

# ENVIRONMENTAL IMPACT STATEMENT

## EXECUTIVE SUMMARY

### INTEGRATED WASTE MANAGEMENT FACILITY

OCTOBER 2020  
Report No. 01375A\_3\_v3



ERIAS



TWM PNG Ltd t/a Total Waste Management

Integrated Waste Management Facility

## **Environmental Impact Statement**

Executive Summary

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# Executive Summary

## 1 Proposed Development

TWM PNG Limited t/a Total Waste Management (TWM), as proponent of the Integrated Waste Management Facility (IWMF) Project ('the Project'), is proposing to further develop and extend the existing infrastructure and operations of the IWMF, located adjacent to the AES Industrial Park at Site Portion 2703, Napa Napa Road, Porebada, Central Province, Papua New Guinea, approximately 21 km from Port Moresby by road (Figure ES1; Plates ES1 and ES2).

**Plate ES1 – View of the Napa Napa Peninsula**



Photo: Google Earth.

**Plate ES2 – The AES Industrial Park**



Photo: TWM.

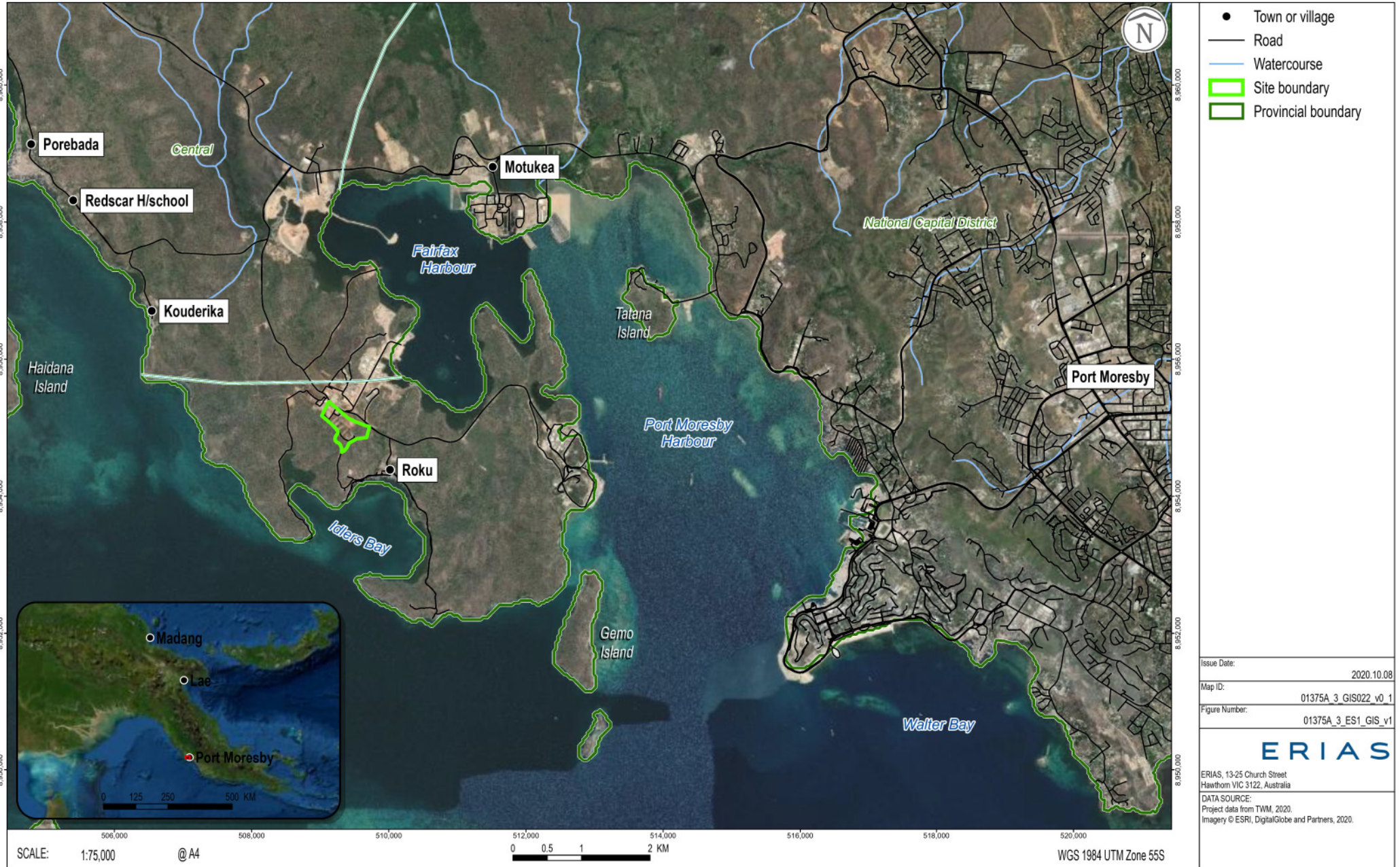
# PROJECT LOCATION

Integrated Waste Management Facility | Environmental Impact Statement

FIGURE ES1



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TWM proposes to extend the waste types to be processed and treated at the facility, including hazardous solid and liquid wastes. TWM anticipates up to 150,000 tonnes of waste will be received at the facility each year. The extended IWMF is anticipated to have an operational life of up to 50 years. The details of rehabilitation and decommissioning activities are yet to be determined but will comply with regulatory requirements that are in force at the time of decommissioning, and good industry practice.

## **1.1 Project Justification**

The IWMF will be the first facility of its kind in Papua New Guinea, increasing the country's capacity to treat, recover and recycle waste material and dispose of hazardous contaminants in an environmentally sustainable manner, reducing the current need to export waste to other countries (e.g., Australia). By providing in-country waste management solutions, the Project also aims to reduce the current uncontrolled waste stockpiling practices in Papua New Guinea and aims to address the existing environmental, health and safety risks associated with unlicensed waste storage and disposal.

## **1.2 Project Objectives**

The overarching Project objective is to construct and operate engineered infrastructure capable of sustainably storing, treating and disposing of industrial and commercial wastes, including hazardous wastes. Specifically, the Project aims to:

- Improve the safe and environmentally sustainable handling of waste materials including hazardous waste and reduce the current stockpiling of such materials in uncontrolled circumstances throughout Papua New Guinea.
- Address the current environmental and public health risks associated with unlicensed waste storage and disposal.
- Improve cost structures for the safe management of end of life hazardous materials for industry and government agencies.
- Build in-country capacity and provide local access to sustainable hazardous waste treatment and disposal services to reduce the current reliance on hazardous waste export.
- Expand Papua New Guinean exports of hazardous waste knowledge and capacity to provide hazardous waste services to other Pacific countries.
- Increase government tariff revenues through waste imports and provide reliable feedstock for IWMF development.
- Support the PNG Government in meeting its current and future obligations under a number of multilateral environmental agreements (e.g., Montreal Protocol, Stockholm Convention).

### 1.3 Environmental Permit Requirements

Several activities and components of the IWMF are already approved under TWMs existing Level 2 Environment Permit EP-L2 (485), either in regard to construction or operation and receipt and treatment of wastes.

For the proposed Project (extended IWMF), a Level 3 environmental permit is required in order to undertake construction and operation of the following specific activities:

- Construction and operation of engineered infrastructure capable of receiving and managing hazardous waste.
- Extension of types of waste materials to be received/handled/stored at the IWMF, including hazardous solid and liquid wastes.
- Resource recovery activities including e-waste dismantling and plastics reprocessing.

The EIS assesses the potential environmental and socio-economic (including cultural heritage) impacts of the Project on the study area. The EIS has been prepared in line with the requirements of:

- Relevant Papua New Guinea laws, regulations and permits.
- TWM corporate requirements.

### 1.4 Study Area

The environmental and socio-economic study area is shown in Figure ES1.

The following aspects were considered in defining the study area, all of which set the context for the area in which environmental and socio-economic baseline studies (desktop reviews, stakeholder engagement and field studies) were undertaken:

- The expansion footprint (5.5 ha to the southeast and 2.4 ha to the southwest of the existing site boundaries) with an additional 500 m buffer from the boundary.
- Ongoing site operational activities and intermittent activities such as construction works.
- Surface water catchments and the potential for runoff to extend beyond the facility boundaries and 500 m buffer.
- The location of sensitive receptors, including neighbouring industries (and Roku village).
- Community land use and traditional resource use activities surrounding the IWMF.
- Transportation routes (i.e., roads, shipping routes).
- The location of local infrastructure (e.g., schools, health centres and markets).
- Organisations or communities that could be indirectly affected by the proposal (e.g., landowners, communities who use/access surrounding natural resources, supply chains, Project workforce and government departments).

Within the environmental study area sampling locations were determined based on representativeness of receptors and potential impact pathways for soil, groundwater, surface water and stream sediment, air and noise and aquatic and terrestrial biodiversity.

Given the localised expansion of the IWMF and distance from most local communities, the socio-economic study area (i.e., the area where primary data would be collected from the community) focussed on Roku village.

## **1.5 Data Collection**

The environmental and socio-economic conditions in the study area are characterised using a combination of a bibliographic (desktop) review of publicly available information, data gathered during previous surveys at the IWMF and surrounding area, and data gathered during field surveys and interviews undertaken by ERIAS between the 15 and 22 July 2020, which included community interviews, discussion with specialists (e.g., CEPA), site field assessments and sediment sampling.

Interviews were conducted with the local community (with Roku village leaders and the Roku Women's Fellowship), with businesses in the neighbouring industrial precinct and with government agency representatives. Information on community use of natural resources was supplemented through the environmental field surveys.

## **2. Project Setting**

### **2.1 Physical Environment**

The Project is located within the Southern Plains and Lowlands region of Papua New Guinea, comprising of hilly lowlands and foothills, and depositional plains. The IWMF site is located on the top of a low, flat hill or ridge, running northwest to southeast at an elevation of between 112 m above sea level (asl) at the highest point to 49 m (asl) at the lowest. Plates ES3 and ES4 demonstrate the landscape in the study area. Plates ES1 and ES5 show the development on the Napa Napa Peninsula and the extensive existing ground disturbance in the study area.

Air quality in the study area is affected by dust and emissions from vehicles operating at the various industrial facilities in the area, including the IWMF site; equally existing industry in the area contributes to current background noise levels.

There are no creeks within the IWMF site and water primarily drains from the site towards the AES industrial park and Fairfax Harbour. Generally, water flow and quality in the region are affected by seasonal rainfall, in particular during the monsoon season (December to May). Land clearance and industrial development in the region have limited natural flood protection, allowing heavy monsoon rains to wash through the study area potentially mobilising pollutants from human and industrial activities into downstream waterways.

The Project is located in the vicinity of the AES Industrial Park and already experiences a degree of air pollution and noise disturbance from industrial activity and vehicles on the Napa Napa Road.

**Plate ES3 – Landscape Type: Wooded Drainage Lines**



**Plate ES4 – Landscape Type: Eucalypt Savanna**



**Plate ES5 – Pre-Existing Disturbance within the Study Area**



## **2.2 Biological Environment**

In keeping with the characteristics of the southern coastal lowlands of Central Province of Papua New Guinea, the entire study area is identified as savanna vegetation, comprising scattered eucalypt trees and grassland; however, the IWMF site and adjacent land, including the nearby AES Industrial Park, is heavily disturbed with little to no original vegetation remaining (see Plate ES5). Biodiversity in the study area is therefore less diverse than other parts of Papua New Guinea with only a number of fauna (including birds, amphibians and reptiles) observed during field surveys (Plate ES6) or previous surveys in the broader region. Small mammals, such as the agile wallaby, were not identified during surveys however are known to exist in the area (as identified by the local community). Marine biodiversity was not studied as part of the EIS as the Project is not predicted to impact on the marine environment.

**Plate ES6 – Green Tree Frog (*Ranoidea caerulea*)**



### **2.3 Socio-economics and Cultural Heritage**

Roku village has a population of between 2,000 and 2,500 people and is the closest village to the IWMF (located approximately 500 m away, to the southeast of the facility), located on the shores of Idler's Bay (Plates ES7 and ES8). The traditional language of Roku village is Koita (also known as Koitabu); however, the Koita have interacted extensively with neighbouring Motu villages, such that intermarriage has slowly changed Koita society. The Kuriu clan are the traditional landowners in Roku village.

The broader study area does not contain any active commercial forestry, agriculture or livestock production, and is primarily used for industrial purposes. Over half of the local community (Roku) earn income from waged (formal) employment, mostly at businesses at the AES Industrial Park, including TWM. Subsistence practices are still part of daily life for the local community; however, few households maintain gardens, despite communal land being available adjacent to Roku village. Those that do garden, grow cassava, banana, mango and yam during the rainy season (see Plate ES9).

Firewood is still regularly collected from the savanna surrounding Roku village and is used for cooking and/or is sold locally at table markets and trade stores (see Plate ES10). Fishing is an important activity for the local community (see Plate ES11), both in terms of nutritional benefits and because of the income generated through sale of fish locally or at the Koki market in Port Moresby (approximately 20 minutes by dinghy).

There is an elementary school and a primary school in the village, however there are no health facilities (the closest is the Porebada Health Sub-Centre, approximately 8.5 km away).

**Plate ES7 – Typical Housing in Roku Village and Dinghies Used for Fishing**



**Plate ES8 – Eastern side of Roku village**



**Plate ES9 – Garden in Roku Village**



**Plate ES10 – Firewood Being Dried to Sell**



**Plate ES11 – Fish Caught in Waters off Roku Village**



In March 2018, a survey of the IWMF site was conducted by the National Museum and Art Gallery of Papua New Guinea to identify any archaeological and cultural heritage sites. No sites of cultural significance were found within the study area.

### **3 Stakeholder Engagement**

TWM is committed to establishing and maintaining positive stakeholder relations through effective communication and consultation with identified stakeholders throughout the life of the IWMF. Due to the nature of the existing operations at the IWMF, TWM already has an in-depth understanding of its stakeholders, including key representatives of the local community and had established a program of regular stakeholder engagement.

TWM has undertaken a number of engagement activities specific to the proposed expansion of the IWMF with affected stakeholder groups, in line with the requirements set out in the *Environment Act 2000*, to further understand potential impacts on stakeholders, including on the local community at Roku village and neighbouring businesses. Further formal stakeholder engagement on the EIS will be undertaken in conjunction with Papua New Guinea's Conservation and Environment Protection Authority in order to satisfy requirements of the Act.

## 4 Assessment of Project's Impacts and Benefits

Project activities (described in Section 1) have the potential to generate the following impacts and benefits described in Table ES1. However, the EIS does not include a 'blanket' assessment of all impacts; some potential impacts have been discounted during preliminary screening as part of the impact assessment process due to not meeting significance or magnitude criteria, as described in Table ES1 below. Table ES1 summarises the residual impact significance assessment for each environmental and socio-economic discipline and, where applicable, highlights any impacts that were considered negligible or unlikely following preliminary screening of impacts. Additional detail is provided in Chapters 10 and 11 of the EIS.

**Table ES1 – Potential Project Impacts**

| EIS Section No.    | Potential Impacts                                               | Residual Impact Assessment | Impacts Discounted during Preliminary Screening and Not Assessed Further in EIS                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------|-----------------------------------------------------------------|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ENVIRONMENT</b> |                                                                 |                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>10.1</b>        | <b><i>Landform and Soils</i></b>                                |                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                    | Destabilisation of landform resulting in increased soil erosion | Negligible                 | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                    | Deterioration in soil quality                                   | Negligible to Minor        | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>10.2</b>        | <b><i>Hydrological Processes</i></b>                            |                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                    | Altered surface water processes (industrial landfill)           | Negligible                 | <ul style="list-style-type: none"> <li>Preliminary screening determined that there will be no impact to the hydrological regimes of downslope surface waters from surface water abstraction as this will not be required to meet the domestic and industrial water demands of the Project. Further assessment in EIS not required</li> </ul>                                                                                                                                                                                           |
|                    | Change to groundwater levels                                    | Not assessed               | <ul style="list-style-type: none"> <li>Preliminary screening determined that no groundwater drawdown will occur as no groundwater will be abstracted to meet Project water demands. Further assessment in EIS not required</li> <li>Preliminary screening determined that groundwater mounding from seepage is unlikely to occur as all stormwater and sediment dams and the leachate storage pond will be lined with multiple HDPE geo-membrane barriers combined with clay liners. Further assessment in EIS not required</li> </ul> |
| <b>10.3</b>        | <b><i>Surface Water Quality</i></b>                             |                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                    | Increased sediment and turbidity from rainfall erosion          | Negligible to Minor        | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                    | Deterioration in surface water quality                          | Negligible to Minor        | <ul style="list-style-type: none"> <li>Preliminary screening determined that discharge of treated wastewater from the IWMF site is not proposed and discharge of stormwater does not need to be assessed as</li> </ul>                                                                                                                                                                                                                                                                                                                 |

| EIS Section No. | Potential Impacts                                                                                                               | Residual Impact Assessment                                                                                                                                                                                                                                                           | Impacts Discounted during Preliminary Screening and Not Assessed Further in EIS                                                                                                                                                                                                                                                                   |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 |                                                                                                                                 |                                                                                                                                                                                                                                                                                      | TWM has an existing environment permit for the offsite discharge of storm water. Further assessment in EIS not required                                                                                                                                                                                                                           |
| <b>10.4</b>     | <b>Groundwater Quality</b>                                                                                                      |                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                   |
|                 | Deterioration in groundwater quality due to contamination                                                                       | Negligible                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>Preliminary screening determined that no water will be discharged from the IWWMF, apart from stormwater, (from weighbridge and guardhouse) which is approved under an existing environment permit. Further assessment in EIS not required</li> </ul>                                                       |
| <b>10.5</b>     | <b>Air Quality and Greenhouse Gas</b>                                                                                           |                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                   |
|                 | Decline, loss of or change to existing air quality and amenity from dust and particulate matter and from incinerator emissions  | <ul style="list-style-type: none"> <li>Residual impact assessment determines air quality emissions (dust and particulate matter and from incinerator emissions) comply with acceptable criteria and there will be no discernible change resulting from Project activities</li> </ul> | None                                                                                                                                                                                                                                                                                                                                              |
|                 | Increased levels of greenhouse gases resulting from fuel and electricity consumption and from waste management plant operations | Minor                                                                                                                                                                                                                                                                                | None                                                                                                                                                                                                                                                                                                                                              |
| <b>10.6</b>     | <b>Noise</b>                                                                                                                    |                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                   |
|                 | Reduction in local amenity due to increased noise emissions from construction and operation of industrial landfill              | Minor                                                                                                                                                                                                                                                                                | None                                                                                                                                                                                                                                                                                                                                              |
| <b>10.7</b>     | <b>Visual Amenity</b>                                                                                                           |                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                   |
|                 | Change in visual amenity due to landform modification, dust and windblown litter                                                | Negligible                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>Preliminary screening determined that the following potential impacts did not require further assessment in the EIS: <ul style="list-style-type: none"> <li>Changes to the visual character of the area from additional infrastructure as these changes will be in keeping with the</li> </ul> </li> </ul> |

| EIS Section No.                              | Potential Impacts                                                                                 | Residual Impact Assessment                                                                                                                                        | Impacts Discounted during Preliminary Screening and Not Assessed Further in EIS                                                                                                                                                                                                                                                                                                     |
|----------------------------------------------|---------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                              |                                                                                                   |                                                                                                                                                                   | <p>infrastructure and facilities already present</p> <ul style="list-style-type: none"> <li>Visual amenity as a result of land use changes associated with the removal of vegetation or artificial lighting</li> </ul>                                                                                                                                                              |
| <b>10.8</b>                                  | <b><i>Terrestrial Biodiversity</i></b>                                                            |                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                     |
|                                              | Habitat loss and fragmentation                                                                    | <ul style="list-style-type: none"> <li>Negligible for species of non-conservation significance</li> <li>Minor for species of conservation significance</li> </ul> | <ul style="list-style-type: none"> <li>Preliminary screening determined that habitat loss and fragmentation resulting from reduced movement of species (barrier effects) is unlikely to occur given minimal clearing of vegetation for Project activities at the existing IWMF site and the poor habitat quality within the site. Further assessment in EIS not required</li> </ul> |
|                                              | Habitat degradation                                                                               | Negligible to Minor                                                                                                                                               | None                                                                                                                                                                                                                                                                                                                                                                                |
|                                              | Introduction or increase of invasive weeds and pest fauna                                         | Negligible                                                                                                                                                        | None                                                                                                                                                                                                                                                                                                                                                                                |
|                                              | Increase in death and disturbance of animals from hunting and vehicle collisions                  | Negligible                                                                                                                                                        | None                                                                                                                                                                                                                                                                                                                                                                                |
| <b>10.9</b>                                  | <b><i>Aquatic Biodiversity</i></b>                                                                |                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                     |
|                                              | Habitat degradation or modification                                                               | Negligible to Minor                                                                                                                                               | <ul style="list-style-type: none"> <li>Preliminary screening determined that impacts to surface water processes and aquatic biodiversity from surface water abstraction will not occur as surface water will not be abstracted for Project water demands. Further assessment in EIS not required</li> </ul>                                                                         |
|                                              | Sub-lethal or lethal toxicity effects on aquatic biota as a result of surface water contamination | Negligible to Minor                                                                                                                                               | None                                                                                                                                                                                                                                                                                                                                                                                |
|                                              | Introduction of aquatic weeds                                                                     | Negligible                                                                                                                                                        | <ul style="list-style-type: none"> <li>Preliminary screening determined that there is no credible pathway for the introduction of introduced/pest fish species to aquatic habitats as a result of Project activities. Further assessment in EIS not required</li> </ul>                                                                                                             |
| <b>SOCIO-ECONOMICS AND CULTURAL HERITAGE</b> |                                                                                                   |                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>11.1</b>                                  | <b><i>Economy and Employment</i></b>                                                              |                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                     |
|                                              | Increased direct and indirect economic opportunities, workforce training, skills and experience   | Positive                                                                                                                                                          | None                                                                                                                                                                                                                                                                                                                                                                                |

| EIS Section No. | Potential Impacts                                                                                                            | Residual Impact Assessment | Impacts Discounted during Preliminary Screening and Not Assessed Further in EIS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------|------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>11.2</b>     | <b><i>Community Health and Safety</i></b>                                                                                    |                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                 | Increase in accidents and injuries as a result of increased traffic volumes on Napa Napa Road                                | Minor                      | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                 | Reduced amenity and wellbeing as result of air and noise emissions                                                           | Minor                      | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                 | Health risks associated with the transportation and handling of hazardous wastes                                             | Minor                      | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>11.3</b>     | <b><i>Land and Natural Resource Use</i></b>                                                                                  |                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                 | Loss of access to natural resources                                                                                          | Negligible                 | <ul style="list-style-type: none"> <li>• Preliminary screening determined that: <ul style="list-style-type: none"> <li>– The potential for increased noise emissions to contribute to a reduction in hunting success (given the impact on noise on local fauna) is negligible. Further assessment in EIS not required</li> <li>– Contamination of the marine environment and subsequent impacts on marine fisheries and Roku village (apart from impacts resulting from a Major Hazard, see Chapter 12 of EIS) is unlikely as there are no planned Project activities that would result in impacts extending to the marine environment. Further assessment in EIS not required</li> <li>– Project impacts on regulating and maintaining ecosystem services such as maintaining surface water quality, erosion control and regulation of natural hazards are unlikely given the highly localised nature of the activities. Further assessment in EIS not required</li> </ul> </li> </ul> |
| <b>11.4</b>     | <b><i>Traffic and Transport</i></b>                                                                                          |                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                 | Disrupted access to social services (i.e., health, education, economic services) as a result of increased traffic congestion | Minor                      | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>11.5</b>     | <b><i>Law and Order</i></b>                                                                                                  |                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                 | Increased conflict and antisocial behaviour resulting                                                                        | Negligible                 | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

| EIS Section No. | Potential Impacts                                                                | Residual Impact Assessment | Impacts Discounted during Preliminary Screening and Not Assessed Further in EIS                                                                                                                                                                                     |
|-----------------|----------------------------------------------------------------------------------|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | from increased income, distribution of benefits and Project-induced in-migration |                            |                                                                                                                                                                                                                                                                     |
| <b>11.6</b>     | <b><i>Cultural Heritage and Archaeology</i></b>                                  |                            |                                                                                                                                                                                                                                                                     |
|                 | Loss or damage to unknown cultural heritage                                      | Negligible                 | <ul style="list-style-type: none"> <li>Preliminary screening determined that impacts to known cultural heritage are unlikely as there are no known materials or sites within or in the vicinity of the IWMF site. Further assessment in EIS not required</li> </ul> |

An assessment of major hazards and potential unplanned (accidental or abnormal) incidents or events) identified a number of impacts/risks potentially resulting from external (e.g., major seismic activity, uncontrolled fire from natural or non-Project human source, flooding) and Project-related hazards (e.g., unplanned major spills or loss of containment of chemicals, fuel or hazardous materials; landslide resulting from failure of landfill construction). Potential Project risks from major hazards will be managed through the implementation of mitigation measures which will aim to manage the potential for unplanned events and incidents through prevention, response, reporting and corrective action.

Mitigation measures have been applied to potential impacts by implementing the mitigation hierarchy, e.g., avoid impacts where possible, minimise impacts when avoidance is impossible and, when they remain, consider rehabilitation or restoration, and ultimately compensate/offset.

While most residual impacts were assessed as negligible to minor (considering the existing design and mitigation and management measures already in place at the IWMF), Table ES2 provides further details on some key impacts that may still be perceived as significant by the local community and other Project stakeholders, despite existing and proposed mitigation measures and management controls.

**Table ES2 – Summary of Key Interest Areas for Stakeholders**

| Potential Key Impact                         | Assessment of Potential Impact on Key Stakeholders                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Employment and economic opportunities        | <ul style="list-style-type: none"> <li>The Project will result in increased job opportunities for local communities in the area and TWM is committed to hiring locally where the relevant skillsets exist, or training can be provided</li> <li>Logistics companies supporting TWM (in transporting waste to the IWMF) may experience increased business activity</li> <li>Local community members who have small businesses (e.g., trade stores, table markets) in the vicinity of the IWMF (e.g., in Roku) may also experience an increase in income if local community members and other members of the increased workforce who have jobs at the IWMF spend their money locally</li> </ul> |
| Noise impacts disturbing the local community | <ul style="list-style-type: none"> <li>Existing noise levels are influenced by the existing IWMF activities and the surrounding industrial activities and the associated traffic using Napa Napa Road</li> <li>Studies have shown that construction and operation of the expanded IWMF (including noise from traffic using the Napa Napa Road to access the</li> </ul>                                                                                                                                                                                                                                                                                                                        |

| Potential Key Impact                                                                                               | Assessment of Potential Impact on Key Stakeholders                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                    | <p>IWMF) are only likely to cause a small increase in noise levels, mostly affecting industrial neighbours around the IWMF; the predicted noise levels are at or below acceptable noise limits</p> <ul style="list-style-type: none"> <li>Noise levels are unlikely to increase in Roku village during Project construction and operations</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Incineration of hazardous waste and medical waste affecting air quality and thus the health of the local community | <ul style="list-style-type: none"> <li>Most of the existing air emissions in the area around the IWMF is caused by traffic on the Napa Napa Road and the adjacent industrial areas</li> <li>Air quality studies show that there is likely to be a small increase in air emissions, as a result of increased traffic using the Napa Napa Road to access the IWMF, mostly affecting industrial neighbours around the IWMF</li> <li>Air quality levels are unlikely to change at all in Roku village during Project construction activities and operations (e.g., operation of the incineration plant) based on appropriate mitigation of dust emissions, in particular</li> <li>The incinerator at the IWMF is located in the southwest corner of the IWMF site, as far away as possible from Roku village. It was built in 2019 and has pollution control system technology capable of meeting US EPA and European Union emission standards for the thermal destruction of hazardous (and other) wastes</li> <li>The incineration of hazardous waste is not likely to increase the existing levels of emissions such as carbon monoxide, sulphur dioxide and oxides of nitrogen in comparison to incineration of general wastes, and therefore is unlikely to affect the health of the local community</li> </ul> |
| Contamination of water and soils from fuel/oil/chemical spills                                                     | <ul style="list-style-type: none"> <li>Project activities and the normal day-to-day operations of the IWMF are unlikely to have any effect on land-based resources (e.g., firewood), groundwater, surface water or marine resources (e.g., fish stocks) because the IWMF has been designed to international standards and has adopted sustainable waste management practices</li> <li>Natural drainage of water from the IWMF site is primarily to the north and northeast, towards the AES Industrial Park and Fairfax Harbour and away from Roku village and Idler's Bay</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

## 5 Environmental and Social Management System

TWM operates within an integrated quality, health, safety and environment (QHSE) management system and has triple ISO certification (Environment Management ISO 14001 – 2015, Quality Management ISO 9001 – 2015 and Occupational Health and Safety OHSAS 18001 – 2017). The TWM QHSE Management System will underpin the implementation of the Project Construction Environmental and Social Management Plan (CESMP) and, in time, the Project operations EMP.

The Project CESMP comprises a series of detailed management plans, each of which detail the aspect-specific objectives, targets, compliance requirements, management/mitigation measures, performance measures, roles and responsibilities and monitoring and reporting regime. Contractors undertaking work on behalf of TWM will be contractually obligated to comply with the CESMP and other applicable (detailed) management plans.





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