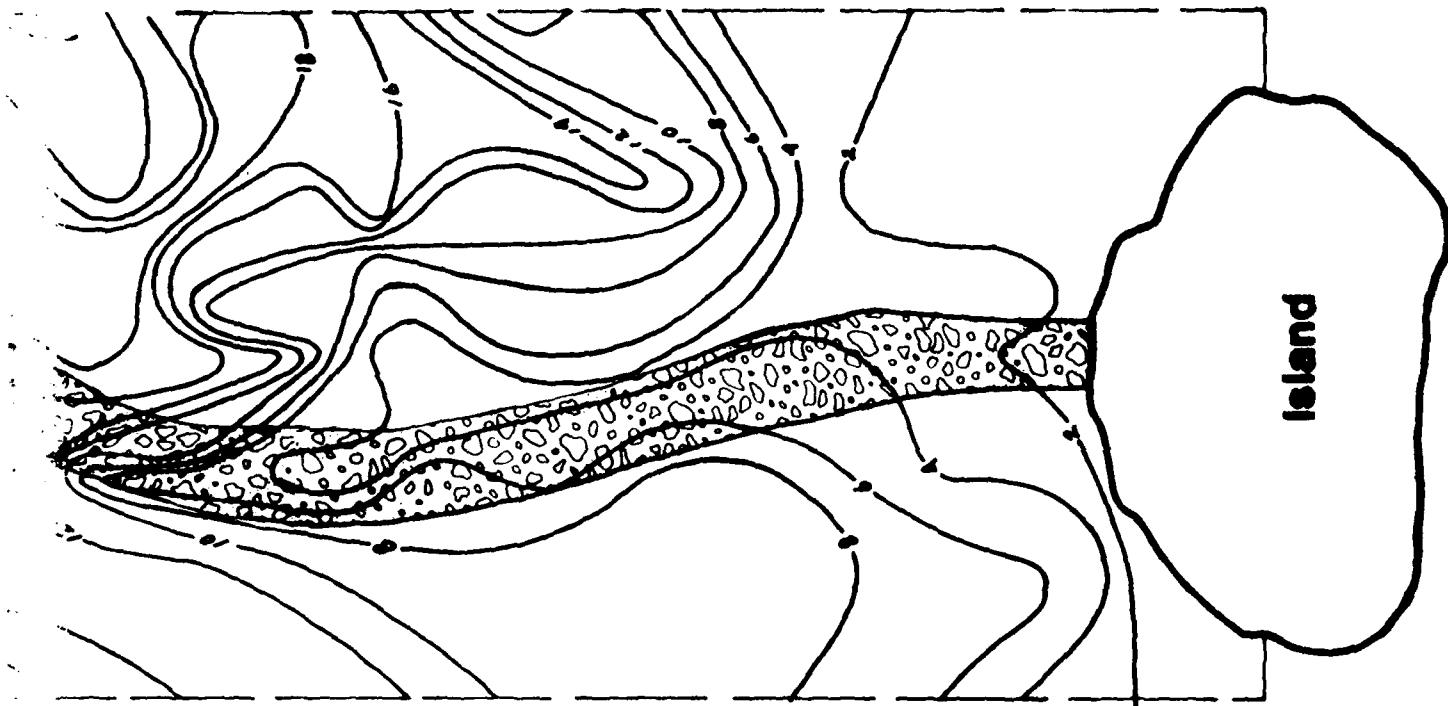





M 2F

1" = 50'

Figure D-5 General Bathymetric and Substrate Map of Wing Dam M2F

10/2



LEGEND
Emergent Rock 
Submerged Rock 
Sand/Silt 

M2F

38

20/2

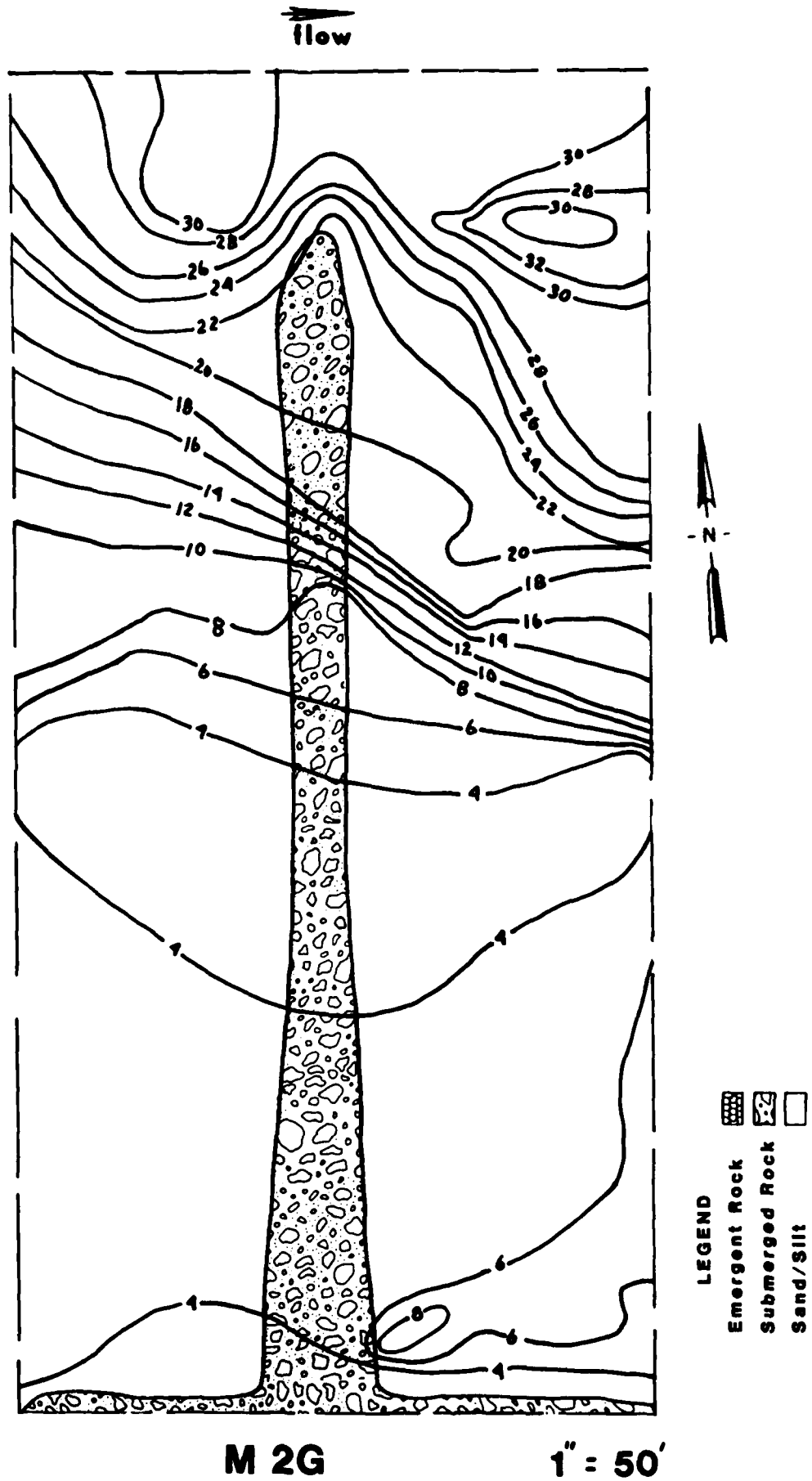
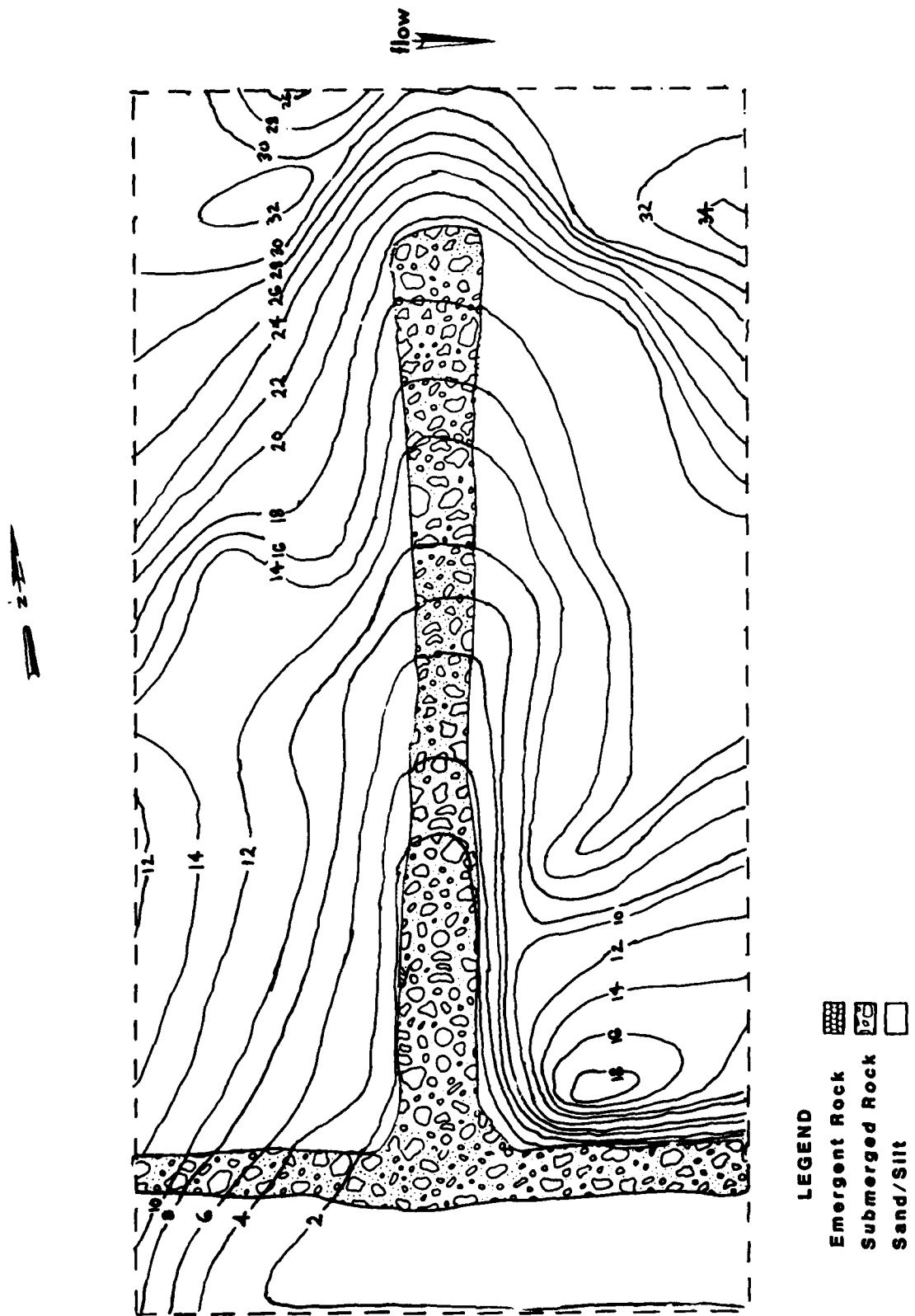


Figure D-6 General Bathymetric and Substrate Map of Wing Dam M2G

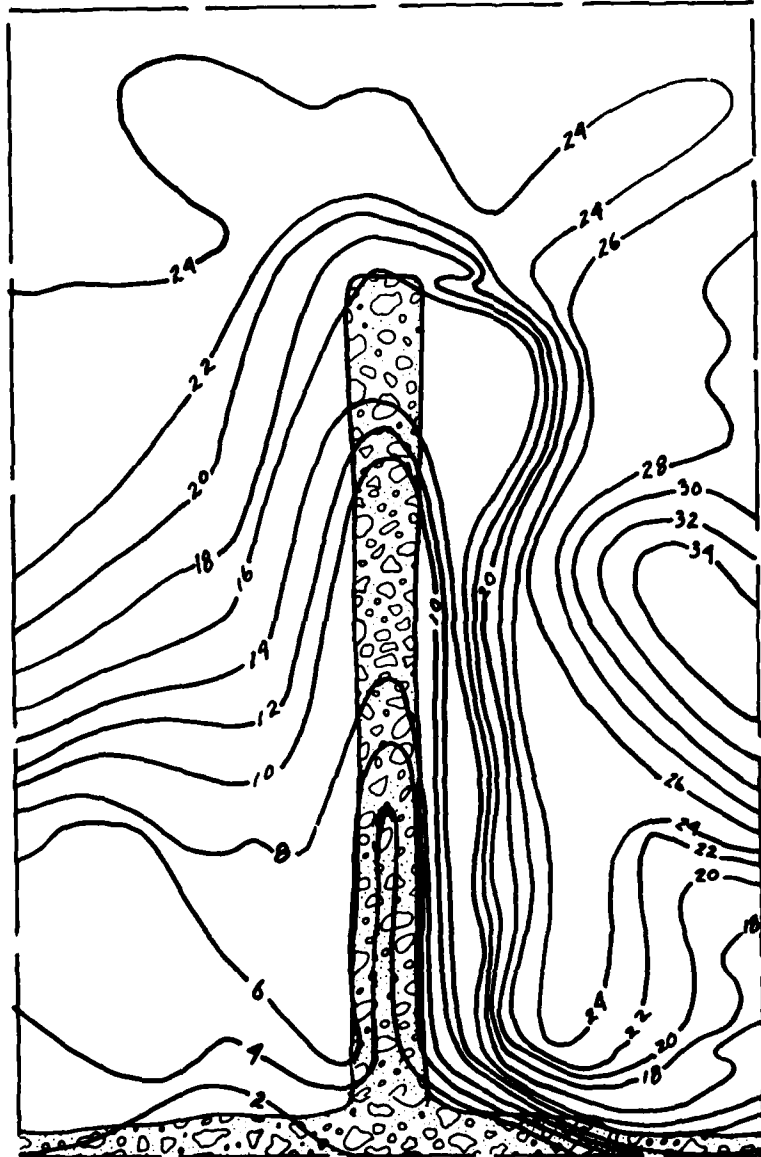


M 2H

1" = 50'

Figure D-7 General Bathymetric and Substrate Map of Wing Dam M2H

flow



Polander Lake

M 2i

1" = 50'

LEGEND

- Emergent Rock 
- Submerged Rock 
- Sand/Silt 

Figure D-8 General Bathymetric and Substrate Map of Wing Dam M2I

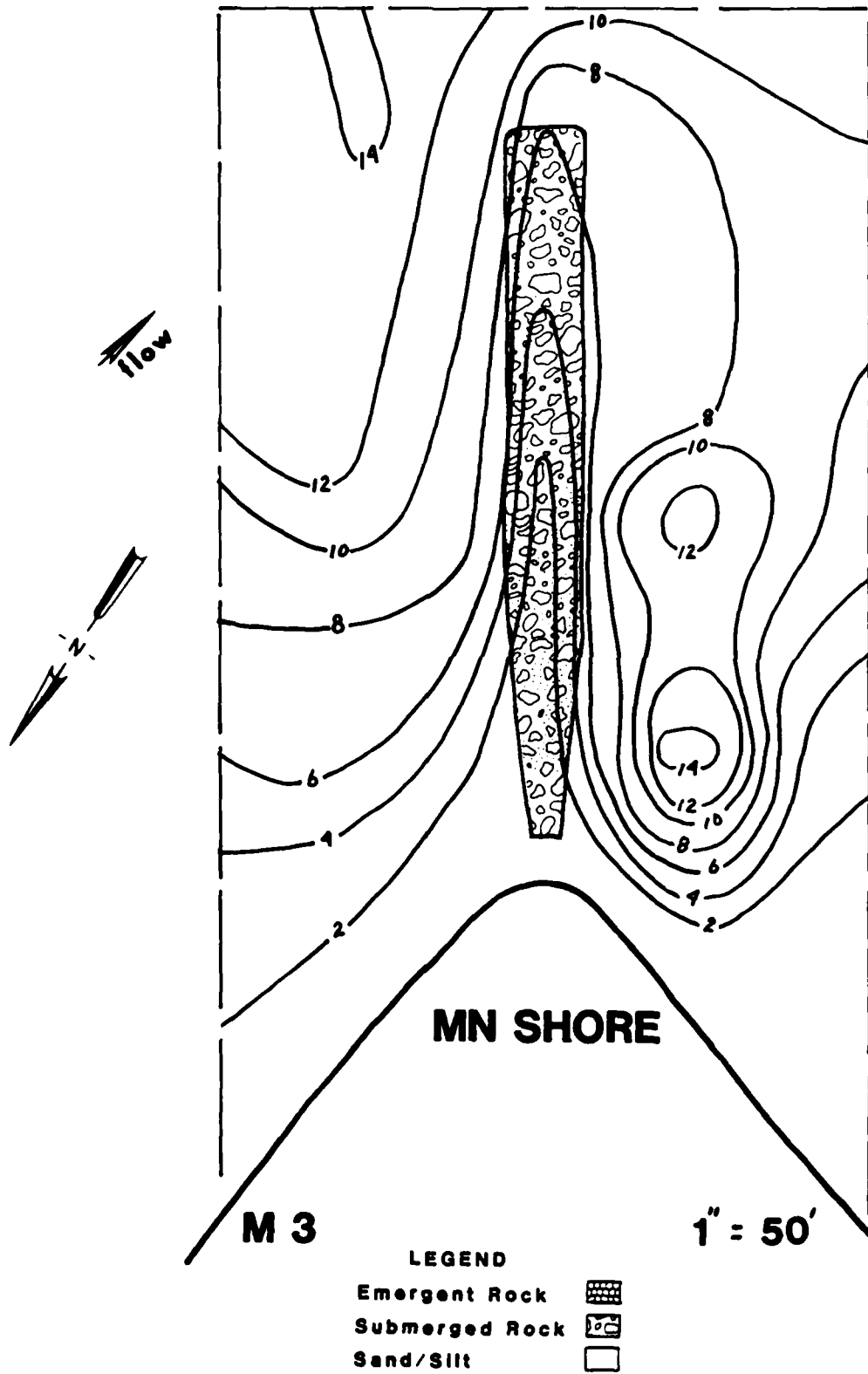
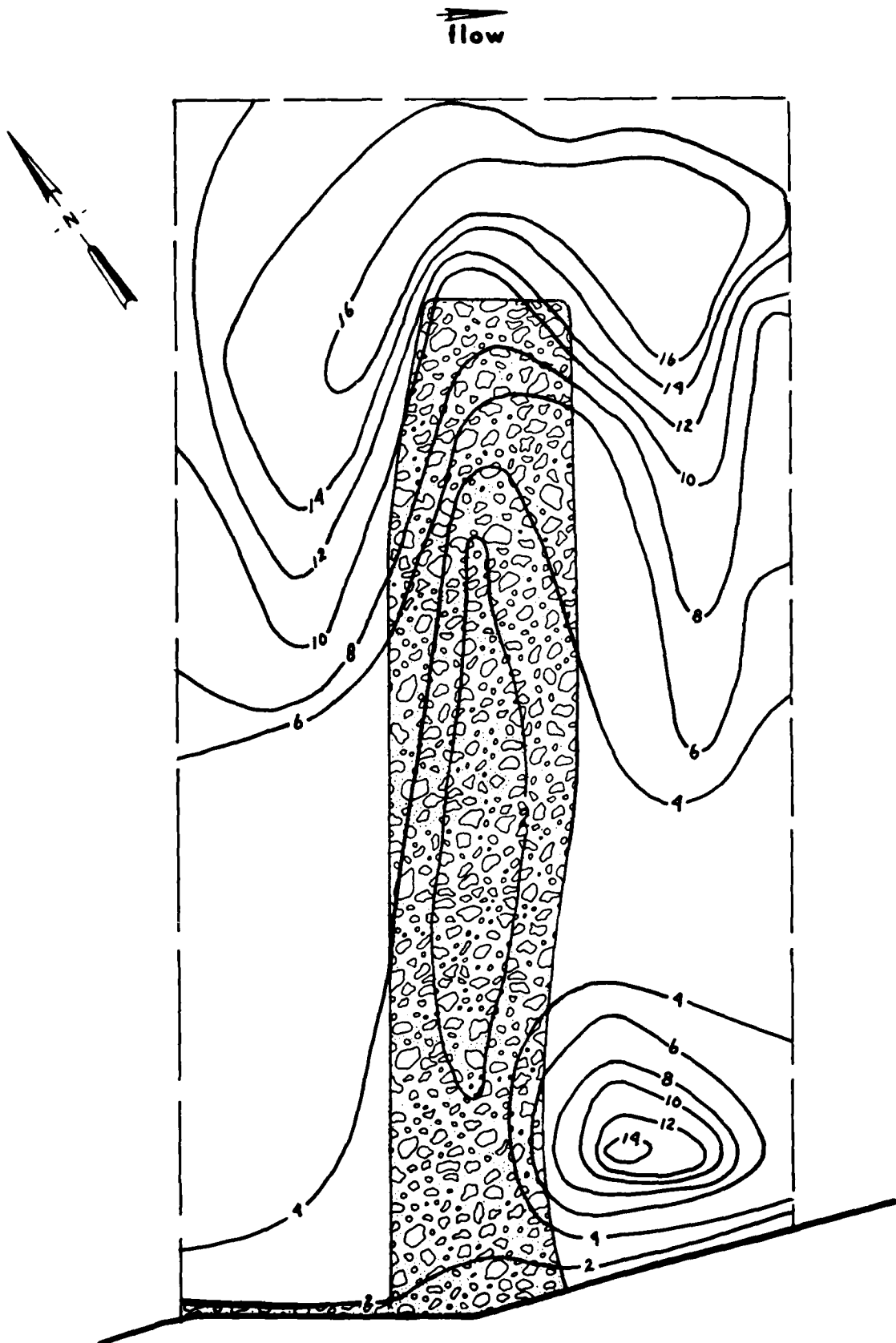





Figure D-9 General Bathymetric and Substrate Map of Wing Dam M3

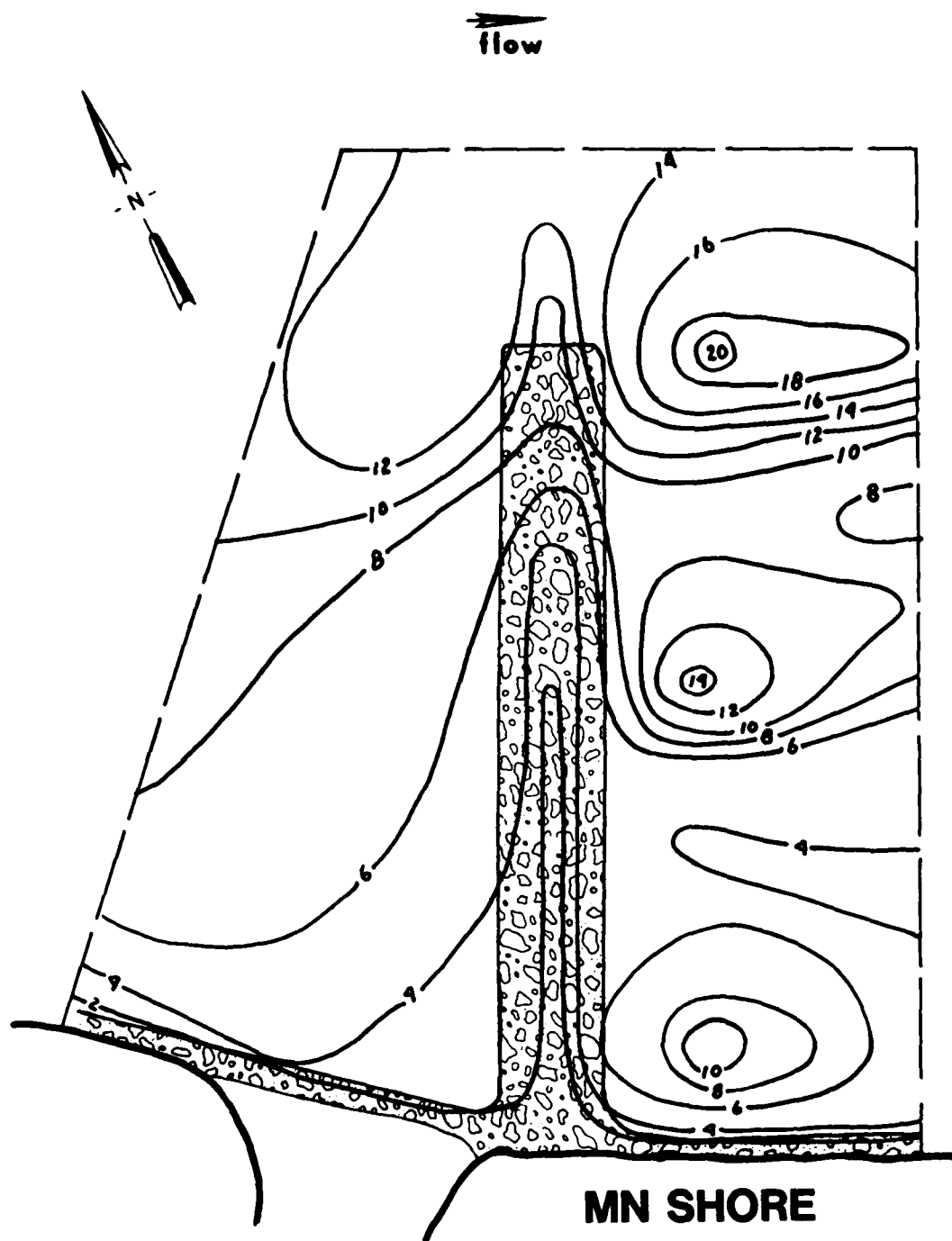


MN SHORE
M 4

LEGEND
 Emergent Rock 
 Submerged Rock 
 Sand/Silt 

1" = 50'

Figure D-10 General Bathymetric and Substrate Map of Wing Dam M4



M 5

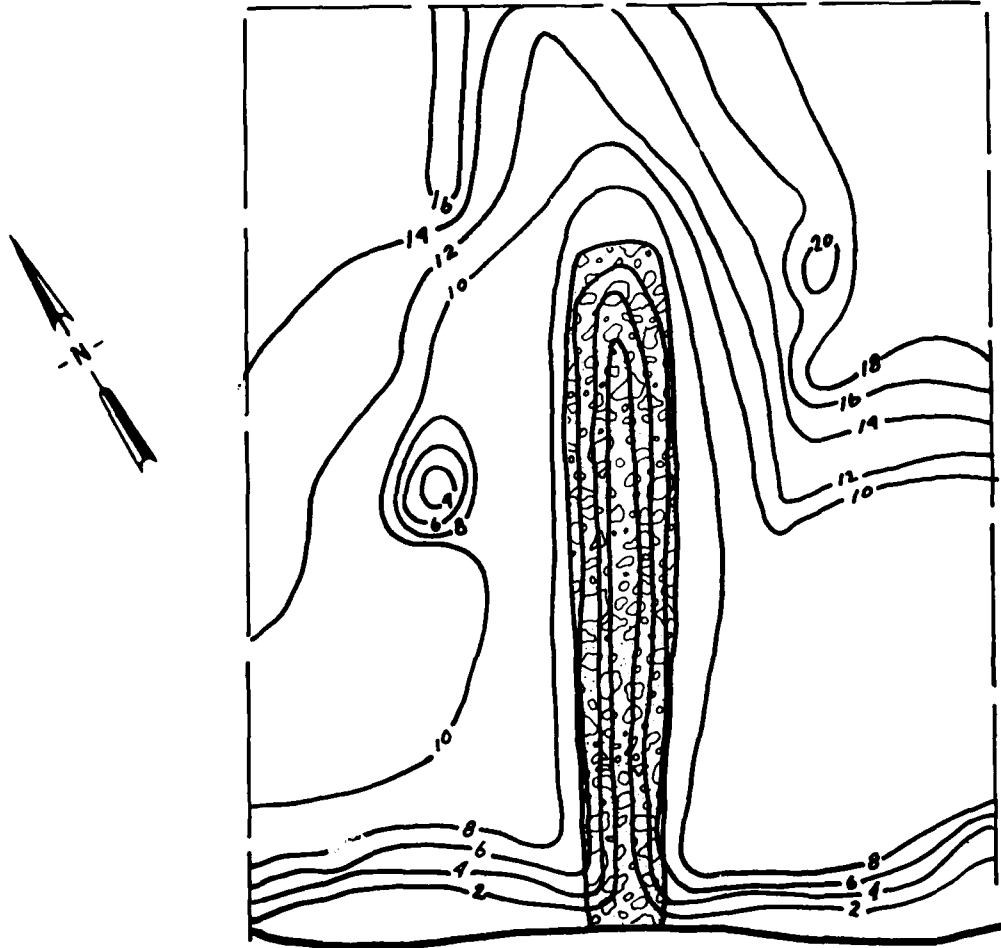
LEGEND

- Emergent Rock
- Submerged Rock
- Sand/Silt

1" = 50'

Figure D-11 General Bathymetric and Substrate Map of Wing Dam M5

flow



MN SHORE

M 6

LEGEND

1" = 50'

- Emergent Rock 
- Submerged Rock 
- Sand/Silt 

Figure D-12 General Bathymetric and Substrate Map of Wing Dam M6

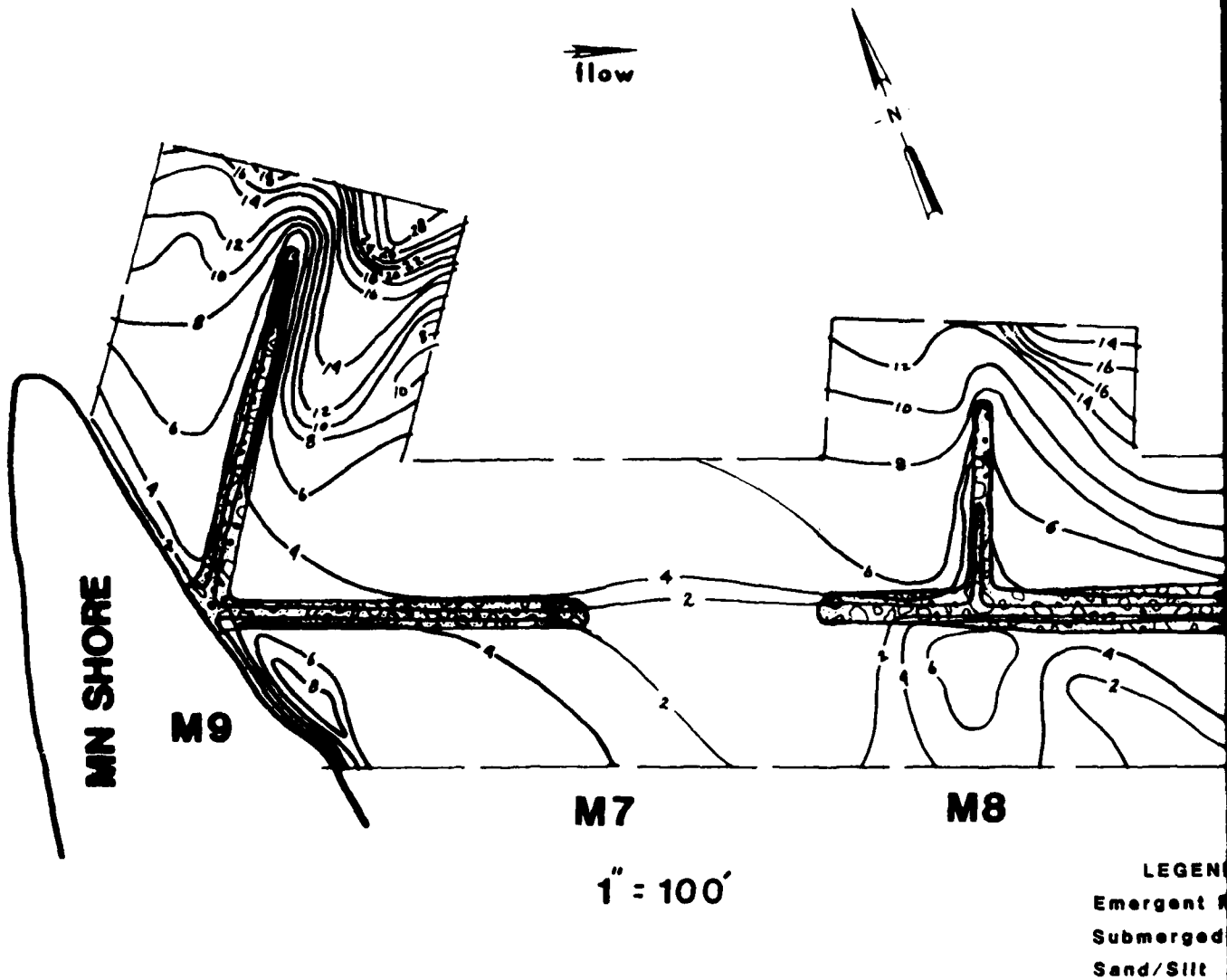
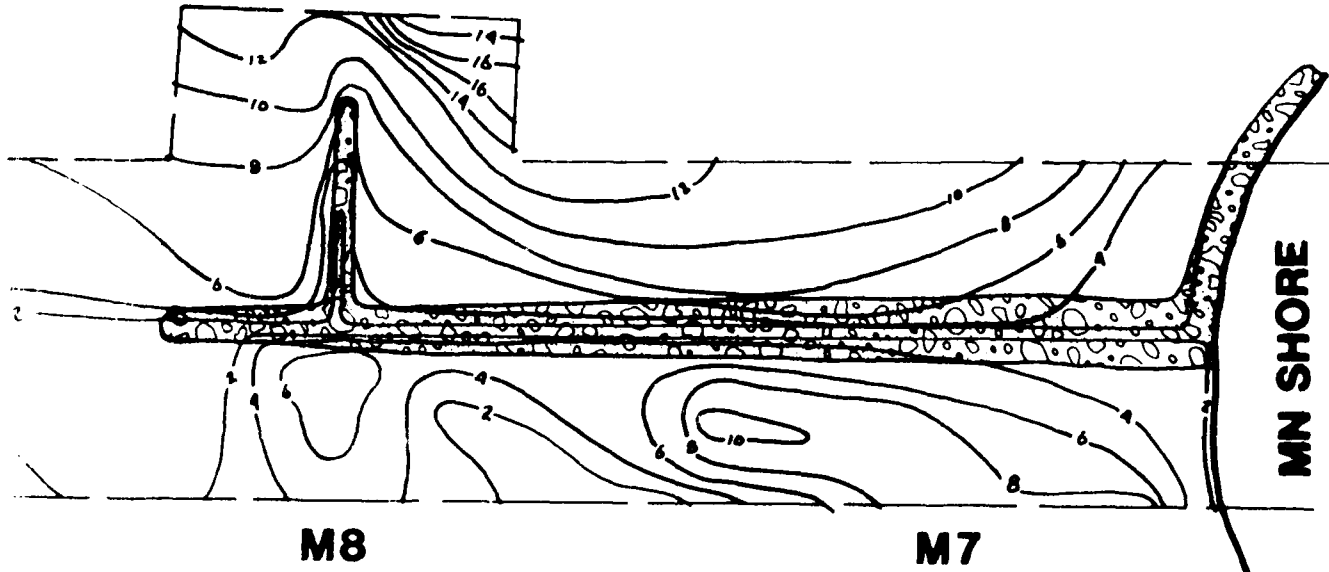


Figure D-13 General Bathymetric and Substrate Map of Closing Dam M7, Wing Dams M8 and M9

1212



20'

LEGEND

- Emergent Rock 
- Submerged Rock 
- Sand/Silt 

of Closing Dam M7, Wing Dams M8 and M9

46
200

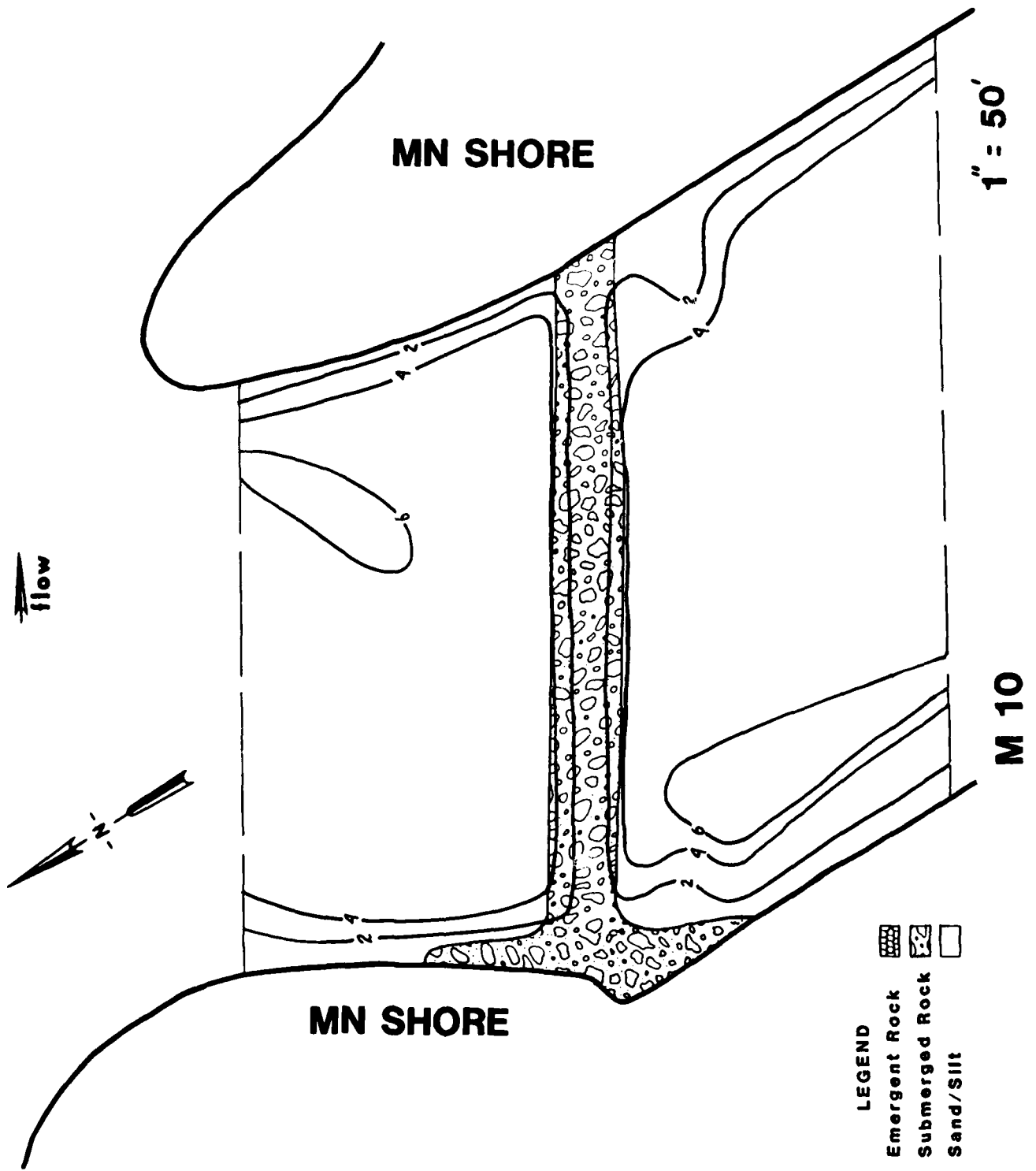
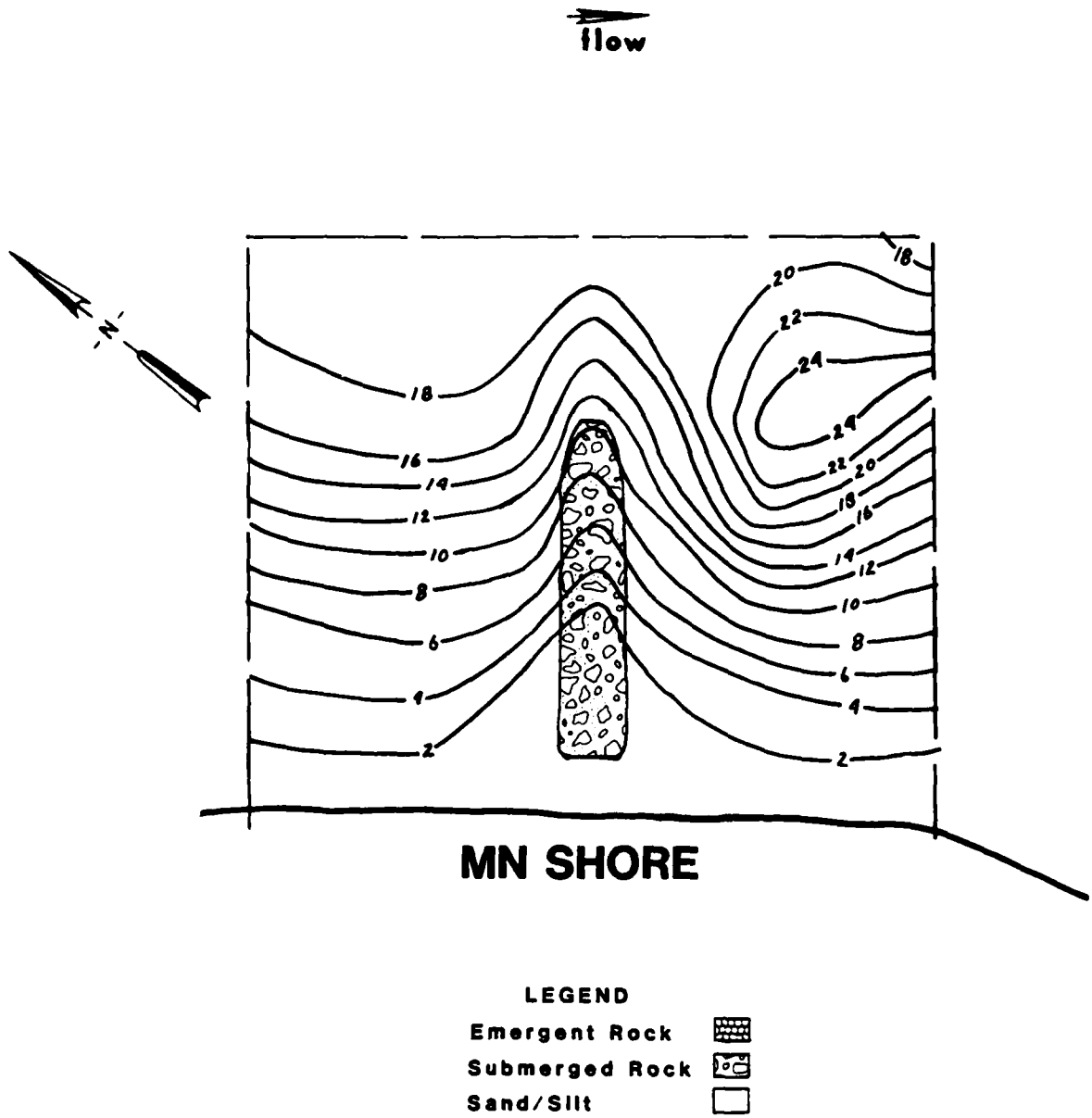


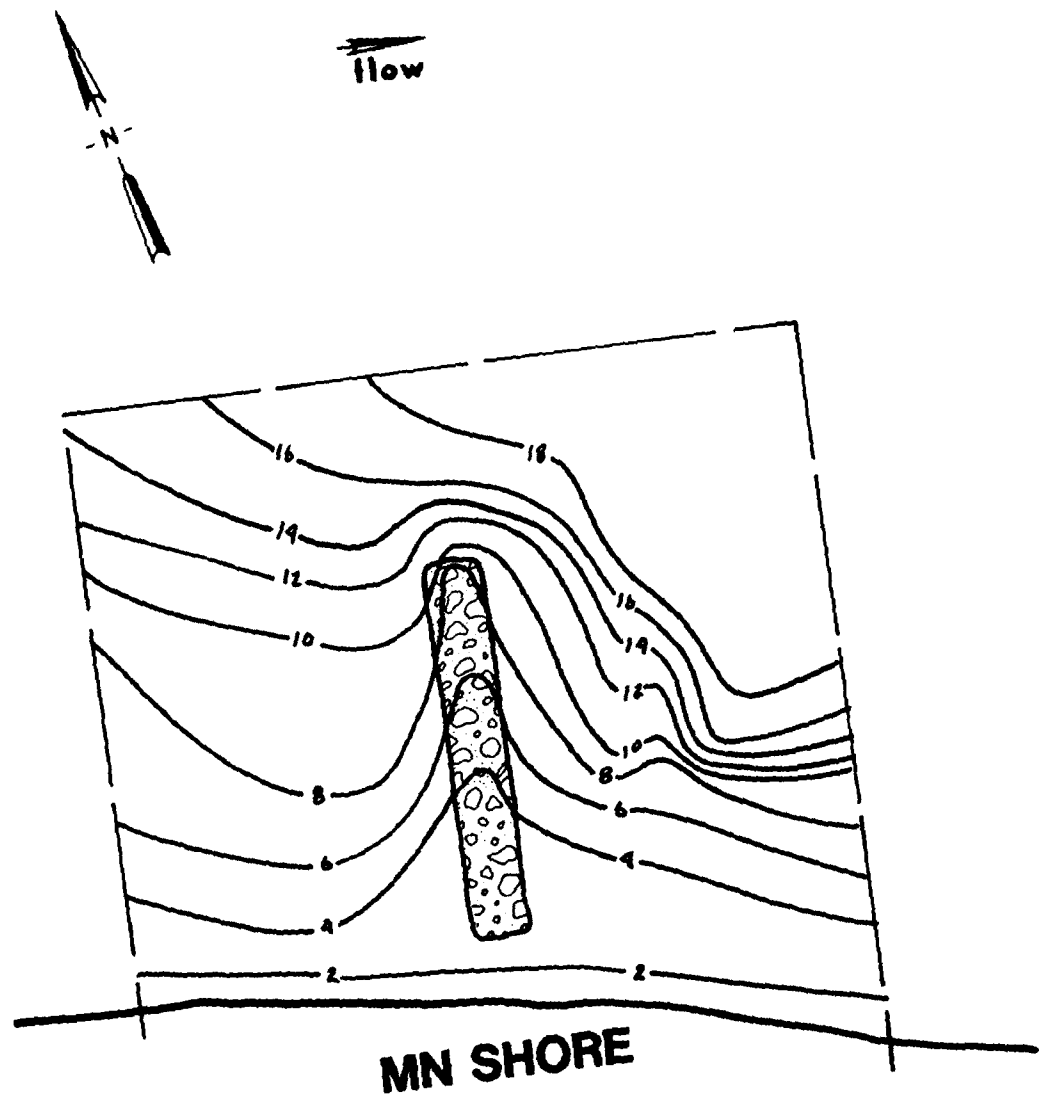
Figure D-14 General Bathymetric and Substrate Map of Closing Dam M10



M 11

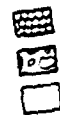
1" = 50'

Figure D-15 General Bathymetric and Substrate Map of Wing Dam M11



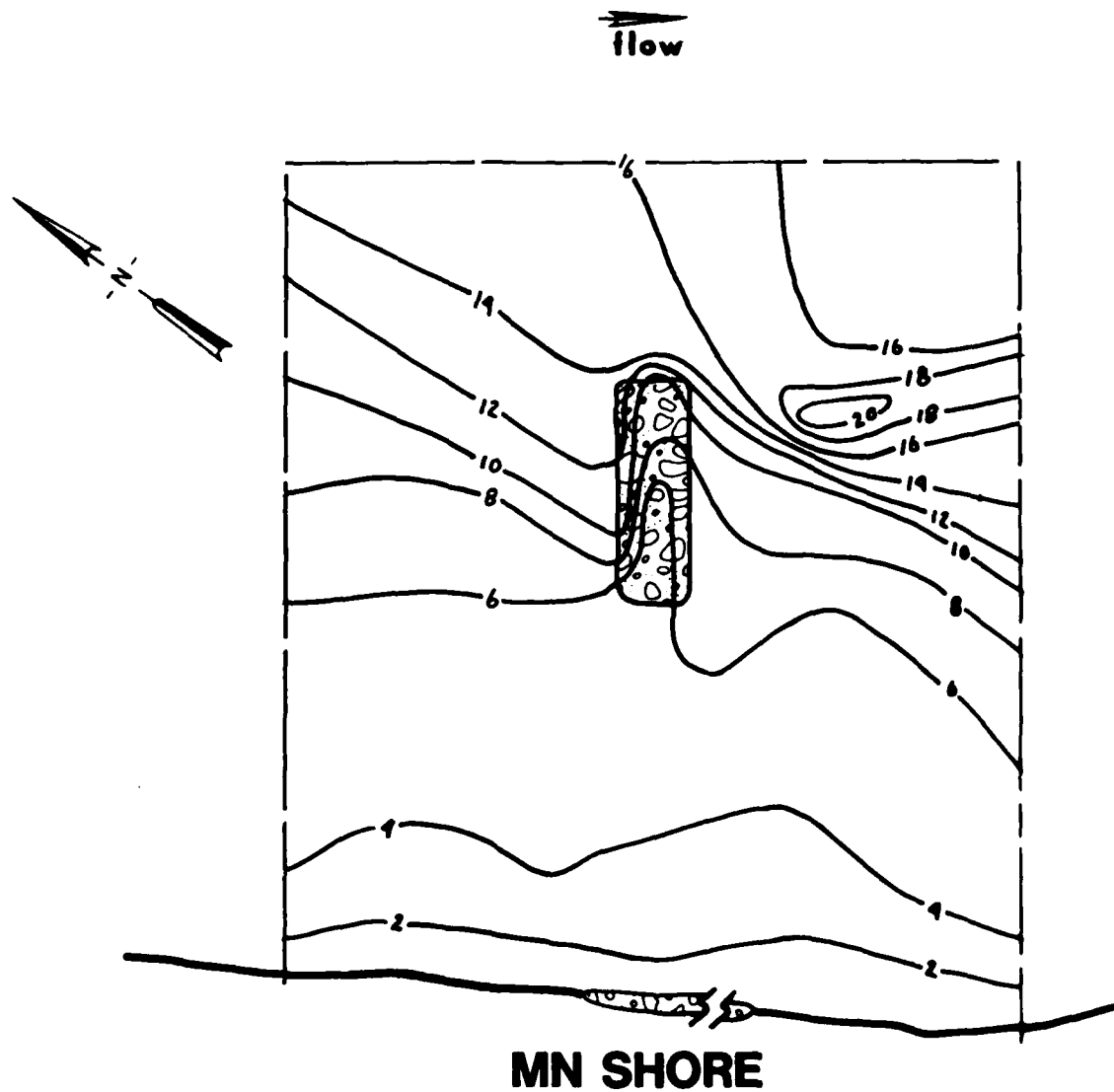
M 12

LEGEND
 Emergent Rock
 Submerged Rock
 Sand/Silt



1" = 50'

Figure D-16 General Bathymetric and Substrate Map of Wing Dam M12



MN SHORE

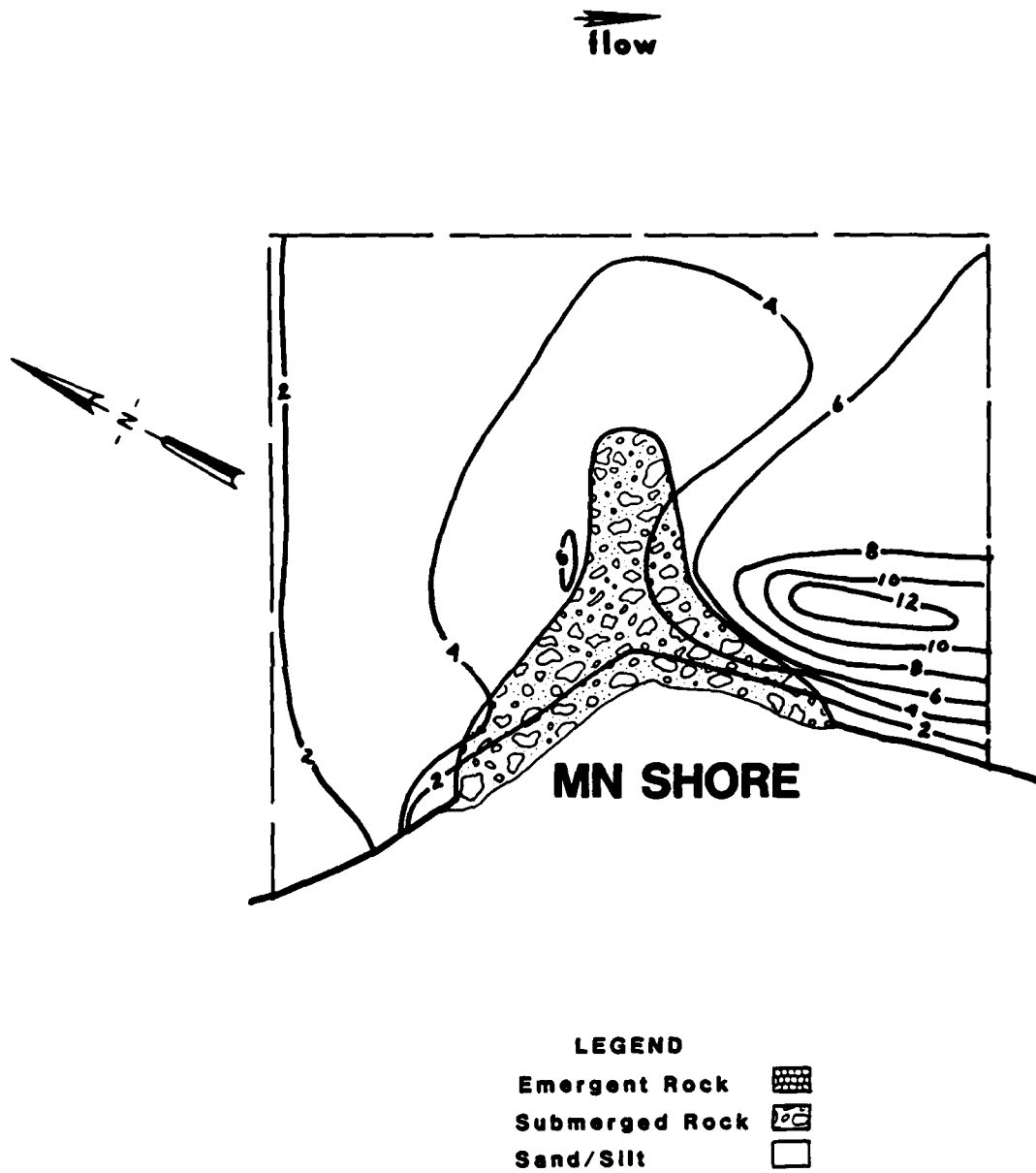
LEGEND

- Emergent Rock** 
- Submerged Rock** 
- Sand/Silt** 

M 13

1" = 50'

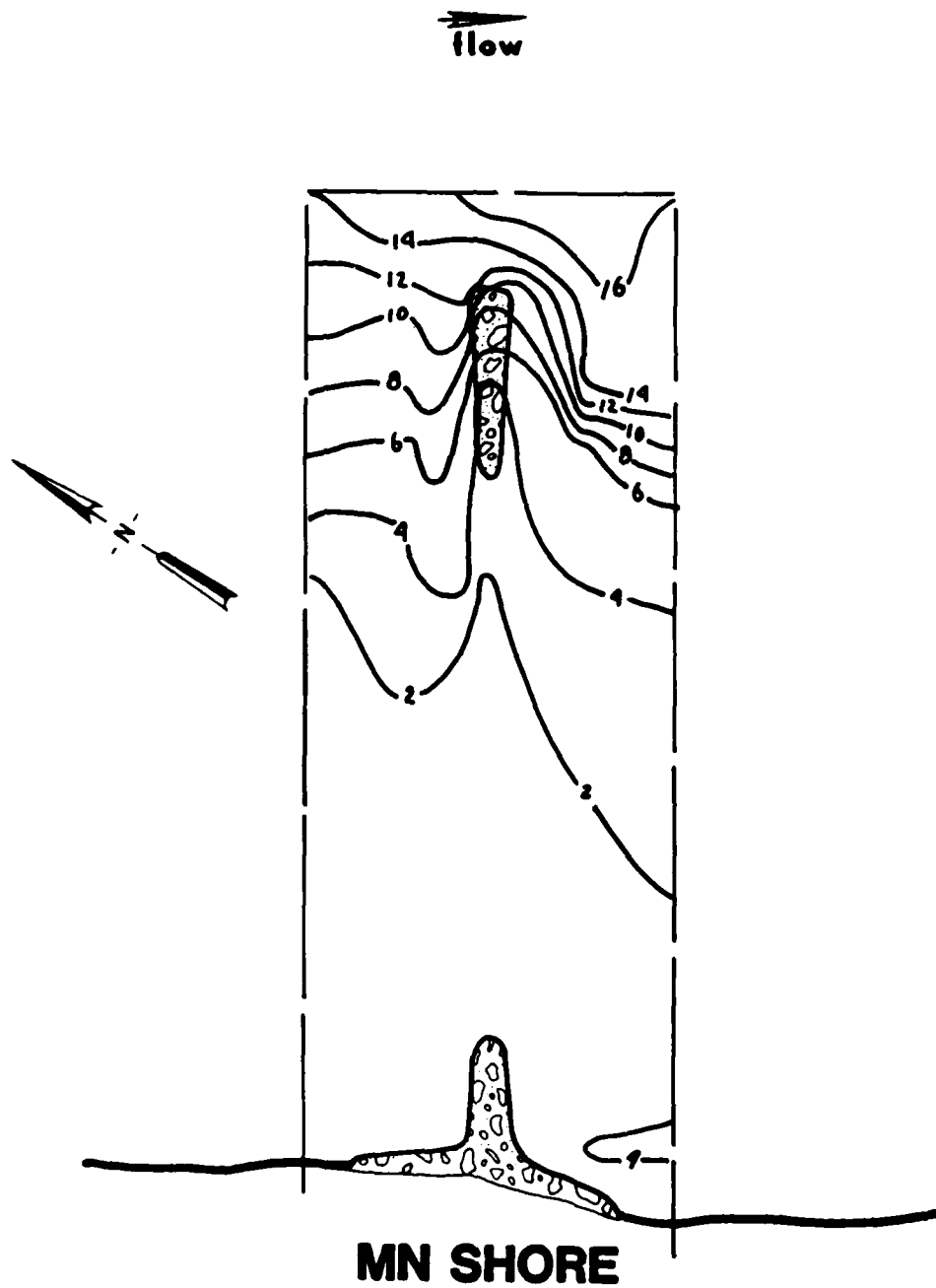
Figure D-17 General Bathymetric and Substrate Map of Wing Dam M13



M 14

1" = 50'

Figure D-18 General Bathymetric and Substrate Map of Wing Dam M14



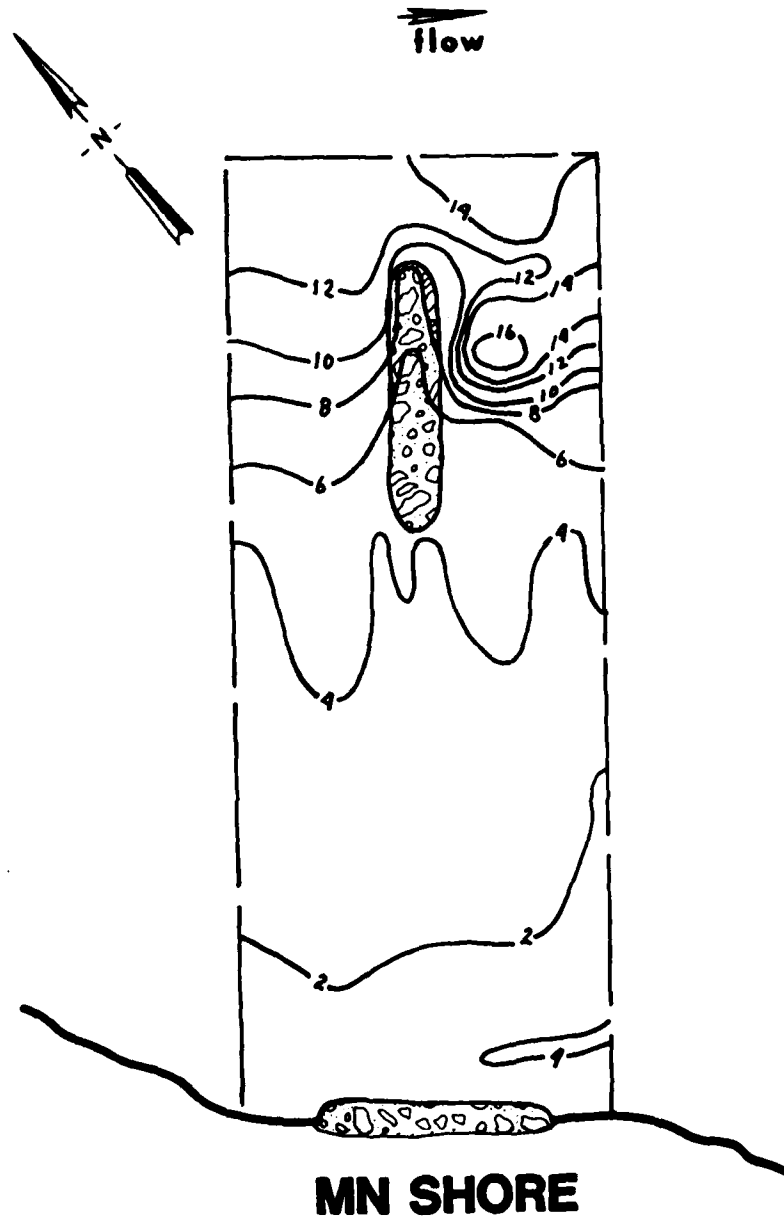
M 15

LEGEND

- Emergent Rock** 
- Submerged Rock** 
- Sand/Silt** 

1" = 100'

Figure D-19 General Bathymetric and Substrate Map of Wing Dam M15



M 16

LEGEND

- Emergent Rock** 
- Submerged Rock** 
- Sand/Silt** 

1" = 100'

Figure D-20 General Bathymetric and Substrate Map of Wing Dam M16

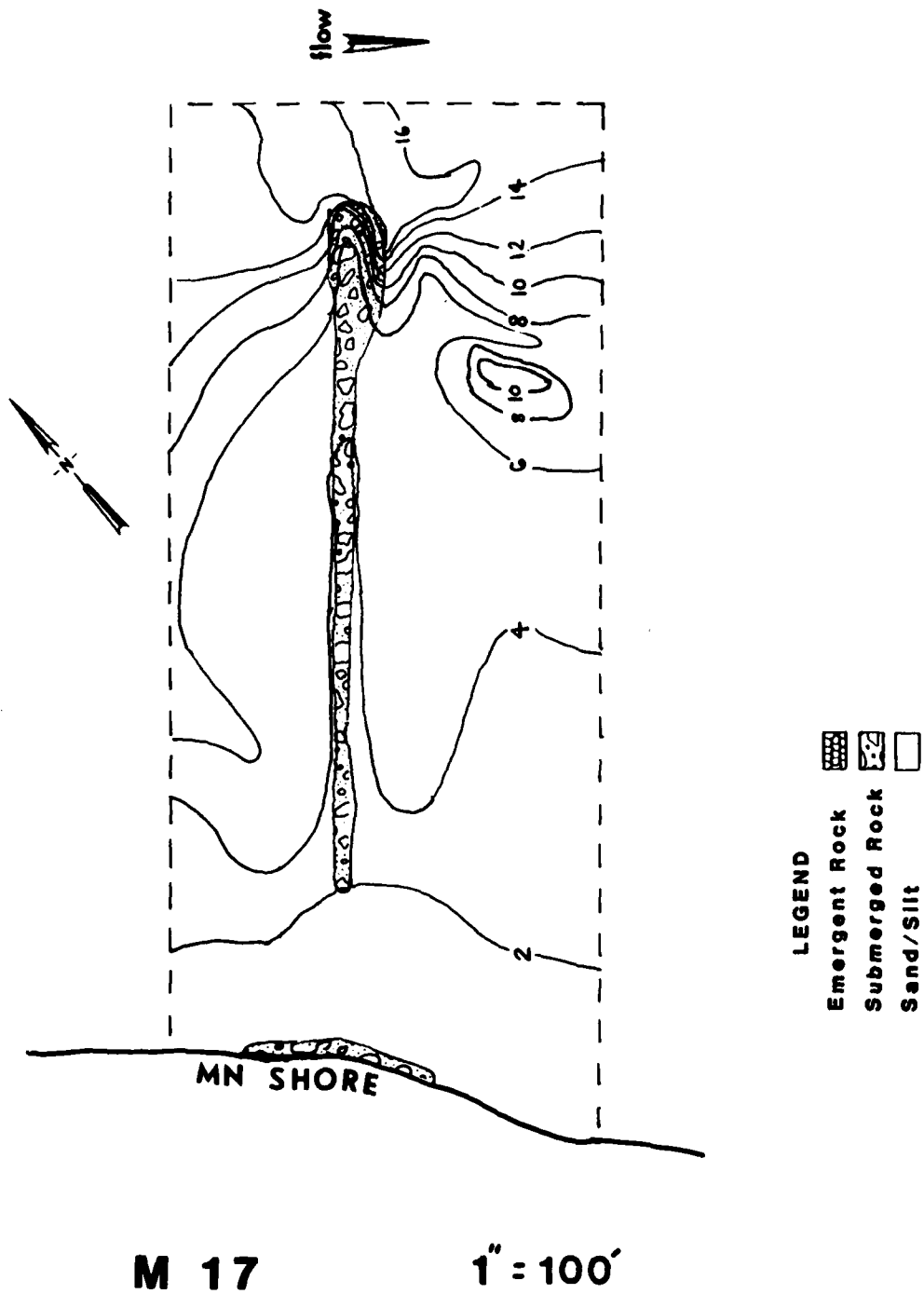


Figure D-21 General Bathymetric and Substrate Map of Wing Dam M17

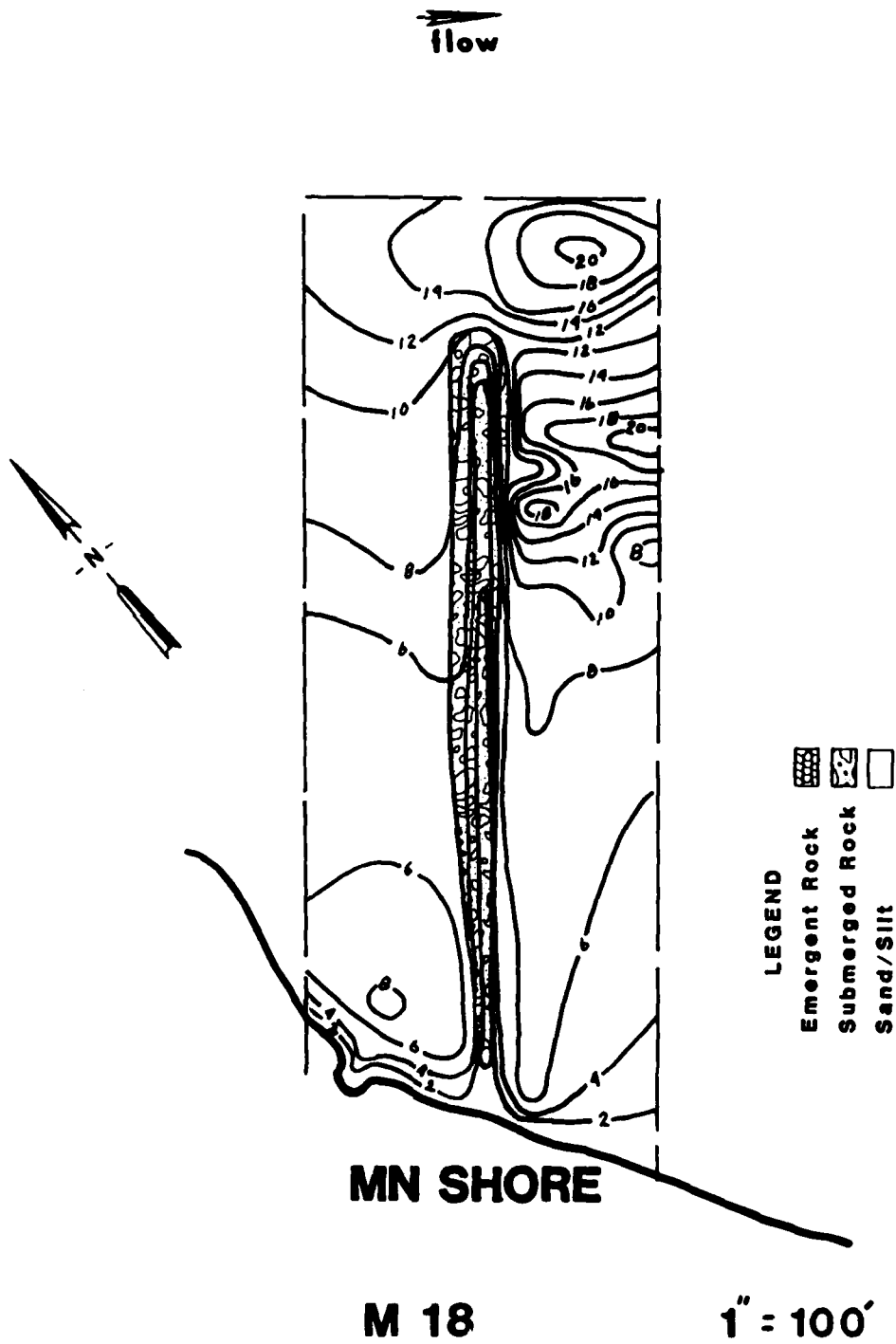


Figure D-22 General Bathymetric and Substrate Map of Wing Dam M18

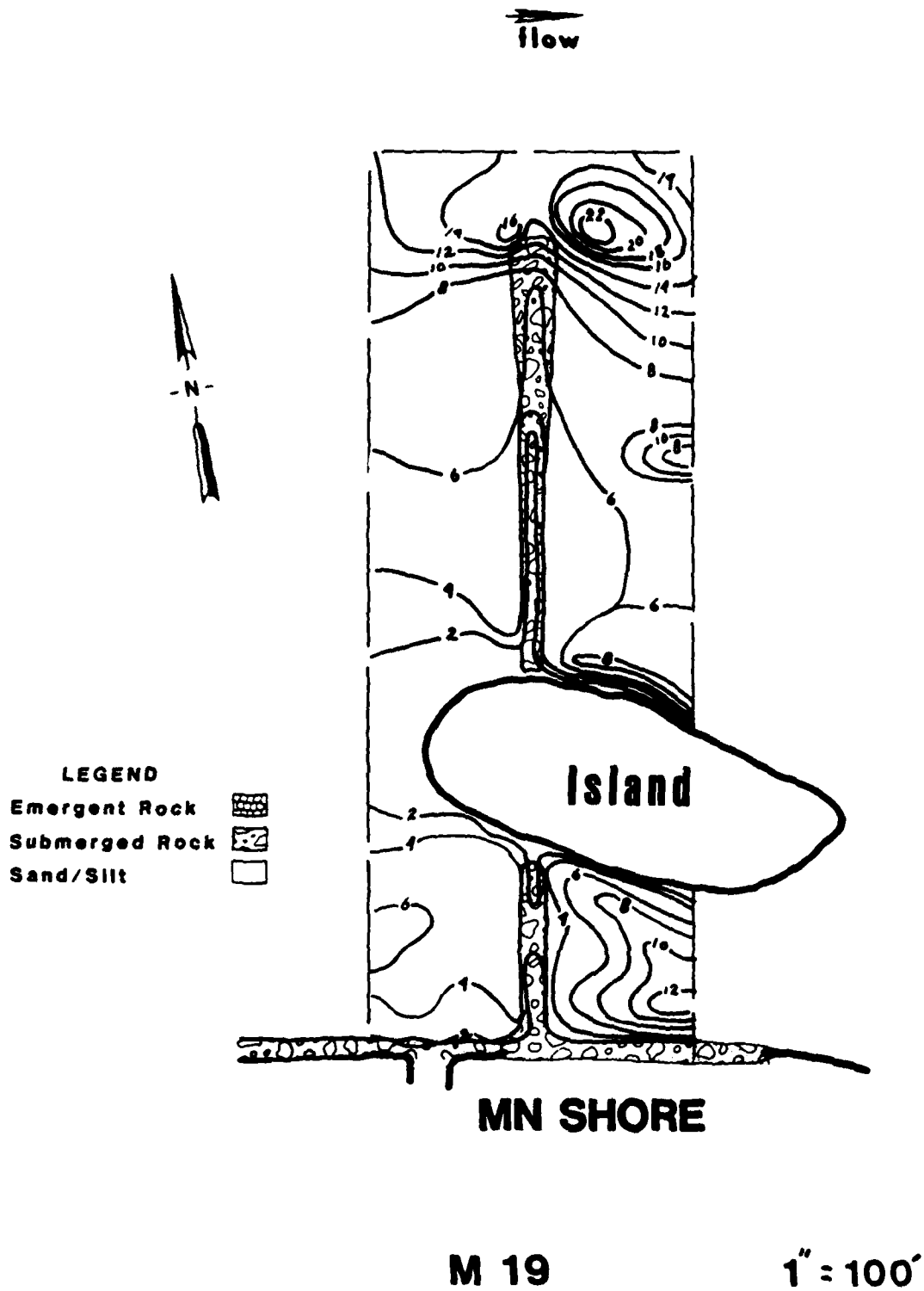


Figure D-23 General Bathymetric and Substrate Map of Wing Dam M19

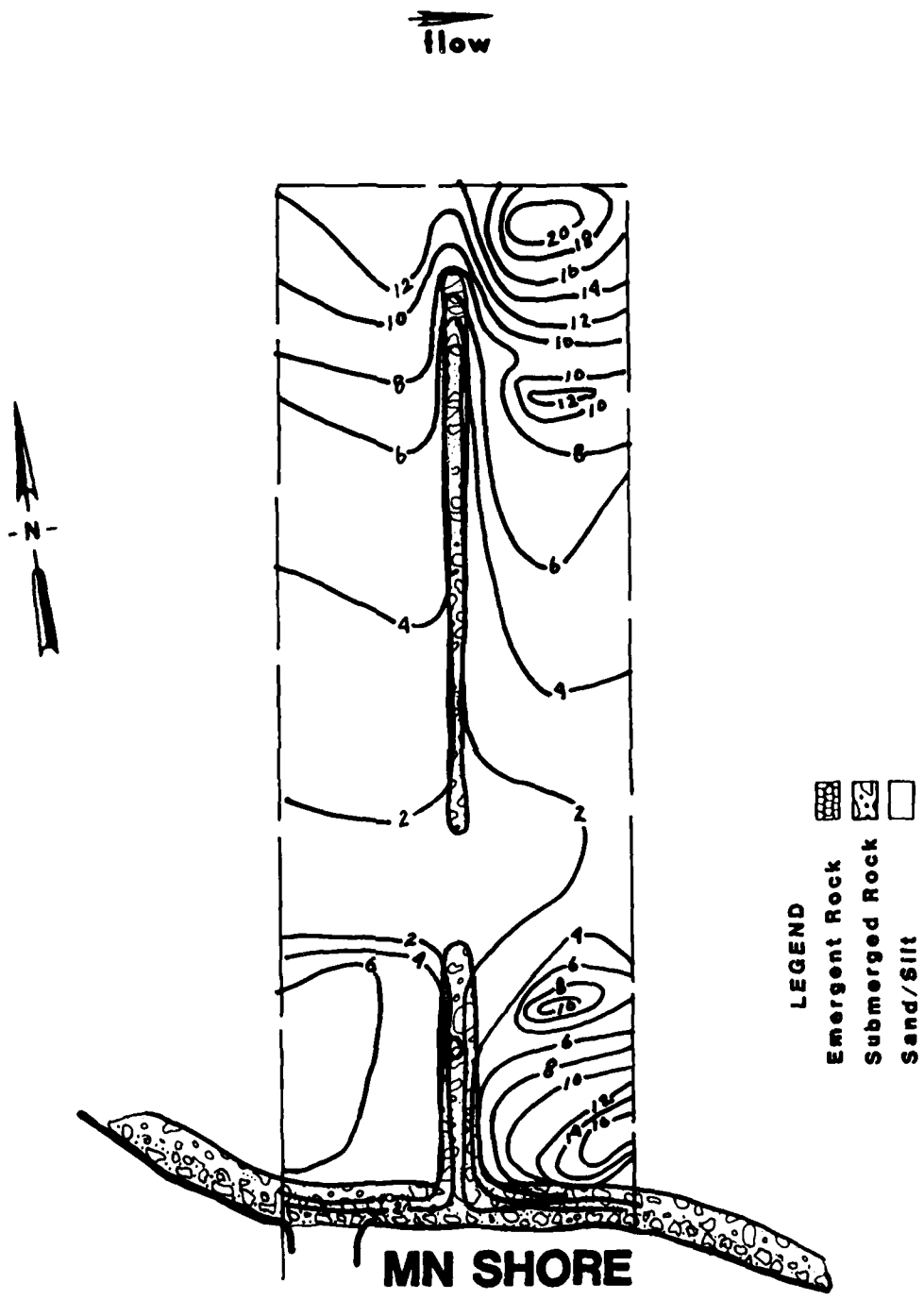
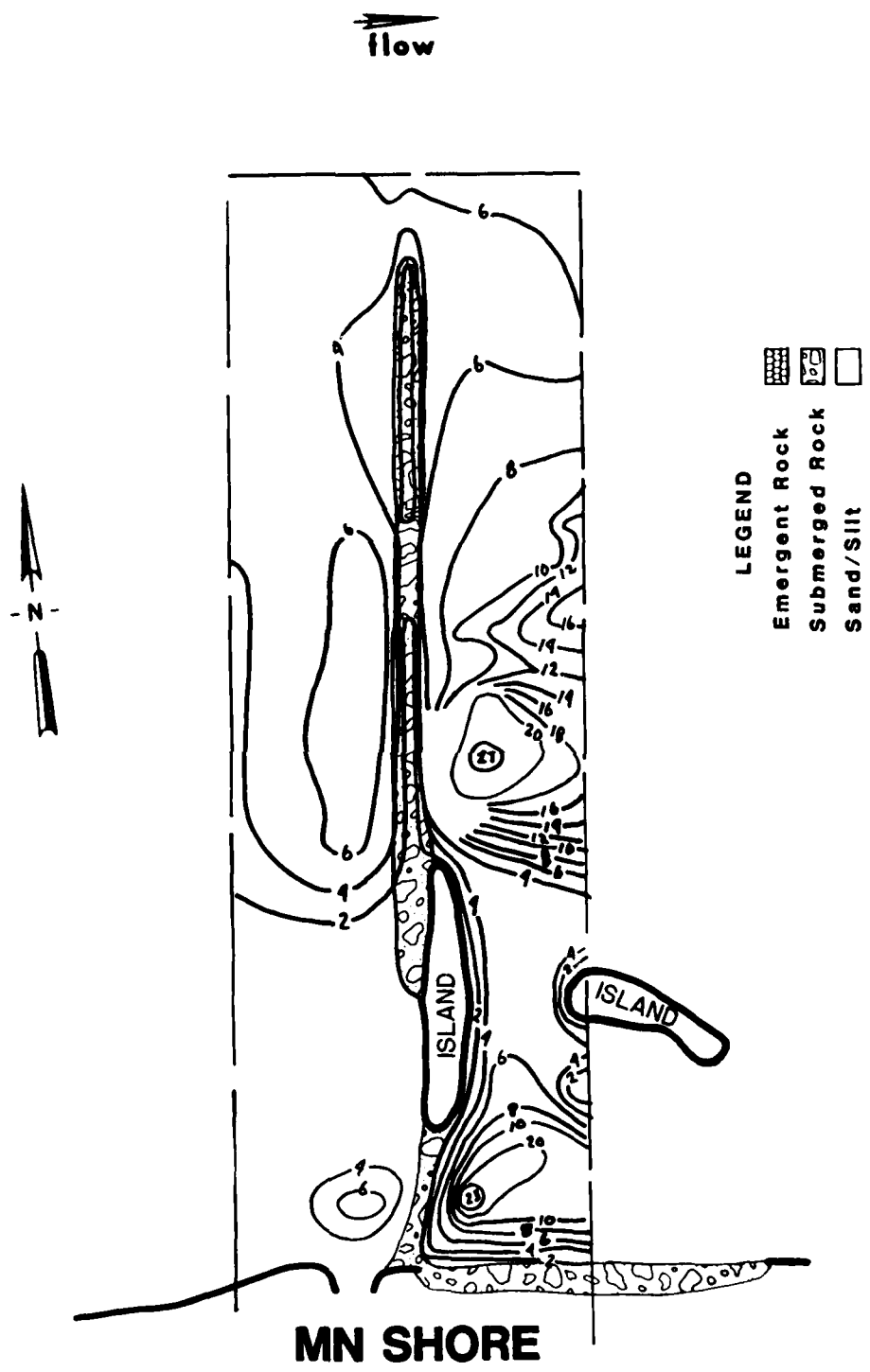


Figure D-24 General Bathymetric and Substrate Map of Wing Dam M20



M 21

1" = 100'

Figure D-25 General Bathymetric and Substrate Map of Wing Dam M21

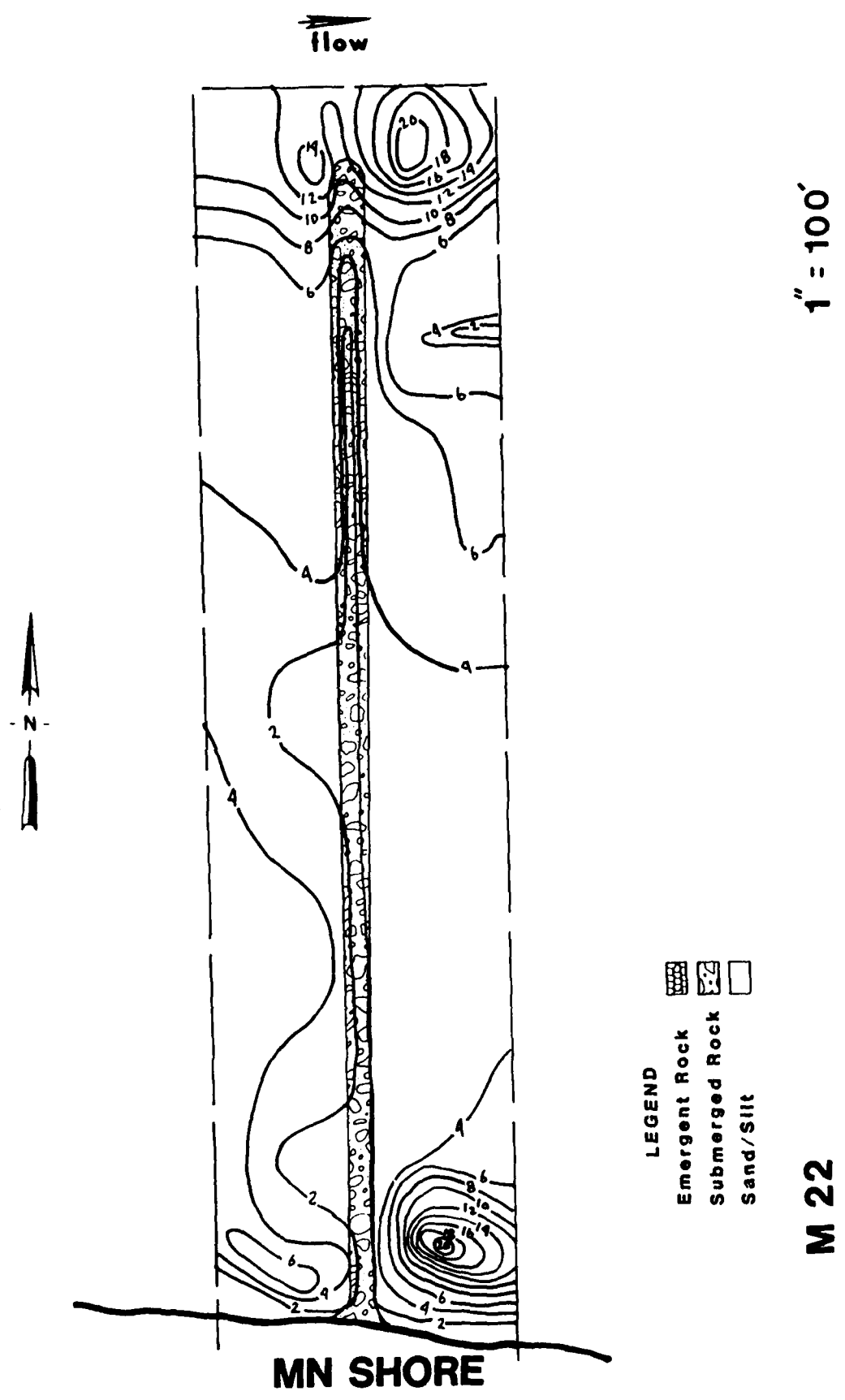


Figure D-26 General Bathymetric and Substrate Map of Wing Dam M22

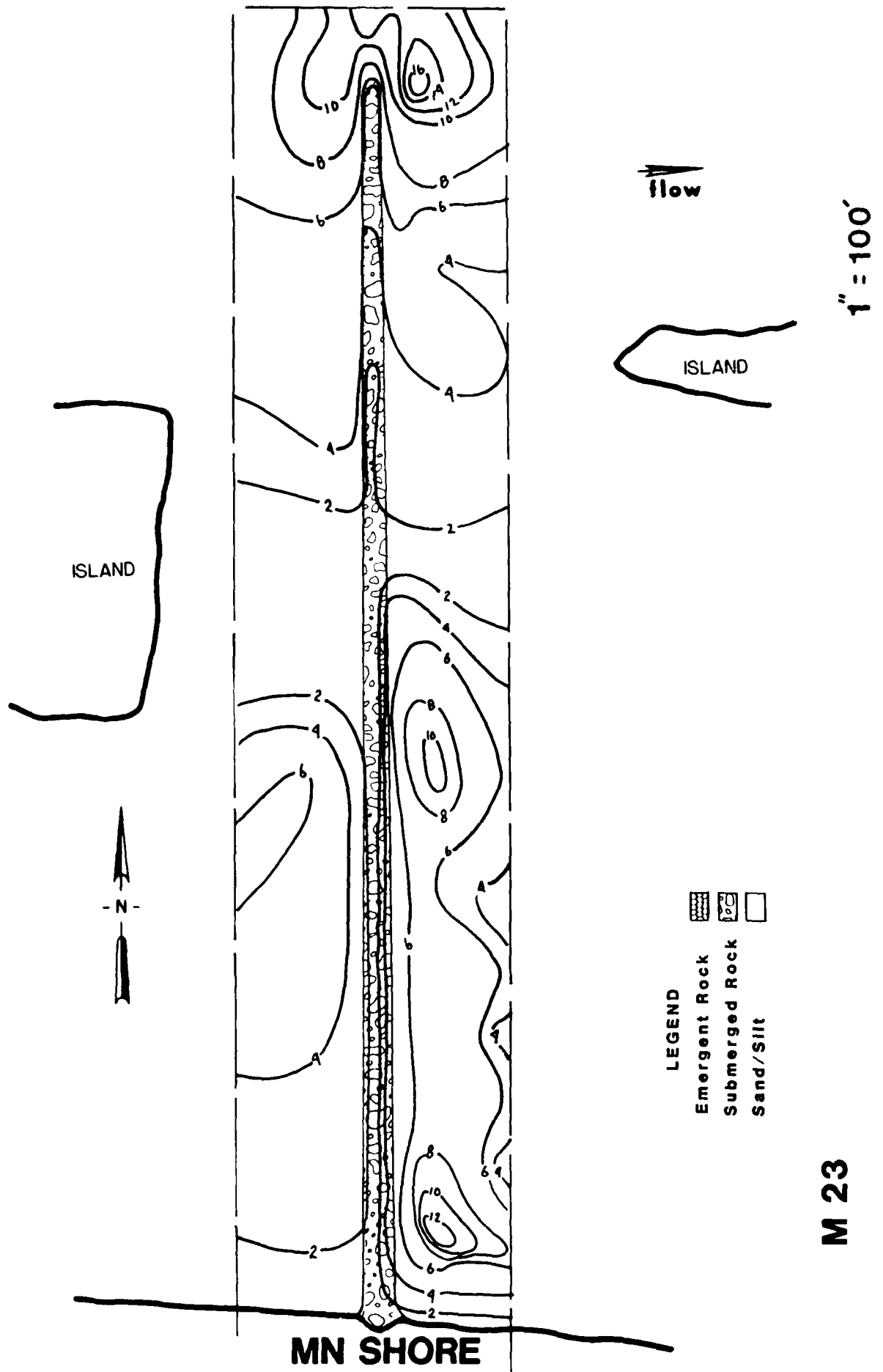
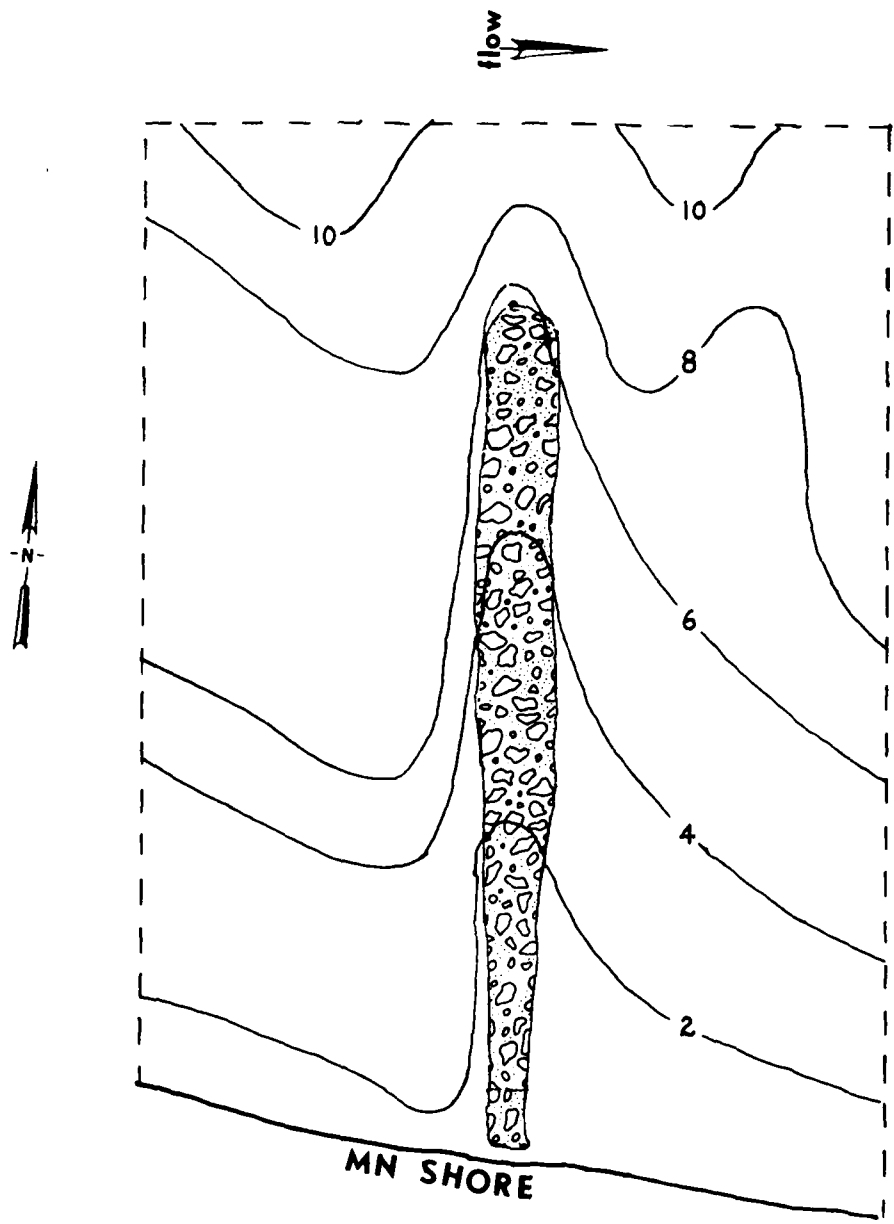


Figure D-27 General Bathymetric and Substrate Map of Wing Dam M23



M 24A

1" = 50'




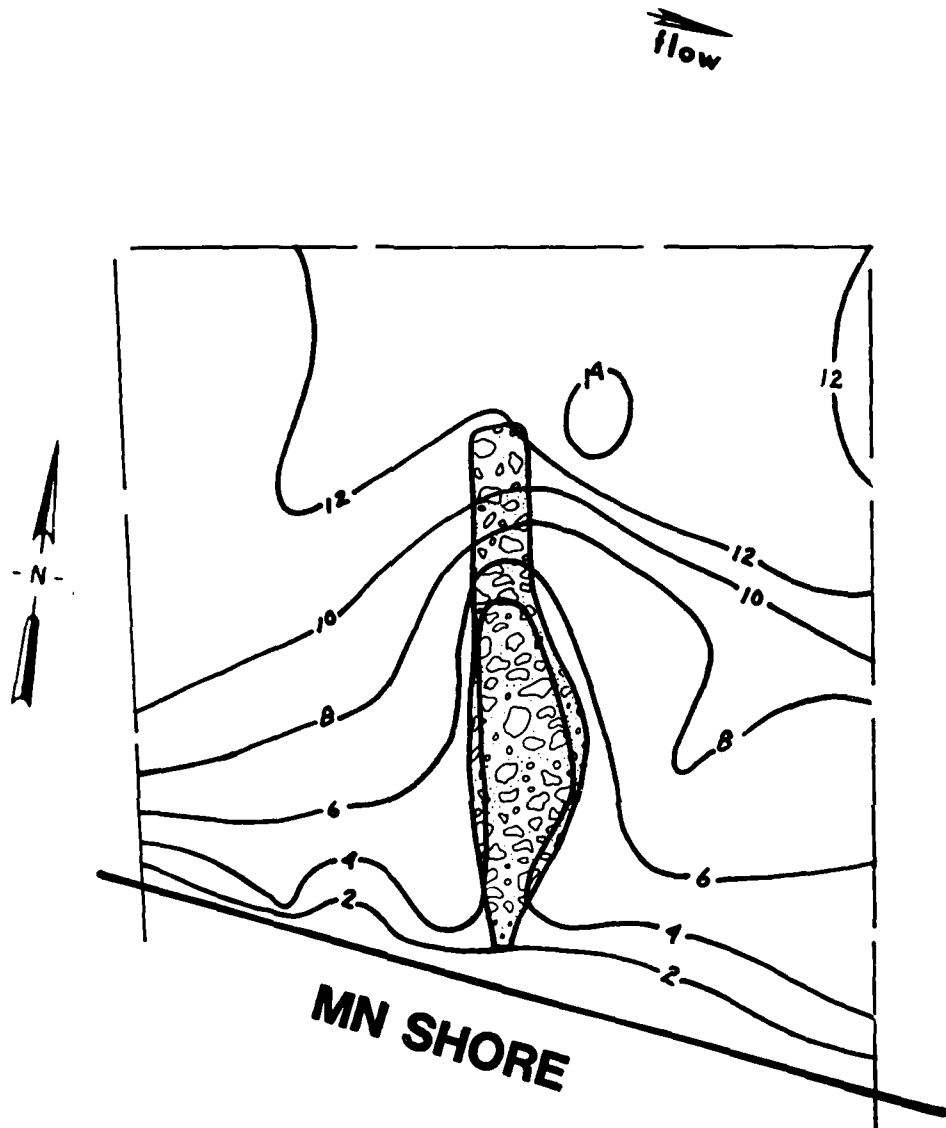
- LEGEND**
- Emergent Rock 
 - Submerged Rock 
 - Sand/Silt 

Figure D-28 General Bathymetric and Substrate Map of Wing Dam M24A



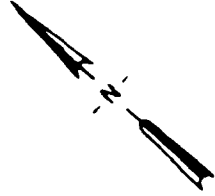
M 24B

LEGEND

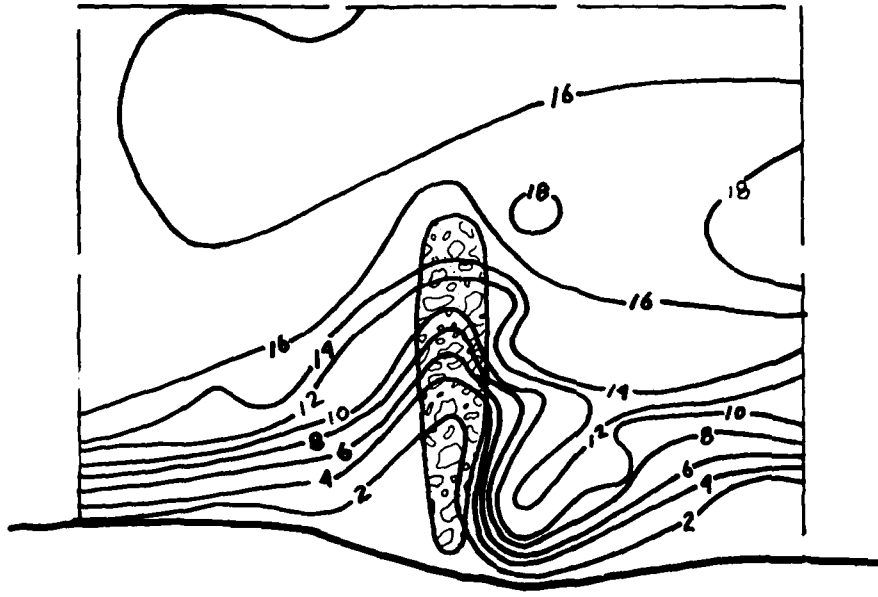
- Emergent Rock** 
- Submerged Rock** 
- Sand/Silt** 

1" = 50'

Figure D-29 General Bathymetric and Substrate Map of Wing Dam M24B



flow



MN SHORE

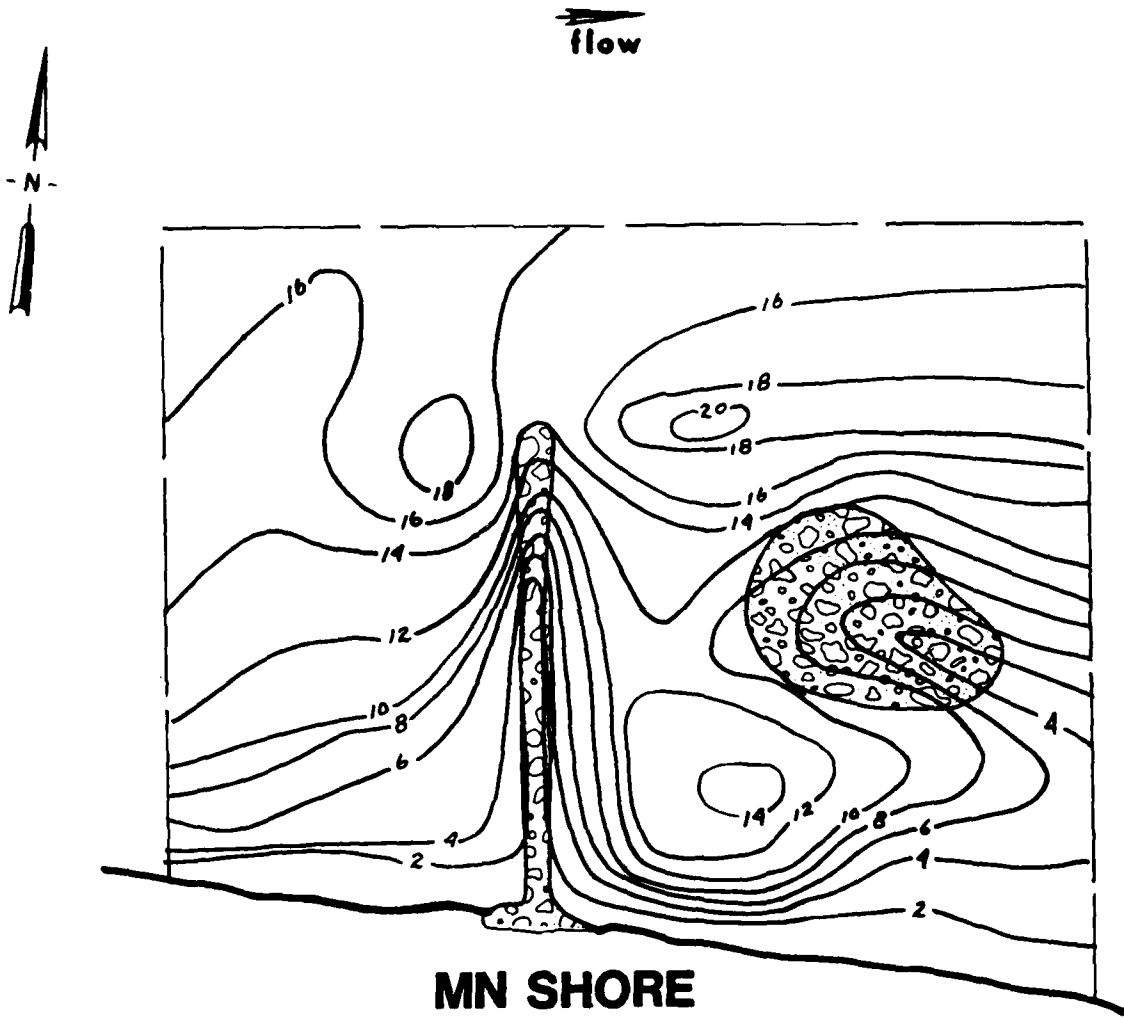
M 24C




LEGEND

- Emergent Rock 
- Submerged Rock 
- Sand/Silt 

1" = 50'

Figure D-30 General Bathymetric and Substrate Map of Wing Dam M24C

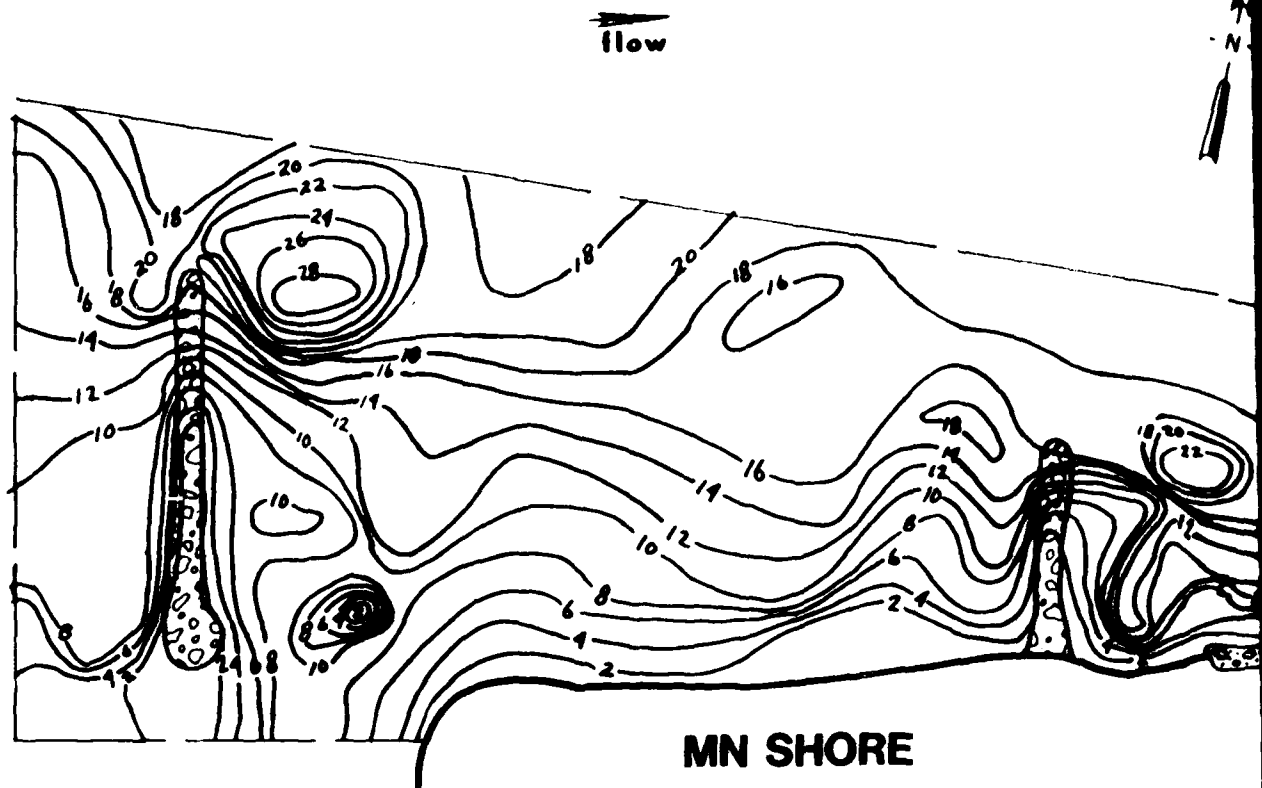


LEGEND
 Emergent Rock 
 Submerged Rock 
 Sand/Silt 

M 25

1" = 50'

Figure D-31 General Bathymetric and Substrate Map of Wing Dam M25



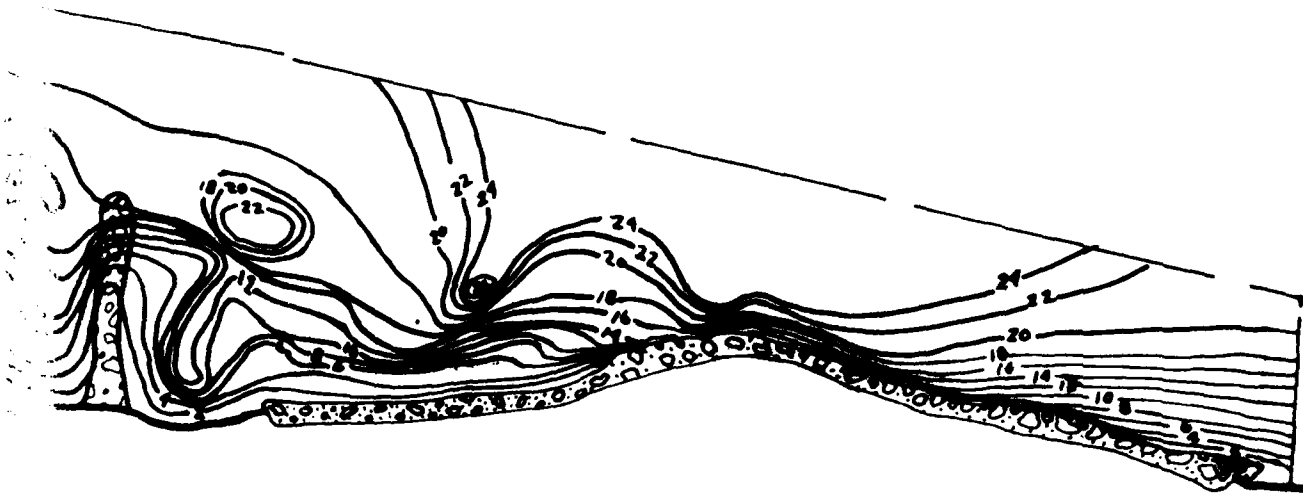
M 28

1" = 100'




M 27

Figure D-32 General Bathymetric and Substrate Map of Riprap M26, Wing Dam M27 and M28

16/2



M 27

LEGEND
Emergent Rock 
Submerged Rock 
Sand/Silt 

M 26

g Dam M27 and M28

65
20/2

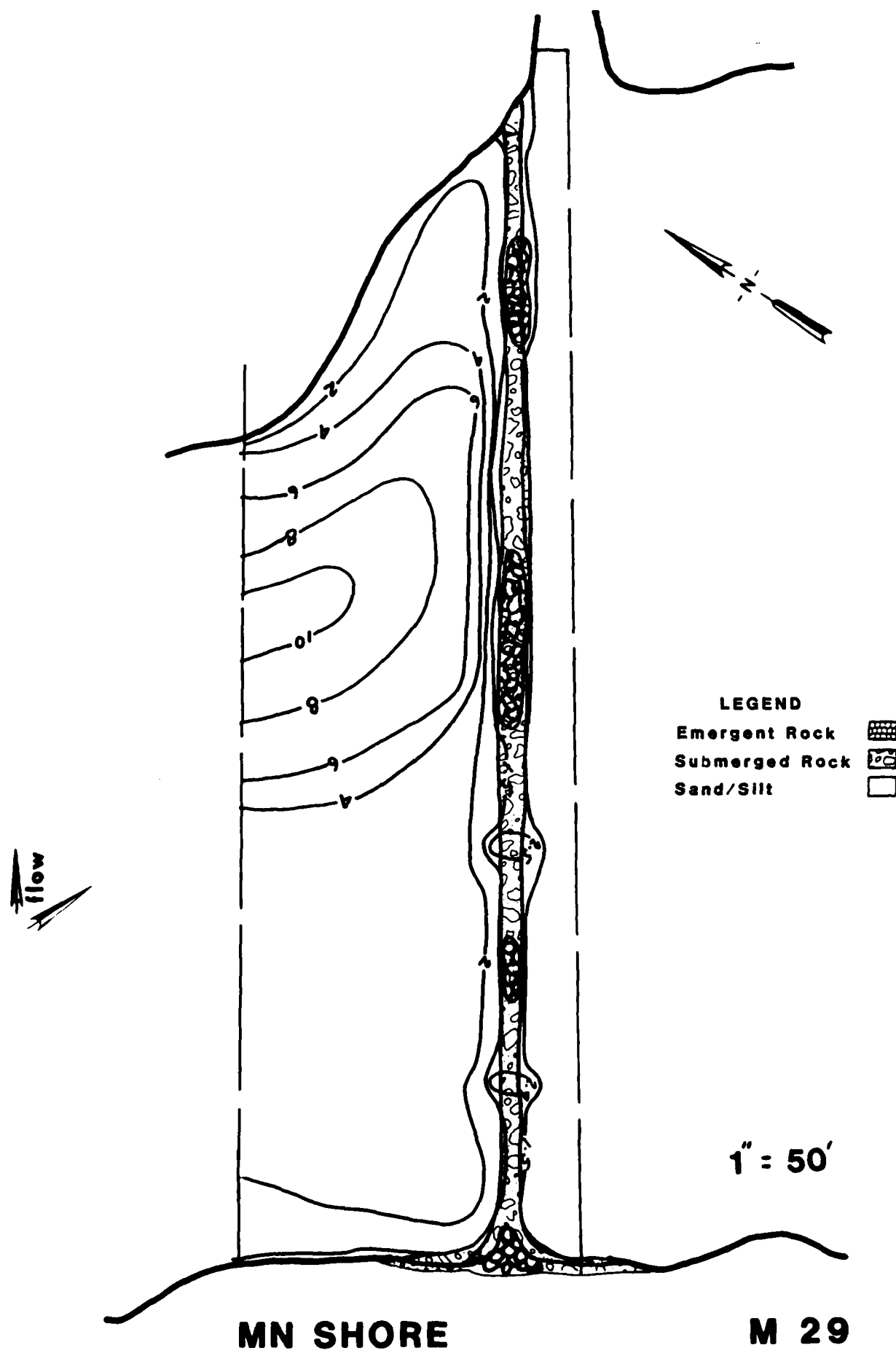
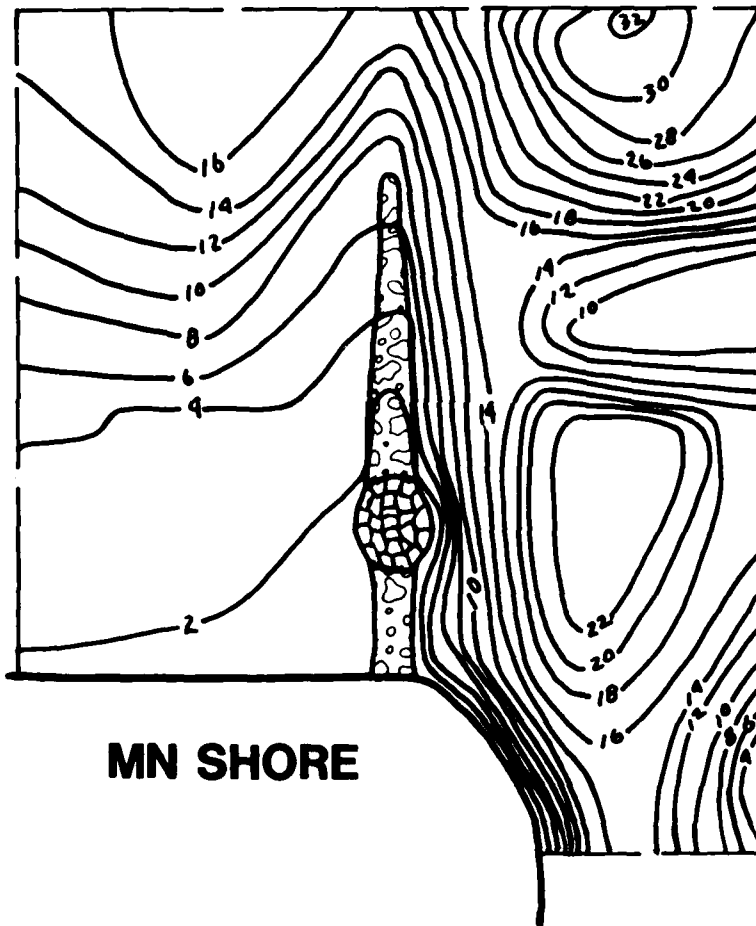


Figure D-33 General Bathymetric and Substrate Map of Closing Dam M29



flow



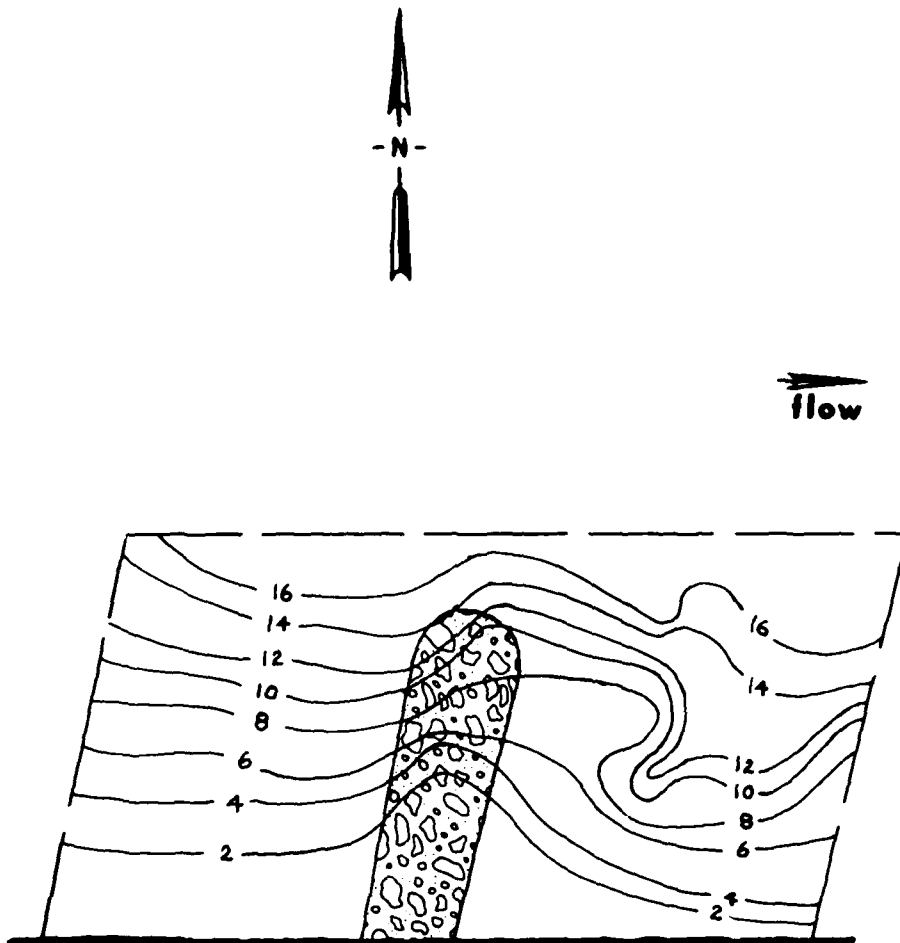
M 30

LEGEND

- Emergent Rock** 
- Submerged Rock** 
- Sand/Silt** 

1" = 50'

Figure D-34 General Bathymetric and Substrate Map of Wing Dam M30



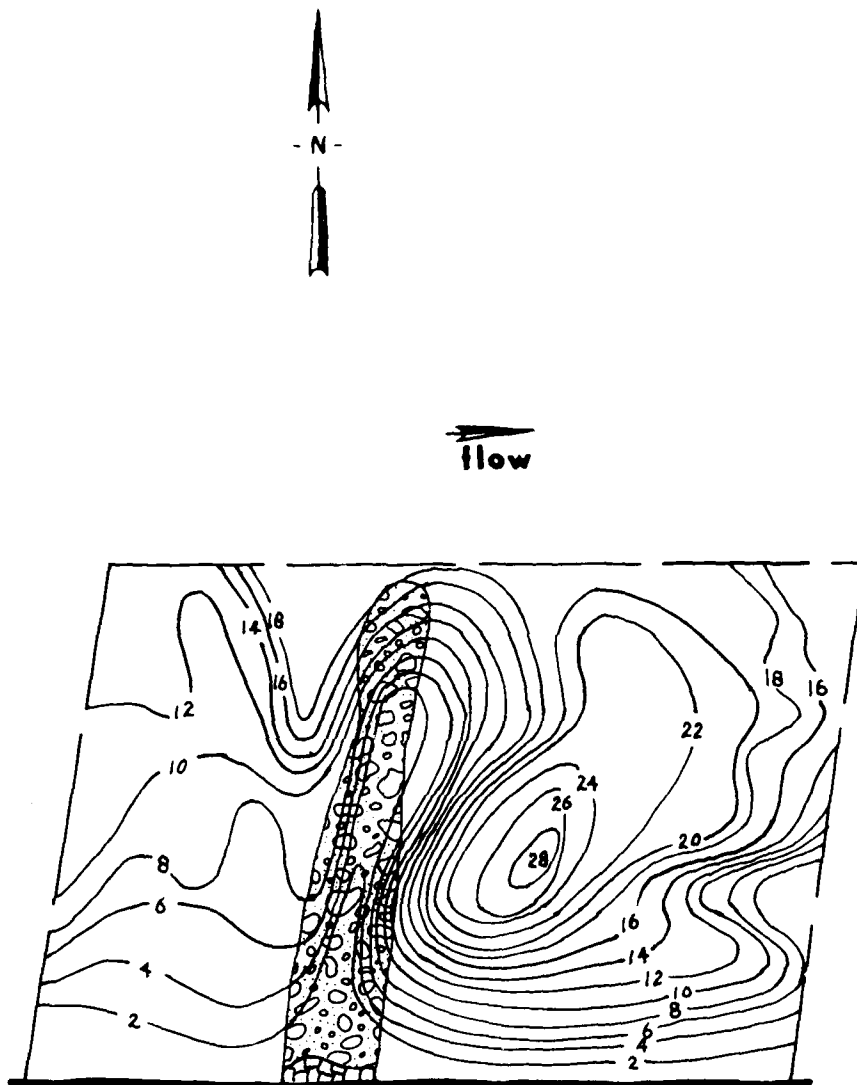
M 31

1" = 50'

LEGEND

- Emergent Rock** 
- Submerged Rock** 
- Sand/Silt** 

Figure D-35 General Bathymetric and Substrate Map of Wing Dam M31



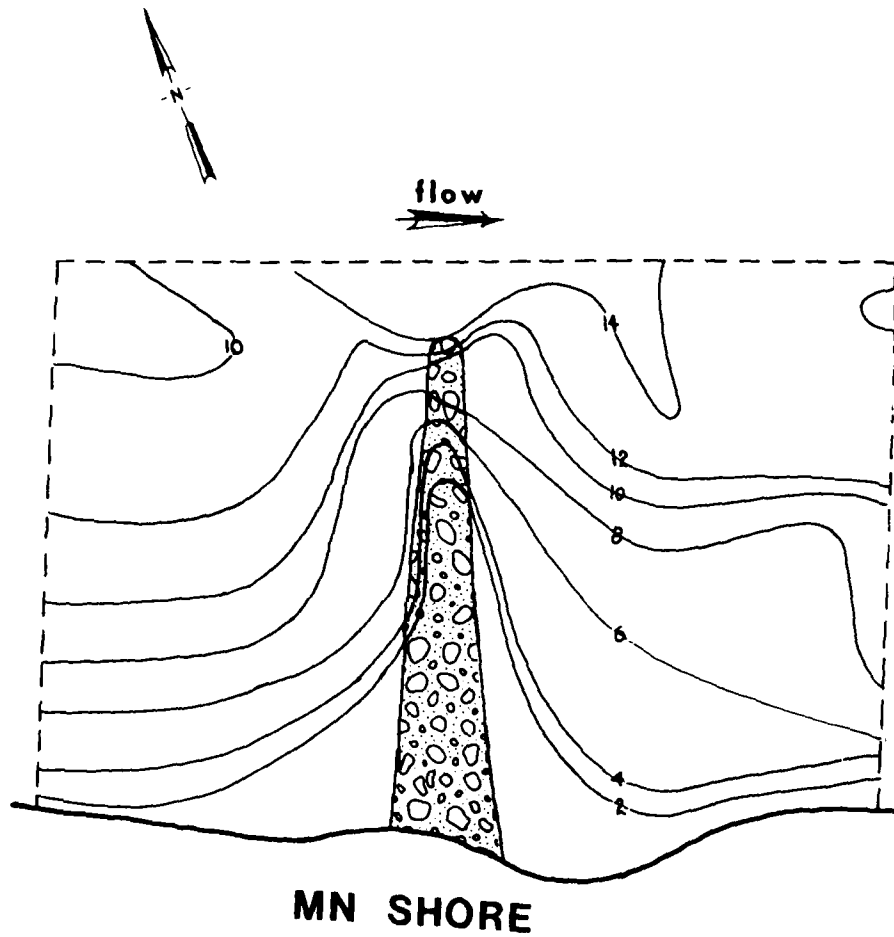
M 32

LEGEND

1" = 50'

- Emergent Rock** 
- Submerged Rock** 
- Sand/Silt** 

Figure D-36 General Bathymetric and Substrate Map of Wing Dam M32



M 33

1" = 50'




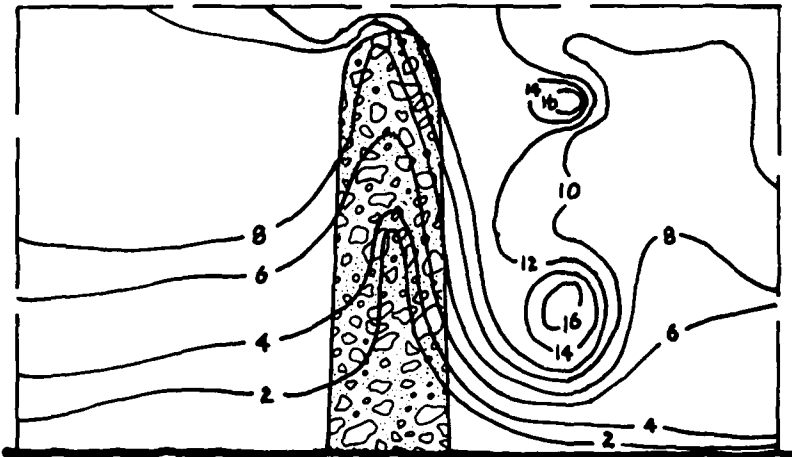


- LEGEND**
- Emergent Rock 
 - Submerged Rock 
 - Sand/Silt 

Figure D-37 General Bathymetric and Substrate Map of Wing Dam M33



M 34

- LEGEND**
- Emergent Rock** 
 - Submerged Rock** 
 - Sand/Silt** 

1" = 50'

Figure D-38 General Bathymetric and Substrate Map of Wing Dam M34

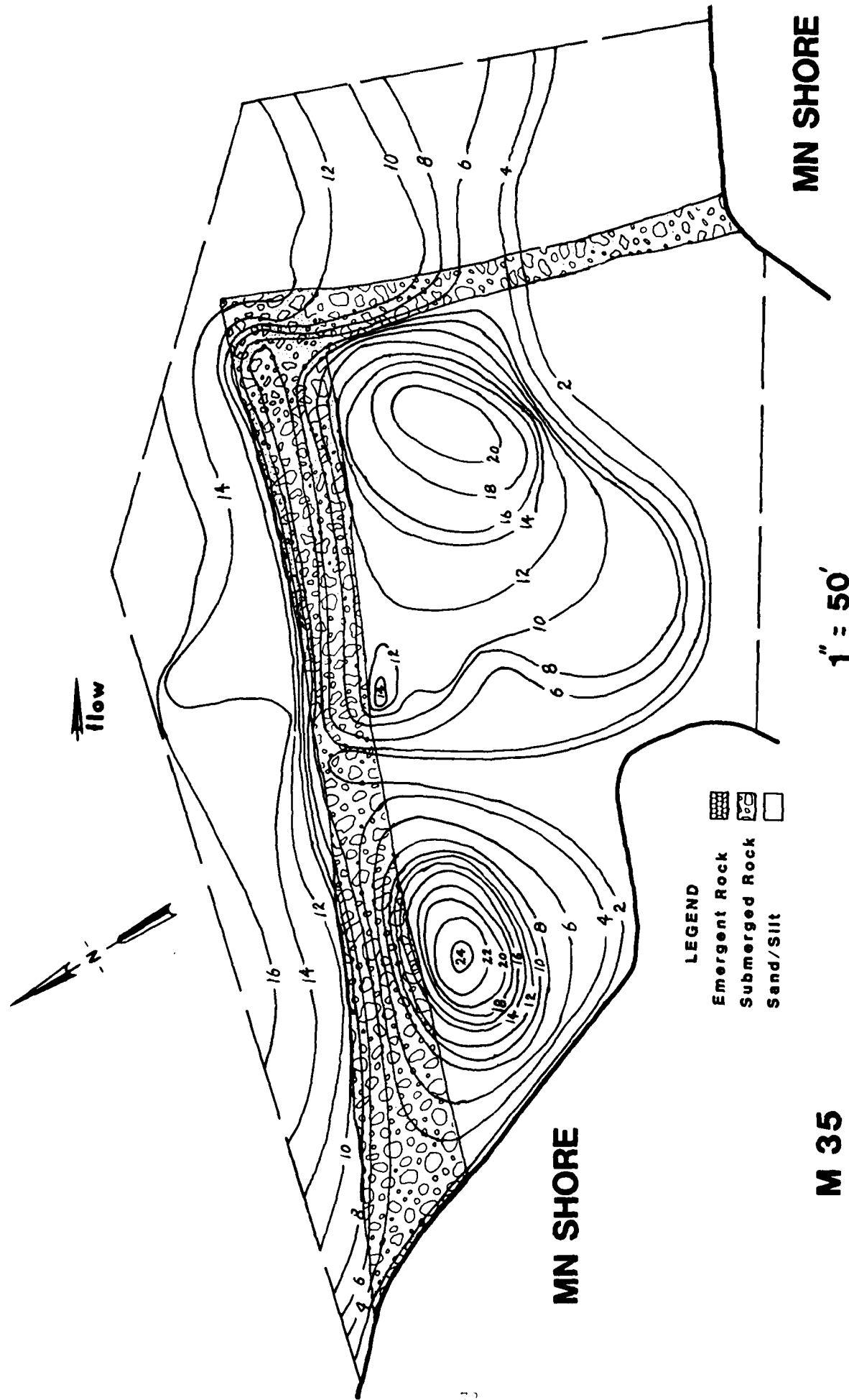
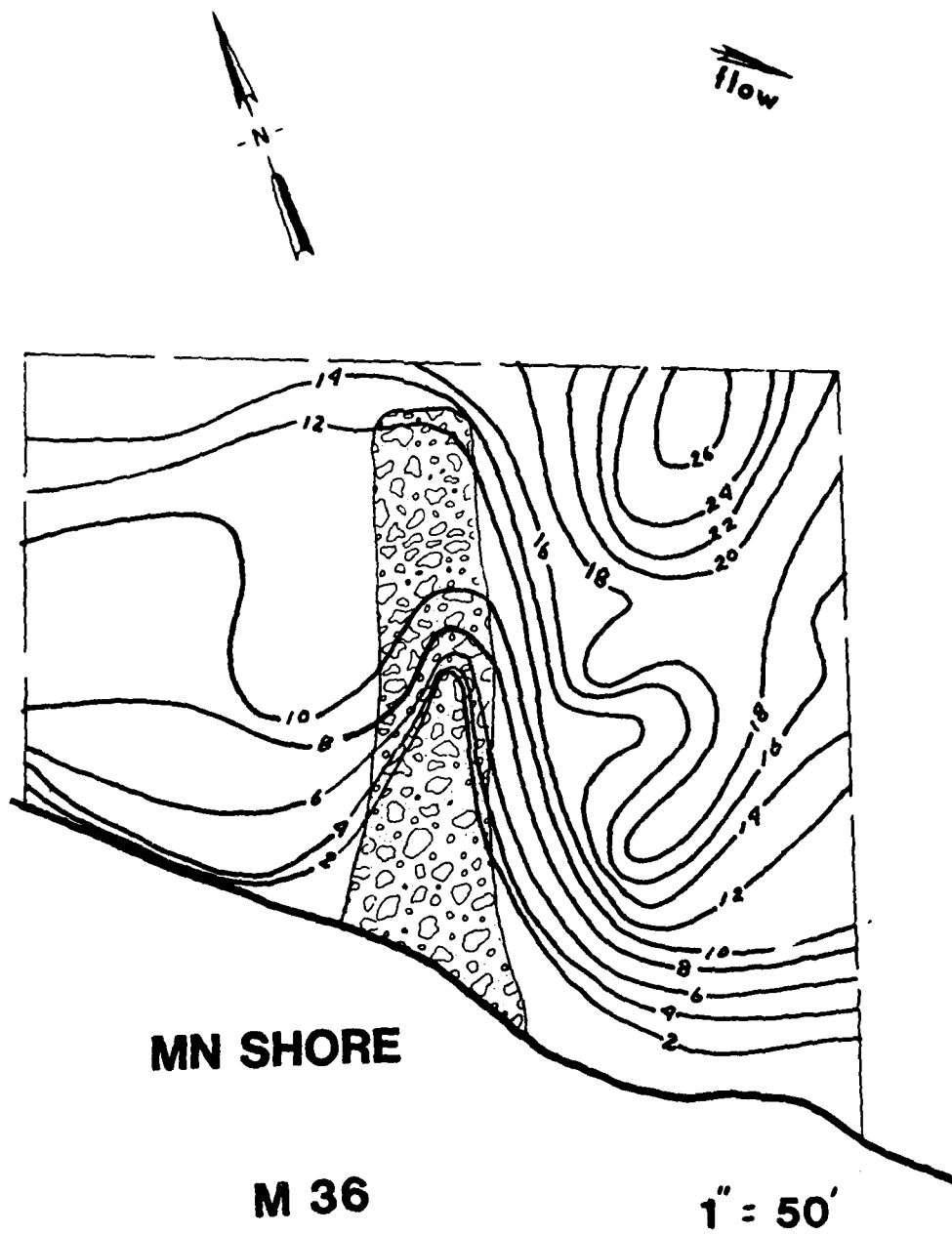


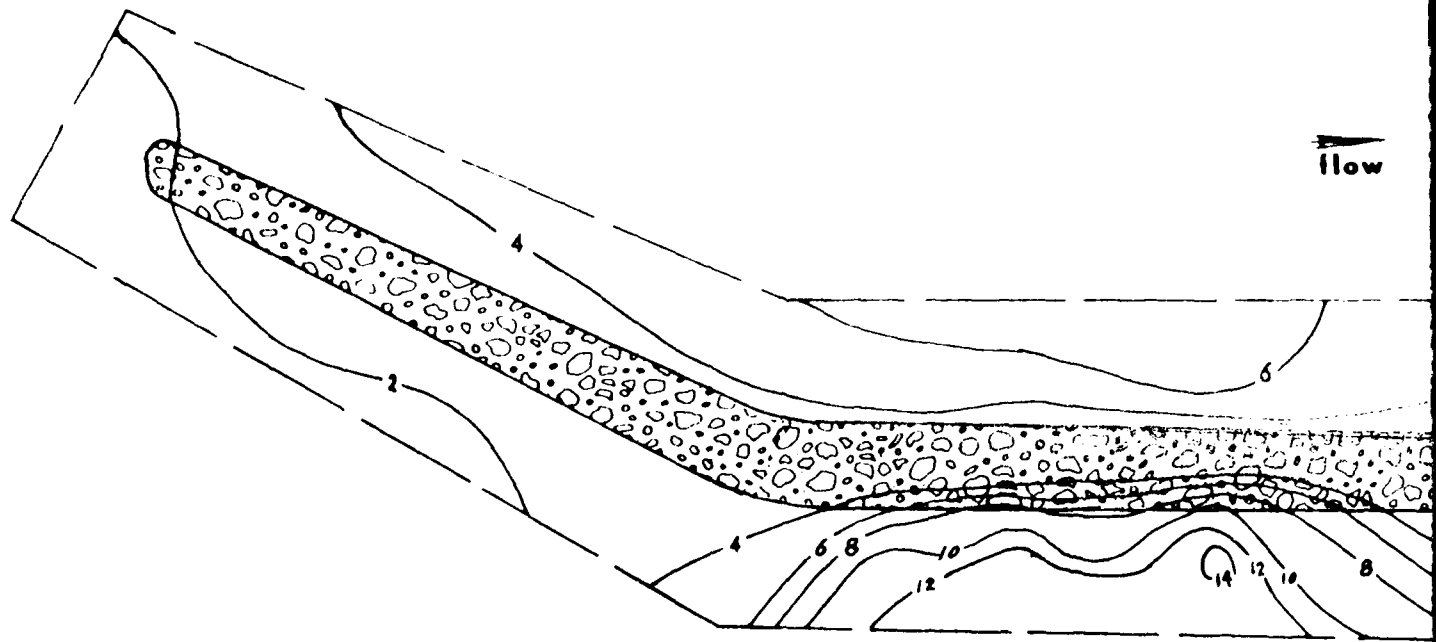
Figure D-39 General Bathymetric and Substrate Map of Closing Dam M35



LEGEND

- Emergent Rock**
- Submerged Rock**
- Sand/Silt**

Figure D-40 General Bathymetric and Substrate Map of Wing Dam M36

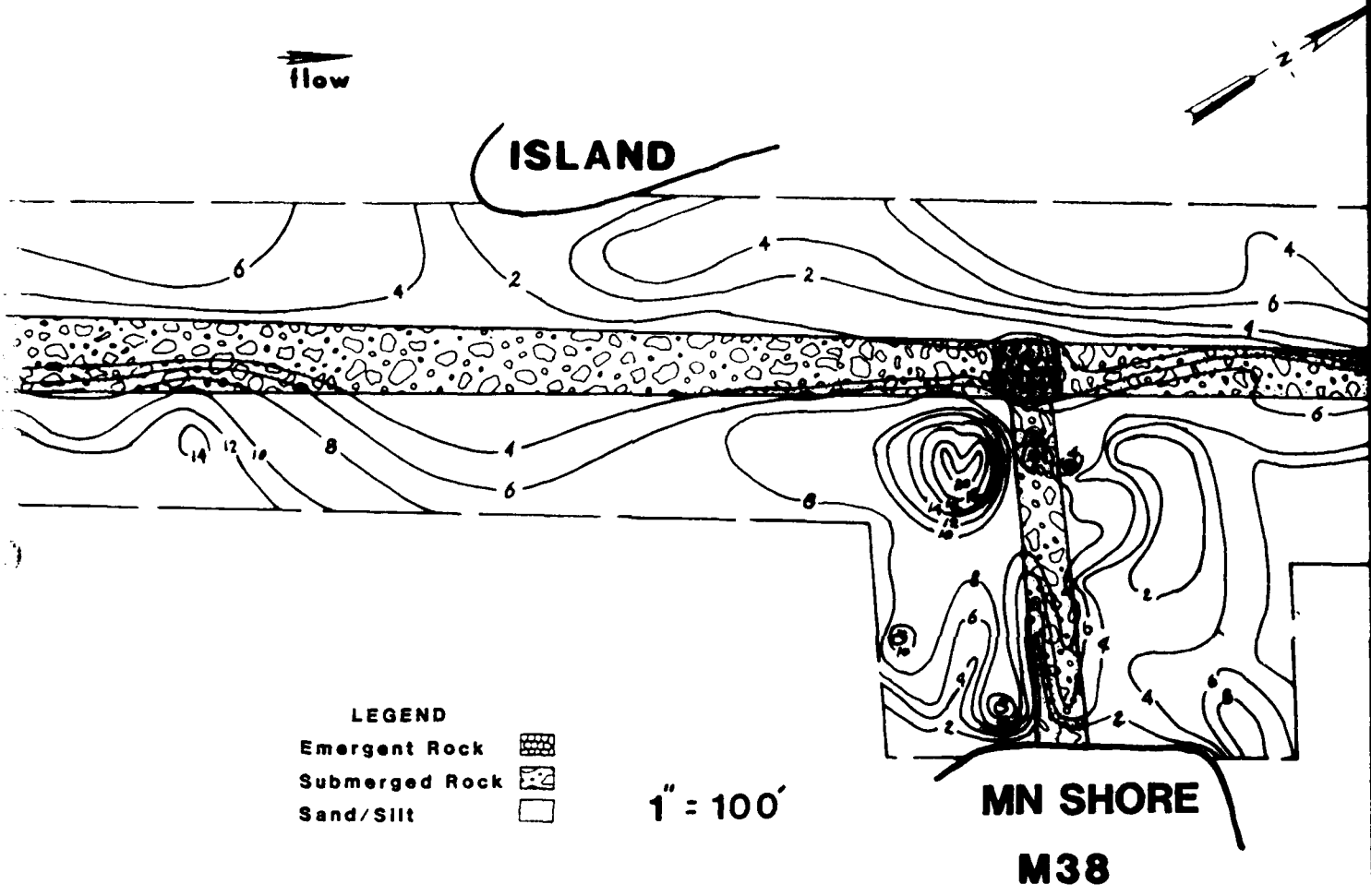


M39

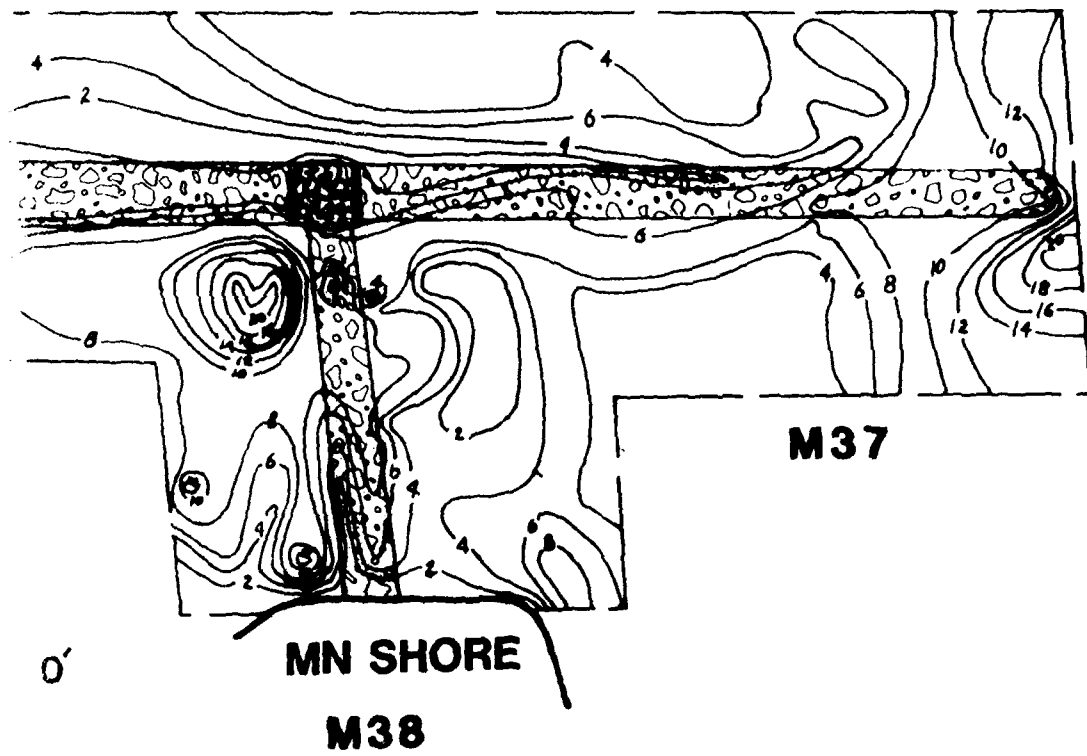
LEG
Emerge
Submer
Sand/S

Figure D-41 General Bathymetric and Substrate Map of Wing Dam M38, Closing Dam

1372

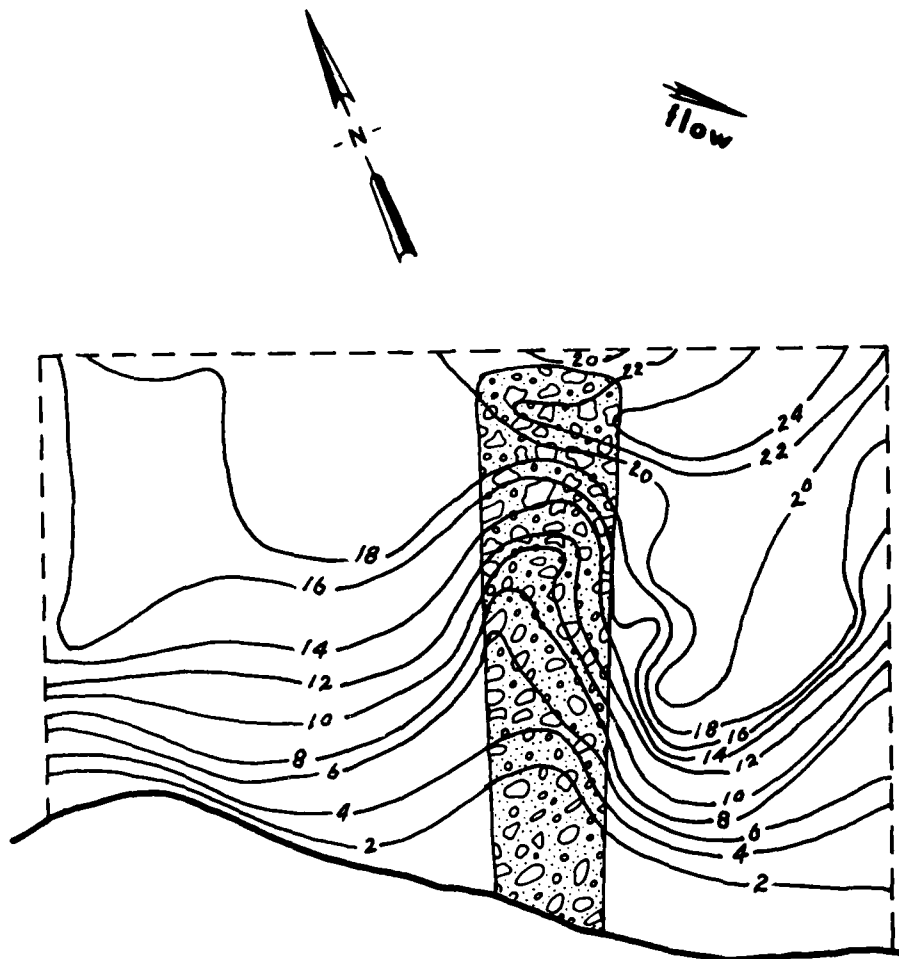


Wing Dam M38, Closing Dams M37 and M39



3 of 3

74



MN SHORE

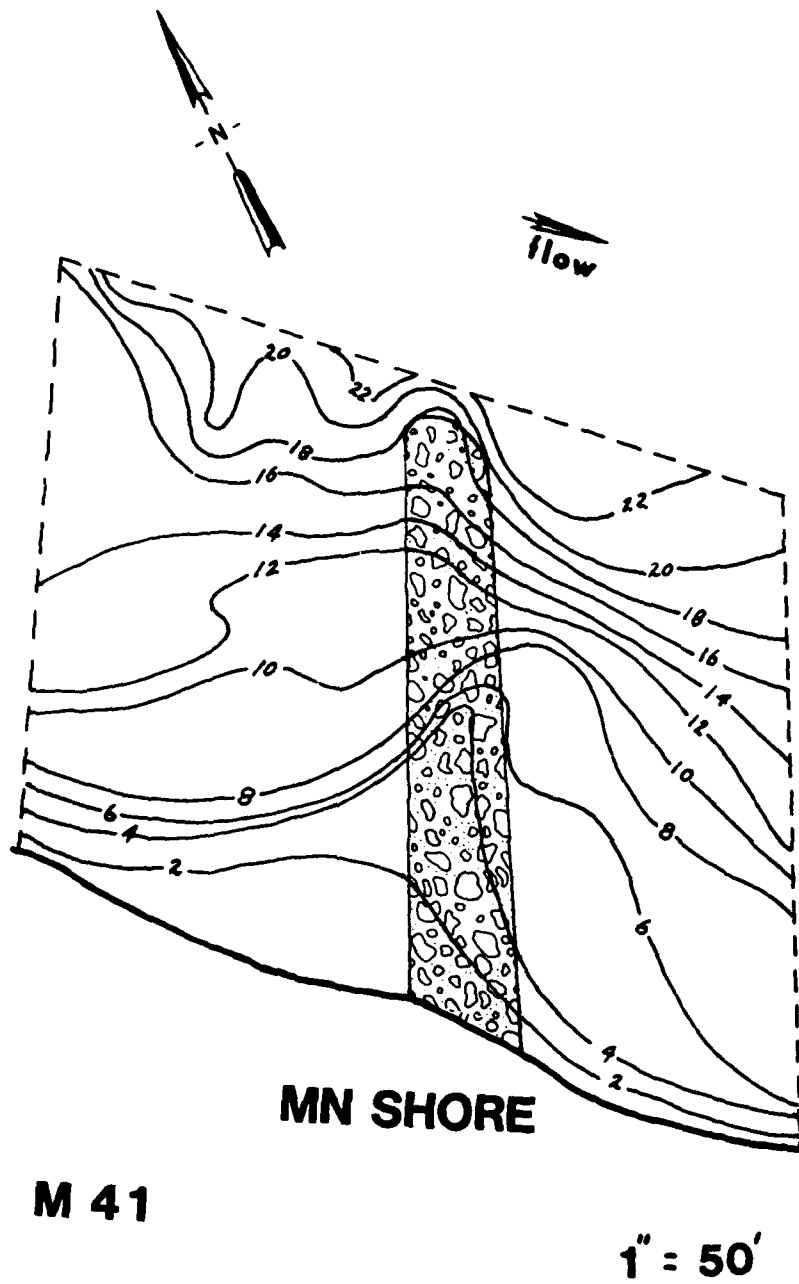
M 40

1" = 50'

LEGEND

- Emergent Rock 
- Submerged Rock 
- Sand/Silt 

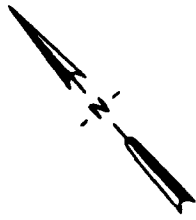
Figure D-42 General Bathymetric and Substrate Map of Wing Dam M40



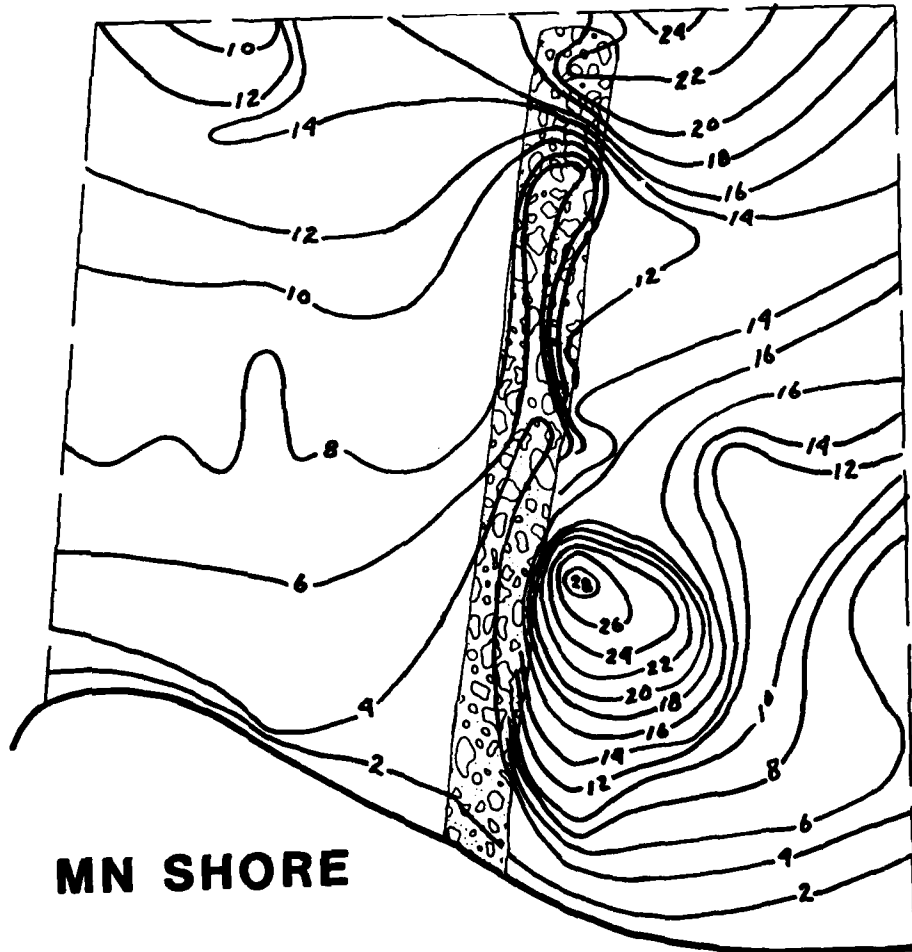
LEGEND

Emergent Rock	
Submerged Rock	
Sand/Silt	

Figure D-43 General Bathymetric and Substrate Map of Wing Dam M41



flow



MN SHORE

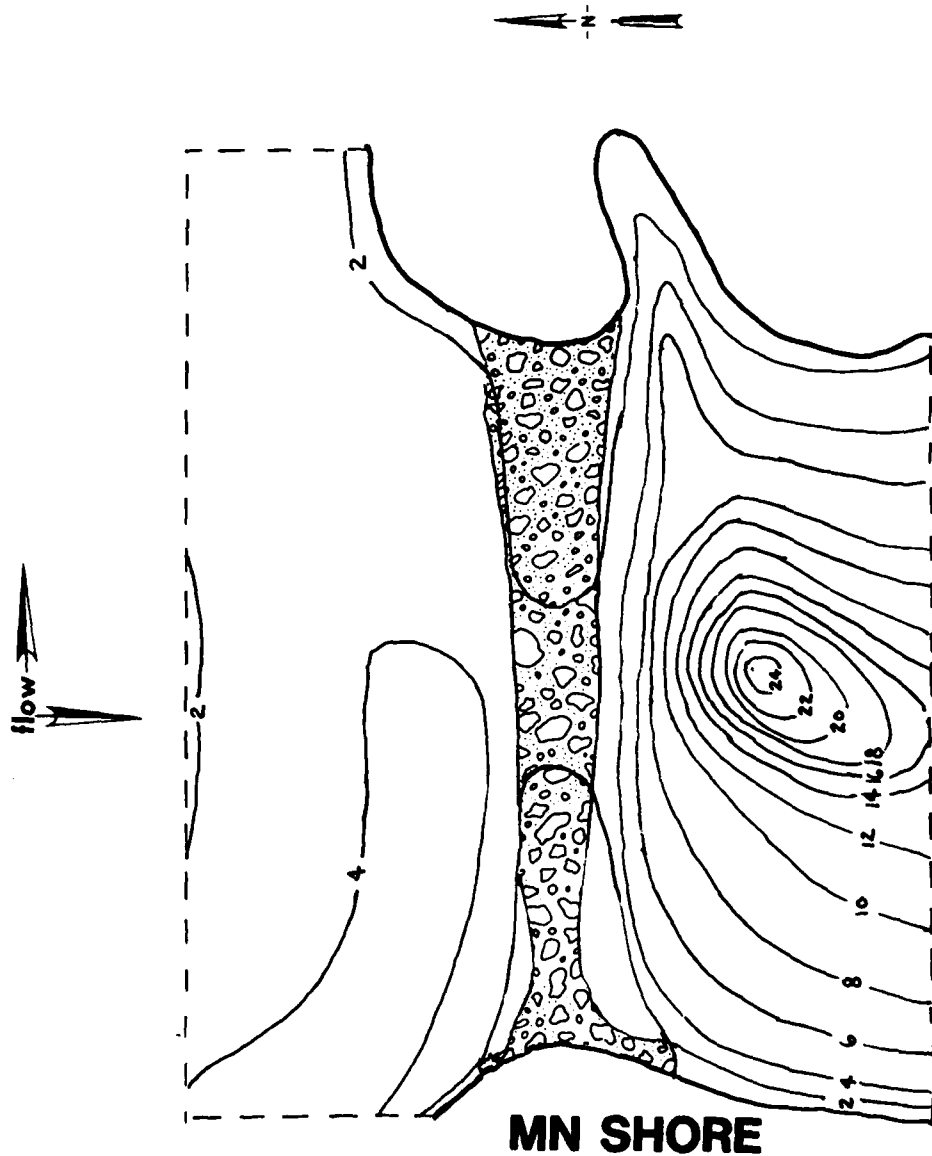
M 42

1" = 50'

LEGEND

- Emergent Rock** 
- Submerged Rock** 
- Sand/Silt** 

Figure D-44 General Bathymetric and Substrate Map of Wing Dam M42



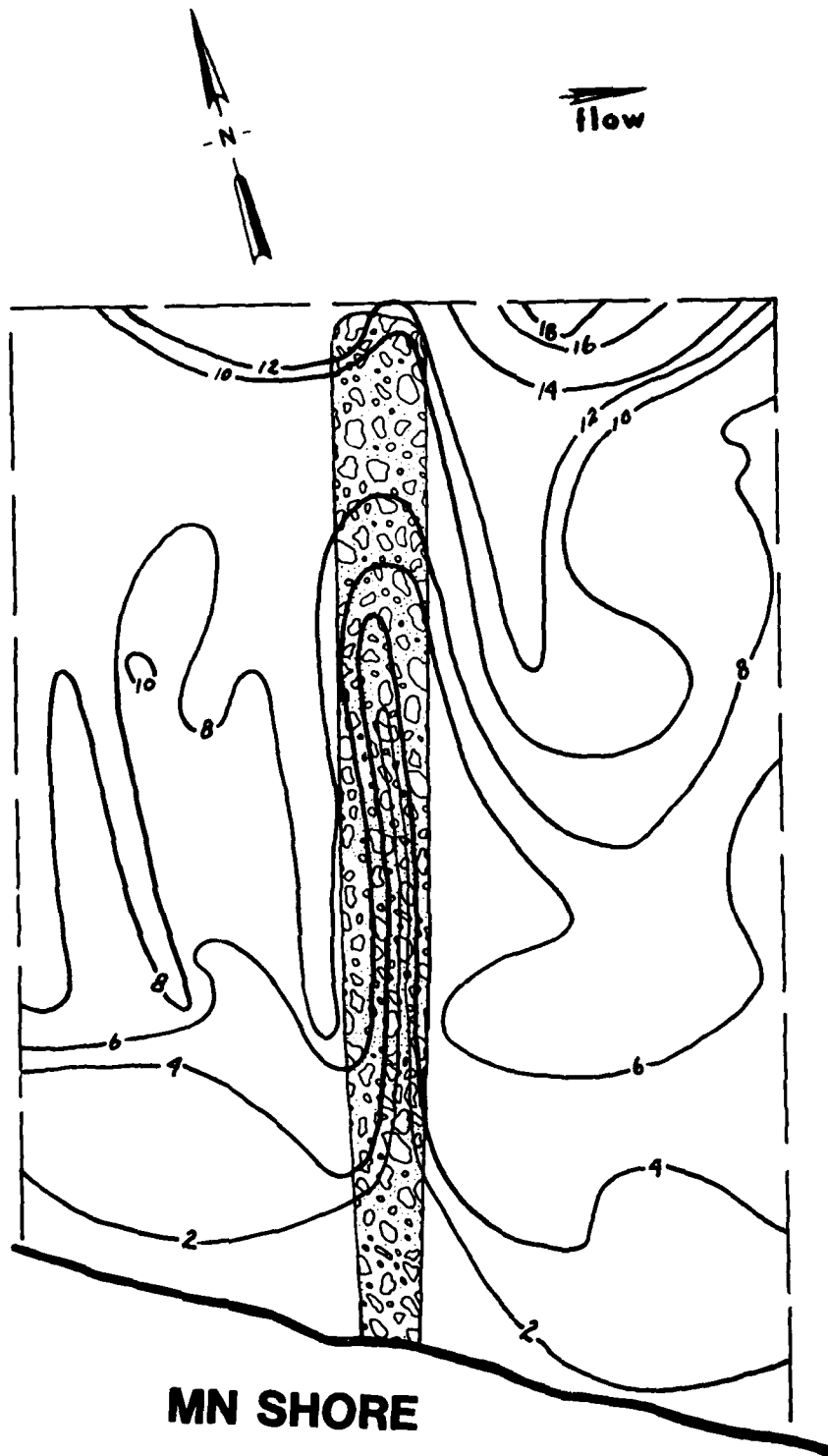
M 43

1" = 50'

LEGEND

- Emergent Rock** 
- Submerged Rock** 
- Sand/Silt** 

Figure D-45 General Bathymetric and Substrate Map of Closing Dam M43



M 44

1" = 50'

LEGEND

- Emergent Rock** 
- Submerged Rock** 
- Sand/Silt** 

Figure D-46 General Bathymetric and Substrate Map of Wing Dam M44

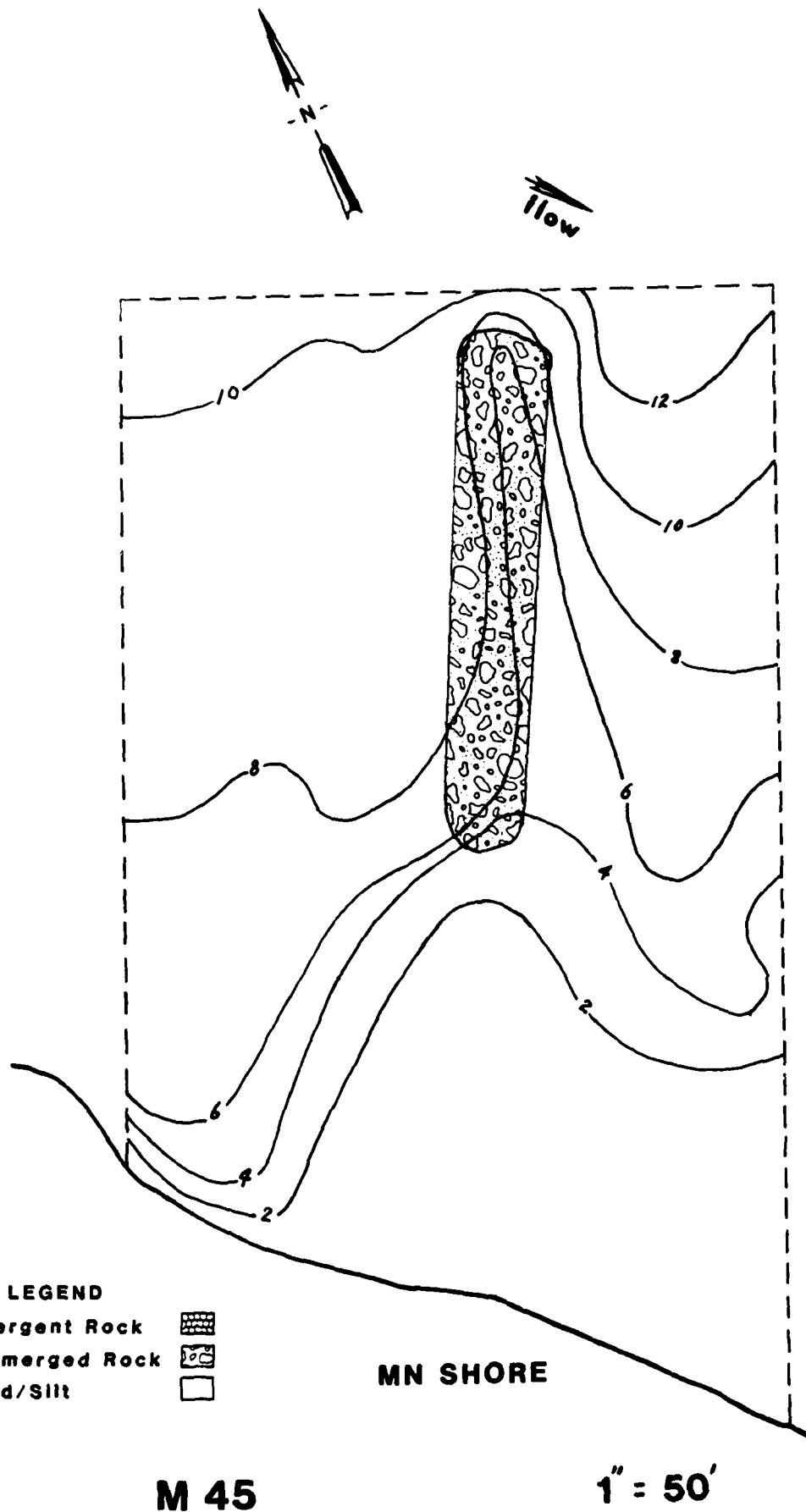
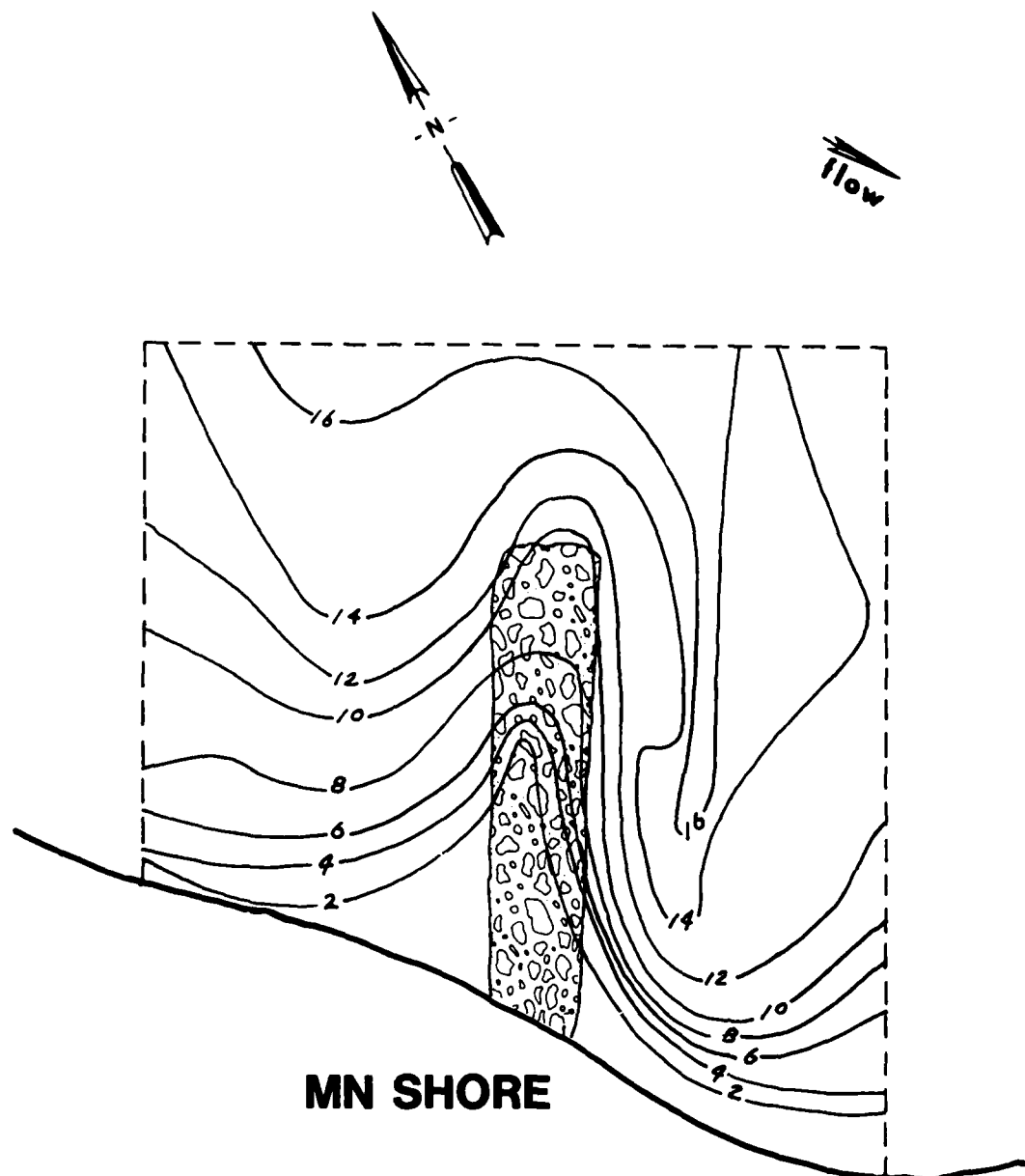


Figure D-47 General Bathymetric and Substrate Map of Wing Dam M45



M 46

1" = 50'

LEGEND




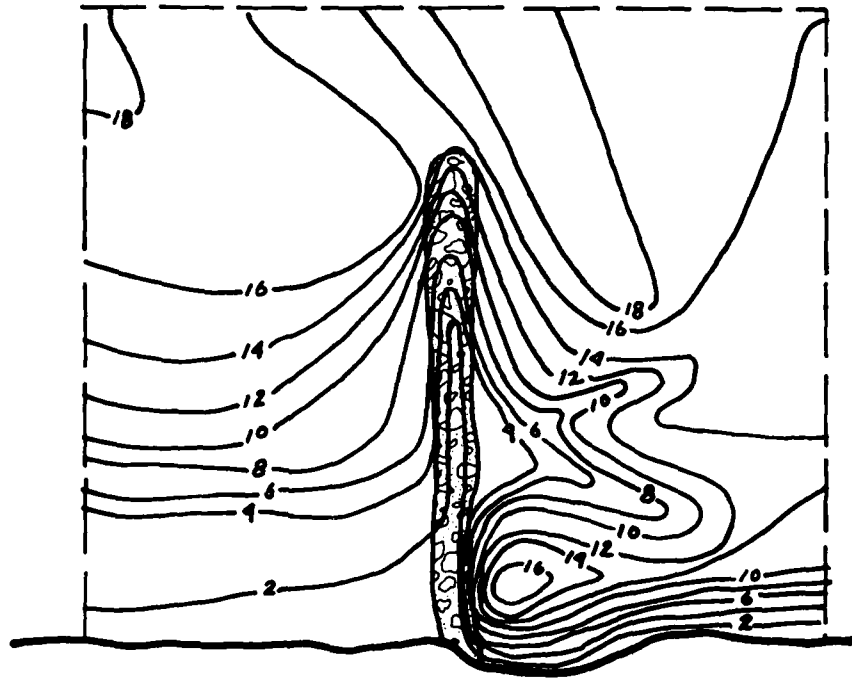
Emergent Rock	
Submerged Rock	
Sand/Silt	

Figure D-48 General Bathymetric and Substrate Map of Wing Dam M46

flow



MN SHORE

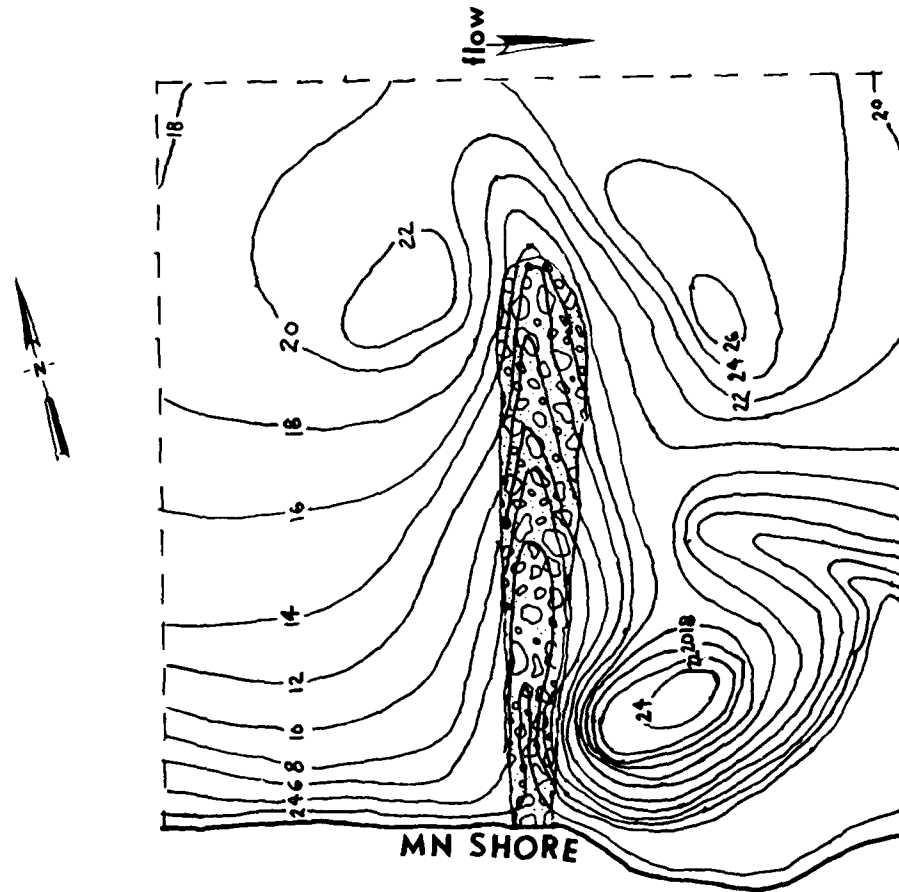
M 47

1" = 50'

LEGEND

- Emergent Rock** 
- Submerged Rock** 
- Sand/Silt** 

Figure D-49 General Bathymetric and Substrate Map of Wing Dam M47



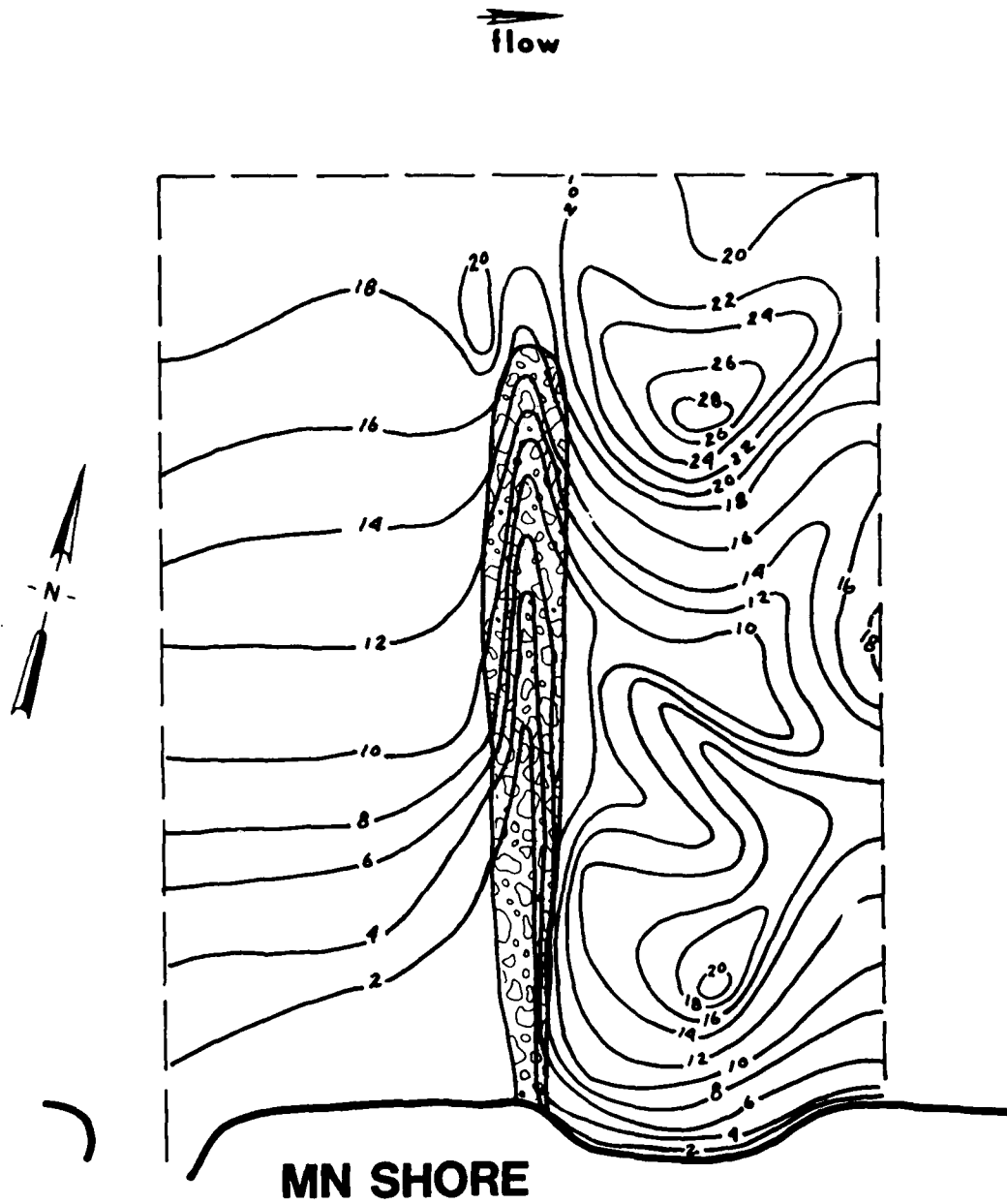
M 48

1" = 50'

LEGEND

- Emergent Rock** 
- Submerged Rock** 
- Sand/Silt** 

Figure D-50 General Bathymetric and Substrate Map of Wing Dam M48



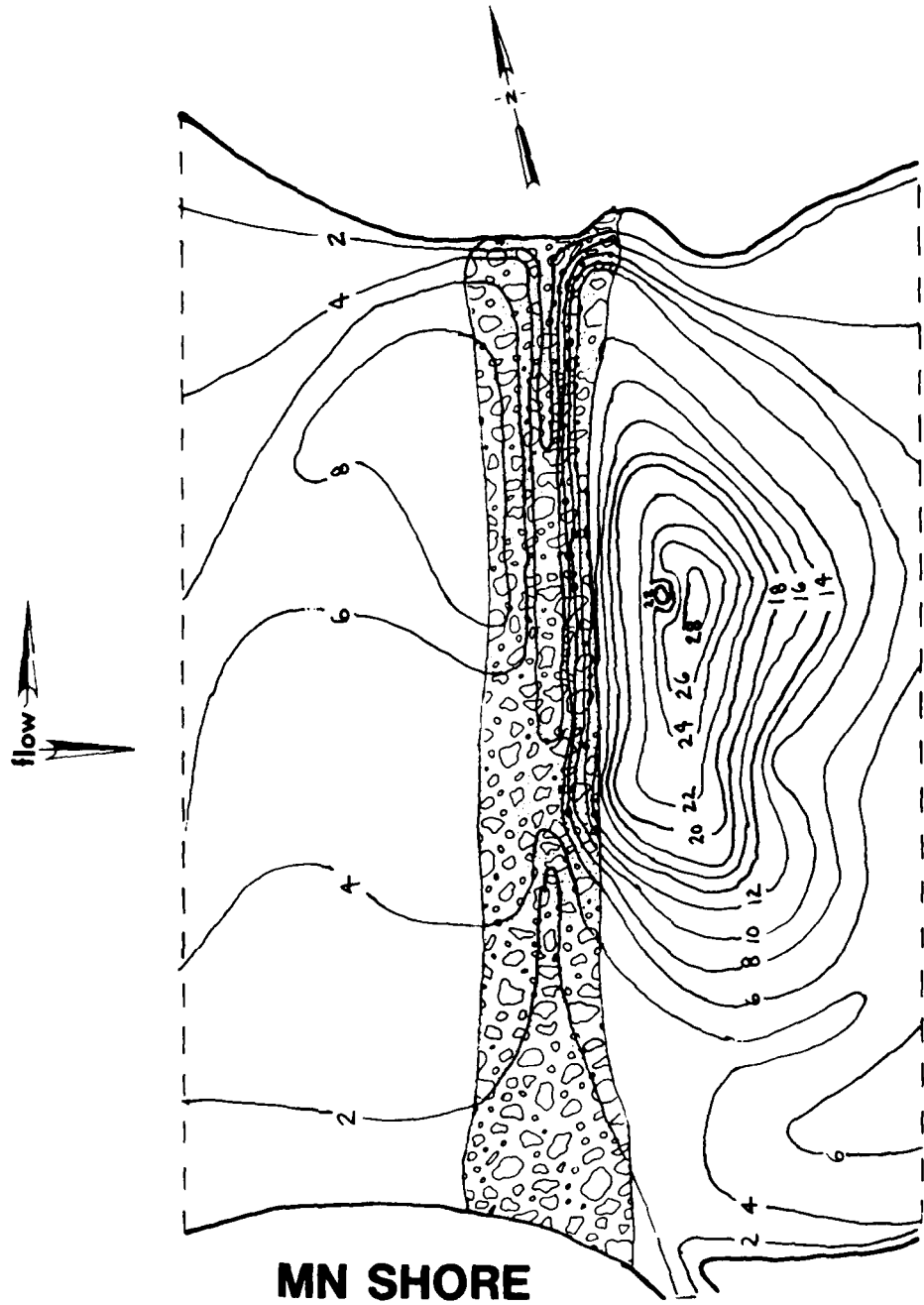
M 49

1" = 50'

LEGEND

- Emergent Rock**
- Submerged Rock**
- Sand/Silt**

Figure D-51 General Bathymetric and Substrate Map of Wing Dam M49



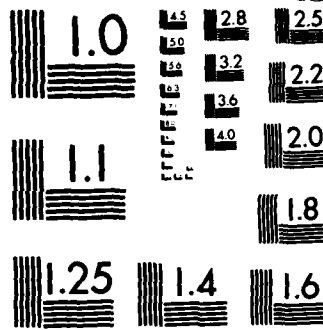
M 50

LEGEND

- Emergent Rock** 
- Submerged Rock** 
- Sand/Silt** 

1" = 50'

Figure D-52 General Bathymetric and Substrate Map of Closing Dam M50



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

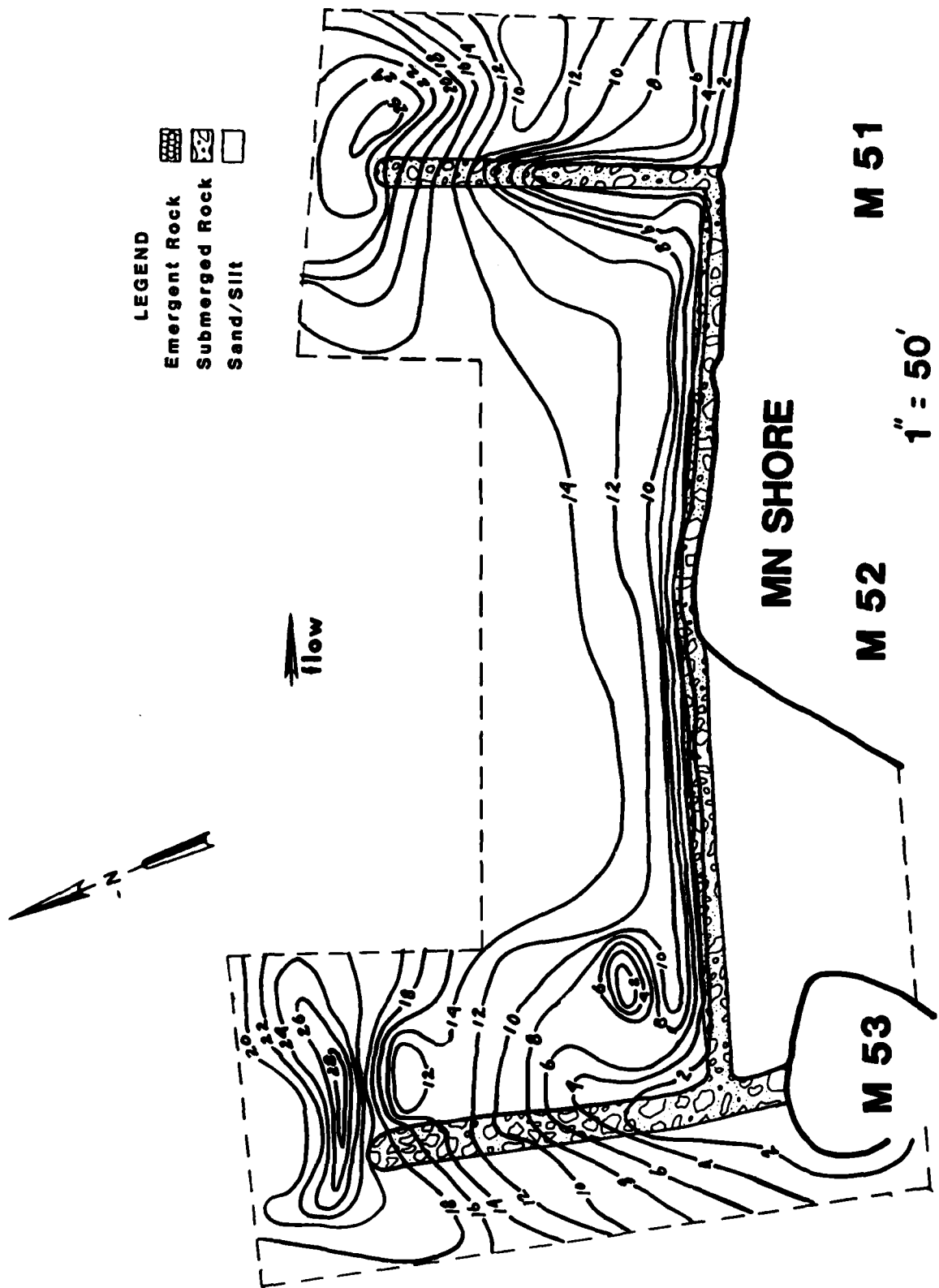


Figure D-53 General Bathymetric and Substrate Map of Wing Dams M51, M53, Closing Dam M52

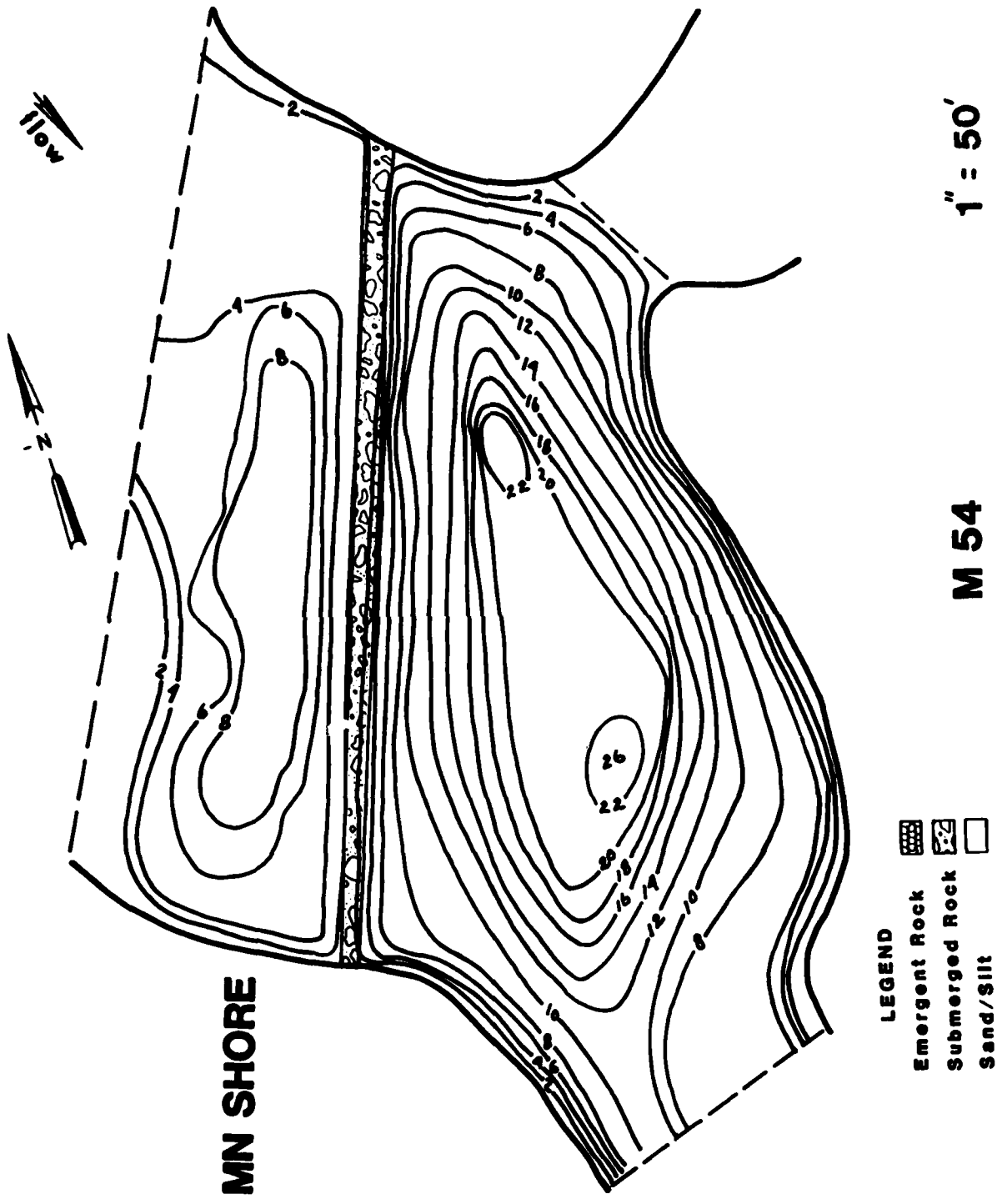


Figure D-54 General Bathymetric and Substrate Map of Closing Dam M54

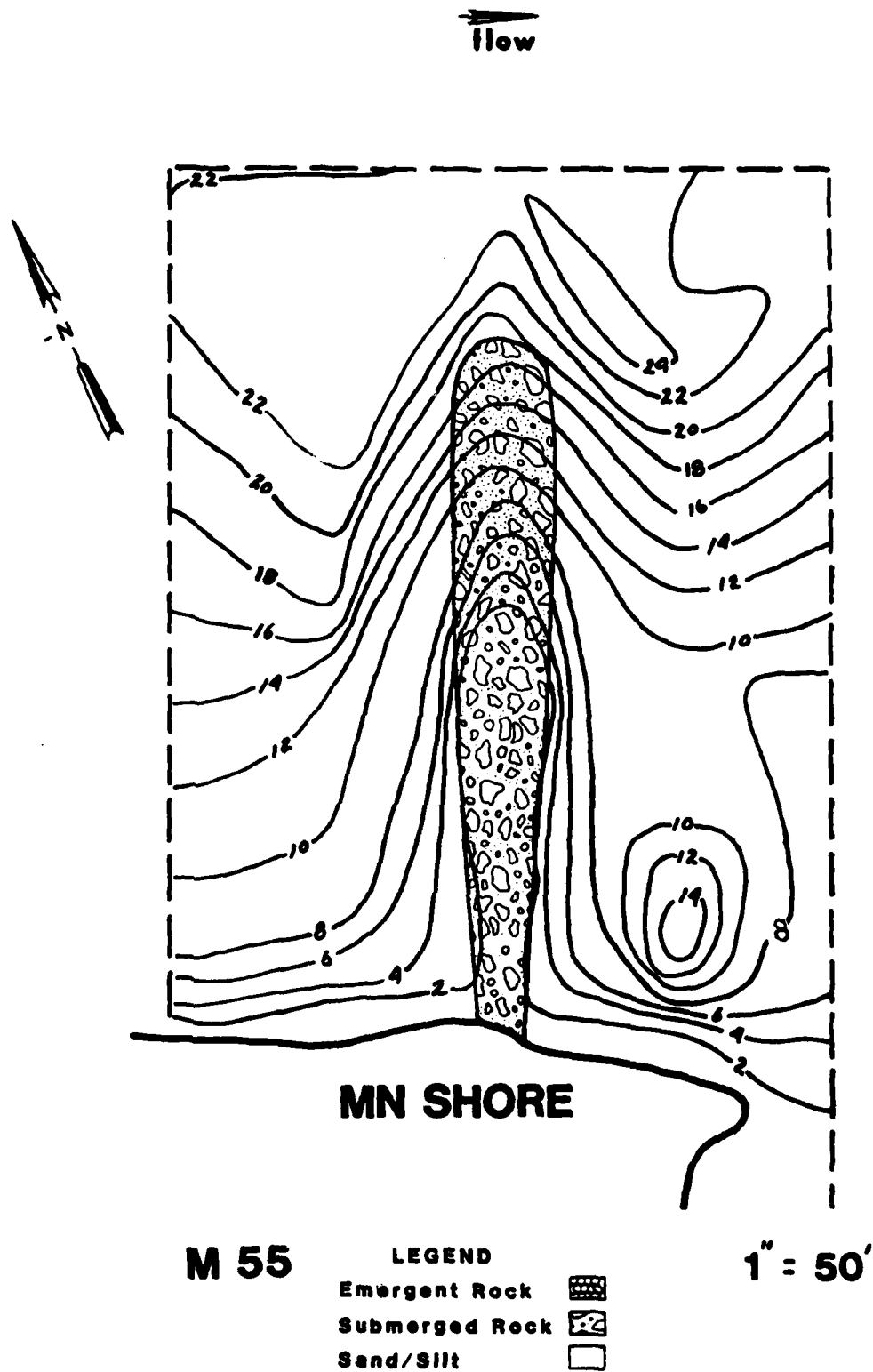
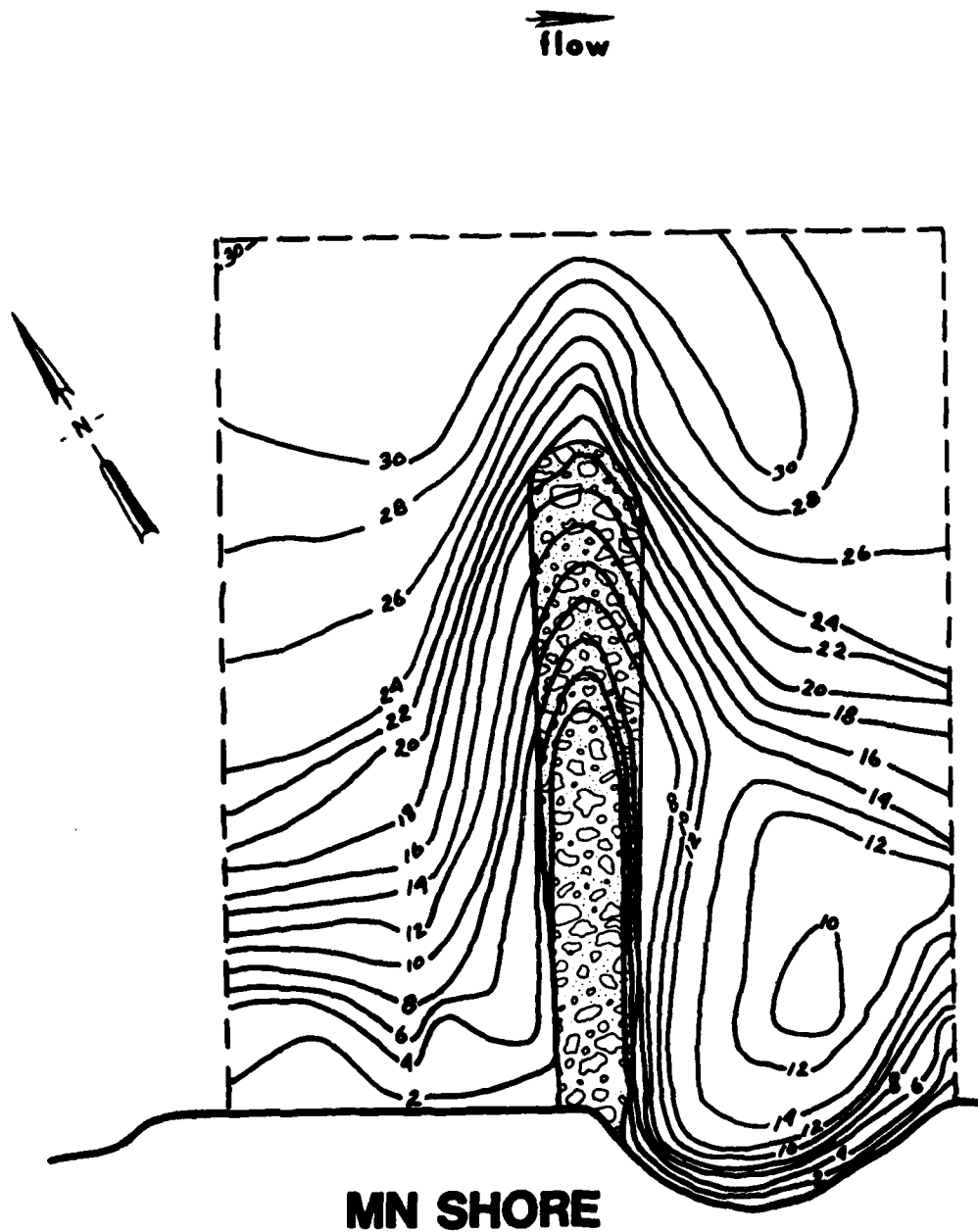


Figure D-55 General Bathymetric and Substrate Map of Wing Dam M55



M 56

LEGEND

- Emergent Rock** 
- Submerged Rock** 
- Sand/Silt** 

1" = 50'

Figure D-56 General Bathymetri and Substrate Map of Wing Dam M56

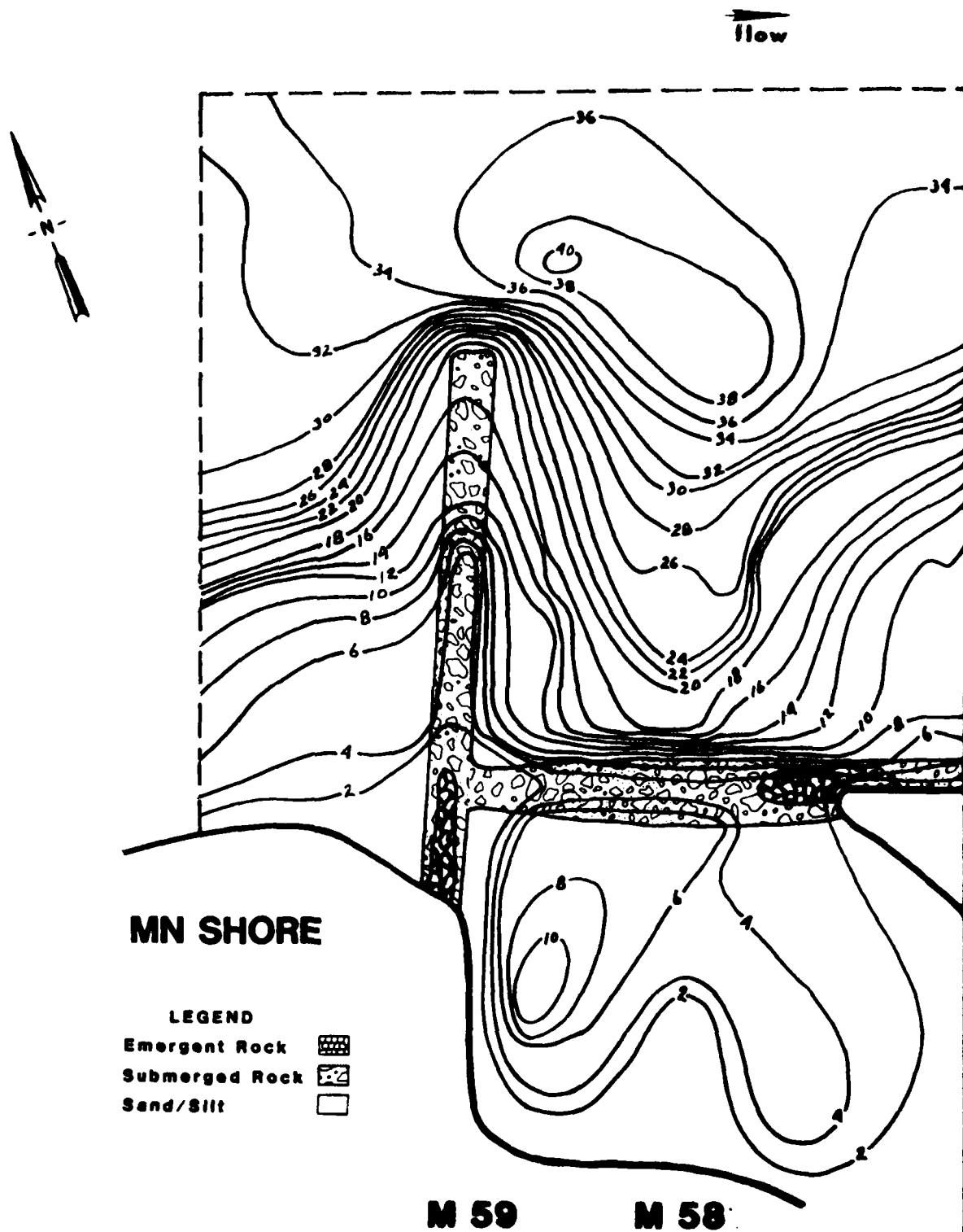
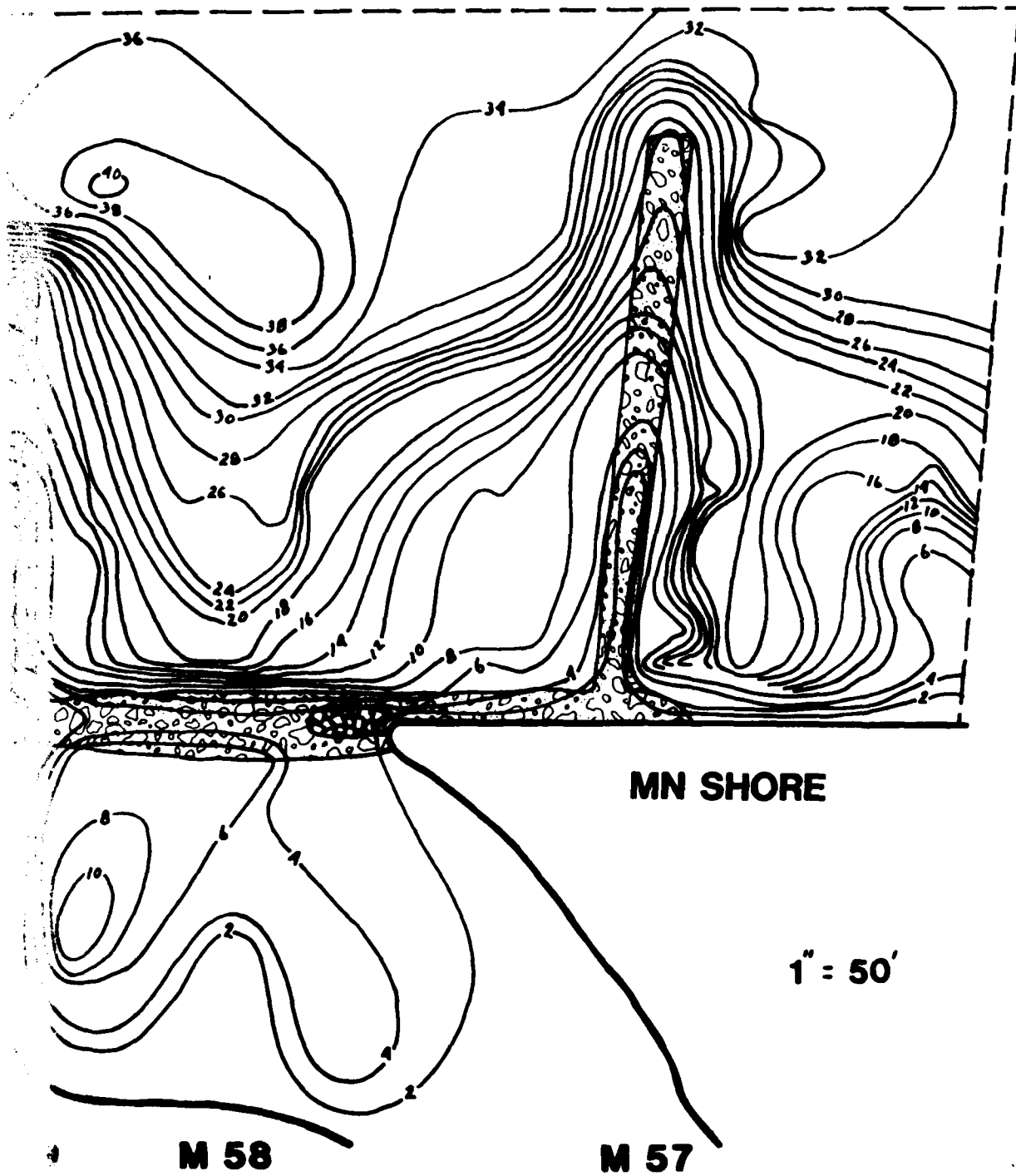


Figure D-57 General Bathymetric and Substrate Map of Wing Dam M57, Closing Dam M58

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MN SHORE

1" = 50'

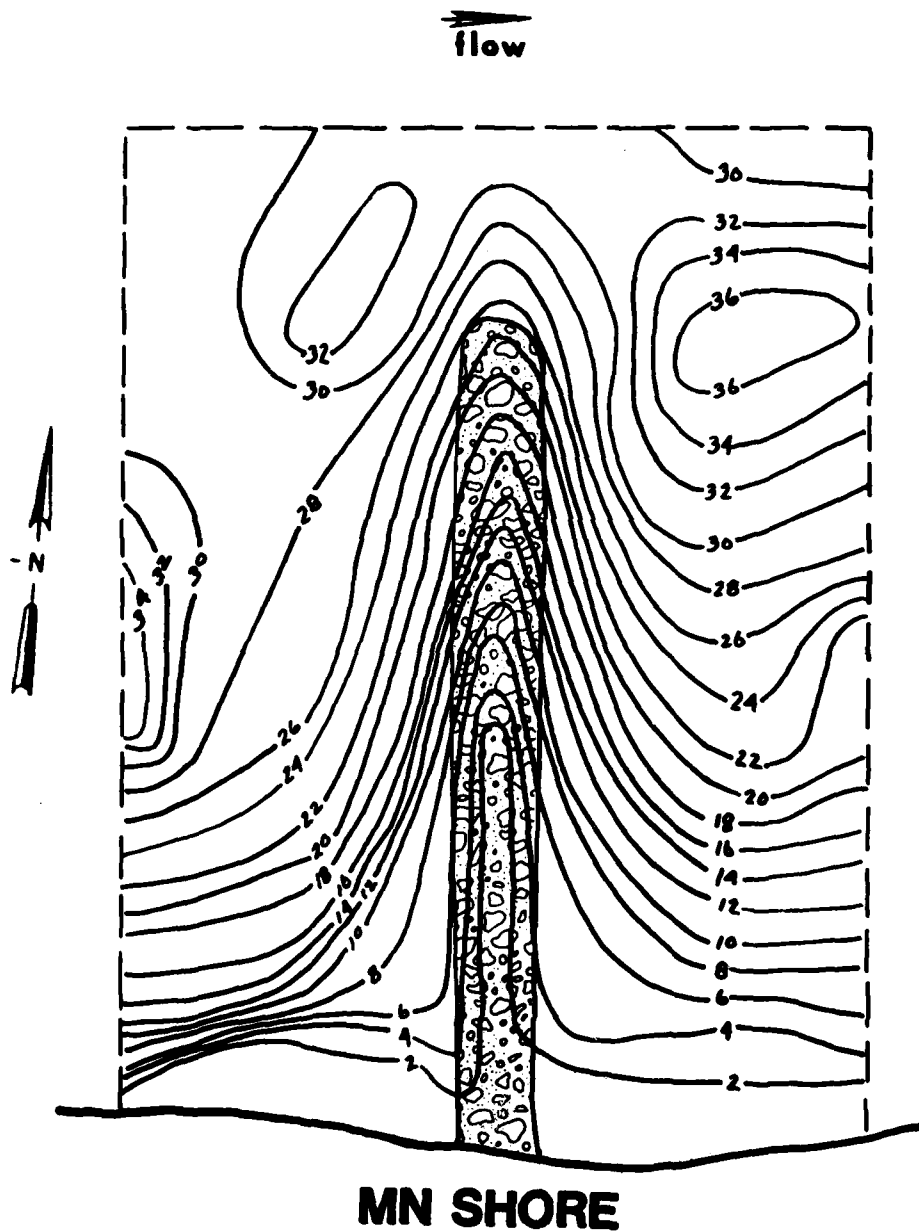
M 58

M 57



Map of Wing Dam M57, Closing Dam M58 and Wing Dam M59

90

242

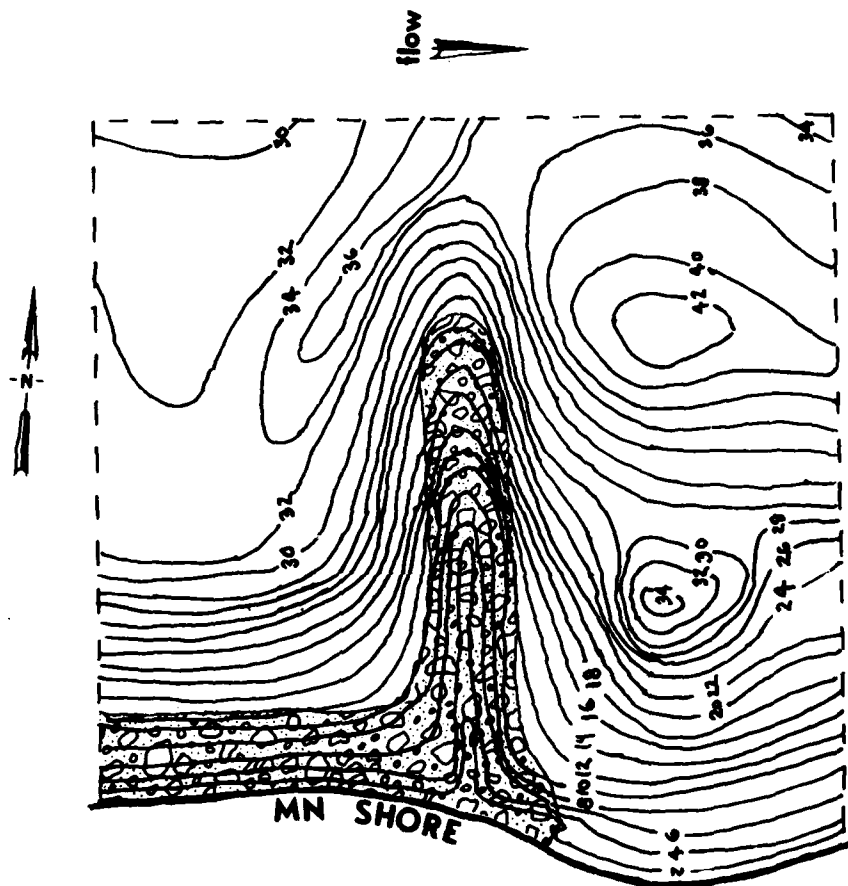


M 60

LEGEND
 Emergent Rock 
 Submerged Rock 
 Sand/Silt 

1" = 50'

Figure D-58 General Bathymetric and Substrate Map of Wing Dam M60



M 61

1" = 50'

LEGEND

- Emergent Rock 
- Submerged Rock 
- Sand/Silt 

Figure D-59 General Bathymetric and Substrate Map of Wing Dam M61

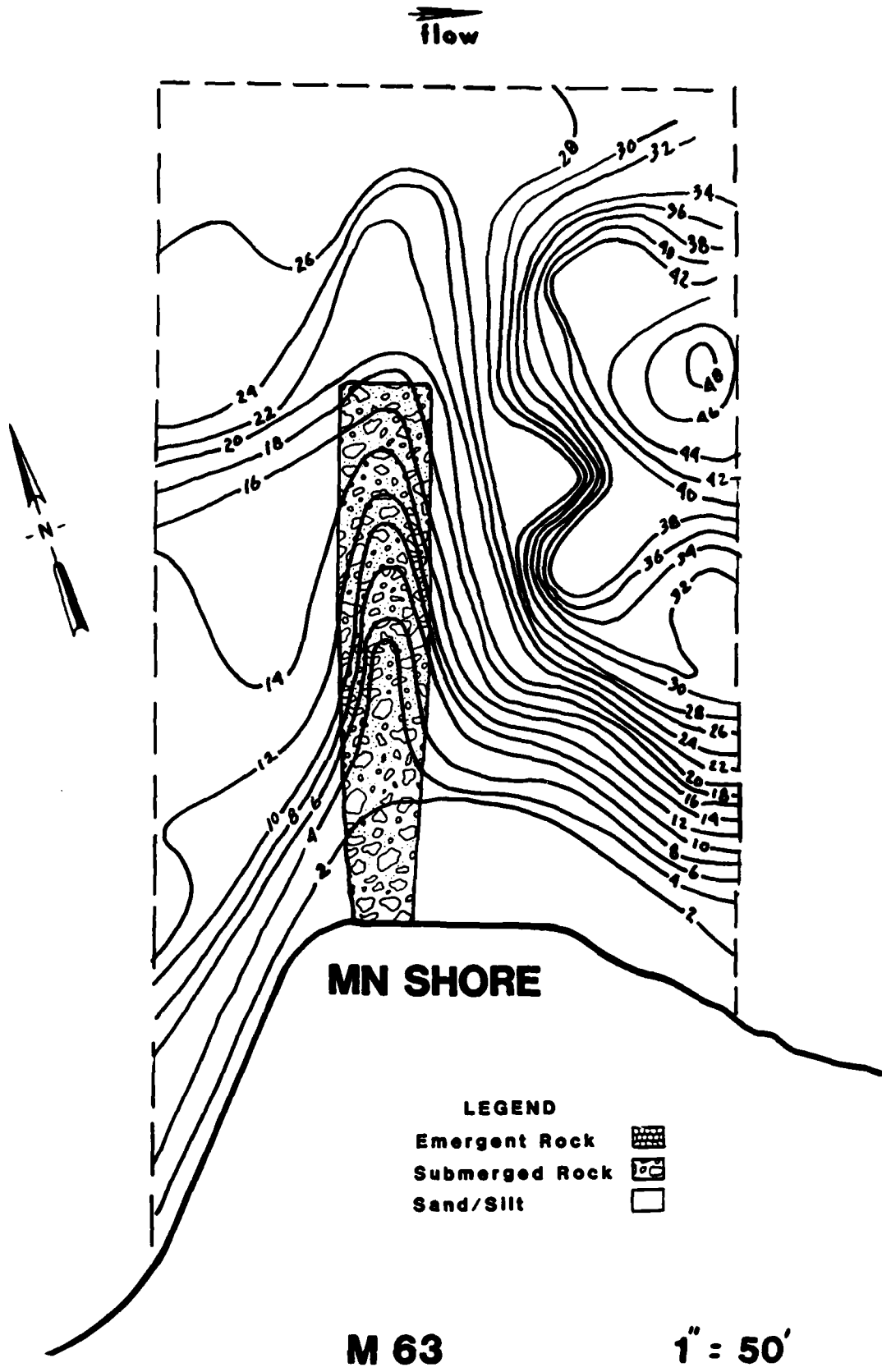
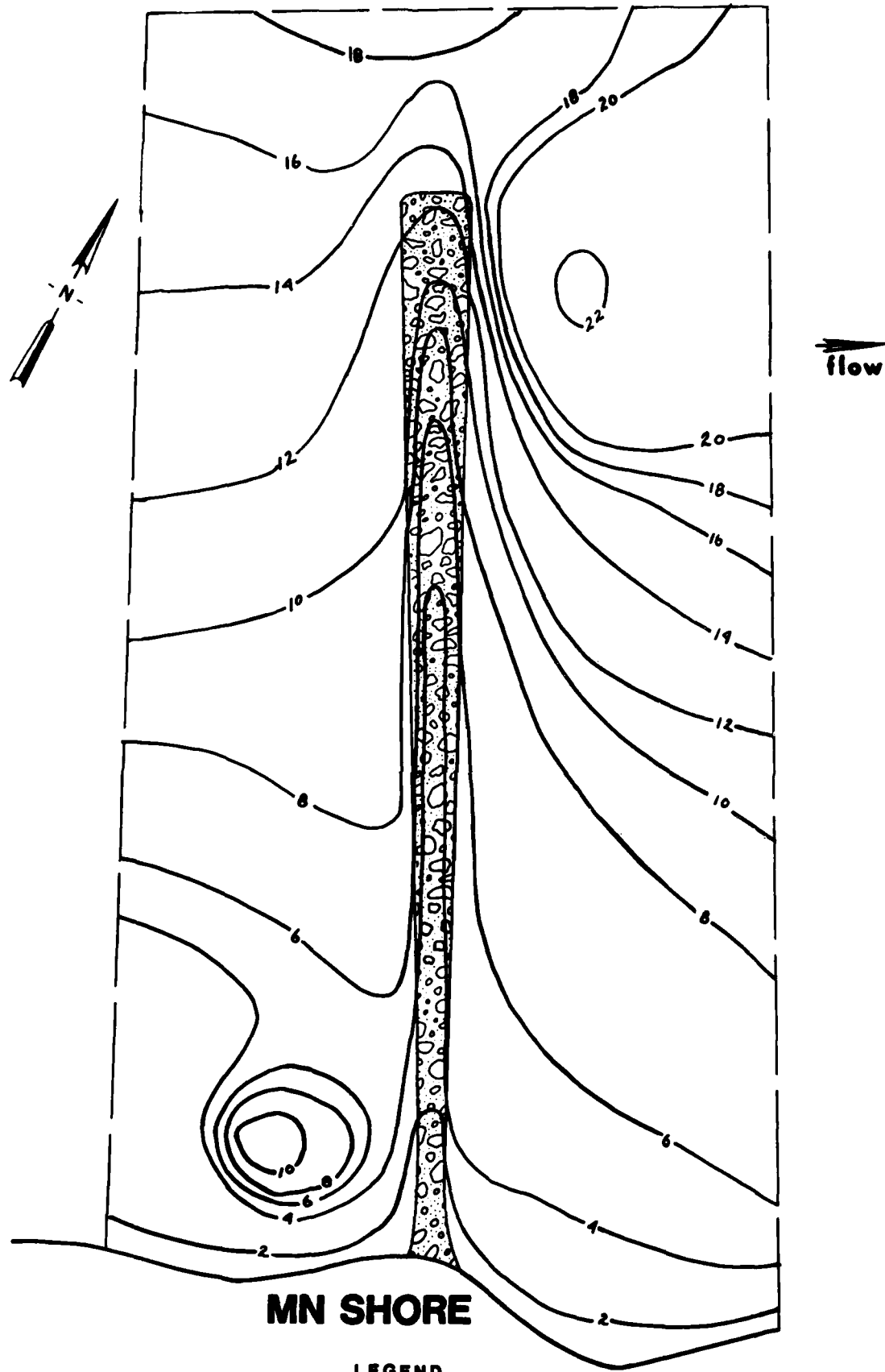





Figure D-60 General Bathymetric and Substrate Map of Wing Dam M63



M 64

LEGEND

- Emergent Rock 
- Submerged Rock 
- Sand/Silt 

1" = 50'

Figure D-61 General Bathymetric and Substrate Map of Wing Dam M64

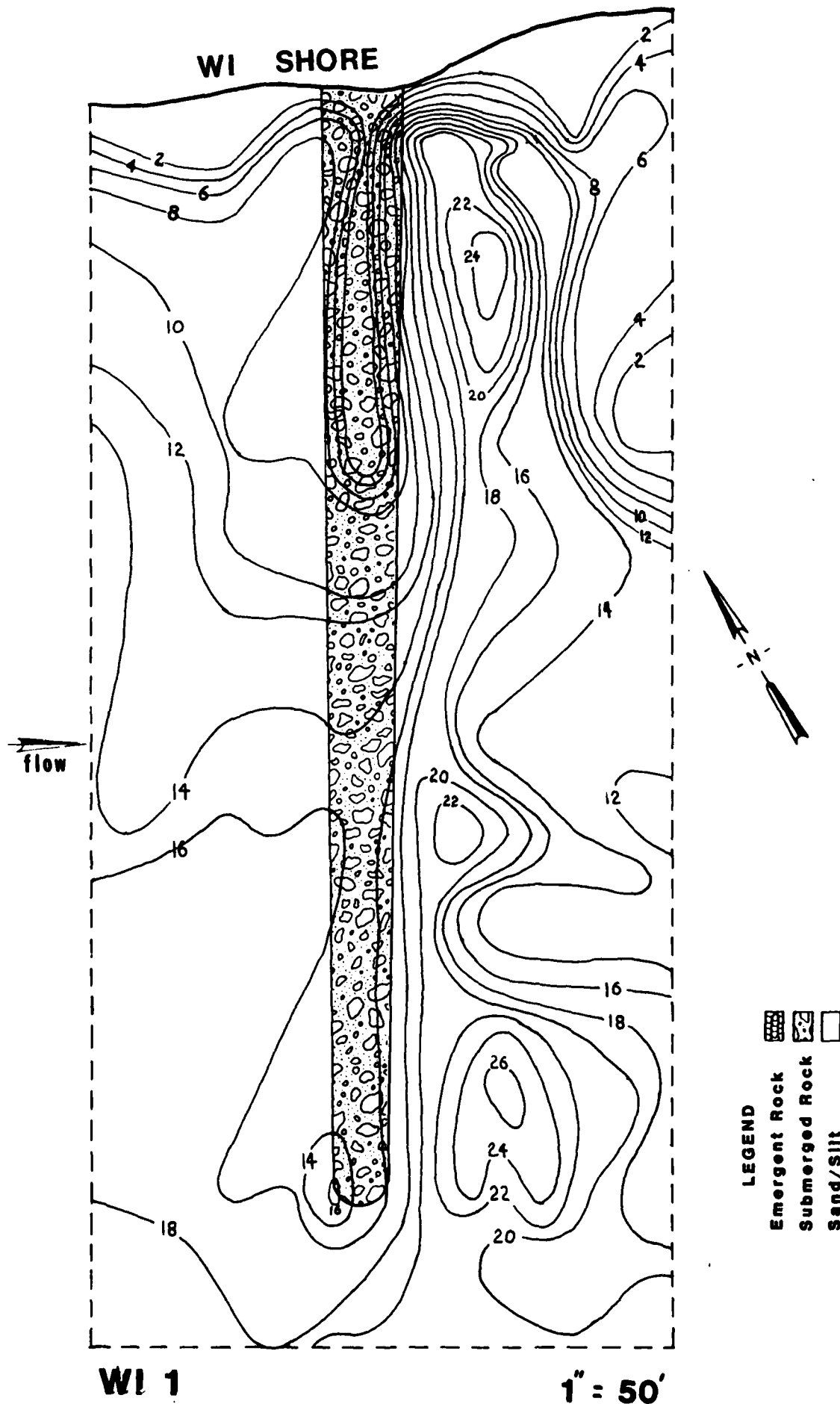
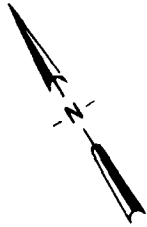
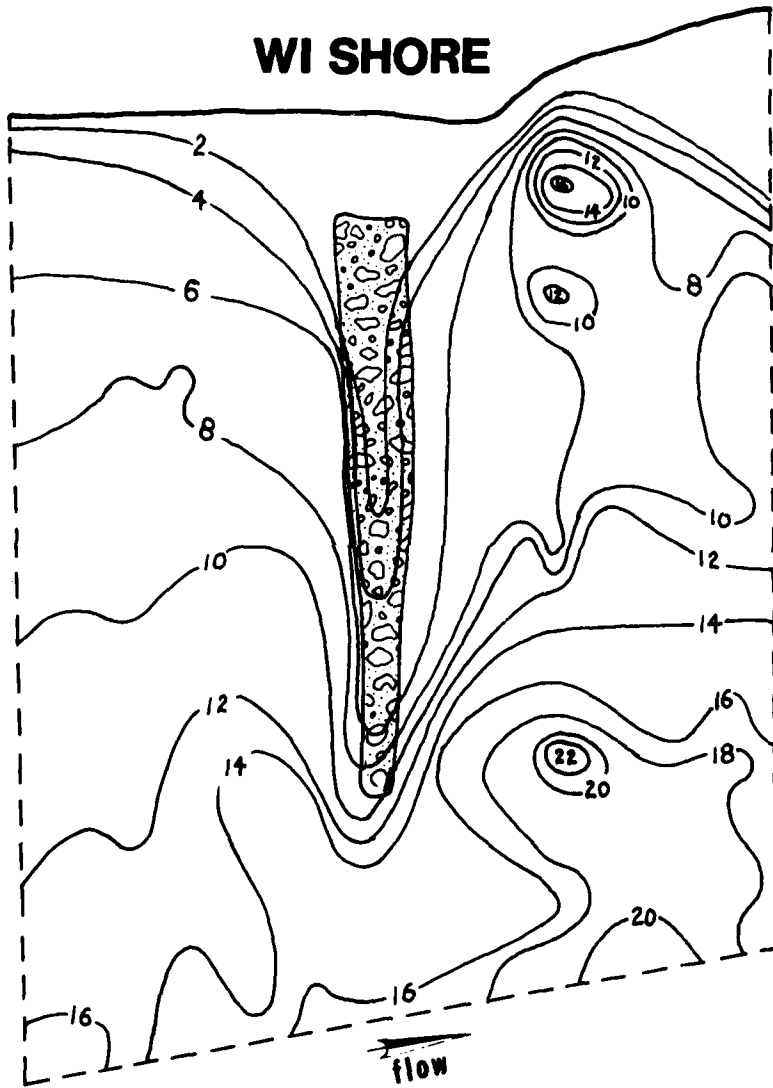


Figure D- 62 General Bathymetric and Substrate Map of Wing Dam WI1



WI SHORE



WI 2

LEGEND

- Emergent Rock 
- Submerged Rock 
- Sand/Silt 

1" = 50'

Figure D-63 General Bathymetric and Substrate Map of Wing Dam WI2

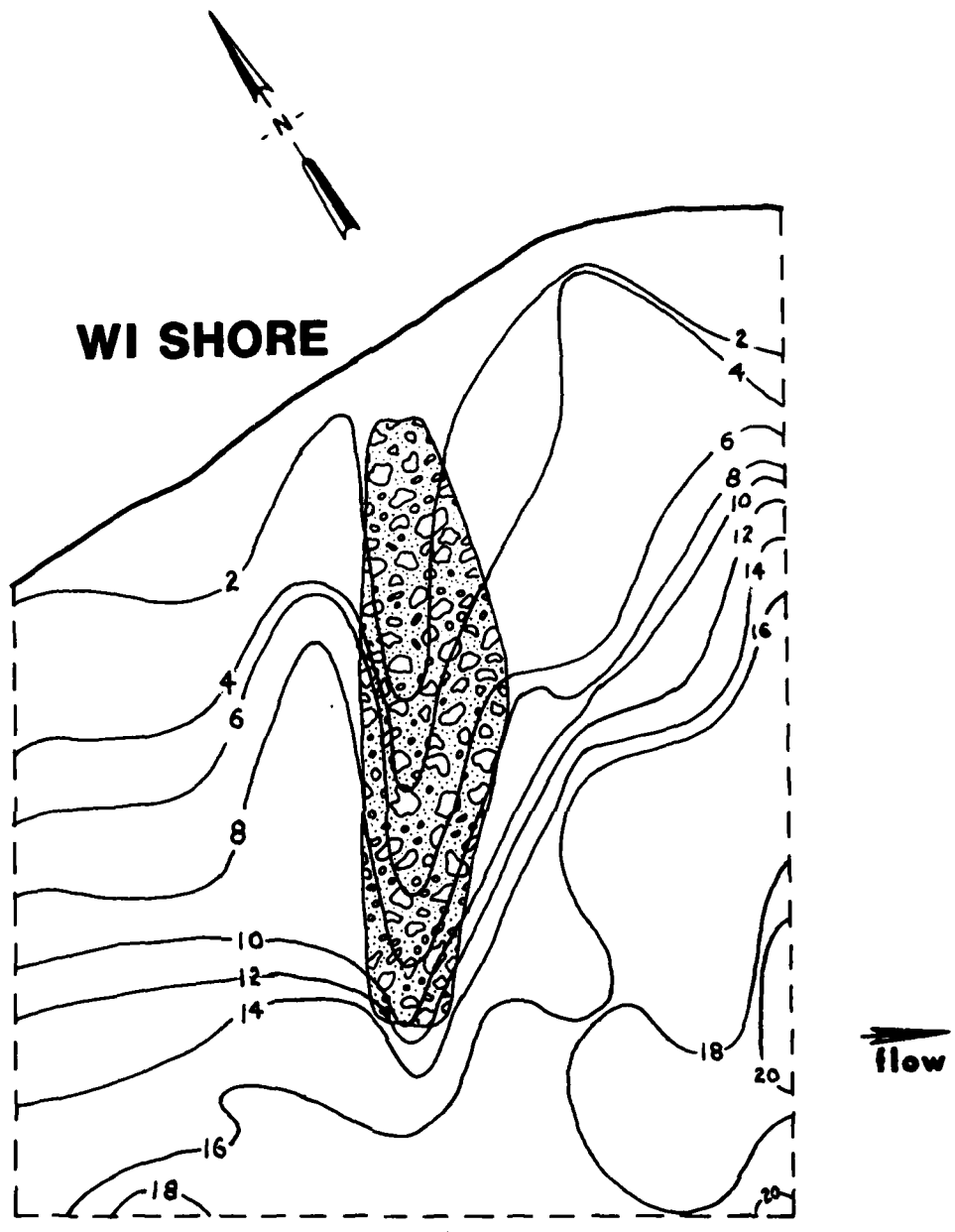
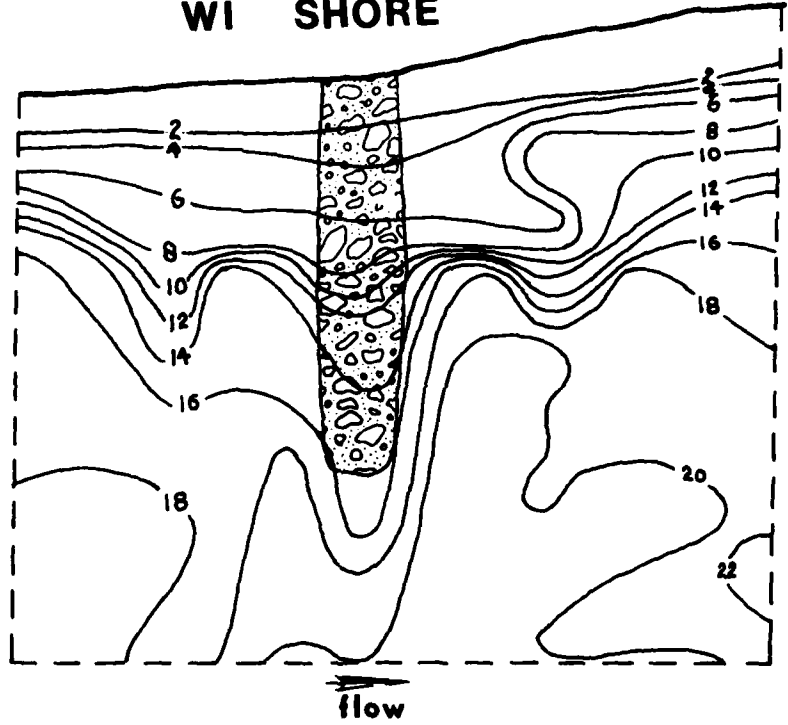


Figure D- 64 General Bathymetric and Substrate Map of Wing Dam WI3



WI SHORE



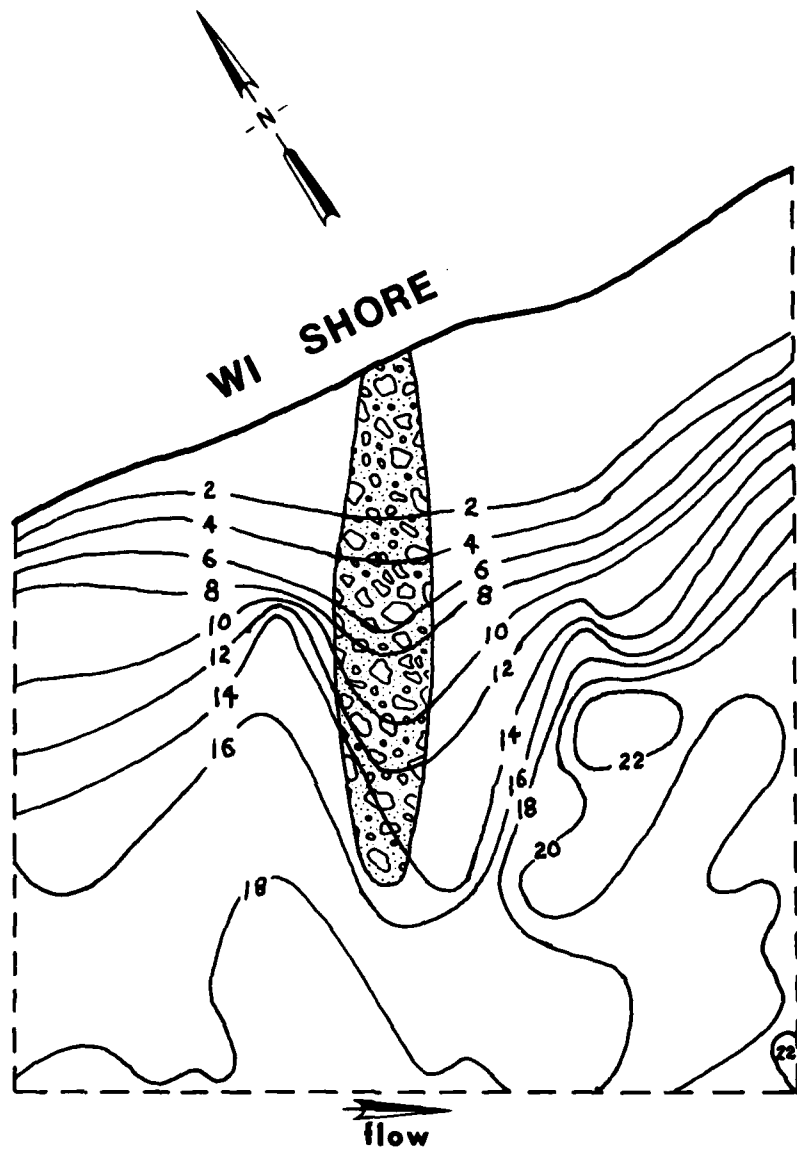
WI 4

LEGEND

- Emergent Rock** 
- Submerged Rock** 
- Sand/Silt** 

1" = 50'

Figure D- 65 General Bathymetric and Substrate Map of Wing Dam WI4



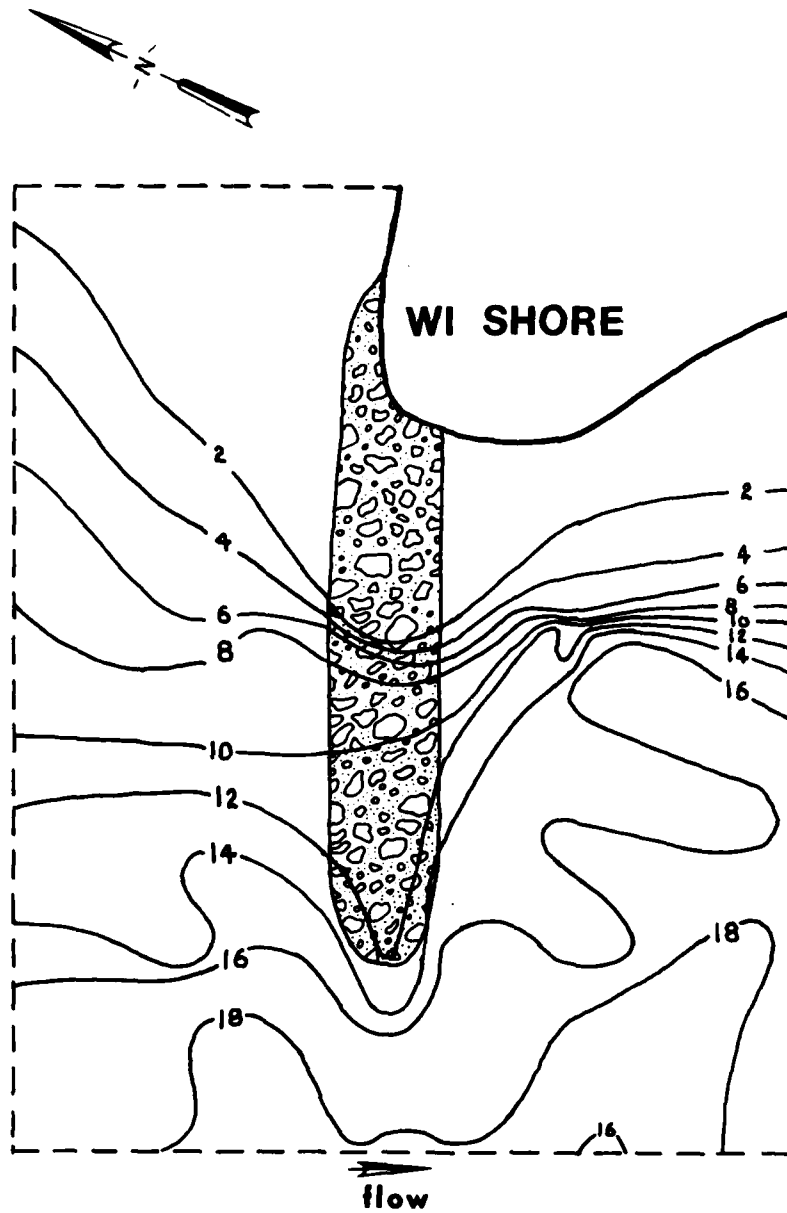
WI 5.

LEGEND

- Emergent Rock** 
- Submerged Rock** 
- Sand/Silt** 

1" = 50'

Figure D- 66 General Bathymetric and Substrate Map of Wing Dam WI5



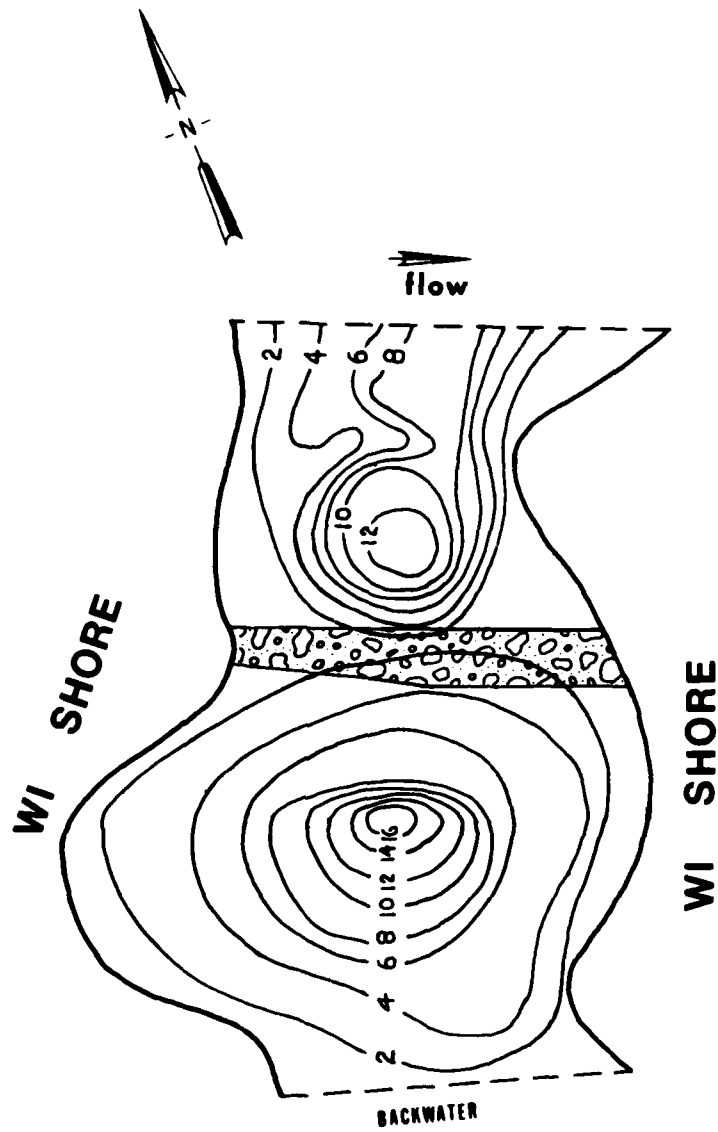
WI 6

LEGEND

- Emergent Rock** 
- Submerged Rock** 
- Sand/Silt** 

1" = 50'

Figure D- 67 General Bathymetric and Substrate Map of Wing Dam WI6



WI 7

1" = 50'




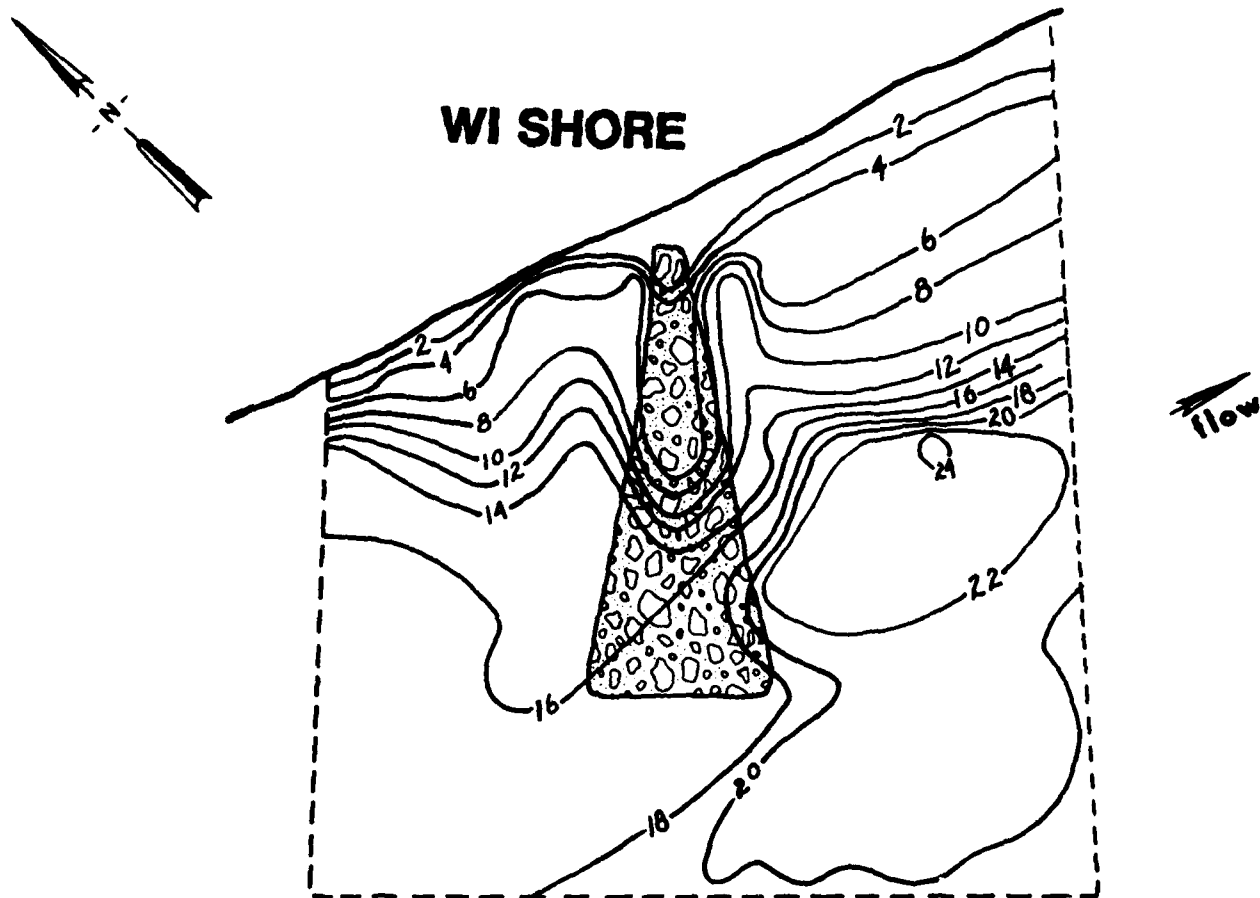
- LEGEND**
- Emergent Rock 
 - Submerged Rock 
 - Sand/Silt 

Figure D-68 General Bathymetric and Substrate Map of Closing Dam WI7



WI 8

1" = 50'

LEGEND




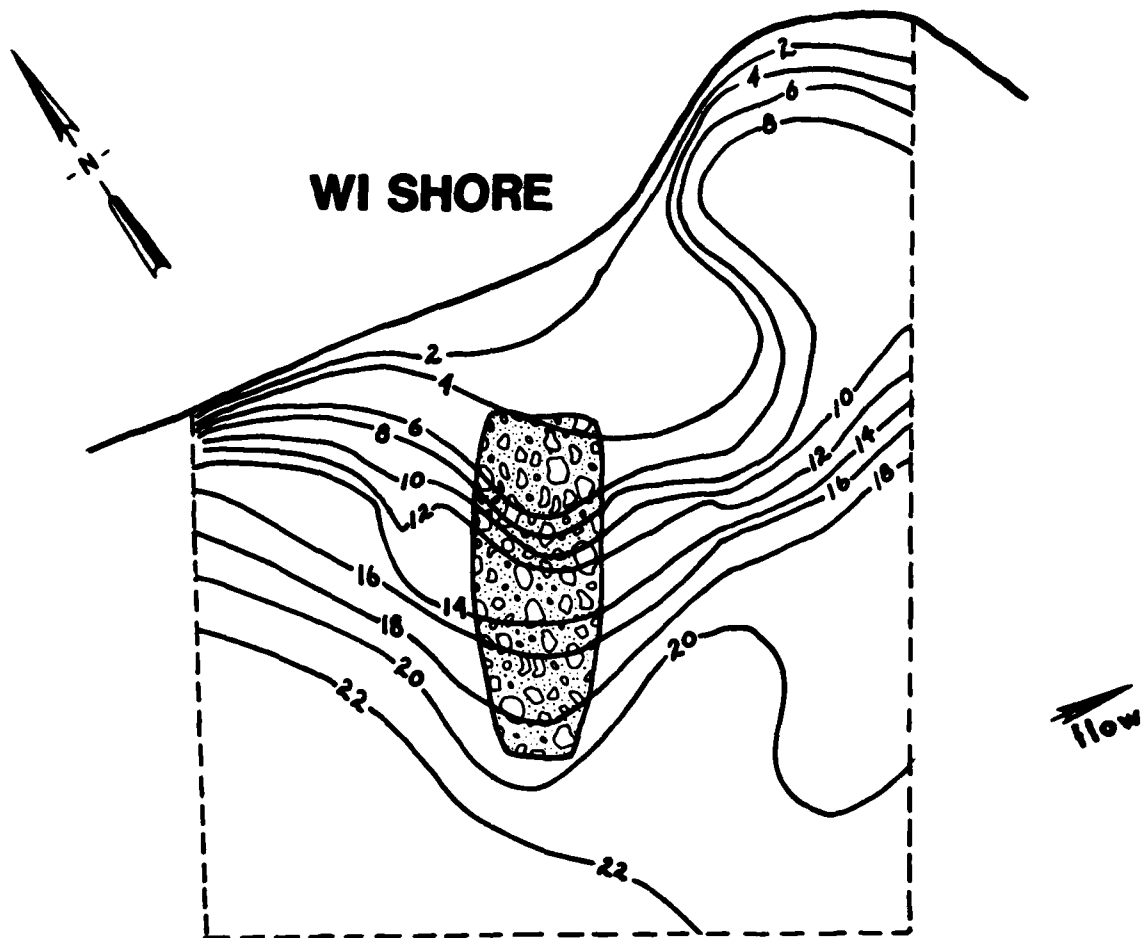
Emergent Rock	
Submerged Rock	
Sand/Silt	

Figure D-69 General Bathymetric and Substrate Map of Wing Dam WI8



WI 10

1" = 50'




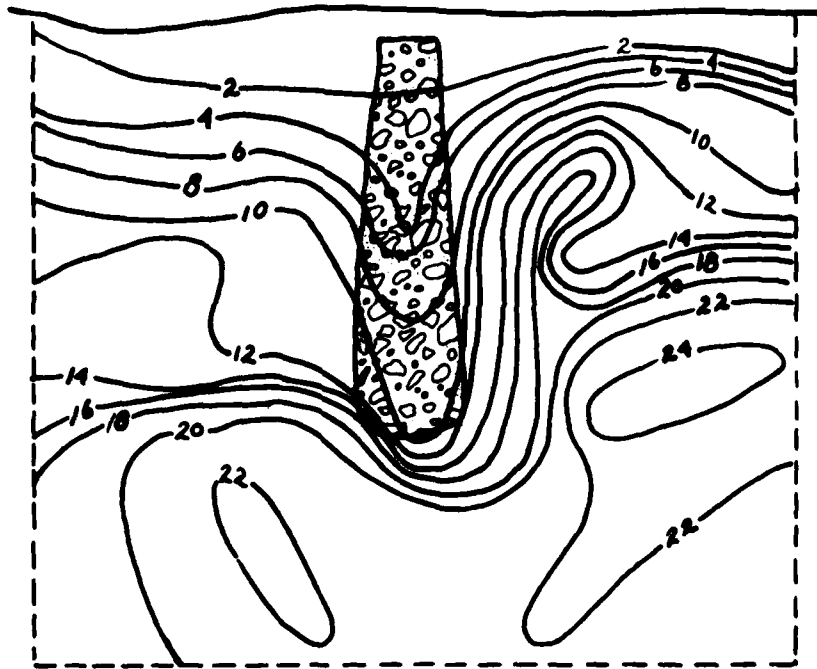
- LEGEND**
- Emergent Rock** 
 - Submerged Rock** 
 - Sand/Silt** 

Figure D-70 General Bathymetric and Substrate Map of Wing Dam WI10





WI SHORE



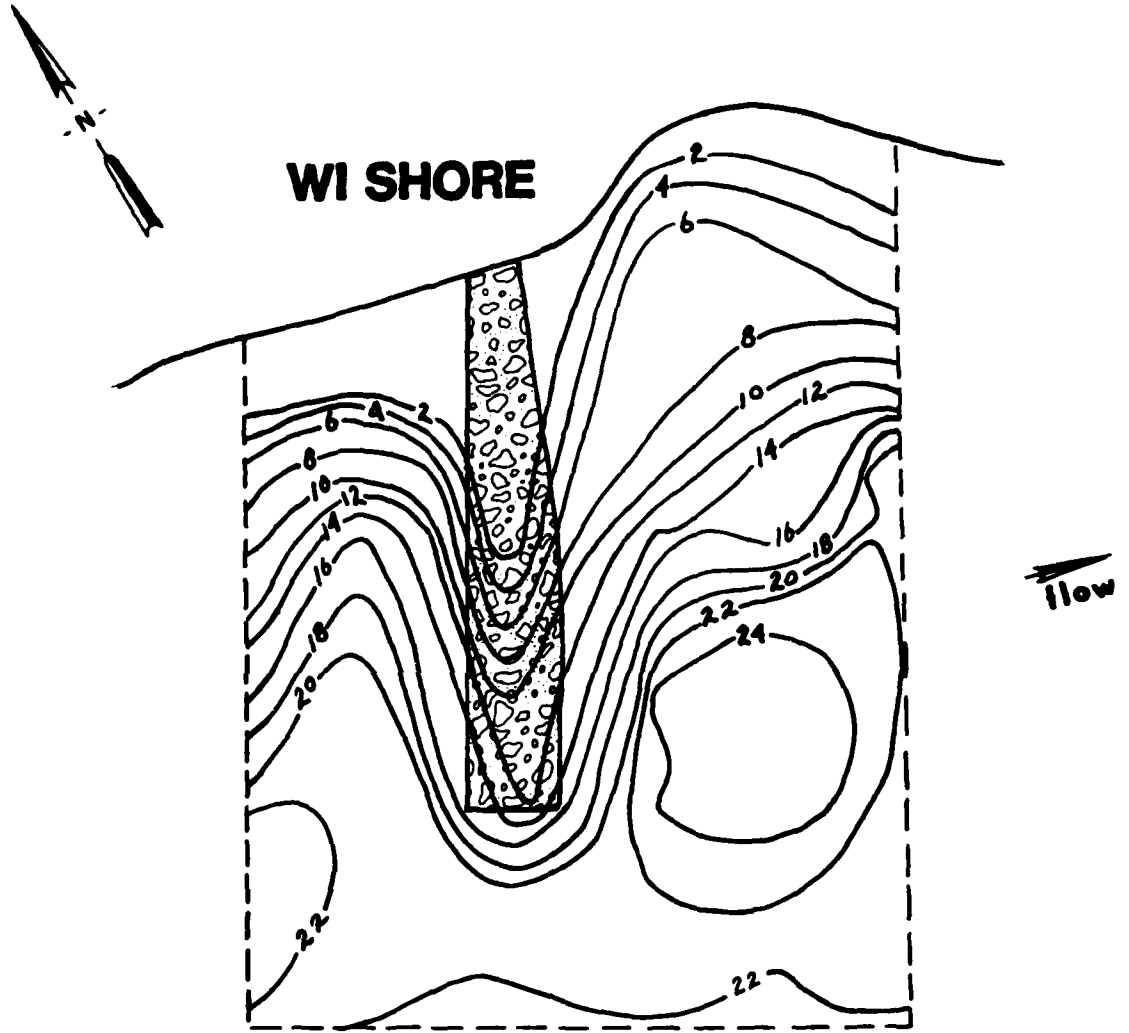
WI 11

LEGEND

- Emergent Rock** 
- Submerged Rock** 
- Sand/Silt** 

1" = 50'

Figure D-71 General Bathymetric and Substrate Map of Wing Dam WI11



WI 12

1" = 50'

LEGEND




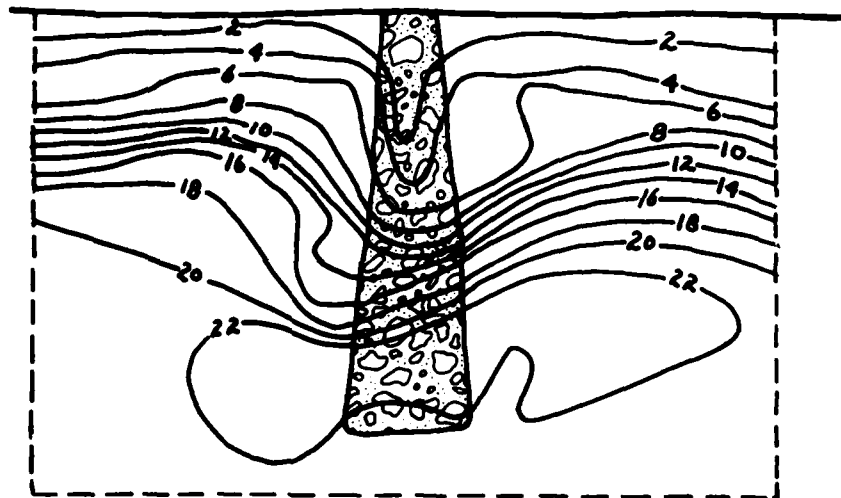
- Emergent Rock** 
- Submerged Rock** 
- Sand/Silt** 

Figure D-72 General Bathymetric and Substrate Map of Wing Dam WI12



WI SHORE



WI 13

1" = 50'

LEGEND

- Emergent Rock** 
- Submerged Rock** 
- Sand/Silt** 

Figure D-75 General Bathymetric and Substrate Map of Wing Dam WI13

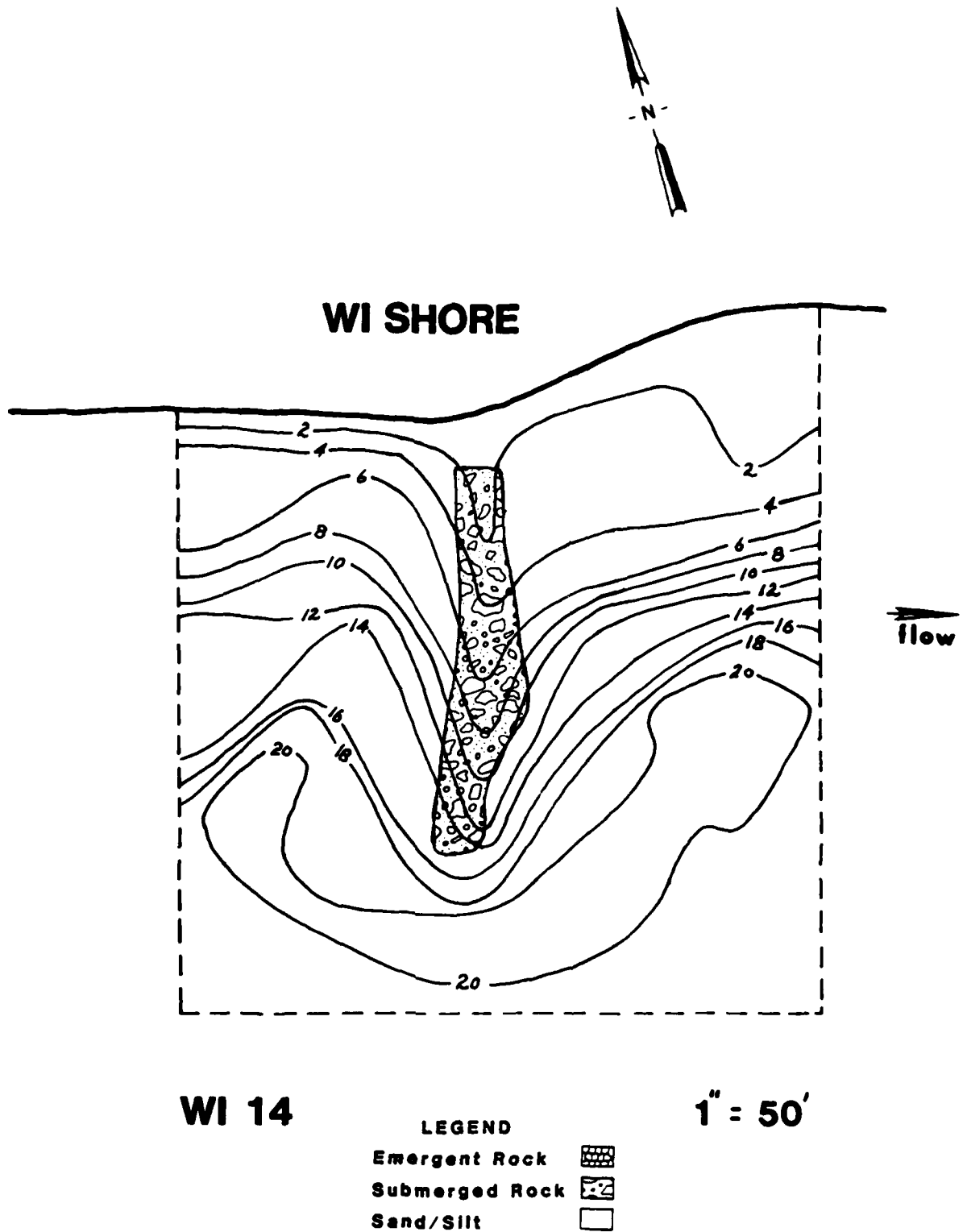
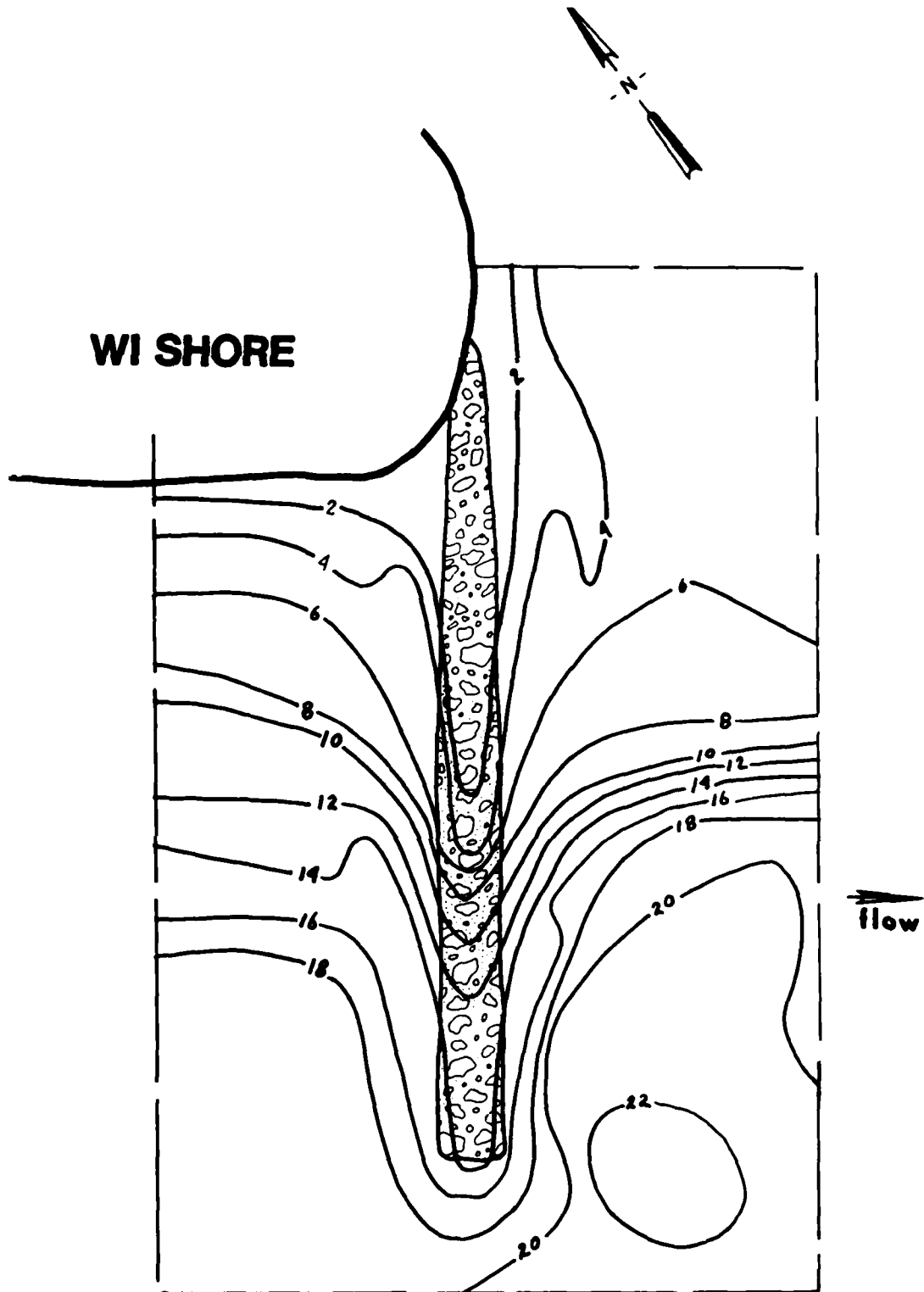


Figure D-74 General Bathymetric and Substrate Map of Wing Dam WI14



WI 15

LEGEND

- Emergent Rock** 
- Submerged Rock** 
- Sand/Silt** 

1" = 50'

Figure D-75 General Bathymetric and Substrate Map of Wing Dam WI15

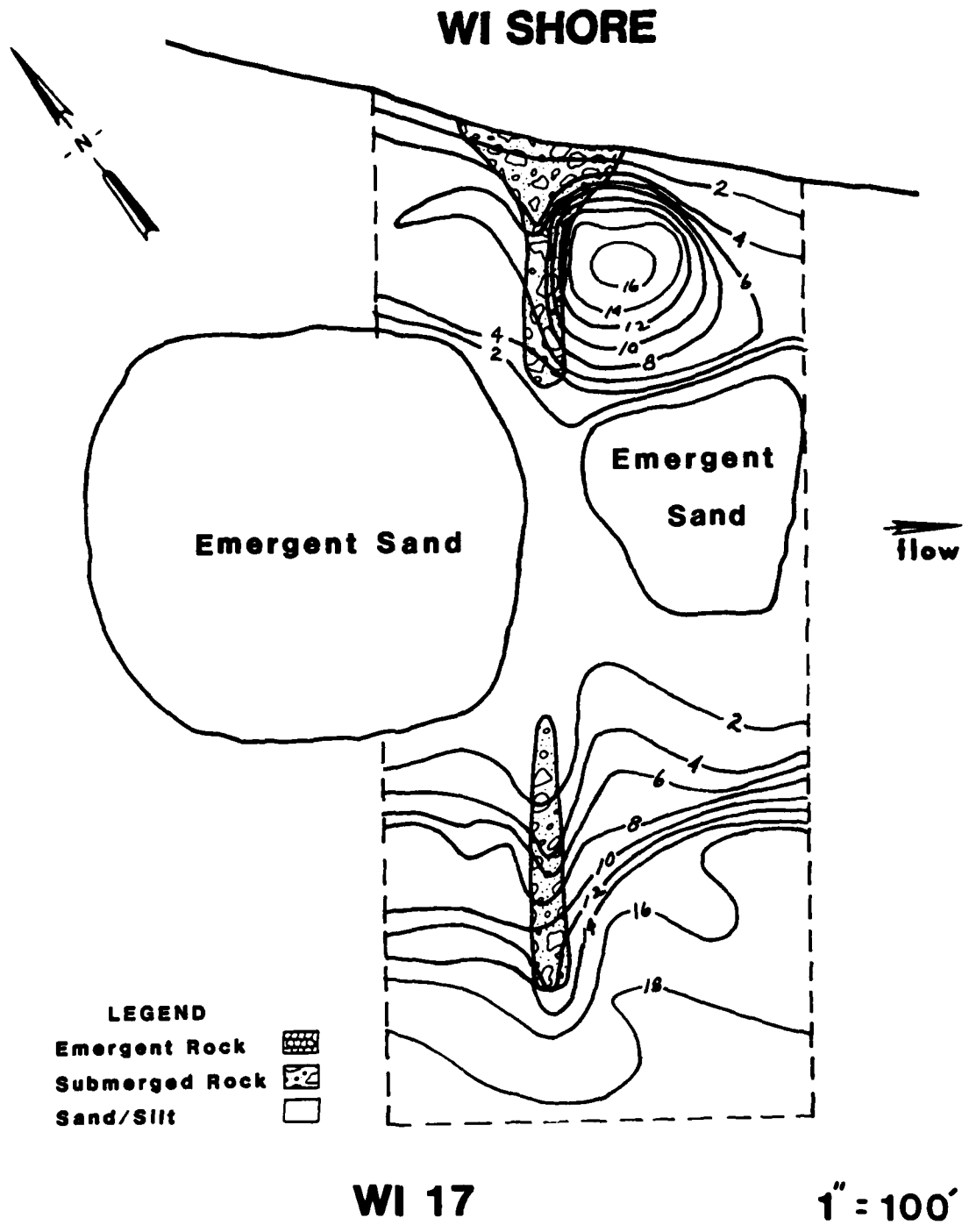
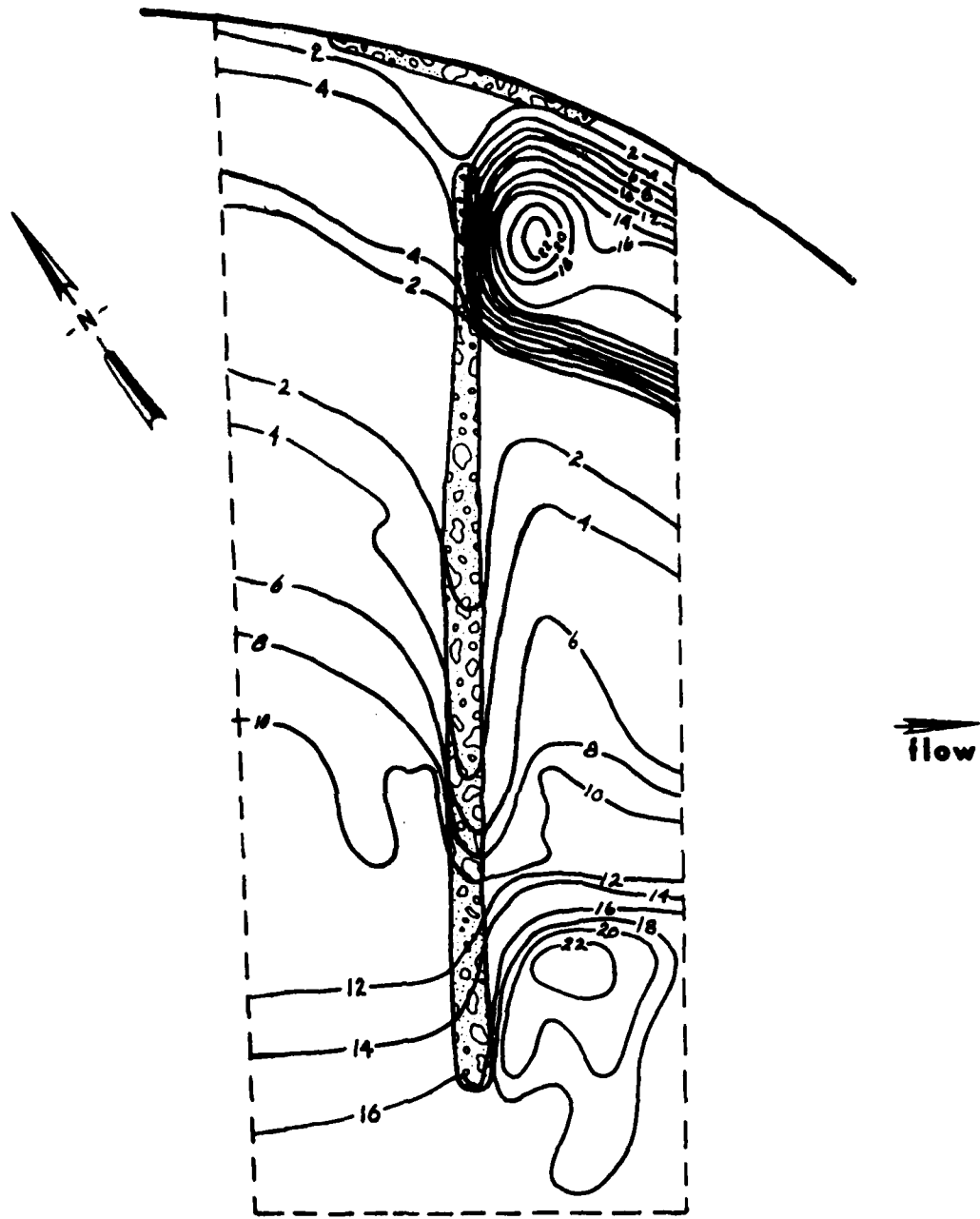


Figure D-76 General Bathymetric and Substrate Map of Wing Dam WI17

WI SHORE



WI 18

1" = 100'

LEGEND

- Emergent Rock 
- Submerged Rock 
- Sand/Silt 

Figure D-77 General Bathymetric and Substrate Map of Wing Dam WI18

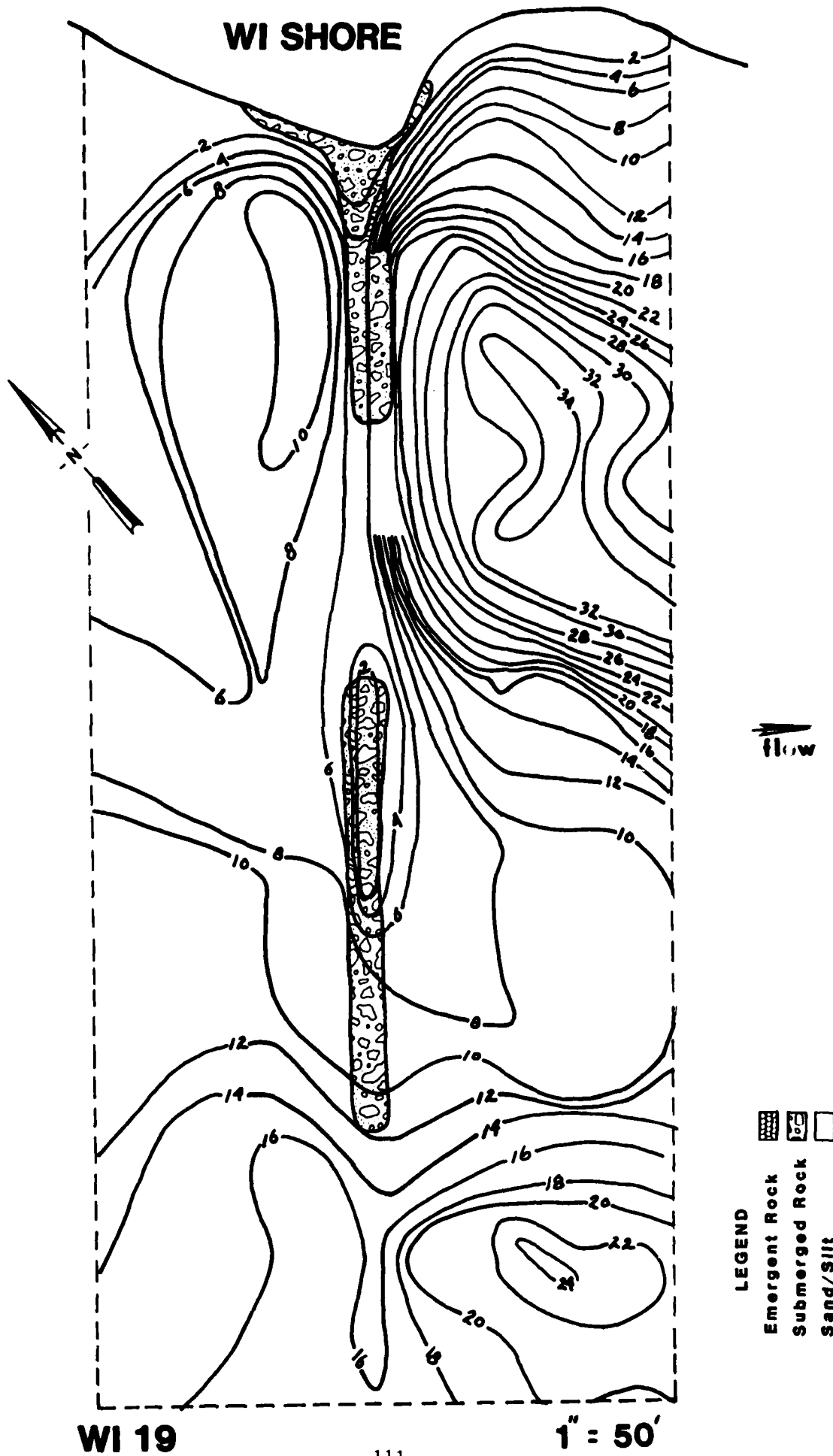


Figure D-78 General Bathymetric and Substrate Map of Wing Dam WI19

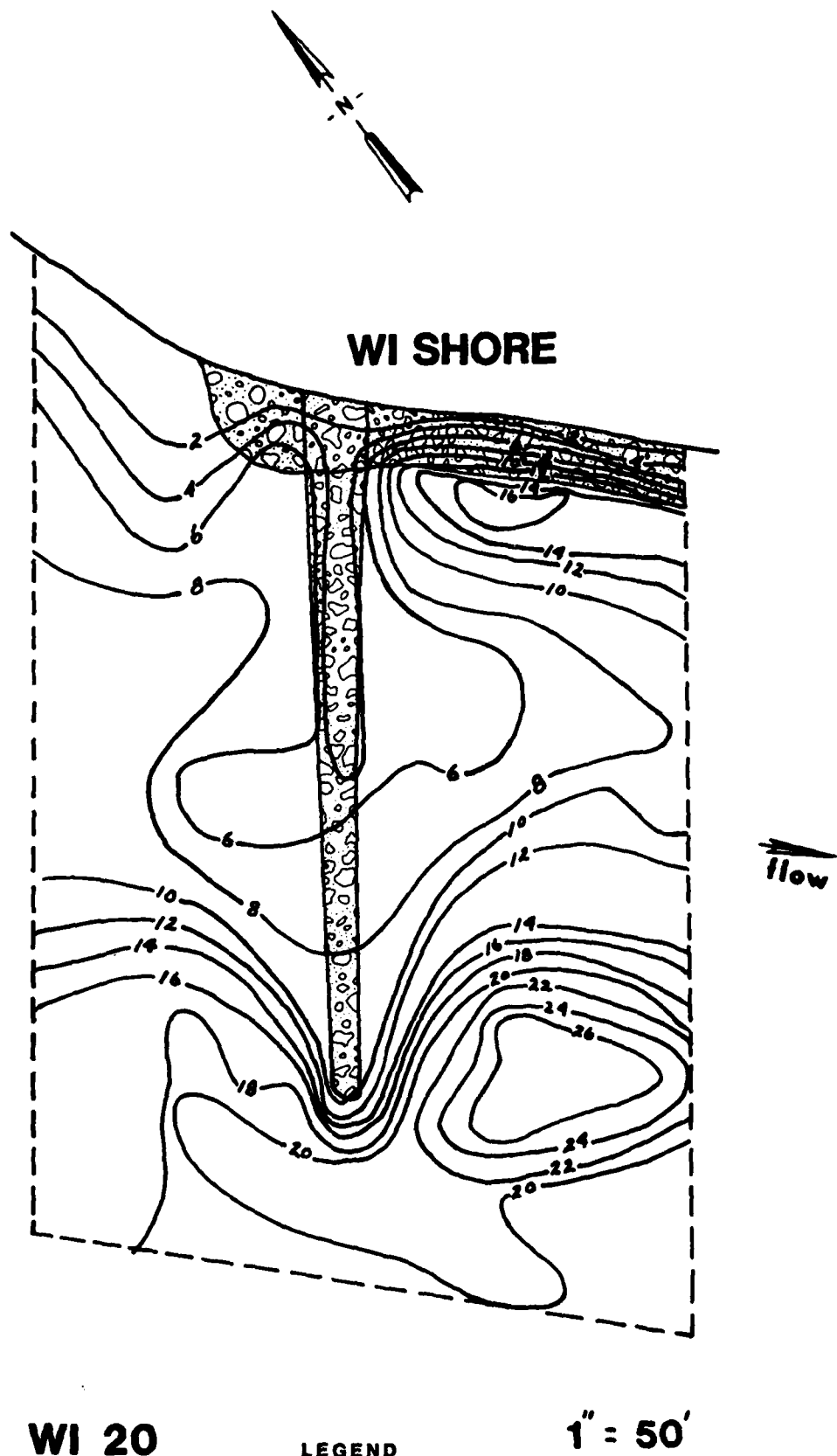
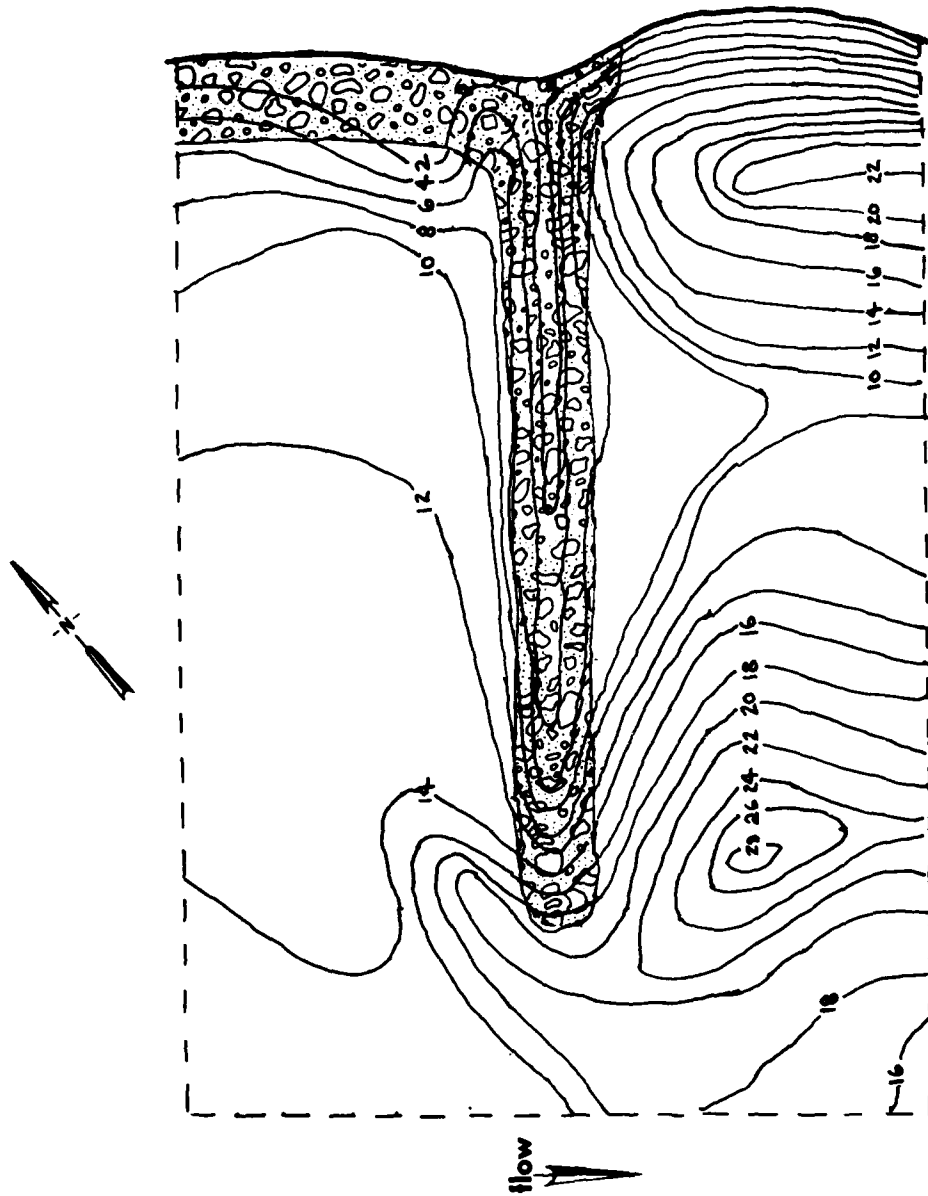


Figure D-79 General Bathymetric and Substrate Map of Wing Dam WI20

WI SHORE



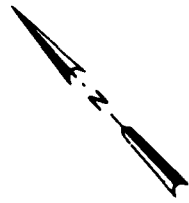
WI 22

LEGEND

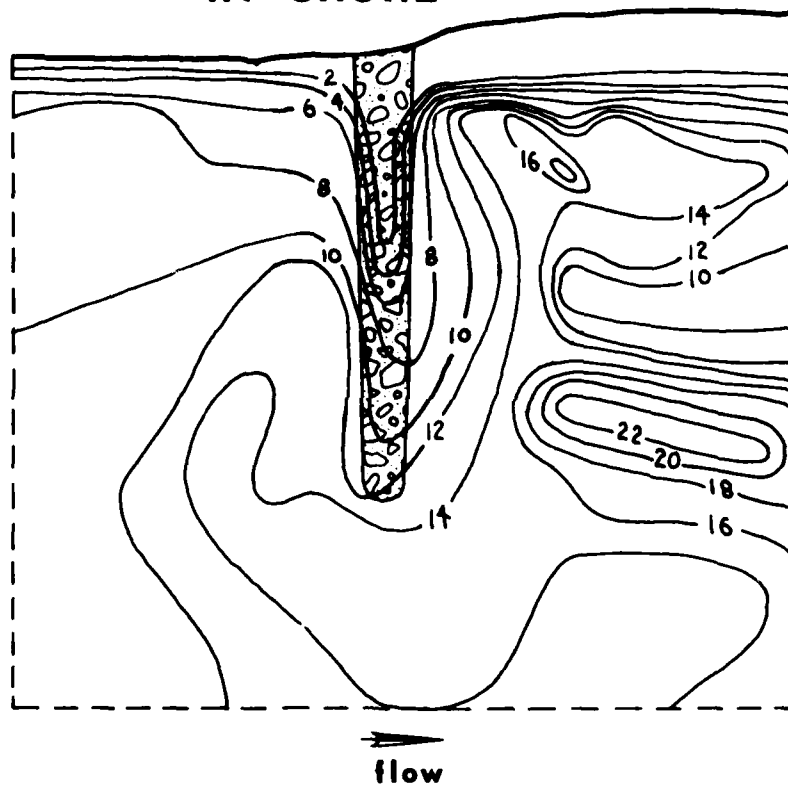
- Emergent Rock 
- Submerged Rock 
- Sand/Silt 

1" = 50'

Figure D-80 General Bathymetric and Substrate Map of Wing Dam WI22



WI SHORE



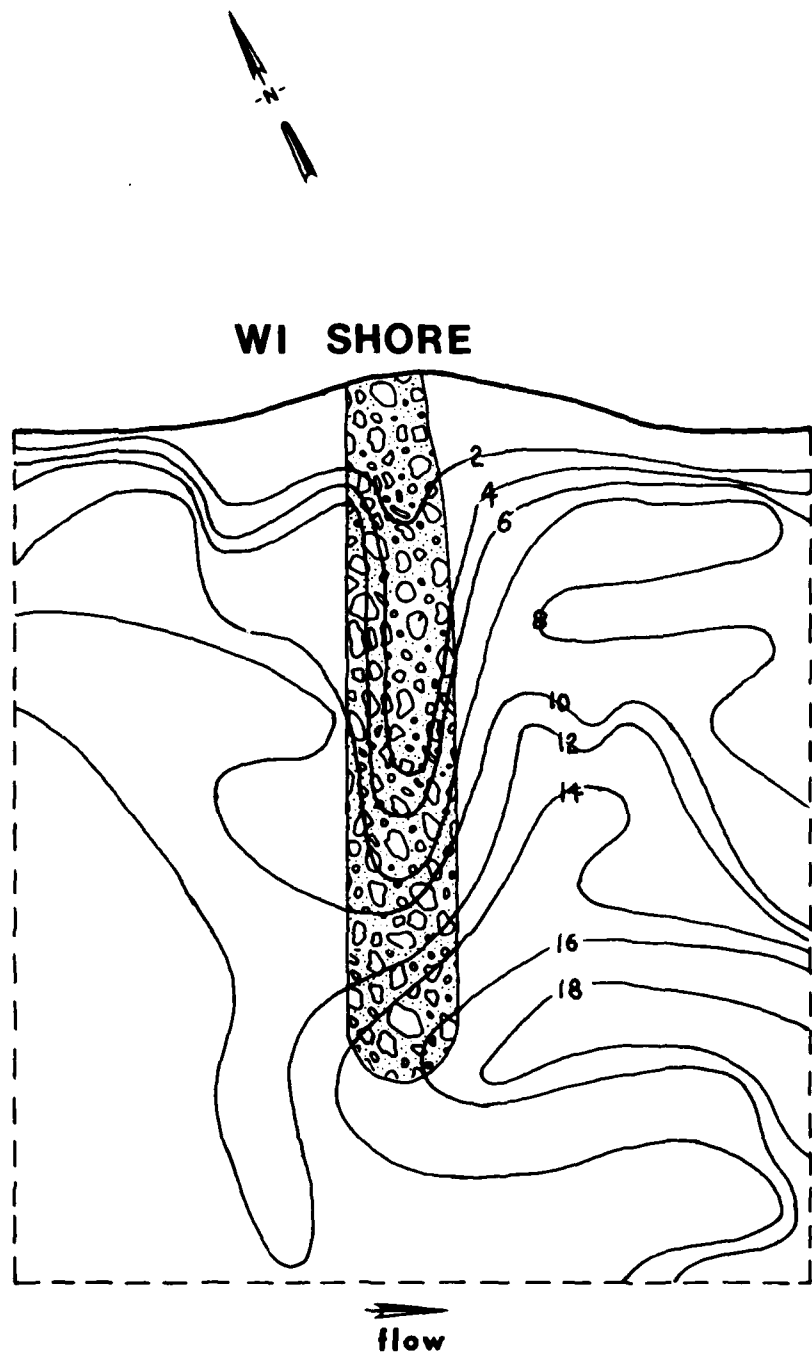
WI 23

LEGEND

- Emergent Rock 
- Submerged Rock 
- Sand/Silt 

1" = 50'

Figure D-81 General Bathymetric and Substrate Map of Wing Dam WI23



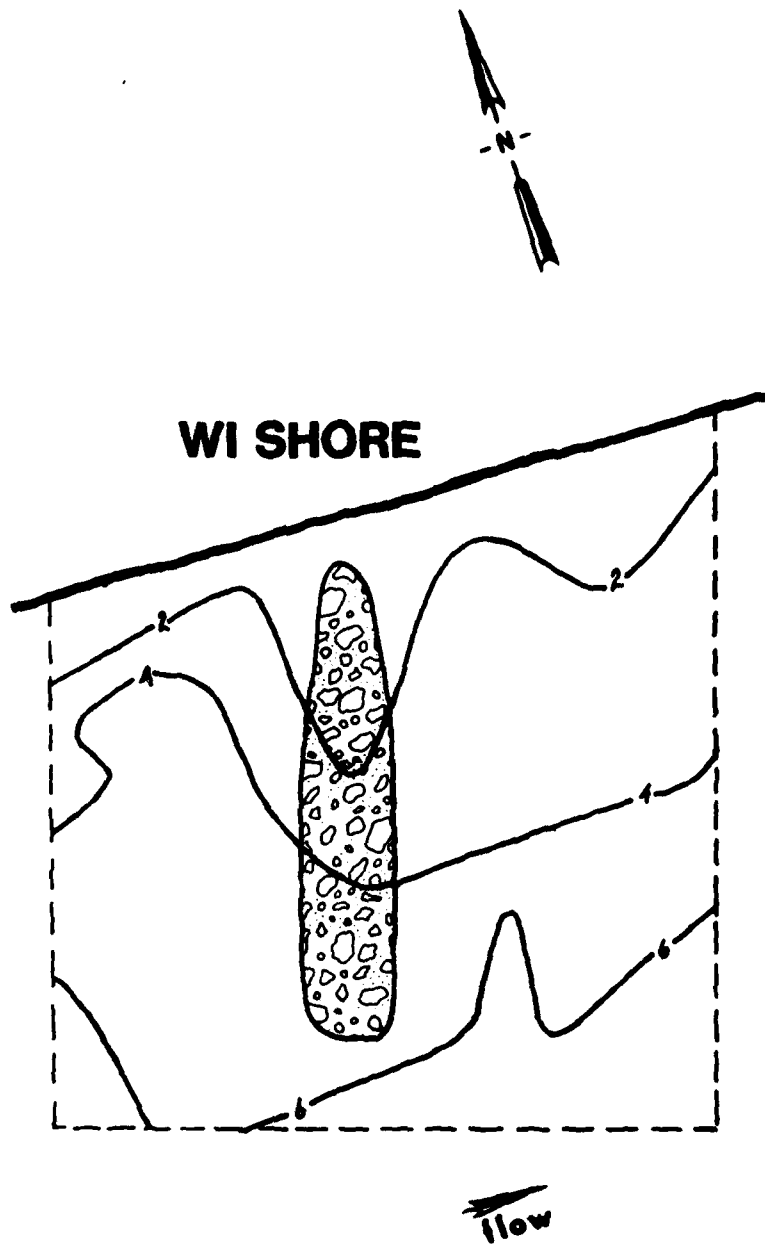
WI 25

LEGEND

- Emergent Rock** 
- Submerged Rock** 
- Sand/Silt** 

1" = 50'

Figure D-82 General Bathymetric and Substrate Map of Wing Dam WI25



WI 26

1" = 50'

LEGEND




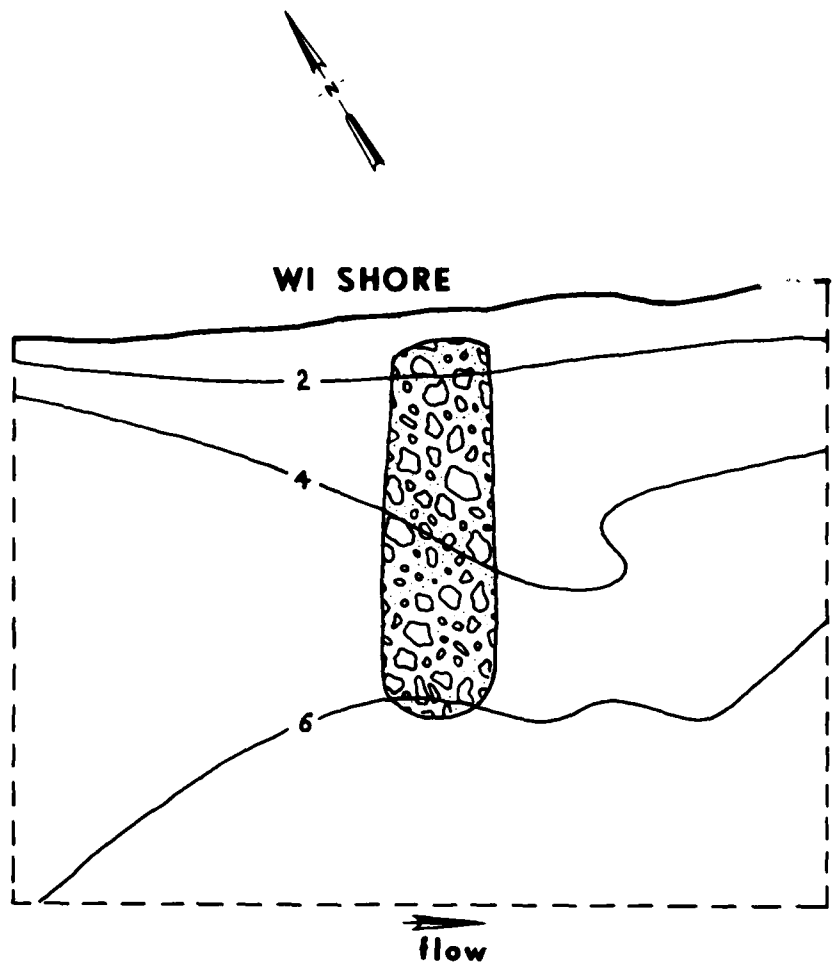



Emergent Rock	
Submerged Rock	
Sand/Silt	

Figure D-83 General Bathymetric and Substrate Map of Wing Dam WI26



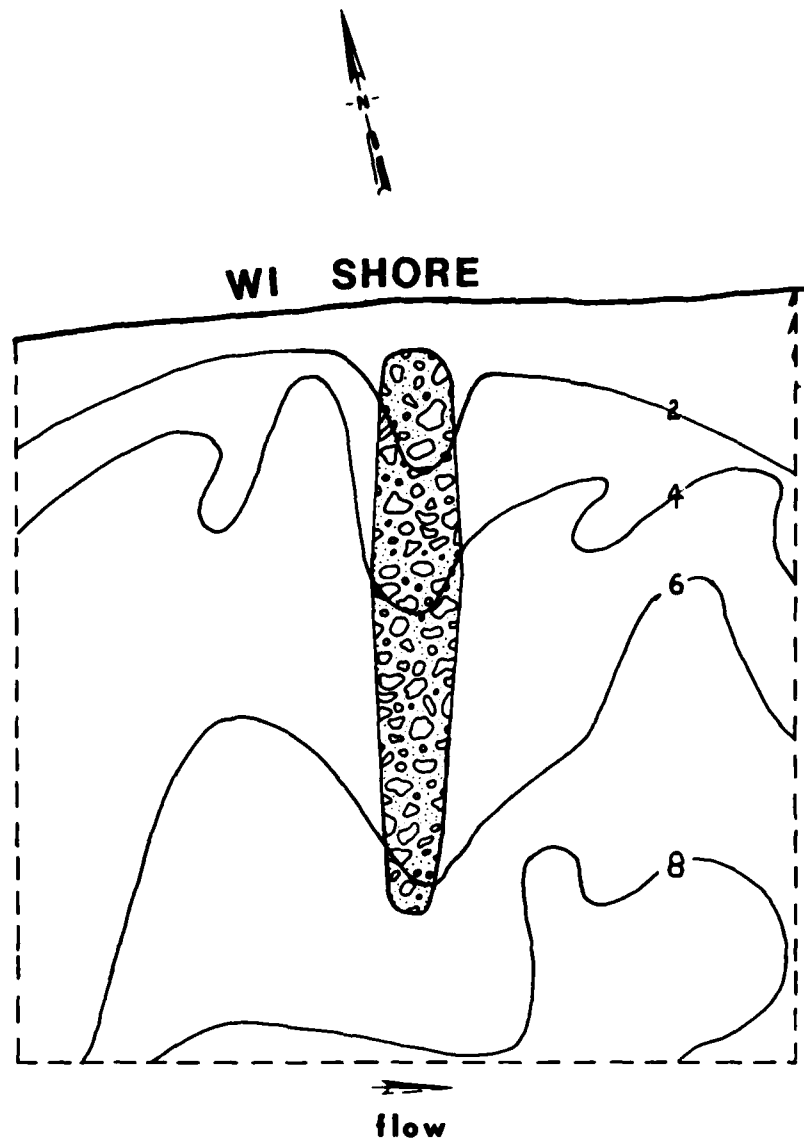
WI 27

LEGEND

- Emergent Rock 
- Submerged Rock 
- Sand/Silt 

1" = 50'

Figure D-84 General Bathymetric and Substrate Map of Wing Dam WI27



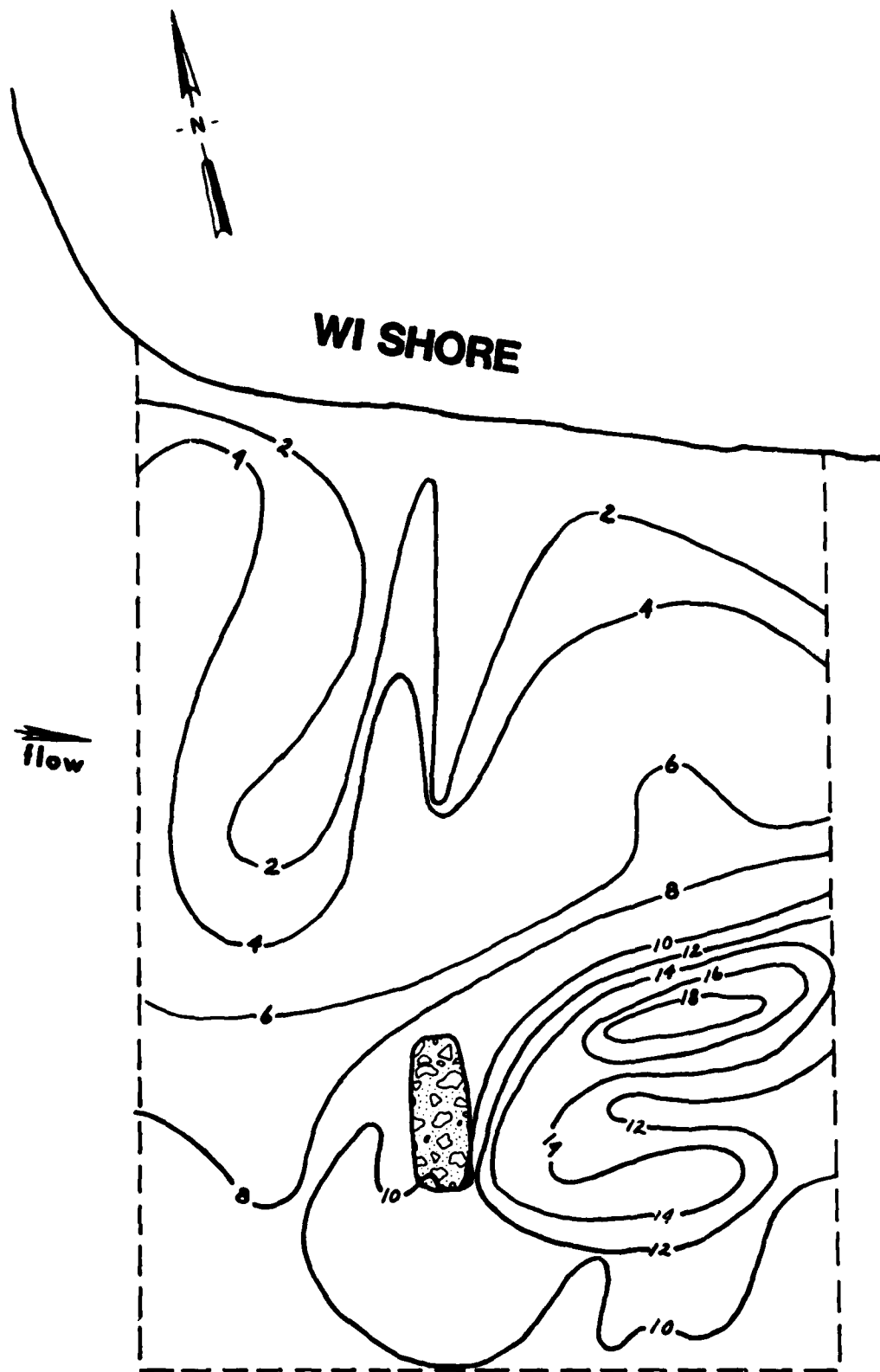
WI 28

LEGEND

- Emergent Rock** 
- Submerged Rock** 
- Sand/Silt** 

1" = 50'

Figure D-85 General Bathymetric and Substrate Map of Wing Dam WI28



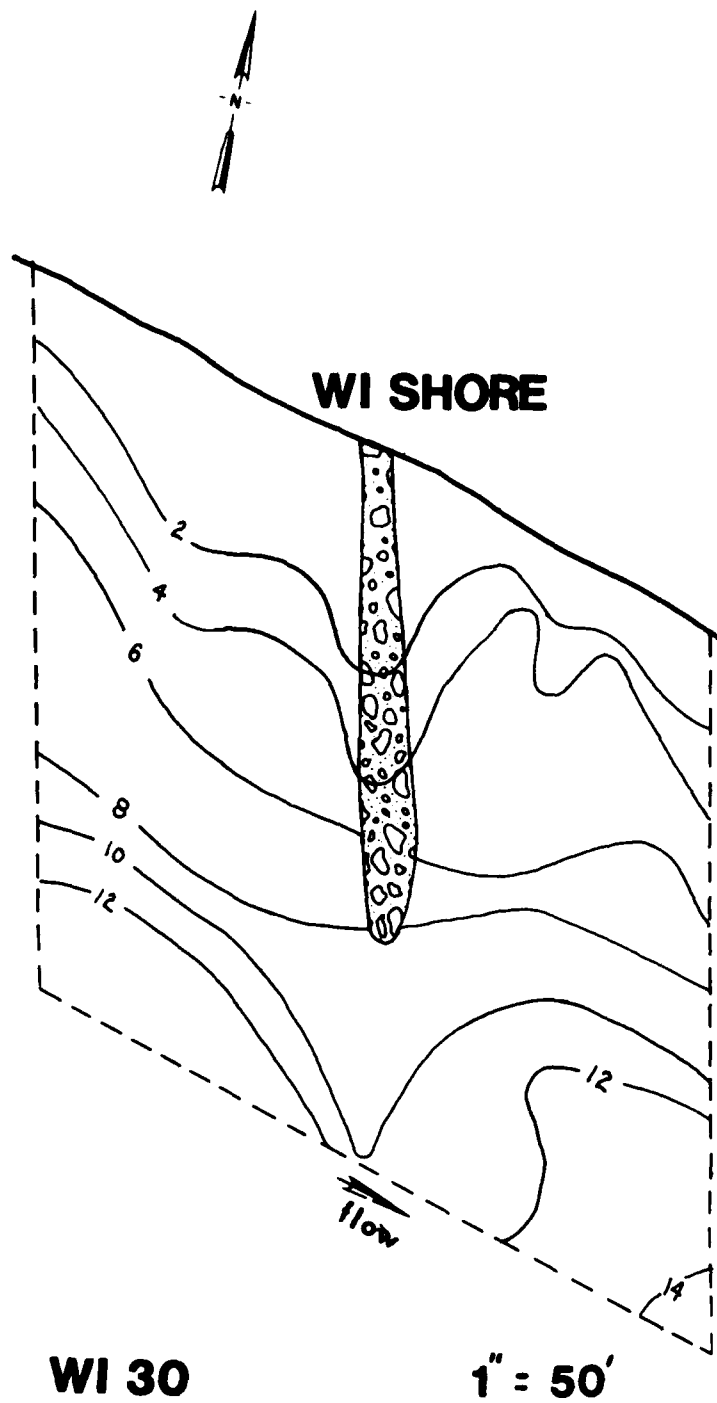
WI 29

LEGEND

- Emergent Rock 
- Submerged Rock 
- Sand/Silt 

1" = 50'

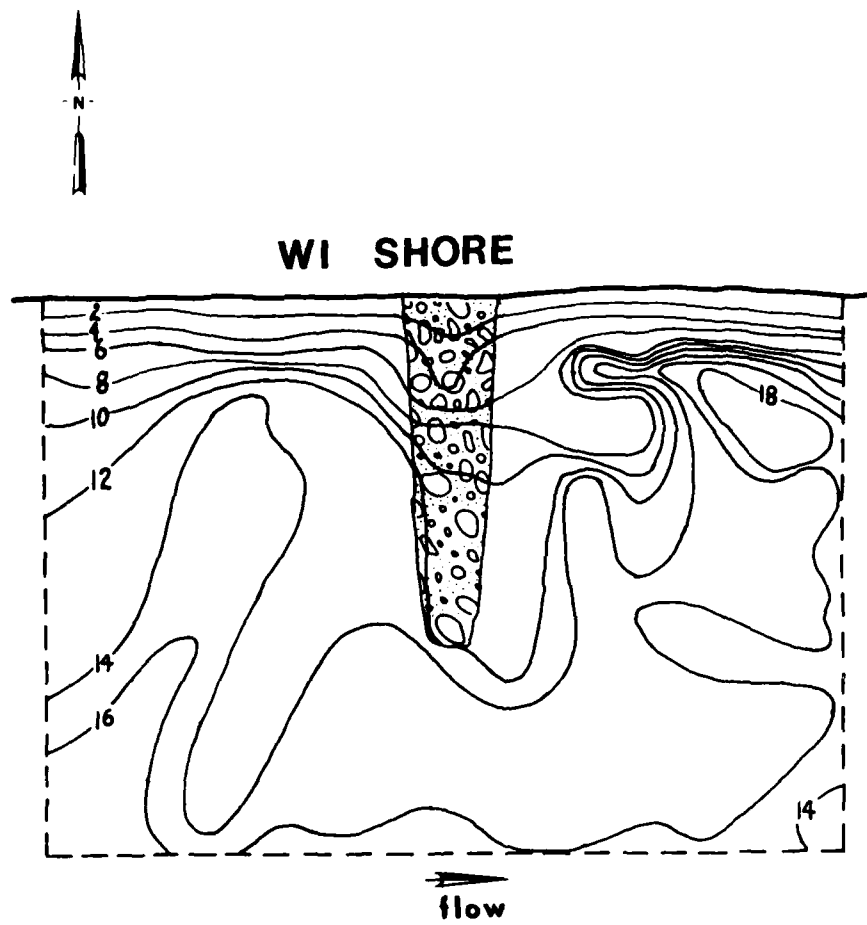
Figure D-86 General Bathymetric and Substrate Map of Wing Dam WI29



LEGEND

Emergent Rock	
Submerged Rock	
Sand/Silt	

Figure D-87 General Bathymetric and Substrate Map of Wing Dam WI30

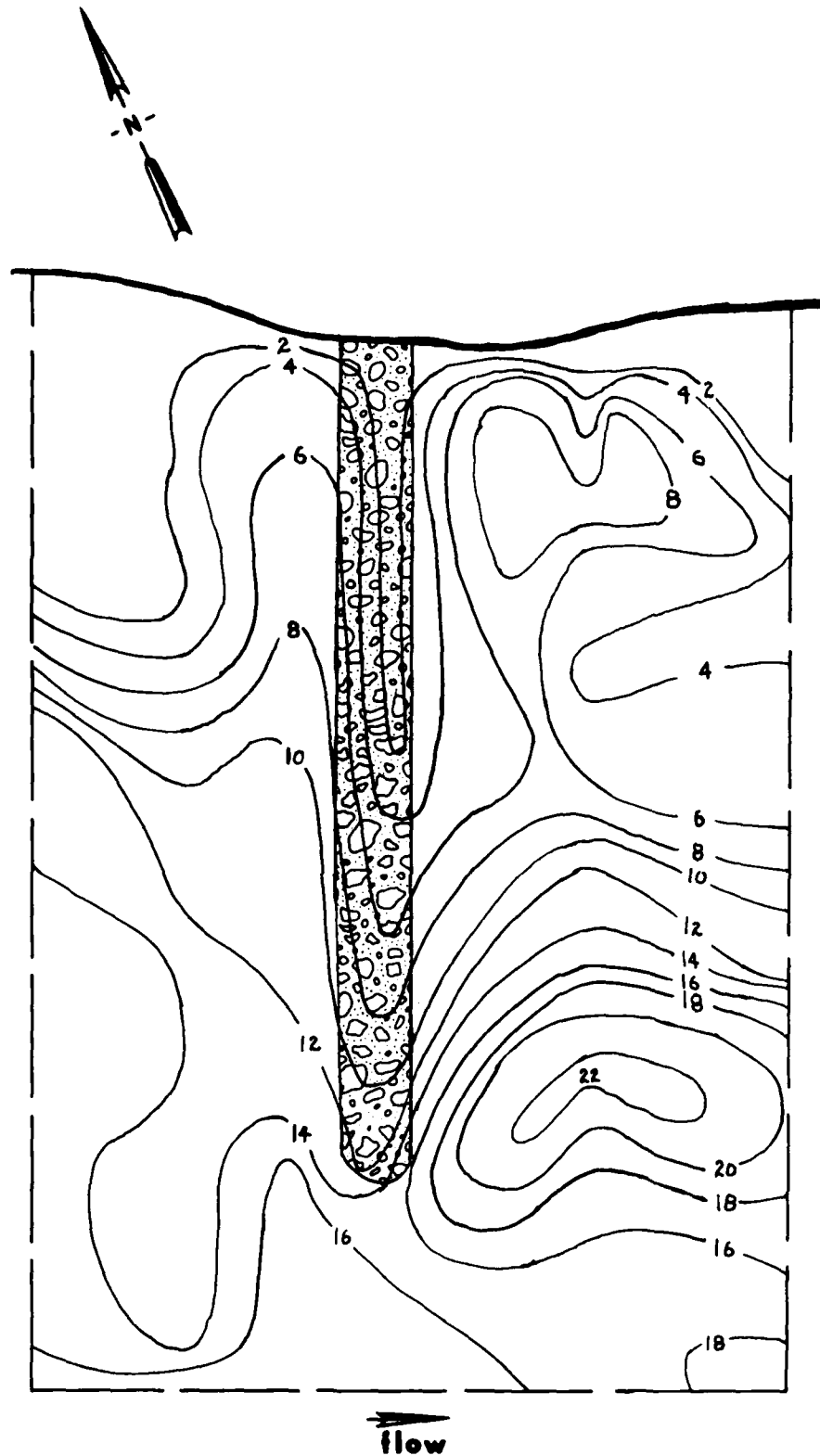


WI 32




1" = 50'

- LEGEND**
- Emergent Rock**
 - Submerged Rock**
 - Sand/Silt**

Figure D-88 General Bathymetric and Substrate Map of Wing Dam WI32

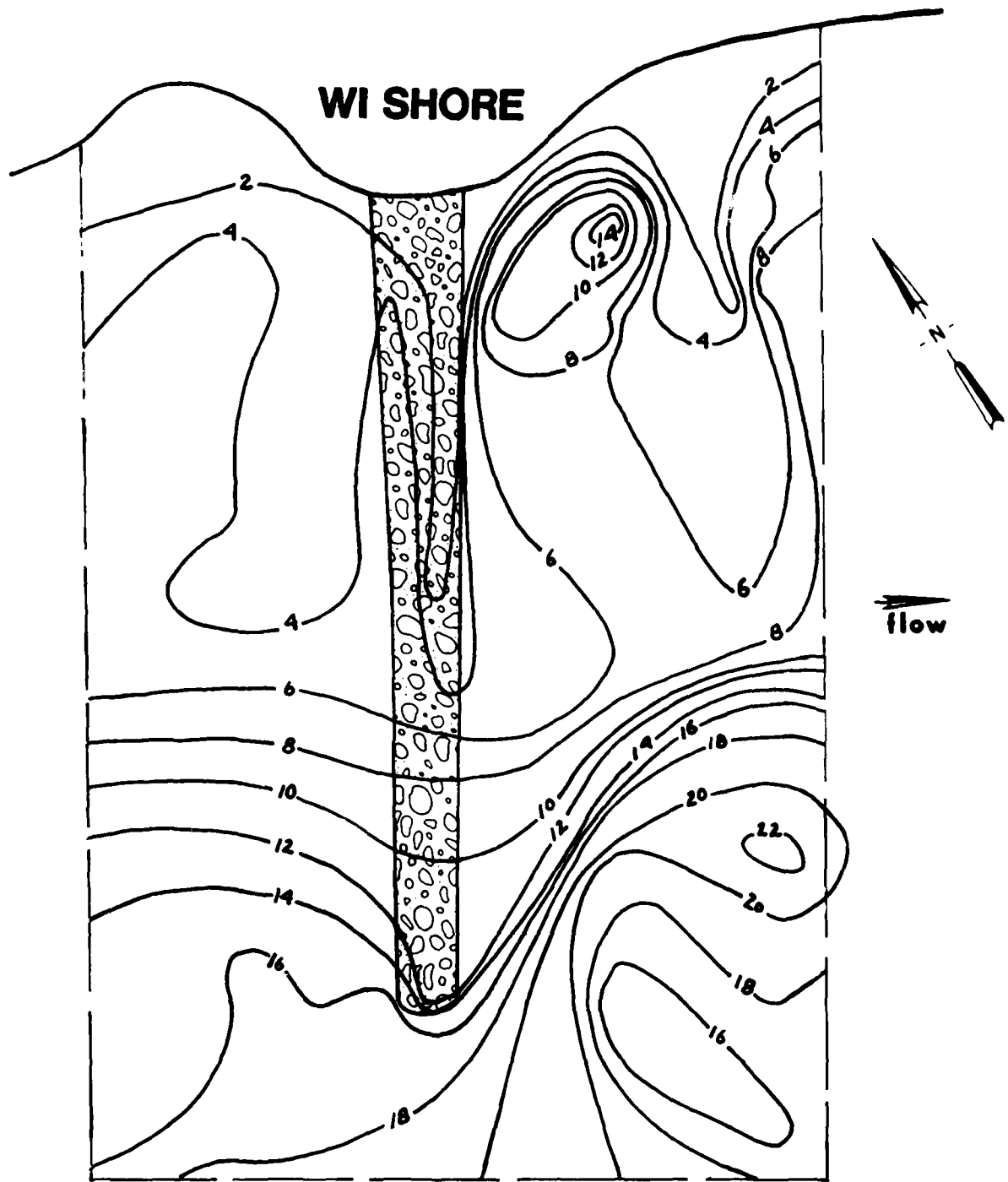


WI 33

LEGEND
 Emergent Rock 
 Submerged Rock 
 Sand/Silt 

1" = 50'

Figure D-89 General Bathymetric and Substrate Map of Wing Dam WI33



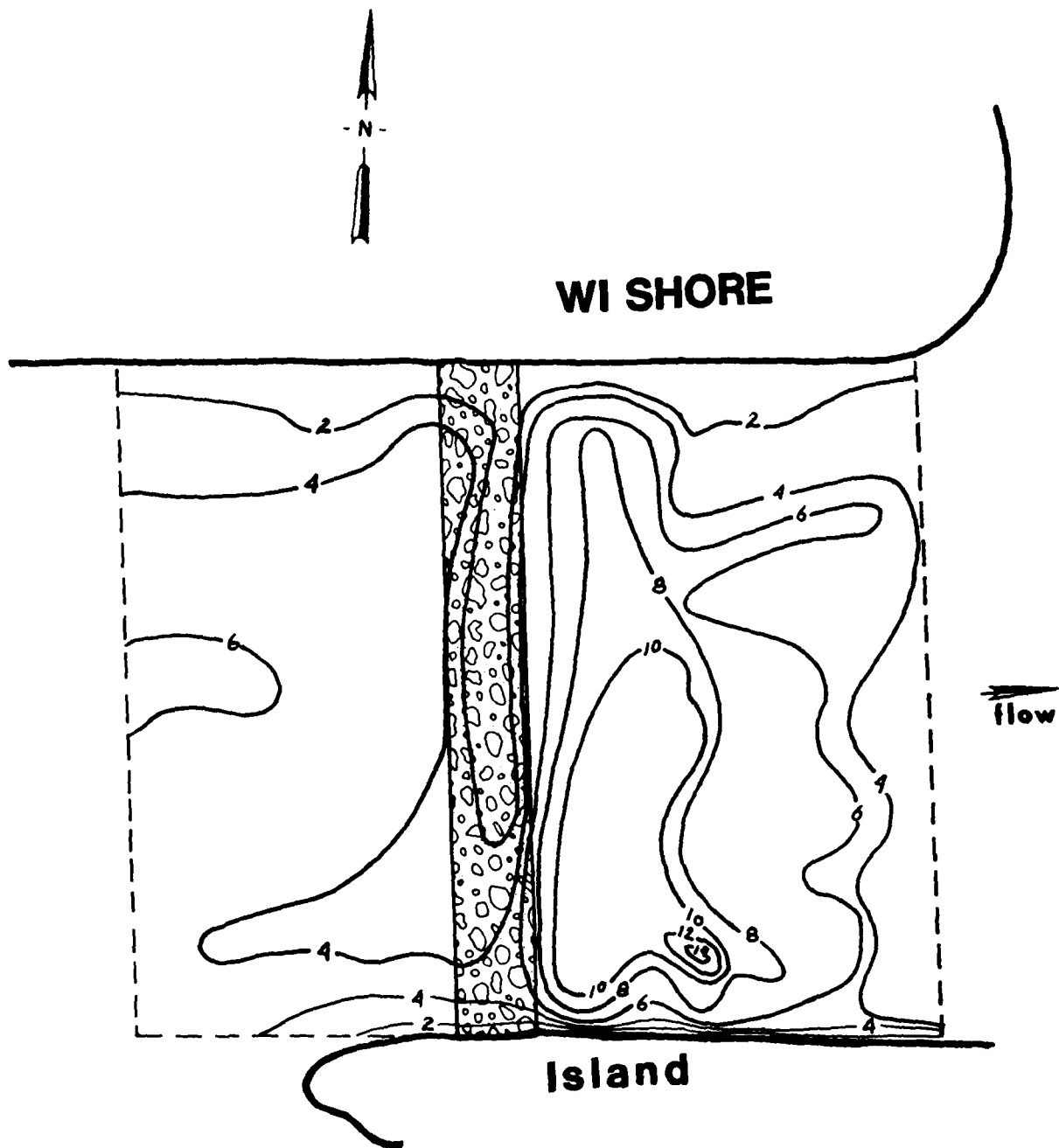
WI 34

LEGEND

- Emergent Rock 
- Submerged Rock 
- Sand/Silt 

1" = 50'

Figure D-90 General Bathymetric and Substrate Map of Wing Dam WI34



WI 35

1" = 50'




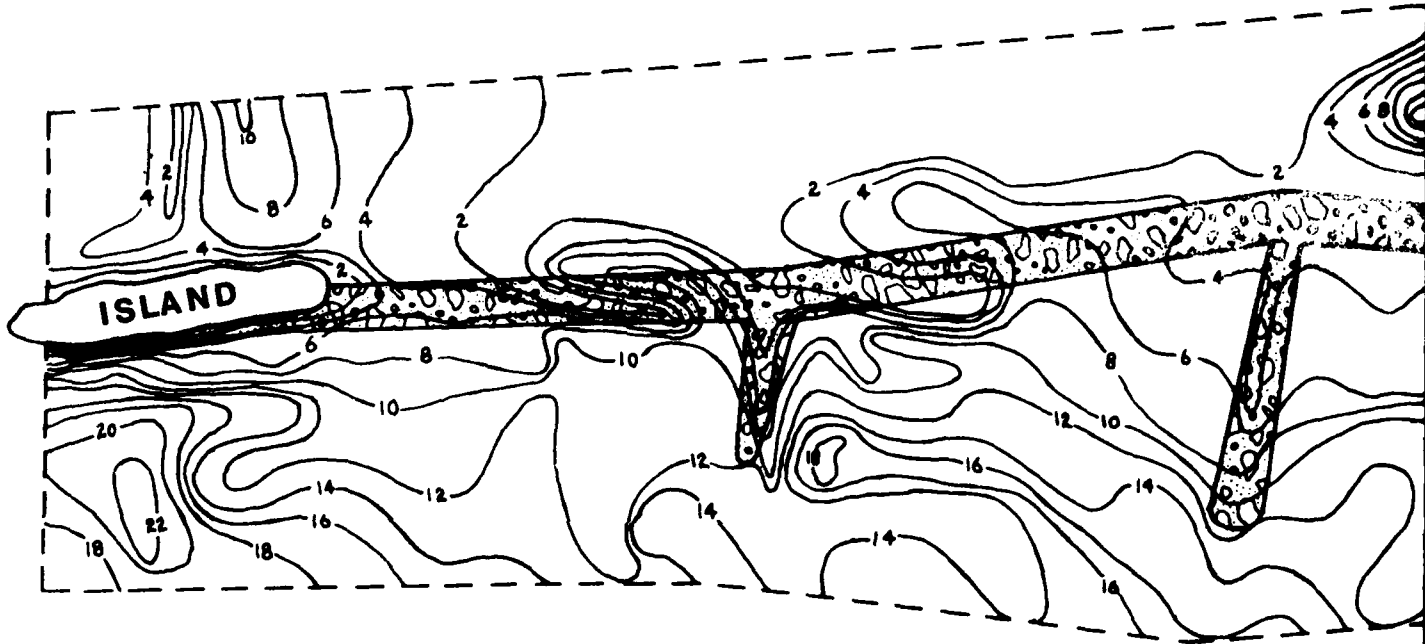
- LEGEND**
- Emergent Rock** 
 - Submerged Rock** 
 - Sand/Silt** 

Figure D-91 General Bathymetric and Substrate Map of Closing Dam WI35

W39



LEGEND

- Emergent Rock 
- Submerged Rock 
- Sand/Silt 

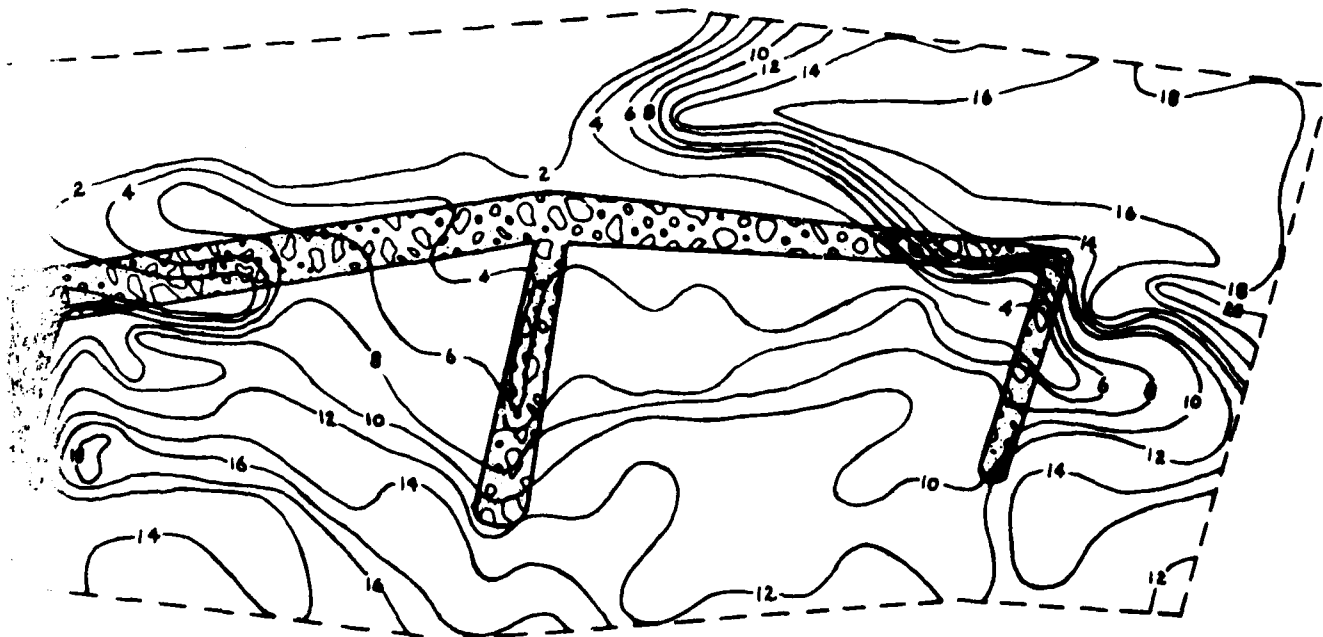
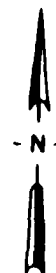
W36

W37

Figure D-92 General Bathymetric and Substrate Map of Wing Dam WI36, WI37, WI38, and

10/2

W39



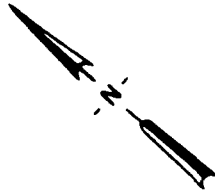
1" = 100'

W37

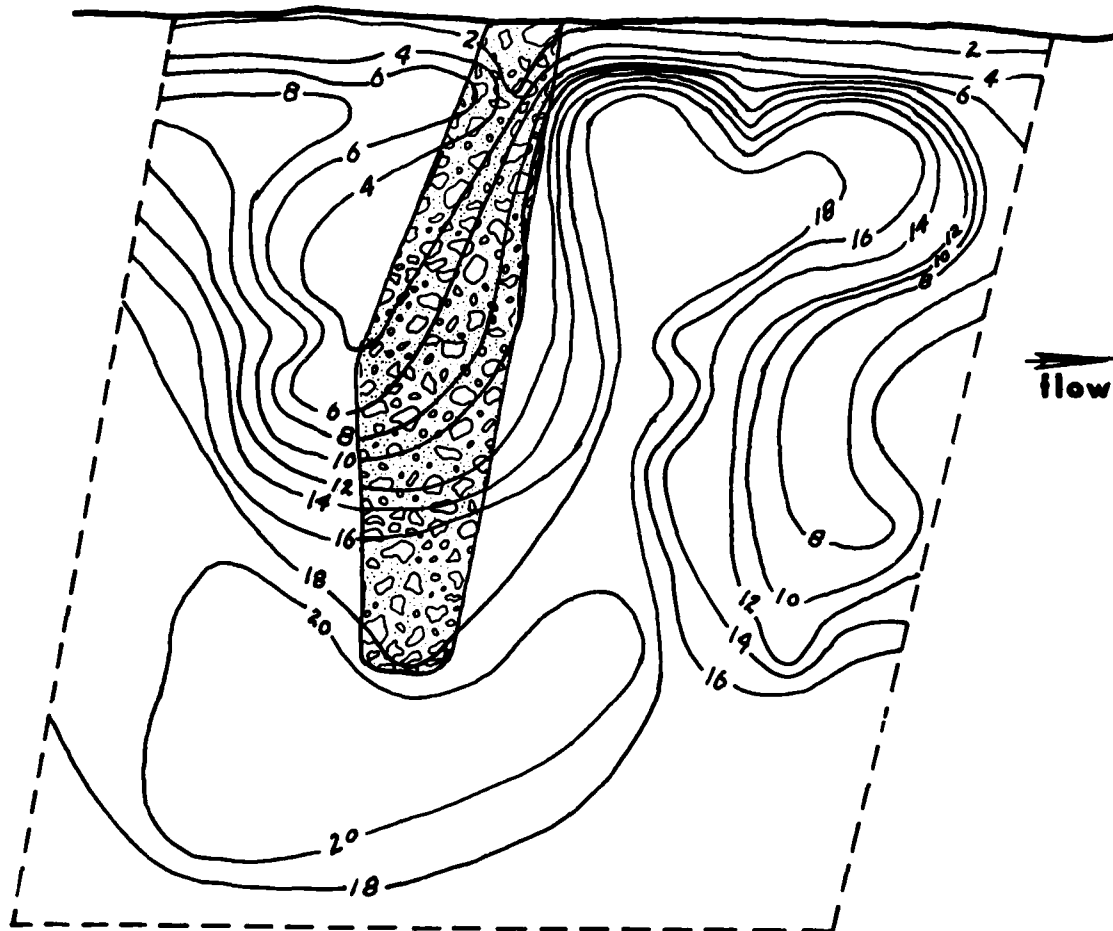
W38

Map of Wing Dam WI36, WI37, WI38, and Closing Dam WI39

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WI SHORE



WI 41

LEGEND

- Emergent Rock 
- Submerged Rock 
- Sand/Silt 

1" = 50'

Figure D-93 General Bathymetric and Substrate Map of Wing Dam WI41

WI SHORE

Figure D-91 General Bat



WI 42, 43, 44

1 of 3

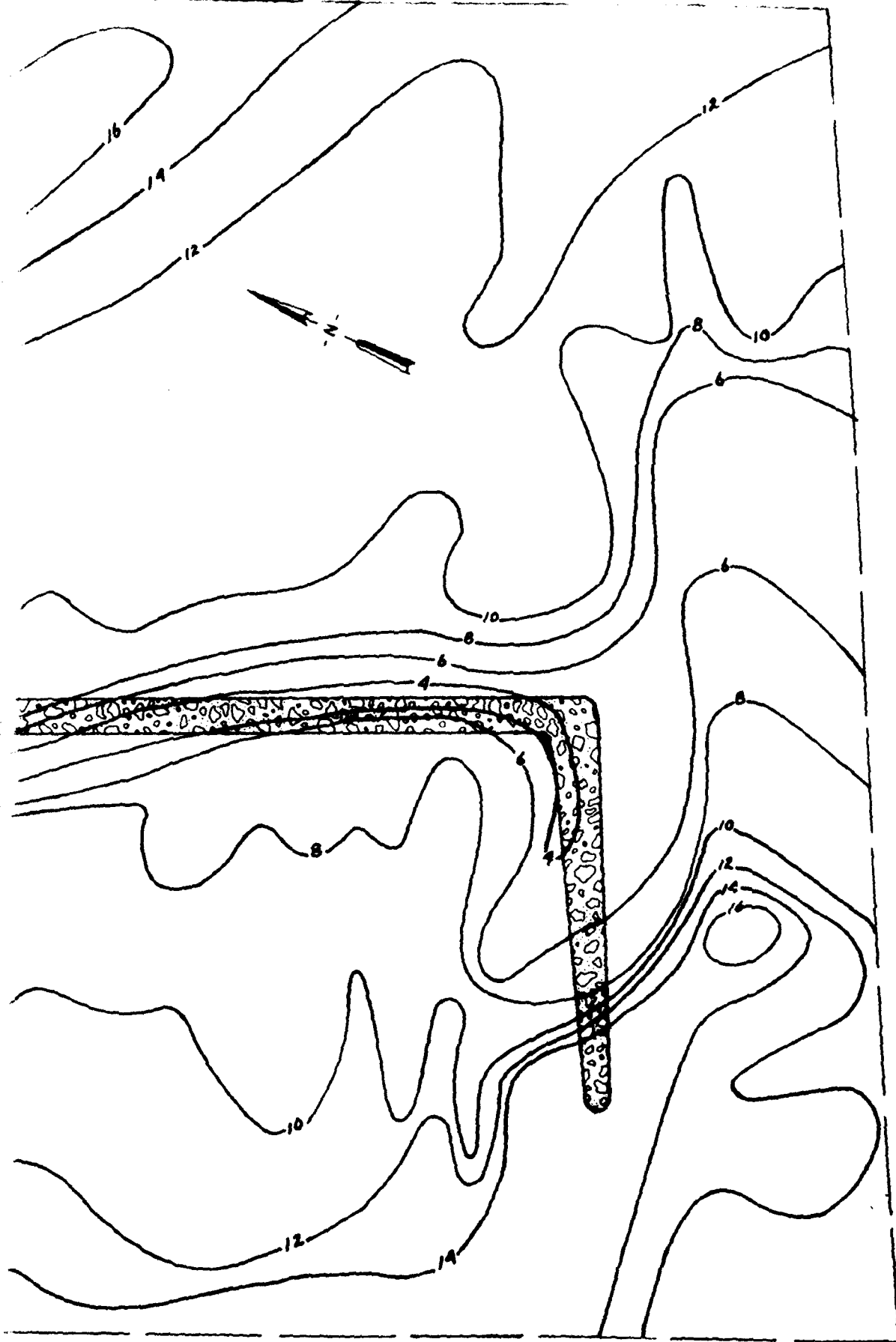
D-91 General Bathymetric and Substrate Map of Wing Dam No. 2, Closing Dam W113 and Wing Dam W114



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24(3)

Wing Dam Well and Wing Well

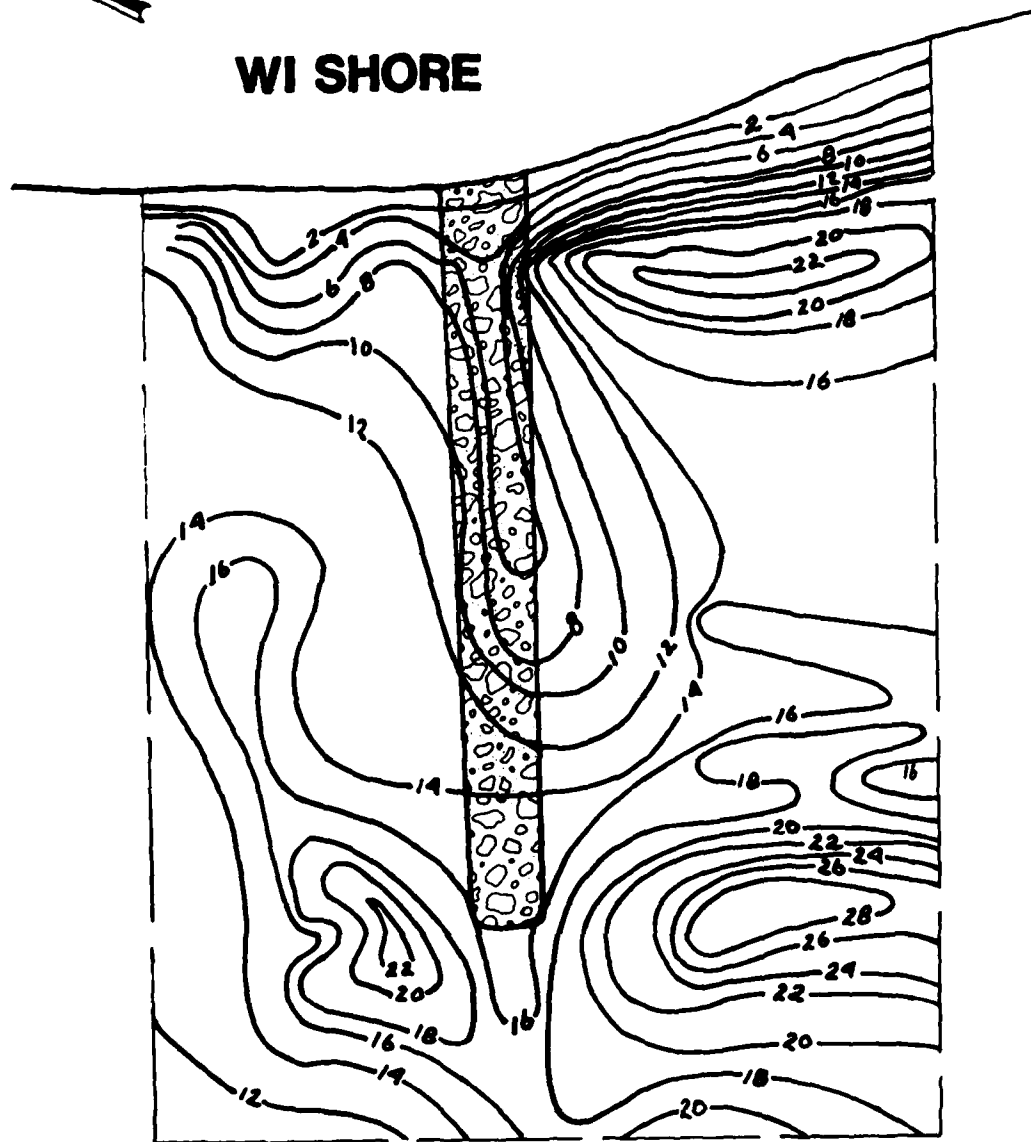


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34B



WI SHORE



WI 45

1" = 50'

LEGEND

- Emergent Rock 
- Submerged Rock 
- Sand/Silt 

Figure D-95 General Bathymetric and Substrate Map of Wing Dam WI45

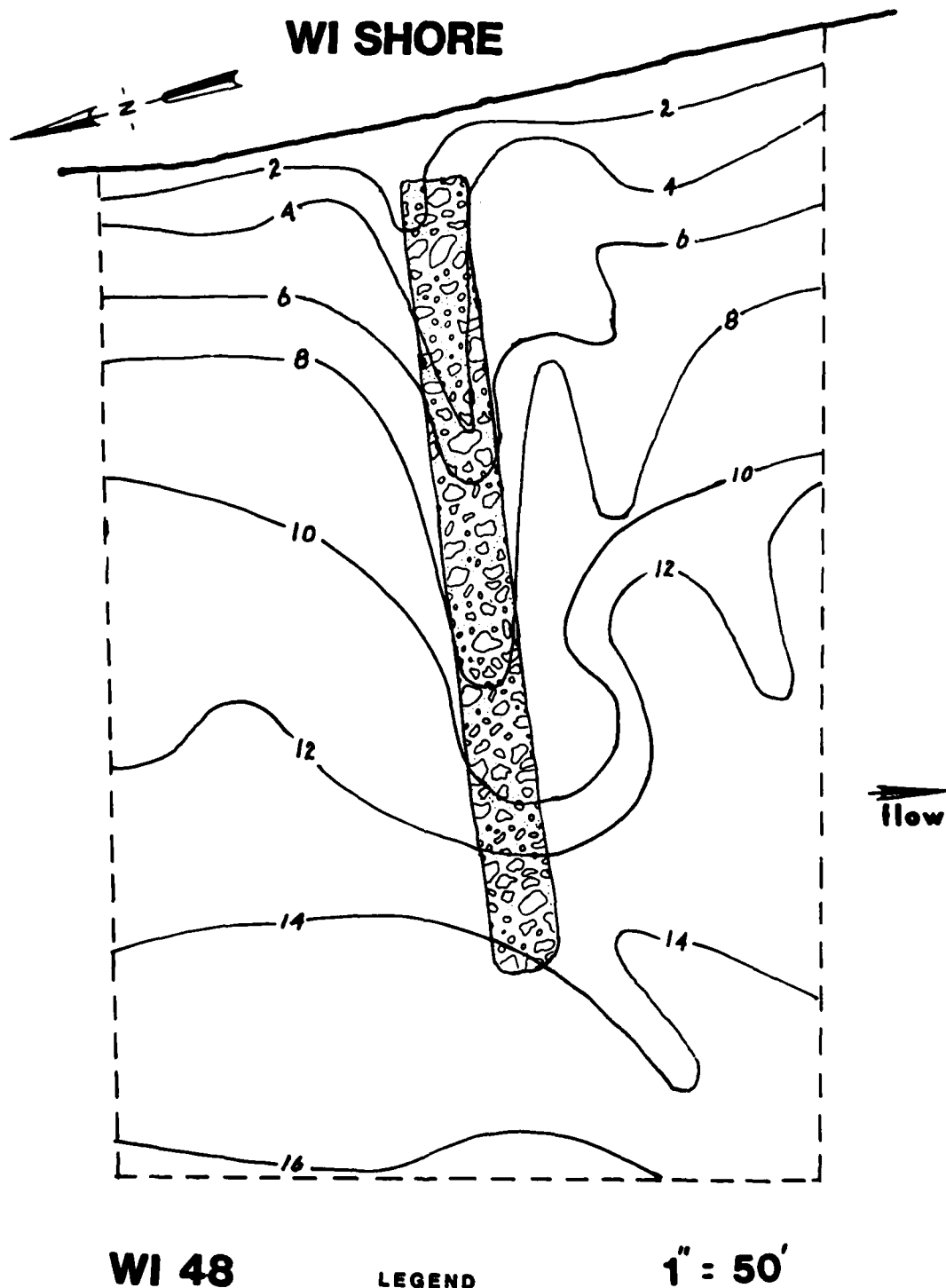
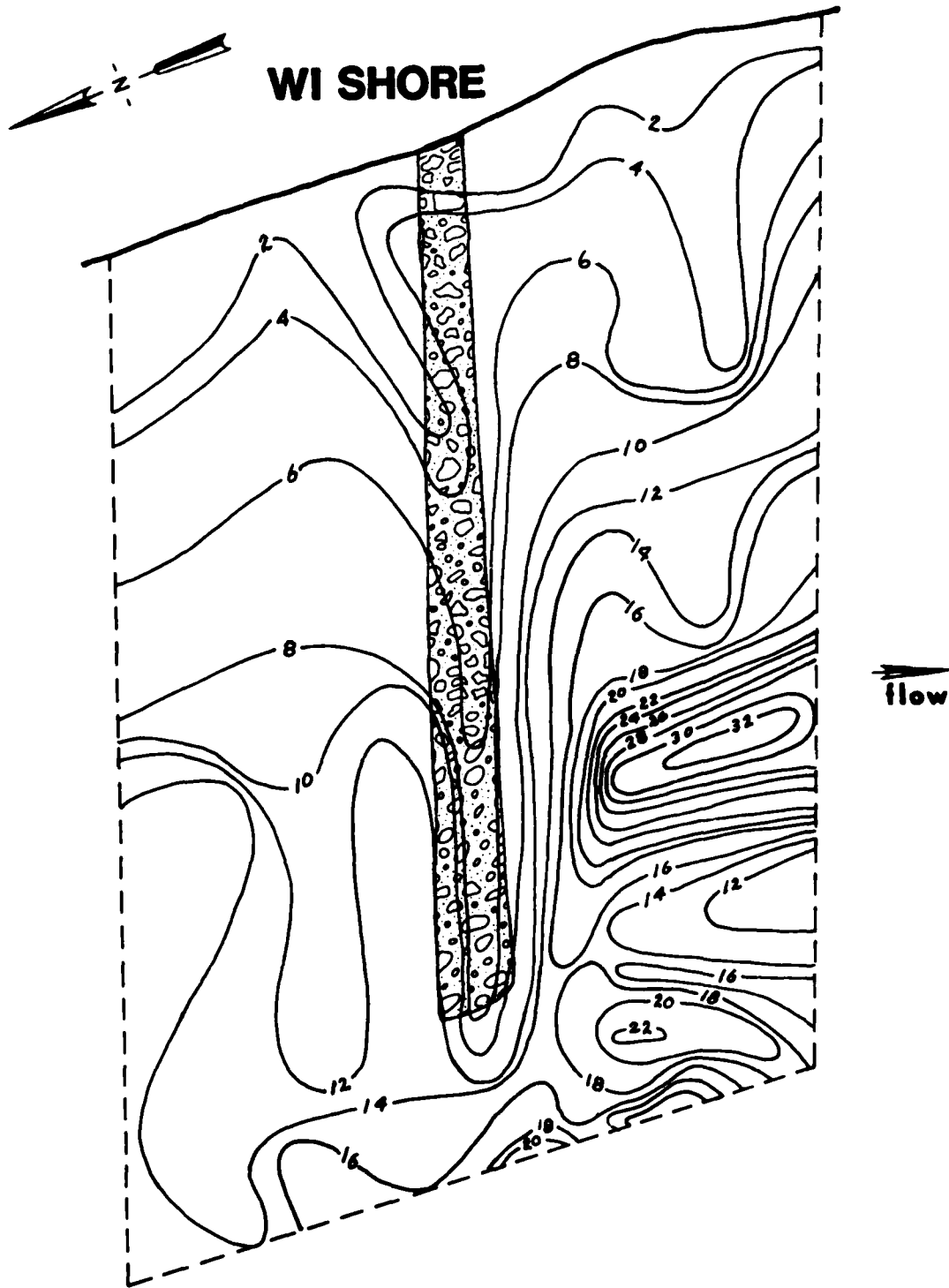


Figure D-96 General Bathymetric and Substrate Map of Wing Dam WI48



WI 49

LEGEND

- Emergent Rock** 
- Submerged Rock** 
- Sand/Silt** 

1" = 50'

Figure D-97 General Bathymetric and Substrate Map of Wing Dam WI49

WI SHORE

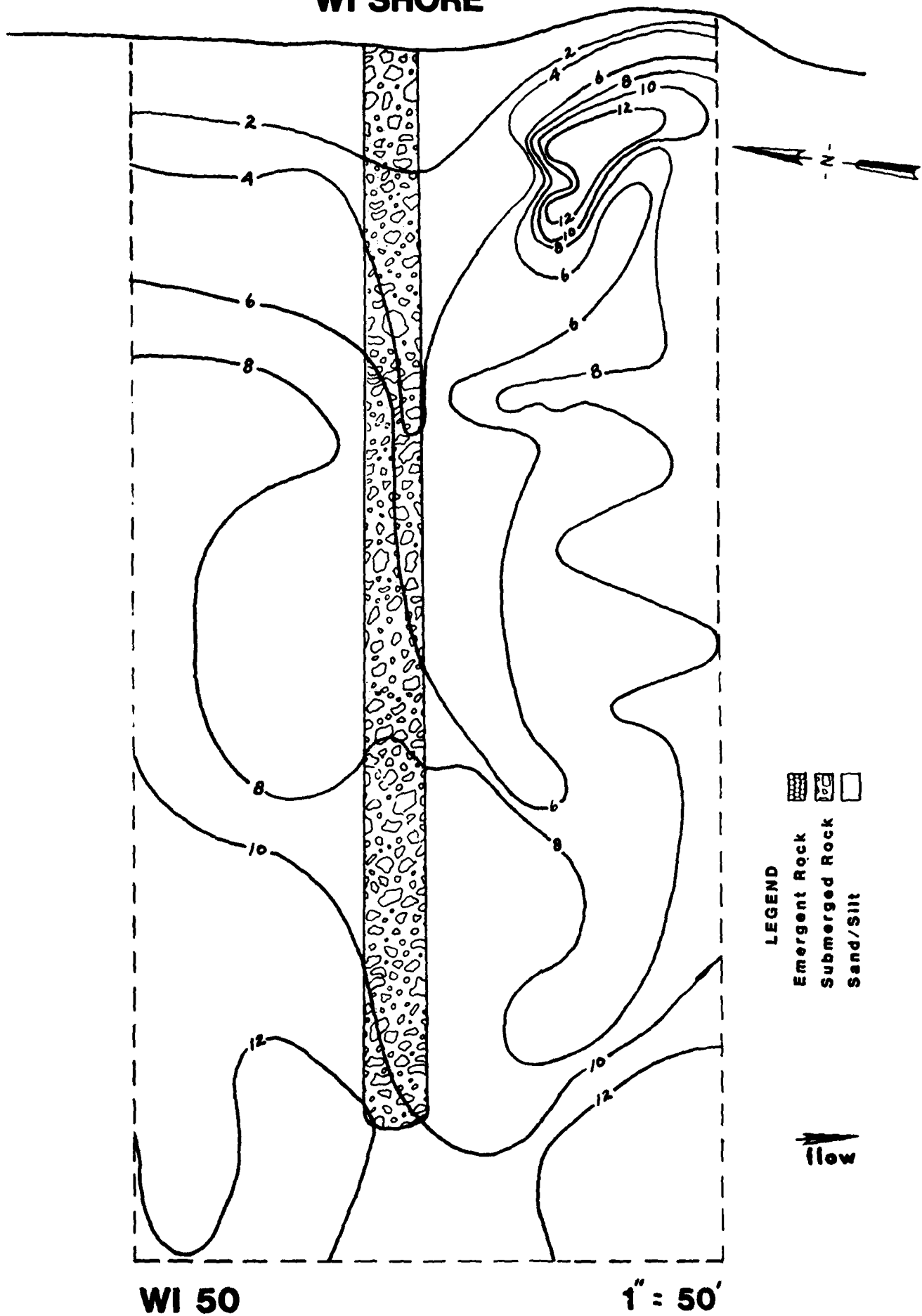
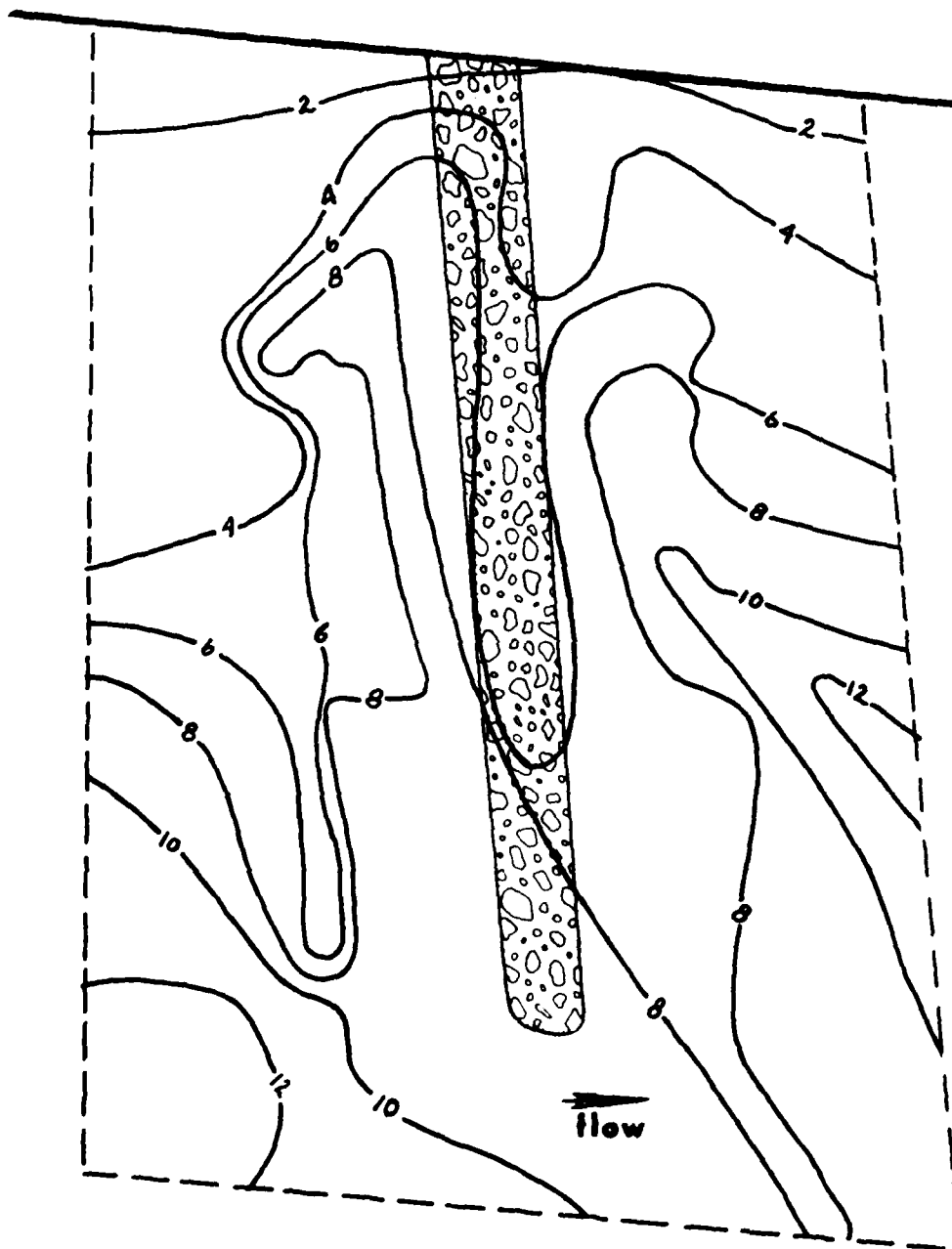
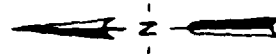


Figure D-98 General Bathymetric and Substrate Map of Wing Dam W150

WI SHORE



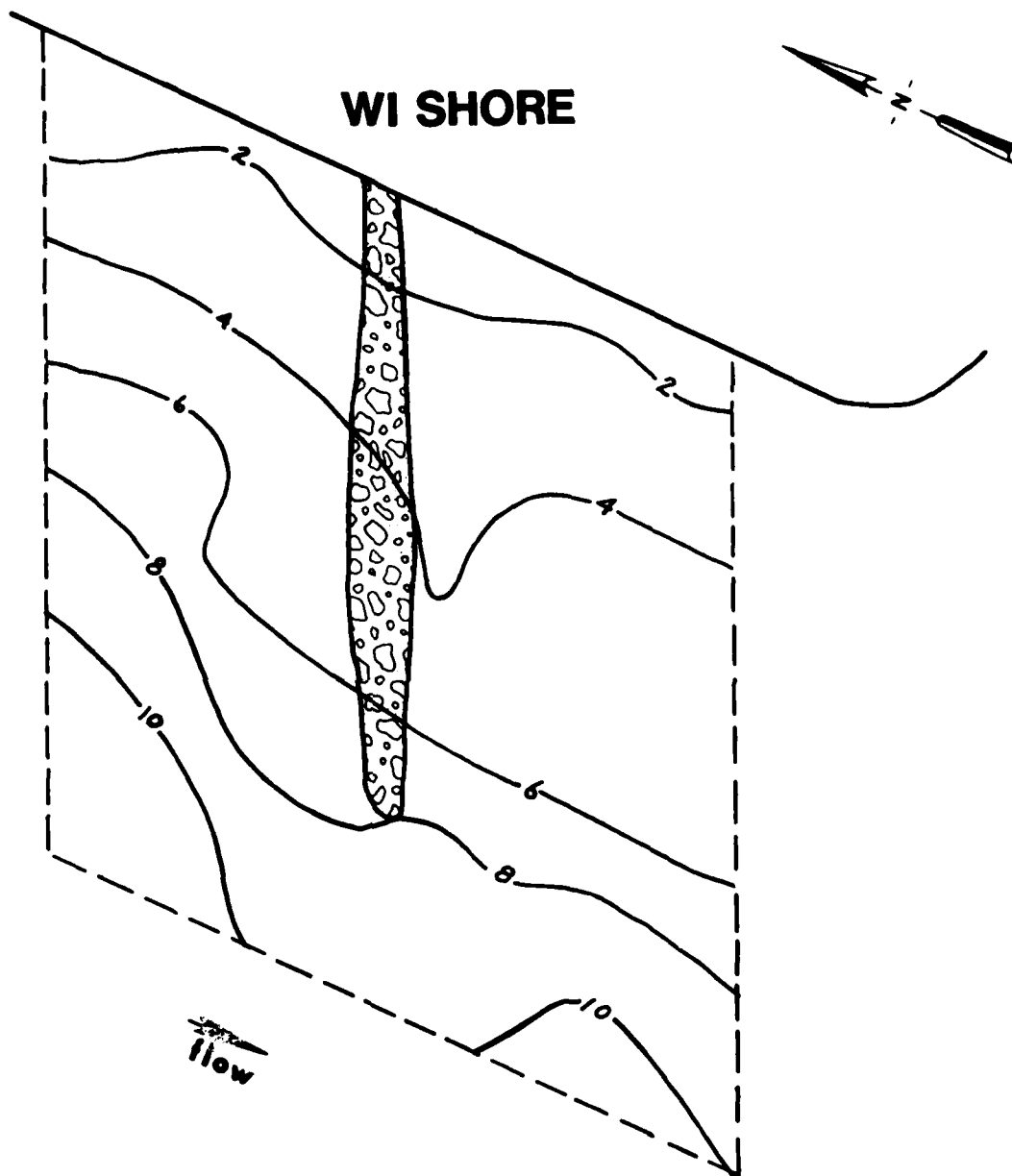
WI 51

LEGEND

- Emergent Rock 
- Submerged Rock 
- Sand/Silt 

1" = 50'

Figure D-99 General Bathymetric and Substrate Map of Wing Dam WI51



WI SHORE

WI 52

1" = 50'

LEGEND




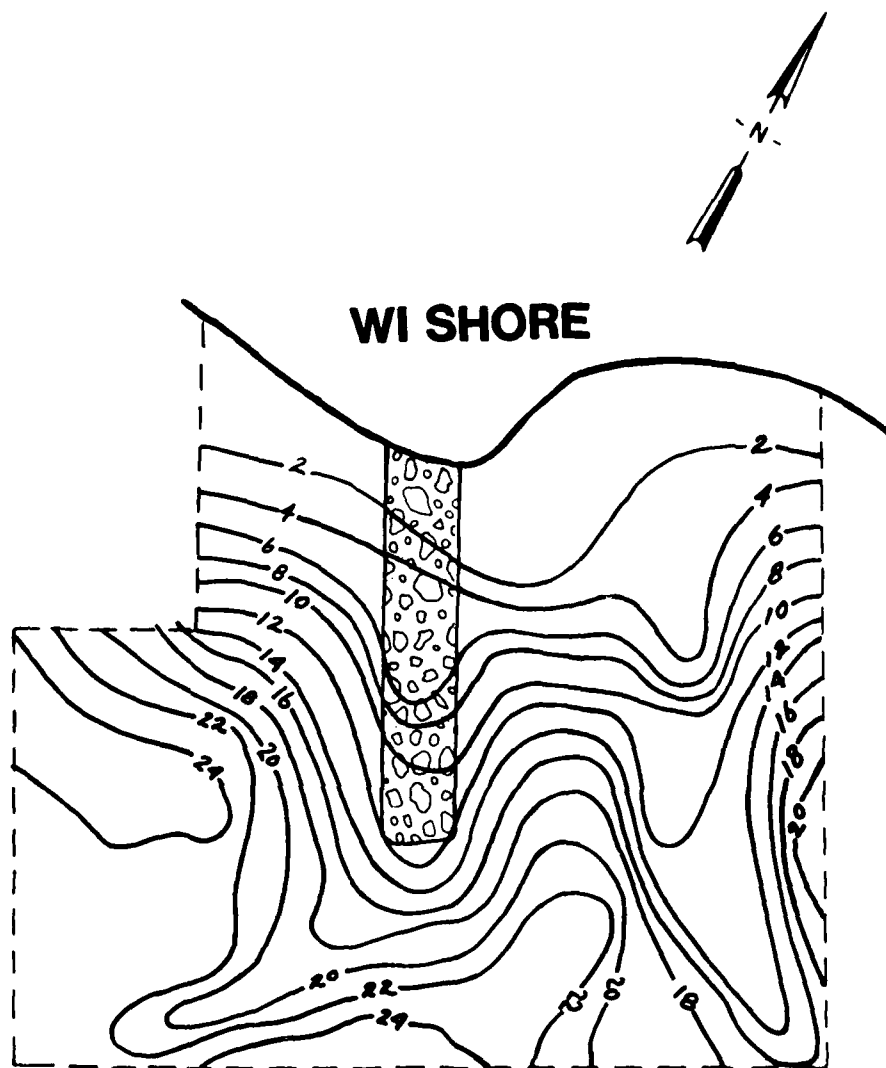
Emergent Rock	
Submerged Rock	
Sand/Silt	

Figure D-100 General Bathymetric and Substrate Map of Wing Dam WI52



WI 55



1" = 50'

LEGEND

- Emergent Rock 
- Submerged Rock 
- Sand/Silt 

Figure D-101 General Bathymetric and Substrate Map of Wing Dam WI55

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