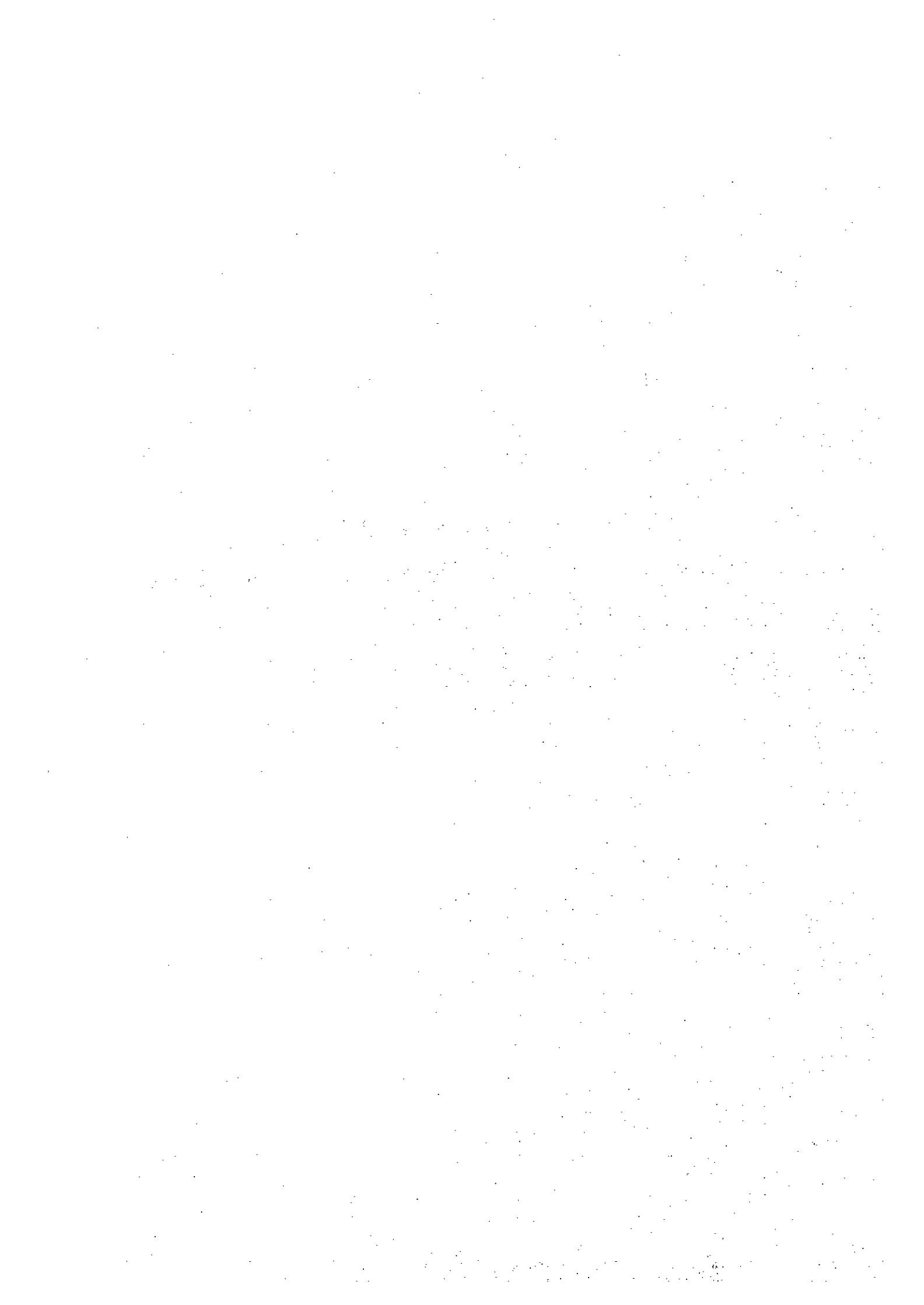


CHAPTER 3

IMPLEMENTATION PLAN



CHAPTER 3 IMPLEMENTATION PLAN

3-1 Implementation Plan

3-1-1 Implementation Concept

- (1) Since the area behind project site is harbour activity area and there are many vessels mooring in this area, it will be considered not to disturb their activities during construction period.
- (2) To formulate an implementation plan, discussion with the implementation agency will be needed in order to coordinate with local residents. A part of detached breakwater will be handed over to implementation agency when its construction is completed so that harbour activity would not be affected.
- (3) Implementation schedule will be planned basically with using barge for offshore construction works because of the lack of construction area on land.
- (4) The coral stones will be provided from the demolished and removed existing structures and will be reused as the filling materials in the new detached breakwater structures.
- (5) It has to be considered carefully to maintain the existing surrounding conditions, especially for the clean environmental conditions, during the construction and post-construction period.
- (6) To establish the construction plan, it is proposed that Japanese firms will perform the design work, supervision work and construction work.

The Executing Agency for the Project is the Department of External Resources (DER), the Ministry of Foreign Affairs and the Implementation Agency is the Ministry of Construction and Public Works (MCPW).

3-1-2 Implementation Conditions

With the consideration of minimizing adverse effect to the vicinity of the project site with respect to physical and environmental aspects, and peculiarity of offshore construction works, the following items will be duly considered in formulating the construction plan.

- (1) Construction plan will be planned to keep different entrance/exit for harbour activity area and construction area respectively in order to maintain security of the harbour activities.

- (2) The location of construction area of barge as construction base, route plan of barge as transportation for the materials, loading/unloading area, and mooring area will be decided based on careful study.
- (3) Since concrete structures below sea water level has to be fabricated on land, location of temporary yard and transportation between temporary yard and construction site will be decided base on careful study.
- (4) For the cast-in-concrete, the method of transportation and concreting in site will be considered in order to meet the implementation schedule.
- (5) In making the construction plan, the natural conditions, especially wind and wave, will be fully considered, in order to avoid tight and unreasonable schedule.
- (6) As for the demolition of the existing detached breakwaters, its schedule will be harmonized with construction schedule of new detached breakwaters in order to prevent deterioration of harbour calmness. Besides, the demolition works will consider the prevention of water pollution.

3-1-3 Scope of Works

Outline of allocation of works between the two (2) countries of Japan and Maldives during implementation of the Project is given in the following table.

Table 3.1 Allocation of Work Items of the Project

Type of Works	Responsibility of Japanese Side	Responsibility of Maldivian Side
Provision of construction site including temporary yard area		○
Access roads for the Project, and obtaining permits for their usage		○
Notification of construction area and keeping local vessels and residents out of construction area		○
Allocation of temporary mooring area and coordination for related matters with related agencies		○
Dredging works planned to widen the harbour area behind detached breakwaters after completion of the project.		○
Removal, storage and replace of the existing light beacon		○
Permission to use the existing temporary jetty		○
Demolition of the existing temporary jetty	○	
Demolition of the existing detached breakwaters	○	
Construction of new detached breakwaters and related facilities	○	

3-1-4 Construction Supervision

The project will commence after all procedures have been completed under the Grand Aid Project Requirements and a Japanese consulting firm has signed the Contract Agreement for the preparation of Tender and Contract Documents and Construction Supervision with the executing Agency of the Government of the Republic of Maldives, as required by the Ministry of Foreign Affairs of the Government of Japan for this project. The Consultant will perform his work for the Ministry of Foreign Affairs, who is the Executing Agency for this project. The work undertaken by the Consultant will generally consist of the followings:

(1) Detailed Design and Preparation of Tender Documents Stage

The consultant will prepare the Tender and Contract Documents, Drawings, Technical Specifications, and the detailed construction cost estimates based on the Basic Design Study Report and the Exchange of Notes.

(2) Tender Stage

The consultant will be responsible for preparing the Prequalification of Tenderers, and assist the Government of the Republic of Maldives to conduct the Tender Advertising, Tender Evaluation, Tender Negotiation, and Contract Award.

(3) Construction Supervision

The consultant will assign one resident engineer on a permanent basis to supervise and check the construction works in accordance with the contract documents. The project manager will supervise the works at the project site once in a while to ensure conformity with the contract documents and to provide necessary guidance to the resident engineer.

3-1-5 Procurement Plan

(1) Construction Materials

As mentioned before, construction materials and equipment except for fuels, coral sands/stones and Portland cements, will have to be procured from overseas. Fine and coarse aggregates for concrete, rubble stones, etc. will have to be secured from India, Indonesia, Malaysia, Singapore and other neighboring countries. In this study, the following sources are considered:

Local Sources: Coral sands/stones, Demolished materials from existing structures, Portland cements, Plywood, Steel materials for temporary construction, Pavement blocks, Reinforcing bars, Timbers, Oil and fats, Fuels

Neighbouring Countries: Fine and coarse concrete aggregates, Structural steel, Stones, Filter fabrics

(2) Construction Equipment

It has been confirmed that the following construction equipment could be leased from construction company in Malé.

Crawler crane (80t, 45t), Truck crane (20t), Backhoe, Wheel loader, Truck mixer, Batch plant, Dump truck (11t), Forklift, Generator (175KVA, 100KVA), Flat barge (500t), Spud barge (300t), Anchor boat (240HP, 105HP)

The following need to be procured from neighbouring countries. Temporary construction materials, Experimental equipment, Survey equipment

3-1-6 Implementation Schedule

Implementation schedule referring to responsibilities of Japanese side under this Project is shown in Table 3.2.

3-1-7 Undertakings of the Government of Republic of Maldives

It is envisaged that in case this Project is implemented according to Grand Aid System of Japan, the Government of the Republic of Maldives will execute the following measures.

- (1) Provision of construction site including temporary yard area
- (2) Obtaining of all necessary licenses/permissions for facilities' construction works
- (3) Conclusion of interbank agreement with a bank located in Japan
- (4) Unloading of imported equipment and materials into Maldivian territory, paying custom/port clearance fees, prompt transportation within the country and tax-exemption measures

- (5) Exemption of custom duties/tariffs, domestic taxes (including VAT), and of other charges/levies towards the Japanese citizens who enter the Republic of Maldives in order to purchase equipment and for execution of works on the basis of verified contract
- (6) Obtaining permissions for entry and stay into the Maldives for Japanese citizens who enter the Republic of Maldives on the basis of verified contracts for execution of works
- (7) Proper and effective usage of facilities and equipment provided through Japanese Grant Aid
- (8) Undertaking the burden of all necessary expenditures for implementation of this Project beyond the scope of Japanese Grant Aid
- (9) Issuance of Authorization to Payment for Consulting services and Construction works according to the contract

3-2 Operation and Maintenance Plan

Since the proposed structure of the detached breakwaters is planned to be maintenance-free, no maintenance costs will be required, basically. However, it is recommended that inspection of the condition of the detached breakwaters and wave breaking condition on the detached breakwaters should be carried out periodically. Accordingly, some amount of budget to maintain the facilities and clean up the detached breakwaters and the surrounding area would be allocated by executing Agency.

Table 3.2 Implementation Schedule

Month	1	2	3	4	5	6	7	8	9	10	11	12
Phase I	Detailed Deisn											
	<p>(Study in Site) (Study in Japan) (Assistance for Tender)</p> <p>(Total : 4.0 months)</p>											
Phase I	Construction											
	<p>(Preparation & Temporary Work) (Mobilization) (Seawall Type A : 97.3m) (Seawall Type B : 470.0m) (Seawall Type-D : 159.7m)</p> <p>(Total : 11 months)</p>											
Phase II	Detailed Deisn											
	<p>(Study in Site) (Study in Japan) (Assistance for Tender)</p> <p>(Total : 4.0 months)</p>											
Phase II	Construction											
	<p>(Preparation & Temporary Work) (Mobilization) (Seawall Type C : 356.2r) (Seawall Type E : 46.0m) (Seawall Type A : 197.7m) (Site Clearance)</p> <p>(Total : 11 months)</p>											

3-3 Environmental Considerations

3-3-1 Institutional Systems for Environmental Conservation

At the beginning, main responsible organization for the environmental affairs in the Republic of Maldives was the Ministry of Planning, Human Resources and Environment (MPHRE). However, from November 1998 the Environment Section of MPHRE has been transferred to the Ministry of Home Affairs and the amalgamated reorganized new ministry is being referred to as the Ministry of Home Affairs, Housing and Environment (MHAHE). The Environmental Section of MHAHE has practical jurisdiction to ensure the relevant environmental laws and regulations, including the environmental impact assessment (EIA) for development projects, are adhered to by potential polluters and project initiators. Essentially the Environment Section of MHAHE is the basic planning and executing agency on a national basis including environmental management, preservation and protection measures.

The National Commission for the Protection of the Environment (NCPE) established in 1989 belongs to the President Office. As an adviser organization to MHAHE, NCPE occupies the important position on Environmental planning, management and environmental impact assessment (EIA).

As other institutions with significant involvement in environmental affairs of the country, there is the Ministry of Health, which has the sole water quality analytical laboratory. The Ministry of Fisheries, Agriculture and Marine Resources is responsible for the protection of marine environment by promoting sustainable utilization of marine resources and their conservation, including coral ecology, and to the maintenance of uninhabited islands and wooded areas, including tree plantation (forestation), hence to the protection of terrestrial environment as well.

The Environmental Protection and Preservation Act of Maldives enacted in 1993, known as Law No. 4/93, formed the basis of national environmental law. According to this law, any concerned ministry of the government could issue environmental guidance. Moreover, MHAHE has been given the authority to identify and declare protected nature reserve areas and also to formulate the required regulations concerning the activities allowed in such protected areas, including audit of such allowed activities. This law also stipulates the formulation of EIA for all development projects having potential impact on environment and its submission to the MHAHE for evaluation and approval. MHAHE is also authorized to terminate any project causing undesirable environmental impact with no compensation.

The environmental problems and tasks in relation to the Male Seawall Project Phase-IV are identified and discussed with the method of Initial Environmental Examination (IEE) established by JICA. The followings are the report of the discussion.

3-3-2 Initial Environmental Examination and Discussion

(1) Outline of the Project and Geophysical Conditions

The capital city Male island is located in the southern tip in the Male atoll, and it is highly populated city where about 63000 person (census in 1995) lives in 1.8 km² area. The ground level of Malé island is high from 20 cm to 30 cm at the high-tide sea water - level. And the coral reef, which developed from the coast to the distant out at sea, fulfilled the role of the natural pier. But by the recent landfill, land reclamation was made this coral reef to the near reef edge. Therefore, Malé island was affected by a storm wave due to the Australia open sea cyclone in April, 1987, and the island sustained great damage.

After this disaster, the Urgent Grant Aid and the Grant Aid over 3 times from Japan were carried out for seawall improvement of the Male island. As this result, the seawall of the weak and conventional structure was reborn as the permanent seawall. Present north coast seawall project makes this conclusion.

The geophysical conditions of the Project are summarized in Table 3.3.1. This project has done improvement of existing offshore breakwater, and large-scale modification of the present state such as the new development construction is not carried out. As a location environment, the following are the important features:

The ocean wave is comparatively calm, since the north coast faces north Male atoll

The north coast fulfils the main country function as commercial harbour, fishing port and sightseeing base harbour. Therefore, egress and ingress of the ship is intense.

(2) Screening

The aim of screening process defined in JICA's guidelines is to make judgement whether the Project is required to conduct Environmental Impact Assessment (EIA) or not. A series of discussion is made to determine whether EIA is necessary or not from the standpoint to harmonize the sustainable development with the lives of inhabitants and environment based on the outline of the Project and geophysical conditions.

Table 3.3.2 shows the summary of screening of the Project by the JICA format. The possibility that the Project would damage the environmental conditions is very small and it is judged that EIA is unnecessary.

(3) Scoping

Scoping is defined in JICA's guidelines as to find out important effects of environmental impacts in relation to the Project, and to clarify the fields and items to be studied intensively in the EIA process.

Table 3.3.3 is the checklist prepared for scoping of the Project. According to the checklist, few items are expected as the environmental impacts by the Project, and the fear on water pollution of the offshore breakwater inside has been indicated in the "Pollution" items. It is necessary to carry out the systematic correspondence after the offshore breakwater improvement. In present facilities plan, it copes by considering the water-conveyance function in the embankment body structure in addition to the opening for harbour zone water quality improvement of the offshore breakwater inside.

Table 3.3.4 shows the relations of cause and effect between elements of environmental impact by Matrix method concerning the period of construction stage and operation stage of port facilities installed in the Project.

3-1) "Social Environment" items

Since it is the improvement project of existing offshore breakwater, problem generation in the social environment items is little for this project. In the item on waste, there is a problem of the waste that arises by the removal of the existing offshore breakwater, and it can reach solution by recycling the waste for this construction.

And the problem of waste dumps and dredged materials generated in construction stage might occur. These problems should be considered in the process of construction planning and can be resolved by the treatment in the proper way and with environmental considerations.

3-2) "Natural Environment" items

It is understood that there is no major problem item to be pointed out, since the aim of the project is improvement of existing offshore breakwater and coral does not live either.

3-3) "Pollution" items

The items "Water pollution" and "Noise and vibration" of "Pollution" items can be pointed out in the construction stage. The construction area is the coral reef rock mass geology and there are no pollution sources such as sedimentary organic silt. However, it is necessary to consider the pollution of the earth and sand with the construction by roll risers, etc. It can cope with this by considering silt protector installation, etc. in scheme of execution.

The fishes, which live near the construction area, are abounding. But, they are expected to move to another water area during the Construction stage and to return to this area after the construction, and it is expected that extreme worsening of the environment is avoidable.

"Noise and vibration" is expected to happen by the construction equipment in the Construction stage. Since there exists the city area of Malé within 200 meters of the construction site, the construction method and the construction equipment which are able to restrain generation of noise and vibration should be employed.

The water quality problem of offshore breakwater interior side after the common use start is a problem to be coped based on actual condition by regulation and measure of water treatment plant, etc. in the port and harbour utilization plan. As described before, in present facilities plan, it copes by considering the water-conveyance function in the embankment body structure in addition to the opening for harbour zone water quality improvement of the offshore breakwater inside. Concretely, the installation of pipes, etc. is planned to the embankment body of the offshore breakwater in order to promote the exchange of the sea water.

Table 3.3.1 Geophysical Conditions of the Project

Items		Description
Name of the Project		The Seawall Construction in Malés Island (Phase 4)
Social Environment	LOCAL INHABITANTS (Residents / Inhabitants / Opinion for the Plan, etc.)	The project is improvement of existing seawall as the main entrance in the capital city of Maldives and the local inhabitants highly expect the project as part of the socioeconomic infrastructure investment.
	LAND USE (Fishing village & Fish market / Seaboard Industrial Area / Historic sites, etc.)	The project site is located near commerce and government building, and it is the harbour as a base of the access to district island, resort island and airport island.
	ECONOMY / RECREATION (Agriculture, Fisheries & Business / Resort facilities, etc.)	The capital city function is concentrated, and international harbour, fishing port have also been located. The advanced utilization can be expected as base of economy and recreation activity.
Natural Environment	GEOGRAPHICAL & GEOLOGICAL FEATURES (Steep configuration, Soft ground & Swamp / Fault, etc.)	The offshore breakwater is constructed on the coral reef in the coral atoll island.
	SEA & COASTAL ZONE (Erosion & Accretion / Tide & Tidal Current / Bathymetry, etc.)	The ocean wave of the project site is comparatively calm, since it faces north Male atoll inside, though the effect of tidal current and ocean wave is received. North coast western edge receives the effect of westerly, and the wave is comparatively high. It is judged that there is no effect of the drift sand, because there is no record of drift sand and erosion in the Male island north coast
	VALUABLE FAUNA AND FLORA / HABITAT (Mangrove/ Coral reef / Hydrobious, etc.)	The situation of the reef of the project site is the ground where all were formed by the dead coral, and gregariousness of the living coral is not confirmed. Though the population of the fish is abounding, especially, the valuable kind does not live.
Pollution	OCCURRENCE OF COMPLAINTS (Highly interested pollution or events, etc.)	Dumping of waste oil or garbage from vessels and fishing boat is seen in the harbour. Films of oil and/or floating garbage are seen inside and outside of the harbour.
	RESPONSE / REACTION (Countermeasure / Compensation, etc.)	The egress and ingress ship is comparatively small, and the pollution status is also regarded slight, and especially, countermeasure is not taken.
Miscellaneous		It is feared that the congestion of ships and fishing boats with work boats during the construction works may occur.

Table 3.3.2 Environmental Screening in Port & Harbour Development

Element of Environmental Impact		Description	Evaluation	Remarks (Grounds)	
Social Environment	1	Resettlement of inhabitants	Resettlement due to occupancy of inhabited area by the Project.	None	This Project is improvement of the existing offshore breakwater.
	2	Economic activities	Loss of productive measures such as land or fishery; fatal change of social economy.	None	
	3	Traffic and public facilities	Impact on traffic and/or public facilities such as traffic jam, traffic accident and so on.	None	This Project is improvement of the existing offshore breakwater.
	4	Split of district	Split of community due to interruption of communication and traffic by the Project	None	
	5	Cultural property	Loss of cultural property (temple, shrine, buried property, etc.)	None	Cultural property, etc. are not in the vicinity
	6	Water right and common right	Violation of fishing right, water rights, common right in forest and so on.	None	
	7	Health and hygiene	Worsening of environment such as dumping of waste and/or outbreak of harmful insect	None	This Project is improvement of the existing offshore breakwater.
	8	Waste and garbage	Generation waste dumps, waste oil and so on through construction and operation	Some	Though the existing offshore breakwater is dismantled, it is recycled, but the generation of the part waste is anticipated. And, consideration of the waste to disposal is necessary, since the construction waste also arises.
	9	Risk and hazard	Increase of danger of risk and hazard such as land-slide, vessel accident and so on	None	
Natural Environment	10	Topography and geology	Large-scale change of topographic /geological features by excavation and/or landfill	None	This Project is improvement of the existing offshore breakwater.
	11	Soil erosion	Soil erosion by rain fall due to land excavation and/or forest cutting	None	
	12	Underground Water	Water shortage due to excavation and drainage; pollution by soaked water	None	
	13	Hydrological situation	Change of discharge volume or river bed due to landfill and/or drainage	None	

Natural Environment	14	Coastal zone	Erosion or accretion due to landfill and/or change of sea condition	None	Though the part of the existing offshore breakwater is transferred offshore, the generation of beach erosion and sedimentation is not anticipated based on ground condition.
	15	Flora and fauna	Interruption of breeding or extinction of species due to change of habitat condition	None	Coral does not live in the construction area. It is expected that the fish to decrease with the construction. However, they are regarded as to return after the construction completion.
	16	Meteorology	Change of temperature or wind flow due to large-scale landfill and/or construction	None	
	17	Landscape	Topographic change due to landfill; destruction of harmony due to building	None	
Pollution	18	Air pollution	Air pollution due to exhaust gas from vehicles and/or vessels	None	
	19	Water pollution	Water pollution due to flow-in of soil and earth or waste water	None	Consideration for water pollution is necessary for the construction.
	20	Soil contamination	Dust from field stock-pile; contamination by agricultural chemicals	None	
	21	Noise and vibration	Noise and vibration from vehicles and vessels	None	Consideration is necessary for noise and vibration which arise from construction equipment in the construction.
	22	Land subsidence	Land subsidence due to geological change or decline of underground water level	None	
	23	Offensive odor	Outbreak of exhaust gas or offensive odor from port facilities	None	
Total Evaluation : Are IEE or EIA necessary for the Project?				No	

Table 3.3.3 Check-list for Scoping (Port & Harbour Development)

Element of Environmental Impact		Evaluation	Reasons	
Social Environment	1	Resettlement of inhabitants	D	Rehabilitation of functions of existing offshore breakwater.
	2	Economic activities	D	Ditto
	3	Traffic and public facilities	D	Ditto
	4	Split of district	D	Ditto
	5	Cultural property	D	Nothing is reported in the Project area.
	6	Water right and common right	D	Ditto
	7	Health and hygiene	D	No specific problem.
	8	Waste and garbage	D	To be treated properly.
	9	Risk and hazard	D	No plan of new development or landfill.
Natural Environment	10	Topography and geology	D	No rare and valuable topography is reported.
	11	Soil erosion	D	No plan of new development or landfill.
	12	Underground water	D	No plan to affect underground water.
	13	Hydrological situation	D	Rehabilitation of functions of existing offshore breakwater.
	14	Coastal zone	D	Ditto
	15	Flora and fauna	D	Coral does not live in the construction area. There is no effect to the fish.
	16	Meteorology	D	No plan of large-scale development or landfill.
17	Landscape	D	No plan of large-scale development or landfill.	
Pollution	18	Air pollution	D	Rehabilitation of functions of existing offshore breakwater.
	19	Water pollution	C	Ditto
	20	Soil contamination	D	Nothing to contaminate soil is assumed
	21	Noise and vibration	C	Traffic volume of vehicles and vessels is considered to increase accompanied by improvement of port facilities, but the effect is not clear.
	22	Land subsidence	D	No plan of large-scale development or landfill.
	23	Offensive odor	C	There is no action which generates offensive odor.

Note : Evaluation of environmental impact

- A : High magnitude of impact is expected.
- B : Low intensity of impact is expected.
- C : Unidentified (to be considered that studying is necessary and the problem will become clear after investigation in detail).
- D : Almost no impact is expected and IEE or EIA is considered not necessary.

Table 3.3.4 Matrix for Environmental Scoping (Port & Harbour Development)

Main Actions relating to the Project		Port and Related Facilities						
Elements of Environmental Impact		Total Evaluation	Pre-Operation Stage			Operation Stage		
			Change of Topography, Exclusive Use of Space	Operation of Construction Equipment, Vehicles and Vessels	Exclusive Use of Space	Operation of Vehicles	Navigation of Vessels	Operation of Facilities
Social Environment	1 Resettlement of inhabitants	-	-	-	-	-	-	-
	2 Economic activities	○	-	○	-	-	-	-
	3 Traffic and public facilities	○	-	○	-	-	-	-
	4 Split of district	-	-	-	-	-	-	-
	5 Cultural property	-	-	-	-	-	-	-
	6 Water right and common right	-	-	-	-	-	-	-
	7 Health and hygiene	-	-	-	-	-	-	-
	8 Waste and garbage	○	-	○	-	-	-	-
	9 Risk and hazard	-	-	-	-	-	-	-
Natural Environment	10 Topography and geology	-	-	-	-	-	-	-
	11 Soil erosion	-	-	-	-	-	-	-
	12 Underground water	-	-	-	-	-	-	-
	13 Hydrological situation	-	-	-	-	-	-	-
	14 Coastal zone	-	-	-	-	-	-	-
	15 Flora and fauna	-	-	-	-	-	-	-
	16 Meteorology	-	-	-	-	-	-	-
	17 Landscape	-	-	-	-	-	-	-
Pollution	18 Air pollution	-	-	-	-	-	-	-
	19 Water pollution	○	-	○	-	-	-	○
	20 Soil contamination	-	-	-	-	-	-	-
	21 Noise and vibration	○	-	○	-	-	-	-
	22 Land subsidence	-	-	-	-	-	-	-
	23 Offensive odor	-	-	-	-	-	-	-

- ◎ : Important environmental element which can affect the practicability of the Project depending on its magnitude and countermeasure.
- : Potential important environmental element depending on the Project magnitude and site conditions.
- : Environmental element which has least impact and requires detail investigation and study in usual condition.

CHAPTER 4

PROJECT EVALUATION AND RECOMMENDATION

CHAPTER 4 PROJECT EVALUATION AND RECOMMENDATION

4-1 Project Effect

As the design wave condition of the return period of the 50-year probability is employed for the design of coastal structures, the following project effects can be expected.

4-1-1 Direct Effect

- (1) As the detached breakwaters are improved to a permanent firm facility by the execution of this project, breaking of the detached breakwaters is prevented. Hence flood disaster into official buildings and houses in about 10 ha at north area of Malé is prevented. With implementation of this project, the property of the residents of 8,000 in the area can be protected from the flood disaster, be expected to secure the stable growth of the economy, society activities and lives of the residents. Also, the repairing cost which is more than Mrf 1 million per year for the detached breakwaters of north coast is saved after this project.
- (2) With the execution of this project, the breaking of the detached breakwaters at north coast of Malé is prevented. Also the harbour interior side of the detached breakwaters is secured with the calmness of the sea surface. With this project, about 170 boats mooring in the basin of the harbour are protected from the disaster caused by the wave. The harbour could be secured of its functions including transportation of the cargoes between Malé and inhabited islands, stable supply of the fish to residents of Malé and the marine activities of the country.

4-1-2 Indirect Effect

- (1) For the functions of the north harbour, with implementation of this project, the utilization of the harbour would be improved. Also safe harbour operation is ensured by the plan of the detached breakwaters being taken into account the harbour operations.

With consideration of the walkway on the breakwaters and mooring rings installed inner side of the breakwaters, the management of the mooring condition of the boats in the harbour would be easier than before. It is expected that the environmental water conditions in the harbour will improve with the installation of pipes through breakwater bodies to expedite exchange of seawater of the basin. In the eastern side of the north coast, a part of the detached breakwater (about 350 m) will be sifted 11 m to the reef-edge side in order to widen the harbour basin from 40 m to 50 m. Hence, this area of

harbour would be secured to safe operation with a minimum of 48 m wide basin being available for the general boats (12 m length).

- (2) As the north coast of Malé is improved the aspect of the tourism by the enhanced appearance of breakwaters conforming the landscape under the situation of the main gateway for the visitors to Maldives, tourism of the Malé island and income from the tourists would increase indirectly.

There are four hundred thousand people who visit Maldives per year (1999). They said, about 20 % (100,000 peoples) of the visitors have visited Malé for sightseeing and shopping per year. All of the tourists to visit Malé shall enter from the north coast. With consideration of the appearance of breakwaters to meet to the landscape, which would be provided by this project, a good impression is given to the tourists, and it is expected that the tourists visit to Malé increase indirectly.

- (3) In the situation where the climate change is an alarm signal for the world now, the sea level rise due to the global warming of the earth is one of the most serious problem. The peoples living in Maldives where the land elevation is only few meter higher than the sea level have anxious in there mind. As the breakwaters planned in this project have been designed as the structure due to the wave condition of the return period of the 50-year probability, the breakwaters retains its function and stability for the sea level rise in long term. Hence, this project will provide the safety of mind to the peoples in Malé.

In the central area of the north coast, the wave height in the bad weather condition is about 40 cm. For this condition, the detached breakwater planned in the project is designated for the wave height of 60 cm which is the wave condition of the return period of the 50-year probability and the structure having more than 1.2 safety factor for its stability. Due to the sea level rise in long term, it is considered that the rate of the wave overtopping of the breakwaters will increase. However, the breakwaters could still retain the required stability of the structure and effect of the wave dissipation, and the facility would secure the calmness of the harbour and prevent the flooding of the city due to the sea level rise in long term.

4-2 Recommendation

The management and maintenance of this project will be performed by personnel and financing of the Government of Maldives, and it is assumed that they have necessary resources. In addition, the following points are recommended for effective and smooth implementation of the project and a betterment of the maintenance of the facilities.

- (1) For the implementation of the project, coordination for related matters with related agencies and to keep local vessels and residents out of construction area is performed smoothly before beginning of the construction.
- (2) The dredging work for widening of the harbour is executed by the Government of Maldives after completion of the project as soon as possible, and care must be exercised when dredging work take pace to see that the breakwaters are not damaged.
- (3) Some detached breakwaters will be used party for the mooring of boats. Care must be paid to see that the boats do not collide with the breakwater structures causing breakage.
- (4) As the important operation and maintenance service, monitor continuously for wave conditions and sea level rise.

APPENDIX

APPENDIX - 1 MEMBER LIST OF SURVEY TEAM

(1) Survey Stage

Mr. Kenichi ITO	Team Leader	Deputy Director, Wage and Allowance Division, Personnel Department, Japan International Cooperation Agency
Mr. Hisashi SAITO	Grant Aid Planner	Grant Aid Division, Bureau of Economic Cooperation, Ministry of Foreign Affairs
Mr. Yuichi MATSUSHITA	Coordinator	Third Project Management Division, Grant Aid Management Department, Japan International Cooperation Agency
Mr. Hiromi NAMIKI	Chief Consultant / Coastal Protection	Pacific Consultants international (PCI)
Mr. Kazutoshi KASHIMA	Design of Facilities	Pacific Consultants international (PCI)
Mr. Hiroshi KIKUTA	Natural Condition / Sea Environmental Assessment	Pacific Consultants international (PCI)
Mr. Kazuo UEZUMI	Cost Estimation / Construction Planning	Pacific Consultants international (PCI)

(2) Draft Report Explanation Stage

Mr. Masafumi NAGAISHI	Team Leader	Asst. Resident Representative, JICA Sri-Lanka Office Japan International Cooperation Agency (JICA)
Mr. Hiromi NAMIKI	Chief Consultant / Coastal Protection	Pacific Consultants international (PCI)
Mr. Kazutoshi KASHIMA	Design of Facilities	Pacific Consultants international (PCI)

APPENDIX - 2 SURVEY SCHEDULE

Survey Stage

Date		Trip	Stay at	Activites
13 Feb	Sun	Tokyo - Colombo	Colombo	
14 Feb	Mon	Colombo - Male'	Male'	Courtesy call on Embassy of Japan at Colombo
15 Feb	Tue		Male'	Submission and Explanation of Inception Report to DER, MCPW.
16 Feb	Wed		Male'	Site Survey
17 Feb	Thurs		Male'	Discussion with MCPW
18 Feb	Fri		Male'	Visit to Seawall of South, East, West coast.
19 Feb	Sat		Male'	Site Survey at North coast
20 Feb	Sun		Male'	Discussion with MCPW, preparation of M/D
21 Feb	Mon		Male'	Signing of M/D
22 Feb	Tue		Male'	Collection data and information Current survey
23 Feb	Wed		Male'	Bathymetric Survey, Data collection. Current survey
24 Feb	Thurs		Male'	Bathymetric Survey, Discussion with MPA
25 Feb	Fri		Male'	Bathymetric Survey,
26 Feb	Sat		Male'	Bathymetric Survey,
27 Feb	Sun		Male'	Bathymetric Survey, Discussion with MWSC
28 Feb	Mon		Male'	Bathymetric Survey, Discussion with MHUDB
29 Feb	Tue		Male'	Bathymetric Survey, Data collection
1 Mar	Wed		Male'	Bathymetric Survey, Discussion with MHAHE
2 Mar	Thurs		Male'	Bathymetric Survey, Data collection
3 Mar	Fri		Male'	Meeting of Study Team
4 Mar	Sat		Male'	Environmental Survey
5 Mar	Sun		Male'	Discussion with MCPW
6 Mar	Mon		Male'	Data analysis
7 Mar	Tue		Male'	Discussion with MCPW, Exchange of Memorandum
8 Mar	Wed		Male'	Supplementary investigation
9 Mar	Thurs	Male'- Colombo	Male'/Colombo	Preparation of leaving for Japan, Colombo
10 Mar	Fri		Colombo	Visit Embassy and JICA Colombo
11 Mar	Sat		Colombo	Survey on Construction Labour
12 Mar	Sun		Colombo	Preparation of leaving for Japan,
13 Mar	Mon	Colombo - Tokyo		

APPENDIX - 3 LIST OF PARTIES CONCERNED IN THE MALDIVES

Government of Maldives

(1) Ministry of Foreign Affairs

Ahmed Latheef	Director General, Department of External Resources
Aminath Didi	Director, Department of External Resources

(2) Ministry of Construction and Public Works

Umar Zahir	Minister of Construction and Public Works
Ismail Ibrahim	Deputy Director Engineering
Ibrahim Shiaz	Civil Engineer (Project Manager)

(3) Maldives Ports Authority

Mahdi Imad	General Manager
Mohamed Haneef	Deputy Director
Ali Ahmed	Deputy Director

(4) Maldives Housing and Urban Development Board

Ibrahim Rafeeq	Director, Physical Planning
Abdulla Saleem	Director
Ali Haidar Ahmed	Deputy Director, Physical Planning
Mohamed Ishan	Architect
Mohamed Ahsan	Civil Engineer

(5) Ministry of Home Affairs, Housing and Environment

Abdullahi Majeed, MP	Deputy Minister
Mohamed Khaleel	Director, Environmental Affairs
Mohamed Riyaz	Senior Environment Analyst
Mizna Mohamed	Assistant Environment Analyst

(6) Ministry of Transport and Civil Aviation

Ilyas Ibrahim	Minister
---------------	----------

(7) Maldives Water & Sewerage Company

Mohamed Ahmed Didi	Director
--------------------	----------

Government of Japan

(1) Embassy in Sri Lanka

Tomoko NODA

Third Secretary

(2) JICA Sri Lanka Office

Seiji KAIHO

Resident Representative

Masafumi NAGAISHI

Assistant Resident Representative

APPENDIX - 4 MINUTES OF DISCUSSIONS

MINUTES OF DISCUSSIONS
ON BASIC DESIGN STUDY
ON THE PROJECT FOR THE SEAWALL CONSTRUCTION
IN MALE' ISLAND (Phase 4)
IN THE REPUBLIC OF MALDIVES

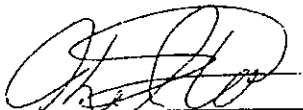
In response to a request from the Government of the Republic of Maldives (hereinafter referred to as "Maldives"), the Government of Japan decided to conduct a Basic Design Study on the Project for the Seawall Construction in Male' Island (Phase 4) (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA dispatched to Maldives the Basic Design Study Team (hereinafter referred to as "the Team"), which is headed by Mr. Kenichi Ito, Deputy Director, Wage and Allowance Division, Personnel Department, JICA, and is scheduled to stay in the country from February 14 to March 9, 2000.

The Team held discussions with officials concerned of the Government of Maldives and conducted a field survey at the study area.

In the course of discussions and field survey, both parties confirmed the main items described on the attached sheets. The Team will proceed with further works and prepare the Basic Design Study Report.

Male', February 20, 2000



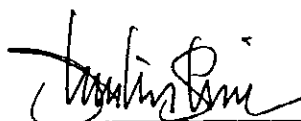
Kenichi Ito
Leader,
Basic Design Study Team,
JICA



Aminath Didi
Director,
Department of External Resources,
Ministry of Foreign Affairs



Ismail Ibrahim
Deputy Director Engineering,
Ministry of Construction and Public Works



Ibrahim Shiaz
Project Manager,
Ministry of Construction and Public Works

Handwritten mark

ATTACHMENT

1. Objective

The Objective of the Project is to protect Male' Island from sudden tidal waves which occurred several times and to protect the inhabitants of the island from disasters by constructing the Seawalls on the Northern Coast in the island.

2. Project Site

The project site is located at the north coast of Male' Island as shown in ANNEX-1.

3. Responsible and Implementing Agency

The Responsible Agency of the Project is Department of External Resources, Ministry of Foreign Affairs.

The Implementing Agency of the Project is Ministry of Construction and Public Works.

4. Items requested by the Government of Maldives

After discussions with the Team, the following items as shown below were finally requested by Maldivian side.

JICA will assess the appropriateness of the request and will recommend to the Government of Japan for approval.

Seawall to be constructed

Length About 1,290m

5. Japan's Grant Aid Scheme

- (1) Maldivian side understands the Japan's Grant Aid Scheme explained by the Team, as described in ANNEX-2.
- (2) Maldivian side will take necessary measures, as described in ANNEX-3 for smooth implementation of the Project, as a condition for the Japan's Grant Aid to be implemented.

6. Schedule of the Study

- (1) The consultants will proceed with further studies in Maldives until March 9, 2000.
- (2) JICA will prepare the draft report in English and dispatch a team in order to explain its contents in the end of May, 2000.

Handwritten signatures

- A
- (3) In case that the contents of the report are accepted in principle by the Government of Maldives, JICA will complete the final report and send it to the Government of Maldives by August, 2000.

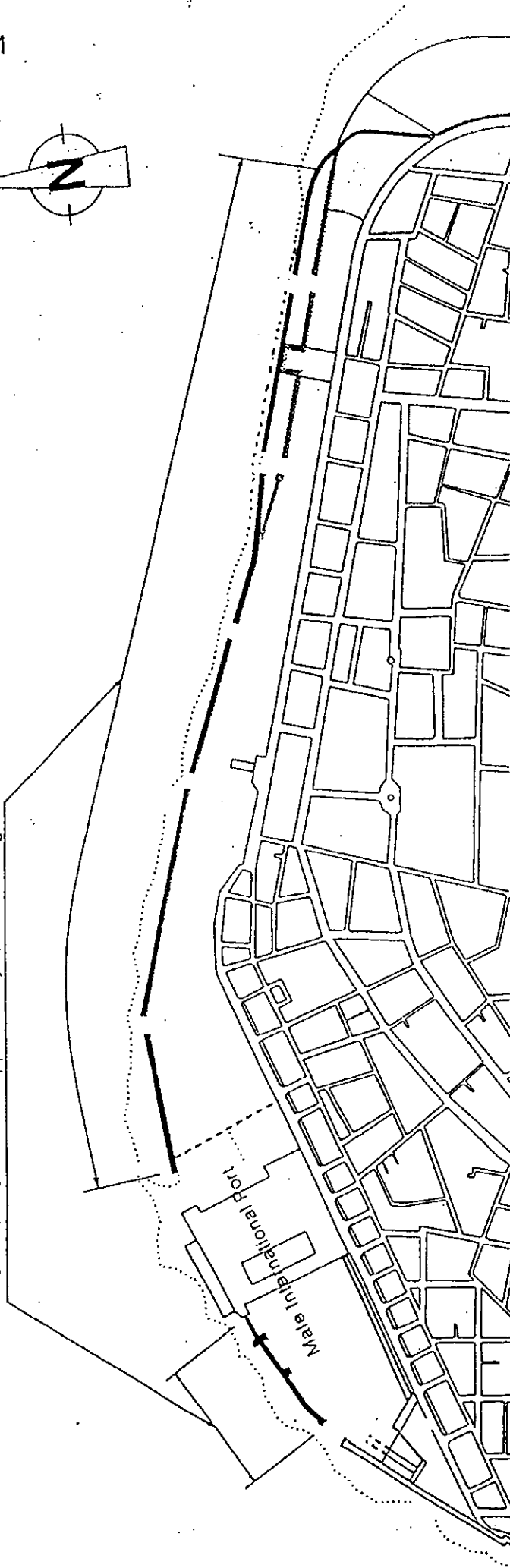
7. Other Relevant Issues

- (1) Ministry of Construction and Public Works will be responsible for coordination with other relevant agencies.
 - (2) Maldivian side has planned to widen the basin of the eastern side of North Harbour. Therefore, Maldivian side requested that the basic design would be carried out taking this plan into account. The Team agreed to consider this request in the study on the basis of the harbour dredging which should be done by Maldivian side after construction of the Seawall.
 - (3) The western Seawall of the Male' International Port would be included in this study based on the condition that the constructed Seawall of the Project should be incorporated with future port expansion plan of the Male' International Port.
 - (4) A part of the existing Seawall in north coast in the Project area has been utilized for mooring place for small ships. The Team will consider the present situation into the study.
 - (5) Pipes or culverts for change of water of the harbour would be considered in the structure of the Seawall.
 - (6) Sufficient temporary yard and jetty for the construction of the Seawall would be secured in Male' by the Maldivian side.
 - (7) The Team considers that the future utilization plan of interior side of the Seawall will be incorporated with the structure of Seawall as far as possible.
- H

ANNEX-1



Seawall construction approximately 1,290m in length



de

Amid
H
de

Japan's Grant Aid Program

1. Japan's Grant Aid Procedures

- (1) The Japan's Grant Aid is executed by the following procedures.
- **Application** (request made by a recipient country)
 - **Study** (Preparatory Study / Basic Design Study conducted by JICA)
 - **Appraisal & Approval** (Appraisal by the Government of Japan and Approval by the Cabinet of Japan)
 - **Determination of Implementation** (Exchange of Notes between the Governments of Japan and the recipient country)
 - **Implementation** (Implementation of the Project)

(2) Firstly, an application or a request for a Project submitted by the recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is suitable for Japan's Grant Aid. If the request is deemed appropriate, the Government of Japan entrusts a study on the request to JICA (Japan International Cooperation Agency).

Secondly, JICA conducts the study (Basic Design Study), using a Japanese consulting firm(s). If the background and objective of the requested project are not clear, a Preparatory Study is conducted prior to a Basic Design Study.

Thirdly, the Government of Japan appraises the project to see whether or not the Project is suitable for Japan's Grant Aid Program, based on the Basic Design Study report prepared by JICA and the results are then submitted for approval by the Cabinet.

Fourthly, the Project approved by the Cabinet becomes official when pledges by the Exchange of Notes signed by the both Governments.

Finally, for the implementation of the Project, JICA assists the recipient country in preparing contracts and so on.

H

Amo

J

Handwritten mark

2. Basic Design Study

(1) Contents of the Study

The purpose of the Study (Preparatory Study/Basic Design Study) conducted on a project requested by JICA is to provide a basic document necessary for appraisal of the project by the Japanese Government. The contents of the Study are as follows:

- (a) to confirm background, objectives, benefits of the project and also institutional capacity of agencies concerned of the recipient country necessary for project implementation;
- (b) to evaluate appropriateness of the Project for the Grant Aid Scheme from a technical, social and economical point of view;
- (c) to confirm items agreed on by both parties concerning the basic concept of the Project;
- (d) to prepare a basic design of the project,
- (e) to estimate cost involved in the project.

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the project is confirmed considering the guidelines of Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the project. Therefore, the implementation of the project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

(2) Selecting (a) Consulting Firm(s)

For smooth implementation of the study, JICA uses (a) consulting firm(s) registered. JICA selects (a) firm(s) through proposals submitted by firms which are interested. The firm(s) selected carry(ies) out a Basic Design Study and write(s) a report, based upon terms of reference made by JICA.

The consulting firm(s) used for the study is(are) recommended by JICA to a recipient country after Exchange of Notes, in order to maintain technical consistency .

Handwritten marks: a checkmark, the word 'And', and a signature.

3. Japan's Grant Aid Scheme

(1) What is Grant Aid?

The Grant Aid provides a recipient country with non-reimbursable funds needed to procure facilities, equipment and services for economic and social development of the country under the following principles in accordance with relevant laws and regulations of Japan. The Grant Aid is not in a form of donation as such.

(2) Exchange of Notes (E/N)

The Japan's Grant Aid is extended in accordance with the Exchange of Notes by both Governments, in which the objectives of the Project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

(3) "The period of the Grant Aid" means Japanese single fiscal year which the Cabinet approves the Project for. Within the fiscal year, all procedure such as Exchange of Notes, concluding contracts with (a) consulting firm(s) and (a) contractor(s) and a final payment to them must be completed. However in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of single fiscal year at most by mutual agreement between the two Governments.

(4) Under the Grant, in principle, products and services of origins of Japan or the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant may be used for the purchase of products or services of a third country origin.

However the prime contractors, namely, consulting, construction and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means Japanese physical persons or Japanese juridical persons controlled by Japanese physical persons.)

h

(5) Necessity of the "Verification"

The Government of the recipient country or its designated authority will conclude into contracts in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. The "Verification" is deemed necessary to secure accountability to Japanese tax payers.

(6) Undertakings required to the Government of the recipient country

In the implementation of the Grant Aid, the recipient country is required to undertake necessary measures such as the following:

- (a) to secure land necessary for the sites of the project and to clear and level the land prior to commencement of the construction work,
- (b) to provide facilities for distribution of electricity, water supply and drainage and other incidental facilities in and around the sites,
- (c) to secure buildings prior to the installation work in case the Project is providing equipment,
- (d) to ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid,
- (e) to exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts,
- (f) to accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.

A

Am

S

Ac

(7) Proper Use

The recipient country is required to maintain and use facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for their operation and maintenance as well as to bear all expenses other than those to be borne by the Grant Aid.

(8) Re-export

The products purchased under the Grant Aid shall not be re-exported from the recipient country.

(9) Banking Arrangement (B/A)

(a) The Government of the recipient country or its designated authority shall open an account in the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank") . The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by Government of the recipient country or its designated authority under the contracts verified.

(b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an Authorization to Pay issued by the Government of the recipient country or its designated authority.

14

Ames

J

Handwritten mark

Major Undertakings to be taken by Each Government

NO	Items	To be covered by Grant Aid	To be covered by Recipient side
1	To secure land		●
2	To clear, level and reclaim the site when needed		●
3	To bear the following commissions to a bank of Japan for the banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
4	To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country		
	1) Marine(Air) transportation of the products from Japan to the recipient country	●	
	2) Tax exemption and customs clearance of the products at the port of disembarkation		●
5	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●
6	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract		●
7	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid		●
8	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for construction of the facilities		●
9	To coordinate and solve any issues related to the Project which may be raised from third parties or inhabitants in the Project area		●

Handwritten mark

Handwritten mark

Handwritten mark

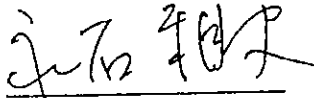
MINUTES OF DISCUSSIONS
ON BASIC DESIGN STUDY
ON THE PROJECT FOR SEAWALL CONSTRUCTION
IN MALE' ISLAND (PHASE 4)
IN THE REPUBLIC OF MALDIVES
(EXPLANATION ON DRAFT REPORT)

In February 2000, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched a Basic Design Study Team on the Project for Seawall Construction in Male' Island (Phase 4) (hereinafter referred to as "the Project") to the Republic of Maldives (hereinafter referred to as "Maldives"), and through discussion, field survey, and technical examination of the results in Japan, JICA prepared a draft report of the study.

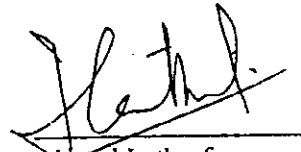
In order to explain and to consult the Maldives on the components of the draft report, JICA sent to Maldives the Draft Report Explanation Team (hereinafter referred to as "the Team"), which is headed by Mr. Masafumi Nagaishi, Assistant Resident Representative, JICA Sri Lanka Office, JICA, from May 24 to May 31, 2000.

As a result of discussions, both parties confirmed the main items described on the attached sheets.

Male', May 30, 2000



Masafumi Nagaishi
Leader,
Draft Report Explanation Team,
JICA



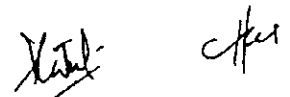
Ahmed Latheef
Director - General,
Department of External Resources,
Ministry of Foreign Affairs



Ismail Ibrahim
Deputy Director Engineering,
Ministry of Construction and Public Works



Ibrahim Shiaz
Project Manager,
Ministry of Construction and Public Works



ATTACHMENT

1. Components of the Draft Report

The Government of Maldives agreed and accepted in principle the components of the draft report explained by the Team.

2. Japan's Grant Aid Scheme

Maldivian side understood the Japan's Grant Aid Scheme and the necessary measures to be taken by the Government of Maldives as explained by the Team and described in ANNEX-2 and ANNEX-3 of the Minutes of Discussions signed by both parties on February 20, 2000.

3. Schedule of the Study

JICA will complete the final report in accordance with the confirmed items and send it to the Government of Maldives by August 2000.

4. Other Relevant Issues

(1) Maldivian side shall ensure enough budget and personnel to operate and maintain the facilities after the completion of the Project.

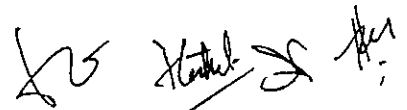
(2) Ministry of Construction and Public Works should be responsible for coordination with other relevant agencies.

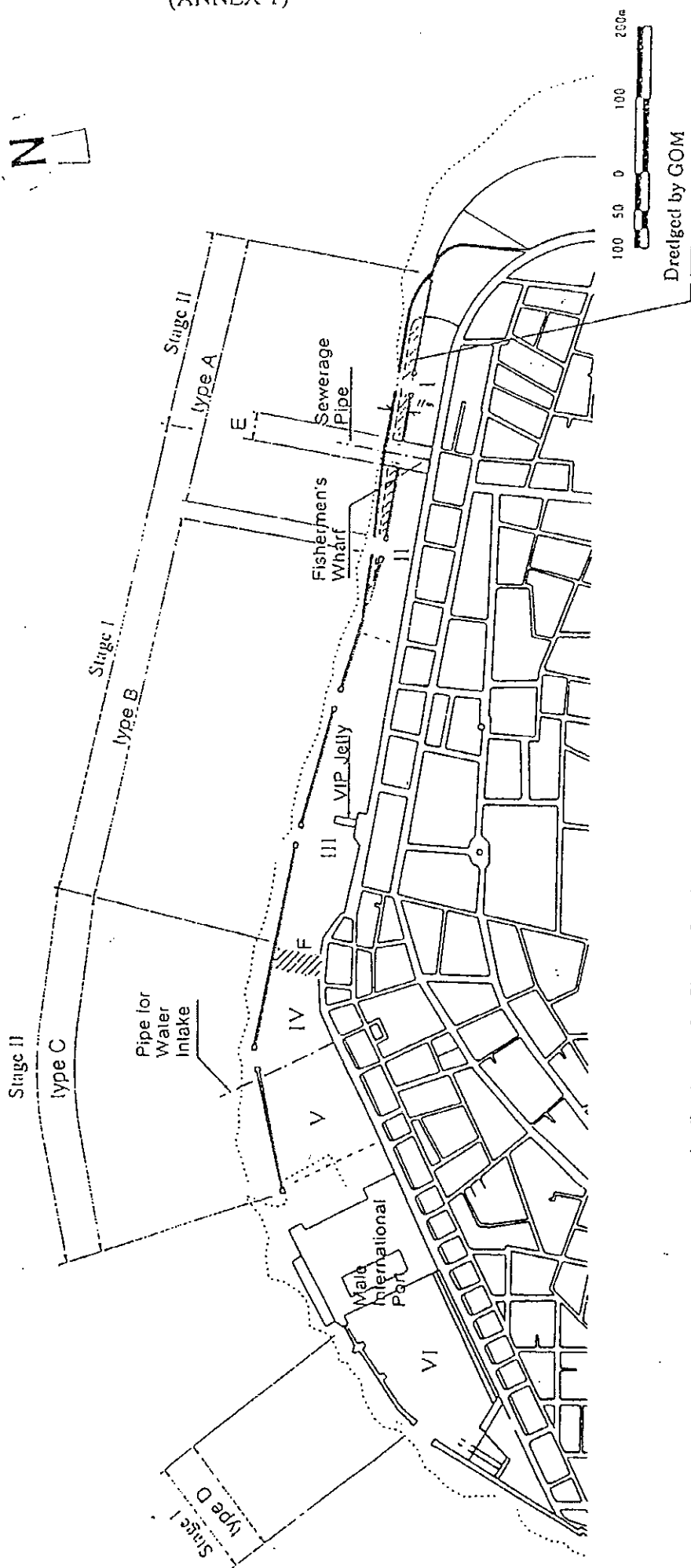
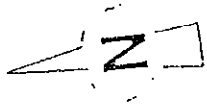
(3) Maldivian side should dredge interior side of the Seawall of the eastern part of North Harbor after construction of Seawall as soon as possible.

(4) Sufficient construction yard and temporary jetty for the Seawall construction shall be secured in Male' Island by Maldivian side.

(5) Maldivian side should incorporate constructed Seawall in the area of Male' International Harbour into future harbour expansion plan.

(6) Maldivian side agreed to divide into two construction stages for the Project as attached figure (ANNEX 1) and basically agreed with the construction schedule described in the report for their coordination with relevant agency and third party.

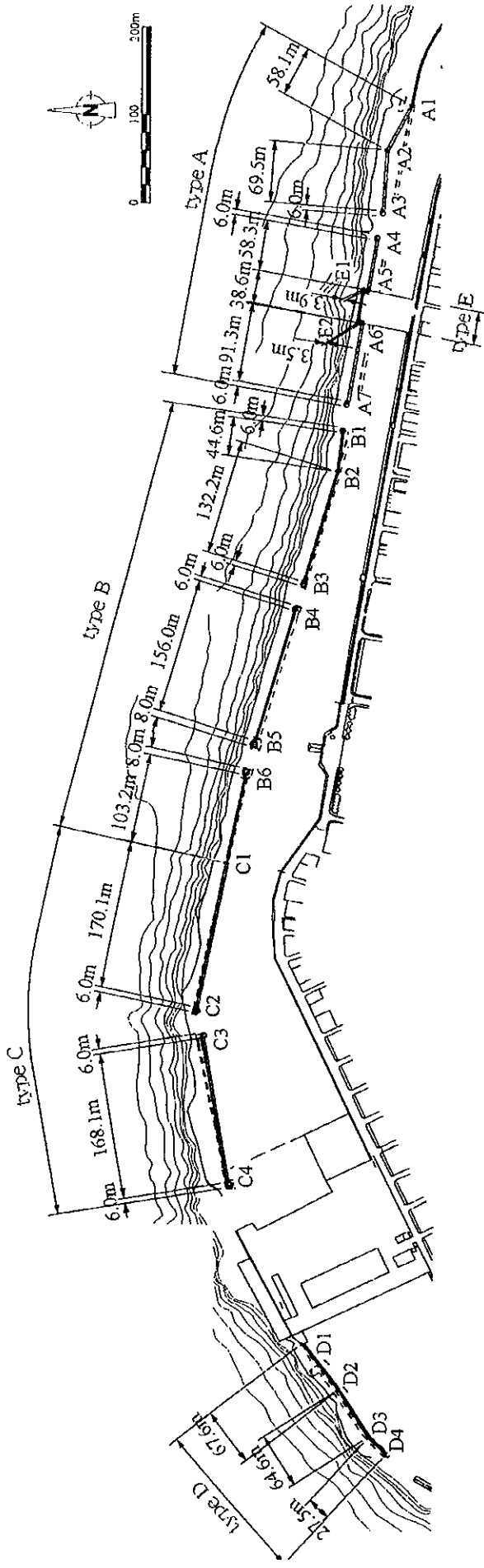




- I: Berth Area for Shuttle Service Boats between Male' and Airport Island
- II: Berth Area for Fishing Boats and Passenger Service Boats of Resort Island
- III: Berth Area for Official/Coast Guard Boats and Pleasure Boats
- IV: Berth Area for Inter-island Passenger Boats and Discharging Fishing Boats
- V: Berth Area for Inter-island Commercial Boats
- VI: Male' International Port Area

Figure 1.3.3 Division of Water Area and Types of New Seawall

Handwritten notes:
 Hatt
 Hg
 J
 G

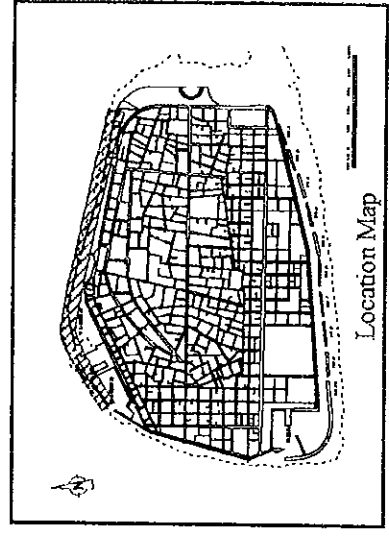


Length of Seawall

Structure Type	Length (m)
type A	295.2
type B	470.0
type C	356.2
type D	159.7
type E	46.0
Total	1,327.1

Coordinates

	X	Y
A1	2,033.832	5,087.162
2	2,060.685	5,035.672
3	2,065.249	4,966.274
4	2,071.862	4,933.051
5	2,081.293	4,875.474
6	2,087.831	4,837.635
7	2,103.826	4,747.765
B1	2,108.769	4,712.078
2	2,114.569	4,667.808
3	2,152.218	4,541.048
4	2,162.723	4,507.642
5	2,206.747	4,358.020
6	2,217.075	4,317.780
C1	2,237.875	4,216.680
2	2,271.591	4,049.911
3	2,266.167	4,014.563
4	2,235.275	3,849.348
D1	2,147.888	3,664.466
2	2,105.888	3,611.466
3	2,070.808	3,557.184
4	2,050.508	3,538.684
E1	2,085.093	4,876.224
2	2,091.331	4,838.135



General Plan of The Seawall

APPENDIX - 5 COST ESTIMATION BORNE BY THE MALDIVES

Project cost of the work to be undertaken by the Government of the Republic of Maldives is estimated as follows:

Work Items	Estimated Costs
Provision of Construction Site including temporary yard area	Nil
Dredging works behind the new detached breakwater	MRf 500,000
Removal, storage and transfer of the existing light beacon	MRf 50,000
Total	MRf 550,000 (about 5 million yen)

APPENDIX - 6 OTHER RELEVANT DATA (SURVEY MAP)

Figure - 1

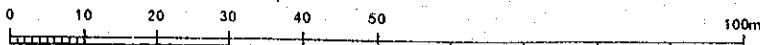
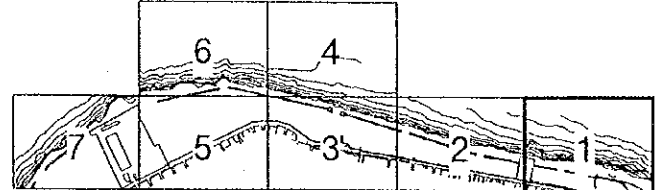
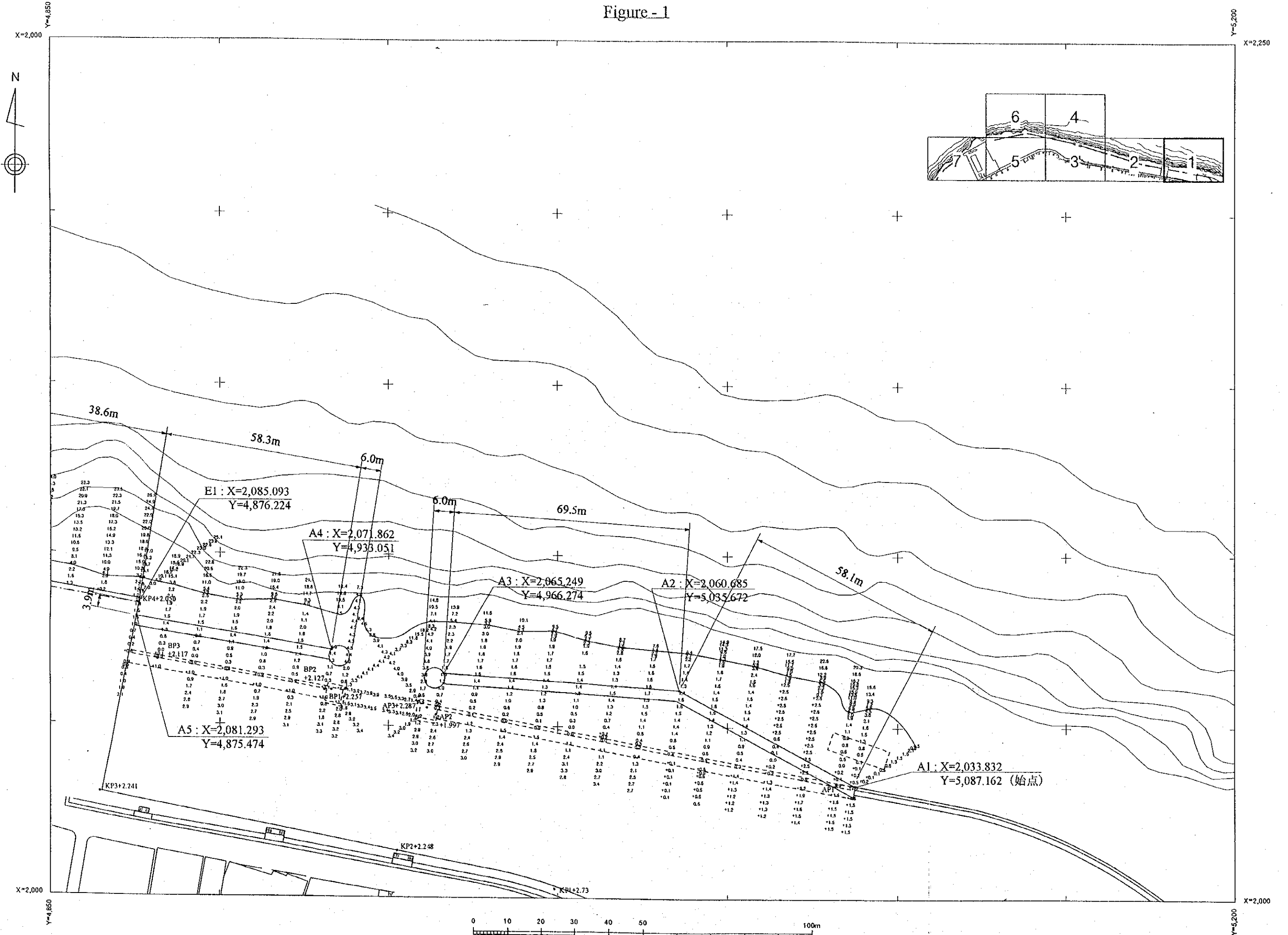


Figure - 3

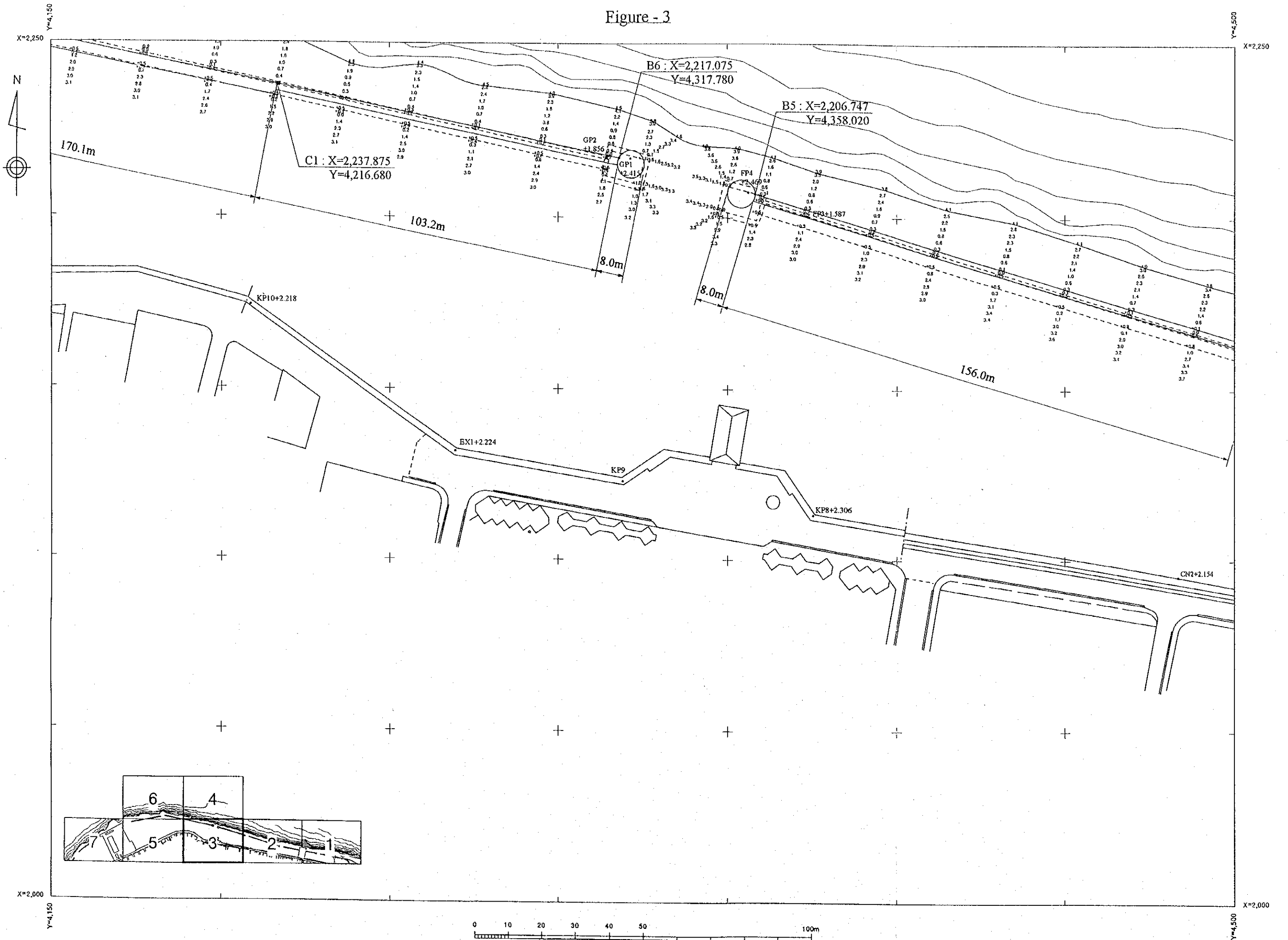


Figure - 4

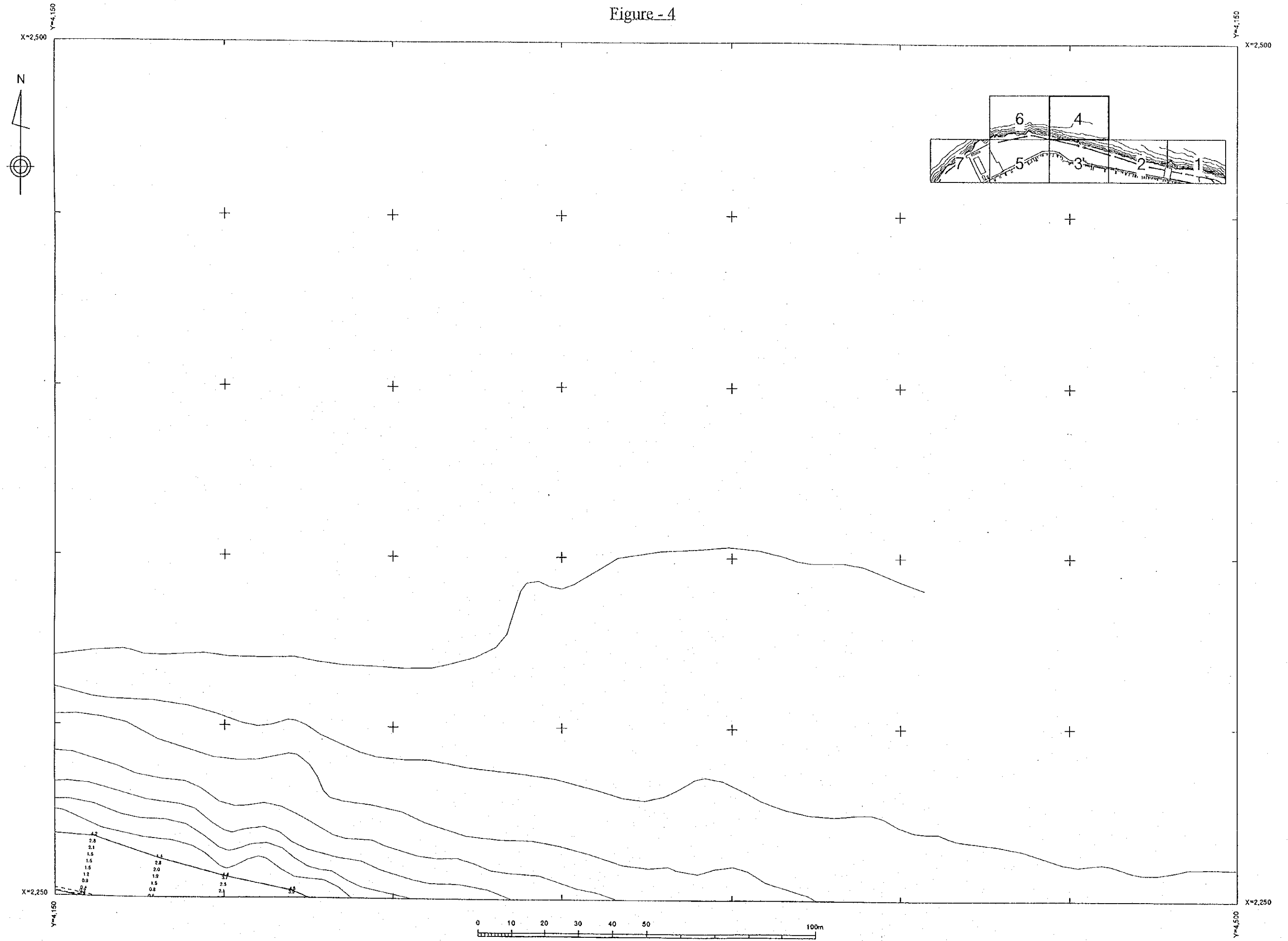


Figure - 5

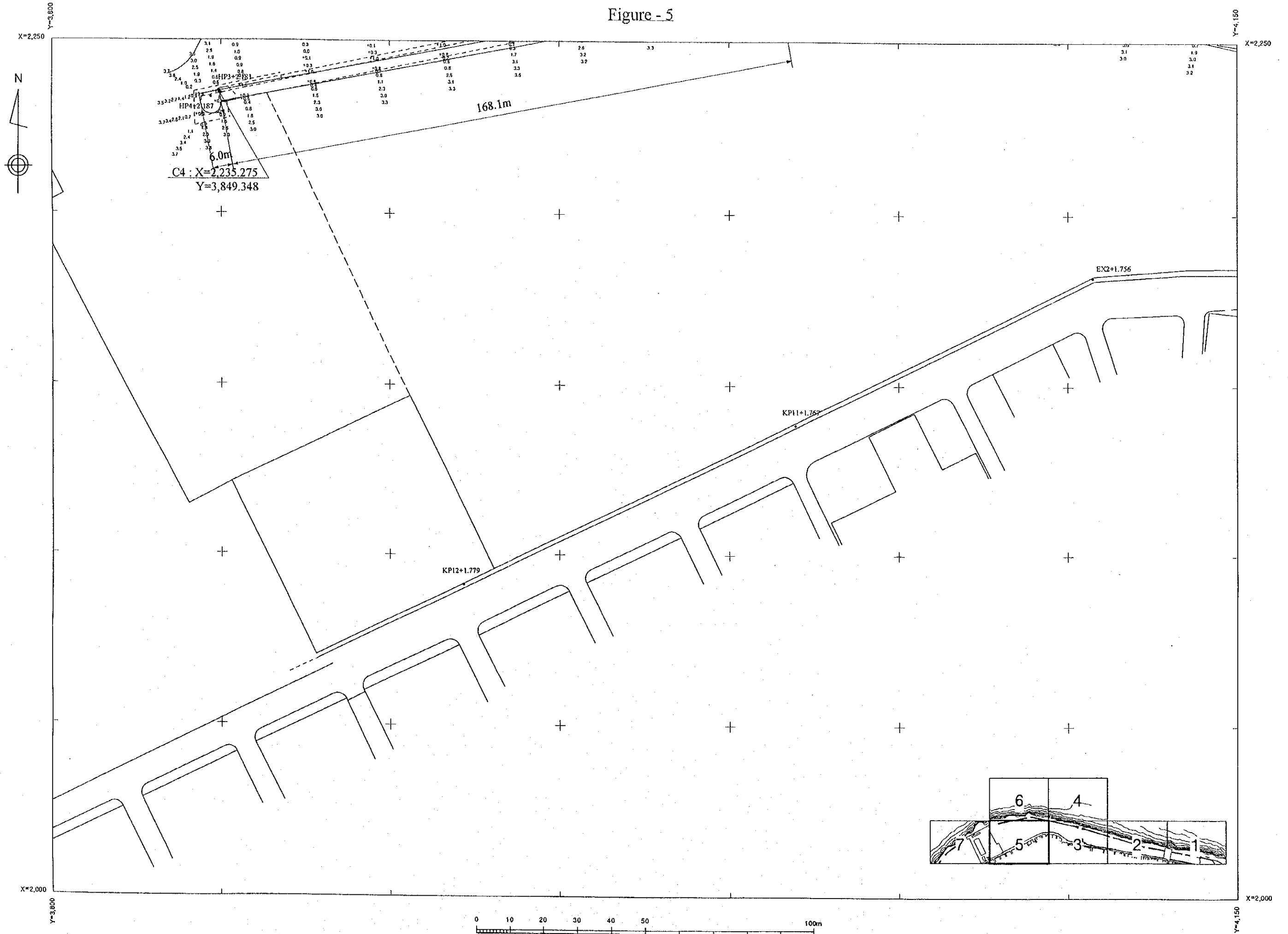


Figure - 6

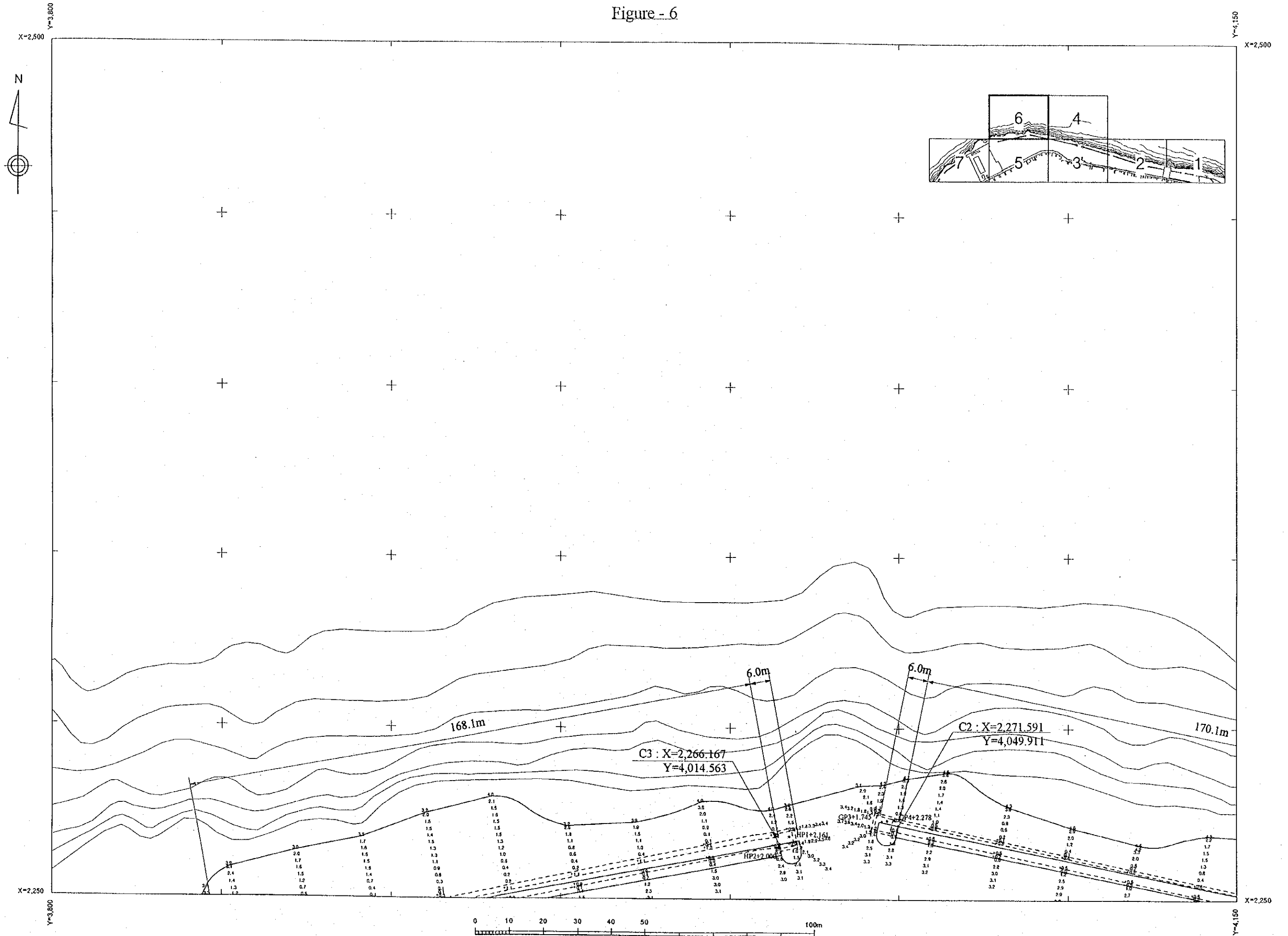
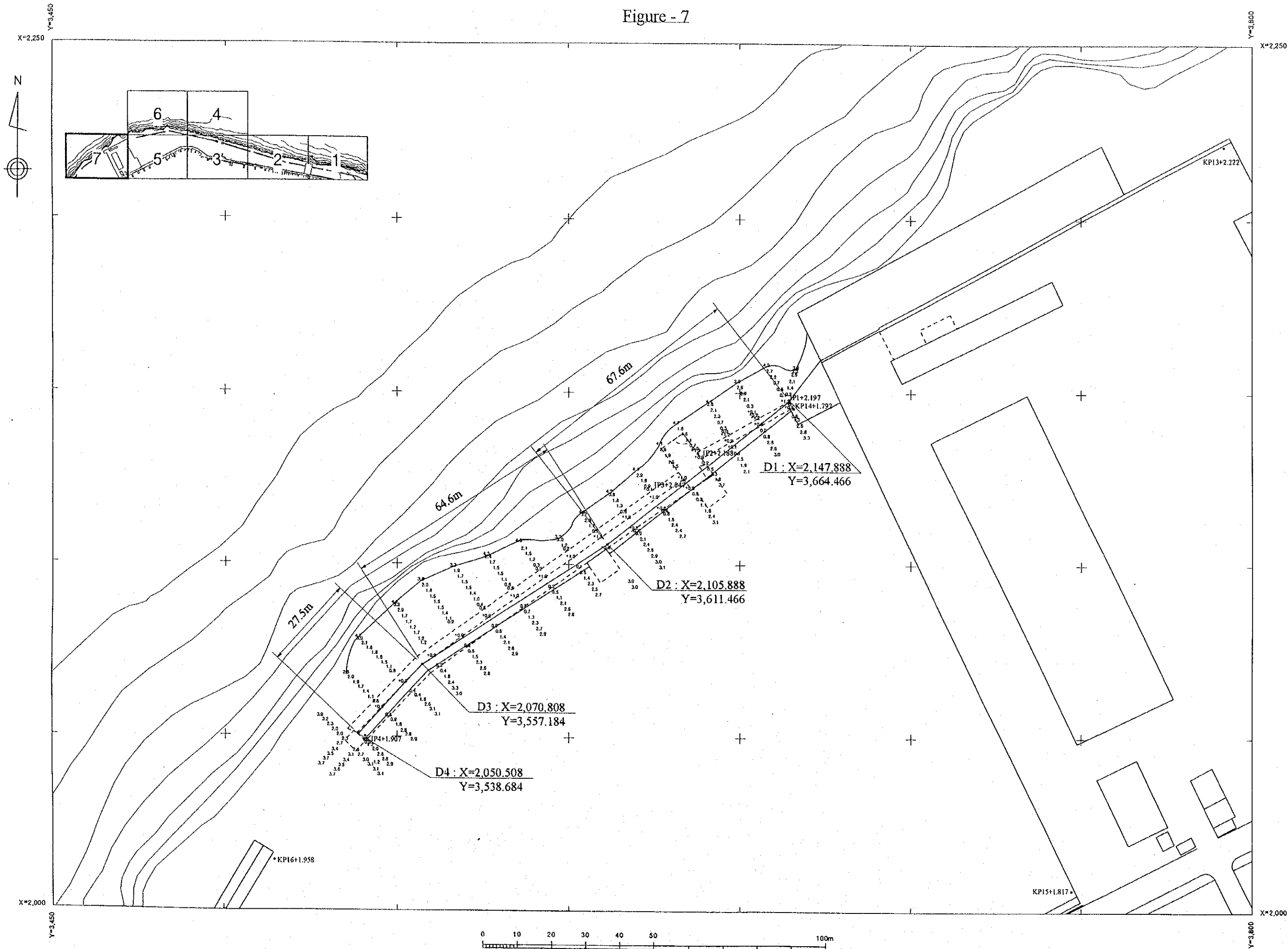


Figure - 7



APPENDIX - 7 REFERENCE

<u>Title</u>	<u>Publisher</u>
1. Vulnerability and Poverty Assessment 1998	Ministry of Planning
2. Fifth National Development Plan (1997 - 2000 Summary / Volume I / Volume II)	Ministry of Planning
3. Second National Environment Action Plan (NEAP II)	MHAHE
4. Statistical Year Book of Maldives 1998	Ministry of Planning
5. Statistical Year Book of Maldives 1999	Ministry of Planning
6. Cargo Handled by Vessel wise 1997 / 1998 / 1999	MPA
7. Malé Land Use Map	MHUDB
8. Maldives Meteorological Data 1999	Department of Meteorology
9. STO Peoples Choice Construction Materials	STO
10. The Tariff / Charges for Water Services / Charges for other services	MWSC
11. Prices of Electricity	State Electric Co.

JICA