List of References

1) Vongvisessomjai S., S. Thinaphong: Prediction of Probable Maximum and Minimum Water Levels, Ao Phai, Research Report No. 69, Asian Institute of Technology, March 1977.

2) Ludwing, H.P.: Environmental Guideline for Coastal Zone Management in Thailand, Zone of Pattaya, November 1975.

3) Hydrographic Department Royal Thai Navy: Tide Tables Thai Waters Mae Nam Chao Phraya- Gulf of Thailand and Andaman Sea, 1978.

4) NEDECO: Deep Sea Port of Laem Chabang, Survey and Design, 1972.

5) Ludwing, H.P.: Background Information Relating to Environmental Guidelines for Zones in Gulf of Thailand, June 1976.

6) Pescod, M.B. & Others: An Environmental Background Survey of the Area Near the Proposed Site of the Petrochemical Complex in Chonburi Province, AIT Research Report No. 64, March 1975.

7) Ludwing, H.P.: Coastal Zone Management in Thailand Phase II, Environmental Reconnaissance, A Case Study at Phuket, January 1976.

8) Electricity Generating Authority of Thailand Sand Movement Investigation of Nuclear Power Project, Progress Report from October to March 1974, Report No. HD-005, May 1974.

9) Royal Observatory Hong Kong: Wave Observations along East Coast of Peninsula Malaysia, 1972.

10) Meteorological Department: Climatological Data of Thailand 20 year Period (1951-1970), Bangkok, 1972.

11) A.I.T.: Coastal Water Pollution Survey of Chonburi Province, Prepared for ESSO/Thailand, 1973

12) National Marine Science Committee: Report on the Forth-Seventh Pollution Survey in the Upper Part of the Gulf of Thailand, October 20, 1974-July 30, 1975.

13) Tapananont, S.: Source and Distribution of Sand along Coastline from Bang Prakong River Mouth to Sri Racha 1970

14) Scripps Institution of Oceanography: Ecology of the Gulf of Thailand and the South China Sea, A Report on the Results of the Naga Expedition, 1959-1961, February 1963.

15) Wyrtki, K.: Scientific Results of Marine Investigations of the South China Sea and the Gulf of Thailand, 1959-1961, NAGA REPORT Volume 2, Scripps Institution of Oceanography, The University of California, 1961.

16) Meteorological Department: Wind Data at Chonbuli and Sattahip, period of 1965-1975.

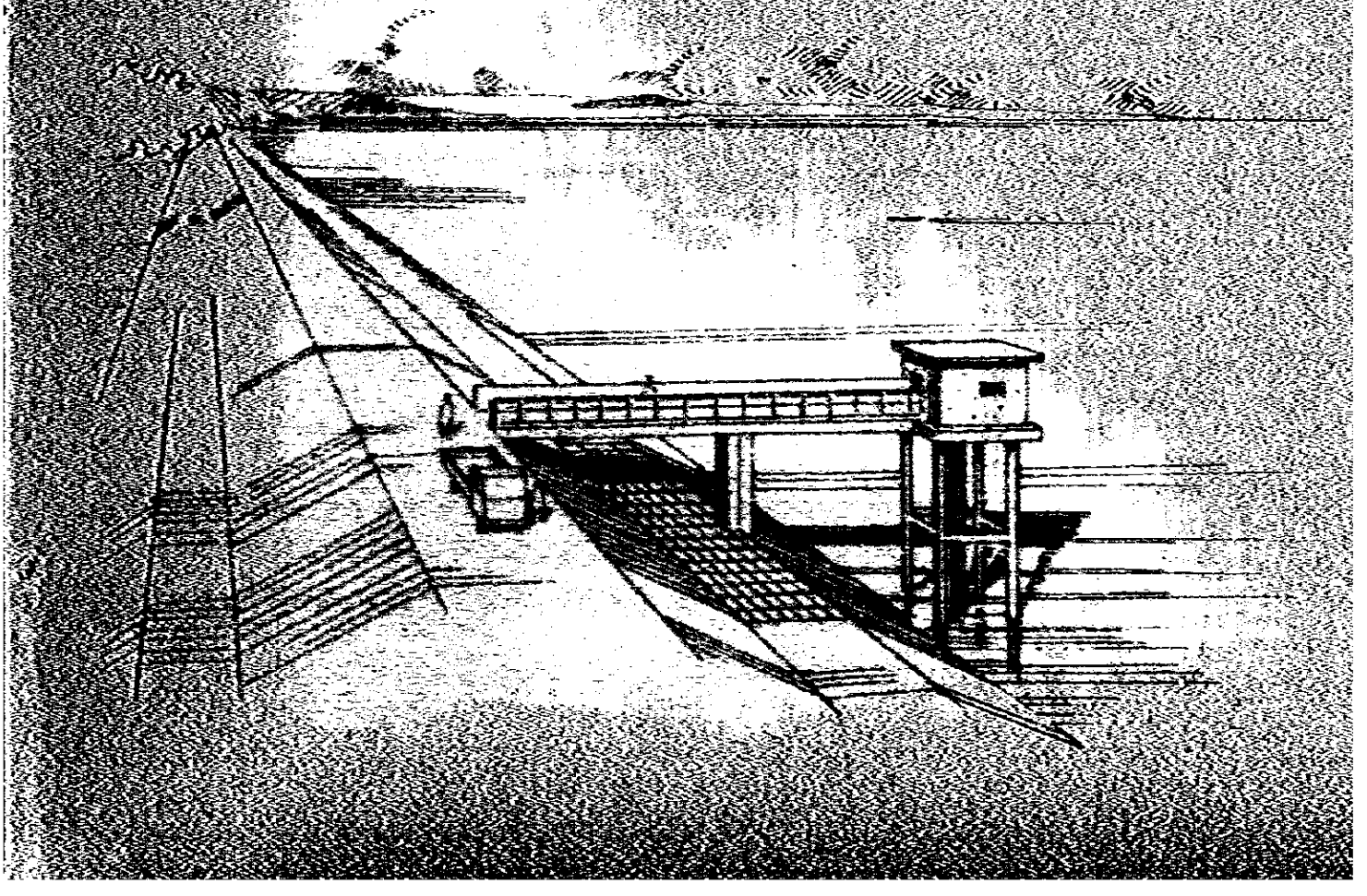
17) U.S. Army Engineer Waterways Experiment Station: Igloo Wave Absorber Tests For Port Washington Harbor, Wisconsin. Miscellaneous H-76-22, 1976.

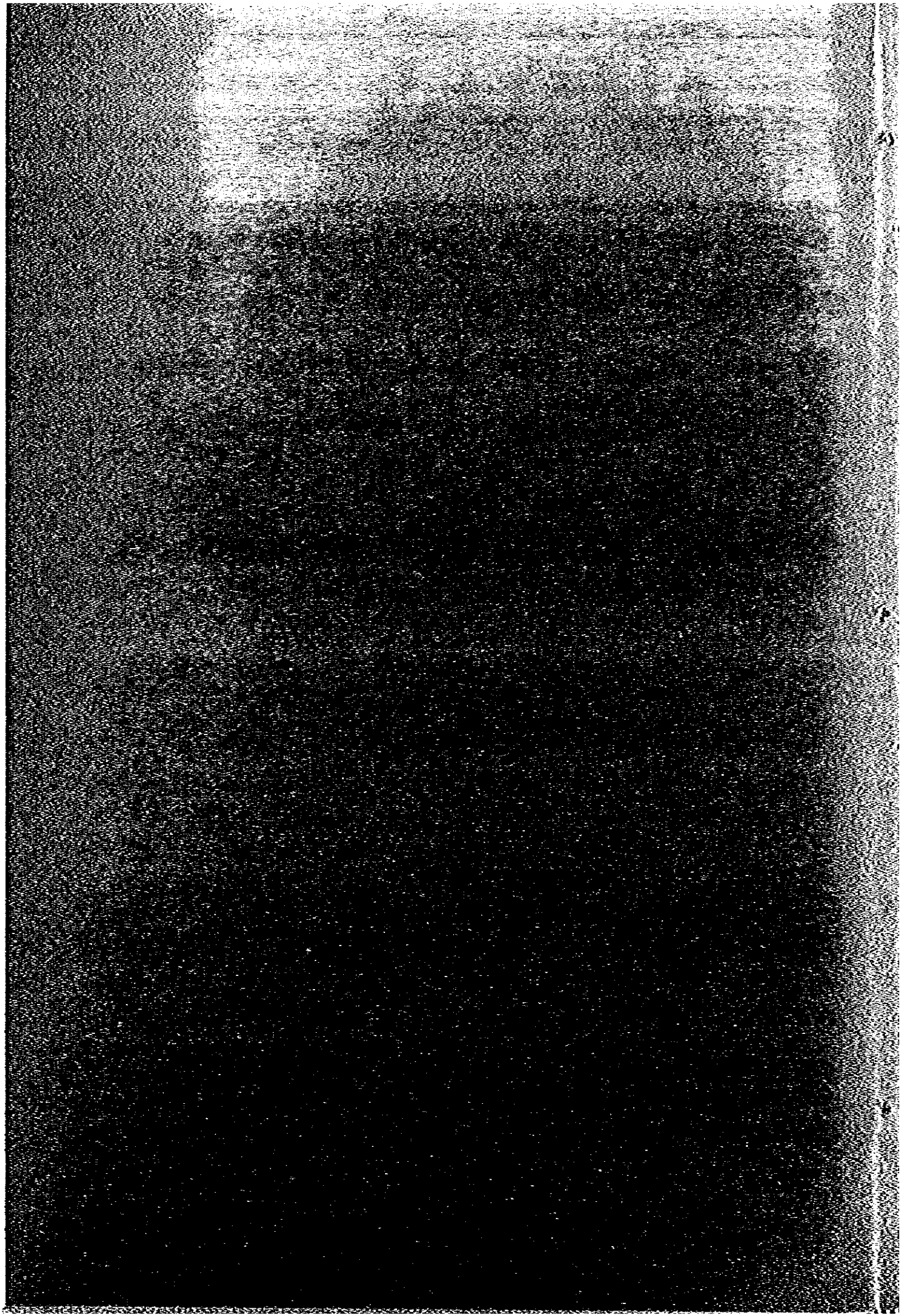
18) Charles A. Chaney; Marinas (Recommendation for Design, Construction and Maintenance)

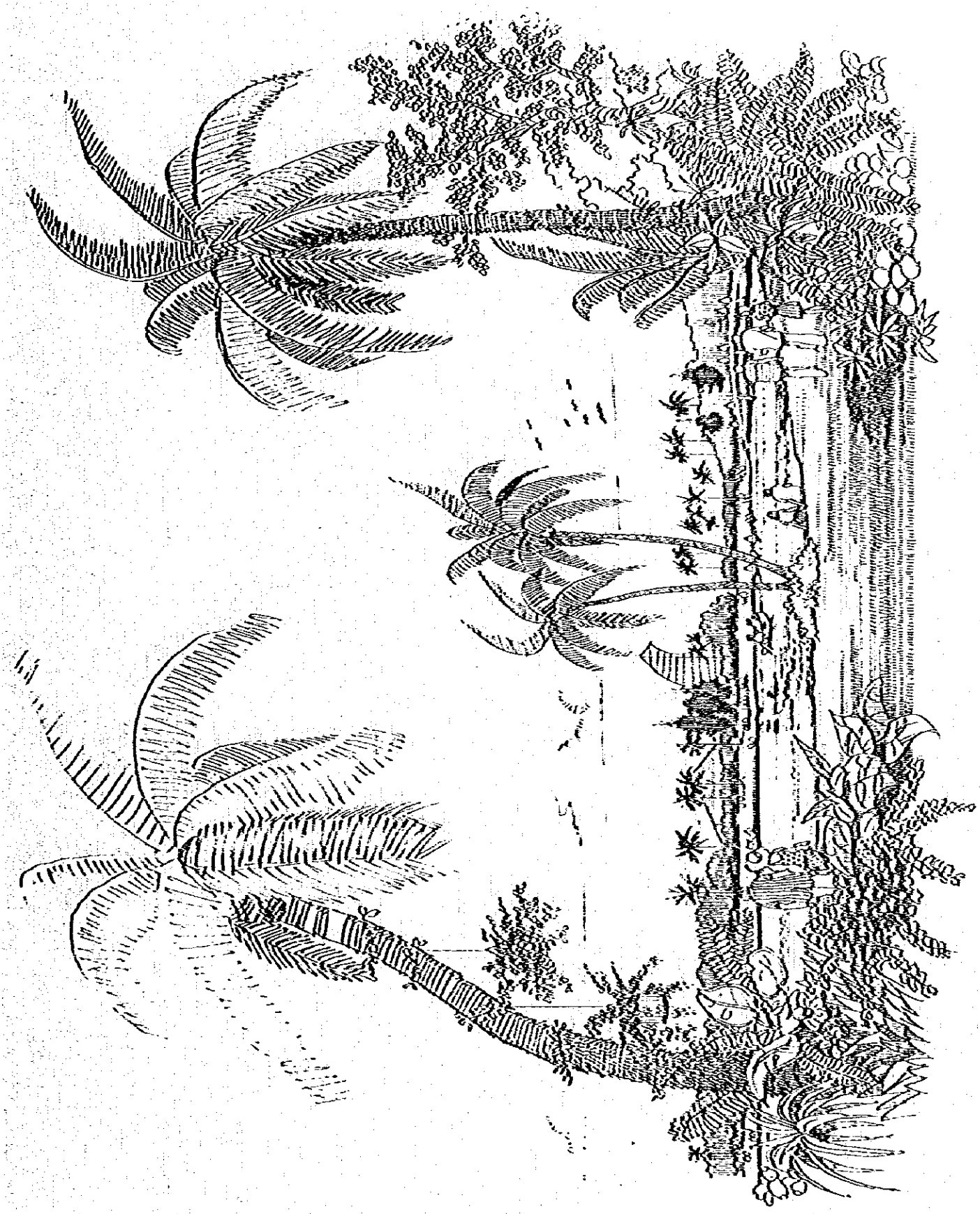
19) Williams, Kuebelbeck & Associates, Inc.; Marina Management Study, Volume 1, Management and Operating Guidlines for Public Marinas.

CHAPTER 7
WATER SUPPLY SYSTEM

1. GENERAL
2. PURPOSE OF THE STUDY
3. HISTORY OF THE STUDY
4. RELATIONSHIP TO OTHER PARTS OF THE INFRASTRUCTURE
5. AMOUNT OF WATER TO BE SUPPLIED







CHAPTER 7 WATER SUPPLY SYSTEM

7.1 General

As mentioned in Chapter-1, the 1-1-3 Water Supply System for the Study Area, the purpose of the study of this subject would not be in the same category as for other major infrastructure developments. The Thai Government has announced that as regards this sytem it is intended to proceed further into the detailed design stage and construction in the governments budget.

According to information received from over counterparts in the project, the following could be said:

(1) The Thai Covernment will carry out the detailed design.

(2) The Thai Covernment has allocated a construction budget for this system.

(3) The detailed design will be completed by the end of 1978 but contents of the design is not able to be clear.

(4) The cost estimations based on the detailed design will be finished at the beginning of 1979.

(5) The detailed design is based on the basic figures on two study reports such as "The final report of the master plan for Pattaya Trourism development" by Japan International Cooperation Agency 1977 and "The Feasibility Report on Water Supply for Pattaya - Bang Lamung" by Water Resources Planning Subcommittee in National Economic and Social Development Board 1976.

(6) Size of the system
- First Stage ..... 20,000 m^3/day in

Water supply for tapioca factories is included but as for Ko Lan island is not included.

7.2 History of the Study

The following is a history of water supply system for Pattaya from 1976 upto now.

- Angust 1976 : Feasibility Report by N.E.S.D.B was completed.
- November 1976 : Scope of Work was established on the master plan and feasibility study for Pattaya Tourism Development Project in Thailand between Government of Thailand and Government of Japan.
- January 1977 : Field survey by Japan International Cooperation Agency (J.I.C.A.) was started for preparation of the master plan.
- August 1977 : J.I.C.A. submitted the draft final report of master plan to the Government of Thailand. The Government of Thailand requested to J.I.C.A. to carry out feasibility study on six high priority components based on the agreement between both Governments.
- September 1977 : Government of Thailand informed to the Government of Japan that feasibility study on water supply system would be made by the Government of Thailand.
- December 1977 : J.I.C.A. agreed that feasibility study on 5 items excluding water supply system would be carried out by J.I.C.A.'s consultants.
- December 1977 : Government of Thailand announced that the detailed design for water supply system would be an international tender for selecting of the consultant. After a while this tender was concelled by the Government of Thailand.
- January 1978 : Feasibility study was started by J.I.C.A.
- October 1978 : J.I.C.A. submitted the draft final report on Feasibility Study to the Government of Thailand.
- December 1978 : J.I.C.A. submitted the final report on Feasibility Study to the Government of Thailand.

7.3 Purpose of the Study

This study has been made because of its importance in the evaluation of the whole project though this system is not listed up on the items of feasibility study. Basic figures in this report, such as planning and cost estimates, could be replaced by the results of the detailed design which is carried out currently by the Government of Thailand. The Main purposes of the study are itemized as follows:

(1) Preparation of the preliminary study

(2) Estimation of rough costs for construction, maintenance and operations

This study has been harmonized with the design concepts and basic policy in the Masterplan. The basic figures inlcude expected demand and landuse plans as follows:

(1) The expected number of tourists-international, Domestic and day tripper.

(2) Required size and scale of public and private facilities, amenity cores, hotels and restaurants.

(3) Proposed landuse plan

(4) Population increase and controls

(5) Planning for the island

7.4 Relationship to Other Parts of the Infrastructure

The water supply system will be one of keystone to the other parts of the infrastructure in the planning, construction and operation stages. It is inevitable that this system must be implemented so as to act in concert with the other systems.

(1) Planning Stage

The most feasible and economic plans and designs should be drawn up in accordnace with basic figures such as forecasted demand and the landuse plan. The water supply system would have to be coordinated with the sewerage system in every possible way.

(2) Construction Stage

At this stage, the system would have to be implemented together with the road and street systen to avoid uneconomical disordering such as double excavations for pipe laying. Also arrangement shall be made between water supply piping and sewer mains and their branches in line and elevation as well.

(3) Operation

The system could start operating after completion or even partial completion. The required charges should then be collected from the users.

Generally the colleciton of charges for the sewerage system would be done together with the colleciton of charges for the water supply system. It would be difficult to collect the sewerage charges independently from the water charges. Because it is so difficult to measure a volume of sewage.

Thus, the combined collection of charges of these two systems might be practical.

7.5 Amount of Water to be Supplied

The total annual amount of water to be required have been studied tentatively as shown in Table 7-4-1. The annual amount of water has been estimated for a typical year, as follows.

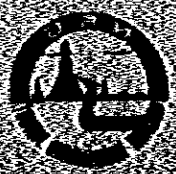
Table 7.4.1 Total Annual Amount of Water

Unit: Thousand Cubic Met

Year	Tourism	Residential	Total
1981	414	2,926	3,340
1986	1,546	4,568	6,114
1991	1,561	5,080	6,641
1996	1,561	5,573	7,144

The water for tourism includes that for users on Ko Lan Island.

More detial is shown on Chapter 3, 3.6.2 (a) 1) water supply volume (daily average).



TOURIST ORGANIZATION
OF THAILAND
JAPAN INTERNATIONAL
COOPERATION AGENCY