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Ministry of Public Works and Utilities, Kiribati

KAP III, KRRP and KAIP Projects: Coastal Protections - Environmental Management Plan (CPEMP)

Report prepared for:

Ministry of Public Works and Utilities, Kiribati

Report prepared by:

Tonkin & Taylor International Ltd

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1 Introduction

1.1 Background

This Environmental Management Plan (EMP) is a supplementary management plan, which is intended to address coastal protection works that will be carried out under three of the Government of Kiribati's existing projects, namely:

- The Kiribati Adaptation Programme - Phase III (KAP-III), which involves enhancement in coastal resilience (with primary emphasis on continuation of shoreline protection works) in South Tarawa, as well as improvements to water use and management, institutional strengthening and project management.
- The Kiribati Road Rehabilitation Project (KRRP), which involves rehabilitation of approximately 35 km of main road, 8 km of feeder and access roads and 10 km of water main on South Tarawa.
- The Kiribati Aviation Investment Project (KAIP), which aims to improve Kiribati's airport infrastructure, meet International Civil Aviation Organisation (ICAO) standards for international airports and ensure sustainable operation of the civil aviation sector in Kiribati.

Each of these three projects has had an EMP prepared for the majority of its physical components, as follows:

AECOM, 2014. Pacific Aviation Investment Program (PAIP), Basic Environmental Impact Assessment – Bonriki International Airport (TRW) Final Draft.

Government of Kiribati (Office of the President), 2011. Kiribati Adaptation Programme – Phase III; Environmental Management Plan. February 2011.

Government of Kiribati, June 2014. Kiribati Road Rehabilitation Project, Improvement of the Main Betio-Buota Road, Temaiku Road and Feeder Roads in Betio, Bairiki and Bikenibeu. Contract Document Volume 2A (Revision 5), Part 2: Works Requirements, Environmental Management Plan

However, at the time that the Environmental Management Plans for these three projects were developed, the scope of associated coastal protections works required was not clear. Now that designs have been developed and funding approved, this current CPEMP has been prepared, which builds on the three existing EMPs and details environmental mitigation and monitoring measures specifically for the coastal protection works.

1.2 Coastal sites covered by this CPEMP

This CPEMP covers coastal protection works at a total of 10 sites on South Tarawa, as listed in Table 1.1. Locations of these sites are shown in Figure 1.

Table 1.1 Coastal protection work sites covered by this CPEMP

Site Name	Location	Project	Notes
1	Bairiki-Nanikai Causeway (lagoon side)	KRRP	Two sections (1E and 1W), separated by a section of existing seawall
2	Nanikai-Teaorareke Causeway (ocean side)	KAP III	
4	Antebuka Road (lagoon side)	KAP III	Sites 4 and 6 are approximately 300 m apart
6	Korobu Road (lagoon side)	KAP III	
5	Ambo-Taborio Causeway (lagoon side)	KRRP	
11	Temaiku Road (ocean side) – opposite Taiwanese Technical Mission (plant nursery)	KRRP	
10	Temaiku Road (ocean side) – also known as Kabin Temaiku	KRRP	
15E	Eastern end of Bonriki Airport runway (ocean side)	See Note	
15N	North-eastern end of Bonriki Airport runway (ocean side)	See Note	
Ananau ("Long") Causeway	Bonriki (lagoon side)	KRRP	Construction nearing completion as of June 2014.

Note: "Project" to be confirmed: could be subject to either KRRP or KAIP funding.

SCALE 1: 50,000

0 500 1000 1500 2000 2500(m)

Aerial photo sourced from IKONOS, dated 2007

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THE GOVERNMENT OF KIRIBATI

PROTECTION OF VULNERABLE COASTAL SITES
KAPIII, KRRP & KAIP COASTAL PROTECTION WORKS EMP

Site Locations

FIG. No. Figure 1

REV. 0

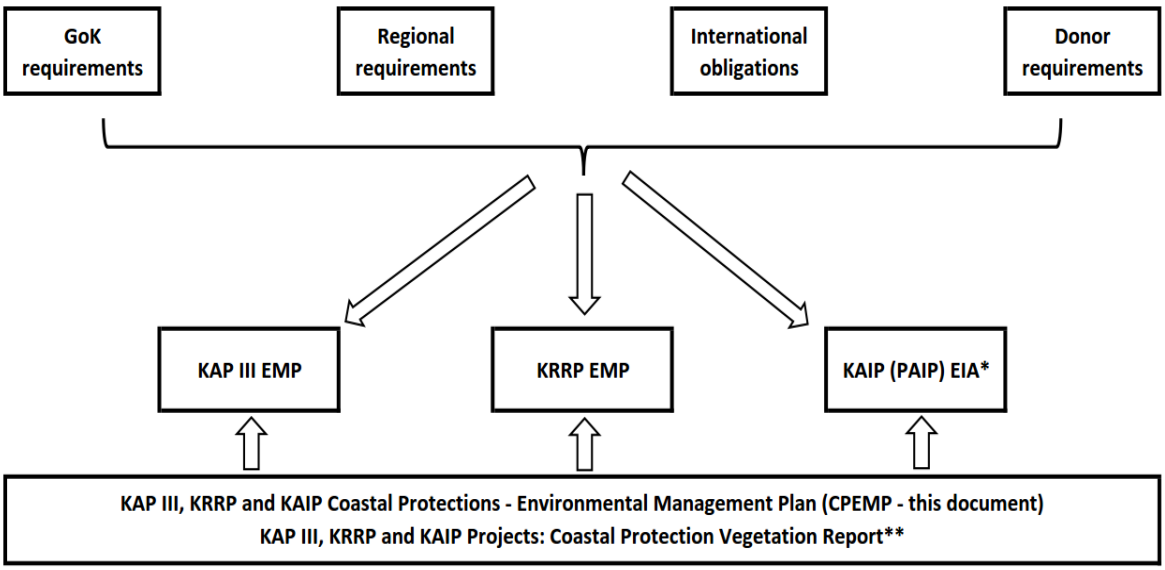
1.3 Relationship to existing EMPs

This CPEMP is intended to integrate with the existing approved EMPs for the KAP III, KRRP and KAIP projects. For this reason, the majority of the background information in the three existing EMPs, some of which is specific to the sites that each EMP covers, is not repeated and instead is cross-referenced wherever possible. This includes information relating to the Policy, Legal and Administrative Frameworks, or Socio-Economic settings. However, Section 2 of this CPEMP includes information linking this CPEMP to existing regulatory processes, and Section 3 provides summary information on the physical (coastal) environment at each site, which was not provided in the three existing EMPs.

The layout of the Environmental Management Plan presented in Section 4 is intended to mirror that in the existing EMPs, which will assist in implementation, and in incorporating it into Tender/Contract documents.

This CPEMP and the existing project EMPs are driven by the overarching legislation and policy framework as set out in Sections 2.1 to 2.4 below. In essence, the CPEMP forms an addendum to each of the existing project EMPs, but in each case it relates only to coastal protection works that are a component of the relevant project.

The figure below shows the relationship of this CPEMP to the three project EMPs.



*Specifically, Sections 7 and 9, and Appendices B, C and D, which contain environmental mitigation, monitoring and inspection measures
**Relates only to projects where (re-) vegetation is proposed as part of the Coastal Protection Works: Sites 1, 4, 6, 10, 11, 15E, 15N

If there is any inconsistency between the project EMPs and this CPEMP, other than in relation to matters of 'currency'[1], then the relevant project EMP takes precedence over this CPEMP.

The CPEMP is a dynamic document which may be updated as consultation and detailed designs of the project components are finalised to ensure currently unanticipated impacts and revised

[1] This relates to any instances where, due to the ongoing design and development of the projects since the project EMPs were finalised, this CPEMP refers (directly or indirectly) to more recent versions of drawings, specifications or other documents than does the relevant project EMP.

mitigation measures are addressed. Effective implementation of the CPEMP is a requirement of the funding agencies and local legislation, so monitoring is an integral component of implementation. A Monitoring Plan is included in Section 4 (Table 4.4) of this CPEMP. This CPEMP is to form part of the bidding documents for contract(s) yet to be awarded, and once awarded will form a basis of the contractor's EMP.

Land acquisition and compensation aspects of the projects are covered by the main project EMPs, and the relevant Resettlement Plan or Land Acquisition and Resettlement Policy Framework, as appropriate.

2 Policy, Legal and Administrative Frameworks

2.1 National Requirements

Kiribati is a republic with a constitution that was promulgated on 12 July 1979. As a sovereign state, the proposed works must comply with a number of Kiribati's legislative acts and regulations. These are summarised below and described more comprehensively in the three existing EMPs.

- Environment Act 1999: provides for the protection, restoration and enhancement of Kiribati's natural, social and cultural environment. Gives power to the Environment and Conservation Division (ECD) of the Ministry of Environment, Lands & Agricultural Development (MELAD) for the administration of environmental affairs including providing for sustainable development and implementing the Environmental Regulations 2009, including consideration of applications for Environment Licences (ELs), issuance of ELs and monitoring compliance with the conditions of ELs, and enforcement activities as provided for by Section 49 of the Act.
- Biosecurity Act 2011: controls movement of plants and animals and their products in order to prevent the establishment and spread of animal and plant pests and diseases. Administered by MELAD.
- Mineral Development Licensing Ordnance 1977: provides for the licensing and development of activities relating to the use of Kiribati's mineral resources (including sands and aggregates).
- Wildlife Conservation Ordnance 1977: allows the Minister for Environment, Lands & Agricultural Development to declare areas such as wildlife sanctuaries, or for protection of specific animal species. There are no sanctuaries or closed areas on South Tarawa.
- Aerodromes and Air Navigation Aids Ordnance 1977: allows for the GoK to declare controlled areas for security and safety around aerodromes and navigational aids.
- Civil Aviation Act 1977: provides for the administration and management of the civil aviation sector in Kiribati.
- Recreational Reserves Act 1996: allows for land owned or leased by GoK to be reserved for recreational purposes for the use and enjoyment of the people of Kiribati.
- The Foreshore and Land Reclamation Ordnance 1969, as amended in 1977 and 2005: this ordnance *inter alia* strengthens the recognition of customary rights over the foreshore.
- The Prohibited Areas Ordinance 1957 provides for certain islands and their territorial waters to be prohibited areas, set aside for conservation purposes, while the Closed Districts Act 1990 allows for parts of islands to be declared for conservation purposes. There are no Prohibited Areas or Closed Districts in the vicinity of any of the proposed works sites.

Of particular relevance to this CPEMP is the requirements of the Environment Act for Environment Licences for the proposed coastal protection works. The current status of the Environment Licences for each works area are set out in Table 2.1 below.

Table 2.1. Environment Licence (EL) status at July 2014

Site Name	Location	EL Status at July 2014
1	Bairiki-Nanikai Causeway (lagoon side)	EL No. ELA 118/12 issued to MPWU, 9/10/2013. Amendments have recently been processed by MELAD-ECD to provide for seawall design.
2	Nanikai-Teaorareke Causeway (ocean side)	EL No. ELA 009/14 issued to MPWU, 16/4/2014, but final design requires MELAD-ECD approval before construction commences.
4	Antebuka Road (lagoon side)	Application lodged with MELAD-ECD, but may need revision to include proposed 'soft measures'
6	Korobu Road (lagoon side)	Application lodged with MELAD-ECD, but may need revision to include proposed 'soft measures'
5	Ambo-Taborio Causeway (lagoon side)	EL No. ELA 123/12 issued to MPWU, 9/10/2012
11	Temaiku Road (ocean side) – opposite Taiwanese Technical Mission (plant nursery)	EL No. ELA 121/12 issued to MPWU, 11/3/2014
10	Temaiku Road (ocean side)	EL No. ELA 122/12 issued to MPWU, 6/5/2014
15E	Eastern end of Bonriki Airport runway (ocean side)	EL No. ELA 010/14 issued to MPWU, 11/3/2014
15N	North-eastern end of Bonriki Airport runway (ocean side)	EL No. ELA 011/14 issued to MPWU, 16/4/2014
Ananau ("Long") Causeway	Bonriki (lagoon side)	EL No. ELA 075/13 issued to MPWU, 3/10/2013

The conditions attached to the Environment Licences form a major component of the environmental mitigation and monitoring measures that are set out in Section 4 of this CPEMP, i.e. this CPEMP is a tool by which the requirements of the Environment Licences (as well as other requirements such as those of international financial institutions) are collated and implemented.

2.2 Regional Requirements

The Local Government Act 1984 establishes local councils (also named island, town and urban councils) that have powers to regulate and administer a number of functions around utilities, agriculture, buildings and town planning among other things. In accordance with this legislation Tarawa has three administrative councils:

- Betio Town Council (or BTC), on Betio Islet;
- Teinainano Urban Council (or TUC), from Bairiki to Bonriki (this is the council applicable to the project area)
- Eutan Tarawa Council (or ETC), for North Tarawa or Tarawa Ieta (all the islets on the east side of the atoll, north of Bonriki, including Buota which is linked by road to South Tarawa.

All of the sites are within the Teinainano Urban Council's jurisdiction.

Relevant instruments include:

- The declared Bonriki Water Reserve (in the vicinity of and to the immediate north-west of Sites 15E and 15N) under LN 58/69 as described on plan No. 5/26 of 28 May 1969.

- The Temaiku Bonriki General Land Use [Zoning] Plan, December 2010.

2.3 International Obligations

Kiribati is a signatory to a number of international agreements. Listed below are some of the more applicable agreements to the type of activities of KAP III, KRRP and KAIP. In particular, they pertain to disposal of waste. This list is not exhaustive.

- Convention to Ban the Importation into Forum Island Countries of Hazardous and Radioactive Waste and to Control the Transboundary Movement and Management of Hazardous Waste within the South Pacific region. (Adopted at Waigani, PNG on 16 September 1995)
- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal
- Convention for the Protection of the Natural Resources and Environment of the South Pacific Region (Adopted at Noumea, New Caledonia on 24 November 1986)
- Protocol concerning Cooperation in Combating Pollution Emergencies in the South Pacific Region
- Protocol for the Prevention of Pollution of the South Pacific Region by Dumping

Due to the problems regarding solid waste on Kiribati and the need to export all waste generated by the project not able to be reused locally, the Waigani Convention and Basel Convention are particularly relevant and will need to be adhered to in preparing hazardous substances (e.g. waste oil, lubricants, articles containing polychlorinated biphenyls or asbestos) for shipping and final disposal at acceptable and licensed waste facilities. The conventions outline the necessary information required for documents (notification and movement) and agreements that need to be in place with the receiving territory.

These requirements are generally addressed at the project-specific EMP level, but they are mentioned here for completeness.

2.4 Donor Requirements

As the World Bank and the Asian Development Bank (ADB) are both donors to the projects, the policies of these organisations are also of relevance.

2.4.1 World Bank Group

The projects are considered to be Category B project under World Bank environmental and social screening guidelines and require development of project specific EMP. Due to the nature of the project it is expected that environmental impacts will be site specific, few if any are irreversible, and mitigation measures can be readily designed and implemented.

In accordance with the World Bank Operational Policy 4.01 (Environmental Assessment), this CPEMP includes information on mitigation, monitoring, capacity development and training, and implementation costs.

World Bank Operational Policy 4.04 (Natural Habitats) is also relevant to these projects and their EMP. OP 4.04 requires the design and implementation of appropriate measures to avoid the significant conversion or degradation of natural habitats.

2.4.2 Asian Development Bank

The Safeguard Policy Statement of the Asian Development Bank (ADB) requires *inter alia* borrowers/clients to prepare an EMP, which will include proposed mitigation measures,

environmental monitoring, reporting, and capacity development requirements. Key considerations include mitigation of potential adverse impacts to the level of “no significant harm to third parties”, the polluter pays principle, the precautionary approach, and adaptive management.

ADB assigns projects to similar environmental categories to the World Bank (i.e. Category B for the KAP III, KRRP and KAIP projects).

3 Environmental Setting and Proposed Works

This sections provides a description of the environmental setting for each project site, and an overview of the proposed physical works at each site. Further detail on the physical works can be obtained from the relevant detailed design reports, released by Tonkin & Taylor International Ltd, as follows:

- Detailed Design Report for Site 1 (dated December 2013)
- Detailed Design Report for Site 5 (dated December 2013)
- Detailed Design Report for Site 11 (dated April 2014)
- Detailed Design Report for Site 10 (dated July 2014)
- Detailed Design Report for Site 15 (dated July 2014)
- Detailed Design Report for Site 2 (dated August 2014)
- Detailed Design Report for Site 4 (dated September 2014)
- Detailed Design Report for Site 6 (dated September 2014)

As the design drawings are liable to change as the projects are further developed, the design drawings have not been appended to this CPEMP, and the reader is directed to the most recent versions of the detailed design reports.

3.1 Site 1 (1 East and 1 West)

This site is located on the lagoon shoreline between Nanikai and Bairiki. A causeway was constructed to link these islets in the early 1960s and currently supports the main island road. Due to ongoing coastal erosion which threatened the road in this location, a sand-cement bag wall approximately 1.7 m high and 140 m long was constructed in 2010 under the KAP-II project. While the constructed wall improved on previous sandbag designs, erosion continued at both ends adjacent the wall. Thus the works area comprises two sites which are separated by the KAP-II wall: Site 1 East and Site 1 West.

Site 1 East – works will extend beyond the end of the KAP-II seawall which is visible to the right.

Site 1 West – works will extend to the KAP-II seawall (near the sign – upper middle of picture).

The upper beach (loose coral sand) zone at the site is a strip approximately 10 m wide with a gradient of around 12(H) to 1(V). Below this is a wide intertidal reef flat approximately 200 m wide, which slope gently into the lagoon.

Recommended long-term works at Site 1 (subject to funding) comprise precast concrete block seawalls at both Sites 1 East and 1 West. However, we understand that as an interim measure, it is proposed to construct concrete sand bag walls at these sites, with the concrete block seawall sections constructed over these in due course. The surfaces of concrete sand bags will break apart relatively quickly (over a period of months) if they are exposed to wave action, releasing pieces of bag and plastic fibre into the environment. Such releases would be lessened by construction of the pre-cast concrete wall over the concrete sand bags as soon as possible.

The works at Site 1 East will also incorporate a set of beach access stairs, a beach access sand ladder, and a vegetated beach berm, enclosed within a fence. The sand ladder will focus pedestrian traffic to and from the beach into single (protected) location, and thus reduce potential damage to the vegetated berm and other components of the works as the result of informal pedestrian access.

Once the 'hard structures' at Site 1 East have been built in accordance with the construction drawings, it is proposed that fast growing, salt-tolerant vegetation will be established along the upper beach and road berm east of the grouted block wall, to reduce wave run-up extent and damage potential, trap wind-blown sand and improve ecological connectivity between the land and sea. Plant specifications, propagation, planting and monitoring/management requirements for Site 1 East are provided in the accompanying Coastal Protection Vegetation Report (Tonkin & Taylor International, 2014).

Site 1 is located on a man-made causeway, and there are no *Natural Habitats* or *Critical Natural Habitats*[2] within or in the vicinity of the proposed works footprint. Around 10 trees (including 5 *te nii* or coconut trees) and a number of shrubs will need to be removed from the road margin at Site 1 East, to allow works to proceed. Two large pine trees and a number of smaller shrubs will need to be removed from Site 1 West. Due to the close proximity of the proposed seawall to the roadway, there is unlikely to be any opportunity for planting replacement trees above the coastal protection works after physical works are complete, other than low ground-cover vegetation or shrubs in the vegetated berm area at Site 1 East. However, as the integrity of the land which these plants occupy is already compromised by erosion, they would likely have been lost in the short-medium term in any case.

3.2 Site 2

Site 2 is located on the southern (ocean) side of the Nanikai-Teaorareke Causeway, opposite the entrance to the Nanikai landfill. At this location, the backshore west of the existing seawall is eroding and threatening the main road, with the scarp edge coming within 2 m of the road edge. Further west, trees are being undermined and will soon fall onto the beach.

Works are proposed immediately to the west of (and adjoining) a section of existing coral block seawall, in a location where wall has failed. Works proposed comprise the removal of the broken coral and concrete sandbag wall, construction of a grouted pre-cast block wall approximately 55 m in length, placement of broken wall material as scour protection at the toe of the new wall, and patching cavities in the remaining sections of the existing wall. The works will also include the construction of a beach access sand ladder beyond the western end of the new wall section. The sand ladder will focus pedestrian traffic to and from the beach into single (protected) location, and thus reduce potential damage to the remaining berm as the result of informal pedestrian access.

[2] According to World Bank OP 4.04 definitions

Site 2 works area showing broken seawall. Remaining seawall is visible in right hand photograph.

Foreshore below Site 2.

Site 2 is located on a man-made causeway, and there are no Natural Habitats or Critical Natural Habitats within or in the vicinity of the proposed works footprint. Habitats at the site comprise a gently sloping intertidal reef flat with a relatively steep upper beach strip approximately 10 m wide. A 'finger' of conglomerate rock boulders overlies the rock shelf, extending approximately 150 m through the intertidal area seaward of the works area to a small vegetated island, which is visible in the photograph above.

Trees in the works area have been compromised by (and likely contributed to) the failure of the coastal protection works, and no significant viable vegetation is required to be removed.

3.3 Site 4

An existing 1.5 m high sand-cement bag wall spans approximately 50 m at the KAP-II Site 4 at Korobu Road. The wall is in average condition, but unlikely to fail in the very near future. The coastal edge on both sides of the wall is low and extends close (within 2-5 m) to the existing road edge. It is likely that during strong onshore winds and high tides, some wave overtopping onto the road surface will occur.

The shoreline has been subject to erosion of up to 15 m since 1969. This, combined with future increased sea level rise means that ongoing erosion is likely to continue.

In the works area, the conglomerate rock platform is exposed. Below this, there are gently sloping reef flats, mostly covered in sand, with some fragments of conglomerate rock. Abundance and diversity of animals in this area is low. The works area is located in the upper intertidal/supratidal zone, which is affected by the presence of the road immediately adjacent to the site, and densely populated human settlements across that road. There are no Natural Habitats or Critical Natural Habitats within or in the vicinity of the proposed works footprint.

Proposed intervention works at this site involve placement of sand from a sustainable local (authorised) aggregate source to create a wider beach berm, which will provide a buffer against future erosion and protect against wave overtopping. Aggregate will be required to be sourced from a site with approved licences, e.g. Te Atinimarawa Company Ltd (TACL), however the exact source will be proposed by tenderers for construction contracts.

The widened berm will be vegetated between the roadway and the high water mark using fast-growing, salt-tolerant plants sourced locally from South Tarawa. Plant specifications, propagation, planting and monitoring/management requirements for Site 4 are provided in the accompanying Coastal Protection Vegetation Report (Tonkin & Taylor International, 2014).

The works will include a sand ladder to provide pedestrian access to the beach without damaging the plantings, as at Sites 1 and 2, and a hardstand to provide storage for small boats without damaging the plantings.

Beach and foreshore at Site 4

3.4 Site 6

Site 6 is located on the lagoon side of the Antebuka Road, approximately 300 m from Site 4. At Site 6, a 2.5 m high sand-cement bag wall with boat ramp was constructed under the KAP-II project. The total wall length is approximately 130 m. Around 50 m of natural shoreline exists between the end of the KAP II wall and an adjacent coral block wall. This section of shoreline is eroding (possibly exacerbated by the adjacent walls).

It is proposed to stabilise the section of shoreline using 'soft engineering' measures: placement of sand to augment the natural beach and berm, and stabilising this with fast-growing salt-tolerant plant species (sourced locally). Plant specifications, propagation, planting and monitoring/management requirements for Site 6 are provided in the accompanying Coastal Protection Vegetation Report (Tonkin & Taylor International, 2014).

The works will include a sand ladder to provide pedestrian access to the beach without damaging the plantings, and a slipway to assist with launching and retrieving small boats.

Site 6 – KAP-II seawall visible at right, informal rock wall visible at left.

In common with Site 4, the works area at Site 6 is located in the upper intertidal/supratidal zone, which is affected by the presence of the road immediately adjacent to the site, and densely populated human settlements across that road. The foreshore below Site 6 consists of gently-sloping sandflats with a characteristic intertidal assemblage dominated by molluscs, echinoderms and anthozoans. While there are some substantial trees, including coconut trees, on the landward side of the works area, it is likely that the works can be completed with only smaller shrubs being removed to provide access. The project will not result in the significant conversion of Natural Habitats or Critical Natural Habitats.

3.5 Site 5

Site 5 is located on the northern (lagoon) side of the Ambo-Taborio causeway, which was constructed in the 1960s. Recently, erosion of the lagoon shoreline along the eastern part of the causeway has exposed utilities (water supply pipes and power cables) and is threatening the roadway, reaching to within 1 m of the road edge in places.

General view of Site 5, taken from foreshore

Western extent of proposed works area, adjacent to KAP-II sand-cement bag wall

The proposed works will be carried out in the upper beach area, where a layer approximately 1 m deep of loose coral sand has been deposited against the causeway, and overlies the intertidal reef flat. Surface habitats consist of a coral sand upper beach strip approximately 5 m wide, which provides some habitat for coconut crabs – during a site visit in June 2014 a small number (<5) of coconut crab holes were seen, outside of the proposed permanent works footprint, and in an area which is subject to periodic inundation, and thus unlikely to provide permanent habitat for

coconut crabs. Seaward of this area is a reef sand/mud flat with large numbers of coral fragments, and the area provides habitat for intertidal invertebrate species such as gastropods and brittle stars. A mangrove planting trial has been conducted in the upper intertidal area at Site 5 (some seedlings visible in the left photograph above). This trial appears to have been largely unsuccessful, probably due to wave damage. Site 5 is located on a man-made causeway, and there are no Natural Habitats or Critical Natural Habitats within or in the vicinity of the proposed works footprint.

Proposed works comprise a sand-cement bag seawall in the first instance (similar to that which was constructed on the western section of the causeway under KAP II), followed by a blockwork wall at a later date, subject to funding being secured. Underground services will also be realigned closer to the roadway. Works will require the remove of 3 pine trees above the erosion scarp, which because of their location are presumed to be owned by GoK/MPWU and thus require no compensation. Due to the close proximity of the proposed coastal protection works to the roadway, there is unlikely to be any opportunity for planting after physical works are complete.

3.6 Site 11

Site 11 is located on Temaiku Road (ocean side) at approximately chainage 1500 m (opposite the Taiwanese Technical Mission). The existing roadway at this site extends very close to the shoreline. A number of existing sandbag walls are failing and the existing roadway is in danger of being undermined by erosion and is currently vulnerable to wave overtopping during storm conditions. Flooding due to wave overtopping has also been noted as problematic in this area Coastal protection is likely required along a length of approximately 100 m between road chainages 1460 m and 1560 m to tie into adjacent low coral conglomerate headlands.

Site 11: existing coastal protection works and nearby habitats

Proposed new coastal protection works for Site 11 comprise the removal of failed sections of sandbag wall, and construction of a rock revetment of approximately 75 m total length, either side of, and below the existing vertical section of wall. Voids beneath the existing wall ends would be filled with concrete.

Once the 'hard structures' at Site 11 have been built in accordance with the construction drawings, it is proposed that approximately 75 m^2 of fast growing, salt-tolerant vegetation will be established, to reduce damage potential, trap wind-blown sand and improve ecological connectivity between the land and sea. Plant specifications, propagation, planting and monitoring/management requirements for Site 11 are provided in the accompanying Coastal Protection Vegetation Report (Tonkin & Taylor International, 2014).

Habitats and species in the vicinity of Site 11 are typical of exposed rocky shores, with a gradation from terrestrial grasses in the supratidal zone, through boulders with few encrusting species in the spray zone to the rock shelf with pools which provide habitat for algae, brittle stars, anemones, gastropods and other molluscs, albeit in relatively low densities. There is no

significant terrestrial vegetation in or near the footprint of the proposed works. The project will not result in the significant conversion of Natural Habitats or Critical Natural Habitats.

3.7 Site 10

Site 10 (Kabin Temaiku) is located on Temaiku Road, approximately 700 m east of Site 11. The shoreline in this part of Temaiku has experienced large-scale and rapid recession over the last few decades, with recession of up to 140 m observed to the north of this site.

Temaiku Road is low and passes close to the coastline in this area. An existing sand-cement bag wall extends for around 110 m but is in generally average to poor condition with toe scour and overtopping scour threatening the short-term integrity of the wall. To the north of the wall a small pocket beach exists which is popular with locals for swimming at high tide but also overtops and the backing land is low. The northern end of the wall adjacent to this beach is being outflanked. To the south of the wall a narrow section of unprotected coastline before a low coral conglomerate headland channels incoming waves and overtops the existing road. The sand-cement bag wall has completely failed in places within this section.

The existing roadway is low in this area ranging between RL 3.2 and 3.4 m. The existing high tide level is 2.5 m and waves are observed to easily overtop the southern section of roadway. Currently only around 15 m at the southern end of the site is overtopped and threatened by erosion but the wall is close to failure at its northern and southern ends and complete failure could be expected within the next 1-5 years. When this occurs around 130 m of roadway will be threatened by flooding due to wave overtopping and by erosion. A section of road to the north has already been relocated further inland between 2005 and 2007.

Site 10: Eastern end (outflanking); central section; western end (seawall failure)

A combination of works are proposed at Site 10. These comprise:

- Demolition of sections of existing seawall as required, to permit construction of new seawall.
- Excavation down to hard reef rock and construction of new rock-armoured revetment at a gradient of approximately 1(V):2(H).
- Augmentation of the existing beach at the eastern end of the site with sediment imported from a sustainable source to provide increased protection against erosion and wave overtopping, and for public amenity. Aggregate will be sourced from a site with approved licences, e.g. Te Atinimarawa Company Ltd (TACL), however the exact source will be proposed by tenderers for construction contracts.
- A boat ramp at 1:8 gradient will be incorporated into the coastal protection works.

Once the 'hard structures' at Site 10 have been built in accordance with the construction drawings, it is proposed that approximately 430 m^2 of fast growing, salt-tolerant vegetation will be established in three separate sections, to reduce damage potential, trap wind-blown sand and improve ecological connectivity between the land and sea. Plant specifications, propagation,

planting and monitoring/management requirements for Site 1 are provided in the accompanying Coastal Protection Vegetation Report (Tonkin & Taylor International, 2014).

As the foreshore adjacent to the coastal protection works is expected to continue to retreat, ongoing maintenance will be required, e.g. adjusting rock locally to protect adjacent land, and eventually extending the seawall (potentially up to 50 m over the next 30 years).

Habitats and species in the vicinity of Site 10 are a combination of exposed rocky shore (with a similar assemblage to Site 11), sandy beach and reef sand flats. There is no significant terrestrial vegetation in or near the footprint of the proposed coastal protection works, although some trees may have to be removed, to make way for the road realignment. The project will not result in the significant conversion of Natural Habitats or Critical Natural Habitats.

3.8 Site 15

Site 15 is at the eastern (ocean) end of the runway at Bonriki International Airport and comprises eastern (15E) and northern (15N) parts separated by a conglomerate rock headland.

At Site 15E, a variety of coral block, sand cement bag, gabion basket and asphalt-covered rock walls have been constructed historically and all are in various states of disrepair and failure. A new 90 m long vertical reinforced concrete seawall with wave return wall and a crest height of RL 4.8 m has been constructed under KAP-II funding. The wall is in good repair, but is located seaward of the current coastal edge and is flanked by sand-cement bags which are likely to fail in the short-term.

Views of the existing seawall and foreshore at Site 15E

The proposed remediation at Site 15E involves the demolition and removal of the existing sandbag and other informal walls along a 100 m section of the shore, and placing this material behind a new rock-armoured revetment (gradient 2(H):1(V)) extending approximately 120 m south and 20 m north of the existing concrete seawall. The section of vertical reinforced concrete wall to the northern end of this site, which has not yet been compromised, would remain. Additional rocks may be placed seaward of the existing seawall to reduce the potential for wave overtopping. The proposed coastal protection works will run from headland to headland – connecting to hard structures at each end - and thus there is no risk of erosion being transferred to adjacent beach areas.

At Site 15N, a 2 m high sand-cement bag wall extends for approximately 120 m. While most of the wall is in average condition, and is unlikely to fail in the immediate future, it is being outflanked at its western end where it adjoins the adjacent beach, and there are two sections where there are holes through the wall, and fines are being lost from behind the wall, leading to partial failure of the wall at one of the locations, and likely failure at the other location if remedial works are not undertaken shortly.

Views of the existing seawall and foreshore at Site 15N

Coastal protection proposals for Site 15N comprise extension to westward of the existing wall by approximately 20 m (to tie in with the existing beach berm), using mortared precast concrete blocks, patching cavities in the existing seawall, and backfilling behind both sections of seawall with fill sourced locally (i.e. excavated to form the toe of the new wall). Where the proposed new section of seawall overlaps the existing seawall, it is proposed to construct the new section to the seaward side of the old section, and keep the existing section of seawall in place behind the new section. It is noted that the western end of the seawall will likely require further extension in future, as the beach is expected to continue retreating at this location. At its eastern end, the seawall connects into a headland, and thus there will be no transfer of erosion to an adjacent beach area.

Once the 'hard structures' at Site 15E and 15N have been built in accordance with the construction drawings, it is proposed that approximately 760 m^2 of fast growing, salt-tolerant vegetation will be established, to reduce damage potential, trap wind-blown sand and improve ecological connectivity between the land and sea. 125 m^2 will be planted at Site 15N, with the balance at 15E. Plant specifications, propagation, planting and monitoring/management requirements for Site 15 are provided in the accompanying Coastal Protection Vegetation Report (Tonkin & Taylor International, 2014).

Marine habitats in the vicinity of Site 15E comprise largely of a wave-cut conglomerate rock platform, with a rich assemblage of rock pool intertidal species such as seagrasses, invertebrates such as brittle stars, chitins and gastropods, and wading birds. Such habitats are also present at the eastern end of Site 15N, while the balance of intertidal habitats at this location comprise intertidal sand flats with cobble-sized coral fragments, and a sandy upper beach with low habitat value. No significant vegetation, which would require removal in order to carry out the works is present at either site. While the rock pool assemblage near the works area could be deemed *Natural Habitat* under World Bank OP4.04, it will not be directly affected by the proposed works. The works will not result in the significant conversion of Natural Habitats.

3.9 Ananau Causeway

The Ananau causeway runs approximately north-south across the Temaiku Bight (lagoon side), connecting Temaiku in the south, with the airport and the island of Buota to the north.

The coastal protection works on the Ananau Causeway are complete, and consist of a gentle sloping ramp of sand-cement bags, which have been constructed as part of the KRRP project.

Coastal protection works on the Ananau Causeway

As a separate project to the KRRP work, in 2010-2011, MELAD-ECD embarked on a program of planting mangrove seedlings, with KAP II and other GoK budgetary support. Mangrove seedlings were locally sourced from a swamp area at the southern end of the causeway. As can be seen from the photographs above and below, these have become well established.

As the physical works are complete, the provisions in this CPEMP relate only to operational aspects at the Ananau causeway, including monitoring of any impacts of the works on these planted mangroves.

Mangrove planting (carried out by MELAD-ECD) adjacent to the Ananau causeway

4 Environmental Management Plan

4.1 Introduction

The CPEMP summarises the anticipated environmental impacts and associated mitigation and monitoring measures during the pre-construction, construction and operational phases.

It makes reference to the relevant law and contract documents, provides approximate locations, timeframes, mitigation costs, and the responsibility for implementation and supervision of mitigation and monitoring actions. As stated in Section 1.3, in the event of any inconsistency between the mitigation and monitoring actions as set out in this CPEMP and those in the project EMPs, other than for matters of 'currency', the project EMP shall have precedence.

The recommendations and proposed mitigation measures will be attached to the Project Bidding Documents and subsequently the Contractors' contracts. There are no environmental mitigation costs as these are incorporated in the civil work design and included in contractor's contract. Many of the mitigation measures will be incorporated as part of the standard design and construction practices and as such their costs will be included in the construction cost.

4.2 Linkage to contract documents

Inadequate implementation of the CPEMP by the contractor may occur due to weak linkages of the CPEMP with the contract documents. The CPEMP is a part of the work program and as such it must be addressed by the contractor and carried out as required.

In the Bid and Contract section "Special Conditions of Contract", the Construction Supervision Consultant (CSC) of the MPWU will, prior to the tender being called and if necessary, revise and update the CPEMP, which will form part of the Bid and Contract document between MPWU and the successful tenderer. Any CPEMP issues are to be included in the agenda for any Pre-Tender meeting.

The contractor will be required to provide a short statement within their tender, which confirms that:

- the CPEMP conditions have been costed into the bid price,
- the contractor has experience of working with Environmental Management Plans,
- the contractor has a qualified and experienced person on the contractor's team who will be responsible for the environmental compliance requirements of the CPEMP.

During construction, the contractor will work according to the requirements of the Contractor's Environmental Management Plan (CEMP) (based on the relevant EMP and also this CPEMP) which will be prepared by the contractor and submitted to MPWU for approval, before construction can commence. Supervision and monitoring of the CEMP activities will be undertaken as follows:

(i) The contractor has the initial responsibility for preparing and implementing the CEMP as per the works contract.

(ii) The Resident Engineer (RE) will direct the contractor with regard to compliance with the CEMP.

(iii) The MPWU will carry out independent monitoring of the work and can issue Defect Notices to the RE who will transmit these to the contractor.

(iv) The contractor will have his own representative on site – the Site Engineer (SE) who will be responsible for implementing the contract and ensuring that the Contractor complies with the CEMP at all times.

(v) MELAD-ECD has responsibility for periodic verification that the conditions of the Environmental Licences are being adhered to.

For sites such as Ananau Causeway, physical works are complete, and therefore this CPEMP only affects the operational monitoring phase of the project.

4.3 EMP Activity Tables

Tables 4.1 to 4.4, which follow, set out specific environmental management actions that will be carried out, prior to, during and after construction of the coastal protection works, as follows:

- Table 4.1: Design/Pre-construction environmental management plan (Generic)
- Table 4.2: Construction/Operation phase pre-construction activities (Generic)
- Table 4.3: Site specific environmental management measures
- Table 4.4: Environmental Monitoring Plan

Action items that are italicised in the following tables are direct requirements of the Environmental Licences issued by MELAD-ECD.

Table 4.1 below sets out generic environmental management measures that apply to all sites during the design/pre-construction phase. As a substantial proportion of the work in Table 4.1 has already been completed by various parties, in accordance with GoK or lender requirements, this table does not attempt to estimate costs.

TABLE 4.1: GENERIC ENVIRONMENTAL MANAGEMENT PLAN: DESIGN/PRE-CONSTRUCTION PHASE			
ENVIRONMENTAL ISSUE AND OBJECTIVE:	**MITIGATION MEASURES**	**ACTIONS DURING DESIGN/PRE-CONSTRUCTION PHASE**	**RESPONSIBILITY**
DESIGN/PRE-CONSTRUCTION PHASE			
Protection of (sensitive) Natural areas To minimise negative impacts on sensitive ecosystems, or the natural environment:	• Identify potential environmentally sensitive / natural areas (see Table 4.3) • Locate optional construction sites/activities away from them. • Ensure construction personnel are aware of locations of sensitive areas and avoid them • Where the proposed construction accesses pass close to environmentally sensitive areas, include temporary fences or other markers, to restrict machines and activities from encroaching in the area.	Potential contractors have been consulted during preparation of this CPEMP, and it is agreed that construction access can be confined to a strip of foreshore no more than 10 m wide, measured from the seaward extent of any new structure. Mark out and fence off (or otherwise demarcate) sensitive areas as set out in Table 4.3 prior to construction commencement, and train personnel to increase awareness of the areas and the relevant rules. Final design of planting plans in accordance with T&TI (2014) Coastal Protection Vegetation Report. Identify and document any vegetation (including mangroves) which must be removed, so that compensation planting can be carried out at other locations or as additional planting at the subject site when works are complete. *Provide vegetation inventory report to MELAD-ECD.*	MPWU/Contractor
Shoreline profile Minimise adverse impacts on shorelines adjacent to works area, including increased erosion of adjacent unprotected shorelines	• Appropriate design, restrictions on sand sourcing to prevent reduction of alongshore sediment transport.	Detailed designs will take into consideration, and avoid, potential impacts on adjacent shorelines. Tender documents will proscribe the taking of sand locally: sand can only be taken from licensed sources.	Designer/MPWU

TABLE 4.1: GENERIC ENVIRONMENTAL MANAGEMENT PLAN: DESIGN/PRE-CONSTRUCTION PHASE			
ENVIRONMENTAL ISSUE AND OBJECTIVE:	**MITIGATION MEASURES**	**ACTIONS DURING DESIGN/PRE-CONSTRUCTION PHASE**	**RESPONSIBILITY**
Biosecurity To minimise risk from introduction of exotic plant species.	• Ensure planting plans do not include exotic plant species which are not already present in Kiribati.	Develop detailed planting plans based on these species already present in South Tarawa, in accordance with the T&TI (2014) vegetation plan. Agree planting plans and implementation arrangements with local communities prior to implementation.	MPWU/Contractor
Cultural Heritage To avoid any damage to cultural heritage site (i.e., ceremonial sites and burial grounds):	• No cultural sites are known to be present in the proposed works areas. However, if a cultural heritage site is identified during construction, the Contractor will cease all work immediately and notify the Project Supervising Consultant.	Contractor briefing, establish lines of communication with CSC ahead of construction commencement.	CSC
Final Design Submit final designs and notify of construction commencement, to comply with Environmental Licence requirements	• Submit final designs to MELAD-ECD and notify them of construction commencement.	*Submit final designs to MELAD-ECD* *Notify MELAD-ECD of construction commencement at least 3 days in advance.*	CSC

TABLE 4.1: GENERIC ENVIRONMENTAL MANAGEMENT PLAN: DESIGN/PRE-CONSTRUCTION PHASE			
ENVIRONMENTAL ISSUE AND OBJECTIVE:	**MITIGATION MEASURES**	**ACTIONS DURING DESIGN/PRE-CONSTRUCTION PHASE**	**RESPONSIBILITY**
Social or Community Concerns To minimise social impact of an relocation or resettlement of people:	• Plan activities to avoid/minimise disruption to residents • Discuss the projected impacts and agree proposed management measures in advance with the affected community. • Provide an ongoing point of contact for any concerns raised by community members.	Preliminary consultations have taken place with groups of community members at the KAP III sites. These identified some concerns related to design and minor concern over construction activities. Concerns related to design were (i) possible removal of trees to make way for coastal protection works and (ii) plant species to be selected for berm stabilisation at Sites 4 and 6. These are addressed by (i) confining tree removal to only those required to make way for the coastal protection measures and/or to maintain the integrity of the road, (ii) replacing removed trees with suitable species, space permitting (iii) involving communities in finalisation of planting plans and (iv) involving communities in planting activities and ongoing maintenance. Further consultation to be carried out, where necessary, with communities affected by coastal protection works at the KRRP sites. MPWU to identify and publicise a key contact person for any enquiries from affected communities.	MPWU
Compensation for loss of private property To fairly compensate residents for unavoidable loss of asset e.g. trees, buildings within the works area.	• Minimise effects on private property and fairly compensate owners for loss which is unavoidable.	Finalise designs to minimise impacts on private property. Compensate for loss of trees, buildings and other assets in accordance with respective compensation and resettlement plans for each project.	Designer/MPWU

TABLE 4.1: GENERIC ENVIRONMENTAL MANAGEMENT PLAN: DESIGN/PRE-CONSTRUCTION PHASE			
ENVIRONMENTAL ISSUE AND OBJECTIVE:	**MITIGATION MEASURES**	**ACTIONS DURING DESIGN/PRE-CONSTRUCTION PHASE**	**RESPONSIBILITY**
Unexploded Ordnance To minimise risk to workers, members of the public, and property from unexploded ordnance encountered during construction.	• Detection using methods as set out in Table 4.3, followed by clearance work under the supervision of a qualified and designated Explosive Ordnance Disposal (EOD) expert • Relocation of unexploded ordnance to the police bunker in Betio. • Clear and accurate marking of all cleared areas • Confirmation from EOD expert that sites are safe for construction activities to proceed	All measures to be carried out prior to construction commencement. No construction to proceed without confirmation from EOD expert that sites are safe for construction activities.	MPWU/Contractor

Table 4.2 below sets out generic environmental management measures that apply to all sites. It should be read in conjunction with relevant sections of the project-specific EMPs. While there is some repetition of "Environmental Issues and Objectives" from the project-specific EMPs, this has been done where the mitigation methods have been modified in order to specifically address potential issues that may arise due to the nature of coastal protection works, or if the proposed mitigation is a requirement of the Environmental Licence(s) for coastal protection works.

TABLE 4.2: GENERIC COASTAL PROTECTION ENVIRONMENTAL MANAGEMENT PLAN (CONSTRUCTION & OPERATION PHASES)

ENVIRONMENTAL ISSUE AND OBJECTIVE:	MITIGATION MEASURES	LOCATIONS	TIMEFRAME	ESTIMATED MITIGATION COSTS	IMPLEMENTATION AGENCY	SUPERVISION AGENCY
CONSTRUCTION PHASE						
Social or Community Concerns To minimise social disturbance and maximise community benefits from the project:	• Advise the local community of actual project plans and proposed construction methodology in advance of construction, and involve them in planning, as necessary (measures for specific sites are given in Table 4.3). • Abide by the laws of the Republic of Kiribati relating to employment and use of labour • Maintain liaison with community representatives and arrange for the involvement of community groups where practicable, such as the provision of catering services, or inputs to planting programmes.	All sites	During mobilisation and commencement of construction activities in the communities	Minimal (part of standard design practices).	Contractor	MPWU/CSC

TABLE 4.2: GENERIC COASTAL PROTECTION ENVIRONMENTAL MANAGEMENT PLAN (CONSTRUCTION & OPERATION PHASES)						
ENVIRONMENTAL ISSUE AND OBJECTIVE:	**MITIGATION MEASURES**	**LOCATIONS**	**TIMEFRAME**	**ESTIMATED MITIGATION COSTS**	**IMPLEMENTATION AGENCY**	**SUPERVISION AGENCY**
Coastal Vegetation Minimise net adverse impacts of construction works on existing vegetation	• *Re-plant any vegetation that is removed during construction, and provide evidence of re-planting to MELAD-ECD*	All sites	As soon as possible during construction phase	Minimal (part of construction contract)	Contractor	MPWU/CSC
Soil Instability and Erosion To minimise the amount of sediment lost from the site to the sea and to the lagoon:	• *Place geotextile silt fences or other silt traps as appropriate* • At sites where vegetation is removed, carry out re-vegetation immediately after construction activity finishes • Schedule construction to minimise areas of soil disturbance during wet seasons • Limit ground disturbance to areas that are small enough for erosion and sediment generation to be managed. • Avoid discharging sediment-bearing contaminated water to the sea or lagoon	All areas where land disturbance is required	Continuous	Minimal (part of standard construction practices)	Contractor	MPWU/CSC
Shoreline profile Minimise adverse impacts on shorelines adjacent to works area, including increased erosion of adjacent unprotected shorelines	• Contractor will be required to construct coastal protection works to the approved final design.	All coastal protection sites except Ananau Causeway (where construction works are complete)	Duration of construction	None additional to construction contract price.	Contractor	MPWU/CSC

TABLE 4.2: GENERIC COASTAL PROTECTION ENVIRONMENTAL MANAGEMENT PLAN (CONSTRUCTION & OPERATION PHASES)						
ENVIRONMENTAL ISSUE AND OBJECTIVE:	**MITIGATION MEASURES**	**LOCATIONS**	**TIMEFRAME**	**ESTIMATED MITIGATION COSTS**	**IMPLEMENTATION AGENCY**	**SUPERVISION AGENCY**
Controlling Storm water To minimise the impact of contaminated runoff water:	• Pass storm water run-off from construction areas through geotextile silt traps/curtains and/or siltation ponds before discharge to sea or lagoon.	All areas where soil disturbance is required.	Continuous	Minimal (part of standard construction practices)	Contractor	MPWU/CSC
Management of Stockpiles and Spoil-heaps To minimise dust and runoff	• *Cover or re-vegetate spoil-heap or stockpiles during windy weather or if prolonged exposure is envisaged, to minimise erosion and sediment runoff* • Place geotextile silt traps around materials stockpiles • Adequate provision shall be made to ensure that no stockpiles are able to release material into the sea or lagoon. Arrangements shall be made to ensure that no silt in silt traps is able to drain to the shore.	Dumping areas and areas where materials are stored.	Continuous	Minimal (part of standard construction practices)	Contractor	MPWU/CSC
Construction of Coastal protection works To reduce risk of smothering benthic habitats, release of oil or fuel from machinery and collapse of excavated surface prior to completion of the wall	• Submission of a method statement for each site to the Engineer stating how risks of collapse will be minimised and excavated material handled including mention of measures to be adopted at sites where work	The intertidal zone on the seaward side of the island	Continuous	Minimal (part of standard design practices).	Contractor	MPWU/CSC

TABLE 4.2: GENERIC COASTAL PROTECTION ENVIRONMENTAL MANAGEMENT PLAN (CONSTRUCTION & OPERATION PHASES)						
ENVIRONMENTAL ISSUE AND OBJECTIVE:	**MITIGATION MEASURES**	**LOCATIONS**	**TIMEFRAME**	**ESTIMATED MITIGATION COSTS**	**IMPLEMENTATION AGENCY**	**SUPERVISION AGENCY**
	will take place over open water • Careful planning of the works to ensure that excavation work takes place above the waterline. • Immediate removal of excavated material to dry land • Minimizing the period that excavated areas are left unprotected • Ensuring that all plant used is in sound and well maintained condition, and free of any leaks of any fluid at all times.					
Unexploded Ordnance To eliminate risks of death or injury to workers or the public from accidental detonation of ordnance that may remain from historical fighting on South Tarawa	• Implementation of approved clearance method. • Relocation of unexploded ordnance to the police bunker in Betio under secure conditions • Survey of mined areas in accordance with the United Nations International Standard for Level 2 Surveys. • Clear and accurate marking and recording of all cleared areas to facilitate subsequent identification during construction.	Any construction sites where military combat is known or suspected to have taken place	Prior to the commencement of construction at suspect sites (as indicated in the Contractor's Work Plan)	Included in Contract Price	Contractor	MPWU/CSC

TABLE 4.2: GENERIC COASTAL PROTECTION ENVIRONMENTAL MANAGEMENT PLAN (CONSTRUCTION & OPERATION PHASES)						
ENVIRONMENTAL ISSUE AND OBJECTIVE:	**MITIGATION MEASURES**	**LOCATIONS**	**TIMEFRAME**	**ESTIMATED MITIGATION COSTS**	**IMPLEMENTATION AGENCY**	**SUPERVISION AGENCY**
	• Quality control checking, to a minimum of 5% of the de-mined area.					
OPERATIONAL PHASE						
Shoreline Profile Ensure long-term shoreline profile at actual works sites and adjacent sites is maintained as per design.	• Redistribute or replenish beach material as required (to be determined based on Baseline and Operational Phase monitoring results – see Table 4.4). Any material used for replenishment will come from a licensed source eg. TACL.	All sites where a beach or widened berm is proposed as part of the works	Nominally 5 tears post-construction.	Depends upon scale of re-profiling required (if any). Potentially 10,000 per year.	MPWU	MPWU HQ (Donors: World Bank/ADB, funds permitting)
Maintenance & Upgrading To be able to carry out maintenance and upgrading of coastal protection works while managing environmental effects, e.g. • Routine maintenance such as beach/berm re-profiling, patching of seawall • Seawall extensions to deal with predicted beach erosion, as	• For any required maintenance work, implement relevant mitigation measures as set out above for construction phase.	All coastal protection sites, particularly Sites 1, 2, 10 and 15N, where upgrades to precast seawalls or extension of seawall length is anticipated in due course.	As required	Part of ongoing maintenance costs.	MPWU	MPWU HQ (Donors: World Bank/ADB, funds permitting)

TABLE 4.2: GENERIC COASTAL PROTECTION ENVIRONMENTAL MANAGEMENT PLAN (CONSTRUCTION & OPERATION PHASES)						
ENVIRONMENTAL ISSUE AND OBJECTIVE:	**MITIGATION MEASURES**	**LOCATIONS**	**TIMEFRAME**	**ESTIMATED MITIGATION COSTS**	**IMPLEMENTATION AGENCY**	**SUPERVISION AGENCY**
anticipated for Sites 10 and 15N.						

Table 4.3 sets out site-specific mitigation measures, over and above the generic measures recommended for all sites, which are set out in Tables 4.1 and 4.2. For some sites, this table includes specific monitoring provisions, that link to site-specific mitigation measures (e.g. in relation to shoreline profile monitoring and maintenance). This has been done deliberately, so that the monitoring and mitigation measures can each be seen in context, and so that site-specific cost estimates can be seen. However, for completeness, this monitoring is also included (in generic form) in Table 4.4.

TABLE 4.3: SITE SPECIFIC MITIGATION MEASURES

SITE NO.	ISSUE/OBJECTIVE	MITIGATION MEASURE	PHASE – Pre-Construction/Construction/ Operational	COST	IMPLEMENTATION	SUPERVISION
1	Vegetation selection	Consult with local community on plant selection for vegetated berm, before finalising design (making reference to T&T 2014 Coastal Protection Vegetation Report).	Pre	Negligible	Design Consultant	MPWU
	Construction noise	Advise local community when unavoidable noisy activities will be taking place.	Construction	Within contract	Contractor	MPWU
2	Protection of hard reef structure	Mark out defined vehicle access route (including temporary ramp from roadway onto foreshore) to avoid tracking on conglomerate rock reef.	Start of construction phase	Within contract	Contractor	MPWU
4	Vegetation selection	Consult with local community on plant selection for vegetated berm, before finalising design (making reference to T&T 2014 Coastal Protection Vegetation Report).	Pre	Negligible	Design Consultant	MPWU
	Boat hardstand design and location	Consult with local community on final design for boat hardstand	Pre	Negligible	Design Consultant	MPWU
	Sand ladder location	Consult with local community on final location for sand ladder to access beach	Pre	Negligible	Design Consultant	MPWU

TABLE 4.3: SITE SPECIFIC MITIGATION MEASURES						
SITE NO.	**ISSUE/OBJECTIVE**	**MITIGATION MEASURE**	**PHASE – Pre-Construction/Construction/ Operational**	**COST**	**IMPLEMENTATION**	**SUPERVISION**
	Construction noise	Advise local community when unavoidable noisy activities will be taking place	Construction	Within contract	Contractor	MPWU
6	Vegetation selection	Consult with local community on plant selection for vegetated berm, before finalising design (making reference to T&T 2014 Coastal Protection Vegetation Report).	Pre	Negligible	Design Consultant	MPWU
	Boat hardstand design and location	Consult with local community on final design for boat hardstand	Pre	Negligible	Design Consultant	MPWU
	Sand ladder location	Consult with local community on final location for sand ladder to access beach	Pre	Negligible	Design Consultant	MPWU
	Construction noise	Advise local community when unavoidable noisy activities will be taking place	Construction	Within contract	Contractor	MPWU
5	Protection of mangroves	Mark out defined vehicle access route (including temporary ramp from roadway onto foreshore) to avoid tracking through mangroves.	Start of construction phase	Within contract	Contractor	MPWU
11	Vegetation selection	Consult with local community on plant selection for vegetated berm, before finalising design (making reference to T&T 2014 Coastal Protection Vegetation Report).	Pre	Negligible	Design Consultant	MPWU

TABLE 4.3: SITE SPECIFIC MITIGATION MEASURES						
SITE NO.	**ISSUE/OBJECTIVE**	**MITIGATION MEASURE**	**PHASE – Pre-Construction/Construction/ Operational**	**COST**	**IMPLEMENTATION**	**SUPERVISION**
	Protection of hard reef structure from physical damage	Mark out defined vehicle access route (including temporary ramp from roadway onto foreshore) to avoid tracking on conglomerate rock reef.	Start of construction phase	Within contract	Contractor	MPWU
10	Vegetation selection	Consult with local community on plant selection for vegetated berm, before finalising design (making reference to T&T 2014 Coastal Protection Vegetation Report).	Pre	Negligible	Design Consultant	MPWU
	Boat hardstand design	Consult with local community on final design for boat hardstand	Pre	Negligible	Design Consultant	MPWU
	Trees, structures to be removed for road realignment.	Prepare schedule of assets to be removed and compensate owners in accordance with existing compensation and resettlement plans.	Pre	Negligible	Design Consultant/MPWU	LMD
	Protection of hard reef structure from physical damage	Mark out defined vehicle access route (including temporary ramp from roadway onto foreshore) to avoid tracking on conglomerate rock reef.	Start of construction phase	Within contract	Contractor	MPWU
	Continued retreat of adjacent sections of shore	Monitor retreat (topographic survey/photographic records) and carry out short and long-term repair works if required, using aggregate from a licensed source.	Operational	$5,000 per year	MPWU	MELAD
	Construction noise	Advise local community when unavoidable noisy activities will be taking place	Construction	Within contract	Contractor	MPWU

TABLE 4.3: SITE SPECIFIC MITIGATION MEASURES						
SITE NO.	**ISSUE/OBJECTIVE**	**MITIGATION MEASURE**	**PHASE – Pre-Construction/Construction/ Operational**	**COST**	**IMPLEMENTATION**	**SUPERVISION**
15E	Vegetation selection	Consult with local community on plant selection for vegetated berm, before finalising design (making reference to T&T 2014 Coastal Protection Vegetation Report).	Pre	Negligible	Design Consultant	MPWU
	Protection of hard reef structure	Mark out defined vehicle access route (including temporary ramp from roadway onto foreshore) to avoid tracking on conglomerate rock reef.	Start of construction phase	Within contract	Contractor	MPWU/MCTTD
15N	Vegetation selection	Consult with local community on plant selection for vegetated berm, before finalising design (making reference to T&T 2014 Coastal Protection Vegetation Report).	Pre	Negligible	Design Consultant	MPWU
	Protection of hard reef structure	Mark out defined vehicle access route (including temporary ramp from roadway onto foreshore) to avoid tracking on conglomerate rock reef.	Start of construction phase	Within contract	Contractor	MPWU/MCTTD
	Continued retreat of section of shore immediately to East of 15N.	Monitor retreat and extend coastal protection works when required.	Operational phase (10-15 years)	$2,000 per year	MPWU/MCTTD	ECD (Environmental Licence monitoring)
	Repair of existing sandbag wall	Monitor condition of existing sandbag wall and repair as necessary until condition degrades to imminent failure, then replace.	Operational phase (2-5 years)l	$2,000 per year until replacement	MPWU/MCTTD	MELAD
Ananau Causeway	None identified					

Table 4.4 below sets out environmental monitoring measures that apply to all sites. It should be read in conjunction with relevant sections of the project-specific EMPs. While there is some repetition of "Environmental Issues and Objectives" from the project-specific EMPs, this has been done where:

- the monitoring methods have been modified in order to specifically address potential issues that may arise due to the nature of coastal protection works
- the proposed monitoring was only stated in one of the project-specific EMPs (and therefore did not apply to some of the projects)
- the project-specific EMP did not state the performance standards or criteria, or
- if the proposed monitoring is a requirement of the Environmental Licence(s) for coastal protection works and was not stated in the project-specific EMPs.

TABLE 4.4: ENVIRONMENTAL MONITORING PLAN

ENVIRONMENTAL ISSUE AND OBJECTIVE:	WAYS FOR VERIFICATION	LOCATION	STANDARDS/CRITERIA	DURATION/FREQUENCY AND ESTIMATED COSTS	IMPLEMENTATION	SUPERVISION
PRE-CONSTRUCTION PHASE						
Shoreline Profiles *Monitor and minimise adverse impacts on shorelines adjacent to works area, including increased erosion of adjacent unprotected shorelines*	Comparison of post-construction profiles with pre-construction profiles (tied in to known datum, with spacings no more than 1 m apart)	All works sites and adjacent beach areas where the natural beach profile will be maintained after construction (i.e. there will be no addition to berms)	Comparison with pre-construction profiles	Once, prior to commencement of construction (estimate $3,000 for one-off survey at up to 9 sites)	Contractor (survey data to be provided to MPWU prior to commencement of construction)	ES and Engineer of MPWU
Unexploded Ordnance Minimise risk of injury to construction personnel or members of the public.	Detection at all suspected sites by means of a 100% sweep by mine/metal detectors and a deep magnetometer search followed by	Sites known to be at risk of contamination from historical fighting	100% sweep by mine/metal detectors and a deep magnetometer Qualifications of designated EOD expert, verification of training of other staff	Continuous (minimal costs, included in standard supervision)	Joint monitoring by the MPWU Engineer and the Contractor.	ES and Engineer of MPWU

TABLE 4.4: ENVIRONMENTAL MONITORING PLAN						
ENVIRONMENTAL ISSUE AND OBJECTIVE:	**WAYS FOR VERIFICATION**	**LOCATION**	**STANDARDS/CRITERIA**	**DURATION/FREQUENCY AND ESTIMATED COSTS**	**IMPLEMENTATION**	**SUPERVISION**
	clearance as set out in Table 4.2. Nomination of a qualified EOD expert to declare sites safe, and formal recognised training for other staff involved in the work. Where collateral property damage is likely to occur as a result of disposal activity, the Contractor will advise the Engineer before proceeding. Provision for medical treatment and emergency evacuation. Use of approved, nominated search instruments. A 100% sweep by mine/metal detectors and a deep magnetometer search following clearance work		Provision for medical treatment and emergency evacuation. Approval of search instruments nominated for use in detection. Review/approval of proposed clearance method. Relocation of unexploded ordnance to the police bunker in Betio under secure conditions Survey of mined areas in accordance with the United Nations International Standard for Level 2 Surveys. Clear and accurate marking and recording of all cleared areas to facilitate subsequent identification during construction. Quality control checking, to a minimum of 5% of the de-mined area and 10% of the existing road formation.			

TABLE 4.4: ENVIRONMENTAL MONITORING PLAN						
ENVIRONMENTAL ISSUE AND OBJECTIVE:	**WAYS FOR VERIFICATION**	**LOCATION**	**STANDARDS/CRITERIA**	**DURATION/FREQUENCY AND ESTIMATED COSTS**	**IMPLEMENTATION**	**SUPERVISION**
CONSTRUCTION PHASE						
Increased erosion of shorelines adjacent to coastal protection works areas Construct coastal protection works in accordance with approved designs	Close observation of construction against approved design	All coastal protection works areas	Construction is in accordance with approved final design	Continuous (minimal costs, included in standard supervision)	MPWU Engineer	ES and Engineer of MPWU
Controlling Sediment Minimising storm water containing sediment from discharging into the sea or lagoon.	Visual and field Inspection. Verbal or formal complaints.	All areas where land disturbance is required.	No visible sign of sediment being transported to sea or lagoon (e.g. turbid water, sedimentation)	Continuous (minimal costs, included in standard supervision)	Joint monitoring by the MPWU Engineer and the Contractor.	ES and Engineer of MPWU
Air Quality and Dust Control Ensure there is no health risk or inconvenience due to dust production:	Visual field checks. Verbal or formal complaints. Review of asphalt production method and siting of plant	Cleared areas	International 'Best Practices' (see ADB's Environmental Assessment Guidelines, WB Handbook on Roads and the Environment and WHO Guidelines), as necessary.	Continuous (minimal costs, included in standard supervision)	Joint monitoring by the MPWU Engineer and the Contractor.	ES and Engineer of MPWU
Noise control Ensure nuisance from noise is minimised.	Visual field checks. Verbal or formal complaints	All construction areas, access routes	International 'Best Practices' (see ADB's Environmental Assessment Guidelines, WB Handbook	Continuous (minimal costs, included in standard supervision)	Joint monitoring by the MPWU Engineer and the Contractor.	ES and Engineer of MPWU

TABLE 4.4: ENVIRONMENTAL MONITORING PLAN						
ENVIRONMENTAL ISSUE AND OBJECTIVE:	**WAYS FOR VERIFICATION**	**LOCATION**	**STANDARDS/CRITERIA**	**DURATION/FREQUENCY AND ESTIMATED COSTS**	**IMPLEMENTATION**	**SUPERVISION**
			on Roads and the Environment and WHO Guidelines), as necessary.			
OPERATIONAL PHASE						
Shoreline profiles Timely identification of significant changes in adjacent shoreline and constructed berm profiles	*Monitor coastline changes (erosion or accretion) in the footprint of constructed beaches/berms, and at beach sites in the vicinity of the coastal protection works.* *Use pre-construction baseline profile or as-built profile as baseline.* *Report to MELAD-ECD after each monitoring exercise*. Restore beach/berm profile if necessary. *Report to MELAD-ECD after each monitoring round.*	Monitor beach profiles in the vicinity of works at all sites. Monitor constructed beach/berm profile at Sites 1, 4, 6 and 10.	Proposed standard is that vertical elevation at the majority of survey points on a survey transect is >0.50 m different from baseline/as built.	Three monthly for first 3 years post-construction, annually thereafter. Analyse profiles yearly and determine volumetric change since construction.	MPWU Engineer (potentially devolved to MELAD-ECD, with their agreement)	MPWU HQ (Donors: World Bank/ADB, funds permitting)

TABLE 4.4: ENVIRONMENTAL MONITORING PLAN						
ENVIRONMENTAL ISSUE AND OBJECTIVE:	**WAYS FOR VERIFICATION**	**LOCATION**	**STANDARDS/CRITERIA**	**DURATION/FREQUENCY AND ESTIMATED COSTS**	**IMPLEMENTATION**	**SUPERVISION**
Vegetation Maintain vegetation as planted on berms.	Visual check inspections using methods as set out in T&TI (2014) Coastal Protection Vegetation Report.	Sites 1E, 4, 6, 10, 11, 15E and 15W, and any other sites where compensation planting is carried out address vegetation removal.	As set out in T&TI (2014) Coastal Protection Vegetation Report. (Triggers re-vegetation/infill planting if necessary).	See Table 5 of T&TI (2014) Coastal Protection Vegetation Report.	MPWU Engineer (potentially devolved to MELAD-ECD)	MPWU HQ (Donors: World Bank/ADB, funds permitting)

5 Capacity Development

Consultation with implementing organisations has generally indicated that there is adequate capacity within these organisations to effectively carry out the measures which are set out in the CPEMP. Furthermore, potential contractors appear to have capacity on staff to implement the required mitigation and monitoring measures.

There is a potential requirement for developing capacity is within MELAD-ECD, which has the responsibility to provide periodic verification that the conditions of the Environmental Licences are being adhered to. During consultation, MELAD-ECD staff noted that although there is capacity to monitor compliance with conditions of the Environmental Licences, there is a shortage of inhouse skills to monitor whether coastal protection works have been constructed in accordance with the documentation which has been issued for construction, and any subsequent amendments. Such skills would be transferable to other coastal protection works project in the future.

Capacity building for MELAD-ECD staff may also be of value in the area of assessment of impacts on coastal processes from various types of physical works, and what suitable mitigation and monitoring measures are. Construction-related impacts are relatively well-understood, but not the long-term impacts that may be caused by hard structures and plantings.

Furthermore, MPWU staff could also benefit from capacity development in coastal protection asset monitoring and maintenance, consistent with the KAP III project's objectives.

There would be benefits both to the Implementing Agencies in the short term, and to MELAD-ECD and KAP III in the longer term, if opportunities were taken to upskill local staff in these areas. This could be in the form of bespoke training courses, or simply accompanying the supervising engineer/s on site when construction and operational phase measurements and observations are being made.

6 Grievance Redress Mechanisms

Refer to the relevant 'parent' plan for the grievance redress mechanisms – these apply equally to the proposed Coastal Protection works as set out in this CPEMP.

7 References

AECOM, 2014. Pacific Aviation Investment Program (PAIP), Basic Environmental Impact Assessment – Bonriki International Airport (TRW) Final Draft.

Government of Kiribati (Office of the President), 2011. Kiribati Adaptation Programme – Phase III; Environmental Management Plan. February 2011.

Government of Kiribati, June 2014. Kiribati Road Rehabilitation Project, Improvement of the Main Betio-Buota Road, Temaiku Road and Feeder Roads in Betio, Bairiki and Bikenibeu. Contract Document Volume 2A (Revision 5), Part 2: Works Requirements, Environmental Management Plan.

Tonkin & Taylor International Ltd. KAP III, KRRP and KAIP Projects: Coastal Protection Vegetation Report. Prepared for Ministry of Public Works & Utilities, Kiribati.

8 Applicability

This report has been prepared for the benefit of Ministry of Public Works & Utilities, Government of Kiribati, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose without our prior review and agreement.

Tonkin & Taylor International Ltd

Environmental and Engineering Consultants

Report prepared by:

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Brett Ogilvie

Senior Environmental Scientist

Authorised for Tonkin & Taylor International Ltd by:

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Chris Freer

Project Director

Technical review by Tom Shand, Tonkin & Taylor International Ltd

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Appendix A: Environmental Licences

GOVERNMENT OF THE REPUBLIC OF KIRIBATI
MINISTRY OF ENVIRONMENT LANDS AND AGRICULTURAL DEVELOPMENT
P.O. Box 234, Bikenibeu, Tarawa, Republic of Kiribati. Phone: 686 28000. Fax: 686 28334

ENVIRONMENT LICENCE

is hereby issued in accordance with Section 32 (1) (a) of the Environment Act 1999

Licence Holder:	Ministry of Public Works and Utilities
Description of allowed activity:	Seawall construction
Site:	*Nanikaai (lagoon side)*
Licence Number:	**ELA 118/12**

This licence is issued subject to the attached conditions.

Signed this 9 day of October 2013.

09 OCT 2013

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Principal Environment Officer

CONDITIONS OF THE ENVIRONMENT LICENCE ISSUED TO LICENCE HOLDER

The conditions attached to this environment license are as follows:

1.0 General

1.1 This licence is for **seawall construction** for the purpose of protecting the South Tarawa road project from coastal erosion as applied for in the Environment Licence application **No. 118/12.**

1.2 The licence holder is responsible for compliance with the conditions and ensuring compliance by any contractors or any other person engaged to undertake any activity for the purpose of this licence.

1.3 The licence holder must ensure that a copy of this licence is made available to the Environment Inspector for inspection upon request.

1.4 The licence holder will be informed of any public complaints that are communicated to the Ministry of Environment Lands and Agricultural Development (MELAD) during the construction of the seawall. The licence holder must take reasonable measures to investigate and if required, temporarily cease the construction of the seawall to address significant issues raised in complaints to ensure compliance with these licence conditions.

1.5 The Principal Environment Officer (PEO) may amend the conditions of this licence in writing, if required by MELAD and/or the licence holder through consultation.

1.6 If there is a suspected contravention to any of the licence conditions, the Principal Environment Officer (PEO) may issue a request for information or records in accordance with Section 53 of the Environment Act 1999 (as amended 2007).

1.7 The licence holder shall notify MELAD in writing 3 days prior to the commencement of the construction.

1.8 The licence holder or its contractor shall adhere to all mitigation measures set out in the Environmental Management Plan and in the Contractor's Environmental Management Plan to be approved by MELAD before

construction start and throughout the physical implementation of the seawall construction. The Environmental Management Plan and the approved Contractor's Environmental Management Plan form part of this licence.

1.9 Legal actions under the Environment Act 1999 (as amended 2007) may be taken against the licence holder if there is evidence of non-compliance with any of the licence conditions and/or directions issued by the Environment Inspector(s) in relation to this activity.

2.0 Pre-Construction Phase

2.1 Mobilization of equipment to the construction site shall not cause any environmental damages and any nuisance to the nearby dwellers.

2.2 The final design on this seawall shall be submitted to MELAD – ECD prior to the commencement of the actual work on site.

2.3 The licence holder must undertake the inventory survey on the number of coastal vegetation that may be affected by the construction of the seawall. The report must be provided to MELAD-ECD for monitoring purpose.

3.0 Construction Phase

3.1 Specifications requirements

3.11 The seawall shall be constructed at Nonikaai on the lagoon side as shown on the site plan provided.

3.12 The licence holder or its contractor shall construct the seawall according to the scope and the FINAL design specifications provided to ECD which form part of this licence.

3.13 Where practical, the licence holder must ensure that the seawall follow as much as possible the natural profile including the slope of the beach and does not significantly alter it.

3.14 Should the licence holder wishes to change the design of the seawall, the new design has to be approved first by MELAD.

3.15 No sand, aggregates and reef mud to be mined outside the limit of the physical work of the activity. Materials mined as part of the physical work shall, wherever practicable, be re-used for seawall construction.

3.2 Impacts management

3.21 Any coastal vegetation that are totally removed during construction must be replanted, despite their conditions whether in poor or healthy conditions. The cost associated with the replanting shall be borne by the licence holder. Evidence of replanting must be provided to MELAD-ECD in any form.

3.22 If construction is to be encroached into inundated area, a silt curtain shall be applied to contain sediments from spreading.

3.23 The licence holder must ensure that the noise level and vibration emitted from the seawall construction is acceptable and does not reasonably interfere with the health or comfort of any person. Seawall construction along residential areas shall be limited to daylight hours only between 7am to 7pm. Subject to PEO approval, the Contractor shall however be permitted to work outside of the time given above if the work is needed for emergency reasons or for works that are being scheduled to mitigate the potential disruption to travelling public or other users.

3.24 Any stockpiles for aggregate including sand, gravel and reef mud required for the seawall construction must be fenced with geo-textile silts or any other fencing methods and must be covered during windy day to avoid the emission of dust.

3.25 The depot for aggregates including sand, gravel, and reef mud stockpiled along the road alignment must NOT block the road completely.

3.26 Hazardous materials including fuel, oil, and lubricants required for the construction machineries shall NOT be left along the road alignment or construction site at the end of each working day without proper and secure

fencing and storage. No solid wastes generated from construction are to be disposed in the sea or lagoon, or left uncontained on site, they should be disposed at designated landfill at end of each working day.

3.27 The licence holder must ensure that no contaminant including waste water from cement and concrete works, oil, fuel, and silt is discharged or released into the terrestrial and marine environment.

3.28 Any incidence of spills including contaminated sand/beaches occurred during seawall construction shall be removed within a given timeline issued by Environment Inspectors.

3.29 The licence holder must ensure that no substance or material, including dust and fumes from the construction activity, unreasonably interferes with the health or comfort of any person.

3.30 The licence holder must put up visibe signs during the day and night at the construction site areas to warn road users and the general public of the construction activity to ensure public safety.

4.0 Monitoring

4.1 The licence holder shall monitor the coastline changes (erosion or accretion) within the vicinity of the constructed seawall before the construction of the seawall and then every 3 months after the seawall has declared completed and the monitoring will continue for the period of 3 years. The monitoring should use appropriate methods such as visual check, beach profiling, or satellite imagery.

5.0 Post construction

5.1 The licence holder or its contractor shall not leave wastes and debris, hazardous materials including, oil, and fuel, at the construction site after the completion of the seawall. Solid wastes including debris shall be removed to designated landfill sites. Hazardous materials shall be removed for proper storage at the main construction camp/yard.

5.2 Reference to condition 2.3, the decline in coastal vegetation as a result of seawall construction, must be replanted after the completion of the seawall. Evidence of replanting must be provided to MELAD-ECD in any form.

6.0 Reporting

6.1 Any incidence of spills including contaminated sand/beaches occurred during seawall construction shall be reported immediately to MELAD-ECD.

6.2 In reference to condition 4.1, the licence holder must submit a monitoring report to MELAD before seawall construction and at end of every 3 months monitoring period.

If any further clarification is required on the above points please contact the Director at the Environment and Conservation Division, 686 28000.

(Signing the conditions means you are now aware and agree with the requirements of this Environment Licence)

Section 29 of theEnvironment Act ,Contraventions of Conditions of an Environment Licence: maximum penalty: fine of $100,000, imprisonment for five years.

MPWU / Kaaa. Ekeata
Applicant (or on behalf) (sign and print name)

Taouea Reiher /
MELAD Staff (sign and print name)

9/10/2013
Date

Date

09 OCT 2013

GOVERNMENT OF THE REPUBLIC OF KIRIBATI
MINISTRY OF ENVIRONMENT LANDS AND AGRICULTURAL DEVELOPMENT
P.O. Box 234, Bikenibeu, Tarawa, Republic of Kiribati, Phone: 686 28000, Fax: 686 28334

ENVIRONMENT LICENCE

is hereby issued in accordance with Section 32 (1) (a) of the Environment Act 1999

Licence Holder:	Ministry of Public Works and Utilities
Description of allowed activity:	Seawall Construction
Site:	Nanikaai (western end of Anderson Causeway- Site No.2)
Licence Number:	**ELA 009/14**

This licence is issued subject to the attached conditions.

Signed this 16th day of April 2014.

.....
Principal Environment Officer

CONDITIONS OF THE ENVIRONMENT LICENCE ISSUED TO LICENCE HOLDER

The conditions attached to this environment license are as follows:

1.0 General

1. This licence is for **seawall construction** for the purpose of protecting the South Tarawa road project from coastal erosion as applied for in the Environment Licence apolication **No.009/14**
2. The licence holder is responsible for compliance with the conditions and ensuring compliance by any contractors or any other person engaged to undertake any activity for the purpose of this licence.
3. The licence holder must ensure that a copy of this licence is made available to the Environment Inspector for inspection upon request.
4. The licence holder will be informed of any public complaints that are communicated to the Ministry of Environment Lands and Agricultural Development (MELAD) during the construction of the seawall. The licence holder must take reasonable measures to investigate and if required, temporarily cease the construction of the seawall to address significant issues raised in complaints to ensure compliance with these licence conditions.
5. The Principal Environment Officer (PEO) may amend the conditions of this licence in writing, if required by MELAD and/or the licence holder through consultation.
6. If there is a suspected contravention to any of the licence conditions, the Principal Environment Officer (PEO) may issue a request for information or records in accordance with Section 53 of the Environment Act 1999 (as amended 2007).
7. The licence holder shall notify MELAD in writing 2 weeks prior to the commencement of the construction.
8. The licence holder or its contractor shall adhere to all mitigation measures set out in the Environmental Management Plan and in the Contractor's Environmental Management Plan to be approved by MELAD before

construction start and throughout the physical implementation of the seawall construction. The Environmental Management Plan and the approved Contractor's Environmental Management Plan form part of this licence.

9. Legal actions under the Environment Act 1999 (as amended 2007) may be taken against the licence holder if there is evidence of non-compliance with any of the licence conditions and/or directions issued by the Environment Inspector(s) in relation to this activity.

2.0 Pre-Construction Phase

1. Mobilization of equipment to the construction site shall not cause any environmental damages and any nuisance to the nearby dwellers.
2. The final design on this seawall shall be submitted to MELAD – ECD prior to the commencement of the actual work on site.
3. The licence holder must undertake the inventory on the number of coastal vegetation that may be affected by the construction of the seawall. The report must be provided to MELAD-ECD for monitoring purpose.

3.0 Construction Phase

1. The seawall shall be constructed at Nanikaai, western end of Anderson causeway (Site 2), as shown on the site plan provided.
2. The licence holder or its contractor shall construct the seawall according to the scope and the FINAL design specifications provided to ECD which form part of this licence.
3. Where practical, the licence holder must ensure that the seawall follow as much as possible the natural profile including the slope of the beach and does not significantly alter it.
4. Should the licence holder wishes to change the design of the seawall, the new design has to be approved first by MELAD.
5. No sand aggregates including sand and gravel and reef mud to be mined under this licence.

6. Any coastal vegetation that are totally removed during construction must be replanted, despite their conditions whether in poor or healthy conditions. The cost associated with the replanting shall be borne by the licence holder. Evidence of planting must be provided to MELAD-ECD in any form.
7. If construction is to be encroached into inundated area, a silt curtain shall be applied to contain seciments from spreading.
8. The licence holder must ensure that the noise level and vibration emitted from the seawall construction is acceptable and does not unreasonably interfere with the health or comfort of any person. Seawall construction along residential areas shall be limited to daylight hours only between 7am to 7pm. Subject to PEO approval, the Contractor shall however be permitted to work outside of the time given above if the work is needed for emergency reasons or for works that are being scheduled to mitigate the potential disruption to travelling public or other users.
9. Any stockpiles for aggregate including sand, gravel and reef mud required for the seawall construction must be fenced with geo-textile silts or any other fencing methods and must be covered during windy day to avoid the emission of dust.
10. The depot for aggregates including sand, gravel, and reef mud stockpiled along the road alignment must NOT block the road.
11. Hazardous materials including fuel, oil, and lubricants required for the construction machineries shall NOT be left along the road alignment or construction site at the end of each working day without proper and secure fencing and storage. No solid wastes generated from construction are to be disposed in the sea or lagoon, or left uncontained on site, they should be disposed at designated landfill at end of each working day.
12. The licence holder must ensure that no contaminant including waste water from cement and concrete works, oil, fuel, and silt is discharged or released into the terrestrial and marine environment.

13. Any incidence of spills including contaminated sand/beaches occurred during seawall construction shall be removed within a given timeline issued by Environment Inspectors.
14. The licence holder must ensure that no substance or material, including dust and fumes from the construction activity, unreasonably interferes with the health or comfort of any person.
15. The licence holder must put up visible signs during the day and night at the construction site areas to warn road users and the general public of the construction activity to ensure public safety.

4.0 Monitoring

1. The licence holder shall monitor the coastline changes (erosion or accretion) within the vicinity of the constructed seawall before the construction of the seawall and then every 3 months after the seawall has been declared completed and the monitoring will continue for the period of 3 years. The monitoring should use appropriate methods such as visual check, beach profiling, or satellite imagery.

5.0 Post construction

1. The licence holder or its contractor shall not leave wastes and debris, hazardous materials including, oil, and fuel, at the construction site after the completion of the seawall. Solid wastes including debris shall be removed to designated landfill sites. Hazardous materials shall be removed for proper storage at the main construction camp/yard.
2. Reference to condition 2.0 (3), the decline in coastal vegetation as a result of seawall construction, must be replanted after the completion of the seawall. Evidence of replanting must be provided to MELAD-ECD in any form.

3. The licence holder is responsible to address adverse long term impacts or damages to the environment including coastal erosion, the loss of coastal vegetation and mangroves caused after the construction of a seawall.
4. Any costs related to compensation and rehabilitation works shall be borne by the licence holder.

6.0 Reporting

1. Any incidence of spills including contaminated sand/beaches occurred during seawall construction shall be reported immediately to MELAD-ECD.
2. In reference to condition 4.0 (1), the licence holder must submit a monitoring report to MELAD before seawall construction and at end of every 3 months monitoring period.

If any further clarification is required on the above points please contact the Director at the Environment and Conservation Division, 686 28000.

(Signing the conditions means you are now aware and agree with the requirements of this Environment Licence) / (Tiainakintebeebaaio e kaotiabwakoamatataraoiao n nanoraoinikanoankaetietinteraitientiaio)

Section 29 of theEnvironment Act ,Contraventions of Conditions of an Environment Licence: maximum penalty: fine of $100,090, imprisonment for five years.

Applicant (or on behalf) (sign and print name) MELAD Staff (sign and print name)

2/05/14 06/05/14

Date Date

GOVERNMENT OF THE REPUBLIC OF KIRIBATI
MINISTRY OF ENVIRONMENT LANDS AND AGRICULTURAL DEVELOPMENT
P.O. Box 234, Bikenibeu, Tarawa, Republic of Kiribati. Phone: 686 28000. Fax: 686 28334

ENVIRONMENT LICENCE

is hereby issued in accordance with Section 32 (1) (a) of the Environment Act 1999

Licence Holder:	Ministry of Public Works and Utilities
Description of allowed activity:	Seawall Construction
Site:	Ambo-Taborio (Steward) Causeway
Licence Number:	**ELA 123/12**

This licence is issued subject to the attached conditions.

Signed this 3 day of October 2012.

.....
Principal Environmert Officer

CONDITIONS OF THE ENVIRONMENT LICENCE ISSUED TO LICENCE HOLDER

The conditions attached to this environment license are as follows:

1.0 General

1.1 This licence is for **seawall construction** for the purpose of protecting the South Tarawa road project from coastal erosion as applied for in the Environment Licence application **No. 123/12**.

1.2 The licence holder is responsible for compliance with the conditions and ensuring compliance by any contractors or any other person engaged to undertake any activity for the purpose of this licence.

1.3 The licence holder must ensure that a copy of this licence is made available to the Environment Inspector for inspection upon request.

1.4 The licence holder will be informed of any public complaints that are communicated to the Ministry of Environment Lands and Agricultural Development (MELAD) during the construction of the seawall. The licence holder must take reasonable measures to investigate and if required, temporarily cease the construction of the seawall to address significant issues raised in complaints to ensure compliance with these licence conditions.

1.5 The Principal Environment Officer (PEO) may amend the conditions of this licence in writing, if required by MELAD and/or the licence holder through consultation.

1.6 If there is a suspected contravention to any of the licence conditions, the Principal Environment Officer (PEO) may issue a request for information or records in accordance with Section 53 of the Environment Act 1999 (as amended 2007).

1.7 The licence holder shall notify MELAD 3 days prior to the commencement of the construction.

1.8 The licence holder or its contractor shall adhere to all mitigation measures set out in the Environmental Management Plan and in the Contractor's Environmental Management Plan to be approved by MELAD before

construction start and throughout the physical implementation of the seawall construction. The Environmental Management Plan and the approved Contractor's Environmental Management Plan form part of this licence.

1.9 Legal actions under the Environment Act 1999 (as amended 2007) may be taken against the licence holder if there is evidence of non-compliance with any of the licence conditions and/or directions issued by the Environment Inspector(s) in relation to this activity.

2.0 Pre-Construction Phase

2.1 Mobilization of equipment to the construction site shall not cause any environmental damages and any nuisance to the nearby dwellers.

2.2 The final design on this seawall shall be submitted to MELAD – ECD prior to the commencement of the actual work on site.

2.3 The licence holder must undertake the inventory survey on the number of coastal vegetation and mangrove seedlings that may be affected by the construction of the seawall. The report must be provided to MELAD-ECD for monitoring purpose.

3.0 Construction Phase

3.1 Specifications requirements

3.11 The seawall shall be constructed along the lagoon of Ambo-Taborio(steward) causeway as shown on the site plan provided.

3.12 The licence holder or its contractor shall construct the seawall according to the scope and the FINAL design specifications provided to ECD which form part of this licence.

3.13 Where practical, the licence holder must ensure that the seawall follow as much as possible the natural profile including the slope of the beach and does not significantly alter it.

3.14 Should the licence holder wishes to change the design of the seawall, the new design has to be approved first by MELAD.

3.15 No sand, aggregates and reef mud to be mined outside the limit of the physical work of the activity. Materials mined as part of the physical work shall, wherever practicable, be re-used for seawall construction.

3.2 Impacts management

3.21 Any coastal vegetation including mangrove seedlings that are totally removed during construction must be replanted, despite their conditions whether in poor or healthy conditions. The cost associated with the replanting shall be borne by the licence holder. Evidence of replanting must be provided to MELAD-ECD in any form.

3.22 If construction is to be encroached into inundated area, a silt curtain shall be applied to contain sediments from spreading.

3.23 The licence holder must ensure that the noise level and vibration emitted from the secwall construction is acceptable and does not reasonably interfere with the health or comfort of any person. Seawall construction along residential areas shall be limited to daylight hours only between 7am to 7pm. Subject to PEO approval, the Contractor shall however be permitted to work outside of the time given above if the work is needed for emergency reasons or for works that are being scheduled to mitigate the potential disruption to travelling public or other users.

3.24 Any stockpiles for aggregate including sand, gravel and reef mud required for the seawall construction must be fenced with geo-textile silts or any other fencing methods and must be covered during windy day to avoid the emission of dust.

3.25 The depot for aggregates including sand, gravel, and reef mud stockpiled along the road alignment must NOT block the road completely.

3.26 Hazardous materials including fuel, oil, and lubricants required for the construction machineries shall NOT be left along the road alignment or construction site at the end of each working day without proper and secure

fencing and storage. No solid wastes generated from construction are to be disposed in the sea or lagoon, or left uncontained on site, they should be disposed at designated landfill at end of each working day.

3.27 The licence holder must ensure that no contaminant including waste water from cement and concrete works, oil, fuel, and silt is discharged or released into the terrestrial and marine environment.

3.28 Any incidence of spills including contaminated sand/beaches occurred during seawall construction shall be removed within a given timeline issued by Environment Inspectors.

3.29 The licence holder must ensure that no substance or material, including dust and fumes from the construction activity, unreasonably interferes with the health or comfort of any person.

3.30 The licence holder must put up visible signs during the day and night at the construction site areas to warn road users and the general public of the construction activity to ensure public safety.

4.0 Monitoring

4.1 The licence holder shall monitor the coastline changes (erosion or accretion) within the vicinity of the constructed seawall before the construction of the seawall and then every 3 months after the seawall has declared completed and the monitoring will continue for the period of 3 years. The monitoring should use appropriate methods such as visual check, beach profiling, or satellite imagery.

5.0 Post construction

5.1 The licence holder or its contractor shall not leave wastes and debris, hazardous materials including, oil, and fuel, at the construction site after the completion of the seawall. Solid wastes including debris shall be removed to designated landfill sites. Hazardous materials shall be removed for proper storage at the main construction camp/yard.

5.2 Reference to condition 2.3, the decline in coastal vegetation or mangrove seedlings as a result of seawall construction, must be replanted after the completion of the seawall. Evidence of replanting must be provided to MELAD-ECD in any form.

6.0 Reporting

6.1 Any incidence of spills including contaminated sand/beaches occurred during seawall construction shall be reported immediately to MELAD-ECD.

6.2 In reference to condition 4.1, the licence holder must submit a monitoring report to MELAD before seawall construction and at end of every 3 months monitoring period.

If any further clarification is required on the above points please contact the Director at the Environment and Conservation Division, 686 28000.

(Signing the conditions means you are now aware and agree with the requirements of this Environment Licence) *Section 29 of theEnvironment Act ,Contraventions of Conditions of an Environment Licence: maximum penalty: fine of $100,000, imprisonment for five years.* MPWU / Koaa. Ekeata   Taoaea Rabes / [signature] Applicant (or on behalf) (sign and print name)   MELAD Staff (sign and print name) 9/10/2013   09/10/13 Date   Date

Environment & Conservation Division
09 OCT 2013
Official Stamp

GOVERNMENT OF THE REPUBLIC OF KIRIBATI
MINISTRY OF ENVIRONMENT LANDS AND AGRICULTURAL DEVELOPMENT
P.O. Box 234, Bikenibeu, Tarawa, Republic of Kiribati, Phone: 686 28000, Fax: 686 28334

ENVIRONMENT LICENCE

is hereby issued in accordance with Section 32 (1) (a) of the Environment Act 1999

Licence Holder:	Ministry of Public Works and Utilities
Description of allowed activity:	Seawall Construction
Site:	Temaiku (opposite Taiwan Technical Mission)
Licence Number:	ELA 121/12

This licence is issued subject to the attached conditions.

Signed this 11th day of March 2014.

.....

Principal Environment Officer

CONDITIONS OF THE ENVIRONMENT LICENCE ISSUED TO LICENCE HOLDER

The conditions attached to this environment license are as follows:

1.0 General

1. This licence is for **seawall construction** for the purpose of protecting the South Tarawa road project from coastal erosion as applied for in the Environment Licence application **No.121/12**
2. The licence holder is responsible for compliance with the conditions and ensuring compliance by any contractors or any other person engaged to undertake any activity for the purpose of this licence.
3. The licence holder must ensure that a copy of this licence is made available to the Environment Inspector for inspection upon request.
4. The licence holder will be informed of any public complaints that are communicated to the Ministry of Environment Lands and Agricultural Development (MELAD) during the construction of the seawall. The licence holder must take reasonable measures to investigate and if required, temporarily cease the construction of the seawall to address significant issues raised in complaints to ensure compliance with these licence conditions.
5. The Principal Environment Officer (PEO) may amend the conditions of this licence in writing, if required by MELAD and/or the licence holder through consultation.
6. If there is a suspected contravention to any of the licence conditions, the Principal Environment Officer (PEO) may issue a request for information or records in accordance with Section 53 of the Environment Act 1999 (as amended 2007).
7. The licence holder shall notify MELAD in writing 2 weeks prior to the commencement of the construction.
8. The licence holder or its contractor shall adhere to all mitigation measures set out in the Environmental Management Plan and in the Contractor's Environmental Management Plan to be approved by MELAD before

construction start and throughout the physical implementation of the seawall construction. The Environmental Management Plan and the approved Contractor's Environmental Management Plan form part of this licence.

9. Legal actions under the Environment Act 1999 (as amended 2007) may be taken against the licence holder if there is evidence of non-compliance with any of the licence conditions and/or directions issued by the Environment Inspector(s) in relation to this activity.

2.0 Pre-Construction Phase

1. Mobilization of equipment to the construction site shall not cause any environmental damages and any nuisance to the nearby dwellers.
2. The final design on this seawall shall be submitted to MELAD – ECD prior to the commencement of the actual work on site.
3. The licence holder must undertake the inventory on the number of coastal vegetation that may be affected by the construction of the seawall. The report must be provided to MELAD-ECD for monitoring purpose.

3.0 Construction Phase

1. The seawall shall be constructed at Temaiku (Site 11), opposite Taiwan Technical Mission area, as shown on the site plan provided.
2. The licence holder or its contractor shall construct the seawall according to the scope and the FINAL design specifications provided to ECD which form part of this licence.
3. Where practical, the licence holder must ensure that the seawall follow as much as possible the natural profile including the slope of the beach and does not significantly alter it.
4. Should the licence holder wishes to change the design of the seawall, the new design has to be approved first by MELAD.
5. No sand aggregates including sand and gravel and reef mud to be mined under this licence.

6. Any coastal vegetation that are totally removed during construction must be replanted, despite their conditions whether in poor or healthy conditions. The cost associated with the replanting shall be borne by the licence holder. Evidence of planting must be provided to MELAD-ECD in any form.
7. If construction is to be encroached into inundated area, a silt curtain shall be applied to contain sediments from spreading.
8. The licence holder must ensure that the noise level and vibration emitted from the seawall construction is acceptable and does not unreasonably interfere with the health or comfort of any person. Seawall construction along residential areas shall be limited to daylight hours only between 7am to 7pm. Subject to PEC approval, the Contractor shall however be permitted to work outside of the time given above if the work is needed for emergency reasons or for works that are being scheduled to mitigate the potential disruption to travelling public or other users.
9. Any stockpiles for aggregate including sand, gravel and reef mud required for the seawall construction must be fenced with geo-textile silts or any other fencing methods and must be covered during windy day to avoid the emission of dust.
10. The depot for aggregates including sand, gravel, and reef mud stockpiled along the road alignment must NOT block the road.
11. Hazardous materials including fuel, oil, and lubricants required for the construction machineries shall NOT be left along the road alignment or construction site at the end of each working day without proper and secure fencing and storage. No solid wastes generated from construction are to be disposed in the sea or lagoon, or left uncontained on site, they should be disposed of designated landfill at end of each working day.
12. The licence holder must ensure that no contaminant including waste water from cement and concrete works, oil, fuel, and silt is discharged or released into the terrestrial and marine environment.

13. Any incidence of spills including contaminated sand/beaches occurred during seawall construction shall be removed within a given timeline issued by Environment Inspectors.
14. The licence holder must ensure that no substance or material, including dust and fumes from the construction activity, unreasonably interferes with the health or comfort of any person.
15. The licence holder must put up visible signs during the day and night of the construction site areas to warn road users and the general public of the construction activity to ensure public safety.

4.0 Monitoring

1. The licence holder shall monitor the coastline changes (erosion or accretion) within the vicinity of the constructed seawall before the construction of the seawall, and then every 3 months after the seawall has been declared completed and the monitoring will continue for the period of 3 years. The monitoring should use appropriate methods such as visual check, beach profiling, or satellite imagery.

5.0 Post construction

1. The licence holder or its contractor shall not leave wastes and debris, hazardous materials including, oil, and fuel, at the construction site after the completion of the seawall. Solid wastes including debris shall be removed to designated landfill sites. Hazardous materials shall be removed for proper storage at the main construction camp/yard.
2. Reference to condition 2.0 (3), the decline in coastal vegetation as a result of seawall construction, must be replanted after the completion of the seawall. Evidence of replanting must be provided to MELAD-ECD in any form.

3. The licence holder is responsible to address adverse ong term impacts or damages to the environment including coasta erosion, the loss of coastal vegetation and mangroves caused after the construction of a seawall.
4. Any costs related to compensation and rehabilitation works shall be borne by the licence holder.

6.0 Reporting

1. Any incidence of spills including contaminated sand/beaches occurred during seawall construction shall be reported immediately to MELAD-ECD.
2. In reference to condition 4.0 (1), the licence holder must submit a monitoring report to MELAD before seawall construction and at end of every 3 months monitoring period.

If any further clarification is required on the above points please contact the Director at the Environment and Conservation Division 686 28000.

(Signing the conditions means you are now aware and agree with the requirements of this Environment Licence) / (Tiainakintebaebaaio e kaotiabwakoamatataraolao n nanoraoinikanoankaaitetinteraitientiaio)

Section 29 of the Environment Act, Contraventions of Conditions of an Environment Licence maximum penalty: fine of $100,000/ imprisonment for five years.

Applicant (or on behalf) (sign and print name) MELAD Staff (sign and print name)

2/05/14 — Date

06/05/14 — Date

GOVERNMENT OF THE REPUBLIC OF KIRIBATI
MINISTRY OF ENVIRONMENT LANDS AND AGRICULTURAL DEVELOPMENT
P.O. Box 234, Bikenibeu, Tarawa, Republic of Kiribati. Phone: 686 28000. Fax: 686 28334

ENVIRONMENT LICENCE

is hereby issued in accordance with Section 32 (1) (a) of the Environment Act 1999

Licence Holder:	Ministry of Public Works and Utilities
Description of allowed activity:	Seawall Construction
Site:	Temaiku (Kabin Temaiku)
Licence Number:	ELA 122/12

This licence is issued subject to the attached conditions.

Signed this 6th day of May 2014.

.....
Principal Environment Officer

CONDITIONS OF THE ENVIRONMENT LICENCE ISSUED TO LICENCE HOLDER

The conditions attached to this environment license are as follows:

1.0 General

1. This licence is for **seawall construction** for the purpose of protecting the South Tarawa road project from coastal erosion as applied for in the Environment Licence application **No.122/12**
2. The licence holder is responsible for compliance with the conditions and ensuring compliance by any contractors or any other person engaged to undertake any activity for the purpose of this licence.
3. The licence holder must ensure that a copy of this licence is made available to the Environment Inspector for inspection upon request.
4. The licence holder will be informed of any public complaints that are communicated to the Ministry of Environment Lands and Agricultural Development (MELAD) during the construction of the seawall. The licence holder must take reasonable measures to investigate and if required, temporarily cease the construction of the seawall to address significant issues raised in complaints to ensure compliance with these licence conditions.
5. The Principal Environment Officer (PEO) may amend the conditions of this licence in writing, if required by MELAD and/or the licence holder through consultation.
6. If there is a suspected contravention to any of the licence conditions, the Principal Environment Officer (PEO) may issue a request for information or records in accordance with Section 53 of the Environment Act 1999 (as amended 2007).
7. The licence holder shall notify MELAD in writing 2 weeks prior to the commencement of the construction.
8. The licence holder or its contractor shall adhere to all mitigation measures set out in the Environmental Management Plan and in the Contractor's Environmental Management Plan to be approved by MELAD before

construction start and throughout the physical implementation of the seawall construction. The Environmental Management Plan and the approved Contractor's Environmental Management Plan form part of this licence.

9. Legal actions under the Environment Act 1999 (as amended 2007) may be taken against the licence holder if there is evidence of non-compliance with any of the licence conditions and/or directions issued by the Environment Inspector(s) in relation to this activity.

2.0 Pre-Construction Phase

1. Mobilization of equipment to the construction site shall not cause any environmental damages and any nuisance to the nearby dwellers.
2. The final design on this seawall shall be submitted to MELAD – ECD prior to the commencement of the actual work on site.
3. The licence holder must undertake the inventory on the number of coastal vegetation that may be affected by the construction of the seawall. The report must be provided to MELAD-ECD for monitoring purpose.

3.0 Construction Phase

1. The seawall shall be constructed at Kabin Temjaku (Site 10), as shown on the site plan provided.
2. The licence holder or its contractor shall construct the seawall according to the scope and the FINAL design specifications provided to ECD which form part of this licence.
3. Where practical, the licence holder must ensure that the seawall follow as much as possible the natural profile including the slope of the beach and does not significantly alter it.
4. Should the licence holder wishes to change the design of the seawall, the new design has to be approved first by MELAD.
5. No sand aggregates including sand and gravel and reef mud to be mined under this licence.

6. Any coastal vegetation that are totally removed during construction must be replanted, despite their conditions whether in poor or healthy conditions. The cost associated with the replanting shall be borne by the licence holder. Evidence of planting must be provided to MELAD-ECD in any form.
7. If construction is to be encroached into inundated area, a silt curtain shall be applied to contain sediments from spreading.
8. The licence holder must ensure that the noise level and vibration emitted from the seawall construction is acceptable and does not unreasonably interfere with the health or comfort of any person. Seawall construction along residential areas shall be limited to daylight hours only between 7am to 7pm. Subject to FEO approval, the Contractor shall however be permitted to work outside of the time given above if the work is needed for emergency reasons or for works that are being scheduled to mitigate the potential disruption to travelling public or other users.
9. Any stockpiles for aggregate including sand, gravel and reef mud required for the seawall construction must be fenced with geo-textile silts or any other fencing methods and must be covered during windy day to avoid the emission of dust.
10. The depot for aggregates including sand, gravel, and reef mud stockpiled along the road alignment must NOT block the road.
11. Hazardous materials including fuel, oil, and lubricants required for the construction machineries shall NOT be left along the road alignment or construction site at the end of each working day without proper and secure fencing and storage. No solid wastes generated from construction are to be disposed in the sea or lagoon, or left uncontained on site, they should be disposed of designated landfill at end of each working day.
12. The licence holder must ensure that no contaminant including waste water from cement and concrete works, oil, fuel, and silt is discharged or released into the terrestrial and marine environment.

13. Any incidence of spills including contaminated sand/beaches occurred during seawall construction shall be removed within a given timeline issued by Environment Inspectors.
14. The licence holder must ensure that no substance or material, including dust and fumes from the construction activity, unreasonably interferes with the health or comfort of any person.
15. The licence holder must put up visible signs during the day and night at the construction site areas to warn road users and the general public of the construction activity to ensure public safety.

4.0 Monitoring

1. The licence holder shall monitor the coastline changes (erosion or accretion) within the vicinity of the constructed seawall before the construction of the seawall and then every 3 months after the seawall has been declared completed and the monitoring will continue for the period of 3 years. The monitoring should use appropriate methods such as visual check, beach profiling, or satellite imagery.

5.0 Post construction

1. The licence holder or its contractor shall not leave wastes and debris, hazardous materials including, oil, and fuel, at the construction site after the completion of the seawall. Solid wastes including debris shall be removed to designated landfill sites. Hazardous materials shall be removed for proper storage at the main construction camp/yard.
2. Reference to condition 2.0 (3), the decline in coastal vegetation as a result of seawall construction, must be replanted after the completion of the seawall. Evidence of replanting must be provided to MELAD-ECD in any form.

3. The licence holder is responsible to address adverse long term impacts or damages to the environment including coastal erosion, the loss of coastal vegetation and mangroves caused after the construction of a seawall.
4. Any costs related to compensation and rehabilitation works shall be borne by the licence holder.

6.0 Reporting

1. Any incidence of spills including contaminated sand/beaches occurred during seawall construction shall be reported immediately to MELAD-ECD.
2. In reference to condition 4.0 (1), the licence holder must submit a monitoring report to MELAD before seawall construction and at end of every 3 months monitoring period.

If any **further clarification is required on the above points** please contact the **Director at the Environment and Conservation Division, 686 28000.**

(Signing the conditions means you are now aware and agree with the requirements of this Environment Licence) / (Tiainakintebeebaaio e kaotiabwakoamatataraoiao n nanoraoinikanoankaetiatinteraitientiaio)

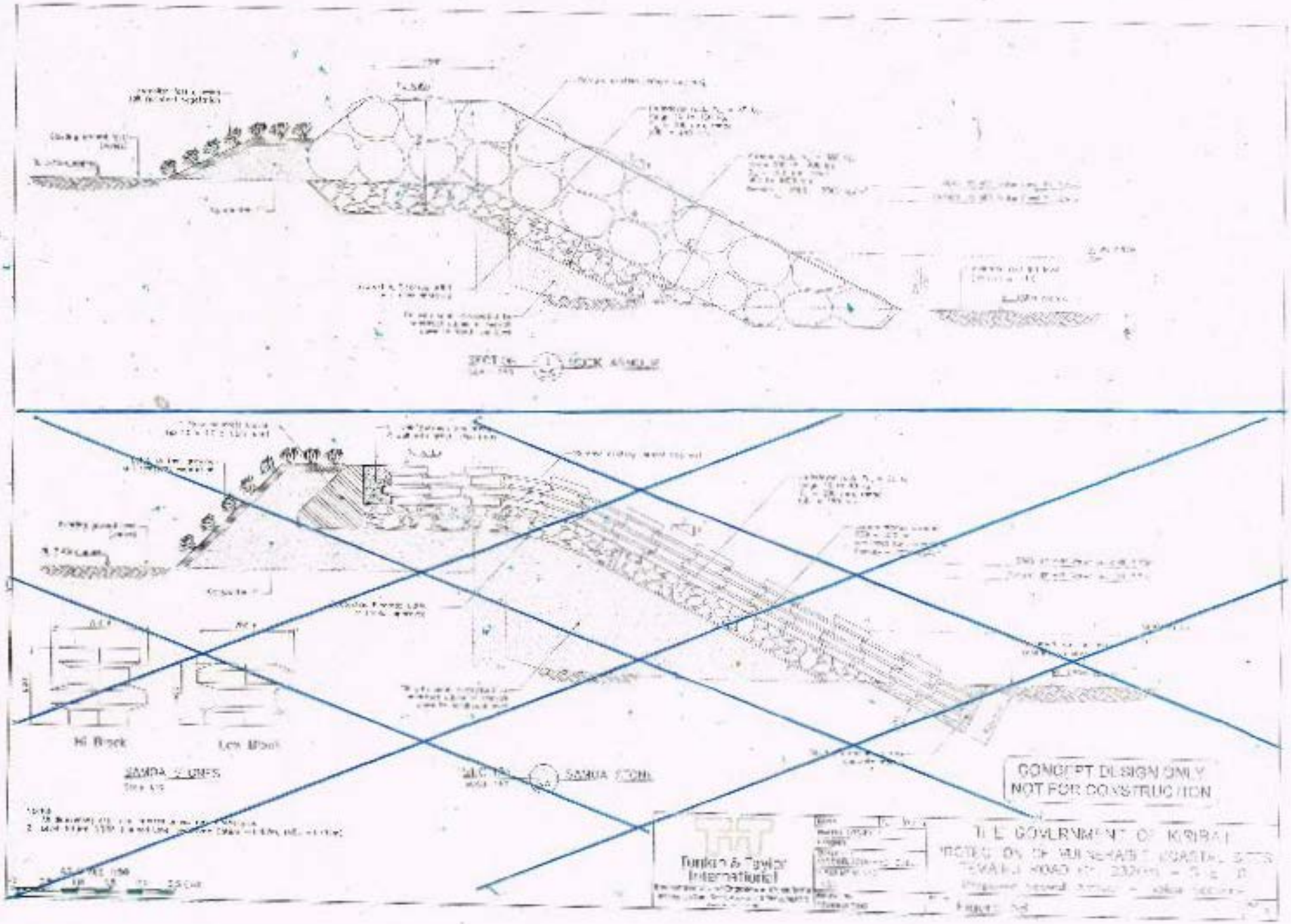
Section 29 of the Environment Act , Contraventions of Conditions of an Environment Licence maximum penalty: fine of $100,000, imprisonment for five years.

Applicant (or on behalf), (sign and print name) MELAD Staff (sign and print name)

12/05/14 — Date

12/05/14 — Date


CONCEPT DESIGN ONLY
NOT FOR CONSTRUCTION
Tonkin & Taylor International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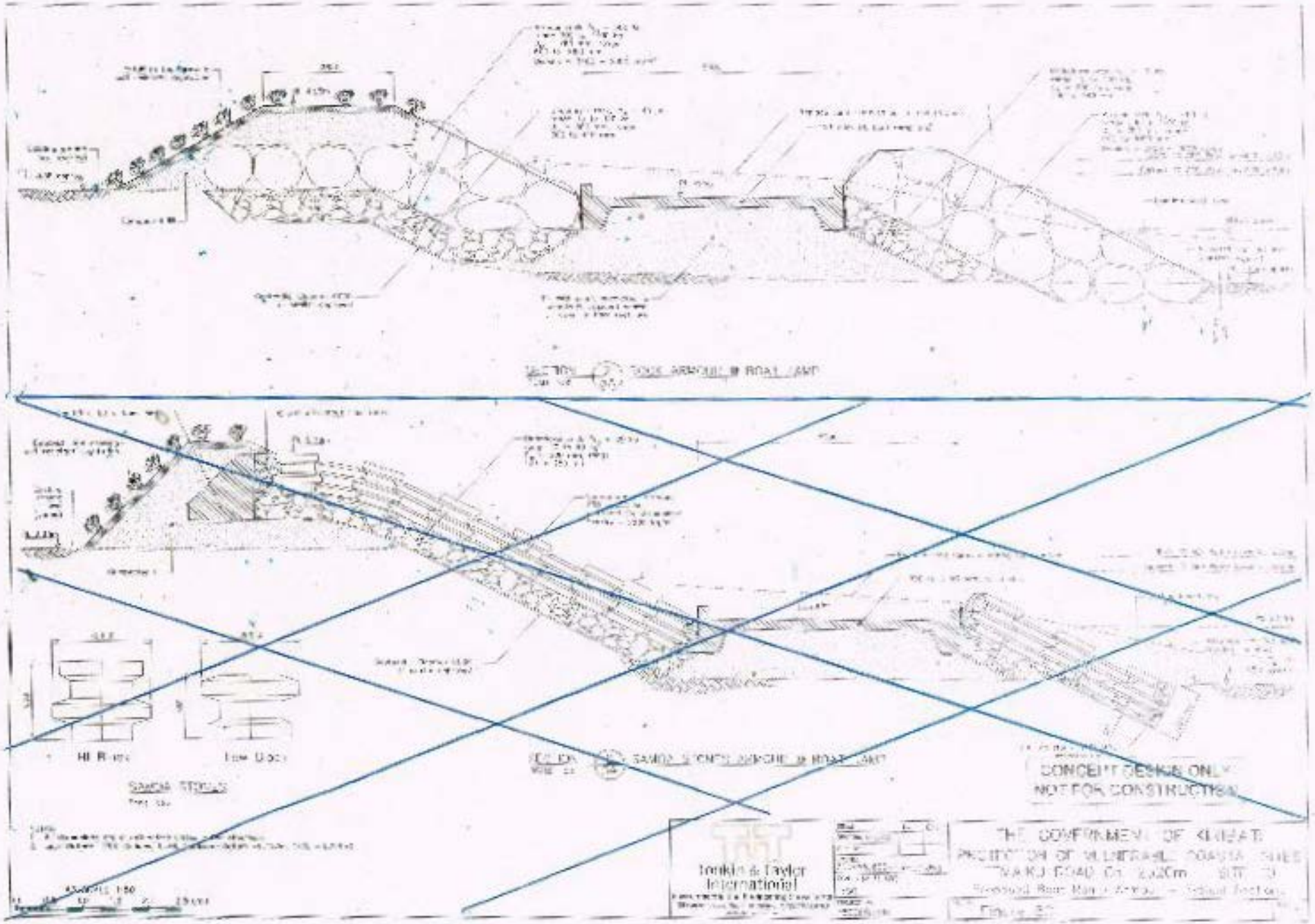
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GOVERNMENT OF THE REPUBLIC OF KIRIBATI
MINISTRY OF ENVIRONMENT LANDS AND AGRICULTURAL DEVELOPMENT
P.O. Box 234, Bikenibeu, Tarawa, Republic of Kiribati. Phone: 686 28000, Fax: 686 28334

ENVIRONMENT LICENCE

is hereby issued in accordance with Section 32 (1) (a) of the Environment Act 1999

Licence Holder:	Ministry of Public Works and Utilities
Description of allowed activity:	Seawall Construction
Site:	Bonriki (Eastern end of runway)
Licence Number:	ELA 016/14

This licence is issued subject to the attached conditions.

Signed this 11th day of March 2014

Principal Environment Officer

MELAD
Environment & Conservation Division
MAR 2014
Official Stamp

CONDITIONS OF THE ENVIRONMENT LICENCE ISSUED TO LICENCE HOLDER

The conditions attached to this environment license are as follows:

1.0 General

1. This licence is for **seawall construction** for the purpose of protecting the eastern end of the runway from coastal erosion as applied for in the Environment Licence application **No. 010/14.**
2. The licence holder is responsible for compliance with the conditions and ensuring compliance by any contractors or any other person engaged to undertake any activity for the purpose of this licence.
3. The licence holder must ensure that a copy of this licence is made available to the Environment Inspector for inspection upon request.
4. The licence holder will be informed of any public complaints that are communicated to the Ministry of Environment Lands and Agricultural Development (MELAD) during the construction of the seawall. The licence holder must take reasonable measures to investigate and if required, temporarily cease the construction of the seawall to address significant issues raised in complaints to ensure compliance with these licence conditions.
5. The Principal Environment Officer (PEO) may amend the conditions of this licence in writing, if required by MELAD and/or the licence holder through consultation.
6. If there is a suspected contravention to any of the licence conditions, the Principal Environment Officer (PEO) may issue a request for information or records in accordance with Section 53 of the Environment Act 1999 (as amended 2007).
7. The licence holder shall notify MELAD in writing 2 weeks prior to the commencement of the construction.
8. The licence holder or its contractor shall adhere to all mitigation measures set out in the Environmental Management Plan and in the Contractor's Environmental Management Plan to be approved by MELAD before

construction start and throughout the physical implementation of the seawall construction. The Environmental Management Plan and the approved Contractor's Environmental Management Plan form part of this licence.

9. Legal actions under the Environment Act 1999 (as amended 2007) may be taken against the licence holder if there is evidence of non-compliance with any of the licence conditions and/or directions issued by the Environment Inspector(s) in relation to this activity.

2.0 Pre-Construction Phase

1. Mobilization of equipment to the construction site shall not cause any environmental damages and any nuisance to the nearby dwellers.
2. The final design on this seawall shall be submitted to MELAD – ECD prior to the commencement of the actual work on site.
3. The licence holder must undertake the inventory on the number of coastal vegetation that may be affected by the construction of the seawall. The report must be provided to MELAD-ECD for monitoring purpose.

3.0 Construction Phase

1. The seawalls shall be constructed at the eastern end of the runway, Bonriki, as shwon on the site plan provided.
2. The licence holder or its contractor shall construct the seawall according to the scope and the FINAL design specifications provided to ECD which form part of this licence.
3. Where practical, the licence holder must ensure that the seawall follow as much as possible the natural profile including the slope of the beach and does not significantly alter it.
4. Should the licence holder wishes to change the design of the seawall, the new design has to be approved first by MELAD.
5. No sand aggregates including sand and gravel and reef mud to be mined under this licence.

6. Any coastal vegetation that are totally removed during construction must be replanted, despite their conditions whether in poor or healthy conditions. The cost associated with the replanting shall be borne by the licence holder. Evidence of planting must be provided to MELAD-ECD in any form.
7. If construction is to be encroached into inundated area, a silt curtain shall be applied to contain sediments from spreading.
8. The licence holder must ensure that the noise level and vibration emitted from the seawall construction is acceptable and does not unreasonably interfere with the health or comfort of any person. Seawall construction along residential areas shall be limited to daylight hours only between 7am to 7pm. Subject to PEO approval, the Contractor shall however be permitted to work outside of the time given above if the work is needed for emergency reasons or for works that are being scheduled to mitigate the potential disruption to traveling public or other users.
9. Any stockpiles for aggregate including sand, gravel and reef mud required for the seawall construction must be fenced with geo-textile silts or any other fencing methods and must be covered during windy day to avoid the emission of dust.
10. The depot for aggregates including sand, gravel, and reef mud stockpiled along the road alignment must NOT block the road.
11. Hazardous materials including fuel, oil, and lubricants required for the construction machineries shall NOT be left along the road alignment or construction site at the end of each working day without proper and secure fencing and storage. No solid wastes generated from construction are to be disposed in the sea or lagoon, or left uncontained on site, they should be disposed of designated landfill at end of each working day.
12. The licence holder must ensure that no contaminant including waste water from cement and concrete works, oil, fuel, and silt is discharged or released into the terrestrial and marine environment.

13. Any incidence of spills including contaminated sand/beaches occurred during seawall construction shall be removed within a given timeline issued by Environment Inspectors.

14. The licence holder must ensure that no substance or material, including dust and fumes from the construction activity, unreasonably interferes with the health or comfort of any person.

15. The licence holder must put up visible signs during the day and night at the construction site areas to warn road users and the general public of the construction activity to ensure public safety.

4.0 Monitoring

1. The licence holder shall monitor the coastline changes (erosion or accretion) within the vicinity of the constructed seawall before the construction of the seawall and then every 3 months after the seawall has been declared completed and the monitoring will continue for the period of 3 years. The monitoring should use appropriate methods such as visual check, beach profiling, or satellite imagery.

5.0 Post construction

1. The licence holder or its contractor shall not leave wastes and debris, hazardous materials including, oil, and fuel, at the construction site after the completion of the seawall. Solid wastes including debris shall be removed to designated landfill sites. Hazardous materials shall be removed for proper storage at the main construction camp/yard.

2. Reference to condition 2.0 (3), the decline in coastal vegetation as a result of seawall construction, must be replanted after the completion of the seawall. Evidence of replanting must be provided to MELAD-ECD in any form.

3. The licence holder is responsible to address adverse long term impacts or damages to the environment including coastal erosion, the loss of coastal vegetation and mangroves caused after the construction of a seawall.
4. Any costs related to compensation and rehabilitation works shall be borne by the licence holder.

6.0 Reporting

1. Any incidence of spills including contaminated sand/beaches occurred during seawall construction shall be reported immediately to MELAD-ECD.
2. In reference to condition 4.0 (1), the licence holder must submit a monitoring report to MELAD before seawall construction and at end of every 3 months monitoring period.

If any further clarification is required on the above points please contact the Director at the Environment and Conservation Division, 686 28000.

(Signing the conditions means you are now aware and agree with the requirements of this Environment Licence) / (Tiainakintebeebaaio a kaotiaowakoamataeraciao n naaoraoikanoankaetieteraitientiaio)

Section 29 of theEnvironment Act, Contraventions of Conditions of an Environment Licence: maximum penalty: fine of $100,000, imprisonment for five years.

Applicant (or on behalf) (sign and print name) MELAD Staff (sign and print name)

2/05/14 06/05/14

Date Date

GOVERNMENT OF THE REPUBLIC OF KIRIBATI
MINISTRY OF ENVIRONMENT LANDS AND AGRICULTURAL DEVELOPMENT
P.O. Box 234, Bikenibeu, Tarawa, Republic of Kiribati. Phone: 686 28000. Fax: 686 28334

ENVIRONMENT LICENCE

is hereby issued in accordance with Section 32 (1) (a) of the Environment Act 1999

Licence Holder:	Ministry of Public Works and Utilities
Description of allowed activity:	Seawall Construction
Site:	Bonriki (Site No.15 North)
Licence Number:	ELA 011/14

This licence is issued subject to the attached conditions.

Signed this 16th day of April 2014.

.....

Principal Environment Officer

CONDITIONS OF THE ENVIRONMENT LICENCE ISSUED TO LICENCE HOLDER

The conditions attached to this environment license are as follows:

1.0 General

1. This licence is for **seawall construction** for the purpose of protecting the eastern end of the runway from coastal erosion as applied for in the Environment Licence application **No. 011/14.**
2. The licence holder is responsible for compliance with the conditions and ensuring compliance by any contractors or any other person engaged to undertake any activity for the purpose of this licence.
3. The licence holder must ensure that a copy of this licence is made available to the Environment Inspector for inspection upon request.
4. The licence holder will be informed of any public complaints that are communicated to the Ministry of Environment Lands and Agricultural Development (MELAD) during the construction of the seawall. The licence holder must take reasonable measures to investigate and if required, temporarily cease the construction of the seawall to address significant issues raised in complaints to ensure compliance with these licence conditions.
5. The Principal Environment Officer (PEO) may amend the conditions of this licence in writing, if required by MELAD and/or the licence holder through consultation.
6. If there is a suspected contravention to any of the licence conditions, the Principal Environment Officer (PEO) may issue a request for information or records in accordance with Section 53 of the Environment Act 1999 (as amended 2007).
7. The licence holder shall notify MELAD in writing 2 weeks prior to the commencement of the construction.
8. The licence holder or its contractor shall adhere to all mitigation measures set out in the Environmental Management Plan and in the Contractor's Environmental Management Plan to be approved by MELAD before

construction start and throughout the physical implementation of the seawall construction. The Environmental Management Plan and the approved Contractor's Environmental Management Plan form part of this licence.

9. Legal actions under the Environment Act 1999 (as amended 2007) may be taken against the licence holder if there is evidence of non-compliance with any of the licence conditions and/or directions issued by the Environment Inspector(s) in relation to this activity.

2.0 Pre-Construction Phase

1. Mobilization of equipment to the construction site shall not cause any environmental damages and any nuisance to the nearby dwellers.
2. The final design on this seawall shall be submitted to MELAD – ECD prior to the commencement of the actual work on site.
3. The licence holder must undertake the inventory on the number of coastal vegetation that may be affected by the construction of the seawall. The report must be provided to MELAD-ECD for monitoring purpose.

3.0 Construction Phase

1. The seawalls shall be constructed at the eastern end of the runway, Bonriki, also known as Site No.1 & North as shown on the site plan provided.
2. The licence holder or its contractor shall construct the seawall according to the scope and the FINAL design specifications provided to ECD which form part of this licence.
3. Where practical, the licence holder must ensure that the seawall follow as much as possible the natural profile including the slope of the beach and does not significantly alter it.
4. Should the licence holder wishes to change the design of the seawall, the new design has to be approved first by MELAD.
5. No sand aggregates including sand and gravel and reef mud to be mined under this licence.

6. Any coastal vegetation that are totally removed during construction must be replanted, despite their conditions whether in poor or healthy conditions. The cost associated with the replanting shall be borne by the licence holder. Evidence of planting must be provided to MELAD-ECD in any form.
7. If construction is to be encroached into inundated area, a silt curtain shall be applied to contain sediments from spreading.
8. The licence holder must ensure that the noise level and vibration emitted from the seawall construction is acceptable and does not unreasonably interfere with the health or comfort of any person. Seawall construction along residential areas shall be limited to daylight hours only between 7am to 7pm. Subject to PEO approval, the Contractor shall however be permitted to work outside of the time given above if the work is needed for emergency reasons or for works that are being scheduled to mitigate the potential disruption to travelling public or other users.
9. Any stockpiles for aggregate including sand, gravel and reef mud required for the seawall construction must be fenced with geo-textile silts or any other fencing methods and must be covered during windy day to avoid the emission of dust.
10. The depot for aggregates including sand, gravel, and reef mud stockpiled along the road alignment must NOT block the road.
11. Hazardous materials including fuel, oil, and lubricants required for the construction machineries shall NOT be left along the road alignment or construction site at the end of each working day without proper and secure fending and storage. No solid wastes generated from construction are to be disposed in the sea or lagoon, or left uncontained on site, they should be disposed of designated landfill at end of each working day.
12. The licence holder must ensure that no contaminant including waste water from cement and concrete works, oil, fuel, and silt is discharged or released into the terrestrial and marine environment.

13. Any incidence of soils including contaminated sand/beaches occurred during seawall construction shall be removed within a given timeline issued by Environment Inspectors.

14. The licence holder must ensure that no substance or material, including dust and fumes from the construction activity, unreasonably interferes with the health or comfort of any person.

15. The licence holder must put up visible signs during the day and night at the construction site areas to warn road users and the general public of the construction activity to ensure public safety.

4.0 Monitoring

1. The licence holder shall monitor the coastline changes (erosion or accretion) within the vicinity of the constructed seawall before the construction of the seawall and then every 3 months after the seawall has been declared completed and the monitoring will continue for the period of 3 years. The monitoring should use appropriate methods such as visual check, beach profiling, or satellite imagery.

5.0 Post construction

1. The licence holder or its contractor shall not leave wastes and debris, hazardous materials including, oil, and fuel, at the construction site after the completion of the seawall. Solid wastes including debris shall be removed to designated landfill sites. Hazardous materials shall be removed for proper storage at the main construction comp/yard.

2. Reference to condition 2.0 (3), the decline in coastal vegetation as a result of seawall construction, must be replanted after the completion of the seawall. Evidence of replanting must be provided to MELAD-ECD in any form.

3. The licence holder is responsible to address adverse long term impacts or damages to the environment including coastal erosion, the loss of coastal vegetation and mangroves caused after the construction of a seawall.
4. Any costs related to compensation and rehabilitation works shall be borne by the licence holder.

6.0 Reporting

1. Any incidence of spills including contaminated sand/beaches occurred during seawall construction shall be reported immediately to MELAD-ECD.
2. In reference to condition 4.0 (1), the licence holder must submit a monitoring report to MELAD before seawall construction and at end of every 3 months monitoring period.

If any further clarification is required on the above points please contact the Director at the Environment and Conservation Division, 686 28000.

(Signing the conditions means you are now aware and agree with the requirements of this Environment Licence) / (Tiainakintebeebaaio e kaotiabwakoamatataraoiao n nanoraoinikanoankaetietinteraitientiaio)

Section 29 of theEnvironment Act ,Contraventions of Conditions of an Environment Licence. maximum pebalty: fine of $100,000, imprisonment for five years

Applicant (or on behalf) (sign and print name) MELAD Staff (sign and print name)

2/05/14 — Date

06/05/14 — Date

GOVERNMENT OF THE REPUBLIC OF KIRIBATI
MINISTRY OF ENVIRONMENT LANDS AND AGRICULTURAL DEVELOPMENT
P.O. Box 234, Bikenibeu, Tarawa, Republic of Kiribati. Phone: 686 28000, Fax: 686 28334

ENVIRONMENT LICENCE

is hereby issued in accordance with Section 32 (1) (a) of the Environment Act 1999

Licence Holder:	Ministry of Public Works and Utilities
Description of allowed activity:	Seawall construction
Site:	*Anunau causeway (in reference to site plan in the application)*
Licence Number:	**ELA 075/13**

This licence is issued subject to the attached conditions.

Signed this 03 day of October 2013.

Principal Environment Officer

CONDITIONS OF THE ENVIRONMENT LICENCE ISSUED TO LICENCE HOLDER/ KAETIETI IAAN TE RAITIENTI ARE E ANGANAKI TE TIA BUBUTI

The conditions attached to this environment license are as follows:/Aikai kaetieti ibukin te raitienti:

General

1. This licence is for **seawall construction** for the purpose of protecting the South Tarawa road project investment from coastal erosion as applied for in the Environment Licence application **No. 075/13.**
2. Ministry of Public Works and Utilities is the nominated licence holder.
3. The licence holder is responsible for compliance with the conditions and ensuring compliance by any contractors or any other person engaged to undertake any activity for the purpose of this licence.
4. The licence holder must ensure that a copy of this licence is made available to the Environment Inspector, or other responsible authorities for inspection upon request.
5. This licence may be transferred in accordance with the Environment Act 1999 (as amended 2007).
6. The licence holder will be informed of any public complaints that are communicated to the Ministry of Environment Lands and Agricultural Development (MELAD) during the construction of the seawall. The licence holder must take reasonable measures to investigate and if required, temporarily cease the construction of the seawall to address significant issues raised in complaints to ensure compliance with these licence conditions.
7. The Principal Environment Officer (PEO) may amend the conditions of this licence in writing, if required by MELAD and/or the licence holder through consultation.
8. If there is a suspected contravention to any of the licence conditions, the Principal Environment Officer (PEO) may issue a request for information or records in accordance with Section 53 of the Environment Act 1999 (as amended 2007).

9. The licence holder shall notify MELAD in writing 3 days prior to the commencement of the construction.
10. The licence holder or its contractor shall adhere to all mitigation measures set out in the Environmental Management Plan and in the Contractor's Environmental Management Plan to be approved by MELAD before construction start throughout the physical implementation of the seawall construction. The Environmental Management Plan and the approved Contractor's Environmental Management Plan form part of this licence.
11. Legal actions under the Environment Act 1999 (as amended 2007) may be taken against the licence holder if there is evidence of non-compliance with any of the licence conditions and/or directions issued by the Environment Inspector(s) in relation to this activity.

Pre-Construction Phase

12. The licence holder shall notify the relevant users of the Anandu causeway such as the the Eco-farm at Temaiku two weeks prior the construction of seawall starts. Should any issues emerge during the notification period, the applicant should ensure to resolve it prior the construction starts.
13. The licence holder shall carry out an inventory survey of coastal vegetation to identify those vegetation that need not to be removed and must be labeled.

Construction Phase

14. The seawall shall be constructed along the Anandau Causeway only at the site(s) shown on the site plan provided.
15. The licence holder or its contractor shall construct the seawall according to the scope and the FINAL design specifications provided in the application form.

16. . No sand, aggregates and reef mud to be mined outside the limit of the physical work of the activity. Materials mined as part of the physical work shall, wherever practicable, must be re-used for seawall construction.

17. The licence holder must ensure that the seawall follow as much as possible the natural profile including the slope of the beach and does not significantly alter it.
18. Should the licence holder wishes to change the design of the seawall, the change in the design has to be approved first by the PEO before construction of the seawall is implemented.
19. The toe of the seawall shall be at least 3m away from the mangroves.
20. The licence holder must not disturb or harm the mangroves. Any mangrove damaged during construction must be reported to MELAD immediately and shall be replanted by the licence holder.
21. If construction is to be encroached into inundated area, a silt curtain shall be applied to contain sediments from spreading.
22. Coastal vegetation that are not obstructing any construction work must not be removed. Where possible, coastal vegetation must be cut at the base, especially those that are already within the construction boundary.
23. The licence holder must ensure that the noise level and vibration emitted from the seawall construction is acceptable and does not reasonably interfere with the health or comfort of any person. Seawall construction along residential areas shall be limited to daylight hours only between 7am to 7pm. Subject to PEO approval, the Contractor shall however be permitted to work outside of the time given above if the work is needed for emergency reasons or for works that are being scheduled to mitigate the potential disruption to travelling public or other users.
24. Any stockpiles for aggregate including sand, gravel and reef mud required for the seawall construction must be fenced with geo-textile silts or other sediment barriers/traps, and must be covered during windy and rainy days or when not used.

25. Hazardous materials including fuel, oil, and lubricants required for the construction machineries shall **NOT** be left along the road alignment or construction site at the end of each working day without proper and secure storage and fencing.
26. The licence holder must ensure that no contaminant including waste water from cement and concrete works, oil, fuel, and silt is discharged or released into the marine environment and mangrove strands.
27. Any incidence of spills including contaminated sand/beaches occurred during seawall construction must be reported to PEO immediately and shall be removed within a given timeline issued by Environment Inspectors.
28. No solid waste is to be dumped in the sea or lagoon or to be left uncontained on the ground.
29. Solid Wastes generated from the construction activity shall be well contained at all times and must be removed from the construction site to the landfills at the end of each working day.
30. The licence holder must ensure that no substance or material, including dust and fumes from the construction activity, unreasonably interferes with the health or comfort of any person.
31. The licence holder or its contractor must ensure that any impact or damage to land and coast is **AVOIDED** during construction and any adverse impacts caused to land and coast as a result of this construction must be mitigated within a given time issued by the Environment Inspector.
32. The licence holder must put up visible signs during the day and night at the construction site areas to warn road users of the construction activity to ensure public safety.

Post construction

33. The licence holder or its contractor shall notify MELAD one week prior to the completion of the seawall.

34. The licence holder or its contractor shall not leave wastes and debris, hazardous materials including, oil, and fuel, at the construction site after the completion of the seawall.
35. The licence holder is responsible to address adverse impacts or damages to the environment including coastal erosion, the loss of coastal vegetation and mangroves caused after the construction of a seawall.
36. Any damage to the environment especially mangroves as stated in condition 37 above, must be compensated/ restored/rehabilitated by the licence holder after the completion of the seawall. The compensation or rehabilitation report is to be provided to MELAD one week after the compensation or rehabilitation work is completed.
37. Wherever practicable, the licence holder must ensure that replanting of selected coastal vegetation (*te itai, te ruku, te kaina, te uri*) is undertaken in areas where coastal vegetation are removed at the end of the construction work.
38. All costs related to compensation and rehabilitation works shall be borne by the licence holder.

Monitoring

39. The licence holder shall monitor coastline changes (erosion or accretion) vicinity of the constructed seawall before the construction of the seawall and then **every 3 months** after the seawall has declared completed and the monitoring will continue for the period of 3 years. The monitoring should use appropriate methods such as visual check, beach profiling, or satellite imagery.
40. The monitoring cost shall be borne by the licence holder.

Reporting

41. Reference to condition 13, the result of the survey on coastal vegetation must be provided to MELAD in a report form within two weeks of completing the survey.

42. The licence holder must submit a monitoring report to MELAD as required under condition 39 at end of every 3 months monitoring period.

If any further clarification is required on the above points please contact the Director at the Environment and Conservation Division, 686 28000.

(Signing the conditions means you are now aware and agree with the requirements of this Environment Licence) / (Tiainakintebeebaaio e kaotiabwakoamatataraoiao n nanoraoinikanoankaetietinteraitientiaio)

Section 29 of theEnvironment Act ,Contraventions of Conditions of an Environment Licence maximum penalty: fine of $100.000, imprisonment for five years.

MPWU, Koaa Ekeata

Applicant (or on behalf) (sign and print name)

Taouea Reiher, Reiher

MELAD Staff (sign and print name)

9/10/2013

Date

9/10/13

Date