Technical Report HL-93-15
October 1993

US Army Corps
of Engineers
Waterways Experiment
Station

Ship Navigation Simulation Study, Lorain Harbor, Lorain, Ohio

Volume II: Appendices A and B

by Michelle M. Thevenot, Carl J. Huval, Larry L. Daggett
Hydraulics Laboratory

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Prepared for U.S. Army Engineer District, Buffalo

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U.S. Army Corps of Engineers
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3909 Halls Ferry Road
Vicksburg, MS 39180-6199

Final report

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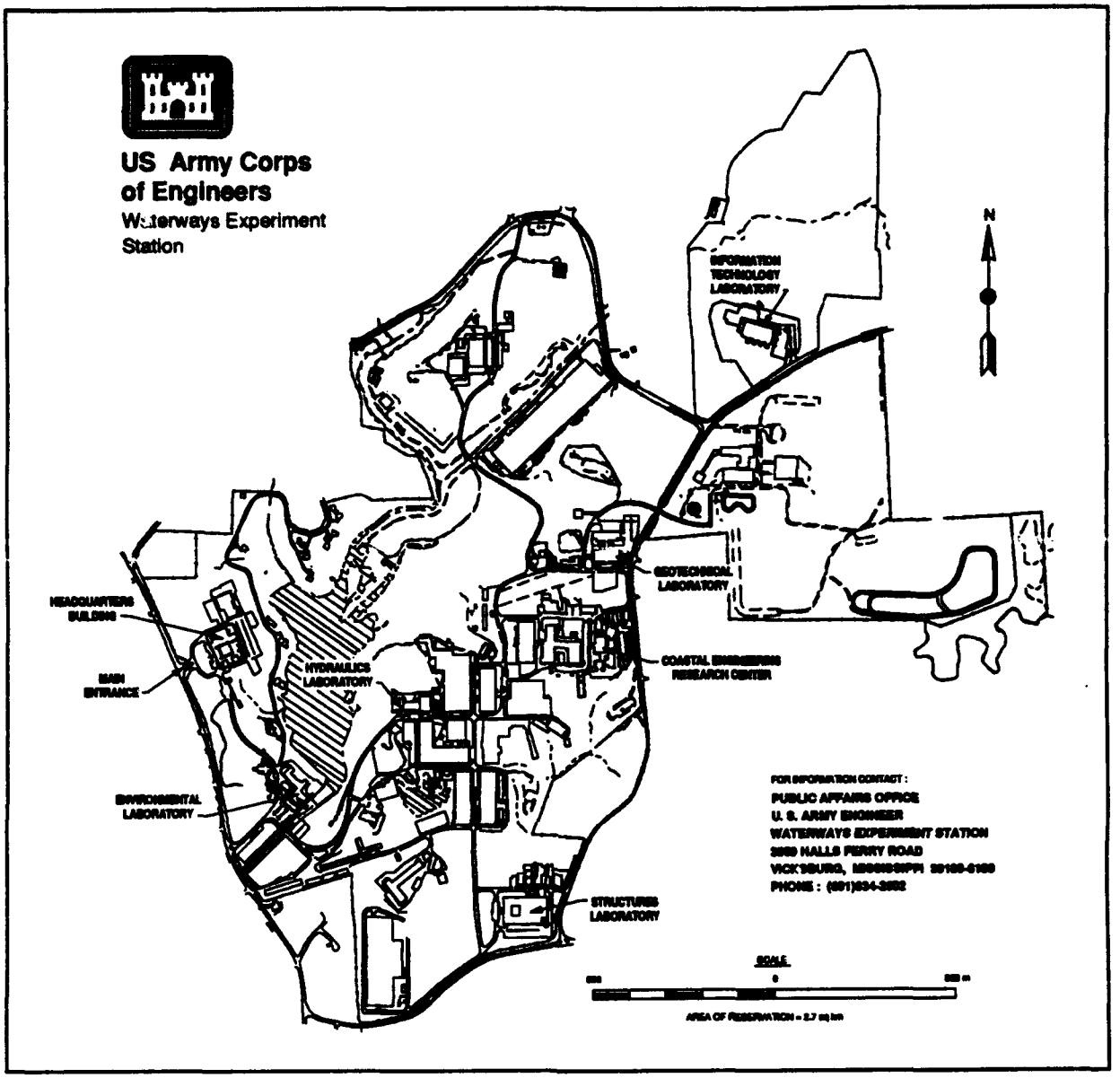

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APPENDIX A: SHIPMASTER QUESTIONNARIE AND COMMENTS

LORAIN HARBOR SHIP SIMULATION PROJECT
PILOT RATING

PILOT:_____ DATE:_____
RUN CODE:_____ FILE NAME:_____
START TIME:_____ END TIME:_____

Have you ever piloted a vessel with a stern thruster?_____

The purpose of this questionnaire is to document your evaluation of the simulator run you have just completed. Please rate the run relative to your overall experience in handling ships in this reach. Feel free to make any specific comments you believe will be helpful in interpreting your ratings. You may wish to make notes on the trackline plot presented to you following the run.

	Very Simple										Very difficult
Area A	0	1	2	3	4	5	6	7	8	9	10
Area B	0	1	2	3	4	5	6	7	8	9	10
Area C	0	1	2	3	4	5	6	7	8	9	10
Area D	0	1	2	3	4	5	6	7	8	9	10
Area 1	0	1	2	3	4	5	6	7	8	9	10
Area 2	0	1	2	3	4	5	6	7	8	9	10

DIFFICULTY OF THE RUN

	Little										All of it
Area A	0	1	2	3	4	5	6	7	8	9	10
Area B	0	1	2	3	4	5	6	7	8	9	10
Area C	0	1	2	3	4	5	6	7	8	9	10
Area D	0	1	2	3	4	5	6	7	8	9	10
Area 1	0	1	2	3	4	5	6	7	8	9	10
Area 2	0	1	2	3	4	5	6	7	8	9	10

MANEUVERABILITY

	Little										Tremendous
Area A	0	1	2	3	4	5	6	7	8	9	10
Area B	0	1	2	3	4	5	6	7	8	9	10
Area C	0	1	2	3	4	5	6	7	8	9	10
Area D	0	1	2	3	4	5	6	7	8	9	10
Area 1	0	1	2	3	4	5	6	7	8	9	10
Area 2	0	1	2	3	4	5	6	7	8	9	10

DANGER OF GROUNDING

	Little										Tremendous
Area A	0	1	2	3	4	5	6	7	8	9	10
Area B	0	1	2	3	4	5	6	7	8	9	10
Area C	0	1	2	3	4	5	6	7	8	9	10
Area D	0	1	2	3	4	5	6	7	8	9	10
Area 1	0	1	2	3	4	5	6	7	8	9	10
Area 2	0	1	2	3	4	5	6	7	8	9	10

AMOUNT OF BANK EFFECTS

	Bad										Very good
Area A	0	1	2	3	4	5	6	7	8	9	10
Area B	0	1	2	3	4	5	6	7	8	9	10
Area C	0	1	2	3	4	5	6	7	8	9	10
Area D	0	1	2	3	4	5	6	7	8	9	10
Area 1	0	1	2	3	4	5	6	7	8	9	10
Area 2	0	1	2	3	4	5	6	7	8	9	10

AMOUNT OF THRUSTER USED

LORAIN HARBOR SHIP SIMULATION STUDY

The purpose of this questionnaire is to get your final thoughts on the simulation study in which you have just participated. Please base your answers on the simulation runs.

1. Do you feel that the way in which the thrusters were used would damage the vessels docked along the banks or cause extensive erosion?

2. On the channel provided, show the cuts you would implement assuming a stern thruster is added to the ship. Prioritize them by numbering from most important through least important.

3. Have the bank effects changed? If so, show where (on the channel provided). State whether they were helpful or hindering.

4. The simulator provides (circle one):

a) less information than
b) the same information
c) more information than

available aboard the ship.

5. On a scale from 0 to 10 (10 being excellent), what is your overall opinion of the simulator and the Lorain Harbor simulation.

6. Do you have any suggestions for improving the simulation?

7. Please use the space provided for any additional comments.

LORAIN HARBOR SHIP SIMULATION STUDY

The purpose of this questionnaire is to get your final thoughts on the simulation study in which you have just participated. Please base your answers on the simulation runs.

1. Do you feel that the way in which the thrusters were used would damage the vessels docked along the banks or cause extensive erosion?

Little damage to other vessels (possibly hazard for small craft). Could create some erosion as all thrusters will.

2. On the channel provided, show the cuts you would implement assuming a stern thruster is added to the ship. Prioritize them by numbering from most important through least important.

Done.

3. Have the bank effects changed? If so, show where (on the channel provided). State whether they were helpful or hindering.

No effects noticed.

4. The simulator provides (circle one):

a) less information than
b) the same information
c) more information than

available aboard the ship.

5. On a scale from 0 to 10 (10 being excellent), what is your overall opinion of the simulator and the Lorain Harbor simulation.

8

6. Do you have any suggestions for improving the simulation?

Longer period of time for Pilot to familiarizes himself @ characteristics of equipment.

7. Please use the space provided for any additional comments.

LORAIN HARBOR SHIP SIMULATION STUDY
PILOT RATING

PILOT:_____ DATE:_____
RUN CODE:_____ FILE NAME:_____
START TIME:_____ END TIME:_____

The purpose of this questionnaire is to document is to your evaluation of the simulation run just completed. Please rate the run relative to your overall experience in handling ships in this reach. Feel free to make any specific comments you believe will be helpful in interpreting your ratings. You may wish to make notes on the trackline plot presented to you following the run.

Rate the difficulty of the run?

very simple ... very difficult

0 1 2 3 4 5 6 7 8 9 10

What was the likelihood of grounding?

none ... often

0 1 2 3 4 5 6 7 8 9 10

Rate the controllability of the ship in the following areas?

1. Area B

very easy ... very difficult

0 1 2 3 4 5 6 7 8 9 10

2. Area C

very easy ... very difficult

0 1 2 3 4 5 6 7 8 9 10

3. Area D

very easy ... very difficult

0 1 2 3 4 5 6 7 8 9 10

4. Turning Basin

very easy — very difficult

0 1 2 3 4 5 6 7 8 9 10

Rate the damage you feel would have been caused to docked ships due to the wake of the ship or the thruster jets.

no damage — unacceptable amounts of damage

0 1 2 3 4 5 6 7 8 9 10

How accurate were the simulated bank effects.

very unrealistic — very realistic

0 1 2 3 4 5 6 7 8 9 10

How accurate was the behavior of the ship.

very inaccurate — very accurate

0 1 2 3 4 5 6 7 8 9 10

Please feel free to make comments concerning the simulator run you have just completed.

LORAIN HARBOR SHIP SIMULATION STUDY
FINAL QUESTIONNAIRE

The purpose of this questionnaire is to document your final thoughts on the proposed bank cuts to the Black River in Lorain, Ohio.

With the consideration that initial and maintenance dredging costs are major factors in project viability, what channel cuts would you recommend in the following areas? Please specify the size. Also, give the priority of the cut in each area.

1. Area B

2. Area C

3. Area D

4. Turning Basin

5. Do you feel that the way in which the thrusters were used would cause extensive bank erosion? Specify where.

6. Do you have any suggestions for improving the simulator procedure in general?

7. Overall how do you rate the realism of the simulator?

LORAIN HARBOR SHIP SIMULATION STUDY
FINAL QUESTIONNAIRE

The purpose of this questionnaire is to document your final thoughts on the proposed bank cuts to the Black River in Lorain, Ohio.

With the consideration that initial and maintenance dredging costs are major factors in project viability, what channel cuts would you recommend in the following areas? Please specify the size. Also, give the priority of the cut in each area.

1. **Area B**

The proposed cut in Area "B" in Plan #1 would be helpful, need not be large as Plan #2 - Priority #3.

2. **Area C**

The propose cut in Area C would be most helpful. The cut in Plan #1 would be all that is needed. Need not Plan #2.

3. **Area D**

The cut in Plan 2 would be of some help. Not a high Priority Area.

4. **Turning Basin**

The propose cut at the turn basin would be very helpful Plan #1
Priority #2 - need not go to Plan 2.

Priority #4 would be the corner area across from the old ship yard dry docks near Erie Ave.

5. **Do you feel that the way in which the thrusters were used would cause extensive bank erosion? Specify where.**

No.

6. **Do you have any suggestions for improving the simulator procedure in general?**

The speed for the RPM in the River, with the hard turns, may be a little fast.

7. **Overall how do you rate the realism of the simulator?**

Good.

LORAIN HARBOR SHIP SIMULATION STUDY
FINAL QUESTIONNAIRE

The purpose of this questionnaire is to document your final thoughts on the proposed bank cuts to the Black River in Lorain, Ohio.

With the consideration that initial and maintenance dredging costs are major factors in project viability, what channel cuts would you recommend in the following areas? Please specify the size. Also, give the priority of the cut in each area.

1. **Area B**

Cut 80 ft

2. **Area C**

Cut 150 ft

3. **Area D**

Cut 50 ft

4. **Turning Basin**

Cut 150 ft

5. **Do you feel that the way in which the thrusters were used would cause extensive bank erosion? Specify where.**

Yes Area B and A and Turning Basin

6. **Do you have any suggestions for improving the simulator procedure in general?**

No.

7. **Overall how do you rate the realism of the simulator?**

Very accurate.

LORAIN HARBOR SHIP SIMULATION STUDY
FINAL QUESTIONNAIRE

The purpose of this questionnaire is to document your final thoughts on the proposed bank cuts to the Black River in Lorain, Ohio.

With the consideration that initial and maintenance dredging costs are major factors in project viability, what channel cuts would you recommend in the following areas? Please specify the size. Also, give the priority of the cut in each area.

1. **Area B**

Cut between 1 + 2 proposal.

2. **Area C**

Cut between 1 + 2 proposal.
Most important.

3. **Area D**

50 ft.

4. **Turning Basin**

Take corner off.

5. **Do you feel that the way in which the thrusters were used would cause extensive bank erosion? Specify where.**

No.

6. **Do you have any suggestions for improving the simulator procedure in general?**

No.

7. **Overall how do you rate the realism of the simulator?**

Very good.

LORAIN HARBOR SHIP SIMULATION STUDY
FINAL QUESTIONNAIRE

The purpose of this questionnaire is to document your final thoughts on the proposed bank cuts to the Black River in Lorain, Ohio.

With the consideration that initial and maintenance dredging costs are major factors in project viability, what channel cuts would you recommend in the following areas? Please specify the size. Also, give the priority of the cut in each area.

1. **Area B**

WNW corner removal of western bank would aid in vessels not required to use thrusters in marina area.
Priority #3

2. **Area C**

This would be a priority #1 of all the areas. Cut as much as the last run (FDW 242) Re: When vessel, single screw, backing does not help make the turn.

3. **Area D**

Removal of west corner would aid in turn if vessels are using the south dock
Priority #4

4. **Turning Basin**

Remove corner, north pt, also widen and deepen notch.
RE: vessel turning in wind and current would be able to handle the conditions easier.
Priority #2 (also relieves the master on room for the stern to swing.)

5. **Do you feel that the way in which the thrusters were used would cause extensive bank erosion? Specify where.**

Yes, in any area that is not lined with rip-rap-providing the turns are left as is. If all turns are widened thruster wash should not do too much damage. There is not that much damage in Rouge River.

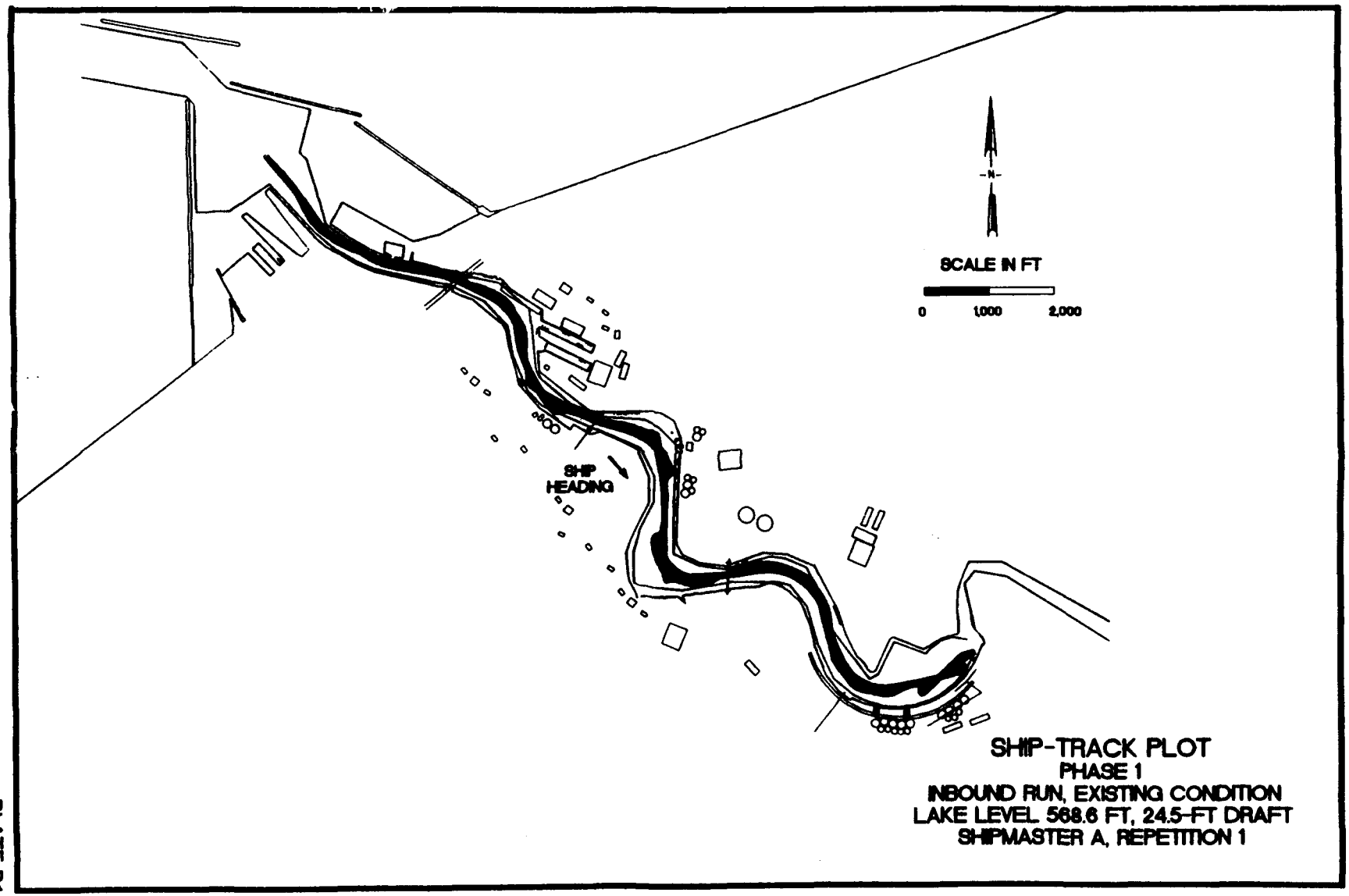
6. **Do you have any suggestions for improving the simulator procedure in general?**

None, as is, the system is very realistic to handling a vessel.

7. **Overall how do you rate the realism of the simulator?**

Very good.

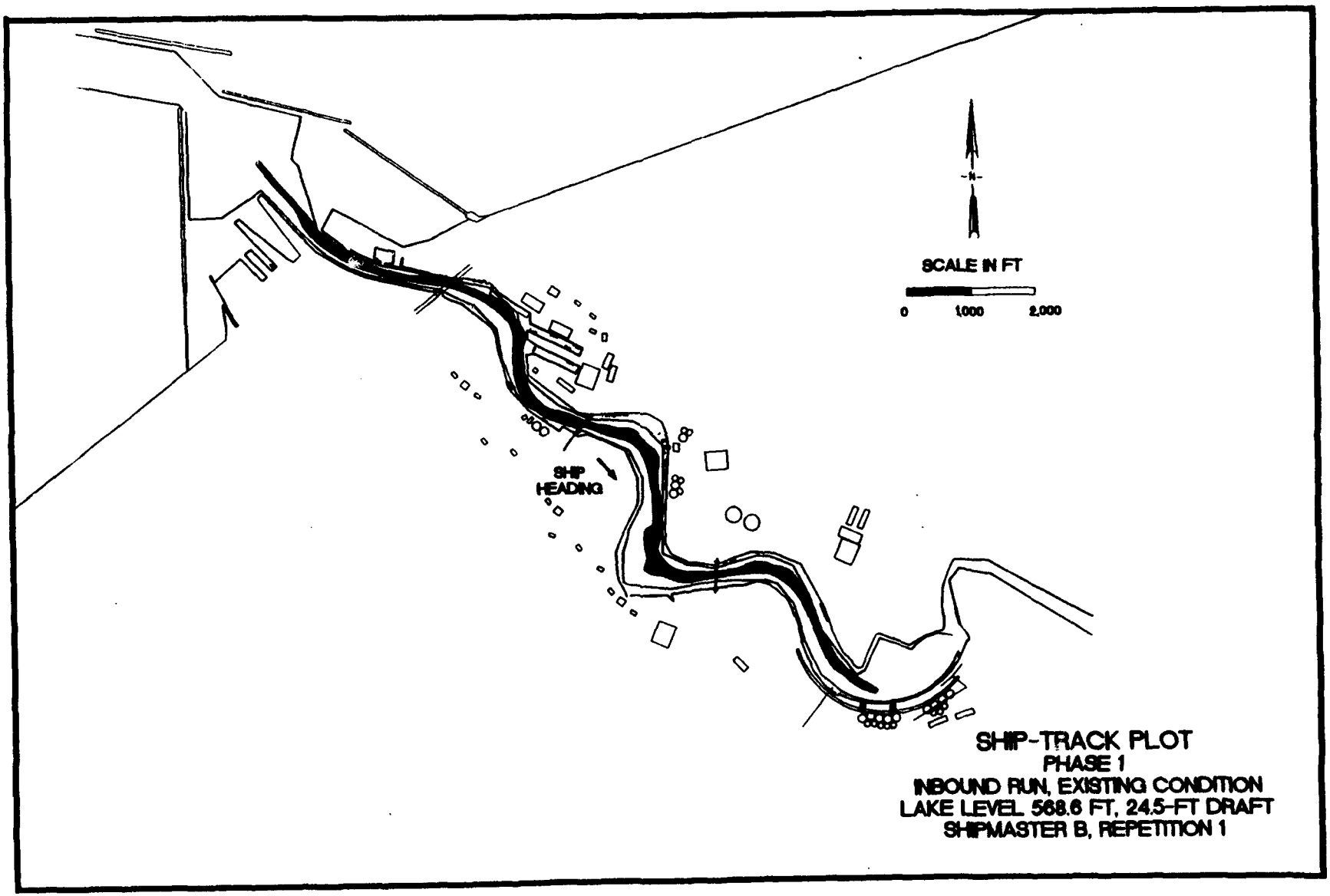
APPENDIX B: SHIP TRACK PLOTS



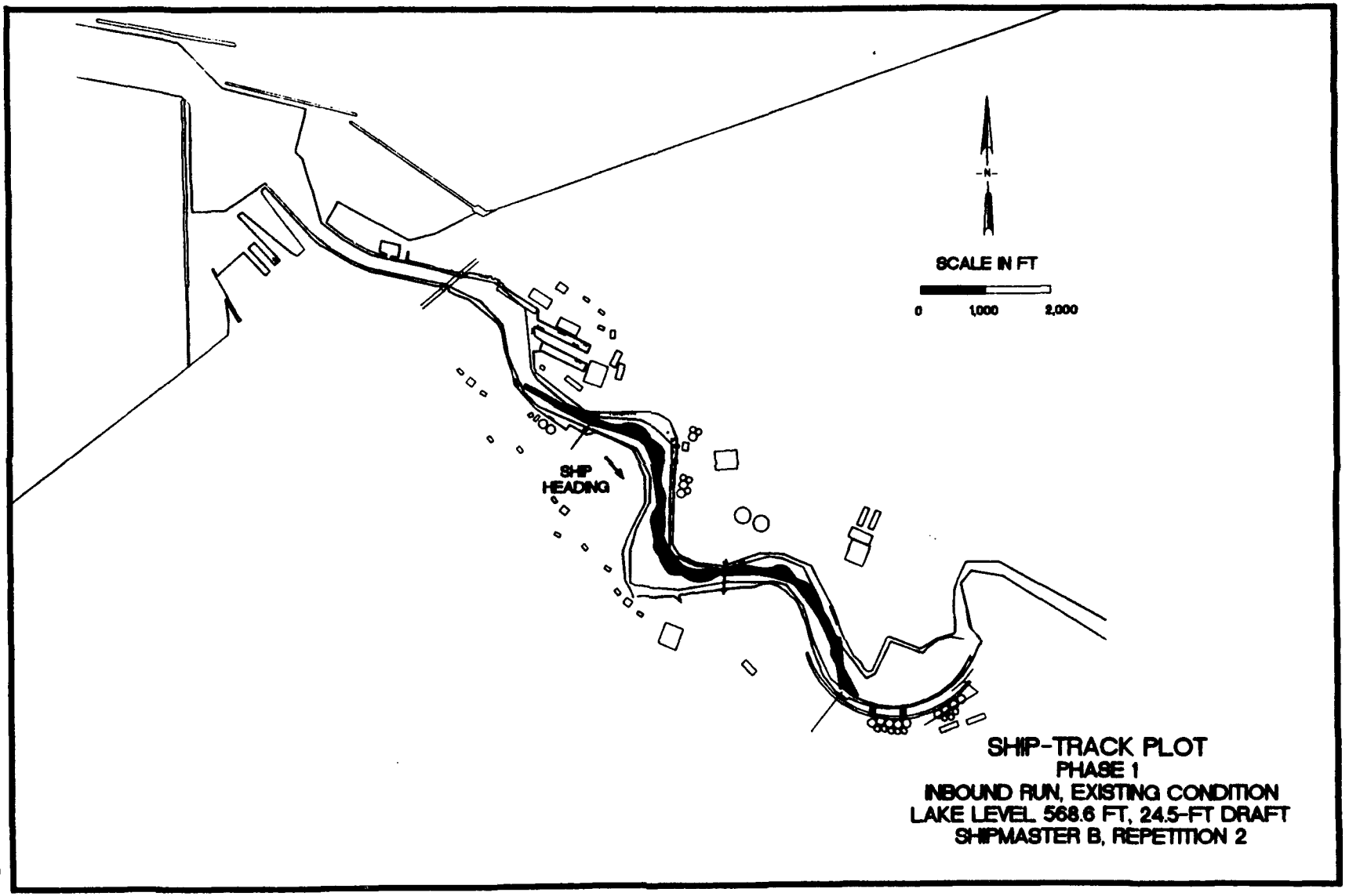
SHIP-TRACK PLOT
PHASE 1
INBOUND RUN, EXISTING CONDITION
LAKE LEVEL 568.6 FT, 24.5-FT DRAFT
SHIPMASTER A, REPETITION 1

PLATE B1

PLATE B2



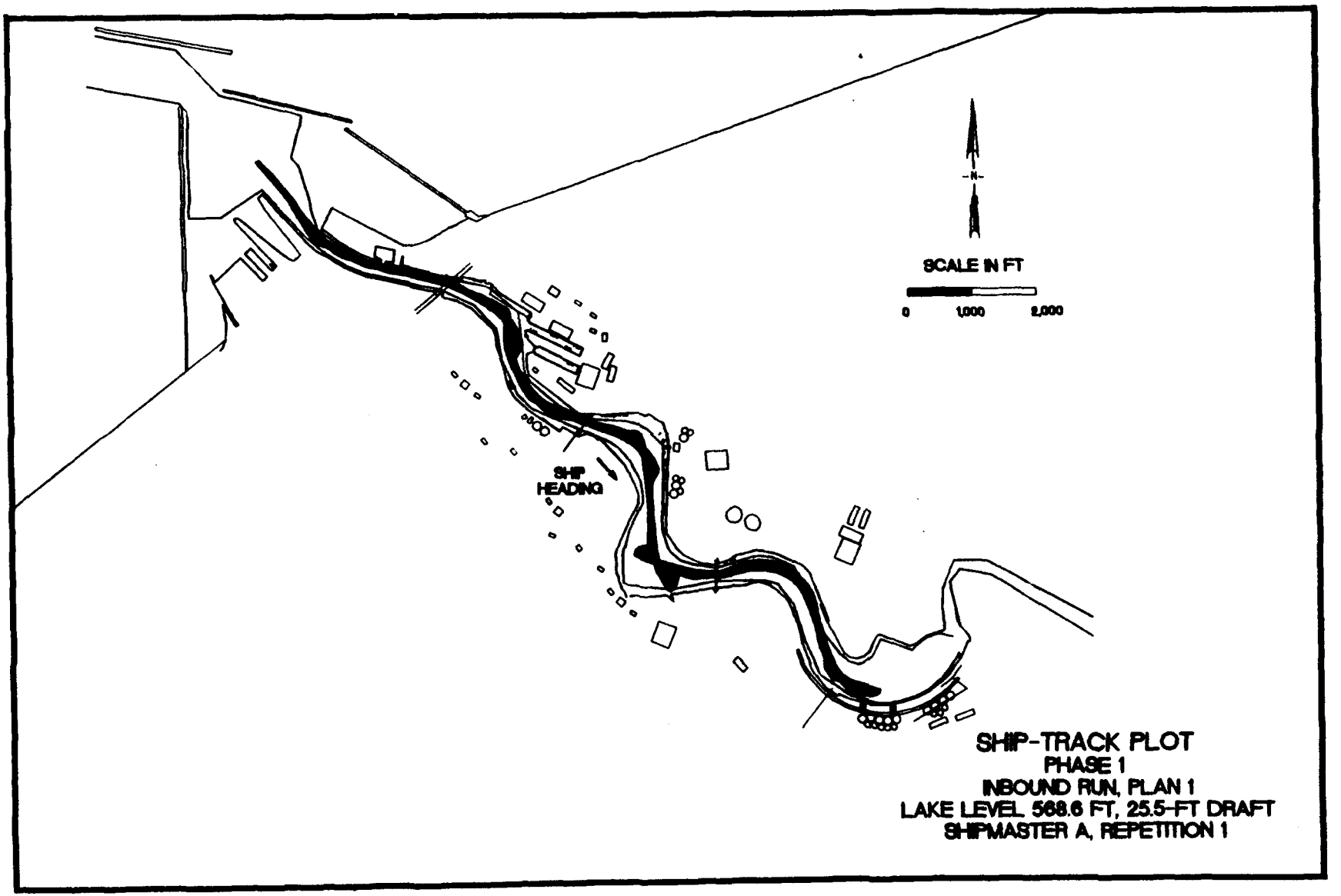
SHIP-TRACK PLOT
PHASE 1
INBOUND RUN, EXISTING CONDITION
LAKE LEVEL 568.6 FT, 24.5-FT DRAFT
SHIPMASTER B, REPETITION 1



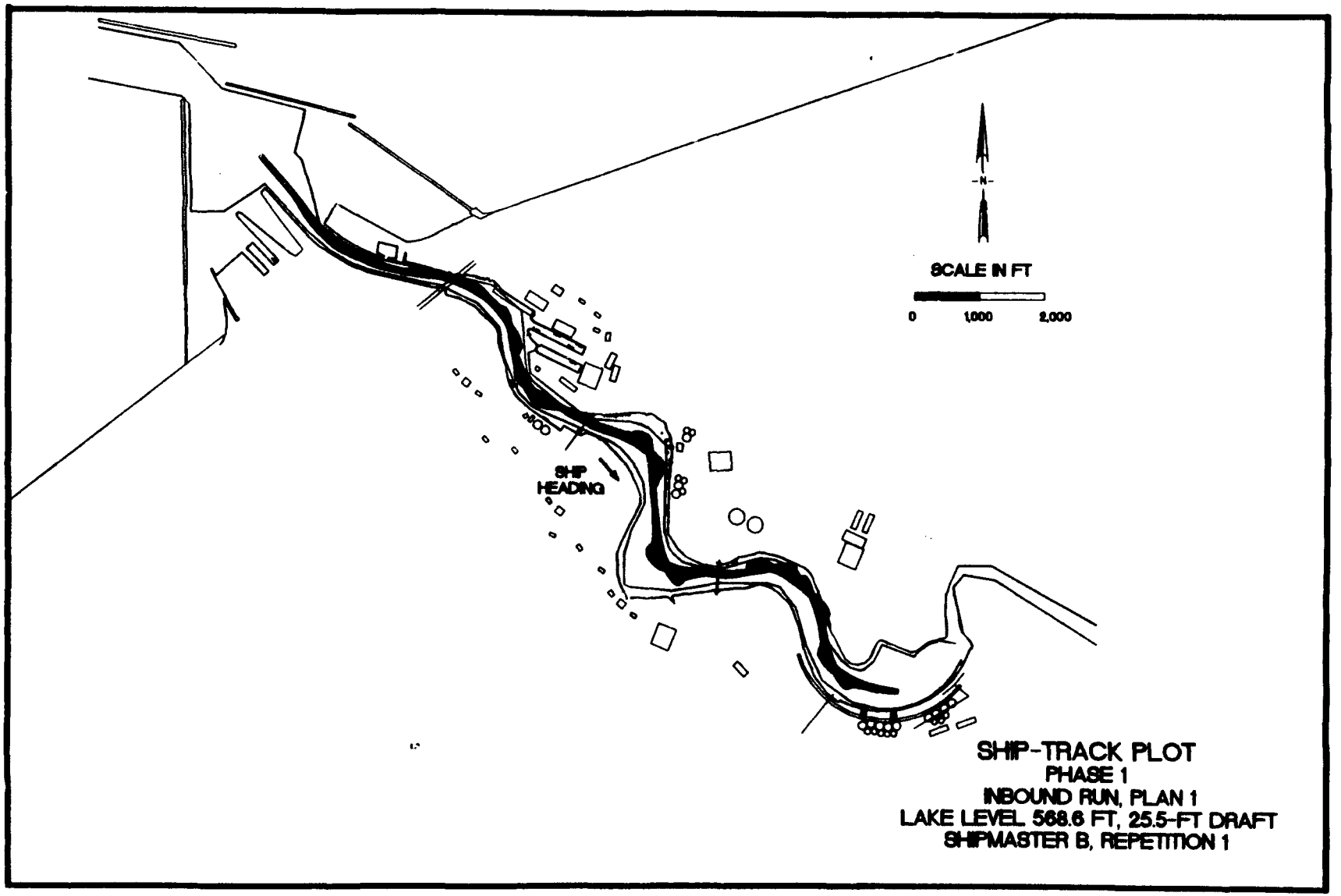
SHIP-TRACK PLOT
PHASE 1
INBOUND RUN, EXISTING CONDITION
LAKE LEVEL 568.6 FT, 24.5-FT DRAFT
SHIPMASTER B, REPETITION 2

PLATE B3

PLATE B4



SHIP-TRACK PLOT
PHASE 1
INBOUND RUN, PLAN 1
LAKE LEVEL 568.6 FT, 25.5-FT DRAFT
SHIPMASTER A, REPETITION 1



SHIP-TRACK PLOT
PHASE 1
INBOUND RUN, PLAN 1
LAKE LEVEL 568.6 FT, 25.5-FT DRAFT
SHIPMASTER B, REPETITION 1

PLATE B5

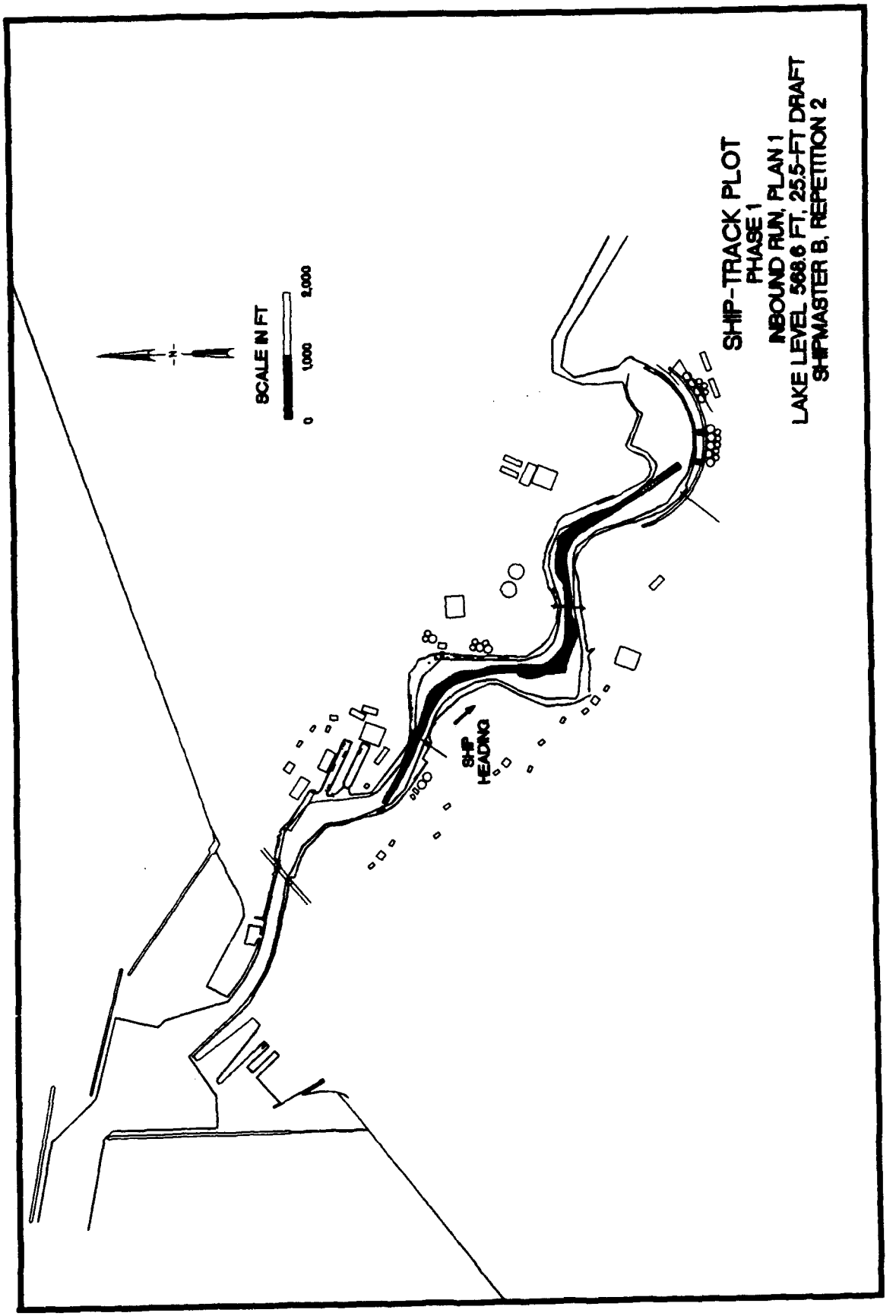
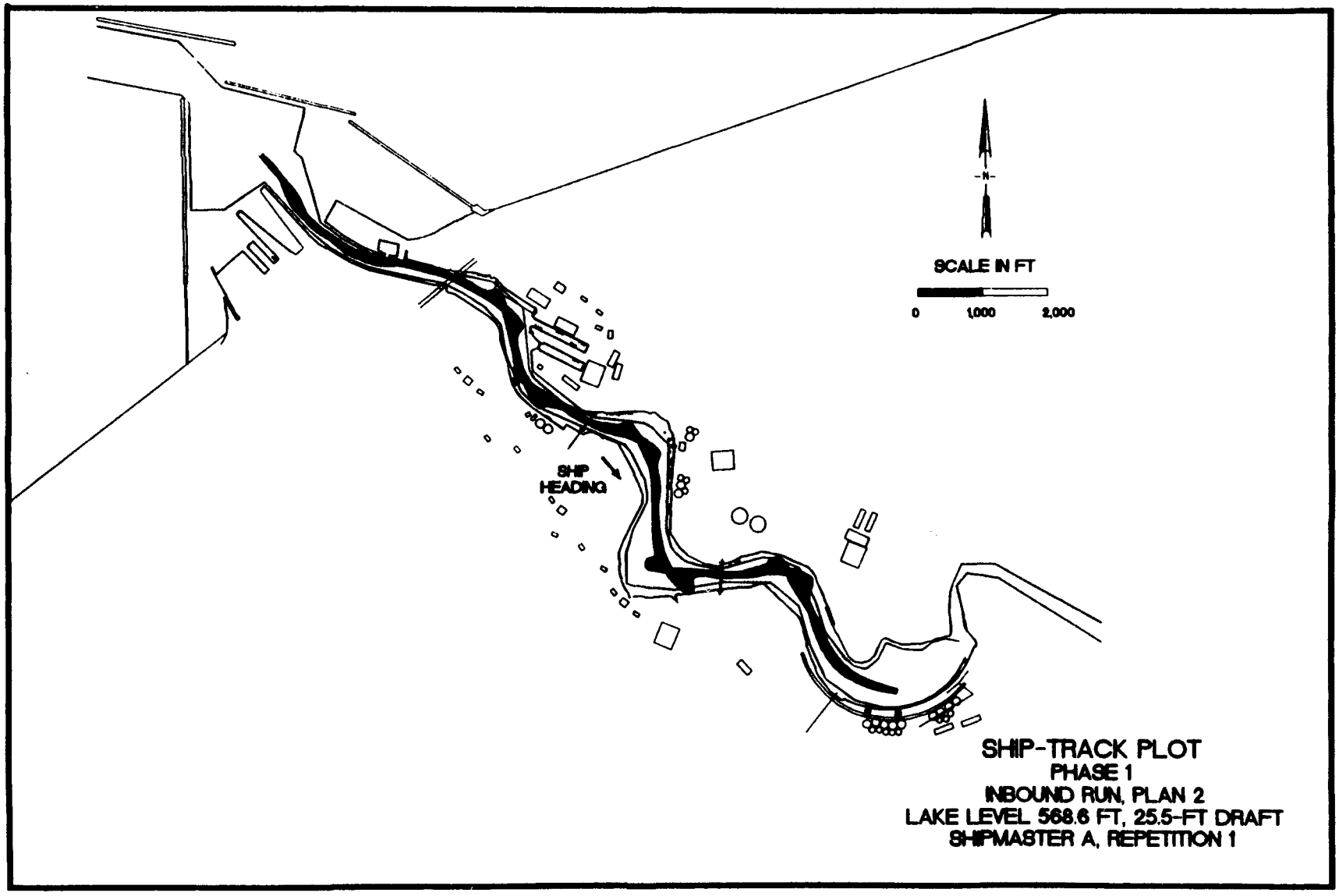

SHIP-TRACK PLOT
PHASE 1
INBOUND RUN, PLAN 1
LAKE LEVEL 568.6 FT, 25.5-FT DRAFT
SHIPMASTER B, REPETITION 2
SCALE IN FT
0
1,000
2,000
N
SHIP HEADING

PLATE B6



SHIP-TRACK PLOT
PHASE 1
INBOUND RUN, PLAN 2
LAKE LEVEL 568.6 FT, 25.5-FT DRAFT
SHIPMASTER A, REPETITION 1

PLATE B7

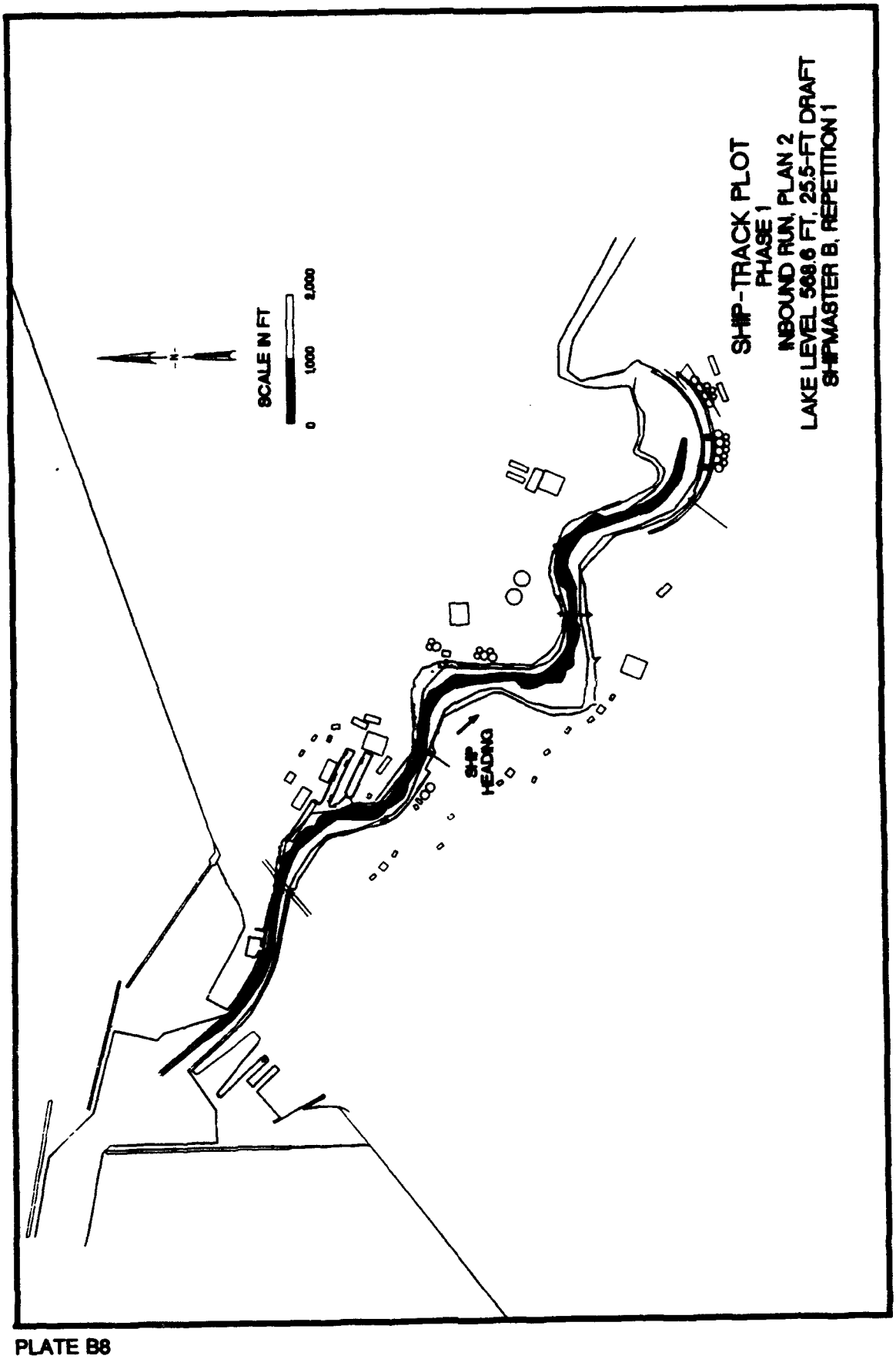
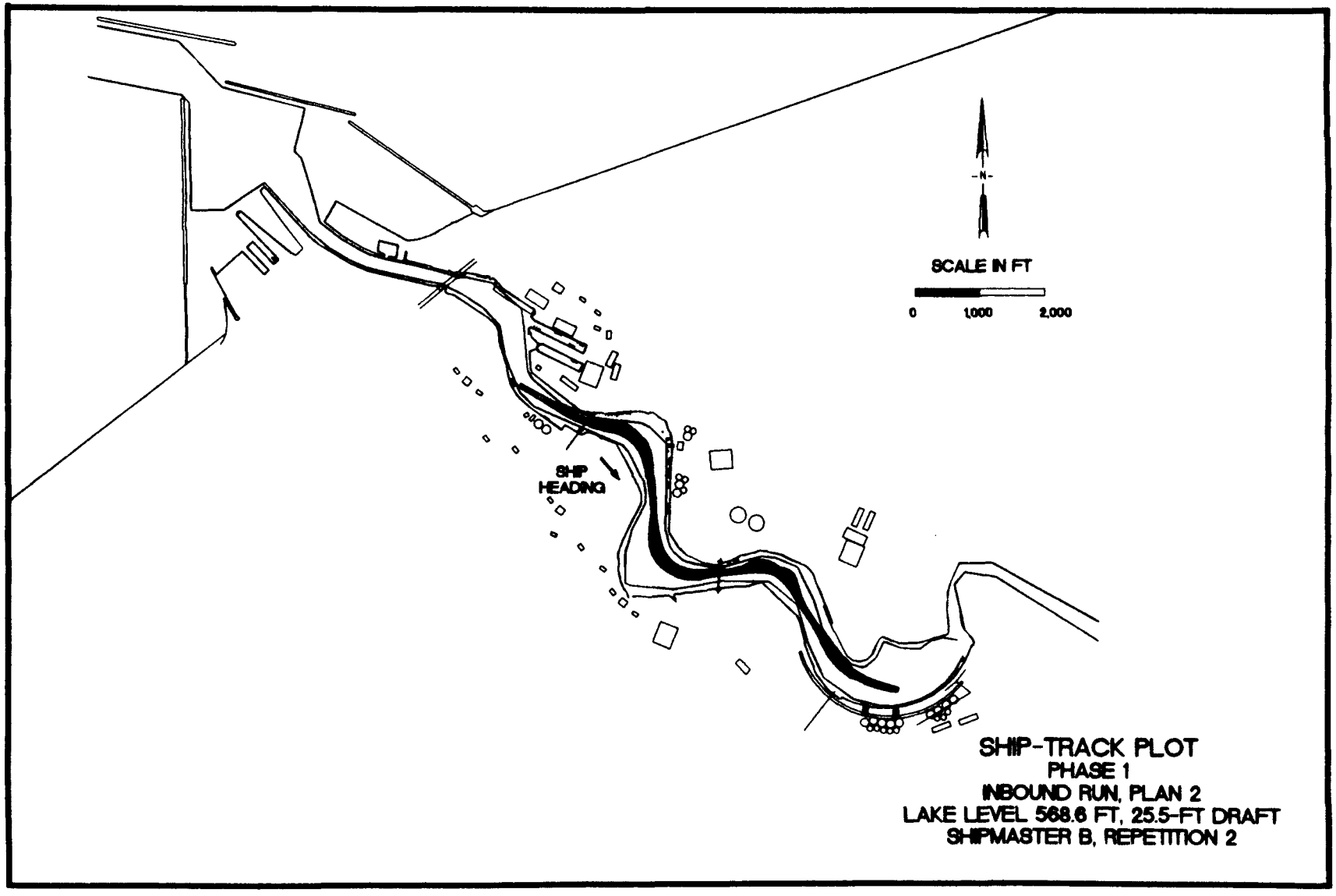

SHIP-TRACK PLOT
PHASE 1
INBOUND RUN, PLAN 2
LAKE LEVEL 568.6 FT, 25.5-FT DRAFT
SHIPMASTER B, REPETITION 1
SCALE IN FT
0
1,000
2,000
N
SHIP HEADING

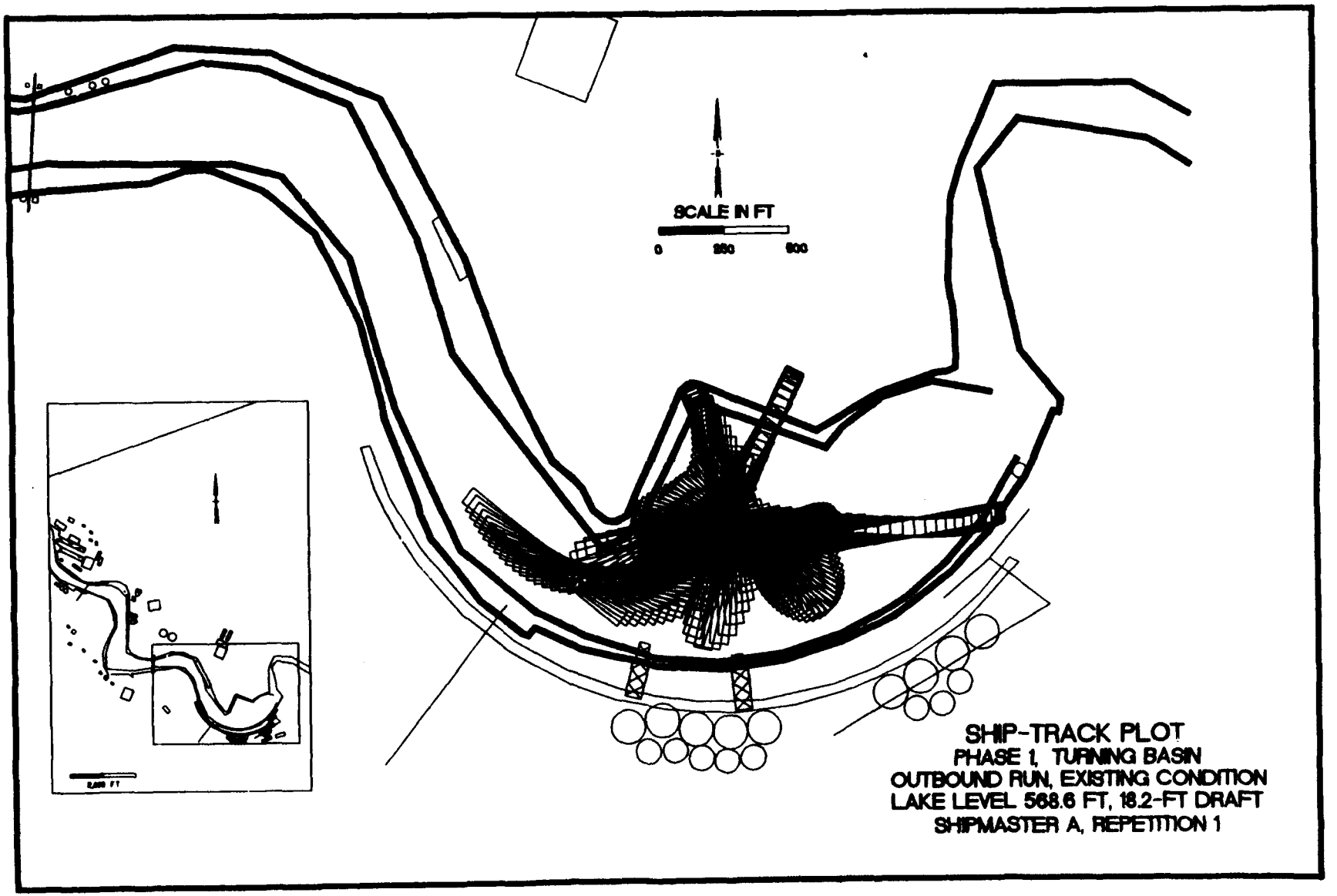
PLATE B8



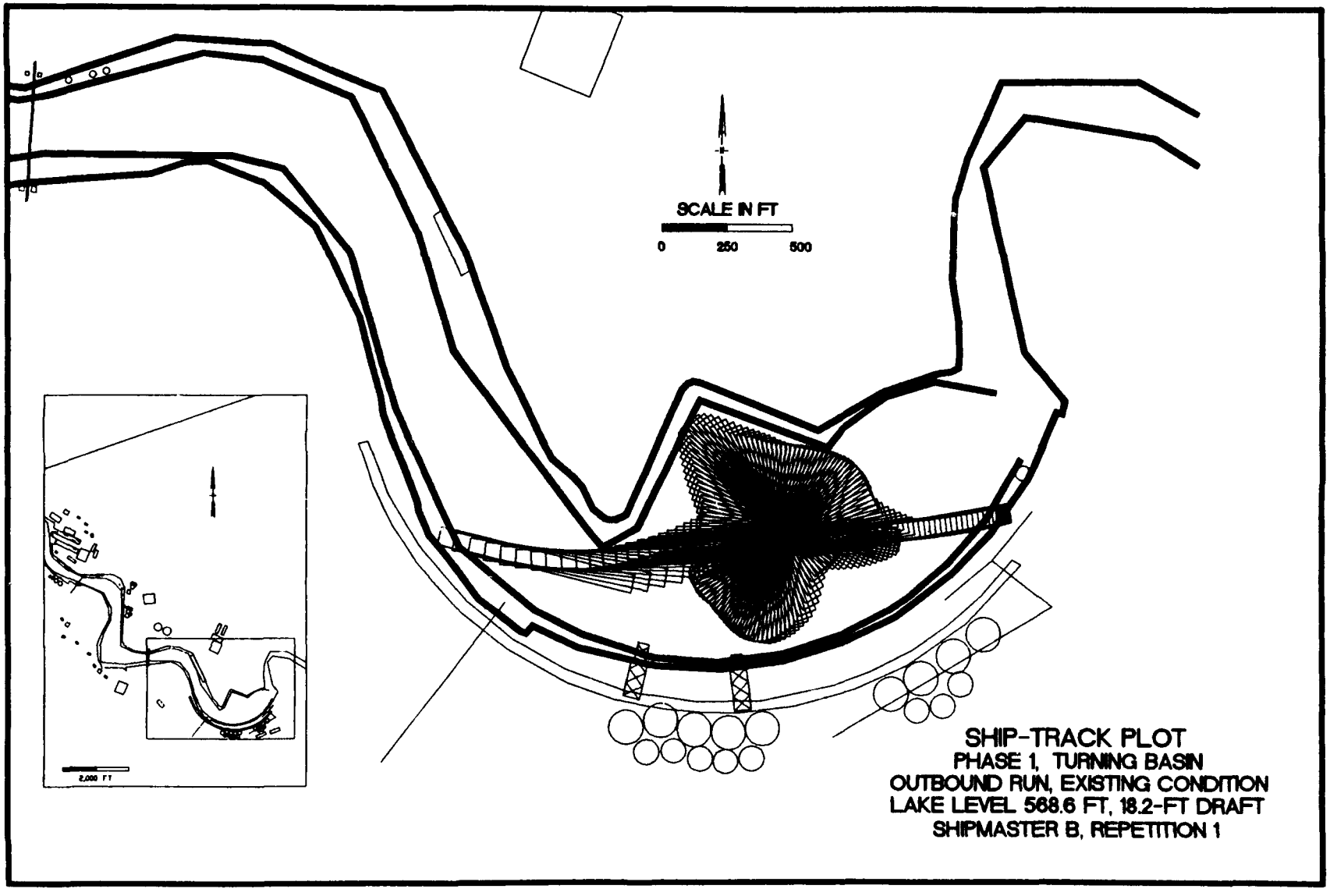
SHIP-TRACK PLOT
PHASE 1
INBOUND RUN, PLAN 2
LAKE LEVEL 568.6 FT, 25.5-FT DRAFT
SHIPMASTER B, REPETITION 2

PLATE B9

PLATE B10



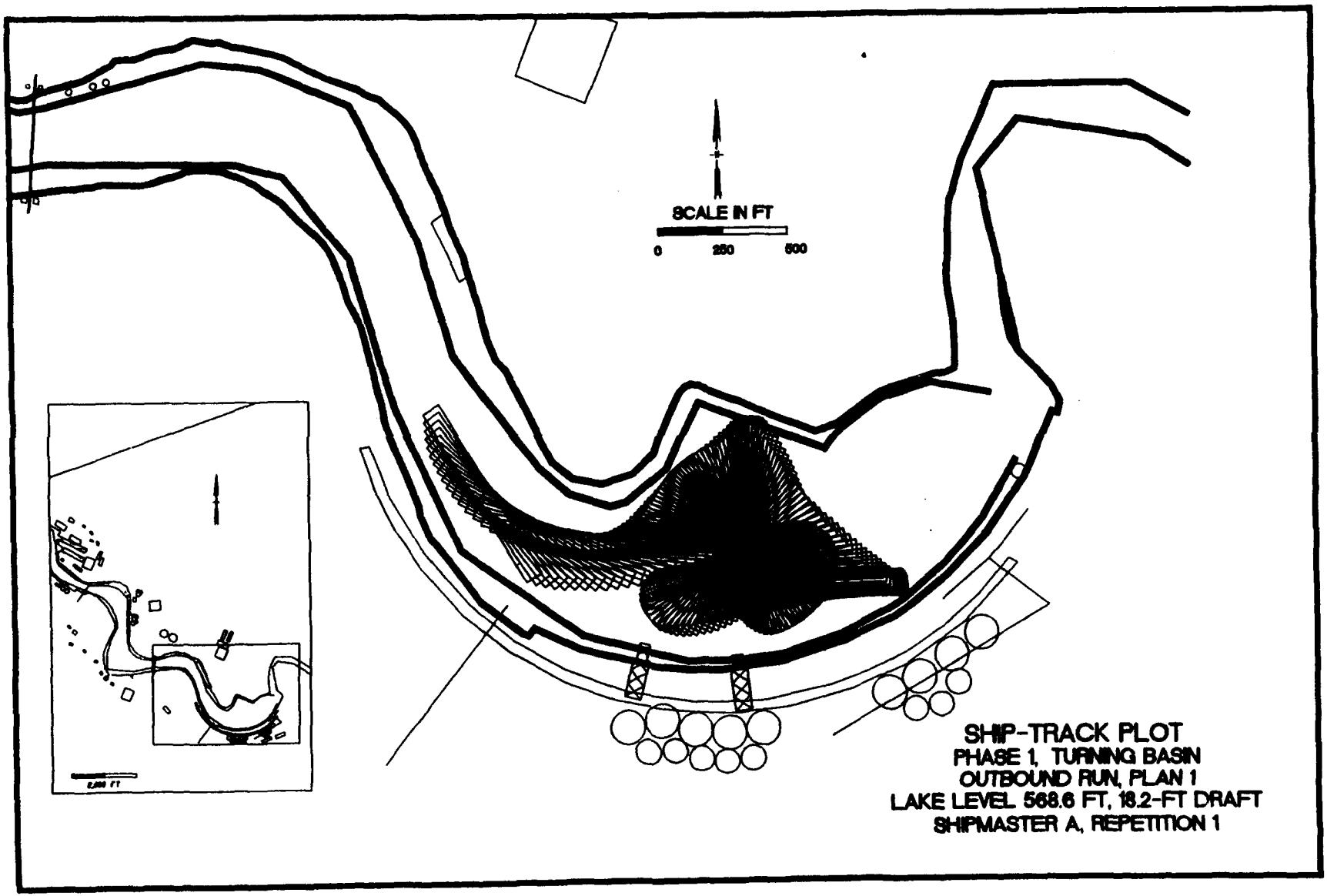
SHIP-TRACK PLOT
PHASE 1, TURNING BASIN
OUTBOUND RUN, EXISTING CONDITION
LAKE LEVEL 568.6 FT, 18.2-FT DRAFT
SHIPMASTER A, REPETITION 1



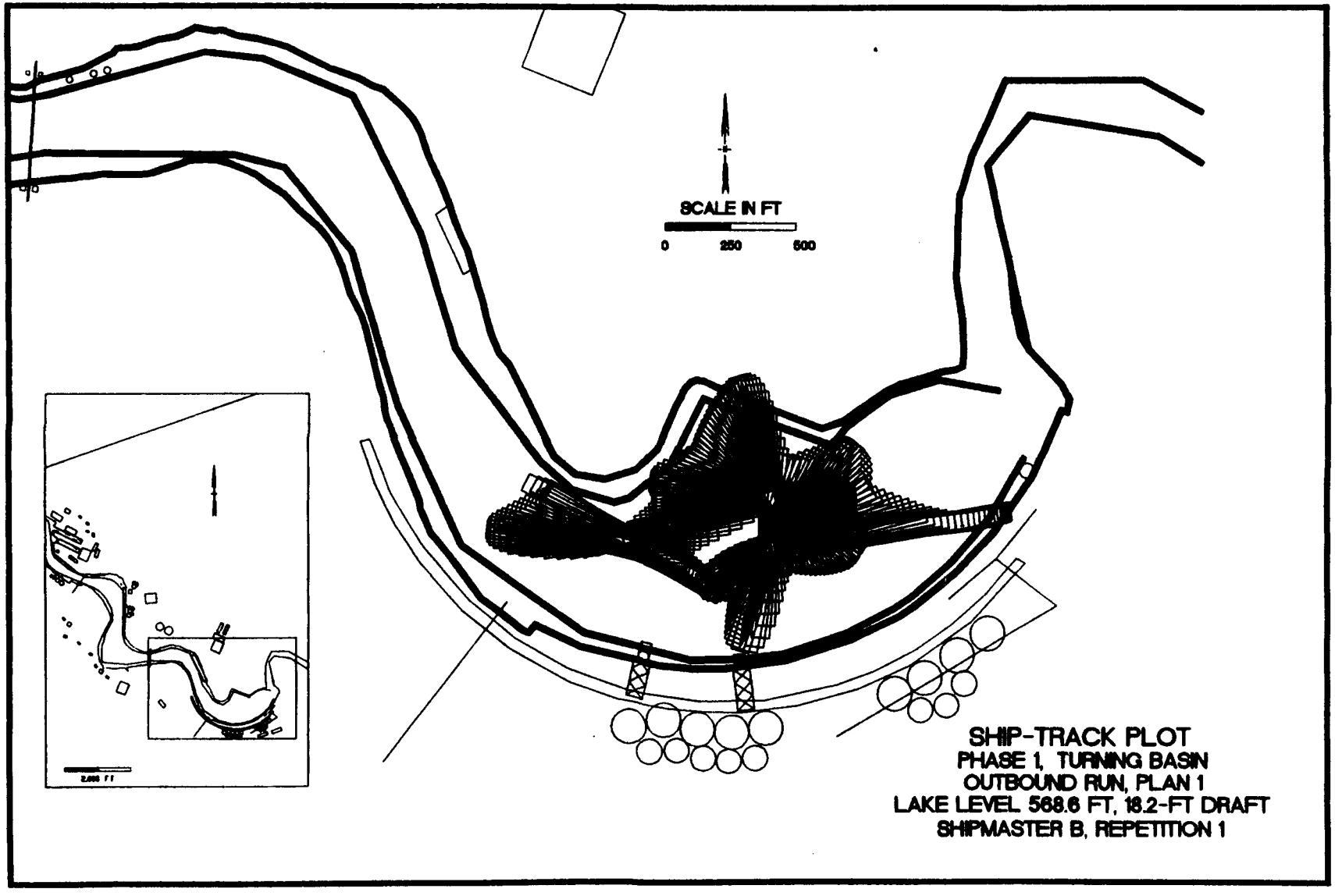
SHIP-TRACK PLOT
PHASE 1, TURNING BASIN
OUTBOUND RUN, EXISTING CONDITION
LAKE LEVEL 568.6 FT, 18.2-FT DRAFT
SHIPMASTER B, REPETITION 1

PLATE B11

PLATE B12



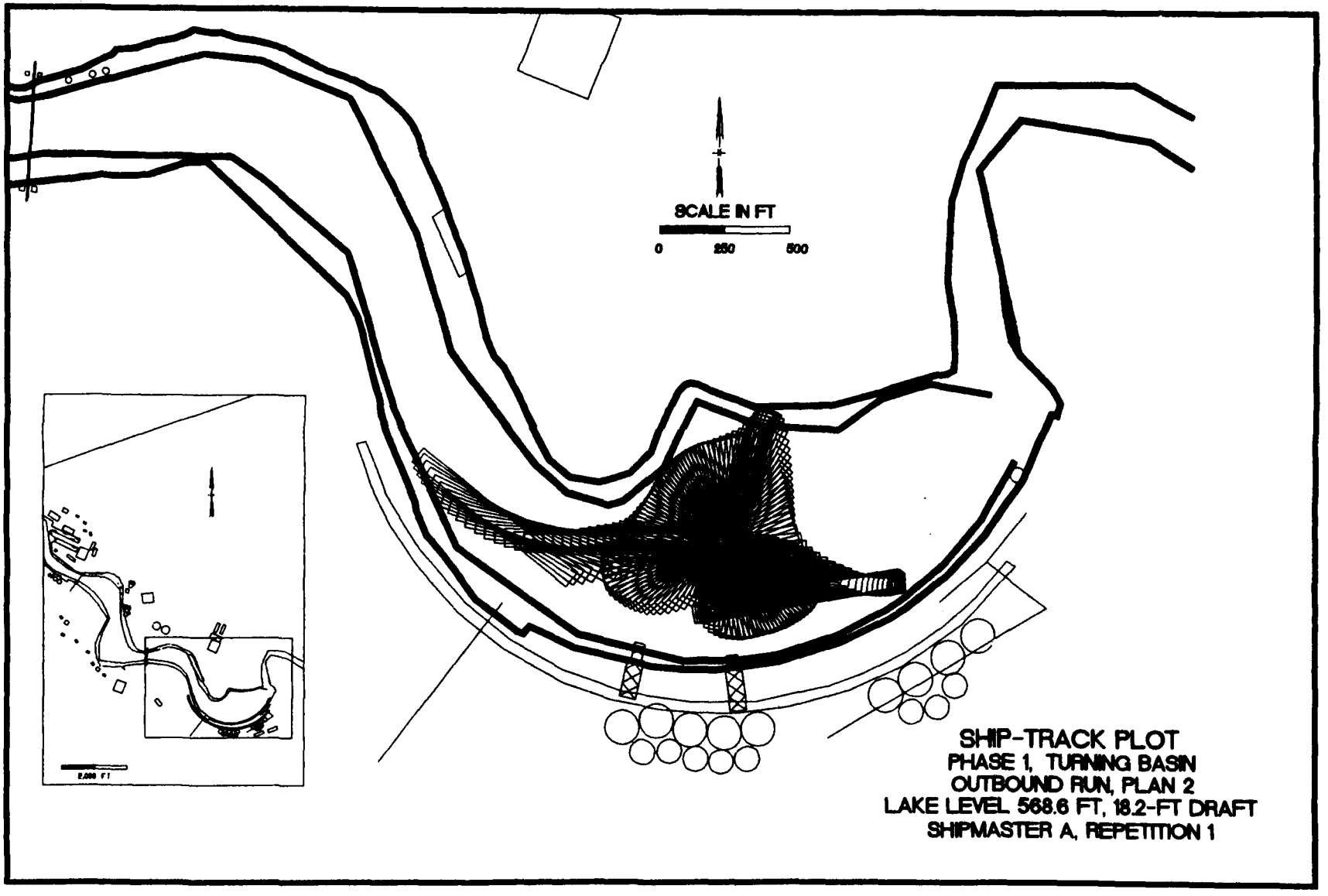
SHIP-TRACK PLOT
PHASE 1, TURNING BASIN
OUTBOUND RUN, PLAN 1
LAKE LEVEL 568.6 FT, 18.2-FT DRAFT
SHIPMASTER A, REPETITION 1



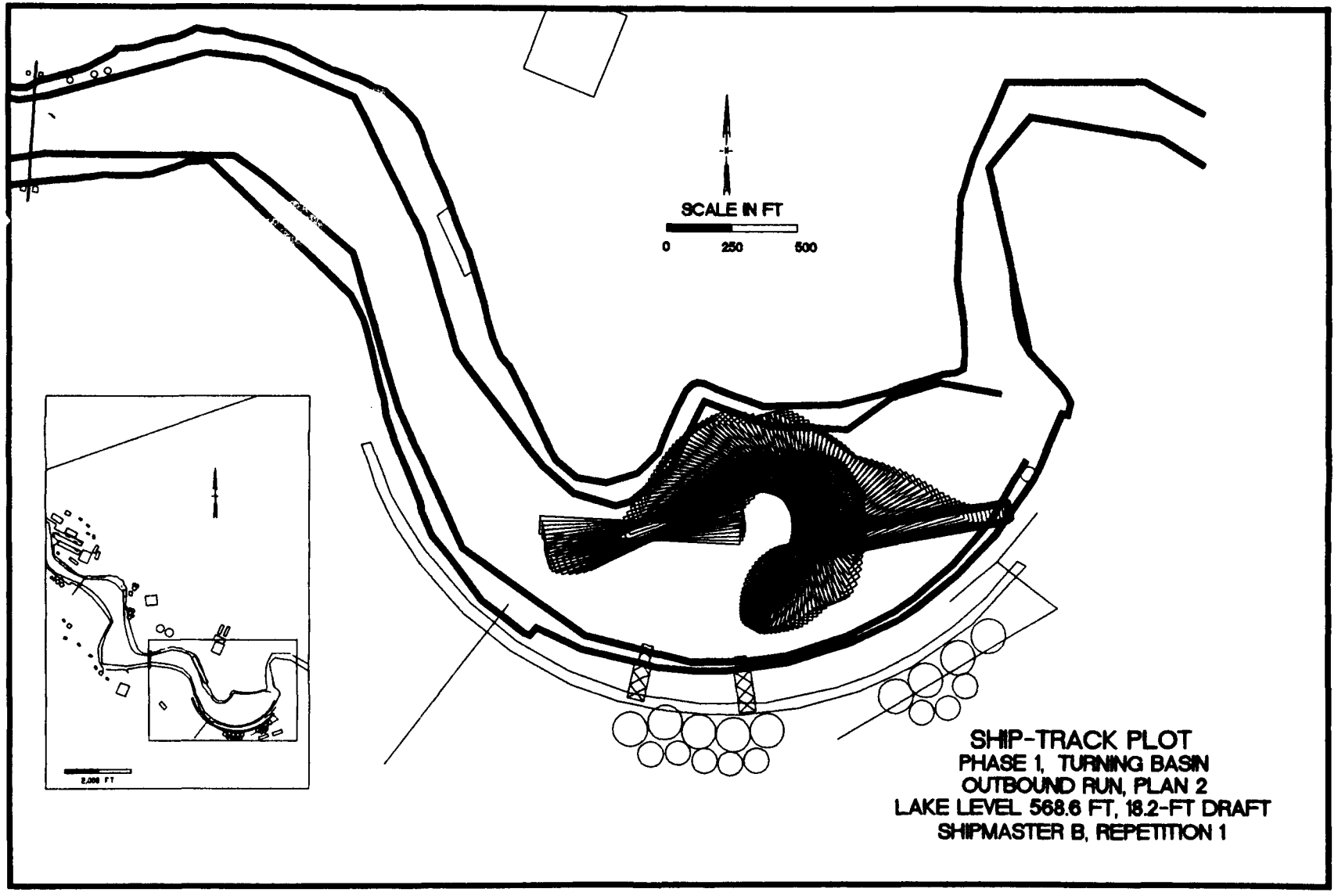
SHIP-TRACK PLOT
PHASE 1, TURNING BASIN
OUTBOUND RUN, PLAN 1
LAKE LEVEL 568.6 FT, 18.2-FT DRAFT
SHIPMASTER B, REPETITION 1

PLATE B13

PLATE B14



SHIP-TRACK PLOT
PHASE 1, TURNING BASIN
OUTBOUND RUN, PLAN 2
LAKE LEVEL 568.6 FT, 18.2-FT DRAFT
SHIPMASTER A, REPETITION 1



SHIP-TRACK PLOT
PHASE 1, TURNING BASIN
OUTBOUND RUN, PLAN 2
LAKE LEVEL 568.6 FT, 18.2-FT DRAFT
SHIPMASTER B, REPETITION 1

PLATE B15

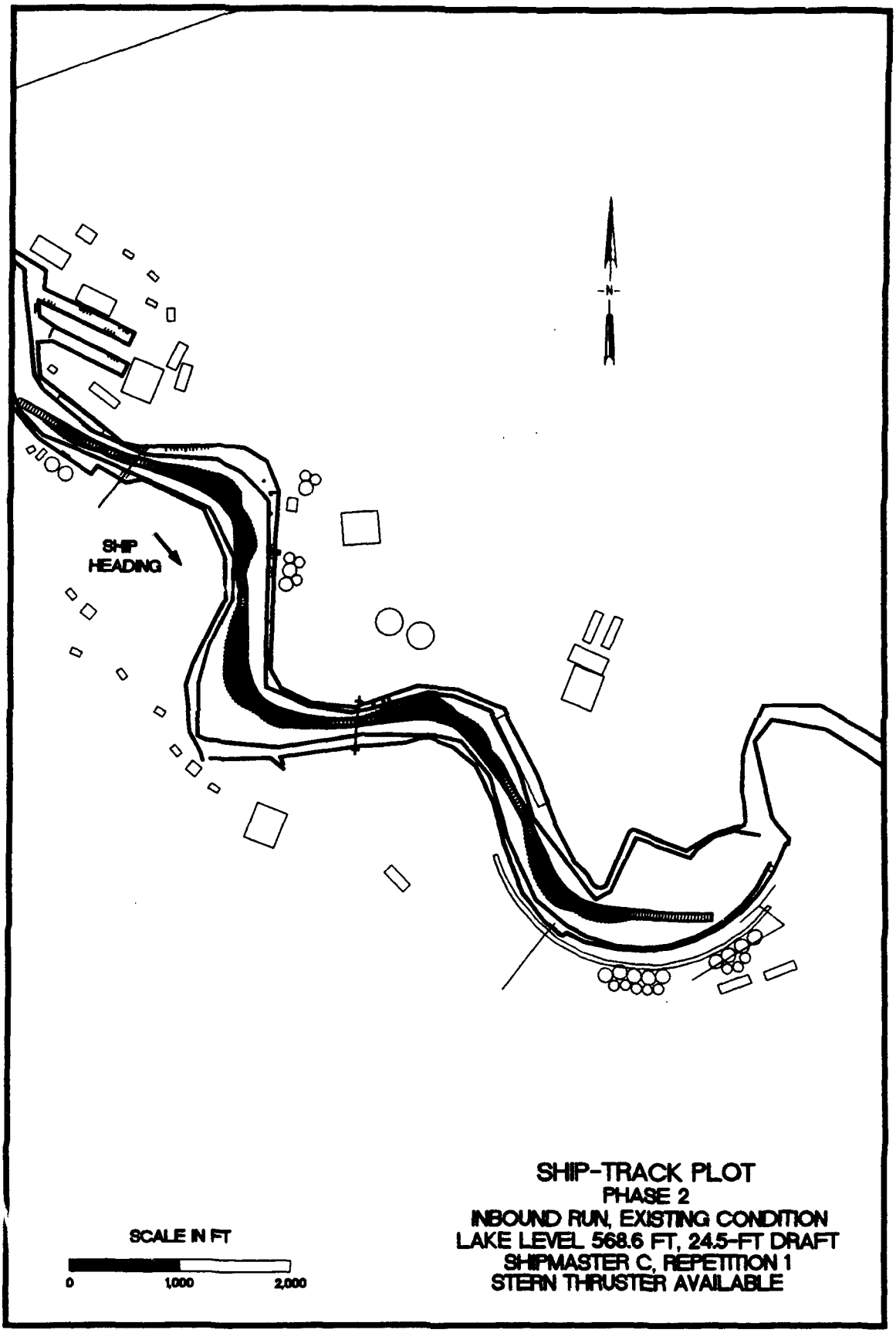
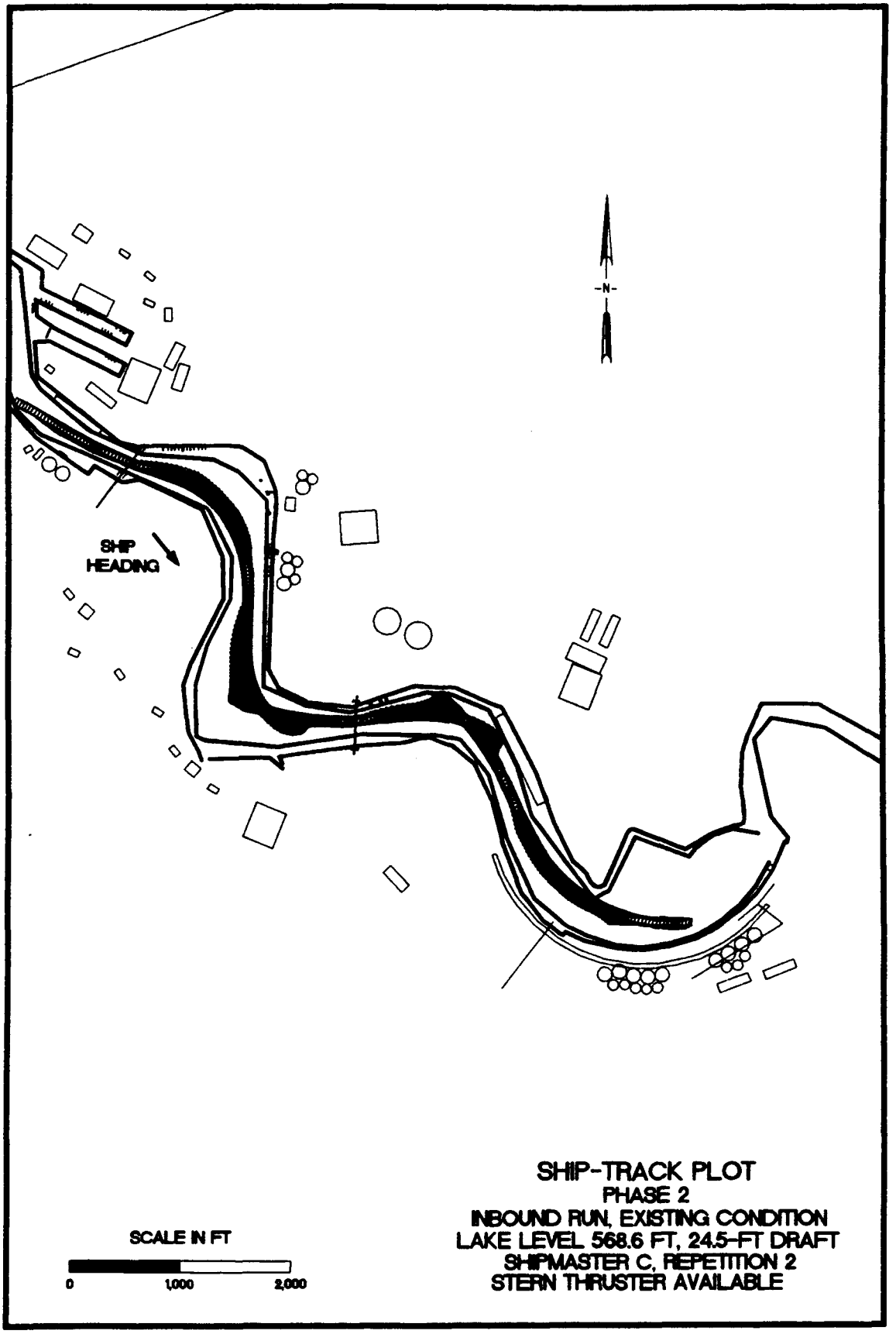

SHIP
HEADING
N
SCALE IN FT
0
1,000
2,000
SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, EXISTING CONDITION
LAKE LEVEL 568.6 FT, 24.5-FT DRAFT
SHIPMASTER C, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B16



SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, EXISTING CONDITION
LAKE LEVEL 568.6 FT, 24.5-FT DRAFT
SHIPMASTER C, REPETITION 2
STERN THRUSTER AVAILABLE

PLATE B17

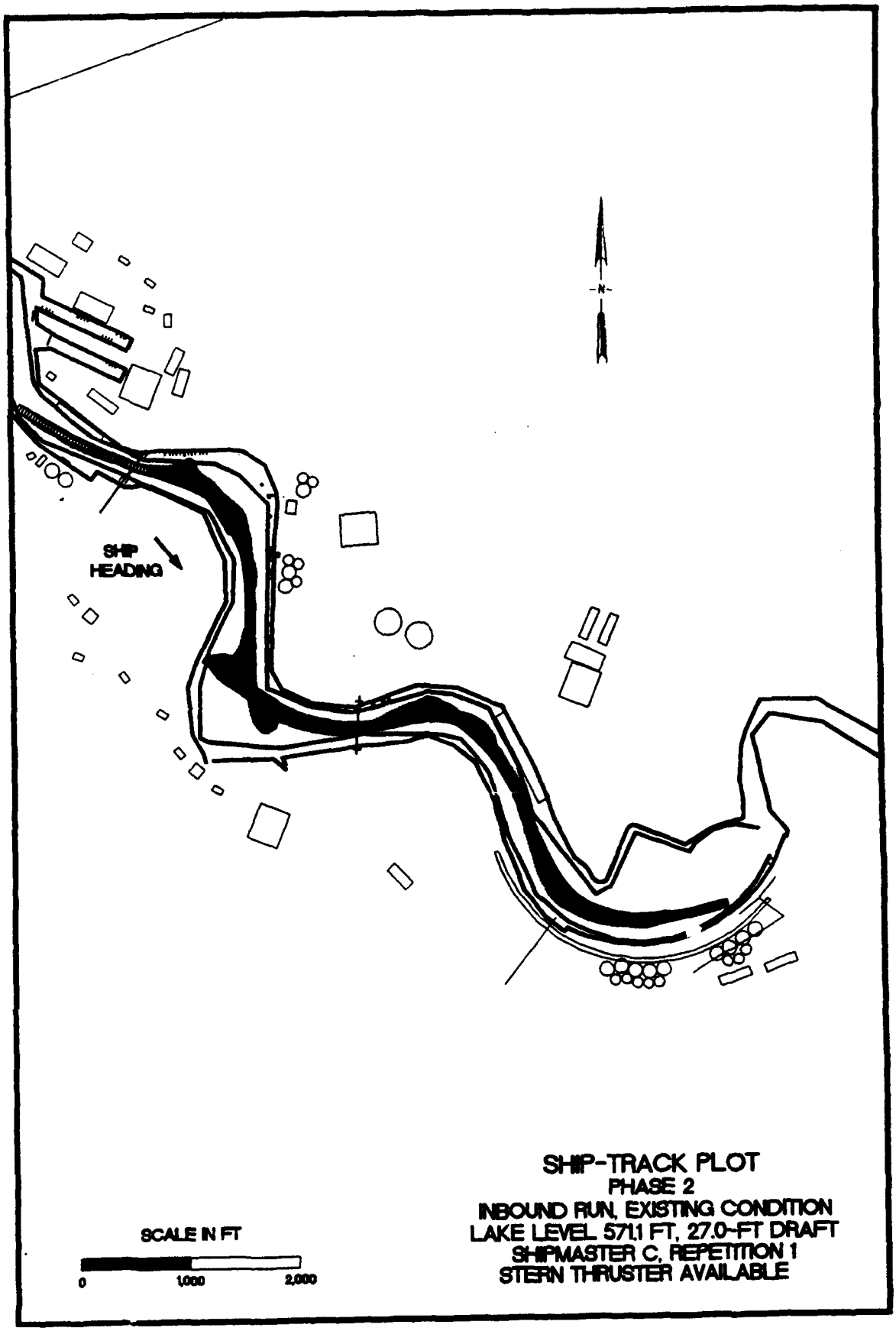
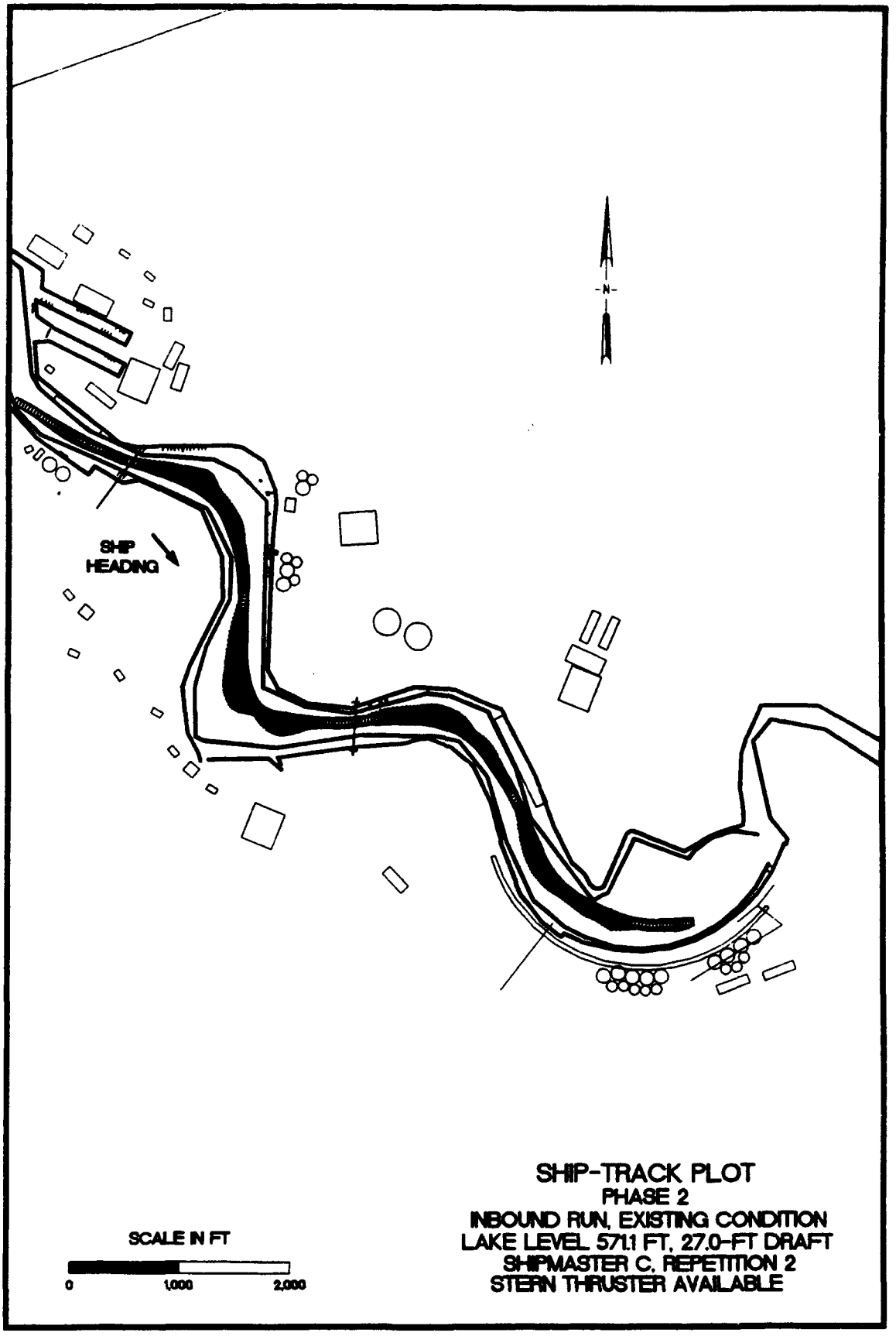

N
SHIP
HEADING
SCALE IN FT
0
1,000
2,000
SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, EXISTING CONDITION
LAKE LEVEL 571.1 FT, 27.0-FT DRAFT
SHIPMASTER C, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B18



SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, EXISTING CONDITION
LAKE LEVEL 571.1 FT, 27.0-FT DRAFT
SHIPMASTER C, REPETITION 2
STERN THRUSTER AVAILABLE

PLATE B19

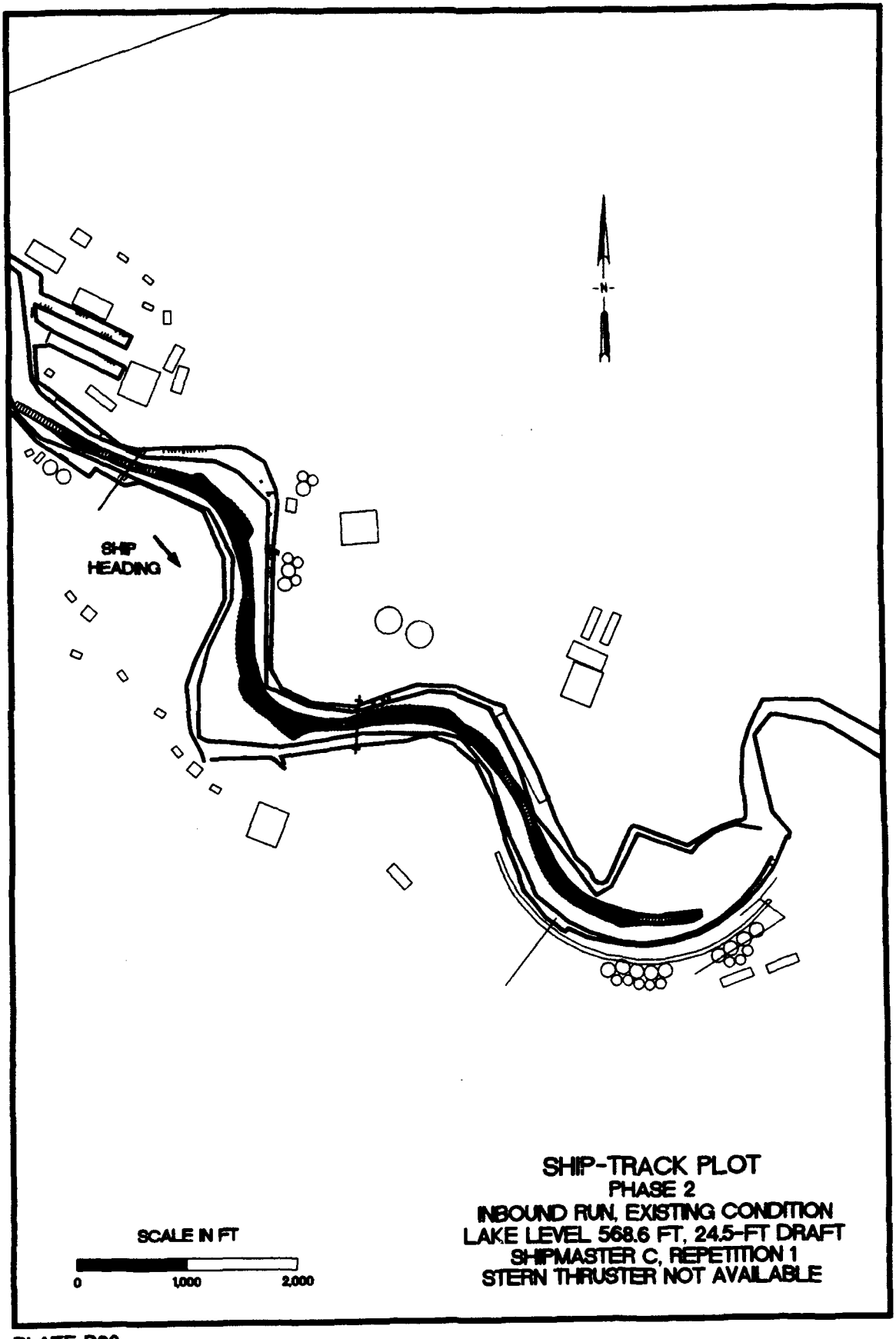
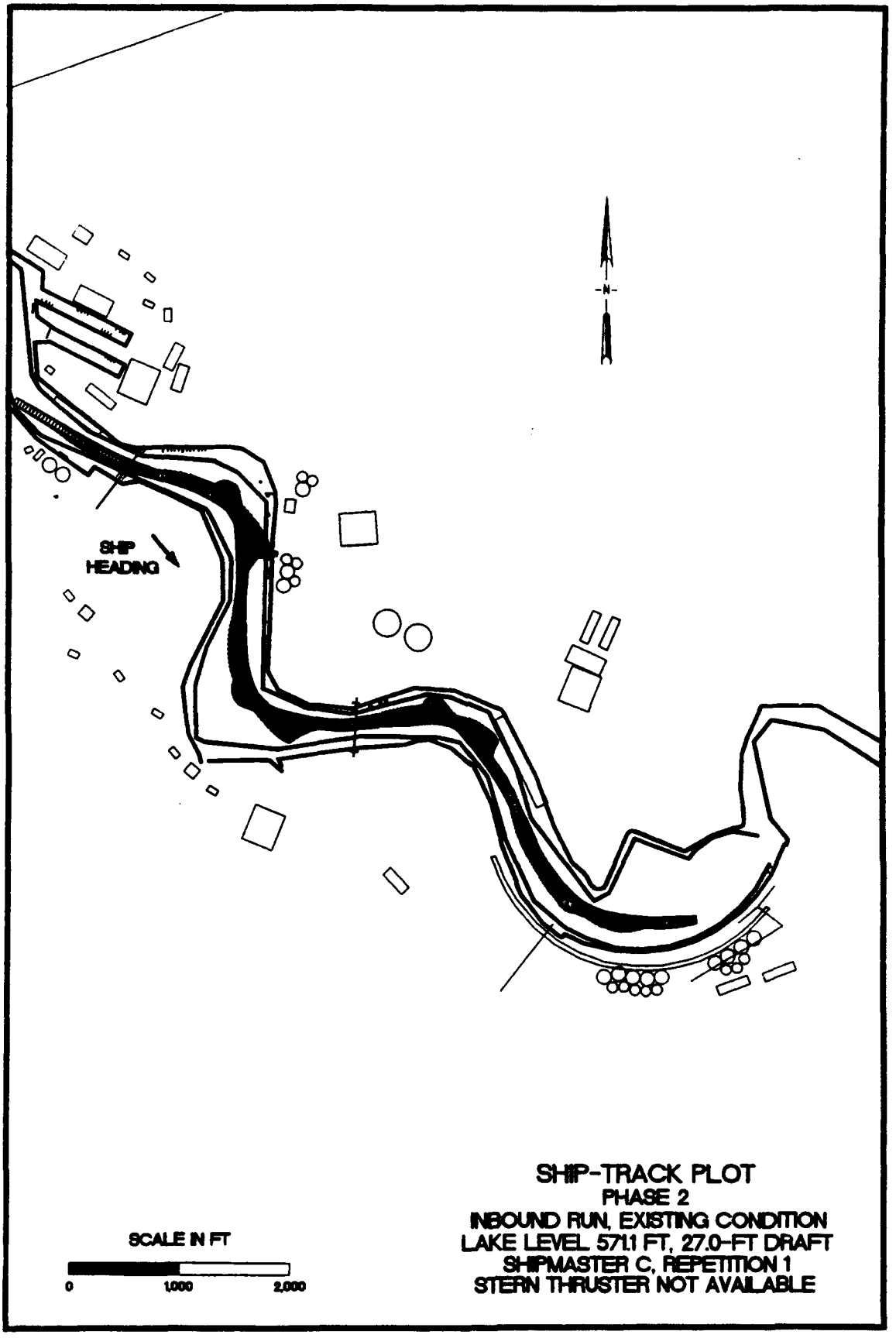

N
SHIP
HEADING
SCALE IN FT
0
1,000
2,000
SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, EXISTING CONDITION
LAKE LEVEL 568.6 FT, 24.5-FT DRAFT
SHIPMASTER C, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B20



SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, EXISTING CONDITION
LAKE LEVEL 571.1 FT, 27.0-FT DRAFT
SHIPMASTER C, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B21

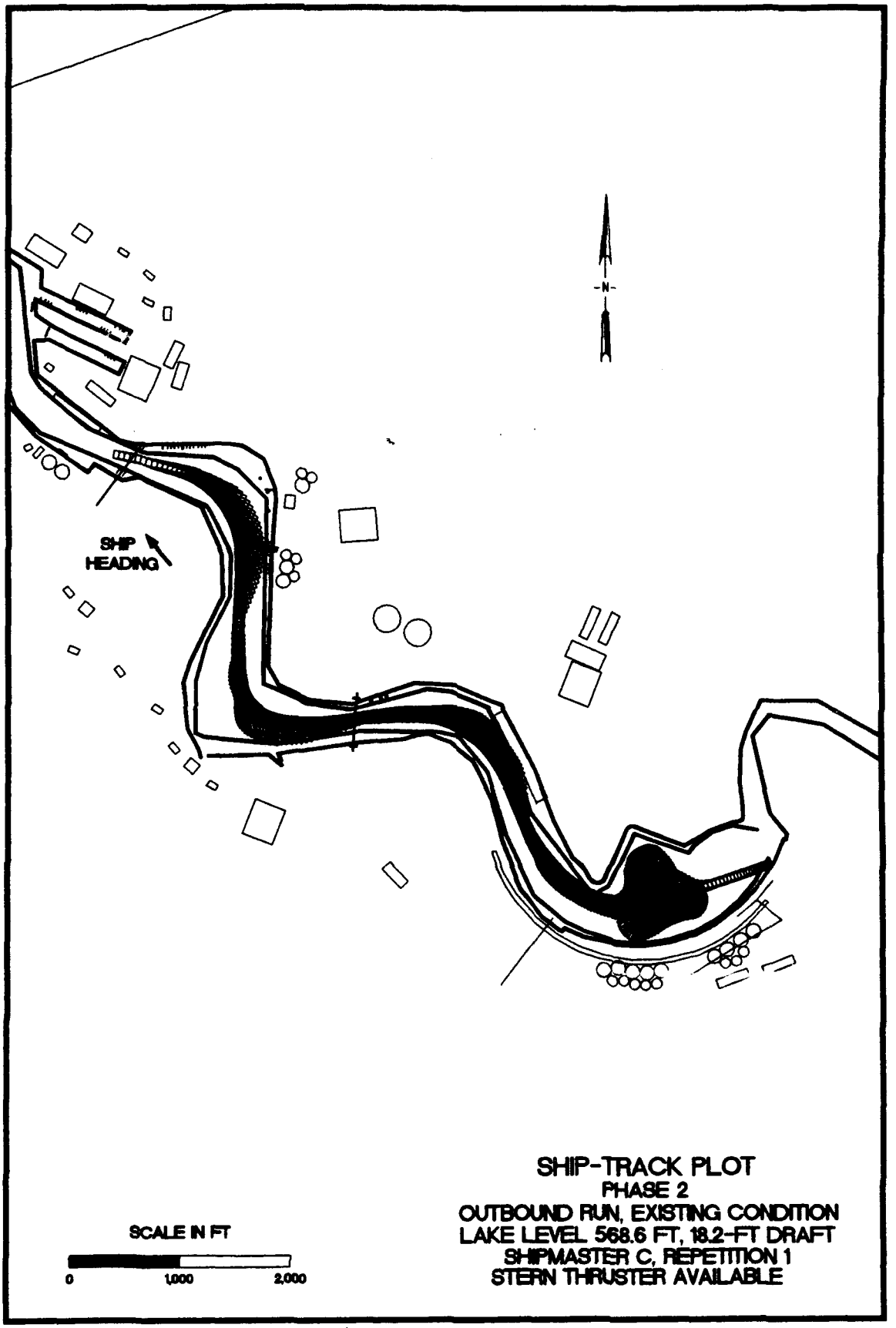
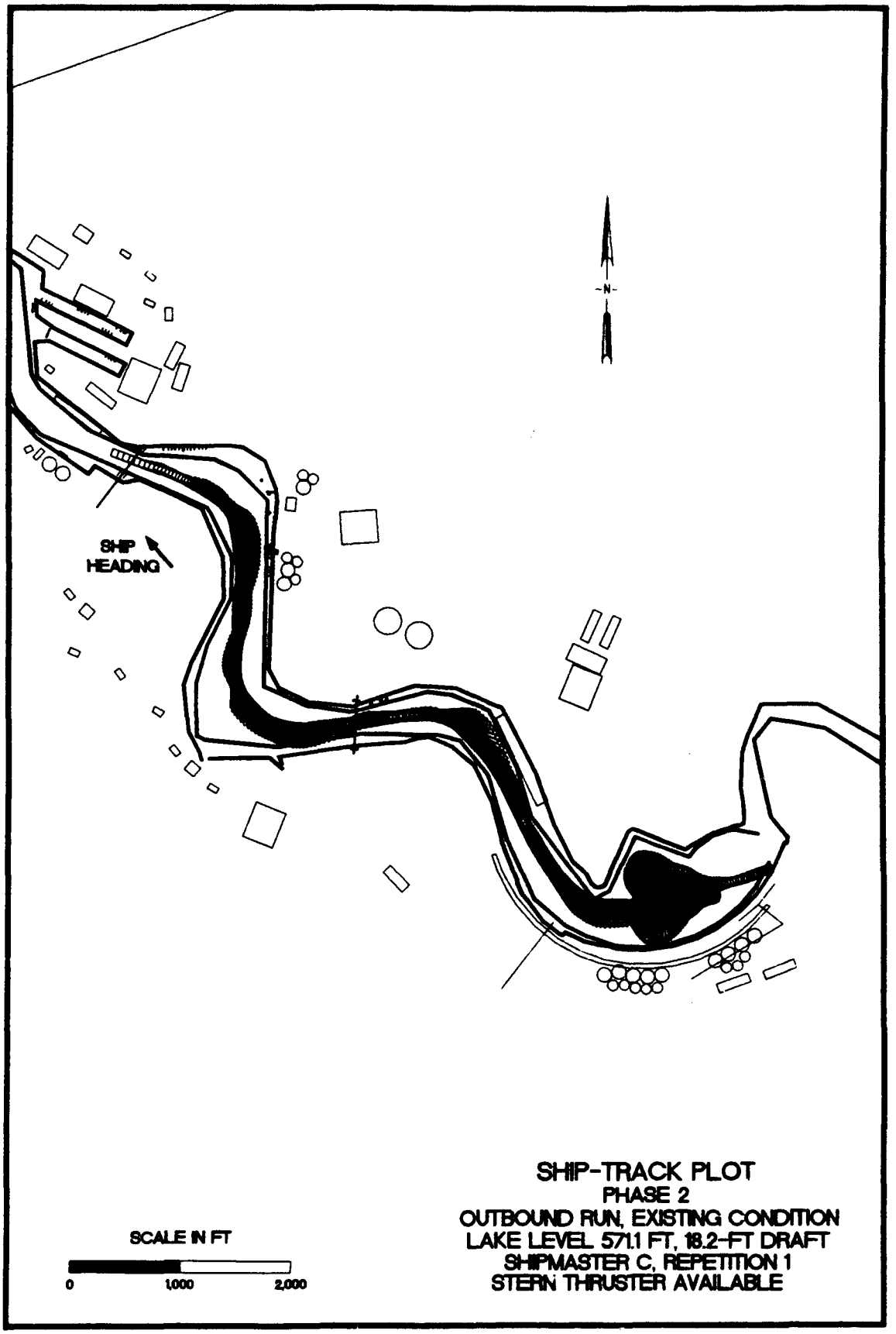
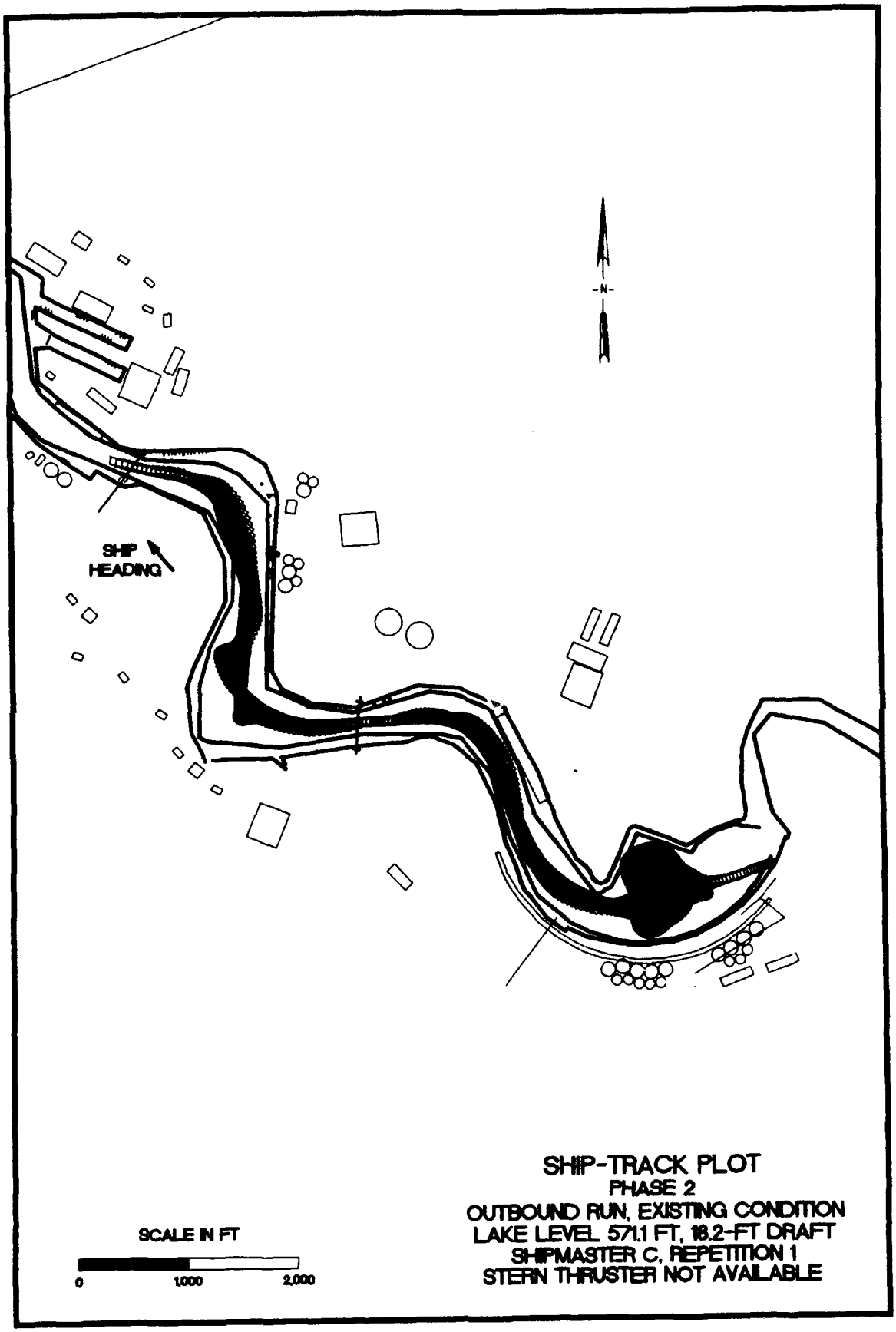

-N-
SHIP
HEADING
SCALE IN FT
0
1,000
2,000
SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, EXISTING CONDITION
LAKE LEVEL 568.6 FT, 18.2-FT DRAFT
SHIPMASTER C, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B22



SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, EXISTING CONDITION
LAKE LEVEL 571.1 FT, 18.2-FT DRAFT
SHIPMASTER C, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B23


-N-
SHIP
HEADING
SCALE IN FT
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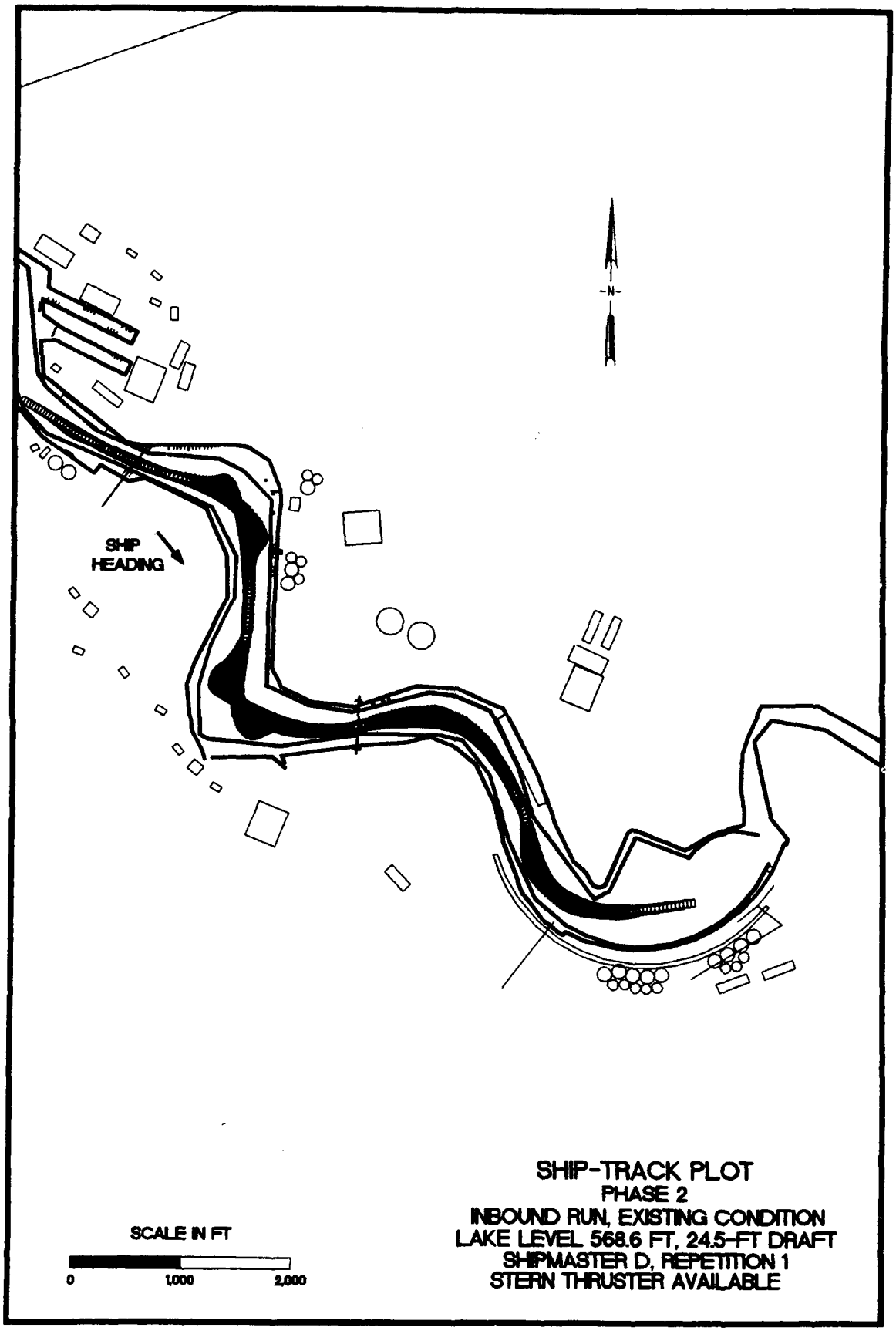
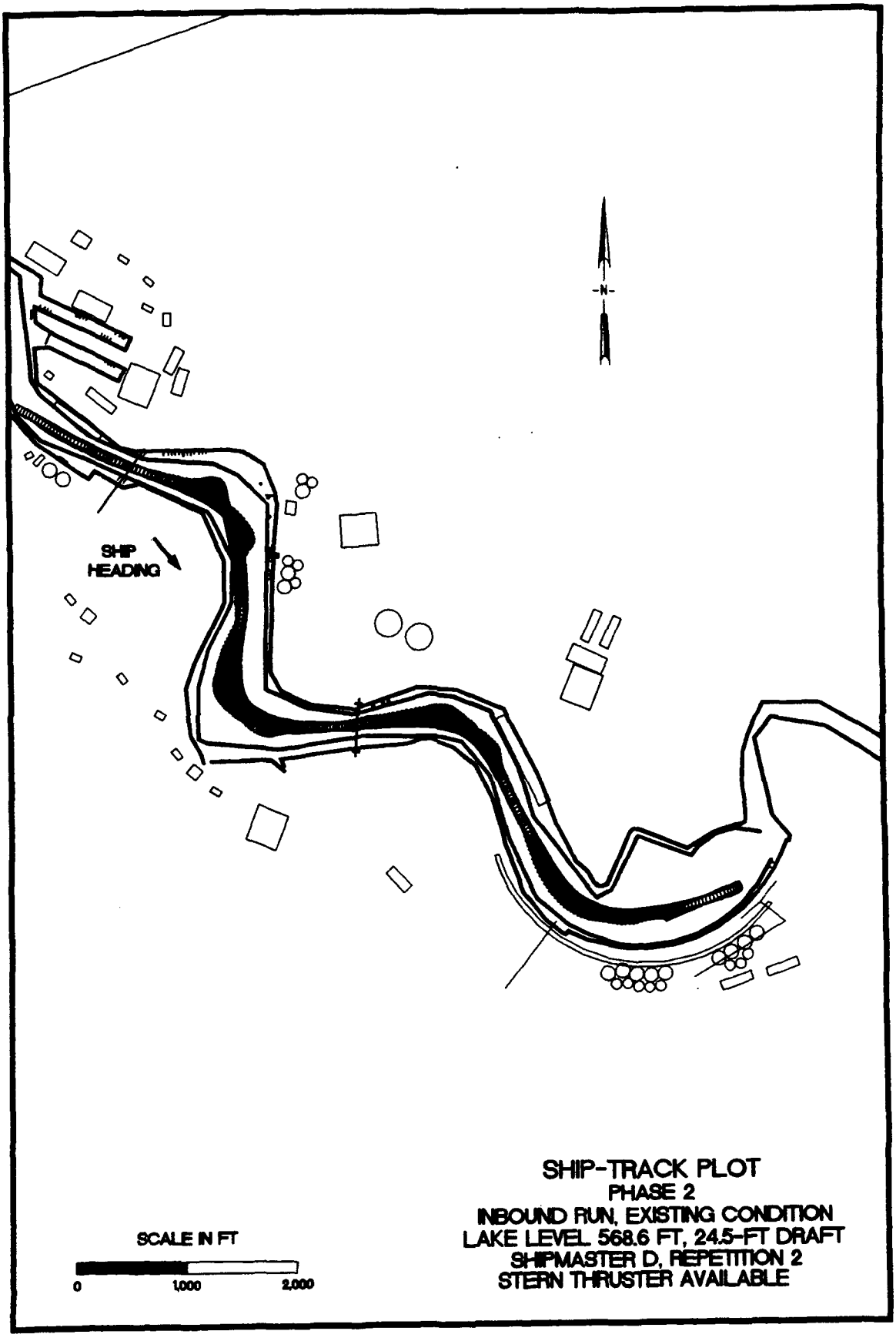
1,000
2,000
SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, EXISTING CONDITION
LAKE LEVEL 571.1 FT, 18.2-FT DRAFT
SHIPMASTER C, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B24



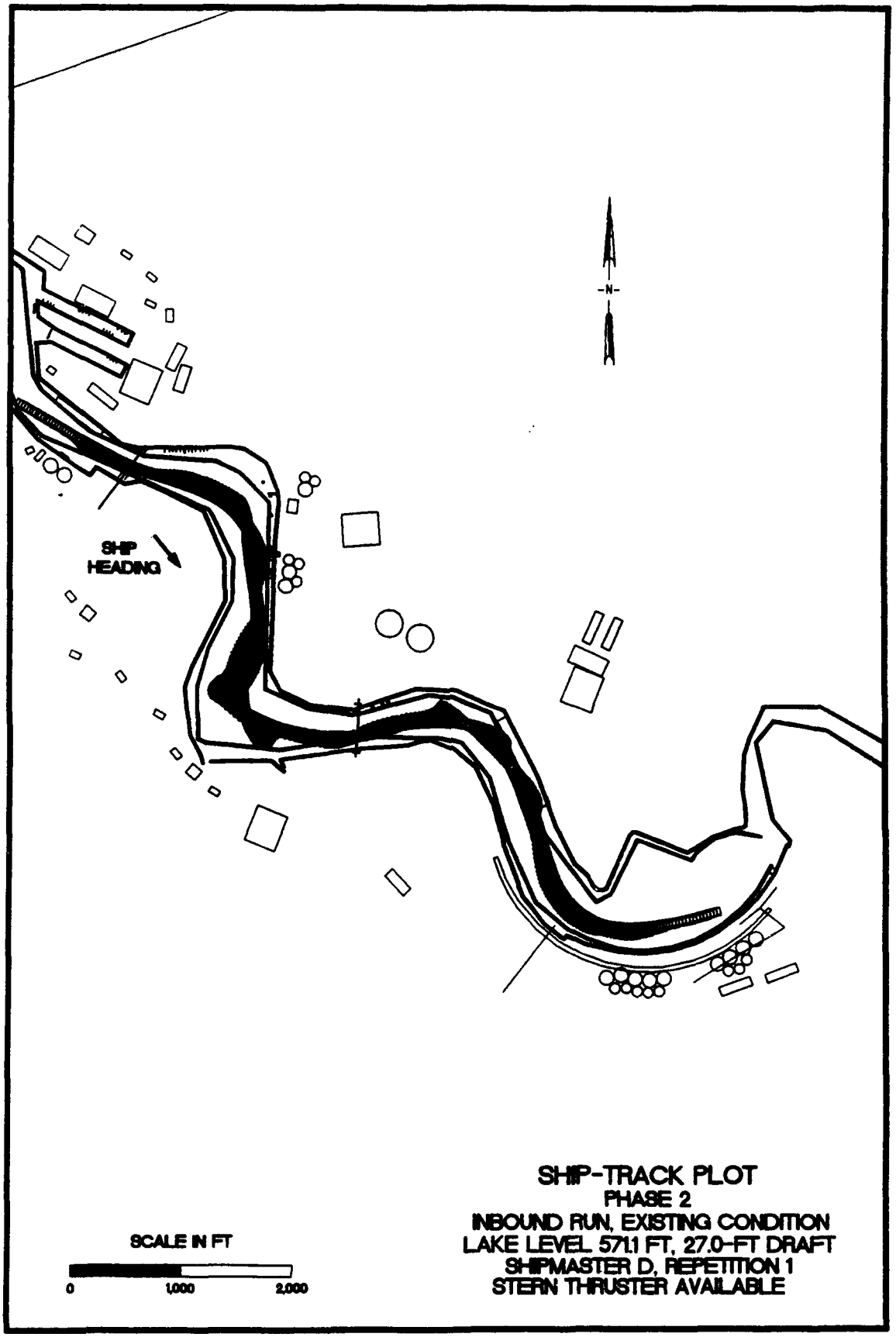
SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, EXISTING CONDITION
LAKE LEVEL 568.6 FT, 24.5-FT DRAFT
SHIPMASTER D, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B25



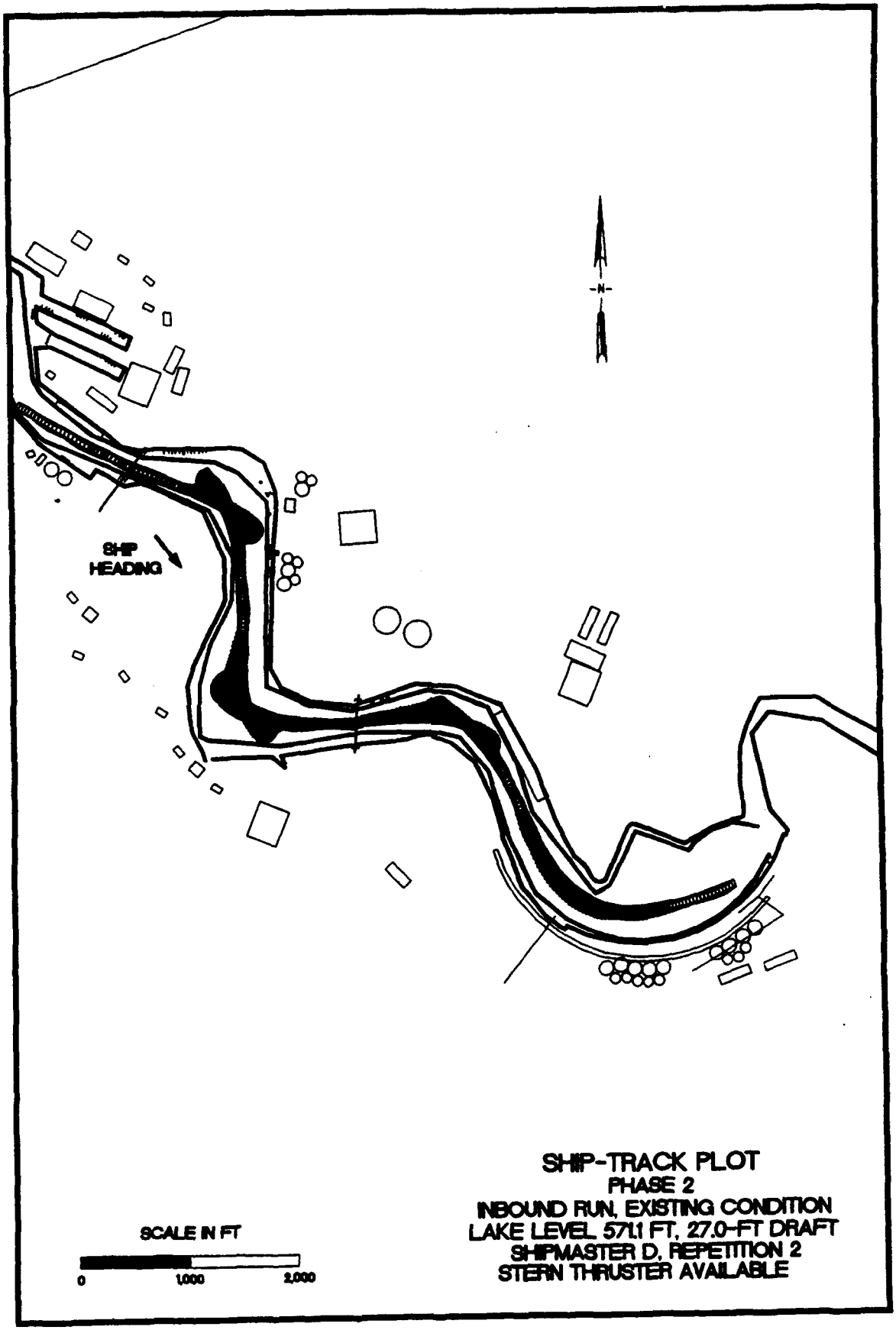
SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, EXISTING CONDITION
LAKE LEVEL 568.6 FT, 24.5-FT DRAFT
SHIPMASTER D, REPETITION 2
STERN THRUSTER AVAILABLE

PLATE B26



SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, EXISTING CONDITION
LAKE LEVEL 571.1 FT, 27.0-FT DRAFT
SHIPMASTER D, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B27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SHIP
HEADING
SCALE IN FT
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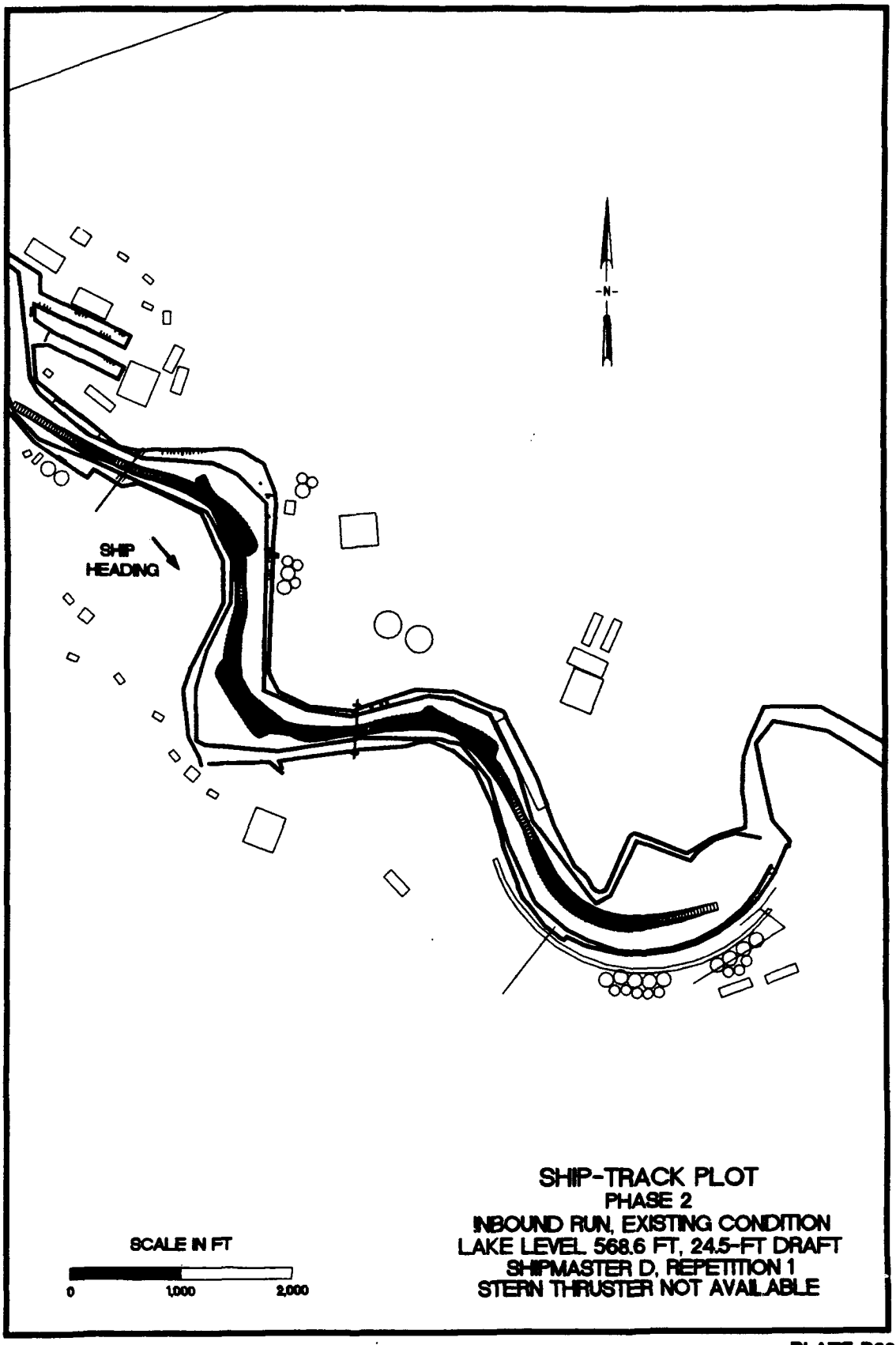
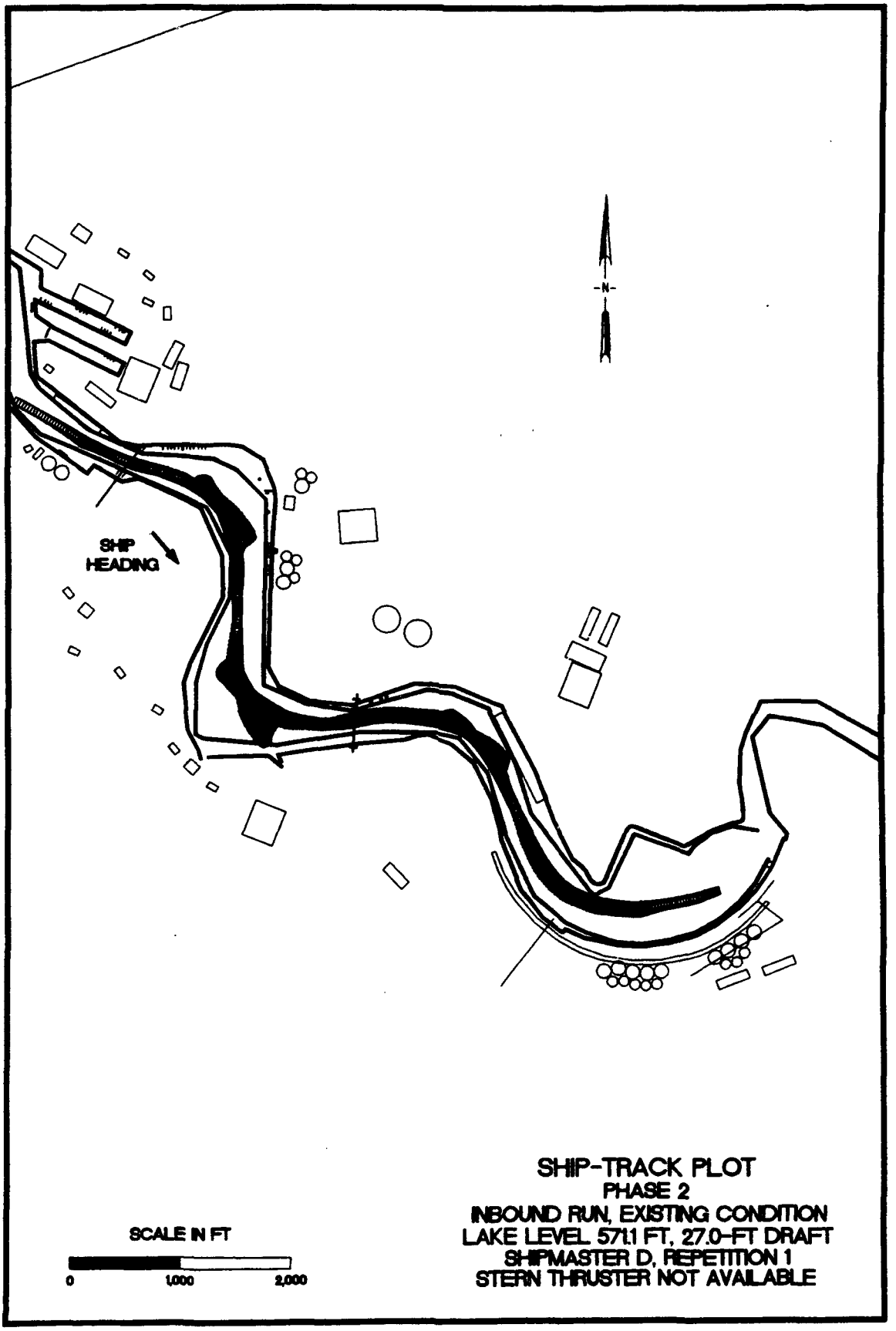
2,000
SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, EXISTING CONDITION
LAKE LEVEL 571.1 FT, 27.0-FT DRAFT
SHIPMASTER D, REPETITION 2
STERN THRUSTER AVAILABLE

PLATE B28



SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, EXISTING CONDITION
LAKE LEVEL 568.6 FT, 24.5-FT DRAFT
SHIPMASTER D, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B29


N
SHIP
HEADING
SCALE IN FT
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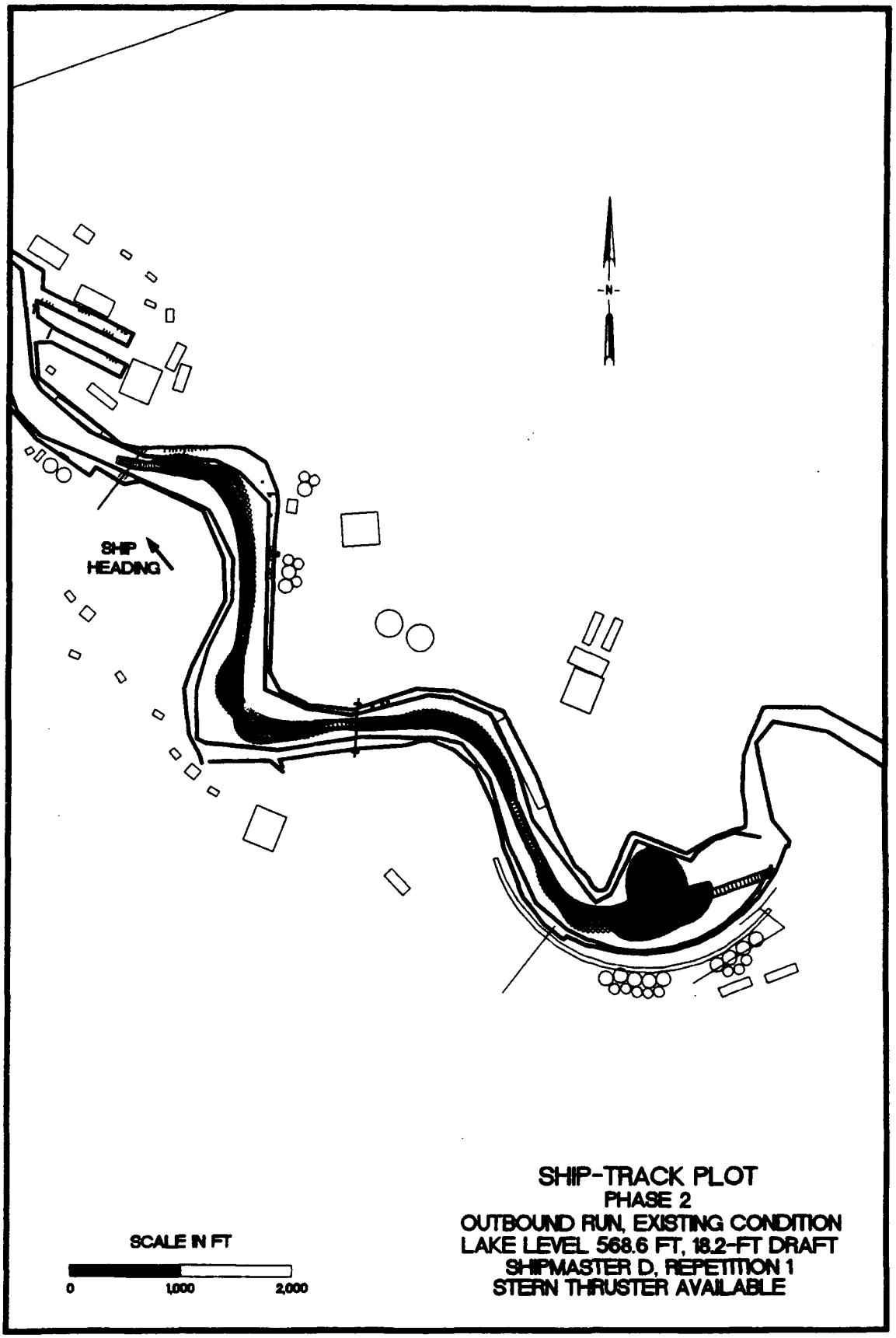
2,000
SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, EXISTING CONDITION
LAKE LEVEL 571.1 FT, 27.0-FT DRAFT
SHIPMASTER D, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B30



SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, EXISTING CONDITION
LAKE LEVEL 568.6 FT, 18.2-FT DRAFT
SHIPMASTER D, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B31

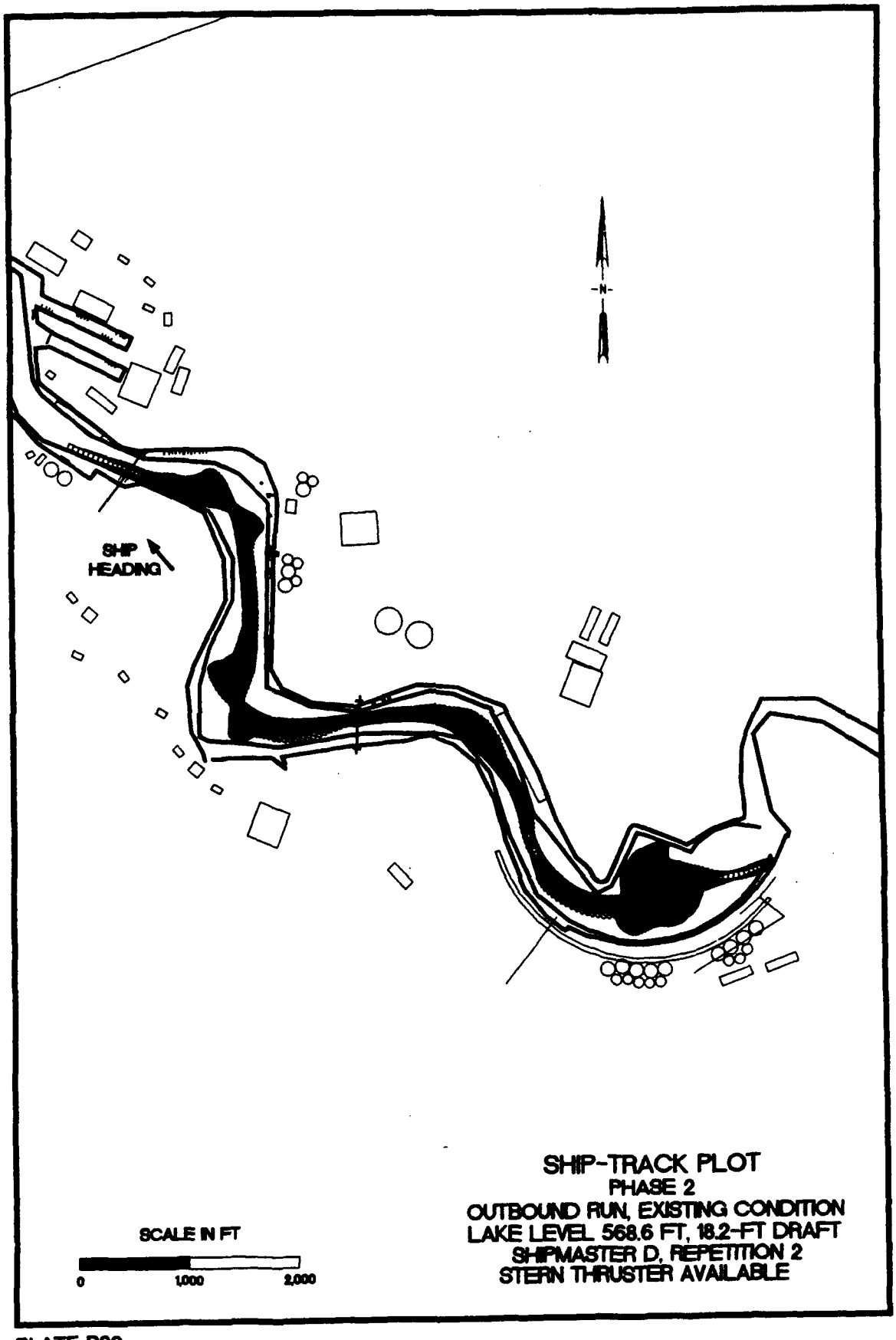
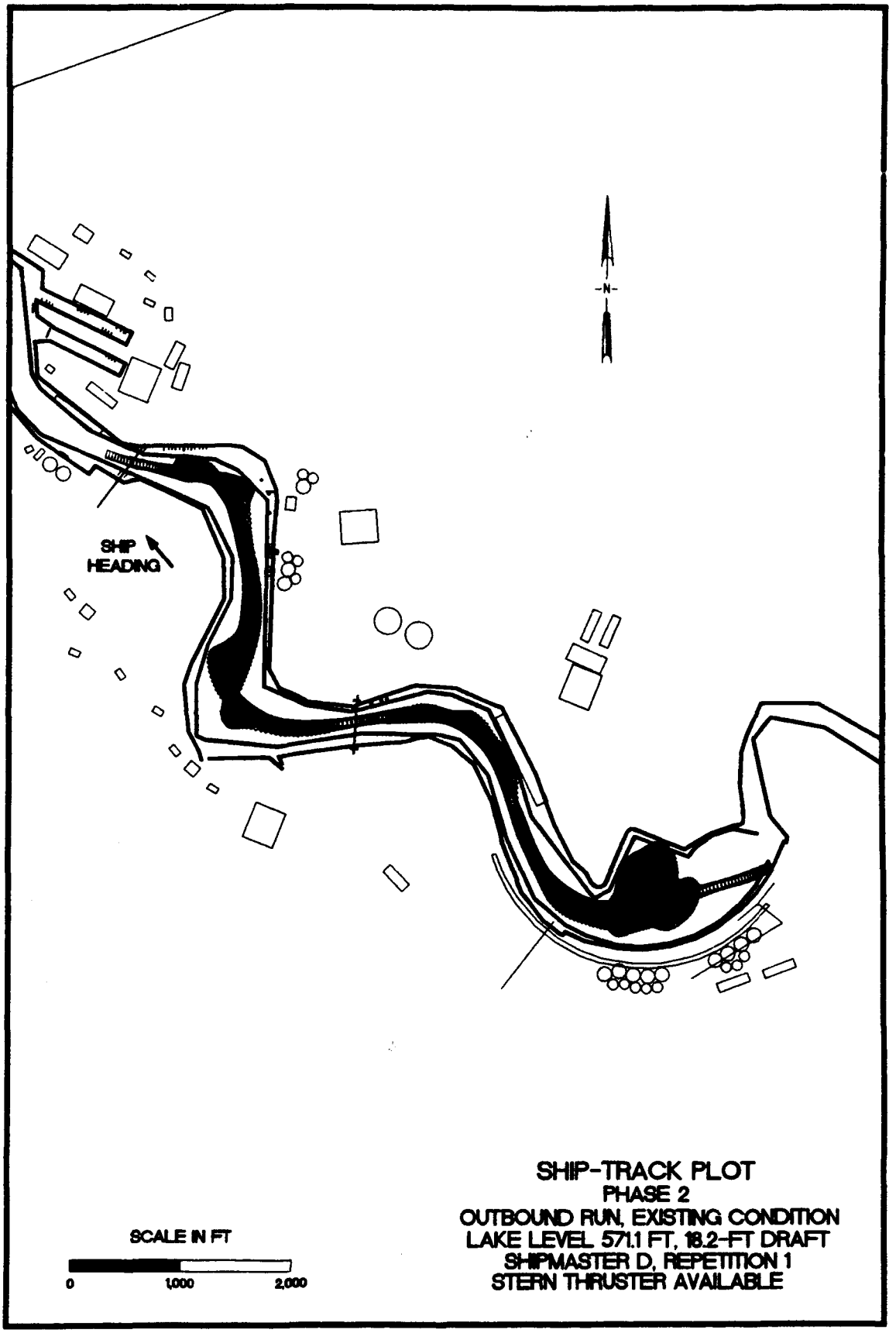
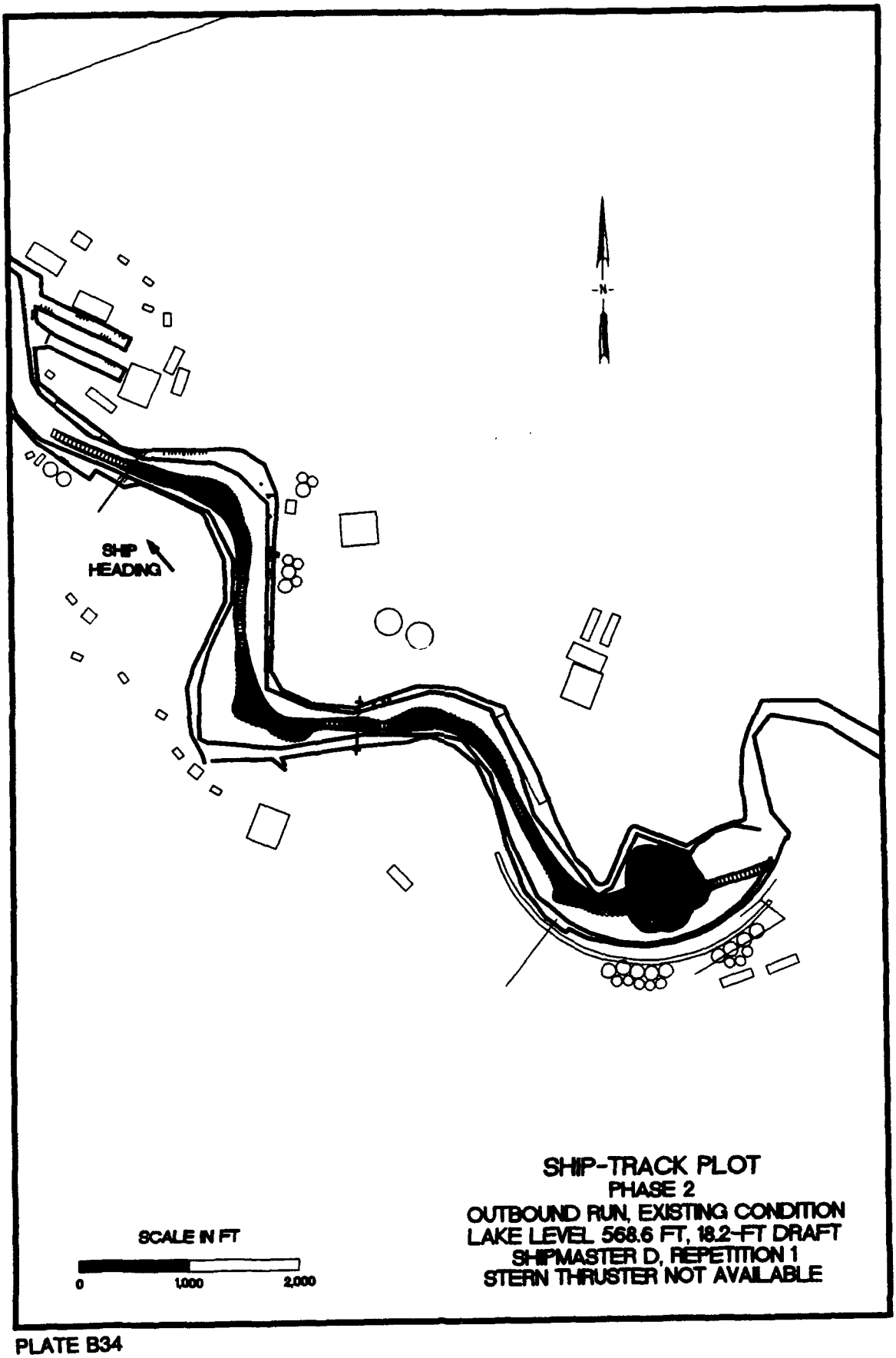

N
SHIP HEADING
SCALE IN FT
0
1,000
2,000
SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, EXISTING CONDITION
LAKE LEVEL 568.6 FT, 18.2-FT DRAFT
SHIPMASTER D, REPETITION 2
STERN THRUSTER AVAILABLE

PLATE B32



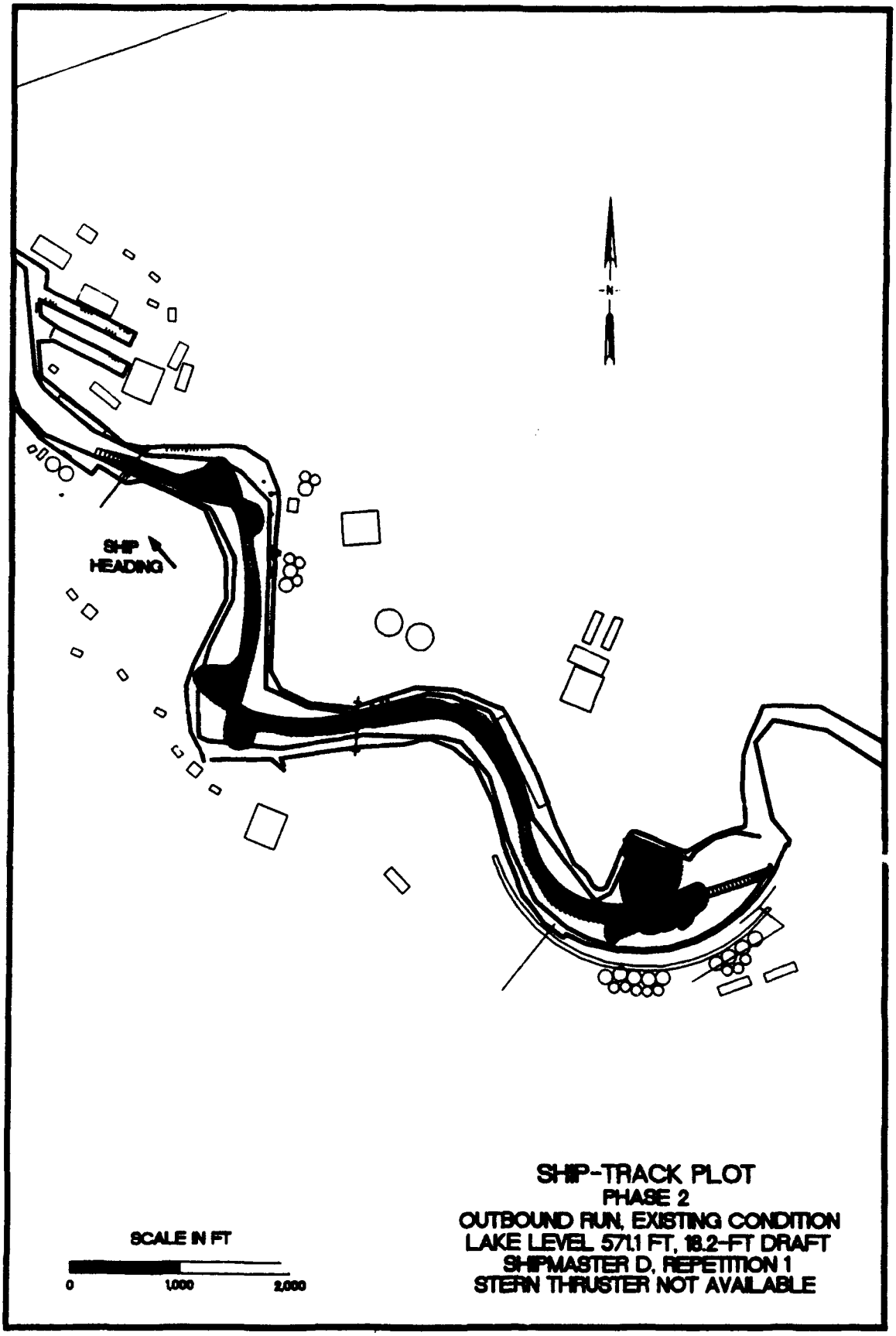
SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, EXISTING CONDITION
LAKE LEVEL 571.1 FT, 18.2-FT DRAFT
SHIPMASTER D, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B33



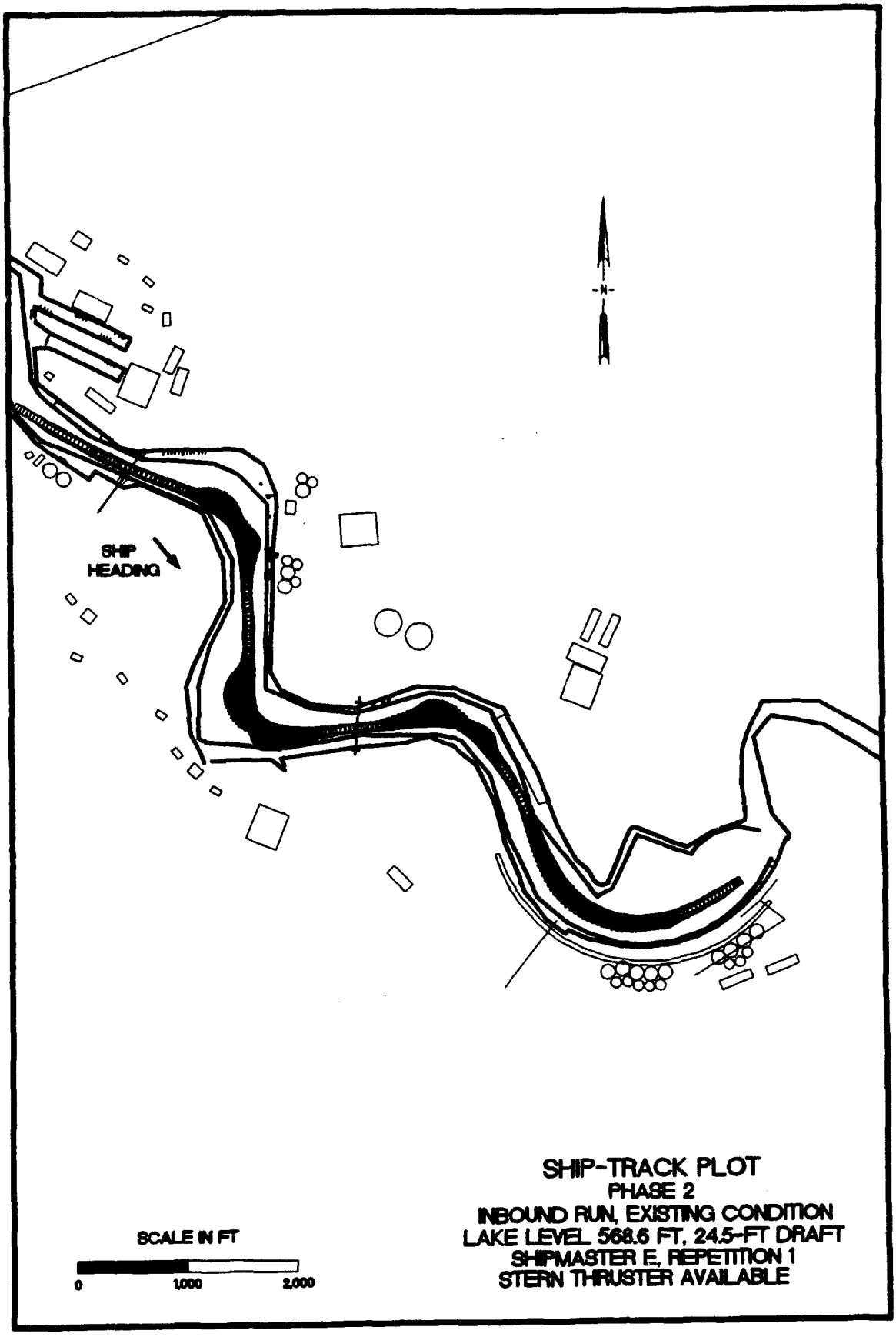
SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, EXISTING CONDITION
LAKE LEVEL 568.6 FT, 18.2-FT DRAFT
SHIPMASTER D, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B34



SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, EXISTING CONDITION
LAKE LEVEL 571.1 FT, 18.2-FT DRAFT
SHIPMASTER D, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B35


SHIP
HEADING
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SCALE IN FT
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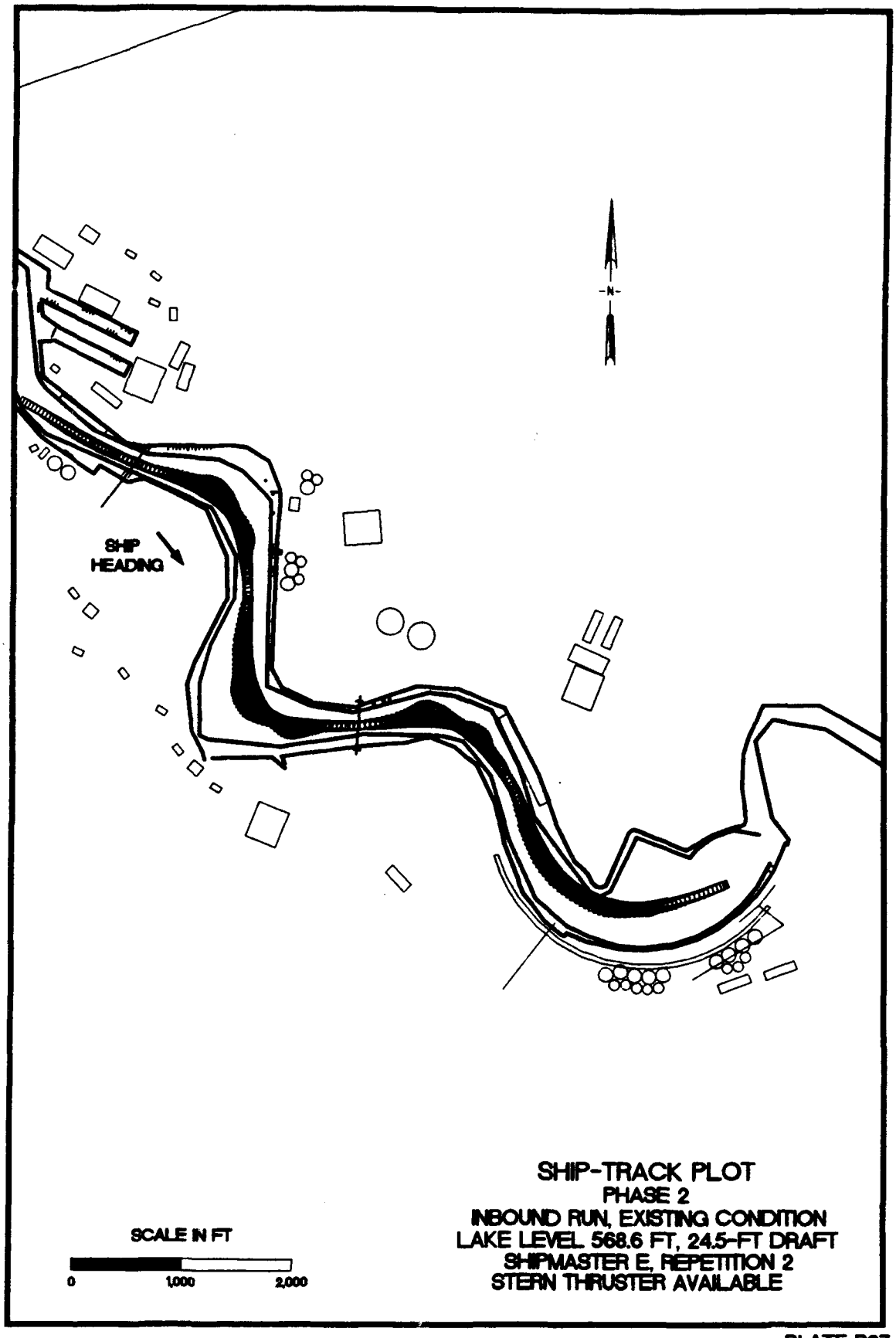
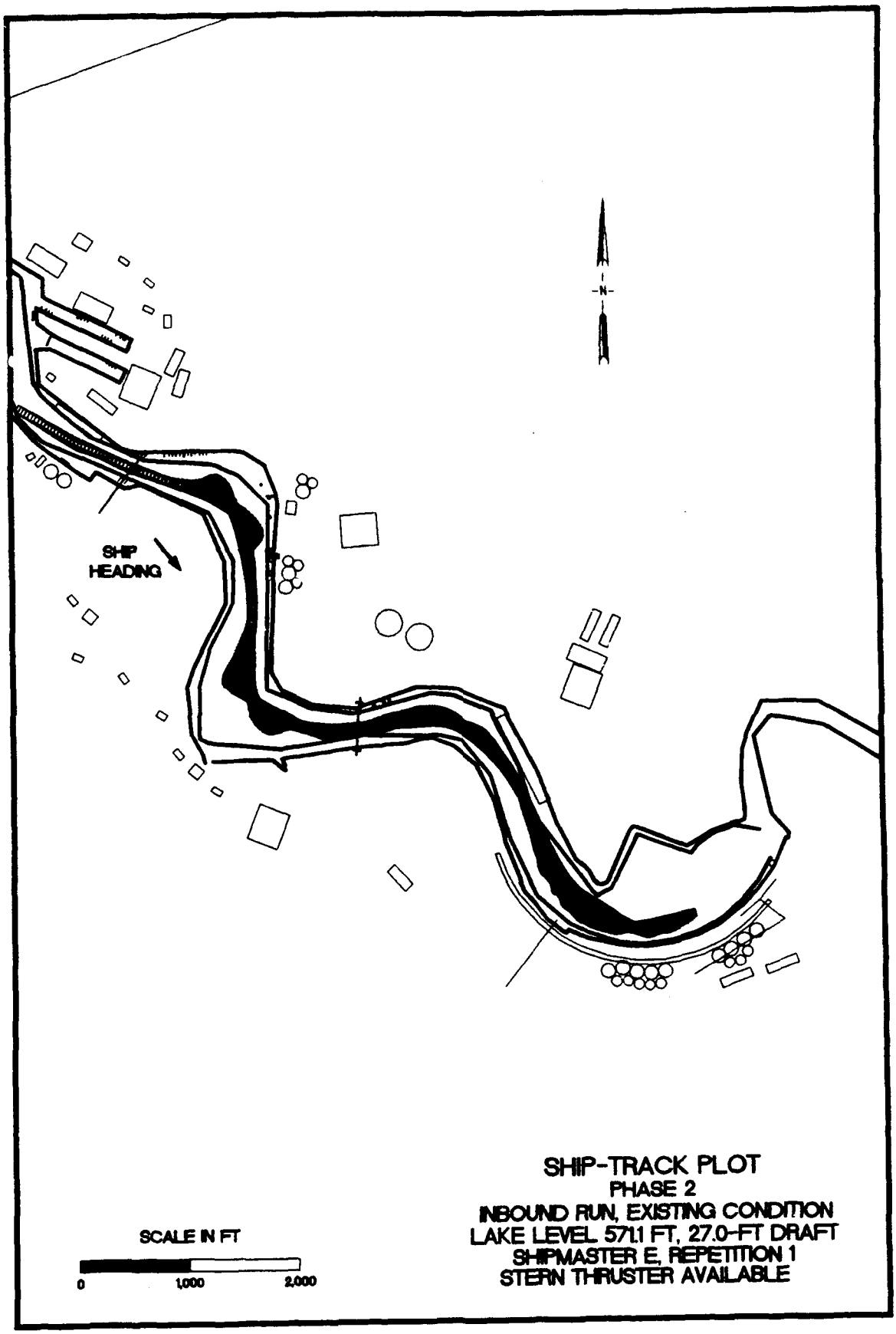
1,000
2,000
SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, EXISTING CONDITION
LAKE LEVEL 568.6 FT, 24.5-FT DRAFT
SHIPMASTER E, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B36



SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, EXISTING CONDITION
LAKE LEVEL 568.6 FT, 24.5-FT DRAFT
SHIPMASTER E, REPETITION 2
STERN THRUSTER AVAILABLE

PLATE B37


N
SHIP
HEADING
SCALE IN FT
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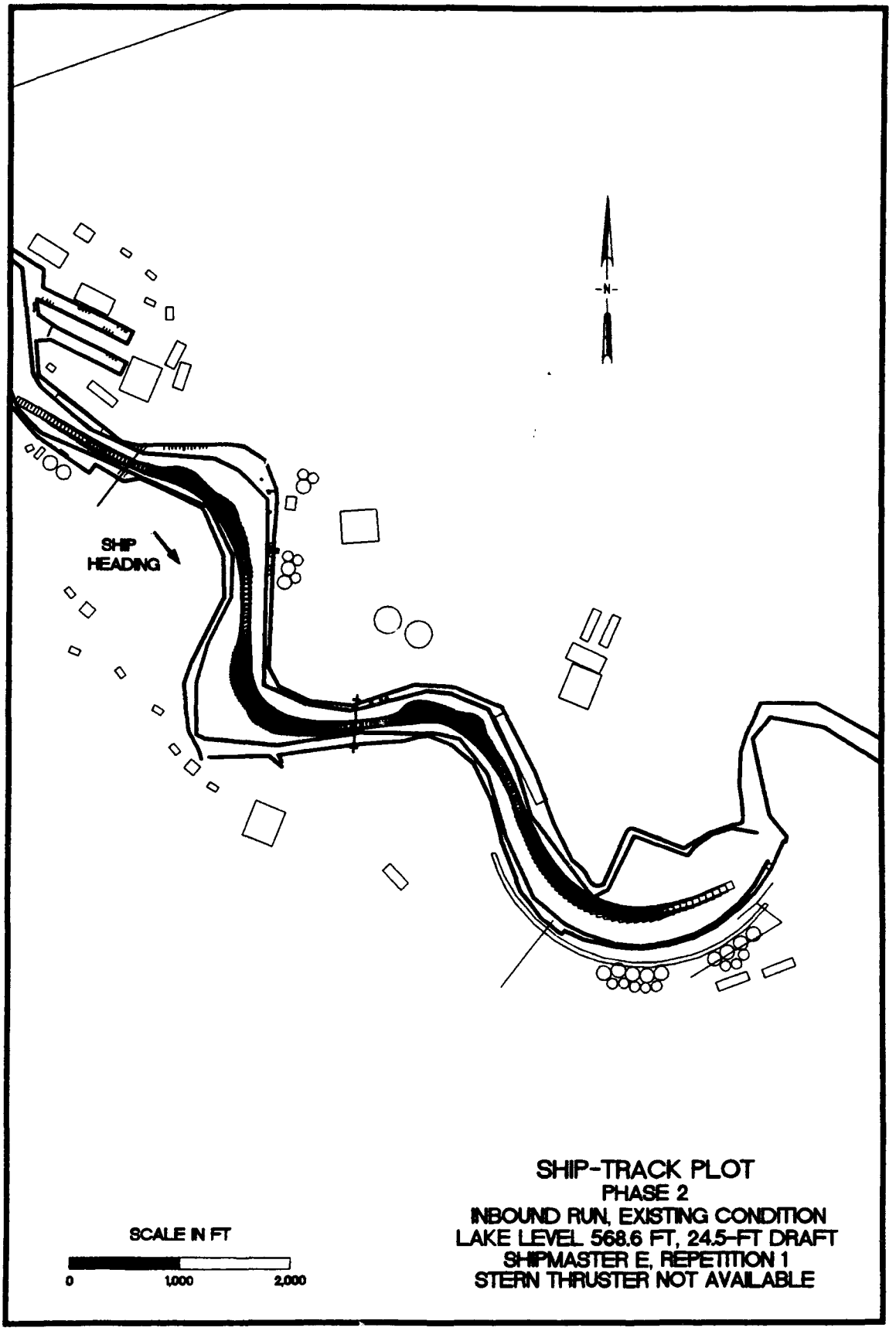
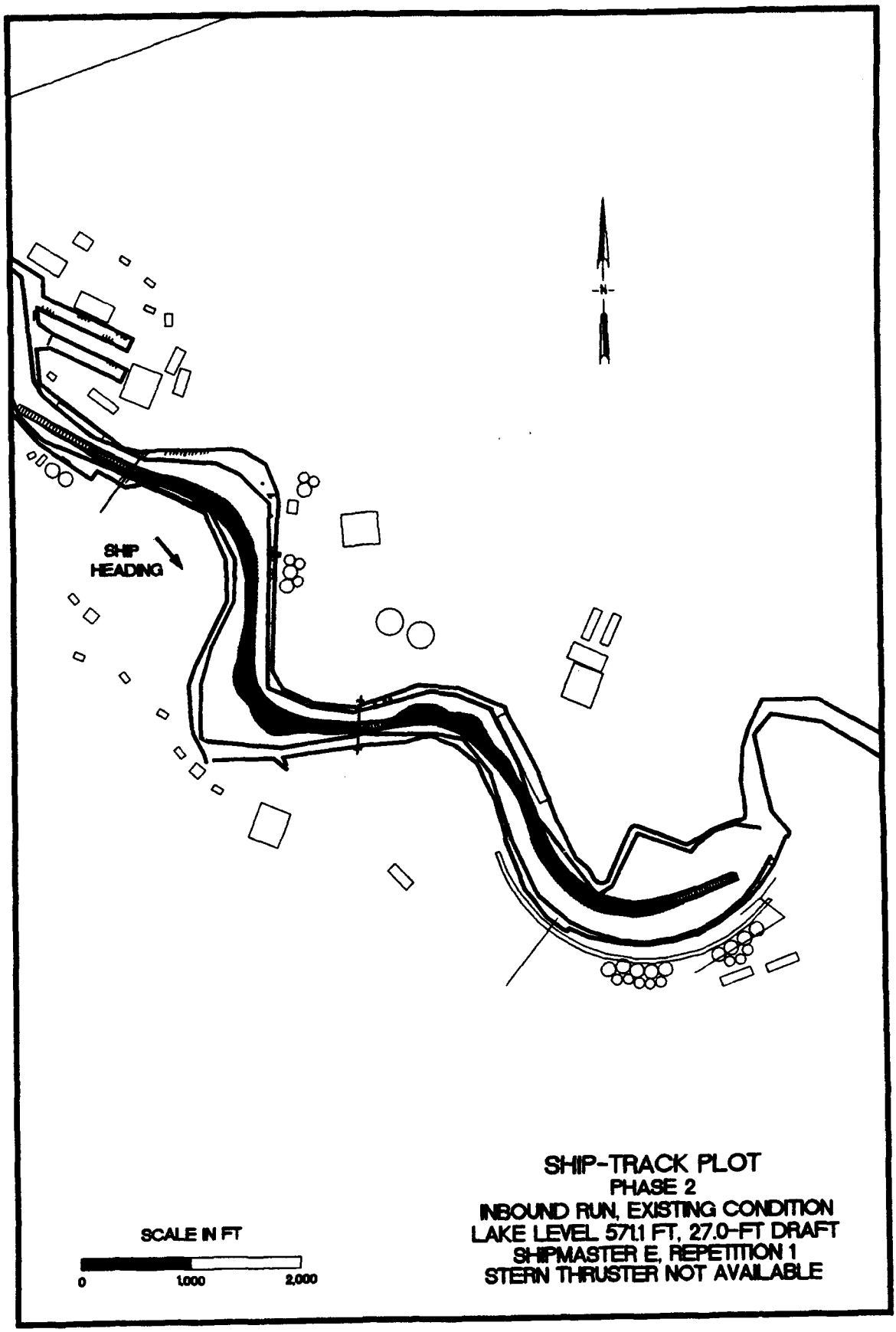
1,000
2,000
SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, EXISTING CONDITION
LAKE LEVEL 571.1 FT, 27.0-FT DRAFT
SHIPMASTER E, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B38



SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, EXISTING CONDITION
LAKE LEVEL 568.6 FT, 24.5-FT DRAFT
SHIPMASTER E, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B39


N
SHIP
HEADING
SCALE IN FT
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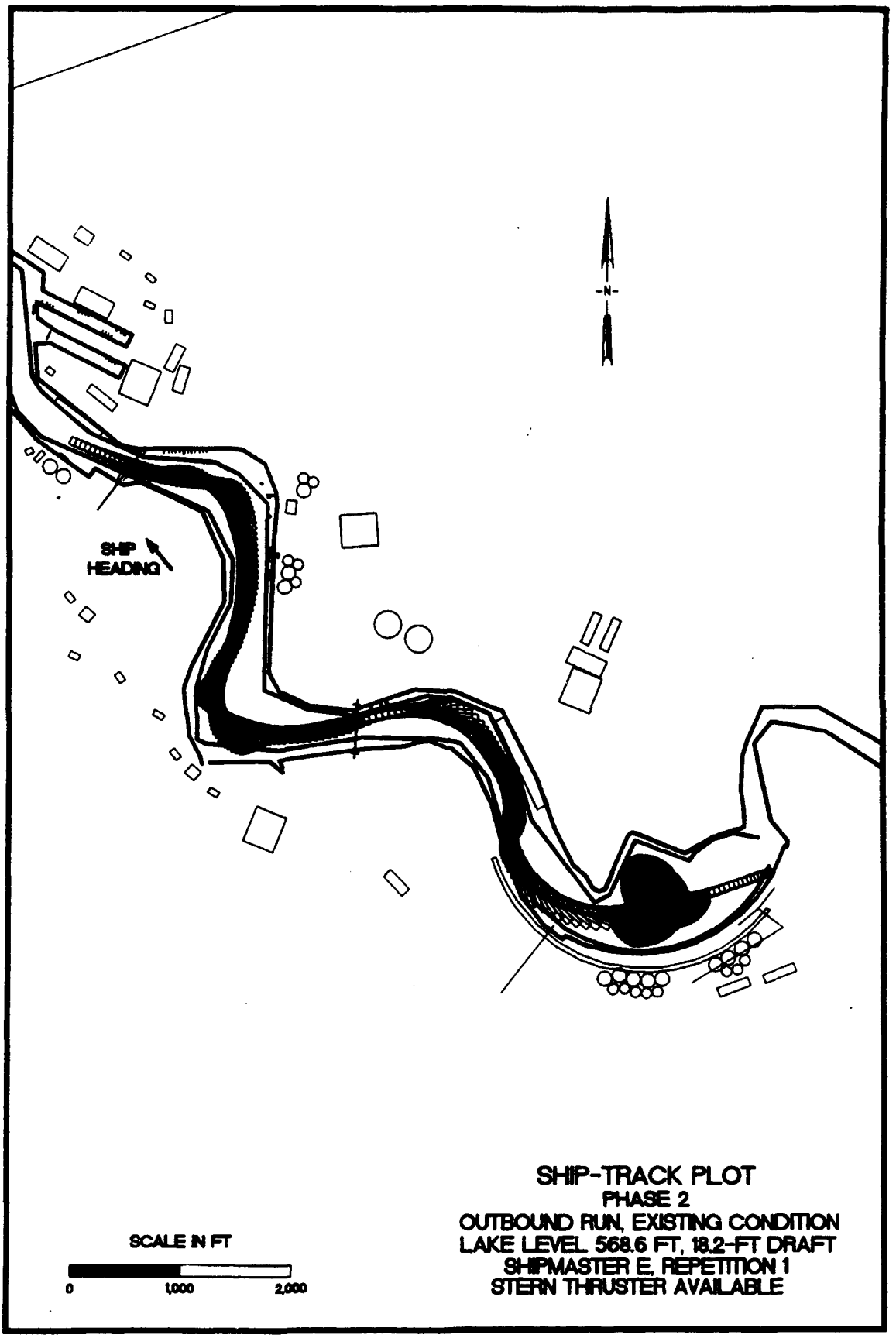
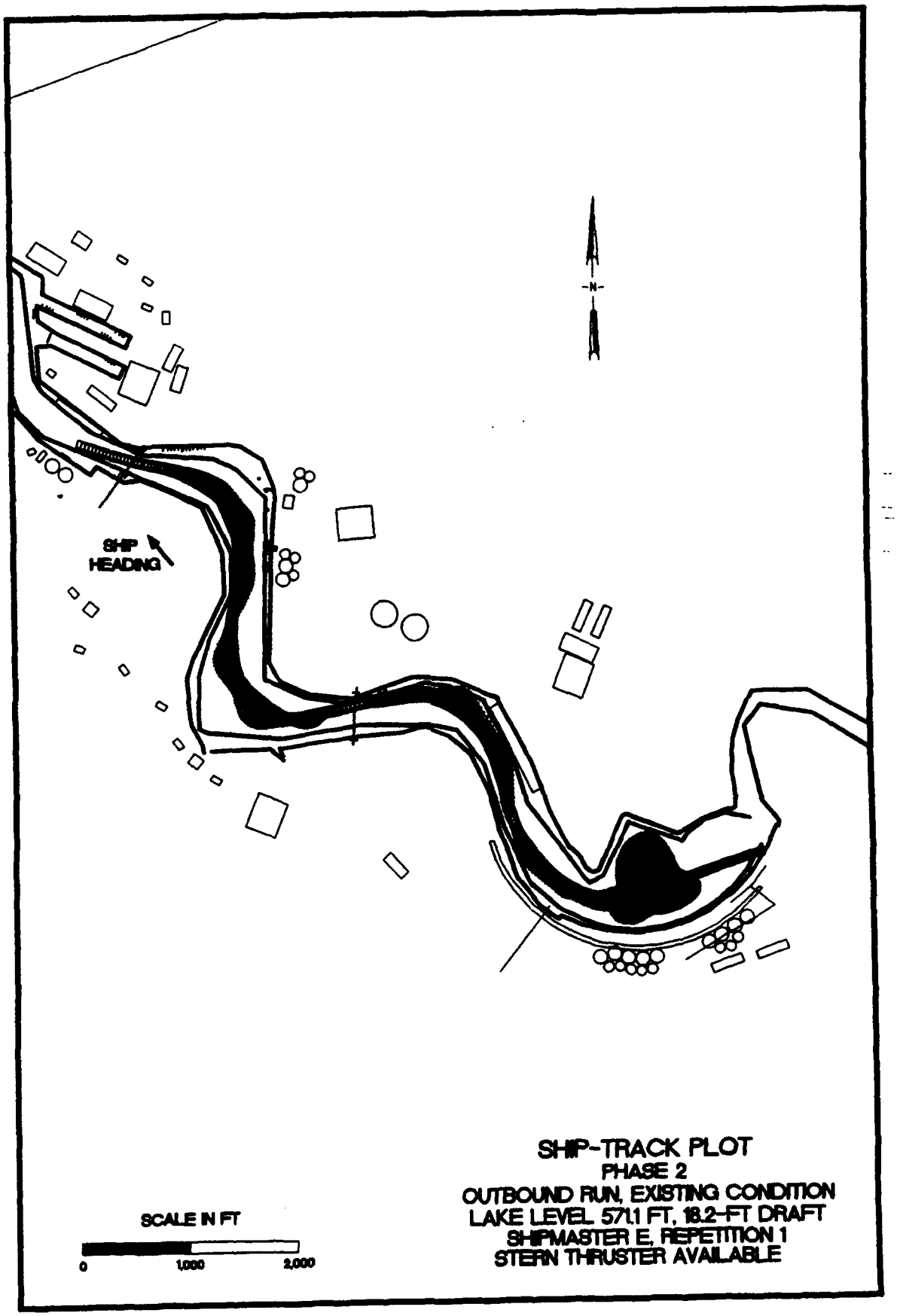
2,000
SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, EXISTING CONDITION
LAKE LEVEL 571.1 FT, 27.0-FT DRAFT
SHIPMASTER E, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B40



SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, EXISTING CONDITION
LAKE LEVEL 568.6 FT, 18.2-FT DRAFT
SHIPMASTER E, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B41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SHIP HEADING
SCALE IN FT
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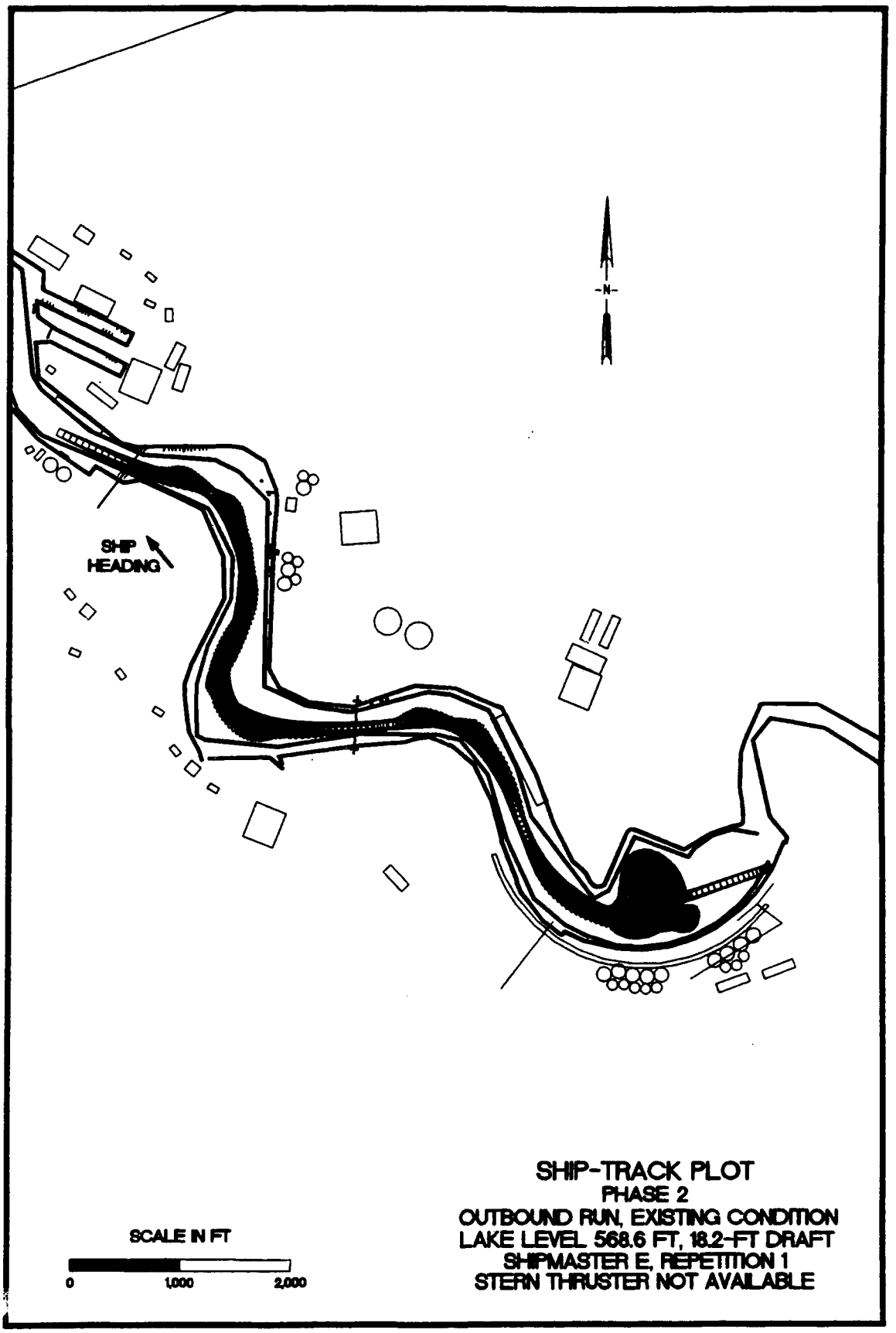
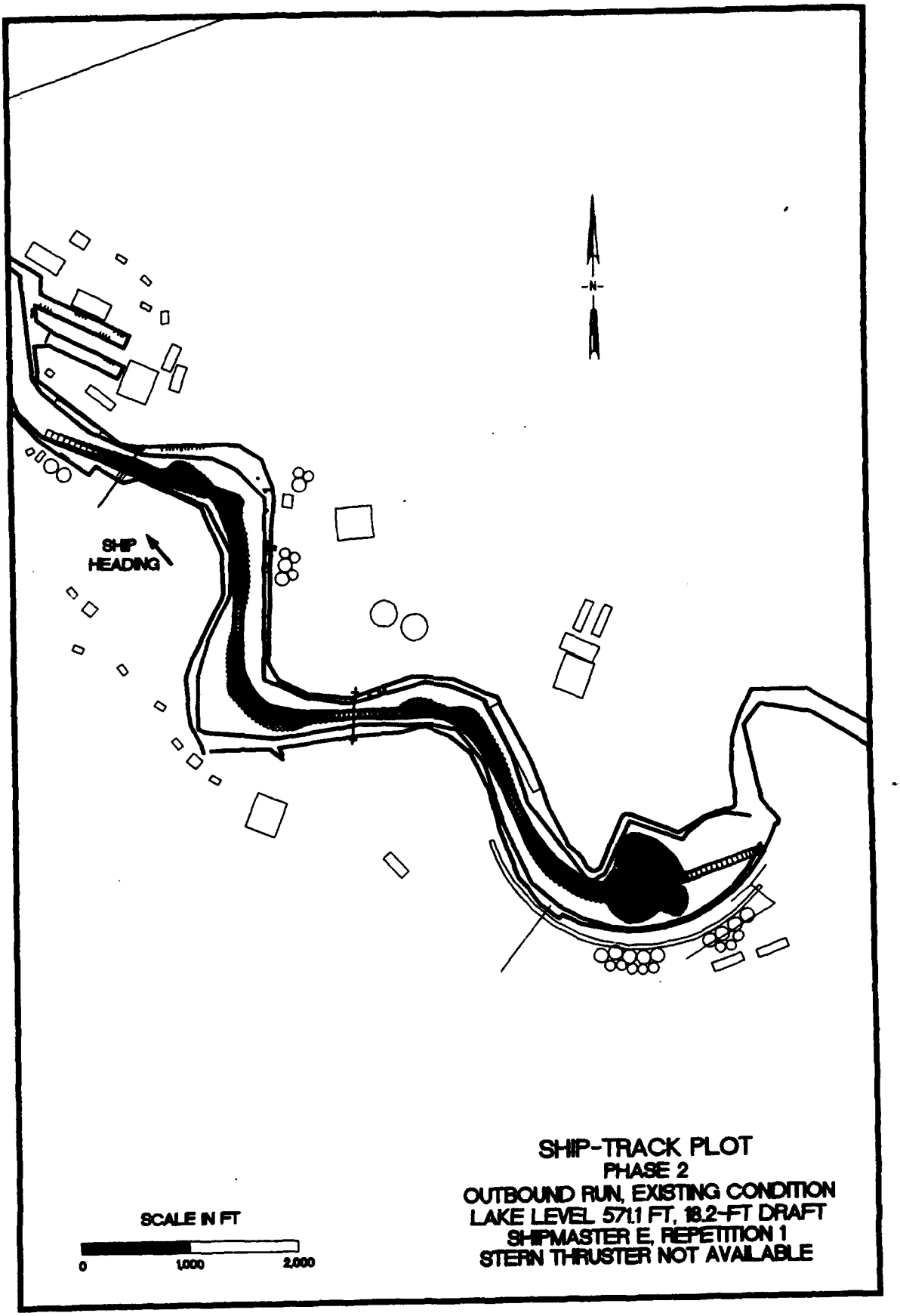
2,000
SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, EXISTING CONDITION
LAKE LEVEL 571.1 FT, 18.2-FT DRAFT
SHIPMASTER E, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B42



SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, EXISTING CONDITION
LAKE LEVEL 568.6 FT, 18.2-FT DRAFT
SHIPMASTER E, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B43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SCALE IN FT
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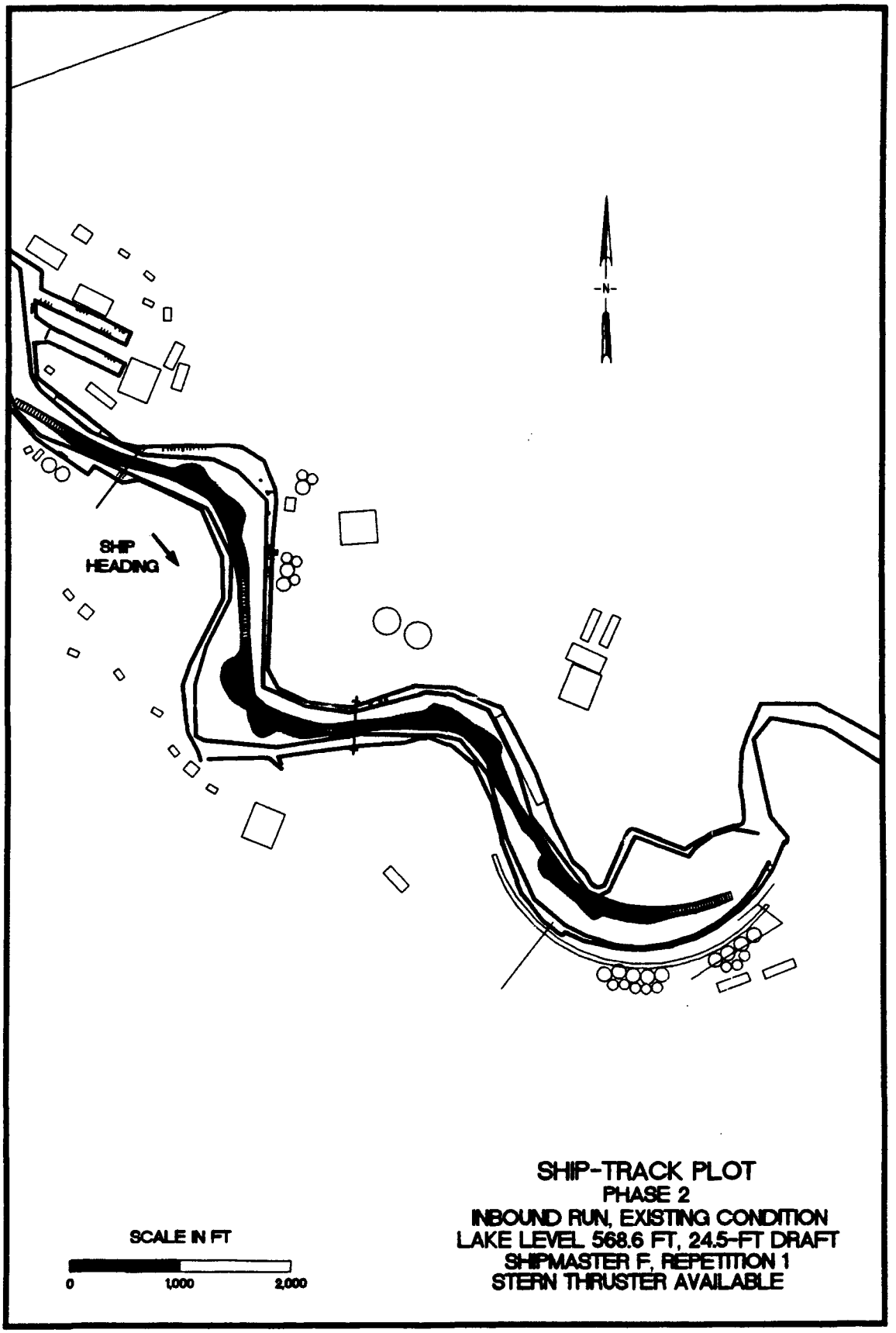
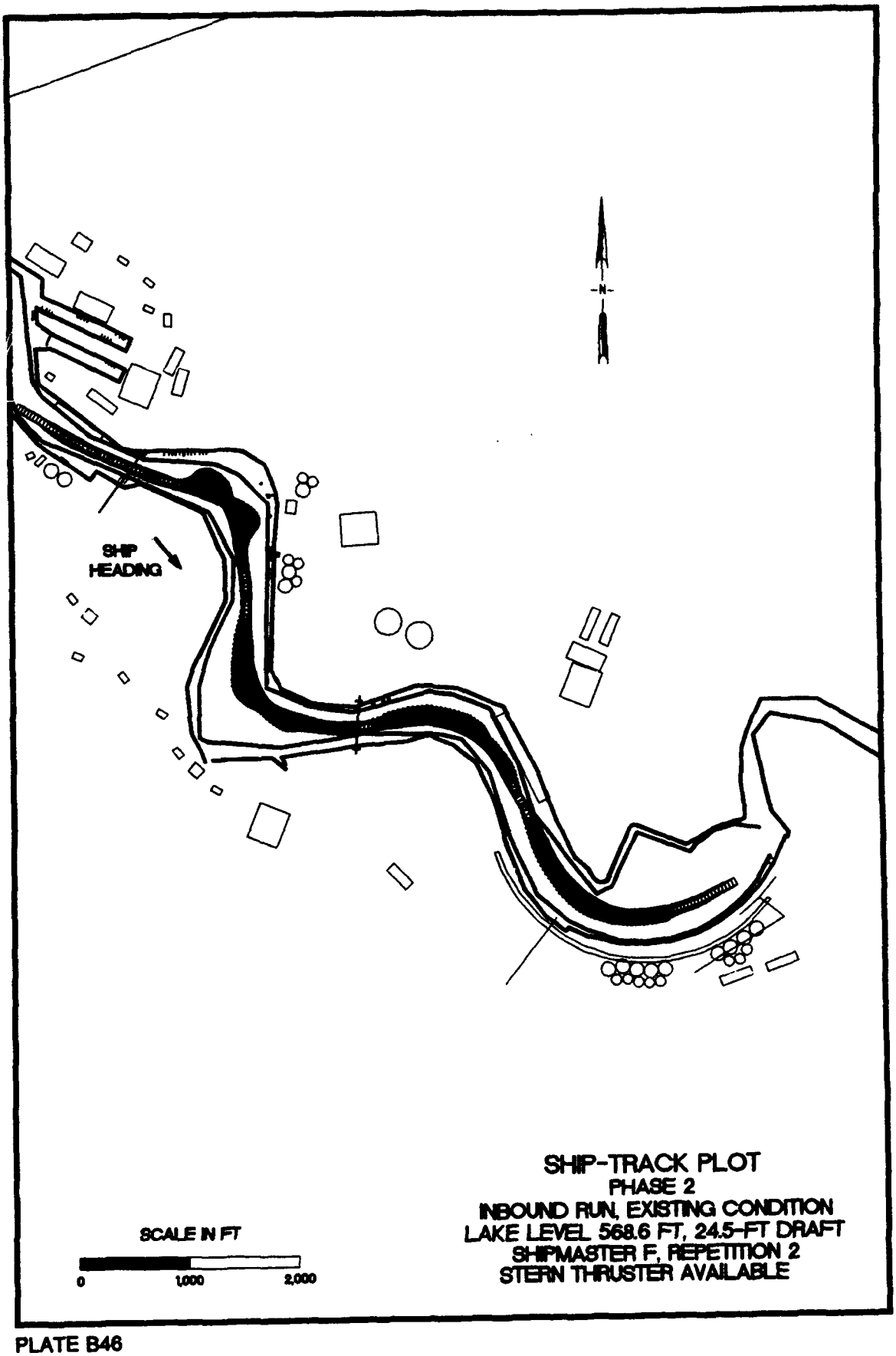
2,000
SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, EXISTING CONDITION
LAKE LEVEL 571.1 FT, 18.2-FT DRAFT
SHIPMASTER E, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B44



SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, EXISTING CONDITION
LAKE LEVEL 568.6 FT, 24.5-FT DRAFT
SHIPMASTER F, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B45


N
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HEADING
SCALE IN FT
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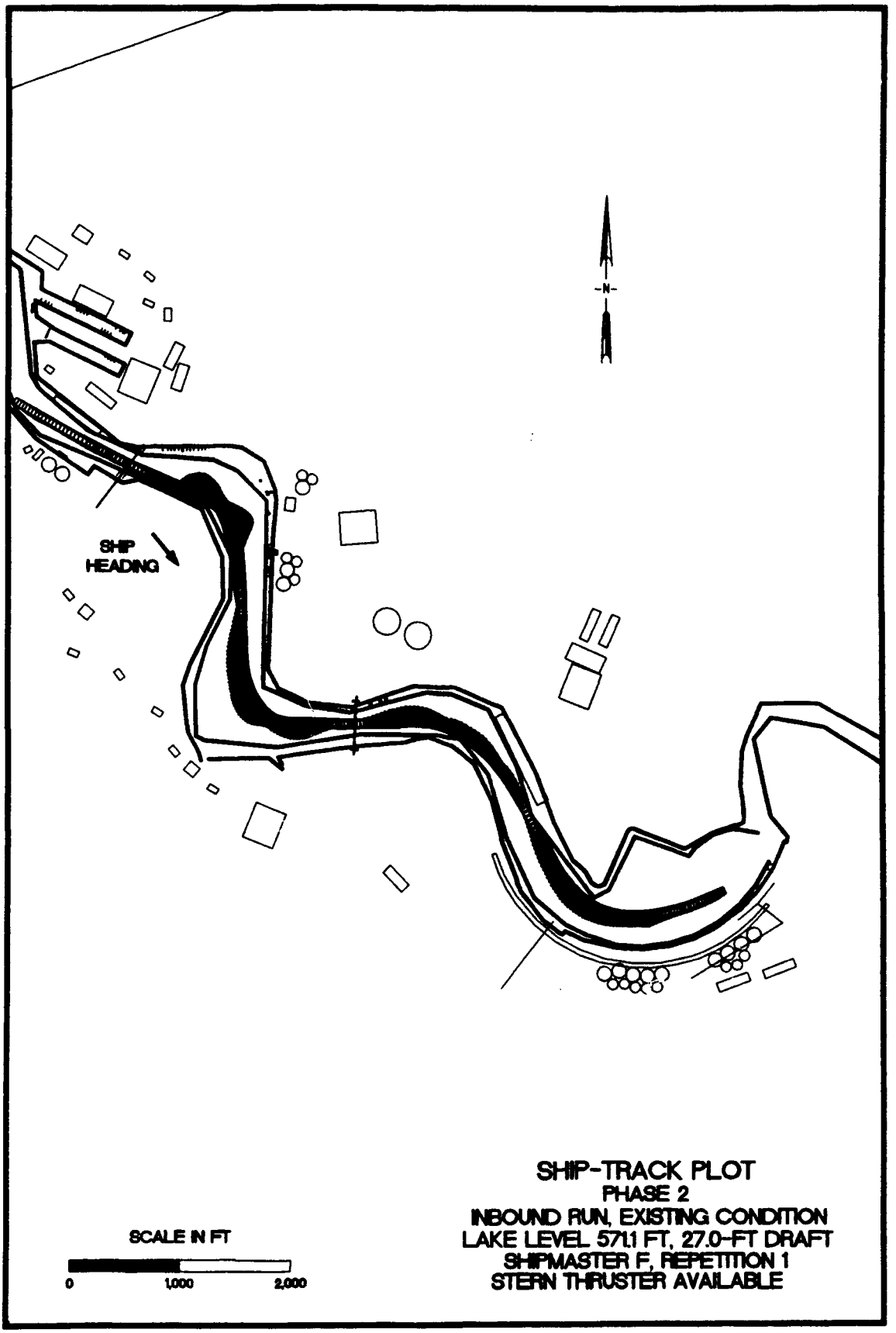
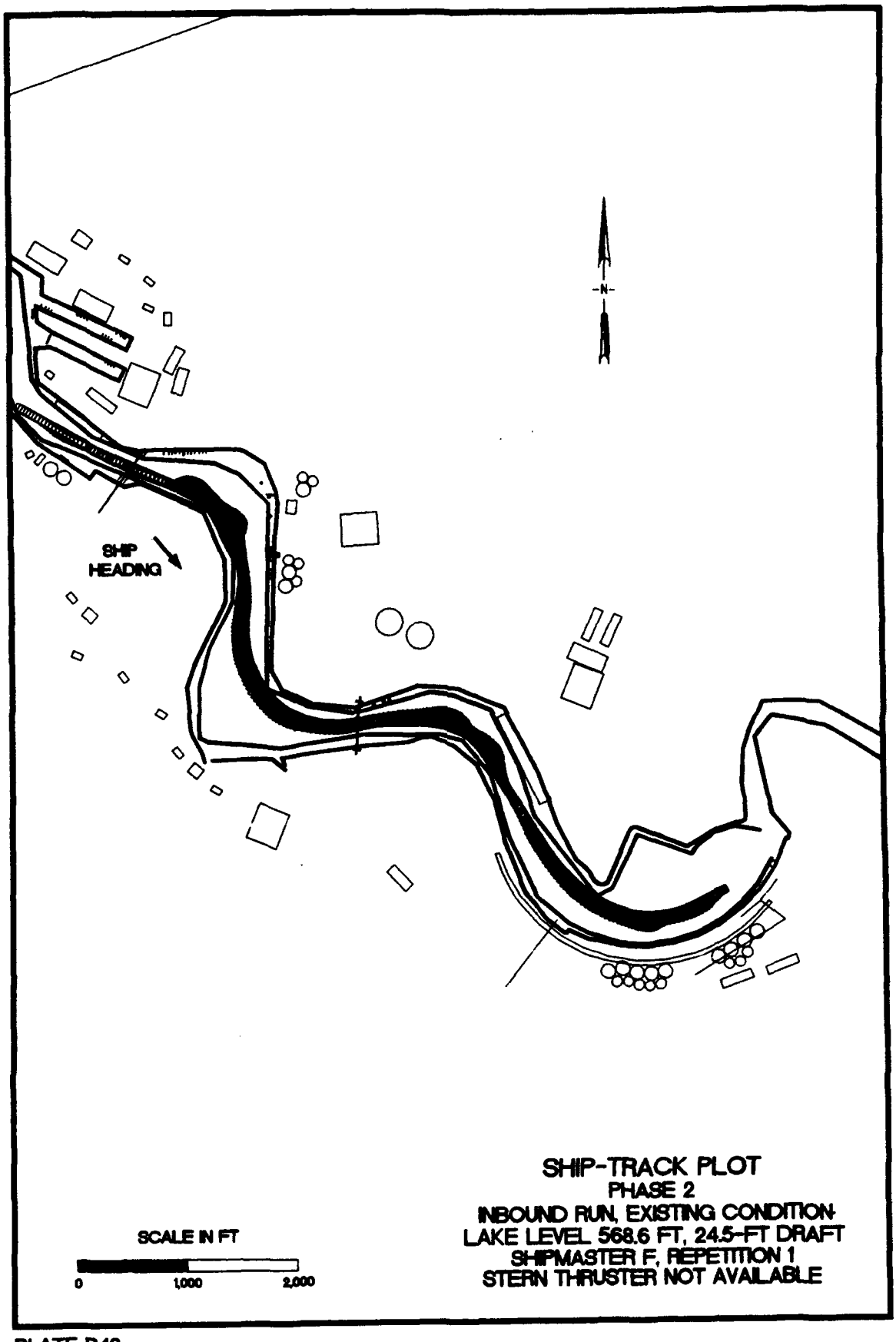
2,000
SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, EXISTING CONDITION
LAKE LEVEL 568.6 FT, 24.5-FT DRAFT
SHIPMASTER F, REPETITION 2
STERN THRUSTER AVAILABLE

PLATE B46



SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, EXISTING CONDITION
LAKE LEVEL 571.1 FT, 27.0-FT DRAFT
SHIPMASTER F, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B47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SHIP
HEADING
SCALE IN FT
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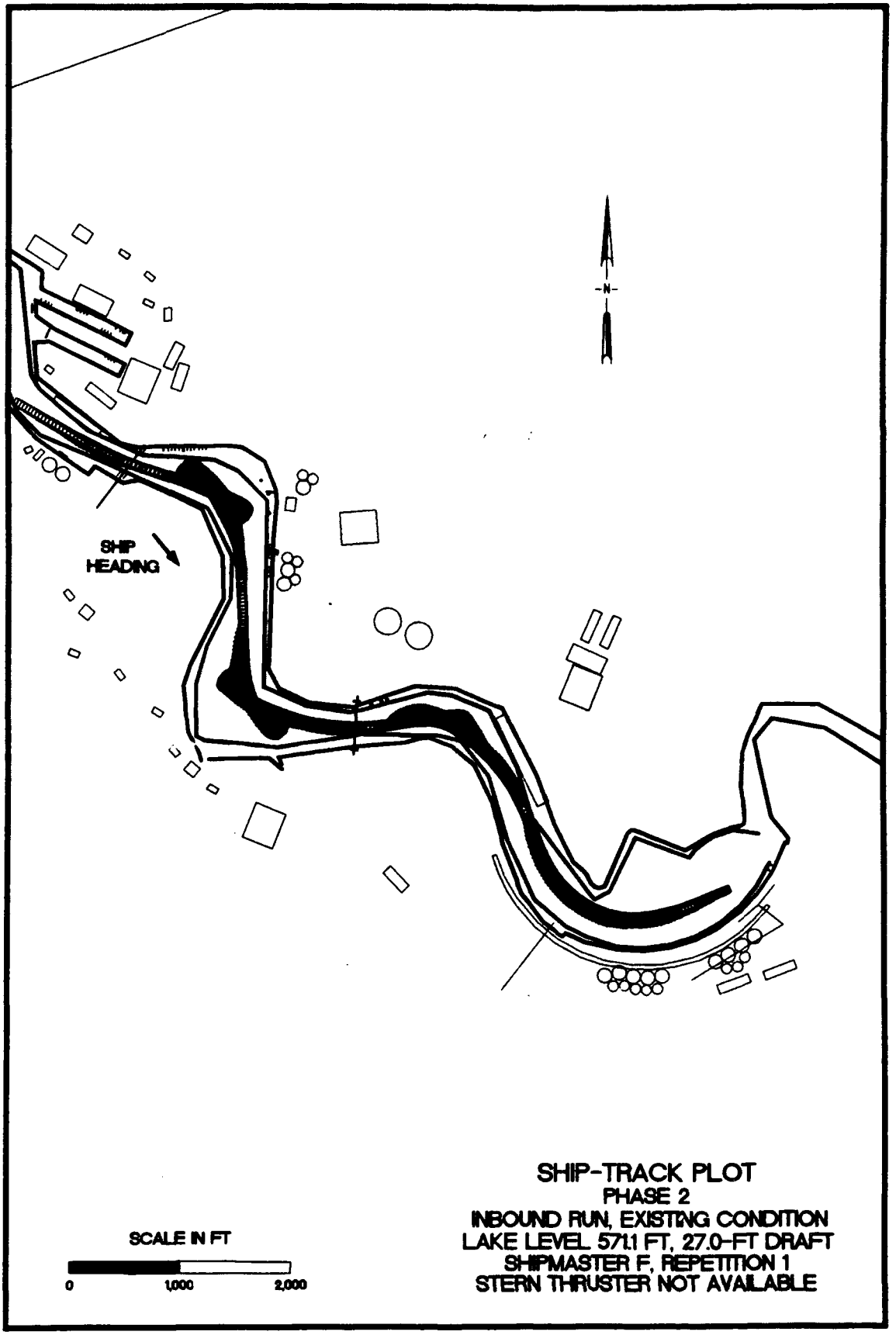
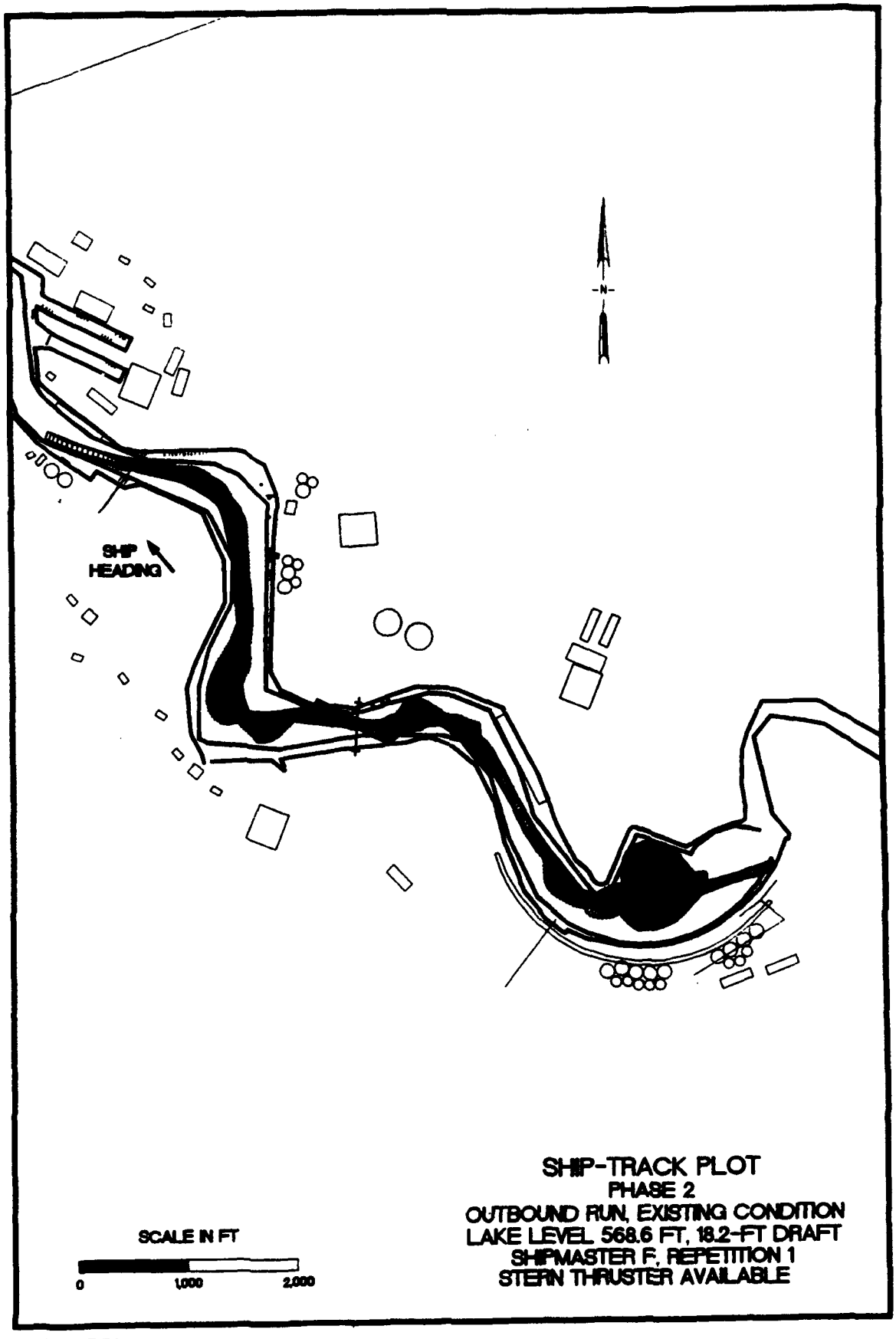
2,000
SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, EXISTING CONDITION
LAKE LEVEL 568.6 FT, 24.5-FT DRAFT
SHIPMASTER F, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B48



SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, EXISTING CONDITION
LAKE LEVEL 571.1 FT, 27.0-FT DRAFT
SHIPMASTER F, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B49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HEADING
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SCALE IN FT
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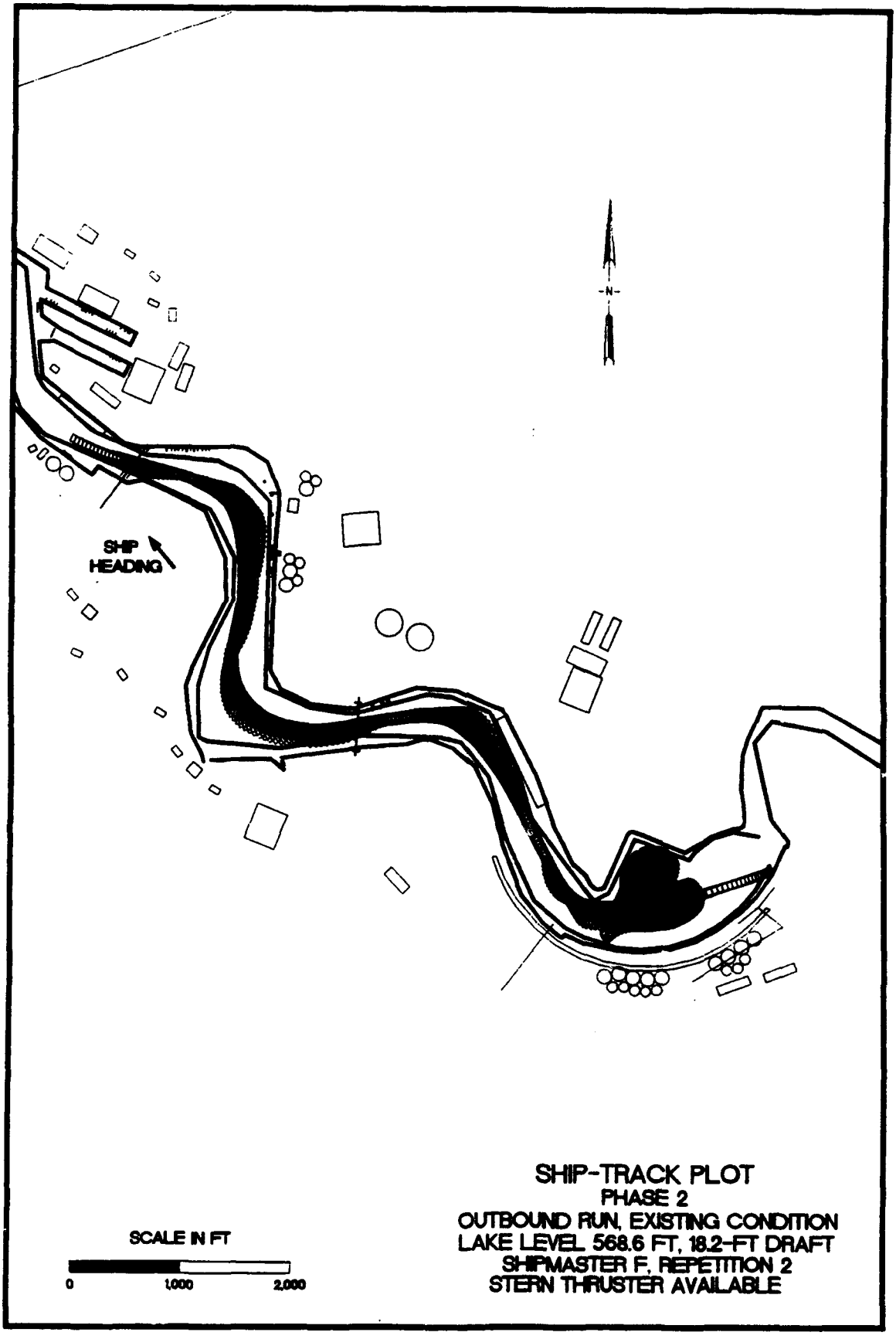
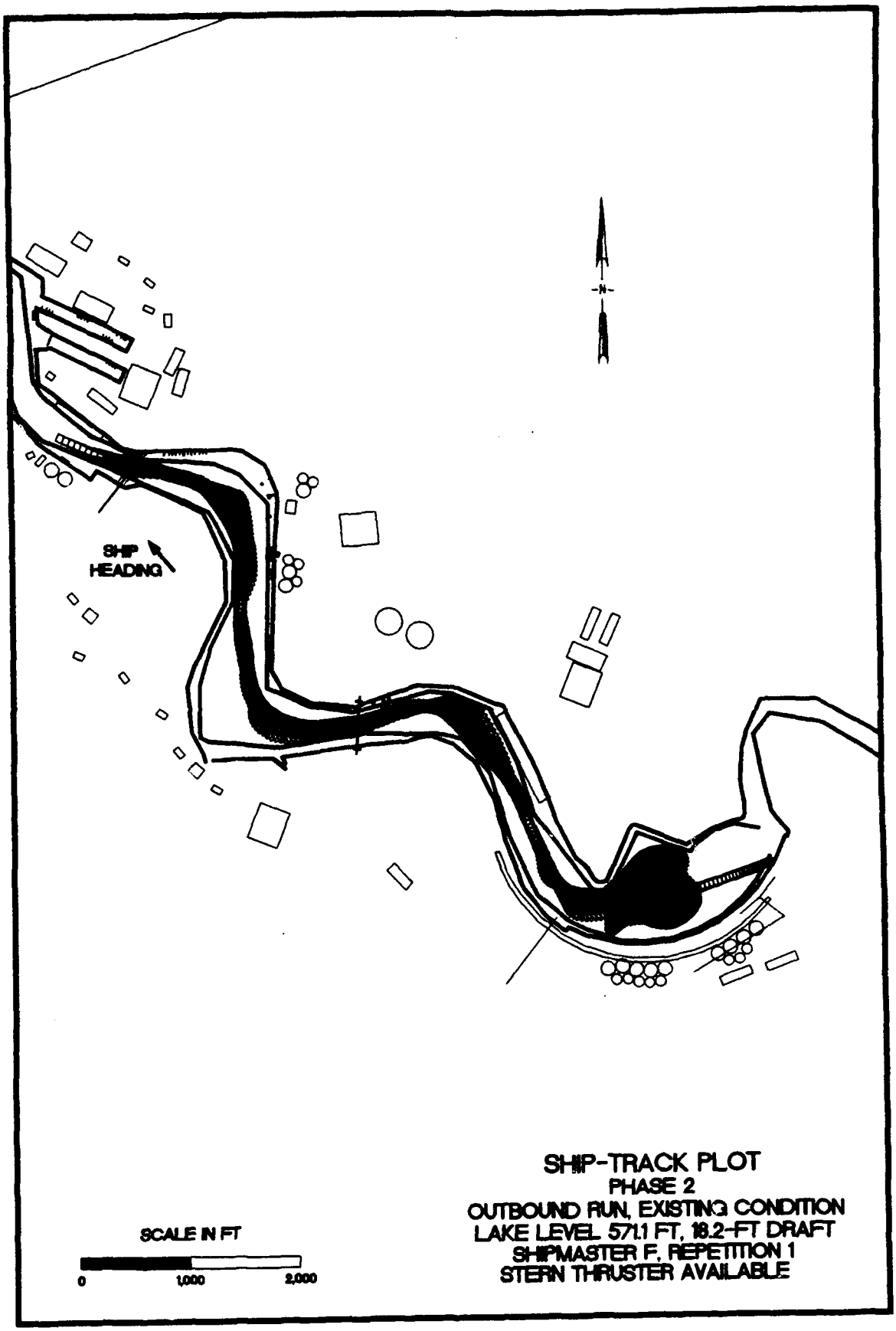
2,000
SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, EXISTING CONDITION
LAKE LEVEL 568.6 FT, 18.2-FT DRAFT
SHIPMASTER F, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B50



SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, EXISTING CONDITION
LAKE LEVEL 568.6 FT, 18.2-FT DRAFT
SHIPMASTER F, REPETITION 2
STERN THRUSTER AVAILABLE

PLATE B51


SHIP
HEADING
SCALE IN FT
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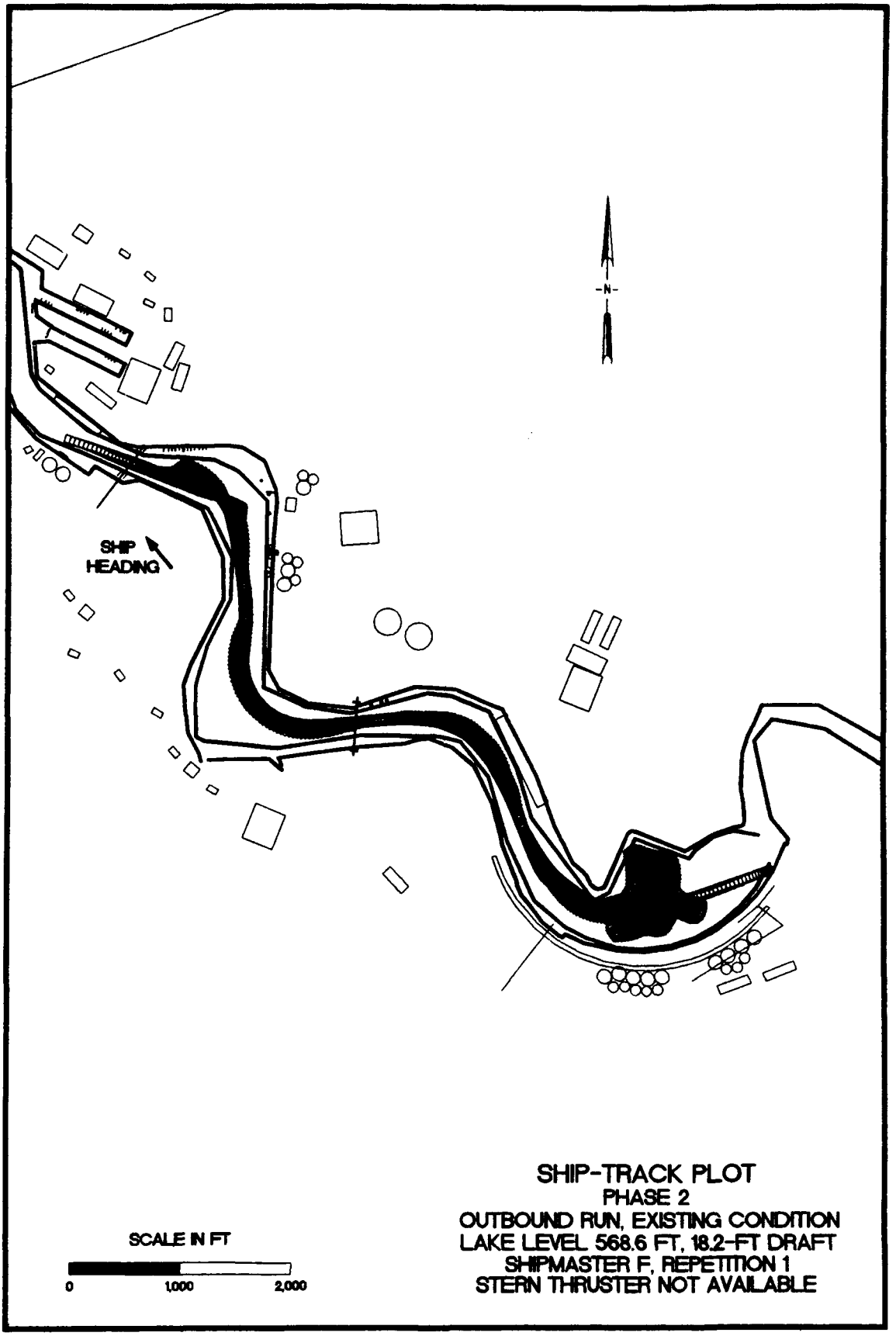
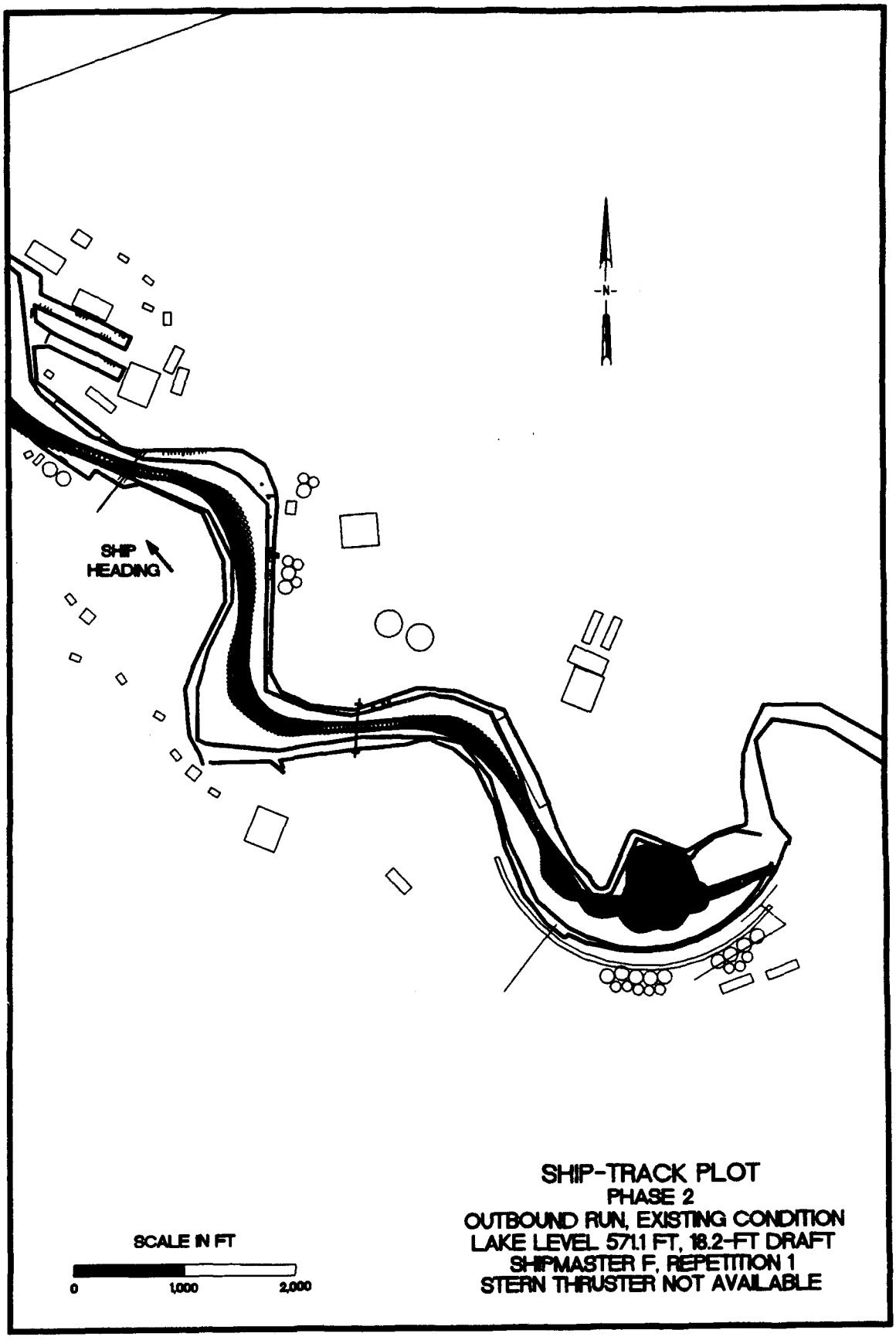
1,000
2,000
SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, EXISTING CONDITION
LAKE LEVEL 571.1 FT, 18.2-FT DRAFT
SHIPMASTER F, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B52



SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, EXISTING CONDITION
LAKE LEVEL 568.6 FT, 18.2-FT DRAFT
SHIPMASTER F, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B53


-N-
SHIP
HEADING
SCALE IN FT
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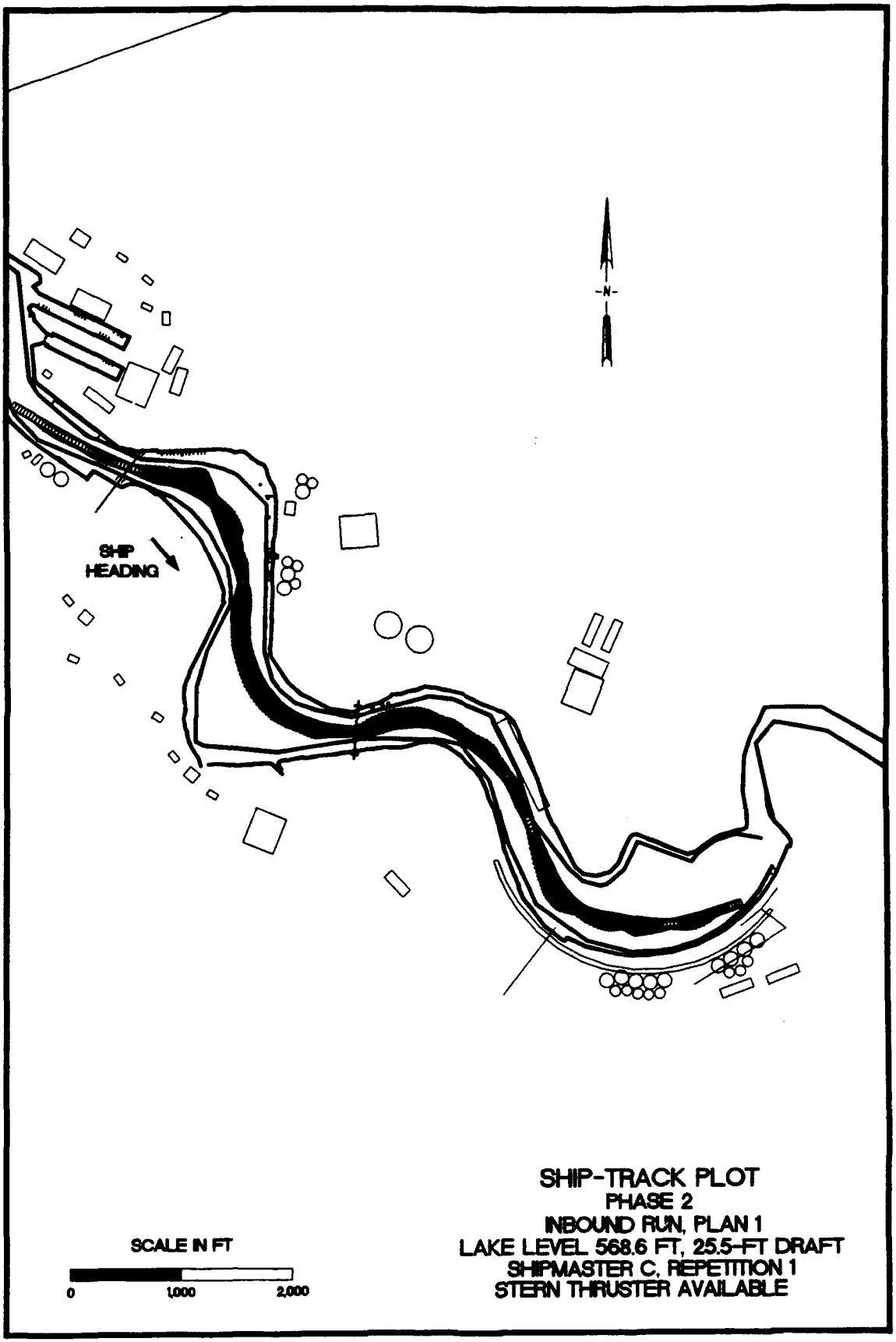
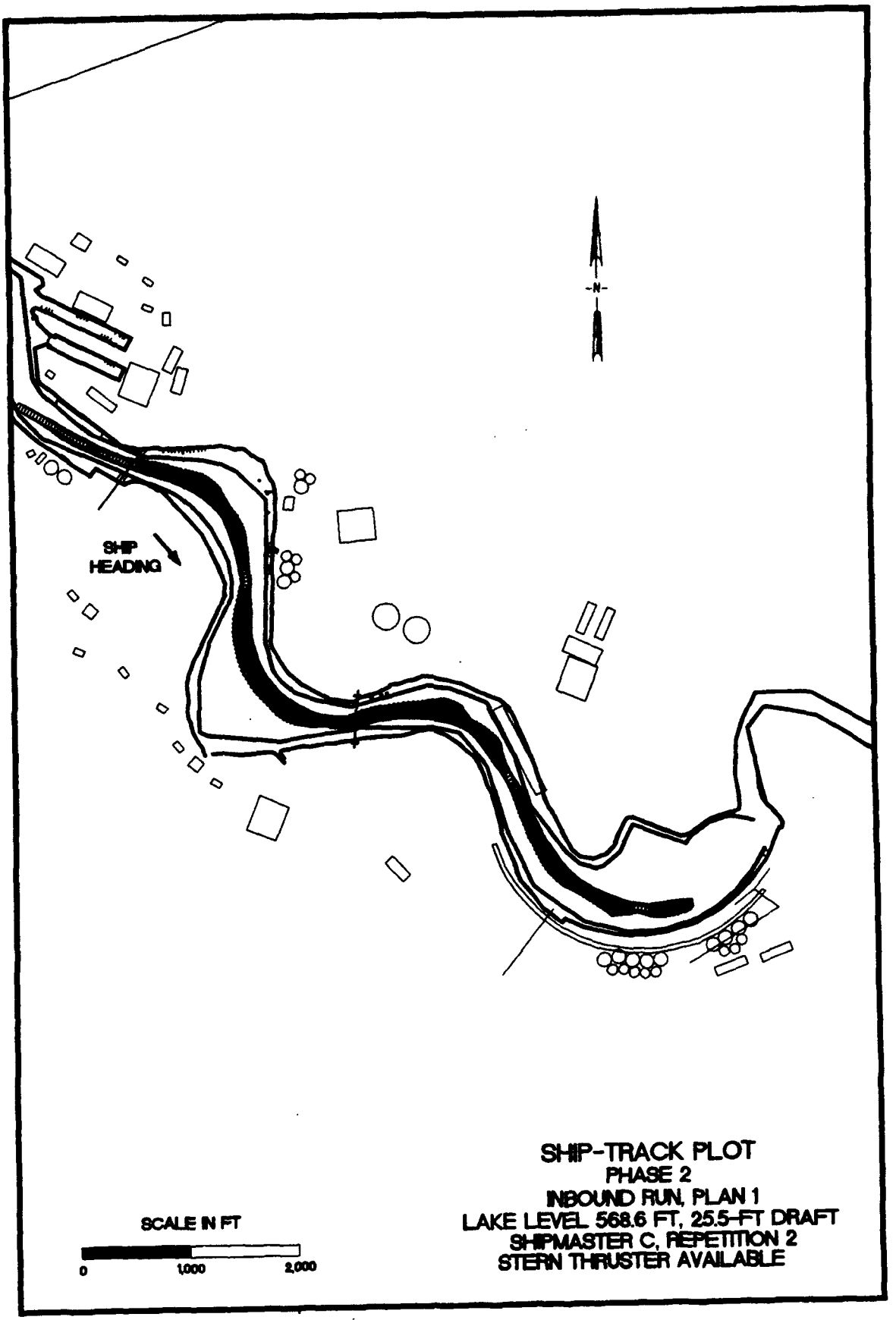
1,000
2,000
SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, EXISTING CONDITION
LAKE LEVEL 571.1 FT, 18.2-FT DRAFT
SHIPMASTER F, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B54



SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 1
LAKE LEVEL 568.6 FT, 25.5-FT DRAFT
SHIPMASTER C, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B55


-N-
SHIP
HEADING
SCALE IN FT
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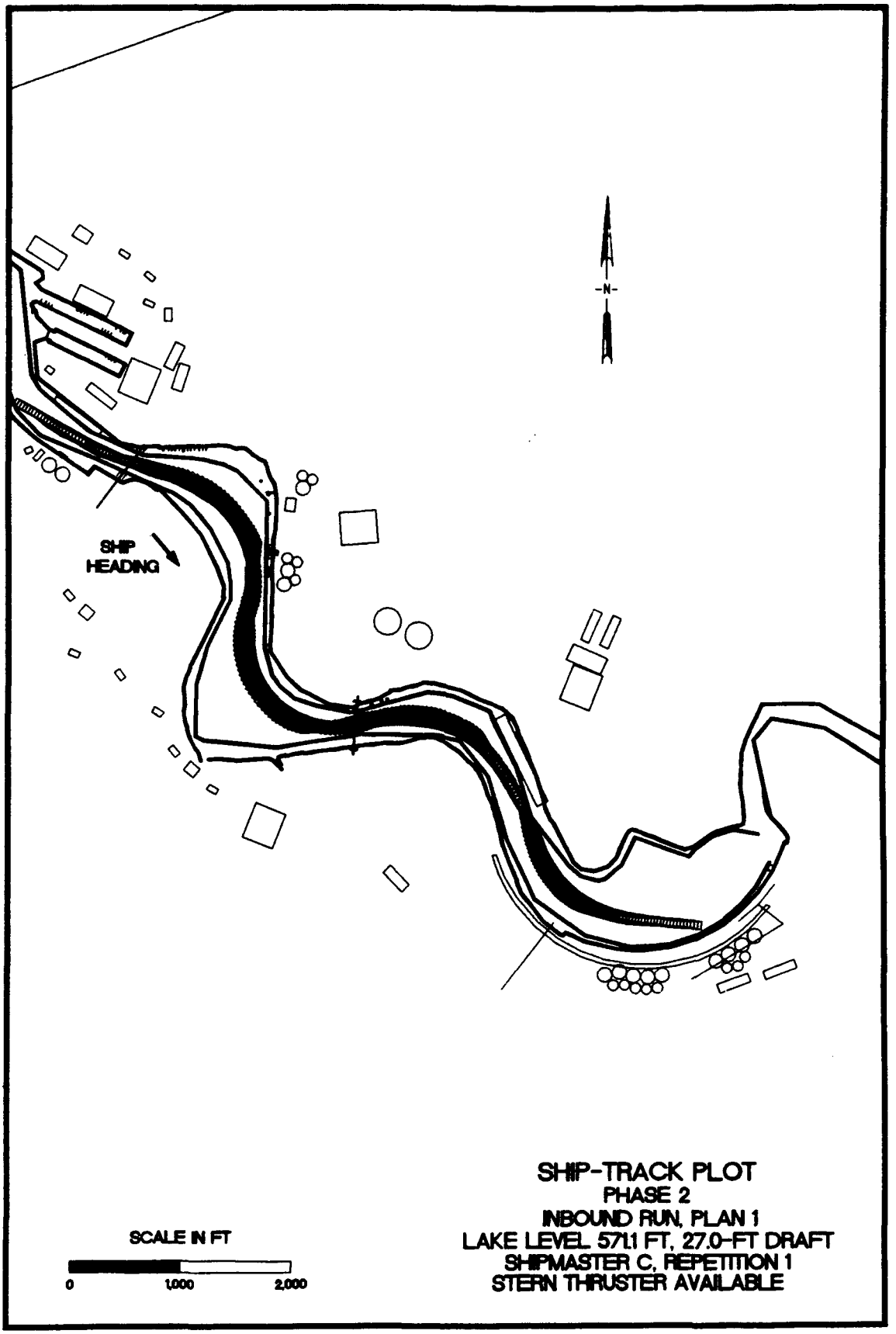
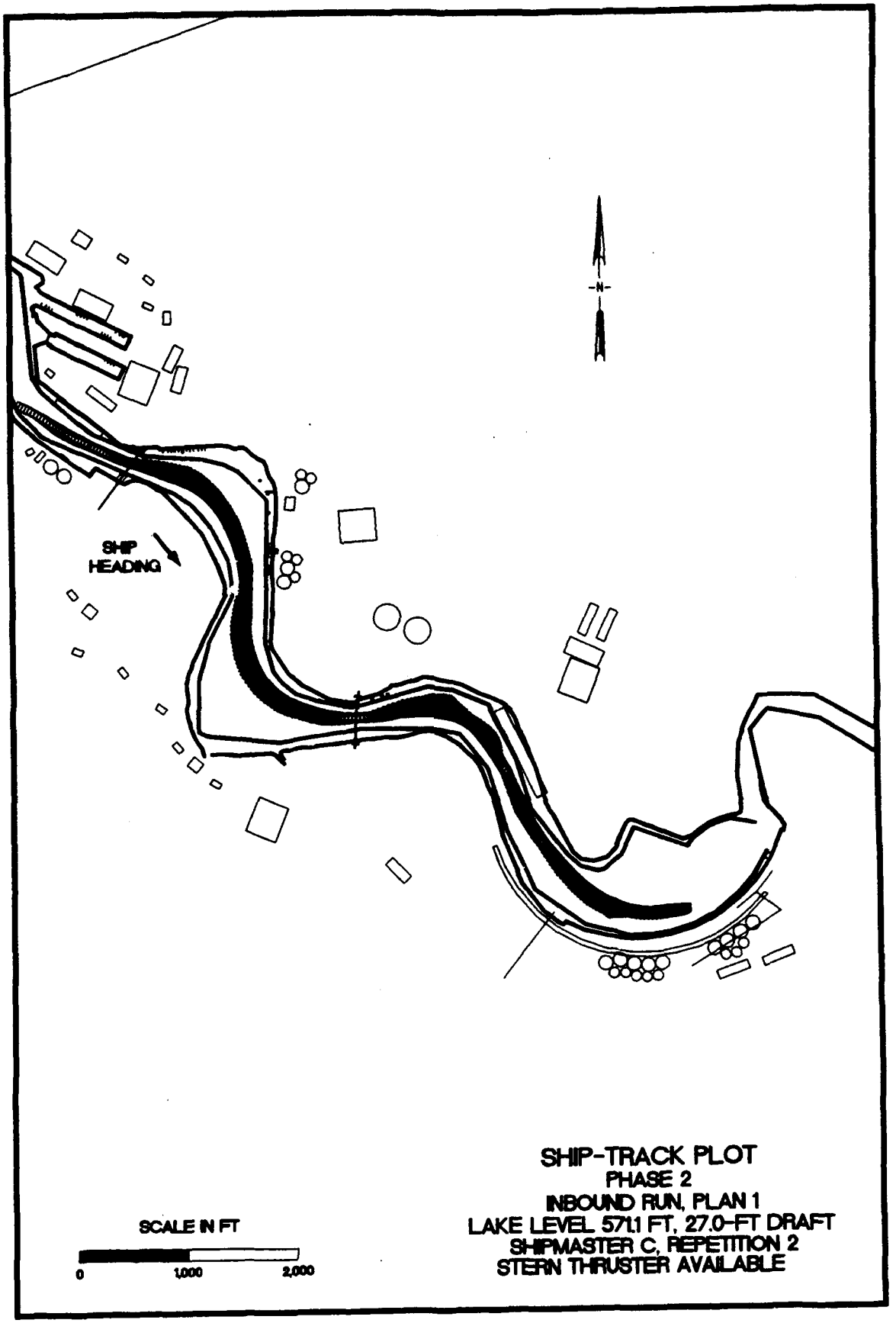
1,000
2,000
SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 1
LAKE LEVEL 568.6 FT, 25.5-FT DRAFT
SHIPMASTER C, REPETITION 2
STERN THRUSTER AVAILABLE

PLATE B56



SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 1
LAKE LEVEL 571.1 FT, 27.0-FT DRAFT
SHIPMASTER C, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B57


N
SHIP
HEADING
SCALE IN FT
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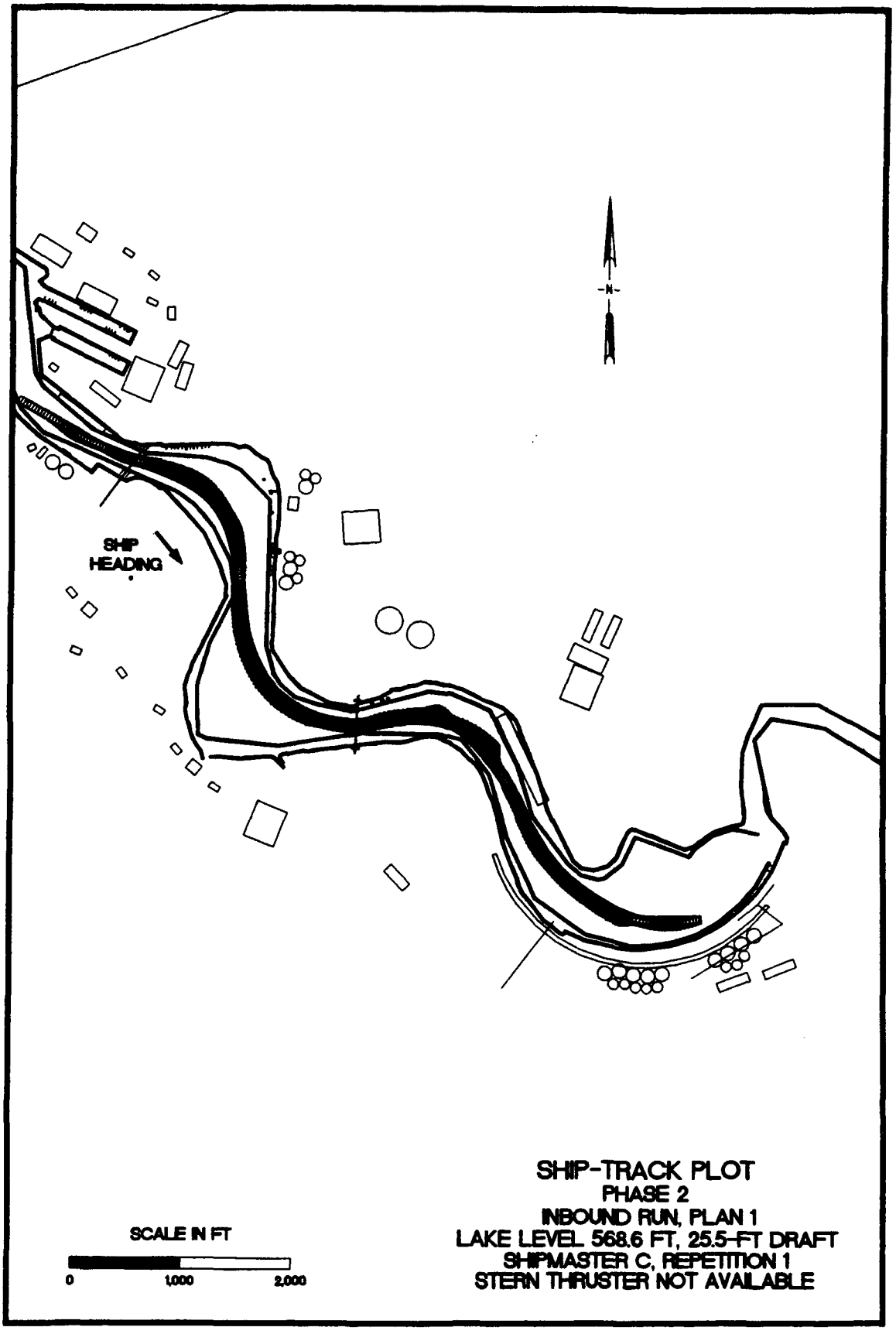
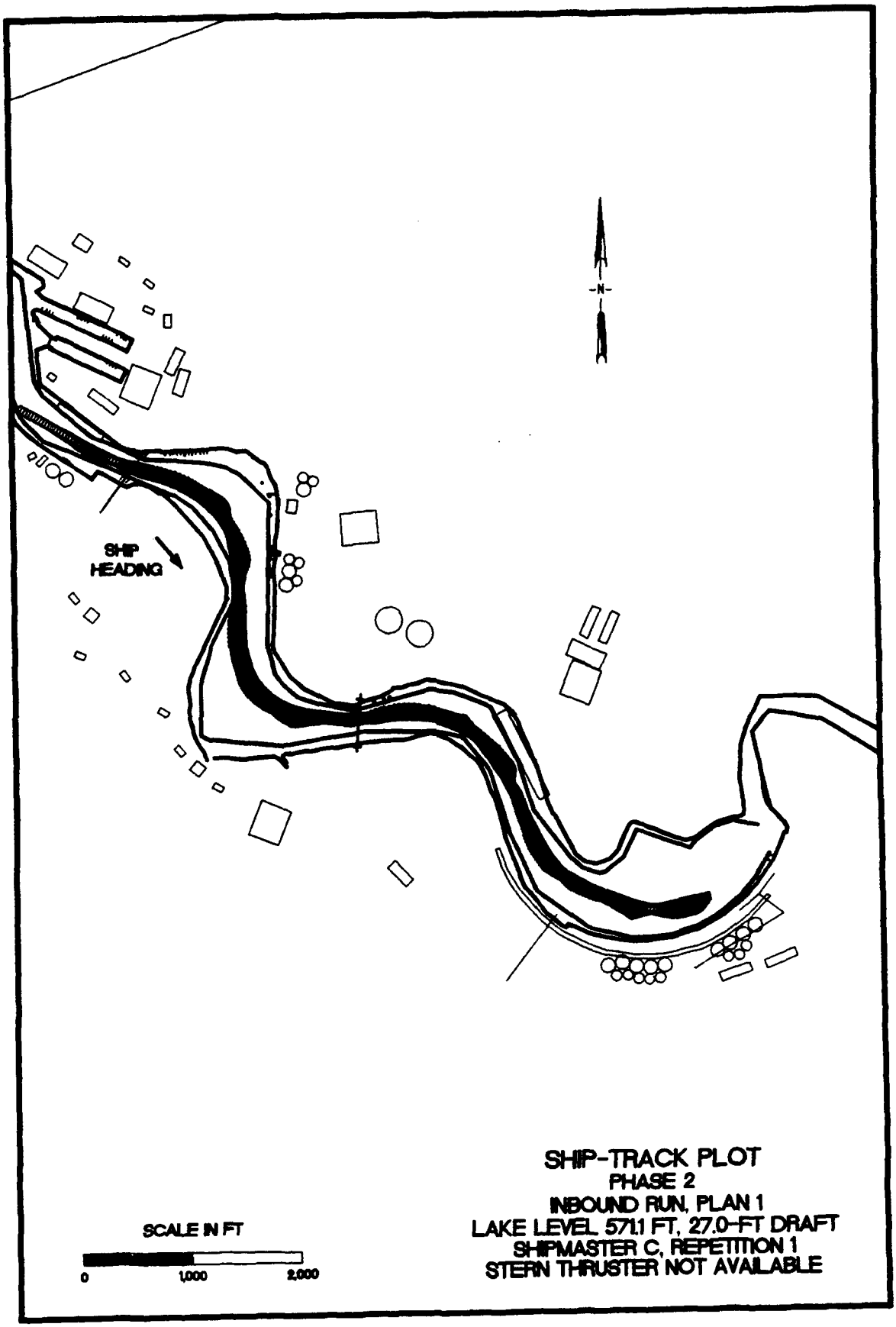
1,000
2,000
SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 1
LAKE LEVEL 571.1 FT, 27.0-FT DRAFT
SHIPMASTER C, REPETITION 2
STERN THRUSTER AVAILABLE

PLATE B58



SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 1
LAKE LEVEL 568.6 FT, 25.5-FT DRAFT
SHIPMASTER C, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B59


-N-
SHIP
HEADING
SCALE IN FT
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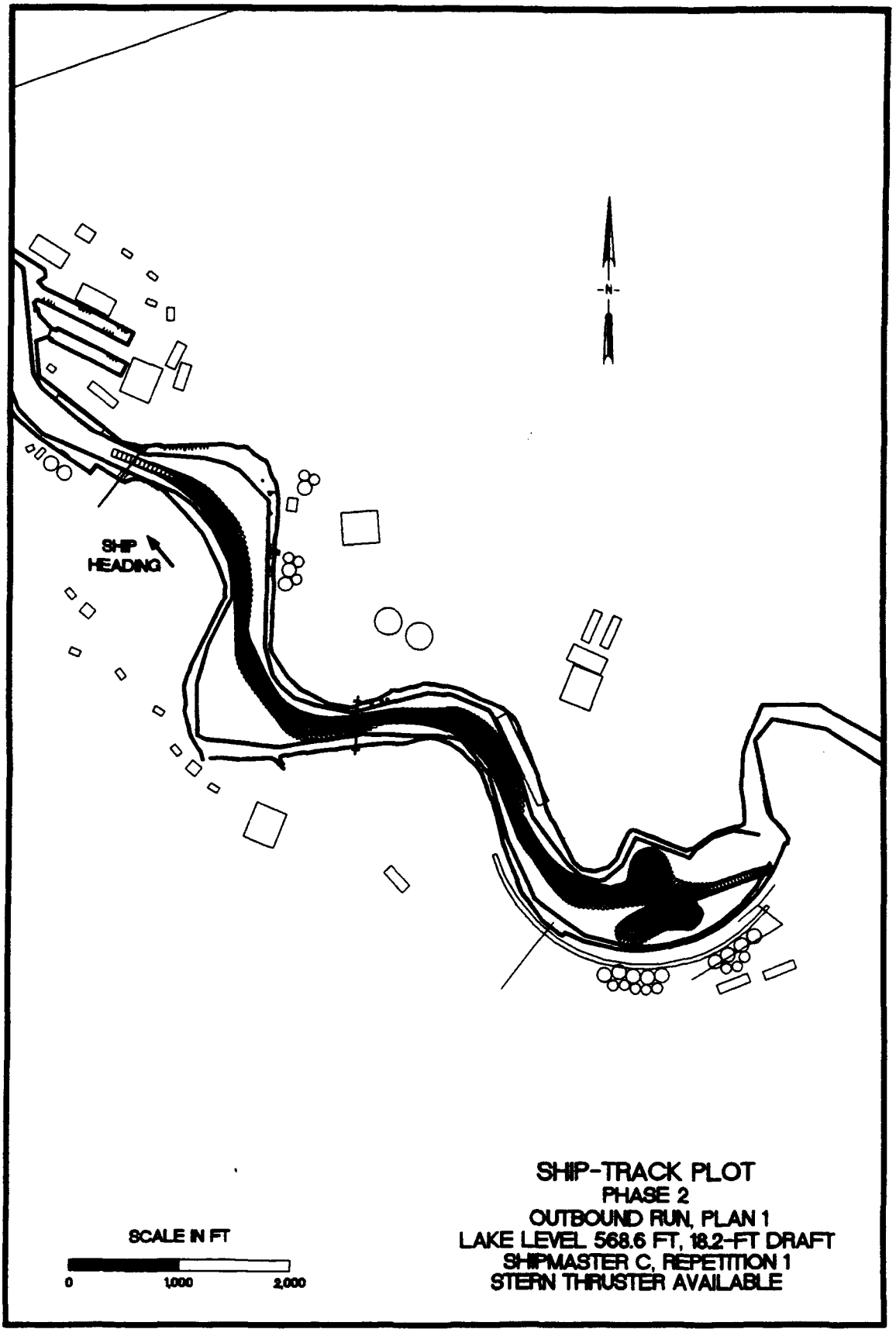
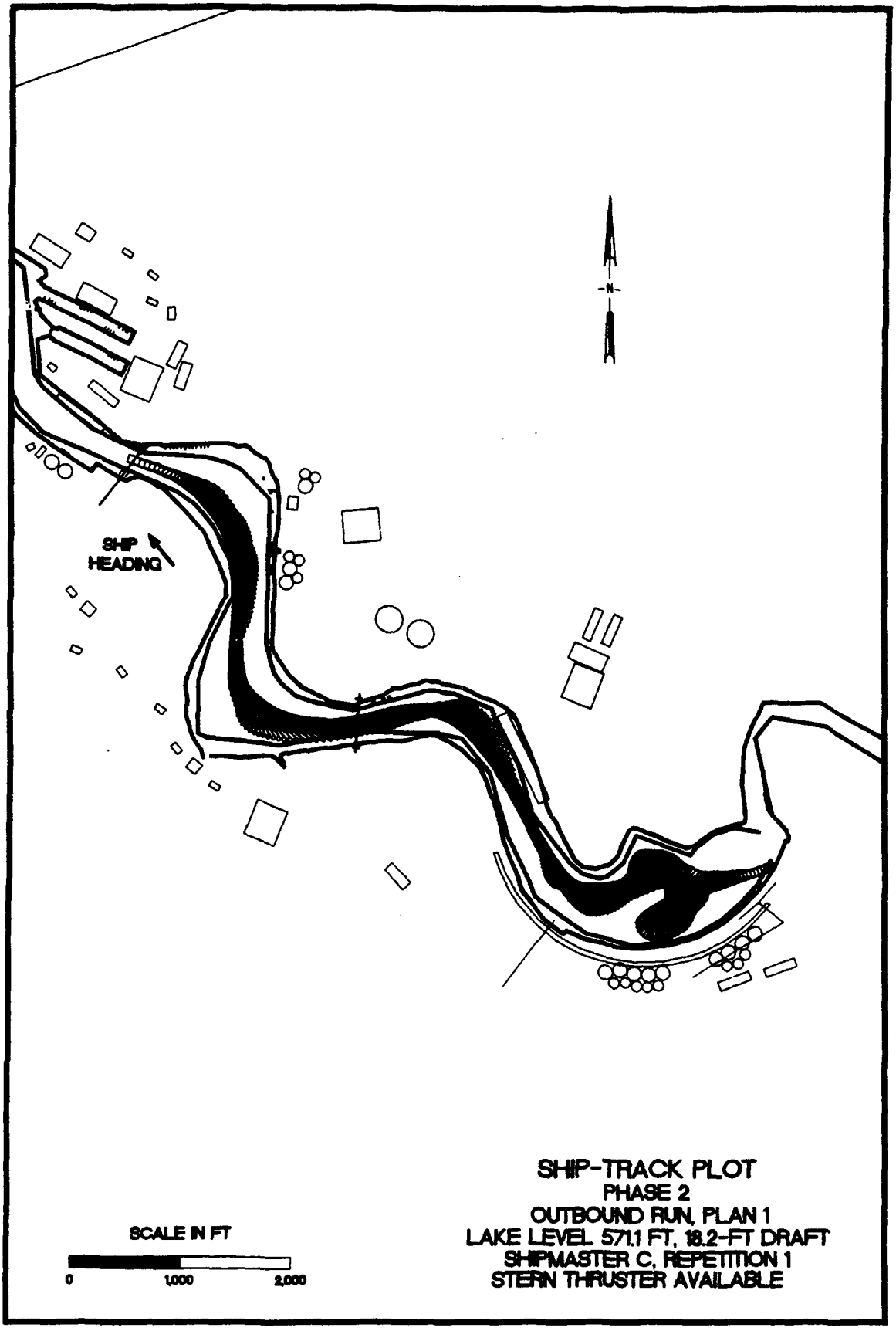
1,000
2,000
SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 1
LAKE LEVEL 571.1 FT, 27.0-FT DRAFT
SHIPMASTER C, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B60



SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, PLAN 1
LAKE LEVEL 568.6 FT, 18.2-FT DRAFT
SHIPMASTER C, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B61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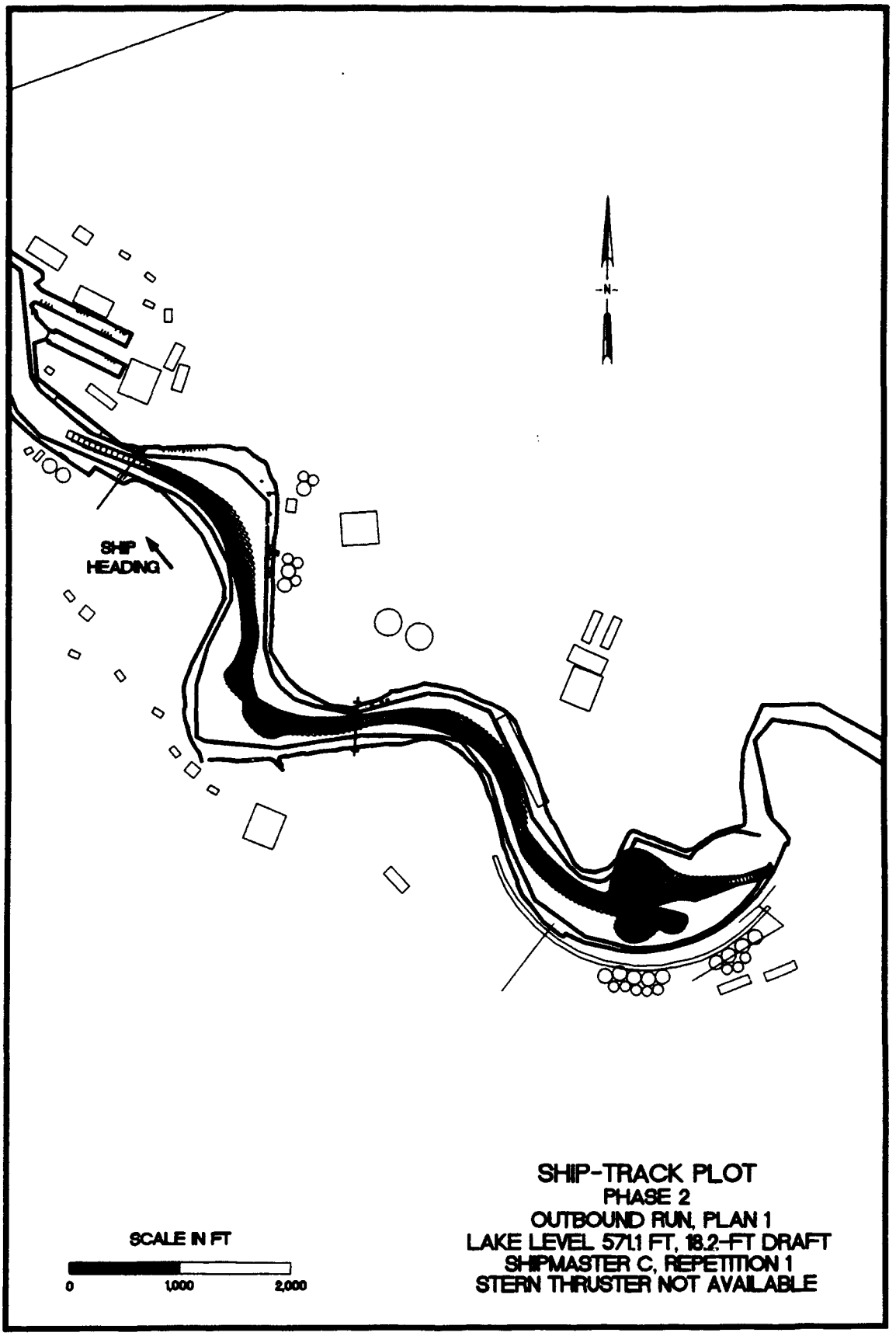
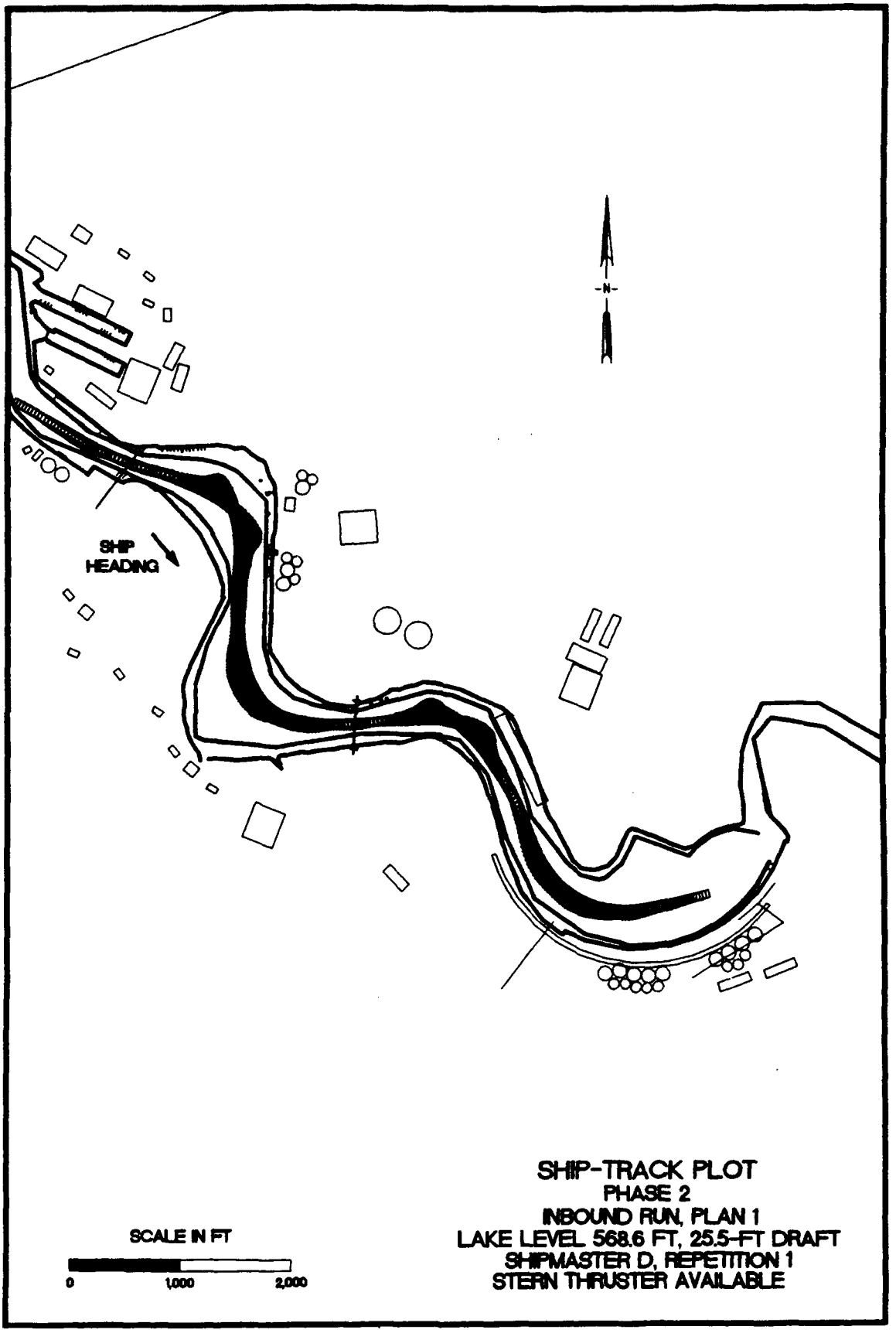
SHIP
HEADING
SCALE IN FT
0
1,000
2,000
SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, PLAN 1
LAKE LEVEL 571.1 FT, 18.2-FT DRAFT
SHIPMASTER C, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B62



SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, PLAN 1
LAKE LEVEL 571.1 FT, 18.2-FT DRAFT
SHIPMASTER C, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B63


SHIP
HEADING
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SCALE IN FT
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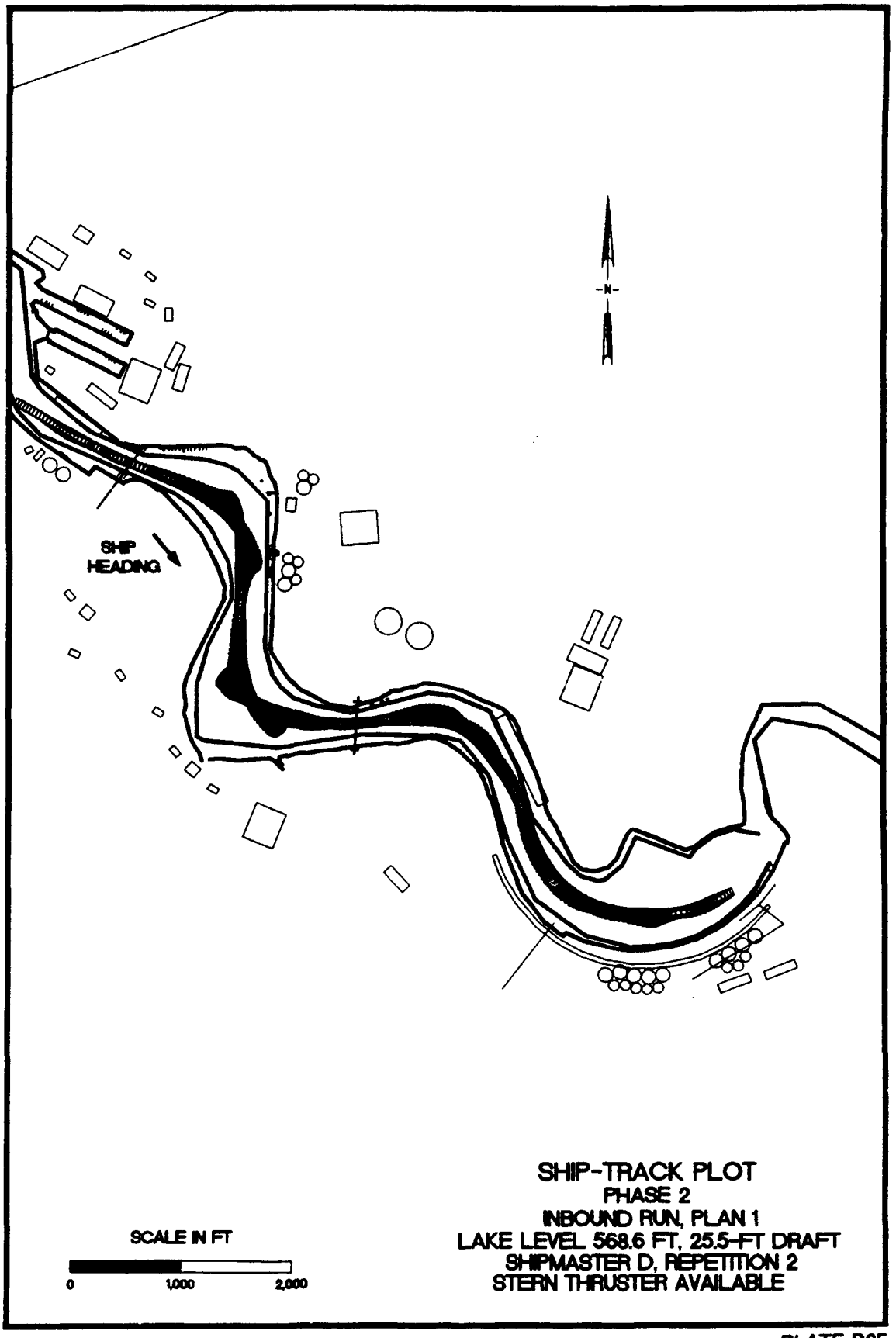
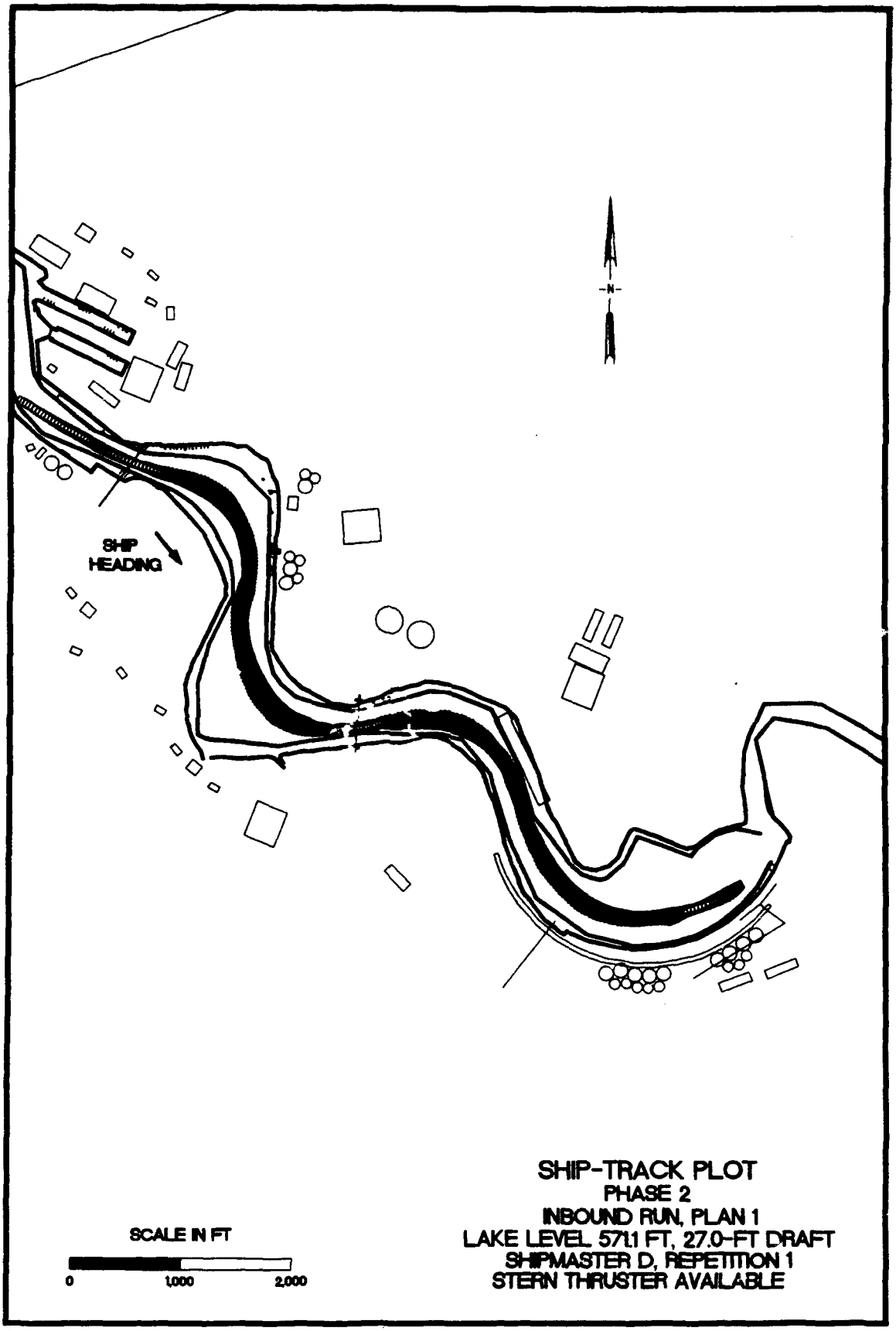
1,000
2,000
SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 1
LAKE LEVEL 568.6 FT, 25.5-FT DRAFT
SHIPMASTER D, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B64



SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 1
LAKE LEVEL 568.6 FT, 25.5-FT DRAFT
SHIPMASTER D, REPETITION 2
STERN THRUSTER AVAILABLE

PLATE B65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SHIP
HEADING
SCALE IN FT
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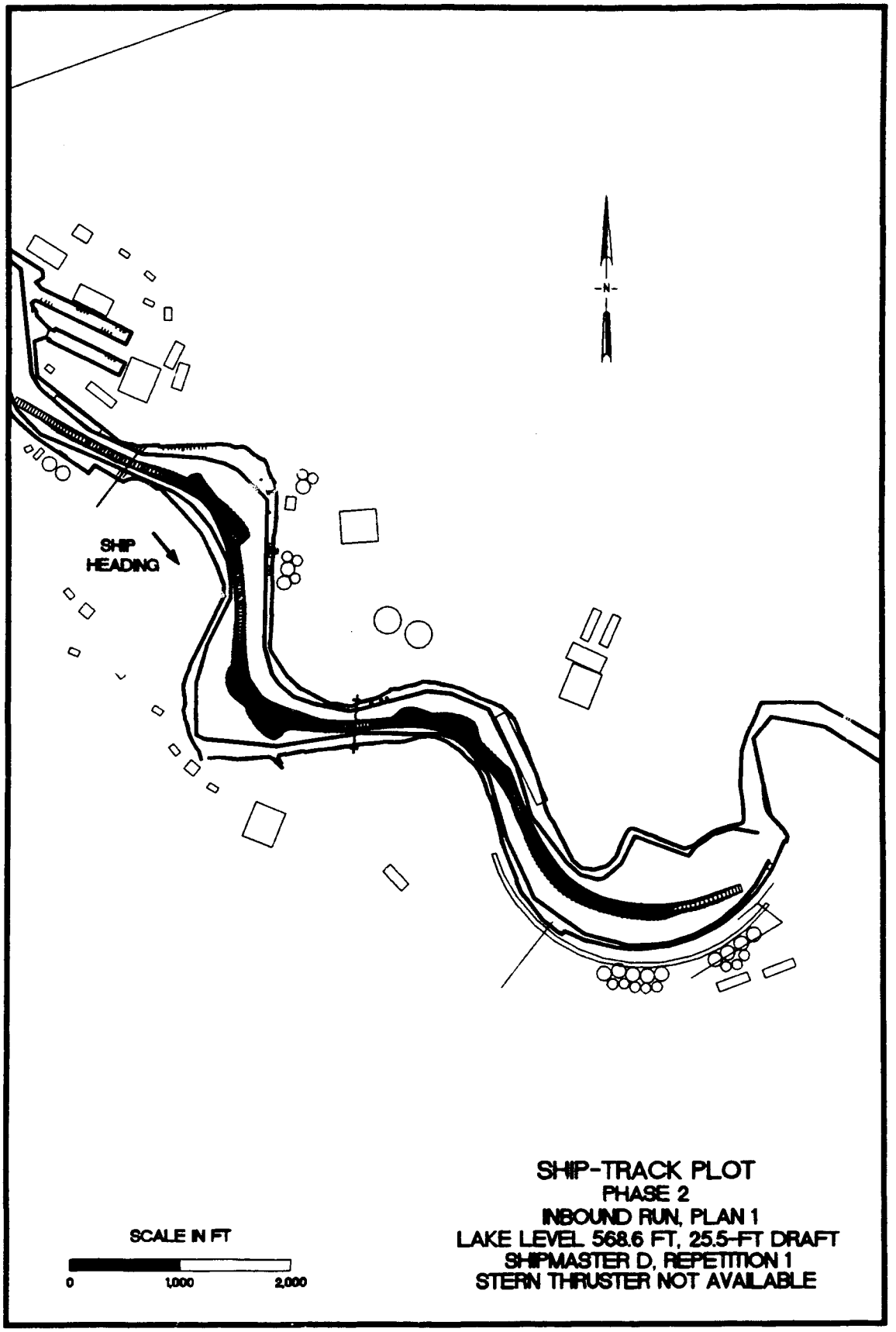
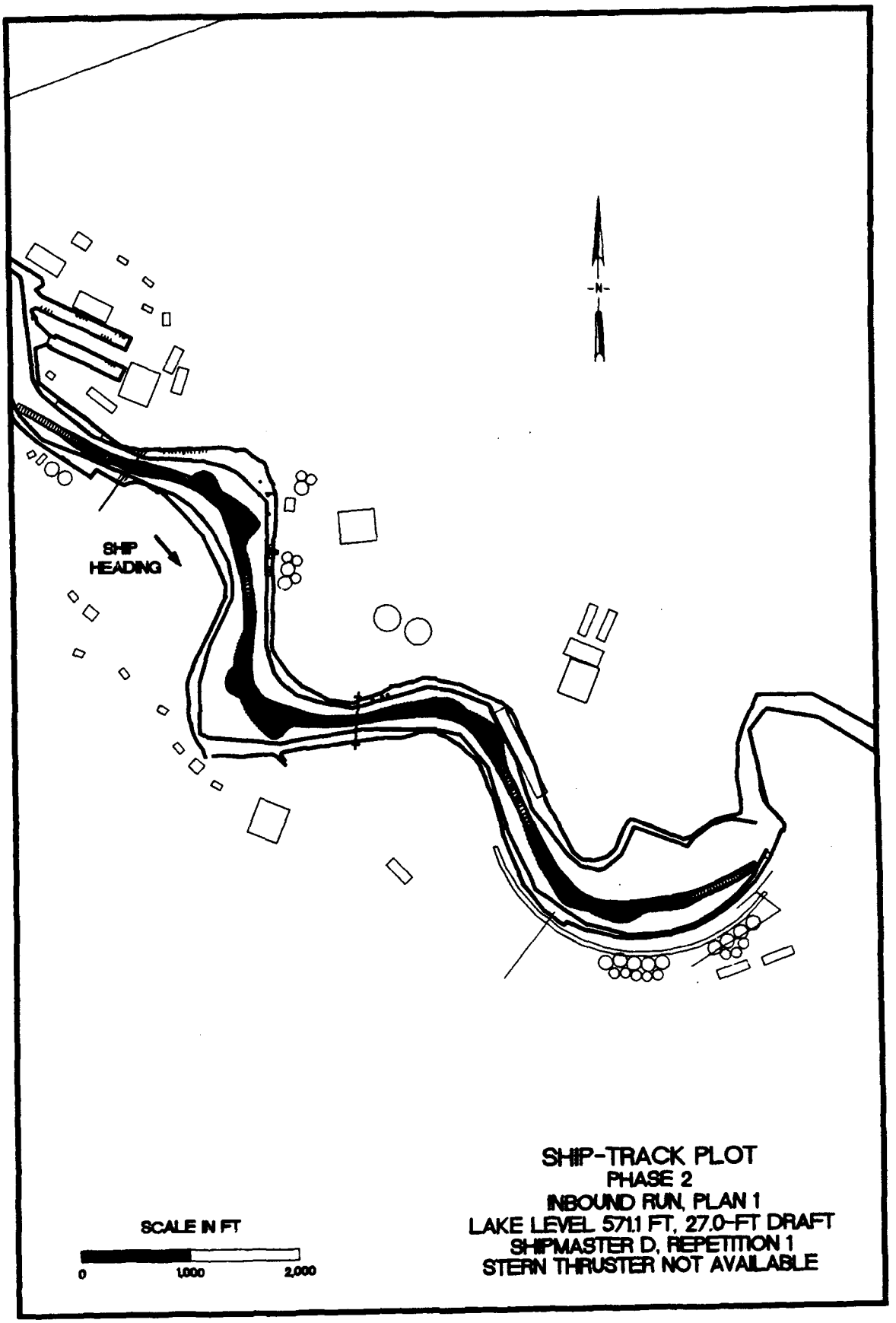
2,000
SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 1
LAKE LEVEL 571.1 FT, 27.0-FT DRAFT
SHIPMASTER D, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B66



SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 1
LAKE LEVEL 568.6 FT, 25.5-FT DRAFT
SHIPMASTER D, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B67


N
SHIP
HEADING
SCALE IN FT
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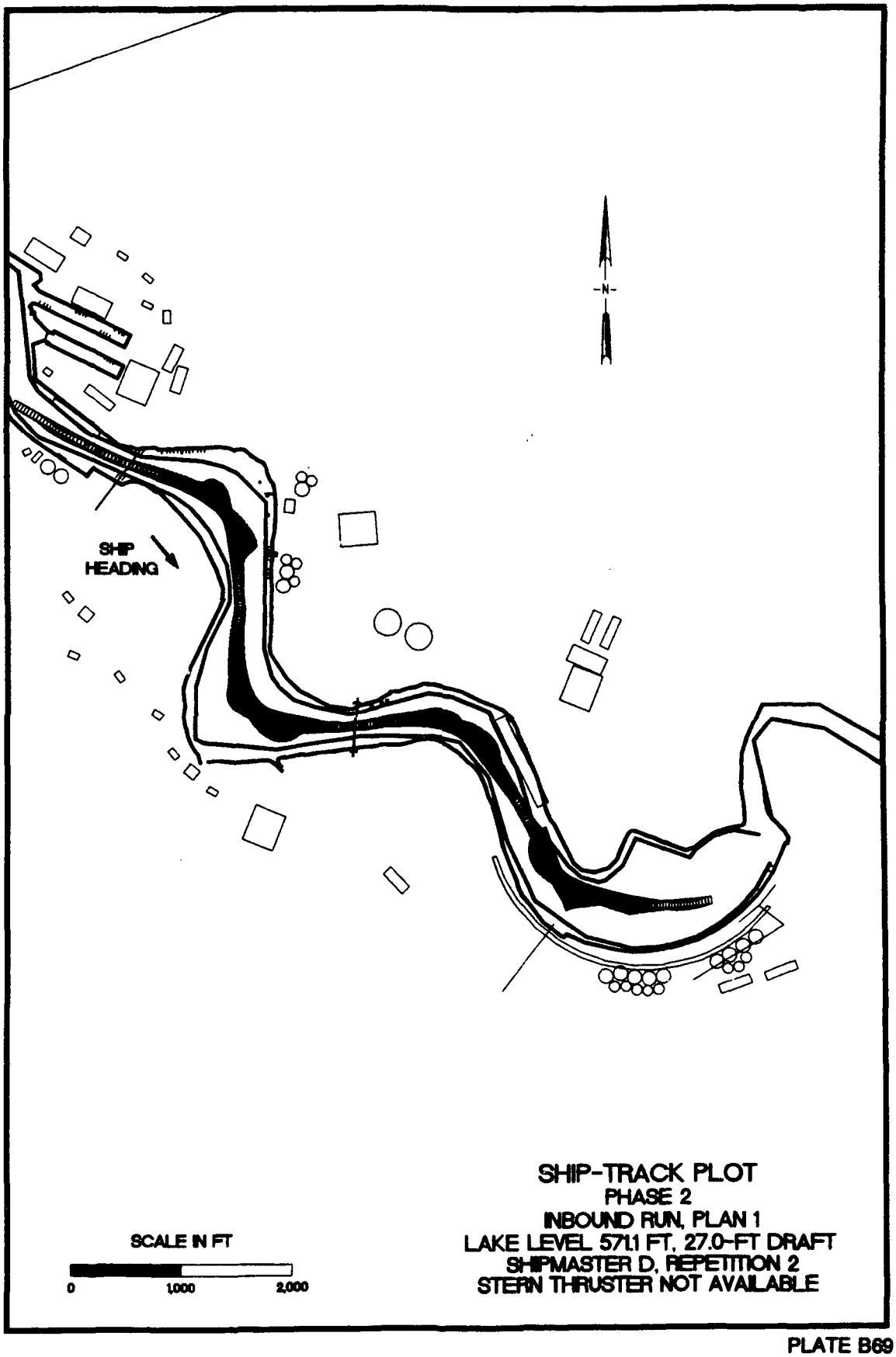
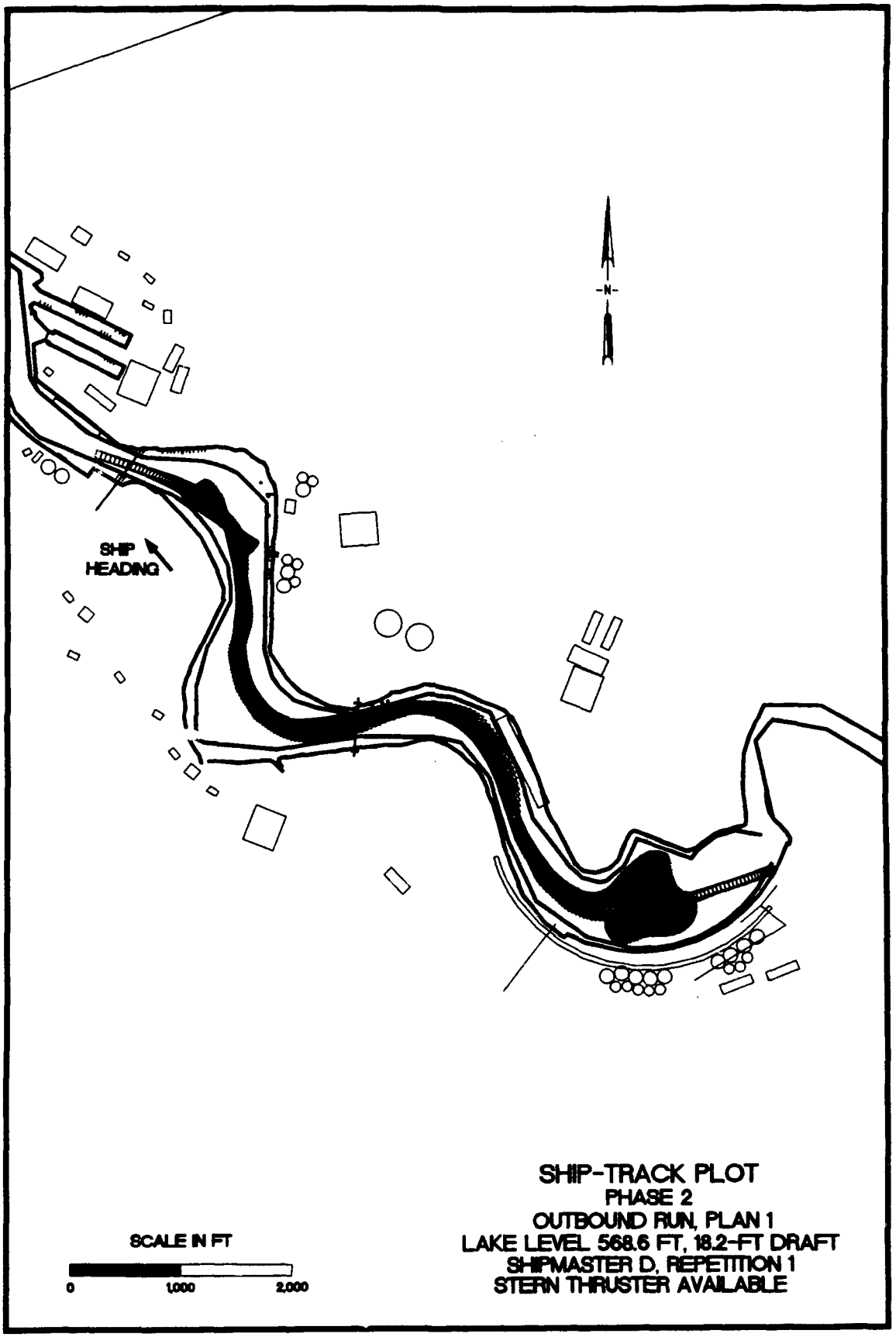
1,000
2,000
SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 1
LAKE LEVEL 571.1 FT, 27.0-FT DRAFT
SHIPMASTER D, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B68



SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 1
LAKE LEVEL 571.1 FT, 27.0-FT DRAFT
SHIPMASTER D, REPETITION 2
STERN THRUSTER NOT AVAILABLE

PLATE B69


-N-
SHIP
HEADING
SCALE IN FT
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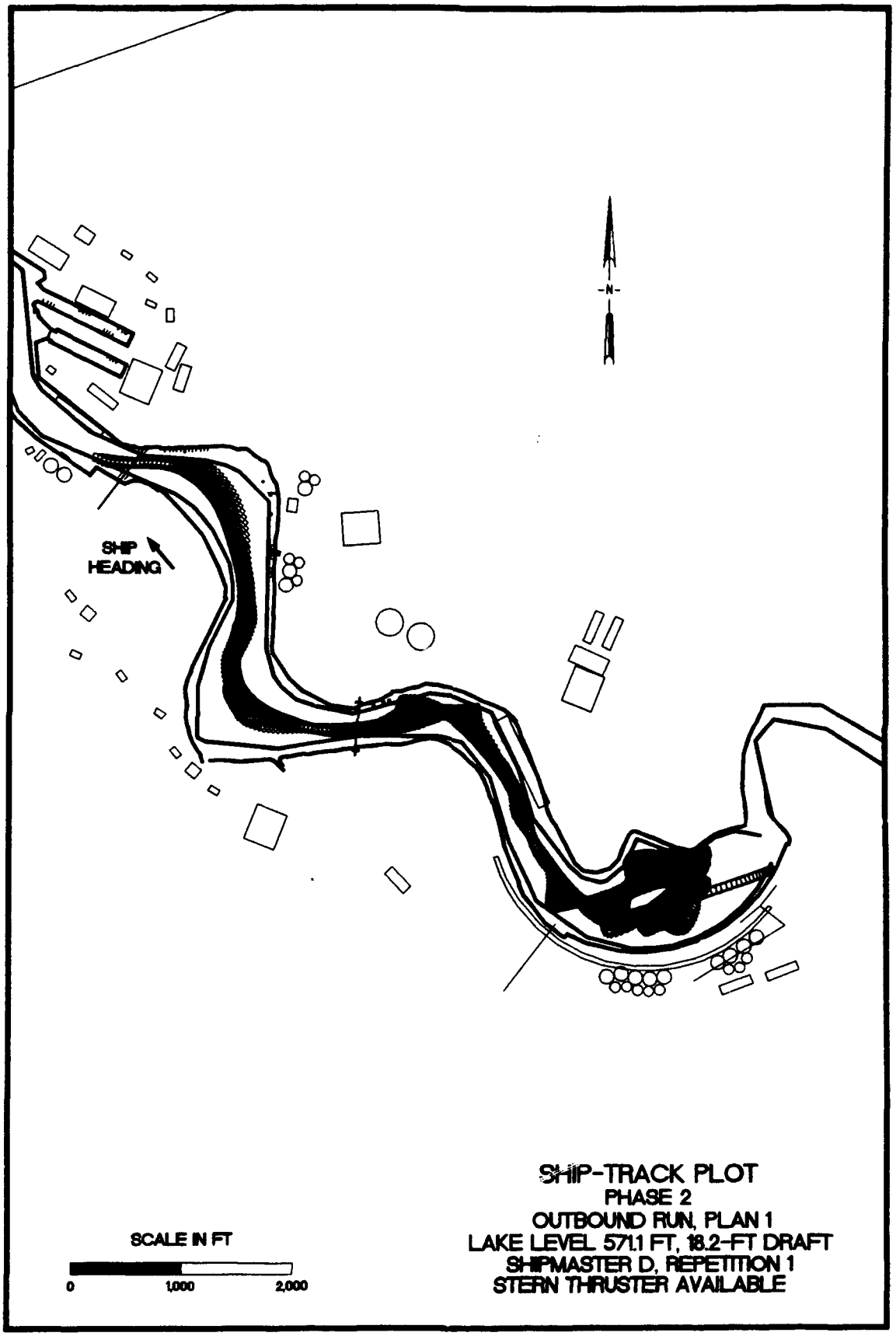
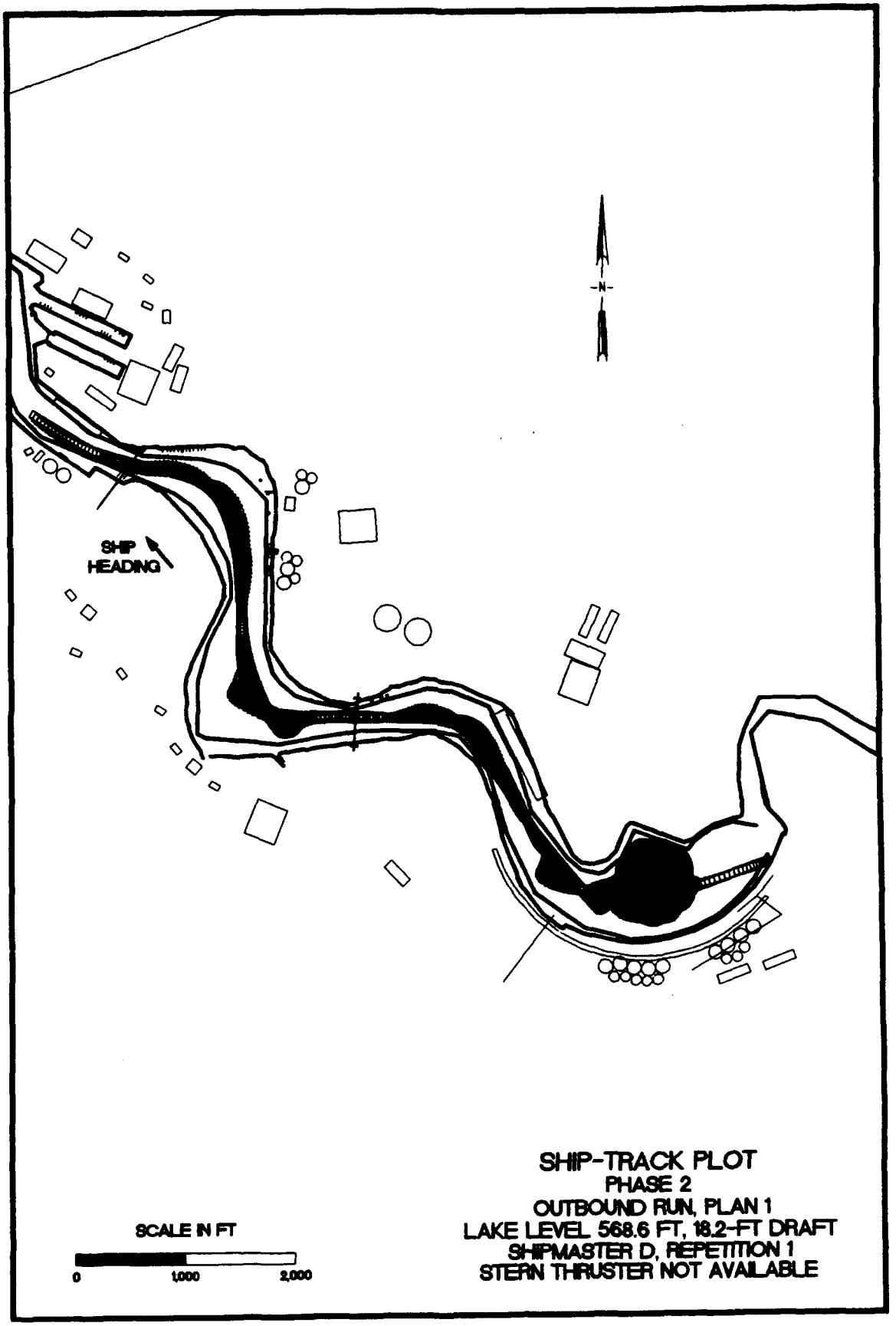
2,000
SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, PLAN 1
LAKE LEVEL 568.6 FT, 18.2-FT DRAFT
SHIPMASTER D, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B70



SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, PLAN 1
LAKE LEVEL 571.1 FT, 18.2-FT DRAFT
SHIPMASTER D, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B71


N
SHIP HEADING
SCALE IN FT
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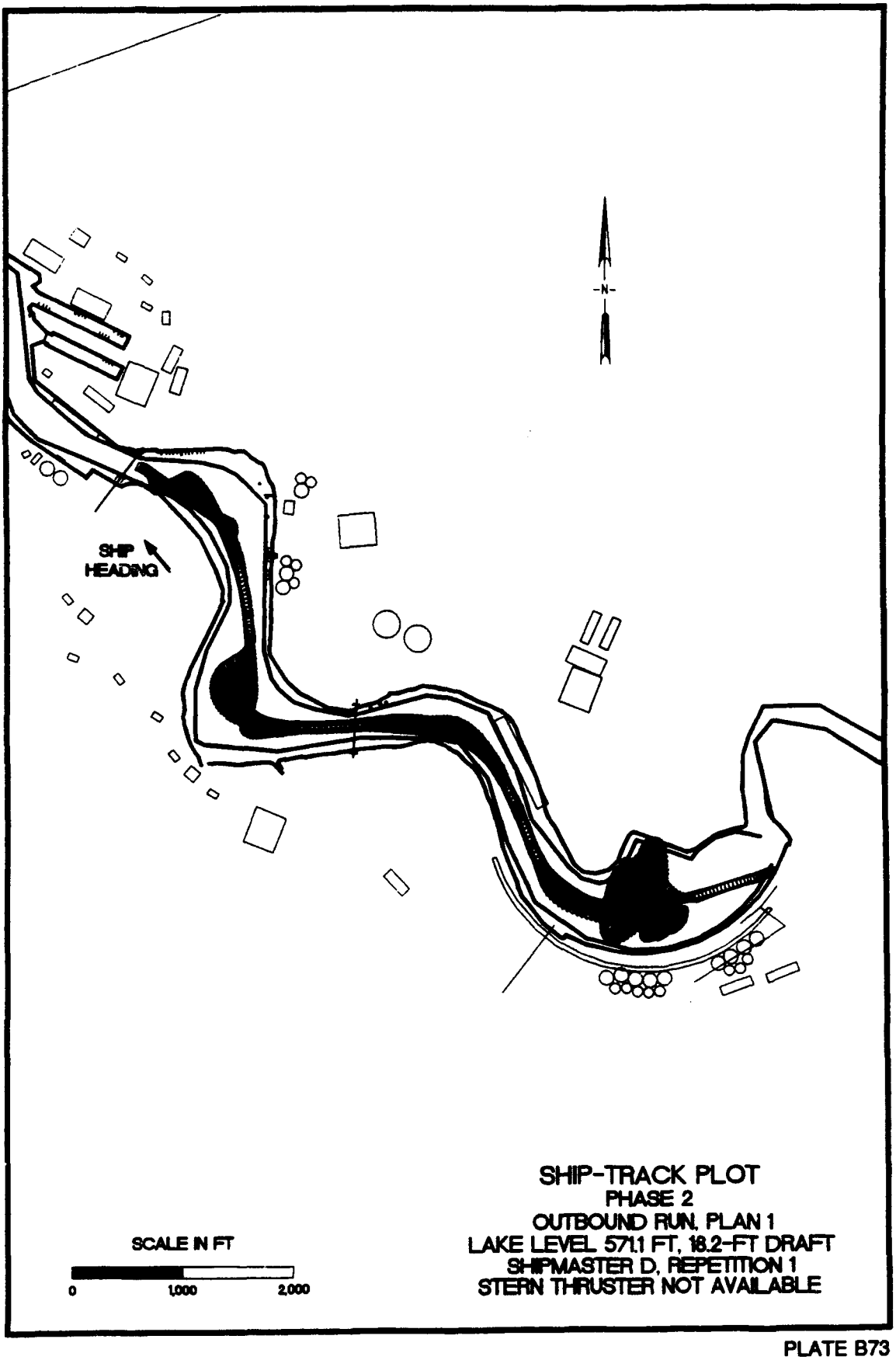
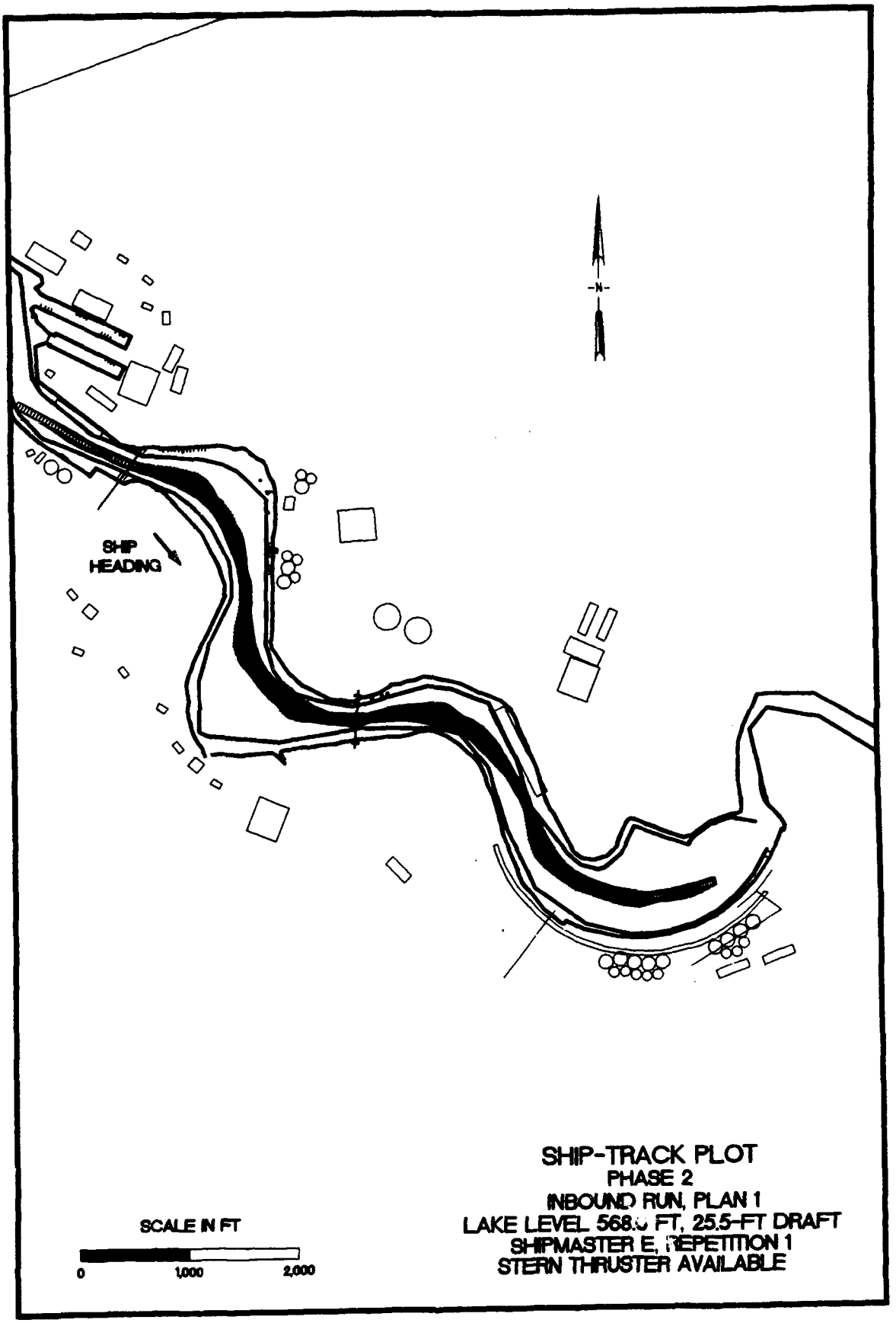
1,000
2,000
SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, PLAN 1
LAKE LEVEL 568.6 FT, 18.2-FT DRAFT
SHIPMASTER D, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B72



SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, PLAN 1
LAKE LEVEL 571.1 FT, 18.2-FT DRAFT
SHIPMASTER D, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B73


N
SHIP
HEADING
SCALE IN FT
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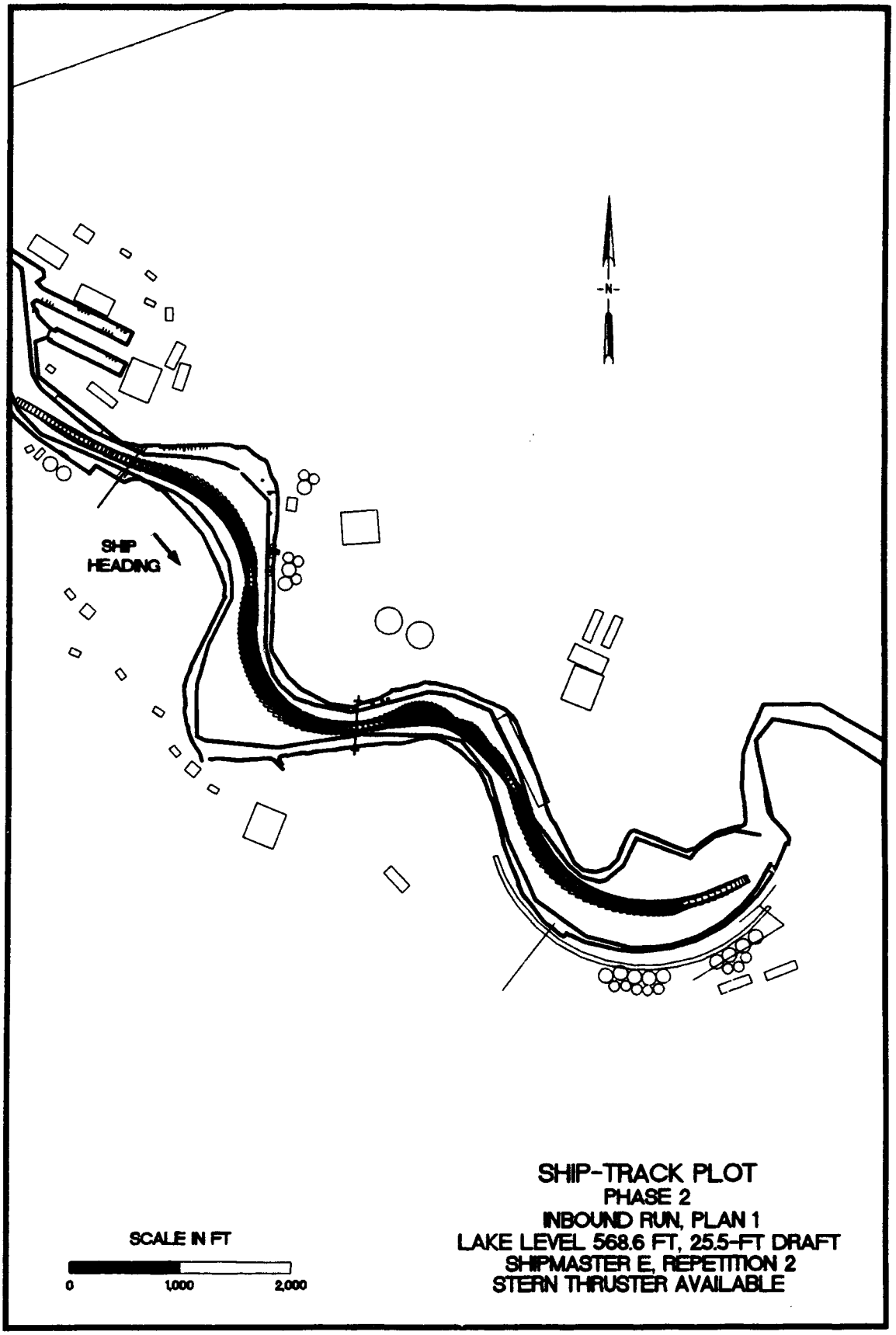
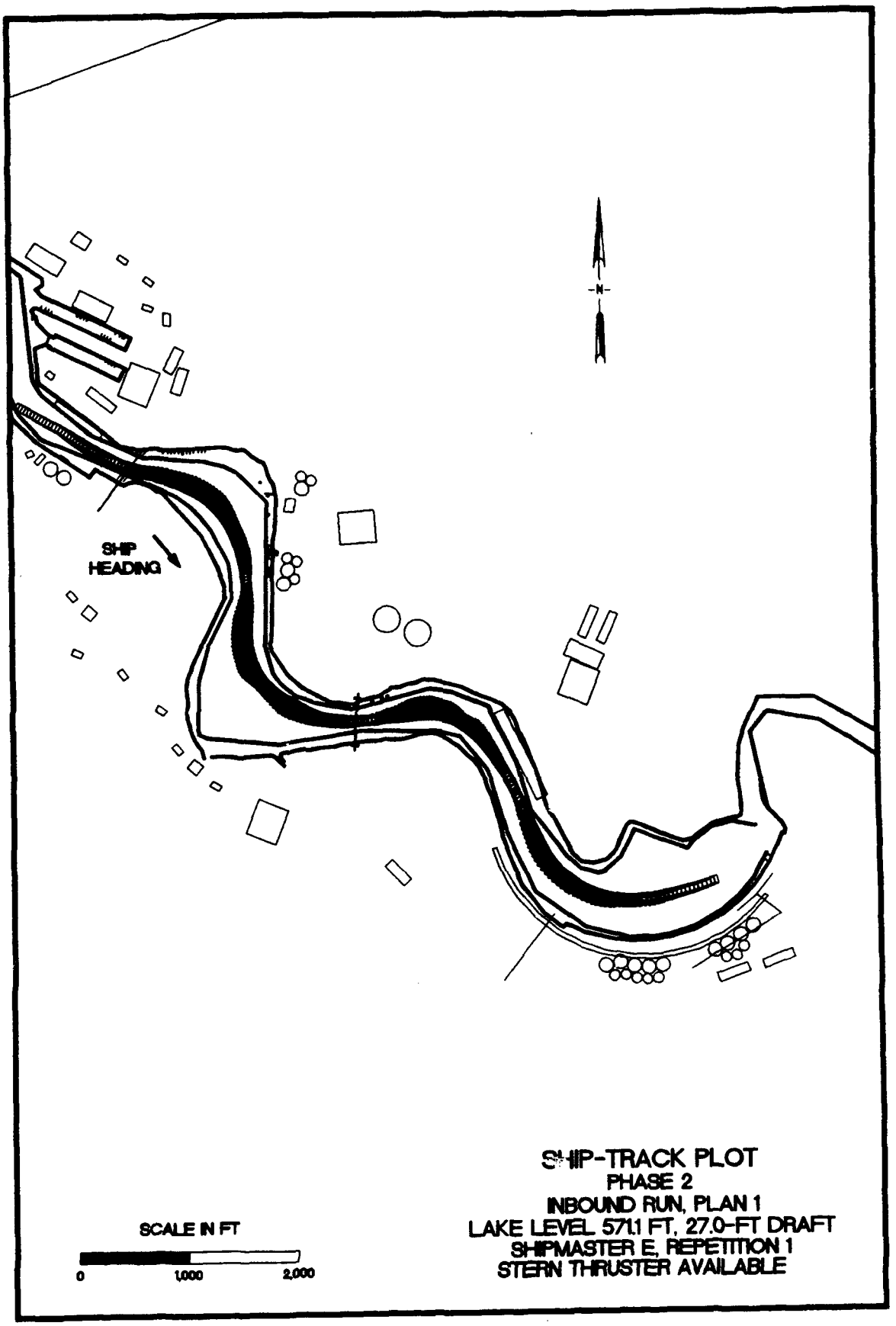
1,000
2,000
SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 1
LAKE LEVEL 568.0 FT, 25.5-FT DRAFT
SHIPMASTER E, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B74



SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 1
LAKE LEVEL 568.6 FT, 25.5-FT DRAFT
SHIPMASTER E, REPETITION 2
STERN THRUSTER AVAILABLE

PLATE B75


N
SHIP
HEADING
SCALE IN FT
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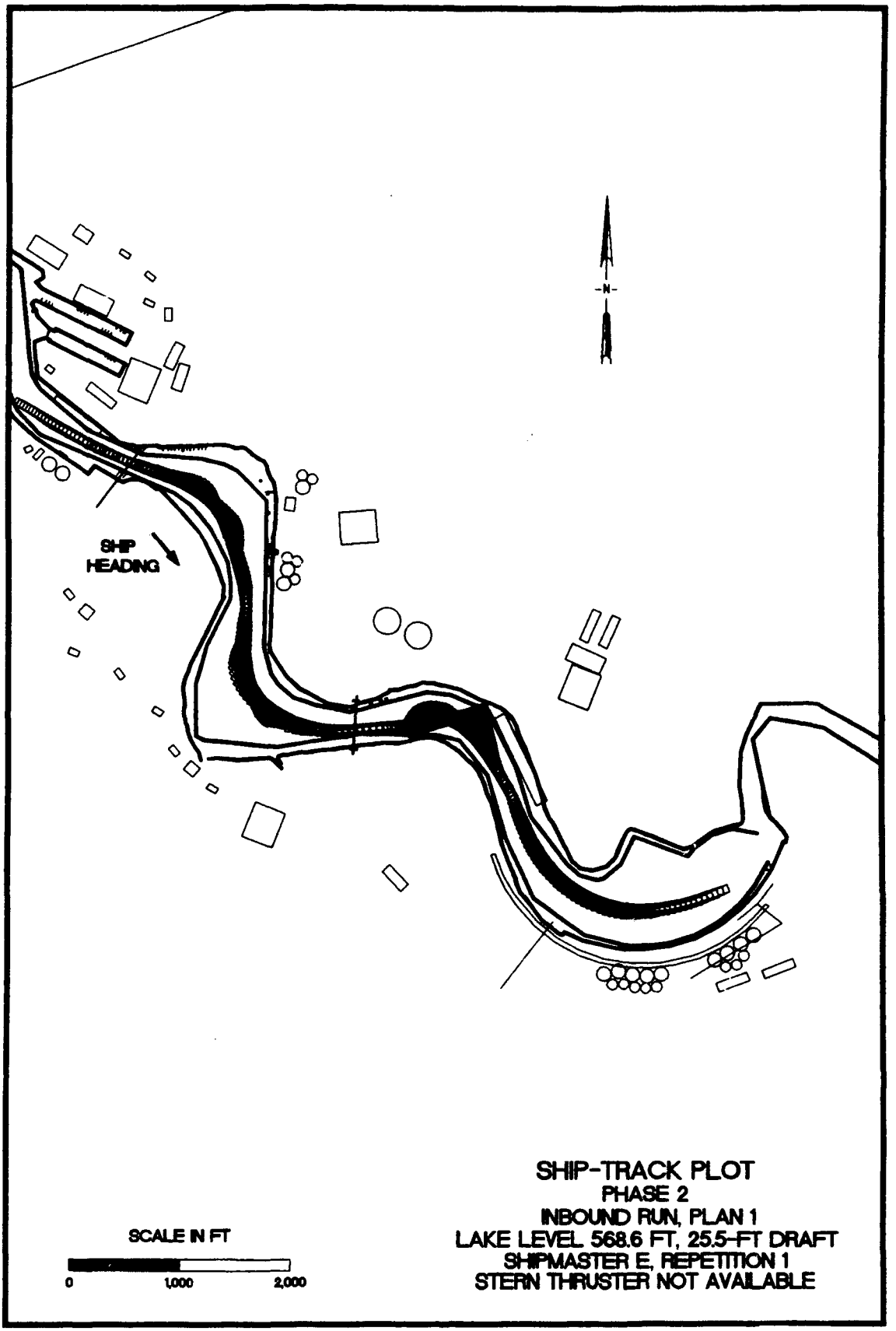
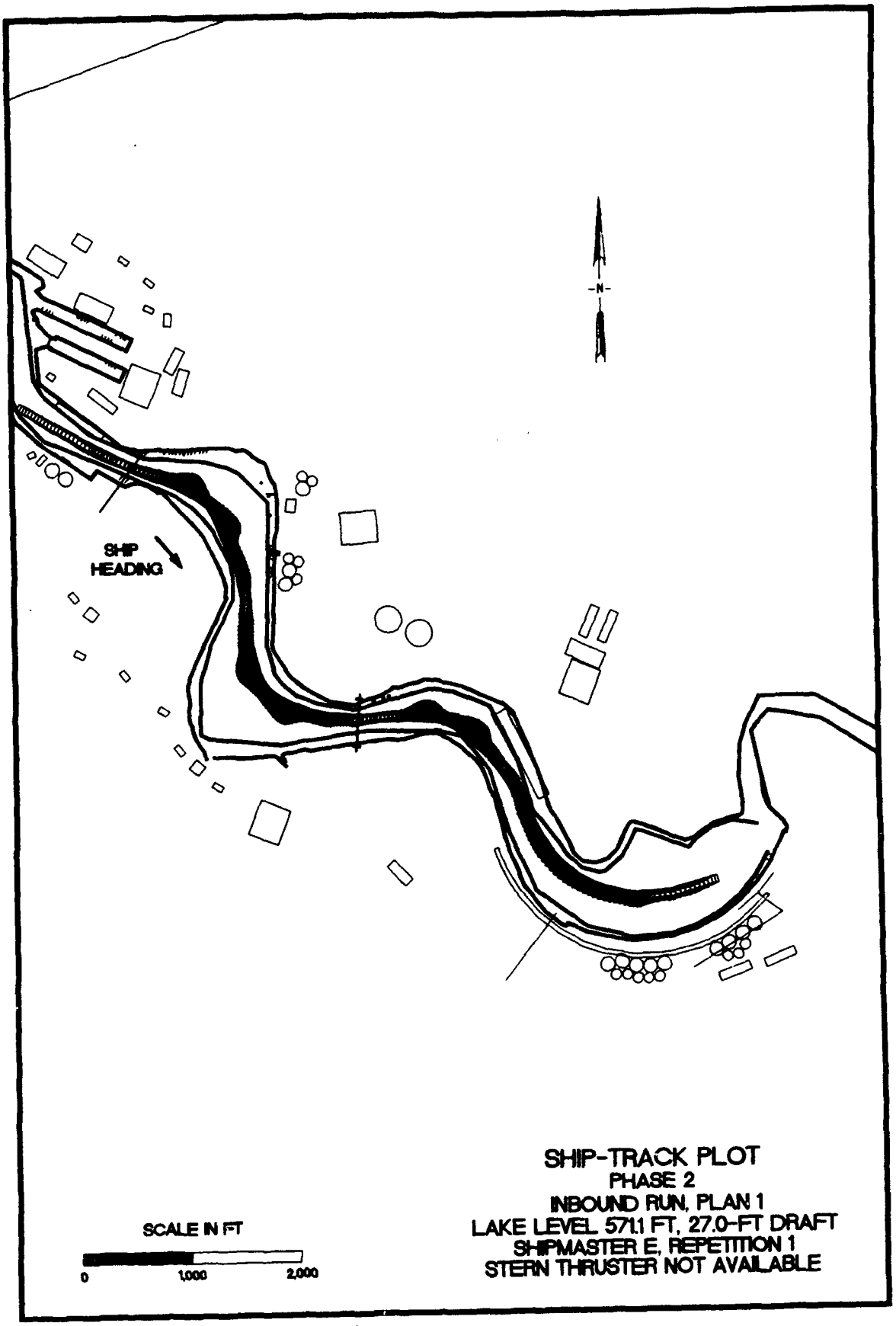
2,000
SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 1
LAKE LEVEL 571.1 FT, 27.0-FT DRAFT
SHIPMASTER E, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B76



SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 1
LAKE LEVEL 568.6 FT, 25.5-FT DRAFT
SHIPMASTER E, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B77


N
SHIP
HEADING
SCALE IN FT
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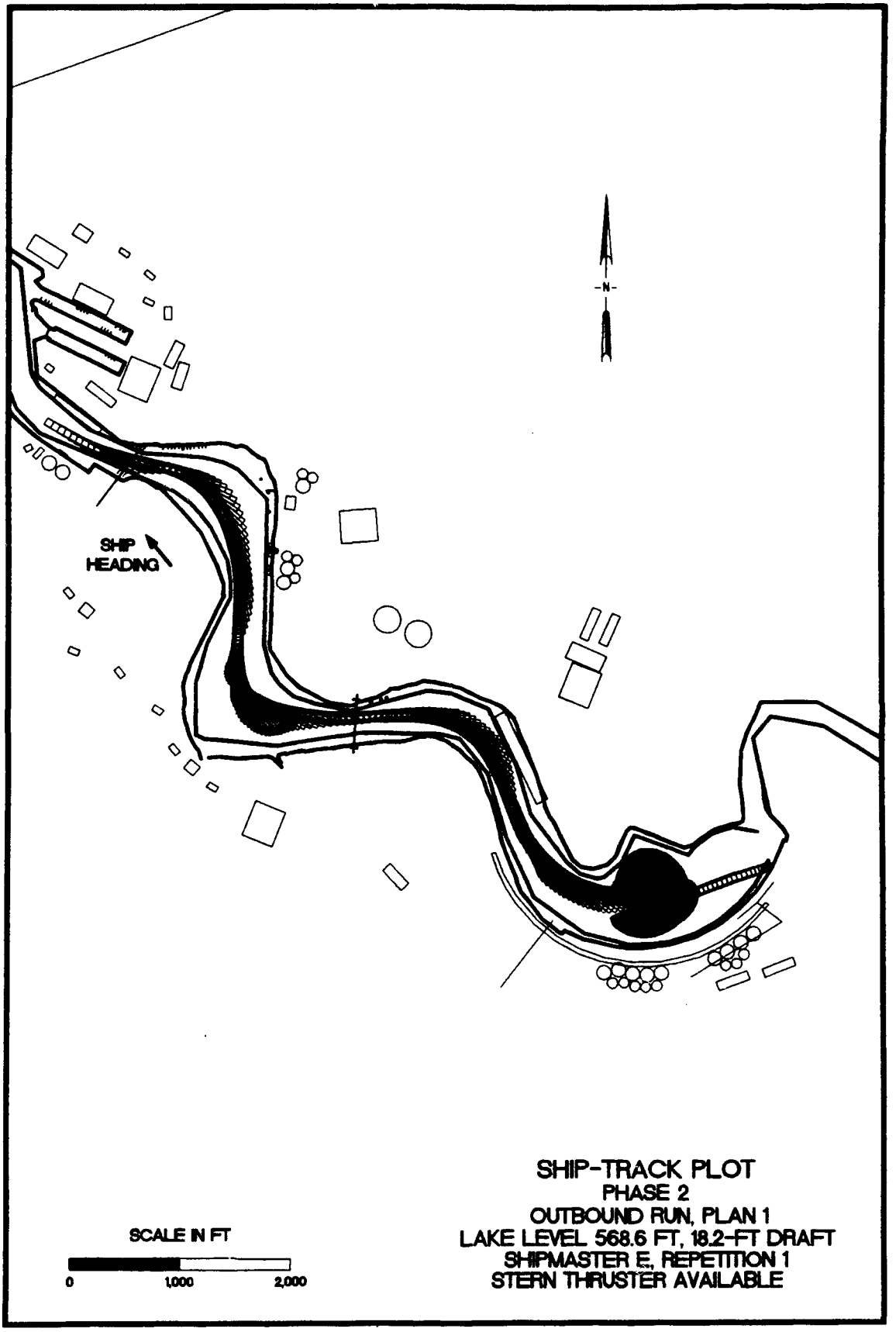
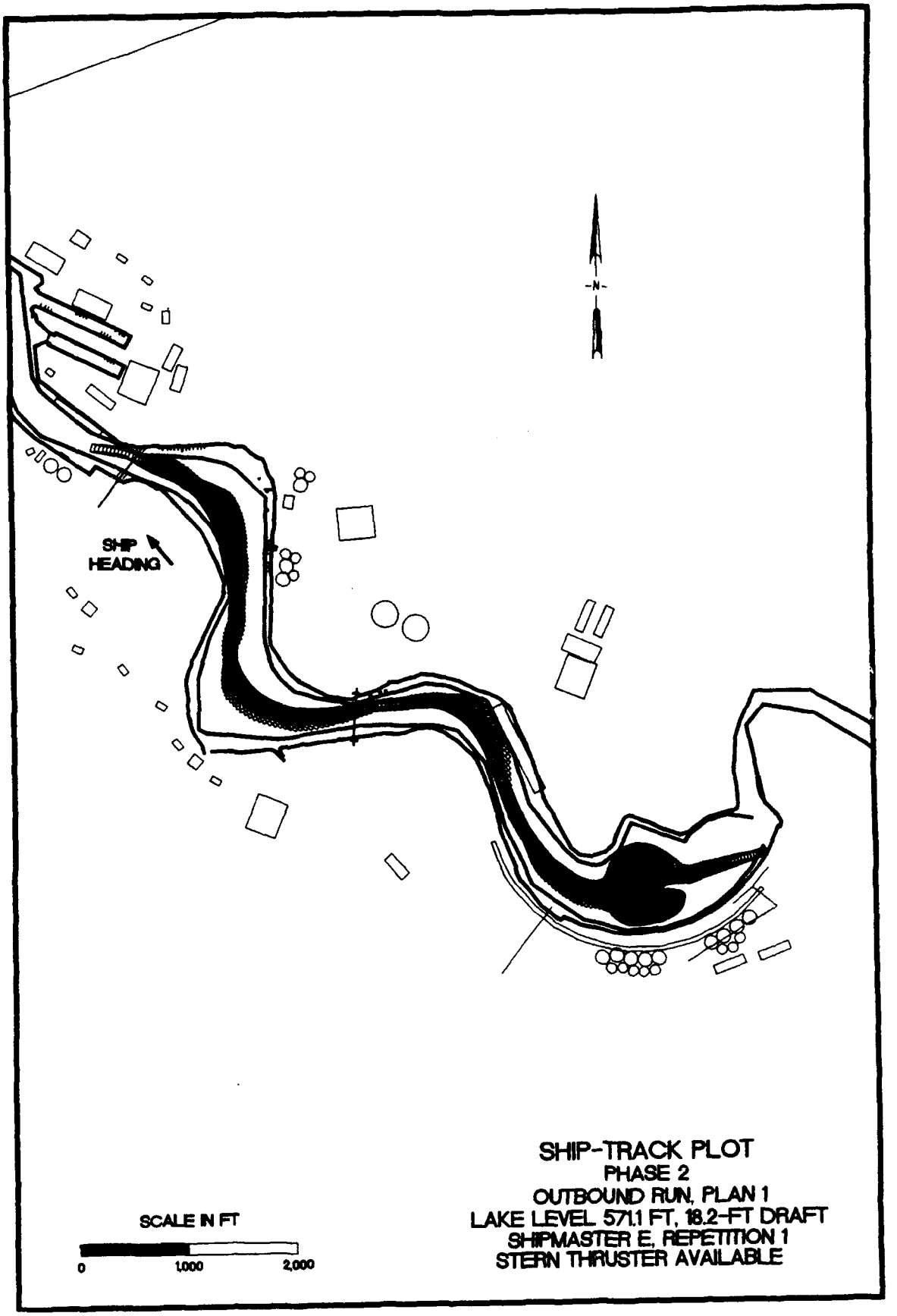
1,000
2,000
SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 1
LAKE LEVEL 571.1 FT, 27.0-FT DRAFT
SHIPMASTER E, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B78



SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, PLAN 1
LAKE LEVEL 568.6 FT, 18.2-FT DRAFT
SHIPMASTER E, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B79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HEADING
SCALE IN FT
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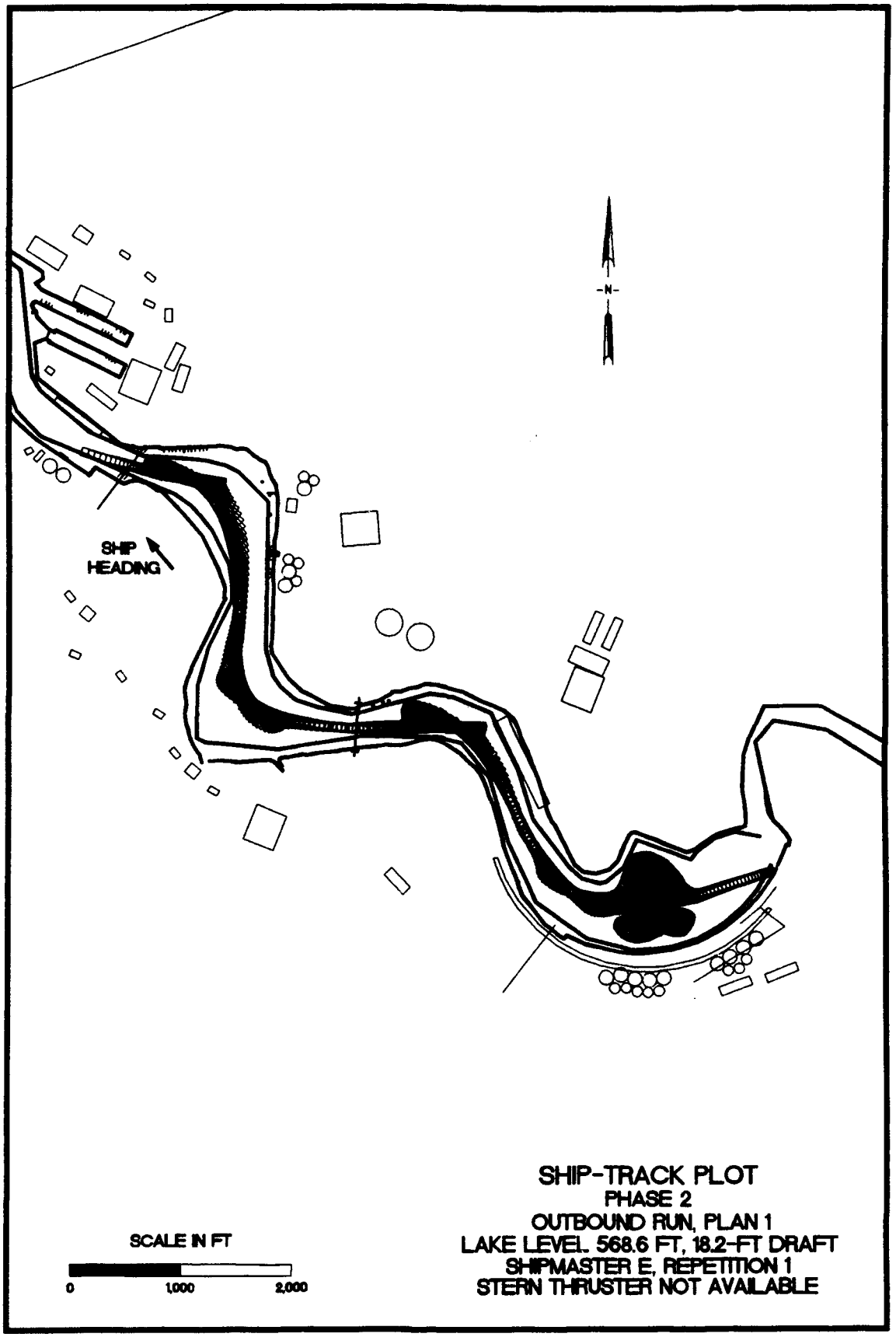
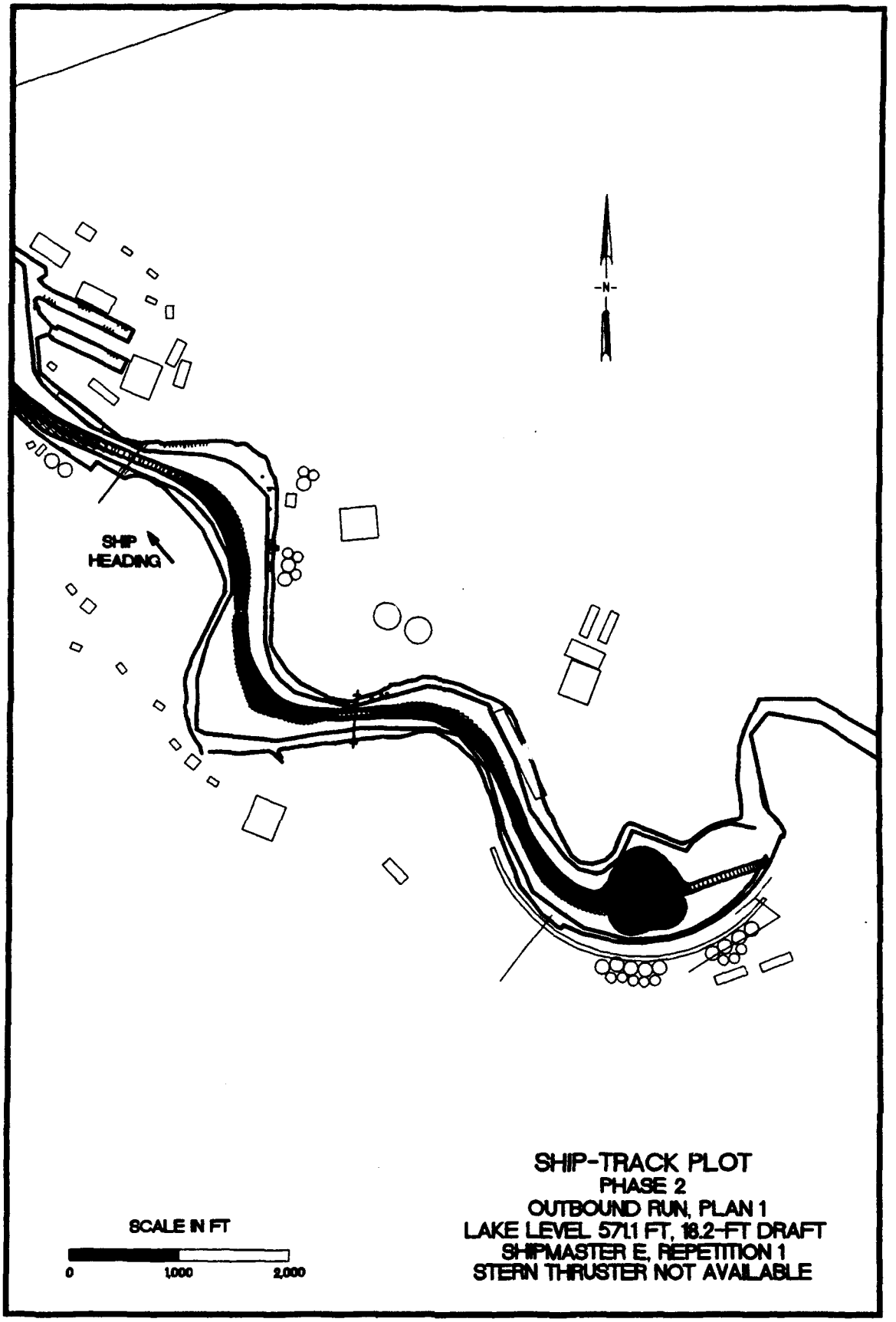
1,000
2,000
SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, PLAN 1
LAKE LEVEL 571.1 FT, 18.2-FT DRAFT
SHIPMASTER E, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B80



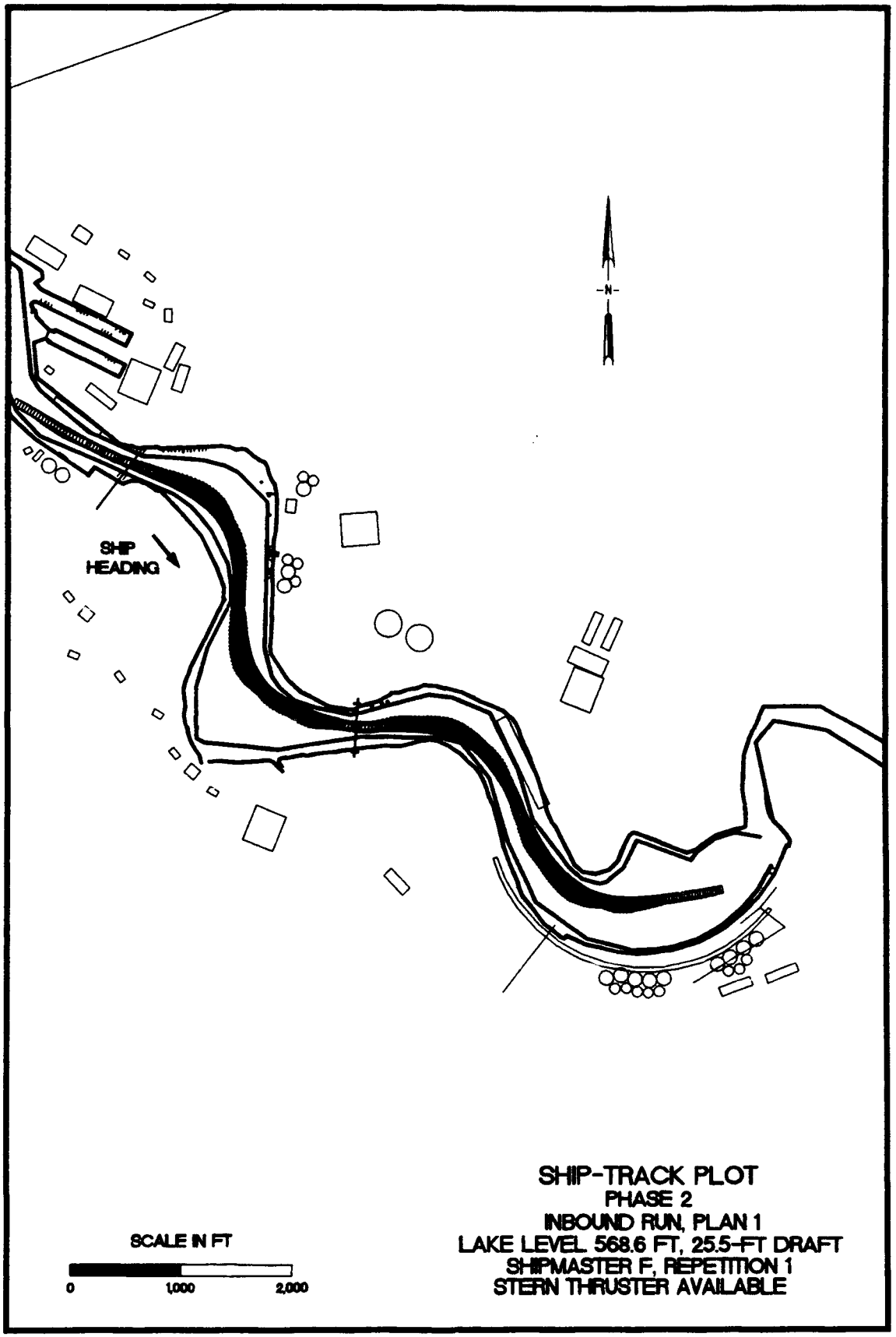
SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, PLAN 1
LAKE LEVEL 568.6 FT, 18.2-FT DRAFT
SHIPMASTER E, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B81



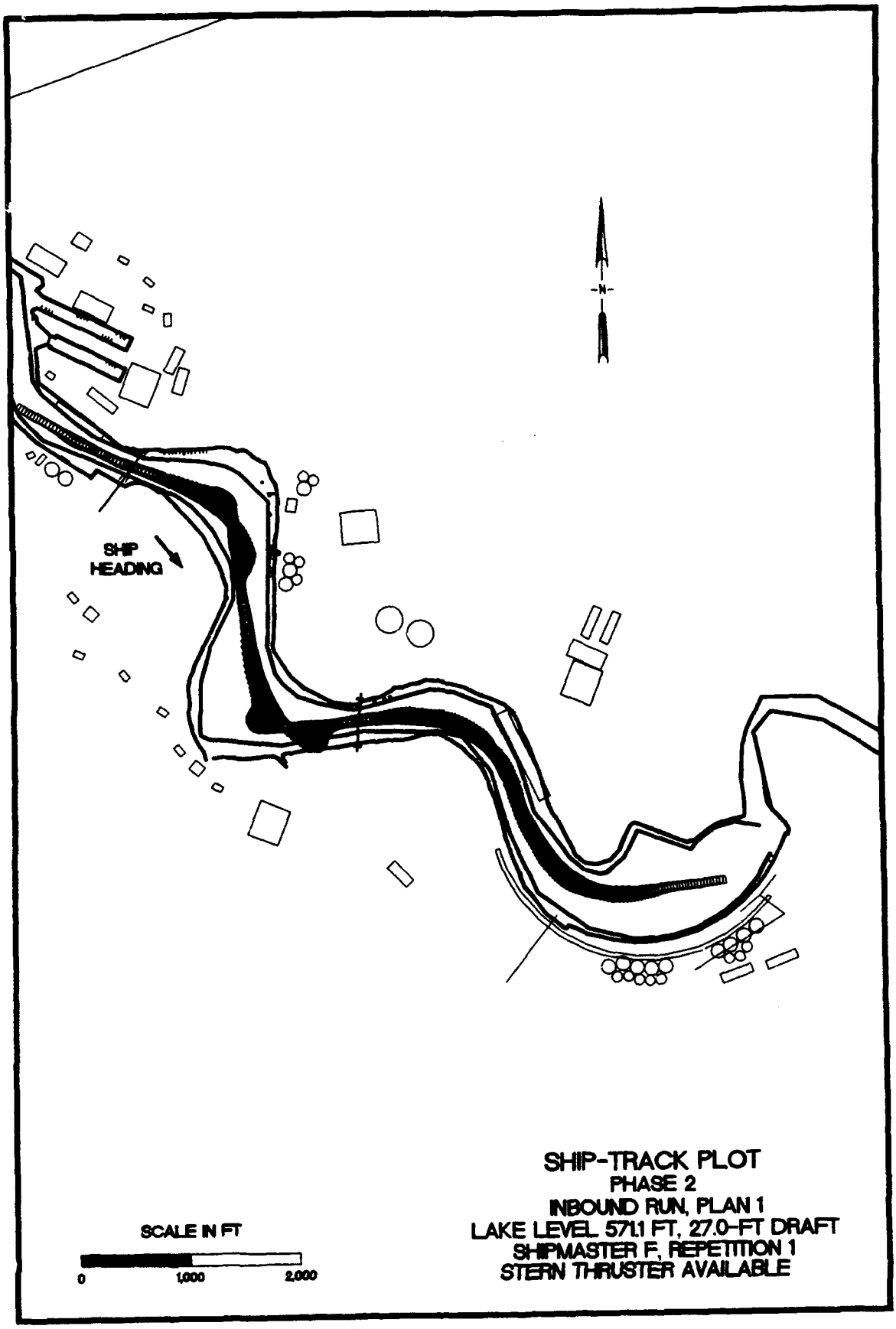
SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, PLAN 1
LAKE LEVEL 571.1 FT, 18.2-FT DRAFT
SHIPMASTER E, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B82



SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 1
LAKE LEVEL 568.6 FT, 25.5-FT DRAFT
SHIPMASTER F, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B83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SHIP
HEADING
SCALE IN FT
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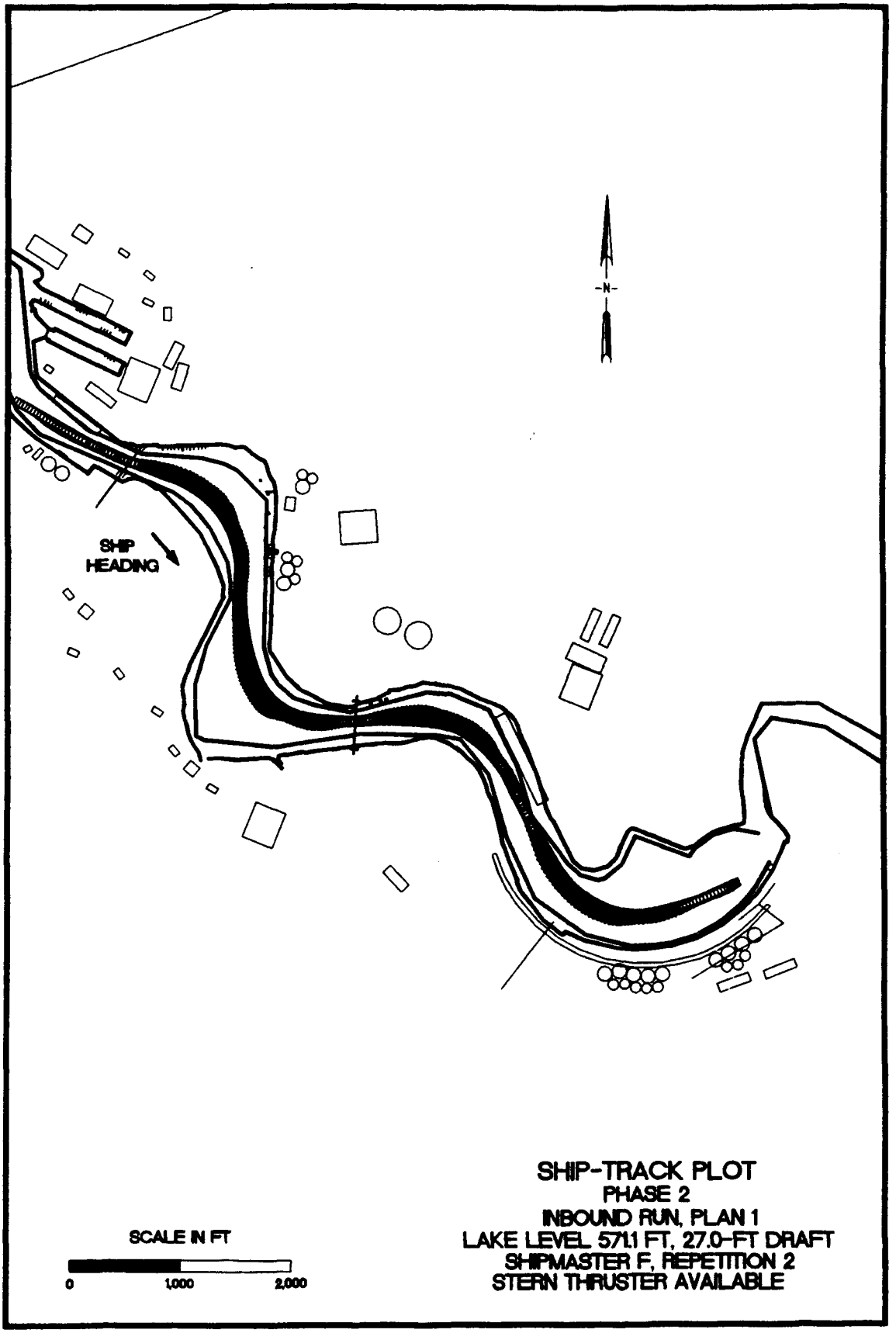
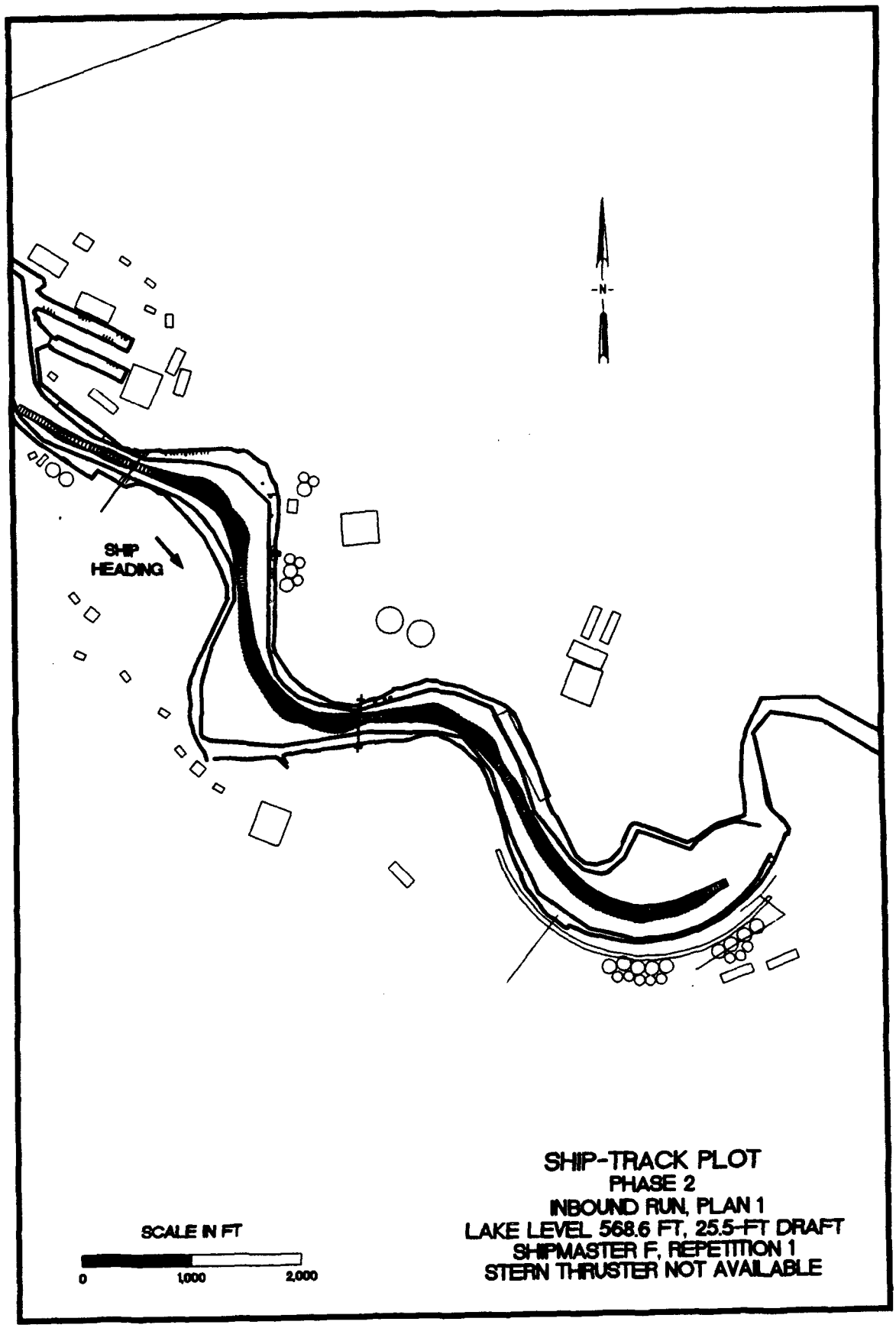
2,000
SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 1
LAKE LEVEL 571.1 FT, 27.0-FT DRAFT
SHIPMASTER F, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B84



SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 1
LAKE LEVEL 571.1 FT, 27.0-FT DRAFT
SHIPMASTER F, REPETITION 2
STERN THRUSTER AVAILABLE

PLATE B85


-N-
SHIP
HEADING
SCALE IN FT
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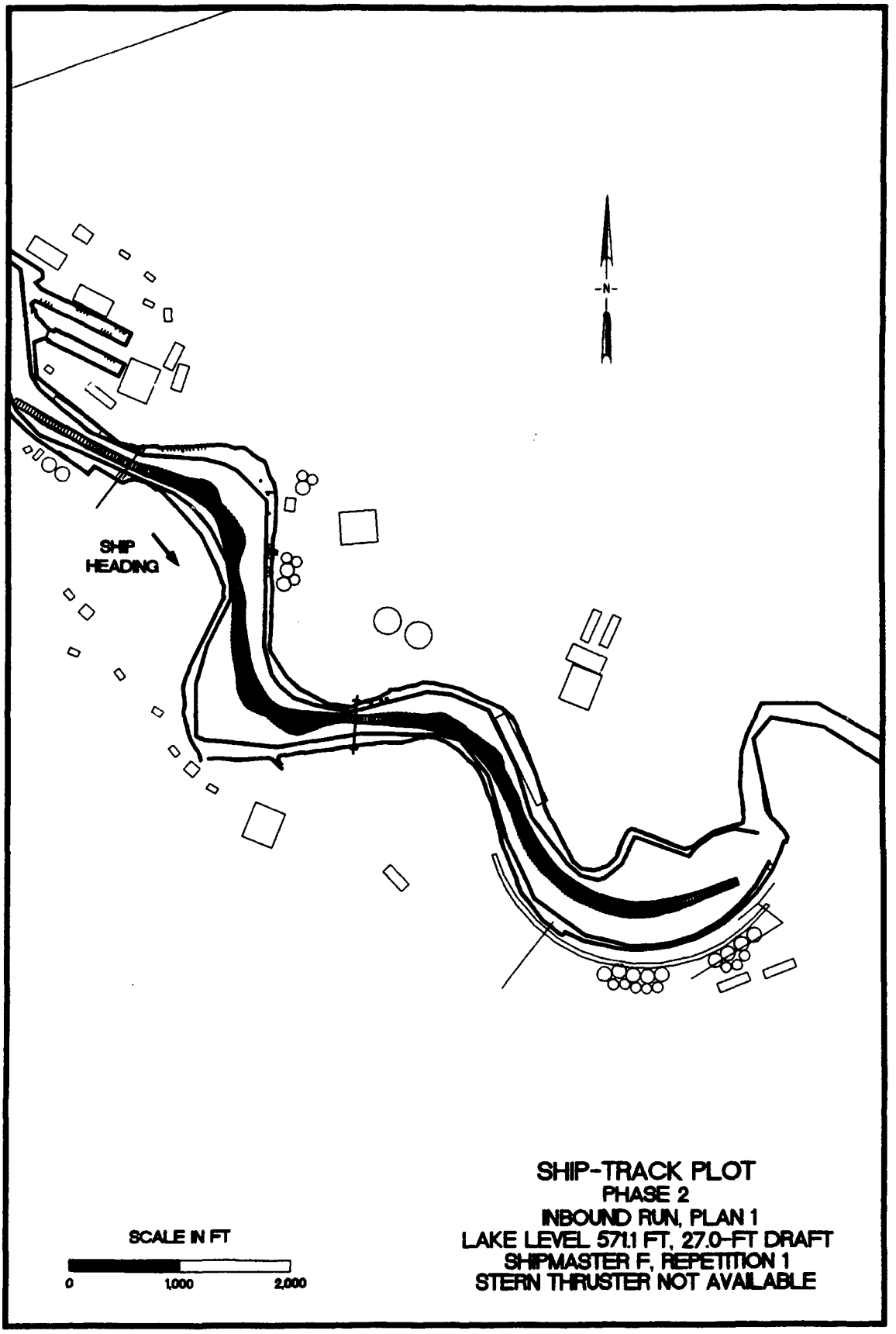
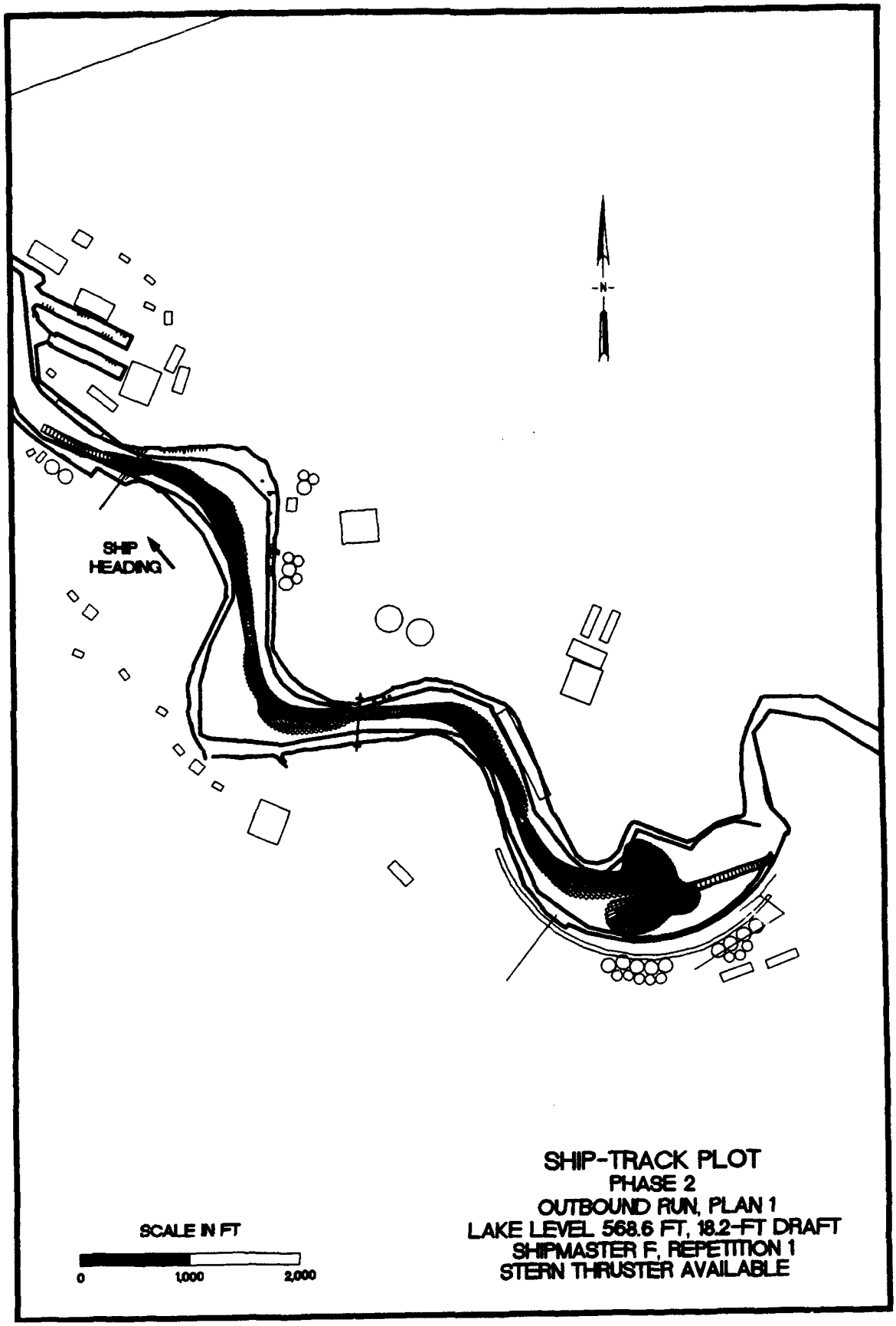
2,000
SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 1
LAKE LEVEL 568.6 FT, 25.5-FT DRAFT
SHIPMASTER F, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B86



SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 1
LAKE LEVEL 571.1 FT, 27.0-FT DRAFT
SHIPMASTER F, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B87


-N-
SHIP
HEADING
SCALE IN FT
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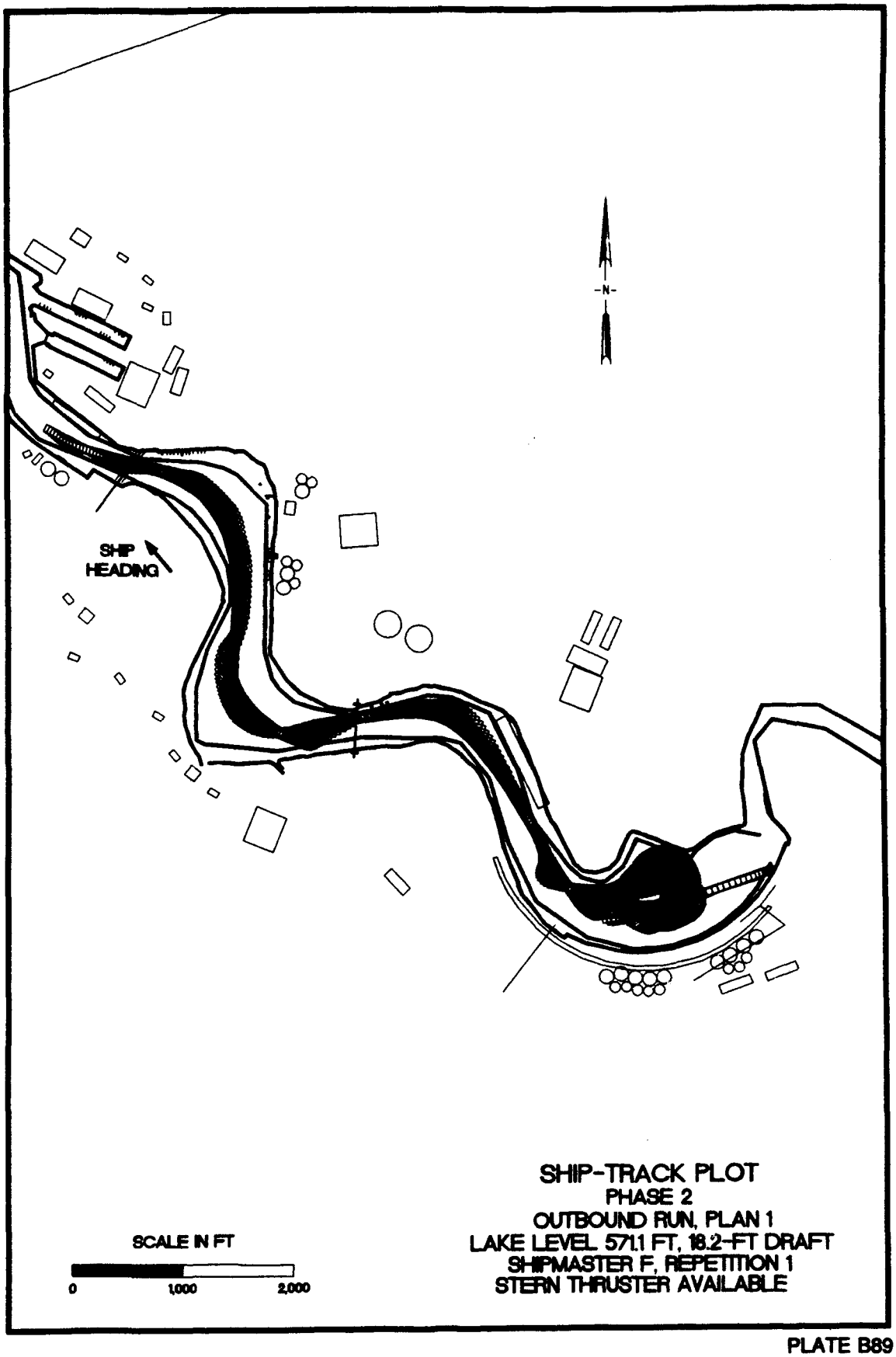
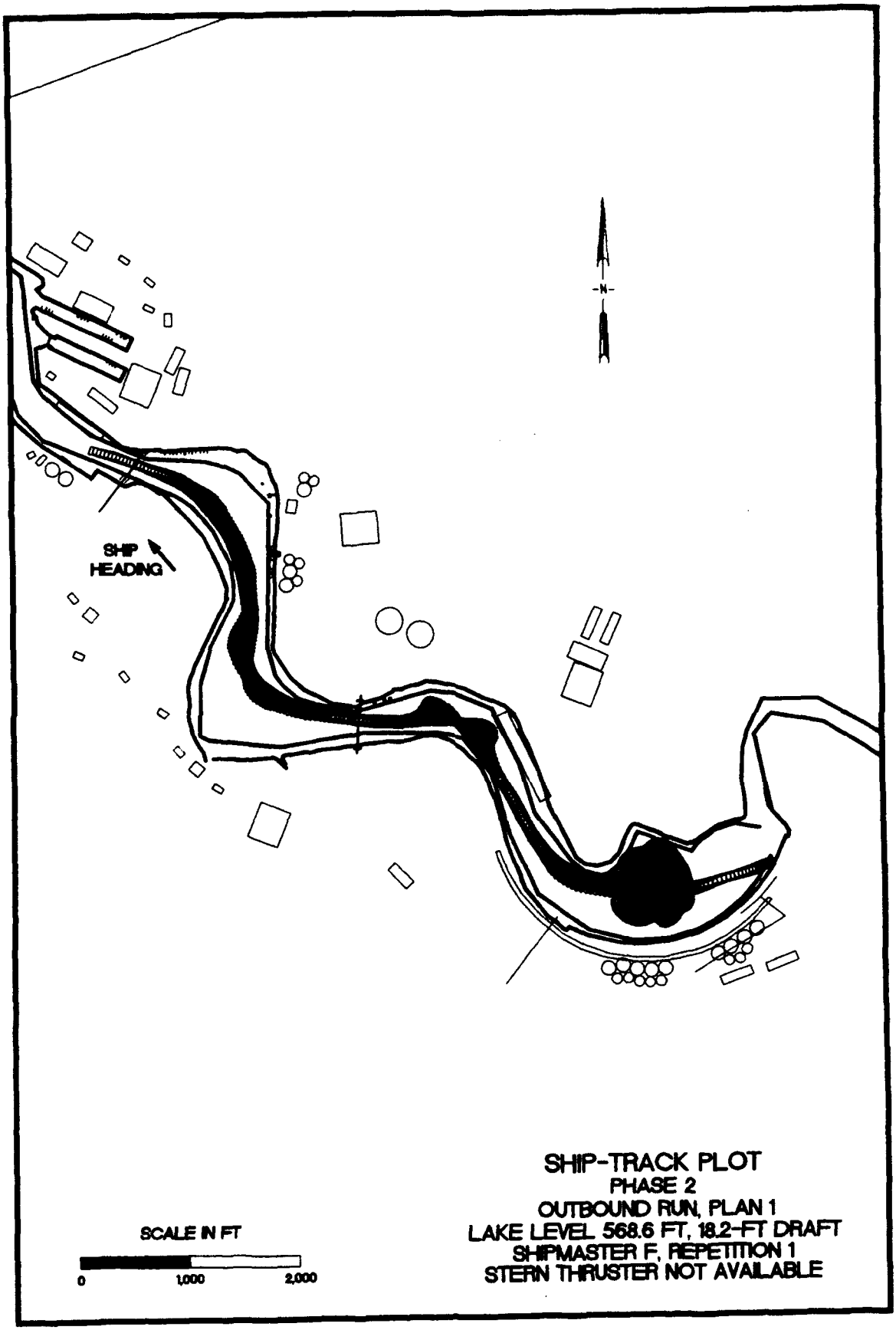
2,000
SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, PLAN 1
LAKE LEVEL 568.6 FT, 18.2-FT DRAFT
SHIPMASTER F, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B88



SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, PLAN 1
LAKE LEVEL 571.1 FT, 18.2-FT DRAFT
SHIPMASTER F, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B89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SHIP
HEADING
SCALE IN FT
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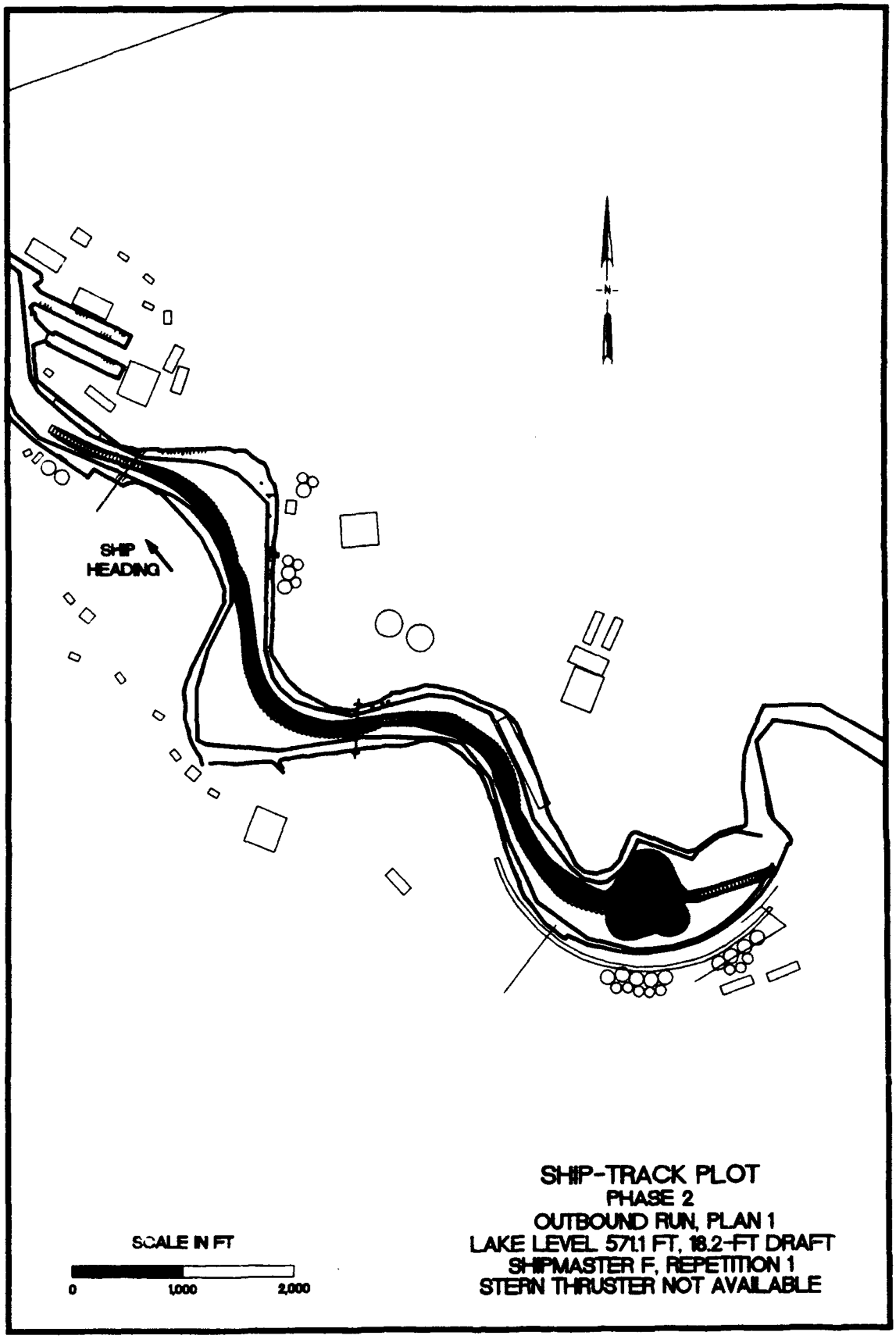
1,000
2,000
SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, PLAN 1
LAKE LEVEL 568.6 FT, 18.2-FT DRAFT
SHIPMASTER F, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B90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HEADING
SCALE IN FT
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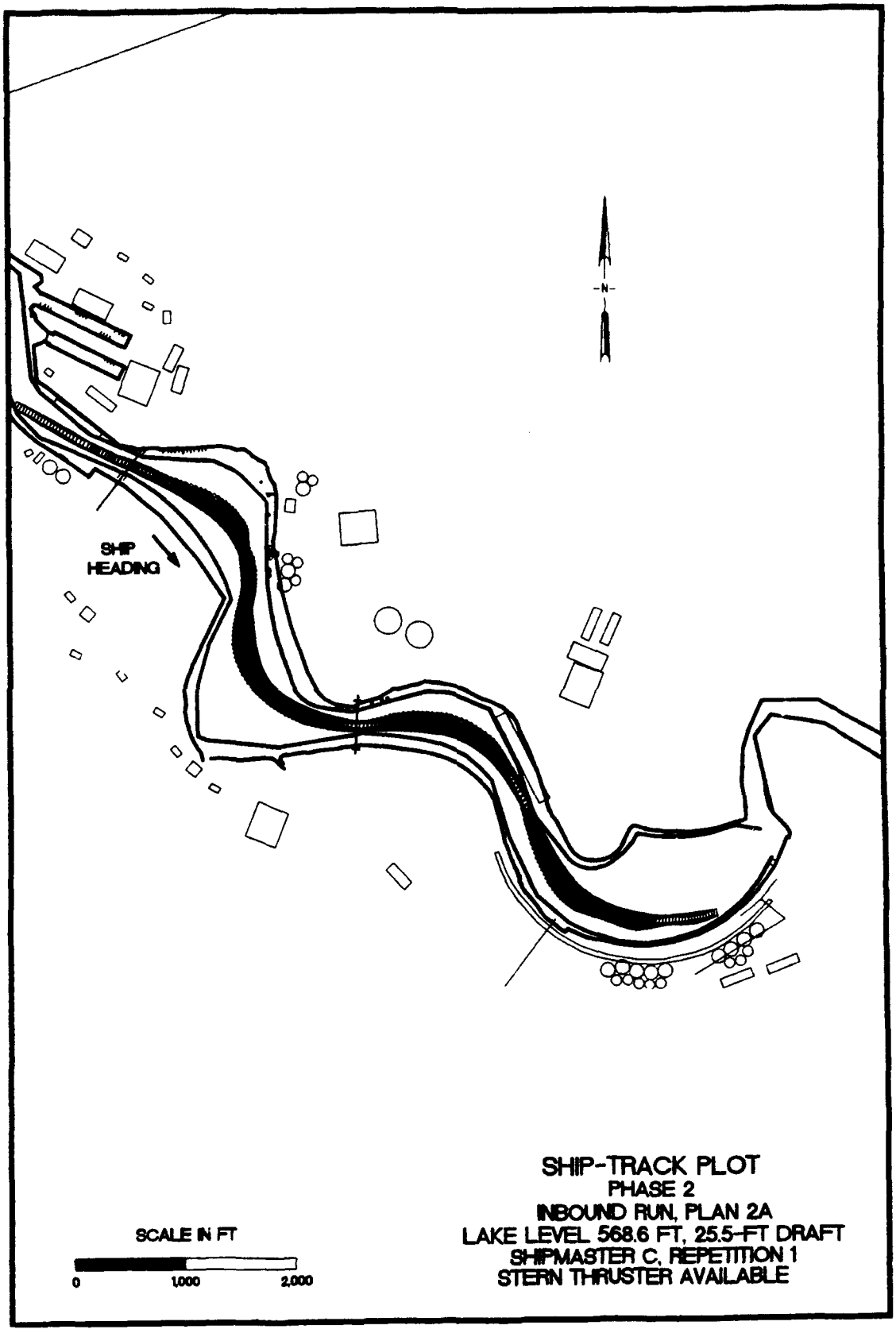
1,000
2,000
SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, PLAN 1
LAKE LEVEL 571.1 FT, 18.2-FT DRAFT
SHIPMASTER F, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B91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HEADING
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SCALE IN FT
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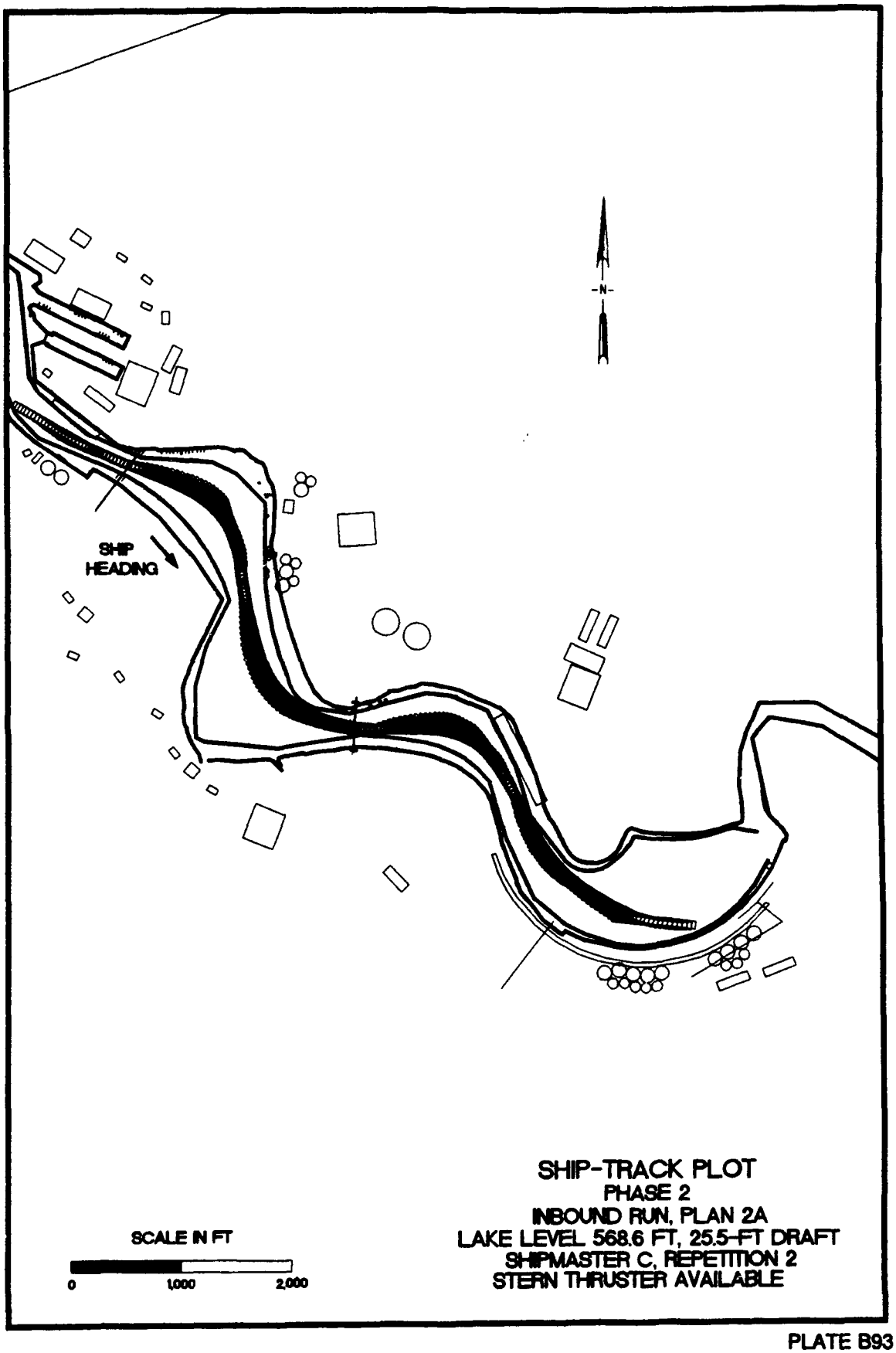
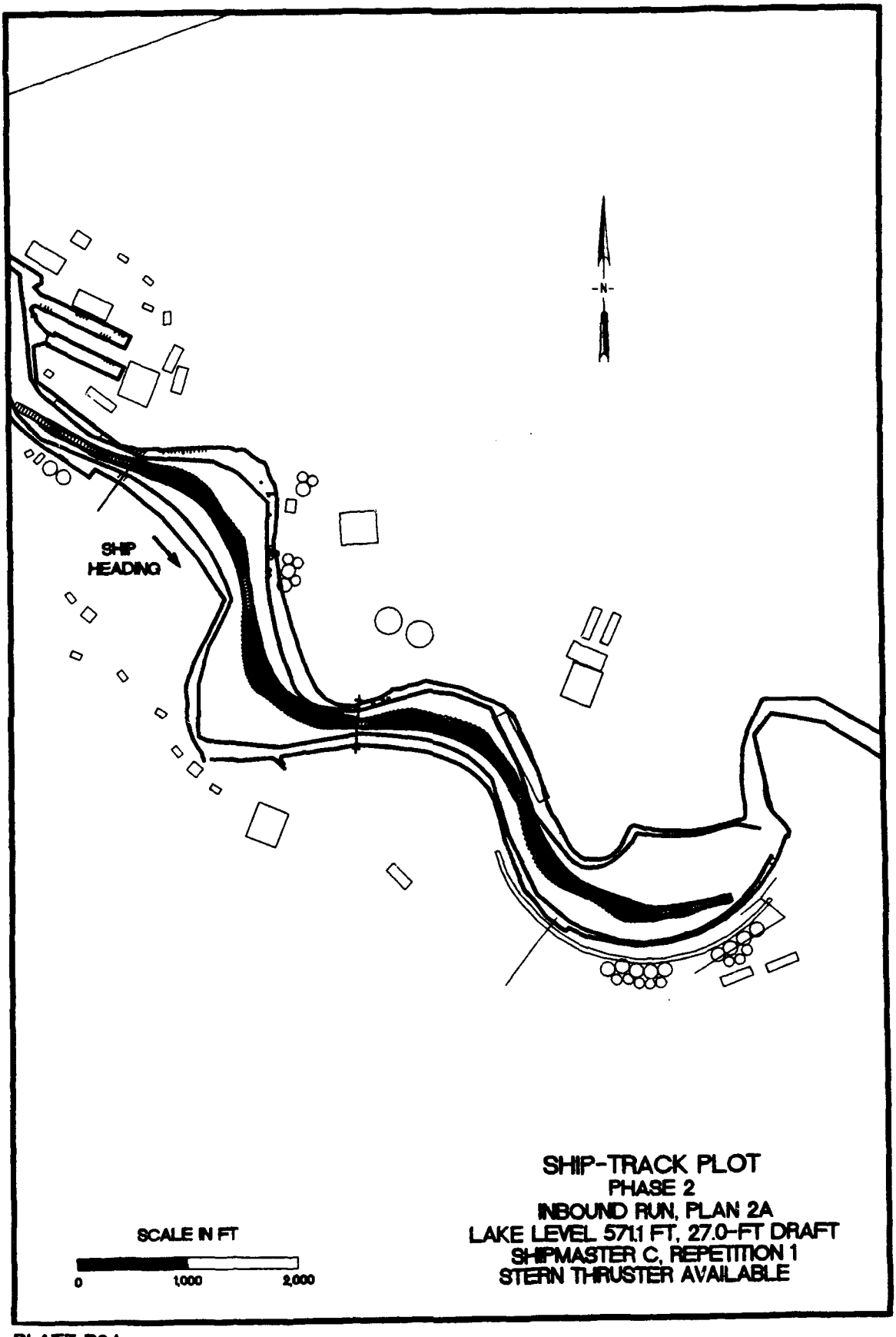
1,000
2,000
SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 2A
LAKE LEVEL 568.6 FT, 25.5-FT DRAFT
SHIPMASTER C, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B92



SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 2A
LAKE LEVEL 568.6 FT, 25.5-FT DRAFT
SHIPMASTER C, REPETITION 2
STERN THRUSTER AVAILABLE

PLATE B93


-N-
SHIP
HEADING
SCALE IN FT
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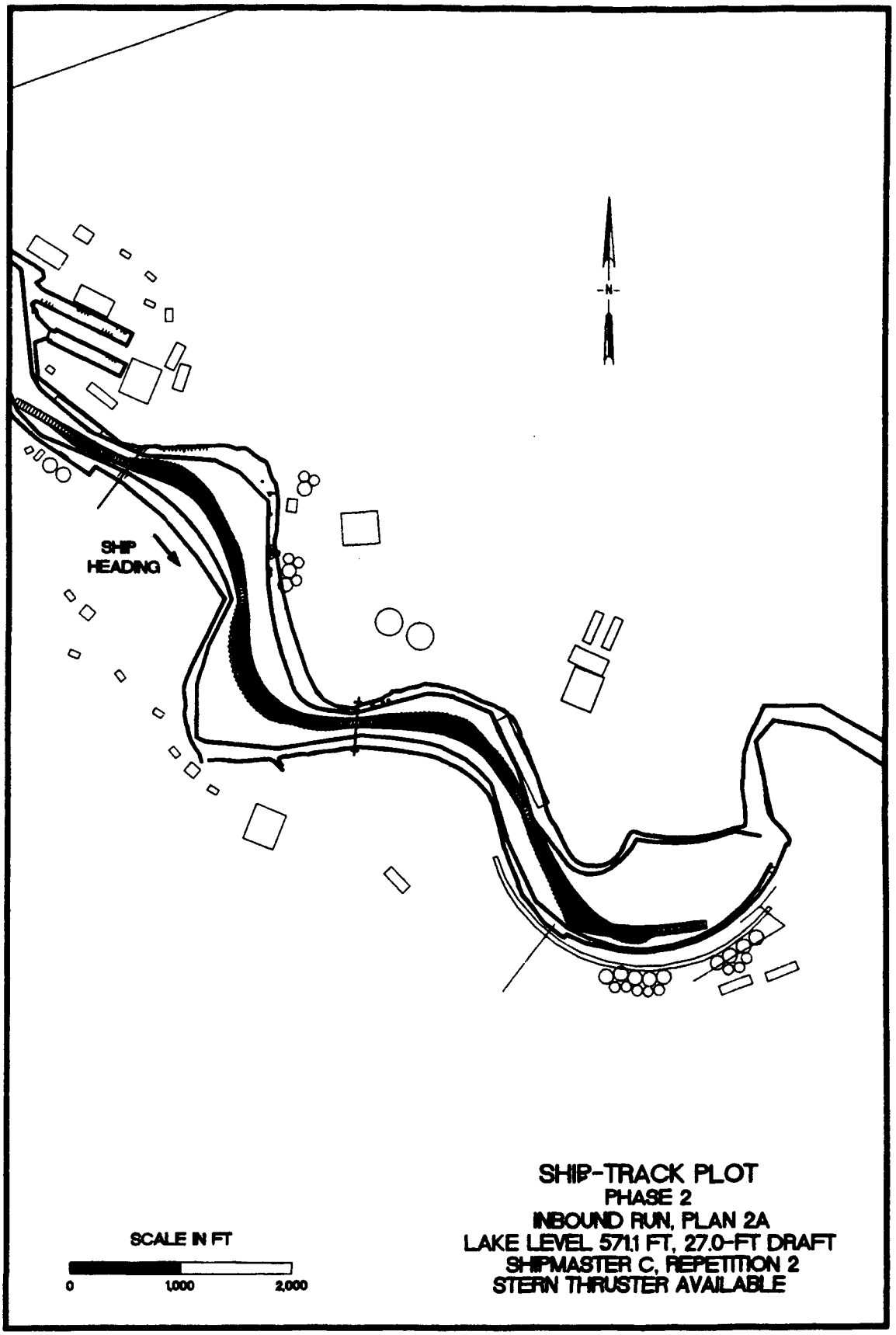
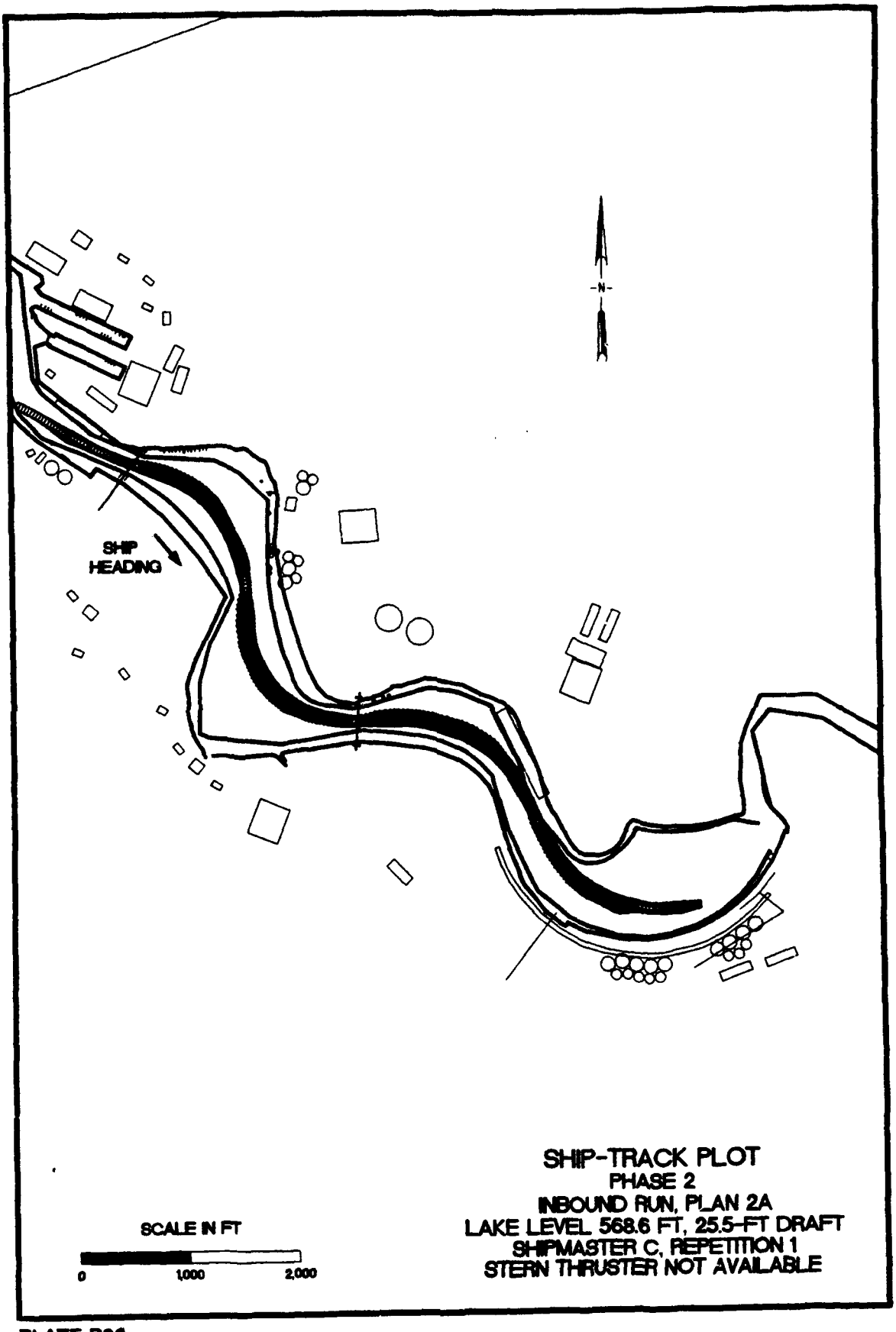
1,000
2,000
SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 2A
LAKE LEVEL 571.1 FT, 27.0-FT DRAFT
SHIPMASTER C, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B94



SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 2A
LAKE LEVEL 571.1 FT, 27.0-FT DRAFT
SHIPMASTER C, REPETITION 2
STERN THRUSTER AVAILABLE

PLATE B95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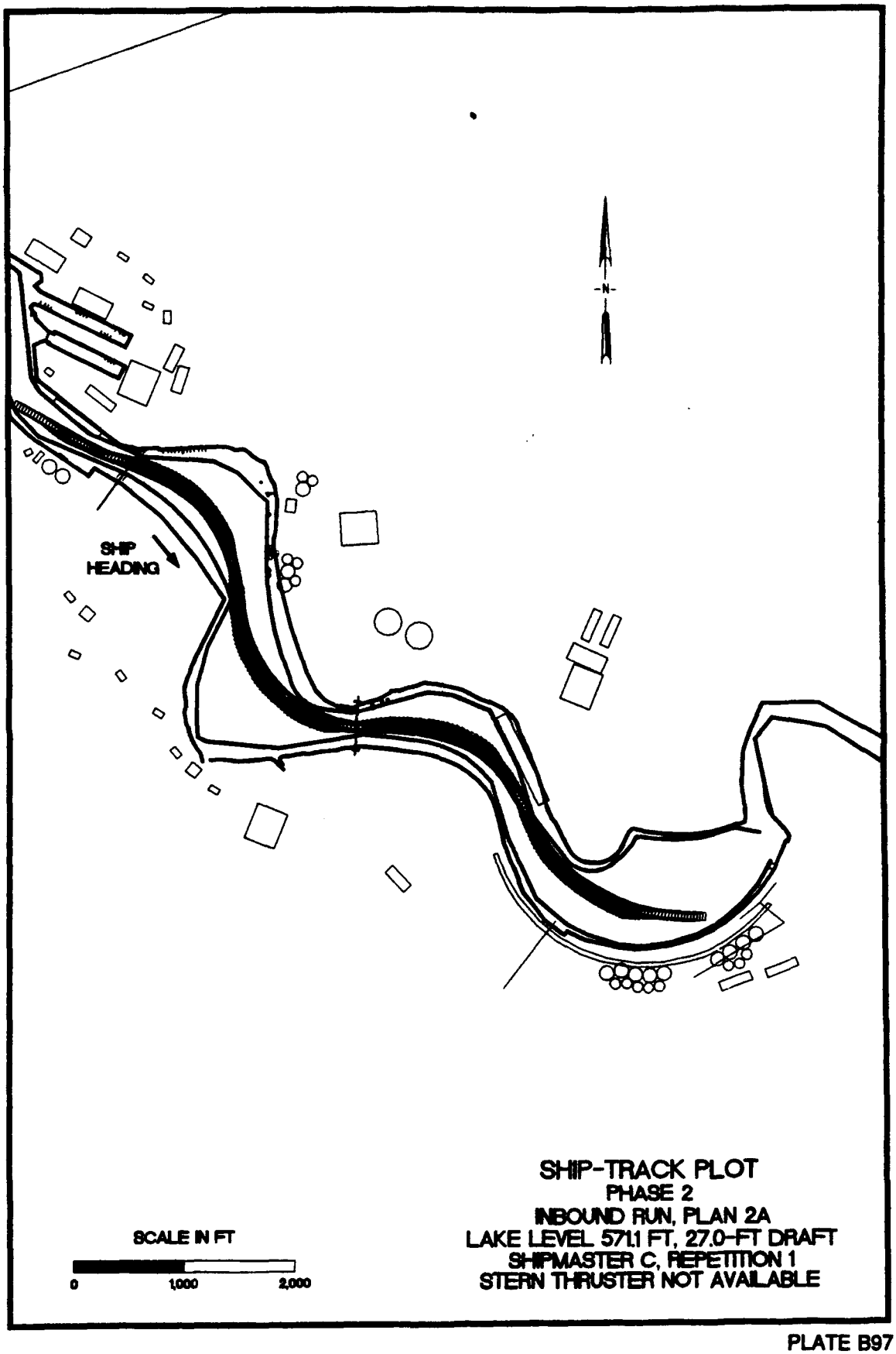
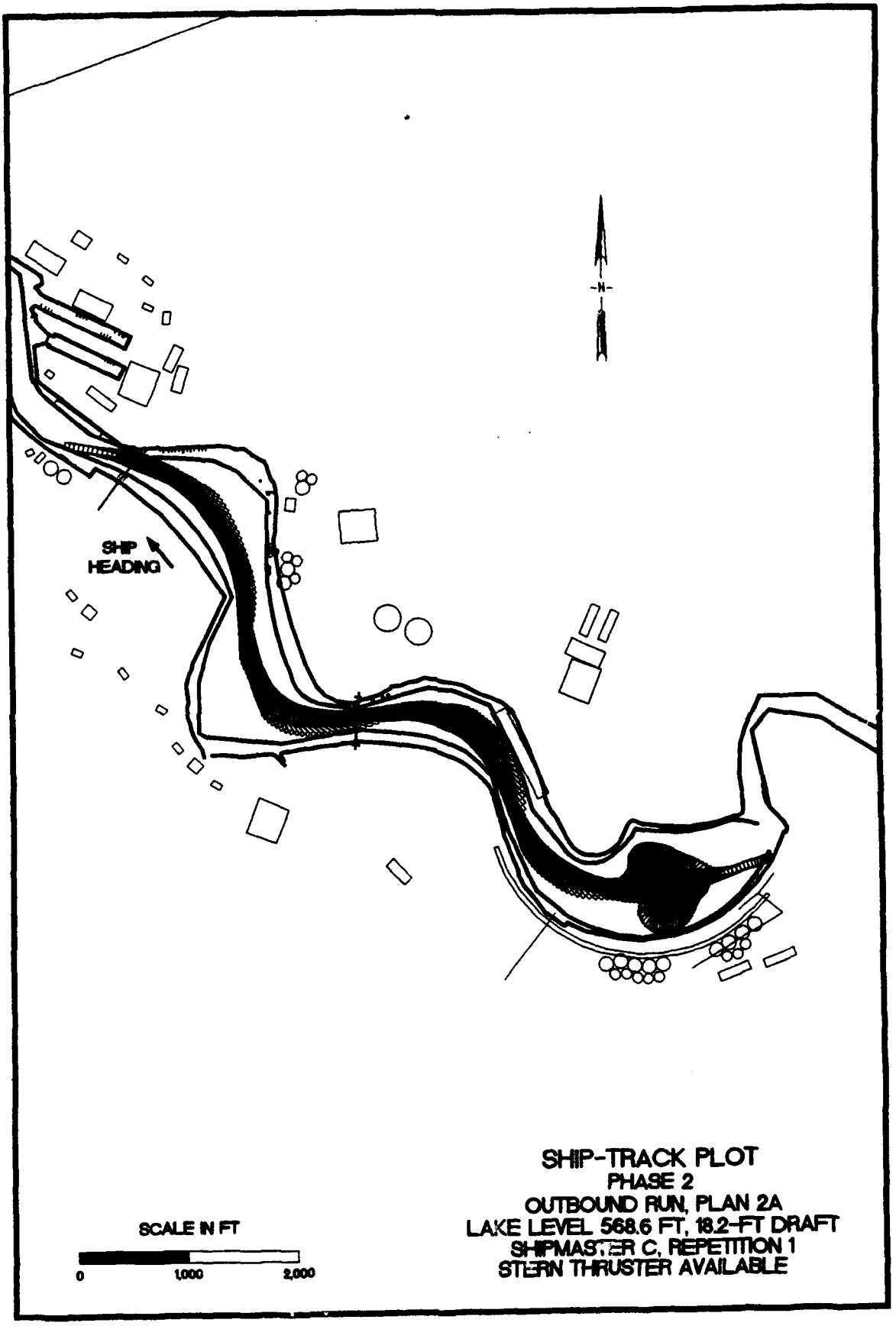
SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 2A
LAKE LEVEL 568.6 FT, 25.5-FT DRAFT
SHIPMASTER C, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B96



SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 2A
LAKE LEVEL 571.1 FT, 27.0-FT DRAFT
SHIPMASTER C, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B97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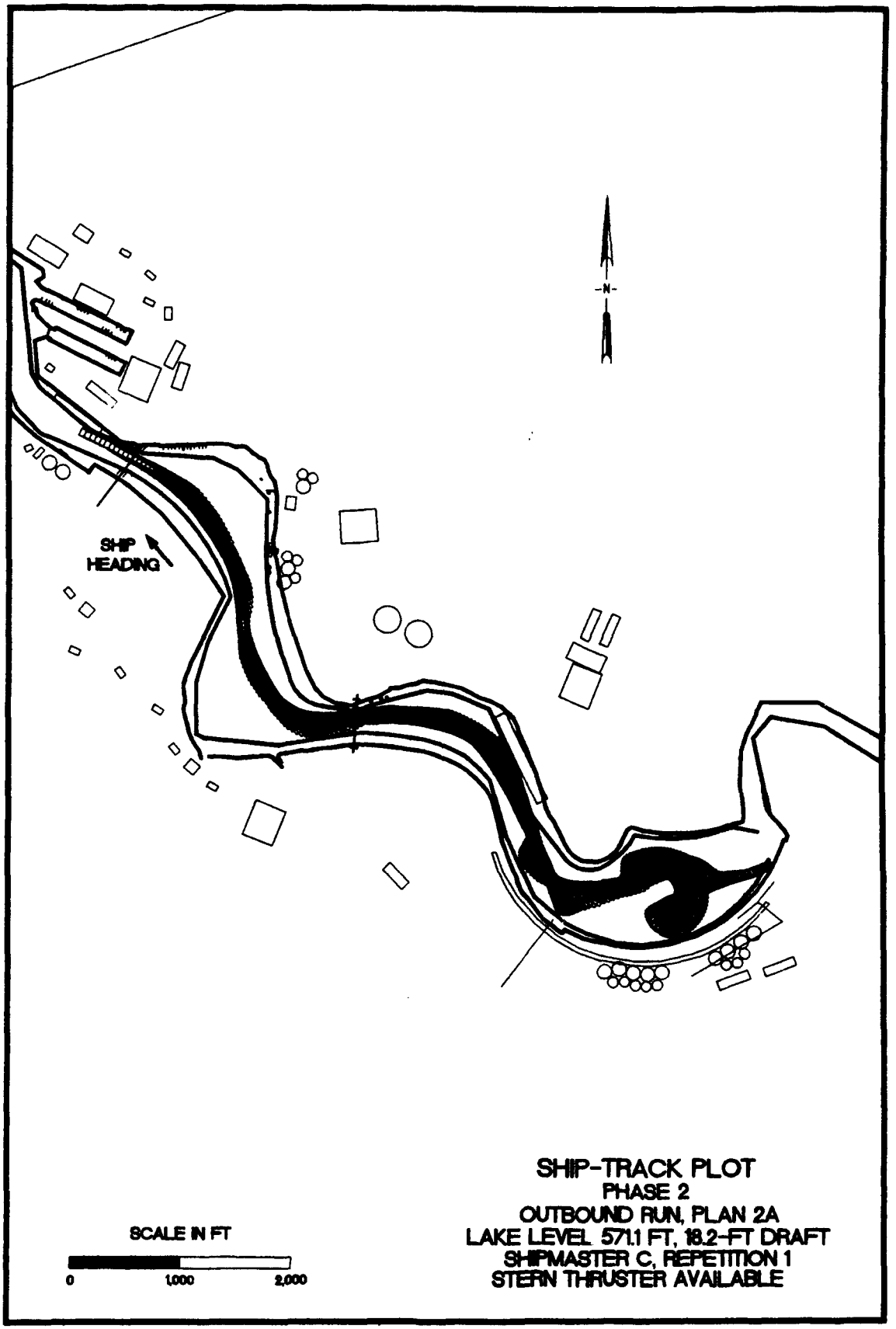
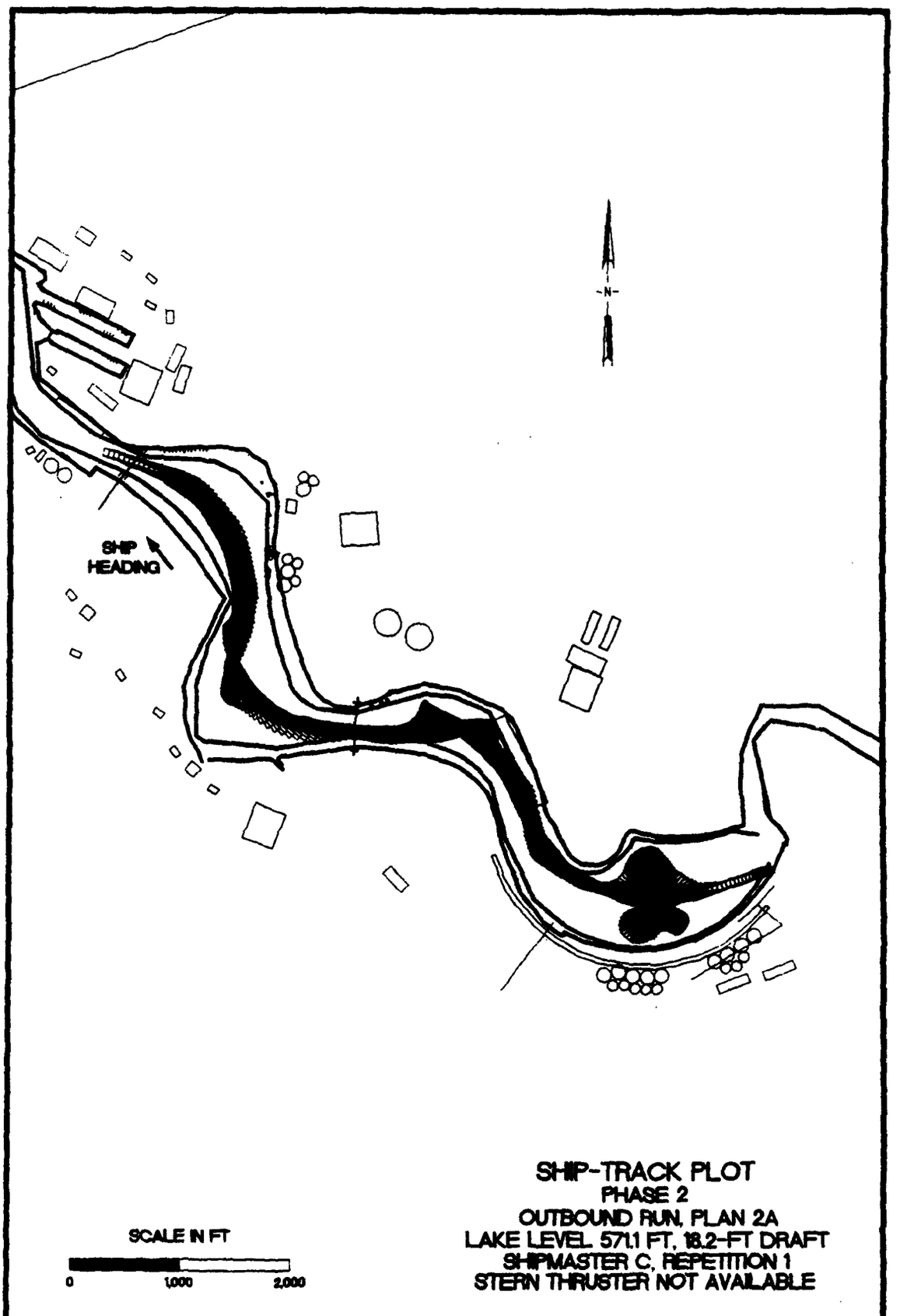
PHASE 2
OUTBOUND RUN, PLAN 2A
LAKE LEVEL 568.6 FT, 18.2-FT DRAFT
SHIPMASTER C, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B98



SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, PLAN 2A
LAKE LEVEL 571.1 FT, 18.2-FT DRAFT
SHIPMASTER C, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B99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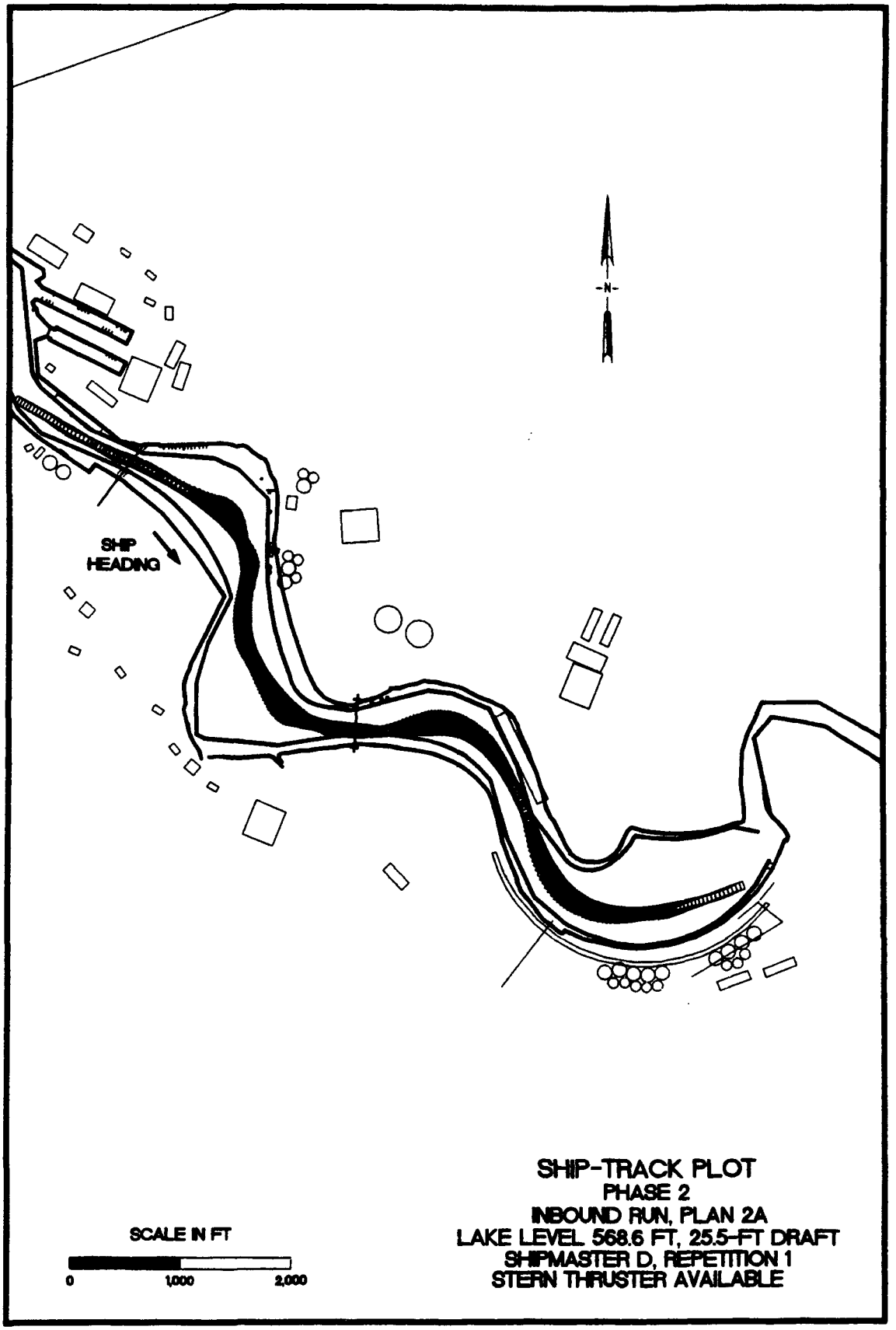
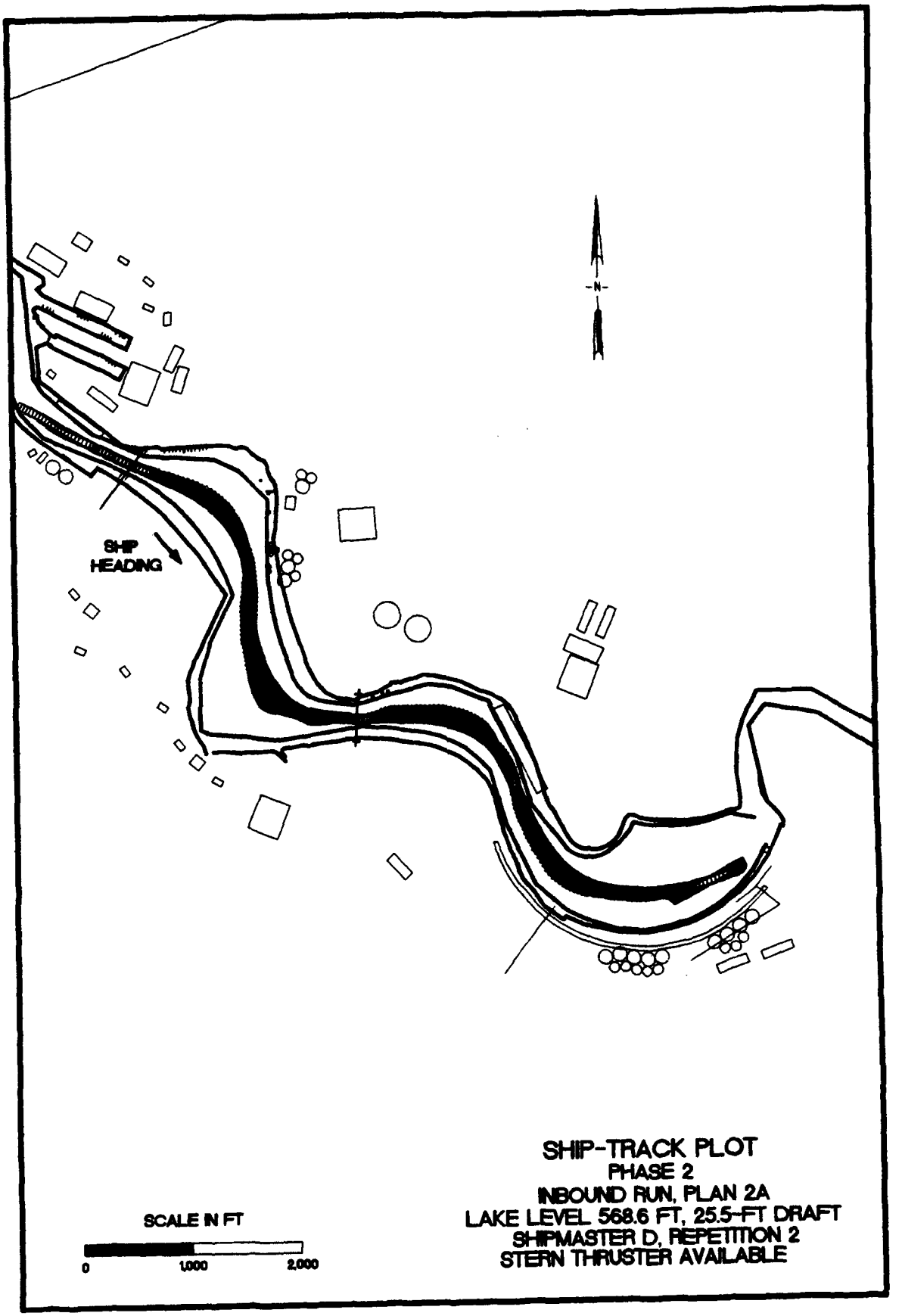
PHASE 2
OUTBOUND RUN, PLAN 2A
LAKE LEVEL 571.1 FT, 18.2-FT DRAFT
SHIPMASTER C, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B100



SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 2A
LAKE LEVEL 568.6 FT, 25.5-FT DRAFT
SHIPMASTER D, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B101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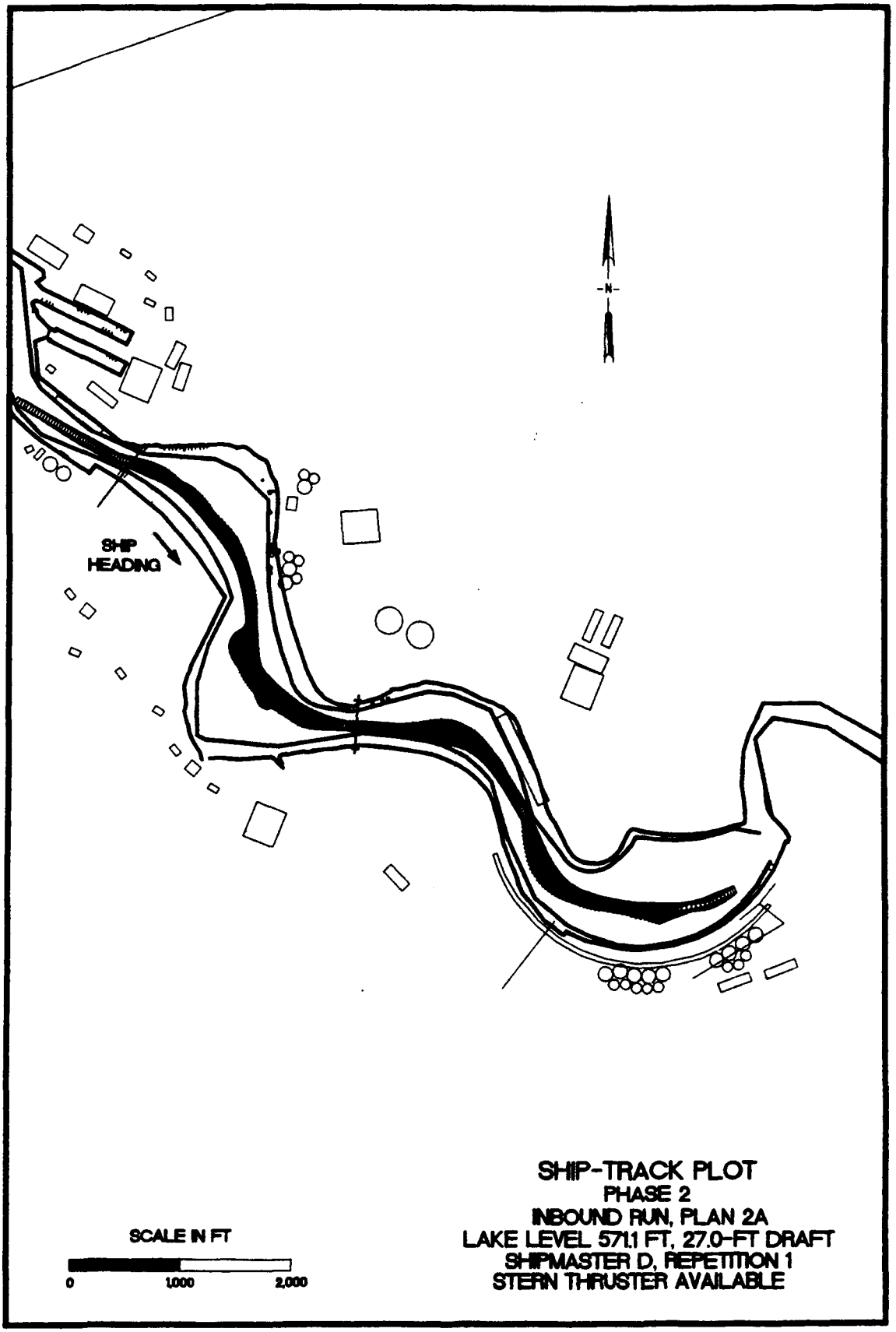
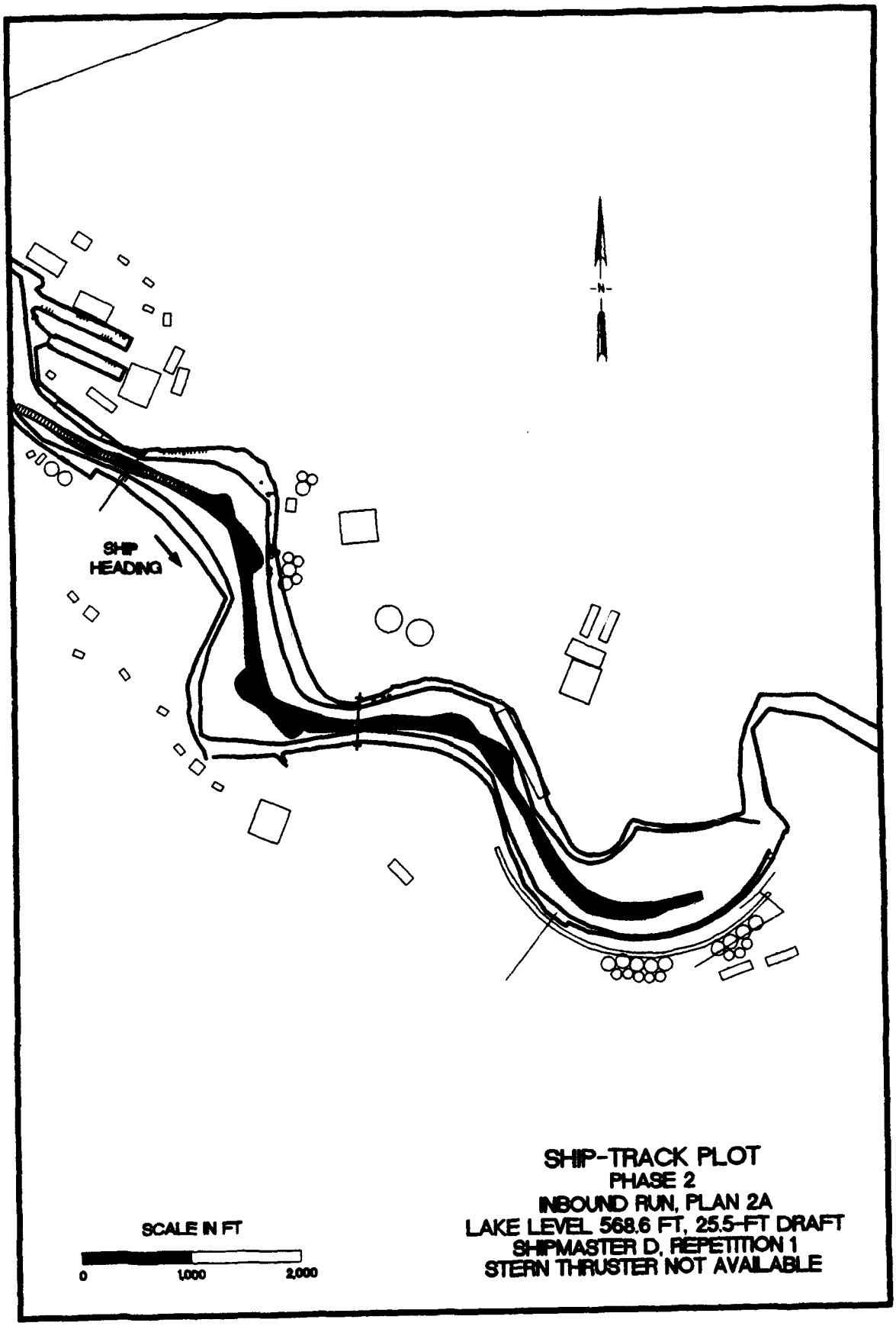
PHASE 2
INBOUND RUN, PLAN 2A
LAKE LEVEL 568.6 FT, 25.5-FT DRAFT
SHIPMASTER D, REPETITION 2
STERN THRUSTER AVAILABLE

PLATE B102



SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 2A
LAKE LEVEL 571.1 FT, 27.0-FT DRAFT
SHIPMASTER D, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B103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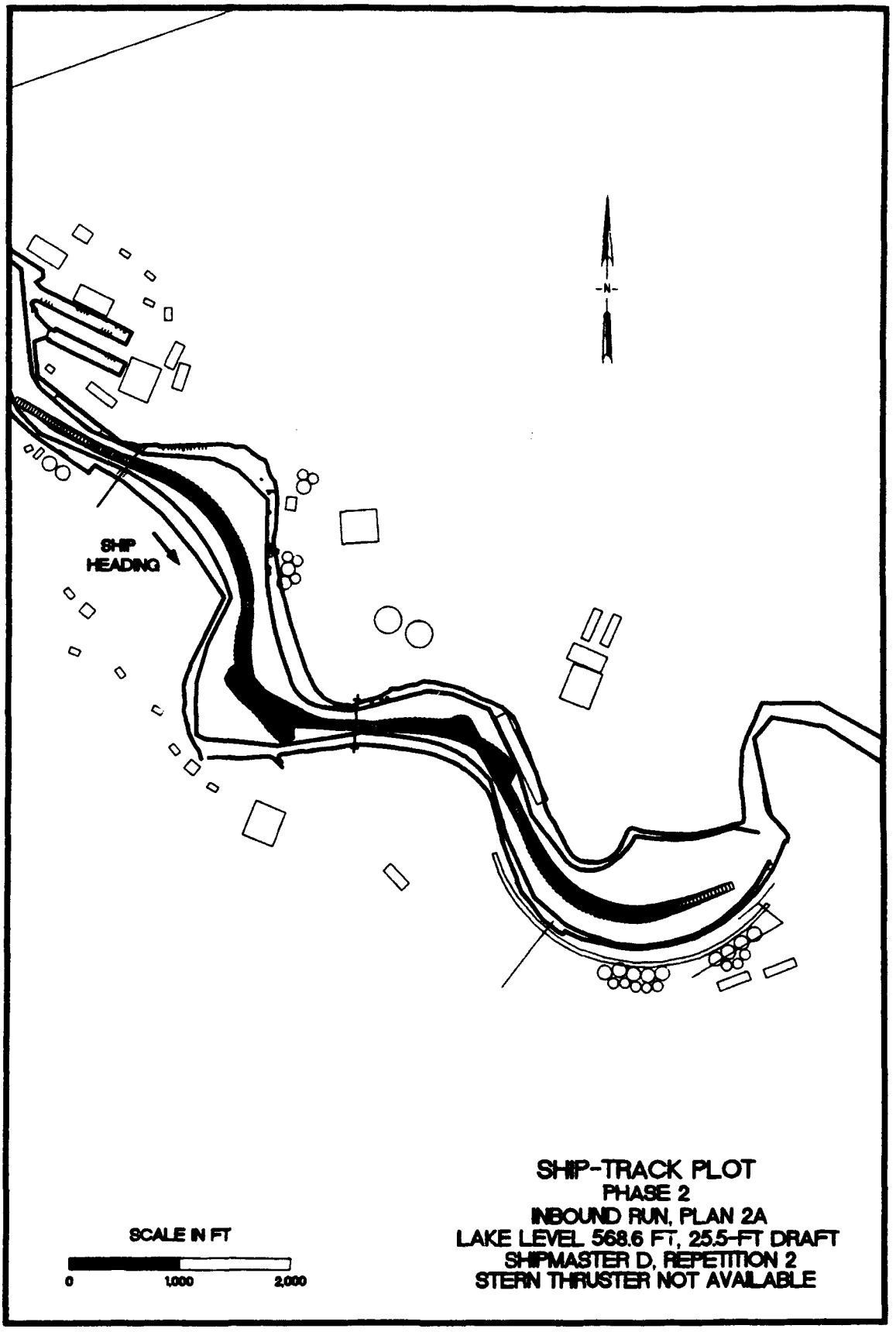
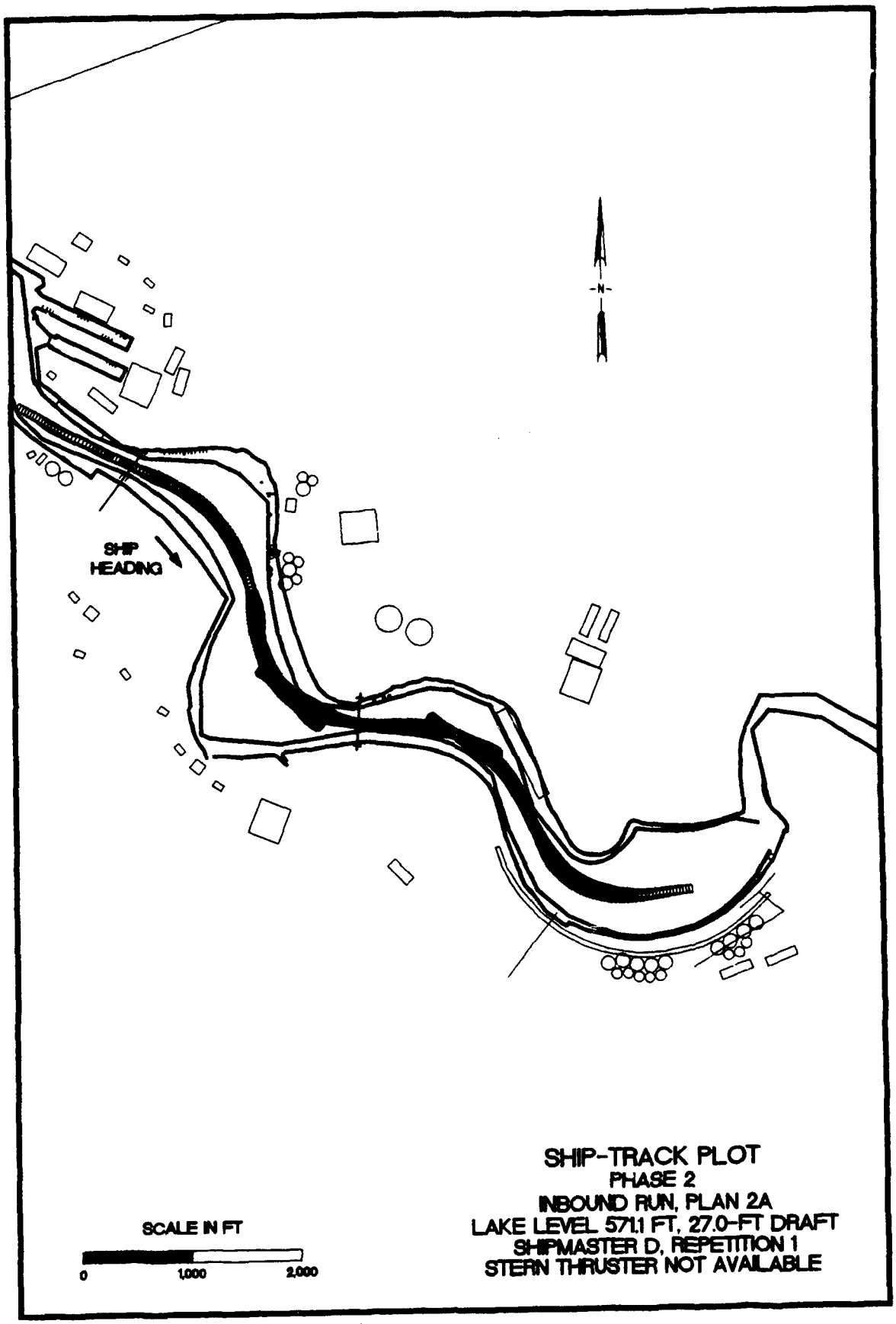
SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 2A
LAKE LEVEL 568.6 FT, 25.5-FT DRAFT
SHIPMASTER D, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B104



SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 2A
LAKE LEVEL 568.6 FT, 25.5-FT DRAFT
SHIPMASTER D, REPETITION 2
STERN THRUSTER NOT AVAILABLE

PLATE B105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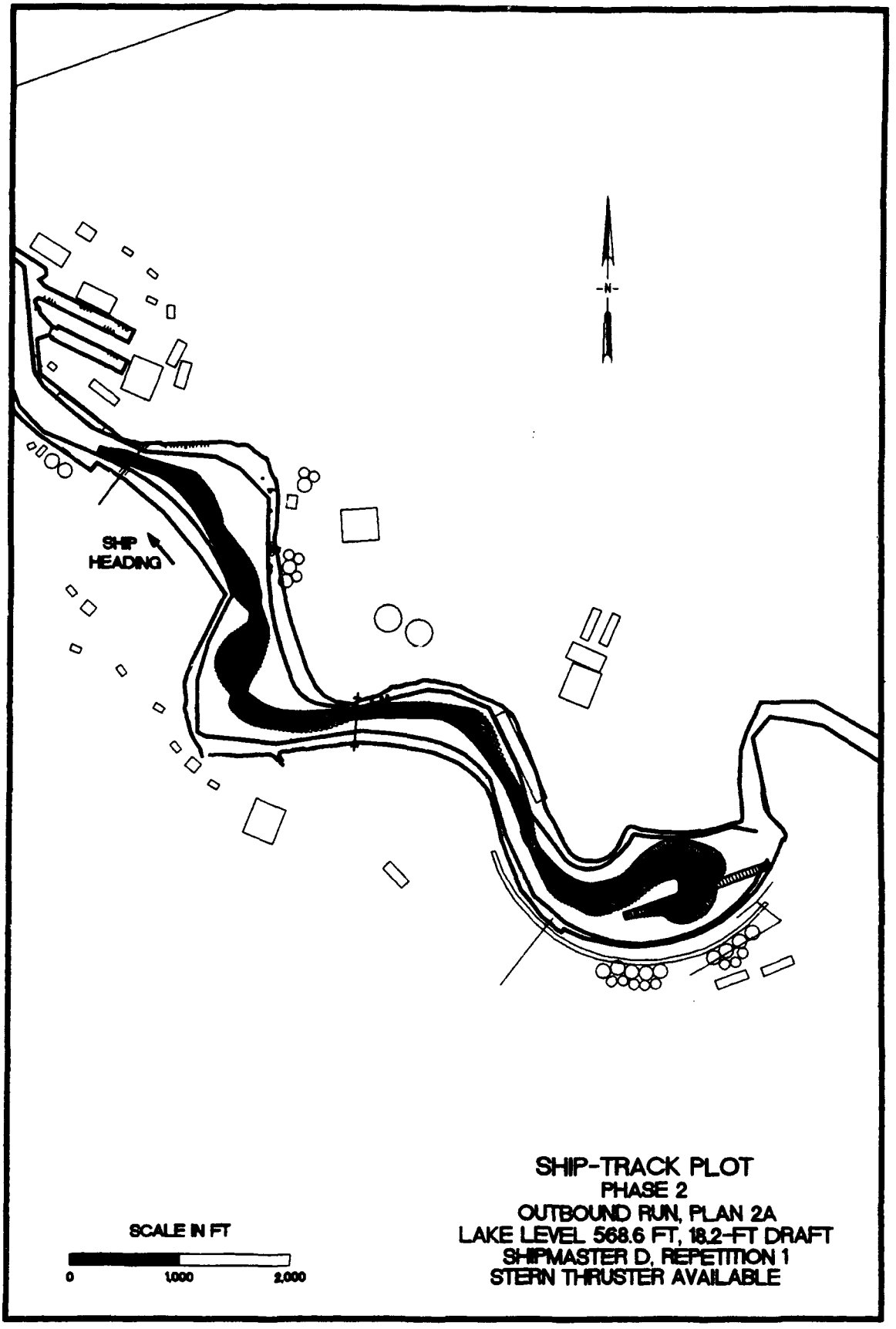
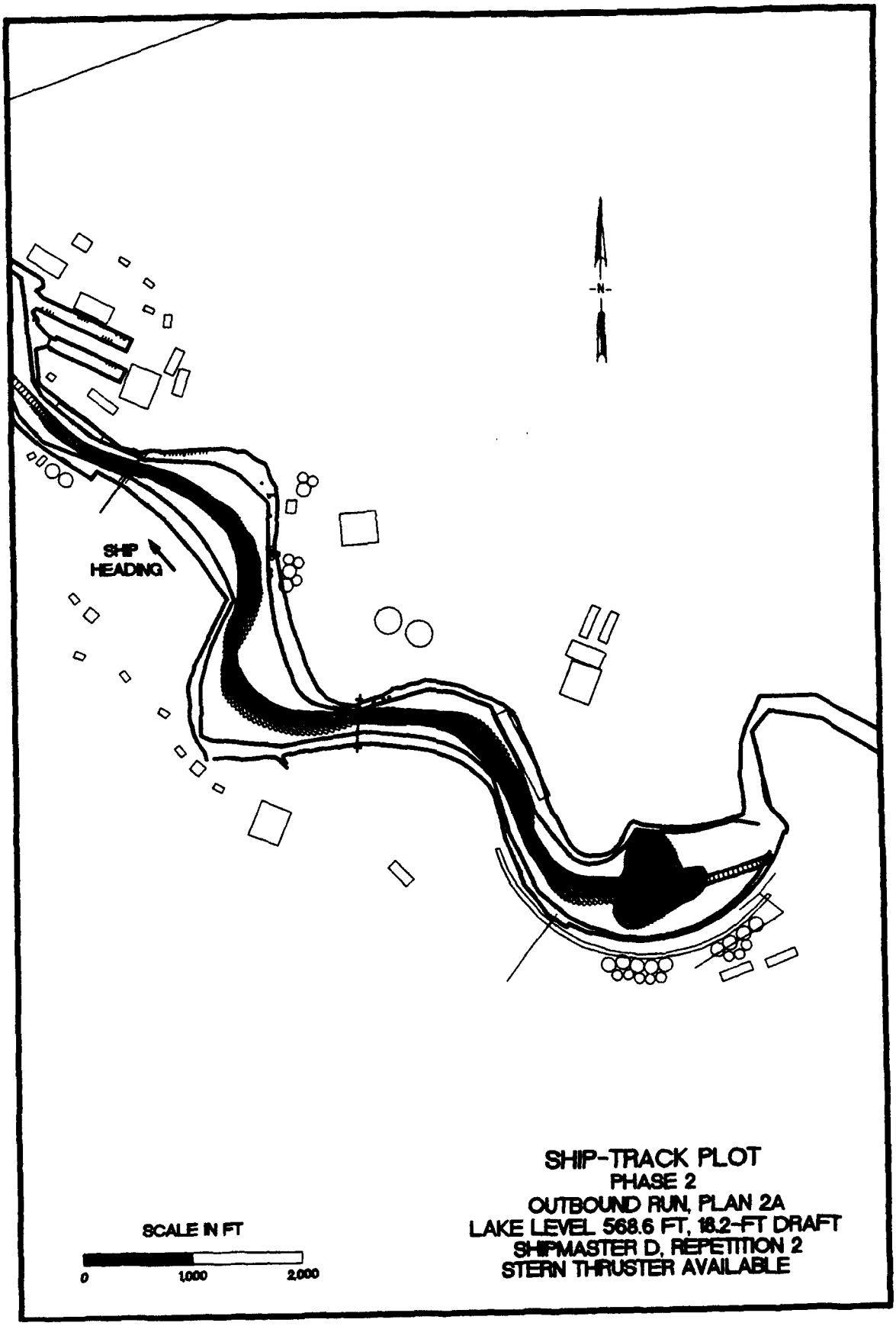
SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 2A
LAKE LEVEL 571.1 FT, 27.0-FT DRAFT
SHIPMASTER D, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B106



SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, PLAN 2A
LAKE LEVEL 568.6 FT, 18.2-FT DRAFT
SHIPMASTER D, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B107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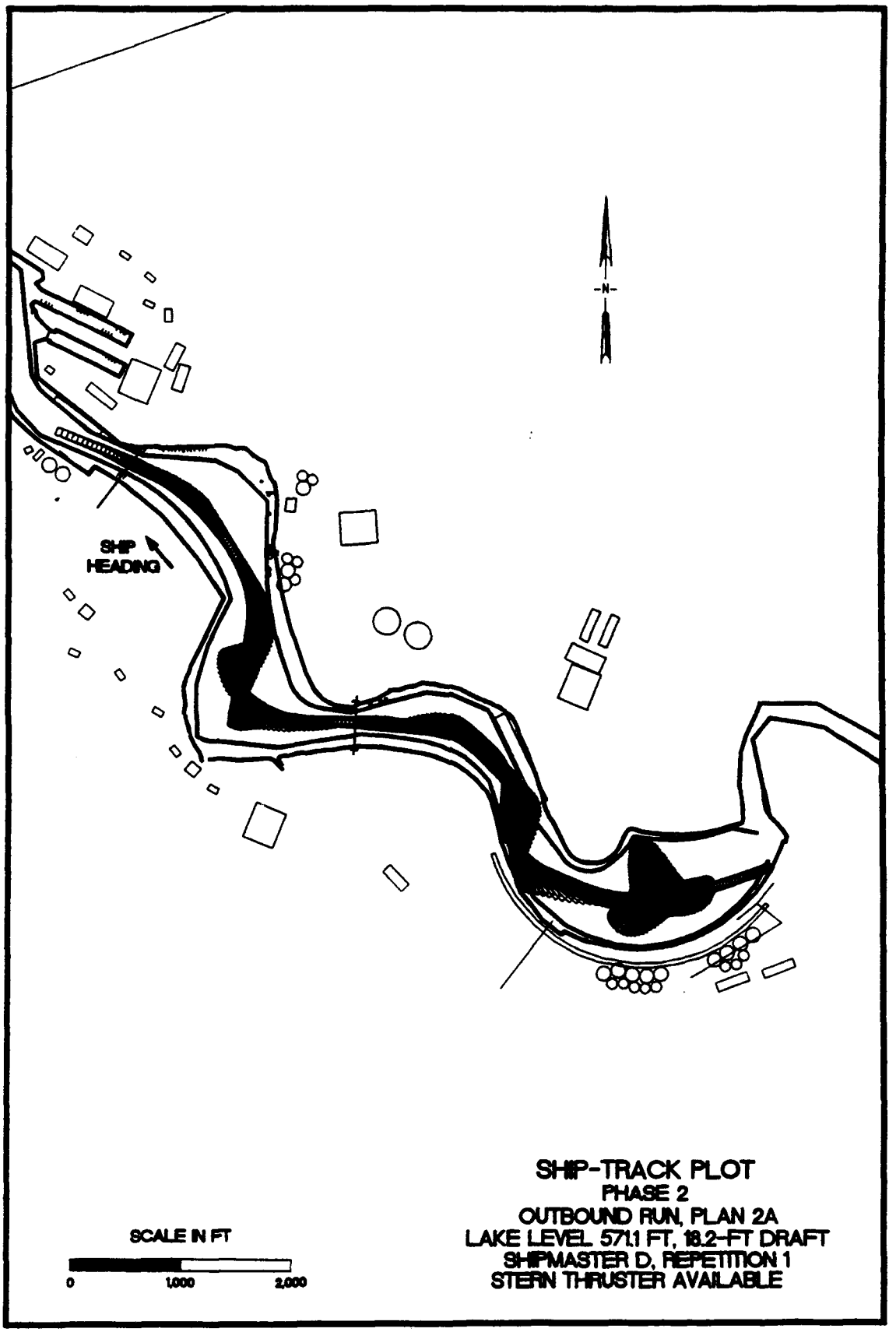
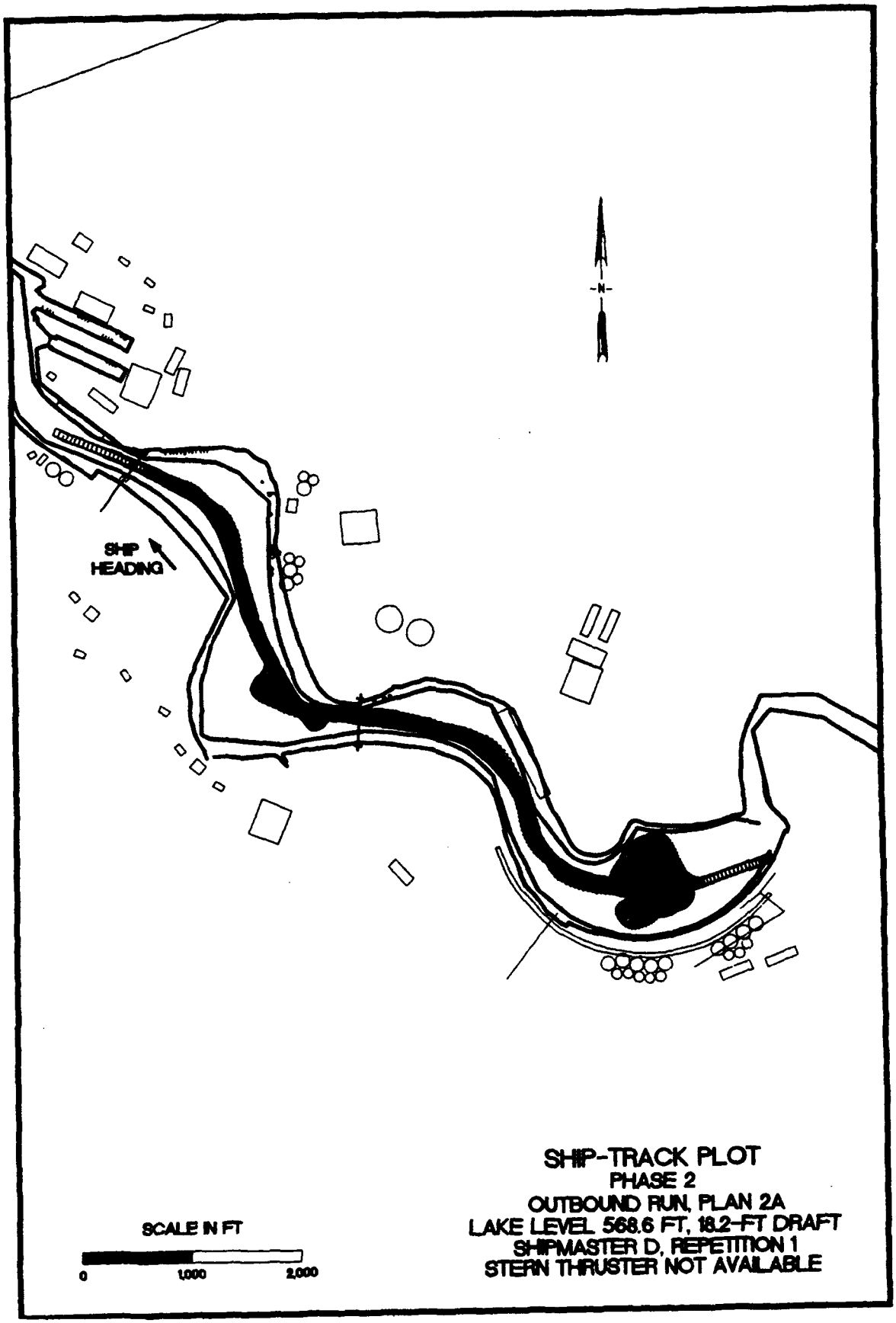
SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, PLAN 2A
LAKE LEVEL 568.6 FT, 18.2-FT DRAFT
SHIPMASTER D, REPETITION 2
STERN THRUSTER AVAILABLE

PLATE B108



SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, PLAN 2A
LAKE LEVEL 571.1 FT, 18.2-FT DRAFT
SHIPMASTER D, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B109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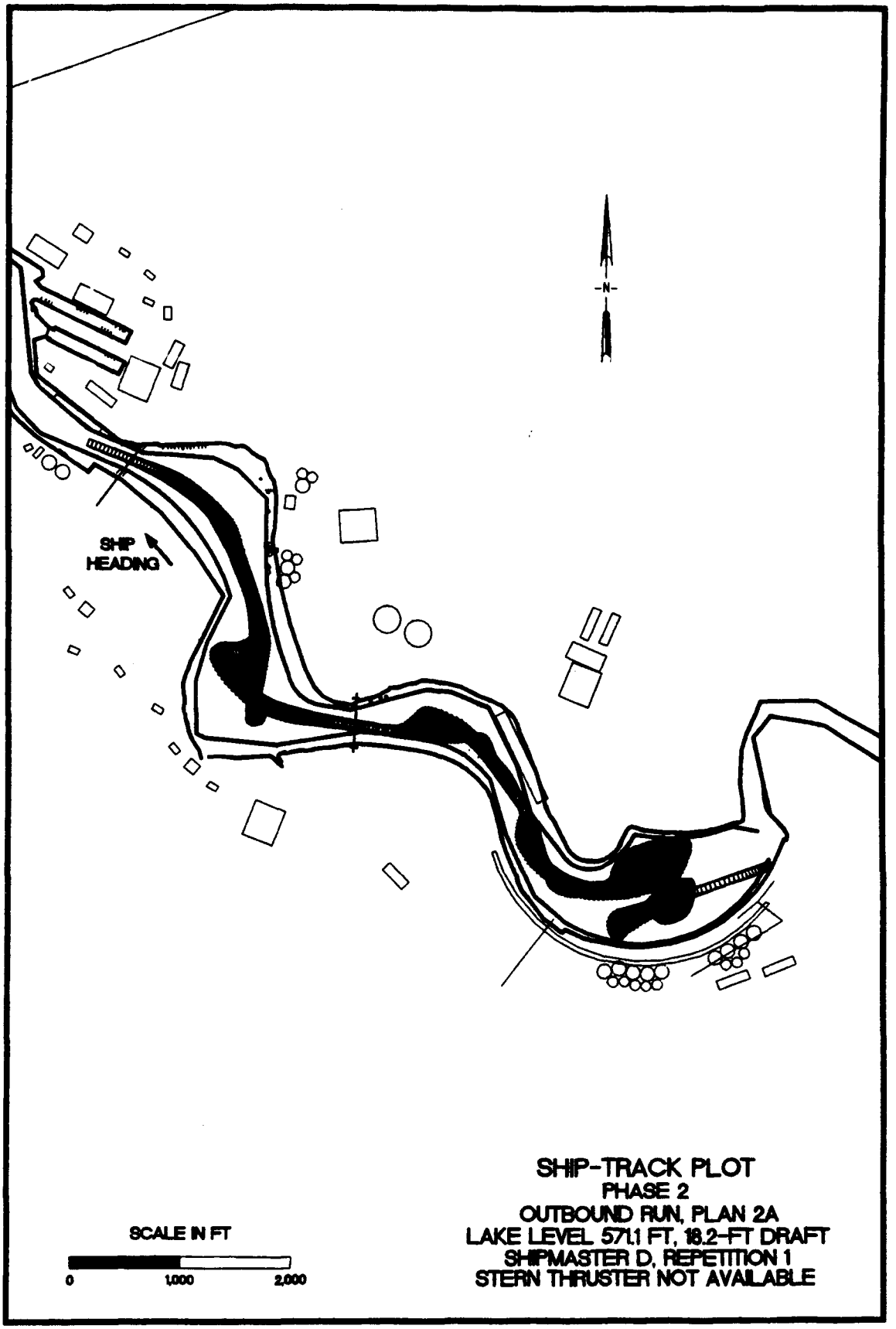
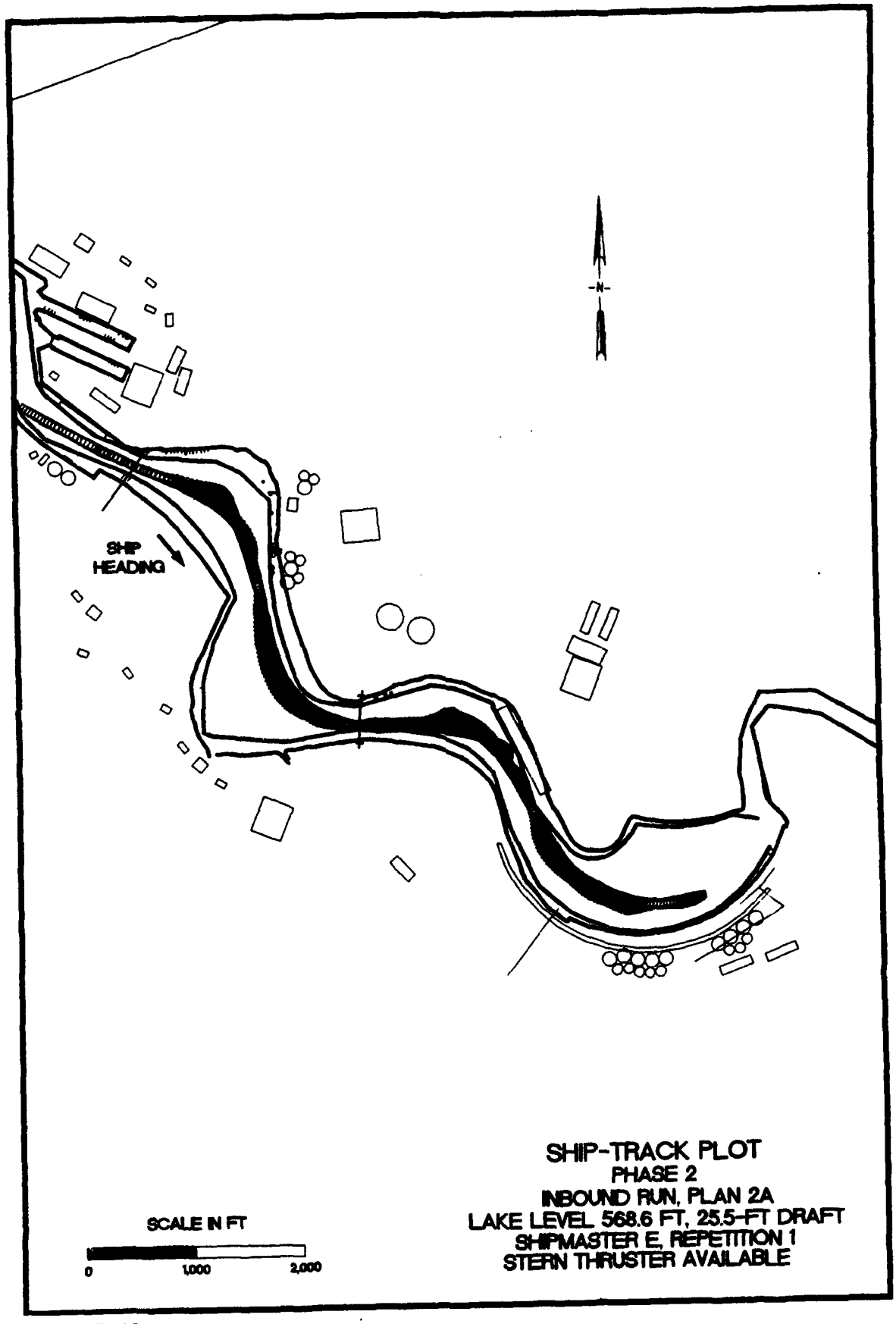
SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, PLAN 2A
LAKE LEVEL 568.6 FT, 18.2-FT DRAFT
SHIPMASTER D, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B110



SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, PLAN 2A
LAKE LEVEL 571.1 FT, 18.2-FT DRAFT
SHIPMASTER D, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B111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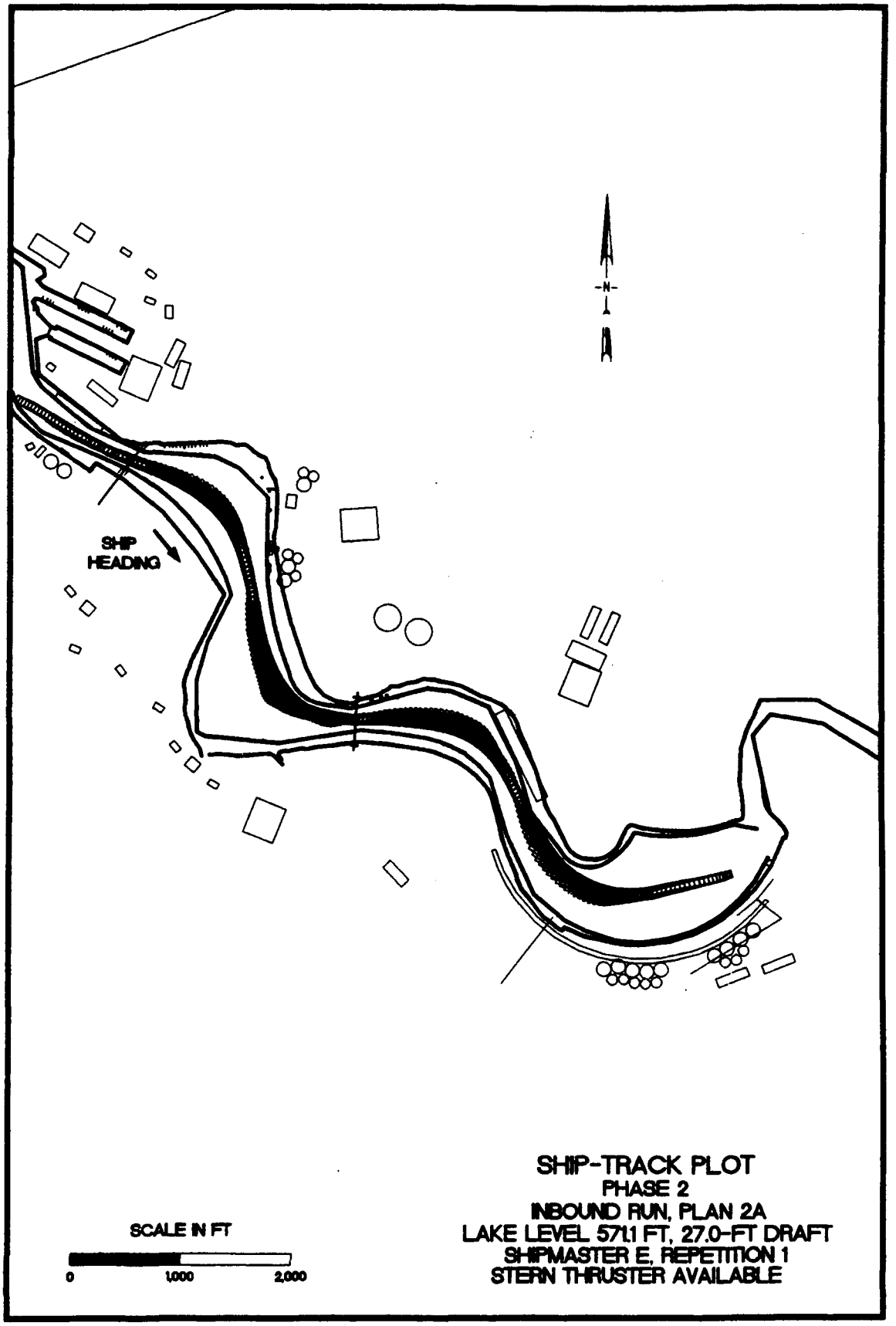
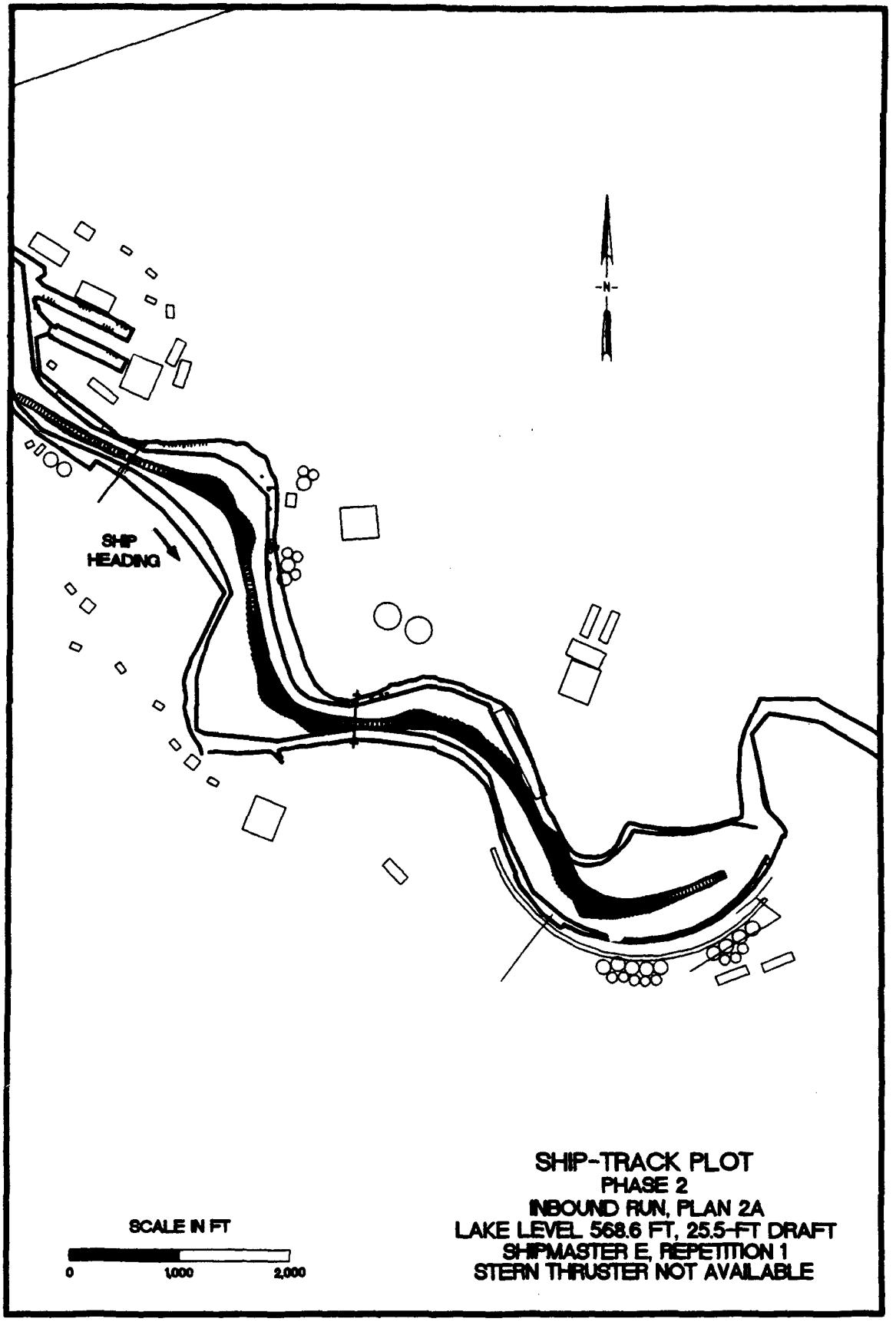
SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 2A
LAKE LEVEL 568.6 FT, 25.5-FT DRAFT
SHIPMASTER E, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B112



SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 2A
LAKE LEVEL 571.1 FT, 27.0-FT DRAFT
SHIPMASTER E, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B113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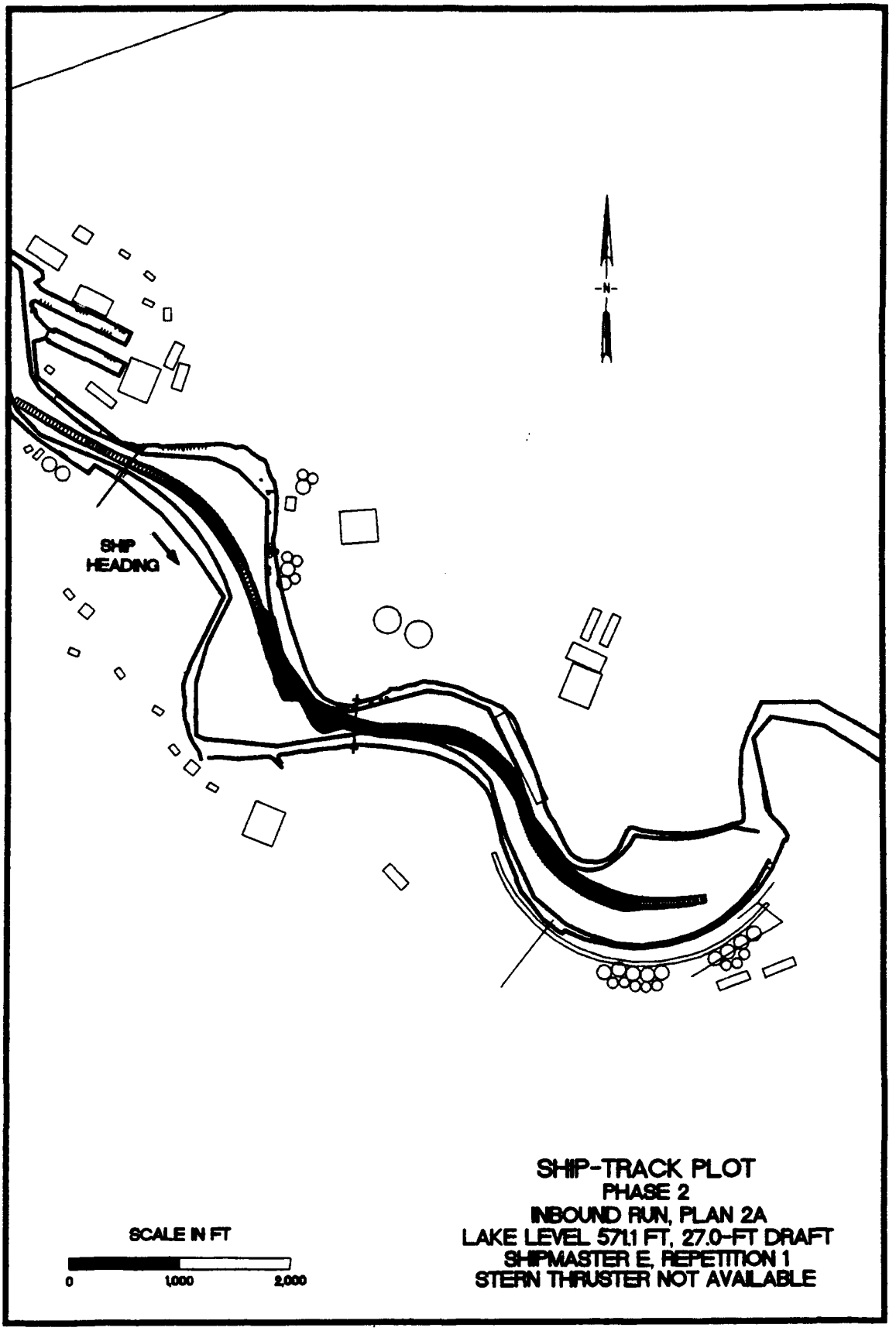
SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 2A
LAKE LEVEL 568.6 FT, 25.5-FT DRAFT
SHIPMASTER E, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B114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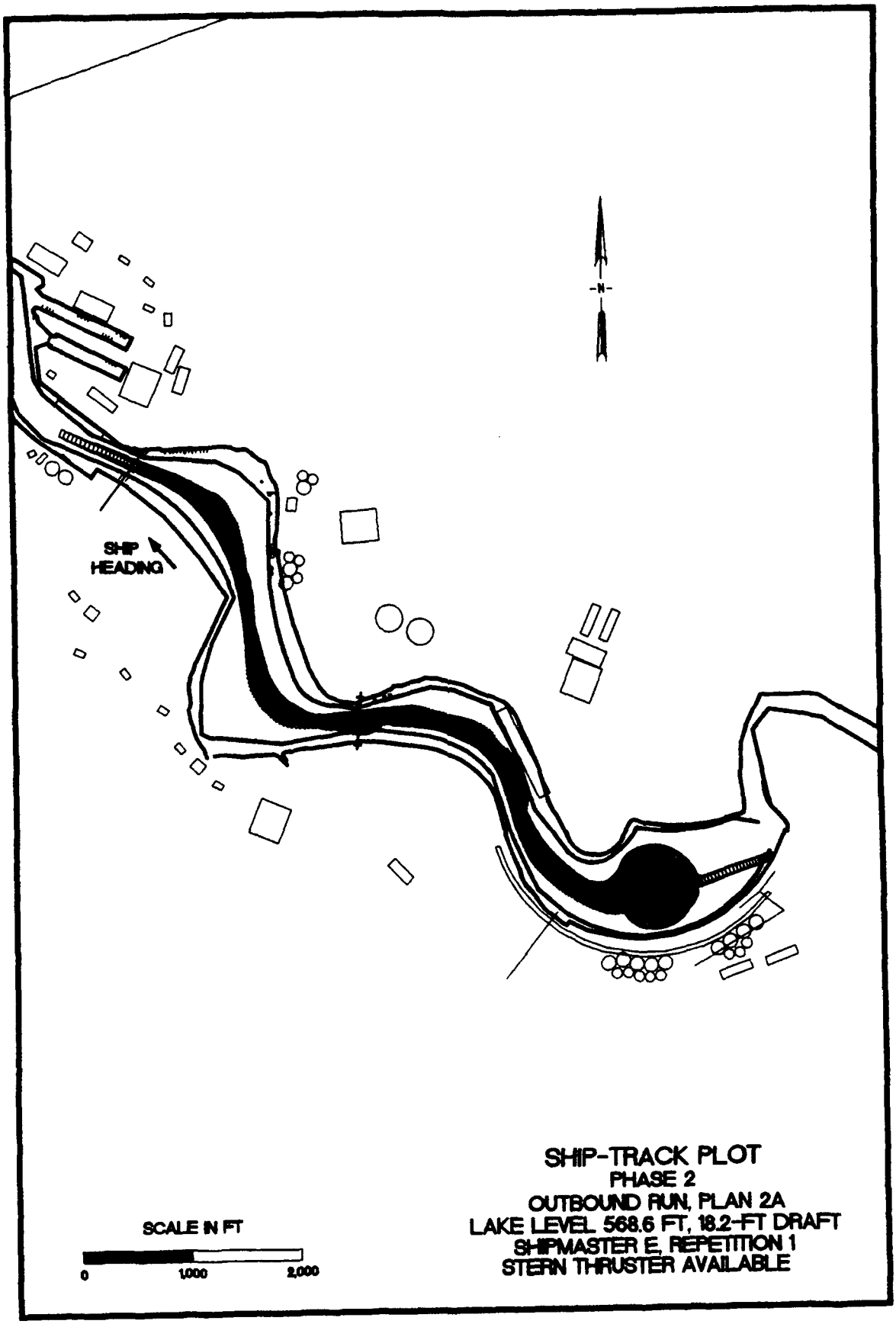
PHASE 2
INBOUND RUN, PLAN 2A
LAKE LEVEL 571.1 FT, 27.0-FT DRAFT
SHIPMASTER E, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B115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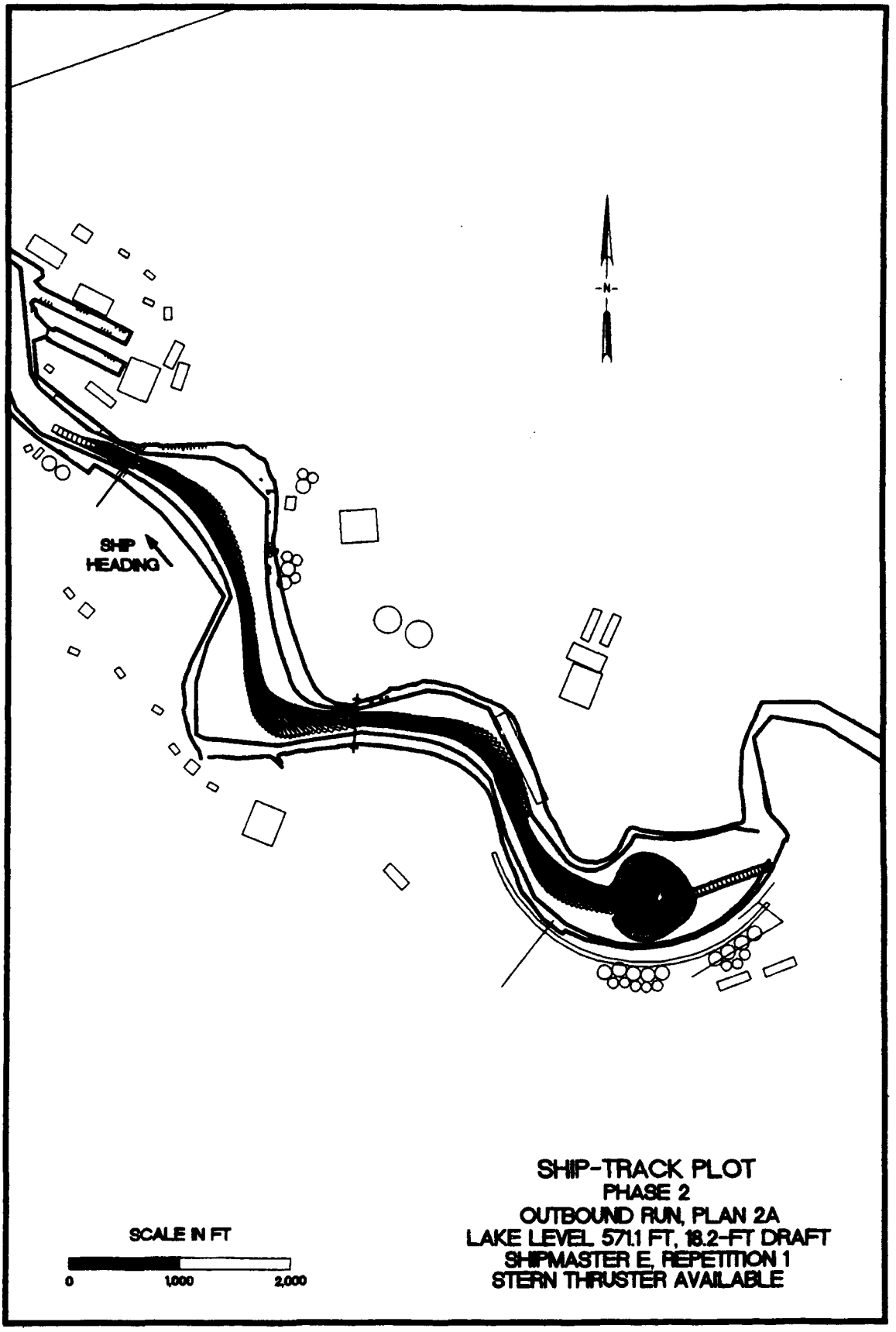
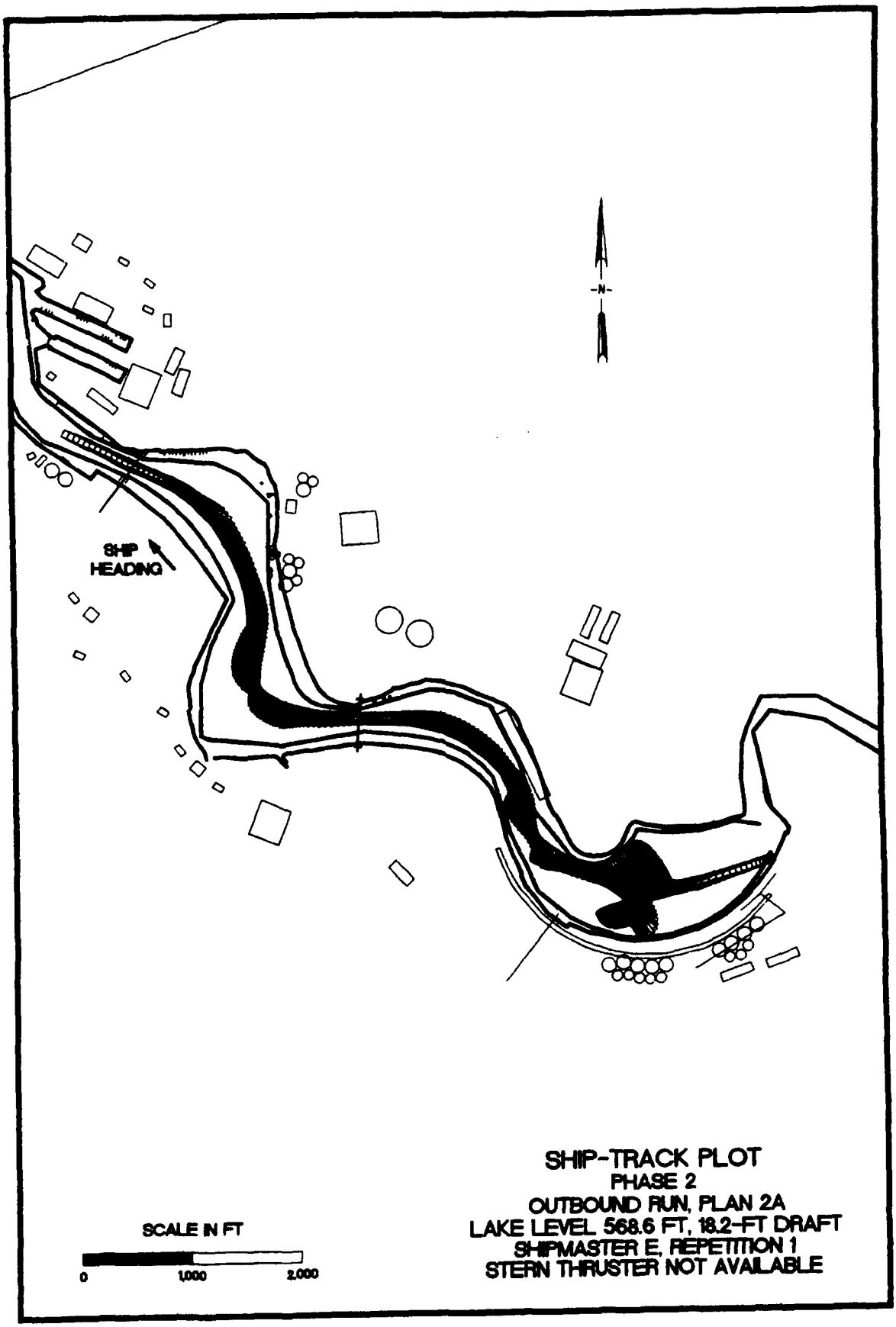
SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, PLAN 2A
LAKE LEVEL 568.6 FT, 18.2-FT DRAFT
SHIPMASTER E, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B116



SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, PLAN 2A
LAKE LEVEL 571.1 FT, 18.2-FT DRAFT
SHIPMASTER E, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B117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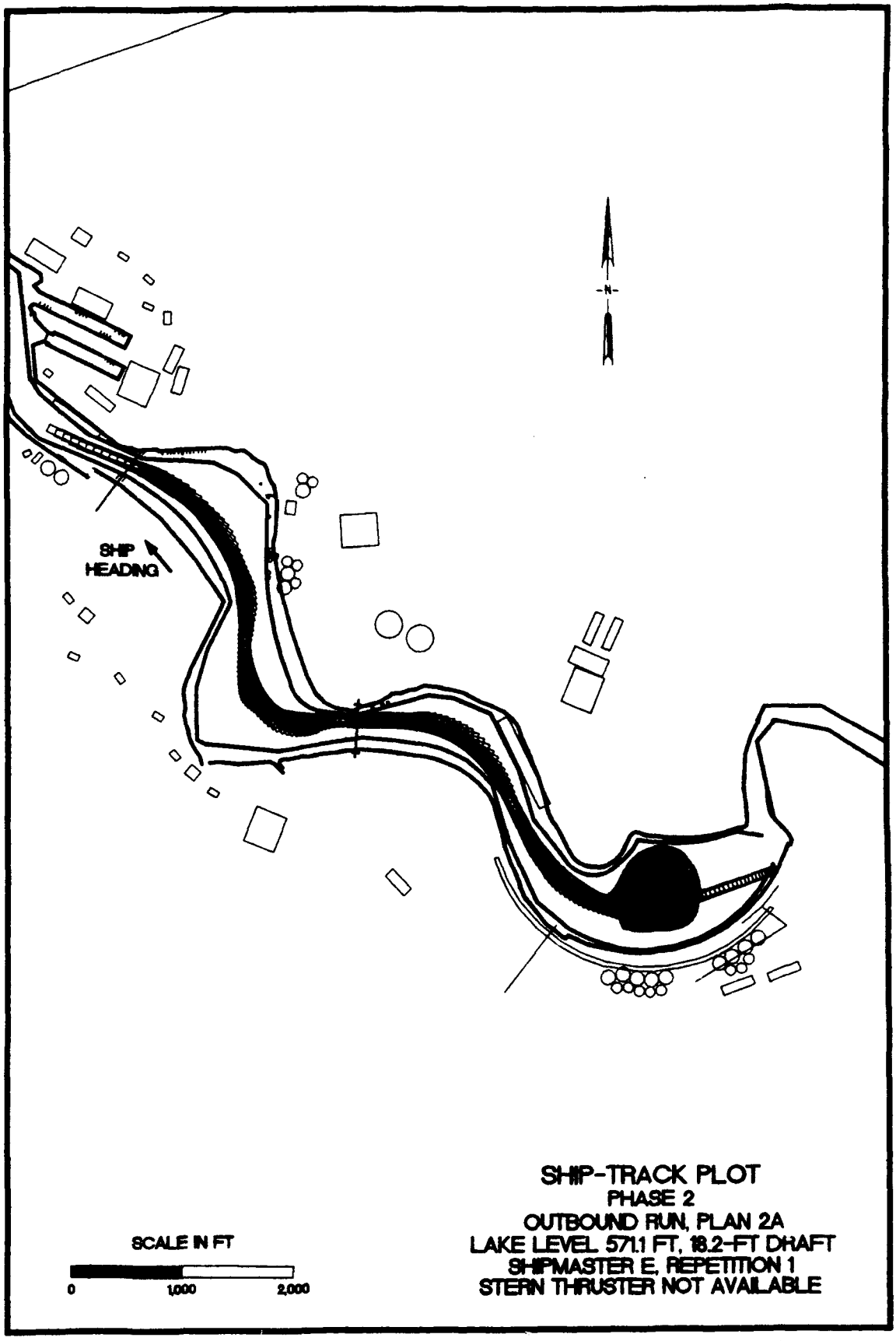
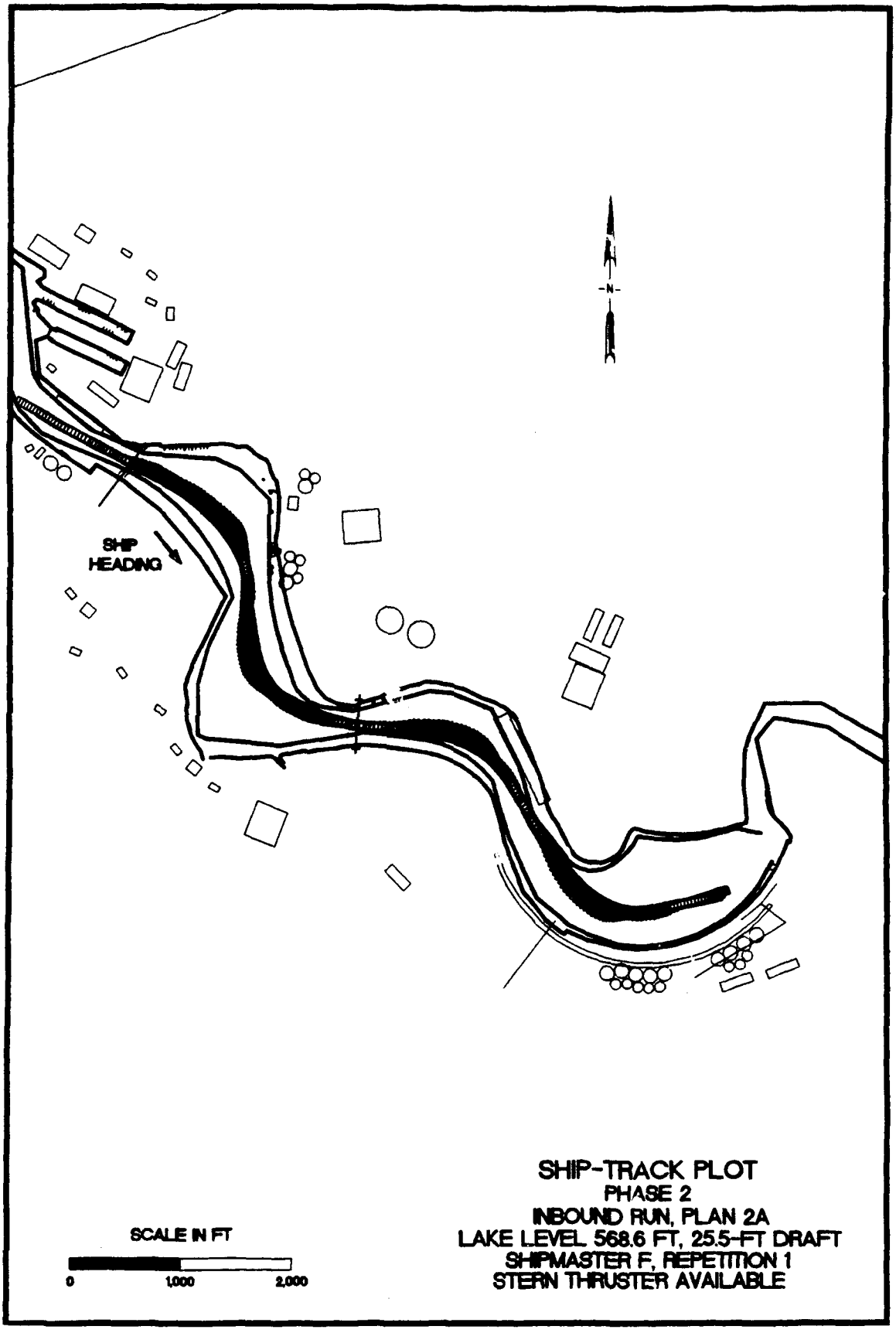
SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, PLAN 2A
LAKE LEVEL 568.6 FT, 18.2-FT DRAFT
SHIPMASTER E, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B118



SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, PLAN 2A
LAKE LEVEL 571.1 FT, 18.2-FT DRAFT
SHIPMASTER E, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B119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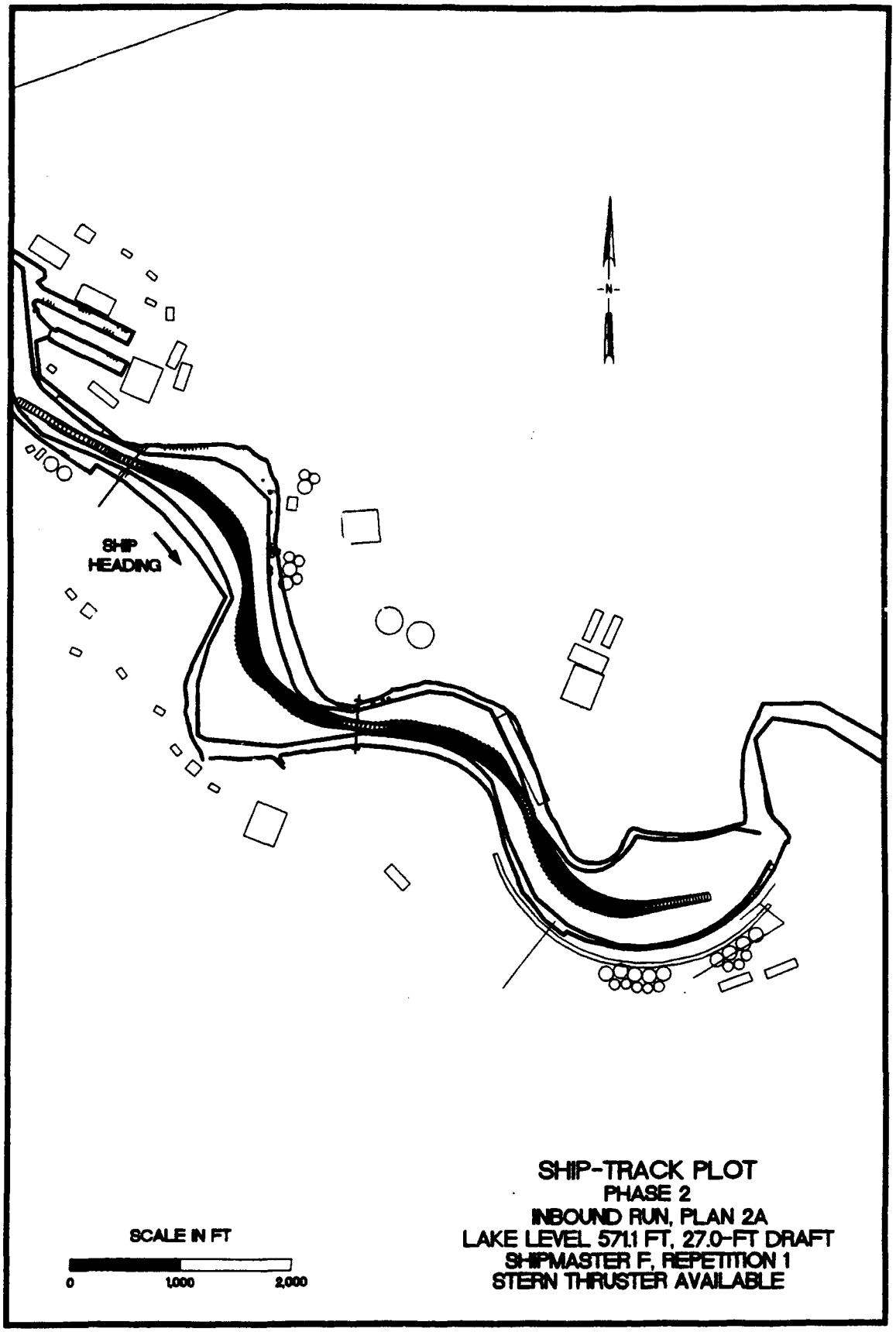
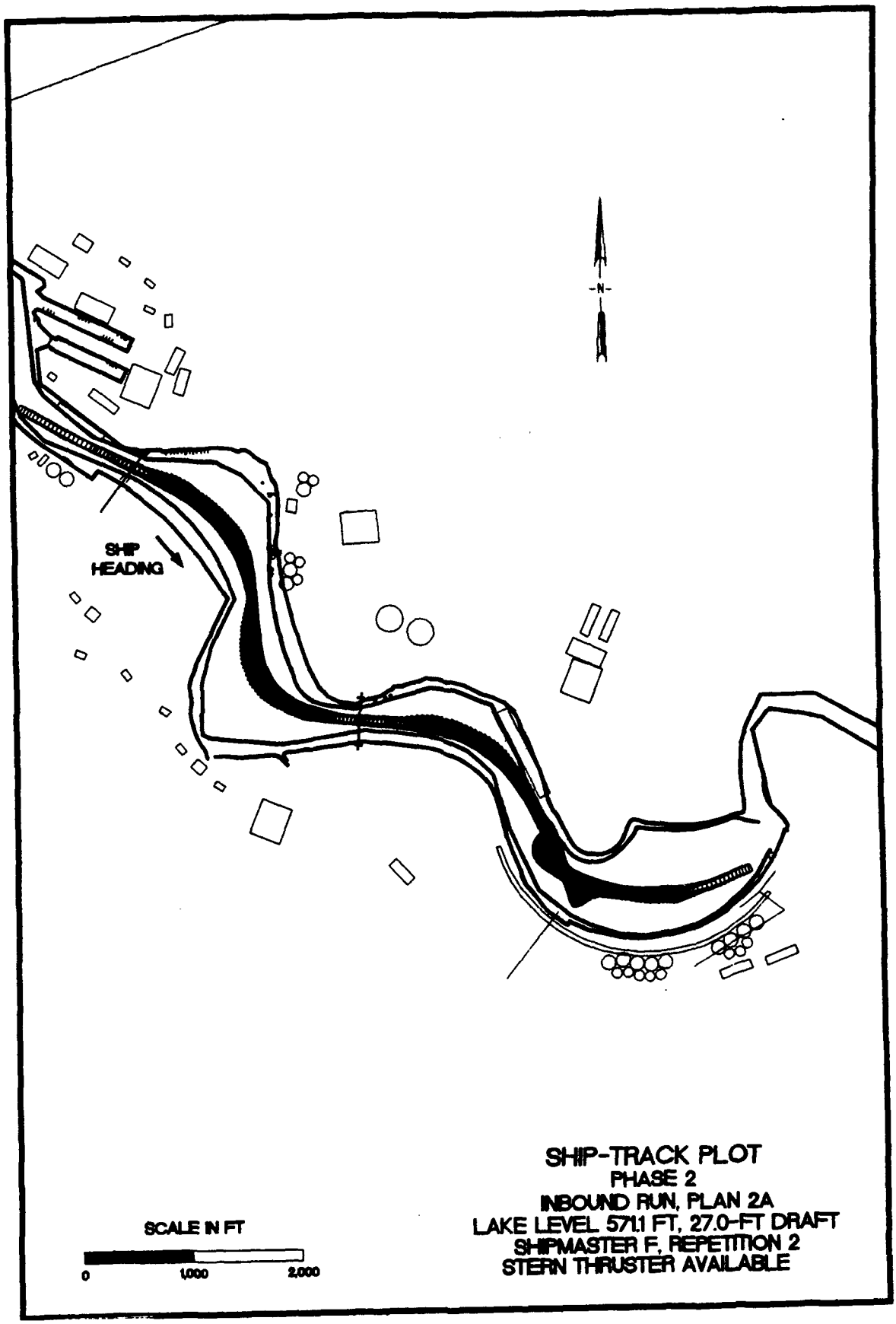
PHASE 2
INBOUND RUN, PLAN 2A
LAKE LEVEL 568.6 FT, 25.5-FT DRAFT
SHIPMASTER F, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B120



SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 2A
LAKE LEVEL 571.1 FT, 27.0-FT DRAFT
SHIPMASTER F, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B121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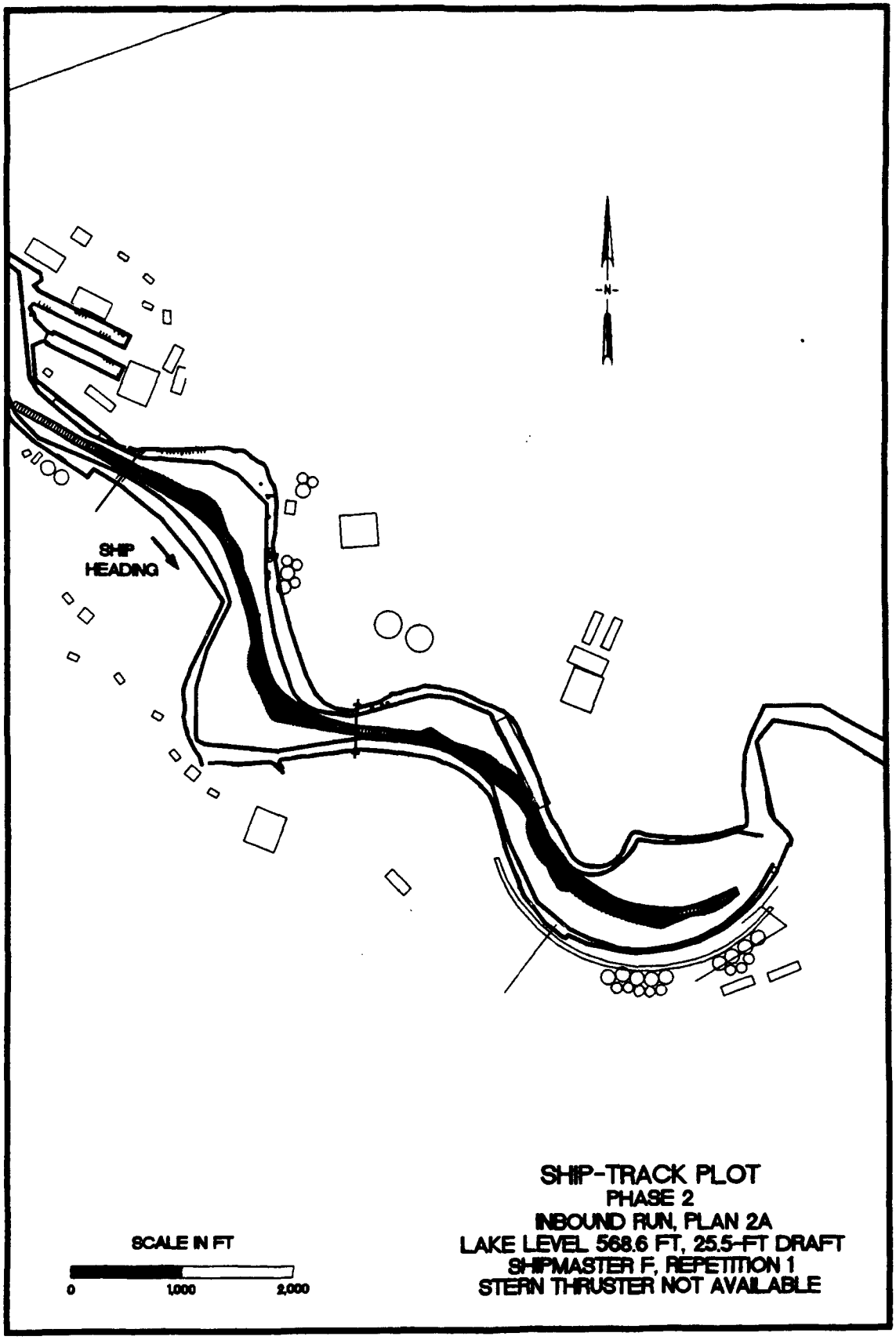
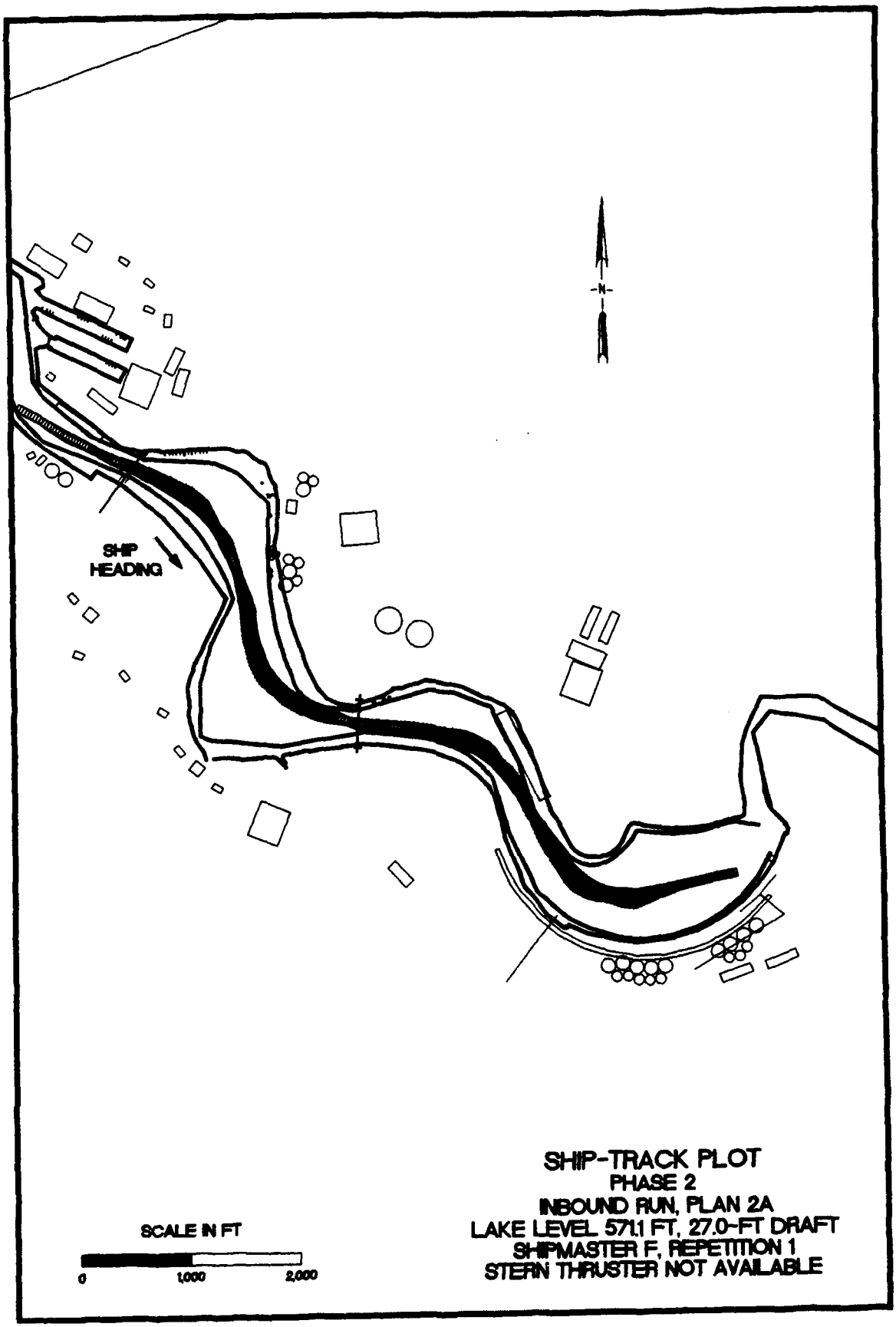
SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 2A
LAKE LEVEL 571.1 FT, 27.0-FT DRAFT
SHIPMASTER F, REPETITION 2
STERN THRUSTER AVAILABLE

PLATE B122



SHIP-TRACK PLOT
PHASE 2
INBOUND RUN, PLAN 2A
LAKE LEVEL 568.6 FT, 25.5-FT DRAFT
SHIPMASTER F, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B123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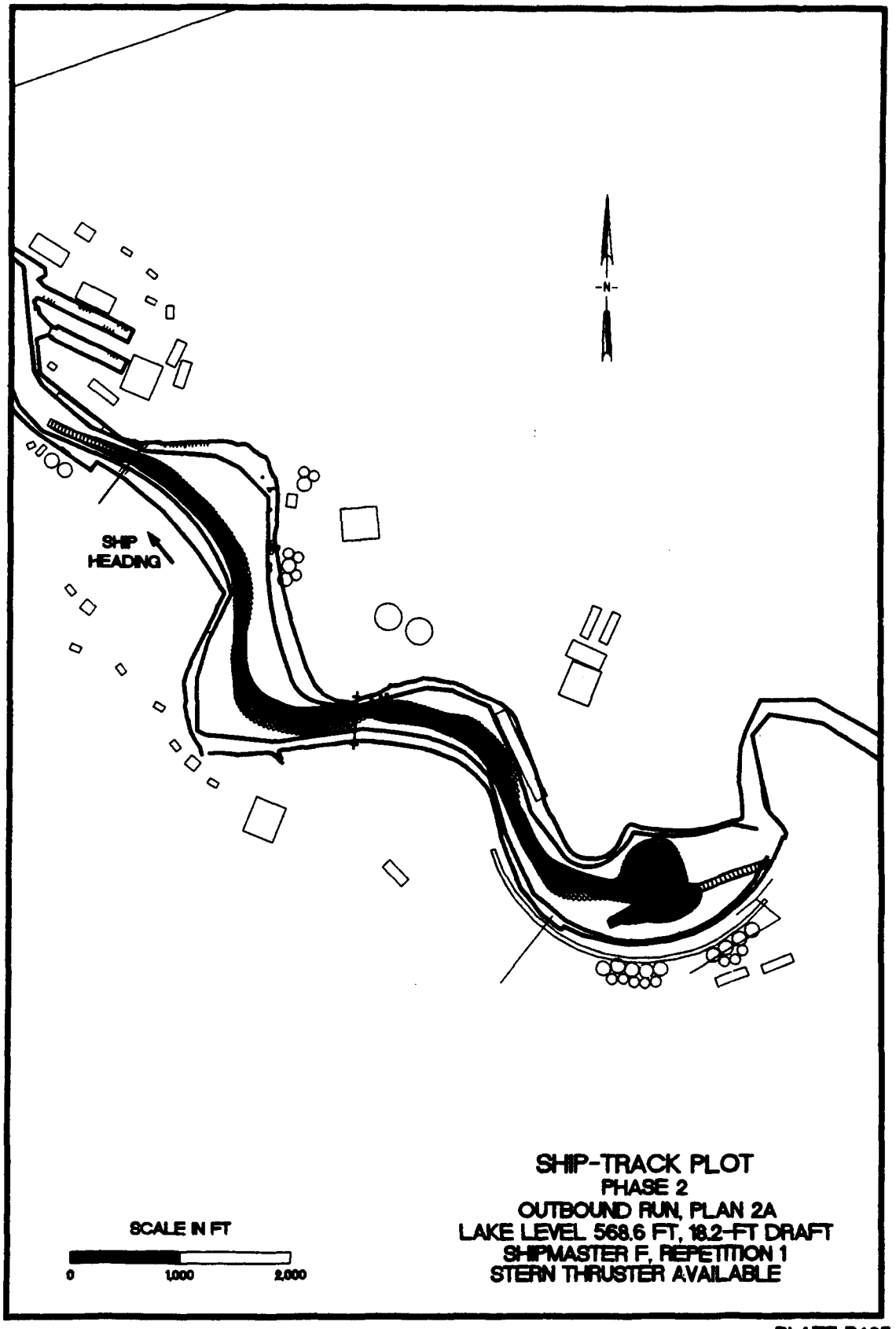
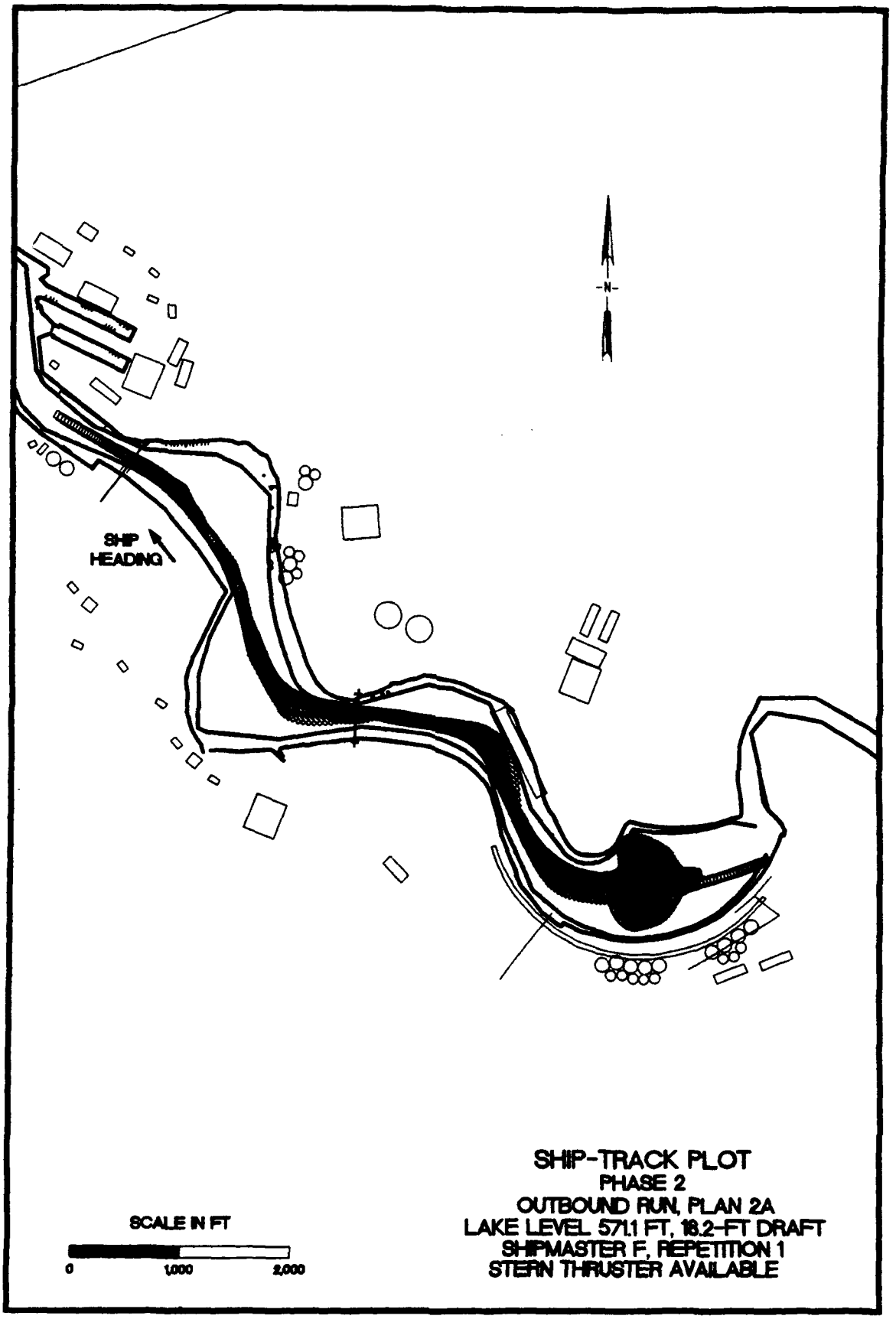
PHASE 2
INBOUND RUN, PLAN 2A
LAKE LEVEL 571.1 FT, 27.0-FT DRAFT
SHIPMASTER F, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B124



SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, PLAN 2A
LAKE LEVEL 568.6 FT, 18.2-FT DRAFT
SHIPMASTER F, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B125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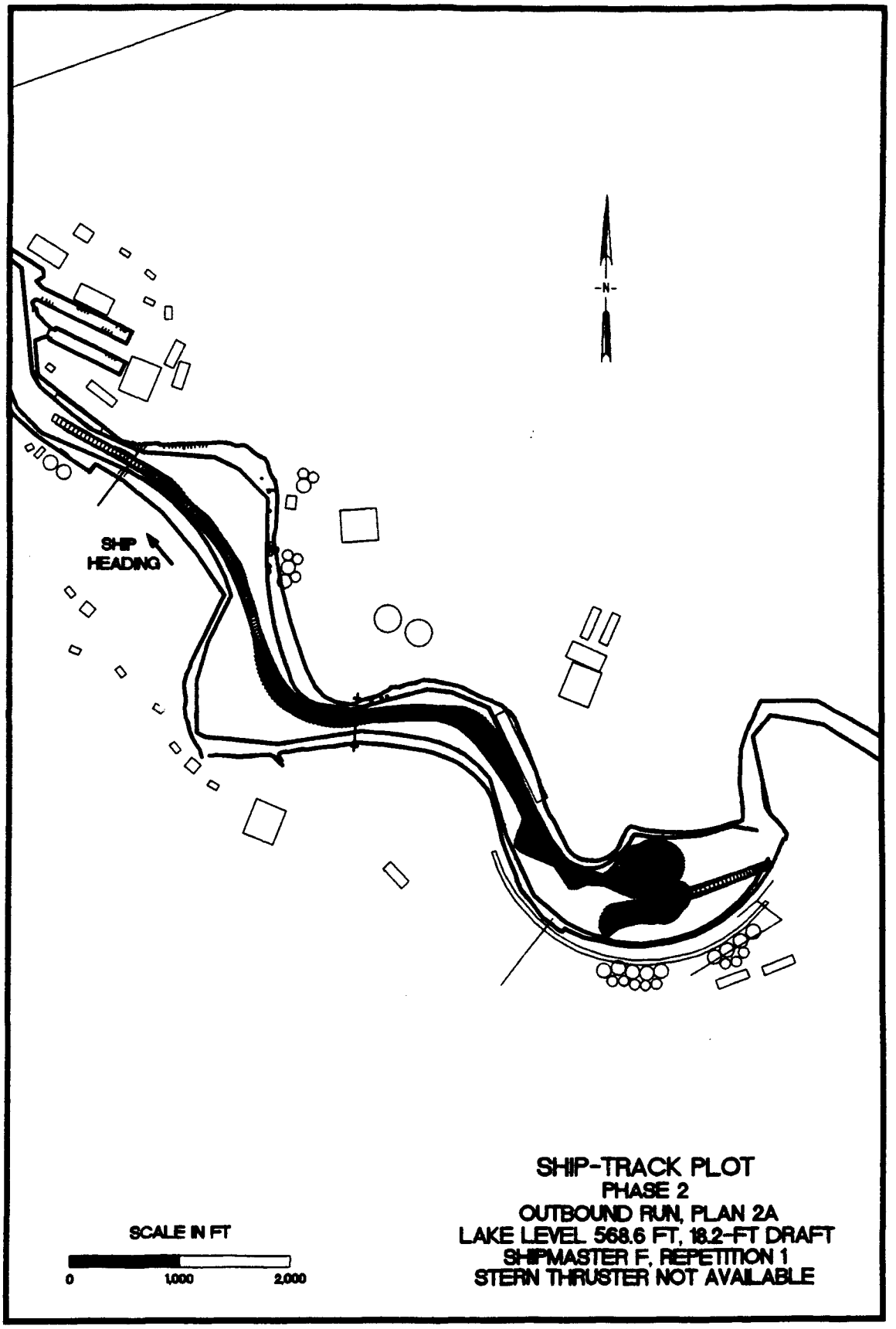
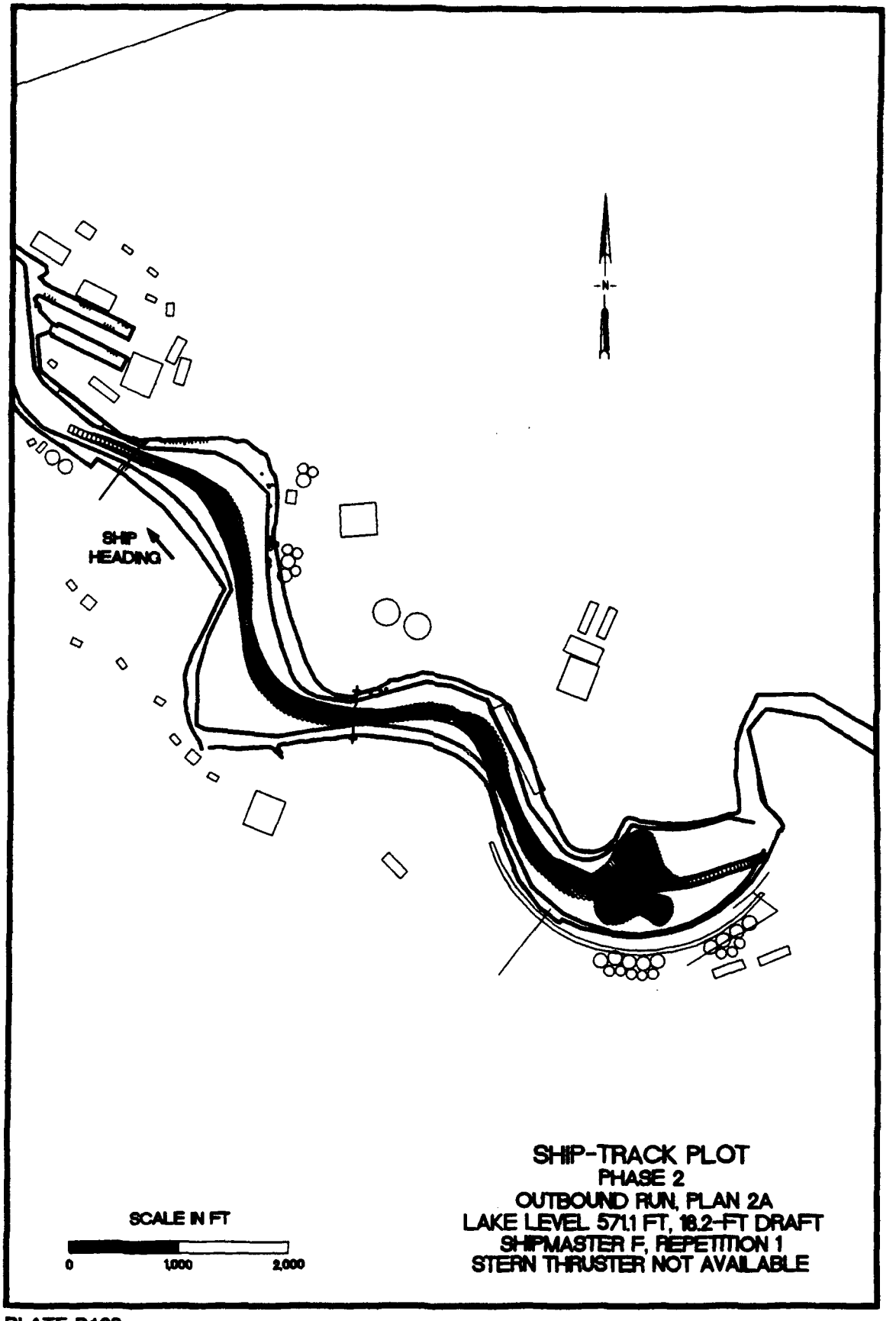
SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, PLAN 2A
LAKE LEVEL 571.1 FT, 18.2-FT DRAFT
SHIPMASTER F, REPETITION 1
STERN THRUSTER AVAILABLE

PLATE B126



SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, PLAN 2A
LAKE LEVEL 568.6 FT, 18.2-FT DRAFT
SHIPMASTER F, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B127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SHIP-TRACK PLOT
PHASE 2
OUTBOUND RUN, PLAN 2A
LAKE LEVEL 571.1 FT, 18.2-FT DRAFT
SHIPMASTER F, REPETITION 1
STERN THRUSTER NOT AVAILABLE

PLATE B128

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Michelle M. Thevenot, Carl J. Huval, Larry L. Daggett

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