



ENVIRONMENTAL ASSESSMENT STATEMENT

Guam Hilton Hotel Dredging Project

Public Notice Number PODCO-0 1054-SD

Tumon Bay, Ypao, Territory of Guam

*No comment*

GOVERNMENT OF GUAM

AGANA

22 MAR 1973



Memorandum

To: Territorial Planning Commission  
From: Director of Land Management  
Subject: Guam Hilton Hotel Dredging Project

Please take notice that Hotels of the Marianas, Inc. (Guam Hilton Hotel), is proposing to dredge a swimming area from submerged lands adjacent to the Guam Hilton Hotel.

A copy of the application and environmental assessment statement are provided for your information and comments. Any comments should be submitted in writing to the Department of Land Management, no later than April 23, 1973.

*Gregorio S. Perez*  
GREGORIO S. PEREZ  
Acting

Attachments

**ENVIRONMENTAL ASSESSMENT STATEMENT**  
**Guam Hilton Hotel Dredging Project**  
**Public Notice Number PODCO-0 1054-SD**  
**Tumon Bay, Ypao, Territory of Guam**

**Prepared by**  
**Hotels of the Marianas, Inc.**  
**March 9, 1973**

# TABLE OF CONTENTS

## ENVIRONMENTAL ASSESSMENT STATEMENT

|                                                                                                                                              | <u>Page</u> |
|----------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| I. Project Description .....                                                                                                                 | 2           |
| II. Environmental Setting Without the Project.....                                                                                           | 3           |
| III. Environmental Impact of the Proposed Action.....                                                                                        | 4           |
| IV. Adverse Environmental Effects Which Cannot be Avoided<br>Should the Proposal be Implemented.....                                         | 4           |
| V. Alternatives to the Proposed Action.....                                                                                                  | 4           |
| VI. Relationship Between Local Short-Term Uses of Man's<br>Environment and the Maintenance and Enhancement of<br>Long-Term Productivity..... | 4           |
| VII. Any Irreversible and Irretrievable Commitment of<br>Resources Which Would be Involved in the Proposed<br>Action.....                    | 5           |
| VIII. Coordination With Others.....                                                                                                          | 5           |
| Exhibit A - Public Notice Number PODCO-0 1054-SD.....                                                                                        | 6           |
| Exhibit B - Mailing List for Public Notices for Guam.....                                                                                    | 13          |
| Exhibit C - Marine Survey.....                                                                                                               | 17          |
| Introduction.....                                                                                                                            | 18          |
| The Proposal.....                                                                                                                            | 18          |
| Results.....                                                                                                                                 | 19          |
| Description of Study Area.....                                                                                                               | 19          |
| Current Patterns.....                                                                                                                        | 23          |
| Biological Studies.....                                                                                                                      | 24          |
| Conclusions.....                                                                                                                             | 25          |
| Recommendations.....                                                                                                                         | 26          |
| Figures.....                                                                                                                                 | 28-47       |
| Exhibit D - Letter from and Response to Charles W. Spero.....                                                                                | 48          |
| Exhibit E - Letter from and Response to Jeff Busha, President<br>Guam Board of Realtors.....                                                 | 52          |
| Exhibit F - Letter from and Response to Gerald Perez, Director<br>of Department of Land Management, Guam.....                                | 55          |
| Exhibit G - Letter from and Response to O. V. Natarajan,<br>Administrator.....                                                               | 58          |
| Exhibit H - Letter from and Response to U. S. Department of Commerce..                                                                       | 61          |
| Exhibit I - Letter from and Response to Isaac I. Ikehara, Chief<br>Division of Fish and Wildlife.....                                        | 64          |

## I. Project Description

A. Background - Hotels of the Marianas, Inc. (Guam Hilton Hotel), Kenneth T. Jones, Jr., President, Post Office Box 7, Agana, Guam 96910, is submitting a proposal to the Department of Land Management, Government of Guam; the U. S. Department of Interior; and the Corps of Engineers, to dredge a swimming area from submerged lands adjacent to the Guam Hilton Hotel.

B. Name of Proposal - The proposal is generally referred to as the Guam Hilton Hotel Dredging Project and has been announced through Army Corps of Engineers' Public Notice Number PODCO-0 1054-SD, dated December 6, 1972. A copy of this notice which includes detailed drawings of the project is attached (Exhibit A). A copy of the distribution of this public notice is also attached (Exhibit B). The project consists of creating a salt water swimming area from submerged lands adjacent to the hotel property and improvement of the adjoining beach by placing surplus sand removed in dredging on the beach behind existing seawalls. Construction boundaries include an area of about 200 by 200 feet (Figure 2 of Exhibit C). Dredging will begin seaward of the inter-tidal zone and the area will be gradually deepened out to the seaward boundary. The deepest dredge cut will be about 4 feet below the present bay bottom. This will make the seaward portion of the swimming area 5 feet deep at 0.0 tide and 7.5 to 8.0 feet deep at high tide (about +2.5 feet).

C. Location of Project - The submerged lands involved in this project are located in the Philippine Sea, Tumon Bay, adjacent to the north face of Ypao Point Headland, seaward of a portion of Lot 5174-D, within the Municipality of Tamuning in an area generally known as Ypao, Territory of Guam (for drawings of the project location see Figures 1 and 2 of Exhibit C and Sheets 1 and 2 of Exhibit A).

D. Project Modifications - At the request of Hotels of the Marianas, Inc., a marine survey for the proposed project was made by Richard H. Randall and Robert S. Jones of the University of Guam Marine Laboratory. Their report, dated March 6, 1973 is attached (Exhibit C). As a result of their study and at their suggestion, the project as outlined in Corps of Engineers Public Notice Number PODCO-0 1054-SD (Exhibit A) has been modified as follows:

1. The proposal to add a loose rock fill as shown on Sheet 2 of Exhibit A has been deleted.
2. The proposal to place the dredging surplus behind the loose rock fill as indicated on Sheet 2 of Exhibit A has been deleted. The dredged surplus allocated to these areas under the original proposal will be removed from the project area and disposed of as directed by the Government for the Government's account.
3. The proposal to move the existing rock groin as indicated on Sheet 2 of Exhibit A has been deleted.
4. Dredging will be accomplished only during plus tides as recommended in the marine survey report.

5. Microatolls in the project area will be moved to the upstream boundaries of the project site before and during the dredging. These atolls will then be returned to deeper portions of the area adjoining the swimming basin.
6. For purposes of clarification it should be noted that the proposed sea walls indicated on Sheets 2 and 4 of Exhibit A actually are existing sea walls, the construction of these sea walls being accomplished prior to publication of the notice contained in Exhibit A. No additional sea walls will be constructed.

E. Purpose of the Project - The purpose of this project is to provide hotel guests and members of the public with a safe and usable beach and salt water swimming area.

## II. Environmental Setting Without the Project

A. Physical Description of the Project Area - A detailed physical description of the project area, including geographical, biographical and marine data is contained in the marine survey attached (Exhibit C). The beach on Tumon Bay is typical of most Guam beaches in that it is beautiful to view but not very satisfactory for swimming. The beach tends to be narrow and covered with a mixture of rock, pebbles and sand and the underwater surface adjoining the beach contains sharp rocks which are hazardous to bare feet. The hotel currently provides tennis shoes free of charge to hotel guests who desire to enter the water in order to afford them some protection from cuts and abrasions. The reef platform extends from the shoreline of the bay seaward for up to three or four hundred yards and the incoming waves and tides break over the sea edge of the reef and move into the shoreline. This current pattern has resulted in a gradual accretion of sand and other debris on the reef platform causing the inner bay area to become extremely shallow. Due to the shallow water level, persons wishing to swim freely in the ocean must venture out from the beach toward the seaward edges of the reef and thereby expose themselves to the unpredictable currents which exist in that area. While currents along the outer edges of the reef can be unpredictable and hazardous, currents in the shallow interior portion of the reef and bay are usually safe and acceptable. The proposed swimming area will be located directly adjacent to the hotel property on Tumon Bay and the beach at this point is several hundred yards from the seaward edge of the reef. As disclosed in the marine survey (Exhibit C) the current pattern through this area is sufficient to provide fresh water in the swimming area but is not sufficient to constitute a hazard to swimmers under normal sea conditions. In addition, a lifeguard will be posted at the swimming area by the hotel for the protection of all concerned.

B. Marine Life - As indicated in the marine survey (Exhibit C) other than a few small coral atolls (which will be moved upward of the dredging area and will be replaced after dredging) very little of significance in the way of marine life or support systems is located in the area to be dredged.

C. Economic Development - The principal source of revenue on Guam traditionally has been the U.S. military complex and assistance from the United States Government. Guam has very little in the way of industry or agriculture and the Government has been actively supporting tourism for the last five or six years. The success of this promotion is evidenced by the fact that tourist expenditures on

Guam have increased over this period from a few thousand dollars to an estimated 50 million dollars for the calendar year 1973. Tumon Bay has emerged as the principal resort center for Guam and has received most of the development incident to the increased tourist trade. During this short period of time five substantial hotels have been built on Tumon Bay and a number of others are in various stages of planning and/or construction. In addition to the hotels, the Government of Guam has a park located at Ypao on Tumon Bay. Several years ago the Government of Guam created a swimming area from submerged lands adjacent to the park substantially similar to the one proposed by Hotels of the Marianas, Inc. This facility is heavily used as it is one of the very few in existence on the island open to the public. Other than the hotels and the park site, there is no substantial development on Tumon Bay. It is the consensus of many in the tourist industry and real estate here on Guam that Tumon Bay will continue to be developed as the principal resort area on Guam. Many in the hotel industry, including management of the Guam Hilton, feel that in order to preserve tourism on Guam it will be necessary to provide safe, suitable swimming areas for the tourists. The water and beaches constitute a major attraction to the tourists and when they find they cannot use the beaches and the water is unsuitable for swimming and recreation they are understandably disappointed.

### III. Environmental Impact of the Proposed Action

A. The Dredging - The dredging will be accomplished as recommended in the marine survey (Exhibit C). That is, dredging will only be done at high or plus tides and prior to dredging activity, microatolls will be moved upstream of the area to be dredged. By accomplishing the dredging in the manner prescribed, the short term and long term impact upon the marine and geological elements of the bay will be insignificant.

B. Advantages of the Project - The principal advantage of the project is that it will provide tourists and members of the public with a much needed recreational facility. In terms of long term advantages, it will also help assure the island of continued tourist interest which in turn will provide employment for the people and revenue for the Government.

C. Protective Action - As mentioned above, the dredging will be done strictly in accordance with the recommendations of the marine survey team and every effort to preserve the natural surroundings will be made.

IV. Adverse Environmental Effects Which Cannot be Avoided Should the Proposal be Implemented - As mentioned in the marine survey, the dredging will physically remove the extant benthic habitat within the dredged site. However, as noted in the marine survey, this habitat, other than the coral microatolls which will be preserved, is basically poor in comparison to the midbay region.

### V. Alternatives to the Proposed Action

The only alternative to the proposed action is to leave the area undisturbed. As previously mentioned, modifications to the original proposal have been made consistent with the recommendations of the marine survey team in order to assure minimum impact on the marine community.

### VI. Relationship Between Local Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity

It is not contemplated that the proposed project would have any short-term

or long-term detrimental impact on the environment. It will provide recreational facilities for visitors and residents of Guam which is of significant short-term and long-term benefit.

VII. Any Irreversible and Irretrievable Commitment of Resources Which Would be Involved in the Proposed Action

The only irreversible and irretrievable commitment of resources would be the removal of the dredged materials from the project site. The beach sand dredged from the area will be used to improve the beaches. Excess rock and other dredged materials will be removed from the project site, and to this extent, a commitment of resources would be involved. It is also anticipated that periodic maintenance of the dredged area will be required in order to remove sand from the swimming area brought in by storms and currents. However, based upon a history of the Government swimming area down the beach from the hotel site, it is not anticipated that this maintenance will be extensive or significant in terms of the environment.

VIII. Coordination With Others

A number of governmental agencies and individuals have responded to the public notice published by the Corps of Engineers with comments and suggestions concerning the project. Copies of the letters and response by Hotels of the Marianas, Inc. to them requested by the Army Corps of Engineers are attached hereto as Exhibits D through I as follows:

| <u>Name of Agency or Individual</u>                              | <u>Exhibit</u> |
|------------------------------------------------------------------|----------------|
| Charles W. Spero                                                 | D              |
| Jeff Busha, President of Guam Board of Realtors                  | E              |
| Gerald S. Perez, Director of Department of Land Management, Guam | F              |
| Department of Land Management, Guam                              | G              |
| U. S. Department of Commerce                                     | H              |
| Isaac I. Ikehara, Chief of Division of Fish and Wildlife, Guam   | I              |



DEPARTMENT OF THE ARMY  
Honolulu District, Corps of Engineers  
Building 96, Fort Armstrong  
Honolulu, Hawaii 96813

6 December 1972

PUBLIC NOTICE NO. PODCO-O 1054-SD

TO WHOM IT MAY CONCERN:

1. Notice is hereby given that the Hotels of the Marianas (Guam Hilton Hotel) Kenneth T. Jones, Jr., President, P. O. Box 7, Agana, Guam 96910, has applied to the Department of the Army for work in the navigable waters of the United States, Territory of Guam. This application will be evaluated under Section 10 of the River and Harbor Act, approved 3 March 1899 (33 U.S.C. 403).
2. The applicant has constructed improvements consisting of rubble rock walls, walks and landscaping. In addition to this work he proposes to construct a deep swimming area which will involve the removal of approximately 4,000 cubic yards dredged materials. Surplus sand from dredging will be used as sand fill at the seawalls; excess sand and rock will be removed from the site. Construction details are as shown on attached sketches entitled "Beach Development for Guam Hilton Hotel, dated 20 November 1972," in six sheets.
3. A permit issued by the Department of the Army does not give any property rights, either in real estate or materials, or any exclusive privileges, and does not authorize injury to private property or invasion of private rights, or infringements of Federal, State, or local laws or regulations. Further information may be obtained from Mr. Peter C. Toves, Director of Public Works, Government of Guam, Agana, Guam 96910, telephone number 746-1509 or from the Operations Branch, Room 301, Fort Armstrong, Honolulu, telephone number 543-2871 or 543-2713.
4. Interested parties may submit in writing any comments that they may have to the work described in paragraph 2. The decision as to whether a permit will be issued will be based on the impact of the project on the public interest. Factors to be considered in such an evaluation of public interest include, but are not limited to, navigation, fish and wildlife, water quality improvement and pollution control, economics, conservation, aesthetics, recreation, water supply, flood damage prevention, preservation and enhancement of the environment and, in general, the needs and welfare of the people. Comments should be forwarded so as to reach this District not later than forty-five (45) days from date of this notice.

6 Incl  
Drawings (6 sheets)

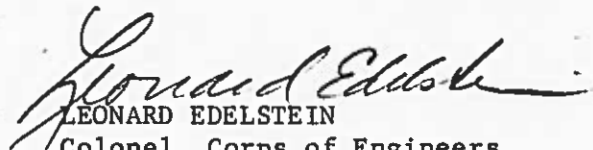
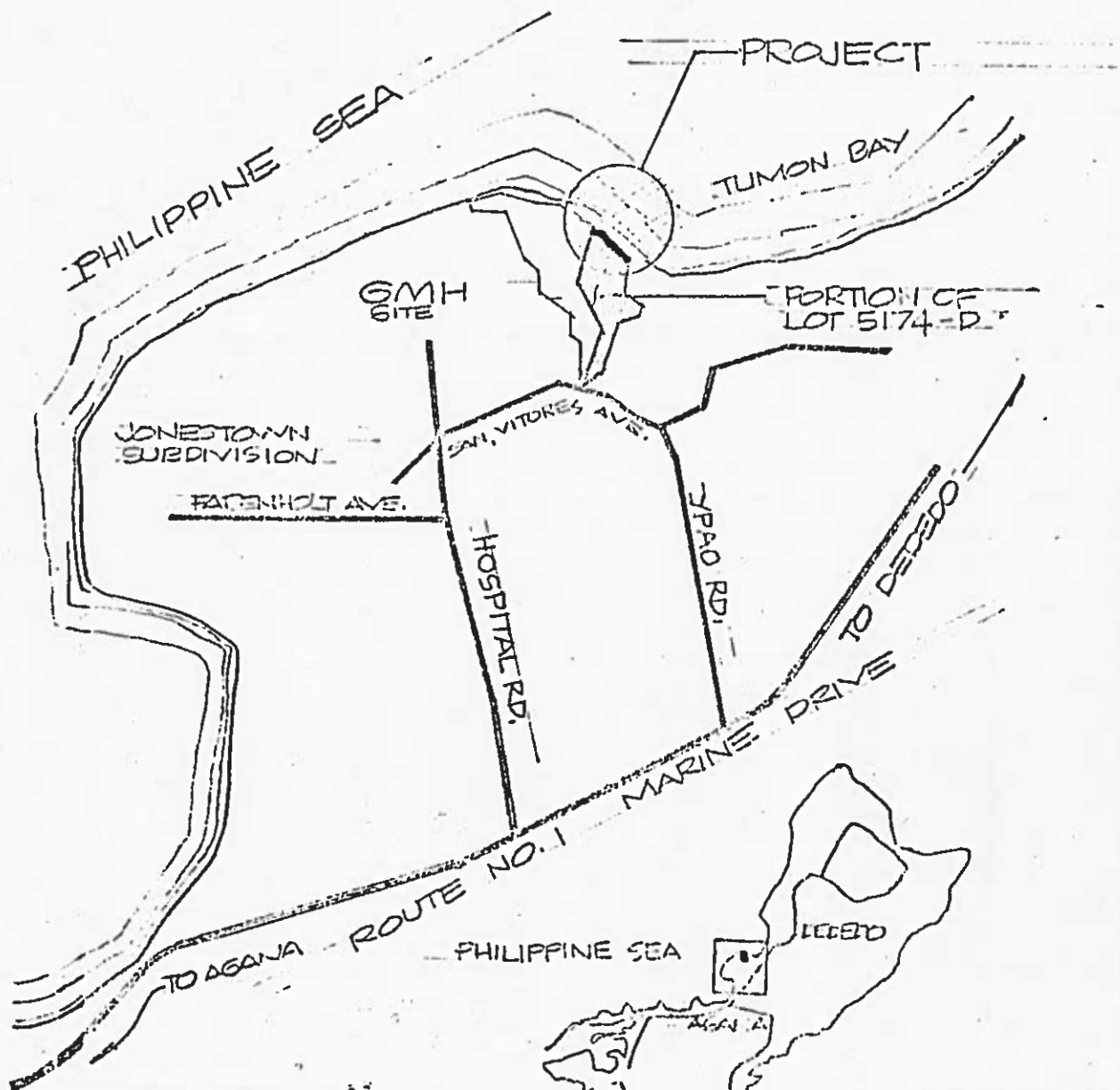
  
LEONARD EDELSTEIN  
Colonel, Corps of Engineers  
District Engineer

EXHIBIT A

6



VICINITY MAP



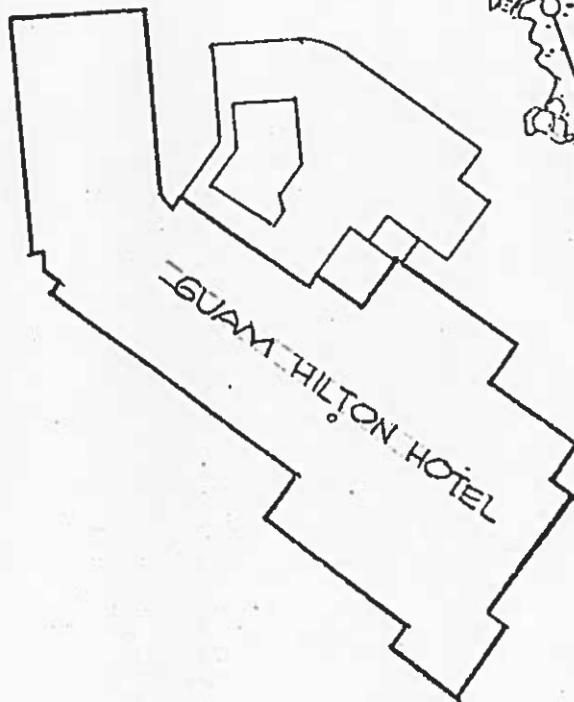
20 NOV. 73

|                                           |                   |
|-------------------------------------------|-------------------|
| BEACH DEVELOPMENT<br>for GUAYHILION HOTEL | DESIGNED:<br>PARK |
| CONTRACTOR'S<br>VICINITY MAP              | DRAWN:<br>G.M.H.  |

SHEET NO. I



PORTION OF LOT 5174-D

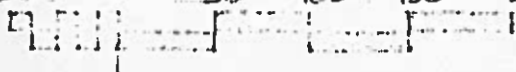


# BEACH DEVELOPMENT PLAN

SCALE 1" = 100'

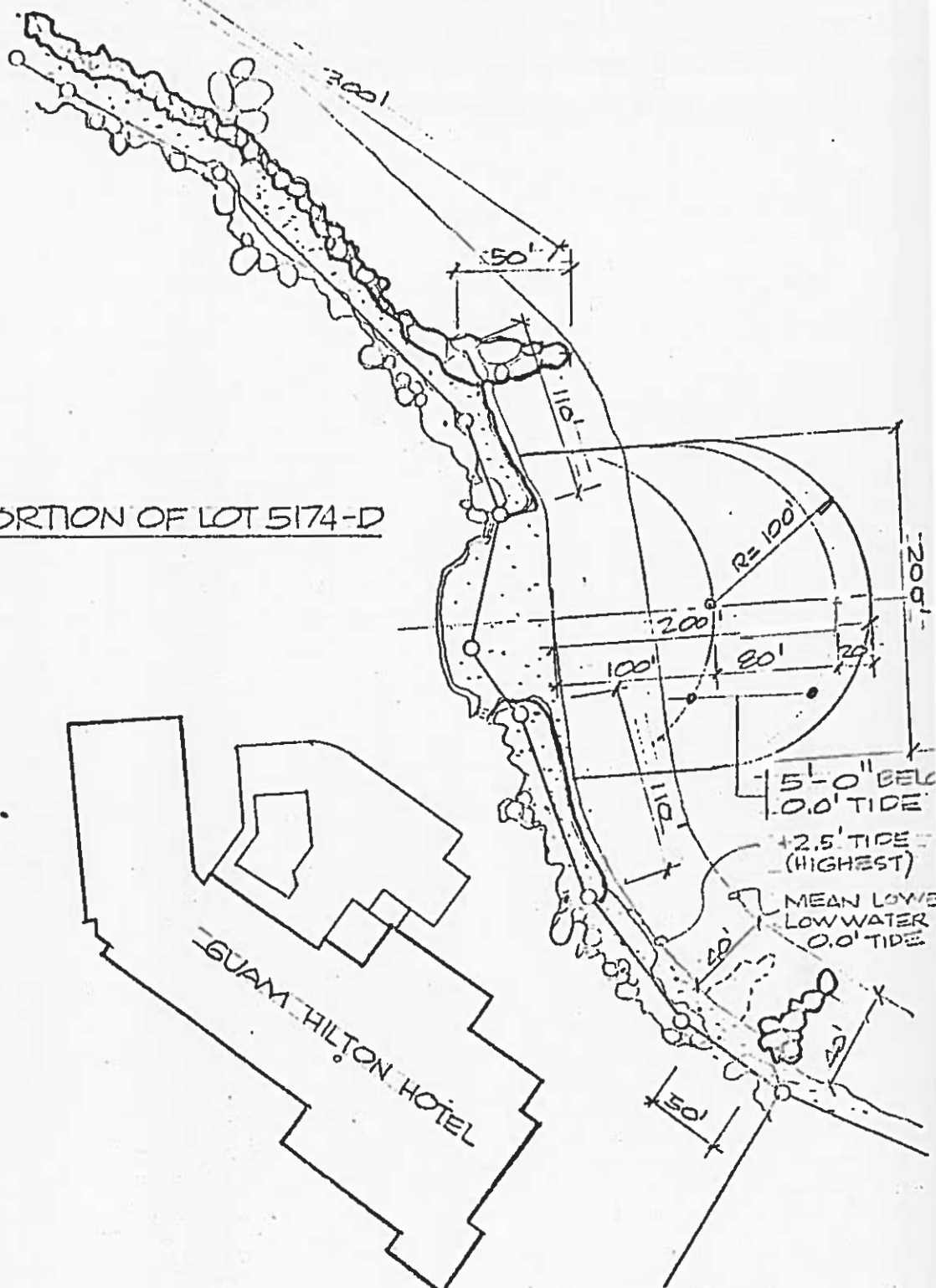
GRAPHIC SCALE

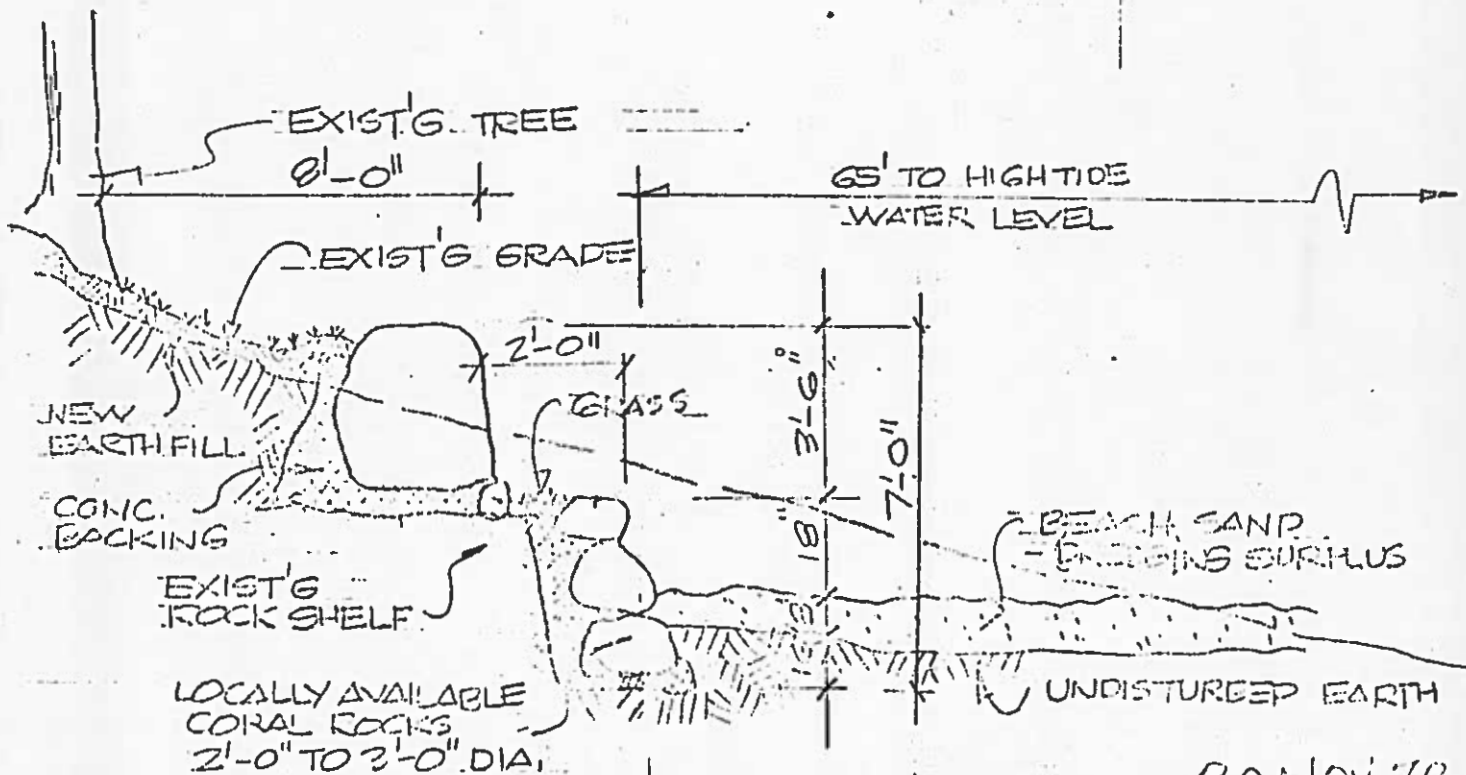
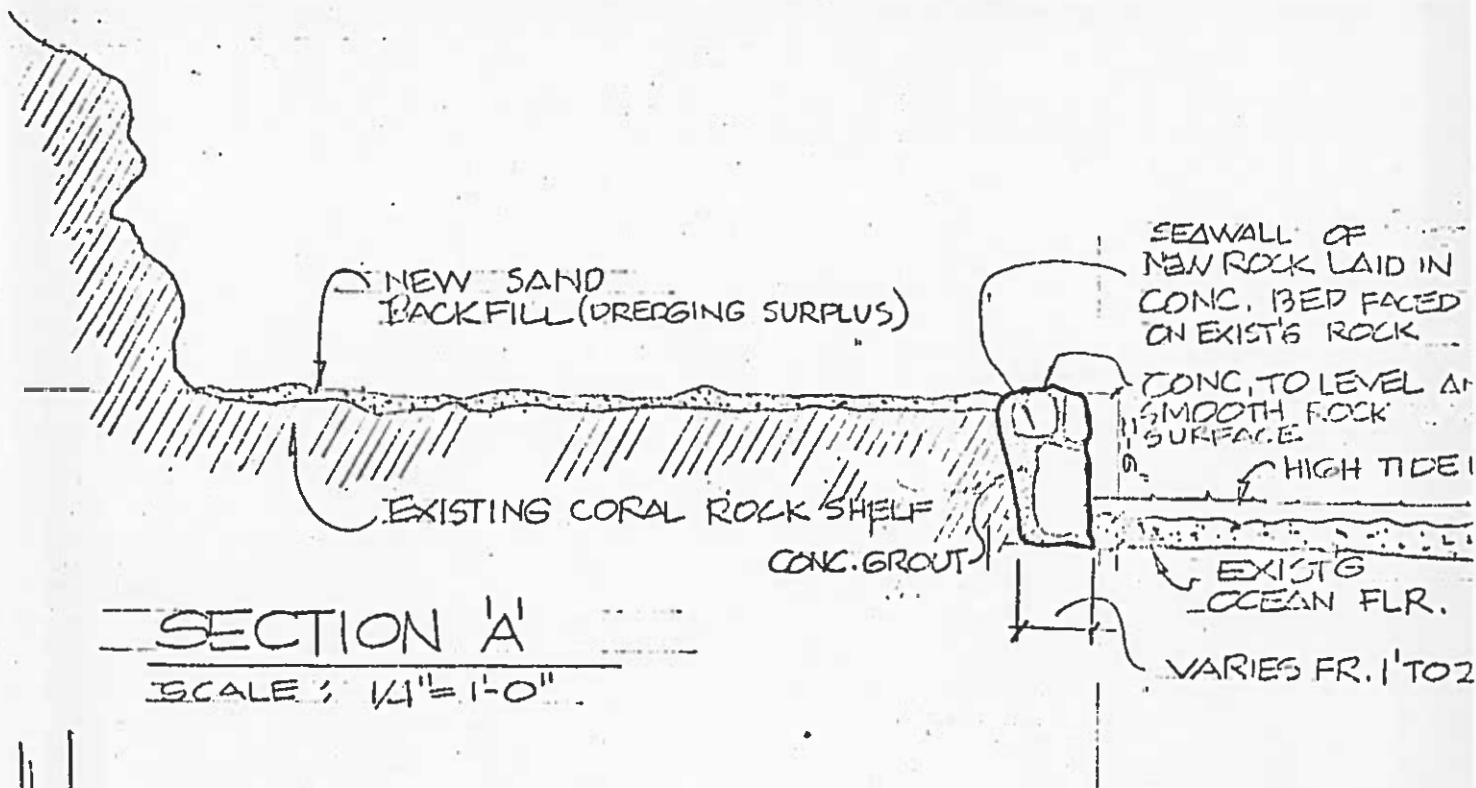
0 50 100 150 200 FT.



SHEET NO. 3

|                                            |                   |
|--------------------------------------------|-------------------|
| BEACH DEVELOPMENT<br>for GUAM HILTON HOTEL | DESIGNED:<br>HAYL |
| CONTENT:<br>DEV. PLAN                      | DRAWING<br>(0000) |

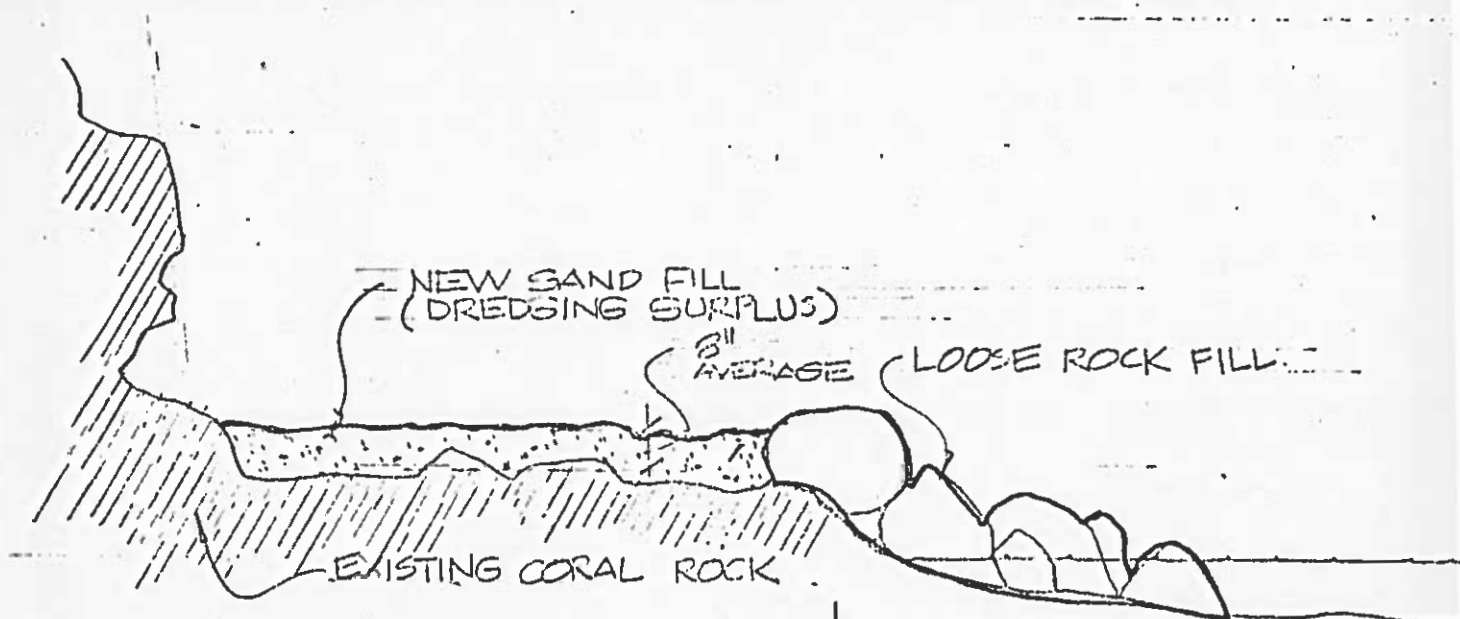




20 NOV 77

|                                            |                 |
|--------------------------------------------|-----------------|
| BEACH DEVELOPMENT<br>FOR GUAM HILTON HOTEL | DESIGNED<br>WVC |
| CONTENTS<br>SECTIONS                       | DESIGNED<br>CWH |

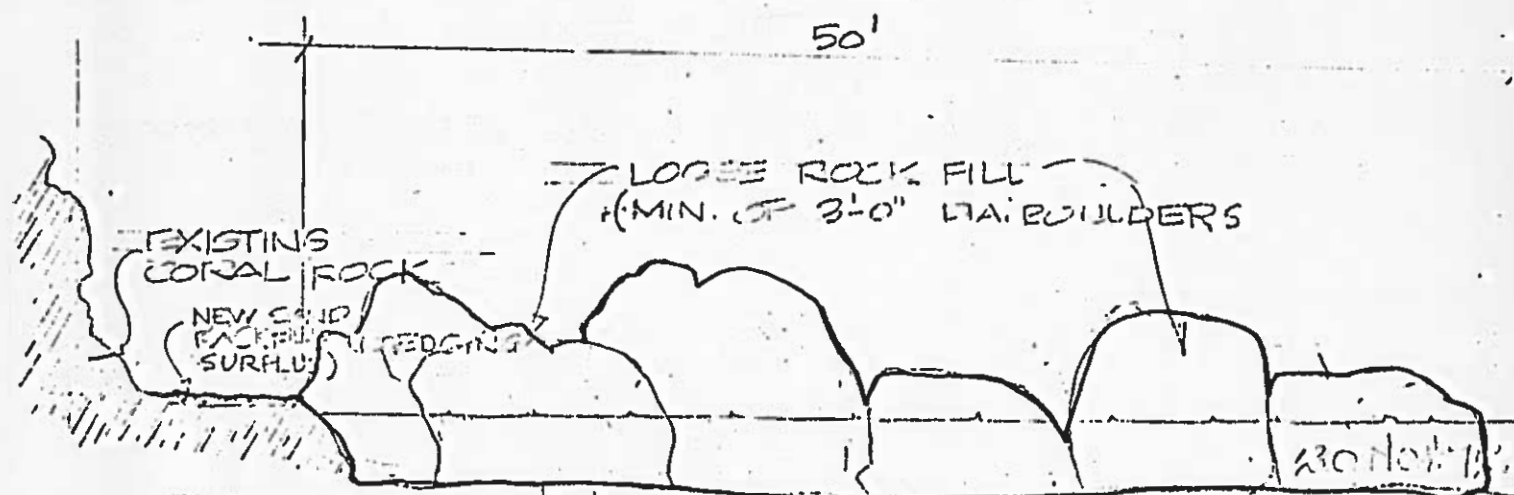
SHEET NO. 4



SECTION 'C'

SCALE:  $1/4" = 1'-0"$

VARIES FR. 4' TO 5'



SECTION 'D'

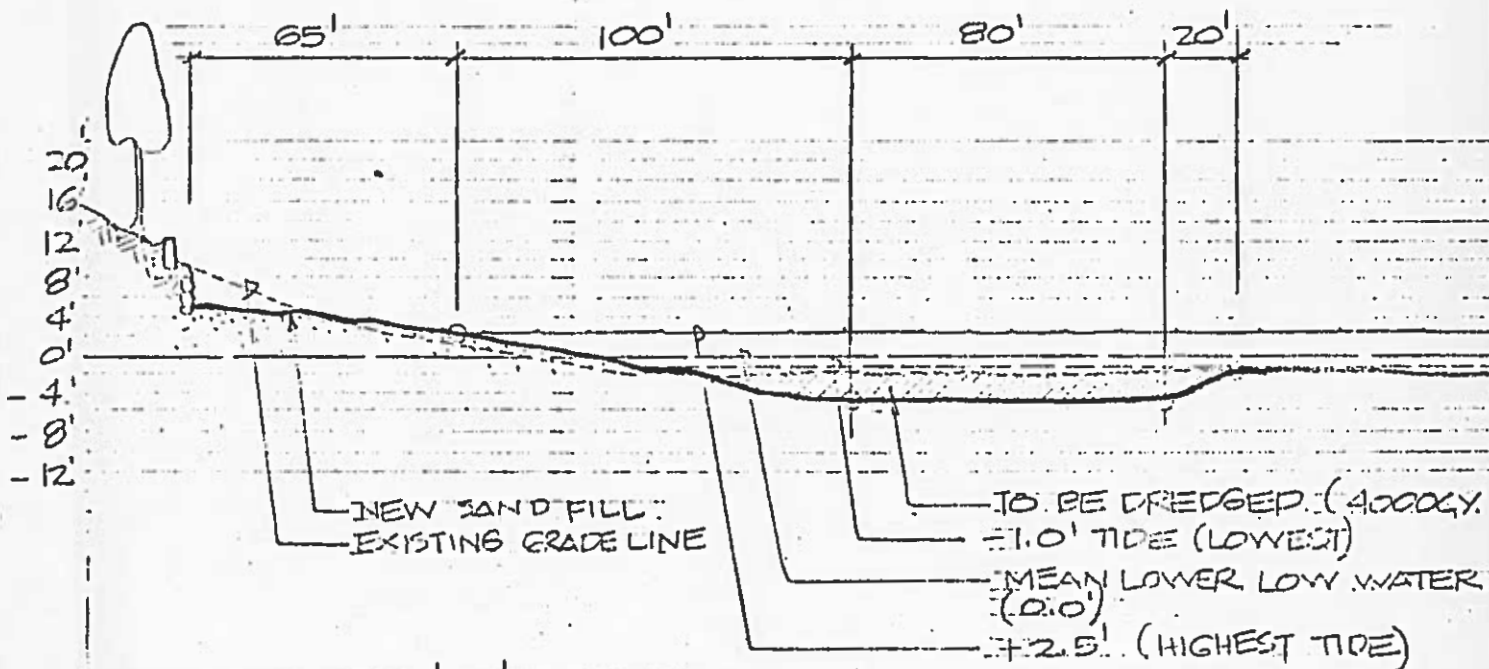
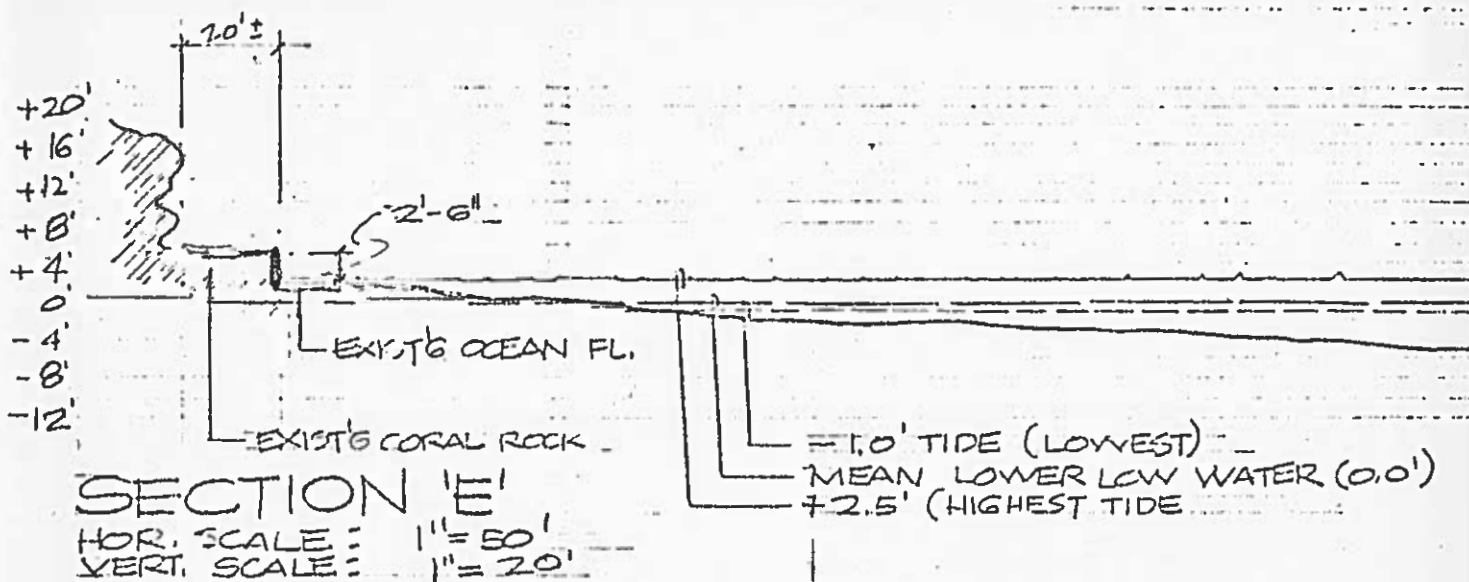
SCALE:  $1/8" = 1'-0"$

BEACH DEVELOPMENT DESIGNED BY  
FOR GULF HILTON HOTEL, HONOLULU

CONTINUED  
SECTIONS

DRAWN BY  
C. M. H.

SHEET NO. 5



SECTION 'F'

HOR. SCALE: 1" = 50'

VERT. SCALE: 1" = 20'

NOTE: SURPLUS SAND FROM DREDGING TO BE USED AS SAND FILL AT SEAWALLS. EXCESS SAND AND ROCK TO BE HAILED OFF SITE

20 NOV. 72

SHEET NO. 6

|                                                 |          |                     |
|-------------------------------------------------|----------|---------------------|
| BEACH DEVELOPMENT DESIGNED FOR GUAM HILTON HTL. |          | DESIGNED BY: M.Y.S. |
| CONTENT                                         | SECTIONS | DRAWN BY: W.H.H.    |



MAILING LIST FOR PUBLIC NOTICES  
FOR GUAM

PUBLIC NOTICE NO. 1054-S

Kenneth T. Jones, Jr., President, Hotels of the Marianas, P.O.Box 7, Agana, Guam  
96910

MEMBERS OF CONGRESS

Honorable Hiram L. Fong, United States Senate, Washington, D. C. 20510  
United States Senator, 195 S. King Street,  
Honolulu, HI 96813  
Honorable Daniel K. Inouye, United States Senate, Washington, D. C. 20510  
United States Senator, 850 Richards St., Rm 602  
Honolulu, HI 96813  
Honorable Spark M. Matsunaga, House of Representatives, Washington, D.C. 20515  
Representative in Congress  
Federal Bldg. Rm. 218, Honolulu, HI 96813  
Honorable Patsy T. Mink, House of Representatives, Washington, D. C. 20515  
Representative in Congress  
Federal Bldg. Rm. 346, Honolulu, HI 96813

FEDERAL OFFICIALS AND AGENCIES

2 HQDA (DAEN-CWZ-G) WASH D.C. 20314  
2 Board of Engineers for Rivers and Harbors, Tempo C Bldg., 2nd & "Q" Sts, S.W.,  
Washington, D. C. 20315  
Dir, Defense Mapping Agency, Hydrographic Center, Attn: NS12, Wash. D.C. 20390  
Regional Director, Pacific Region, Federal Aviation Agency, P.O. Box 4009,  
Honolulu, HI 96813, ATTN: Chief, Air Traffic Div  
2 Chief, Nautical Chart Div, NOAA, National Ocean Survey, Rockville, MD 20852  
~~Commanding Officer, U.S. Navy Support Command, HI AFM. HCFD, APO 96557~~  
2 DMA Hydrographic Center Honolulu Office, 3631 Nimitz Highway, Honolulu,  
HI, 96818  
Chief of Staff, Headquarters, U.S. Air Force, WASH D.C. 20315  
Commandant, 14th Naval Dist, Navy 7-128, (Code 48) Pearl Harbor, HI 96818  
Commander, 14th Coast Guard Dist, 677 Ala Moana Blvd, Honolulu, HI 96813  
Commander, 14th Coast Guard Dist, ATTN: Ofc of Aids to Navigation,  
677 Ala Moana Blvd, Honolulu, HI 96813  
Bureau of Outdoor Recreation, U.S. Dept of Interior, Pacific Southwest  
Regional Ofc, Box 36062, 450 Golden Gate Ave, San Francisco, CA 94102  
Commander in Chief, U.S. Pacific Fleet, FPO San Francisco 96610  
U.S. Dept of Interior, Geological Survey, Rm 330, First Insurance Bldg,  
1100 Ward Ave, Honolulu, HI 96814  
Commander Pacific Division, Naval Facilities Engr Cmd, FPO San Fran 96610  
Commanding General, PACAF, APO 96553  
Regional Rep (HI) Southwest Region, National Marine Fisheries Service,  
c/o Honolulu Lab, P.O. Box 3830, Honolulu, HI 96812  
Environmental Protection Agency, Water Quality Office, Pacific Island Basins,  
1000 Bishop Street, Suite 601, Honolulu, HI 96813

Incl 1



- Regional Director, Division of Sport Fisheries & Wildlife, P.O. Box 3737,  
Portland, Oregon 97208
- 2 Regional Administrator, Region IX, Environmental Protection Agency, 100  
California Street, San Francisco, California 94111
- Regional Coordinator, Pacific Southwest Region, Dept of Interior, Office of  
the Secretary, P.O. Box 36098, 450 Golden Gate Ave., San Fran, CA 94102
- 5 Bureau of Sport Fisheries & Wildlife, Division of River Basin Studies,  
337 Uluniu Street, Kailua, Hawaii 96934
- Chairman, Advisory Council on Historic Preservation, National Park Service,  
WASH D.C. 20240
- Federal Information Center, Federal Bldg, Rm 102, Honolulu, HI 96813
- Coastal Engineering Research Board, Executive Secretary, 5201 Littlefalls  
Road, N.W. WASH D.C. 20016
- National Park Service, Hawaii Gp, Suite 512, 677 Ala Moana Blvd, Honolulu  
HI 96813
- Commander, U.S. Coast Guard, Marine Drive, Agana, Guam 96910
- Commander, Andersen Air Force Base, Guam 96910
- Commander, Naval Forces, Guam, Marianas Islands 96910
- Dept. of Navy, OICC, NFECC, M.I. FPO SF 96630
- Federal Aviation Agency, Guam, M.I. 96910
- U.S. Geological Survey, Guam, M.I. 96910
- National Aeronautic and Space Admin. Agana, Guam 96910
- U.S. Public Health Service, Agana, Guam 96910
- National Weather Service, Weather Bureau, Guam, M.I. 96910
- Small Business Administration, Agana, Guam 96910
- U.S. Attorney, District of Guam, P.O. Box 2, Agana, Guam 96910*

#### INTERESTED FIRMS & INDIVIDUALS

- R.M. Towill Corp, 1600 Kapiolani Blvd, 14th Floor, Honolulu, HI 96814
- Sierra Club, ATTN: Conservation Chairman, P.O. Box 518, Haleiwa, HI 96712
- Save Our Surf, ATTN: John M. Kelly, Pres, 4117 Blackpoint Rd, Honolulu 96810
- Healy-Tibbitts Construction Co, P.O. Box 3058, Honolulu, HI 96801
- Friends of the Earth, 1372 Kapiolani Blvd, Honolulu, HI 96814.
- Life of the Land, 404 Piikoi St, Honolulu, HI 96814
- Hawaiian Dredging & Construction Co., Ltd, P.O. Box 3468, Honolulu, HI  
96801 *BYN. D. L. Robison*
- Alan Chung* *Gov. 893 East St, Room 404, Honolulu 96813*
- GOVERNMENT OF GUAM
- Honorable Carlos G. Camacho, Governor of Guam, Agana, Guam 96910
- Lt. Governor of <sup>Guam</sup> Department of Administration, Agana, Guam 96910

GOVERNMENT OF GUAM

Department of Agriculture, ATTN: Mr. Isaac Ikehara, Mangilao, Guam 96910

Department of Commerce, Mr. Frank Blas, Director, Agana, Guam 96910

Senator Paul J. Bordallo, President, Marianas Boats & Motors, Inc., Sinajana, Guam 96910

Department of Public Health, Environmental Health Section, ATTN: Mr. Sebastian Ongcsli, Agana, Guam 96910

~~Mr. Paul Siebert~~, Territorial Planner, <sup>ing Commission</sup> Govt. of Guam, Agana, Guam 96910

Department of Education, Adm Bldg., Agana, Guam 96910

Department of Labor, Agana, Guam 96910

Department of Land Management, Mr. Gerald Perez, Director, Adm Bldg., Agana, Guam 96910

Department of Public Health & Social Services, Agana, Guam 96910

ATTN: Dr. O. V. Natarajan

Department of Public Safety, Agana, Guam 96910

Department of Public Works, Agana, Guam 96910

Guam Economic Opportunity Commission, Agana, Guam 96910 ATTN: Mr. Peter Tovey  
Director

Public Utility Agency of Guam, Agana, Guam 96910

University of Guam, Mangilao, Guam 96910

ATTN: Dr. L. G. Eldredge, Director of Marine Biology Laboratory

ATTN: Dr. Robert Jones, Marine Biology Laboratory

ATTN: Dr. Edwin Carey, School of Business Administration

Commissioners:

Mr. Thomas F. P. Muna, Chief Commissioner, Muna, Agat, Guam 96910

Mr. Pedro Roberto, Commissioner, Santa Rita, Guam 96910

Mr. Lucas L. San Nicolas, Commissioner, Agana, Guam 96910

Honorable Florencio T. Ramirez, Speaker, Eleventh Guam Legislature, Agana; Guam 96910

Honorable Antonio B. Won Pat, Representative in Congress, P. O. Box 373 Agana, Guam 96810

Senator Concepcion C. Barrett, P. O. Box 373, Agana, Guam 96810

*Mr. Albert T. San Agustin, Director of Federal Prisons, Bureau of Prisons, P.O. Box 373, Agana, Guam 96810*  
*Budget and Management, Office of the Govt., Agana, Guam 96910*

NEWSPAPERS

Dateline, Agana, Guam 96910

Pacific Daily News, Agana, Guam 96910

RADIO AND TELEVISION

Station KUAM, Ordot, Guam 96910

POSTMASTERS

Agana, Guam 96910, 910

Andersen Air Force Base, Guam 96910

Naval Station Branch, Agana, Guam 96910

*Tamuning, Guam 96910*

*Mering, Guam 96910* 3

INTERESTED FIRMS & INDIVIDUALS

Guam Fishing & Boating Association, Agana, Guam 96910  
Metcalf and Eddy, Inc. New Ada Plaza, Agana, Guam 96910  
Guam Boating and Fishing Association, Dededo, Guam 96910  
Chamber of Commerce, Agana, Guam  
Guam Contractors' Association, Agana, Guam 96910

~~Marianas Yacht Club, Agana, Guam 96910~~

Commodore, Marianas Yacht Club, Agana, Guam 96910

~~Mr. Florencio T. Ramirez, Speaker, Eleventh Guam Legislature, Agana, Guam 96910~~

Guam Women's Club, Anigua, Guam 96910

Mr. Richard F. Taitano, Pres, Guam Environmental Council, Agana, Guam 96910

*Mr. Juan C. Tenorio, Tenorio & Associates, Agana, Guam 96910*

A MARINE SURVEY  
FOR THE PROPOSED  
HILTON HOTEL DREDGING  
PROJECT

BY

RICHARD H. RANDALL AND ROBERT S. JONES

March 6, 1973

University of Guam  
The Marine Laboratory  
Environmental Survey Report  
No. 7

EXHIBIT C

17

## INTRODUCTION

### Background

Hotels of the Marianas (Guam Hilton Hotel) Kenneth T. Jones, Jr., President, P.O. Box 7, Agana, Guam 96910, is submitting a proposal to the Department of Land Management, Government of Guam; the U.S. Department of Interior; and the Corps of Engineers to dredge a swimming area from submerged lands adjacent to the Guam Hilton Hotel. The project has been announced through Corps of Engineers Public Notice No. PODCO-- 1054-SD.

The submerged lands are located in the south end of Tumon Bay, adjacent to the north face of Ypao Point headland, seaward of a portion of lot no. 5174-D, within the Municipality of Tamuning, in an area generally known as Ypao, Territory of Guam (Figs. 1 and 2).

It is necessary for Hotels of the Marianas to file an Environmental Impact Statement and obtain permission to dredge from the above governmental agencies. The authors of this report were contacted by Vice President Robert H. Jones through Legal Counsel Willis R. Lawrence. We were asked to provide an environmental assessment of the dredging site. The results of the survey are included herein.

This report does not constitute a complete Environmental Impact Statement. Instead, it is an environmental impact survey or assessment from which the developer may extract details for the final statement.

The report is based in part upon drawings provided by the developer in the proposal, entitled Beach Development for Guam Hilton Hotel, dated 20 November 1972. Figures 1 and 2 (modified) are from this proposal.

### The Proposal

The following is quoted from the above Corps of Engineers Public Notice:

"The applicant has constructed improvements consisting of rubble rock walls, walks and landscaping. In addition to this work he proposes to construct a deep swimming area which will involve the removal of approximately 4,000 cubic yards of dredged materials. Surplus sand from dredging will be used as sand fill at the seawalls; excess sand and rock will be removed from the site."

<sup>1</sup> This work and the opinions contained herein are those of the authors and not necessarily those of the University of Guam, the Marine Laboratory, or the Government of Guam. The project is considered a community service and the work was conducted by the authors on their own time.

Construction boundaries include an area of about 200 X 200 feet (Fig. 2). Dredging will begin seaward of the intertidal zone and the area will be gradually deepened out to the seaward boundary. The deepest dredge cut will be about four feet below the present bay bottom. This will make the seaward portion of the swimming area five feet deep at 0.0 tide and 7.5 to 8.0 feet deep at high tide (about +2.5 feet). As pointed out above, part of the excess sand was to be used to back fill around the seawalls. The remainder of the dredge spoil was to be placed behind a loose rock fill along the shore to the northwest of the dredge site (Fig. 2). The dredging surplus would, presumably, provide more sand beach along what is now a low limestone cliff and narrow cut bench. Finally, the existing rock groin to the southeast of the dredge site was to be shifted to the property line (Fig. 2).

Potential modification of the marine environment includes the following:

1. Dredging will physically remove the extant benthic habitat within the dredge site.
2. Dredge silt may affect downstream benthic organisms.
3. The rock groins above and below the dredge site might restrict circulation within the inner part of the basin and divert the flow of the normal current pattern in the area.
4. Loose rock fill and surplus sand to be placed northwest of the construction site will cover part of the intertidal habitat.

## RESULTS

### Description of Study Area

#### General Land Forms and Geology:

The Guam Hilton Hotel is situated on a narrow raised limestone terrace located at the southwest end of Tumon Bay reef flat platform (Figs. 1-3). Steep limestone slopes and cliffs form the backdrop immediately behind the hotel site. The raised limestone terrace slopes toward the shallow Tumon Bay reef flat platform where it terminates in a low irregular cliff 10 to 30 feet in height above the general reef flat level. In a north-west direction, from the hotel site, the terrace increases in elevation toward Ypao Point (Fig. 3). The seaward edge of the terrace at Ypao Point terminates in steep rocky slopes and headlands. In a southeast direction the terrace slopes downward from the hotel site and grades into the unconsolidated beach deposits at Ypao Beach (Fig. 3). The surface of the terrace is very irregular and consists of pinnacles, knobs, and solution pipes which are features formed by subaerial solution. The limestone is jointed and in many places these have been widened, by subaerial solution, into large cracks and fissures. These cracks and fissures are particularly noticeable along the cliff faces in front and behind the hotel site. The limestone surface is sculptured, in most places, by solution-pitting, into small circular depressions and miniature cirque-shaped ridges. This type of erosion gives the limestone surface its

of the terrace consists of an irregular cliff face. At places along the base of the cliff a narrow bench, 2 to 5 feet in elevation, has been cut by a previous higher sea stand. This bench is best developed along the hotel and dredge site region, southeast, toward Ypao Beach. It ranges in width from a few feet to about 30 to 40 feet. At some locations, where the bench joins the base of the terrace cliff, an indentation, commonly referred to as a "nip", is present. This "nip" was probably cut at the same time the 2-5 foot bench was truncated and is about six feet above the present mean sea level when measured to the deepest part of indentation. At some locations, particularly in a northwest direction from the dredge site, the 2-5 foot bench is absent and a cliff face forms the shoreline. At these locations the cliff face usually has a "nip" cut in the supratidal zone at the six foot level by the former higher sea stand.

Sand is generally absent on the upper surface of the narrow 2-5 foot bench described above. In order to provide a sand beach for the hotel guests the hotel owners have built a seawall several feet in height along parts of the outer margin of the bench. The region enclosed by the seawall to the cliff face was then backfilled with sand. These modifications of the supratidal bench were completed before this study began.

#### Intertidal Zone:

This zone is the portion of the beach or shore that is covered by water at high tide and exposed at low tide (Fig. 2). From Gognga Beach to Ypao Beach this zone consists of unconsolidated bioclastic material similar to that described for the supratidal zone beach deposits. Freshwater seepage, from the lens system mentioned earlier, escapes from the sand of this region.

From the southern end of Ypao Beach in a northwest direction to Ypao Point, this zone is bordered by the limestone bench and cliff face that was described earlier in the supratidal zone. At some places a "nip" is being cut at mean sea level near the base of these limestone features. Along the dredge site region the low tide limit of this zone extends outward onto the reef flat platform from 30 to 50 feet. This outer section of the intertidal zone consists of a limestone platform covered with unconsolidated coral-algal-mollusc rubble, sand, and gravel. An offshore boring (bore hole #2) was made in this zone (Fig. 3) by Trasen Associates, Limited (1972). The boring log from this hole shows three feet of coarse to medium coral sand overlying three feet of fractured coralline limestone. Fresh water from the lens system escapes from joints and cracks in the limestone bench and cliff in this zone and from the unconsolidated material along the outer part of the zone.

#### Reef Flat Zone:

This is the flat limestone platform that extends from the intertidal zone to the wave-washed reef margin. At Tumon Bay, the outer seaward part of the reef flat is slightly elevated in respect to the inner shoreward section, and consequently, at low tide, is often exposed, while the inner part retains water. On this basis, the reef flat is divided into two subzones--an outer reef flat subzone that is exposed during low tide, and an inner reef flat subzone that is covered by water at low tide (Fig. 3). The inner water mass is here called the "moat".



### Inner Reef Flat Subzone:

This region of the reef flat is considerably wider than the outer reef flat subzone (Fig. 3). Unconsolidated sediments vary in thickness from several meters or more near the beach, to a thin veneer of less than a centimeter near the outer reef flat. Local areas of bare reef-rock are common, especially where this subzone grades into the outer reef flat subzone. Sand, gravel, coral-algal-mollusc rubble and boulders become more abundant as the outer reef flat is approached. The entire subzone is relatively flat, with a few cracks, holes, low mounds of rubble, and shallow bowl-shaped depressions, but the general relief is usually less than 50 cm. The deepest water on the inner reef flat occurs at the mid-point, about 150 m from shore.

### Outer Reef Flat Subzone:

This subzone of the reef flat is exposed during lower tides and is bounded on the shoreward side at low tide by the impounded water of the moat and on the seaward side by the reef margin, which is constantly awash. Figure 3 shows that it varies considerably in width. Between Gognga and Naton Beaches (Fig. 3), it disappears completely because of a shallow channel that occurs there. Unconsolidated sediments are nearly absent over the outer, seaward part of this region, except in small widely scattered shallow pools where boulders, sand, and gravel accumulate. The inner, shoreward part usually has scattered boulders over the surface and, in some areas, large boulder tracks from where it grades into the inner reef flat. The source of these boulders is the reef margin and reef front, where living corals are broken loose and worked shoreward by typhoon and other storm waves. A large accumulation of boulders have formed a small islet (Fig. 3) on the outer reef flat between Naton and Ypao beaches.

At low tide this subzone appears as a flat limestone pavement with very little relief except for shallow pools a few centimeters deep, scattered boulders, and larger pieces of reef-rock up to a meter in height broken from the margin and thrown up on the reef by storm waves. The surface of the limestone pavement is usually covered with a turf-like mat of filamentous algae. Foraminifera are abundantly distributed throughout this algal mat and are the main source of the buff-colored sand found over the reef flat and beach.

Depth of water over the outer reef flat varies due to elevation differences. The reef section between the boat channel and the shallow channel immediately seaward of the small islet (Fig. 3) seems to be depressed in respect to reef sections opposite Ypao and Gognga beaches. Since there are no streams opposite or shoreward of these channels to account for their origin, the depressed reef section between them may be due to a local faulting or slumping of the reef margin and outer reef flat.

Several patches of remnant limestone, composed of solution-pitted pinnacles and knobs, are found on the outer reef flat near Ypao Point (Fig. 3). This feature probably represents a former reef platform of higher elevation.

jagged appearance. Little or no soil accumulation is found on the surface of the terrace.

The physiographic features and rocks described above belong to the Mariana Limestone formation which, according to Tracey, et al (1964), were deposited during the Pliocene and Pleistocene epochs.

The limestone and unconsolidated beach deposits bordering the south end of Tumon Bay are very porous, resulting in a well-developed Ghyben-Herzberg freshwater lens system. Water escapes continually along most sections of the intertidal zones of Tumon Bay. This fresh water seepage onto the reef flat is particularly noticeable along sandy beaches at low tide, where it forms small rills. Emery (1962) measured the fresh water seepage along a 150 foot section of the beach at the northern end of Tumon Bay and found it to be 1.5 cfs.

Bordering the shoreline, along the hotel site, is the Tumon Bay fringing reef flat platform. This reef flat is a broad crescent-shaped limestone platform, 3,540 m in length, measured along the concave seaward margin (Fig. 3). It is relatively uniform in width ranging from 460 m at Gognga Beach to 430 m at Ypao Beach. According to Tracey, et al (1964), Tumon Bay was probably formed by large scale slumping. This slumping provides a wide, shallow submarine platform upon which the Tumon fringing reef has developed. Submarine evidence of this slumping can be found at the southern end of the reef flat platform near Ypao Point where a small channel cuts through the seaward edge of the reef flat platform (Fig. 3). This channel marks the slump boundary and forms a submarine cliff, about 100 feet in height, several hundred feet farther seaward.

A beach to seaward discussion of the zones that make up the Tumon Bay fringing reef flat are found below.

#### Supratidal Zone:

This is the region of the shoreline immediately above the high water mark (HHWL). From Gognga Beach to Ypao Beach (Fig. 3) this zone consists of unconsolidated beach deposits, except for a small outcrop of limestone located midway between the two beaches. According to Emery (1962) these beach deposits are composed of nearly 100% bioclastic material. This is due to the absence of rivers and streams emptying onto the Tumon Bay reef flat. The origin of the bioclastic deposits are from calcium carbonate secreting marine organisms of the adjacent fringing reef and reef flat platform. The primary components of the deposits are the remains of calcareous red and green algae, foraminifera tests, mollusc shells, and coral debris. These deposits are transported from the reef flat platform to the beach by currents and wave action. Much of the sand fraction of the deposits has been reworked by these physical forces and are reduced to a fine grain fraction that is often unidentifiable as to origin.

The zone from the east end of Ypao Beach to Ypao Point (Fig. 3), a stretch including the dredge site, consists of a rocky limestone terrace that has been described earlier. Along most of this region the seaward boundary

## Reef Margin Zone:

This zone is represented by the seaward edge of the reef flat platform that is constantly awash even at low tide. A poorly developed algal ridge is present along most of the Tumon Bay reef margin except at Ypao Point, where a narrow, elevated crest rises about 50 to 75 cm above the general outer reef flat level. This algal ridge diminishes in height and disappears completely where the reef flat widens east of Ypao Point. The algal ridge development along this section of reef margin is probably due to its more northern exposure and subsequent greater surf and wave action.

## Current Patterns

Fluorescein dye was injected into the water at various stations in the study area. Drift of the dye pattern was measured with a tape and converted to knots. Set was measured with a hand bearing compass to the nearest degree magnetic. Additional dye releases were made in the direction of the reef margin (Figs. 3 and 4).

These data were collected on four separate dates (Table 1). One 24 hour observation was made from the afternoon of February 16 to the afternoon of the 17th and included a -0.4 tide to a +2.5. Numerous observations were made of both ebb and flood tides and a variety of wind and sea conditions.

On two occasions, dye casts were made along the southern boundary of the project site. The dye cloud was followed on foot and replenished as necessary. Figure 3 shows the results of these drifts.

The data in Table 1 and Figures 3 to 5 suggest the following conclusions. The energy system that governs current patterns in the study area is primarily the result of wave transported water over the seaward reef margin. This water pours over the shallow outer reef flat and into the deeper inner reef flat (Fig. 4). Most of this wave transported water continues on to the inner reef flat moat where it swings northeast and follows the shoreline of Tumon Bay. This water exits, ultimately, at the boat channel in the north end of the Bay (Fig. 3).

The current patterns shown on Figure 4 are consistent during both ebb and flood tides until near 0.0 tide. During 0.0 and minus tides, the sea surface falls below the outer reef flat and transport of water ceases unless driven by very high waves. The current patterns on Figure 4 are no longer valid during minus tides and low surf. At these times, the current direction in all southern parts of the Bay shifts directly to the northeast on ebb tides (Fig. 5). This directional change simply reflects the tendency of the "trapped" reef flat water to flow across the Bay to the primary escape point at the boat channel. This continues until the next flood tide, when the sea level is high enough to pour water over the reef margin near the project site, the strong current patterns on Figure 4 pick up and continue until the next 0.0 or minus tide. Net movement of current patterns on an annual cycle would approximate those of Figure 4.

## Supratidal Community:

In the study area this zone consists of a raised limestone bench and terrace upon which the hotel is located. Vegetation on the terrace is fairly well developed considering the high population density around other parts of Tumon Bay. The forest which has developed on this raised limestone terrace consists mainly of the following genera: Artocarpus, Macaranga, Pandanus, Cycas, Cordia, Ochrosia, Morinda, Pisonia, Triphasia, Aralia, Ficus, Clerodendrum, Colubrina, Intsia, Merrilliodendron, and Barringtonia. The hotel developers have taken considerable pains in preserving as much of this original forest cover as possible. There has been an obvious emphasis in their landscaping program to use the natural vegetation that is present. Many of the irregular limestone pinnacles, knobs, and blocks that were characteristic of this region have been arranged into attractive walkways and paths upon which a natural cover of understory mosses, lichens, and ferns is developing.

The strand forest bordering the Bay has been virtually left intact except for a small region where a walkway leads to the beach. The principal vegetation consists of Barringtonia asiatica, Thespecia populnea, Hernandia nymphaecifolia, Messerschmidia argentea, Cordia subcordata, Pemphis acidula, Wedelia biflora, Triphasia trifolia, Clerodendrum inerme, and Bikkia tetrandra. None of this strand vegetation will be disturbed during the dredging of the adjacent subtidal region. The cliff face and 2-5 foot bench bordering the raised terrace is mostly barren of vegetation except for scrub Pemphis acidula, Bikkia tetrandra, Wedelia biflora, and Scaevola taccada.

Animal life inhabiting the low supratidal bench consists mostly of hermit crabs, and scattered littorinid snails.

## Marine Community:

Table 2 is a compilation of the organisms found in the study area. This table compares the dredge site with the rich biotic assemblage of the Mid-bay region and the downstream community from the dredge site to the Ypao dredge area (Fig. 3).

The intertidal community within the dredge site is limited to the lower surface of the seawalls and the adjacent sand patches. Nerite, littorine snails, limpets and chitons are found along the seawall. These are few in number and should not be in the zone of disturbance. The sand patches are dominated by the green alga Enteromorpha clathrata, which is common along the sandy shores of Tumon Bay especially where fresh water escapes from the lens. The area is completely dry at low tide and is relatively barren.

In the subtidal portions of the dredge site, the bottom is basically sand and coral rubble with numerous interspersed coral colonies in the form of small clumps and microatolls. These colonies are mostly Porites lutea but corals of other species grow on the microatolls. Figure 7 shows that the dredge site is located at the extreme edge of the major coral beds in this part of Tumon Bay. These microatolls with their associated attached species, scattered

patches of benthic algae (particularly Padina), and a large number of several echinoderm species dominate the dredge site. Tables 3 and 4 give an idea of the abundance and distribution of the coral and echinoderm species in the immediate project site. Most of the marine fishes in the area are restricted to habitat associations with the microatolls. Without these structures for cover, the number of fishes would be far less than that shown for the area on Table 2.

Coral cover in the dredge site is considerably reduced when compared to the rich nearby mid-bay community (Fig. 7). There was a total of 532 coral colonies found in this area (Table 3). The range of size of these colonies was from small clusters 5 cm in diameter to large microatolls 1 m in diameter and 15 to 30 cm high. About 100 of these colonies average 0.5 m in diameter. The remaining 432 corals average 10 cm in diameter. This results in a total mass of corals of about 23 m<sup>2</sup>. Based on a dredge area of 3721 m<sup>2</sup>, the percent coral cover is only 0.6 percent. Of this coral mass only about 30 to 50 percent of the colony area is living. This reduces the percent of cover even more when considering live corals. Table 7 shows nearly 2000 specimens of echinoderms in the dredge site. This number seems high but when compared to the enormous community of these organisms in the Bay, it is not.

The area downstream of the dredge site shows even fewer corals (Table 2, Fig. 7). This area is dominated by the Padina sand community, with fewer microatolls and associated fish communities in evidence. There is still a considerable number of echinoderms but the reduction in microatolls results in fewer echinoids. Holothurians are the dominant animals downstream.

Figure 7 and Table 2 show the increase in diversity of organisms along a line from the dredge site to the rich coral communities of the mid-bay. A look at the fish section of Table 2 shows that not only the diversity but the relative abundance of species increases as coral cover increases. It should be pointed out that unusually low spring tides occurred in October 1972 that resulted in catastrophic kills of reef flat organisms. These were the lowest tides recorded on Guam since 1968. The upper surface of numerous corals were killed by these low tides and much of the once rich Acropora aspera beds living in the mid-bay part of reef flat, adjacent to the dredge site was killed.

## CONCLUSIONS

We feel that the dredge site and the downstream area are comparable in community structure, with the dredge site being slightly richer in terms of species diversity and biomass. Neither area is comparable with the mid-bay region due to the enormous increase in diversity and biomass there. This is fairly typical throughout Tumon Bay. Its perimeter shows a considerably depauperate shifting nature of the sand along most of the Bay's shoreline. The latter makes it difficult for larvae of benthic organisms to settle nearshore.

It is obvious from the current pattern studies that if dredging is not done during times of 0.0 or minus tides, the dredge spoil will not encroach on the rich mid-bay environment. We suspect that a milky stream of dredge spoil



will form and follow the shoreline of the Bay as shown on Figure 3. The heavier fraction should settle out between the dredge site and the dredged swimming area at Ypao Beach. Some of the finer grain sediments may be carried as far as the boat channel in the north end of the Bay but no major coral communities are located in the path of the silt bearing currents.

It is obvious that the extant community within the dredge site will be removed and destroyed. We doubt that communities downstream (toward Ypao Beach) from the dredge site will be significantly effected. There is no way, however, that this could be predicted with certainty. Any damage done would be to an already depauperate community.

The socio-economic impact of the project may be of greater concern than the biological. We suspect that there may be some objections voiced by officials at the Public Beach (Ypao) and by management of other hotels with beach frontage located in the path of the silt stream. This would of course be temporary and of short duration.

The existing rock groins have no significant effect on the current patterns that sweep through the dredge site except immediately in front of and behind the groins. Currents passing along the northwest shoreline strike the first groin and are diverted lagoonward about 5 to 10 feet before the water again turns in the direction of prevailing long shore currents. The intertidal area downstream of the groin shows very weak circulation. Some water passes through the groin but there is very little movement. The northwest groin prevents the sand on the Hotel beach from being washed downstream. Upstream of this groin, the limestone is scoured and exposed.

Currents passing through the dredge site often exceed 0.5 kts and should provide adequate flushing for the proposed swimming basin. The basin can be expected to be recolonized rather quickly by benthic algae and echinoderms. This is evident from observations made at another dredge site nearby (Ypao Swimming Basin).

It is doubtful that surplus sand placed behind a loose rock fill above the northwest groin will stay in place beyond the first storm. This material can be expected to wash back into the dredge hole and increase maintenance problems. This portion of the project and the movement of the southeast groin has already been discussed with the developer and a basic agreement has been reached not to pursue these parts of the proposed improvements. The southeast groin may cause some accretion of sand along the hotel beach. This is the normal pattern of sand deposition. Accretion usually takes place on the upstream side of a groin.

## RECOMMENDATIONS

1. Under no circumstances should dredging be done during 0.0 or minus tides. The ideal time to dredge is during flood tides and high surf conditions when water flow over the outer reef flat is maximum. Table 1, however, shows that both flood and ebb provide a good flow of water through the

dredge site if associated with plus tides.

2. We suggest that a number of the microatolls could be moved to the upstream boundary of the project site before and during the dredging. These corals could then be returned to the deeper portions of the swimming basin. The microatolls should soon be recolonized by fishes and other associated marine organisms. It is not possible to predict how successful these transplants would be but we have no reason to suspect failure if the corals are handled carefully. If the project succeeded it would be a considerable plus for the environment and might prove interesting to the users of the swimming hole.

#### REFERENCES

- Emery, K.O. 1962. Marine geology of Guam. U.S. Geol. Surv. Prof. Pap. 403-B; 1-76.
- Tracey, J. I., Jr., S. O. Schlanger, J. T. Stark, D. B. Doan, and H. D. May. 1964. General geology of Guam. U. S. Geol. Surv. Prof. Pap. 403-A:1-104.



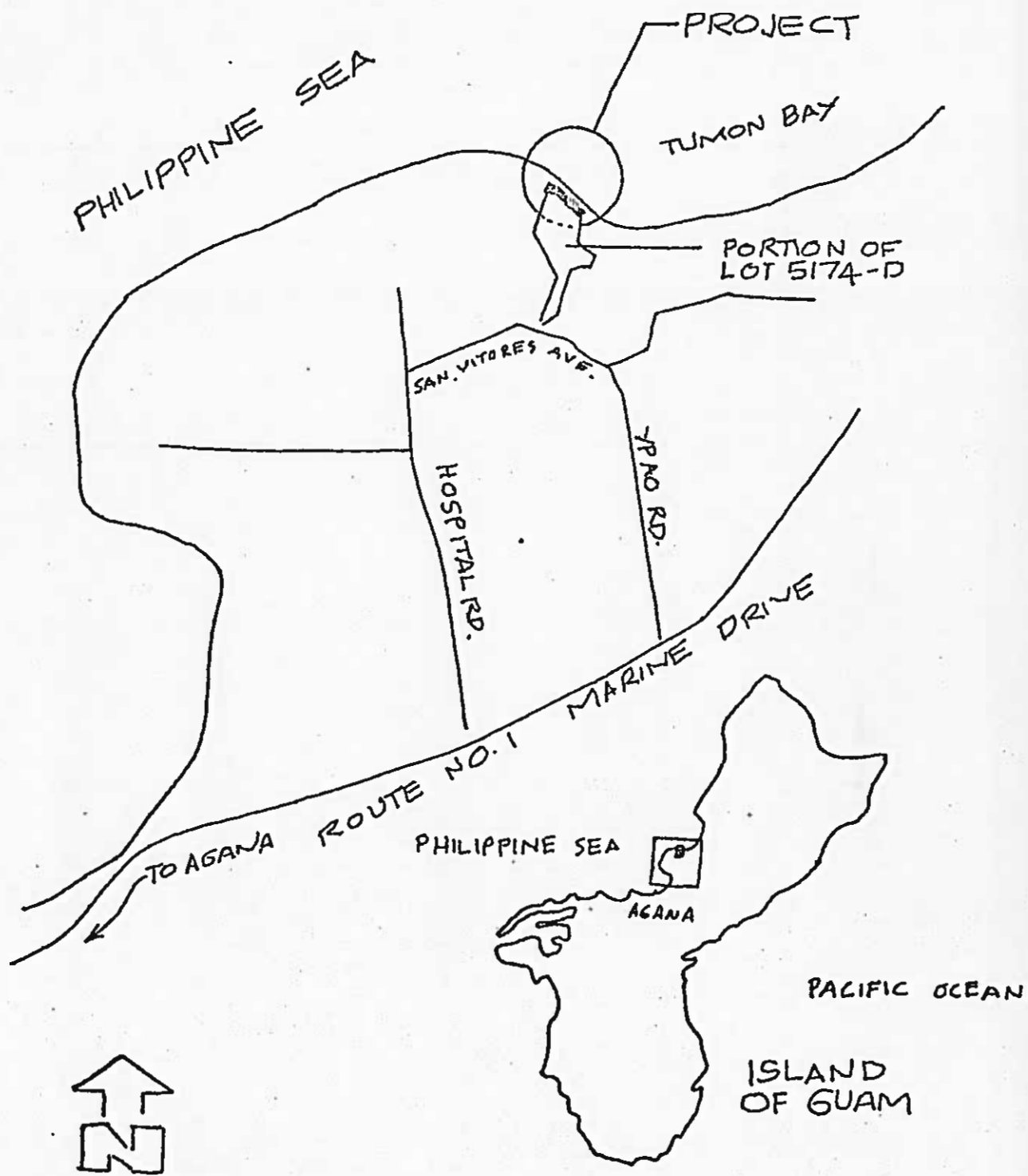


Figure 1. Location map for study area.

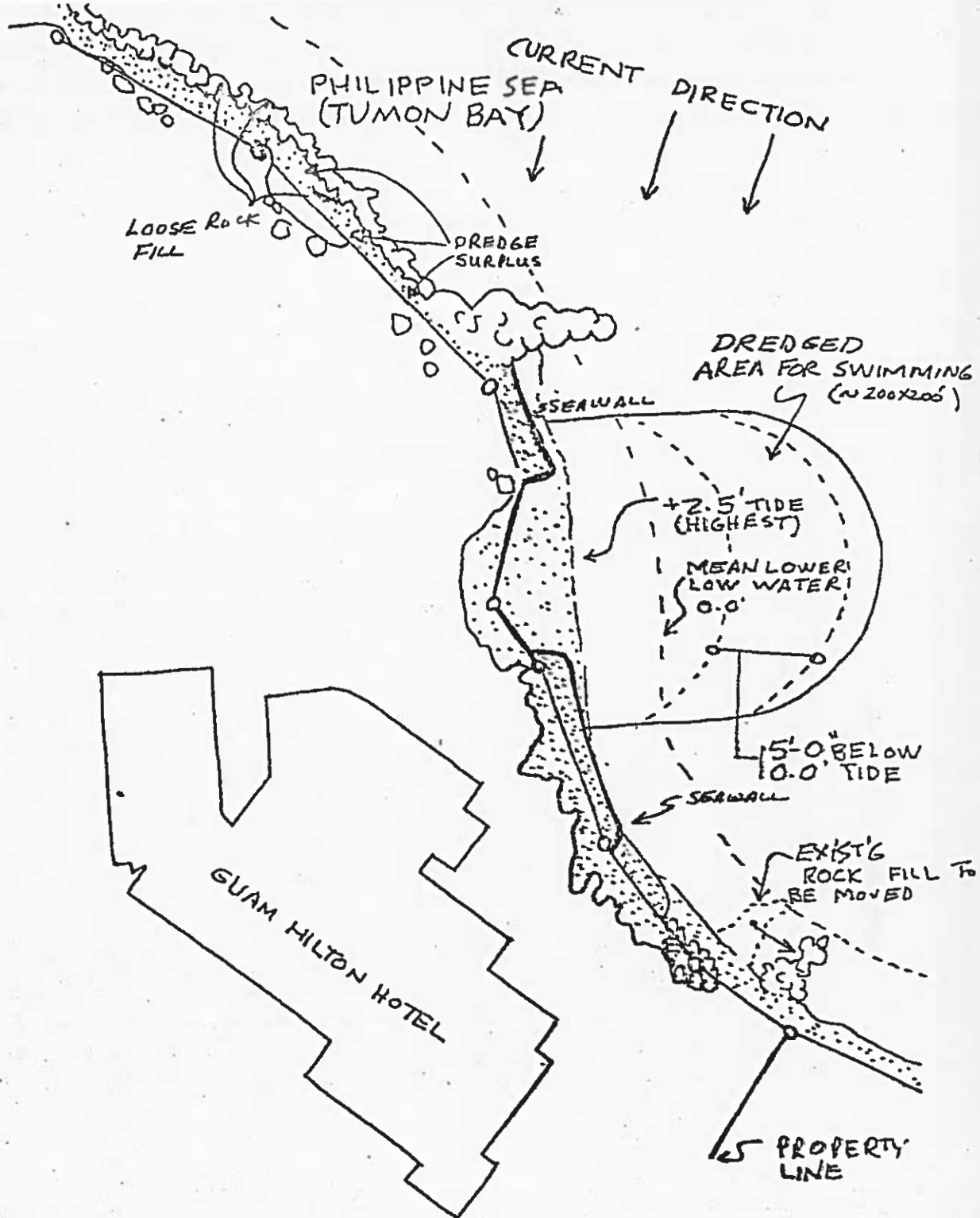


Figure 2. Detail map of project site showing proposed modifications.

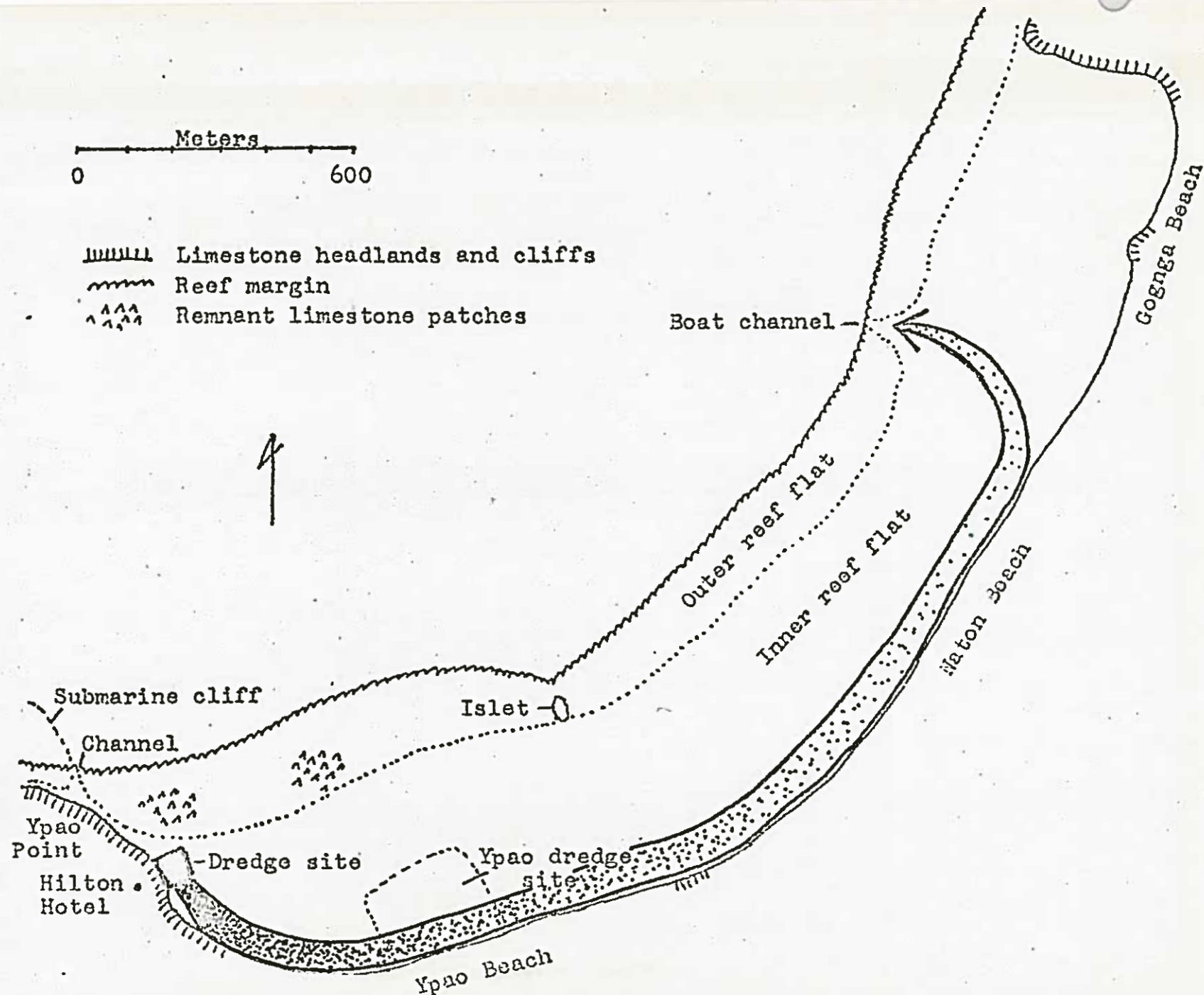


Figure 3. Detail map of Tumon Bay showing reef zones. The stippled arrow shows the direction of water movement from the project site during all tide stands above 0.0. This is the probable path of the dredge spoil if dredging is done above 0.0 tide.

||||| Limestone headlands and cliffs

~~~~~ Reef Margin

^^^ Remnant limestone patches

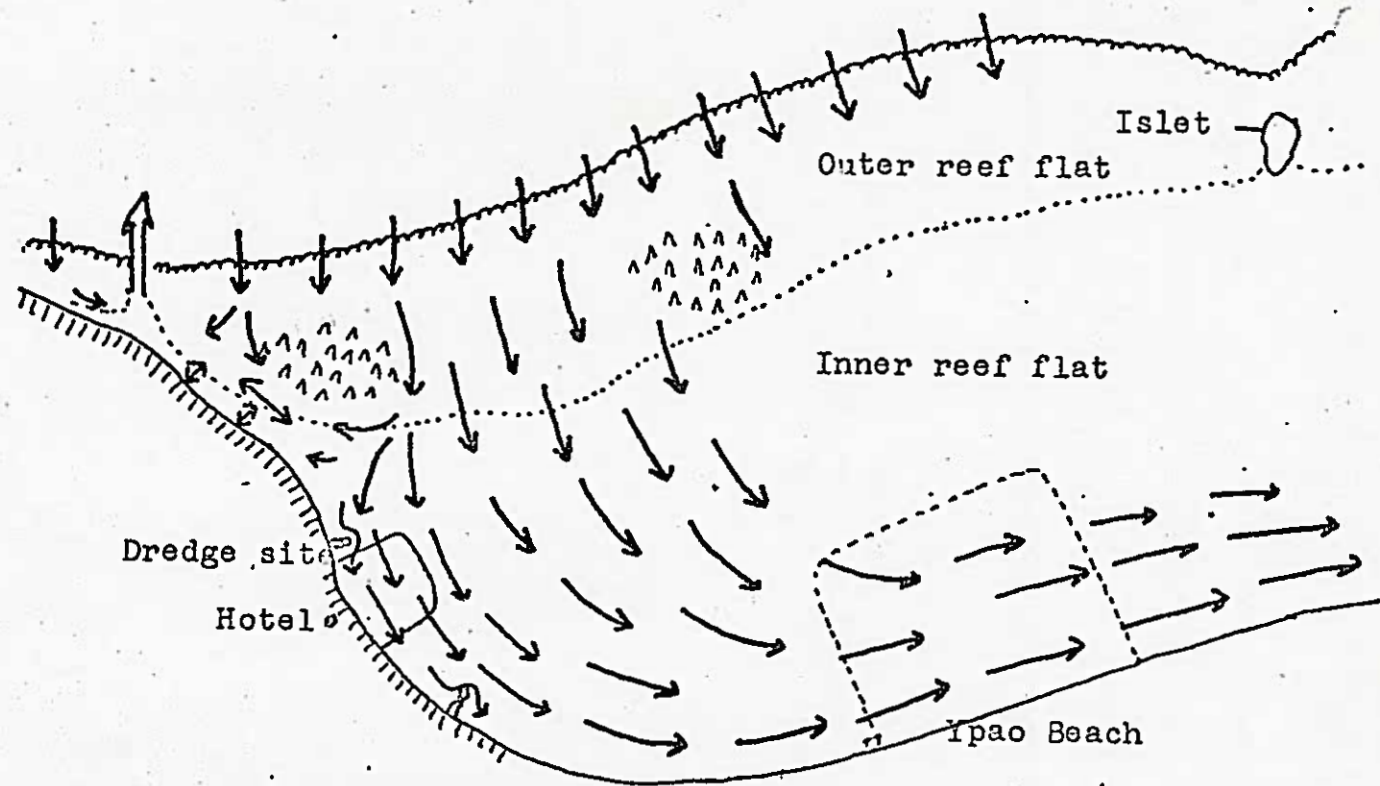


Figure 4. Current pattern diagram showing the most prevalent movement of water through the study area at all tide stands above 0.0. Note that a small portion of the wave transported water reflects off the seaciff northwest of the Hotel. This results in confused, oscillating currents, part of which escape from the small fault channel to the northwest. The majority of the water sweeps into the inner reef flat.

||||| Limestone headlands and cliffs

~~~~~ Reef Margin

^^^ Remnant limestone patches

////// Exposed outer reef flat

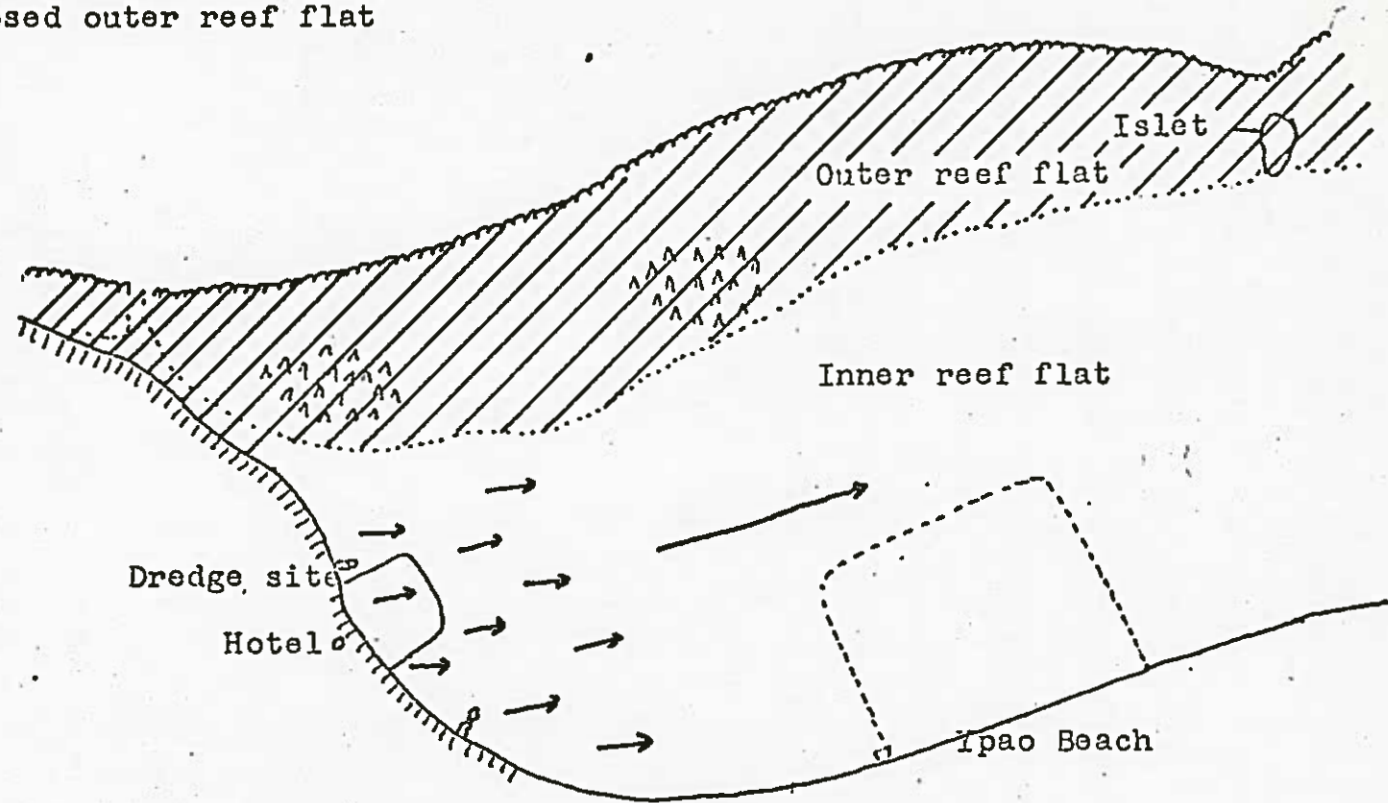


Figure 5. Current pattern diagram showing movement of water at 0.0 and minus tides. Current patterns are extremely weak and often undetectable at these times. Note that the outer reef flat is exposed and water is prevented from passing into the inner reef flat.



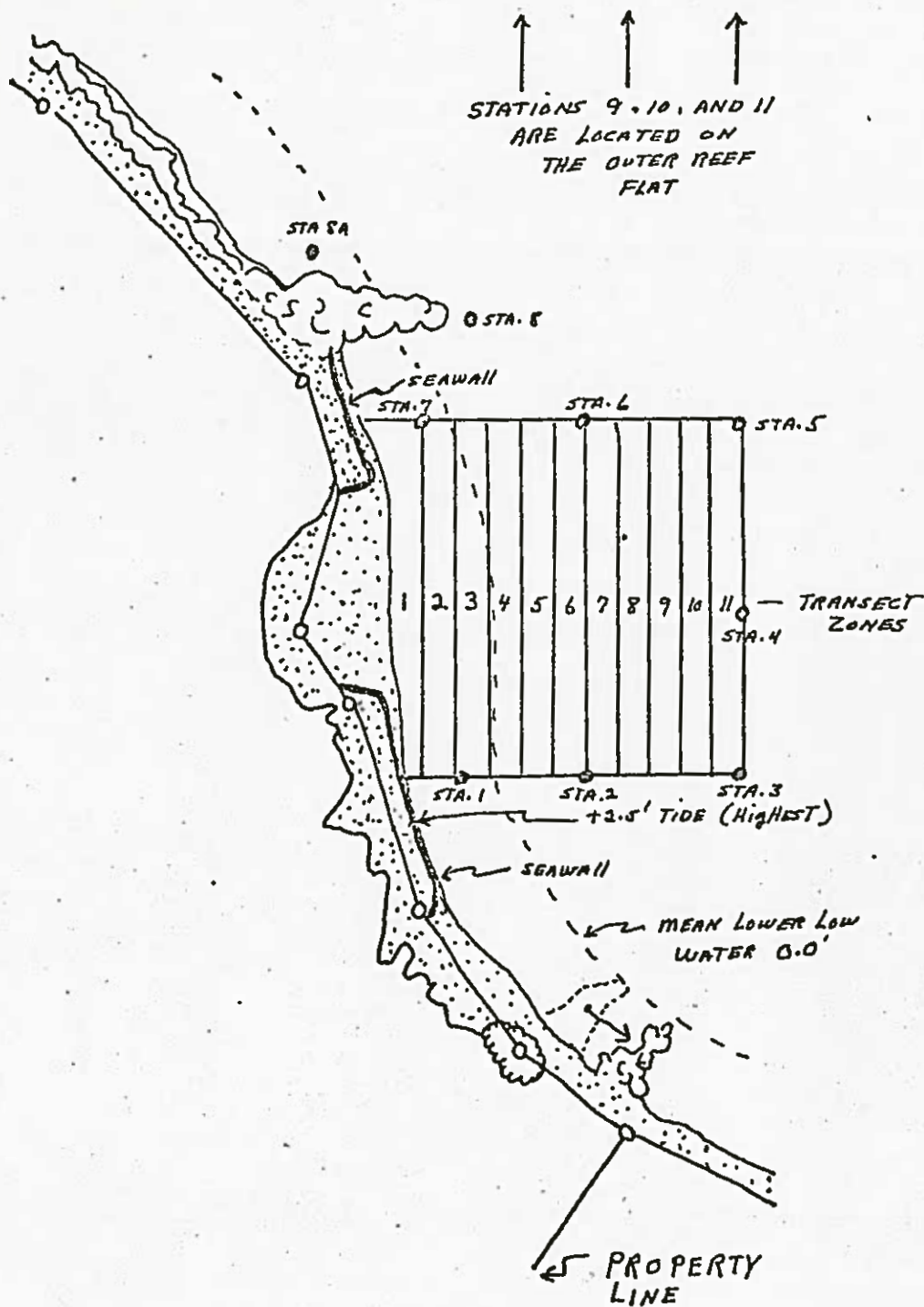


Figure 6. Location map of transect zones. Coral and echinoderm distribution data was taken from these zones. The diagram also shows the primary current measuring stations.

||||| Limestone headlands and cliffs

~~~~~ Reef Margin

^^^ Remnant limestone patches

/// Acropora beds

⊗⊗⊗ Porites cocosensis (microatolls)

xxx Porites lutea (microatolls)

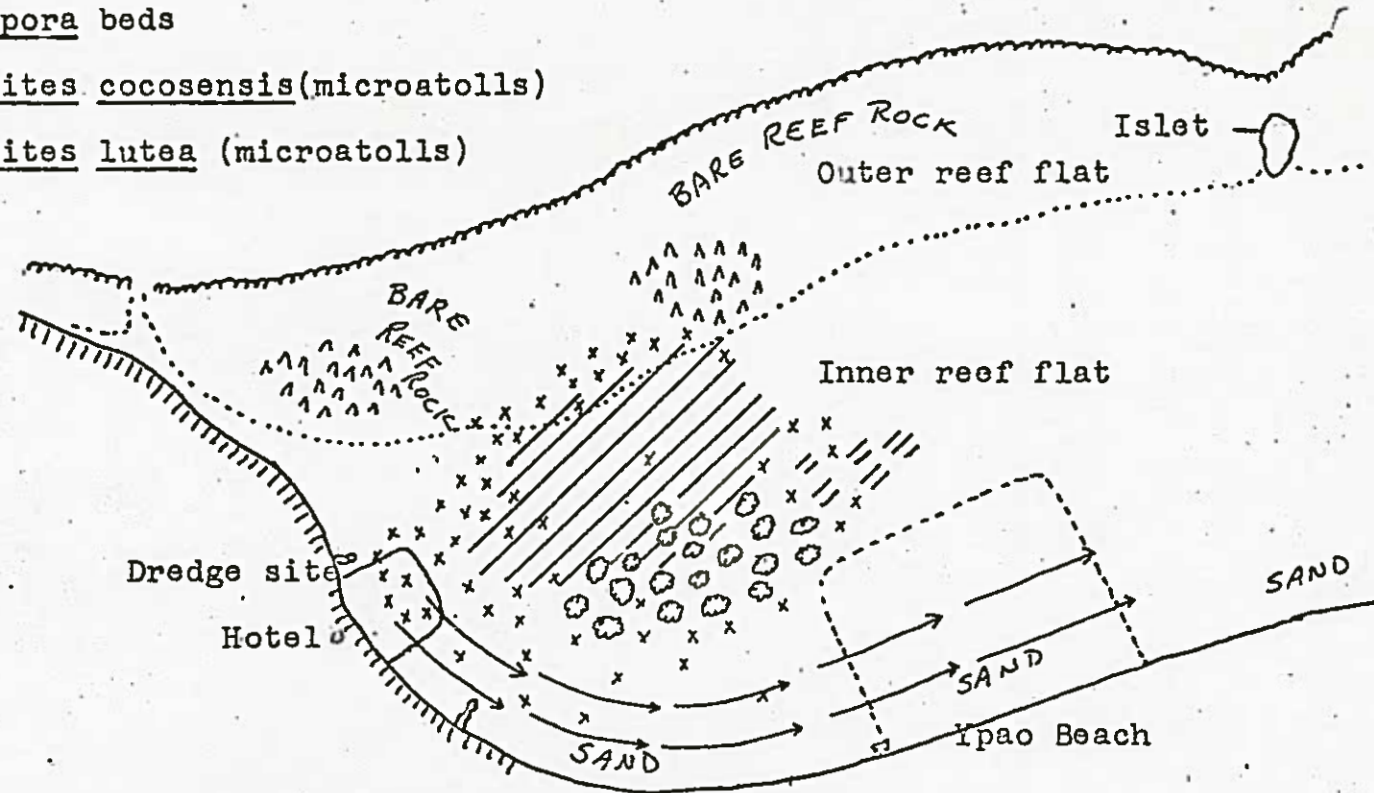


Figure 7. General distribution map of corals in areas adjacent to and downstream from the dredge site. Arrows indicate probable path of dredge spoil.



Table 1. Reef flat current data.

| Date    | Station | Time | Direction<br>(°Mag.) | Speed<br>(kts.) | Tide<br>Phase | Wind<br>[Dir.(°Mag.)/<br>Speed (mph)] | Remarks                                       |
|---------|---------|------|----------------------|-----------------|---------------|---------------------------------------|-----------------------------------------------|
| 11 Feb. | 1       | 1010 | 132                  | .14             | Flood         | 075-085/10-15                         | follows shore, oscillation, translatory waves |
| "       | 2       | 1017 | 160                  | .36             | "             | "                                     |                                               |
| "       | 3       | 1025 | 152                  | .44             | "             | "                                     |                                               |
| "       | 4       | 1030 | 168                  | .42             | "             | "                                     |                                               |
| "       | 5       | 1033 | 171                  | .56             | "             | "                                     |                                               |
| "       | 6       | 1035 | 160                  | .62             | "             | "                                     |                                               |
| "       | 7       | 1043 | 169                  | .12             | "             | "                                     | follows shore, oscillation, with trans. waves |
| "       | 8       | 1047 | 150                  | .42             | "             | "                                     | moves parallel with shore                     |
| "       | 9       | 1115 | Fig. 4               | .30             | "             | "                                     | outer reef flat                               |
| "       | 10      | 1125 | 170                  | .39             | "             | "                                     | outer reef flat                               |
| "       | 11      | 1130 | 165                  | .56             | "             | "                                     | outer reef flat                               |
| "       | 5       | 1507 | 150                  | .56             | Ebb           | "                                     |                                               |
| "       | 6       | 1505 | 168                  | .52             | "             | "                                     |                                               |
| "       | 7       | 1500 | ---                  | ---             | "             | "                                     |                                               |
| "       | 8       | 1501 | 159                  | .66             | "             | "                                     |                                               |
| 16 Feb. | 7       | 1710 | 155                  | .10             | Flood         | 060-090/15-20                         |                                               |
| "       | 6       | 1715 | 154                  | .42             | "             | "                                     |                                               |

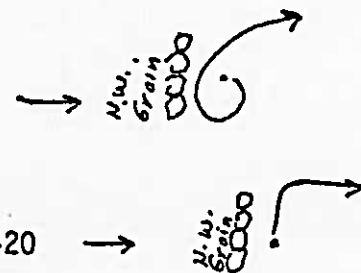


Table 1. (continued)

| Date    | Station | Time | Direction<br>(°Mag.) | Speed<br>(kts.) | Tide<br>Phase | Wind<br>[Dir.(°Mag.)/<br>Speed (mph)] | Remarks                         |
|---------|---------|------|----------------------|-----------------|---------------|---------------------------------------|---------------------------------|
| 16 Feb. | 5       | 1718 | 154                  | .33             | Flood         | 060-090/15-20                         |                                 |
| "       | 8       | 1723 | 147                  | .26             | "             | "                                     |                                 |
| "       | 7       | 1750 | 88                   | .19             | "             | "                                     |                                 |
| "       | 6       | 1755 | 146                  | .21             | "             | "                                     |                                 |
| "       | 5       | 1808 | 150                  | .33             | "             | "                                     |                                 |
| "       | 1       | 1810 | 130                  | .16             | "             | 075-090/15-20                         |                                 |
| "       | 7       | 1905 | ---                  | .09             | Ebb           | "                                     |                                 |
| "       | 6       | 1912 | 156                  | .22             | "             | "                                     |                                 |
| "       | 5       | 1915 | 152                  | .30             | "             | "                                     |                                 |
| "       | 7       | 1955 | 082                  | .10             | "             | 090/6-8                               |                                 |
| "       | 6       | 2001 | 150                  | .26             | "             | "                                     |                                 |
| "       | 5       | 2005 | 145                  | .28             | "             | "                                     |                                 |
| "       | 7       | 2215 | 60                   | .09             | "             | "                                     |                                 |
| "       | 6       | 2221 | 80                   | .19             | "             | "                                     |                                 |
| "       | 5       | 2225 | 90                   | .12             | "             | "                                     |                                 |
| "       | 8       | 2235 | 90                   | ---             | --            | --                                    | oscillation, net 090°           |
| "       | 9       | 2255 | --                   | ---             | --            | --                                    | diffusion seaward from NW groin |
| 17 Feb. | 7       | 0130 | 0                    | 0               | Low           | 090/5-6                               |                                 |

Table 1. (continued)

| Date    | Station | Time | Direction<br>(°Mag.) | Speed<br>(kts.) | Tide<br>Phase | Wind<br>[Dir.(°Mag.)/<br>Speed(mph)] | Remarks |
|---------|---------|------|----------------------|-----------------|---------------|--------------------------------------|---------|
| 17 Feb. | 6       | 0131 | 100                  | .08             | Low           | 090/5-6                              |         |
| "       | 5       | 0136 | 64                   | .04             | "             | "                                    |         |
| "       | 7       | 0807 | 111                  | .11             | Flood         | 090/5-8                              |         |
| "       | 8       | 0812 | 121                  | .44             | "             | "                                    |         |
| "       | 6       | 0814 | 148                  | .34             | "             | "                                    |         |
| "       | 5       | 0818 | 130                  | .39             | "             | "                                    |         |
| "       | 7       | 0852 | 106                  | .17             | Ebb           | "                                    |         |
| "       | 8       | 0856 | 142                  | .53             | "             | "                                    |         |
| "       | 8 A     | 0858 | 116                  | .53             | "             | "                                    |         |
| "       | 6       | 0900 | 146                  | .27             | "             | "                                    |         |
| "       | 6       | 0907 | 141                  | .39             | "             | "                                    |         |
| "       | 5       | 0904 | 142                  | .45             | "             | "                                    |         |
| "       | 7       | 1055 | 122                  | .10             | "             | 080/8-10                             |         |
| "       | 6       | 1101 | 160                  | .28             | "             | "                                    |         |
| "       | 5       | 1105 | 150                  | .26             | "             | "                                    |         |
| "       | 7       | 1159 | 158                  | .08             | "             | "                                    |         |
| "       | 8       | 1200 | 170                  | .28             | "             | "                                    |         |
| "       | 6       | 1204 | 140                  | .22             | "             | "                                    |         |

Table 1. (continued)

| Date    | Station | Time | Direction<br>(°Mag.) | Speed<br>(kts.) | Tide<br>Phase | Wind<br>[Dir.(°Mag.)/<br>Speed (mph)] | Remarks                    |
|---------|---------|------|----------------------|-----------------|---------------|---------------------------------------|----------------------------|
| 17 Feb. | 5       | 1207 | 126                  | .30             | Ebb           | 080/8-10                              |                            |
| "       | 7       | 1345 | ---                  | ---             | "             | 090/15-20                             | oscillatory                |
| "       | 8       | 1348 | 130                  | .23             | "             | "                                     |                            |
| "       | 6       | 1350 | 140                  | .16             | "             | "                                     |                            |
| "       | 5       | 1354 | 130                  | .18             | "             | "                                     |                            |
| 25 Feb. | 7       | 1150 | ---                  | *               | Flood         | 025/4-5                               | * slow oscillation         |
| "       | 8       | 1152 | 144                  | .30             | "             | "                                     |                            |
| "       | 6       | 1154 | 142                  | .33             | "             | "                                     |                            |
| "       | 5       | 1157 | 139                  | .30             | "             | "                                     |                            |
| "       | 5A      | 1200 | 156                  | .16             | "             | "                                     | 25 yds. lagoonward of site |
| "       | 5B      | 1203 | 127                  | .17             | "             | "                                     | 50 yds. lagoonward of site |

Table 2. Checklist of marine organisms.

| ALGAE:                           | Dredge site | Downstream | Mid-Bay |
|----------------------------------|-------------|------------|---------|
| <u>Acanthophora spicifera</u>    | X           | X          | X       |
| <u>Acrochaetium sp.</u>          | O           | O          | X       |
| <u>Amphiroa fragilissima</u>     | X           | O          | X       |
| <u>Boodlea sp.</u>               | X           | X          | X       |
| <u>Bryopsis pennata</u>          | O           | O          | X       |
| <u>Calothrix confervicola</u>    | X           | X          | X       |
| <u>C. pilosa</u>                 | X           | X          | X       |
| <u>Caulerpa racemosa</u>         | X           | O          | X       |
| <u>Centroceras minutum</u>       | O           | O          | X       |
| <u>Ceramium gracillium</u>       | O           | O          | X       |
| <u>C. huyamansii</u>             | O           | O          | X       |
| <u>C. vagabunde</u>              | O           | O          | X       |
| <u>Chaetomorpha indica</u>       | O           | O          | X       |
| <u>Champia compressa</u>         | O           | O          | X       |
| <u>Cladophoropsis mebranacea</u> | O           | O          | X       |
| <u>Dictyopteris repens</u>       | O           | O          | X       |
| <u>Dictyota divaricata</u>       | X           | X          | X       |
| <u>Enteromorpha clathrata</u>    | X           | X          | O       |
| <u>Feldmania indica</u>          | O           | O          | X       |
| <u>Galaxaura filamentosa</u>     | O           | O          | X       |
| <u>Gelidium sp.</u>              | X           | X          | X       |
| <u>Gracilaria sp.</u>            | O           | O          | X       |
| <u>Halimeda opuntia</u>          | O           | O          | X       |
| <u>H. macroloba</u>              | O           | O          | X       |
| <u>Hormothamnion solutum</u>     | X           | X          | X       |
| <u>Hypnea esperi</u>             | X           | O          | X       |
| <u>H. pannosa</u>                | O           | O          | X       |
| <u>Jania capillacea</u>          | X           | O          | X       |
| <u>Laurencia majuscula</u>       | X           | X          | X       |
| <u>Lobophora variegata</u>       | X           | X          | X       |
| <u>Mastophora lamourouxii</u>    | X           | O          | X       |
| <u>Microdictyon</u>              | O           | O          | X       |
| <u>Microcoleus lyngbyaceus</u>   | X           | X          | X       |
| <u>M. sp.</u>                    | X           | X          | X       |
| <u>Neogoniolithon frutescens</u> | X           | X          | X       |
| <u>Neomeris sp.</u>              | X           | O          | X       |
| <u>Padina sp.</u>                | X           | X          | X       |
| <u>Peyssonelia sp.</u>           | X           | X          | X       |
| <u>Polysiphonia scopulorum</u>   | O           | O          | X       |
| <u>P. sp.</u>                    | O           | O          | X       |
| <u>Porolithon onkodes</u>        | O           | O          | X       |
| <u>P. sp.</u>                    | X           | X          | X       |
| <u>Pterocladia parva</u>         | X           | X          | X       |

Table 2. (continued)

|                                  | Dredge site | Downstream | Mid-Bay |
|----------------------------------|-------------|------------|---------|
| <u>Ralfsia</u> sp.               | x           | 0          | x       |
| <u>Sargassum polycystum</u>      | x           | x          | x       |
| <u>S. duplicatum</u>             | x           | 0          | x       |
| <u>Schizothrix mexicana</u>      | x           | x          | x       |
| <u>Sphacelaria furcigera</u>     | x           | x          | x       |
| <u>Spyridia filamentosa</u>      | x           | x          | x       |
| <u>Symploca</u> sp.              | 0           | 0          | x       |
| <u>Taenioma perpusillum</u>      | 0           | 0          | x       |
| <u>Tolypiocladia glomerulata</u> | 0           | 0          | x       |
| <u>Turbinaria ornata</u>         | x           | x          | x       |
| TOTAL                            | 30          | 22         | 52      |
| ANGIOSPERMS:                     |             |            |         |
| <u>Halophela minor</u>           | 0           | 0          | x       |
| TOTAL                            | 0           | 0          | 1       |
| PROTOZOA:                        |             |            |         |
| <u>Calarina spengleri</u>        | x           | x          | x       |
| <u>Carpenteria</u> sp. 1         | x           | 0          | x       |
| <u>Homotrema rubrum</u>          | x           | x          | x       |
| <u>Marginopora vertebralis</u>   | x           | x          | x       |
| <u>Miniacina miniacea</u>        | 0           | 0          | x       |
| TOTAL                            | 4           | 3          | 5       |
| PORIFERA:                        |             |            |         |
| <u>Cinachyra australiensis</u>   | x           | x          | x       |
| "Sponge" sp. 1                   | x           | x          | x       |
| "Sponge" sp. 2                   | x           | 0          | x       |
| "Sponge" sp. 3                   | x           | 0          | x       |
| TOTAL                            | 4           | 2          | 4       |
| CNIDARIA:                        |             |            |         |
| Anthozoa (corals):               |             |            |         |
| <u>Acropora acuminata</u>        | 0           | 0          | x       |
| <u>Acropora aspera</u>           | x           | x          | x       |



Table 2. (continued)

|                                | Dredge site | Downstream | Mid-Bay |
|--------------------------------|-------------|------------|---------|
| <u>Goniastrea retiformis</u>   | x           | 0          | x       |
| <u>Lobophyllia costata</u>     | 0           | 0          | x       |
| <u>Montipora acanthea</u>      | 0           | 0          | x       |
| <u>M. lobulata</u>             | x           | 0          | x       |
| <u>M. verrilli</u>             | 0           | 0          | x       |
| <u>Pavona decussata</u>        | x           | 0          | x       |
| <u>P. frondifera</u>           | 0           | 0          | x       |
| <u>P. (Polyastra) obtusata</u> | x           | 0          | x       |
| <u>P. (Polyastra) sp. 1</u>    | 0           | 0          | x       |
| <u>P. varians</u>              | 0           | 0          | x       |
| <u>Pocillopora damicornis</u>  | x           | x          | x       |
| <u>Porites annae</u>           | 0           | 0          | x       |
| <u>P. cocosensis</u>           | x           | x          | x       |
| <u>P. compressa</u>            | x           | 0          | x       |
| <u>P. lobata</u>               | 0           | 0          | x       |
| <u>P. lutea</u>                | x           | x          | x       |
| <u>P. (Synaraea) solida</u>    | 0           | 0          | x       |
| <u>Psammocora contigua</u>     | x           | 0          | x       |
| <u>P. sp. 1</u>                | 0           | 0          | x       |
| <u>Stylaraea punctata</u>      | 0           | x          | 0       |
| <u>Stylocoeniella armata</u>   | 0           | 0          | x       |
| TOTAL                          | 10          | 5          | 22      |
| Alcyonaria:                    |             |            |         |
| <u>Sarcophyton sp. 1</u>       | 0           | 0          | x       |
| TOTAL                          | 0           | 0          | 1       |
| ANNELIDA:                      |             |            |         |
| <u>Sabellastarte sp. 1</u>     | x           | 0          | x       |
| <u>Spirobranchus sp. 1</u>     | x           | 0          | x       |
| TOTAL                          | 2           | 0          | 2       |
| MOLLUSCA:                      |             |            |         |
| <u>Cerithium sp. 1</u>         | x           | x          | 0       |
| <u>C. sp. 2</u>                | x           | 0          | 0       |
| <u>Conus pulicarius</u>        | x           | x          | x       |
| <u>Coralliophila violacea</u>  | 0           | 0          | x       |
| <u>Cypraca lynx</u>            | 0           | 0          | x       |
| <u>C. moneta</u>               | x           | x          | x       |
| <u>C. annulus</u>              | x           | 0          | x       |
| <u>Drupa nodus</u>             | 0           | 0          | x       |
| <u>Cymatium pileare</u>        | x           | 0          | x       |



Table 2. (continued)

|                              | Dredge site | Downstream | Mid-Bay |
|------------------------------|-------------|------------|---------|
| <u>Cypraca vitellus</u>      | 0           | 0          | x       |
| <u>Mitra mitra</u>           | 0           | x          | x       |
| <u>Teribra mainlata</u>      | 0           | x          | x       |
| <u>Tridacna marima</u>       | 0           | 0          | x       |
| <u>Polinius pyriformis</u>   | x           | 0          | x       |
| <u>Nerita plicata</u>        | x           | x          | 0       |
| <u>Nodulus</u> sp. 1         | 0           | 0          | x       |
| <u>Littorina</u> sp. 1       | x           | 0          | 0       |
| <u>Bursa</u> sp. 1           | 0           | 0          | x       |
| <u>Tonna perdix</u>          | 0           | 0          | x       |
| <u>Purpura intermedia</u>    | 0           | 0          | x       |
| <u>Mitra litterata</u>       | 0           | 0          | x       |
| <u>Conus ebracus</u>         | 0           | 0          | x       |
| <u>C. miles</u>              | 0           | 0          | x       |
| <u>C. lividus</u>            | 0           | 0          | x       |
| <u>C. flavidus</u>           | 0           | 0          | x       |
| <u>C. chaldaeus</u>          | 0           | 0          | x       |
| <u>C. ceylonensis</u>        | 0           | 0          | x       |
| <u>Terebra subulata</u>      | 0           | x          | x       |
| <u>T. guttata</u>            | 0           | x          | x       |
| "Limpets" sp. 1              | x           | x          | x       |
| "Limpets" sp. 2              | x           | x          | x       |
| "Chiton" sp. 1               | x           | 0          | x       |
| "Vermetidae" sp. 1           | x           | x          | x       |
| TOTAL                        | 13          | 11         | 29      |
| CRUSTACEA:                   |             |            |         |
| Amphipoda:                   |             |            |         |
| "Amphipod" sp. 1             | x           | x          | x       |
| TOTAL                        | 1           | 1          | 1       |
| ECTOPROCTA:                  |             |            |         |
| "Bryozoa" sp. 1              | x           | x          | x       |
| TOTAL                        | 1           | 1          | 1       |
| ECHINODERMATA:               |             |            |         |
| <u>Actinopyga mauritiana</u> | x           | x          | x       |
| <u>Echinaster luzonicus</u>  | 0           | 0          | x       |
| <u>Echinometra mathaei</u>   | x           | x          | x       |
| <u>Diadema setosum</u>       | x           | 0          | x       |
| <u>D. sp.</u>                | x           | x          | x       |

Table 2. (continued)

|                              | Dredge site | Downstream | Mid-Bay |
|------------------------------|-------------|------------|---------|
| <u>Echinothrix diadema</u>   | X           | X          | X       |
| <u>Holothuria argus</u>      | X           | X          | X       |
| <u>H. atra</u>               | X           | X          | X       |
| <u>H. sp. 1</u>              | X           | O          | X       |
| <u>H. sp. 2</u>              | X           | X          | X       |
| <u>Linkia laevigata</u>      | O           | O          | X       |
| <u>Opheodesoma @deffroyi</u> | X           | X          | X       |
| <u>"Ophiuroid" sp. 1</u>     | O           | O          | X       |
| <u>Stichopus chloronotus</u> | X           | O          | X       |
| <u>S. variegatus</u>         | X           | O          | X       |
| TOTAL                        | 10          | 7          | 13      |

## FISHES:

O - not observed  
 R - rare (1 fish)  
 P - present (2-5 fish)  
 C - common (6-10 fish)  
 D - dominant (10+ fish)  
 T - too numerous to count (100+)

|                                    |   |   |   |
|------------------------------------|---|---|---|
| <u>Abudefduf biocellatus</u>       | O | O | P |
| <u>A. glaucus</u>                  | O | O | P |
| <u>A. septemfasciatus</u>          | O | P | O |
| <u>A. sexfasciatus</u>             | R | R | P |
| <u>A. leucozona</u>                | O | O | P |
| <u>Acanthurus triostegus</u>       | O | O | D |
| <u>A. nigrofasciatus</u>           | O | D | C |
| <u>A. xanthopterus</u>             | O | O | P |
| <u>Amblygobius albimaculatus</u>   | O | O | P |
| <u>Apogon isostigma</u>            | O | O | P |
| <u>A. novemfasciatus</u>           | C | C | D |
| <u>A. nubilus</u>                  | O | O | P |
| <u>A. variegatus</u>               | P | O | P |
| <u>Arothron meleagris</u>          | O | O | P |
| <u>Asterropteryx semipunctatus</u> | R | P | P |
| <u>Aulostomus chinensis</u>        | R | O | P |
| <u>Bathygobius fuscus</u>          | R | O | C |
| <u>Bothus mancus</u>               | R | O | O |
| <u>Callionymus xanthesemeion</u>   | O | O | P |
| <u>Canthigaster bennetti</u>       | P | P | C |
| <u>C. solandri</u>                 | O | P | D |
| <u>Chaetodon auriga</u>            | O | O | P |
| <u>C. bennetti</u>                 | O | O | P |
| <u>C. citrinellus</u>              | O | O | P |
| <u>C. ephippium</u>                | O | O | P |
| <u>C. lunula</u>                   | R | O | C |

Table 2. (continued)

|                                    | Dredge site | Downstream | Mid-Bay |
|------------------------------------|-------------|------------|---------|
| <u>Chaetodon melannotus</u>        | O           | O          | R       |
| <u>C. strigangulus</u>             | O           | O          | P       |
| <u>C. trifasciatus</u>             | O           | O          | D       |
| <u>Cheilinus chlorurus</u>         | O           | O          | R       |
| <u>Chromis caeruleus</u>           | R           | O          | T       |
| <u>Corythoichthys intestinalis</u> | P           | O          | D       |
| <u>Ctenochaetus striatus</u>       | O           | O          | P       |
| <u>Dascyllus aruanus</u>           | C           | C          | T       |
| <u>D. trimaculatus</u>             | O           | R          | O       |
| <u>Eleotriodes strigatus</u>       | O           | O          | P       |
| <u>Enchelyurus sp.</u>             | O           | O          | P       |
| <u>Epibulus insidiator</u>         | O           | O          | P       |
| <u>Epinephelus merra</u>           | O           | O          | P       |
| <u>Fistularia petimba</u>          | O           | O          | R       |
| <u>Fusigobius neophytus</u>        | O           | O          | P       |
| <u>Gnatholepis deltoides</u>       | P           | C          | P       |
| <u>Gymnothorax fimbriatus</u>      | O           | O          | P       |
| <u>G. thyrsoideus</u>              | O           | O          | P       |
| <u>G. undulatus</u>                | O           | O          | P       |
| <u>G. sp.</u>                      | R           | O          | O       |
| <u>Hemigymnus melapterus</u>       | O           | O          | C       |
| <u>Heniochus permutatus</u>        | O           | O          | R       |
| <u>Holocentrus microstomus</u>     | O           | O          | P       |
| <u>H. sammara</u>                  | R           | O          | C       |
| <u>H. spinifer</u>                 | R           | R          | P       |
| <u>H. tiere</u>                    | O           | O          | P       |
| <u>Halichoeres trimaculatus</u>    | C           | P          | D       |
| <u>Labroides dimidiatus</u>        | R           | O          | P       |
| <u>Lactoria cornutus</u>           | R           | O          | R       |
| <u>Mugil sp.</u>                   | C           | C          | O       |
| <u>Mulloidichthys samoensis</u>    | P           | O          | T       |
| <u>Myridithys elaps</u>            | O           | O          | C       |
| <u>Myripristis sp.</u>             | P           | O          | D       |
| <u>Naso unicornis</u>              | O           | O          | P       |
| <u>Ostracion cubicus</u>           | R           | O          | P       |
| <u>Oxymonacanthus longirostris</u> | O           | O          | P       |
| <u>Paramia quinque-lineata</u>     | O           | O          | P       |
| <u>Parupeneus barberinus</u>       | R           | P          | C       |
| <u>P. porphyreus</u>               | O           | P          | P       |
| <u>Petrosciartes mitratus</u>      | O           | O          | P       |
| <u>Plesiops corallicola</u>        | O           | O          | P       |
| <u>Pomacentrus albofasciatus</u>   | C           | D          | T       |
| <u>P. lividus</u>                  | R           | P          | T       |
| <u>P. nigrigans</u>                | P           | P          | D       |
| <u>Rhinecanthus aculeatus</u>      | R           | C          | D       |

Table 2. (continued)

|                               | Dredge site | Downstream | Mid-Bay |
|-------------------------------|-------------|------------|---------|
| <u>Salarias fasciatus</u>     | 0           | 0          | P       |
| <u>Scarus lepidus</u>         | 0           | 0          | C       |
| <u>S. sordidus</u>            | 0           | 0          | D       |
| <u>S. venosus</u>             | 0           | 0          | P       |
| <u>Scolopsis cancellatus</u>  | P           | R          | T       |
| <u>Scorpaenodes guamensis</u> | 0           | 0          | P       |
| <u>Siganus spinus</u>         | 0           | 0          | C       |
| <u>Stethojulis axillaris</u>  | P           | P          | D       |
| <u>S. linearis</u>            | R           | 0          | P       |
| <u>Synodus variegatus</u>     | R           | 0          | P       |
| <u>Xyrichtyes taeniurus</u>   | 0           | 0          | P       |
| <u>Zebrasoma flavescens</u>   | 0           | 0          | R       |
| <u>Z. veliferum</u>           | 0           | 0          | R       |
| <u>Cheilinus chlorurus</u>    | 0           | 0          | P       |
| <u>Monotaxis grandoculis</u>  | 0           | 0          | P       |
| TOTAL                         | 32          | 21         | 81      |

Table 3. Frequency distribution of corals within the dredge site. See Figure 6 for location of zones.

| Coral                         | Transect Zones |    |    |    |    |    |    |     |    |    |    | Total | Percent |
|-------------------------------|----------------|----|----|----|----|----|----|-----|----|----|----|-------|---------|
|                               | 1              | 2  | 3  | 4  | 5  | 6  | 7  | 8   | 9  | 10 | 11 |       |         |
| <u>Acropora aspera</u>        | -              | -  | -  | -  | -  | -  | -  | -   | 1  | 1  | -  | 2     | <1      |
| <u>Goniastrea retiformis</u>  | -              | -  | -  | 1  | -  | -  | -  | -   | -  | -  | -  | 1     | <1      |
| <u>Montipora lobulata</u>     | -              | -  | -  | -  | -  | -  | -  | 1   | -  | -  | -  | 1     | <1      |
| <u>Pavona decussata</u>       | -              | -  | -  | -  | -  | -  | -  | -   | 2  | 2  | -  | 4     | <1      |
| <u>P. (P.) obtusata</u>       | -              | -  | -  | 2  | 1  | -  | -  | -   | 1  | 1  | -  | 5     | 1       |
| <u>Pocillopora damicornis</u> | -              | -  | -  | 8  | 10 | 17 | 20 | 15  | 8  | 8  | 10 | 96    | 18      |
| <u>Porites cocosensis</u>     | -              | -  | -  | 1  | 4  | 9  | 19 | 26  | 3  | 2  | 2  | 66    | 12      |
| <u>P. compressa</u>           | -              | -  | -  | 1  | 1  | 5  | 2  | 20  | 5  | 6  | 5  | 45    | 8       |
| <u>P. lutea</u>               | -              | 1  | 3  | 13 | 28 | 50 | 52 | 52  | 28 | 30 | 45 | 302   | 57      |
| <u>Psammocora contigua</u>    | -              | -  | -  | -  | 1  | 1  | -  | 5   | 1  | 1  | 1  | 10    | 2       |
| TOTAL                         | 0              | 1  | 3  | 26 | 45 | 82 | 93 | 119 | 49 | 51 | 63 | 532   | 100     |
| PERCENT                       | -              | <1 | <1 | 5  | 9  | 15 | 17 | 22  | 9  | 10 | 12 | 100   |         |



Table 4. Frequency distribution of echinoderms within the dredge site. See Figure 6 for location of zones, (T = 100+).

|                              | Transect numbers |     |     |     |      |      |     |     |      |      |      | Total | Percent |
|------------------------------|------------------|-----|-----|-----|------|------|-----|-----|------|------|------|-------|---------|
|                              | 1                | 2   | 3   | 4   | 5    | 6    | 7   | 8   | 9    | 10   | 11   |       |         |
| <u>Holothuria atra</u>       | 1                | 4   | 10  | 25  | 20   | 14   | 23  | 20  | 35   | 36   | T    | 188   | 15.6    |
| <u>H. argus</u>              | -                | 1   | 2   | 2   | 3    | 4    | -   | 3   | 9    | 8    | 10   | 42    | 2.3     |
| <u>H. sp. 1</u>              | -                | 2   | 20  | 30  | 60   | T    | T   | 30  | 25   | 25   | 16   | 408   | 22      |
| <u>H. sp. 2</u>              | 34               | 60  | T   | T   | T    | 34   | 20  | 10  | T    | T    | T    | 758   | 41      |
| <u>Stichopus chloronatus</u> | -                | -   | -   | 2   | 2    | 12   | 3   | 5   | 3    | 3    | 5    | 35    | 1.9     |
| <u>S. variegatus</u>         | -                | -   | -   | -   | -    | -    | -   | 1   | 1    | 1    | 2    | 5     | 0.2     |
| <u>Actinopyga mauritiana</u> | -                | -   | 2   | -   | 3    | 8    | 2   | 4   | 5    | 5    | 4    | 33    | 1.8     |
| <u>Ophiodesma godeffroyi</u> | 1                | -   | 1   | -   | -    | 6    | 2   | 4   | 4    | 4    | 3    | 25    | 1.4     |
| <u>Echinothrix diadema</u>   | -                | -   | -   | -   | -    | 3    | -   | 1   | -    | -    | -    | 4     | 0.2     |
| <u>Diadema setosum</u>       | -                | -   | -   | -   | 1    | 4    | 6   | 9   | 13   | 12   | 19   | 64    | 3.5     |
| <u>D. sp.</u>                | -                | -   | -   | -   | 3    | 1    | 5   | 3   | 1    | 1    | -    | 14    | 0.8     |
| <u>Echinometra mathaei</u>   | -                | 1   | 2   | 26  | 2    | 7    | 1   | 7   | 14   | 14   | T    | 174   | 9.4     |
| <u>Culcita</u>               | 1                | -   | -   | -   | -    | -    | -   | -   | -    | -    | -    | 1     | 0.05    |
| TOTAL                        | 37               | 67  | 137 | 185 | 194  | 193  | 162 | 97  | 210  | 209  | 359  | 1851  | 100     |
| PERCENT                      | 2.0              | 3.7 | 7.4 | 10  | 10.5 | 10.4 | 8.8 | 5.2 | 11.3 | 11.3 | 19.4 | 100   |         |

Charles W. Spero  
406 Jones Circle  
Jonestown, Tamuning,  
Guam 96911

December 30, 1978

District Engineer  
Honolulu District, Corps of Engineer's  
Honolulu, Hawaii

Re: Public Notice No. PODCO-O 1054-SD

Gentlemen:

As a resident of Guam, I wish to take exception to the issuance of a permit to the Hotels of the Marianas, for so called improvements along the water area north of their property in Tumon Bay.

Our Legislature has been working hard to pass legislation whereby the Government of Guam can acquire a strip of land approximately 35 feet high water mark throughout the island beach areas. It is obvious that the Legislature recognizes the need for public access and public beach.

A study of the sketches attached to the proposal of the Hotels of the Marianas indicates that the property line is far above the high water mark. The property lines were established by the Government of Guam when they traded the land to Mr. K.T. Jones Jr., President, for other inland areas. The beach area was always intended to belong to the people of Guam.

It is apparent that the Hotels of the Marianas have taken over Government of Guam land and now are in the process of taking over water rights and water areas for private use.

Section "F", Sheet #6, as submitted indicates 4000 C.Y. to be dredged although the actual calculated amount is slightly over 2000 C.Y. With beach sand selling at \$9.00 per cubic yard on Guam, and the proposal that excess material be removed from site, the indication is that Government materials will be used for private acquisition.

The North end of the beach development plan is poorly designed as the sand fill would be washed out of the rock breakwater. The only purpose served is again to establish rights to the area outside of the Hotel property lines.

This particular area is in a dangerous zone, due to under water current action and several people have been washed out to sea and lost in this vicinity. Providing easy access to a dangerous area that should be marked-off limits, is not considered an improvement.

The seawalls as shown on sheets #4 & 5 appear inadequate and once again

EXHIBIT D



are located on public lands mostly, thereby establishing rights of a private owner to land which belongs to the public.

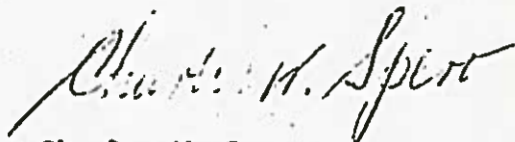
Removing of the stabilized rock fill breakwater and replacing with a rock fill at the Hotel property line will not only act as a fence to keep out the public but will permit the Hotel owners to acquire more land thru accretion.

The Ipao Public Beach area adjoins the Hotel land on the east side and is the only public beach in the north end of the island.

Any and all new beach areas created should be open to the public and should be properly planned and constructed. The establishing of a policy of absorbing beach land and water areas for private use and development must be thoroughly analysed, especially in view of the many beach property owners, who in the past could not obtain permission to dredge areas both for swimming use and creating of fish pool areas.

As a taxpayer and local resident I strongly object to the granting of a permit for this project for the above mentioned reasons. I also request the proper authorities to investigate work already done on public land by the Hotel owners and their right to exclude the public from these areas.

Respectfully submitted,



Charles W. Spero  
(Lt. Col. C.E. Ret.)

CWS/rb

c.c. Gov of Guam  
Director of Land Management G. of G.  
Guam Legislature

# JONES & GUERRERO COMPANY INC.

P. O. BOX 7, AGANA, GUAM 96910

KENNETH T. JONES, JR.  
PRESIDENT

CABLE: JANDG GUAM

March 13, 1973

Mr. Charles W. Spero  
406 Jones Circle  
Jonestown  
Tamuning, Guam 96 911

Re: Public Notice Number PODCO-0 1054-SD

Dear Mr. Spero:

We have been asked by Col. Leonard Edelstein, Honolulu District Engineer of the Army Corps of Engineers, to respond to your letter of December 30, 1972, reference the above subject.

Hotels of the Marianas, Inc. has not taken over any Government of Guam land and has no intention of doing so. Neither does the corporation intend to develop Government property for individual use. The deed from the Government of Guam to Hotels of the Marianas, Inc. conveying the property on which the hotel is situated provides that public access to the beach area will be provided. It has never been the intention of the corporation to restrict the public from the proposed swimming area and it will be available for public use.

The proposed project will convey absolutely no property interest in the area to Hotels of the Marianas, Inc. The excess dredged material will be removed from the project at the Government's direction and for the Government's account.

I have enclosed herewith a copy of an environmental assessment statement which includes a marine survey. The biologists who conducted the marine survey have advised us that the sand would not remain behind the proposed rock fill and we have accordingly deleted this part of the proposed project. There are several other modifications recommended by the marine biologists that we have adopted and these are also outlined in the environmental assessment statement attached.

We cannot agree with you that the area involved is a danger zone. It is true that the outer seaward edge of any reef area on Guam is hazardous but the inner portion of the bay and particularly that along the shoreline certainly does not fall in this

EXHIBIT D

Mr. Charles W. Spero  
March 13, 1973  
Page 2

category. Anyone wishing to walk out to the edge of the reef may do so from any point on the bay. The point is, the proposed swimming area will provide people a place to swim away from the extremities of the reef with the further added protection of a lifeguard in the area. As noted by the team conducting the marine survey the current along the shoreline where the swimming area will be created is minimal under normal sea conditions.

Your suggestion that removing the stabilized rock fill break water and replacing it with a rock fill at the hotel property line will act as a fence to keep out the public and permit the corporation to acquire more land through accretion is without foundation. We have deleted from the project the proposal to move the stabilized rock fill break water inasmuch as the marine survey team indicated in their report that it would not be of any benefit to the project. However, any land accretion which might have resulted from moving the stabilized rock fill would not have belonged to the corporation but would have belonged to the United States government. Since the existing rock break waters as you refer to them, do not extend up onto the beach, they will certainly not restrict the public's access in any way. In fact, it will be an easy matter to walk around either the seaward edge of the break water or beach end, inasmuch as these groups of stone are only a few feet in length.

We agree that new beaches created in this area should be open to the public and as already mentioned, the public will have complete access to this particular swimming area.

I have attached a copy of an editorial concerning this project which recently appeared in the Pacific Daily News.

If we can be of further assistance, please do not hesitate to get in touch with us.

Cordially yours,

Kenneth T. Jones, Jr., President  
Hotels of the Marianas, Inc.

KTJ,jr:so  
Enclosures (2)





# GUAM BOARD OF REALTORS

AIRPORT PLAZA 2ND FLOOR  
SUITE 1A Phone: 746-2775  
P. O. Box 6215  
TAMUNING, GUAM 96911



DEDICATED TO A BETTER GUAM

January 17, 1973

Col. Leonard Edelstein, District Engineer  
Honolulu District, Corps of Engineers  
Building 96, Fort Armstrong  
Honolulu, Hawaii 96813

Re: Public Notice No. PODCO-O 1054-SD

Dear Col. Edelstein,

The Guam Board of Realtors wish to comment on the work described in above public notice..

In the public interest the Guam Legislature has continually attempted to pass proper legislation to make all beach front property available to the general public.

This particular parcel of land upon which the Hotels of the Marianas are attempting to receive permission to develop as a part of the Guam Hilton Hotel, now belongs to the Government of Guam and has been designated for public use. While funds are not at present available to develop this land by the Government neither has there been any proper action taken to acquire this land by the Hotel people for their use.

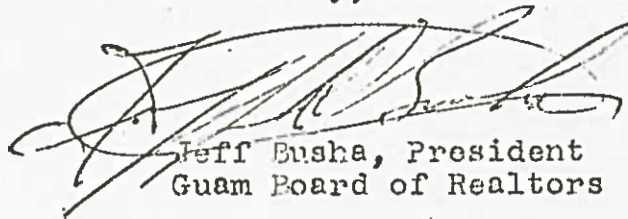
While we understand that the issuance of a permit by the Department of the Army does not give any property rights, either in real estate or materials, or any exclusive privileges and does not authorize injury to private property or invasion of private rights, or infringements of Federal, State, or local laws or regulations, the application of the Hotel people to develop land other than their own and the detailed plans incorporated in the application all as shown in par. 2 of basic letter, violates practically every facet of this understanding.

EXHIBIT E

We also fail to see how a private organization can develop public property predominantly for private use and receive sanctions of Governmental Agencies to do so.

As the proposal does not in any way, shape or form indicate that the development of public property is for use by the public but rather indicates completely that the development is for the Guam Hilton Hotel, a private profit organization, we emphatically request that permission to perform any or all of this work be denied as not in the public interest.

Sincerely,



Jeff Eusha, President  
Guam Board of Realtors

JB/rb

# JONES & GUERRERO COMPANY INC.

P. O. BOX 7, AGANA, GUAM 96910

KENNETH T. JONES, JR.  
PRESIDENT

CABLE: JANDG GUAM

March 13, 1973

Mr. Jeff Busha, President  
Guam Board of Realtors  
Airport Plaza  
Second Floor, Suite 1A  
Post Office Box 6215  
Tamuning, Guam 96911

Re: Public Notice Number PODCO-0 1054-SD

Dear Mr. Busha:

We have been asked by Col. Edelstein, Honolulu District Engineer of the Army Corps of Engineers, to respond to your letter of January 17, 1973 reference the above subject.

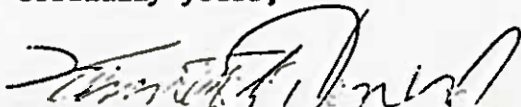
Hotels of the Marianas, Inc. has not at any time suggested that access of the public to the beach and area be restricted in any way. The deed from the Government of Guam conveying the hotel property to Hotels of the Marianas, Inc. provides for access of the public to this area and we can assure you and all others concerned that free access to the public will be provided.

Your comments concerning development of the Property for private use are not applicable inasmuch as it has never been the intention of the hotel to develop the property for private use.

We share with you the feeling that the beach areas along Tumon Bay should be open to the public. The hotel will assume the responsibility of assuring that the beach areas along the hotel property are maintained and kept clean. With the limited facilities available to the public on Guam, I hope you will agree that this project will be beneficial to the whole island.

If we can be of further assistance to you or answer any further questions concerning this project please do not hesitate to contact us.

Cordially yours,



Kenneth T. Jones, Jr., President  
Hotels of the Marianas, Inc.

KTJ,jr:so

EXHIBIT E





DEPARTMENT OF LAND MANAGEMENT  
GOVERNMENT OF GUAM  
AGANA, GUAM 96910

29 DEC 1972

Colonel Leonard Edelstein  
District Engineer  
Corps of Engineers  
Department of the Army  
Building 96, Ft. Armstrong  
Honolulu, Hawaii 96813

Dear Colonel Edelstein:

Subject: Public Notice No. PODCO-0 1054-SD

We received referenced public notice on December 15, 1972. Regrettably, we are unable to submit substantiated comments on the proposed dredging by the Guam Hilton Hotel at Ypao Beach because of the inadequate information regarding the project.

After due deliberation with some of the interested Government of Guam agencies, it is our consensus that we need the Environmental Impact or Assessment Statement for the proposed project. It is our understanding that such statements are generally required from the developers for projects similar to that proposed by the Guam Hilton. Lacking such statements, we feel that your request in Paragraph 4 of subject public notice entails a study which we could not possibly complete by the January 20, 1973 deadline. Moreover, we feel that such studies are the responsibility of the developers.

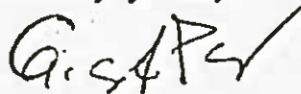
Our concerns remain tentative pending substantiating data from your office or the developers. However, I would like to raise the following questions which might have already been answered by a completed environmental impact statement:

1. Will the proposed north rock groins create new current patterns?  
If so, what are the possible after effects?
2. Will the loose rock fill affect siltation on one side?
3. Will free public access be inhibited?

EXHIBIT F

In view of the foregoing, we request that you send us copies of the Environmental Impact Statement, and subsequently extend the deadline for the submission of our comments.

Sincerely yours,

A handwritten signature in dark ink, appearing to read 'G. S. A. Perez', with a large checkmark at the end.

GERALD S. A. PEREZ  
Director

# JONES & GUERRERO COMPANY INC.

P. O. BOX 7, AGANA, GUAM 96910

KENNETH T. JONES, JR.  
PRESIDENT

CABLE: JANDG GUAM

March 13, 1973

Mr. Gerald S. Perez, Director  
Department of Land Management  
Government of Guam  
Agana, Guam 96910

Re: Public Notice Number PODCO-0 1054-SD

Dear Mr. Perez:

We have been asked by Col. Edelstein, Honolulu District Engineer of the Army Corps of Engineers, to respond to your letter of December 29, 1972 reference the above subject.

We have enclosed herewith a copy of an environmental assessment statement prepared by Hotels of the Marianas, Inc. based upon data provided by a marine survey team from the University of Guam Marine Laboratory.

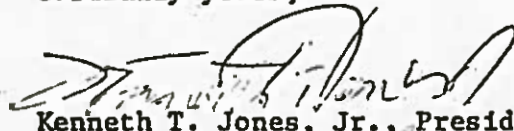
In answer to the specific questions raised in your letter, we would offer the following information:

1. No rock groins will be erected in the area. The existing rock groins will be left in place. However, these are very short structures lengthwise and I believe you will find from the marine survey that they do not significantly affect current patterns.
2. You will note from the environmental assessment statement that based upon the recommendations of the marine survey team, the proposal to place a loose rock fill in the area has been deleted.

We wish to assure you and all concerned that complete and free access of the public to this area will be provided.

If we can be of further assistance in this matter please do not hesitate to contact us.

Cordially yours,



Kenneth T. Jones, Jr., President  
Hotels of the Marianas, Inc.

KTJ,jr:so  
Enclosure

EXHIBIT F

GUAM WATER POLLUTION CONTROL COMMISSION

POST OFFICE BOX 299

AGANA, GUAM

PH. 7469-138

JAN 2 1973

Colonel Leonard Edelstein  
Department of the Army  
Honolulu District, Corps of Engineers  
Building 96, Fort Armstrong  
Honolulu, Hawaii 96813

Ref: Public Notice No. POD-O 1054-SD  
(Guam Hilton Hotel)

Dear Colonel Edelstein:

We have reviewed the construction details for Beach Development for Guam Hilton Hotel and have concluded that these details are too incomplete to evaluate. Some of the questions raised are:

Current as shown shows no pattern, does it flow on to the east?  
If so, will material be carried into the Ipao swimming area?  
Will the current adequately flush the proposed sump? Will the  
north rock groin create new current patterns with resultant  
silting and erosion? This area is relatively safe at this time  
for youngsters, but with the added depth may not be; therefore,  
will a lifeguard be provided? Where would tower be? Would it  
be an obstruction? The rock groins appear to be barriers to  
create a private beach. Will free public passage be maintained?  
How much of the 4000 CY of dredged material will be used on  
site? Where will the remainder be disposed of? Will the pool  
be maintained, i.e. cleaning, etc?

There are many more questions to be answered and we are of the  
opinion that a complete environmental assessment be prepared and submitted  
and that this be the new starting point for evaluating this proposed project.

Very truly yours,

*O. V. Natarajan*  
O. V. NATARAJAN, Ph.D.  
Administrator

CC: Director of Land Management  
Fish and Wildlife Division; Department of Agriculture  
Director of Commerce

EXHIBIT G



# JONES & GUERRERO COMPANY INC.

P. O. BOX 7, AGANA, GUAM 96910

KENNETH T. JONES, JR.  
PRESIDENT

CABLE: JANDG GUAM

March 13, 1973

Department of Land Management  
Government of Guam  
Agana, Guam 96910

Attn: O. V. Natarajan, Administrator

Re: Public Notice Number PODCO-0 1054-SD

Dear Mr. Natarajan:

We have been asked by Col. Edelstein, Honolulu District Engineer of the Army Corps of Engineers, to respond to your letter of January 2, 1973 concerning the above referenced project.

Enclosed herewith please find a copy of an environmental assessment statement prepared by Hotels of the Marianas, Inc. with assistance from a marine survey team from the University of Guam Marine Laboratory. I hope this study will be of assistance to you in evaluating the project.

In response to the specific questions asked in your letter, I would offer the following:

1. Your questions concerning the current and siltation are answered in the environmental assessment statement attached.
2. A lifeguard will be provided for the swimming area and plans are to provide a mobile tower structure which will not constitute an obstruction on the beach.
3. The rock groins will not be moved as originally contemplated. The marine survey team has advised us that it will not significantly affect the swimming area one way or the other so we have decided to leave them in place. The existing rock groins do not obstruct the beach and no obstruction will be erected on the beach. The swimming area will be freely open to the public and complete accessibility assured.

EXHIBIT G

Department of Land Management

March 13, 1973

Page 2

4. We cannot at this time answer your question as to the amount of the dredged material that will be used on site. This will in great part be determined by the proportion of the dredged material which is made up of usable sand. The remainder will be disposed of as the Government directs for the Government's account.

5. We will maintain the pool and assure that it is safe for use at all times.

If we can be of further assistance to you please do not hesitate to contact us.

Cordially yours,



Kenneth T. Jones, Jr., President  
Hotels of the Marianas, Inc.

KTJ,jr:so  
Enclosures





U.S. DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
National Marine Fisheries Service  
Southwest Region  
300 South Ferry Street  
Terminal Island, California 90731

January 18, 1973

Colonel Leonard Edelstein  
District Engineer  
Corps of Engineers  
Honolulu District  
Building 96, Fort Armstrong  
Honolulu, Hawaii

Recd 22Jan73

DDE *JE*

AEF

C-O

Ops

Dear Colonel Edelstein:

Subject: Public Notice PODCO-O 1054-SD, dated December 6, 1972 - application by the Hotels of the Marianas (Guam Hilton Hotel) to dredge a swimming area in front of the hotel, renovate existing seawalls, and construct new barrier walls of loose rock fill.

According to sheet 4, cross section A, a vertical seawall of new rock will be constructed in a concrete bed faced on an existing rock wall. The same procedure presumably will be followed at cross section E. We recommend this new seawall not be of vertical construction, but rather of sloping construction seaward with a slope of 1 on 2 or 1 on 3. Such a slope would not only aid in preventing erosion, but would also provide additional habitat for marine animals. A sloping seawall should not be of smooth concrete construction.

The applicant also proposes to construct an offshore barrier (cross sections C and D) of loose rock fill behind which sand backfill from dredging surplus will be placed on an existing coral rock shelf. Presumably this loose rock barrier will retain the sand placed on the coral shelf. The developer should provide assurance this sand backfill will remain in place and not be subject to erosion, either through the loose rock barrier, or by the periodic storm waves which occasionally sweep this area. If the sand backfill is subject to erosion, it would periodically need replenishment, thus requiring removal of sand from some other area, with possible degradation of the replenishment sand site.

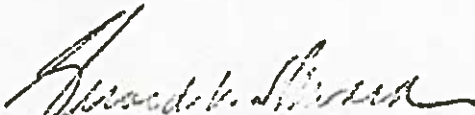
EXHIBIT H

January 18, 1973

Page 2

We request this permit be held in abeyance until we receive a response regarding our recommendations. We will then provide a definitive comment on the project.

Sincerely,

A handwritten signature in dark ink, appearing to read "Gerald V. Howard", written in a cursive style.

Gerald V. Howard  
Regional Director

cc: Maurice H. Taylor, BSF&W, Hawaii  
Robert T. B. Iversen, FSWxl, Hawaii

# JONES & GUERRERO COMPANY INC.

P. O. BOX 7, AGANA, GUAM 96910

KENNETH T. JONES, JR.  
PRESIDENT

CABLE: JANDG GUAM

March 13, 1973

U. S. Department of Commerce  
National Oceanic and Atmospheric Administration  
National Marine Fishery Service  
Southwest Region  
300 South Ferry Street  
Terminal Island, California 90731

Re: Public Notice Number PODCO-0 1054-SD

Gentlemen:

We have been asked by Col. Edelstein, Honolulu District Engineer of the Army Corps of Engineers, to respond to your letter of January 18, 1973, referenced as above.

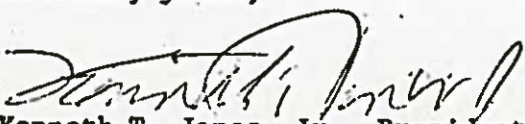
The proposed project has been modified to eliminate construction of any additional rock walls or rock fill. As modified, the project will entail only the removal of sand and debris from an area approximately 200 feet by 200 feet and part of the dredged sand will be used to improve the existing beach. The surplus sand will be placed behind existing sea walls in order to retain the sand.

Also, the original plan to back fill the proposed loose rock barrier with sand has been deleted. The only additional dredging that will be done will be that required for periodic maintenance of the swimming area and the sand removed from the swimming area will be used to replenish any sand eroded from behind the sea walls.

We have enclosed herewith a copy of an environmental assessment statement prepared by Hotels of the Marianas, Inc. with the assistance of a marine survey team from the University of Guam Marine Laboratory. We hope this will be of some assistance to you in your further evaluation.

If we can be of further assistance to you please do not hesitate to contact us.

Cordially yours,

  
Kenneth T. Jones, Jr., President  
Hotels of the Marianas, Inc.



GOVERNMENT OF GUAM  
AGANA, GUAM

January 10, 1973

Col. Leonard Edelstein  
District Engineer  
Corps of Engineer, Honolulu District  
Department of the Army  
Building 96, Fort Armstrong  
Honolulu, Hawaii 96813

Dear Col. Edelstein:

We have reviewed and discussed the proposed development work by Hotels of the Marianas as posted in Public Notice No. PODCO-O 1054-SD.

The proposed swimming area to be dredged will involve submerged tidal lands and will alter and remove a portion of the reef habitat. Also, the sketches submitted show groins and fill areas extending from shore which could possibly alter current flow. Who supplied the information on current Direction?

Although we anticipate that there will be some long term beneficial effects from the dredging and deepening of the area, there also will be some short term detrimental effects caused by the removal of live coral and the effects of siltation caused by the dredging operations. Also, is the developer planning to cut a channel through the reef margin?

The various local government agencies concerned are nearly all in agreement that the developer should submit a written narrative of their proposed plan and should also submit an environmental assessment statement prepared by a competent individual or firm.

We also foresee that the two groins shown on the plan would cause a limited barrier which would prevent the public from easy and free access to the beach and swimming area.

We recommend that the proposed plans be held up until the Environmental Assessment Statement is prepared and submitted for review and comment.

Yours truly,

ISAAC I. IKEHARA  
Chief, Division of Fish  
and Wildlife



# JONES & GUERRERO COMPANY INC.

P. O. BOX 7, AGANA, GUAM 96910

KENNETH T. JONES, JR.  
PRESIDENT

CABLE: JANDG GUAM

March 13, 1973

Mr. Isaac I. Ikehara, Chief  
Division of Fish and Wildlife  
Government of Guam  
Agana, Guam 96910

Re: Public Notice Number PODCO-0 1054-SD

Dear Mr. Ikehara:

We have been asked by Col. Edelman, Honolulu District Engineer of the Army Corps of Engineers, to respond to your letter of January 10, 1973, reference the above subject.

We have enclosed herewith a copy of an environmental assessment statement prepared by Hotels of the Marianas, Inc. based upon a marine survey prepared by a team from the University of Guam Marine Laboratory.

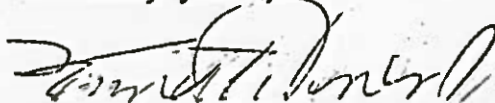
I believe that most of your questions will be answered by the marine survey which is attached to the environmental assessment statement as Exhibit C.

We wish to assure you that the beaches will not be obstructed in any way and free access to the public is guaranteed.

You will note from the environmental assessment statement that the original project has been modified in some respects, based upon recommendations of the marine survey team.

If we can be of further assistance to you in this matter please do not hesitate to contact us.

Cordially yours,



Kenneth T. Jones, Jr., President  
Hotels of the Marianas, Inc.

KTJ,jr:so  
Enclosure

EXHIBIT I