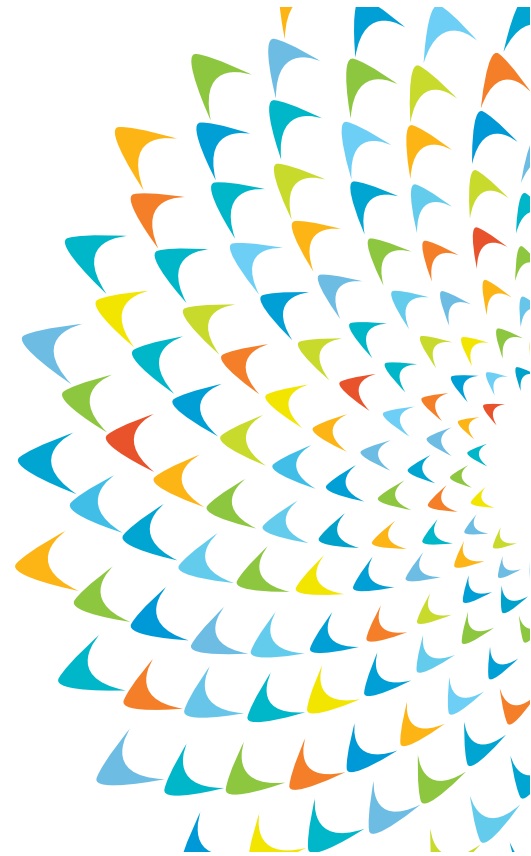


# Environmental Management Planning - A Pacific Case Study





# Acronyms

ADB	-	Asian Development Bank
CCP	-	Community consultation plan
CEMP	-	Construction environmental management plan
CESMP	-	Construction/contractors environmental & social management plan
CSS	-	Country safeguard system
EA	-	Executing agency
EIA/ESIA	-	Environmental impact assessment / environmental & social impact assessment
EMP/ESMP	-	Environmental management plan / environmental & social management plan
EP	-	Environment permit
ES/EU	-	Environment Specialist / Environment Unit
GRM	-	Grievance redress mechanism
H&S	-	Health and safety
IEE	-	Initial environmental examination
IUCN	-	International Union for the Conservation of Nature
PC	-	Project cycle
PIU/PMU	-	Project management unit / project implementation unit
QPR	-	Quarterly progress report
SEMP	-	Site specific environmental management plan
TMP	-	Traffic management plan
VU	-	Vulnerable species (conservation status as per IUCN)

# Objectives

1. How EMP is developed throughout EIA process to approval/consent
2. How to ensure EMP is implemented and the importance of the CEMP
3. Roles and responsibilities in implementing EMP





# Environmental Management Plan

A plan that translates proposed mitigation measures into practice. Typically developed as part of environmental assessment.

EMP includes

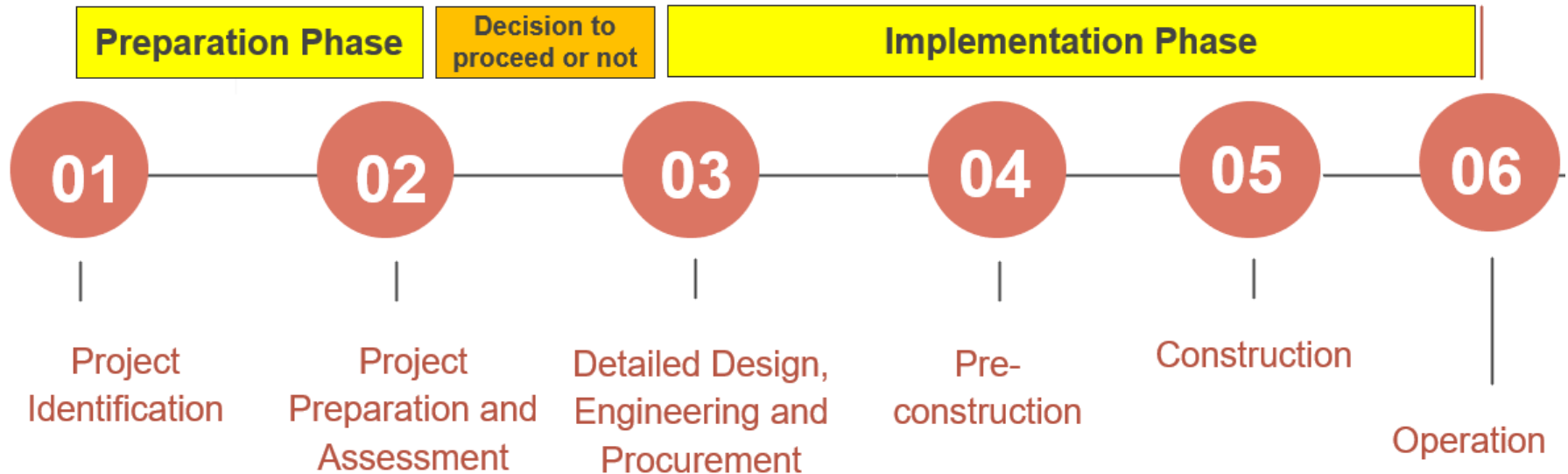
1. Summary of project approvals, permits, conditions etc
2. Summary of significant environmental and social impacts and risks and mitigation measures
3. Actions to be undertaken to implement each mitigation measure
4. Monitoring program – incl. audits, corrective actions, reporting
5. Continued community engagement
6. Institutional/organisational arrangements for EMP implementation (who will do what and when)
7. Implementation schedule and cost estimates



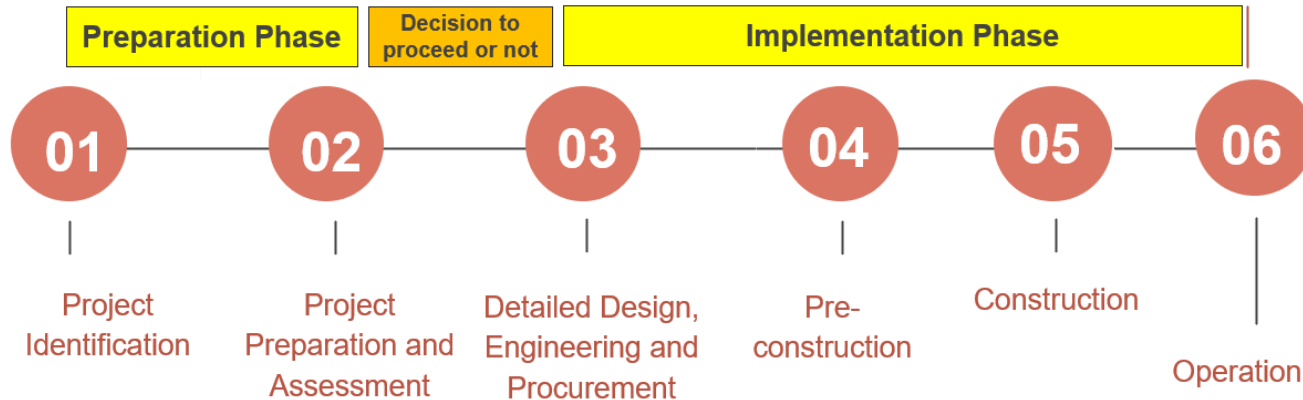
# Part 1. Development of EMP

EMP is developed throughout the Project Cycle as part of EIA process

## Project Cycle



# 1. Development of EMP



## Stage 1

- Initial risk assessment and screening (checklists)
- Engagement with regulatory agencies (country safeguard system)
- ToR prepared for (IEE/ESIA)

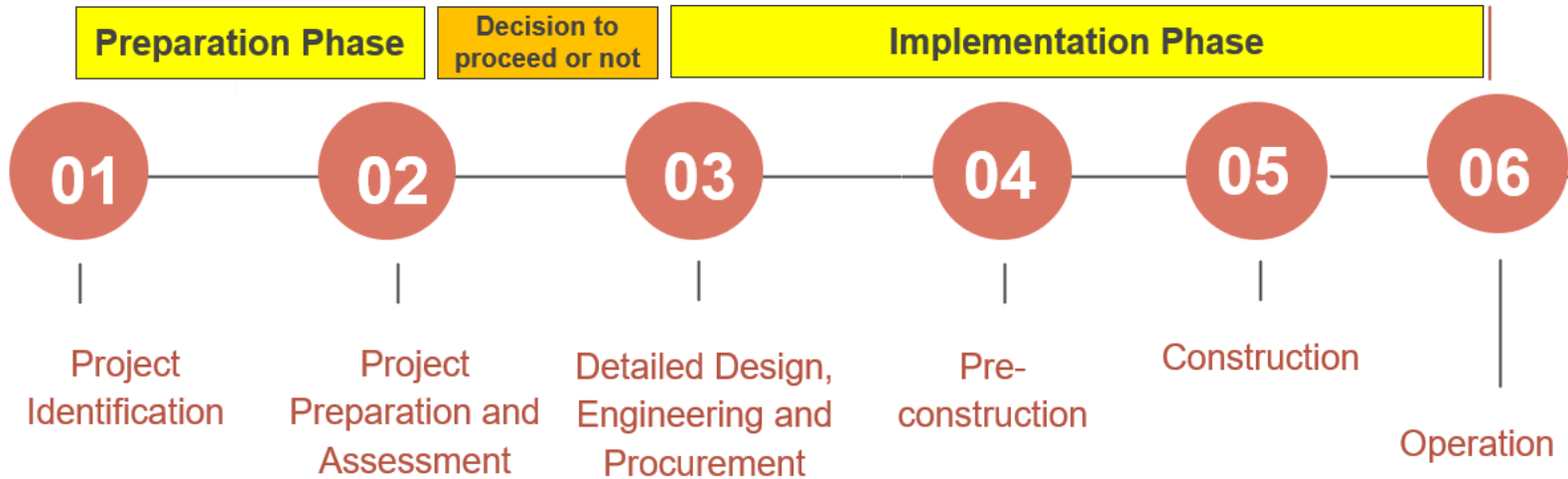
Milestone – Decision to proceed with project preparation (feasibility study) or not

## Stage 2

- Risk identification and analysis,
- draft IEE/EIA and initial EMP based on Preliminary design

Milestone – Decision to proceed with Project or not

# Development of EMP



## Stage 3

- Update EIA & EMP based on detailed design
- Obtain Environmental license/consent under CSS
- EMP & consent conditions included in bid and contract documents

Milestone – Construction contracts awarded

## Stage 4

- Contractor develops CEMP, based on EIA and EMP, reflecting their approach and methodology (as per construction schedule etc)
- Works must not commence before CEMP is reviewed and cleared/approved

Milestone – Construction commences



# Case Study

## South Paray Domestic Wharf - Port Vila

Redesign & construction of partially constructed wharf South Paray Bay

ADB required updated IEE (and EMP)

Regulator required new Environmental Permit (EP)

- EP application supported by updated IEE (incl EMP)
- EP conditions
  - based on CSS regulations and EMP
  - included in design, contract documents
  - legally binding for implementing agency

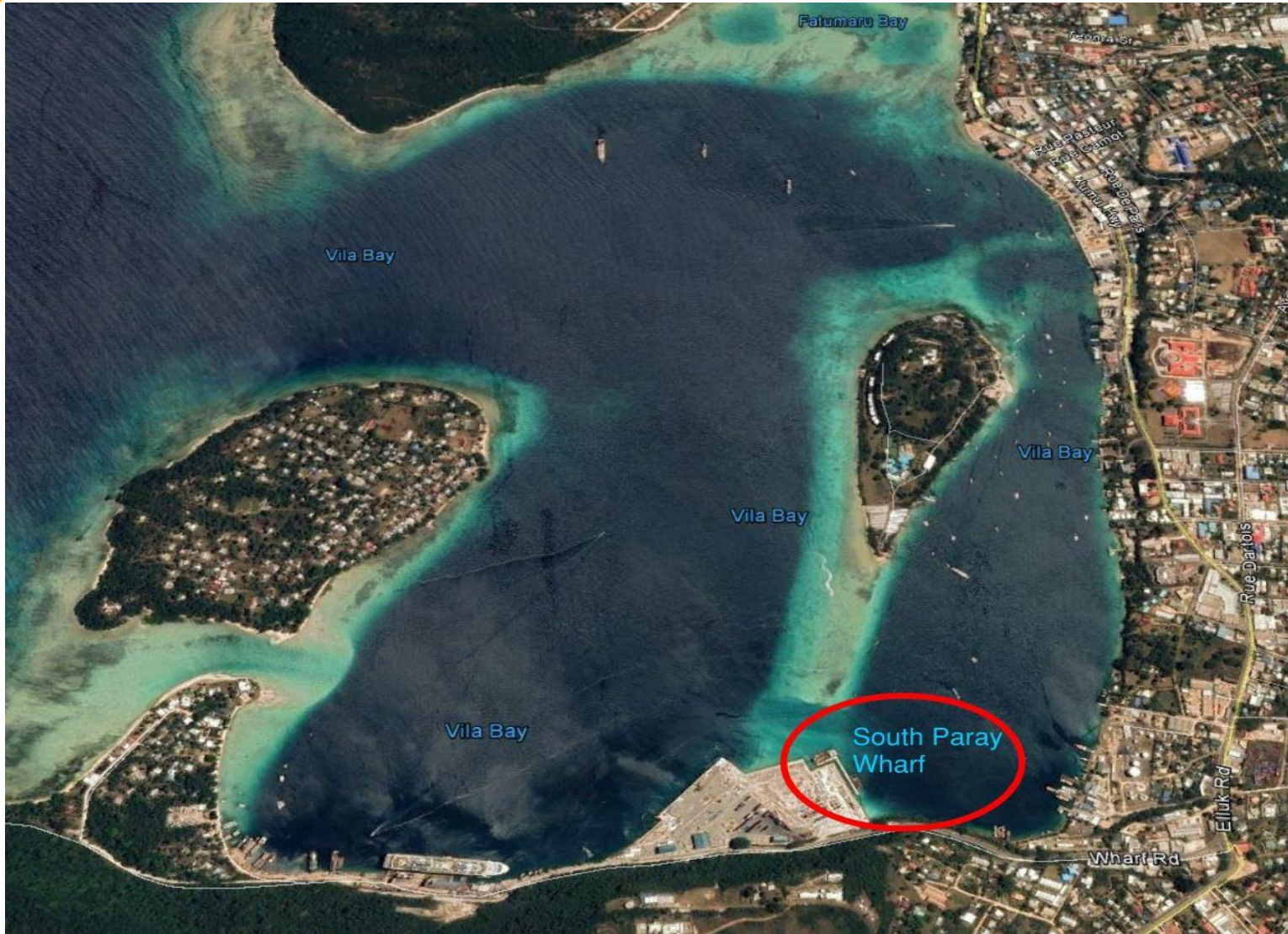


# GEOGRAPHIC SETTING





# PROJECT LOCATION







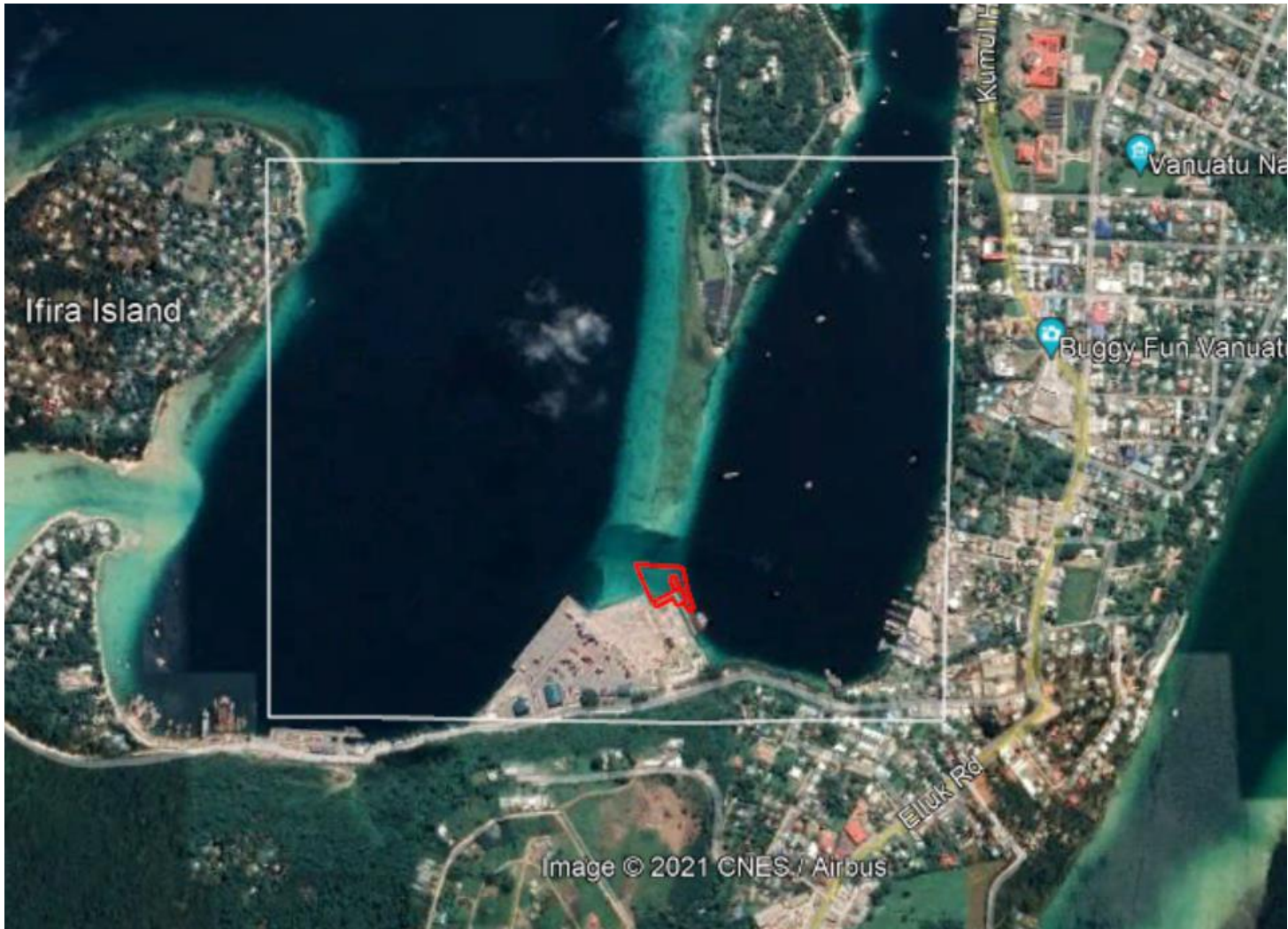
# EMP Development - steps

1. Define project influence area(s)
2. Identify sensitive receptors and env. values (IEE)
3. Identify project components & construction activities
4. Conduct risk assessment
5. Identify environmental management measures
6. Prepare monitoring plan



# Step 1. Define Project Influence Area

- Project site
- Immediately adjoining area
- Broader affected areas
  - Areas subject to induced/indirect impacts
  - Areas subject to cumulative impacts





## Step 2. Identify Environmental or Sensitive Receptors

Communities or objects at risk from project impacts

Communities – social, cultural environmental

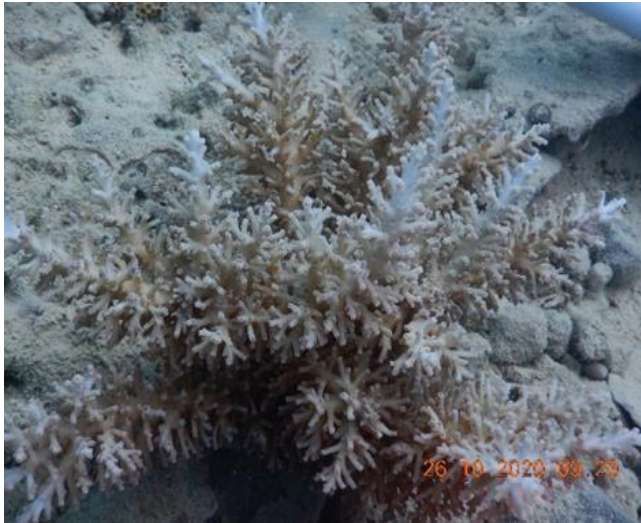
Objects – buildings or artifacts affected by vibration, erosion, worksite itself











Colony of *Acropora echinata*  
(VU) In soft bottom habitat



Curry fish *Stychopus hermanni* (VU) in sand/silt habitat

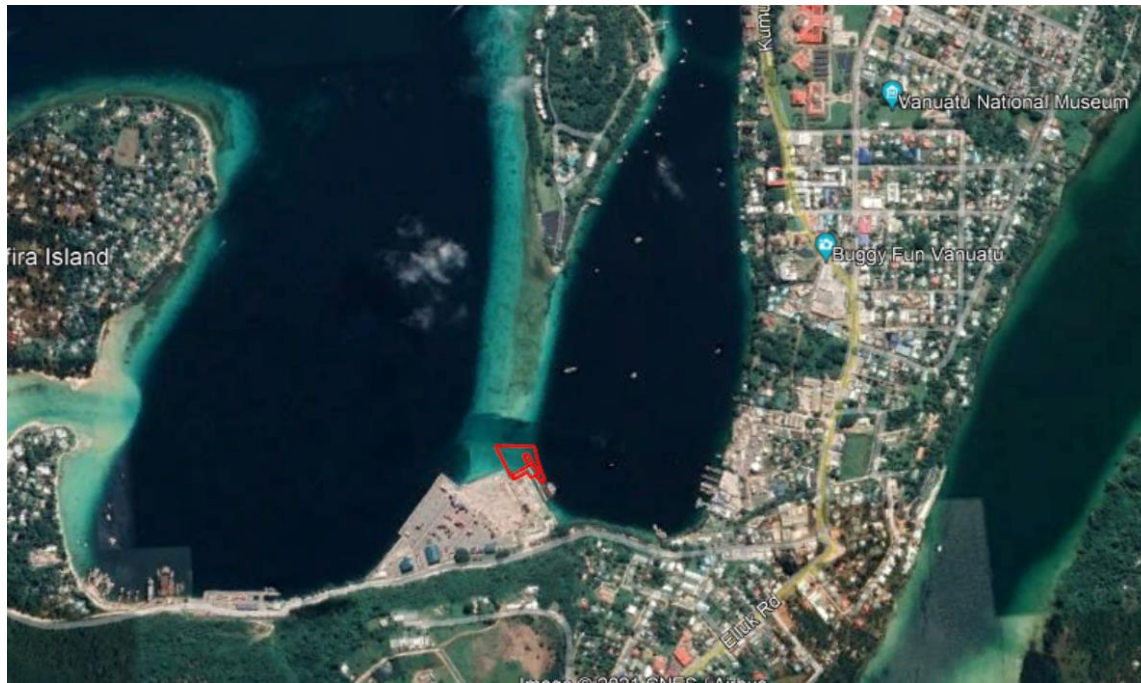


Encrusting coral on a wharf pile



# 3. Identify Project Components & Construction Activities

- Project components
- Construction Activities
- Schedule of works



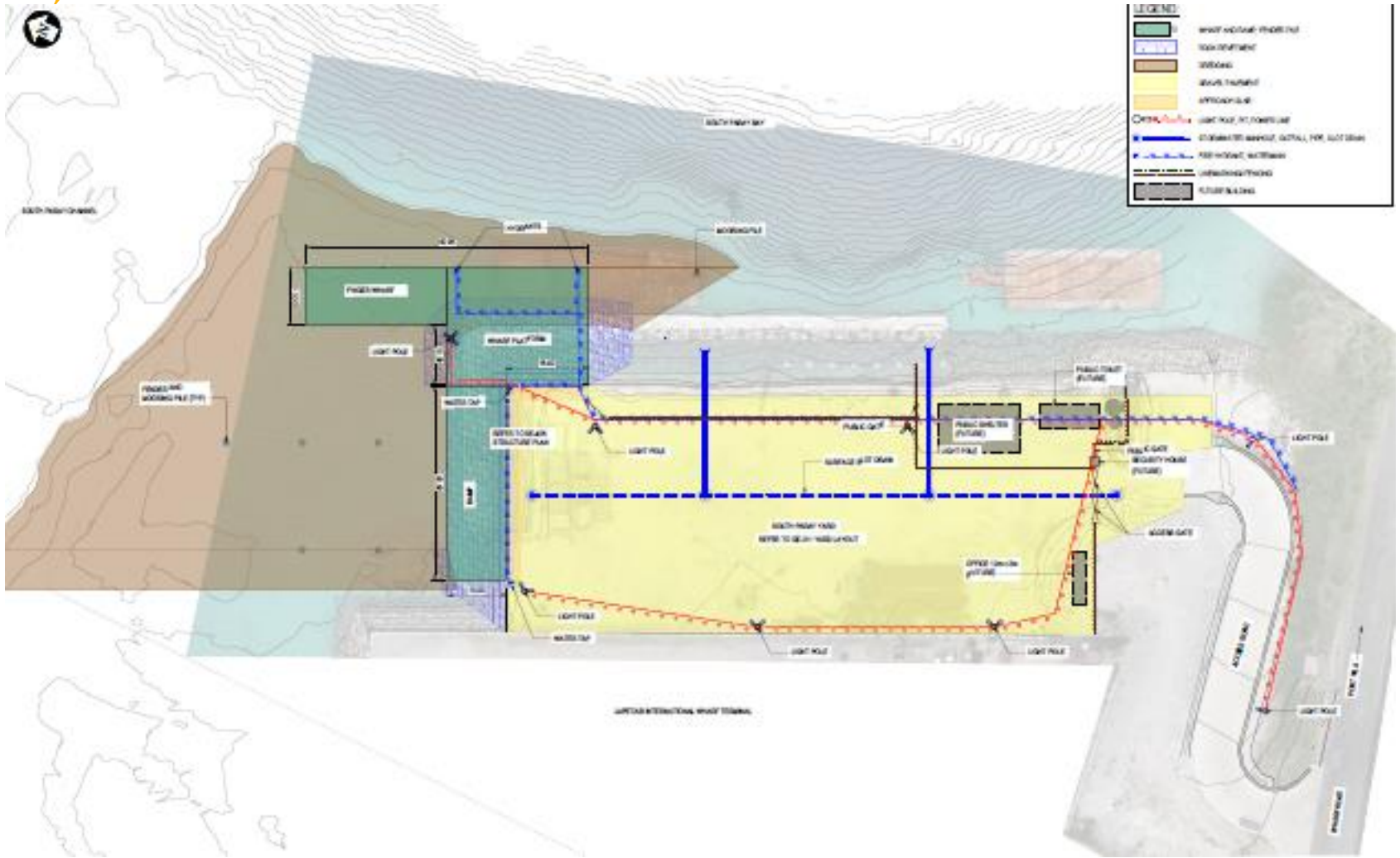
# PROJECT COMPONENTS

- Demolition of partially constructed wharf
- Construction of new wharf and ramp at northern end of existing structure

- Dredging to provide safe depth to access wharf and ramp via existing dredged channel
- Provision of wharf services









# Construction Activities and Schedule

- Site Clearance
- Demolition and removal of structures
- Dredging
- Piling
- Rock armouring for revetment
- Deck & ramp construction
- Site pavement, drainage, water supply, lighting, access gate



## Step 4. Conduct Risk Assessment

Risk = likelihood × consequence

Likelihood – certain (5); likely (3); unlikely (2); rare (1)

Consequence – catastrophic (5); major (3); moderate (2); minor (1)

Risk assessment matrix



# 4. Conduct Risk Assessment

<b>Construction / Operation Activity</b>	<b>Risks (hazards to consider)</b>	<b>Likelihood that site or sensitive receptors will be affected</b>	<b>Consequence if site or sensitive receptors affected</b>	<b>Risk Score (consequence x likelihood)</b>	<b>Environmental Management Measures</b>
		Score	Score		



# E.g. 1: Site Clearance







## E.g. 1: Site Clearance

### Risks (hazards)

- Damage to vegetation beyond project footprint
- Traffic safety on local roads
- Erosion of sediment carried into bay
- Dust generation
- Noise



# E.g. 1: Risks/Hazards

Construction Activity	Risks (hazards to consider)	Likelihood that site or sensitive receptors will be affected	Consequence if the site or sensitive receptors affected	Risk Score (consequence x likelihood)
		Score	Score	
Site clearance	Damage to vegetation beyond project footprint			
	Traffic safety on local roads			
	Erosion of sediment into bay			
	Dust generation			
	Noise			



# E.g. 1: Likelihood

Construction Activity	Risks (hazards to consider)	Likelihood that site or sensitive receptors will be affected	Consequence if the site or sensitive receptors affected	Risk Score (consequence x likelihood)
		Score	Score	
Site clearance	Damage to vegetation beyond project footprint	1		
	Traffic safety on local roads	2		
	Erosion of sediment into bay	2		
	Dust generation	1		
	Noise	1		



# E.g. 1: Consequence

Construction Activity	Risks (hazards to consider)	Likelihood that site or sensitive receptors will be affected	Consequence if the site or sensitive receptors affected	Risk Score (consequence x likelihood)
		Score	Score	
Site clearance	Damage to vegetation beyond project footprint	1	1	
	Traffic safety on local roads	2	3	
	Erosion of sediment into bay	2	1	
	Dust generation	1	2	
	Noise	1	2	



# E.g. 1: Risk Score

Construction Activity	Risks (hazards to consider)	Likelihood that site or sensitive receptors will be affected	Consequence if the site or sensitive receptors affected	Risk Score (consequence x likelihood)
		Score	Score	
Site clearance	Damage to vegetation beyond project footprint	1	1	1
	Traffic safety on local roads	2	3	6
	Erosion of sediment into bay	2	1	2
	Dust generation	1	2	2
	Noise	1	2	2



# Using the Risk Scores

The scores determine the need for environmental management measures (>6 requires action)

	CONSEQUENCE				
		Catastrophic	Major	Moderate	Minor
LIKELIHOOD	Certain	25	15	10	5
	Likely	15	9	6	3
	Unlikely	10	6	4	2
	Rare	5	3	2	1



# Step 5. Assign Environmental Management Measures

For e.g.1

Construction Activity	Risks (hazards to consider)	Likelihood that site or sensitive receptors will be affected	Consequence if site or sensitive receptors are affected	Risk score (consequence x likelihood)	Environmental Management Measures
		Score	Score		
Site clearance	Damage to vegetation beyond project footprint	1	1	1	
	Traffic impacts & safety on local roads	2	3	6	Prepn and implemtn of Traffic Management Plan as part of CEMP.incl vehicle safety, id of haulage routes and commute periods to minimise disturbance, controls and barriers.
	Erosion sediment into bay	2	1	2	Establish bunds to direct drainage to sediment basin
	Dust generation	1	2	2	Spray water on exposed areas when necessary.
	Noise	1	2	2	All construction plant to be well maintained and meet international noise emission standards



# Queries and Comments?





# E.g. 2: Dredging





## E.g. 2: Dredging

### Risks (hazards)

- Loss or damage to marine life and habitat
- Increased turbidity in marine environment
- Impact on coastal processes
- Disposal of dredged material
- Pollution from oils and fuels
- Worker and community safety (marine and land)
- Noise



# E.g. 2: Risks/Hazards

Construction Activity	Risks (hazards to consider)	Likelihood that site or sensitive receptors will be affected	Consequence if the site or sensitive receptors affected	Risk Score (consequence x likelihood)
		Score	Score	
Dredging	Loss or damage to marine life and habitat			
	Increased turbidity in marine environment			
	Impact on coastal processes			
	Disposal of dredged material			
	Pollution from oils and fuels			
	Worker and community safety (marine and land)			
	Noise			



## E.g. 2: Likelihood

Construction Activity	Risks (hazards to consider)	Likelihood that site or sensitive receptors will be affected	Consequence if the site or sensitive receptors affected	Risk Score (consequence x likelihood)
		Score	Score	
Dredging	Loss or damage to marine life and habitat	5		
	Increased turbidity in marine environment	5		
	Impact on coastal processes	1		
	Disposal of dredged material	5		
	Pollution from oils and fuels	2		
	Worker and community safety (marine and land)	2		
	Noise	1		



## E.g. 2: Consequence / Risk Score

Construction Activity	Risks (hazards to consider)	Likelihood that site or sensitive receptors will be affected	Consequence if the site or sensitive receptors affected	Risk Score (consequence x likelihood)
		Score	Score	
Dredging	Loss or damage to marine life and habitat	5	2	10
	Increased turbidity in marine environment	5	2	10
	Impact on coastal processes	1	1	1
	Disposal of dredged material	5	2	10
	Pollution from oils and fuels	2	3	6
	Worker and community safety (marine and land)	2	5	10
	Noise	1	1	1



# Step 5. Assign Environmental Management Measures

Construction Activity	Risks (hazards to consider)	Likelihood that site or sensitive receptors will be affected	Consequence if site or sensitive receptors are affected	Risk score (consequence x likelihood)	Environmental Management Measures
		Score	Score		
Dredging	Loss or damage to marine life and habitat	5	2	10	Prepare and implement marine fauna relocation plan prior to commencement of works as per Marine Ecology Assessment
	Increased turbidity in marine environment	5	2	10	Minimise dredging footprint, avoid dredging during coral spawning periods, use dredging methods that minimize release of SS, deploy silt curtains around dewatering bund.
	Impact on coastal processes	1	1	1	EA hydrodynamic modelling of previous channel indicates insignificant impact.
	Disposal of dredged material	5	2	10	Disposal in marine environment prohibited. Following dewatering, material to be taken to a government approved land based disposal area.
	Pollution from oils and fuels	2	3	6	Ensure plant maintained and no leakage of fuels and oils. Ensure safe storage of fuel etc. Spill clean up kits made available, Immediate clean up of spillages.
	Worker and community safety (marine and land)	2	5	10	Implementation of approved Worker and Community HSP
	Noise	1	1	1	All construction plant to be well maintained and meet international noise emission standards



# Summary - EMP Development

- a key component of environmental assessment – must be updated throughout the project cycle
- best developed using a systematic risk assessment methodology
- specifies the mitigation requirements to ensure that the project results in no unacceptable environmental impacts
- forms the basis for the regulator's approval/consent conditions
- must be included in bid/contract documents along with consent conditions



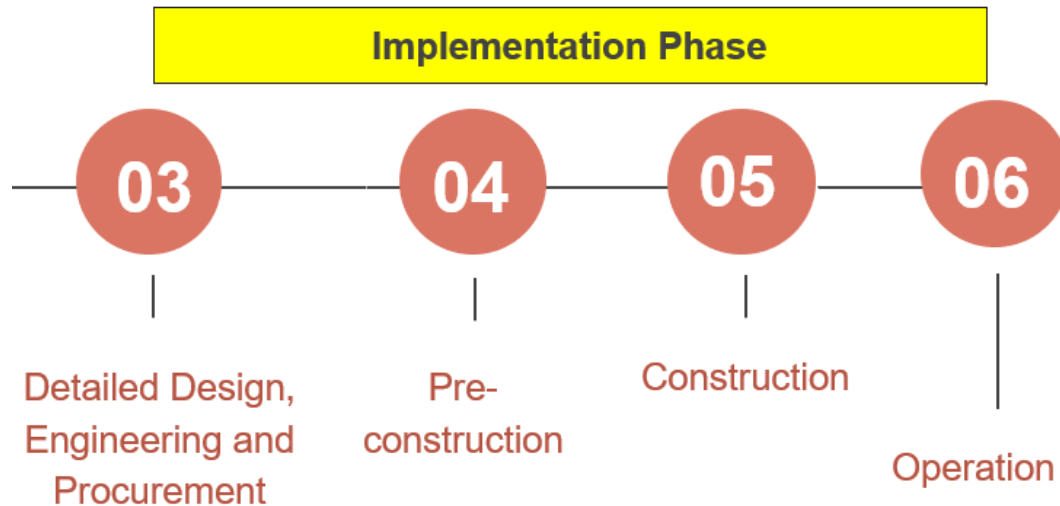
# Queries and Comments?





## Part 2: How to ensure EMP is Implemented

- The EMP has no value unless it is implemented



### Stage 3 – Detailed Design, Engineering & Procurement

- Update EIA & EMP based on detailed design
- Obtain Environmental license/consent under CSS
- EMP & consent conditions included in bid and contract documents

Milestone – Construction contracts awarded



# EMP to be integrated into Tenders & Contracts

Ensures that:

- EMP is addressed as **condition of contract**
- EMP is properly costed and resourced
- EMP is supported by systems to enable compliance
- Institutional arrangements for environmental management are in place



# Tender and contract documents

There are two key components:

- Detailed EMP requirements including site-specific planning (CEMP/CESMP)
- Inspection and control of contractor



## KC 1- Detailed EMP Requirements including Site Specific Planning (CEMP/CESMP)

The Contractor **shall prepare and submit** their construction environmental management plan (CEMP)...to meet the requirements of the Environmental Management Plan **for the approval of the Employer** and follow all directions of the Employer. This shall include **site-specific environmental management plans**...The CEMP will be submitted to the Employer for approval before commencing any work on site. No construction activities will be allowed until the CEMP is approved by the Project Management Unit (PMU)



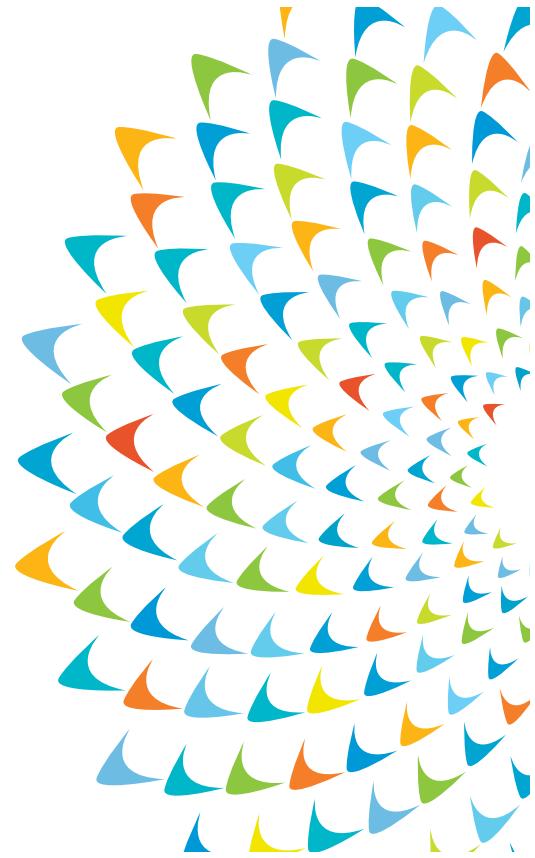
## KC 2 – Inspection and Control of Contractor

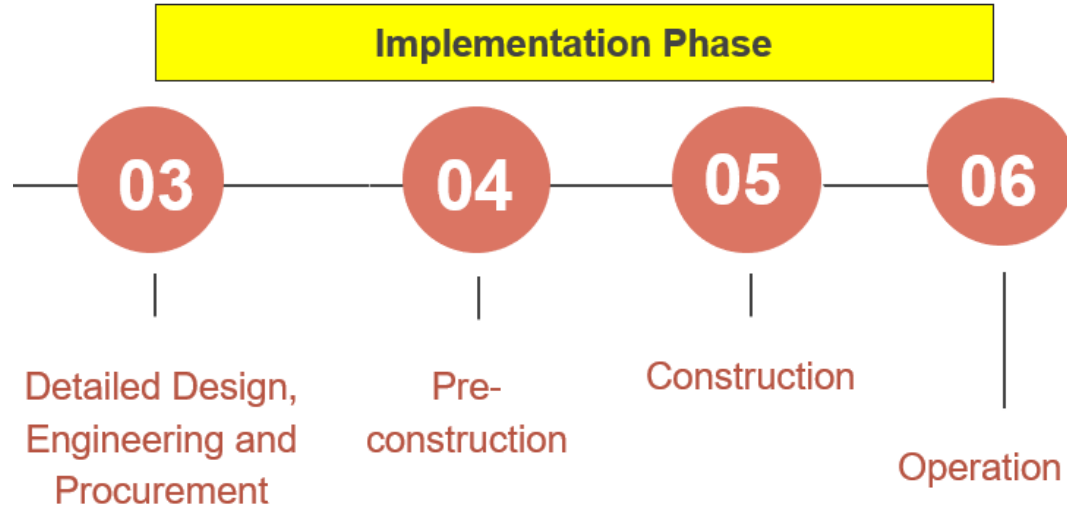
“The Employer will regularly inspect works undertaken by the contractor to check on the implementation of environmental management and monitoring requirements.

A non-compliance notice will be issued to the contractor if the employer requires action to be taken. The contractor is required to prepare a corrective action plan which is to be implemented by a date agreed with the employer.

The failure to prepare a corrective action plan or to implement it within the required time frame will result in the owner undertaking the works and passing the cost plus 15% on to the contractor.”

# Construction Environmental Management Plan





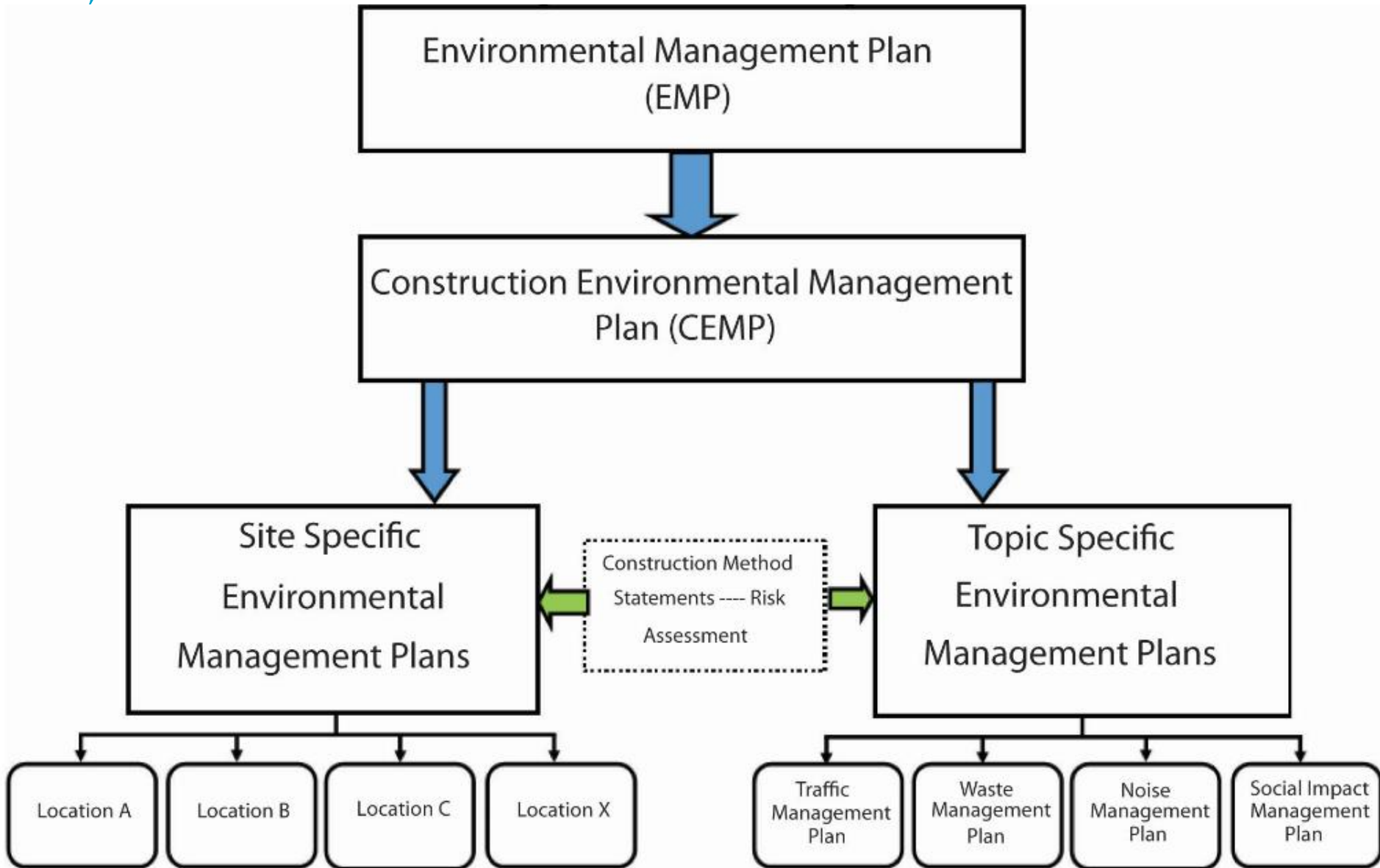
Construction contracts awarded

Stage 4 - Preconstruction

- Contractor prepares CESMP/CEMP (based on updated EMP) - to be updated as required
- CEMP clearly sets out need for subsequent application for permits and submission of other plans such as covering materials sourcing etc
- CEMP reviewed and cleared by PMU, development partner (prior to works commencement)

Milestone – construction commences







# Content of CEMP

## 1 Introduction and Purpose of CEMP

- Identify project, state purpose and coverage of CEMP
- Name and contact details of i) person who prepared CEMP and ii) contractor's person responsible for implementing CEMP
- Contractor's environmental policy or vision statement
- Describe how CEMP links with construction program and site/topic specific plans

## 2 Roles and Responsibilities

- Organizational structure, roles, responsibilities of designated people responsible for supervising CEMP including name, contact details (work /after hours for emergency)
- Reporting and communication channels (who reports to who)
- Identify roles of others ie) supervision consultant, national environmental regulating agency, ADB/financing institution

## 3 Legal Requirements

- Brief outline of environmental and land –related laws, regulations, standards, licenses and permits that Contractor must comply with



# Content of CEMP

## 4 Environmental, Social or Cultural Impacts

- Identify special issues associated with location of works areas (sensitive receptors/environmental values).
- Advise any approvals required and how work undertaken in these areas
- Locate boundaries to the areas in plan of works

## 5 Scope & Description of Works

- Describe construction methodology, linked with construction program for all works
- Plan of works – overall plan (A3) showing location of all construction sites and support facilities – based on detailed engineering plans.
- Plant & Equipment to be brought to site (list incl condition)
- Details of sites used to source raw materials
- Details of Contractors facilities



# Content of CEMP

## 6 Identification of Risks and Impacts

- Identify risks and impacts associated with specific approach and methodology of works including specific measures to mitigate impacts to meet EMP targets

## 7 Mitigation Measures and subplans

- Develop measures identified in EMP as relevant to the specific works and activities to be undertaken
- These will be sub-plans as required H&S, noise, water quality waste management, traffic etc incl layouts drawings
- SEMP's for specific components, activities, sites
- Procedures for complying with the project's GRM and CCP

## 8 Monitoring and Reporting

- Sets out timing, frequency and responsibilities for monitoring compliance with approved CEMP and identifies the various reporting requirements.

**Annexes** – risk assessments, checklists



# Important Note on CEMP

The CEMP is not just a reproduction of the EMP.

It must but be site specific, reflecting the contractor's construction methodology and schedule and demonstrating how these activities meet the requirements of the EMP.

Must be reviewed and approved by PMU before construction commences.

Even most experienced contractors rarely get it right first time, review process can take some time so important for contractor to develop well ahead of when they want to start works



# Review & Update of CEMP

CEMP and subplans/SEMPs to be routinely reviewed updated and supplemented as necessary throughout construction stage.

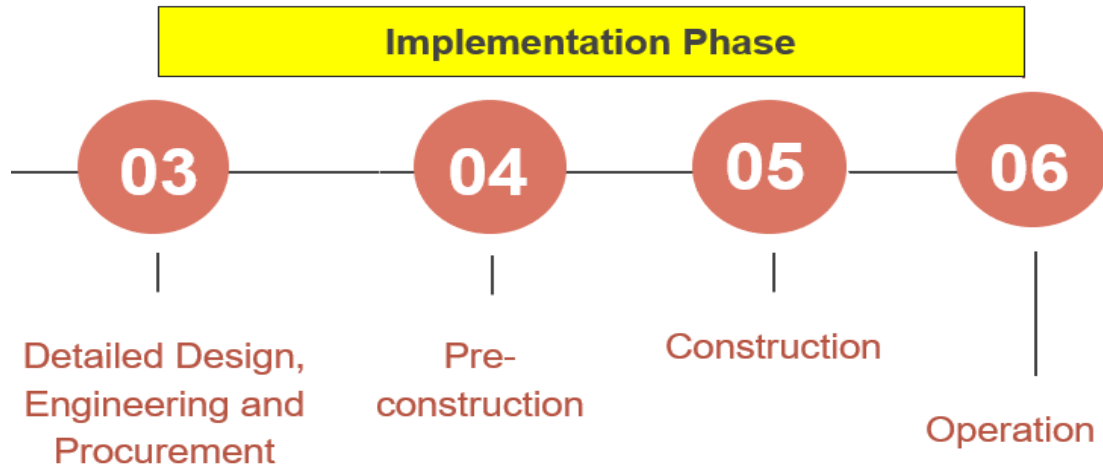
Key triggers for review:

- Commencement of new phase of project
- New risks identified
- Change in design, methodology, schedule, location
- Response to community engagement / complaints
- Unforeseen environmental issues
- Proposed mitigation measures not effective

PMU to ensure CEMP and subplans up to date. All updates to be reviewed and cleared by PMU and Engineer



# Queries and Comments?



CEMP Approved by PMU

Stage 5 - Construction

- CEMP implemented, updated (as required), monitored and supervised.
- Monitoring and reporting as required to construction completion
- PMU and development partner undertake inspections and audits

Milestone – Project Completion Report





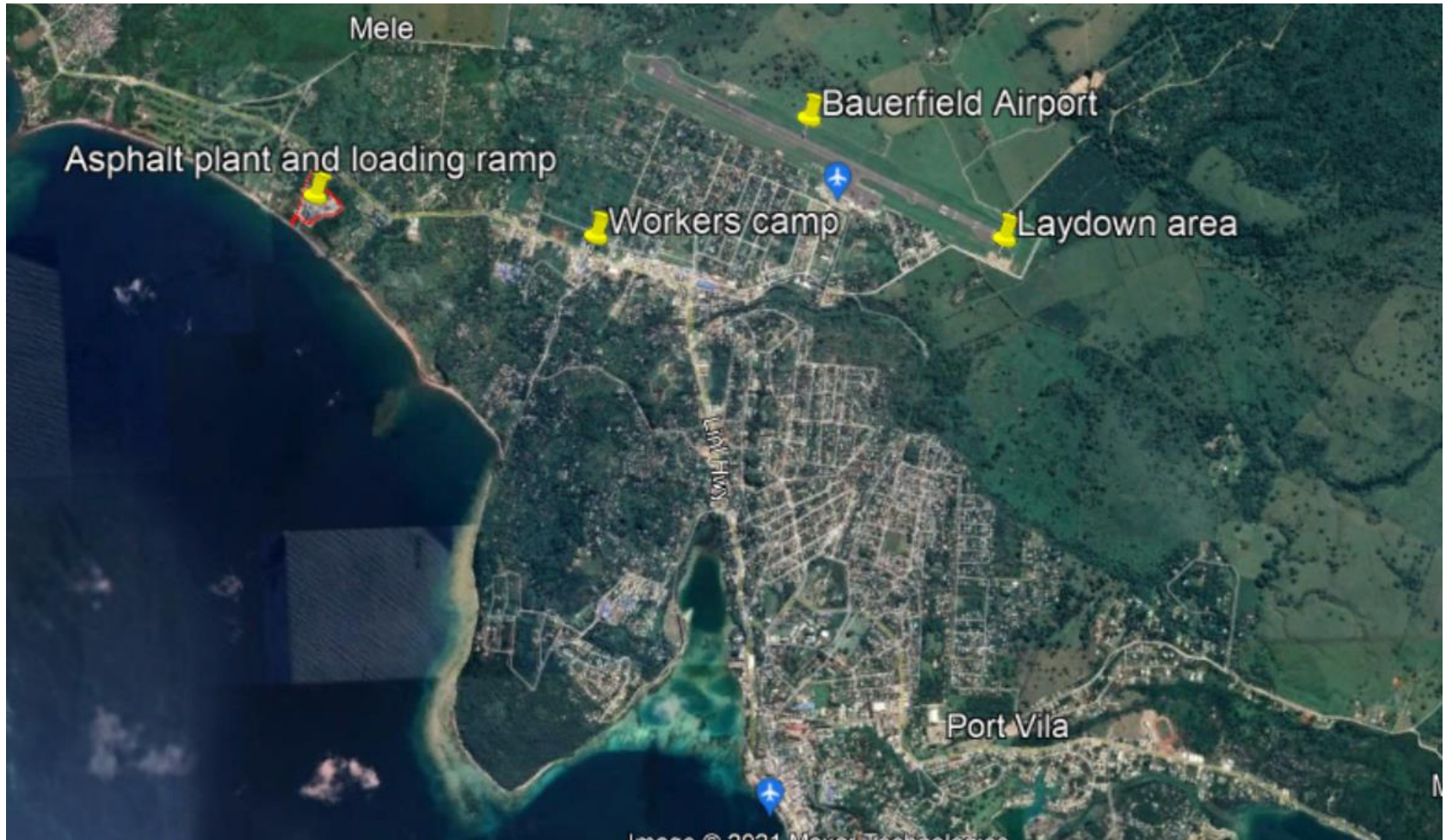
# Rehabilitation of Runway, Aprons and Related Infrastructure – Bauerfield Airport, Port Vila, Vanuatu

## Contractors Environmental and Social Management Plan





# Works Areas







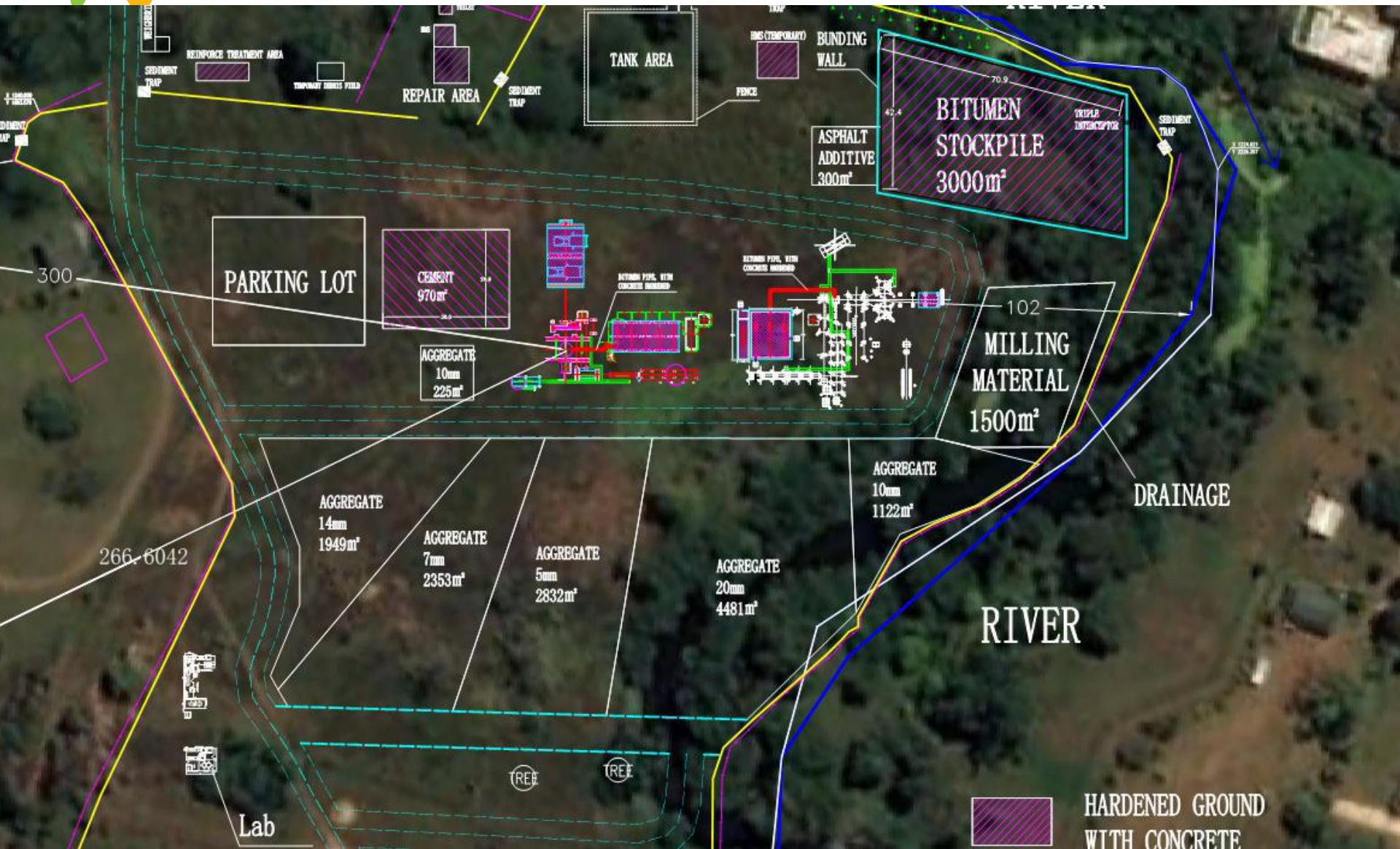
# Asphalt Plant & Loading Ramp Site





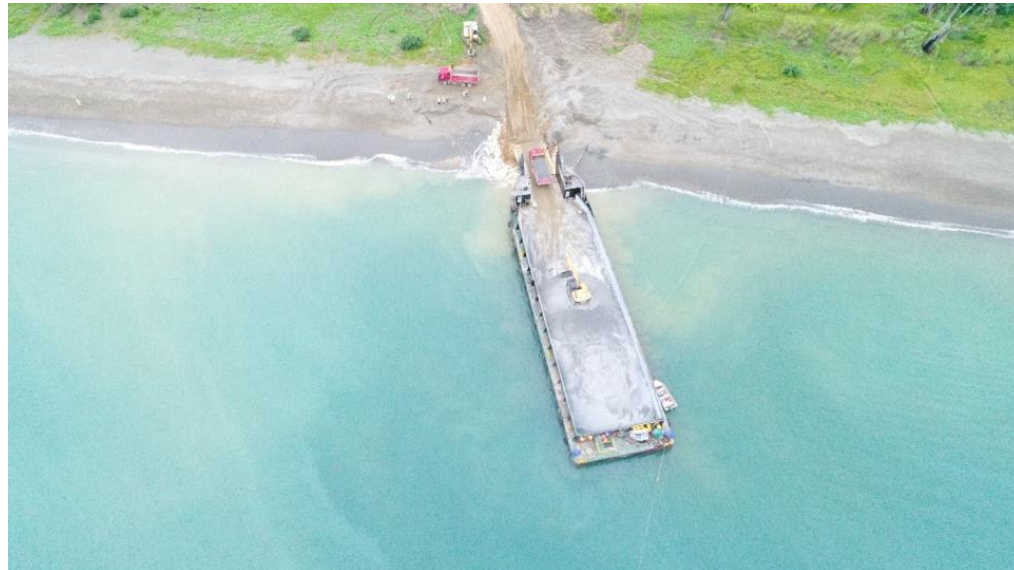


# SEMP Site Plan for Asphalt Plant





# Aggregate Loading Ramp







# Asphalt Batching Plant



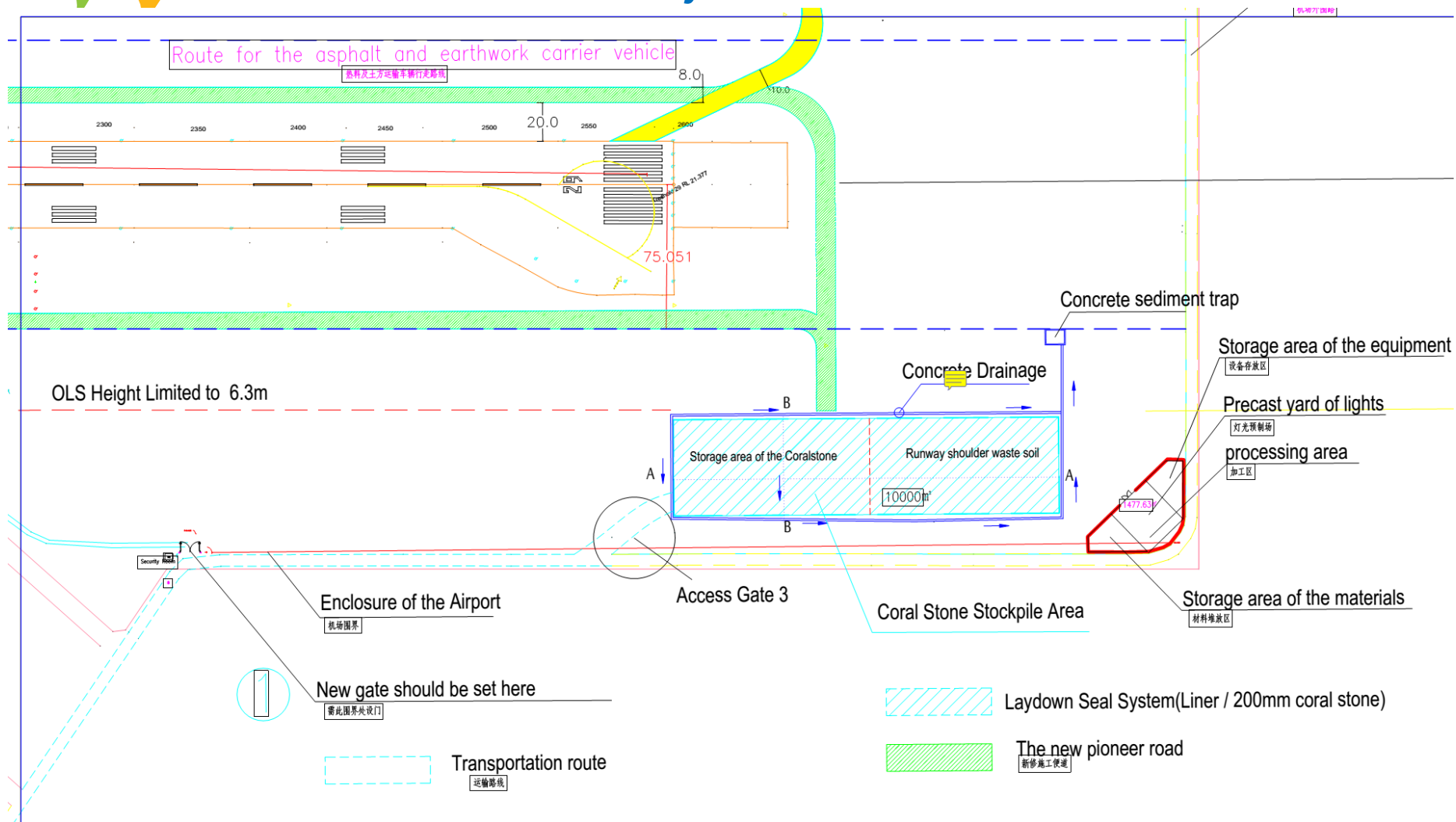


## Laydown Area





# Laydown Area







# Traffic Management Plan







# Traffic Management Plan





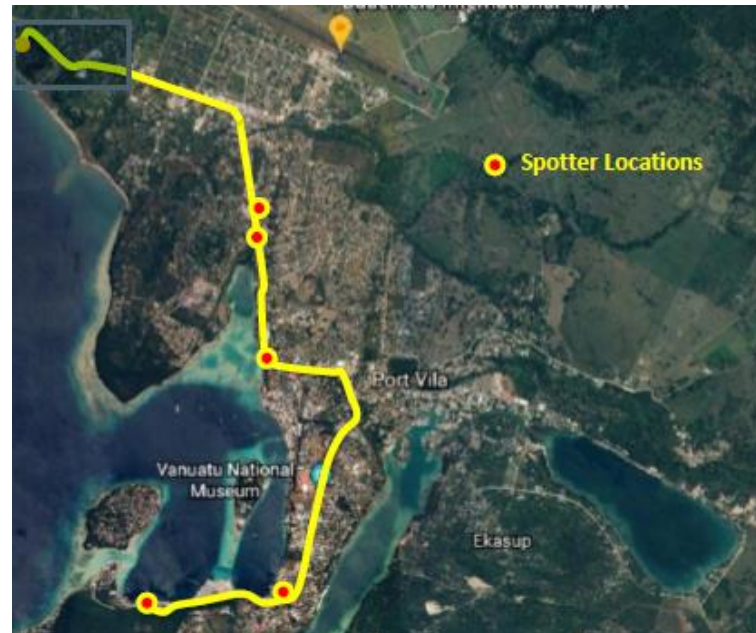
# Traffic Management Plan







# Traffic Management Plan





# Part 3: Roles and Responsibilities of Supervising Team & Contractor



# Supervising Team

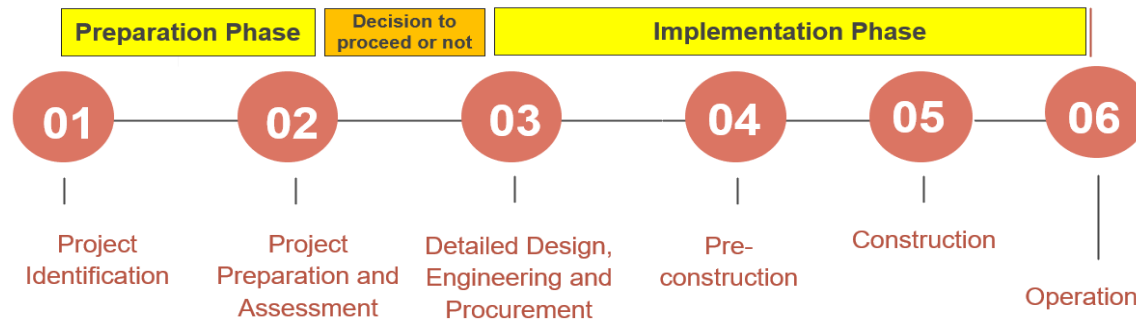
## PMU Staff & Consultants

- Project job managers
- Site supervisors
- Environmental specialists (in PMU and/or supervision consultant)

Primary role in respect of environmental safeguards is to ensure that environmental safeguards for the project are implemented effectively during construction



# PMU ES Main Responsibilities



- **Planning** – Ensuring that everything is in place before construction starts (PC 02, 03, 04)
- **Monitoring** – Checking if the project is proceeding as planned, also recording and correcting problems. (PC 05)
- **Reporting** - Letting all stakeholders know how the project is progressing. (PC 02, 03, 04, 05)





# Pre-construction

## Environmental Management Actions

ES/EU reviews site-specific environmental management plan (CEMP) and, if required (large/complex projects) the environmental management system (EMS).

ES/EU verifies compliance of contractor with CEMP at site meeting.

ES/EU informs PIU that contractor is now cleared to start work.

## Project Implementation Activities

Contractor prepares CEMP (and EMS-large projects-if required)

Contractor is inducted to site by ES/EU

Contractor is approved to start works

## Conditions Required to Complete Actions

Contractor has appointed environmental manager.

After award of contract, contractor **usually** has 30 days to prepare CEMP/EMS.

Contractor cannot take possession of construction site until (i) CEMP/EMS has been approved, and (ii) induction is completed satisfactorily.



# Construction

## Environmental Management Actions

Pre-construction completed

Construction commences

PIU/PMU, with assistance of ES/EU, monitors contractor's compliance with approved CEMP.

ES/EU audits construction activities.

ES/EU evaluates monitoring program.

Site supervisor Checklist at least weekly

Construction completed

Operation commences

## Project Implementation Activities

Contractor begins work.

Environmental monitoring undertaken and reports prepared.  
(i) By contractor: monthly environmental reports sent to PIU.  
(ii) By ES/EU: inputs to QPR, semi-annual environmental reports are sent to EA, ADB & environmental agency.

Construction is completed, and the project commissioned

## Conditions Required to Complete Actions

Contractor has complied with CEMP requirements for implementing and monitoring work on-site.

ES/EU reviewed and signed off on completed work.

Final environmental monitoring report was prepared.

Project works were completed in accordance with the CEMP, and all sites were satisfactorily rehabilitated and restored.

Payments may be withheld if sites have not been cleared and closed according to CEMP specifications.



# Management, recording, auditing

ES needs to establish an organized system for EM - communications, inspections, monitoring, reporting

The ES must keep evidence of all stages of the process

ADB will audit projects according to those stages

Module later in the PLP program focusing on monitoring and reporting



# Thank you

# Discussion & Questions