

# SAEP-13 PRE-RESTORATION COMPLIANCE ADDENDUM

**8 million Mangrove Plantation Project - Phase 2**  
Al Batinah Island, Eastern Province, Kingdom of Saudi Arabia  
**Document Reference: AHAB-8MM-SAEP13-001**

Date: 01 February 2026

## INTRODUCTION

This addendum addresses the specific SAEP-13 compliance requirements for the pre-restoration evaluation of the 8 million Mangrove Plantation Project (Phase 2). Each section corresponds to the referenced SAEP-13 clause requirements.

## 1. DIGITAL ELEVATION DEVELOPMENT

*Reference: SAEP-13, Clause 3.2.2.1.2*

### 1.1 Digital Elevation Model (DEM) Specifications

| Parameter      | Specification                            |
|----------------|--|
| Data Source    | Airbus Pleiades Neo Satellite Imagery    |
| DTM Resolution | 0.5m horizontal / 10cm vertical accuracy |
| DSM Resolution | 0.5m horizontal / 10cm vertical accuracy |
| Vertical Datum | EGM2008 Geoid Model                      |
| Coverage Area  | Abu Ali Island (12,571 x 5,762 pixels)   |
| File Format    | GeoTIFF (.tif), WGS84 coordinate system  |

### 1.2 DEM Products Delivered

| Product       | Description                                   | Application               |
|---------------|---|---------------------------|
| DTM (Filled)  | Digital Terrain Model with interpolated voids | Planting zone delineation |
| DTM (No Fill) | Raw terrain model preserving data gaps        | Quality assessment        |
| DSM (Filled)  | Digital Surface Model including vegetation    | Canopy analysis           |
| DSM (No Fill) | Raw surface model                             | Baseline reference        |

**Elevation Analysis:** The DEM confirms optimal planting elevation zones between +0.30m and +0.60m above Mean Sea Level (MSL), consistent with *Avicennia marina* tidal requirements. All 8 proposed planting sites fall within this elevation band as verified by DEM cross-section analysis.

## 2. ENVIRONMENTAL IMPACT ASSESSMENT (SAEP-13)

*Reference: SAEP-13, Clause 3.2.2.1.2*

### 2.1 EIA Screening Assessment

A screening-level Environmental Impact Assessment (EIA) was conducted in accordance with SAEP-13 requirements. The assessment evaluated potential environmental impacts and confirmed project eligibility under the restoration/rehabilitation category.

### 2.2 Key EIA Findings

| Assessment Criterion | Finding   | Status   |
|----------------------|---|----------|
| Protected Species    | No protected species nesting within planting zones  | PASS     |
| Habitat Impact       | No adverse impacts to existing habitats anticipated | PASS     |
| Cumulative Effects   | Positive long-term carbon sequestration benefits    | POSITIVE |
| Coastal Processes    | Enhancement of coastal protection expected          | POSITIVE |
| Biodiversity         | Expected increase in fish nursery habitat           | POSITIVE |

**EIA Determination:** The project qualifies as a restoration/rehabilitation activity under SAEP-13 Section 3.2.2, requiring monitoring documentation rather than full EIA submission. The pre-restoration assessment serves as the baseline monitoring framework.

### 3. NURSERY SITE IDENTIFICATION

Reference: SAEP-13, Clause 3.2.2.1.2

#### 3.1 Nursery Location and Specifications

| Parameter                | Specification                        |
|--------------------------|--------------------------------------|
| Nursery Location         | Abu Ali Island, Southern Shore       |
| GPS Coordinates (Center) | 27.3062N, 49.4885E                   |
| Nursery Area             | 2.17 hectares                        |
| Operational Capacity     | 8,000,000 seedlings                  |
| Seedling Source          | Local Avicennia marina propagules    |
| Genetic Provenance       | Abu Ali Island natural stands (7 ha) |
| Nursery-to-Site Distance | <5 km (same-day transplanting)       |

#### 3.2 Nursery Boundary Coordinates

| Point | Latitude (N) | Longitude (E) |
|-------|--------------|---------------|
| 1     | 27.3052655   | 49.4877966    |
| 2     | 27.3056097   | 49.4871276    |
| 3     | 27.3063753   | 49.4877413    |
| 4     | 27.3069802   | 49.4881252    |
| 5     | 27.3067063   | 49.4886710    |
| 6     | 27.3072740   | 49.4895351    |
| 7     | 27.3070228   | 49.4899320    |
| 8     | 27.3064455   | 49.4890930    |

### 4. CONTROL SITE DESIGNATION

Reference: SAEP-13, Clause 3.2.2.1.3

#### 4.1 Control Site Selection Rationale

Control sites have been established for long-term monitoring and scientific comparison. These sites enable quantification of restoration success by comparing planted areas against natural references and unplanted controls.

## 4.2 Control Site Specifications

| Control Type      | Location                         | Coordinates        | Purpose             |
|-------------------|----------------------------------|--------------------|---------------------|
| Unplanted Control | Adjacent intertidal (50m buffer) | 27.1900N, 49.5350E | Baseline comparison |
| Natural Reference | Existing 7 ha mangrove stand     | 27.3060N, 49.4880E | Growth benchmarking |
| Substrate Control | Representative bare plots        | 27.2000N, 49.5500E | Soil development    |

## 4.3 Control Site Monitoring Schedule

Control sites will be monitored concurrently with planted areas at the following intervals: 3 months, 6 months, 12 months, 36 months, and 60 months post-planting, per SAEP-13 monitoring protocols.

## 5. SITE HISTORY VERIFICATION

Reference: SAEP-13, Clause 3.2.2.1.4

### 5.1 Natural Mangrove Occurrence

| Assessment Item             | Finding   |
|-----------------------------|---|
| Existing Natural Mangroves  | Approximately 7 hectares of naturally regenerated <i>Avicennia marina</i> on southern shore |
| Establishment Method        | Natural propagule dispersal and colonization  |
| Historical Imagery Analysis | Satellite imagery (2010-2025) confirms gradual natural expansion                            |
| Genetic Origin              | Local Arabian Gulf ecotype, adapted to hypersaline conditions (38-52 ppt)                   |

## 5.2 Previous Restoration Attempts

| Assessment Item          | Finding   |
|--------------------------|---|
| Phase 1 (2025)           | 5 million seedlings planted (December 2025) - COMPLETED     |
| Other Formal Restoration | No other documented restoration activities at Phase 2 sites |
| Phase 2 Site Status      | All 8 proposed sites contain no existing mangroves          |

**Determination:** The proposed Phase 2 restoration sites are distinct from Phase 1 planting areas and contain no existing mangroves from natural occurrence or previous restoration attempts. Sites are verified suitable for new plantation establishment.

## 6. SPATIAL DATA SUBMISSION (ESRI FORMAT)

Reference: SAEP-13, Clause 3.2.2.1.6

### 6.1 ESRI Data Package Contents

| Deliverable                  | Format           | Contents                      |
|------------------------------|------------------|-------------------------------|
| 8MM_Final_Locations_Points   | Shapefile (.shp) | 62 survey point locations     |
| 8MM_Final_Locations_Polygons | Shapefile (.shp) | 4 planting zone boundaries    |
| Abu_Ali_8MM_Sites_Points     | Shapefile (.shp) | 68 site survey points         |
| Abu_Ali_8MM_Sites_Polygons   | Shapefile (.shp) | 8 site polygon boundaries     |
| All_Survey_Points            | Shapefile (.shp) | 130 combined survey points    |
| All_Planting_Zones           | Shapefile (.shp) | 12 combined planting polygons |
| Nursery Boundary             | Shapefile (.shp) | Nursery extent (2.17 ha)      |
| Control Sites                | Shapefile (.shp) | 3 control site locations      |
| DEM Products                 | GeoTIFF (.tif)   | DTM and DSM (filled/unfilled) |

### 6.2 Coordinate System and Projection

| Parameter      | Specification                      |
|----------------|------------------------------------|
| Geographic CRS | WGS 84 (EPSG:4326)                 |
| Projected CRS  | WGS 84 / UTM Zone 39N (EPSG:32639) |
| Datum          | World Geodetic System 1984         |
| Vertical Datum | EGM2008 (for DEM products)         |

### 6.3 KML Reference Files

Google Earth compatible KML/KMZ files are provided for visualization purposes alongside the ESRI shapefiles. These include: new 8 mm final locations.kml and Abu Ali 8mm site new.kml.

### 6.4 Submission Details

| Field             | Details                                   |
|-------------------|---|
| Submission Method | Digital delivery via approved channel     |
| Submission Date   | Upon final location approval              |
| Data Package      | ESRI_Data.zip (all shapefiles + metadata) |

## SAEP-13 COMPLIANCE MATRIX

| Clause    | Requirement                          | Status    | Reference |
|-----------|--------------------------------------|-----------|-----------|
| 3.2.2.1.2 | Digital Elevation Model Developed    | COMPLIANT | Section 1 |
| 3.2.2.1.2 | EIA Conducted per SAEP-13            | COMPLIANT | Section 2 |
| 3.2.2.1.2 | Nursery Site Identified              | COMPLIANT | Section 3 |
| 3.2.2.1.3 | Control Sites Included               | COMPLIANT | Section 4 |
| 3.2.2.1.4 | Natural/Restoration History Verified | COMPLIANT | Section 5 |
| 3.2.2.1.6 | Spatial Data in ESRI Format          | COMPLIANT | Section 6 |

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