[資料]

A-1. 調査団員・氏名

A-2. 調査行程

A-3. 関係者（面会者）リスト

B-1. 協議議事録（第 **1** 次現地調査 **2022/10/13** 時）

B-2. 協議議事録（第 **3** 次現地調査 **2023/07/12** 時）

※第 2 次現地調査時の協議議事録も含む

C-1. ソフトコンポーネント計画書

D-1. 参考資料　マレ島護岸改修の設計計算資料と調査解析資料

E-1. 参考資料　概略設計図（護岸コンポーネント）

E-2. 参考資料　概略設計図（雨水排水コンポーネント）

[資料 A]

A-1. 調査団員・氏名

A-2. 調査行程

A-3. 関係者（面会者）リスト

A-1. 調査団員・氏名

(1) 第 1 次現地調査

氏名	担当分野	所属
並木　広巳	業務主任／構造物設計（海岸護岸）／運営維持管理（1）（海岸護岸）	OCG
池田　陽介	副業務主任／機材計画／運営維持管理（2）（機材）	YEC
白取　進吾	自然条件調査・海岸メカニズム	OCG
古川　潤一	排水計画・維持管理	YEC
松村　聡見	排水ポンプ施設遠隔監視制御システム運営	YEC
濱中　聡年	電気通信	NK
青山　高久	施工計画／積算（1）	OCG
観音寺里佳	調達計画／積算	YEC
渋井　直人	環境社会配慮	OCG
野中　真実	業務調整	OCG
金子　拓也	排水ポンプ施設遠隔監視制御システム設計（国内業務）	NK
水野　竜太	施工計画／積算（2）（国内業務）	OCG

(2) 第 2 次現地調査

氏名	担当分野	所属
並木　広巳	業務主任／構造物設計（海岸護岸）／運営維持管理（1）（海岸護岸）	OCG
池田　陽介	副業務主任／機材計画／運営維持管理（2）（機材）	YEC
渋井　直人	環境社会配慮	OCG
野中　真実	業務調整	OCG

(3) 第 3 次現地調査

氏名	担当分野	所属
並木　広巳	業務主任／構造物設計（海岸護岸）／運営維持管理（1）（海岸護岸）	OCG

OCG: Oriental Consultants Global Co., Ltd.
YEC: Yachiyo Engineering Co., Ltd.
NK:NipponKoei Co., Ltd.

A-2. 調査行程

(1) 第 1 次現地調査（2022 年 10 月 1 日～11 月 4 日）

日数	月日	曜	業務主任者／構造物設計（海岸護岸）／副業務主任／（2）（移転）	副業務主任／（移転計画）／副業務主任／（2）（移転）	自然条件調査・海岸メカニズム	排水計画・維持管理	排水ポンプ施設長期監視制御システム運営	電気通信	施工計画／積算(1)	調達計画／積算	環境社会配慮	業務調整（自社内含む）
	鈴木 武臣		間瀬 肇/??		白鳥 敏基	吉川 誠一	秋村 智昭	渡中 朗宏	青山 雅久	鵜澤幸 藤倉	池井 昌人	野中 真実
1	10/1	土				移動（UL455 成田11:20発-コロンボ17:10着、UL103 コロンボ18:35発-マレ19:55着）	移動（SQ635 羽田22:15発 - シンガポール04:55着）					
2	10/2	日		移動（SQ637 成田11:10発-シンガポール17:20着、SQ4383シンガポール20:45発-マレ22:10着）		12-11 社会環境（排水解析）調査	移動（SQ432 シンガポール0:10-05発 - マレ11:55着）			移動（SQ638 シンガポール20:45発 - マレ22:10着）		
3	10/3	月	移動（SQ637 成田11:10発-シンガポール17:20着）	12-10 調達事情調査（移転）		同上	12-7) 前川：気候変動がアクセに関する法令や基準等の確認			12-10) 調達事情調査（移転）	移動（BG722 アイロピ23:50発 - ドバイ05:55着 (10/4)）	
4	10/4	火								午後：JICA関係打合せ(JICAセンター)、データ受渡し		
5	10/5	水	午後：MNPHIとの協議（面談）		12-2) 自然条件調査	12-11 社会環境（排水解析）調査	12-7) 前川：気候変動がアクセに関する法令や基準等の確認			午後：現地踏査		
6	10/6	木	PM: MNPHI・MWSCとの協議（移転）	MNPHIとの協議	同上	同上	MWSCと協議			PM: MNPHI・MWSCとの協議（移転）		
7	10/7	金	フルマレ島視察		同上	同上	12-7) 前川：気候変動がアクセに関する法令や基準等の確認			MNPHIと協議	12-5) 環境社会配慮	移動（QR1362 マアトi 13:50発 - トーハ 15:00着）
8	10/8	土								フルマレ島視察		移動（QR076 トーハ 10:55発 - マレ 07:50着）
9	10/9	日			国内作業					国内作業		
10	10/10	月	MNPHI、MWSCとのミニッツ協議		12-2) 自然条件調査	12-11 社会環境（排水解析）調査	12-7) 前川：気候変動がアクセに関する法令や基準等の確認	12-11 システム故障情報処理自動化MWSC	12-9) 調達事情調査（移転）	MNPHI、MWSCとのミニッツ協議	12-5) 環境社会配慮	MNPHI、MWSCとのミニッツ協議
11	10/11	火	MNPHI、MWSCとのミニッツ協議		同上	EPACと協議	同上	同上	同上	EPACと協議		
12	10/12	水	同上		同上	12-11 社会環境（排水解析）調査	MWSCと協議	現地踏査（4ポンプ）	12-9) 調達事情調査（移転）	MNPHI、MWSCとのミニッツ協議	12-5) 環境社会配慮	MNPHI、MWSCとのミニッツ協議
13	10/13	木	午後：ミニッツ署名、午後：大統領府のJICAモバイアプリ作成への報告		同上	12-11 社会環境（排水解析）調査	12-7) 前川：気候変動がアクセに関する法令や基準等の確認	現地踏査（4ポンプ）	12-9) 調達事情調査（移転）/ 12-14) 現地特有の契約制度調査	MWSCと協議	同上	同上
14	10/14	金	資料整理					現地踏査（4ポンプ）		資料整理		午後：ミニッツ署名、午後：JICA関係打合せ、団内報告
15	10/15	土										
16	10/16	日	12-4) 構造物設計設計の検討	12-12) 事業内容の技術検討（移転）	12-2) 自然条件調査	12-11 社会環境（排水解析）調査	12-11) ソフトコンポーネントの維持管理の検討、技術移転	12-11) システム故障情報処理自動化MWSC	12-9) 調達事情調査（移転）	12-10) 調達事情調査（移転）	12-5) 環境社会配慮	会議の設定、会計業務等
17	10/17	月	同上	MNPHIと協議	同上	MNPHIと協議	MNPHIと協議	現地踏査（2ポンプ）	同上	MNPHIと協議	同上	同上
18	10/18	火	12-12) 事業内容の技術検討（移転）		同上	12-11 社会環境（排水解析）調査	12-11) ソフトコンポーネントの維持管理の検討、技術移転	現地踏査（1ポンプ）、電気通信線等特殊調査	同上	12-10) 調達事情調査（移転）	同上	同上
19	10/19	水	12-11) ソフトコンポーネントの維持管理の検討、技術移転		同上	同上	同上	市場調査(ポンプ、電気通信線等特殊調査)	同上	同上	同上	同上
20	10/20	木	MSAと協議	MWSCと協議	同上	MWSCと協議	MWSCと協議	同上	同上	MWSCと協議	MSAと協議	
21	10/21	金					資料整理					
22	10/22	土					団内作業					
23	10/23	日	12-11) ソフトコンポーネントの維持管理の検討、技術移転/ 12-16) 維持管理計画	12-2) 自然条件調査	12-11 社会環境（排水解析）調査	12-11) ソフトコンポーネントの維持管理の検討、技術移転	12-11 システム故障情報処理自動化MWSC	12-9) 調達事情調査（移転）	12-10) 調達事情調査（移転）	12-5) 環境社会配慮	会議の設定、会計業務等	
24	10/24	月	12-4) ランニングの構造の確認 / 12-7) 総合や基準等の確認 / 12-13) 相手国負担事項の確認 / 12-14) 特殊技術の現地調査	同上	移動（UL116 マレ15:30発 - コロンボ17:25着、UL454 コロンボ 19:15発）	MNPHIとの協議	同上	同上	同上	同上	同上	
25	10/25	火	EPACと協議、NDMAと協議	同上	移動（UL434 コロンボ発 - 成田07:35着）	12-11 ソフトコンポーネントの維持管理の検討、技術移転	12-11 システム故障情報処理自動化MWSC	同上	同上	同上	同上	
26	10/26	水	MNPHIとMWSC大統領府のJICAモバイアプリ作成への報告		同上	MWSCとの協議	MNPHI,MWSC大統領府のJICAモバイアプリ作成への協議等	同上	MNPHIとMWSCとの協議	MNPHIとMWSCとのJICAモバイアプリ作成への協議報告		
27	10/27	木	資料整理/報告書作成	移動（SQ431 マレ12:55発 - シンガポール20:40着）	資料整理/報告書作成	移動（SQ437 マレ12:25発 - シンガポール07:05）	資料整理/報告書作成	同上	資料整理/報告書作成	移動（SQ431 マレ12:55発 - シンガポール20:40着）	資料整理/報告書作成	
28	10/28	金	同上	移動（SQ638 シンガポール 23:50発 - 成田08:00着）	同上	移動（SQ432 シンガポール0:10-09:25 - 成田17:30）	同上	同上	同上	移動（SQ638 シンガポール 23:50発 - 成田08:00着）	同上	同上
29	10/29	土	移動（SQ437 マレ 23:25発 - シンガポール08:00着）	移動（SQ637 マレ 23:25発 - シンガポール08:00着）			資料整理		移動（SQ437 マレ 23:25 - シンガポール08:00着）		移動（SQ437 マレ 23:25 - シンガポール08:00着）	移動（SQ437 マレ 23:25 - シンガポール08:00着）
30	10/30	日	移動（SQ432 シンガポール 0:10-09:20着、成田17:05着）		移動（SQ12 シンガポール 09:20発 - 成田17:05着）		12-13) システム故障情報処理自動化MWSC&SEAN地震計		移動（SQ12 シンガポール 09:20 - 成田17:05）		移動（SQ721 ドバイ - ナイロビ 06:20）	移動（SQ12 シンガポール 09:20 - 成田17:05）
31	10/31	月					現地踏査					
32	11/1	火					同上					
33	11/2	水					同上					
34	11/3	木					移動（SQ431 マレ 12:55 - シンガポール20:45）					
35	11/4	金					移動（SQ638 シンガポール 23:50 - 成田07:30）					

(2) 第 2 次現地調査（2023 年 6 月 10 日～6 月 24 日）

日数	月日	曜	業務主任者／構造物設計（海岸護岸）/運営維持管理 (1) (海岸護岸)	副業務主任／／機材計画／運営維持管理 (2) (機材)	環境社会配慮	業務調整
			並木　広巳	**池田　陽介**	**渋井　直人**	**野中　真実**
1	6/10	Sat	移動 (SQ637 成田 11:10発 - シンガポール 17:20着, SQ438 シンガポール 20:35発 - マレ 22:10着)		移動 (EK722 ナイロビ - ドバイ, EK652 ドバイ 09:45発 - マレ 15:00着)	移動 (SQ637 成田 11:10発 - シンガポール 17:20着, SQ438 シンガポール 20:35発 - マレ 22:10着)
2	6/11	Sun	午前：JICAモルディブ支所との会議 午前/午後：MNPHIとの会議 (1)事業目的とミニッツ協議の概略の説明, (2) 準備調査報告書（案）ー 事業の概略)			
3	6/12	Mon	午前　MNPHIとの会議 (準備調査報告書（案）ー 護岸の説明) 午後　MNPHIとMWSCとの会議 (準備調査報告書（案）ー 排水機材の説明)			
4	6/13	Tue	午前/午後：MNPHIとの協議及びミニッツ協議の最終決定			
5	6/14	Wed	午前/午後：財務省との会議、マレ市評議会、外務省表敬			
6	6/15	Thu	午前：ミニッツ署名 @ MNPHI 午後：大使館及びJICAモルディブ支所への報告			
7	6/16	Fri				
8	6/17	Sat				
9	6/18	Sun	調査			
10	6/19	Mon	調査	移動 (SQ437 マレ 23:25発 - シンガポール 07:05着)	調査	調査
11	6/20	Tue	調査	移動 (SQ634 シンガポール 13:55発 - 羽田 21:50着)	調査	調査
12	6/21	Wed	調査		調査	調査
13	6/22	Thu	調査		調査	調査
14	6/23	Fri	移動 (SQ431 マレ 12:55発 - シンガポール 21:00着)		移動 (EK659 マレ 11:15発 - ドバイ 14:15着, EK721 ドバイ 15:55 - ナイロビ 20:00)	移動 (SQ431 マレ 12:55発 - シンガポール 21:00着)
15	6/24	Sat	移動 (SQ636 シンガポール 22:50発 - 羽田 06:45着)			移動 (SQ636 シンガポール 22:50発 - 羽田 06:45着)

(3) 第 3 次現地調査（2023 年 7 月 10 日～7 月 13 日）

日数	月日	曜	業務主任者／構造物設計（海岸護岸）/運営維持管理 (1) (海岸護岸)
			並木　広巳
1	7/10	Mon	移動 (SQ637 成田 11:10発 - シンガポール 17:20着, SQ438 シンガポール 20:35発 - マレ 22:10着)
2	7/11	Tue	午前/午後：MNPHIとの協議及びミニッツ協議の最終決定
3	7/12	Wed	午前/午後：MNPHIとの協議及びミニッツ協議の最終決定 移動（SQ437 マレ 23:25発 - ）
4	7/13	Thu	移動 (SQ437 - シンガポール 07:05着, SQ012 シンガポール 09:25発 - 成田 17:30着)

A-3. 関係者（面会者）リスト

主要関係者リストを下に示す。

モルディブ国国家計画・住宅・インフラ省 **(Ministry of National Planning, Housing and Infrastructure: MNPHI)**

Mr. Fathimath Shaana Farooq	Director General
Mr. Hassan Shiyaz	Project Manager
Mr. Hassan Saamee	Project Coordinator
Mr. Afzal Shakir	Engineer
Mr. Ahmed Aiman Shareef	Engineer
Mr. Ibrahim Naufal	Contract Management Engineer
Mr. Ali Janah	Computer Programmer
Mr. Mohamed Niham	Consultant Water & Sewerage Projects

マレ上下水道公社 **(Male' Water and Sewerage Company: MWSC)**

Mr. Suhail Jaufar	WWNO
Mr. Abdulla Muhsin	Manager Sewerage
Mr. Mohamed Adam	Deputy General Manager
Mr. Mohamed Faisal	Assistant General Manager Waste Water
Mr. Ismail Ibrahim	Assistant General Manager Operations
Mr. Ahmed Samiu	Assistant Sales Manager
Mr. Jumana Mohamed	Assistant Sales Officer
Mr. Isoam Aboobakuru	S. IT Infra Officer
Mr. Shamoon Rasheed	Senior Sales Assistant
Mr. Hassan Shafeeg	Electonnic Mechanic Engineer

環境保護庁 **(Environmental Protection Agency: EPA)**

Mr. Basma Abdul Muhsin	GIS officer
Mr. Aishath Amjidha	Assessement Legal
Mr. Fathimath Asna	Environmental Analyst
Ms. Aiminath Fizna	Senior Environmet Analyst

国家災害管理局 **(National Disaster Management Authority: NDMA)**

Mr. Kashif Naseer	Director, policy
Mr. Aminath Izadhiha	Training & Advocacy Officer
Mr. Umar Fikry	Deputy Chief Executive

在モルディブ日本国大使館

竹内　みどり	特命全権大使
浅野　尚未	参事官
福岡　修人	二等書記官（経済・開発協力）

JICA モルディブ支所

高城 元生	Resident Representative
坐間 昇	Project Formulation Advisor
上野 雄司	Project Formulation Advisor
Ms. Zulfeena Ali	Program officer

[資料 B]

B-1. 協議議事録（第 1 次現地調査 2022/10/13 時）

B-2. 協議議事録（第 3 次現地調査 2023/07/12 時）

※第 2 次現地調査時の協議議事録も含む

[資料 B]

B-1. 協議議事録（第 1 次現地調査 2022/10/13 時）

B-2. 協議議事録（第 3 次現地調査 2023/07/12 時）

※第 2 次現地調査時の協議議事録も含む

Minutes of Discussions
on the Preparatory Survey for the Project for
Disaster Resilience Enhancement in Male

In response to the request from the Government of the Republic of Maldives (hereinafter referred to as "the Government of Maldives"), the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Preparatory Survey Team for the Outline Design (hereinafter referred to as "the Team") of the Project for Disaster Resilience Enhancement in Male (hereinafter referred to as "the Project") to Maldives. The Team held a series of discussions with the officials of the Government of Maldives and conducted a field survey. In the course of the discussions, both sides have confirmed the main items described in the attached sheets.

Male, October 13, 2022

松元秀亮

Mr. MATSUMOTO Hideaki
Leader
Preparatory Survey Team
Japan International Cooperation Agency
Japan

Mr. Ahmed Tholhath
Director General
(In charge of the Permanent Secretary's Responsibilities)
Ministry of National Planning, Housing and Infrastructure
Maldives

ATTACHMENT

1. Objective of the Project

The objective of the Project is to reduce damage from waves and heavy rain through improvement of seawall and provision of equipment for stormwater drainage in Male, thereby contributing to enhancement of disaster resilience from water related disaster and to stabilization of the basis of life and economic and social activities in Male.

2. Title of the Preparatory Survey

Both sides confirmed the title of the Preparatory Survey as "the Preparatory Survey for the Project for Disaster Resilience Enhancement in Male".

3. Project Site

Both sides confirmed that the sites of the Project are shown in Annex 1.

4. Responsible authority for the Project

Both sides confirmed the authorities responsible for the Project are as follows:

4-1. Ministry of National Planning, Housing and Infrastructure (hereinafter referred to as "MNPHI") will be the executing agency for the Project (hereinafter referred to as "the Executing Agency"). The Executing Agency shall be responsible for supervising the Project on behalf of the Government of Maldives and shall coordinate with all the relevant authorities to ensure smooth implementation of the Project and ensure that the undertakings for the Project shall be managed by relevant authorities properly and on time. The organization charts are shown in Annex 2.

4-2. The Male' Water and Sewerage Company (hereinafter referred to as "MWSC") will be the related organization and will be responsible for operation/maintenance of provided equipment for stormwater drainage under supervision of the Executing Agency on behalf of the Government of Maldives.

5. Items requested by the Government of Maldives

5-1. As a result of discussions, both sides confirmed that the items requested by the Government of Maldives are as follows:

East of Male' seawall, North side of Male' Seawall, Road drainage cleaning equipment, Drainage pump system for remote monitoring.

5-2. JICA will assess the feasibility of the above requested items through the survey and will report the findings to the Government of Japan. The final scope of the Project will be decided by the Government of Japan.

Ministry of National Planning, Housing and Infrastructure ★ Republic of Maldives ★

松

5-3. Since the Maldivian side has understood that it is indispensable to submit an official request for the Project to the Government of Japan through a diplomatic channel before the appraisal of the Project, which is scheduled in the beginning of June in 2023. The Maldivian side shall take all necessary measures for the submission by the Government of Maldives before the due date of submission of official request.

6. Procedures and Basic Principles of Japanese Grant

6-1. The Maldivian side agreed that the procedures and basic principles of Japanese Grant (hereinafter referred to as "the Grant") as described in Annex 3 shall be applied to the Project.

As for the monitoring of the implementation of the Project, JICA requires the Maldivian side to submit the Project Monitoring Report that the form is attached as Annex 4.

6-2. The Maldivian side agreed to take the necessary measures, as described in Annex 5, for smooth implementation of the Project. The contents of the Annex 5 will be elaborated and refined during the Preparatory Survey and be agreed in the mission dispatched for explanation of the Draft Preparatory Survey Report.

The contents of Annex 5 will be updated through mutual discussions as the Preparatory Survey progresses, and eventually, will be used as an attachment to the Grant Agreement.

7. Schedule of the Survey

7-1. The Team will proceed with further survey in Maldives until November 3rd in 2023.

7-2. JICA will prepare a draft Preparatory Survey Report in English and dispatch a mission to Maldives in order to explain its contents around the beginning of June in 2023.

7-3. If the contents of the draft Preparatory Survey Report are accepted and the undertakings for the Project are fully agreed by the Maldivian side, JICA will finalize the Preparatory Survey Report and send it to Maldives around the end of October.

7-4. The above schedule is tentative and subject to change.

8. Environmental and Social Considerations

8-1. The Maldivian side confirmed to give due environmental and social considerations before and during implementation, and after completion of the Project, in accordance with the JICA Guidelines for Environmental and Social Considerations (January 2022).

8-2. According to the JICA's Guidelines, the Project is categorized as "B" from the following considerations:

The project is not located in a sensitive area, nor has sensitive characteristics, nor falls into sensitive sectors under the JICA guidelines for environmental and social considerations (January 1 2022), and its potential adverse impacts on the environment are not likely to be significant.

If Environmental Impact Assessment (EIA)/Initial Environmental Examination (IEE) is necessary, the Maldivian side will conduct the necessary procedures concerning the environmental assessment (including stakeholder meetings, EIA/IEE and information disclosure, etc.) and make EIA/IEE report of the Project. The EIA/IEE approval shall be received from the responsible authorities and submitted to JICA before the bidding.

8-3. The Maldivian side will conduct the Environmental Impact Assessment (EIA) as per the regulations of the Environmental Protection Act and subsequent regulations.

9. Other Relevant Issues

<Global Issues>

9-1. Gender Mainstreaming

Both sides confirmed that following gender elements shall be duly reflected in the scope of Preparatory Survey.

(a) Collection of information and gender disaggregated data for assessment of gender needs.

(b) Examination of gender-responsive measures based on the assessment, such as:

- Recommendations on gender-friendly land use planning in coastal zone.

9-2. Contribution to Climate Change Adaption

Both sides confirmed that the Project will contribute to Climate Change Adaptation, since it will strengthen the capacity to mitigate disaster risk for protecting from storm surge and heavy rainfall to reduce the damage from climate-related disasters, which are increasing due to climate change.

9-3. Contribution to the Sendai Framework for Disaster Risk Reduction

Both sides confirmed that the Project will contribute to the achievement of Global Target (a), (b), and (c) of the Sendai Framework for Disaster Risk Reduction, since it will contribute to reduce damages for people and economic loss from natural hazard.

<Technical Issues>

9-4. Project site selection

(a) Seawall

The Team conducted site survey for screening of the Project site considering following criteria.

- Relevance to reduce damage from waves.
- Availability of Japanese Grants for the Project.
- Priority sites from the request of the Maldivian side.

Both sides confirmed that the Site A, B, C, D, E, F, G and H in Annex 1 will be in the scope of the Survey. Priority of Maldivian side will be discussed with the Team during the course of on-going survey.

Regarding the site F, the Team explained that it had not been included in the scope of the Survey before their arrival in the Maldives, and during the discussions, the Team clarified the request of Maldives, found damage of seawall at site F by the site survey, and decided to include F to the scope of the Survey.

Both sides agreed that the above sites will be evaluated and selected for the Project site by the Team based on further survey and analysis in Japan, considering the relevance of the cooperation of the Japanese side, including the Japanese government.

The Maldivian side mentioned that the scope of the Project should be confirmed without delay due to site selection.

(b) Stormwater drainage equipment

Both sides agreed as the scope of the Survey that:

- Remote monitoring system of pump stations for stormwater drainage will be installed to the existing fifteen (15) pump stations;
- Equipment for enhancing capacity of existing pump stations will be investigated with further survey by the Team;
- Equipment for cleaning road stormwater drainage will be investigated with further survey by the Team; and
- The result of survey of cooperation of World Bank for improvement of drainage system in Male and Hulhumale should be reviewed in order to decide the scope of remote monitoring system of pump stations and to clarify the needs of equipment.

(c) Others

- Necessary soft components will be discussed by both sides during 1st field survey and will be studied by Japanese side.
- The Team explained that the defect notification period of Japanese Grant Aid Project is twelve months after the completion of construction of the Project.

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9-5. Exemption of Taxes and Duties

Both sides confirmed that in accordance with Japanese Grant aid scheme the Maldivian side ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the Products and/or the Services be exempted or be borne by its designated authority without using the Grant in accordance with the Exchange of Notes to be signed by the both governments. Such customs duties, internal taxes and other fiscal levies mentioned above include GST, commercial tax, income tax and corporate tax of Japanese nationals, resident tax, fuel tax, but not limited, which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract.

9-6. Support from the Team to make project document

The Team explained that the Team will provide necessary information for The Maldivian side to make a project document which is necessary to start the Project in Maldives.

9-7. Selection of Consultants for the Project

The Team explained that as described in the item "3. (1) 4)" of the annex 3, consultants to conduct detailed survey and supervision of the Project will be selected on the basis of recommendation from JICA as part of the system of Japanese Grant Aid Project. The Maldivian side understood the explanation.

9-8. Start of implementation of the Project and Authorization to Pay (A/P)

The Team explained that the start of implementation of the Project is only after the issue of the A/P. The Maldivian side understood the explanation and replied that the Maldivian side will take all necessary measures to start the Project in accordance with the agreed timeline.

9-9. Undertakings of the Maldivian side for the Survey

As a response to the request by the Team, the Maldivian side agreed to arrange counterpart personal for the survey and to provide promptly necessary data and information relevant to the Project for the smooth implementation of the Survey.

9-10. Security and Safety measures

As shown in Annex 5, Both sides confirmed that MNPHI shall take necessary measures to ensure and maintain the security of the Project site and the persons related to the implementation of the Project, in cooperation with relevant authorities such as police.

9-11. Confidentiality of the Project

The Team explained that preparatory survey report to be prepared at the end of the survey would be disclosed to the public in Japan except confidential information according to Maldivian regulations. However, the Team also explained that a confidential part which might affect bidding process such as cost estimation should be kept undisclosed until the bidding has completed.

9-12. Ownership of the facility and equipment

Equipment and facilities acquired through the project shall be handled appropriately to align with the Project purpose, including the changes of the ownership of the assets. If any changes are to be made, such as a change in ownership of the assets and/or demolished and/or disposal, the Maldivian side should inform in advance to the Japanese side for approval.

9-13. Avoid duplication between the Project and the cooperation of World Bank

- Both sides agreed that the equipment to be procured by the Project will be used for enhancement of disaster resilience by improvement of operation and maintenance of stormwater drainage system and by enhancement of capacity of pumping drainage.
- Both sides confirmed that duplication of equipment between those to be procured by the Project and those to be transferred by the World Bank should be avoided. The Team should review the result of survey of the World Bank, therefore the result needs to be provided to the Team by early March otherwise the component may not be included to the Project.

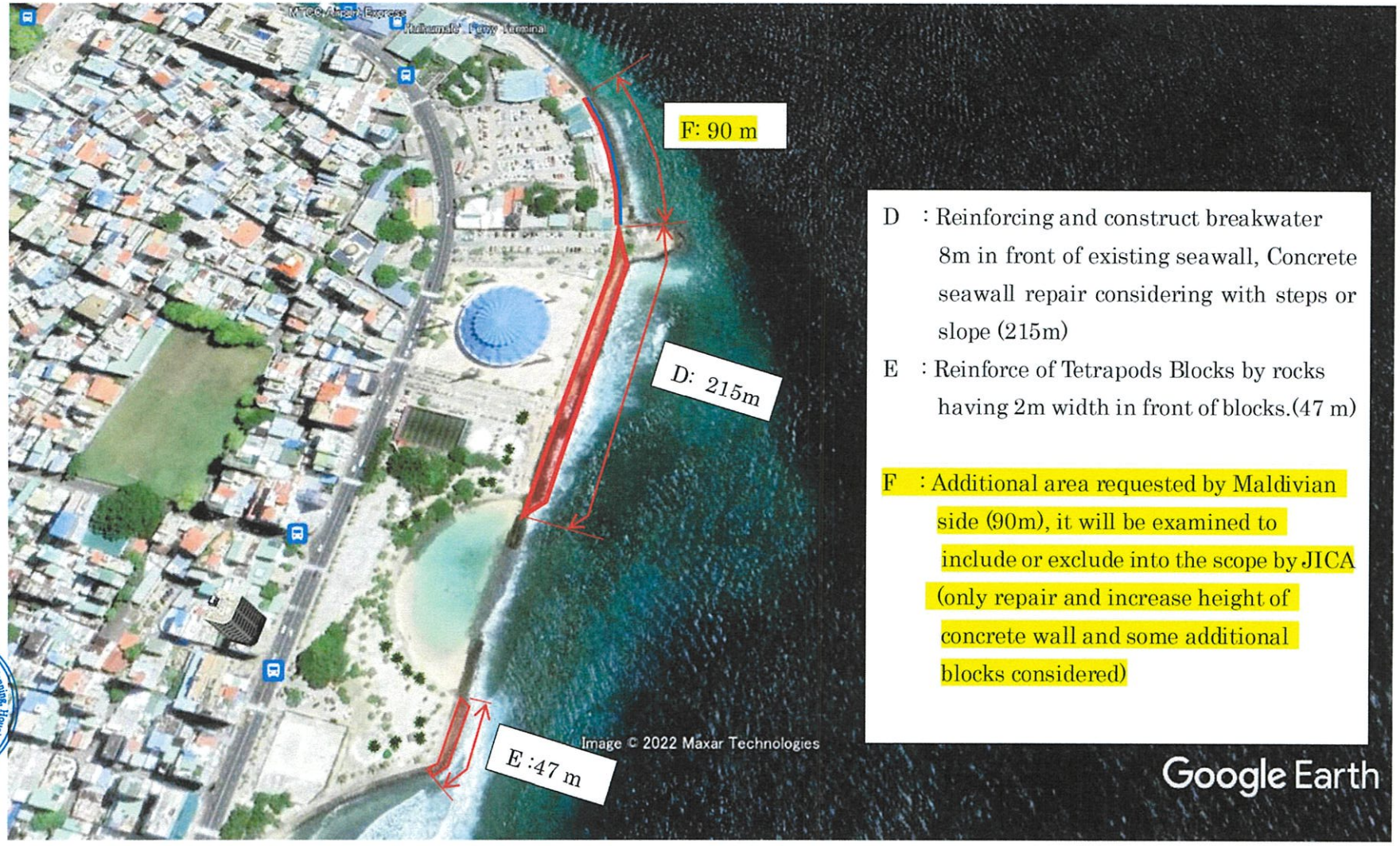
Annex 1 Project Site
Annex 2 Organization Chart
Annex 3 Japanese Grant
Annex 4-1 Project Monitoring Report (template)
Annex 4-2 Project Monitoring Report (format)
Annex 5 Major Undertakings to be taken by the Government of Maldives

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Republic of Maldives

Sand Accumulation and Overflow Area (East Coast)



Overtopping Area affected to the land (East Coast)



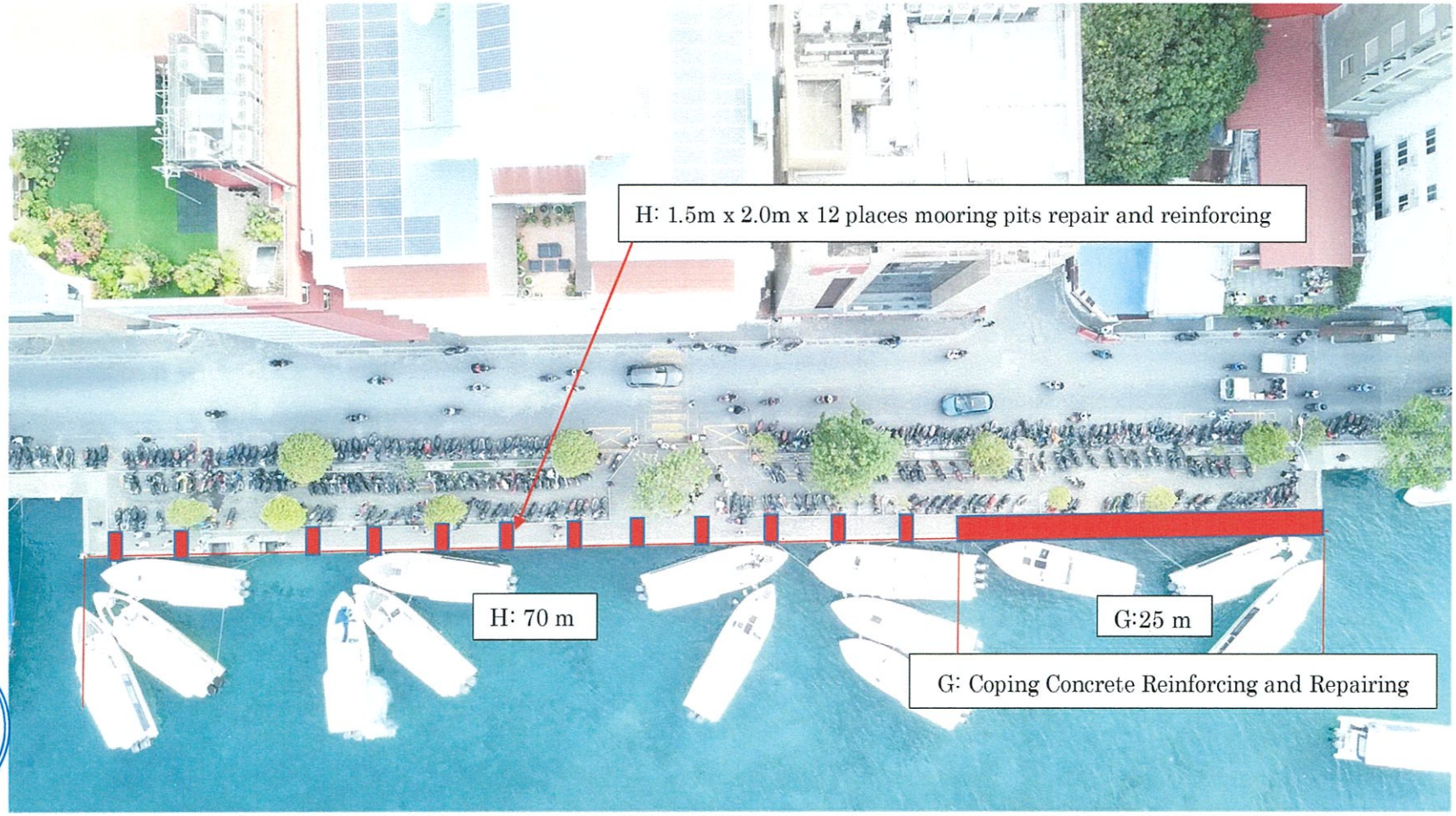
D : Reinforcing and construct breakwater 8m in front of existing seawall, Concrete seawall repair considering with steps or slope (215m)

E : Reinforce of Tetrapods Blocks by rocks having 2m width in front of blocks.(47 m)

F : Additional area requested by Maldivian side (90m), it will be examined to include or exclude into the scope by JICA (only repair and increase height of concrete wall and some additional blocks considered)

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Gap and Misalignment of Coping Concrete (North Coast)



B-12

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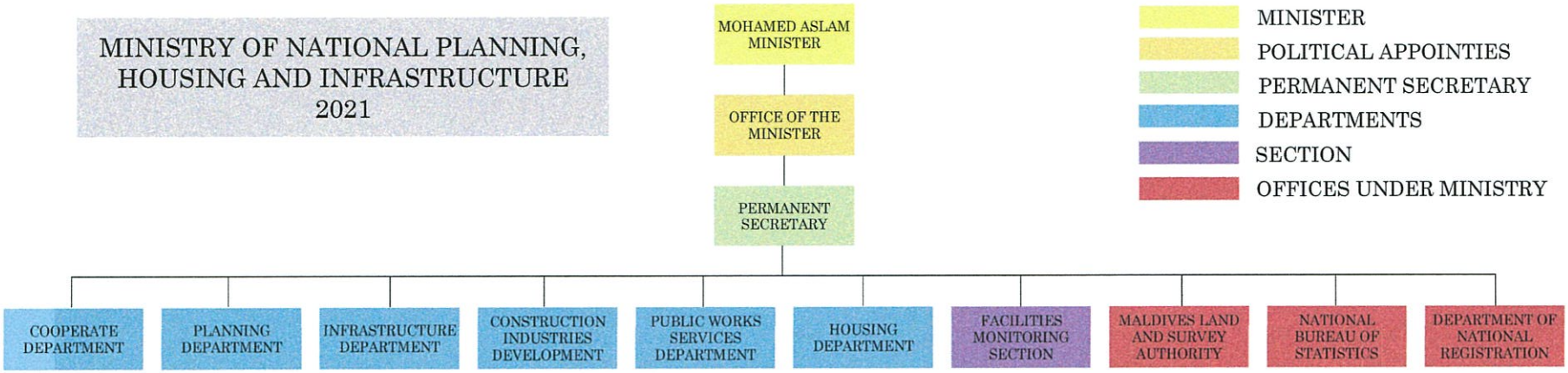
Project Site for Remote monitoring system of pump stations for storm water drainage



Pump station Candidate location for remote monitoring system

Republic of Maldives ★ Ministry of National Planning, Housing and Infrastructure ★

Annex 2 Organization Chart



B-14

JAPANESE GRANT

The Japanese Grant is non-reimbursable fund provided to a recipient country (hereinafter referred to as "the Recipient") to purchase the products and/or services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. Followings are the basic features of the project grants operated by JICA (hereinafter referred to as "Project Grants").

1. Procedures of Project Grants

Project Grants are conducted through following procedures (See "PROCEDURES OF JAPANESE GRANT" for details):

(1) Preparation

- The Preparatory Survey (hereinafter referred to as "the Survey") conducted by JICA

(2) Appraisal

-Appraisal by the government of Japan (hereinafter referred to as "GOJ") and JICA, and Approval by the Japanese Cabinet

(3) Implementation

Exchange of Notes

-The Notes exchanged between the GOJ and the government of the Recipient

Grant Agreement (hereinafter referred to as "the G/A")

-Agreement concluded between JICA and the Recipient

Banking Arrangement (hereinafter referred to as "the B/A")

-Opening of bank account by the Recipient in a bank in Japan (hereinafter referred to as "the Bank") to receive the grant

Construction works/procurement

-Implementation of the project (hereinafter referred to as "the Project") on the basis of the G/A

(4) Ex-post Monitoring and Evaluation

-Monitoring and evaluation at post-implementation stage

2. Preparatory Survey

(1) Contents of the Survey

The aim of the Survey is to provide basic documents necessary for the appraisal of the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the Recipient necessary for the implementation of the Project.
- Evaluation of the feasibility of the Project to be implemented under the Japanese Grant from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of an outline design of the Project.
- Estimation of costs of the Project.
- Confirmation of Environmental and Social Considerations

The contents of the original request by the Recipient are not necessarily approved in their initial form. The Outline Design of the Project is confirmed based on the guidelines of the Japanese Grant.

JICA requests the Recipient to take measures necessary to achieve 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 executing agency of the Project. Therefore, the contents of the Project are confirmed by all relevant organizations of the Recipient based on the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA contracts with (a) consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

JICA reviews the report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the feasibility of the Project.

3. Basic Principles of Project Grants

(1) Implementation Stage

1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes (hereinafter referred to as "the E/N") will be singed between the GOJ and the Government of the Recipient to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Recipient to define the necessary articles, in accordance with the E/N, to implement the Project, such as conditions of disbursement, responsibilities of the Recipient, and procurement conditions. The terms and conditions generally applicable to the Japanese Grant are stipulated in the "General Terms and Conditions for Japanese Grant (January 2016)."

2) Banking Arrangements (B/A) (See "Financial Flow of Japanese Grant (A/P Type)" for details)

a) The Recipient shall open an account or shall cause its designated authority to open an account under the name of the Recipient in the Bank, in principle. JICA will disburse the Japanese Grant in Japanese yen for the Recipient to cover the obligations incurred by the Recipient under the verified contracts.

b) The Japanese Grant will be disbursed when payment requests are submitted by the Bank to JICA under an Authorization to Pay (A/P) issued by the Recipient.

3) Procurement Procedure

The products and/or services necessary for the implementation of the Project shall be procured in accordance with JICA's procurement guidelines as stipulated in the G/A.

4) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the Recipient to continue to work on the Project's implementation after the E/N and G/A.

5) Eligible source country

In using the Japanese Grant disbursed by JICA for the purchase of products and/or services, the eligible source countries of such products and/or services shall be Japan and/or the Recipient. The Japanese Grant may be used for the purchase of the products and/or services of a third country as eligible, if necessary, taking into account the quality, competitiveness and economic rationality of products and/or services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm, which enter into contracts with the Recipient, are limited to "Japanese nationals", in principle.

6) Contracts and Concurrence by JICA

The Recipient will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be concurred by JICA in order to be verified as eligible for using the Japanese Grant.

7) Monitoring

The Recipient is required to take their initiative to carefully monitor the progress of the Project in order to ensure its smooth implementation as part of their responsibility in the G/A, and to regularly report to JICA about its status by using the Project Monitoring Report (PMR).

8) Safety Measures

The Recipient must ensure that the safety is highly observed during the implementation of the Project.

9) Construction Quality Control Meeting

Construction Quality Control Meeting (hereinafter referred to as the "Meeting") will be held for quality assurance and smooth implementation of the Works at each stage of the Works. The member of the Meeting will be composed by the Recipient (or executing agency), the Consultant, the Contractor and JICA. The functions of the Meeting are as followings:

a) Sharing information on the objective, concept and conditions of design from the Contractor, before start of construction.

b) Discussing the issues affecting the Works such as modification of the design, test, inspection, safety control and the Client's obligation, during of construction.

(2) Ex-post Monitoring and Evaluation Stage

1) After the project completion, JICA will continue to keep in close contact with the Recipient in order to monitor that the outputs of the Project is used and maintained properly to attain its expected outcomes.

2) In principle, JICA will conduct ex-post evaluation of the Project after three years from the completion. It is required for the Recipient to furnish any necessary information as JICA may reasonably request.

(3) Others

1) Environmental and Social Considerations

The Recipient shall carefully consider environmental and social impacts by the Project and must comply with the environmental regulations of the Recipient and JICA Guidelines for Environmental and Social Considerations (January, 2022).

2) Major undertakings to be taken by the Government of the Recipient

For the smooth and proper implementation of the Project, the Recipient is required to undertake necessary measures including land acquisition, and bear an advising commission of the A/P and payment commissions paid to the Bank as agreed with the GOJ and/or JICA. The Government of the Recipient shall ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the Recipient with respect to the purchase of the Products and/or the Services be exempted or be borne by its designated authority without using the Grant and its accrued interest, since the grant fund comes from the Japanese taxpayers.

3) Proper Use

The Recipient is required to maintain and use properly and effectively the products and/or services under the Project (including the facilities constructed and the equipment purchased), to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Japanese Grant.

4) Export and Re-export

The products purchased under the Japanese Grant should not be exported or re-exported from the Recipient.



PROCEDURES OF JAPANESE GRANT

Stage	Procedures	Remarks	Recipient Government	Japanese Government	JICA	Consultants	Contractors	Agent Bank
Official Request	Request for grants through diplomatic channel	Request shall be submitted before appraisal stage.	x	x				
1. Preparation	(1) Preparatory Survey Preparation of outline design and cost estimate		x		x	x		
2. Appraisal	(2)Preparatory Survey Explanation of draft outline design, including cost estimate, undertakings, etc.		x		x	x		
	(3)Agreement on conditions for implementation	Conditions will be explained with the draft notes (E/N) and Grant Agreement (G/A) which will be signed before approval by Japanese government.	x	x (E/N)	x (G/A)			
	(4) Approval by the Japanese cabinet			x				
3. Implementation	(5) Exchange of Notes (E/N)		x	x				
	(6) Signing of Grant Agreement (G/A)		x		x			
	(7) Banking Arrangement (B/A)	Need to be informed to JICA	x					x
	(8) Contracting with consultant and issuance of Authorization to Pay (A/P)	Concurrence by JICA is required	x			x		x
	(9) Detail design (D/D)		x			x		
	(10) Preparation of bidding documents	Concurrence by JICA is required	x			x		
	(11) Bidding	Concurrence by JICA is required	x			x	x	
	(12) Contracting with contractor/supplier and issuance of A/P	Concurrence by JICA is required	x				x	x
	(13) Construction works/procurement	Concurrence by JICA is required for major modification of design and amendment of contracts.	x			x	x	
	(14) Completion certificate		x			x	x	
4. Ex-post monitoring & evaluation	(15) Ex-post monitoring	To be implemented generally after 1, 3, 10 years of completion, subject to change	x		x			
	(16) Ex-post evaluation	To be implemented basically after 3 years of completion	x		x			

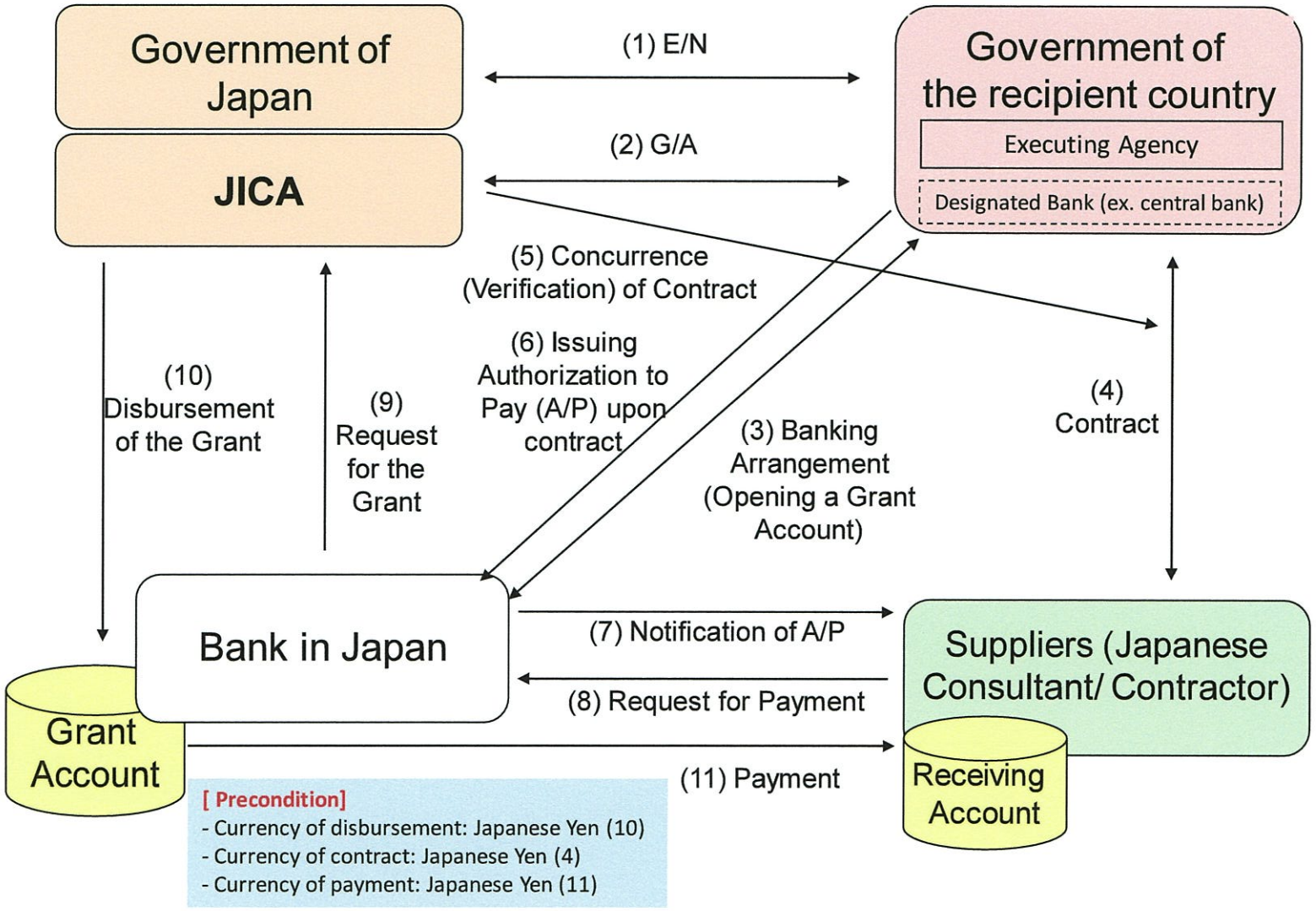
notes:

1. Project Monitoring Report and Report for Project Completion shall be submitted to JICA as agreed in the G/A.

2. Concurrence by JICA is required for allocation of grant for remaining amount and/or contingencies as agreed in the G/A.

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Financial Flow of Japanese Grant (A/P Type)



Date:
Ref. No.

JAPAN INTERNATIONAL COOPERATION AGENCY
JICA XXX OFFICE
[Address specified in the Article 5 of the Grant Agreement]

Attention: Chief Representative

Ladies and Gentlemen:

NOTICE CONCERNING PROGRESS OF PROJECT

Reference : Grant Agreement, dated (signed date of the G/A), for (name of the Project)

In accordance to the Article 6 (3) of the Grant Agreement, we would like to report on the progress of the Project up to the following stages:

[Common]
- ☐ Preparation of bidding documents - result of detailed design
- ☐ Completion of final works under construction/procurement contract

[Construction]
- ☐ Monthly progress [Month/Year]

[Procurement of Equipment]
- ☐ Shipping/delivery, hand-over (take over) of equipment
- ☐ Installation works
- ☐ Operational training

- ☐ Other _____

Please see the details as per attached Project Monitoring Report (PMR).

Very truly yours,

[Signature]_____
[Name of the signer]
[Title of the signer]

[*Name of the executing agency*]

cc:

Director General

Financial Cooperation Implementation Department

Japan International Cooperation Agency

[Address specified in the Article 5 of the Grant Agreement]

Project Monitoring Report
on
Project Name
Grant Agreement No. XXXXXXX
20XX, Month

Organizational Information

Signer of the G/A (Recipient)	Person in Charge (Designation) Contacts Address: Phone/FAX: Email:
Executing Agency	Person in Charge (Designation) Contacts Address: Phone/FAX: Email:
Line Ministry	Person in Charge (Designation) Contacts Address: Phone/FAX: Email:

General Information:

Project Title	
E/N	Signed date: Duration:
G/A	Signed date: Duration:
Source of Finance	Government of Japan: Not exceeding JPY _____ mil. Government of (_____): _____

1: Project Description

1-1 Project Objective

1-2 Project Rationale

- Higher-level objectives to which the project contributes (national/regional/sectoral policies and strategies)
- Situation of the target groups to which the project addresses

1-3 Indicators for measurement of "Effectiveness"

Quantitative indicators to measure the attainment of project objectives		
Indicators	Original (Yr)	Target (Yr)
Qualitative indicators to measure the attainment of project objectives		

2: Details of the Project

2-1 Location

Components	Original *(proposed in the outline design)*	Actual
1.		

2-2 Scope of the work

Components	Original* *(proposed in the outline design)*	Actual*
1.		

Reasons for modification of scope (if any).

(PMR)

2-3 Implementation Schedule

Items	Original		Actual
	(proposed in the outline design)	*(at the time of signing the Grant Agreement)*	

Reasons for any changes of the schedule, and their effects on the project (if any)

2-4 Obligations by the Recipient

2-4-1 Progress of Specific Obligations

See Attachment 2.

2-4-2 Activities

See Attachment 3.

2-4-3 Report on RD

See Attachment 11.

2-5 Project Cost

2-5-1 Cost borne by the Grant(Confidential until the Bidding)

Components			Cost (Million Yen)	
	Original *(proposed in the outline design)*	Actual *(in case of any modification)*	Original[1),2)] *(proposed in the outline design)*	Actual
	1.			
Total				

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar = Yen

2-5-2 Cost borne by the Recipient

Components			Cost (1,000 Taka)	
	Original *(proposed in the outline design)*	Actual *(in case of any modification)*	Original[1),2)] *(proposed in the outline design)*	Actual
	1.			

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar =

Reasons for the remarkable gaps between the original and actual cost, and the countermeasures (if any)

(PMR)

2-6 Executing Agency

- Organization's role, financial position, capacity, cost recovery etc,
- Organization Chart including the unit in charge of the implementation and number of employees.

Original *(at the time of outline design)* name: role: financial situation: institutional and organizational arrangement (organogram): human resources (number and ability of staff):
Actual *(PMR)*

2-7 Environmental and Social Impacts

- The results of environmental monitoring based on Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- The results of social monitoring based on in Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- Disclosed information related to results of environmental and social monitoring to local stakeholders (whenever applicable).

3: Operation and Maintenance (O&M)

3-1 Physical Arrangement

- Plan for O&M (number and skills of the staff in the responsible division or section, availability of manuals and guidelines, availability of spareparts, etc.)

Original *(at the time of outline design)*
Actual *(PMR)*

3-2 Budgetary Arrangement

- Required O&M cost and actual budget allocation for O&M

Original *(at the time of outline design)*

Actual *(PMR)*

4: Potential Risks and Mitigation Measures

- Potential risks which may affect the project implementation, attainment of objectives, sustainability
- Mitigation measures corresponding to the potential risks

Assessment of Potential Risks (*at the time of outline design*)

Potential Risks	Assessment
1. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):
2. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):
3. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:

	Contingency Plan (if applicable):
Actual Situation and Countermeasures	
(PMR)	

5: Evaluation and Monitoring Plan (after the work completion)

5-1 Overall evaluation

Please describe your overall evaluation on the project.

5-2 Lessons Learnt and Recommendations

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

5-3 Monitoring Plan of the Indicators for Post-Evaluation

Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

Attachment

1. Project Location Map
2. Specific obligations of the Recipient which will not be funded with the Grant
3. Monthly Report submitted by the Consultant

Appendix - Photocopy of Contractor's Progress Report (if any)
- Consultant Member List
- Contractor's Main Staff List

4. Check list for the Contract (including Record of Amendment of the Contract/ Agreement and Schedule of Payment)
5. Environmental Monitoring Form / Social Monitoring Form
6. Monitoring sheet on price of specified materials (Quarterly)
7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (PMR (final)only)
8. Pictures (by JPEG style by CD-R) (PMR (final)only)
9. Equipment List (PMR (final)only)
10. Drawing (PMR (final)only)
11. Report on RD (After project)

Monitoring sheet on price of specified materials

1. Initial Conditions (Confirmed)

	Items of Specified Materials	Initial Volume A	Initial Unit Price (¥) B	Initial total Price C=A×B	1% of Contract Price D	Condition of payment	
						Price (Decreased) E=C−D	Price (Increased) F=C+D
1	Item 1	●●t	●	●	●	●	●
2	Item 2	●●t	●	●	●		
3	Item 3						
4	Item 4						
5	Item 5						

2. Monitoring of the Unit Price of Specified Materials

(1) Method of Monitoring : ●●

(2) Result of the Monitoring Survey on Unit Price for each specified materials

	Items of Specified Materials	1st ●month, 2015	2nd ●month, 2015	3rd ●month, 2015	4th	5th	6th
1	Item 1						
2	Item 2						
3	Item 3						
4	Item 4						
5	Item 5						

(3) Summary of Discussion with Contractor (if necessary)

-

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Report on Proportion of Procurement (Recipient Country, Japan and Third Countries)
(Actual Expenditure by Construction and Equipment each)

	Domestic Procurement (Recipient Country) A	Foreign Procurement (Japan) B	Foreign Procurement (Third Countries) C	Total D
Construction Cost	(A/D%)	(B/D%)	(C/D%)	
Direct Construction Cost	(A/D%)	(B/D%)	(C/D%)	
others	(A/D%)	(B/D%)	(C/D%)	
Equipment Cost	(A/D%)	(B/D%)	(C/D%)	
Design and Supervision Cost	(A/D%)	(B/D%)	(C/D%)	
Total	(A/D%)	(B/D%)	(C/D%)	

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Major Undertakings to be taken by the Government of Maldives

1. Specific obligations of the Government of Maldives which will not be funded with the Grant

(1) Before the Bidding

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To sign the banking arrangement (B/A) with a bank in Japan (the Agent Bank) to open bank account for the Grant	within 1 month after the signing of the G/A	MOF		
2	To issue A/P to the Agent Bank for the payment to the consultant	within 1 month after the signing of the contract(s)	MOF		
3	To bear the following commissions to the Agent Bank for the banking services based upon B/A				
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	MOF		
	2) Payment commission for A/P	every payment	MOF		
4	To approve IEE/EIA(Conditions of approval should be fulfilled, if any) and secure the necessary budget for implementation for EMP (Environmental Management Plan) and EMoP (Environmental Monitoring Plan)(and fulfilling conditions of approval, if any), if required	[secure the necessary budget] Within 1 month after signing of the G/A. [to approve IEE/EIA]prior to the tender notice	MNPHI,		
5	To secure the necessary land(s) and/or space(s) and to clear, level and reclaim the site(s) including access road for the Equipment Ancillary Facility(s) and/or installation of the Equipment at the MWSC pumping stations (Existing) and the MWSC office and storehouse in Male.	prior to the tender notice	MNPHI		
6	To implement social monitoring, and to submit the monitoring results to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report	until land acquisition and resettlement complete	MNPHI		
7	To obtain all prior regulatory compliance and necessary permissions from the relevant agencies/authorities as well as to shoulder all the costs of these procedures (application fee, application preparation, etc.) for:	prior to the tender notice	MNPHI		
8	To submit Project Monitoring Report (with the result of Detailed Design)	before preparation of the bidding documents	MNPHI		

(B/A: Banking Arrangement, A/P: Authorization to pay, N/A: Not Applicable, EMP: Environment Management Plan, EMoP: Environment Monitoring Plan)

(2) During the Project Implementation

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To issue A/P to the Agent Bank for the payment to the supplier and the contractor	within 1 month after the signing of the contract(s)	MOF		
2	To bear the following commissions to the Agent Bank for the banking services based upon the B/A				
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	MOF		

	2) Payment commission for A/P	every payment	MOF		
3	To ensure prompt unloading and customs clearance at ports of disembarkation in the country of the Recipient and to assist the Supplier(s) with internal transportation therein	during the Project	MNPHI		
4	To take responsibility for arranging the maximum countermeasures and ensure the appropriate security of the whole Project site/s and of the Japanese and other foreign nationals assigned to the Project prior to the commencement of and during the whole implementation of the Project.	during the Project	MNPHI		
5	To undertake all necessary institutional and juridical procedures in Maldives	every payment	MNPHI		
6	To handle duty (tax) exemption procedures and to take necessary measures as well as provide requisite legal and/or administrative documentations for import permit and customs clearance to the customs broker/forwarder to be employed by the Contractor at the port of disembarkation for the materials and equipment to be imported for the Project as well as the sending back of any defective equipment and/or spare parts to the manufacturer for repair at the factory or replacement and re-importation thereof into Maldives during the implementation and warranty periods of the Project.	during the Project	MNPHI Tax Department Ministry of Finance Bureau of Customs		
7	To accord Japanese physical persons and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the country of the Recipient and stay therein for the performance of their work (i.e. to secure the appropriate visa including its extension/s required by the recipient country in connection thereof).	during the Project	MNPHI		
8	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the products and/or the services be borne by its designated authority without using the Grant;	during the Project	MNPHI		
9	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project such as the transportation, installation of the equipment and the equipment ancillary facilities.	during the Project	MNPHI		
10	To provide temporary facilities for the availability or accessibility of electricity for the implementation of the Project.	during the Project	MNPHI		
11	To provide free of charge and allocate secure temporary storage area/room for the materials, tools and equipment needed during the installation process.	during the Project	MNPHI		
12	To secure an access road and sufficient spaces at the proposed sites for temporary facilities such as a workshop, materials storage, etc. needed for the equipment ancillary facilities.	before start of the work	MNPHI		
13	To support the Contractor to obtain relevant and vital information or data	during the Project	MNPHI		
14	To provide the commercial power supply along with electric poles/wires, etc. for stormwater drainage system <if necessary>	before start of the equipment installation	MNPHI		
15	To confirm necessary internet environment required for remote monitoring stormwater drainage system at MWSC office in Male and other proposed sites of pumping station	before start of the equipment installation	MNPHI		
16	To assign appropriate number of trainees and shoulder cost such as daily allowance, transportation fee, accommodation, for local training, if any.	during the Project	MNPHI		
17	To notify JICA promptly of any incident or accident, which has, or is likely to have, a significant adverse effect on the environment, the affected communities, the public or workers.	during the Project	MNPHI		
18	To submit Project Monitoring Report	Every month	MNPHI		
	1) To submit Project Monitoring Report (final) (including as-built drawings, equipment list, photographs, etc.)	within 1 month after issuance of	MNPHI		

		Certificate of Completion for the works under the contract(s)			
19	2) To submit a report concerning completion of the Project	within 6 months after completion of the Project	MNPHI		
20	To ensure the safety of persons engaged in the implementation of the Project	during the Project implementation	MNPHI		
21	To take necessary measures for security and safety of the Project site (measures for safety) 1) traffic control around the site(s) and on transportation routes of the equipment and materials<If necessary>	during the project implementation	MNPHI		
22	To implement EMP and EMoP	during the implementation	MNPHI		
23	To submit results of environmental monitoring to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report	during the implementation	MNPHI		
24	To implement social monitoring, and to submit the monitoring results to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report - Period of the monitoring may be extended if affected persons' livelihoods are not sufficiently restored. Extension of the monitoring will be decided based on agreement between MNPHI and JICA. <If necessary>	- until the end of livelihood restoration program (In case that livelihood restoration program is provided) *- for 2 years after land acquisition and resettlement complete (In case that livelihood restoration program is not provided)*	MNPHI		

(3) After the Project

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To assign the required staff including responsible personnel of the MNPHI and MWSC who has reliable technical skill and ample experience for the smooth operation and maintenance of the Equipment	After completion of the Project	MNPHI and MWSC		
2	To procure the required spare parts and consumables for the smooth operation and maintenance of the Equipment and enter into a Preventive Maintenance Service Agreement with the equipment supplier if so desired	After completion of the Project	MNPHI and MWSC		
3	To properly operate and maintain, and also effectively utilize the Facilities and the Equipment established under the Project	After completion of the Project	MNPHI and MWSC		
4	To periodically update all the operation/antivirus/application software(s)	After completion of the Project	MNPH and MWSC		

5	To implement EMP and EMoP<If necessary>	for a period based on EMP and EMoP	MNPHI		
6	To submit results of environmental monitoring to JICA, by using the monitoring form, semiannually - The period of environmental monitoring may be extended if any significant negative impacts on the environment are found. The extension of environmental monitoring will be decided based on the agreement between MNPHI and JICA. <If necessary>	for 3 years after the Project	MNPHI		
7	To maintain and use properly and effectively the facilities and equipment established under the Grant Aid 1) Allocation of maintenance cost (such as electricity, communication, etc.) as well as assignment of personnel 2) Operation and maintenance structure 3) Routine check/Periodic inspection	After completion of the Project	MNPHI		

2. Other obligations of the Government of Maldives funded with the Grant

NO	Items	Deadline	Amount (Million Japanese Yen)*
1	To construct seawall 1) To conduct the following transportation a) Marine (Air) transportation of the products from Japan to the country of the Recipient b) Internal transportation from the ports of disembarkation to the project sites		
	2) To construct seawall a) Repairing concrete seawall b) Increasing crest height c) Reinforcing and construct breakwater d) Repairing quay wall		
2	To provide the equipment with the equipment ancillary facilities 1) To conduct the following transportation a) Marine (Air) transportation of the products from Japan to the country of the Recipient b) Internal transportation from the ports of disembarkation to the project sites		
	2) To provide equipment with installation and commissioning		
3	To implement detailed design, bidding support, construction supervision and procurement supervision (Consulting Service)		
4	Contingencies		
	Total		XXX

*The Amount is provisional. This is subject to the approval of the Government of Japan.

[資料 B]

B-1. 協議議事録（第 1 次現地調査 2022/10/13 時）

B-2. 協議議事録（第 3 次現地調査 2023/07/12 時）

※第 2 次現地調査時の協議議事録も含む

Minutes of Discussions
on the Preparatory Survey for the Project for
Disaster Resilience Enhancement in Male'

With reference to the minutes of discussions signed between Ministry of National Planning, Housing and Infrastructure (hereinafter referred to as "MNPHI") and the Japan International Cooperation Agency (hereinafter referred to as "JICA") on October 13, 2022 and on June 15, 2023 in response to the request from the Government of the Republic of Maldives(hereinafter referred to as "the Government of Maldives") dated August 2, 2020 and September 25, 2022. JICA dispatched the Preparatory Survey Team (hereinafter referred to as "the Team") for the explanation of Environmental and Social Consideration part of the Draft Preparatory Survey Report (hereinafter referred to as "the Draft Report") for the Project for Disaster Resilience Enhancement in Male' (hereinafter referred to as "the Project").

As a result of the discussions, both sides agreed on the main items described in the attached sheets.

Male', July 12, 2023

Ms. TSUKIZOE Megumi	Ms. Fathimath Shaana Farooq
Leader	Director General
Preparatory Survey Team	Ministry of National Planning, Housing and
Japan International Cooperation Agency	Infrastructure
Japan	Maldives

ATTACHMENT

1. Objective of the Project

The objective of the Project is to reduce damage from waves and heavy rain through improvement of seawall and provision of equipment for stormwater drainage in Male, thereby contributing to enhancement of disaster resilience from water related disaster and to stabilization of the basis of life and economic and social activities in Male.

2. Outline of the Project

Both sides confirmed that the outline of the Project, such as project sites, timeline of the project implementation, undertakings of the Project, monitoring during the implementation, etc., by the Minutes of Discussions which was signed on June 15th, 2023, which is shown in Annex 1.

3. Contents of the Draft Report

After the explanation of Environmental and Social Consideration (hereinafter referred to as "ESC")part of the Draft Report by the Team, the Maldivian side agreed to its contents. JICA will finalize the Preparatory Survey Report based on the confirmed items. The report will be sent to the Maldivian side around October 2023.

4. Environmental and Social Considerations

4-1 General Issues

4-1-1 Environmental Guidelines and Environmental Category

The Team explained that 'JICA Guidelines for Environmental and Social Considerations (January 2022)' (hereinafter referred to as "the Guidelines") is applicable for the Project. The Project is categorized as B because the Project is not likely to have significant adverse impact on the environment under the Guidelines in terms of its sectors, characteristics and areas.

4-1-2 Environmental Checklist

The environmental and social considerations including major impacts and mitigation measures for the Project are summarized in the tentative Environmental Checklist attached as Annex 2. Maldivian side assured that they shall take the necessary measures in accordance with the Environmental Checklist. Both sides agreed that in case of major modification of the content of the Environmental Checklist, the Maldivian side shall submit the modified version to JICA in a timely manner.

4-2 Environmental Issues

4-2-1 Environmental Impact Assessment (EIA)

Both sides confirmed the EIA report will be approved by Environmental Protection Agency prior to the contract conclusion with contractor which is scheduled in September 2024.

The team requested that Maldivian side make the EIA Report of the Project available to local residents. Maldivian side explained that the EIA Report, written in English, will be disclosed on the Environmental Protection Agency's website by October 2024. Maldivian side agreed to disclose the Reports by the completion of the Project.

MNPHI assured to reflect the result of the Preparatory Survey to the EIA and to take necessary actions to obtain an EIA approval prior to the contract conclusion with contractor by the Environmental Protection Agency in a timely manner. MNPHI confirmed to report to JICA immediately once the EIA approval is obtained.

4-2-2 Environmental Management Plan and Environmental Monitoring Plan

Both sides confirmed the tentative Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP) of the Project is as Annex 3 and Annex 4, respectively. Both sides agreed that environmental mitigation measures and monitoring shall be conducted based on the EMP and EMoP, which may be updated during the detailed design stage.

Since Environmental Impact Assessment (EIA)/Initial Environmental Examination (IEE) is needed for the improvement of seawall, the Maldivian side should conduct the necessary procedures concerning the environmental assessment (including stakeholder meetings, EIA/IEE and information disclosure, etc.) and make EIA/IEE report of the Project. The EIA/IEE approval shall be received from the responsible authorities and submitted to JICA before the contract conclusion with contractor.

4-2-3 Consultation with Local Stakeholders

Maldivian side explained that local stakeholder meetings on the Project with relevant stakeholders and local residents with particular attention to directly affected peoples by the Project were held at MNPHI on June 19th and June 20th, 2023. Advance announcements were posted on MNPHI's website and SNS and invitation letters were sent by MNPHI to main stakeholder; Ministry of Islamic Affairs, Male' City Council, Male' Water and Sewerage Company, owners of neighboring restaurants and cafes, Maldivian Surfing Association. Questions and opinions such as the necessity of seawall raising and importance of information sharing during the Project implementation are raised by

attendees, MNPHI explained the outcome of such consultations was incorporated into the project plans. However, there were no objections to the implementation of the Project. Details regarding the stakeholder meetings are summarized as per Annex 5. Maldivian side explained appropriate considerations have been given to attendees during those meetings by announcing the meeting on SNS 2 weeks before the meetings and by holding meeting for 2 days.

4-4 Environmental and Social Monitoring

4-4-1 Environmental and Social Monitoring

Both sides agreed that the Maldivian side will submit results of environmental and social monitoring to JICA as a part of Monthly Progress Report by using the monitoring form attached as Annex 6. The timing of submission of the monitoring form is described in Annex 5 of Minutes of Discussions which is showed in Annex 1. In case JICA finds that there is a need for improvement in a situation with respect to environmental and social considerations after the agreed monitoring period, JICA may request to extend the period of monitoring and reporting until JICA confirms the issues have been properly addressed. The extension of the monitoring will be decided in accordance with the agreement between MNPHI and JICA.

4-4-2 Information Disclosure of Monitoring Results

Both sides confirmed that it will take stipulated procedures for information disclosure in accordance with the Regulation on the Preparation of Environmental Impact Assessment Report (Regulation Number: 2012/R-27) of the Government of Maldives. In addition, the Team requested Maldivian side to disclose results of environmental and social monitoring to local stakeholders and Maldivian side agreed to disclose monitoring results through their website by date.

The Maldivian side agreed JICA will disclose results of environmental and social monitoring submitted by the Maldivian side as the monitoring forms attached as Annex 6 on its website. If the third parties request further information, JICA disclose the information, which is subject to approval by the Government of Maldives.

Annex 1 Signed Minutes of Discussions (dated June 15th, 2023)
Annex 2 Environmental Check List
Annex 3 Environmental Management Plan
Annex 4 Environmental Monitoring Plan
Annex 5 Summary of the stakeholder meetings
Annex 6 Environmental Monitoring Form

Minutes of Discussions
on the Preparatory Survey for the Project for Disaster Resilience Enhancement in Male'

With reference to the minutes of discussions signed between Ministry of National Planning, Housing and Infrastructure (hereinafter referred to as "MNPHI") and the Japan International Cooperation Agency (hereinafter referred to as "JICA") on October 13, 2022 and in response to the request from the Government of the Republic of Maldives(hereinafter referred to as "the Government of Maldives") dated August 2, 2020 and September 25, 2022. JICA dispatched the Preparatory Survey Team (hereinafter referred to as "the Team") for the explanation of Draft Preparatory Survey Report (hereinafter referred to as "the Draft Report") for the Project for Disaster Resilience Enhancement in Male' (hereinafter referred to as "the Project").

As a result of the discussions, both sides agreed on the main items described in the attached sheets.

Male', June 15, 2023

Ms. TSUKIZOE Megumi	Ms. Fathimath Shaana Farooq
Leader	Director General
Preparatory Survey Team	
Japan International Cooperation Agency	Ministry of National Planning, Housing and Infrastructure
Japan	Maldives

ATTACHMENT

1. Objective of the Project

   The objective of the Project is to reduce damage from waves and heavy rain through improvement of seawall and provision of equipment for stormwater drainage in Male', thereby contributing to enhancement of disaster resilience from water related disaster and to stabilization of the basis of life and economic and social activities in Male'.

2. Title of the Preparatory Survey

   Both sides confirmed the title of the Preparatory Survey as "the Preparatory Survey for the Project for Disaster Resilience Enhancement in Male'".

3. Project Site

   Both sides confirmed that the sites of the Project are in Male', which is shown in Annex 1.

4. Responsible authority for the Project

   Both sides confirmed the authorities responsible for the Project are as follows:

   4-1. MNPHI will be the executing agency for the Project (hereinafter referred to as "the Executing Agency"). The Executing Agency shall be responsible for supervising the Project on behalf of the Government of Maldives and shall coordinate with all the relevant authorities to ensure smooth implementation of the Project and ensure that the undertakings for the Project shall be managed by relevant authorities properly and on time. The organization charts are shown in Annex 2.

   MNPHI agreed that they will be responsible for asset holding and secure budget for operation and maintenance after handover of the equipment for stormwater management. MNPHI also agrees that they will be responsible for coordinate and conduct joint training for MNPHI, Male' City Council (hereinafter referred to as "MCC") and Male' Water and Sewerage Company (hereinafter referred to as "MWSC") in order to ensure proper operation and maintenance of provided equipment by the operator of stormwater management.

   4-2. The MCC and MWSC will be the related organizations and will be responsible for operation and maintenance of provided equipment for stormwater management under supervision of the Executing Agency and Ministry of Finance on behalf of the Government of Maldives.

5. Contents of the Draft Report

After the explanation of the contents of the Draft Report by the Team, the Maldivian side agreed to its contents. JICA will finalize the Preparatory Survey Report based on the confirmed items.

The part of environmental and social consideration of the report will be updated based on the result of consultation with local stakeholders and baseline survey and confirmed the contents though the mission in July 2023. The finalized Preparatory Survey Report will be sent to the Maldivian side around October 2023.

6. Cost estimate

Both sides confirmed that the cost estimate including the contingency explained by the Team is provisional and will be examined further by the Government of Japan for its approval. The contingency would cover the additional cost against natural disaster, unexpected natural conditions, etc.

7. Confidentiality of the cost estimate and technical specifications

Both sides confirmed that the cost estimate and technical specifications of the Project should never be disclosed to any third parties until all the contracts under the Project are concluded.

8. Procedures and Basic Principles of Japanese Grant

The Maldivian side agreed that the procedures and basic principles of Japanese Grant (hereinafter referred to as "the Grant") as described in Annex 3 shall be applied to the Project. In addition, the Maldivian side agreed to take necessary measures according to the procedures.

9. Timeline for the project implementation

The Team explained to the Maldivian side that the expected timeline for the project implementation is as attached in Annex 4.

10. Expected outcomes and indicators

Both sides agreed that key indicators for expected outcomes are as follows. The Maldivian side will be responsible for the achievement of agreed key indicators targeted in year 2029 and shall monitor the progress for Ex-Post Evaluation based on those indicators.

[Quantitative indicators]

<Indicators for Seawall component>

Facility of Seawall (Location)	Indicator	Reference value Existing Seawall (Actual Value in 2022)	Target Value (in 2029)
East Coast Surfing Areas * Sand deposition, flying sand, overflow confirmation area (Area "A")	Seawall Height (DL=MSL+) Overtopping Volume (m3/s/m)	DL : +2.3 m 0.002 m3/s/m	DL : +3.0 m 0.00008 m3/s/m
	Wave height (DL=MSL+)	DL : +1.55 m	DL : +1.77m
East Coast Artificial Beach South Side * Wave overtopping confirmation area (Area "B")	Seawall Height (DL=MSL+) Overtopping Volume (m3/s/m)	DL : +2.4 m 0.003 m3/s/m	DL : +2.8 m 0.00006 m3/s/m
	Wave height (DL=MSL+)	DL : +1.66 m	DL : +1.88m
East Coast in front of the mosque * Wave overtopping confirmation area (Area "C")	Seawall Height (DL=MSL+) Overtopping Volume (m^3/s/m)	DL : +2.4 m 0.005 m^3/s/m	DL : + 3.2 m (Height of Breakwater) 0.0001 m^3/s/m
	Wave height (DL=MSL+)	DL : +1.70 m	DL : +1.92m
Northernmost point on the East Coast * Additional request overtopping area (Area "D")	Seawall Height (DL=MSL+) Overtopping Volume (m^3/s/m)	DL : +2.1 m 0.005 m^3/s/m	DL : + 2.7 m 0.0001 m^3/s/m
	Wave height (DL=MSL+)	DL : + 1.67 m	DL : +1.89m

(DL: Design Level, MSL: Mean Sea Level)

*50 years return period to be targeted in 2026~2070

<Indicators for Stormwater component>

Equipment	Indicator	Expected Effects
Remote Monitoring and Control System for Storm Water Drainage Facility	Reducing the time to detect inundation around manhole pumps on stormwater drainage facilities	Before the Project: 5 min to 45 min After the Project: 0 min Inundation has been detected by patrolling and reporting, but the Remote Monitoring and Control System detects abnormal water levels, will be enabling response and preparation prior to flooding.
	Reducing inspection time for pumps on stormwater drainage facilities (16 in total)	Before the Project: 128 min (Trip: 3 minutes x 16 locations + Inspection: 5 minutes x 16 locations) After the Project: 1 min (Checking the Monitoring screen all time.) The operating status of stormwater drainage pumps and other equipment is shown on the monitoring screens at all times, and if an abnormality occurs, a warning message is immediately displayed on the screen.

[Qualitative indicators]

Improvement of the living environment and quality of life of residents and improvement of the sanitary environment by reducing inundation, flooding, overtopping waves, and flying sand damage caused by water related disasters and reducing the time required to resolve inundation.

11. Ex-Post Evaluation

JICA will conduct ex-post evaluation after three (3) years from the project completion, in principle, with respect to six evaluation criteria (Relevance, Coherence, Effectiveness, Efficiency, Impact, Sustainability). The result of the evaluation will be publicized. The Maldivian side is required to provide necessary support for the data collection.

12. Technical assistance ("Soft Component" of the Project)

Considering the sustainable operation and maintenance of the products and services granted through the Project, following technical assistance is planned under the Project.

Objective: To establish operation and maintenance capabilities for the equipment

Outcome 1: Establishment of the operation and maintenance capabilities for the Remote Monitoring and Control System

Outcome 2: Establishment of the operation and maintenance capabilities for the High-Pressure Drainage Vehicle

The Maldivian side confirmed to coordinate joint training for MNPHI, MCC and MWSC and deploy necessary number of counterparts who are appropriate and competent in terms of its purpose of the technical assistance as described in the Draft Report.

13. Undertakings of the Project

Both sides confirmed the undertakings of the Project as described in Annex 5. With regard to exemption of customs duties, internal taxes and other fiscal levies as stipulated in No. 6 of "(2) During the Project Implementation" in "1. Specific obligations of the Government of Maldives which will not be funded with the Grant" of Annex 5, both sides confirmed that such customs duties, internal taxes and other fiscal levies, which shall be clarified in the contract documents by the Executing Agency during the implementation stage of the Project.

The Maldivian side assured to take the necessary measures and coordination including allocation of the necessary budget which are preconditions of implementation of the Project. It is further agreed that the costs are indicative, i.e. at Outline Design level. More accurate costs will be calculated at the Detailed Design stage.

Both sides also confirmed that the Annex 5 will be used as an attachment of Grant Agreement (G/A).

As shown in Annex 5, Both sides confirmed that the Executing Agency shall take necessary measures to ensure and maintain the security of the Project site and the persons related to the implementation of the Project, in cooperation with relevant authorities such as police.

14. Monitoring during the implementation

The Project will be monitored by the Executing Agency and reported to JICA by using the form of Project Monitoring Report (PMR) attached as Annex 6. The timing of submission of the PMR is described in Annex 5.

15. Project completion

Both sides confirmed that the Project completes when all the constructed facilities and provided equipment by the Grant are in operation. The completion of the Project will be reported to JICA promptly, by using a format, but in any event not later than six months after completion of the Project.

16. Items and measures to be considered for the smooth implementation of the Project

Both sides confirmed the items and measures to be considered for the smooth implementation of the Project as described in Annex 7.

17. Other Relevant Issues

17-1. Disclosure of Information

Both sides confirmed that the Preparatory Survey Report from which project cost is excluded will be disclosed to the public after completion of the Preparatory Survey. The comprehensive report including the project cost will be disclosed to the public after all the contracts under the Project are concluded.

17-2. Major change in infrastructure and/or equipment to be provided by the Project.

Maldivian side agreed that major change in infrastructure and/or equipment, such as modification of seawall and sold, leased, transferred, assigned, or otherwise disposed of any property or assets financed wholly or in part out of the proceeds of the Project, shall not conducted without the consent of JICA.

17-3. Minutes of Discussions on Environmental and Social Consideration.

The result of preparatory survey on Environmental and Social Consideration has not been finalized because consultation with local stakeholders and baseline survey for formulation of Environmental Management Plan and Environmental Monitoring Plan will be completed by June 2023.

Both sides agreed that Minutes of Discussions on Environmental and Social Consideration will be discussed and agreed by the middle of July through explanation of updated Draft Report on Environmental and Social Consideration by the Team.

17-4. Operation and maintenance after the Project

MNPHI agreed to secure annual budget for operation and maintenance after the Project, such as periodic inspection and repair of the constructed seawall, running cost including electricity and communication for provided system and maintenance of provided equipment, etc., through budget provision base on the cost estimation of the Preparatory Survey Report.

17-4-1. Seawall component

The maintenance costs of cleaning the area around the seawall, regular checking of defects, and minor maintenance were assessed as follows.

1. Seawall cleaning fee and Inspection fee : (US$20,000/year)

1) Cleaning Fee	2time/month x 10 person x 50 $ x 12 month =US$12,000
2) Inspection of Seawall for Technical matter and Environmental matter	2 times(2 months) / year x 2 Specialists x US$ 2000 =US$ 8000
2. Minor repairs of Seawall (US$ 30,000/ year)	
1) Seawall Repairing Cost	Concrete 20 m3 and other material and installation x US$ 1,000/ m3 = US$ 20,000
2) Concrete block pavement repairing cost	Paving Block 100 m2 installation x US$ 50/m2= US$ 5,000
3) Block fence repairing cost	Fence installation 50 m installation x US$ 100/m = US$ 5,000

The total budget for the maintenance of the entire seawall on Male' Island is about US$50,000 (about 770,000 MVR) per year.

17-4-2. Stormwater component

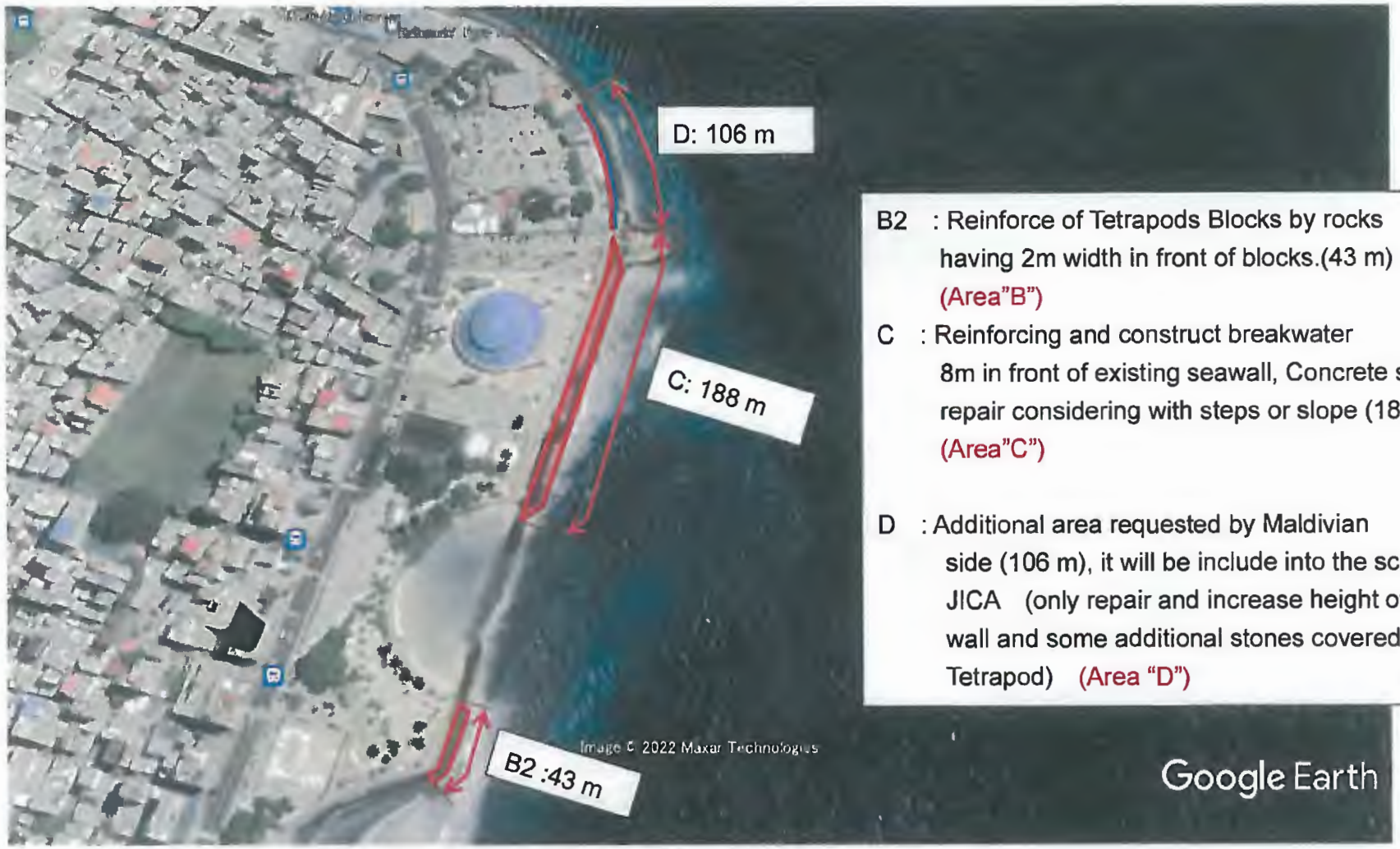
The total annual operation and maintenance costs for the equipment to be procured under the Project are estimated to be approximately 2.06 million MVR.

Annex 1 Project Site
Annex 2 Organization Chart
Annex 3 Japanese Grant
Annex 4 Project Implementation Schedule
Annex 5 Major Undertakings to be taken by the Government of Maldives
Annex 6-1 Project Monitoring Report (template)
Annex 6-2 Project Monitoring Report (format)
Annex 7 Issues to be Considered for Smooth Implementation of the Project

Sand Accumulation and Overflow Area (East Coast)



Overtopping Area affected to the land (East Coast)



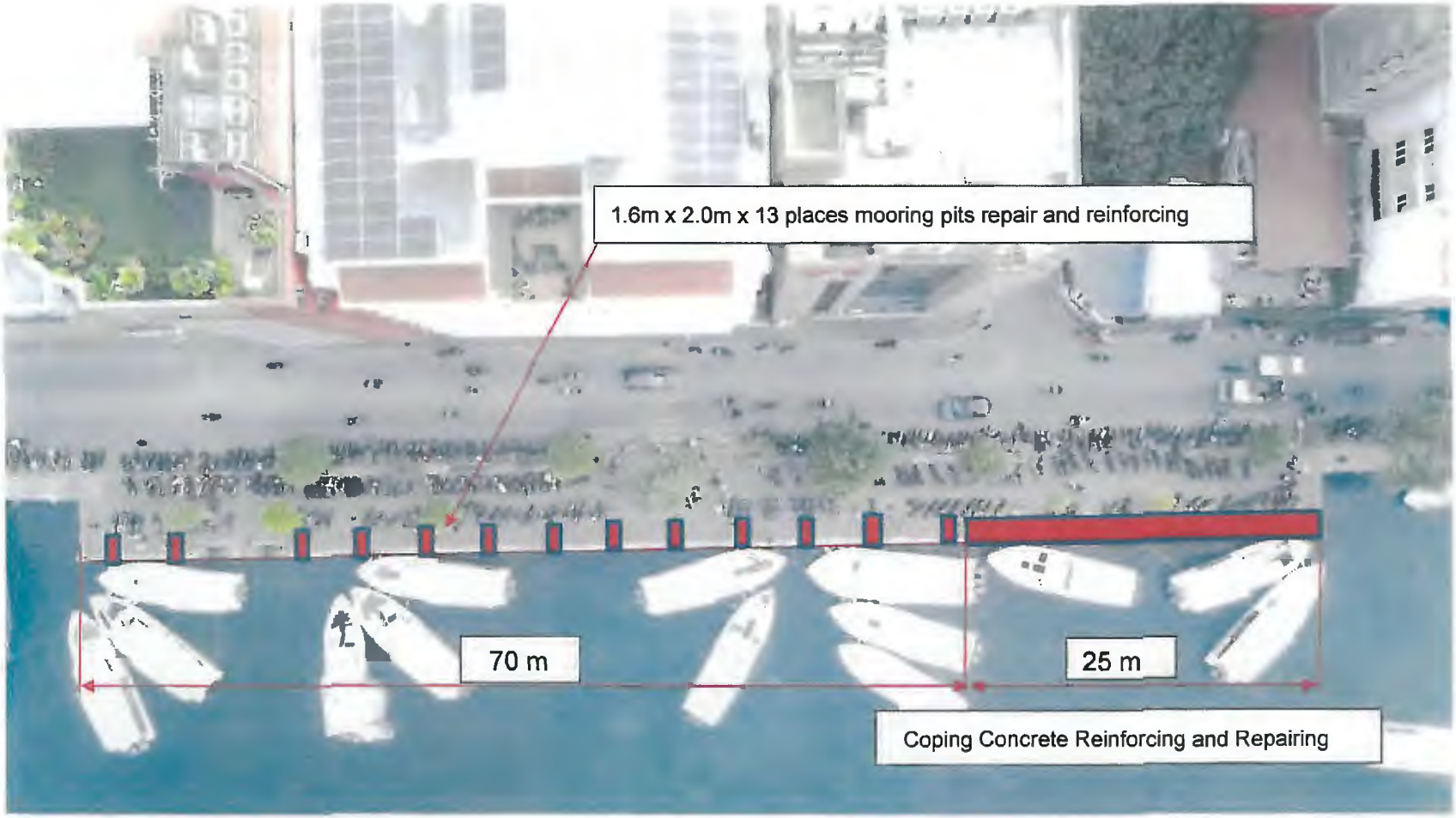
B2 : Reinforce of Tetrapods Blocks by rocks having 2m width in front of blocks.(43 m) (Area"B")

C : Reinforcing and construct breakwater 8m in front of existing seawall, Concrete seawall repair considering with steps or slope (188m) (Area"C")

D : Additional area requested by Maldivian side (106 m), it will be include into the scope by JICA (only repair and increase height of concrete wall and some additional stones covered on the Tetrapod) (Area "D")

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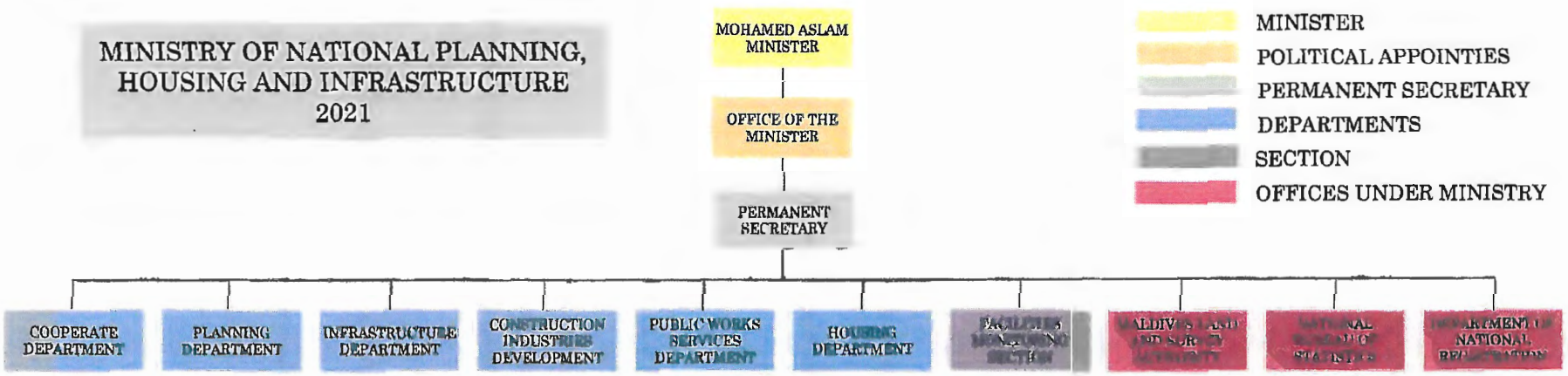
NORTH QUAYWALL : Gap and Misalignment of Coping Concrete



B-53


LS14
LS8
LS10
LS13
LS12
LS4
LS11
LS7
MNPTH
LS3
LS2
MWSC
LS15
LS16
LS1
LS6
LS5
LS9
0 100 200 m
Pump Station
Candidate locations for remote monitoring system

Annex 2 Organization Chart



B-55

JAPANESE GRANT

The Japanese Grant is non-reimbursable fund provided to a recipient country (hereinafter referred to as "the Recipient") to purchase the products and/or services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. Followings are the basic features of the project grants operated by JICA (hereinafter referred to as "Project Grants").

1. Procedures of Project Grants

Project Grants are conducted through following procedures (See "PROCEDURES OF JAPANESE GRANT" for details):

(1) Preparation

- The Preparatory Survey (hereinafter referred to as "the Survey") conducted by JICA

(2) Appraisal

-Appraisal by the government of Japan (hereinafter referred to as "GOJ") and JICA, and Approval by the Japanese Cabinet

(3) Implementation

Exchange of Notes

-The Notes exchanged between the GOJ and the government of the Recipient

Grant Agreement (hereinafter referred to as "the G/A")

-Agreement concluded between JICA and the Recipient

Banking Arrangement (hereinafter referred to as "the B/A")

-Opening of bank account by the Recipient in a bank in Japan (hereinafter referred to as "the Bank") to receive the grant

Construction works/procurement

-Implementation of the project (hereinafter referred to as "the Project") on the basis of the G/A

(4) Ex-post Monitoring and Evaluation

-Monitoring and evaluation at post-implementation stage

2. Preparatory Survey

(1) Contents of the Survey

The aim of the Survey is to provide basic documents necessary for the appraisal of the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the Recipient necessary for the implementation of the Project.
- Evaluation of the feasibility of the Project to be implemented under the Japanese Grant from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of an outline design of the Project.
- Estimation of costs of the Project.
- Confirmation of Environmental and Social Considerations

The contents of the original request by the Recipient are not necessarily approved in their initial form. The Outline Design of the Project is confirmed based on the guidelines of the Japanese Grant.

JICA requests the Recipient to take measures necessary to achieve 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 executing agency of the Project. Therefore, the contents of the Project are confirmed by all relevant organizations of the Recipient based on the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA contracts with (a) consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

JICA reviews the report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the feasibility of the Project.

3. Basic Principles of Project Grants

(1) Implementation Stage

1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes (hereinafter referred to as "the E/N") will be singed between the GOJ and the Government of the Recipient to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Recipient to define the necessary articles, in accordance with the E/N, to implement the Project, such as conditions of disbursement, responsibilities of the Recipient, and procurement conditions. The terms and conditions generally applicable to the Japanese Grant are stipulated in the "General Terms and Conditions for Japanese Grant (January 2016)."

2) Banking Arrangements (B/A) (See "Financial Flow of Japanese Grant (A/P Type)" for details)

a) The Recipient shall open an account or shall cause its designated authority to open an account under the name of the Recipient in the Bank, in principle. JICA will disburse the Japanese Grant in Japanese yen for the Recipient to cover the obligations incurred by the Recipient under the verified contracts.

b) The Japanese Grant will be disbursed when payment requests are submitted by the Bank to JICA under an Authorization to Pay (A/P) issued by the Recipient.

3) Procurement Procedure

The products and/or services necessary for the implementation of the Project shall be procured in accordance with JICA's procurement guidelines as stipulated in the G/A.

4) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the Recipient to continue to work on the Project's implementation after the E/N and G/A.

5) Eligible source country

In using the Japanese Grant disbursed by JICA for the purchase of products and/or services, the eligible source countries of such products and/or services shall be Japan and/or the Recipient. The Japanese Grant may be used for the purchase of the products and/or services of a third country as eligible, if necessary, taking into account the quality, competitiveness and economic rationality of products and/or services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm, which enter into contracts with the Recipient, are limited to "Japanese nationals", in principle.

6) Contracts and Concurrence by JICA

The Recipient will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be concurred by JICA in order to be verified as eligible for using the Japanese Grant.

7) Monitoring

The Recipient is required to take their initiative to carefully monitor the progress of the Project in order to ensure its smooth implementation as part of their responsibility in the G/A, and to regularly report to JICA about its status by using the Project Monitoring Report (PMR).

8) Safety Measures

The Recipient must ensure that the safety is highly observed during the implementation of the Project.

9) Construction Quality Control Meeting

Construction Quality Control Meeting (hereinafter referred to as the "Meeting") will be held for quality assurance and smooth implementation of the Works at each stage of the Works. The member of the Meeting will be composed by the Recipient (or executing agency), the Consultant, the Contractor and JICA. The functions of the Meeting are as followings:

a) Sharing information on the objective, concept and conditions of design from the Contractor, before start of construction.

b) Discussing the issues affecting the Works such as modification of the design, test, inspection, safety control and the Client's obligation, during of construction.

(2) Ex-post Monitoring and Evaluation Stage

1) After the project completion, JICA will continue to keep in close contact with the Recipient in order to monitor that the outputs of the Project is used and maintained properly to attain its expected outcomes.

2) In principle, JICA will conduct ex-post evaluation of the Project after three years from the completion. It is required for the Recipient to furnish any necessary information as JICA may reasonably request.

(3) Others

1) Environmental and Social Considerations

The Recipient shall carefully consider environmental and social impacts by the Project and must comply with the environmental regulations of the Recipient and JICA Guidelines for Environmental and Social Considerations (January, 2022).

2) Major undertakings to be taken by the Government of the Recipient

For the smooth and proper implementation of the Project, the Recipient is required to undertake necessary measures including land acquisition, and bear an advising commission of the A/P and payment commissions paid to the Bank as agreed with the GOJ and/or JICA. The Government of the Recipient shall ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the Recipient with respect to the purchase of the Products and/or the Services be exempted or be borne by its designated authority without using the Grant and its accrued interest, since the grant fund comes from the Japanese taxpayers.

3) Proper Use

The Recipient is required to maintain and use properly and effectively the products and/or services under the Project (including the facilities constructed and the equipment purchased), to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Japanese Grant.

4) Export and Re-export

The products purchased under the Japanese Grant should not be exported or re-exported from the Recipient.

PROCEDURES OF JAPANESE GRANT

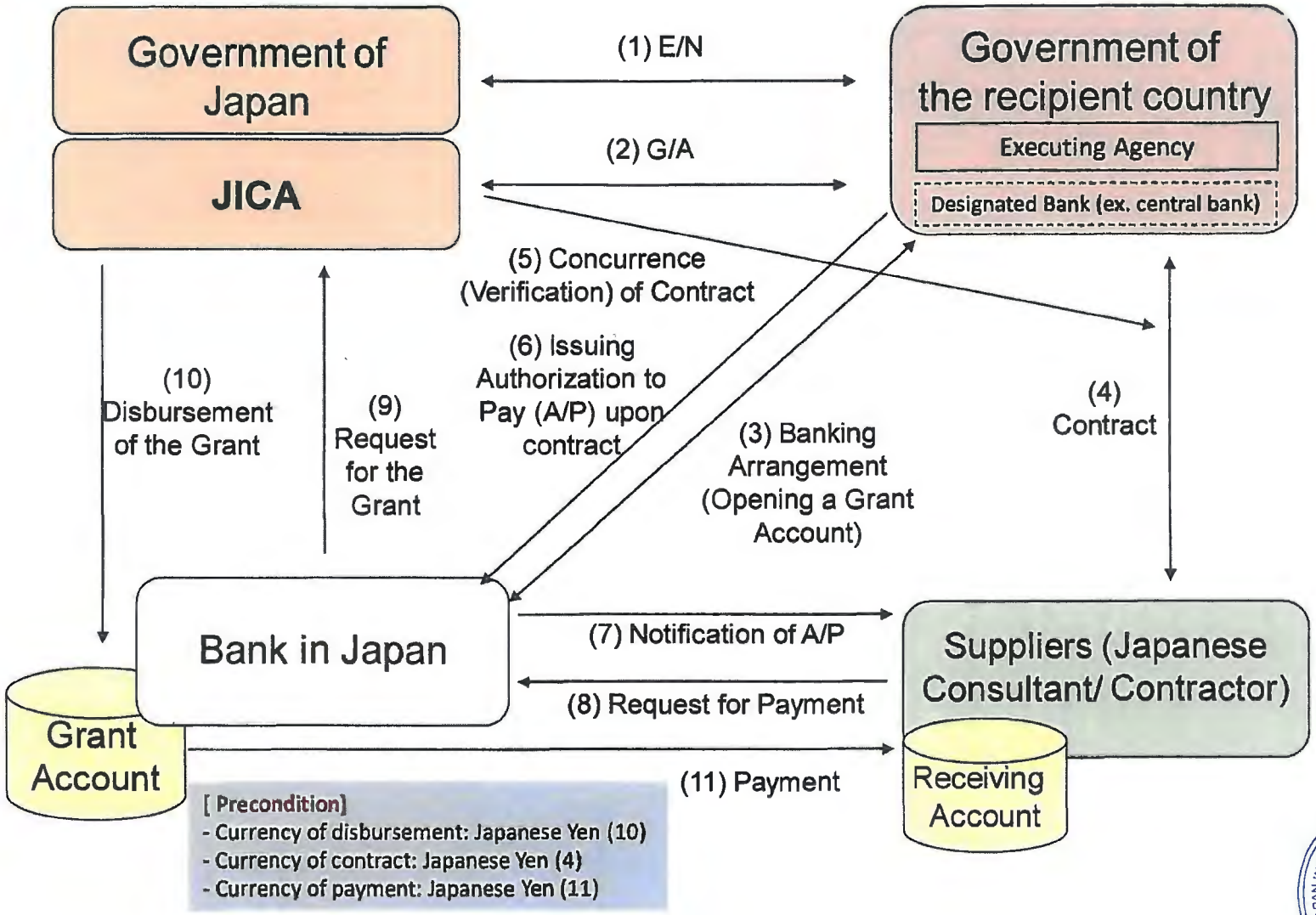
Stage	Procedures	Remarks	Recipient Government	Japanese Government	JICA	Consultants	Contractors	Agent Bank
Official Request	Request for grants through diplomatic channel	Request shall be submitted before appraisal stage.	x	x				
1. Preparation	(1) Preparatory Survey Preparation of outline design and cost estimate		x		x	x		
2. Appraisal	(2)Preparatory Survey Explanation of draft outline design, including cost estimate, undertakings, etc.		x		x	x		
	(3)Agreement on conditions for implementation	Conditions will be explained with the draft notes (E/N) and Grant Agreement (G/A) which will be signed before approval by Japanese government.	x	x (E/N)	x (G/A)			
	(4) Approval by the Japanese cabinet			x				
3. Implementation	(5) Exchange of Notes (E/N)		x	x				
	(6) Signing of Grant Agreement (G/A)		x		x			
	(7) Banking Arrangement (B/A)	Need to be informed to JICA	x					x
	(8) Contracting with consultant and issuance of Authorization to Pay (A/P)	Concurrence by JICA is required	x			x		x
	(9) Detail design (D/D)		x			x		
	(10) Preparation of bidding documents	Concurrence by JICA is required	x			x		
	(11) Bidding	Concurrence by JICA is required	x			x	x	
	(12) Contracting with contractor/supplier and issuance of A/P	Concurrence by JICA is required	x				x	x
	(13) Construction works/procurement	Concurrence by JICA is required for major modification of design and amendment of contracts.	x			x	x	
	(14) Completion certificate		x			x	x	
4. Ex-post monitoring & evaluation	(15) Ex-post monitoring	To be implemented generally after 1, 3, 10 years of completion, subject to change	x		x			
	(16) Ex-post evaluation	To be implemented basically after 3 years of completion	x		x			

notes:

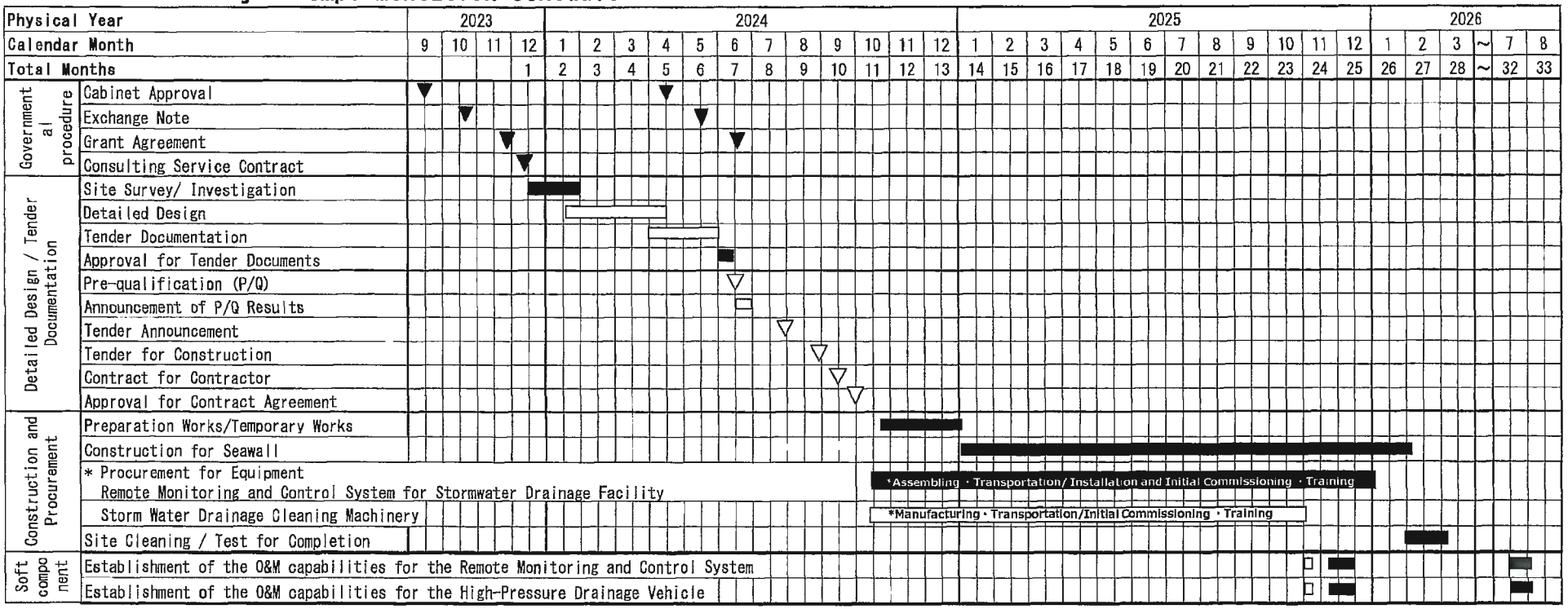
1. Project Monitoring Report and Report for Project Completion shall be submitted to JICA as agreed in the G/A.

2. Concurrence by JICA is required for allocation of grant for remaining amount and/or contingencies as agreed in the G/A.

Financial Flow of Japanese Grant (A/P Type)



Annex 4 : Project Implementation Schedule



Major Undertakings to be taken by the Government of Maldives

1. Specific obligations of the Government of Maldives which will not be funded with the Grant

(1) Before the Bidding

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To sign the banking arrangement (B/A) with a bank in Japan (the Agent Bank) to open bank account for the Grant	within 1 month after the signing of the G/A	MOF		
2	To issue A/P to the Agent Bank for the payment to the consultant	within 1 month after the signing of the contract(s)	MOF (MNPHI)		
3	To bear the following commissions to the Agent Bank for the banking services based upon B/A				
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	MOF	About 6,000JPY for each A/P	
	2) Payment commission for A/P	every payment	MOF	About 0.1% of the payment amount	
4	To approve IEE/EIA(Conditions of approval should be fulfilled, if any) and secure the necessary budget for implementation for EMP (Environmental Management Plan) and EMoP (Environmental Monitoring Plan)(and fulfilling conditions of approval, if any) prior to the contract conclusion with contractor	[secure the necessary budget] Within 1 month after signing of the G/A. [to approve IEE/EIA]prior to the contract conclusion with contractor	MNPHI,	40,000USD	
5	To secure the necessary land(s) and/or space(s) and to clear, level and reclaim the site(s) including access road for the Equipment Ancillary Facility(s) and/or installation of the Equipment at the sixteen (16) pumping stations (Existing) and the office of MNPHI, MCC and MWSC and storehouse in Male'.	prior to the tender notice	MNPHI		
6	To implement social monitoring, and to submit the monitoring results to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report, if required.	until land acquisition and resettlement complete	MNPHI		
7	To submit Project Monitoring Report (with the result of Detailed Design)	before preparation of the bidding documents	MNPHI		

(B/A: Banking Arrangement, A/P: Authorization to pay, N/A: Not Applicable, EMP: Environment Management Plan, EMoP: Environment Monitoring Plan, MOF :Ministry of Finance)

(2) During the Project Implementation

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To issue A/P to the Agent Bank for the payment to the supplier and the contractor	within 1 month after the signing of the contract(s)	MOF (MNPHI)		
2	To bear the following commissions to the Agent Bank for the banking services based upon the B/A				

	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	MOF	About 6,000JPY for each A/P	
	2) Payment commission for A/P	every payment	MOF	About 0.1% of the payment amount	
3	To facilitate to obtain all prior regulatory compliance and necessary permissions from the relevant agencies/authorities which are prepared by contractor/supplier/authorized agent as well as to shoulder all the costs of these procedures (application fee, application preparation, and company registration, etc.).	prior to construction	MNPHI	reimbursement is provided	
4	To ensure prompt unloading and customs clearance at ports of disembarkation in the country of the Recipient and to assist the Supplier(s) with internal transportation therein	during the Project	MNPHI	(50,000MVR) reimbursement is provided	
5	To take responsibility for arranging the maximum countermeasures and ensure the appropriate security of the whole Project site/s and of the Japanese and other foreign nationals assigned to the Project prior to the commencement of and during the whole implementation of the Project.	during the Project	MNPHI		
6	To undertake all necessary institutional and juridical procedures in Maldives	every payment	MNPHI		
7	To handle duty (tax) exemption procedures and to take necessary measures as well as provide requisite legal and/or administrative documentations for import permit and customs clearance to the customs broker/forwarder to be employed by the Contractor at the port of disembarkation for (1) the materials and equipment to be imported for the Project as well as (2) the sending back of any defective equipment and/or spare parts to the manufacturer for repair at the factory or replacement and re-importation thereof into Maldives during the implementation and warranty periods of the Project.	during the Project	MNPHI Tax Department Ministry of Finance Bureau of Customs	exemptions and/or reimbursement are provided	
8	To accord Japanese physical persons and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the country of the Recipient and stay therein for the performance of their work (i.e. to secure the appropriate visa including its extension/s required by the recipient country in connection thereof).	during the Project	MNPHI	XXX	
9	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the products and/or the services be borne by its designated authority without using the Grant;	during the Project	MNPHI	exemptions and/or reimbursement are provided	
10	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project such as project staff for the Project and other administrative cost.	during the Project	MNPHI	1,260,000 MVR	
11	To facilitate with the service provider for provision of temporary facilities for the availability or accessibility of electricity for the implementation of the Project such as the testing and commissioning.	during the Project	MNPHI		
12	To allocate secure temporary storage area for the materials, tools and equipment needed during the installation process.	during the Project	MNPHI		
13	To secure an access road and sufficient spaces at the proposed sites for temporary facilities.	before start of the work	MNPHI		
14	To support the Contractor to obtain relevant and vital information or data	during the Project	MNPHI		
15	To support provision of the commercial power supply along with electric poles/wires, etc. for stormwater drainage system <if necessary>	before start of the equipment installation	MNPHI		

16	To confirm necessary internet environment required for remote monitoring stormwater drainage system at necessary office (such as MNPHI, MCC and/or MWSC) in Male' and other planned sites of pumping station	before start of the equipment installation	MNPHI		
17	To assign appropriate number of trainees and shoulder cost such as daily allowance, transportation fee, accommodation, for local training, if any.	during the Project	MNPHI		
18	To notify JICA promptly of any incident or accident, which has, or is likely to have, a significant adverse effect on the environment, the affected communities, the public or workers.	during the Project	MNPHI		
19	To submit Project Monitoring Report	Every month	MNPHI		
20	To submit the following report after completion.				
	1) To submit Project Monitoring Report (final) (including as-built drawings, equipment list, photographs, etc.)	within 1 month after issuance of Certificate of Completion for the works under the contract(s)	MNPHI		
	2) To submit a report concerning completion of the Project	within 6 months after completion of the Project	MNPHI		
21	To ensure the safety of persons engaged in the implementation of the Project	during the Project implementation	MNPHI		
22	To take necessary measures for security and safety of the Project site (measures for safety) 1) traffic control around the site(s) and on transportation routes of the equipment and materials<If necessary>	during the project implementation	MNPHI		
23	To implement EMP and EMoP	during the implementation	MNPHI	500,000MVR	
24	To submit results of environmental monitoring to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report	during the implementation	MNPHI		
25	To implement social monitoring, and to submit the monitoring results to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report<If necessary> - Period of the monitoring may be extended if affected persons' livelihoods are not sufficiently restored. Extension of the monitoring will be decided based on agreement between MNPHI and JICA.	- until the end of livelihood restoration program (In case that livelihood restoration program is provided) *- for 2 years after land acquisition and resettlement complete (In case that livelihood restoration program is not provided)*	MNPHI		

(3) After the Project

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To assign the required staff including responsible personnel of the MNPHI, MCC and MWSC who has reliable technical skill and ample experience for the smooth operation and maintenance of the Equipment	After completion of the Project	MNPHI and relatec organizations (MCC MWSC)		

2	To procure the required spare parts and consumables for the smooth operation and maintenance of the Equipment and enter into a Preventive Maintenance Service Agreement with the equipment supplier if so desired	After completion of the Project	MNPHI and related organizations (MCC, MWSC)		
3	To properly operate and maintain, and also effectively utilize the Facilities and the Equipment established under the Project	After completion of the Project	MNPHI and related organizations (MCC, MWSC)		
4	To periodically update all the operation/antivirus/application software(s)	After completion of the Project	MNPHI and related organizations (MCC, MWSC)		
5	To implement EMP and EMoP	for a period based on EMP and EMoP	MNPHI	600,000MVR	
6	To submit results of environmental monitoring to JICA, by using the monitoring form, semiannually - The period of environmental monitoring may be extended if any significant negative impacts on the environment are found. The extension of environmental monitoring will be decided based on the agreement between MNPHI and JICA.	for 3 years after the Project	MNPHI		
7	To maintain and use properly and effectively the facilities and equipment established under the Grant Aid 1) Allocation of maintenance cost (such as electricity, communication, etc.) as well as assignment of personnel 2) Operation and maintenance structure 3) Routine check/Periodic inspection	After completion of the Project	MNPHI and related organizations (MCC, MWSC)		

2. Other obligations of the Government of Maldives funded with the Grant

NO	Items	Deadline	Amount (Million Japanese Yen)*
1	To construct seawall 1) To conduct the following transportation a) Marine (Air) transportation of the products from Japan to the country of the Recipient b) Internal transportation from the ports of disembarkation to the project sites	March 2026	
	2) To construct seawall a) Repairing concrete seawall b) Increasing crest height c) Reinforcing and construct breakwater d) Repairing quay wall		
2	To provide the equipment with the equipment ancillary facilities 1) To conduct the following transportation a) Marine (Air) transportation of the products from Japan to the country of the Recipient b) Internal transportation from the ports of disembarkation to the project sites		
	2) To provide equipment with installation and commissioning		

3	To implement site survey, detailed design, bidding support, construction supervision, procurement supervision and soft component. (Consulting Service)		
4	Contingencies		
	Total		1,552 million

*The Amount is provisional. This is subject to the approval of the Government of Japan.

Annex 6-1 Project Monitoring Report (template)

Date:
Ref. No.

JAPAN INTERNATIONAL COOPERATION AGENCY
JICA XXX OFFICE
[Address specified in the Article 5 of the Grant Agreement]

Attention: Chief Representative

Ladies and Gentlemen:

NOTICE CONCERNING PROGRESS OF PROJECT

Reference : Grant Agreement, dated (signed date of the G/A), for (name of the Project)

In accordance to the Article 6 (3) of the Grant Agreement, we would like to report on the progress of the Project up to the following stages:

[Common]
- ☐ Preparation of bidding documents - result of detailed design
- ☐ Completion of final works under construction/procurement contract

[Construction]
- ☐ Monthly progress [Month/Year]

[Procurement of Equipment]
- ☐ Shipping/delivery, hand-over (take over) of equipment
- ☐ Installation works
- ☐ Operational training

- ☐ Other _____

Please see the details as per attached Project Monitoring Report (PMR).

Very truly yours,

[*Signature*]_____

[Name of the signer]

[Title of the signer]

[Name of the executing agency]

cc:

Director General

Financial Cooperation Implementation Department

Japan International Cooperation Agency

[Address specified in the Article 5 of the Grant Agreement]

Project Monitoring Report
on
Project Name
Grant Agreement No. XXXXXXX
20XX, Month

Organizational Information

Signer of the G/A (Recipient)	Person in Charge (Designation) Contacts Address: Phone/FAX: Email:
Executing Agency	Person in Charge (Designation) Contacts Address: Phone/FAX: Email:
Line Ministry	Person in Charge (Designation) Contacts Address: Phone/FAX: Email:

General Information:

Project Title	
E/N	Signed date: Duration:
G/A	Signed date: Duration:
Source of Finance	Government of Japan: Not exceeding JPY _____ mil. Government of (_____): _____

1: Project Description

1-1 Project Objective

1-2 Project Rationale

- Higher-level objectives to which the project contributes (national/regional/sectoral policies and strategies)
- Situation of the target groups to which the project addresses

1-3 Indicators for measurement of "Effectiveness"

Quantitative indicators to measure the attainment of project objectives		
Indicators	Original (Yr)	Target (Yr)
Qualitative indicators to measure the attainment of project objectives		

2: Details of the Project

2-1 Location

Components	Original *(proposed in the outline design)*	Actual
1.		

2-2 Scope of the work

Components	Original* *(proposed in the outline design)*	Actual*
1.		

Reasons for modification of scope (if any).

(PMR)

2-3 Implementation Schedule

Items	Original		Actual
	(proposed in the outline design)	*(at the time of signing the Grant Agreement)*	

Reasons for any changes of the schedule, and their effects on the project (if any)

2-4 Obligations by the Recipient

2-4-1 Progress of Specific Obligations

See Attachment 2.

2-4-2 Activities

See Attachment 3.

2-4-3 Report on RD

See Attachment 11.

2-5 Project Cost

2-5-1 Cost borne by the Grant(Confidential until the Bidding)

Components			Cost (Million Yen)	
	Original *(proposed in the outline design)*	Actual *(in case of any modification)*	Original[1),2)] *(proposed in the outline design)*	Actual
	1.			
Total				

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar = Yen

2-5-2 Cost borne by the Recipient

Components			Cost (1,000 Taka)	
	Original *(proposed in the outline design)*	Actual *(in case of any modification)*	Original[1),2)] *(proposed in the outline design)*	Actual
	1.			

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar =

Reasons for the remarkable gaps between the original and actual cost, and the countermeasures (if any)

(PMR)

2-6 Executing Agency

- Organization's role, financial position, capacity, cost recovery etc,
- Organization Chart including the unit in charge of the implementation and number of employees.

Original *(at the time of outline design)* name: role: financial situation: institutional and organizational arrangement (organogram): human resources (number and ability of staff):
Actual *(PMR)*

2-7 Environmental and Social Impacts

- The results of environmental monitoring based on Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- The results of social monitoring based on in Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- Disclosed information related to results of environmental and social monitoring to local stakeholders (whenever applicable).

3: Operation and Maintenance (O&M)

3-1 Physical Arrangement

- Plan for O&M (number and skills of the staff in the responsible division or section, availability of manuals and guidelines, availability of spareparts, etc.)

Original *(at the time of outline design)*
Actual *(PMR)*

3-2 Budgetary Arrangement

- Required O&M cost and actual budget allocation for O&M

Original *(at the time of outline design)*

Actual *(PMR)*

4: Potential Risks and Mitigation Measures

- Potential risks which may affect the project implementation, attainment of objectives, sustainability
- Mitigation measures corresponding to the potential risks

Assessment of Potential Risks (*at the time of outline design)*

Potential Risks	Assessment
1. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):
2. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):
3. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:

	Contingency Plan (if applicable):
Actual Situation and Countermeasures	
(PMR)	

5: Evaluation and Monitoring Plan (after the work completion)

5-1 Overall evaluation

Please describe your overall evaluation on the project.

5-2 Lessons Learnt and Recommendations

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

5-3 Monitoring Plan of the Indicators for Post-Evaluation

Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

Attachment

1. Project Location Map
2. Specific obligations of the Recipient which will not be funded with the Grant
3. Monthly Report submitted by the Consultant

Appendix - Photocopy of Contractor's Progress Report (if any)
- Consultant Member List
- Contractor's Main Staff List

4. Check list for the Contract (including Record of Amendment of the Contract/Agreement and Schedule of Payment)
5. Environmental Monitoring Form / Social Monitoring Form
6. Monitoring sheet on price of specified materials (Quarterly)
7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (PMR (final)only)
8. Pictures (by JPEG style by CD-R) (PMR (final)only)
9. Equipment List (PMR (final)only)
10. Drawing (PMR (final)only)
11. Report on RD (After project)
12. Report on the Management of Safety for Construction Works

Monitoring sheet on price of specified materials

1. Initial Conditions (Confirmed)

	Items of Specified Materials	Initial Volume A	Initial Unit Price (¥) B	Initial total Price C=A×B	1% of Contract Price D	Condition of payment	
						Price (Decreased) E=C−D	Price (Increased) F=C+D
1	Item 1	●●t	●	●	●	●	●
2	Item 2	●●t	●	●	●		
3	Item 3						
4	Item 4						
5	Item 5						

2. Monitoring of the Unit Price of Specified Materials

(1) Method of Monitoring : ●●

(2) Result of the Monitoring Survey on Unit Price for each specified materials

	Items of Specified Materials	1st ●month, 2015	2nd ●month, 2015	3rd ●month, 2015	4th	5th	6th
1	Item 1						
2	Item 2						
3	Item 3						
4	Item 4						
5	Item 5						

(3) Summary of Discussion with Contractor (if necessary)

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Report on Proportion of Procurement (Recipient Country, Japan and Third Countries)
(Actual Expenditure by Construction and Equipment each)

	Domestic Procurement (Recipient Country) A	Foreign Procurement (Japan) B	Foreign Procurement (Third Countries) C	Total D
Construction Cost	(A/D%)	(B/D%)	(C/D%)	
Direct Construction Cost	(A/D%)	(B/D%)	(C/D%)	
others	(A/D%)	(B/D%)	(C/D%)	
Equipment Cost	(A/D%)	(B/D%)	(C/D%)	
Design and Supervision Cost	(A/D%)	(B/D%)	(C/D%)	
Total	(A/D%)	(B/D%)	(C/D%)	

Report on the Management of Safety for Construction Works

Month/Year 2022年×月	Cumulative number of labor 労働延人数	Cumulative number of public accident 公衆災害件数	Cumulative hours worked 延べ実労働時間数	Number of deaths and injuries due to industrial accidents 労働災害による死傷者				Frequency rate 度数率	Severity rate 強度率
					Death and injuries 死傷者数	Aggregated number of calendar days absent 延べ休業日数	Aggregated number of work-days lost 延べ労働損失日数		
This Month 当月				Death 死者					
				More than 4 calendar days absent 休業4日以上					
				1 to 3 calendar days absent 休業1～3日					
				Total 計					
Total including this month 当月迄累計				Death 死者					
				More than 4 calendar days absent 休業4日以上					
				1 to 3 calendar days absent 休業1～3日					
				Total 計					

Note 注)

1. Frequency rate is the frequency of occurrence of industrial accidents.
   Frequency rate = (Number of deaths and injuries due to industrial accidents ÷ Cumulative hours worked) × 1,000,000
   度数率＝（労働災害による死傷者数÷延べ実労働時間数）×100万時間
2. Severity rate is degree of seriousness of the industrial accident.
   Severity rate = (Aggregated number of work-days lost ÷ Cumulative hours worked) × 1,000
   強度率＝（延べ労働損失日数÷延べ実労働時間数）1000時間
3. Aggregated number of work-days lost = Aggregated number of calendar days absent ×(300÷365)
   Death（7,500 days）: death as a result of an industrial accident includes not only instantaneous death but also death as a result of occupational injury or disease.
   延べ労働損失日数＝延べ休業日数×（300÷365）・・・死亡 7500日（即死のほか負傷が原因で死亡したものを含む）
4. Frequency rate and severity rate are rounding off the third decimal place.
   度数率・強度率は小数点第3位以下四捨五入

1. **Obtaining Approval for Social and Environmental Impact Assessment (ESIA)**
   It is necessary for MNPHI to conduct a Social and Environmental Impact Assessment (ESIA) after the conclusion of Exchange Note (from the end of 2023) and to obtain a license of ESIA (until around September 2024) prior to the contract conclusion with contractor of the Project based on the conditions for obtaining ESIA approval.

2. **Location of Monitoring Equipment for Stormwater Drainage Facility**
   Since it is necessary to secure installation sites around each of the 16 stormwater drainage facilities (sidewalks, private land, etc.) for the "Cabinet for Power Distribution Board (PDB) and Equipment", etc. to be procured by the Project, MNPHI will apply to the relevant organizations for permission to use the site.

3. **Identification of Maintenance and Management Execution Organizations (Agency/ companies) for Stormwater Drainage**
   The Server, Monitoring screens, etc. for the Remote monitoring and control system of stormwater drainage facility must be installed at the agency that will be in charge of actual operation and maintenance of the Project. Therefore, MNPHI will identify the agency responsible for the operation and maintenance of such equipment and determine the location of the server and other equipment during the detailed design phase of the Project.

4. **License/Approval for the Project**
   Acquisition of construction permits, environmental impact assessments and permits, all important permits and approvals (communication use, power supply, sensor installation permits) related to the equipment provided, and necessary budgetary measures

5. **Tax Exemption Procedures, Provision of Convenience, and Provision of Information**
   Goods and Service Tax (GST), duty-free procedures including customs duties, provision of convenience and information such as support for obtaining work permits, coordination with operation and maintenance organizations, establishment of operation and maintenance management system, and necessary budget.

6. **Schedule for Exchange of Note (E/N) and Grant Agreement（G/A）**
   In relation with Government Election in Maldives scheduled for September 2023, it may take time for the project's Exchange of Note (E/N) and Grant Agreement (G/A) signing (expected to be around November 2023), and subsequent processes such as consulting contracts and detailed design may be delayed overall. Prior to the signing of the G/A, the authorization by the Ministry of Finance of the Government of the Maldives is required for opening the government's account in Japanese bank, and it takes a minimum of one month after the conclusion of the E/N.

Annex 2 : Environmental Checklist (see Environmental Checklist 11: Ports and Harbors)

Category	Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
1. Permits and Consultations	(1) Environmental Assessment and Environmental Permits	(a) Have EIA reports been already prepared in official process? (b) Are the EIA reports written in the official or widely used language of the host country? (c) Have EIA reports been approved by authorities of the host country government? (If not yet approved, write the expected date of the approval in the "Confirmation of Environmental Considerations" column.) (d) Have EIA reports been approved with any conditions? If conditions are imposed on the approval of EIA reports, are the conditions satisfied? (e) In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host country's government? (f) Do the EIA reports cover the items described in Appendix 2 of the JICA Guidelines? (The scope and detail of the impact assessment may be adjusted according to the impact of the Project.) (g) Do the environmental and social considerations confirmation cover the Project's whole scope, cumulative impacts, derivative and secondary impacts, as well as impacts of indivisible Projects?	(a)N (b)N (c)N (d)N (e)N (f)N (g)N	(a) No, they haven't. According to the environmental competent authority (Environmental Protection Agency: EPA) and the counterpart (Ministry of National Planning, Housing and Infrastructure: MNPHI) in Maldives, the EIA process should start late 2023 or early 2024 due to the budget shortage of MNPHI, validity of the environmental license for 1 year) and the validity of the environmental baseline data (for 6 months). (b) No, they are not yet prepared as explained above. When it will be prepared, the whole report will be written in English and the executive summary in both English and the local language (Dhivehi). (c) No, they haven't. Based on the discussion with EPA and MNPHI, they should be approved in 2024 by EPA as per the EIA Regulation 2012. (d) No, they haven't. (e) No, they haven't, but it is understood that there are no other additional required environmental permits. (f) No EIA reports have been prepared yet. (g) No EIA reports have been prepared yet.
	(2) Explanation and Consultation with Local Stakeholders	(a) Are local stakeholders properly analysed and identified? (b) Does the Project provide appropriate explanations to local stakeholders about the content and impact of the Project, and gain their understanding, through the process of ensuring meaningful consultation including information disclosure? (c) For local stakeholder consultations, are records of consultations prepared, including the gender and other attributes of the participants? (d) Have comments from local stakeholders (such as local residents) been reflected to the Project design, etc.?	(a)Y (b)Y (c)Y (d)Y	(a) According to MNPHI and EPA, the concept and design of the Project will be appreciated by the general public and most of the institutions, but Maldivian Surfing Association (MSA) should be carefully consulted. (b) The official sessions for "Explanation and consultation with local stakeholders" as a part of the Maldivian EIA is expected in 2024, but early information disclosure to key stakeholders will help getting their understanding on our Project. Therefore, a consultative meeting with MSA was held and 9 changes to our Project design were adopted. (c) Based on the meeting with MSA, meeting records were prepared. (d) Based on the requests from MSA, 9 changes of civil work were incorporated into our Project design.
	(3) Examination of Alternatives	(a) Is the Project/plan's scope of multiple alternatives adequately considered? (b) Are alternatives that are feasible in terms of technical, financial, and environmental and social aspects considered from the viewpoint of environmental and social items and, if necessary, reducing total	(a)Y (b)Y (c)Y	(a) It is a rehabilitation Project. Therefore, EPA informed that alternative locations cannot be considered. The only alternative would be the zero-option. (b) See above. (c) Zero-option, i.e. "Without Project" scenario will be considered in EIA.

Category	Item	Main Check Items	Yes Y No N	Confirmation of Environmental Considerations (Reasons Mitigation Measures)
		greenhouse gas emissions? (c) Are comparisons made with the "without Project" scenario?		
2. Pollution Control	(1) Air Quality	(a) Do air pollutants, such as sulphur oxides (SOx), nitrogen oxides (NOx), and soot and dust emitted from ships, vehicles and Project Equipments comply with the emission standards of the host county, etc. ? (b) Do air pollutants emitted from the Project cause areas that do not comply with the ambient air quality standards of the host country, etc. ? (c) Does the construction have negative impacts? Are there any mitigation measures in place for the impacts?	(a)Y (b)N (c)N	(a) They will likely comply with the standards, but the baseline data should be taken in 2024 and the air quality will be monitored during the Project. (b) They will unlikely cause those areas. The baseline data should be taken in 2024 and the air quality will be monitored during the Project. (c) It is unlikely that the construction will have negative impacts on the air quality as it is designed to follow the low emission equipment/vehicles based on the consultation with EPA and the actual air quality will be monitored.
	(2) Water Quality	(a) Do effluents from the Project facilities comply with the effluent standards of the host county, etc. ? (b) Do effluents from ships and ancillary Equipments such as dock comply with the effluent standards of the host country, etc. ? (c) Are adequate measures taken to prevent leakages of oil and hazardous materials into surrounding waters? (d) Do oceanographic changes, such as alteration of ocean currents and reduction in seawater exchange rates (deterioration of seawater circulation) due to modification of water areas such as shoreline modifications, reduction in water areas, and creation of new water areas, cause changes in water temperature and water quality? (e) In the case of the Projects including land reclamation, are adequate measures taken to prevent contamination of surface water, seawater, and groundwater by leachates from the reclamation areas? (f) Does the quality of sanitary wastewater and stormwater comply with the effluent standards of the host country? (g) Do effluents from the Project cause areas that do not comply with the ambient water quality standards of the host country? (h) Does the construction have negative impacts? Are there any mitigation measures in place for the impacts?	(a)N (b)N (c)Y (d)N (e)NA (f)Y (g)N (h)N	(a) No effluents from the Project facilities are expected. (b) No effluents from ships and ancillary equipment are expected. (c) If oil and hazardous material will be used, they will be kept in labelled containers and monitored regularly for any leakages. (d) Based on the Project design, no oceanographic changes are foreseen. (e) No land reclamation is foreseen. (f) It is unlikely that the Project will negatively affect the quality of sanitary water or rainwater. (g) It is unlikely that the effluents from the Project cause areas that do not comply with the ambient water quality standards. (h) It is unlikely that the construction will have negative impacts on the water quality.

Category	Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
2. Pollution Control	(3) Wastes	(a) Are wastes generated from ships and the related facilities properly treated and disposed of in accordance with the regulations of the host country? (b) Is offshore dumping of dredged materials and soils properly treated and disposed of in accordance with the regulations of the host country to prevent impacts on the surrounding water areas (or land areas)? (c) Are adequate measures taken to prevent discharge or dumping of hazardous materials to the surrounding water areas? (d) Does the construction have negative impacts? Are there any mitigation measures in place for the impacts?	(a)Y (b)NA (c)Y (d)N	(a)Waste will be collected and transferred to the waste facility. (b) No dredging is planned in the Project. (c) Hazardous materials such as fuels or chemicals will be kept separately and taken to the designated waste management facility. (d) It is unlikely that the construction will have negative impacts on the waste matters. Most of the demolished existing seawall will be reused.
	(4) Soil Contamination	(a) Has the soil at the Project site been contaminated in the past? (b) Are adequate measures taken to prevent soil contamination? (c) Does the construction have negative impacts? Are there any mitigation measures in place for the impacts?	(a)Y (b)N (c)N	(a) There is no sign of major soil contamination at the site. However, saltwater intrusion due to flooding might have caused high salinity in the soil. (b) If high salinity in soil should be considered as soil contamination, no adequate measures are currently taken to prevent soil contamination. (c) It is unlikely that the construction will have negative impacts on the soil. However, there is a possibility of small-scale soil contamination as a result of oil leakage from construction machinery and vehicles during construction. Inspection for oil leaks and repair should be carried out on vehicles and machines. If an oil leakage occurs, the polluted soil should be collected and transported to a specified waste disposal site.
	(5) Noise and Vibration	(a) Does the noise generated by operation comply with standards of the host country, etc. ? (b) Does the construction have negative impacts? Are there any mitigation measures in place for the impacts?	(a)Y (b)Y	(a) The Maldives does not have a set criterion for noise and vibration, but with low-noise equipment, noise and vibration can be attained below the international standards. (b) Noise and vibration will occur during construction, mainly associated with demolition and concrete work, but the noise and vibration levels will be maintained below the international standards when low-noise equipment will be applied while demolition work should be limited to certain hours of the day (only during daytime) and will not be continuous.
	(6) Subsidence	(a) Is there a possibility that the extraction of a large volume of groundwater causes subsidence? (b) Does the construction have negative impacts? Are there any mitigation measures in place for the impacts?	(a)NA (b)N	(a) First of all, no extraction of large volume of groundwater is foreseen. (b) It is unlikely that the construction will have negative impacts on subsidence. The ground is reef limestone with thin topsoil, and this is not a region of wide area ground subsidence.

Category	Item	Main Check Items	Yes Y No N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
	(7) Odour	(a) Are there any odour sources? Are adequate odour control measures taken? (b) Does the construction have negative impacts? Are there any mitigation measures in place for the impacts?	(a)N (b)N	(a) The construction activities of the Project will be mainly carried out in existing structures or reclaimed areas and the site investigation did not find material that could be the source of odours, so odours will not likely arise during the Project. (b) Stagnant water bodies are not expected to be created and doors will not likely arise during the Project.
	(8) Sediment	(a) Are adequate measures taken to prevent contamination of sediments by discharges or dumping of hazardous materials from ships and related facilities? (b) Does the construction have negative impacts? Are there any mitigation measures in place for the impacts?	(a)N (b)N	(a) No contamination of sediments by discharges or dumping of hazardous materials from ships and related facilities is expected. (b) It is highly unlikely that the construction will have negative impacts on sediment.
3. Natural Environment	(1) Protected Areas	(a) Is the Project site located in protected areas designated by the country's laws or international treaties/ conventions?(b) Does the Project affect the protected areas?(c) Does the construction have negative impacts? Are there any mitigation measures in place for the impacts?	(a)N (b)NA (c)N	(a) The Project site is not located in protected areas designated by the country's laws or international treaties/ conventions.(b) See above.(c) It is highly unlikely that the construction will have negative impacts on the protected area.
	(2) Biodiversity	(a) Does the Project site encompass primary forests, natural forests in tropical areas, habitats with important ecological value (coral reefs, mangrove wetlands, tidal flats, etc.)? (b) Does the Project site encompass habitats of rare species that require protection under domestic legislation, international treaties, etc.? (c) Are there any concerns about the significant impact on biodiversity by the Project, with significant conversion or significant degradation of critical habitats or critical forests? If yes, are appropriate measures taken to address the impact on biodiversity? (d) Does the Project have negative impacts on aquatic organisms? (e) Does the Project have negative impacts on vegetation or wildlife of coastal zones? (f) If there are any other concerns about significant impacts on biodiversity, are measures taken to reduce the impacts on biodiversity? (g) Does the construction have negative impacts? Are there any mitigation measures in place for the impacts?	(a)N (b)N (c)N (d)N (e)N (f)N (g)N	(a) The Project site does not encompass primary forests, natural forests in tropical areas, habitats with important ecological value (coral reefs, mangrove wetlands, tidal flats, etc.). (b) The Project site does most likely not encompass habitats of rare species that require protection under domestic legislation, international treaties, etc., but during the EIA in 2024, this should be confirmed. (c) There are no concerns about the significant impact on biodiversity by the Project. (d) It is unlikely that the Project will have negative impacts on aquatic organisms, but during the EIA in 2024, this should be confirmed. (e) The Project will highly unlikely have negative impacts on vegetation or wildlife of coastal zones. (f) There are no other concerns about significant impacts on biodiversity, are measures taken to reduce the impacts on biodiversity. (g) The construction will most likely not have any negative impacts.
	(3) Hydrology	(a) Does the installation of the port and harbour facilities cause oceanographic changes? (b) Are there any impacts on groundwater system (drawdown, salification, etc.) due to landfill construction and harbour excavation,	(a)N (b)N (c)N (d)N	(a) There is no installation of the port and harbour facilities. Only the top part of quay wall will be demolished, so no oceanographic changes are expected. (b) There will be no landfill construction and harbour excavation in the Project. The Project activities will not affect groundwater.

Category	Item	Main Check Items	Yes Y No N	Confirmation of Environmental Considerations (Reasons Mitigation Measures)
		etc.? (c) Does the Project have negative impacts on current conditions, waves and tides, etc.? (d) Does the construction have negative impacts? Are there any mitigation measures in place for the impacts?		(c) The Project will have no negative impacts on current conditions, waves and tides, but the wave condition is expected to be rather improved with the implementation of the proposed Project design. (d) The construction is not expected to have any negative impacts, but the hydrology is rather expected to improve with the Project.
	(4) Topography and Geology	(a) Does the installation of port and harbour facilities cause a large-scale alteration of topographic features and geological structures in the surrounding areas or limitation of natural beaches? (b) Does the construction have negative impacts? Are there any mitigation measures in place for the impacts?	(a)N (b)N	(a) No installation of port and harbour facilities is planned, so no large-scale alteration of topographic features and geological structures in the surrounding areas or limitation of natural beaches is expected. (b) The construction will likely not have negative impacts on the topography and geology.
4. Social Environment	(1) Resettlement and Land Acquisition	(a) Is land acquisition with involuntary resettlement caused by Project implementation? If yes, please describe the scale of land acquisition and resettlement. (b) Are efforts made to minimize the impacts caused by the resettlement? Are there any other land acquisition or loss of livelihoods? (c) Is adequate explanation on compensation and livelihood restoration program given to affected people prior to resettlement? (d) Is the resettlement plan, including compensation with full replacement costs, restoration of livelihoods and living standards, developed based on socioeconomic studies on resettlement? (e) Are the compensations paid prior to the resettlement? (f) Are the compensation policies prepared in document? (g) Does the resettlement plan pay particular attention to vulnerable social groups, such as women, children, elderly peoples, people in poverty, persons with disabilities, refugees, internally displaced persons, and minorities? (h) Are the compensation to be agreed are explained to the Project affected persons in writing, and are agreements with the affected people obtained prior to resettlement? (i) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan? (j) Are any plans developed to monitor the impacts of resettlement?	(a)N (b)NA (c)NA (d)NA (e)NA (f)NA (g)NA (h)NA (i)NA (j)NA (k)NA	(a), (b), (c), (d), (e), (f), (g), (h), (i), (j) and (k)There will be no resettlement of residents associated with Project.

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Category	Item	Main Check Items	Yes Y No N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		(k) Is the grievance redress mechanism established?		
	(2) Living and Livelihood	(a) Does the Project adversely affect the living conditions of the inhabitants? Are adequate measures considered to reduce the impacts, if necessary? (b) Do the changes in water uses (including fisheries and recreational uses) in the surrounding areas due to the Project adversely affect the livelihoods of inhabitants? (c) Do the port and harbour facilities adversely affect the existing water traffic and road traffic in the surrounding areas? (d) Does the Project have a negative impact on ecosystem services (provisioning services and regulating services) and affect health and safety of the community (especially indigenous peoples who depend on the services)? (e) Does the construction have negative impacts? Are there any mitigation measures in place for the impacts?	(a)Y (b)Y (c)Y (d)N (e)N	(a) Roads adjacent to some Project sites are busy and narrow. Therefore, pedestrians and vehicles may be hindered due to the temporary storage of materials and equipment; transport of materials and equipment; and the construction site. The traffic control plan will be necessary and safety measures (installing appropriate signs and fence around the Project areas, etc.) will be needed. (b) Recreational users of the area will be impacted. The construction design and schedule was already explained to the major stakeholders. Based on their requests, both the design and schedule were adjusted in order to avoid/minimize the impact to the livelihoods of inhabitants. During the Project, safety measures (installing appropriate signs and fence around Project areas, etc.) should be introduced. (c) Both water and road traffic in the surrounding area of the Project site (East side) will be affected. During construction phase, a minimal portion of the area should be occupied at a time. (d) It is unlikely that the Project will have a negative impact on ecosystem services (provisioning services and regulating services) and affect health and safety of the community (especially indigenous peoples who depend on the services). (e) It is unlikely that the construction will have negative impacts on living and livelihood.
	(3) Vulnerable Social Groups	(a) Is appropriate consideration given to vulnerable social groups, such as women, children, elderly peoples, people in poverty, persons with disabilities, refugees, internally displaced persons, and minorities? (b) Does the construction have negative impacts? Are there any mitigation measures in place for the impacts?	(a)Y (b)N	(a) Appropriate steps and slopes will he established for the pedestrian path along the seawall for children, elderly peoples and persons with disabilities. (b) See above.
4. Social Environment	(4) Heritage	(a) Does the Project damage any archaeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the laws of the host country? (b) Does the construction have negative impacts? Are there any mitigation measures in place for the impacts?	(a)N (b)N	(a) and (b): Project activities will not damage archaeological, historical, cultural, and religious heritage sites.

Category	Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
	(5) Landscape	(a) Does the Project adversely affect landscapes that require special considerations? (b) Does the construction have negative impacts? Are there any mitigation measures in place for the inpacts?	(a)N (b)N	(a) The seawalls will be raised while the paths behind them will be raised in the same way, so that the pedestrians (even kids) will be able to see the sea view like before or even better. Therefore, the Project would not adversely affect the landscapes that require special considerations. (b) Construction will have positive impact on the landscape.
	(6) Ethnic Minorities and Indigenous Peoples	(a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples? (b) Are all of the rights of ethnic minorities and indigenous peoples in relation to land and resources to be respected? (c) Is an indigenous peoples plan prepared and published, if necessary? (d) Do the Project make efforts to obtain the Free, Prior, and Informed Consent (FPIC) of the affected indigenous peoples? (e) Does the construction have negative impacts? Are there any mitigation measures in place for the impacts?	(a)NA (b)NA (c)NA (d)NA (e)NA	(a), (b), (c), (d) and (e) There are no distinct ethnic minorities or indigenous peoples on Project sites.
	(7) Working Conditions	(a) Does the Project comply with laws related to occupational health and safety of the host country? (b) Are tangible safety considerations in place for individuals involved in the Project, such as installation of safety equipment which prevents industrial accidents, and management of hazardous materials, etc.? (c) Are intangible measures being planned and implemented for individuals involved in the Project, such as development of health and safety plans, and conducting safety trainings (including traffic safety and public health) for workers etc.?	(a)Y (b)Y (c)Y	(a) Working condition compliance will be carried out (based on the Maldivian EIA to be undertaken in 2024). (b) Measures to prevent work-related accidents will be implemented (based on the Maldivian EIA to be undertaken in 2024). (c) A labour health and safety plan will be formulated, notified to the workers, and implemented (based on the Maldivian EIA to be undertaken in 2024).
	(8) Health, Safety and Security of Local Communities	(a) Are there any negative impacts on –health/hygiene of the local community, such as disease outbreaks (including HIV and other infectious diseases) due to the influx of workers, etc. associated with the Project? Are there any mitigation measures in place for the impacts? (b) Are there any negative impacts on the safety of the local community, such as deterioration of public safety, due to the influx of workers, etc. associated with the Project? Are there any mitigation measures in place for the impacts? (c) When security guards are hired for the Project or other personnel are deployed to ensure and maintain the security of the Project area as well as the persons related to the implementation of the Project during the Project preparation and implementation, are any appropriate measures	(a)Y (b)Y (c)Y (d)Y	(a) Workers should be screened for such diseases and information will be given regarding the norms of the country. (b) Workers should be identified based on past behaviour and appropriate information on how to behave in a decent manner outside working areas. (c) A guard should be hired based on previous experience and behaviour and training to be provided. (d) Danger of work-related accidents might occur, such as fire or falling of a crane. Regular monitoring of equipment and oil and fuel should be kept in appropriate containers and the Project sites should be fenced out with proper signage.

Category	Item	Main Check Items	Yes Y No N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		taken for such personnel not to use any force to provide security except for preventive and defensive purposes? (d) Does the construction have negative impacts? Are there any mitigation measures in place for the impacts?		
5. Others	(1) Monitoring	(a) Does the Project proponent develop and implement monitoring program for the environmental and social items that are considered to have potential impacts?(b) What are the items, methods and frequencies of the monitoring program?(c) Does the Project proponent establish an adequate monitoring framework (organization, personnel, equipment, and budget to sustain the monitoring framework)?(d) Are any regulatory requirements pertaining to the monitoring report system identified, such as the format and frequency of reporting the monitoring results from the Project proponent to the regulatory authorities?(e) Is the grievance redress mechanism regarding environmental and social considerations established?	(a)Y (b)- (c)-(d)Y (e)Y	(a) The Project proponent will implement the monitoring program for the environmental and social items based on the Maldivian and JICA's monitoring requirements. (b) and (c) The detailed items, methods and frequencies of the monitoring program should be determined when the Maldivian EIA should be conducted in 2024, which will include the environmental baseline survey and official sessions of stakeholder engagement. (d) Although is not currently prescribed, this will be provided in the environmental decision-making process of EPA after the EIA report is prepared in 2024. (e) Grievance redress mechanism regarding environmental and social considerations will be established in the course of the Maldivian EIA.
6. Note	(1) Reference to Checklist of Other Sectors	(a) Where necessary, pertinent items described in the Roads, Railways, and Bridges checklists should also be checked (e.g., Projects including construction of access road to the port).	(a)NA	(a) NA
	(2) Note on Using Environmental Checklist	(a) Where necessary, the impacts to transboundary or global issues should be confirmed (e.g. the Project includes factors that may cause problems, such as transboundary waste treatment or global warming). (b) For Projects that are expected to generate more than a certain amount of greenhouse gas emissions, is the total amount of the greenhouse gas emissions estimated before the Project implementation?	(a)NA (b)NA	(a) NA (b) NA

Remark: NA stands for not applicable.

End of the document

Annex 3: Environmental Management Plan (EMP)

Category	N°	Management Item	Project Activities	Anticipated Environmental Mitigation Measures		Institutions			Cost Estimate of Mitigation Measure (USD)
				Measures	Indicator	Implementation	Responsible	Supervision	
During Construction									
Pollution Countermeasures	1	Air pollution	・Seawall and mooring quay rehabilitation work ・Movement and idling of transportation trucks and heavy machinery ・Open burning of waste	・Sprinkling of water on construction yards and temporary yards, etc. ・Installation of screens, etc. to prevent dust at the boundaries of construction areas as necessary. ・Reduction of gas emissions through regular maintenance of equipment. ・Reduction of gas emissions by reducing the idling of transportation trucks and heavy machinery. ・Regular collection of waste at the site by licensed waste collection companies.	- Waste transportation truck covers - Compliance with gas emission standards - Contract with licensed waste collection companies - Results of ambient air monitoring	Construction company	Construction company / MNPHI	EIA Consultant	About 3,000 USD/year
	2	Water pollution	・Discharge of construction wastewater ・Oil leak from heavy machinery	・Installation of a temporary sand pond if needed. ・Appropriate management, treatment and disposal of oil. ・Installation of latrines at the base of the project and appropriate treatment and disposal of human excrement collected at the base camp if needed.	- Liquid and solid waste management record. - Results of the groundwater and sea water analysis.	Construction company	Construction company / MNPHI	EIA Consultant	About 3,000 USD/year
	3	Waste	・Disposal of construction waste	[Construction waste] ・Reuse of construction waste (Concrete debris, surplus soil or felled trees) or disposed in accordance with the regulations in force in the country. ・Appropriate management, treatment and disposal of general waste from the base camp. ・Transport and disposal of human excreta at the designated sewage treatment plant, after temporary storage within the project in a tank as per the regulation.	- Management record of liquid and solid waste. - Presence of latrines on the site.	Construction company	Construction company / MNPHI	EIA Consultant	About 2,000 USD/year
	4	Noises and vibrations	・Seawall and mooring quay rehabilitation work. ・Movement of transportation trucks and heavy machinery.	・Use of low-noise construction machinery and equipment and limitation of the working hours. ・Installation of sound insulation wall (sheet pile or sound insulation sheet) if necessary. ・Provision of personal protective equipment such as earplugs to construction workers.	- Arrangement of working hours. - Records of procurement and provision of personal protective equipment to the workers. - Results of noise monitoring.	Construction company	Construction company / MNPHI	EIA Consultant	About 3,000 USD/year
	5	Ecosystem	・Same as above	・Minimization of tree felling. ・Implementation of planting trees program if necessary as per the regulation.	- Tree planting records.	Construction company	Construction company / MNPHI	EIA Consultant	About 4,000 USD/year
	6	Existing Social Infrastructure and Social Services	・Same as above	・Setting of passage and detours in the construction plan. ・Installation of traffic signs and allocation of traffic controllers to ease traffic flow during construction. ・Information provision to social infrastructure and service-related organizations affected by traffic congestion.	- Placement of traffic signs and traffic controllers.	Construction company	Construction company / MNPHI	EIA Consultant	About 2,000 USD/year
	7	Uneven Distribution of Damage and Benefit	・Same as above	・Compliance with the construction schedule. ・Traffic management plan to ensure the smooth traffic flow. ・Information provision to stores and other businesses affected by traffic congestion.	- Revenue of the stores and other affected business, if necessary, as per the regulations. - Accessibility to houses / shops / infrastructure.	Construction company	Construction company / MNPHI	EIA Consultant	About 2,000 USD/year
	8	Gender	・Employment of construction managers and workers	・Equal pay for men and women during construction phase. ・Installation of facilities such as washroom for female workers as necessary.	- Salary - Comfort	Construction company	Construction company / MNPHI	EIA Consultant	About 1,000 USD/year

Category	N°	Management Item	Project Activities	Anticipated Environmental Mitigation Measures		Institutions			Cost Estimate of Mitigation Measures (USD)
				Measures	Indicator	Implementation	Responsible	Supervision	
	9	Children's Rights	Employment of construction workers	・The prohibition of child labour should be clearly indicated in the contract agreement of the contractor. ・The possible presence of working children will be monitored and strictly controlled.	- Site inspection and checking documentation	Construction company	Construction company / MNPHI	EIA Consultant	About 1,000 USD/year
	10	HIV/AIDS and other Infection	Influx of construction workers	・Installation of proper drainage system with the aim of eliminating any mosquito habitat. ・Installation of sanitary facilities (latrines) available to workers. ・Implementation of medical examinations and regular health check. ・Educational activities (training) for prevention of infectious diseases.	- Availability of toilets at the construction site. - Records of training.	Construction company	Construction company / MNPHI	EIA Consultant	About 2,000 USD/year
	11	Working Conditions	・Seawall and mooring quay rehabilitation work. ・Movement of transportation trucks and heavy machinery.	・Provision of personal protective equipment such as helmets, safety shoes, and fluorescent jackets to construction workers. ・Implementation of occupational safety training.	- Records of procurement and provision of personal protective equipment. - Records of working hours. - Records of implementation of training.	Construction company	Construction company / MNPHI	EIA Consultant	About 3,000 USD/year
Others	12	Accident	Passage of construction vehicles	・Provision of personal protective equipment such as fluorescent jackets to construction workers. ・Placement of traffic controllers and installation of safety-related signs. ・Restriction of entry to the construction area by installing signs and fences. ・Installation of lighting for night-time in the construction area. ・Establishment of waiting areas and parking lots for construction vehicles. ・Speed limit for construction-related vehicles. ・Implementation of safety training for construction workers. ・Establishment of a safe detour for surrounding residents and commuters during construction.	- Record of procurement and provision of personal protective equipment - Placement of traffic signs and traffic control personnel. - Sharing of safety inspections and near-miss incidents during daily meeting in the morning.	Construction company	Construction company / MNPHI	EIA Consultant	About 1,000 USD/year
Operational Phase									
Pollution Countermeasures	13	Air pollution	Activities which took place during the construction phase*	・Annual monitoring	Monitoring results	MNPHI	MNPHI	EIA Consultant	About 4,000 USD/year
	14	Water pollution	Activities which took place during the construction phase*	・Annual monitoring	Monitoring results	MNPHI	MNPHI	EIA Consultant	About 6,000 USD/year
	15	Noises and vibrations	Activities which took place during the construction phase*	・Annual monitoring	Monitoring results	MNPHI	MNPHI	EIA Consultant	About 3,000 USD/year

Note: * means a monitoring to verify if the activities which took place during the construction phase might have caused any impact or not.

Source: JICA Study Team

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Annex 4 Environmental Monitoring Plan

Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP) are planed in the tables below (the environmental baseline survey was undertaken in May 2023 while the second and comprehensive stakeholder meeting was conducted in June 2023. The results were reflected in the table below).

Table 1 Implementation Structure of EMP and EMoP

No.	Role	Institutions
1	Project Implementation Agency: PIA	MNPHI
2	Construction Contractor	PCC: Project Construction Company
3	Construction Management	CSC: Construction Supervision Consultant
(1)	Construction Management	PMC: Project Management Consultant
(2)	Environmental Management	EC: Environmental Consultant
4	Maldivian Environmental Authority	EPA

Table 2 Agencies and Roles/Responsibilities for Implementation of EMP

Stage	Institution	Roles and Responsibilities
Before and during construction	Project implementing body	
	MNPHI	- Coordination with relevant organizations for EMP implementation. - Supervision of EMP conducted by PCC. - Review and approval of environmental monitoring reports submitted by CSC and EC and direct necessary actions. - Submission of the report to EPA.
	PMC	- Supervision of PCC at the site office and work with EC within CSC. - Oversee of project technology, schedule, and safety.
	EC	- Supervision of approved environmental mitigation measures and monitoring activities implemented on site. - Regular meetings with CSC, PIA and contractors to exchange project-related information. - Review and revision of the environmental monitoring reports submitted by PCC. - Submission of the reports to MNPHI.
	Construction Contractor	
	Construction Company	- Implementation of approved EMP based on the instructions of PMC and EC. - Submission of regular reports, e.g., weekly/monthly reports to EC on all mitigation

		measures taken in the field.
	Administration	
	EPA	- Review of the environmental monitoring reports.
Operation (2 Years)	Project implementing body	
	MNPHI	- Implementation of approved EMP and environmental monitoring for two years based on the approved EIA. - Submission of regular monitoring reports to EPA.
	Administration	
	EPA	- Review of the environmental monitoring reports.

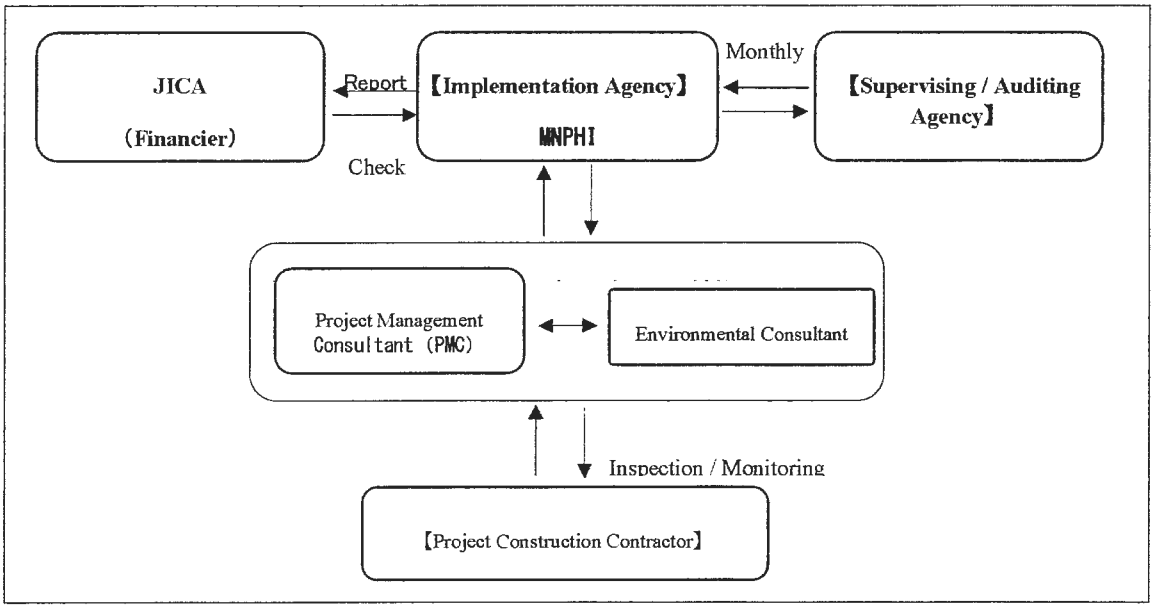


Figure 1 Implementation Structure of EMP and EMoP

In order to handle the complaints, which might be raised in this project, the grievance mechanism and its implementation structure are illustrated below.

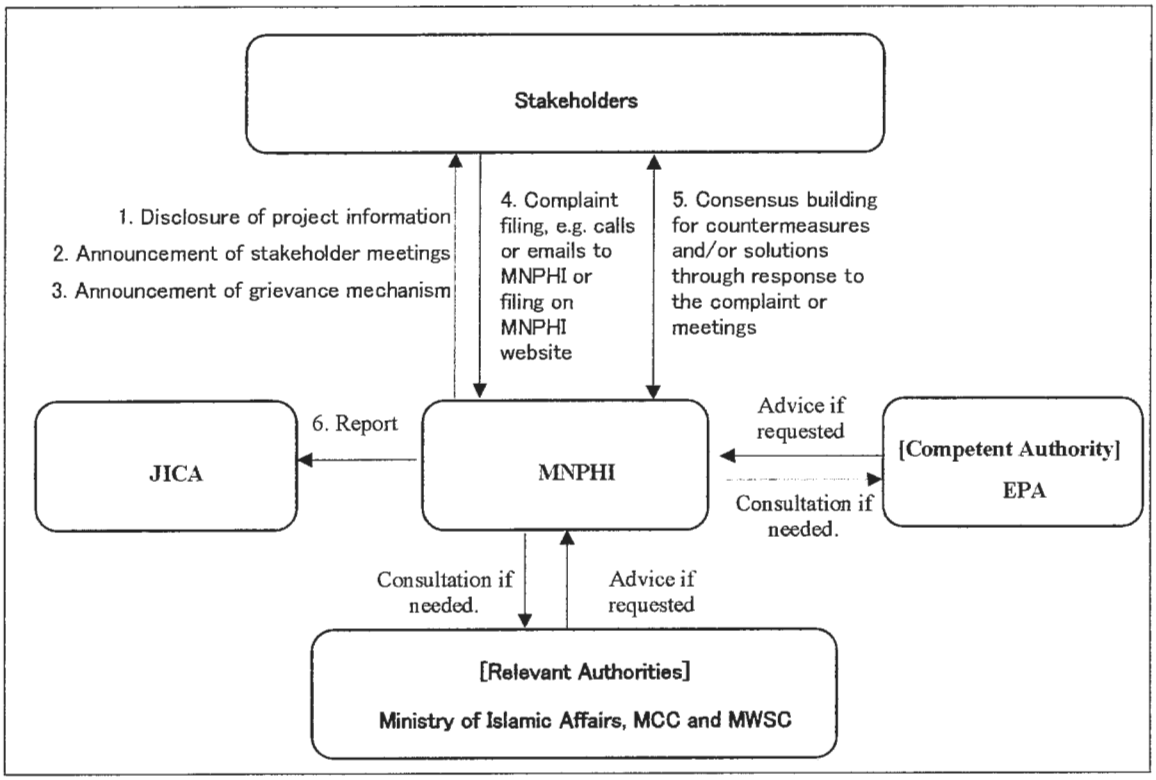


Figure 2 Grievance Mechanism and its Implementation Structure

The environmental monitoring plan for periods prior to the construction, during construction, and during operation is summarized in the table below.

Table 3 Environmental Monitoring Plan

No	Monitoring Item	Parameters	Location	Frequency	Implementation Agency	Supervising Agency	Monitoring Agency	Cost Estimate
	Prior to Construction							
1	Air	NO2 (200 μg/m3 for 1 hour), SO2 (500 μ g/m3 for 10 min.), PM2.5 (15 μ g/m3 for 24 hours), PM10 (45 μ g/m3 for 24 hours) and CO (35mg/m3 for 1 hour).	Three locations (one per Project site)	Once	MNPHI (or JICA Study Team during the detailed survey)	EIA Consultant	EPA	About 20,000 USD
2	Sea water and groundwater	Sea water: Water temperature, pH, salinity, turbidity, electrical conductivity (EC), total suspended solids (TSS), total dissolved solids	Same as above	Same as above		Same as above	Same as above	

No	Monitoring Item	Parameters	Location	Frequency	Implementation Agency	Supervising Agency	Monitoring Agency	Cost Estimate
		(TDS) and total petroleum hydrocarbons (TPH). Groundwater: Water temperature, pH, salinity, turbidity, electrical conductivity (EC), and total dissolved solids (TDS).						
3	Noise	Noise in dB (70dB as standards for days and nights at commercial areas)	Same as above	Same as above		Same as above	Same as above	
4	Ecosystem	Flora, fauna, and ecosystem at and near the Project site (to be compared with the national protected species and Red List) Permits for felling trees	Same as above	Same as above		Same as above	Same as above	
	During Construction							
5	Air	Same as above	Same as above	Every three months	Construction company	EIA Consultant	EPA	It should be included in the construction cost (about 80,000 USD pear year)
6	Sea water and groundwater				Same as above	Same as above	Same as above	
7	Noise				Same as above	Same as above	Same as above	
8	Ecosystem			Every six months	Same as above	Same as above	Same as above	
9	Waste	Liquid and solid waste management	Three locations and disposal site	Every month	Same as above	Same as above	Same as above	It should be included in the construction cost.
10	Existing Social	- Traffic congestion - Accessibility	Project sites	Every three	Same as above	Same as above	Same as above	

No	Monitoring Item	Parameters	Location	Frequency	Implementation Agency	Supervising Agency	Monitoring Agency	Cost Estimate
	Infrastructure and Social Services	- Complaint		months				
11	Uneven Distribution of Damage and Benefit	- Traffic congestion - Accessibility - Complaint - Revenue	Project sites	Every three months	Same as above	Same as above	Same as above	
12	Gender	- Salary -Installation of facilities	Project sites	Every three months	Same as above	Same as above	Same as above	
13	Children's Rights	- Check-up of child labour	Project sites	Every three months	Same as above	Same as above	Same as above	
16	HIV/AIDS and other Infection	- Training -Installation of facilities	Project sites	Every three months	Same as above	Same as above	Same as above	
17	Working Conditions	- PPE - Training	Project sites	Every month	Same as above	Same as above	Same as above	
18	Accident	- PPE - Road sign and traffic officer - Daily training	Project sites	Every month	Same as above	Same as above	Same as above	
19	Grievance mechanism	- Records of received complaints and their contents	Project sites	Every month	Same as above	Same as above	Same as above	
	Operational Phase							
20	Air	NO2 (200 µg/m3 for 1 hour), SO2 (500 μ g/m3 for 10 min.), PM2.5 (15 μ g/m3 for 24 hours), PM10 (45 μ g/m3 for 24 hours) and CO (35mg/m3 for 1 hour).	Three locations (one at each Project site)	Once per year	MNPHI	EIA Consultant	EPA	About 20,000 USD per year
21	Sea water and groundwater	Sea water: Water temperature, pH, salinity, turbidity, electrical conductivity (EC), total suspended solids (TSS), total	Same as above	Same as above	Same as above	Same as above	Same as above	

No	Monitoring Item	Parameters	Location	Frequency	Implementation Agency	Supervising Agency	Monitoring Agency	Cost Estimate
		dissolved solids (TDS) and total petroleum hydrocarbons (TPH). Groundwater: Water temperature, pH, salinity, turbidity, electrical conductivity (EC), and total dissolved solids (TDS).						
22	Noise	Noise in dB (70dB as standards for days and nights at commercial areas)	Same as above	Same as above	Same as above	Same as above	Same as above	

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Annex 5: Summary of Stakeholder Meetings

As an initial data collection, MNPHI and EPA were interviewed on 5 and 10 October 2022, who responded that there is no major concern with the public for the Project. However, precaution was given for the stakeholder engagement for the south-eastern seawall of Male Island of 140m at the time of the project request from MNPHI (and 230m as of now) where the sand is accumulated due to the flying sand.

It is unlikely that there will be a conflict with the normal citizens due to the current basic plan of the seawall rehabilitation work, which does not restrict the view of the pedestrians on promenades, or which does not make the seawalls to hinder the people to access the beach. According to MNPHI, a possible conflict might happen with Maldivian Surfing Association, surfers or other stakeholders because this beach is a venue for a large national and international surfing competition.

Therefore, a consultation meeting was undertaken on 20 October 2022 with the major stakeholder, Maldivian Surfing Association (MSA) in order to provide as much information as possible at this early stage of the Project. The shared information is summarized below:

- Tentative schedule of the Project:
  - The construction period is currently scheduled from December 2024 to January 2026 (around 14 months).
  - The construction around the surfing area from Section A to Section E (Figure below) is tentatively planned from November 2024 to April 2025 (for about 6 months), avoiding the surfing competition period (April to November).
- Tentative design of seawall rehabilitation.

Regarding the design of seawall rehabilitation, MSA requested the following 7 (seven) requirements and JICA Study Team agreed to reflect them into the drawings and construction plan:

- To change the slope gradient of armor stone from 1:4/3 as initially planned to a more gentle slope of 1:3.
- To design that slope surface to be wavy, but not straight.
- To remove tetrapods in Section B (Figure 1-4-7), and to install only armor stones with a shallow slope of 1:3.
- To redesign and reduce the planned armor stone at the edge between Section F and Section G (Figure 1-4-8), so that the Section G remains at 38 m.
- To make 3 (three) stairs for entering the surfing area.
- To enable surfers to access the surfing area during the construction period.
- To ensure removal of all construction debris and cleaning up the beaches after the construction is completed.

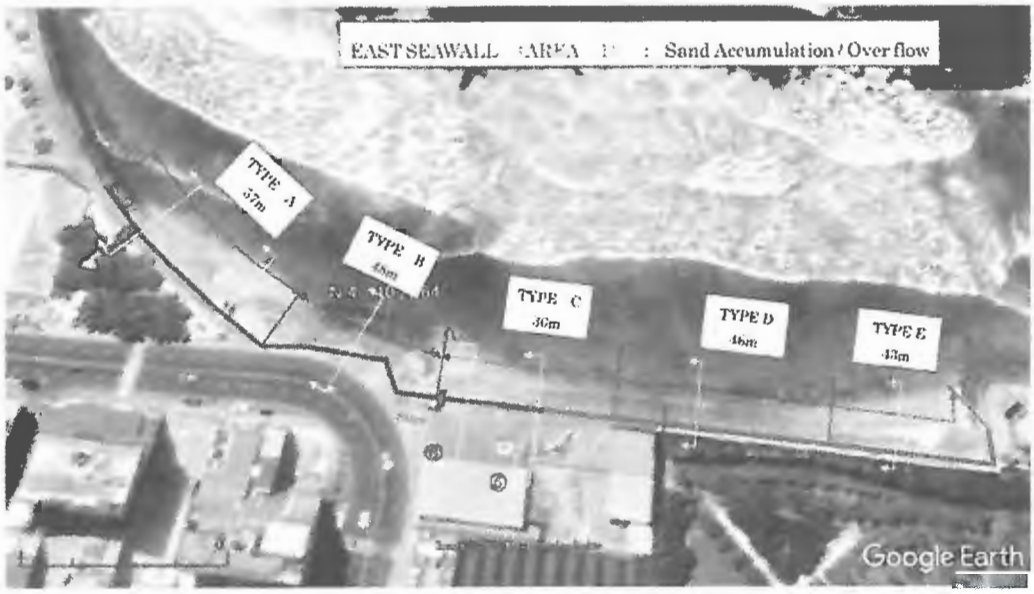


Figure 1: Seawall Rehabilitation Sections A to E at the south-eastern part of Male Island

(SOURCE: JICA STUDY TEAM)

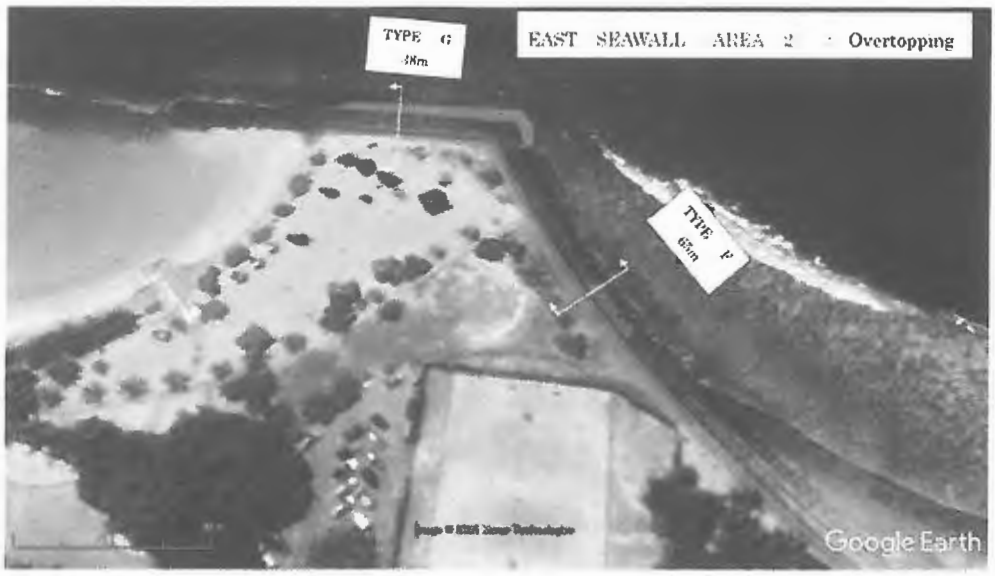


Figure 2: Seawall Rehabilitation Sections F and G at the south-eastern part of Male Island

(SOURCE: JICA STUDY TEAM)

Regarding Section G (Figure 1-4-8), it may coincide with the competition period, but MSA and JICA Study Team confirmed that the competition will not be affected by the construction activities due to the distance. During this stakeholder engagement, MSA seemed to positively accept the Project. This meeting ended after both MSA expressed its willingness to assist in the second and comprehensive stakeholder meeting in June 2023. The result of this meeting was shared with MNPHI and EPA.

Prior to the second stakeholder meeting in June 2023, MNPHI, JICA Study Team and a local expert had held online meetings to consider the widest possible range of stakeholders based on the characteristics and scale of this Project as well as the situation of the project site and its surrounding areas, etc. As results, the following major stakeholders got listed.

- Public institutions

- Ministry of Islamic Affairs (in charge of the large mosque at the eastern part of Male' island).
- Male' City Council (in charge of the residents and commercial facilities of Male' island).
- Male' Water and Sewerage Company (in charge of the utilities for water and waste water of Male' island).

- Private sector institutions and individuals

- Owners of restaurants and cafes at the eastern part of Male' island.
- Maldivian Surfing Association.
- Other stakeholders: Ones, which MNPHI, the competent authority (EPA), and the local expert cannot anticipate the impact.

As for the fishery, there are no fishery-related parties, fishing ports, nor fishing bases at all of the three sites of the Project. Also, there is no fishing ground at the surrounding areas of the Project sites. Considering these facts and the characteristics of the rehabilitation works of the mooring quay and seawall rehabilitation of this Project, fishery-related parties were not positioned as major stakeholders after consultation with MNPHI and the competent authority.

MNPHI directly sent invitation letters to the stakeholders above (except for the "other stakeholders") and made follow-up phone calls to encourage to participate in stakeholder consultations. In order to notify "other stakeholders", this event announcement was posted on the MNPHI website and its SNS for more than two weeks while MNPHI registered the participants, who expressed the interest in attending the stakeholder meeting.

In this way, the stakeholder meetings were announced for both the open public and a targeted audience, who had access to the outline of the Project and the stakeholder meetings. As results, stakeholder meetings were held over the two days of 19 and 20 June 2023, which are summarized in the table below.

Table 1: Summary of the stakeholder meetings in June 2023

Category	Sub-category	Details
Preparation of Stakeholder Meetings	List-up of Stakeholders	- Brainstorming among MNPHI, local experts and JICA Study Team. - Consultation with the competent authority, i.e. Environmental Protection Agency.
	Means of Event Announcement	- Invitation letters to listed stakeholders. - On MNPH's website for wider public.
	Duration of Event Announcement	- Two (2) weeks
Stakeholder Meetings	Date and Time	- On 19 and 20 June 2023 from 9am to 1pm respectively
	Venue	- The largest meeting room of MNPHI
	Participants	- In total: Fifteen (15) individuals from various institutions (14 male and 1 female) ・Participants on 19 June 2023 (Breakdowns are provided below): - Owners of restaurants and café: 4 - Ministry of Islamic Affairs: 1 - Male' City Council: 1 - Malé Water and Sewerage Company: 2 ・Participants on 20 June 2023 (Breakdowns are provided below): - Maldivian Surfing Association: 2 - Zero waste Maldives (NGO): 1 - Small Islands Geographic Foundation: 1 - TTS (Logistic company): 3
	Contents	- Presentation of the project outline, project schedule and environmental baseline survey. - Explanation about this stakeholder meeting and anticipated future stakeholder meetings. - Questions / answers through discussions and questionnaires. - Inquiry about needs of follow-up stakeholder meetings in near future.

(SOURCE: JICA STUDY TEAM)

As an important result of all the stakeholder meetings, there were no objections to the Project itself, and there were many positive opinions. Questions and answers about the Project and other comments from the participants are summarized below:

- Public institutions (Ministry of Islamic Affairs, Male' City Council and Male' Water and Sewerage Company)

- All the three institutions expressed their understanding about the Project.
- Male' City Council mentioned a planned expansion of the road that runs parallel to the mooring quay on the north side of Male' Island, which Male' City Council is involved in. MNPHI agreed with the council on a continuous close information exchange, so that both projects can benefit each other for an efficient public works implementation.

- Private sector institutions and individuals

- All four owners of the restaurants and cafés at the eastern part of Male' island have been reportedly suffering from the overtopping waves for many years, which have been causing damage to their equipment and fixtures. Moreover, they also indicated an increasing trend of the injuries of the customers due to the slippery ground caused by overtopping waves. They were aware of the tentative negative impacts of the rehabilitation works to their business during the construction phase, but they emphasized the long-term positive impact of this rehabilitation after the construction phase, which will be tremendously larger than the short-term negative impacts. Therefore, they eagerly welcomed this Project to be implemented.
- Maldivian Surfing Association expressed its gratitude that all seven requests were reflected in the Project plan, which were raised in October 2022. As a clarification request, there was a question if there is a

civil work method to undertake the seawall repair work on the south-eastern part of Male' Island without raising the seawall height. The chief consultant of the Project explained that the seawall height increase was calculated as minimum necessity to avoid the overtopping wave based on the anticipated sea level rise within a decade and the simulation of the sand accumulation outside the seawall in order to let the participant understand the need.

- An NGO called Zero Waste Maldives requested MNPHI to make the data of storm water among others publicly available. MNPHI responded that it will give its best effort to publicize those data in future.
- A private sector company called TTS, which is a domestic logistic company, seemed to look for business from this Project. The consultants explained the principles of the Japanese official development aid project and the procedures with timelines of this Project.

There was a general response that the participants were satisfied with the type and degree of provided information, the incorporation of their comments into the Project, and future plan of the stakeholder engagement.

All the participants were offered / informed of additional stakeholder meeting opportunities in the same month and for around April next year. Out of them, the private sector company expressed its interest in holding an additional meeting in the same week, so that it was set on the date and time, which it was convenient to that company. It did not appear on that date and time, so a follow-up phone call was given to provide additional information as requested. Other participants emphasized that they would welcome the opportunity to continuously obtain the updated information of the Project and exchange opinions through stakeholder meetings, which MNPHI plans to hold again around April next year.

Annex 6 Environment Monitoring Form

（1） Before Construction

Air Quality (Ambient Air)

Parameter	Unit	Date	Venue	Measured Value	Baseline results	Local Standards	International Standards	Remarks
NO_2	μg/ m^3				Site A : 250 Site B : 230 Site C : 0	None	WHO 200 μ g/m3 （1hr）	- Monitoring locations: One location at each project site (3 locations in total). - Frequency: Once before construction
SO_2	μg/m^3				Site A : 300 Site B : 0 Site C : 0	None	WHO 500μg/m3 （10 min）	
PM2.5	μg/m^3				Site A : 64 Site B : 23 Site C : 257	None	WHO 15μg/m3 （24hrs）	
PM10	μg/m^3				Site A : 45 Site B : 9 Site C : 189	None	WHO 45μg/m3 （24hrs）	
CO	mg/m^3				Site A : 7 Site B : 5 Site C : 6	None	WHO 35mg/m3 （1hr）	

Water Quality (Sea Water)

Parameter	Unit	Date	Venue	Measured Value (Average)	Measured Value (Max)	Baseline results	Local Standards	International Standards	Remarks
Temperature	℃					Site A : 29.1 Site B : 29.2 Site C : 29.2	25-30	-	- Monitoring locations: One location at each project site (3 locations in total). - Frequency: Once before construction
pH	—					Site A : 8.45 Site B : 8.49 Site C : 8.47	7.5-8.5	IFC 6-9	
Salinity	PSU					Site A : 34.65 Site B : 34.23 Site C : 34.34	30-35	-	
Turbidity	NTU					Site A : 0.15 Site B : 0.20 Site C : 0.08	5	-	
EC	mS/cm					Site A : 52,461 Site B : 51,888 Site C : 52,038	35,000- 60,000	-	
TSS	mg/l					Site A, B and C: Under detection limit.	-	IFC 50mg/L	

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Parameter	Unit	Date	Venue	Measured Value (Average)	Measured Value (Max)	Baseline results	Local Standards	International Standards	Remarks
TDS	mg/l					Site A : 26,229 Site B : 25,940 Site C : 26,016	15,000-26,000	-	
TPH	mg/l					Site A : Under detection limit. Site B : 0.07 Site C : 0.34	-	-	

Water Quality (Groundwater)

Parameter	Unit	Date	Venue	Measured Value (Average)	Measured Value (Max)	Baseline results	Local Standards	International Standards	Remarks
Temperature	℃					Site A : 28.28 Site B : 28.35 Site C : 28.31	25-30	-	- Monitoring locations: One location at each project site (3 locations in total). - Frequency: Once before construction
pH	—					Site A : 7.33 Site B : 7.33 Site C : 7.12	7.5-8.5	IFC 6-9	
Salinity	PSU					Site A : 0.40 Site B : 0.29 Site C : 0.30	-	-	
EC	mS/cm					Site A : 833 Site B : 594 Site C : 632	1,000	-	
TDS	mg/l					Site A : 416 Site B : 297 Site C : 316	500	-	

Noise

Parameter	Unit	Date	Venue	Measured Value (L_{Aeq})	Measured Value (L_{max})	Baseline results	Local standards	International Standards	Remarks
Noise level	dB (A)					Weekday Site A : 55.50, 65.85, 67.85 and 68.18 Site B : 52.54, 60.10, 57.03 and 58.52 Site C : 54.24, 65.85, 57.50 and 69.63 Weekend Site A : 45.48, 56.62, 51.71 and 51.71 Site B : 51.52, 54.69, 56.42 and 51.52 Site C : 51.71, 52.80, 56.93 and 63.58	None	WHO for Industrial and Commercial Areas (days and nights) L_{Aeq} 70dB (A)	- Monitoring locations: One location at each project site (3 locations in total). - Frequency: Once before construction

Ecosystem

Monitoring Item	Remark of the monitoring
- Flora, fauna, and ecosystem at and near each site (to be compared with the national protected species and Red List) once before construction - Permits for felling trees	

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(2) During Construction

Air Quality (Ambient Air)

Parameter	Unit	Date	Venue	Measured Value	Baseline results	Local Standards	International Standards	Remarks
NO_2	μg/ m^3				Site A : 250 Site B : 230 Site C : 0	None	WHO 200 μ g/m3 (1hr)	- Monitoring locations: One location at each project site (3 locations in total). - Frequency: Quarterly
SO_2	μg/m^3				Site A : 300 Site B : 0 Site C : 0	None	WHO 500μg/m3 (10 min)	
PM2.5	μg/m^3				Site A : 64 Site B : 23 Site C : 257	None	WHO 15μg/m3 (24hrs)	
PM10	μg/m^3				Site A : 45 Site B : 9 Site C : 189	None	WHO 45μg/m3 (24hrs)	
CO	mg/m^3				Site A : 7 Site B : 5 Site C : 6	None	WHO 35mg/m3 (1hr)	

Water Quality (Sea Water)

Parameter	Unit	Date	Venue	Measured Value (Average)	Measured Value (Max)	Baseline results	Local Standards	International Standards	Remarks
Temperature	℃					Site A : 29.1 Site B : 29.2 Site C : 29.2	25-30	-	- Monitoring locations: One location at each project site (3 locations in total). - Frequency: Quarterly
pH	—					Site A : 8.45 Site B : 8.49 Site C : 8.47	7.5-8.5	IFC 6-9	
Salinity	PSU					Site A : 34.65 Site B : 34.23 Site C : 34.34	30-35	-	
Turbidity	NTU					Site A : 0.15 Site B : 0.20 Site C : 0.08	5	-	
EC	mS/cm					Site A : 52,461 Site B : 51,888 Site C : 52,038	35,000- 60,000	-	
TSS	mg/l					Site A, B and C: Under detection limit.	-	IFC 50mg/L	
TDS	mg/l					Site A : 26,229 Site B : 25,940 Site C : 26,016	15,000-26,000	-	
TPH	mg/l					Site A : Under detection limit.	-	-	

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Parameter	Unit	Date	Venue	Measured Value (Average)	Measured Value (Max)	Baseline results	Local Standards	International Standards	Remarks
						Site B : 0.07 Site C : 0.34			

Water Quality (Groundwater)

Parameter	Unit	Date	Venue	Measured Value (Average)	Measured Value (Max)	Baseline results	Local Standards	International Standards	Remarks
Temperature	℃					Site A : 28.28 Site B : 28.35 Site C : 28.31	25-30	-	- Monitoring locations: One location at each project site (3 locations in total). - Frequency: Quarterly
pH	—					Site A : 7.33 Site B : 7.33 Site C : 7.12	7.5-8.5	IFC 6-9	
Salinity	PSU					Site A : 0.40 Site B : 0.29 Site C : 0.30	-	-	
EC	mS/cm					Site A : 833 Site B : 594 Site C : 632	1,000	-	
TDS	mg/l					Site A : 416 Site B : 297 Site C : 316	500	-	

Noise

Parameter	Unit	Date	Venue	Measured Value (L_{Aeq})	Measured Value (L_{max})	Baseline results	Local standards	International Standards	Remarks
Noise level	dB (A)					Weekday Site A : 55.50, 65.85, 67.85 and 68.18 Site B : 52.54, 60.10, 57.03 and 58.52 Site C : 54.24, 65.85, 57.50 and 69.63 Weekend Site A : 45.48, 56.62, 51.71 and 51.71 Site B : 51.52, 54.69, 56.42 and 51.52 Site C : 51.71, 52.80, 56.93 and 63.58	None	WHO for Industrial and Commercial Areas (days and nights) L_{Aeq} 70dB (A)	- Monitoring locations: One location at each project site (3 locations in total). - Frequency: Quarterly

Ecosystem

Monitoring Item	Remark of the monitoring
- Flora, fauna, and ecosystem at and near each site (to be compared with the national protected species and Red List) once before construction - Permits for felling trees	

Waste

Monitoring Item	Date	Venue	Remark of the monitoring
Record of the waste collection and disposal (amount and processing method)			

Existing Social Infrastructure and Social Services

Monitoring Item	Remark of the monitoring
Traffic congestion, accessibility and complaint	

Uneven Distribution of Damage and Benefit

Monitoring Item	Remark of the monitoring
Traffic congestion, accessibility, complaint and income	

Gender

Monitoring Item	Remark of the monitoring
Salary and installation of facilities	

Children's Rights

Monitoring Item	Remark of the monitoring
Check-up of child labour	

HIV/AIDS and other Infection

Monitoring Item	Remark of the monitoring
Training and installation of facilities	

Working Conditions

Monitoring Item	Remark of the monitoring
PPE and training records	

Accident

Monitoring Item	Remark of the monitoring
PPE, road sign and traffic officer, and daily training records	

Grievance mechanism

Monitoring Item	Remark of the monitoring
Records of received complaints and their contents	

(3) During Operation

Air Quality (Ambient Air)

Parameter	Unit	Date	Venue	Measured Value	Baseline results	Local Standards	International Standards	Remarks
NO_2	μg/ m^3				Site A : 250 Site B : 230 Site C : 0	None	WHO 200 μ g/m3 (1hr)	- Monitoring locations: One location at each project site (3 locations in total) - Frequency: Annual.
SO_2	μg/m^3				Site A : 300 Site B : 0 Site C : 0	None	WHO 500μg/m3 (10 min)	
PM2.5	μg/m^3				Site A : 64 Site B : 23 Site C : 257	None	WHO 15μg/m3 (24hrs)	
PM10	μg/m^3				Site A : 45 Site B : 9 Site C : 189	None	WHO 45μg/m3 (24hrs)	
CO	mg/m^3				Site A : 7 Site B : 5 Site C : 6	None	WHO 35mg/m3 (1hr)	

Water Quality (Sea Water)

Parameter	Unit	Date	Venue	Measured Value (Average)	Measured Value (Max)	Baseline results	Local Standards	International Standards	Remarks
Temperature	℃					Site A : 29.1 Site B : 29.2 Site C : 29.2	25-30	-	- Monitoring locations: One location at each project site (3 locations in total) - Frequency: Annual.
pH	—					Site A : 8.45 Site B : 8.49 Site C : 8.47	7.5-8.5	IFC 6-9	
Salinity	PSU					Site A : 34.65 Site B : 34.23 Site C : 34.34	30-35	-	
Turbidity	NTU					Site A : 0.15 Site B : 0.20 Site C : 0.08	5	-	
EC	mS/cm					Site A : 52,461 Site B : 51,888 Site C : 52,038	35,000- 60,000	-	
TSS	mg/l					Site A, B and C: Under detection limit.	-	IFC 50mg/L	
TDS	mg/l					Site A : 26,229 Site B : 25,940 Site C : 26,016	15,000-26,000	-	

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Parameter	Unit	Date	Venue	Measured Value (Average)	Measured Value (Max)	Baseline results	Local Standards	International Standards	Remarks
TPH	mg/l					Site A : Under detection limit. Site B : 0.07 Site C : 0.34	-	-	

Water Quality (Groundwater)

Parameter	Unit	Date	Venue	Measured Value (Average)	Measured Value (Max)	Baseline results	Local Standards	International Standards	Remarks
Temperature	℃					Site A : 28.28 Site B : 28.35 Site C : 28.31	25-30	-	- Monitoring locations: One location at each project site (3 locations in total) - Frequency: Annual.
pH	—					Site A : 7.33 Site B : 7.33 Site C : 7.12	7.5-8.5	IFC 6-9	
Salinity	PSU					Site A : 0.40 Site B : 0.29 Site C : 0.30	-	-	
EC	mS/cm					Site A : 833 Site B : 594 Site C : 632	1,000	-	
TDS	mg/l					Site A : 416 Site B : 297 Site C : 316	500	-	

Noise

Parameter	Unit	Date	Venue	Measured Value (L_{Aeq})	Measured Value (L_{max})	Baseline results	Local standards	International Standards	Remarks
Noise level	dB (A)					Weekday Site A : 55.50, 65.85, 67.85 and 68.18 Site B : 52.54, 60.10, 57.03 and 58.52 Site C : 54.24, 65.85, 57.50 and 69.63 Weekend Site A : 45.48, 56.62, 51.71 and 51.71 Site B : 51.52, 54.69, 56.42 and 51.52 Site C : 51.71, 52.80, 56.93 and 63.58	None	WHO for Industrial and Commercial Areas (days and nights) L_{Aeq} 70dB (A)	- Monitoring locations: One location at each project site (3 locations in total). - Frequency: Annual

Remarks: The Environmental Monitoring Form should be updated based on the environmental survey for preparing ESIA report during the period of the Detailed Design.

[資料 C]

C-1. ソフトコンポーネント計画書

モルディブ国
マレ島災害に対する強靭性向上計画
準備調査

ソフトコンポーネント計画書

2023 年 10 月

株式会社オリエンタルコンサルタンツグローバル

八千代エンジニヤリング株式会社

日本工営株式会社

共同企業体

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添付資料：活動日程表（案）

1. ソフトコンポーネントを計画する背景

「マレ島災害に対する強靭性向上計画準備調査」（以下、「本計画」という）は、モルディブ共和国（以下、「モルディブ」という）の首都、マレ島において、海岸防災施設（護岸）の改良及び雨水排水能力向上に係る機材整備等を行うことにより、同島の高波・高潮及び豪雨災害の被害軽減を図り、ひいては、同地域の水災害への脆弱性の克服及び生活・経済社会活動基盤の安定に資するものである。

本計画の実施機関として、護岸整備及び機材調達を国家計画・住宅・インフラ省（以下、「MNPHI」という）が担当する。MNPHI は雨水排水関連施設の運用を、マレ上下水道公社（以下、「MWSC」という）に委託しており、本計画の調達機材についても同様に MWSC により運用される予定である。また、正式な公表や施行時期は未定であるが、本計画の調達機材を含め、雨水排水関連の施設の運営に係る責任機関が MNPHI からマレ市評議会（以下、「MCC」という）に移管される方針が 2022 年 12 月に決定されたことを受けて、2023 年 2 月に JICA 地球環境部及び JICA モルディブ支所が MNPHI と現地協議を行い、移管内容の詳細について確認したところ、機材の調達・導入（無償の供用開始前まで）、資産管理（所有権、維持管理費の確保を含む）については、引き続き MNPHI が責任をもって実施する体制とする方針であることを確認した。また、MCC に移管後のオペレーターに関しては、引き続き、MWSC が MCC から委託を受ける体制とするか MCC が新規に雇用を行い直営とするかは現時点で検討する段階に至っていないとの回答があったが、どのような体制になる場合にも、MNPHI が移管する際に、MNPHI、MCC、MWSC の 3 機関合同の研修を実施し、引継ぎ及び技術移転を行う予定であることを確認した。

本ソフトコンポーネントは、本計画により調達される機材が実施機関および受益者により適切に運営・維持管理されるよう必要な技術支援を計画するとともに、機材の運営権が MNPHI から MCC に移管された後も、引き続き適切に運用・維持管理が実施されるための支援を計画することを基本方針とする。

以下に、上記の基本方針に基づき計画するソフトコンポーネントを示す。

セクター	事業段階	項目
雨水排水	維持管理	- 遠隔監視制御システムの適切な運用・維持管理技術の習得
		- 高圧洗浄車の適切な運用・維持管理技術の習得

以下に、これらソフトコンポーネントが必要である背景について記す。

2023 年 3 月現在、マレ島内の雨水排水施設（ポンプ施設 16 カ所を含む）の運用は MNPHI から業務委託された MWSC が行っている。業務委託契約には、当該施設の運用・維持管理、定期点検、清掃の回数などが明記されており、MWSC はこれに従い業務を実施している。

現状の雨水排水ポンプの運用について、遠隔監視、制御等は行われておらず、ポンプの運転／停止はチャンバー内に設置されたフロートスイッチが設定された水位により ON/OFF することで、自動運転で運用されている。また、降雨時にポンプの稼働状況を確認するため、MWSC は現場を 3 人の技術者で見回る体制で運用を行っているが、本事業で遠隔監視制御システムが

導入された場合、これらの運用体制、運用方法を見直す必要がある。

雨水排水路の清掃は、現在 MWSC 所有の下水道用高圧洗浄車が転用されているものの、衛生上の懸念、安定した運営・維持管理を継続するために業務委託者（MNPHI）が機材を所有することを要望しており、本事業で雨水排水施設専用の高圧洗浄車の導入を支援することとなった。

上述の雨水排水施設の運用･維持管理について、標準手順書（Standard Operation Manual : SOP）のように明文化された資料が無いため、本ソフトコンポーネントにより、これを作成し、本計画により調達された機材が適切に運用・維持管理されるための支援を計画する。

2. ソフトコンポーネントの目標

上記背景を踏まえ、プロジェクトの効果発現と持続可能性の観点から以下の目標を設定する。

目標：機材の運用・維持管理能力の定着

本計画にて、雨水排水施設（ポンプ）の持続的な運用・維持管理活動が行えるように、モルディブ側関係機関（MNPHI、MCC 及び MWSC）担当者が調達機材の機能及び基本的な運用・維持管理方法について理解し、調達機材が将来に渡り継続的に有効活用される。

3. ソフトコンポーネントの成果

本計画によるソフトコンポーネント完了時の直接的成果を以下に記す。

成果 1：遠隔監視制御システムの運用・維持管理能力の定着

モルディブ側関係機関（MWSC）職員が、遠隔監視制御システムの基本的な機材構成、機能、操作方法、維持管理方法を理解・習得し、本ソフトコンポーネントで作成した標準作業手順書（SOP）に従い遠隔監視制御システムの運用、定期点検、維持管理を適切に行うことができる。

成果 2：高圧洗浄車の運用・維持管理能力の定着

モルディブ側関係機関（MWSC）職員が、高圧洗浄車の基本的な機材構成、機能、操作方法、維持管理方法を理解・習得し、本ソフトコンポーネントで作成した SOP に従い調達機材（高圧洗浄車）により雨水排水路の清掃を適切に行うことができる。また、高圧洗浄車の定期点検、維持管理を適切に行うことができる。

4. 成果達成度の確認方法

本計画によるソフトコンポーネントの成果達成度を確認するため、成果毎の確認項目を以下の通り設定する。達成度の確認にあたっては、ソフトコンポーネント対象者への事前・事後のアンケート調査により評価を行う。

成果	達成度の確認項目
成果 1： モルディブ側関係機関（MWSC）職員が、遠隔監視制御システムの基本的な機材構成、機能、操作方法、維持管理方法を理解・習得し、本ソフトコンポーネントで作成した SOP に従い遠隔監視制御システムの運用、定期点検、維持管理、不具合発生時の対応を適切に行うことができる。	1. SOP に従い平常時の運用、日常点検・定期点検の実地訓練を行い、手順の精度を確認する。 2. 上述の訓練において、講師が故意に不具合を発生させ、担当者が適切に対応できることを確認する。
成果 2： モルディブ側関係機関（MWSC）職員が、高圧洗浄車の基本的な機材構成、機能、操作方法、維持管理方法を理解・習得し、本ソフトコンポーネントで作成した SOP に従い調達機材（高圧洗浄車）により雨水排水路の清掃を適切に行うことができる。また、高圧洗浄車の定期点検、維持管理を適切に行うことができる。	1. SOP に従い雨水排水管清掃の実地訓練を行い、手順の精度を確認する。 2. SOP に従い日常点検・定期点検の実地訓練を行い、手順の精度を確認する

5. ソフトコンポーネントの活動（投入計画）

本ソフトコンポーネントにおける活動内容（投入計画）を以下に示す。

5-1. 成果 1：遠隔監視制御システムの運用・維持管理能力の定着

分野・対象者	研修内容	成果品	実施リソース（人数・M/M）
前期：第 1 回現地指導（座学、計画書・手順書作成指導及び実機演習）			
遠隔監視制御システム機材・運用コース 「運用能力定着」 対象者： MNPHI 及び MCC 職員（4 名程度） MWSC 職員 4 名程度	・ 調達機材の運用を担当する MWSC 職員に対し以下の技術移転を行う。 ・ 使用する教材類は事前に講師が作成する。以下の各種手順等をまとめた手順書を講師の指導下で受講生が完成させる。 (1)遠隔監視制御端末（親局）の日常運用手順 (2)遠隔監視制御端末（親局）の緊急時運用手順 (3)遠隔監視制御端末（親局）の不具合発生時の対応手順 (4)雨水排水施設監視機材（子局）の日常運用手順 (5)雨水排水施設監視機材（子局）の緊急時運用手順 (6)雨水排水施設監視機材（子局）の不具合発生時の対応手順	■遠隔監視制御端末（親局） ・ 指導教材 ・ 標準作業手順書（SOP） ・ 緊急運用手順書 ■雨水排水施設監視機材（子局） ・ 指導教材 ・ 標準作業手順書（SOP） ・ 緊急運用手順書	■日本人講師： 国内 0.25M/M x 1 名 （0.25M/M） 現地 0.73M/M x 1 名 （0.73M/M）
遠隔監視制御システム機材・維持管理コース 「維持管理能力定着」 対象者： MWSC 職員 4 名程度	・ 調達機材の保守管理を担当する MWSC の職員に対し以下の技術移転を行う。 ・ 使用する教材類は事前に講師が作成する。以下の各種手順等をまとめた手順書を講師の指導下で受講生が完成させる。 (1)遠隔監視制御端末（親局）及び	■遠隔監視制御端末（親局） ・ 指導教材 ・ 定期点検手順書 ・ 保守点検手順書 ・ 故障対応手順書 ■雨水排水施設監視機材（子局） ・ 指導教材 ・ 定期点検手順書	

分野・対象者	研修内容	成果品	実施リソース（人数・M/M）
	雨水排水施設監視機材（子局）の日常・定期点検作業手順、並びに保守点検手順 (2)両機材の不具合発生時の申告体制確立及び障害原因探索・復旧手順 (3)両機材の拡張等応用的手順 (4)現用機器、交換部品等在庫管理方法	・ 保守点検手順書 ・ 故障対応手順書	
後期:第 2 回現地指導（技術移転成果の確認、評価及び見直し）			
遠隔監視制御システム機材・運用コース/維持管理コース 「維持管理能力定着」 「運用能力定着」 対象者: MWSC職員（4名程度） MNPHI 及び MCC 職員（4 名程度）	第一回現地指導実施後（概ね 6ヶ月後）、技術移転成果定着度の測定及び改善が必要な場合の対策を行う。 (1)各種日常・定期作業の実施状況、課題の確認と手順書等への反映指導 (2)故障発生及び修理対応状況と課題の確認、手順書等への反映指導 (3)関係 3 機関合同ワークショップ（アセットを MNPHI から MCC へ移転するに当たり開催される予定）における SOP を用いた実地指導	・ 点検作業等実施状況確認結果 ・ 故障及び修理状況確認結果 ・ 関係 3 機関合同ワークショップにおける SOP を用いた運用及び点検の実施結果 ・ 各種手順書改版（必要に応じ）	■日本人講師: 現地 0.57M/M x1 名 （0.57M/M）

5-2. 成果 2：高圧洗浄車の運用・維持管理能力の定着

分野・対象者	研修内容	成果品	実施リソース（人数・M/M）
前期:第 1 回現地指導（座学、計画書・手順書作成指導及び実機演習）			
高圧洗浄車・運用コース 「運用能力定着」 対象者: MNPHI 及び MCC 職員（4 名程度） MWSC 職員 4 名程度	・ 調達機材の運用を担当する MWSC 職員に対し以下の技術移転を行う。 ・ 使用する教材類は事前に講師が作成する。以下の各種手順等をまとめた手順書を講師の指導下で受講生が完成させる。 (1) 高圧洗浄車の標準作業手順 (2) 高圧洗浄車の不具合発生時の対応手順	■高圧洗浄車 ・ 指導教材 ・ 標準作業手順書（SOP）	■日本人講師: 国内 0.25M/M x 1 名 （0.25M/M） 現地 0.73M/M x 1 名 （0.73M/M）
高圧洗浄車・維持管理コース 「維持管理能力定着」 対象者: MWSC 職員 4 名程度	・ 調達機材の保守管理を担当する MWSC の職員に対し以下の技術移転を行う。 ・ 使用する教材類は事前に講師が作成する。以下の各種手順等をまとめた手順書を講師の指導下で受講生が完成させる。 (1) 高圧洗浄車の日常・定期点検作	■高圧洗浄車 ・ 指導教材 ・ 定期点検手順書 ・ 保守点検手順書 ・ 故障対応手順書 ・	

分野・対象者	研修内容	成果品	実施リソース（人数・M/M）
	業手順、並びに保守点検手順 (2) 高圧洗浄車の不具合発生時の申告体制確立及び障害原因探索・復旧手順 (3) 交換部品等在庫管理方法		
後期:第 2 回現地指導（技術移転成果の確認、評価及び見直し）			
高圧洗浄車・運用コース/維持管理コース 「維持管理能力定着」 「運用能力定着」 対象者: MWSC 職員（4 名程度） MNPHI 及び MCC 職員（4 名程度）	第一回現地指導実施後（概ね 6 ヶ月後）、技術移転成果定着度の測定及び改善が必要な場合の対策を行う。 (1) 各種作業・点検の実施状況、課題の確認と手順書等への反映指導 (2) 故障発生及び修理対応状況と課題の確認、手順書等への反映指導 (3) 関係 3 機関合同ワークショップ（アセットを MNPHI から MCC へ移転するに当たり開催される予定）における SOP を用いた実地指導	・ 点検作業等実施状況確認結果 ・ 故障及び修理状況確認結果 ・ 関係 3 機関合同ワークショップにおける SOP を用いた運用及び点検の実施結果 ・ 各種手順書改版（必要に応じ）	■日本人講師: 現地 0.57M/M x1 名 （0.57M/M）

6. ソフトコンポーネントの実施リソースの調達方法

本ソフトコンポーネントにおける各活動においては、以下に示す理由によりローカルリソースではなく日本人技術者が相応しいと考えられる。

活動項目	日本人技術者による実施の理由
(1) 遠隔監視制御システムの運用・維持管理能力の定着	本活動項目で指導に当たる技術者には、従前のモルディブ側関係機関の業務の運用・維持管理体制を十分に理解していること、且つ本邦企業が製作する遠隔制御システムの仕様について深く精通していることが求められる。現地技術者もしくは第三国技術者で上記条件を満たすことが難しいと考えられるため、受注コンサルタント（日本人技術者）による直接支援型が適切であると判断する。
(2) 高圧洗浄車の運用・維持管理能力の定着	本活動項目で指導に当たる技術者には、従前のモルディブ側関係機関の業務の運用・維持管理体制を十分に理解していること、且つ本邦企業が製作する高圧洗浄車の仕様、同機材を利用した管路の清掃方法について深く精通していることが求められる。現地技術者もしくは第三国技術者で上記条件を満たすことが難しい

活動項目	日本人技術者による実施の理由
	と考えられるため、受注コンサルタント（日本人技術者）による直接支援型が適切であると判断する。

以上の理由により、本ソフトコンポーネントにおいては、受注コンサルタントが直接実施することが適切である。

7. ソフトコンポーネントの実施工程

ソフトコンポーネントの実施工程を下図に示す。

年		2025				2026							
月		9	10	11	12	1	2	3	4	5	6	7	8
据付工事	初期操作指導及び運用指導（調達業者実施）				▼引渡								
ソフトコンポーネント	成果 1: 遠隔監視制御システム機材の運用・維持管理能力定着		0.25MM	0.73MM								0.57MM	
	成果 2 :高圧洗浄車の運用・維持管理能力定着		0.25MM	0.73MM								0.57MM	

国内作業　　現地活動

8. 成果品の種類

ソフトコンポーネントにより作成する成果品を以下に示す。

1） 日本側

- 標準作業手順書（SOP）（成果 1 及び成果 2）
  （遠隔監視制御端末、雨水排水施設監視機材、並びに高圧洗浄車用）
- 緊急運用手順書（成果 1）
  （遠隔監視制御端末及び雨水排水施設監視機材用）
- 定期点検手順書（成果 1 及び成果 2）
  （遠隔監視制御端末、雨水排水施設監視機材、並びに高圧洗浄車用）
- 保守点検手順書（成果 1 及び成果 2）
  （遠隔監視制御端末、雨水排水施設監視機材、並びに高圧洗浄車用）
- 故障対応手順書（成果 1 及び成果 2）
  （遠隔監視制御端末、雨水排水施設監視機材、並びに高圧洗浄車用）
- ソフトコンポーネント完了報告書
  完了報告書は以下の成果品を含む。
  - 施工写真等の活動記録
  - 施主に提出した Final Report

9. ソフトコンポーネントの概算事業費

ソフトコンポーネントにかかる概算事業費は下記の通りである。

費目	金額（千円）	備考
1. 直接人件費	3,174	
2. 直接経費	3,144	1 ルフィア 9.2731 円で換算
3. 間接費	6,602	
合計	12,920	

10. 相手国側の責務

ソフトコンポーネントの目標が達成されるためには、ソフトコンポーネントの実施による成果に加え相手側実施機関が果たすべき責務として以下のような項目が挙げられる。

- ソフトコンポーネントにより作成した SOP、各種手順書に従い、調達機材の継続的な運用・維持管理を行う。
- 本計画で調達した機材の維持管理、及びスペアパーツの追加調達に必要な予算を確保する。また、職員による機材の定期的な点検を実施する。

以上

添付資料：活動日程表（案）

添付資料：活動日程表（案）

第 1 回現地指導		維持・運用能力の定着	
		雨水排水施設遠隔監視システム	高圧洗浄車
日数		22	22
2026/11/14	土	移動［成田→コロンボ→マレ］	移動［成田→コロンボ→マレ］
2026/11/15	日	ソフトコンポーネントに関する MNPHI／MCC／MWSC との協議（研修日程、研修内容、受講者選定依頼）	ソフトコンポーネントに関する MNPHI／MCC／MWSC との協議（研修日程、研修内容、受講者選定依頼）
2026/11/16	月	現状の維持管理業務の手順確認（MWSC）	現状の維持管理業務の手順確認（MWSC）
2026/11/17	火	現状の維持管理業務の手順確認（MWSC）	現状の維持管理業務の手順確認（MWSC）
2026/11/18	水	維持管理業務の確認、各種手順書（案）の修正	維持管理業務の確認、各種手順書（案）の修正
2026/11/19	木	各種手順書（案）の修正	各種手順書（案）の修正
2026/11/20	金	資料整理	資料整理
2026/11/21	土	資料整理	資料整理
2026/11/22	日	座学（サーバー、データストレージ、遠隔監視制御端末）	座学（高圧洗浄車：シャーシ、架装部）
2026/11/23	月	座学（配電盤、水位計など）	座学（保安用機材、安全講習）
2026/11/24	火	座学（各種手順書）	座学（各種手順書）
2026/11/25	水	座学（各種手順書）	座学（各種手順書）
2026/11/26	木	座学（トラブルシューティング）	実機材を用いたシミュレーション（高圧洗浄車）
2026/11/27	金	資料整理	資料整理
2026/11/28	土	資料整理	資料整理
2026/11/29	日	現場での OJT（サーバー、遠隔監視制御端末）	実機材を用いたシミュレーション（保安用機材）
2026/11/30	月	現場での OJT（雨水排水施設：ポンプ 1 台）	現場での OJT（高圧洗浄車、保安用機材）
2026/12/1	火	現場での OJT（雨水排水施設：ポンプ 2 台）	現場での OJT（高圧洗浄車、保安用機材）
2026/12/2	水	研修の復習及び質疑応答	研修の復習及び質疑応答
2026/12/3	木	技術協議・報告	
2026/12/4	金	移動［マレ→コロンボ→］	移動［マレ→コロンボ→］
2026/12/5	土	移動［→成田］	移動［→成田］

第 2 回現地指導		維持・運用能力の定着	
		雨水排水施設遠隔監視システム	高圧洗浄車
日数		17	17
2026/7/23	木	移動［成田→コロンボ→マレ］	移動［成田→コロンボ→マレ］
2026/7/24	金	資料整理	資料整理
2026/7/25	土	資料整理	資料整理
2026/7/26	日	MWSC 技術者との技術協議及び研修のオリエンテーリング	MWSC 技術者との技術協議及び研修のオリエンテーリング
2026/7/27	月	各種手順書の問題点、改善点に係る確認	各種手順書の問題点、改善点に係る確認
2026/7/28	火	各種手順書の修正	各種手順書の修正
2026/7/29	水	関係 3 機関合同ワークショップ（遠隔監視制御システム）	
2026/7/30	木	関係 3 機関合同ワークショップ（高圧洗浄車）	
2026/7/31	金	資料整理	資料整理
2026/8/1	土	資料整理	資料整理
2026/8/2	日	各種手順書（修正版）の説明	各種手順書（修正版）の説明
2026/8/3	月	研修の復習及び質疑応答	研修の復習及び質疑応答
2026/8/4	火	報告書作成	
2026/8/5	水	報告書作成	
2026/8/6	木	技術協議・報告	
2026/8/7	金	移動［マレ→コロンボ→］	移動［マレ→コロンボ→］
2026/8/8	土	移動［→成田］	移動［→成田］

[資料 D]

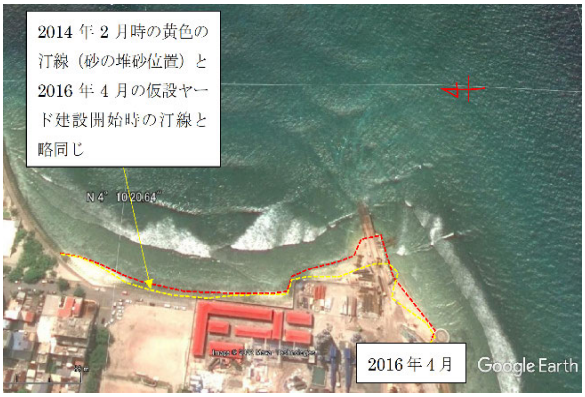
D-1. 参考資料　マレ島護岸改修の設計計算資料と調査解析資料

D-1. 参考資料　マレ島護岸改修の設計計算資料と調査解析資料

D－1 - 1　「東海岸の堆砂区域における堆砂のメカニズムと堆砂の安定性」

東海岸の堆積砂の区域における砂の堆積メカニズムに関しては、砂礫の堆積した要因においてシナ・マーレ橋建設時に、最南端の仮設ヤード埋め立て地から流出した土砂の堆積であることが主因となっており、その仮設ヤードが撤去された現在では、堆積砂礫は安定していることが関係者間で確認されている。それを検証するため、時系列の汀線位を以下様にグーグル写真上で比較検証した。



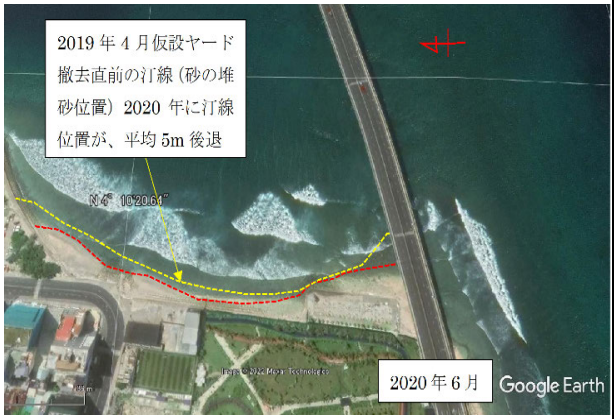
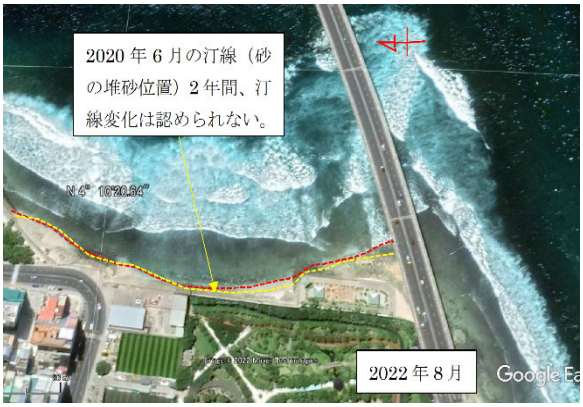


東護岸建設時の 1997 年から 2007 年までの 10 年間で砂礫の堆積が部分的発生し、2008 年から 2016 年 3 月に、シナ・マーレ橋建設に伴い、東海岸最南端に仮設ヤード埋め立てが開始されるまで、上記の比較写真のように、堆積した砂の汀線位置の変化は殆どなく、堆積さ派安定していた。





2016 年 3 月に、シナ・マーレ橋建設に伴い、東海岸最南端に仮設ヤード埋め立てが開始され初め、仮設ヤードの使用中に埋め立て地からの土砂が流出し、2017 年の 8 月までに東海岸の堆積砂の汀線は平均 7m 沖まで進み、堆積量が急増した。その後、2019 年の 5 月に仮設ヤードが撤去されるまで、その汀線位置は位置の変化はなかった。

<table>
<tr>
<td> 
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<tr>
<td colspan="2">2019 年 4 月に、東海岸最南端に仮設ヤード埋め立て地の撤去が開始され初め、仮設ヤードの土砂の流出がなくなり、2020 年の 6 月までに東海岸の堆積砂の汀線は平均 5m 陸側に後退したが、その後、2022 年の 8 月まで、その汀線位置は位置の変化はなかったことから、堆積砂の増減が発生せず、堆積砂は安定している状況である。</td>
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</table>

上記のことから、将来的な砂堆積の増減は、ほとんど発生せず堆積砂は安定すると判断される。

D－1－2　「ECMWF 全球モデル再解析データを基にマレ島東海岸の換算有義波高の計算」

マレ島東海岸に影響を与える沖波として、ECMWF（ヨーロッパ中期予報センター）の作成した全球モデルの再解析データ、ERA5（1992～2021）の 30 年間の 2 時間毎解析データを入手した。（https://cds.climate.copernicus.eu/cdsapp#!/dataset/reanalysis-era5-single-levels?tab=form）。この解析データは、マレ島東海岸リーフ沖で、入手可能な一番近い解析位置ではあるが、東海沖約 2.5 kmの気象データに基づく沖波解析データであり、これを東海岸の沖合 500m の有義波高とすることは、周辺地形の変化と水深の変化における波の屈折・減衰が発生する為にそれらのさらなる解析が必要とされる。（以下の全ての図の出展：調査団）



図 D－１－1. ECMWF の作成した全球モデルの再解析データ位置図

ECMWF（ヨーロッパ中期予報センター）の作成した全球モデルの再解析データ、ERA5（1992～2021）の 30 年間の 2 時間毎の全解析データを集計し、マレ島東海岸に影響を与える波向きである、ENE、N、ESE,SE と SSE の波として、解析された波の高さと頻度と波の方向、以下の図にまとめた。

Maximum significant wave height			
ECMWF		3.193	m
Mean wave period		6.842	s

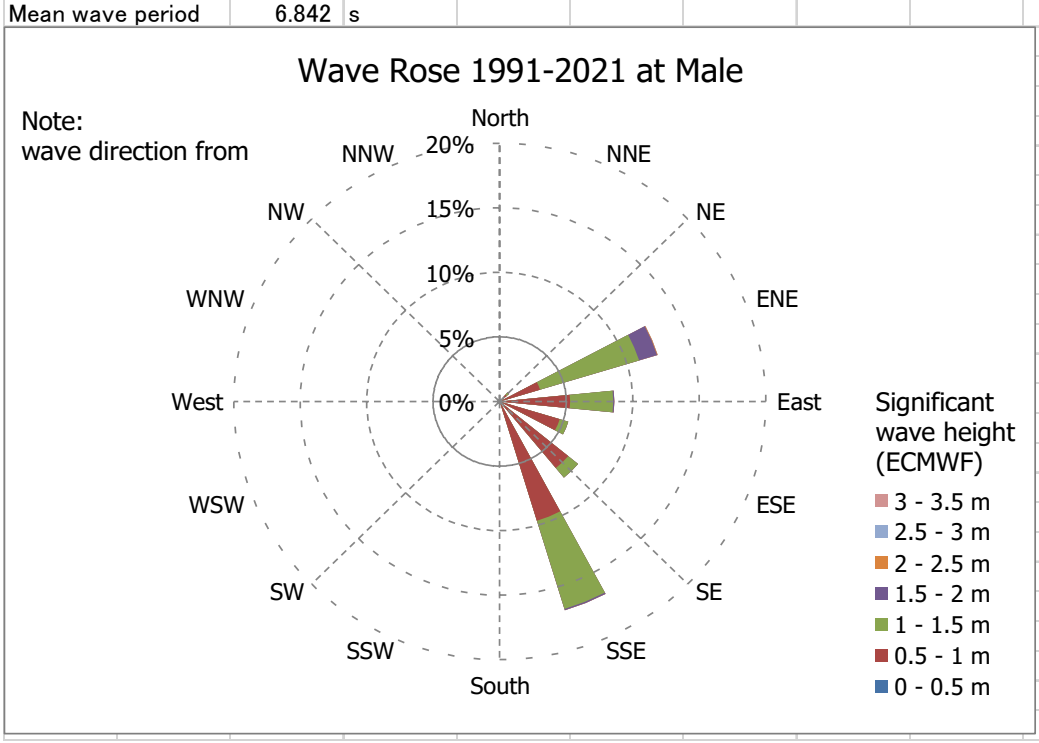


図 D－1－2　ENE、N、ESE, SE と SSE の波として、解析された波の高さと頻度と波の方向

また、1992 年に JICA が実施した「マレ島護岸開発調査」の中で、1 年間の波浪観測(1991 ~1992)の実施された東海岸沖の観測位置は、以下の図の東海岸南端沖の海岸から約 250 m 離れた、Ｅａｓｔ　Ｎｏ．０　水深－20mの位置で観測された

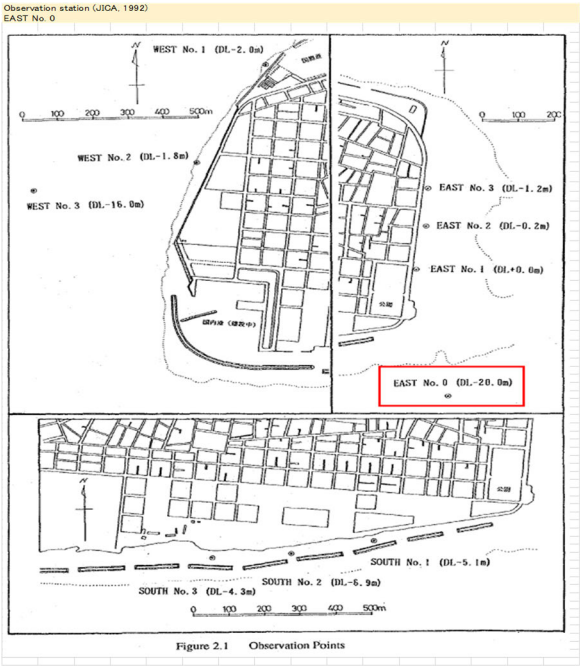


図 D－1－3
1 年間の波浪観測(1991 ~1992)の実施された東海岸沖の観測位置図

JICA が実施した「マレ島護岸開発調査」の中で、1 年間の波浪観測(1991 ~1992)の実施された東海岸沖の観測データと、図 2 の ECMWF（ヨーロッパ中期予報センター）の作成した全球モデルの再解析データの ENE、N、ESE, SE と SSE の波として解析されたデータの内、1991 年～1992 年の同日時の解析データを比較することで、その値の相関関係式を導き出し、ECMWF（ヨーロッパ中期予報センター）の作成した全球モデルの再解析データ、ERA5（1992～2021）の 30 年間のデータを東海岸の沖波（有義波）に換算することとした。

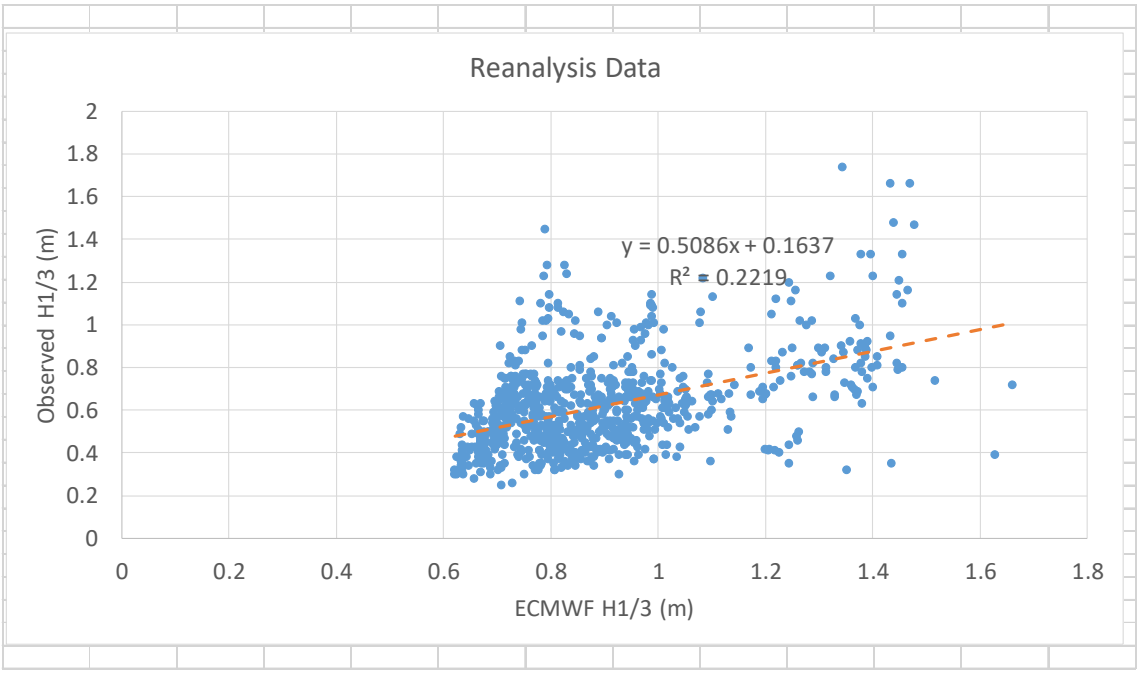


図 D－1－4　1991 年～1992 年の同日時の解析データを比較と相関関係式

図 D－1－4 の比較の結果、以下の相関関係式が導き出された。

$y = 0.5086x + 0.1637$、　$R^2 = 0.2219$

したがって、上記の相関式を基に、ECMWF（ヨーロッパ中期予報センター）の作成した全球モデルの 30 年間の再解析データを調整したデータを示す図を以下に作成した。

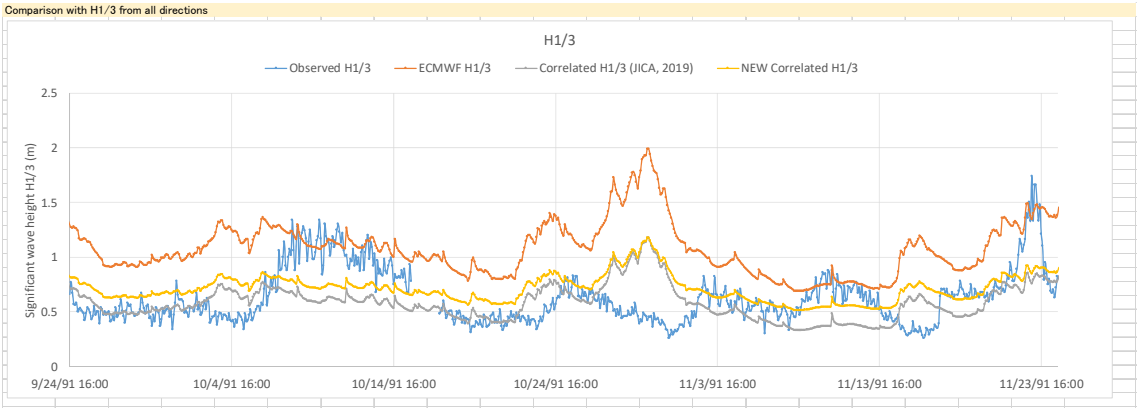


図 D－1－5　全球モデルの 30 年間の再解析データを調整し換算沖波とした図

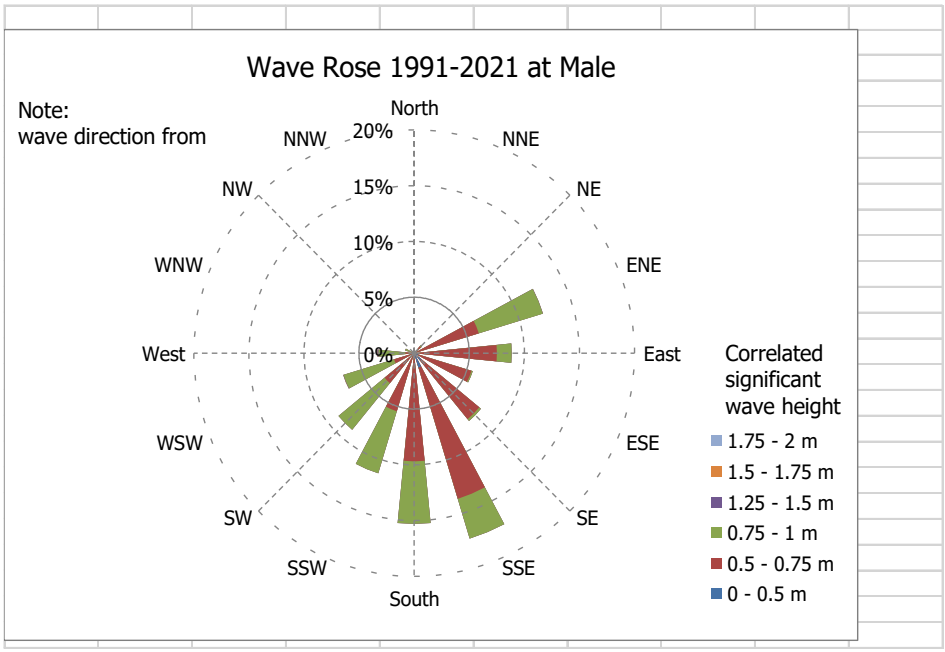


図 D－1－6　H1/3 (m)を基本にした全球モデル 30 年間の再解析データ調整結果

上記の換算沖波（有義波高）をもとに、30 年、50 年及び、100 年確率における東海岸の有義波が、以下の表のように計算された。

表 D－1 - 1　ECMWF 全球モデル再解析データを基にした東海岸の換算有義波高

Return period (year)	Return value of correlated H1/3 (m)				
	E	ESE	SE	SSE	OMNI (all direction)
30	1.11	0.97	0.97	1.28	1.65
50	1.15	1.00	1.00	1.35	1.71
100	1.20	1.05	1.05	1.44	1.80

出典：調査団

D－1－3.　「対象区域別、東海岸のリーフ上の波高の減衰計算書」

マレ島海岸の設計に用いる潮位は、MSL＝±0.0m としているので、高潮位 HWL は DL＝＋0.57ｍとなっているが、東海岸は常時のうねりが卓越して、リーフ上に伝搬しており、うねりの波による潮位上昇（Wave setup）が発生している。東海岸における潮位上昇（Wave setup）は、以下のように計算された。

Wave setup (y_o)=0.1x $H_{1/3}$= 0.1x 3.0= 0.3m

したがって、東海岸の潮位は以下の潮位として設計する

ＨＷＬ＝0.57＋0.3＝DL＋0.87m

ＭＳＬ＝0.0＋0.3＝DL＋0.30m

ＬＷＬ＝－0.64＋0.3＝DL－0.34m

マレ島東海岸におけるリーフ上の波の減衰を計算するにあたり、提前波（設計波高）を求めるために、リーフエッジから護岸前面までの距離と、そのリーフフラット（リーフ）の水深、及びリーフの勾配における深浅係数を、各護岸の区域別に分けて、第２次マレ島護岸建設計画（東海岸，1996 ）の測量図をもとに、以下のように確認した、



図　D－1－7.　リーフエッジから護岸前面までの距離と区域分け図　（出典：調査団）

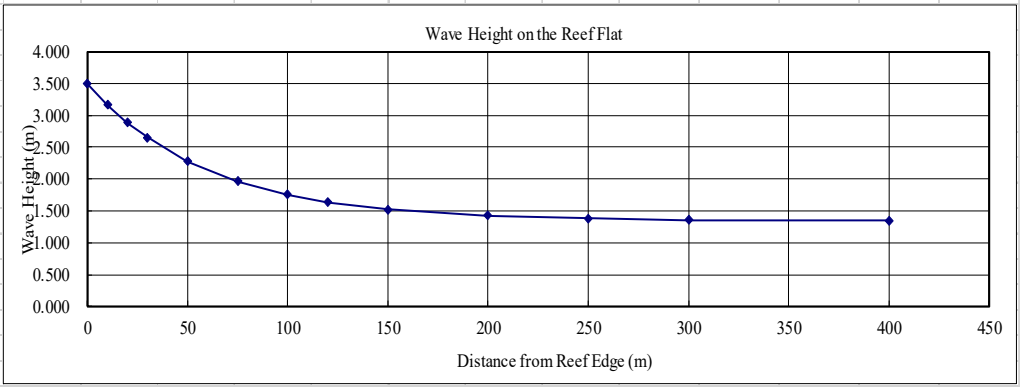
A 区域（砂堆積、越流・飛砂区域）
：リーフからの距離 400m、平均リーフ水深 3.5m、深浅係数 1.17
B 区域（越波、人工ビーチ南側）
：リーフからの距離 120m、平均リーフ水深 2.6m、深浅係数 1.25
C 区域（越波、人工ビーチ北側）
：リーフからの距離 95m、平均リーフ水深 2.6m、深浅係数 1.25
D 区域（東海岸最北端）
：リーフからの距離 135m、平均リーフ水深 2.6m、深浅係数 1.25

上記の計測値から、リーフ上の波の減衰を計算し、提前波（設計波）Ho を求めた。

A 区域（砂堆積、越流・飛砂区域）：　Ho＝1.35m

Wave Height on the Reef Flat and Rise in Mean Water Level								**Male' East Coast Surf Area (400 from Reaf Edge)**					
$H_{1/3}/H_o'$ =	B exp[$-AX/H_o'$] + ah_2/H_o'												
	(Source: Technical Note of the Port and Harbor Research Institute, No.278, Ministry of Transport, Japan)												
H_o':	Offshore Wave Height	3.00	(m),	Wave Period	14.5	(sec)							
H_o'/L_o:	Wave Steepness	0.009			Wave Set-up=	0.3m							
$H_{1/3}$:	Wave Height (m) on the Reef Flat at the distance X (m) from Reef Edge												
h_2:	Water depth (m) including Wave Set-up on the Reef Flat sufficiently distant from the Reef Edge												
h_o:	Still Water Depth (m) on the Reef Flat	3.5	(at HWL)	h_o/L_o =	0.011								
A:	a constant ranging 0.05～0.3 proportional to H_o'/h_2	0.05											
a:	0.33 (H_o' > 3 m),	0.20 (2 m < H_o'< 3 m)	0.33										
B =	$H_{1/3}$ (at X = 0)/H_o' - ah_2/H_o'												
h_2/H_o' =	$0.989([(h_o + y_o)/H_o']^2 + 0.21[H_{1/3}$ (at X=0)/$H_o']^2)^{0.5}$												
$H_{1/3}$(at X=0):	3.495	Shoaling Coefficient K_s =	1.17										
y_o:	0.300	Rise in mean water level: y_o/H_o' =	0.1										
h_2/H_o' =	1.359												
B =	0.716												

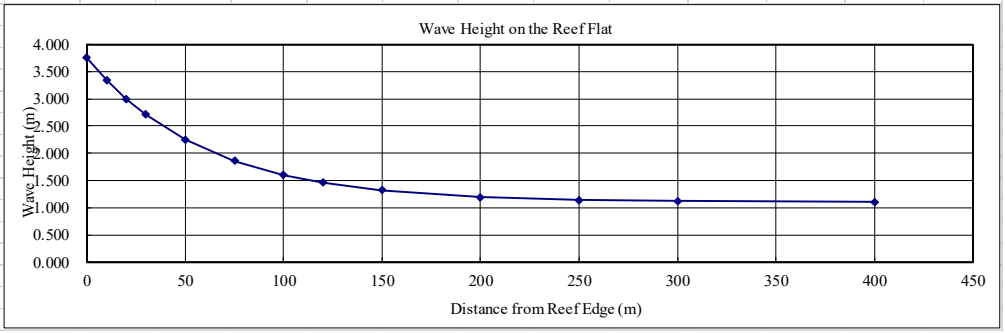
X (m)	0	10	20	30	50	75	100	120	150	200	250	300	400
$H_{1/3}$ (m)	3.495	3.165	2.886	2.649	2.280	1.962	1.752	1.637	1.522	1.423	1.379	1.360	1.349



B 区域（越波、人工ビーチ南側）：Ho＝1.46m

Wave Height on the Reef Flat and Rise in Mean Water Level						Male' East Coast Reclaimed Area (120m from Reaf Edge)							
$H_{1/3}/H_o'$ =	B exp[-AX/H_o'] + ah_2/H_o'												
	(Source: Technical Note of the Port and Harbor Research Institute, No.278, Ministry of Transport, Japan)												
H_o':	Offshore Wave Height			3.00	(m),	Wave Period	16.0	(sec)					
H_o'/L_o:	Wave Steepness			0.008			Wave Set-up=		0.3m				
$H_{1/3}$:	Wave Height (m) on the Reef Flat at the distance X (m) from Reef Edge												
h_2:	Water depth (m) including Wave Set-up on the Reef Flat sufficiently distant from the Reef Edge												
h_o:	Still Water Depth (m) on the Reef Flat				2.6	(at HWL)	h_o/L_o =	0.007					
A:	a constant ranging 0.05～0.3 proportional to H_o'/h_2					0.05							
a:	0.33 (H_o' > 3 m),	0.20 (1 m < H_o'< 3 m)				0.33							
B =	$H_{1/3}$ (at X = 0)/H_o' - ah_2/H_o'												
h_2/H_o' =	$0.989([(h_o + y_o)/H_o']^2 + 0.21[H_{1/3}$ (at X=0)/$H_o']^2)^{0.5}$												
$H_{1/3}$(at X=0):	3.750			Shoaling Coefficient K_s =		1.25							
y_o:	0.300			Rise in mean water level: y_o/H_o' =		0.1							
h_2/H_o' =	1.111												
B =	0.883												

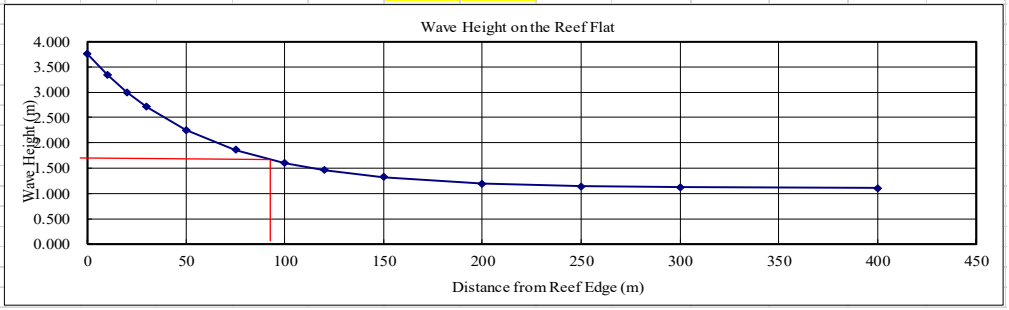
X (m)	0	10	20	30	50	75	100	120	150	200	250	300	400
$H_{1/3}$ (m)	3.750	3.343	2.999	2.707	2.252	1.859	1.601	1.459	1.318	1.195	1.141	1.118	1.104



C 区域（越波、人工ビーチ北側）：Ho＝1.65m

Wave Height on the Reef Flat and Rise in Mean Water Level						Male' East Coast Reclaimed Area (95m from Reaf Edge)							
$H_{1/3}/H_o'$ =	B exp[-AX/H_o'] + ah_2/H_o'												
	(Source: Technical Note of the Port and Harbor Research Institute, No.278, Ministry of Transport, Japan)												
H_o':	Offshore Wave Height			3.00	(m),	Wave Period	16.0	(sec)					
H_o'/L_o:	Wave Steepness			0.008			Wave Set-up=		0.3m				
$H_{1/3}$:	Wave Height (m) on the Reef Flat at the distance X (m) from Reef Edge												
h_2:	Water depth (m) including Wave Set-up on the Reef Flat sufficiently distant from the Reef Edge												
h_o:	Still Water Depth (m) on the Reef Flat				2.6	(at HWL)	h_o/L_o =	0.007					
A:	a constant ranging 0.05～0.3 proportional to H_o'/h_2					0.05							
a:	0.33 (H_o' > 3 m),	0.20 (1 m < H_o'< 3 m)				0.33							
B =	$H_{1/3}$ (at X = 0)/H_o' - ah_2/H_o'												
h_2/H_o' =	$0.989([(h_o + y_o)/H_o']^2 + 0.21[H_{1/3}$ (at X=0)/$H_o']^2)^{0.5}$												
$H_{1/3}$(at X=0):	3.750			Shoaling Coefficient K_s =		1.25							
y_o:	0.300			Rise in mean water level: y_o/H_o' =		0.1							
h_2/H_o' =	1.111												
B =	0.883												

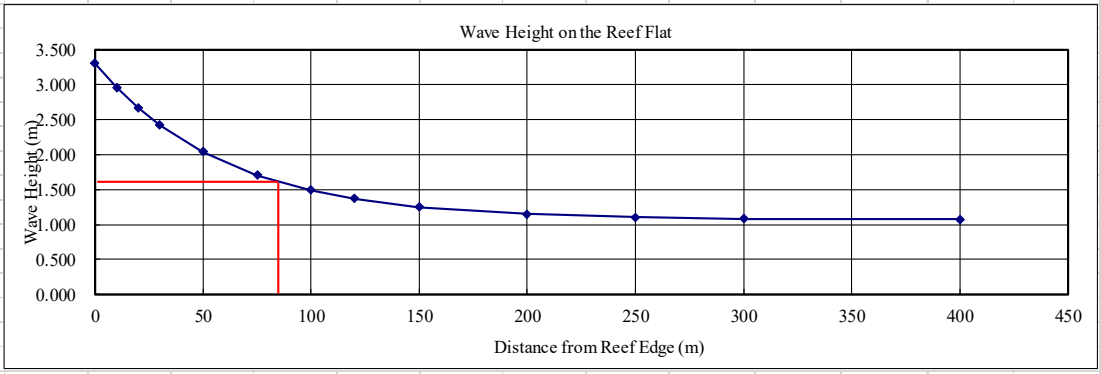
X (m)	0	10	20	30	50	75	100	120	150	200	250	300	400
$H_{1/3}$ (m)	3.750	3.343	2.999	2.707	2.252	1.859	1.601	1.459	1.318	1.195	1.141	1.118	1.104



D 区域（東海岸最北端）：Ho＝1.60m

Wave Height on the Reef Flat and Rise in Mean Water Level						Male' East Coast Reclaimed Area (85 m from Reaf Edge)							
$H_{1/3}/H_o'$ =	B exp[-AX/H_o'] + ah_2/H_o'												
	(Source: Technical Note of the Port and Harbor Research Institute, No.278, Ministry of Transport, Japan)												
H_o':	Offshore Wave Height	3.00	(m),	Wave Period	16.0	(sec)							
H_o'/L_o:	Wave Steepness	0.008			Wave Set-up=	0.3m							
$H_{1/3}$:	Wave Height (m) on the Reef Flat at the distance X (m) from Reef Edge												
h_2:	Water depth (m) including Wave Set-up on the Reef Flat sufficiently distant from the Reef Edge												
h_o:	Still Water Depth (m) on the Reef Flat	2.6	(at HWL)	h_o/L_o =	0.007								
A:	a constant ranging 0.05～0.3 proportional to H_o'/h_2			0.05									
a:	0.33 (H_o' > 3 m),	0.20 (1 m < H_o'< 3 m)		0.33									
B =	$H_{1/3}$ (at X = 0)/H_o' - ah_2/H_o'												
h_2/H_o' =	$0.989([(h_o + y_o)/H_o']^{-2} + 0.21[H_{1/3}$ (at X=0)$/H_o']^{-2})^{-0.5}$												
$H_{1/3}$(at X=0):	3.300		Shoaling Coefficient K_s =	1.10									
y_o:	0.300		Rise in mean water level: y_o/H_o' =	0.1									
h_2/H_o' =	1.078												
B =	0.744												

X (m)	0	10	20	30	50	75	100	120	150	200	250	300	400
$H_{1/3}$ (m)	3.300	2.957	2.667	2.422	2.038	1.707	1.489	1.370	1.251	1.147	1.102	1.082	1.070



D－1－4.　「東海岸の砂堆積区域の波の遡上計算」

マレ島東海岸の砂礫堆積区域における現状の波浪・地形条件

同地域における潮位、堆積砂礫の勾配、設計波、リーフの平均勾配は以下の通りである。

- High Water Level (HWL): +0.57m+0.3m(Setup) = +0.87[m] (mid tide level is set as 0+0.3m setup)
- Slope gradient (θ): 1/6~1/7 (Adopted 1/7)
- Wave high (H'_0): 1.35[m] (Design wave height on the reef-flat)
- Wave period (T): 7[s] (Average shore wave period on the reef-flat)
- Seabed slope: 1/50





写真 D－1 - 1.　East coast (sand accumulation area)　（出典：調査団）

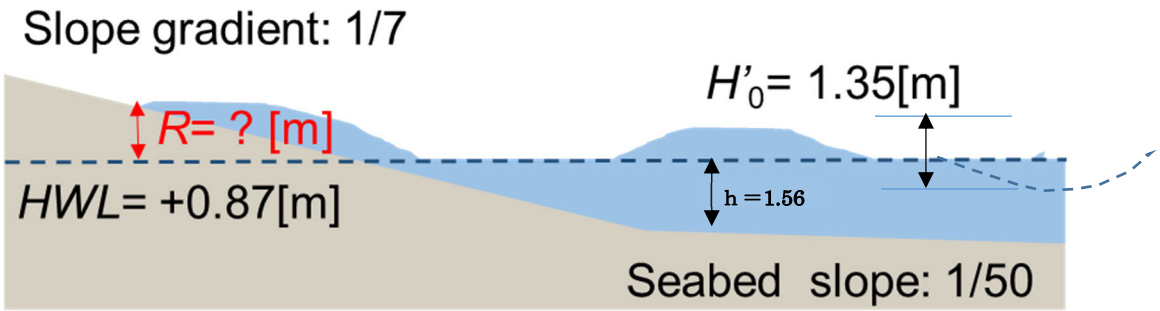


図 D－1－7.　Current wave conditions of East coast　（出典：調査団）

波の遡上高の計算

初めに、設計波の波長を以下の計算式より求める。

$$L_0 = \frac{gT^2}{2\pi} = \frac{9.81}{2\pi} \times 7^2 = 76.50[m]$$

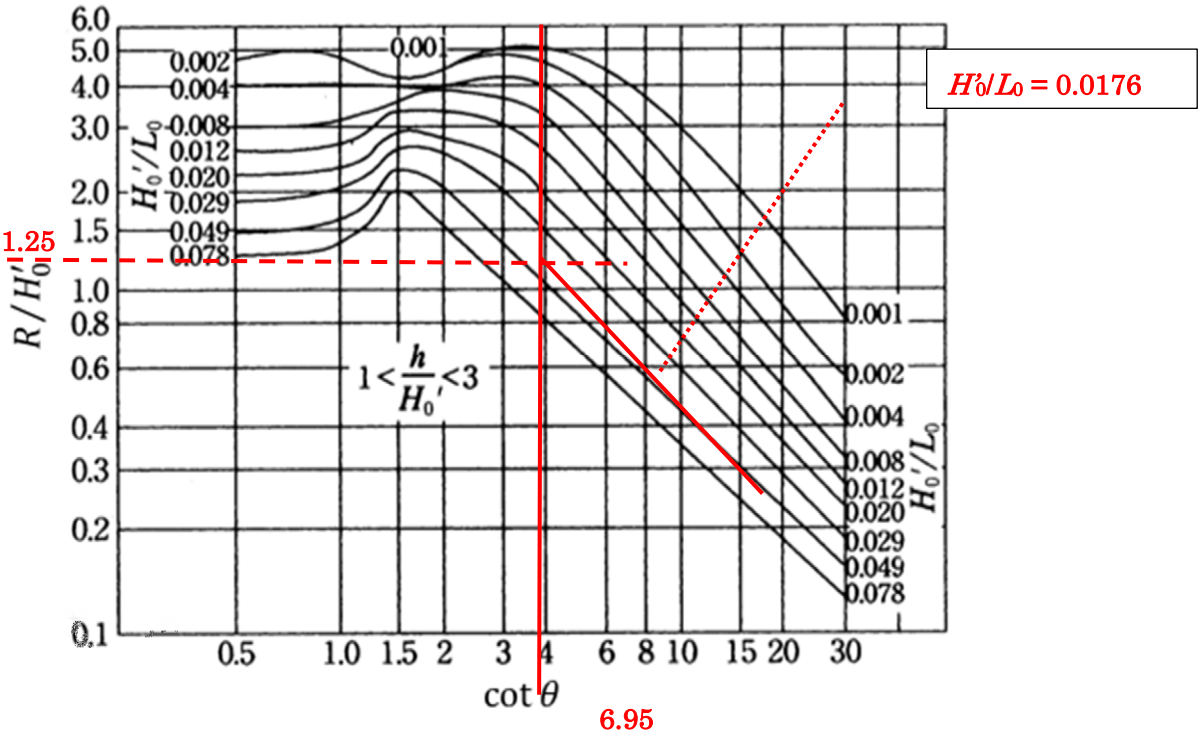
次に設計波の波形勾配（H'_0/L_0）と cot θ. を計算する。

$$\frac{H'_0}{L_0} = \frac{1.35}{76.50} = 0.0176$$

$$\cot\theta = 6.95$$

本区域の堆砂区域の斜面底高（リーフ）高は、約 DL－0.7m であり、HWL 時の水深＝0.87＋0.7＝1.56m となる。従って、h/Ho’＝1.15 であり、水深が波高より深く、且つ水深が波高の 3 倍以下の場合、以下の実験値の相関図から、波の遡上限界高を求める

$$\frac{R}{H'_0} \approx 1.25$$



したがって、波の遡上限界高は、以下ように求められる。

$$R = 1.25 \times H'_0 = 1.25 \times 1.35 = 1.69[m]$$

波の遡上の限界到達高（RDL）

波の遡上到達高（DL）は、DL max= HWL+R= +0.87 m+1.69 m　**=DL + 2.56 m　となる**

D－1－5.　「東海岸の既存護岸の算定越波量と妥当性の検証」

越波量の妥当性の検証において、調査時に越波量の測定が出来ないので、現状の越波量は、越波時のビデオと写真を参考にして越波量を想定し、その越波の堤前波高から越波量を計算して双方の値を比較し、計算値の妥当性を以下に検証した。

越流箇所においては、DFR に土嚢の写真を掲載し、土嚢を積んだ箇所は越流を防げていることから、波の遡上高は、護岸より土嚢２段分（約 25 ㎝）以下の高さ（DL＋2.5）まで遡上したことを前提として、越流量の妥当性を検証した。

サーフィン堆砂区域の越流量の検証（砂堆積区域、A 区域 ）



写真 D－1－2



写真 D－1－3

2022 年 10 月 4 日（出典：調査団撮影）東海岸南端（砂の堆積、越流区域）

写真 D－1－2 は土嚢 2 段の厚さ約 25 ㎝（土嚢 1 つの厚さ 12 ㎝程度)、護岸高＋2.3m（土嚢天端＋2.55m)、写真 7－1－3 は、土嚢が崩れて 1 段となった箇所の歩道側に飛砂が堆積しているのが確認された。



写真 D－1－4　越流時の写真　（2019 年モルディブ政府撮影写真提供）

最も堆積砂の多かった時期(2018 年～2019 年)(津波以降 2005～2021 年で最大の越波) 護岸高（＋2.3m）の上の土嚢 2 段積み天端高（＋2.55m）の上を 5 ㎝程度越流（堆積砂の上を遡上した波が＋2.6m まで達した）写真の想定越波量は、1m x 1m x 0.05m＝0.05m3（50 リッター）/m/s　と見積もられる。(土嚢が無かった場合は、1m（幅）x 1.5 m（1 波当たりの越流長 x 0.3m（越流高）＝0.45m3/m/s と見積もられる。)

東海岸の越波量の検証（モスクのある区域　C 区域、B 区域）



写真 D－1－5　東海岸のモスクの南側の越波の大きい区域

（出典：マレ首都圏気象災害情報収集・確認調査団撮影）

2021 年 12 月にマレ首都圏気象災害情報収集･確認調査団撮影（波高は目視で 1.2m～1.3m程度）
推定越波量は、1 波の護岸 1m当たりの越波量として、0.002～0.003 m3（約 2～3 リッター）/m/s と推定される。（満潮時）
（写真手前の護岸高＋2.4m、前面の捨て石高＋2.7m で天端幅約 3m、越波している場所の捨て石高＋2.4mで天端幅約 2.5m）



写真 D－1－6　東海岸のモスクの南側と人口ビーチの北側の間の越波の大きい区域
出典：2021 年 12 月にマレ首都圏気象災害情報収集・確認調査団撮影

推定越波量は、1 波の護岸 1m 幅当たりの越波量として、0.002～0.003 m3（約 2～3 リッター）/m/s と推定される。この時点の波高は、目視で約 1.3m程度とのこと（満潮時）
（護岸高＋2.4m、1 列目の消波ブロック高＋2.1m、2 列目の消波ブロック高＋1.8m）

サーフィン区域の越流量の検証（砂堆積区域以外の護岸、A 区域）



写真 D－1－7　東海岸の最南端のサーフィン開催区域

2022 年 10 月 16 日撮影（ビデオからピックアップ）、潮位＝＋0.6m、波高約 0.8m　越波量推定約 0.00002m3/m/s（0.02 リッター/m/ｓ）護岸高+2.3m

東海岸最北端の越流量の検証（越波区域、D 区域）



写真 D－1－8　東海岸最北端（レストラン前）の消波ブロックが 30 沈下している区域

2022 年 10 月 16 日撮影（ビデオからピックアップ）、潮位＝＋0.6m、波高約 1.0m
推定越波量：0.0001m3（0.1 リッター）/m/s　（護岸高＋2.1m）

上記の写真①～⑥による推定越波量と、護岸状況を基に計算した越波量の比較

表 D－1 - 2　越波写真からの越波量と算定値の比較表

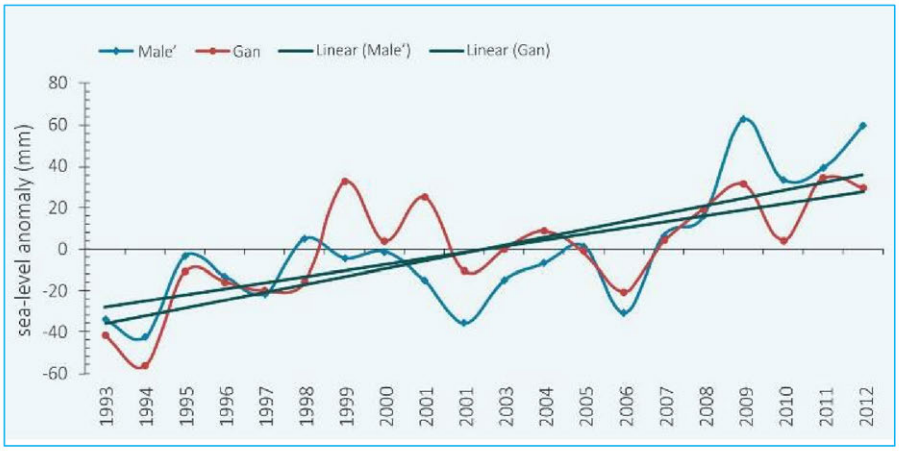
対象区域	越波量の計算値 2019 年～2022 年		写真から推定した現状の越波量 2019 年～2022 年	
	計算越波量 （m3/s/m）	天端高 （m）	越波量（m3/s/m）	天端高 （m）
A 区域、越流区域、砂の堆積区域 写真 7－1－4　区間 30m	0.48 波の遡上高計算値＋2.56m	＋2.3	0.45 推定波の越波高＋2.6m	＋2.3
A 区域　区間約 160m 写真 7－1 - 7	越波無し（0.0 ） 波高を 0.8m で計算	＋2.3	0.00002 （ビデオから推定波高 0.8m）	＋2.3
B 区域（東側）約 40m	0.003	＋2.6	越波の写真なし	＋2.6
C 区域（離岸堤の無い区域）約 88m　写真 7－1－6	0.002 波高を 1.3m で計算	＋2.4	0.003 （推定波高 1.3m）	＋2.4
D 区域　最北端 約 96m　写真 7－1－8	0.0002 波高を 1.0m で計算	＋2.1	0.0001 （ビデオから推定波高 1.0m）	＋2.1

上記の越波量の計算値と写真（ビデオ含む）の推定越波量の比較した結果、波高に対しての護岸形状による越波量の計算値は、大きな相違はなく妥当と判断される。

D－1－6　既設護岸における越波量の増加傾向の要因

（1）最高潮位の増加

近年で越波量が増加している要因としては、過去に比べて、最高潮位高が高くなっていることが、追加要因として挙げられる。以下のマレ島での潮位上昇のグラフを見ると、2001 年から 2008 年までは、潮位は上がっておらず、逆に平均の潮位上昇値より潮位が下がっている。また、2009 年の年平均潮位は高く、過去の平均潮位より 20 ㎜～40 ㎜（平均 2 ㎝～4 ㎝）以上昇し増加傾向にある。2009 年以降は高潮位として、平均高潮位より 5 ㎝　程度高い高潮位が、年間 1～3 回観測されている事も 2009 年以降の越波量増加の要因となっている。



出典：Second National Communication of Maldives to th UN Framework Convention on Climate Change (Oct.2016) SNC レポート

図 3-1.22　1993 年から 2012 年までのモルディブの潮位記録

また、2017 年～2021 年の 5 年間の毎月の潮位記録を見ても、最高潮位が（平均高潮位より 5 ㎝～10 ㎝高い）年間 1～3 回確認された月があり、2008 年以前と、2009 年以降では、最高潮位が大きく異なり、その差は 2009 年以降の方が 10 ㎝～15 ㎝高いことが確認された。2008 年以前に比べ 2009 年以降に高潮位が発生していることについては、過去からの沖波高の変化とは直接的な関係はなく、越波量の増加の要因となっていると言える。近年において高潮位が 10 ㎝程度高い値を年間 1～3 回確認している影響として、計算上の越波量は、建設当時と比べて約 1.8 倍に増加していると試算できる。**3－2－2－1　マレ島護岸改修の施設計画で越波量の算定値として、最高潮位（HWL）が 10 ㎝増加すると、越波量の計算図から約 1.5～2.2 倍（平均 1.8 倍）増加すると試算できる。**

また、本事業の設計において、将来的に 50 年後の地球温暖化による海面上昇を 22 ㎝考慮していることと、2021 年の最高潮位を HWL に設定していることから、この高潮位増加と海面上昇は、本計画の設計上で考慮されているので今回の設計上に問題とはならない。

（2）護岸の消波ブロックの沈下と消波ブロック間への砂礫堆積

インド洋津波（2004 年）において、その波力の影響から東護岸の消波ブロックの 2 段目が海側にズレ落ちて、消波ブロックの天端が部分的に 20 ㎝～30 ㎝下がっていることが確認された。また、約 20 年間の間に、珊瑚の砂礫が消波ブロックの隙間に堆積し、消波機能の低下を招いている。消波ブロック天端が下がったことと、消波ブロック間の隙間がなくなったことにより、越波量の計算上で、捨て石護岸とほぼ同等まで、消波機能が低下したことにより、以下のように越波量が約 1.4 倍増加したと試算できる。

消波ブロック 2 段積で勾配 1：4/3 の Kd 値＝8.3（被災率 0～1）と、捨て石護岸の勾配 1：1.5 で 2 個積みの Kd 値は凡そ 6（被災率 0～1）となり、その差は約 1.4 倍となる。また、捨て石護岸と消波護岸の波の反射率は、同じ勾配では、ほぼ同じ値となっており、消波護岸における越波流量算定値の 1.4 倍の越波量となる。（**3－2－2－1　マレ島護岸改修の施設計画　参照**）

上記（1）と（2）の要因により、越波量増加の試算から、既存の護岸における越波量は、約 2.5 倍増加したと試算できる。

[資料 E]

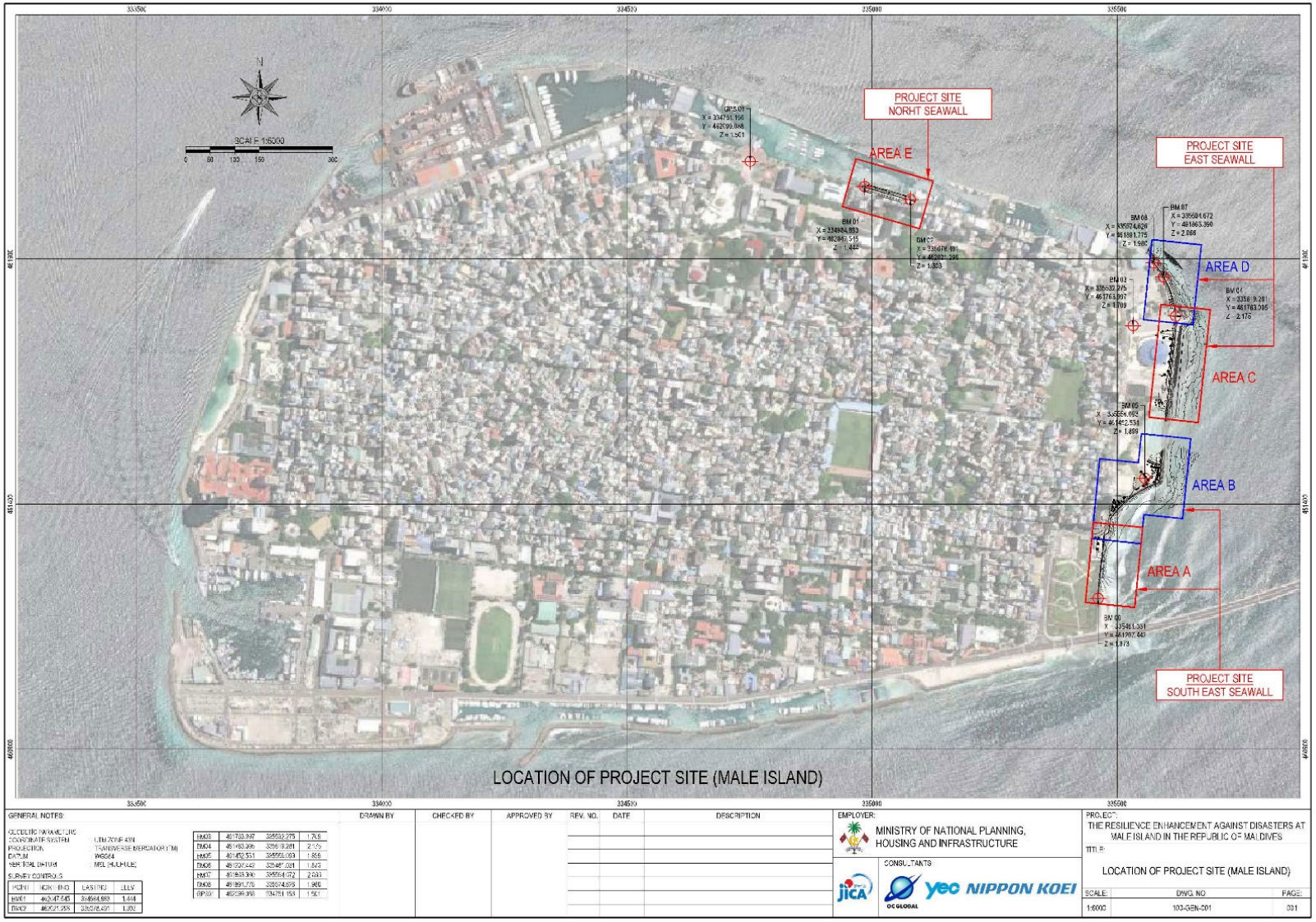
E-1. 参考資料　概略設計図（護岸コンポーネント）

E-2. 参考資料　概略設計図（雨水排水コンポーネント）

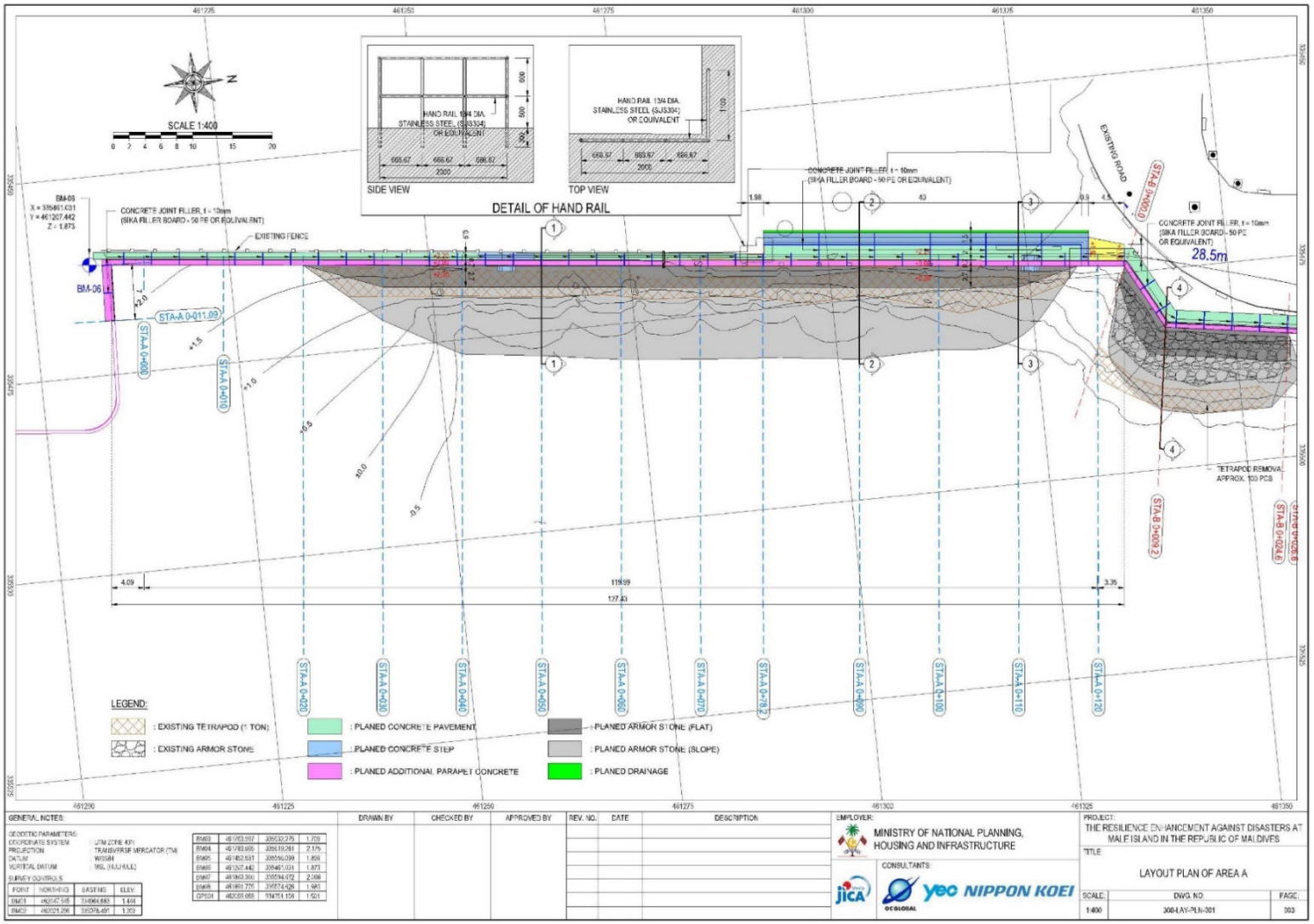
[資料 E]

E-1. 参考資料　概略設計図（護岸コンポーネント）

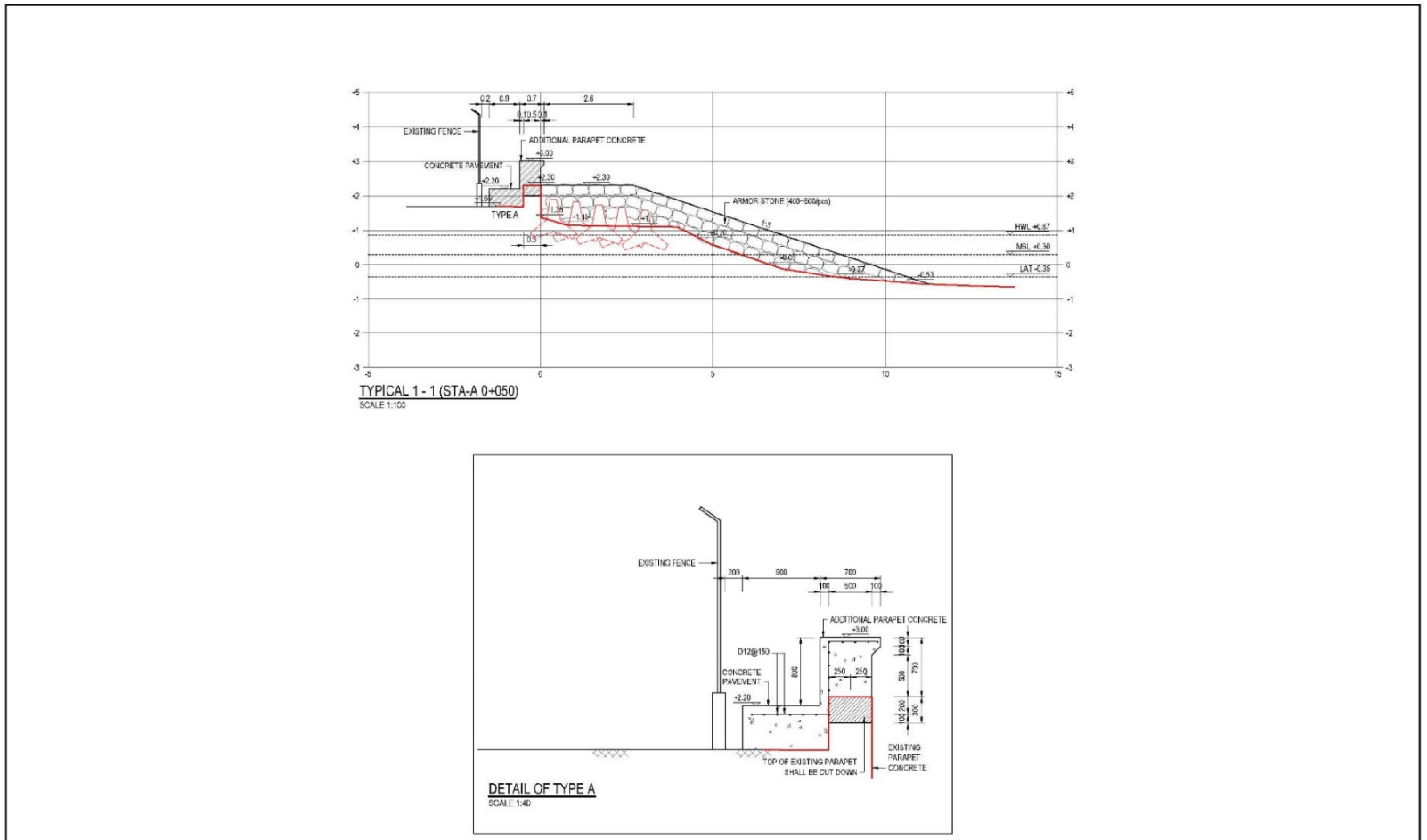
E-2. 参考資料　概略設計図（雨水排水コンポーネント）



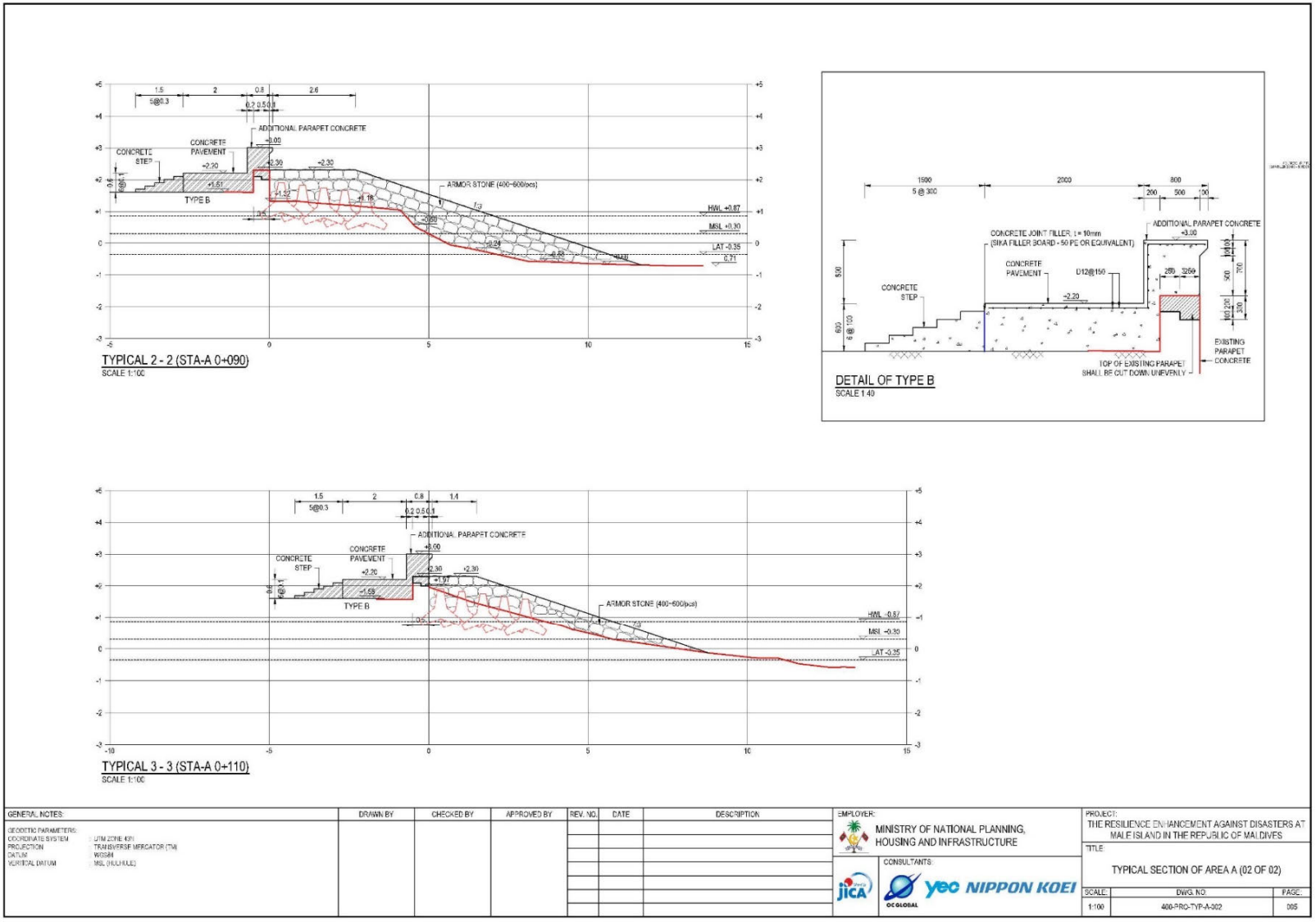
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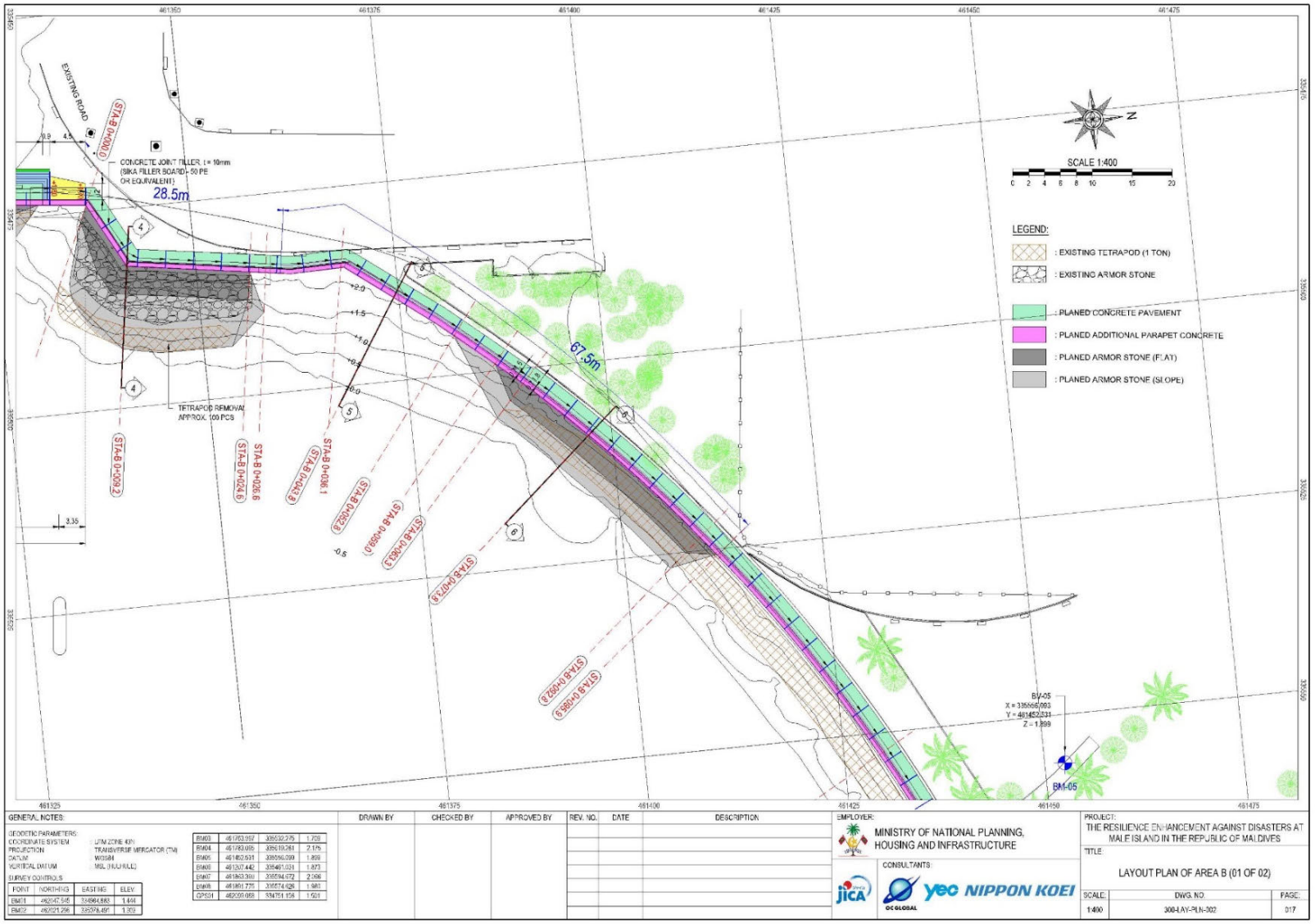
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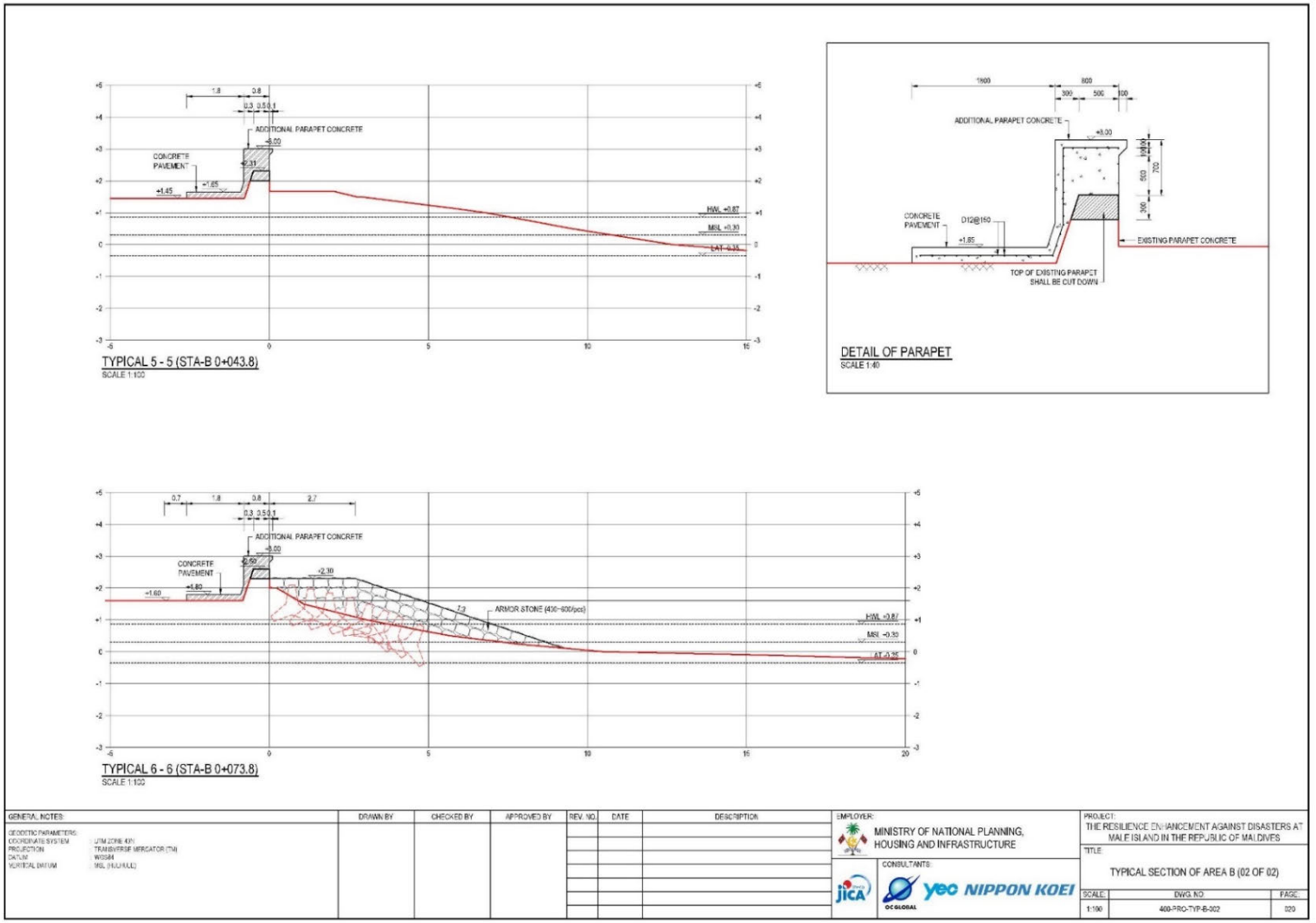
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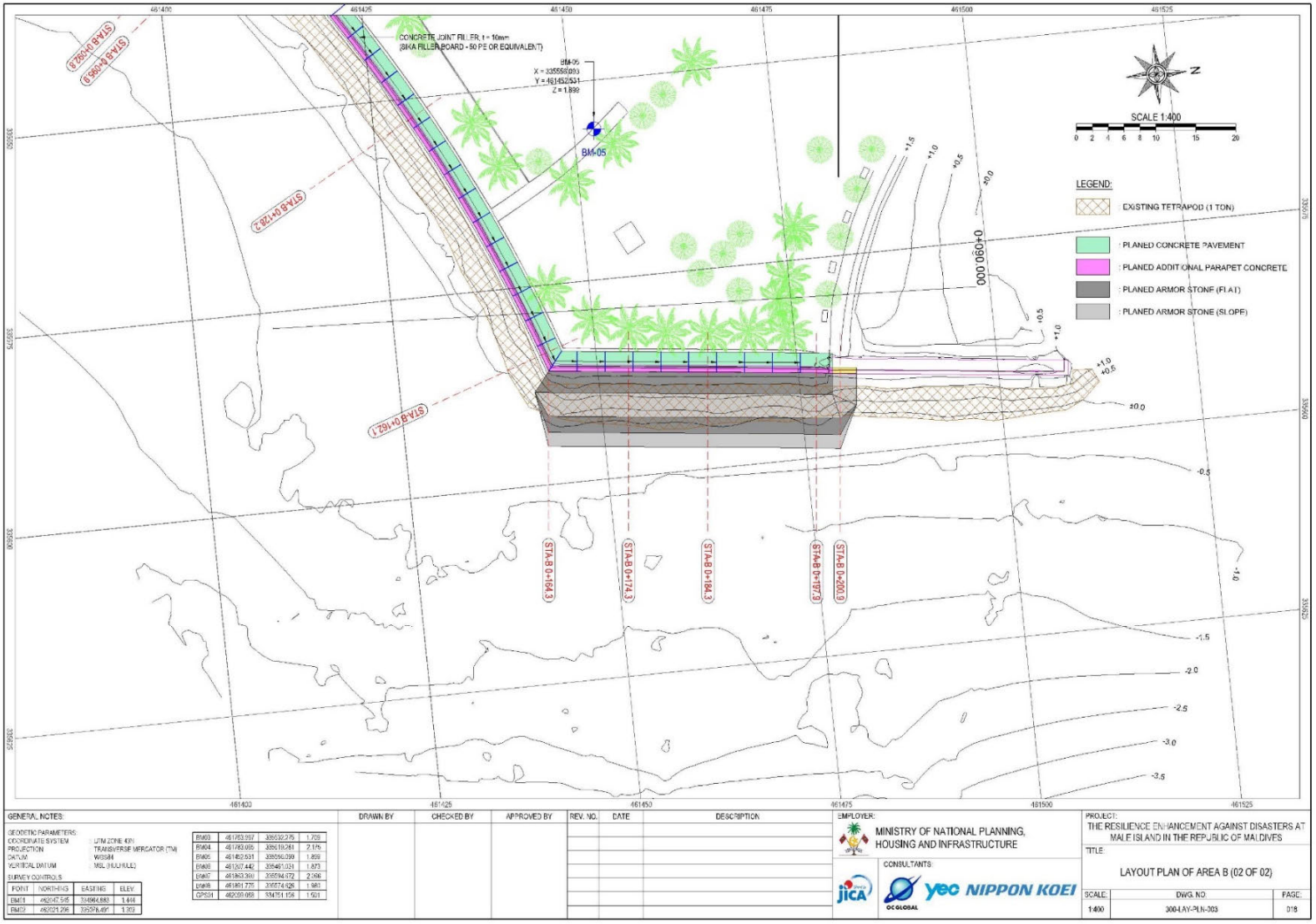
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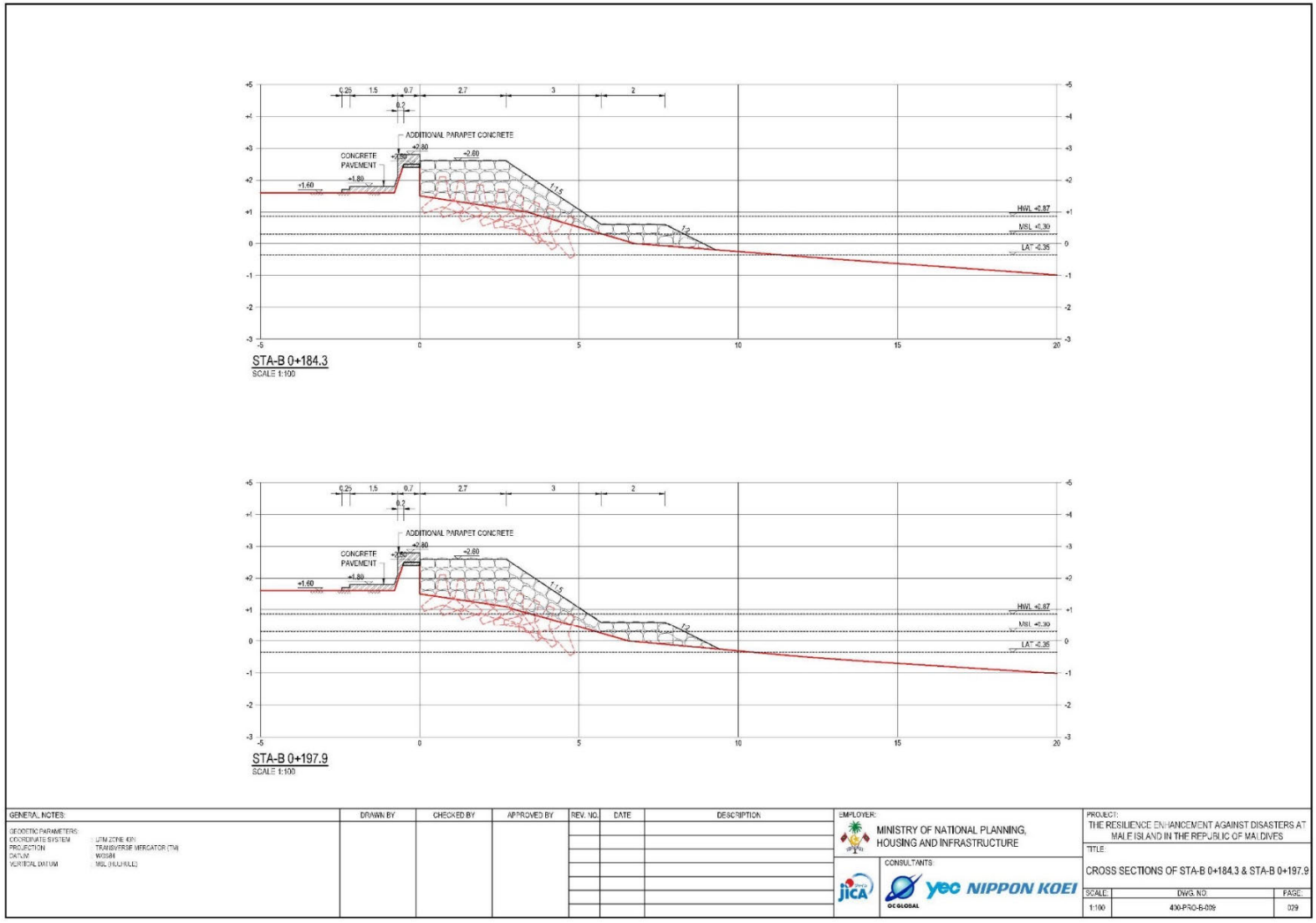
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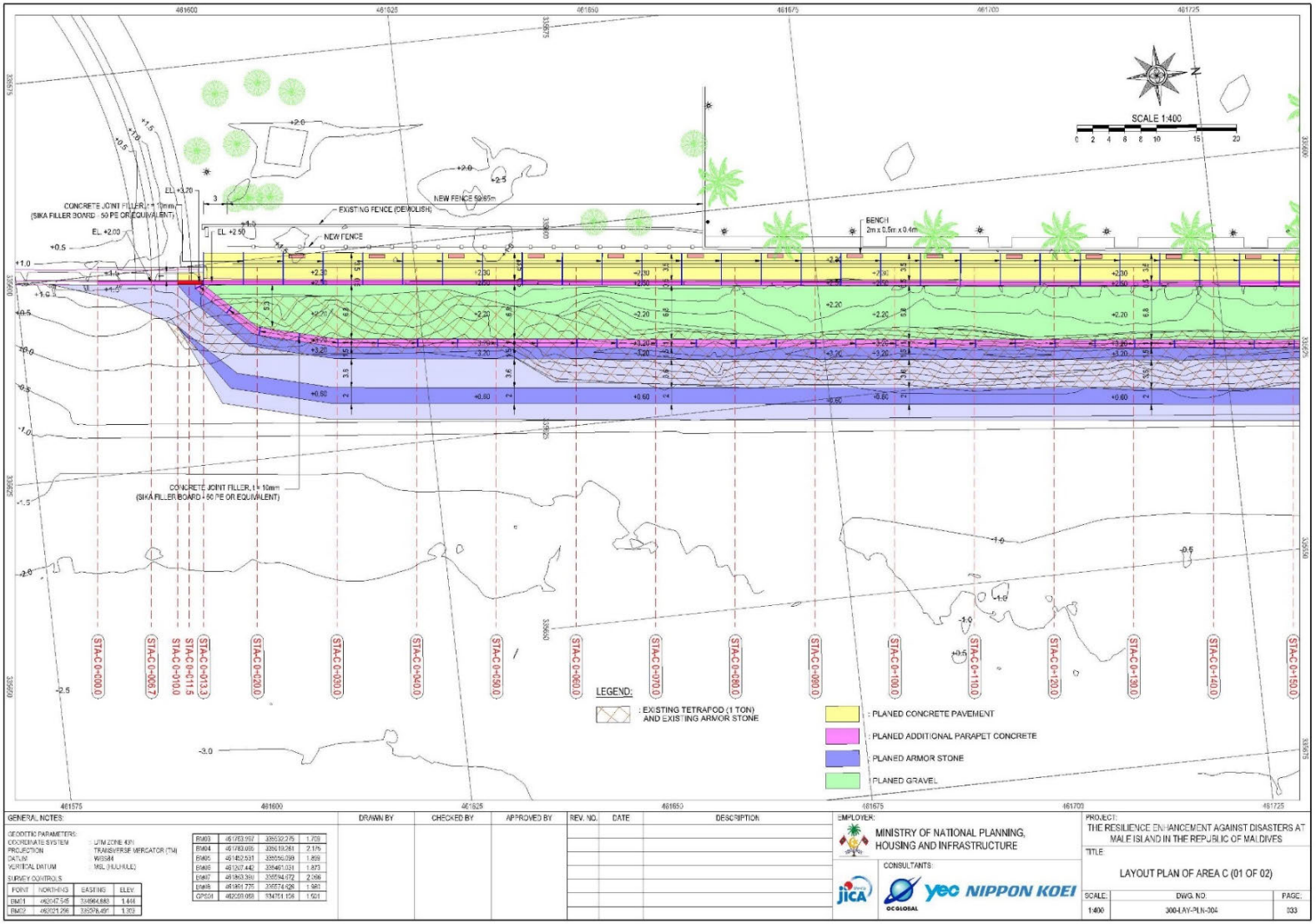
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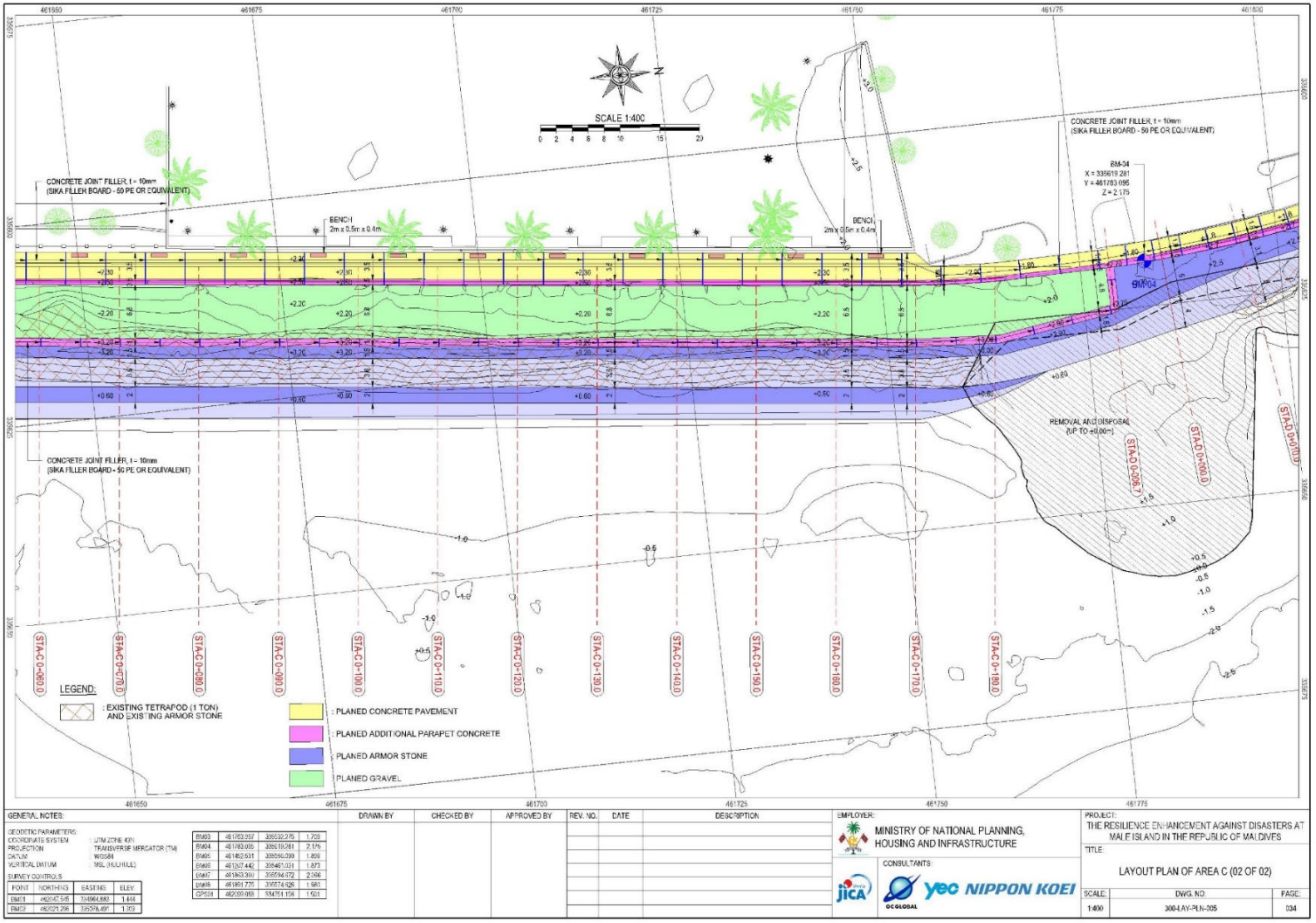
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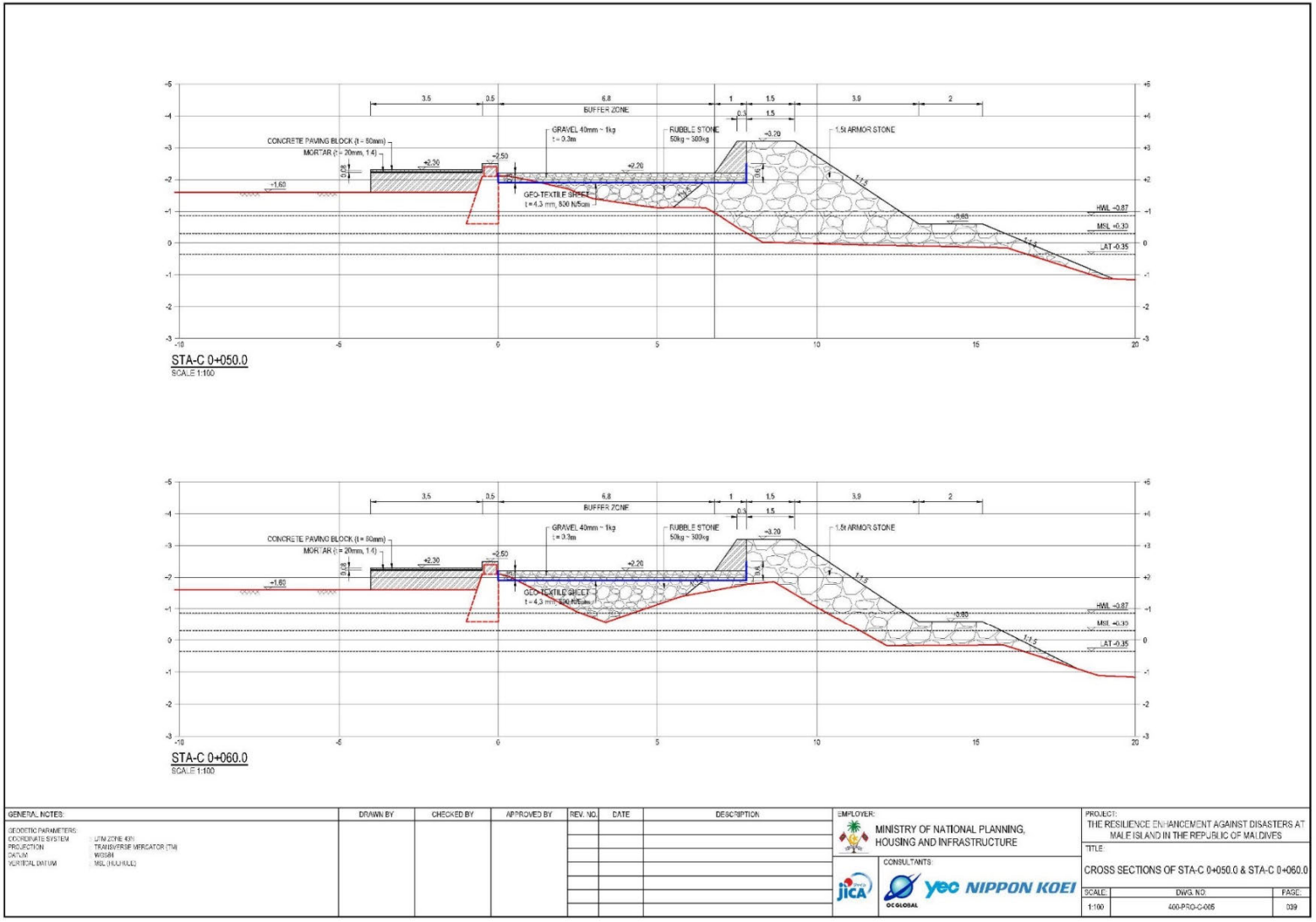
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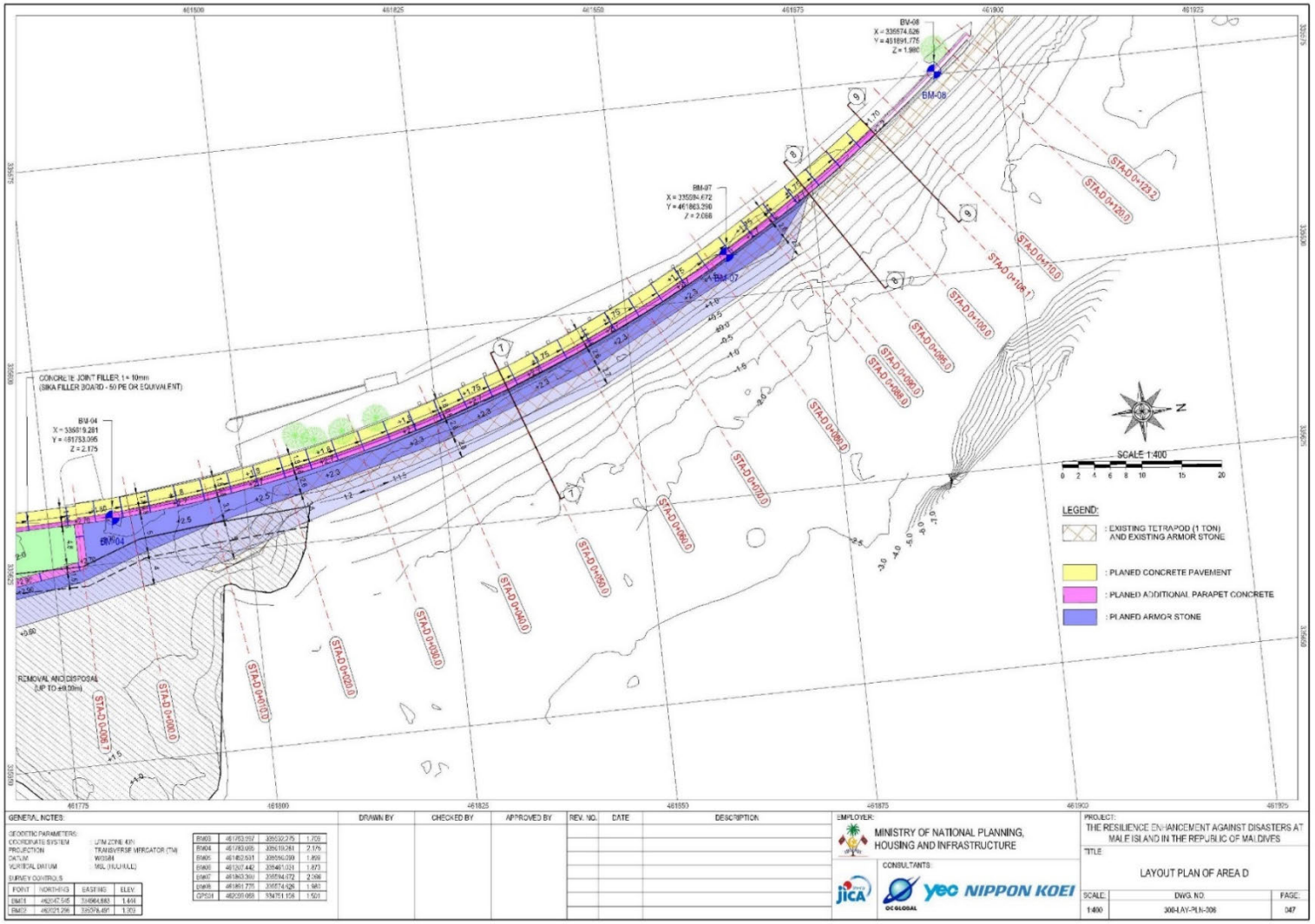
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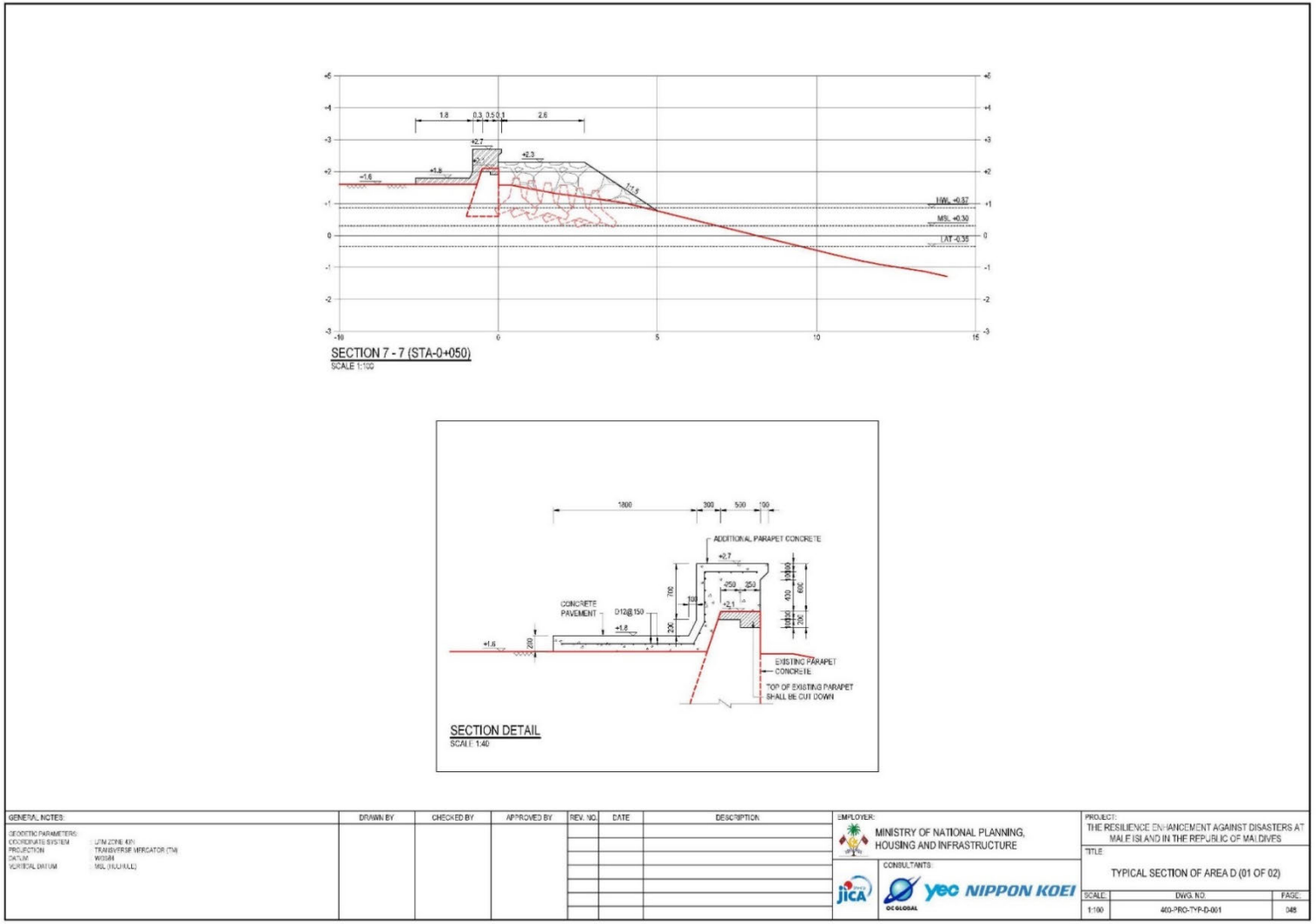
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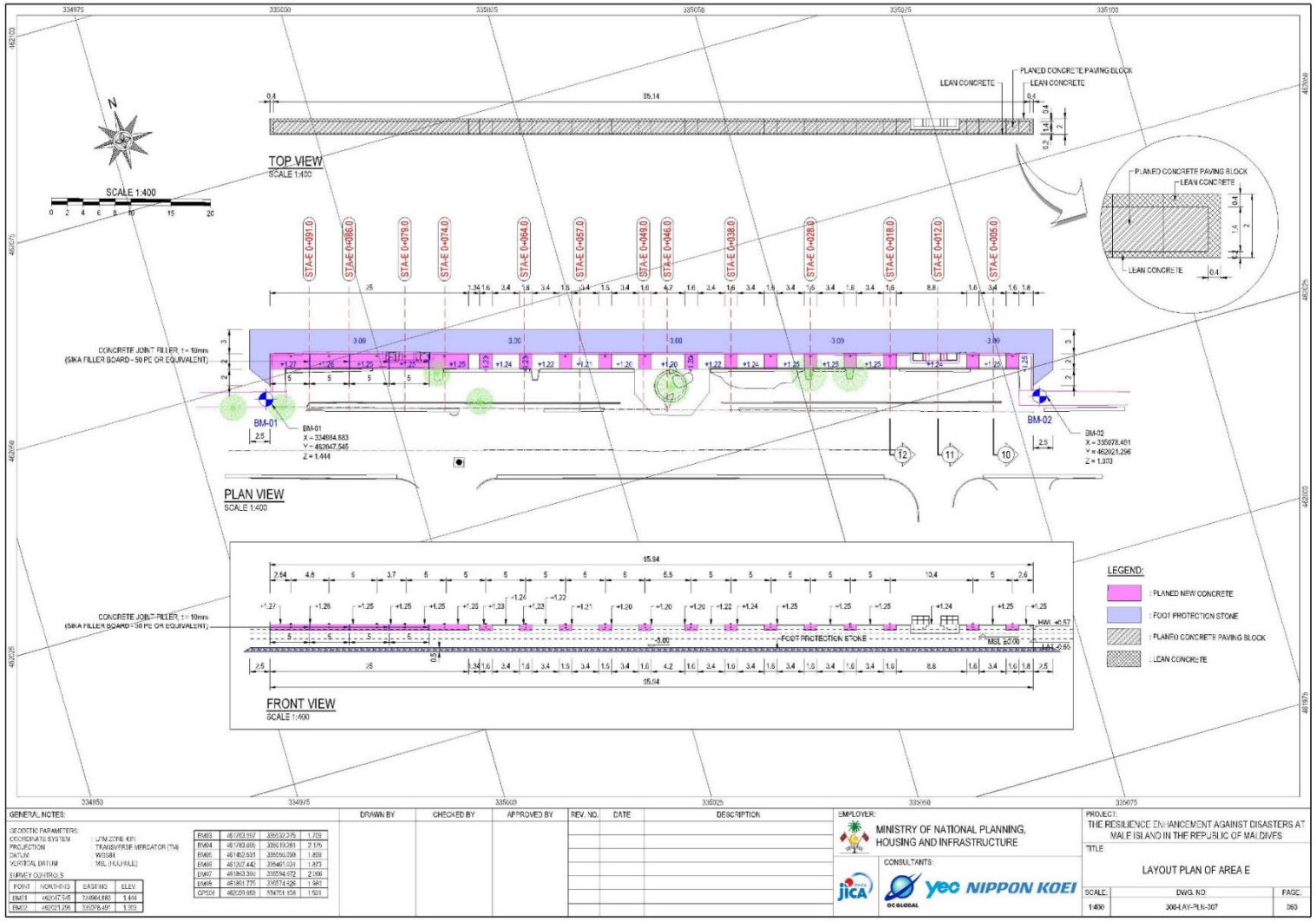
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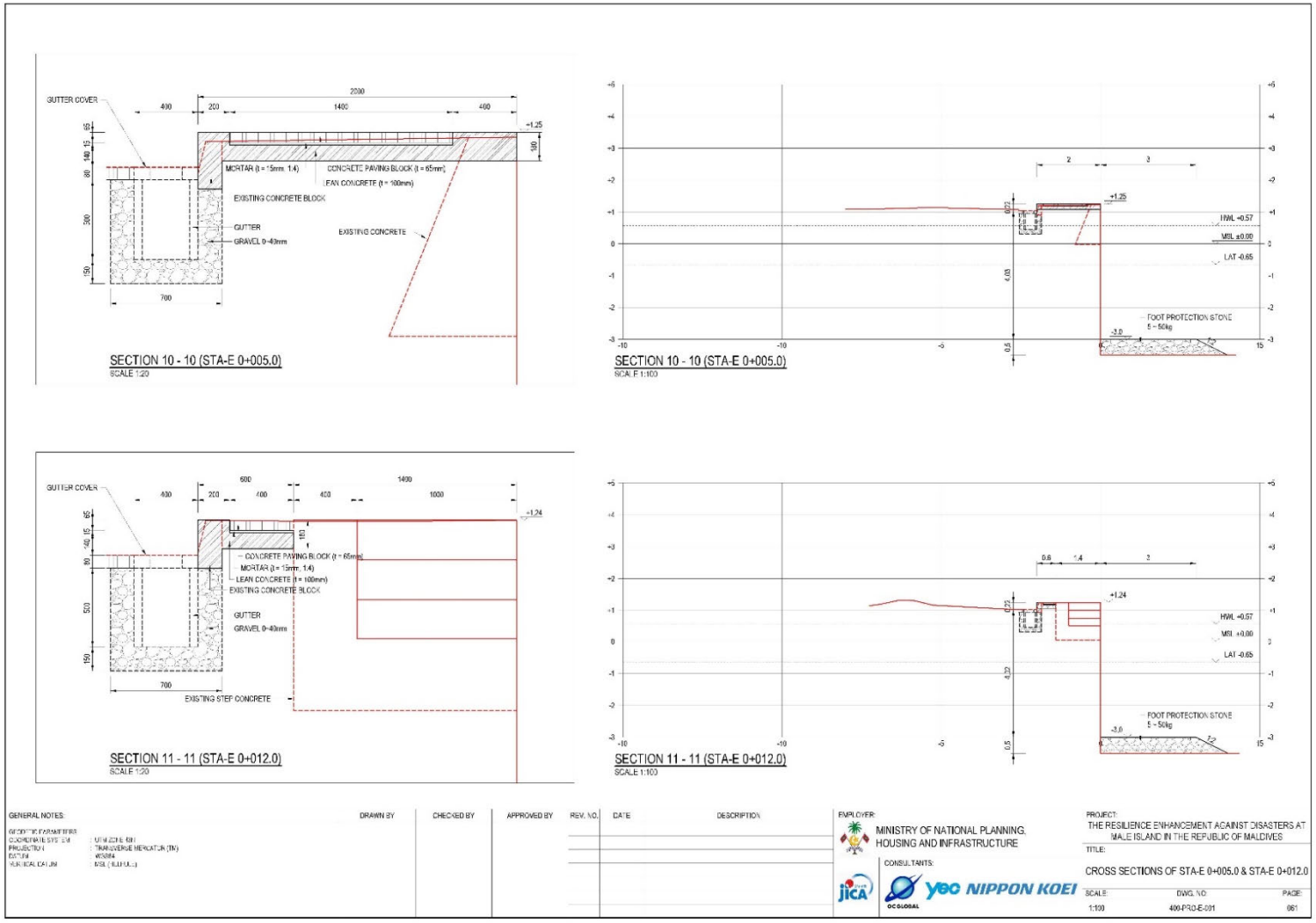
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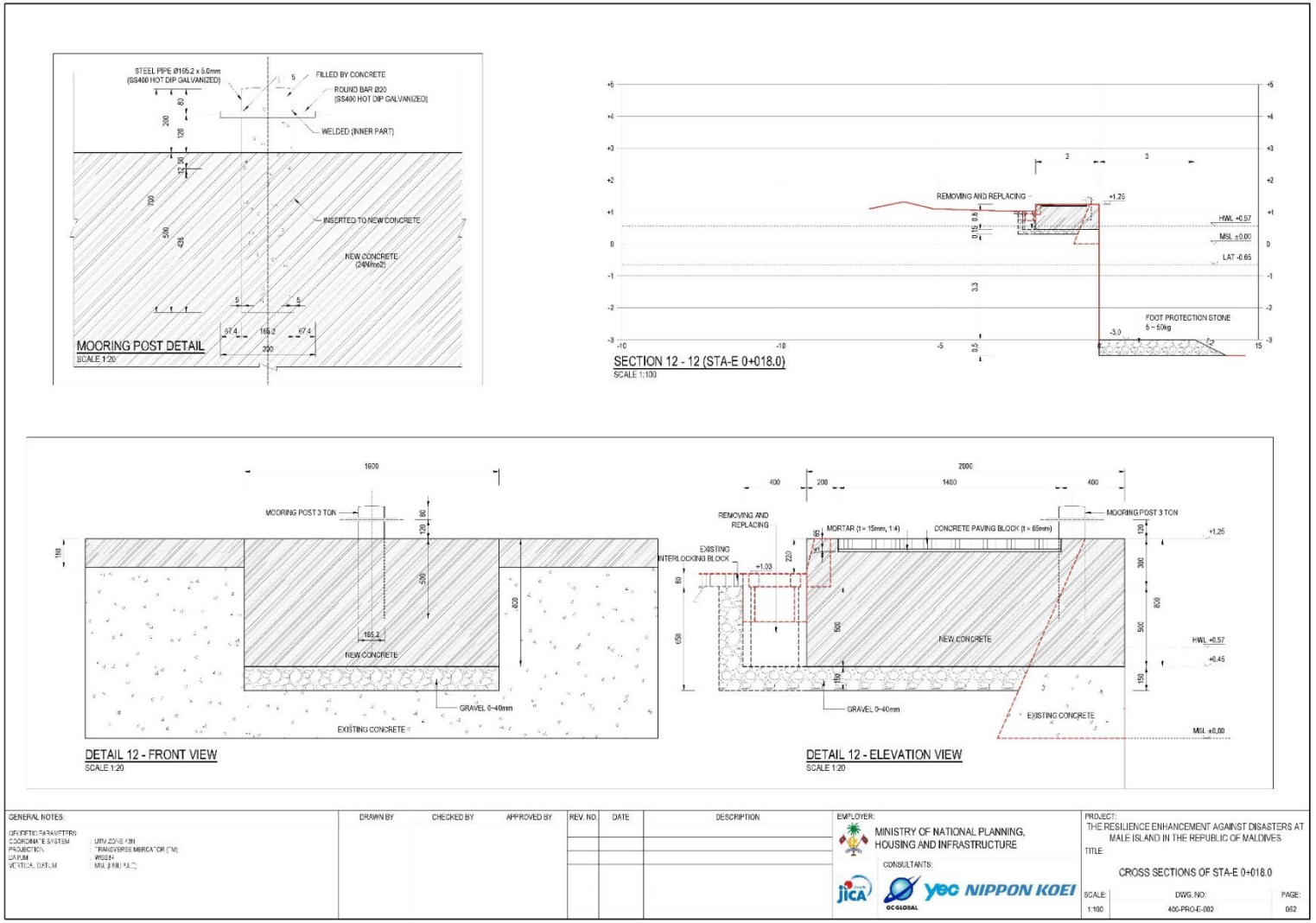
図面番号 400-PRO-TYP-D-001　　（東海岸 D 区域の標準断面）



図面番号 300-LAY-PLN-007　（北護岸の平面計画図）



図面番号 400-PRO-TYP-E-001　（北側岸壁　上部工補修詳細図　その 1）

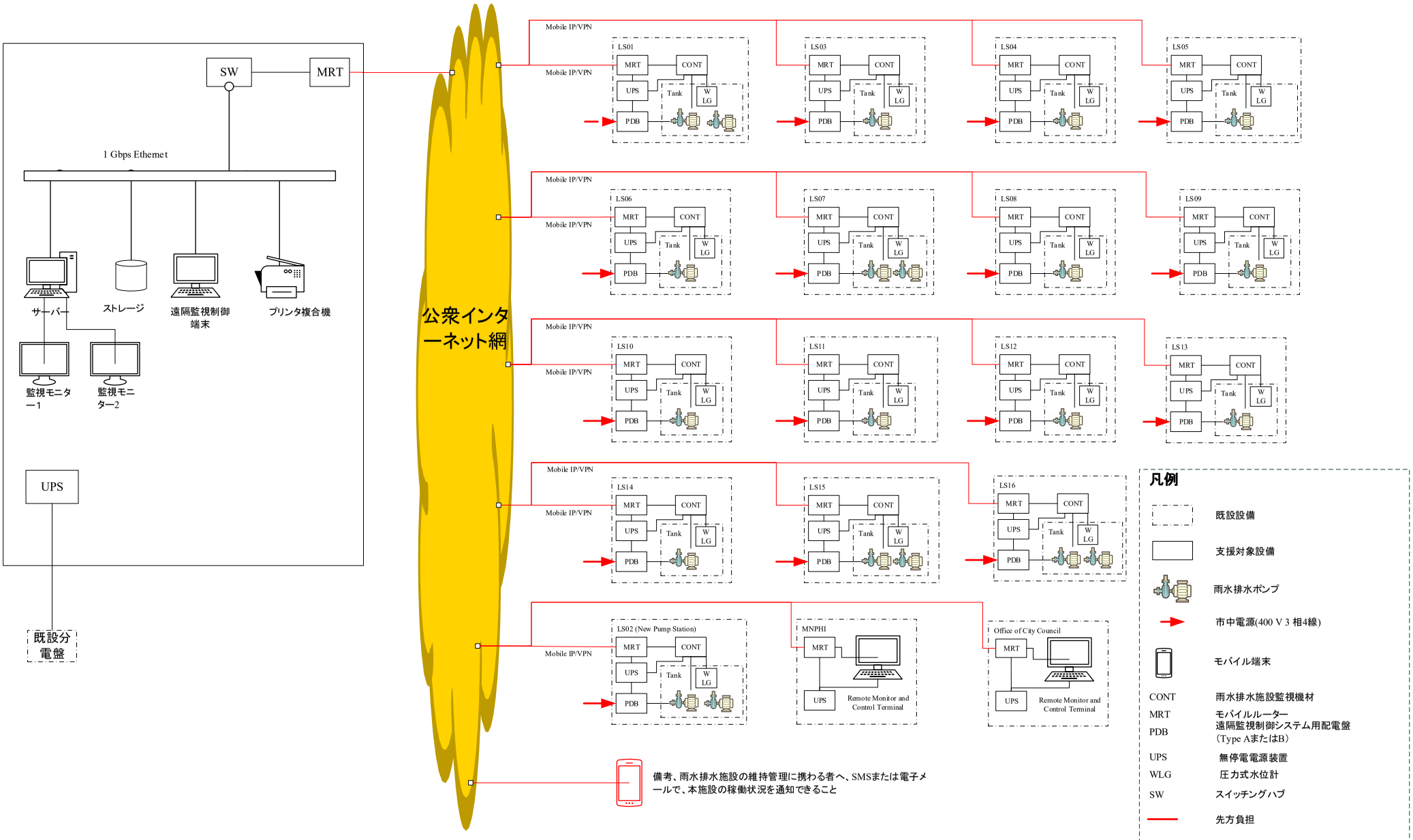


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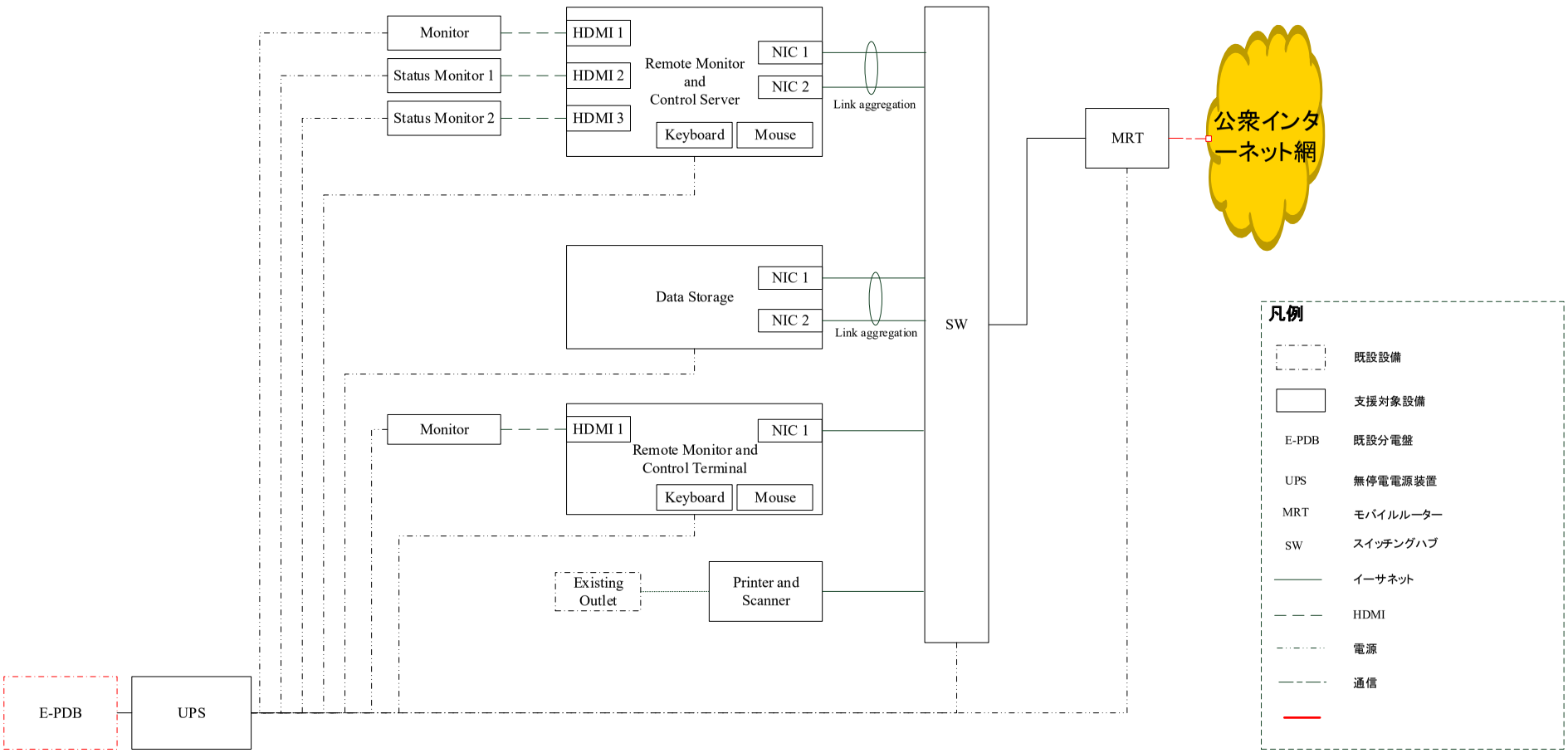
[資料 E]

E-1. 参考資料　概略設計図（護岸コンポーネント）

E-2. 参考資料　概略設計図（雨水排水コンポーネント）

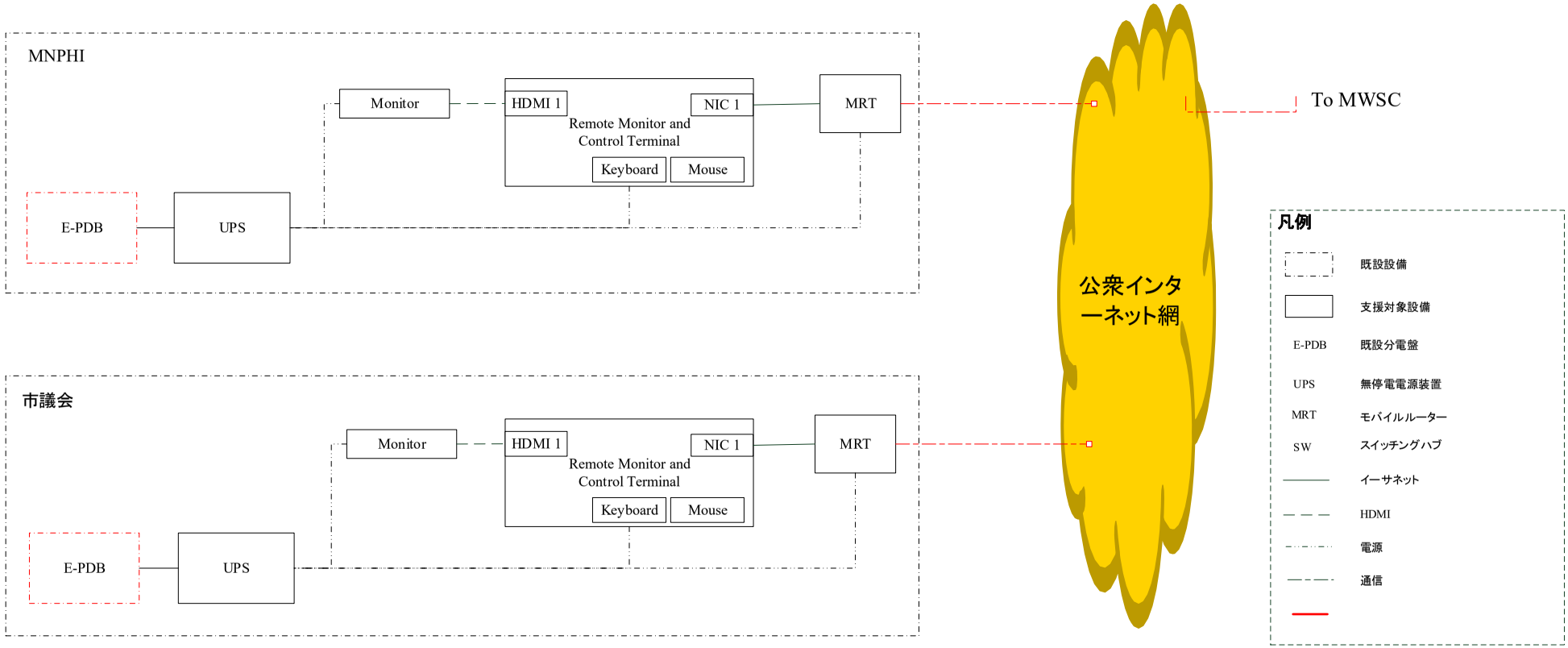


PROJECT NAME	EXECUTING AGENCY	TITLE	SCALE	Unit	DATE			DWG No.
モルディブ共和国マレ島災害に対する強靭性向上計画準備調査	Ministry of National Planning, Housing and Infrastructure	雨水排水施設遠隔監視制御システム 全体系統図	None	None	2023年4月20日 作成 濱中 聡年	2023年4月21日 確認 土屋 敬郎	2023年4月21日 承認 土屋 敬郎	NK-22I0045-001-5



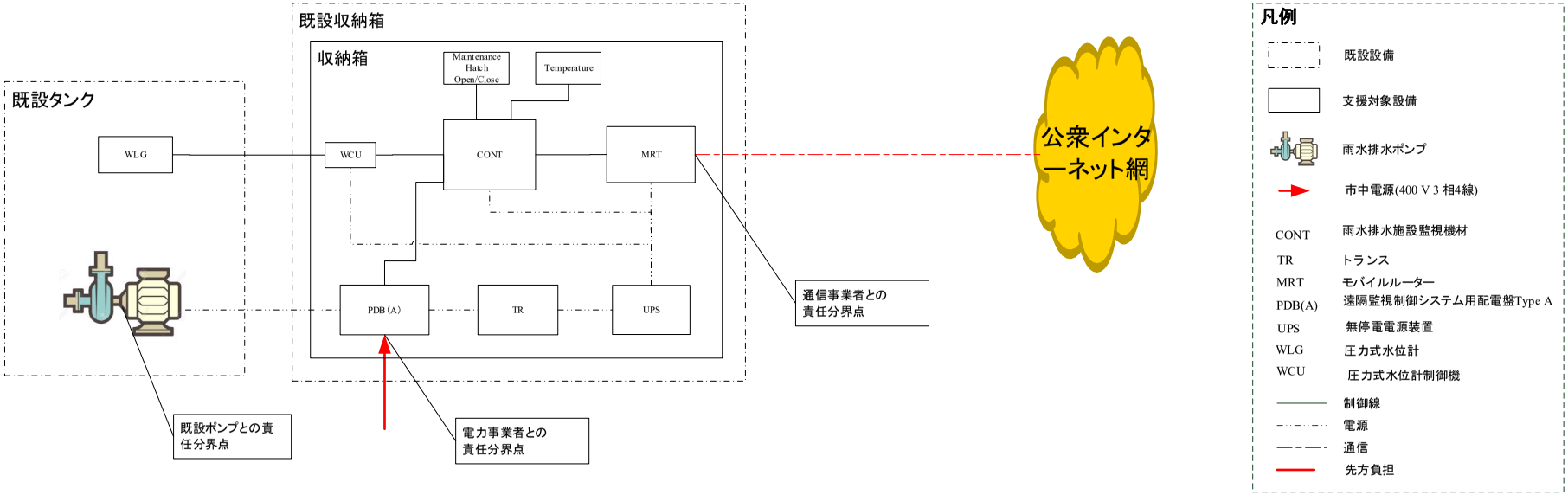
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PROJECT NAME	EXECUTING AGENCY	TITLE	SCALE	Unit	DATE			DWG No.
モルディブ共和国マレ島災害に対する強靭性向上計画準備調査	Ministry of National Planning, Housing and Infrastructure	雨水排水施設遠隔監視制御システム　MWSC系統図	None	None	2023年4月20日 作成 濱中　聡年	2023年4月21日 確認 土屋　敬郎	2023年4月21日 承認 土屋　敬郎	NK-22I0045-002-5

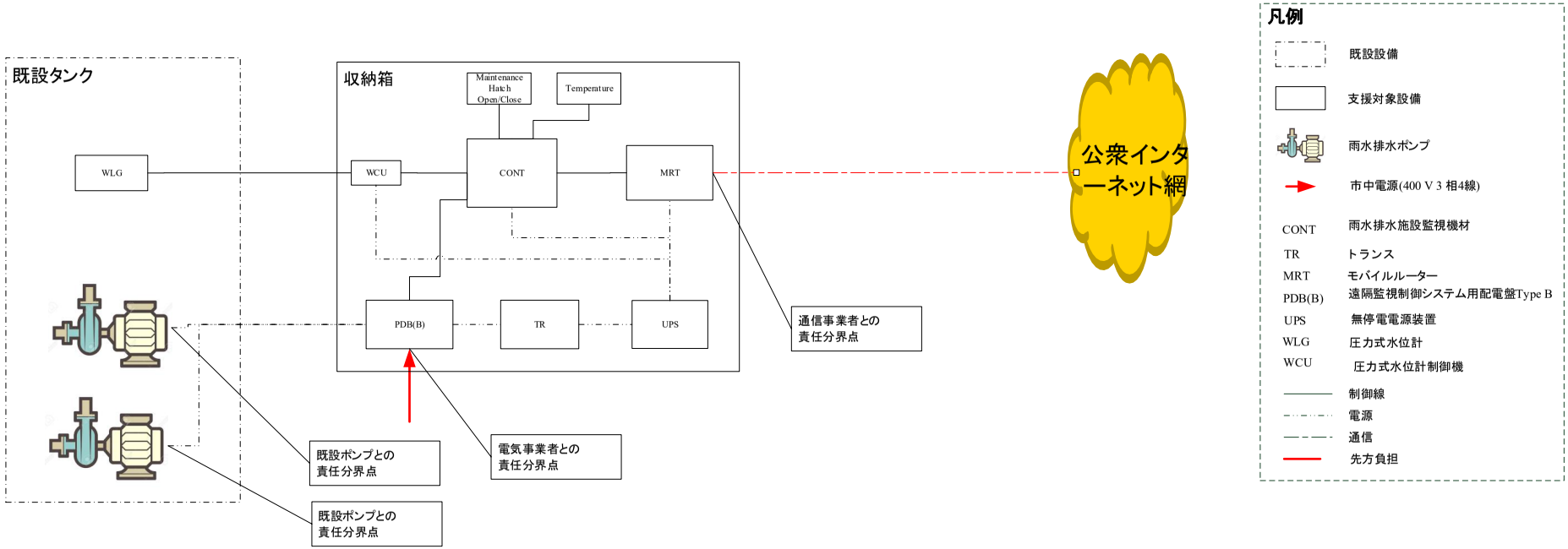


E-22

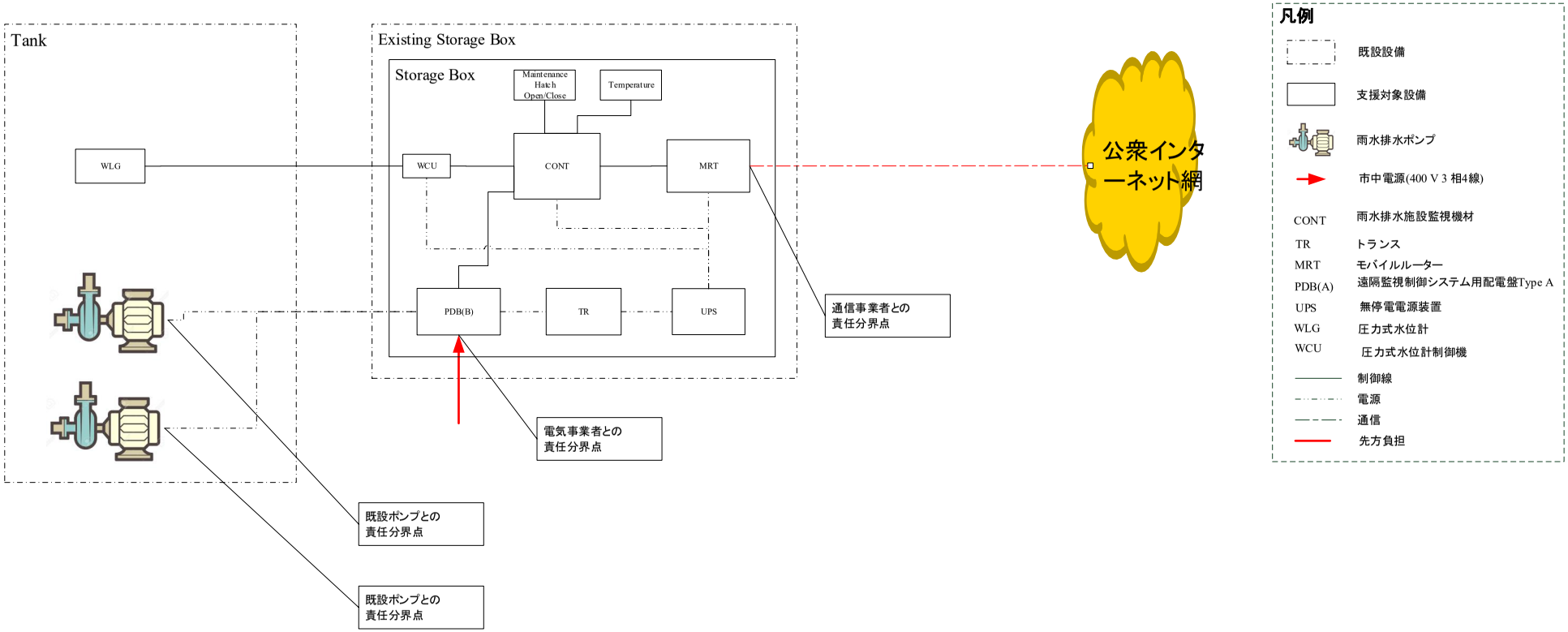
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モルディブ共和国マレ島災害に対する強靭性向上計画準備調査	Ministry of National Planning, Housing and Infrastructure	雨水排水施設遠隔監視制御システムMNPHIおよび市議会系統図	None	None	2023年4月20日 作成 濱中 聡年	2023年4月21日 確認 土屋 敬郎	2023年4月21日 承認 土屋 敬郎	NK-22I0045-003-3



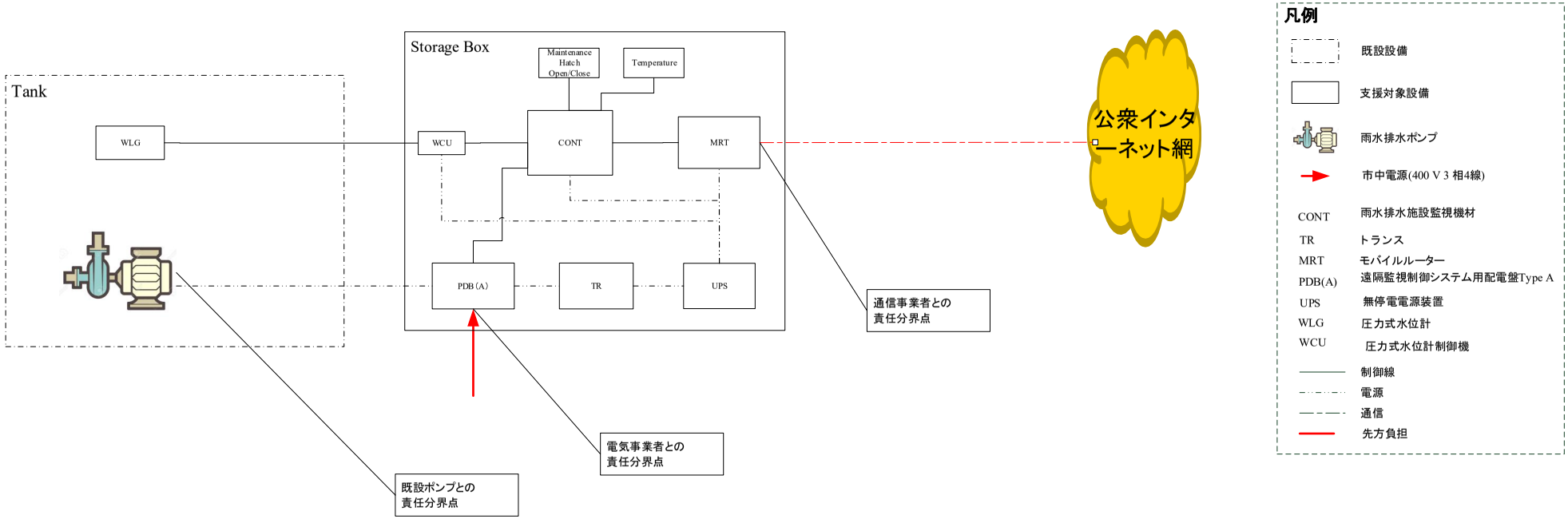
PROJECT NAME	EXECUTING AGENCY	TITLE	SCALE	Unit	DATE			DWG No.
モルディブ共和国マレ島災害に対する強靭性向上計画準備調査	Ministry of National Planning, Housing and Infrastructure	雨水排水施設監視機材（LS04,05,08,09,11および14）	None	None	2023年4月20日 作成 濱中 聡年	2023年4月21日 確認 土屋 敬郎	2023年4月21日 承認 土屋 敬郎	NK-22I0045-004-3



PROJECT NAME	EXECUTING AGENCY	TITLE	SCALE	Unit	DATE			DWG No.
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モルディブ共和国マレ島災害に対する強靭性向上計画準備調査	Ministry of National Planning, Housing and Infrastructure	雨水排水施設監視機材 (LS01および 02)	None	None	作成	確認	承認	
					濱中　聡年	土屋　敬郎	土屋　敬郎	



PROJECT NAME	EXECUTING AGENCY	TITLE	SCALE	Unit	DATE			DWG No.
モルディブ共和国マレ島災害に対する強靭性向上計画準備調査	Ministry of National Planning, Housing and Infrastructure	雨水排水施設監視機材 (LS07, 15 および 16)	None	None	2023年4月20日 作成 濱中 聡年	2023年4月21日 確認 土屋 敬郎	2023年4月21日 承認 土屋 敬郎	NK-22I0045-058-2



PROJECT NAME	EXECUTING AGENCY	TITLE	SCALE	Unit	DATE			DWG No.
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モルディブ共和国マレ島災害に対する強靭性向上計画準備調査	Ministry of National Planning, Housing and Infrastructure	雨水排水施設監視機材 (LS03, 06, 10, 12および 13)	None	None	作成	確認	承認	
					濱中 聡年	土屋 敬郎	土屋 敬郎	