

AD-A138 902

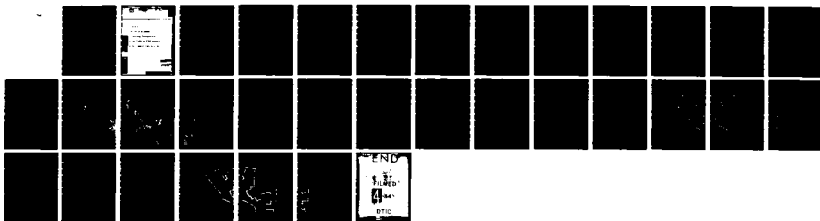
EXAMPLE PLAN FOR EVACUATION OF READING PENNSYLVANIA IN
THE EVENT OF EMERG. (U) HYDROLOGIC ENGINEERING CENTER
DAVIS CA H J OWEN AUG 83 HEC-RD-20 DACN05-80-C-0101

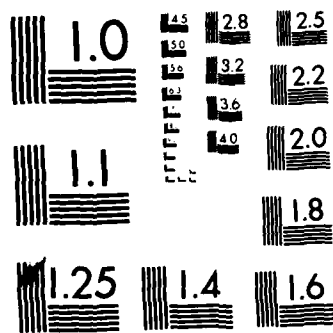
1/1

UNCLASSIFIED

F/G 13/2

NL





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



US Army Corps
of Engineers

The Hydrologic
Engineering Center

12

Example
Plan for Evacuation
of Reading, Pennsylvania
in the Event of Emergencies
at Blue Marsh Dam and Lake

AD A1 38902

DTIC FILE COPY

DTIC

MAR 13 1984

Research Document No. 20

August 1983

84 03 13 019

**US Army Corps of Engineers
Water Resources Support Center**

**The Hydrologic Engineering Center
609 Second Street
Davis, California 95616**

**(916) 440-2105
(FTS) 448-2105**

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER Research Document No. 20	2. GOVT ACCESSION NO. AD-2238702	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Example Plan for Evacuation of Reading, Pennsylvania, in the Event of Emergencies at Blue Marsh Dam and Lake.	5. TYPE OF REPORT & PERIOD COVERED Final	
	6. PERFORMING ORG. REPORT NUMBER	
7. AUTHOR(s) H. Hames Owen	8. CONTRACT OR GRANT NUMBER(s) DACW05-80-C-0101	
9. PERFORMING ORGANIZATION NAME AND ADDRESS Flood Loss Reduction Associates 4145 Maybell Way Palo Alto, CA 94306	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS "Water Resources Planning Study" work unit No. 31638	
11. CONTROLLING OFFICE NAME AND ADDRESS Hydrologic Engineering Center (WRSC-HEC) U.S. Army Corps of Engineers 609 2nd St., Davis, CA 95616	12. REPORT DATE August 1983	
	13. NUMBER OF PAGES 26	
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) ---	15. SECURITY CLASS. (of this report) Unclassified	
	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE ---	
16. DISTRIBUTION STATEMENT (of this Report) Distribution of this publication is unlimited.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report) ---		
18. SUPPLEMENTARY NOTES Prepared as a supplement to "Flood Emergency Plans, Guidelines for Corps Dams," Hydrologic Engineering Center, June 1980.		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Dam Safety, Flood Emergencies, Evacuation Planning, Dam Failure		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report provides an example Evacuation Plan for areas downstream of a dam in the event of a dam failure or other major flood emergencies. It addresses determination of areas requiring evacuation, actions required, warning dissemination, traffic control, and evacuation assistance.		

EXAMPLE PLAN FOR EVACUATION OF READING, PENNSYLVANIA
IN THE EVENT OF EMERGENCIES AT BLUE MARSH DAM AND LAKE

Prepared for the
HYDROLOGIC ENGINEERING CENTER
U.S. ARMY CORPS OF ENGINEERS

By
FLOOD LOSS REDUCTION ASSOCIATES
Palo Alto, California

Accession For	
NTIS GRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By _____	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A-1	

DTIC
Box
2
March 1984

August 1983

DTIC
SELECTED
MAR 15 1984
E

TABLE OF CONTENTS

1. Introduction..... 1
2. Definitions..... 2
3. Areas Requiring Evacuation..... 2
4. Basis for Plan..... 3
5. Notification of Emergencies..... 3
6. Verifications of Notifications..... 4
7. Relay of Notifications..... 5
8. Action When Notified of an Emergency..... 5
9. Plan Maintenance..... 6
PLATES..... 7
APPENDIX 1 - WARNING DISSEMINATION SUBPLAN.....10
APPENDIX 2 - TRAFFIC CONTROL SUBPLAN.....14
APPENDIX 3 - EVACUATION ASSISTANCE SUBPLAN.....18

LIST OF PLATES

Plate 1 - Inundation Boundary, Affected Area and Evacuation Area for
Level 1 Flood..... 7
Plate 2 - Inundation Boundary, Affected Area and Evacuation Area for
Level 2 Flood..... 8
Plate 3 - Inundation Boundary, Affected Area and Evacuation Area for
Level 3 Flood..... 9

LIST OF TABLES

Table 1 - Key Officials and Alternates..... 5

EXAMPLE PLAN FOR EVACUATION OF READING, PENNSYLVANIA
IN THE EVENT OF EMERGENCIES AT BLUE MARSH DAM AND LAKE

1. Introduction

Blue Marsh Dam and Lake are located on Tulpehocken Creek, approximately seven miles northwest of Reading. Emergencies affecting the operation and safety of the dam could require evacuation of portions of Reading.

a. Purpose

This plan establishes procedures to be followed in the event an emergency affecting the operation and safety of Blue Marsh Dam requires evacuation of a portion of Reading.

b. Scope

This plan provides for three levels of evacuation corresponding to areas in which a hazard to life or property would exist as a result of peak flows past the dam of approximately 75,000 cfs; 217,000 cfs; and 493,000 cfs. The plan also provides for adjusting evacuation procedures in accord with the anticipated speed of onset of flooding.

c. Organization of Document

This document consists of the basic plan for evacuation and the three following subplans:

Appendix 1 - Warning Dissemination Subplan.

Appendix 2 - Traffic Control Subplan

Appendix 3 - Evacuation Assistance Subplan.

d. Use of Plan

This plan is intended for use only in the event evacuation is required as a result of an emergency affecting Blue Marsh Dam and Lake. It is not intended as a general plan of action for evacuation in response to other types of emergencies.

e. Authority

This plan is adopted pursuant to *[to be inserted]*.

2. Definitions

a. Emergency

An "emergency" condition is one in which the occurrence of a significant threat to life or property is possible or certain to occur. An emergency condition could occur due to some imminent cause, such as an immediate need for high releases, or due to an anticipated event such as predicted high inflows into the lake.

b. Fast Evacuation

A "fast evacuation" is one in which the time available for evacuation is [] hours or less. Emphasis in fast evacuation is on life-saving to the total exclusion of property considerations.

c. Slow evacuation

A "slow evacuation" is one in which the time available for evacuation is greater than [] hours. Emphasis in slow evacuation is on life-saving but protection of property is permitted to the extent it does not impede evacuation and life-saving efforts.

d. Hazardous Inundation

"Hazardous inundation" is flooding in which water velocities are in excess of four feet per second or in which water depths are either in excess of two feet or sufficiently deep to cause significant property damage.

e. Secondary Problems

"Secondary problems" are conditions affecting safety that arise as a result of inundation such as isolation, release of toxic fumes, fire and explosion, or loss of utility services. Secondary problems can pose dangers outside the inundated area.

3. Areas Requiring Evacuation

Areas affected by flooding and areas requiring evacuation in the event of each postulated emergency condition are shown on Plates 1,2 and 3. Unless otherwise noted, affected areas outside the inundation boundary are potentially subject to isolation, in most cases by flooding of roads serving the area. Notes on the plates indicate any areas outside the inundation boundary which are potentially affected by secondary problems other than isolation that might stem from inundation.

Areas requiring evacuation for each postulated emergency are designated as follows:

Level 1 Evacuation - The area requiring evacuation in the event of a flow past Blue Marsh Dam of approximately 75,000 cfs (Plate 1).

Level 2 Evacuation - The area requiring evacuation in the event of a flow past Blue Marsh Dam of approximately 217,000 cfs (Plate 2).

Level 3 Evacuation - The area requiring evacuation in the event of a flow past Blue Marsh Dam of approximately 493,000 cfs (Plate 3).

4. Basis for Plan

a. Identification of Evacuation Areas

Identification of areas requiring evacuation in the event of each postulated emergency condition is based on information furnished by the Philadelphia District, U.S. Army Corps of Engineers. Computation of flows, flood profiles and other underlying information involves numerous assumptions, not all of which are likely to be accurate for any particular incident which actually occurs. Boundaries of areas to be evacuated are therefore approximate. To provide a margin of safety and enable convenient definition of evacuation areas, boundaries have generally been located to include the whole of each block or other subarea affected and to follow streets, roads or other identifiable courses.

b. Conditions for Plan Execution

Design of the plan was based on the possible need for its conduct under adverse conditions characteristic of a flood episode during a severe winter storm including high winds, heavy rain, high ambient noise conditions, disruption of telephone and electrical service, and flooding of underpasses and other low lying areas.

c. Coordination With Other Plans

This plan is fully coordinated with the emergency plan for Blue Marsh Dam and Lake prepared by the Philadelphia District, U.S. Army Corps of Engineers. It is also fully coordinated with *[list other pertinent plans]*. There are no other plans relating specifically to evacuation of the affected areas other than those named.

5. Notification of Emergencies

The U.S. Army Corps of Engineers will notify the Reading Police Department of all emergency conditions affecting operation of Blue Marsh Dam.

a. Source of Notification

Notification to the Reading Police Department will normally be made by the Philadelphia District office of the U.S. Army Corps of Engineers. However, notifications may be issued by Corps staff operating the dam in the event of conditions requiring very fast action or if communications are disrupted between the dam and the Philadelphia District office or between the District office and the Reading Police Department.

b. Means of Notification

Notifications will normally be made by telephone. Radio will be used in the event telephone service is disrupted.

c. Others Notified

Notification of emergencies at Blue Marsh Dam will be given by the U.S. Army Corps of Engineers to others including:

[insert list]

d. Content of Notification

Information to be provided in notifications by the U.S. Army Corps of Engineers includes:

- (1) Cause of emergency condition.
- (2) Estimated time of arrival of hazardous water levels.
- (3) Recommendation concerning need for evacuation.
- (4) Recommendation concerning level of evacuation.

6. Verification of Notifications

The Reading Police Department dispatcher receiving a notification shall immediately notify the Watch Commander and initiate steps to verify the notification through the originating office. Following are telephone numbers and radio call letters for Corps of Engineers offices:

<u>Office</u>	<u>Telephone No.</u>	<u>Radio Call Letters</u>
Blue Marsh Dam Administrative Office		
Philadelphia District Office		
Northern Area Office		

7. Relay of Notifications

Upon verification of a notification, the police dispatcher shall advise the Police Department Watch Commander and relay the notification to the Mayor, Chiefs of the Police and Fire Departments and City Civil Defense Director. If the specified officials are not immediately available, notifications shall be relayed to the first available alternate for each official. Officials and alternates are listed in Table 1.

TABLE 1
KEY OFFICIALS AND ALTERNATES

<u>Position</u>	<u>Name</u>	<u>Telephone Number</u>		<u>Home Address</u>
		<u>Business</u>	<u>Home</u>	
Mayor				
1st Alt.				
2nd Alt.				
Police Chief				
1st Alt.				
2nd Alt.				
Fire Chief				
1st Alt.				
2nd Alt.				
Civil Def. Dir.				
1st Alt.				
2nd Alt.				

8. Action When Notified of an Emergency

Upon verification of an emergency condition, the Police Department Watch Commander shall take the following actions:

a. Direct the Fire Department Watch Commander to initiate and carry out the Warning Dissemination Subplan (Appendix 1) for the level of fast or slow evacuation recommended by the U.S. Army Corps of Engineers.

b. Direct the City Civil Defense Director to initiate and carry out the Transportation Assistance Subplan (Appendix 3) for the level of fast or slow evacuation recommended by the U.S. Army Corps of Engineers.

c. Initiate and carry out the Traffic Control Subplan (Appendix 2) for the level of fast or slow evacuation recommended by the U.S. Army Corps of Engineers.

9. Plan Maintenance

The following actions shall be taken on an annual or more frequent basis to maintain the accuracy and viability of this plan:

a. The Chief of the Fire Department shall review, update and recommend any needed improvements to the Warning Dissemination Subplan (Appendix 1).

b. The Chief of the Police Department shall review, update and recommend any needed improvements to the Traffic Control Subplan (Appendix 2).

c. The City Civil Defense Director shall review, update and recommend any needed improvements to the Evacuation Assistance Subplan (Appendix 3).

d. The City Civil Defense Director shall convene an annual meeting of city officials and key staff with representatives of the U.S. Army Corps of Engineers to review notification and verification procedures and discuss recommended improvements to the plan.

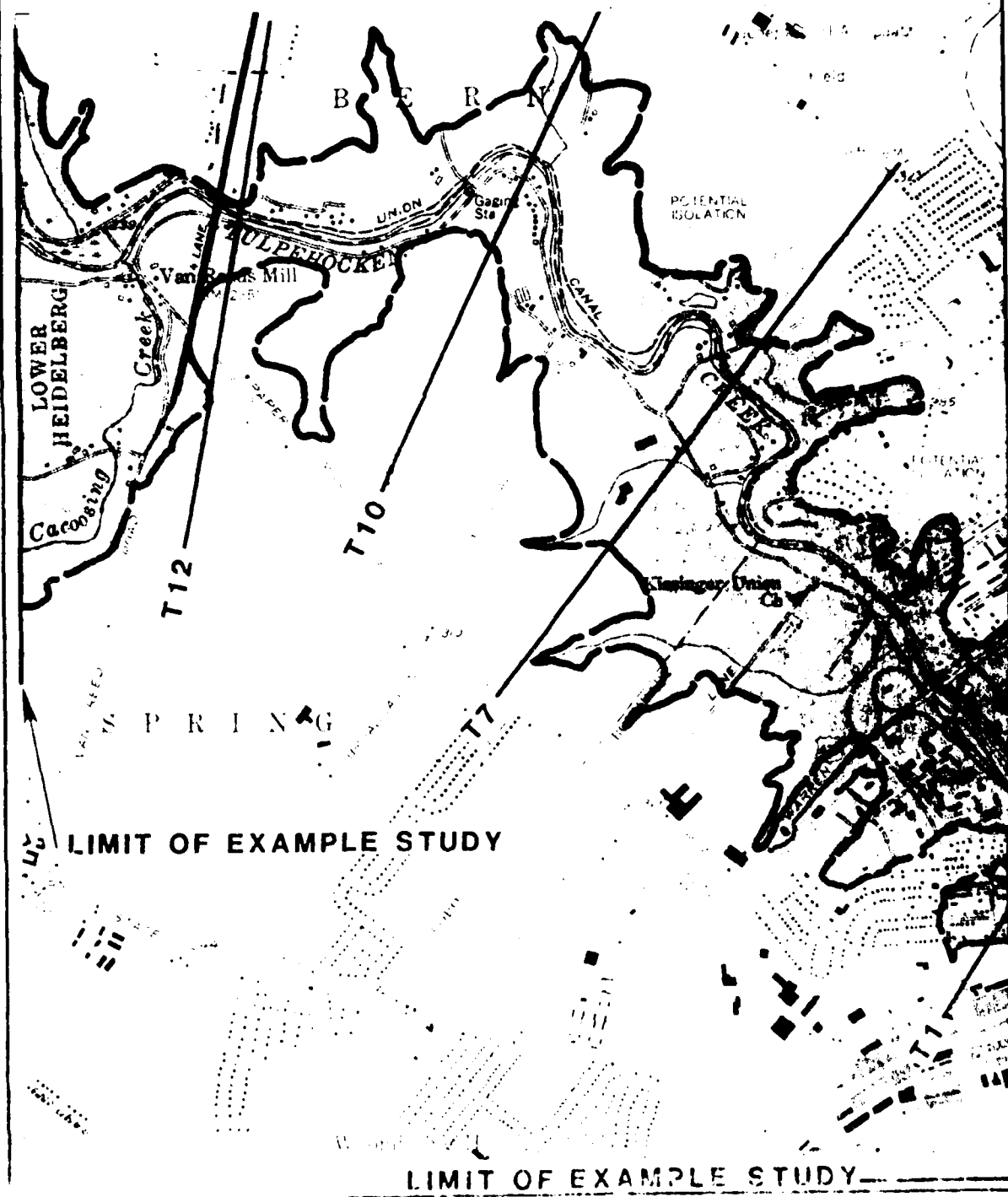
e. The City Civil Defense Director shall revise the plan and subplans as appropriate and issue the revised plan within 30 days of the annual meeting.

f. Within 15 days of issuance of a revised plan, each person responsible for directing execution of a subplan shall review the basic purpose and procedures of the subplan with all parties expected to be involved in its execution or transmit appropriate portions of the plan and subplan for their review.

PLATE 1 NOT INCLUDED
SEE PLATE 3 FOR FORMAT

PLATE 2 NOT INCLUDED
SEE PLATE 3 FOR FORMAT

Hypothetical Example for Demonstration Purposes Only








LIMIT OF EXAMPLE STUDY



LIMIT OF EXAMPLE STUDY

LEGEND

-  Boundary of Inundated Area
-  Area Affected by Inundation
-  Evacuation Area
-  T7 Cross Section
-  Corporate Limits

National Geodetic Vertical Datum of 1929

Sources of base map: U.S. Geological Survey 7.5 minute series Reading, 1956 photorevised 1968 and 1974

- NOTES:
1. The inundated area shown on this map reflects an event of an extremely remote nature. This map is not in any way intended to reflect upon the integrity of Blue Marsh Dam.
 2. Boundaries shown are approximate. An ample margin of safety should be allowed in estimating the extent of flooding and time of arrival of dangerous water levels.



**BLUE MARSH DAM
EMERGENCY PLAN**

**INUNDATION BOUNDARY
AFFECTED AREA
AND
EVACUATION AREA
FOR
LEVEL 3 FLOOD
(APPROXIMATELY 493,000 C.F.S.)**

PLATE NO. 3

WARNING DISSEMINATION SUBPLAN

APPENDIX 1
TO
PLAN FOR EVACUATION IN THE
EVENT OF EMERGENCIES AT
BLUE MARSH DAM AND LAKE
READING, PENNSYLVANIA

Most Recent Update *(to be inserted)*

Hypothetical Example for Demonstration Purposes Only

WARNING DISSEMINATION SUBPLAN

1. Objective

To provide warnings to evacuate to all persons potentially endangered by an emergency affecting the operation and safety of Blue Marsh Dam and Lake.

2. Responsibility for Conduct

Fire Department Watch Commander.

3. Basis for Initiation of Action

Direction from Police Department Watch Commander to execute subplan for a particular level of "fast" or "slow" evacuation.

4. Actions to be Taken

a. Activate sirens as follows:

<u>Level of Evacuation</u>	<u>Sirens to Activate</u>
Level 1	<i>[to be inserted]</i>
Level 2	
Level 3	

b. Recall all off-duty Fire Department personnel to duty.

c. Formulate the warning message to be disseminated using the appropriate example for "fast" or "slow" evacuation.

(1) "Fast" Evacuation

THIS AREA MUST BE EVACUATED IMMEDIATELY. BLUE MARSH DAM (is failing, has failed, may fail). LEAVE YOUR CAR. WALK IMMEDIATELY TO HIGH GROUND. REPEAT, YOU MUST LEAVE THIS AREA AT ONCE. DO NOT MOVE YOUR CAR. IF YOU NEED ASSISTANCE, HANG A BEDSHEET FROM YOUR WINDOW.

(2) "Slow" Evacuation

THIS AREA MUST BE EVACUATED. SEVERE FLOODING IS EXPECTED TO OCCUR BEGINNING AT (insert time).PUT YOUR VALUABLES IN YOUR CAR AND LEAVE. TURN ON YOUR RADIO FOR INFORMATION.

d. Direct the dispatch of all Fire Department vehicles with public address capability to the evacuation area to announce the warning.

e. Shut off sirens so warning announcements can be heard.

f. Initiate notifications to special warning recipients listed in Table 2.

TABLE 2
SPECIAL WARNING RECIPIENTS

<u>Name</u>	<u>Telephone No.</u>	<u>Address</u>	<u>Radio Call</u>
-------------	----------------------	----------------	-------------------

[to be inserted]

g. Initiate urgent requests for mutual aid assistance from parties listed in Table 3.

TABLE 3
FIRE DEPARTMENT MUTUAL AID ASSISTANCE SOURCES

<u>Name</u>	<u>Location</u>	<u>Telephone No.</u>	<u>Radio Call</u>
-------------	-----------------	----------------------	-------------------

[to be inserted]

h. Disperse personnel not engaged in warning dissemination or other critical activities to provide evacuation assistance to handicapped persons, invalids, elderly and others requiring help.

i. Check all local radio and television stations to determine if warning messages issued by the U.S. Army Corps of Engineers are being broadcast. If not, contact the station, identify yourself, and request to tape an emergency message for immediate release. Adapt one of the following messages for use.

(1) "Fast" Evacuation

ATTENTION: THIS IS AN EMERGENCY MESSAGE FROM THE READING FIRE DEPARTMENT. LISTEN CAREFULLY. YOUR LIFE MAY DEPEND ON IMMEDIATE ACTION. THE CORPS OF ENGINEERS REPORTS THAT BLUE MARSH DAM LOCATED SEVEN MILES FROM READING (is failing, has failed, may fail). REPEAT: BLUE MARSH DAM (is failing, has failed, may fail). IDENTIFICATION OF AREAS WHICH MUST BE EVACUATED WILL FOLLOW THESE INSTRUCTIONS.

ONE, DO NOT MOVE YOUR VEHICLE. ALL STREETS MUST BE KEPT CLEAR FOR EMERGENCY VEHICLES.

TWO, WALK TO HIGH GROUND. REPEAT: DO NOT MOVE YOUR VEHICLE.

THREE, IF YOU ARE HANDICAPPED OR NEED ASSISTANCE IN MOVING AN INVALID, HANG A BEDSHEET FROM YOUR WINDOW.

HERE ARE THE AREAS WHICH MUST BE EVACUATED:

(Read areas from following list)

[list to be inserted]

(2) "Slow" Evacuation

ATTENTION: THIS AN EMERGENCY MESSAGE FROM THE READING FIRE DEPARTMENT. LISTEN CAREFULLY. YOUR LIFE MAY DEPEND ON PROPER ACTION. THE CORPS OF ENGINEERS REPORTS THAT SEVERE FLOODING IS EXPECTED TO OCCUR IN READING BEGINNING AT - *(time)*. REPEAT, THE CORPS OF ENGINEERS REPORTS THAT SEVERE FLOODING IS EXPECTED TO OCCUR IN READING BEGINNING AT *(time)*. IDENTIFICATION OF AREAS WHICH MUST BE EVACUATED WILL FOLLOW THESE INSTRUCTIONS.

ONE, RESIDENTS EVACUATING AFFECTED AREAS SHOULD TAKE WHATEVER VALUABLES THEY CAN MOVE IN THEIR VEHICLE. NO VEHICLES WILL BE PERMITTED TO ENTER OR RETURN TO THE AREA UNTIL FURTHER NOTICE.

TWO, IF YOU ARE HANDICAPPED OR NEED ASSISTANCE IN MOVING AN INVALID, HANG A BEDSHEET FROM YOUR WINDOW.

HERE ARE THE AREAS THAT MUST BE EVACUATED:

(Read areas from preceding list)

j. Clear area.

Direct all Fire Department personnel to leave the evacuation area before flooding begins. Leave an ample margin of safety.

TRAFFIC CONTROL SUBPLAN

APPENDIX 2
TO
READING, PENNSYLVANIA
PLAN FOR EVACUATION IN THE
EVENT OF EMERGENCIES AT
BLUE MARSH DAM AND LAKE

Most Recent Update: *(to be inserted)*

Hypothetical Example for Demonstration Purposes Only

TRAFFIC CONTROL SUBPLAN

1. Objective

To provide passage for emergency vehicles during an evacuation due to an emergency affecting the operation and safety of Blue Marsh Dam and Lake.

2. Responsibility for Conduct

Police Department Watch Commander.

3. Basis for Initiation of Action

Verification of notification from the U.S. Army Corps of Engineers of an emergency condition and determination of what level of evacuation is required and whether "fast" or "slow" evacuation is required.

4. Actions to be Taken

- a. Recall all off-duty Police Department personnel to duty.
- b. Dispatch personnel to provide traffic control in accord with Plate A2-1.
- c. Call tow trucks to stand by for clearing streets as needed. Table 4 lists sources of tow trucks and locations where trucks are to be stationed.

TABLE 4
SOURCES AND LOCATIONS FOR TOW TRUCKS

<u>Sources of Tow Trucks</u>	<u>Telephone No.</u>	<u>Locations for Stationing</u>
------------------------------	----------------------	---------------------------------

[to be inserted]

- d. Initiate urgent requests for mutual aid assistance from the law enforcement agencies listed in Table 5.

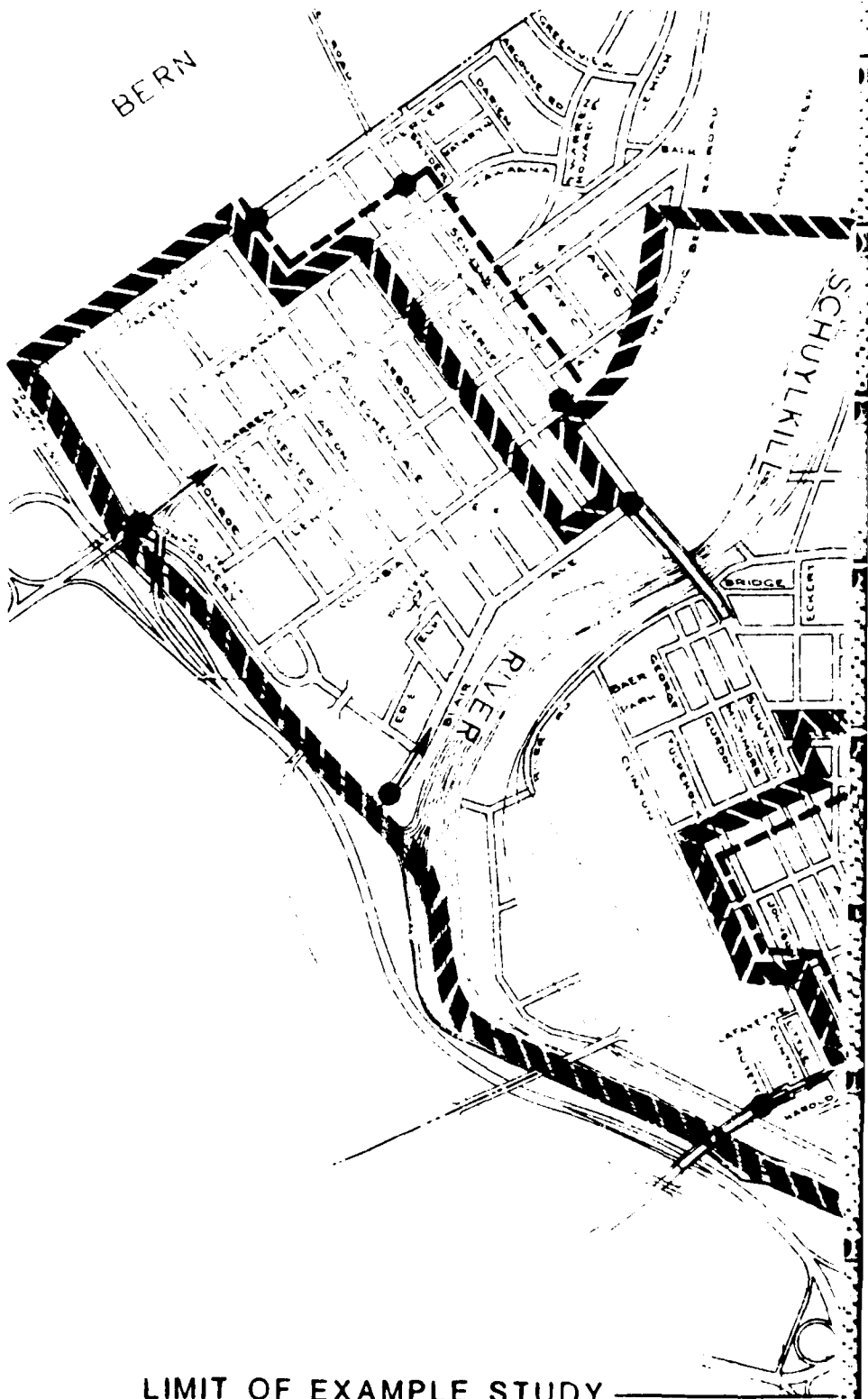
TABLE 5
POLICE DEPARTMENT MUTUAL AID ASSISTANCE SOURCES

<u>Name</u>	<u>Telephone No.</u>	<u>Radio Call</u>
-------------	----------------------	-------------------

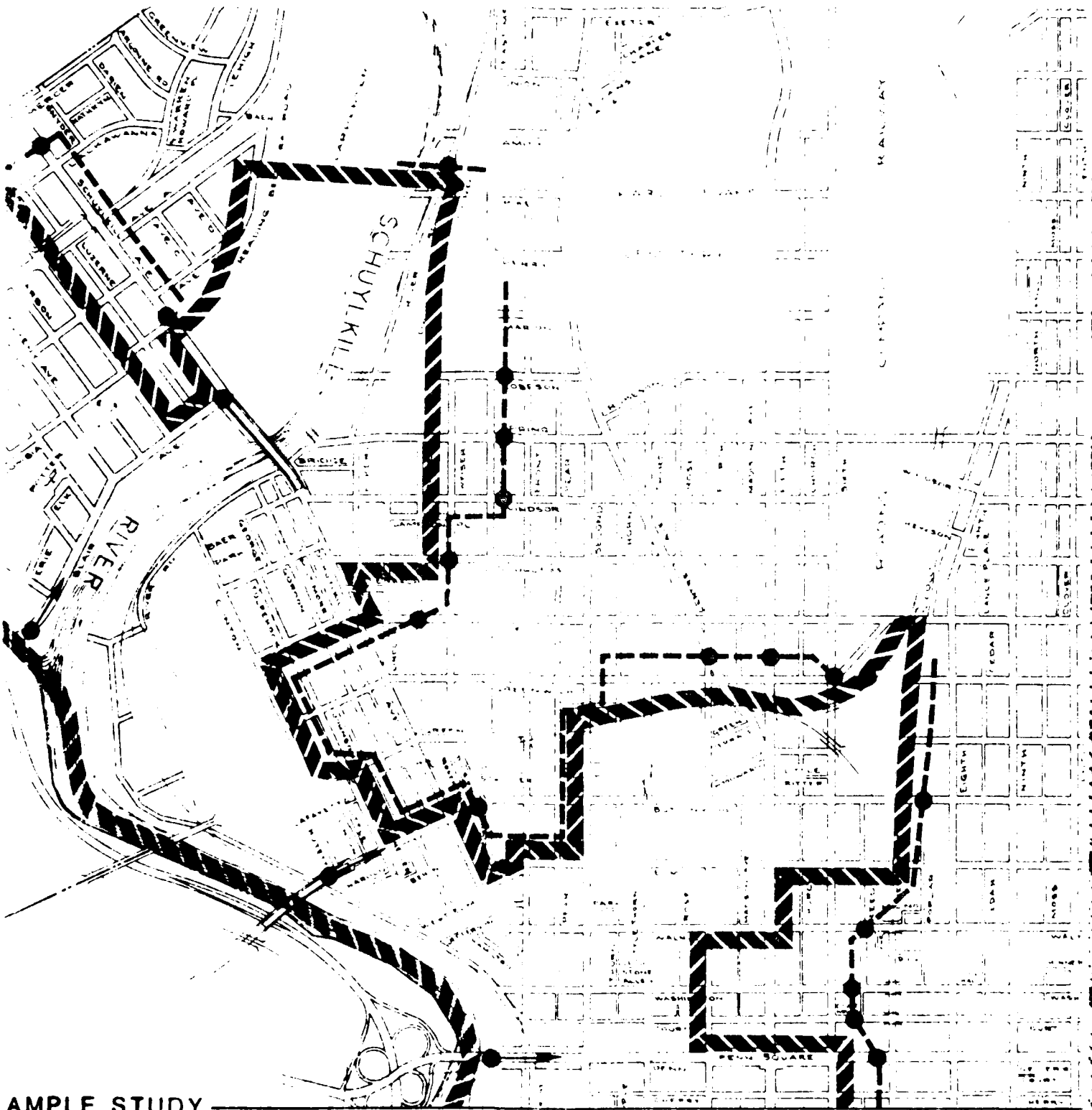
[to be inserted]

e. Clear Area

Direct all Police Department personnel to leave the evacuation area before flooding begins. Leave an ample margin of safety.



LIMIT OF EXAMPLE STUDY



AMPLE STUDY

EVACUATION ASSISTANCE SUBPLAN

APPENDIX 3
TO
PLAN FOR EVACUATION IN THE
EVENT OF EMERGENCIES AT
BLUE MARSH DAM AND LAKE
READING, PENNSYLVANIA

Most Recent Update *(to be inserted)*

Hypothetical Example for Demonstration Purposes Only

EVACUATION ASSISTANCE SUBPLAN

1. Objective

To provide any assistance needed by individuals who are elderly, handicapped or for some other reason require help in evacuating.

2. Responsibility for Conduct

Coordinated by the City Civil Defense Director. Performed by City Transit Department, Ambulance Companies, and Fire Department personnel not engaged in dissemination of warnings.

3. Basis for Initiation of Action

Direction from Police Department Watch Commander to execute subplan for a particular level of "fast" or "slow" evacuation.

4. Actions to be Taken

a. Notify the Transit Department to:

- (1) Recall drivers necessary to put all operable busses into service.
- (2) Direct drivers to immediately terminate regular routes, discharge passengers and drive busses to evacuation area.
- (3) Allocate busses for routes shown on Plate A3-1.

b. Notify the parties listed in Table 6 to dispatch ambulances to the evacuation area to provide assistance as needed in evacuation at marked locations (bedsheets hanging out of window).

TABLE 6
SOURCES AND LOCATIONS OF AMBULANCES

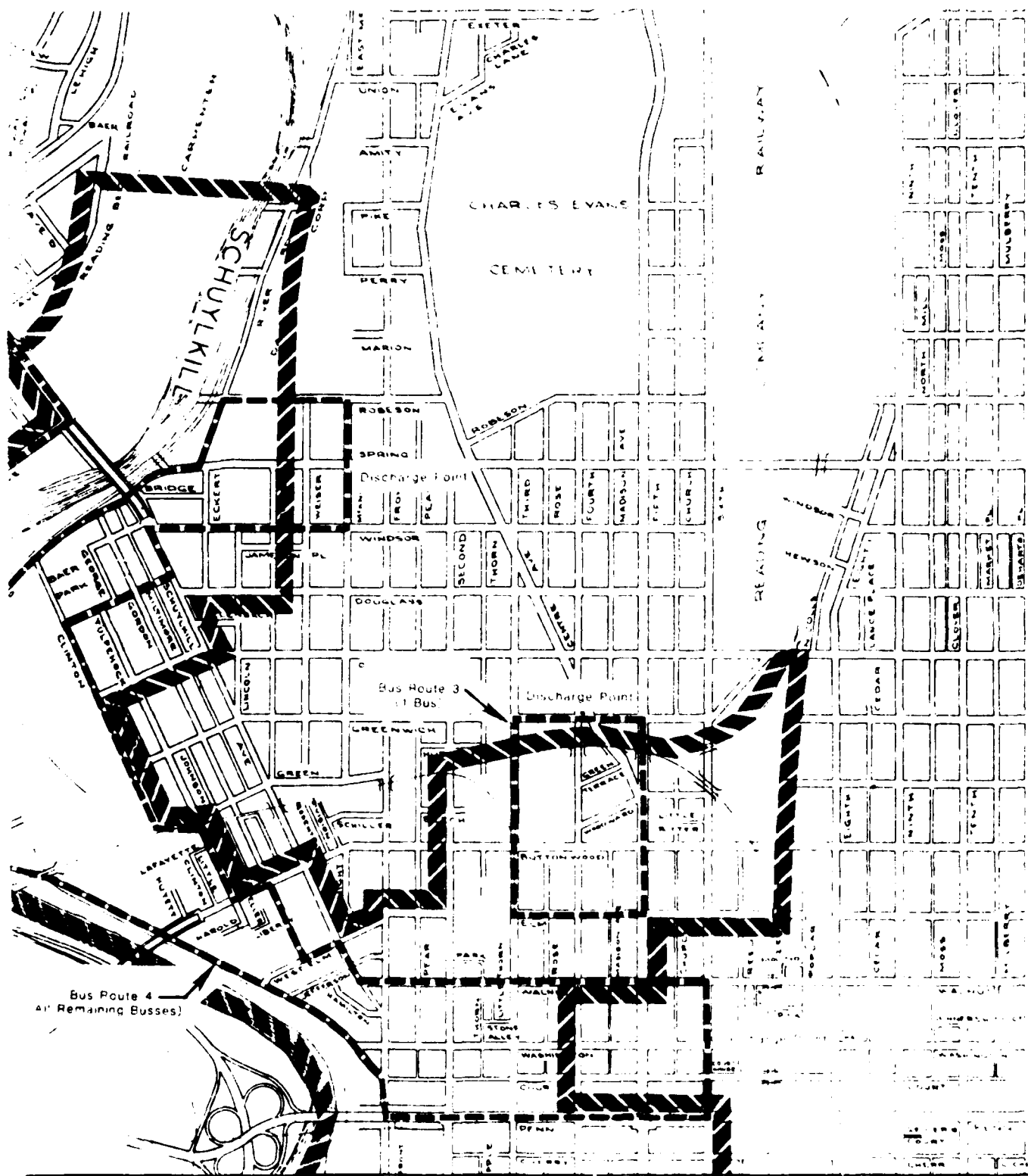
<u>Name</u>	<u>Location</u>	<u>Telephone No.</u>	<u>Assigned Area</u>
-------------	-----------------	----------------------	----------------------

[to be inserted]

c. Coordinate with Fire Department Watch Commander regarding use of available Fire Department personnel to provide evacuation assistance.

d. Clear Area

Direct all personnel assisting in evacuation to leave before flooding begins. Leave an ample margin for safety.



Bus Route 4
All Remaining Buses)

END

FILMED

4-84

DTIC