PERDAMAN INDUSTRIES

CHEMICALS & FERTILISERS

Weed Management Plan

Perdaman Urea Project

Burrup Peninsula, Western Australia

CW1055600

Prepared for Proponent:

Perdaman Chemicals and Fertilisers Pty Ltd.

ABN: 31 121 263 741

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Assessment No:

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Summary

Proposal Title	Perdaman Urea Project
Proponent name	Perdaman Chemicals and Fertilisers Pty Ltd.
Assessment Number	2184 (WA) & 2018/8383 (Commonwealth)
Purpose of the WMP	Weed species have been identified within the Project area. The purpose of this WMP plan is to provide a framework which describes how the project will address, manage, monitor and mitigate impacts of weeds to ensure that they are not spread throughout, or introduced to the Project sites, and where relevant, eradicated.
Key environmental factors and objectives	The key environmental factors and objectives relevant to the Project include: ▪ Coastal processes - To maintain the geophysical processes that shape coastal morphology so that the environmental values of the coast are protected. ▪ Marine environmental quality - To maintain the quality of water, sediment and biota so that environmental values are protected. ▪ Marine fauna - To protect marine fauna so that biological diversity and ecological integrity are maintained. ▪ Flora and vegetation - To protect flora and vegetation so that biological diversity and ecological integrity are maintained. ▪ Terrestrial fauna - To protect terrestrial fauna so that biological diversity and ecological integrity are maintained. Ecological integrity is the composition, structure, function and processes of ecosystems, and the natural range of variation of these elements. ▪ Inland waters - To maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected.
Condition clauses	To be determined.
Key provisions in the plan	The WMP's key provisions are included in *Section 5 Onsite Management of Weeds and Section 6 Monitoring and Maintenance.* These sections detail the outcome and management based actions, that will be applied for the life of the Project.

Foreword

This Weed Management Plan (WMP) is a sub-plan of the overarching Project Environmental Management Plan (PEMP) for the Perdaman Urea Project. An overview of the structure of the PEMP and sub-plans is illustrated in Figure 0-1.

This plan shall be reviewed and updated as necessary throughout the construction, operation and decommissioning phases of the project. The review process is detailed in *Section 15 Review and Continual Improvement* of the PEMP.

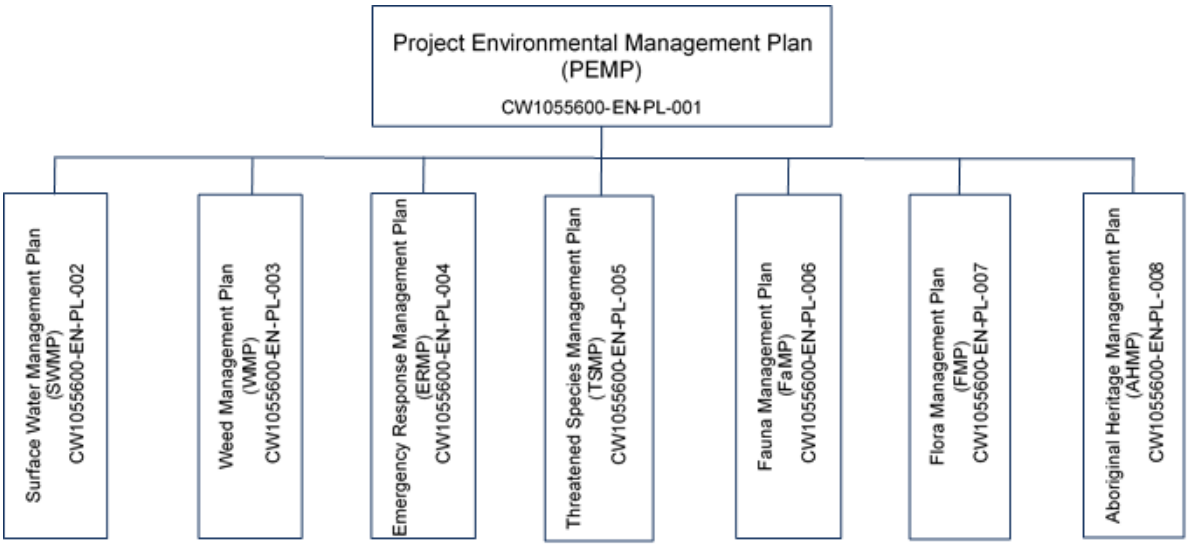

Figure 0-1: Structure of the Project Environmental Management Plan and supporting sub-plans.

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1 Introduction

Perdaman Chemicals and Fertilisers Pty Ltd (Perdaman) proposes to establish a state-of-the-art urea production plant within the Burrup Strategic Industrial Area (BSIA). The site is situated approximately 8 km from Dampier and 20 km north-west of Karratha on the north-west coast of Western Australia.

The key elements of the Project include the design, engineering, construction and operation of the main urea production facility (urea plant), administration, maintenance and storage infrastructure, conveyor and port storage and shiploading facilities.

The main potential weed impacts on the Project include the importation of fill material, movement of vehicles into and within the site, the disturbance of existing weed impacted areas and the movement of soil around the site. The primary strategies that will be implemented to address these impacts include strict quality assurance / quality control (QA/QC) for the movement of soil material and vehicles and the quarantining of impacted material.

This Weed Management Plan (WMP) provides the requirements for managing weeds associated with the Project's construction and operational activities. It includes details on the type and known population of weeds on the Project site, wash-down facilities, movement, stockpiling and management of weed risk materials.

1.1 Purpose

Weed species have been identified within the Project's battery limits. The purpose of this WMP plan is to provide a framework which describes how the project will address, manage, monitor and mitigate impacts of weeds to ensure that they are not spread throughout, or introduced to, the Project sites and where relevant, eradicated. This plan supplements the CW1055600-EN-PL-001 Project Environmental Management Plan (PEMP).

1.2 Scope

This WMP applies to all Project sites throughout the life of the Project. This includes, but is not limited to, Site C, Site F, the causeway, the conveyor corridor, Port side storage, transfer and ship loading areas. Ground disturbing works where the spread of soil containing weed seeds or vegetative material may occur, include, but are not limited to:

- Earthworks such as clearing, grubbing, grading, levelling, drainage, cut and fill;
- Importation of fill material to Project sites from external sources;
- Movement of soil and vegetative material within or between Project sites; and
- Civil works including excavation, trenching and ground stabilisation.

1.3 Responsibility

The responsibility for weed management sits primarily with Perdaman, which will ensure compliance with this plan and the Weed Management Protocol included in the PEMP.

It is the responsibility of all Project personnel to understand their scope of works and how their activities could result in the movement and management of weed contaminated material.

2 Project Overview

Perdaman plans to construct and operate a state of the art urea plant with a production capacity of approximately 2 million tonnes per annum (Mtpa) on the Burrup Peninsula in the North West of Australia (Figure 2-1).

The Project infrastructure including the main production facility (urea plant), administration, maintenance and storage infrastructure, conveyor and port storage and shiploading facilities are situated within the Burrup Strategic Industrial Area (Burrup SIA). The estate's close proximity to gas, port and other key infrastructure makes it an ideal location for the Project.

The Burrup SIA is located in close proximity to the Murujuga National Park which covers an area of 4,913ha on the Burrup Peninsula. The area is considered to host the largest concentration of ancient rock art in the world. As such, the Project will apply effective management strategies that minimise or abate, actual or potential impacts on the environment, heritage and cultural values of the region.

The Project involves piping natural gas from the nearby Woodside operated LNG facility to the project site under a long term commercial off-take agreement. Natural gas is converted to urea and the final granulated product is transported by conveyor to the Dampier Port by closed conveyor along the East West Service route, where new facilities will include an enclosed stockpile shed and ship loading facilities.

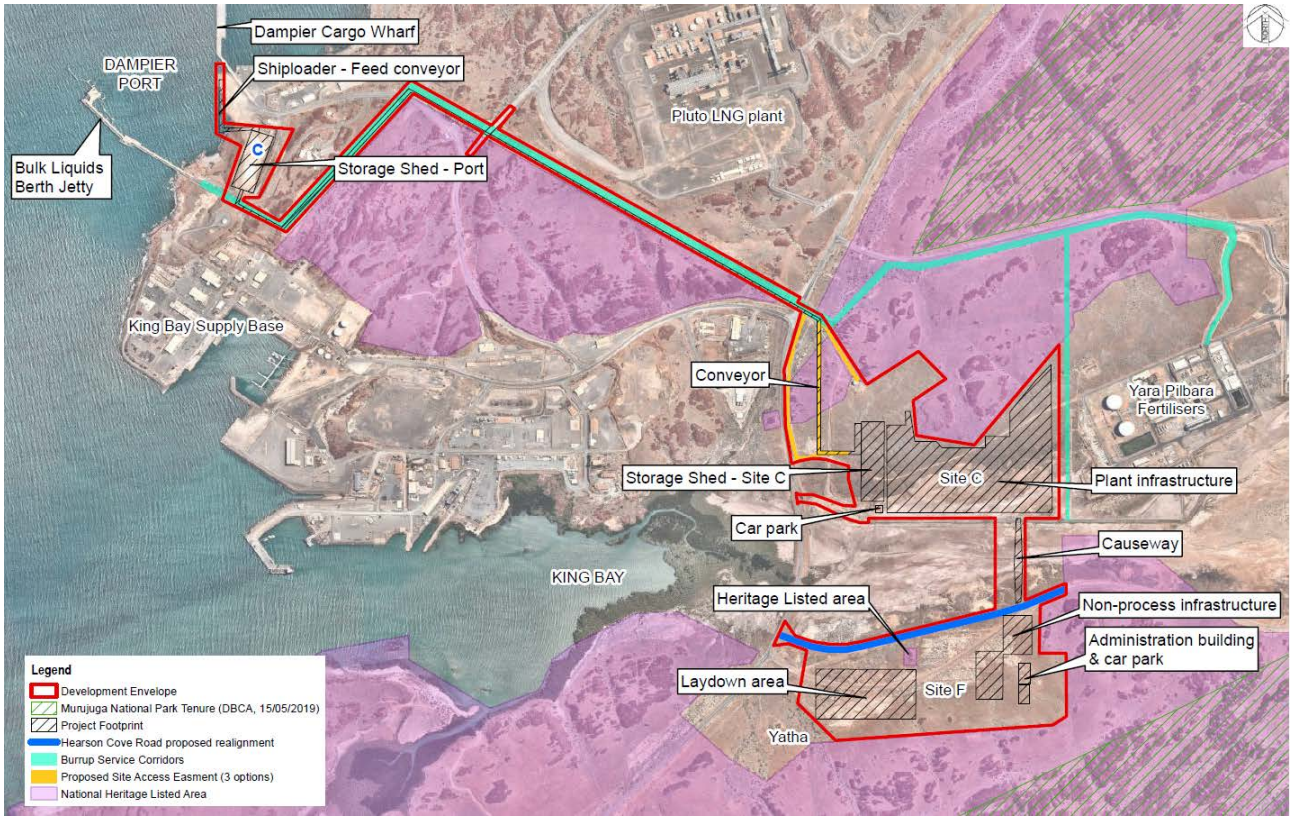

Figure 2-1 Project site layout and adjoining facilities.

Proven Urea production technology underpins each of the key stages of this project. The technologies being applied to the plant are equivalent to the industry best for the specific applications and successfully operate elsewhere in the world. The processing plant can be broadly considered in four sections, or Blocks, namely:

- Gas Block
- Product Block
- Utility Block
- Infrastructure and Logistics

Each of the Process Blocks is made up of a number of process units or physical sections of the plant. The major process sections are described in Figure 2-2.

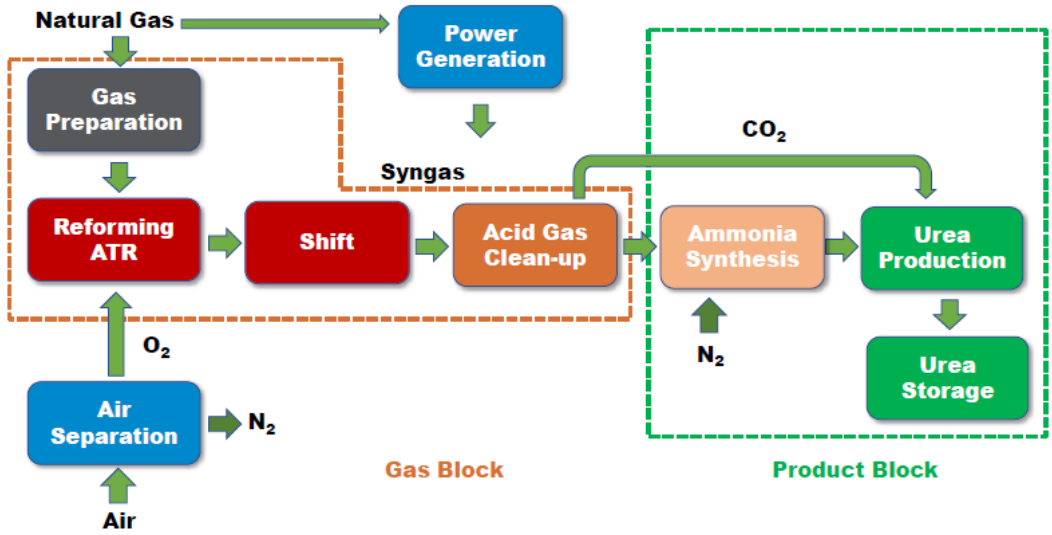

Figure 2-2 Process Block Diagram

3 Legislation, Commitments and Other Legal Obligations

3.1 Regulatory Obligations

Legislation relevant to weed management on the Project includes:

- Environmental Protection Act 1986
- Agriculture and Related Resources Protection Act 1976
- Biosecurity and Agricultural Management Act 2007
- Biodiversity Conservation *Act 2016*

In addition to the above legislation, this management plan will be developed and regularly reviewed to comply with the commitments and legal obligations arising from the Project's environmental approvals process.

3.2 Project Approvals

The Project must comply with all of the conditions included in its granted approvals. Perdaman will be responsible for ensuring all statutory approvals required for activities or infrastructure specific to Project needs are attained in a timely manner.

Table 3-1 below includes indicative licenses and approvals potentially required for the Project, which may apply or contain conditions specifically related to weed management. This list is provided as a guide only, and is subject to change throughout the life of the Project.

A detailed approval register will be maintained by Perdaman to monitor the implementation and progress of conditions, and the achievement, renewal and surrender of all licenses throughout the life of the Project.

Table 3-1 Project statutory approvals and agreements.

Approval / Agreement	Purpose	Agency / Jurisdiction
EP Act 1986 - Part IV Approval - Ministerial Statement	EPA assessment of strategic proposal.	EPA

3.3 Ground Disturbance Permit

A Ground Disturbance Permit (GDP) is a permit issued to Project personnel, including Contractors, enabling Works within defined battery limits which will impact native vegetation, heritage or other environmentally sensitive values.

Activities include, but are not limited to, clearing and grubbing, grading open ground, movement of plant, equipment and vehicles and any other activity which will disturb or damage soil, waterways, habitat and, or vegetation.

A GDP could be issued either through a standalone process, or included in an overall approval to work procedure developed for the Project.

It is the responsibility of the party undertaking the ground disturbing activity, to ensure they submit to Perdaman's Environment and Heritage Manager an application form requesting a GDP at least two weeks prior to requiring access to the area being the subject of the GDP.

4 Weed Species Identified on Project

During the Project's flora and vegetation surveys a number of weed species were identified within the proposed Project work sites. These weeds have been listed below and will be subsequently described in the Project's Flora, Fauna and Weed Species Identification Guide prior to construction activities.

4.1 Declared Plants

Declared plants are weeds which have, or may have, an adverse effect on another organism, humans, the environment, agricultural or related commercial activities, and are listed under the *Biosecurity and Agriculture Management Act 2007*. Declared plants must be managed in accordance with their class which is stipulated in the *Agriculture and Related Resources Protection Act 1976* as Class P1, P2, P3, P4, P5.

Table 4-1 Classes of declared plants listed under the Agriculture and Related Resources Protection Act 1976.

Class	Description
P1	Plant material or their seeds within this category must be prevented from entering into and within the Project area. This includes prohibiting the movement of soil, machinery and vehicles that may contain or carry P1 material.
P2	Plants existing in the Project area within this category must be destroyed, prevented from further propagation and eradicated.
P3	The numbers or distribution of plants in this category will be reduced within the Project area.
P4	Plants of this category must be prevented from spreading beyond the places in which they occur in the area.
P5	This category applies to declared plants on public lands which must be managed as directed by the Minister.

No declared plants have been recorded in the Project area (Animal Plant Mineral, 2018).

4.2 Environmental Weeds

Environmental weeds are plants that establish themselves in natural ecosystems and proceed to modify natural processes, usually adversely, resulting in the decline of the communities they invade (DEC, 1999). Three weed species identified during pre-wet season surveys included:

- *Aerva javanica* (Kapok)
- *Cenchrus ciliaris* (Buffel Grass)
- *Passiflora foetida* (Wild Passionfruit)

The following environmental weeds have been identified on the Burrup Peninsular and may occur within the Project area or could be introduced through the movement of vehicles and plant.

- *Cenchrus setigerus* (Birdwood Grass)
- *Cenchrus enchinatus* (Mossman River Grass)
- *Rumex vesciarius* (Ruby Dock)
- *Stylosanthes hamata* (Caribbean stylo)
- *Bidens bipinnata* (Bipinnate Beggar-Ticks)
- *Euphorbia hirsuta* (Strawberry Weed)
- *Solanum nigrum* (Nightshade)
- *Chloris barbata* (Purple-top chloris)
- *Pennisetum setaceum* (Fountain grass)
- *Malvastrum americanum* (Spiked Malvastrum)

4.3 Field Identification of Weed Populations

Perdaman will prepare a Flora, Fauna and Weed Species Identification Guide to assist Project personnel with field identification. This document will be provided to Project personnel.

4.4 Weed Maps

Weed maps showing existing infected areas within the project sites and adjacent areas will be prepared by Perdaman and issued to Project personnel to assist with monitoring weed risk areas and overall weed management on site.

5 On Site Management of Weeds

Weed management is important to prevent invasive and non-endemic plant species establishing themselves and displacing native species. All heavy vehicles and plant involved in earthworks and civil works are at risk of carrying contaminated soil, weed seeds and regenerative matter onto the Project site. To minimise this risk the following key measures will be implemented on all relevant Project sites to prevent the establishment or further dispersion of weed species.

5.1 Weed Hygiene at Site Entry

At the nominated site entry points identified in section 5.2.3, all heavy vehicles, equipment and mobile plant involved in earthworks and civil works will be inspected prior to entering the Project work sites. As part of the site entry process, Contractors will provide Perdaman, for each vehicle and plant, an independent certificate of verification of weed hygiene. Perdaman's Environmental Representative will then verify through visual inspection that the equipment is free of soil and/or vegetative material. Should the heavy vehicle or plant not be free of soil or vegetative matter, or not be accompanied by an independent certificate of verification of weed hygiene, the Contractor will remove the equipment off site for wash down and, or independent verification at no cost to Perdaman.

Where accepted for use on site, Perdaman's Environmental Representative will issue the Contractor with a completed *Vehicle and Mobile Equipment Weed Inspection Form* for each heavy vehicle or plant. Copies of this form will be kept in the vehicle and in the Contractor's Project Office at all times for audit and inspection purposes.

These requirements do not apply to goods delivery vehicles, light vehicles and trucks delivering clean fill to the site. Where necessary, Perdaman's Environmental Representative may inspect these vehicles prior to entry and refuse entry if they are carrying soil or vegetative material that could introduce weeds to the Project work sites.

It is the responsibility of vehicle operators to ensure all vehicles in their control or possession are free of soil and vegetative material prior to arriving at the site.

5.2 Weed Hygiene in Weed Risk Areas

5.2.1 Demarcating Weed Risk Areas

Weed risk areas, including those containing declared plants and priority environmental weeds, will be identified on weed maps and through the GDP process.

The Contractor will demarcate weed risk areas in the field by installing signage at each designated entry point stating: WEED MANAGEMENT AREA – VEHICLES ENTERING MUST BE CLEAN ON ENTRY. At the designated exit point signage will be installed stating: YOU ARE EXITING A WEED RISK AREA – VEHICLES MUST BE CLEAN PRIOR TO EXIT. Signage will be clearly visible and legible from vehicles.

5.2.2 Working in Weed Risk Areas

Weed risk areas will be treated as avoidance sites wherever possible.

Where it is deemed necessary to work or transit through weed risk areas Project personnel will establish clearly defined entry and exit control points to the area, as outlined in Section 5.2.3.

Prior to exiting a weed risk area Project personnel will ensure that all heavy vehicles, equipment or mobile plant stop at a designated inspection pad. They will conduct an inspection to identify any soil, soil slurry or vegetation materials. All inspections will be documented using the *Vehicle and Mobile Equipment Weed Inspection Form*. Where the inspection identifies that the vehicle or equipment needs to be cleaned the following will apply:

- Dry conditions: Brush down in a designated clean down area using a stiff bristled brush.
- Wet Conditions: Wash down in a designated wash down area using a high pressure spray. Where the inspection identifies that the vehicle is clean then brush down or wash- down will not be required.

5.2.3 Wash Down Facilities

Perdaman will develop a wash down facility for washing down vehicles at all exit points from weed risk areas. The wash down facility will meet, as a minimum, the following requirements:

- The facility will enable a clear separation of vehicle / equipment wheels or tracks from the material that is being washed off.
- Dirty wash down water will be able to drain efficiently to an earthen infiltration sump.
- Only water (no detergent) will be used for wash down.
- The earthen infiltration sump will be accessible using a front-end loader to periodically remove wash down sediment.
- Should oily water be produced, an oil water separator will be installed with waste water discharged to an approved facility.

Any sediment removed from the infiltration sump will be buried in a quarantined area within the weed risk area at a depth of not less than 500mm below the natural surface level.

Systems that recycle or reuse wash water are permitted, provided the water is filtered to prevent seeds and regenerative plant material from being circulated through the system.

Wash down facilities located at the site entry points are not to be used for cleaning vehicles or equipment entering the site, unless coming directly, without deviation, from another Project work site where it was engaged in Project works.

5.3 Movement of Soil, Fill and Other Weed Risk Material

The movement of topsoil, fill, cleared vegetation and other weed risk material poses a risk of introducing weeds to areas with low or no weed species cover or diversity. As such, the following requirements will be implemented to minimise this risk.

5.3.1 On Site Movement and Use of Soil and Vegetation

Prior to the movement or reuse of any soil, borrow, fill or other weed risk material within the Project site, the Perdaman's Environmental Representative will certify that the material is free from weeds by conducting and documenting a weed inspection prior to the first movement of material from the source location. The *Weed Risk Materials Hygiene Form* will be used for this purpose.

Topsoil cleared from within a weed risk area will be collected and stored within the same weed risk area. The topsoil will be stockpiled, signposted and quarantined. A bund will be placed around the toe of the stockpile to prevent runoff of weed contaminated soil.

Vegetation cleared from within a weed risk area will only be stored and reused for rehabilitation within the same weed risk area.

Materials excavated within a weed risk area may be moved within the boundaries of that same weed risk area without requiring a certificate. However, the material cannot be taken to an area with a different weed risk classification.

5.3.2 Imported Soil and Fill Material

Prior to the importation of any fill material to Project sites, Project personnel must obtain written verification from the supplier certifying that the material is weed free and meets the criteria of clean fill as defined in the DWER Landfill Waste Classification and Waste Definitions 1996 (as amended 2018). This verification must be provided to Perdaman's Environmental Representative at least 7 days prior to the first delivery of material from that source / quarry.

5.4 Weed Control

During the project works, weeds germinating in disturbed areas and on stockpiles will be controlled. Depending on the location, coverage and weed species this could include:

- Covering weed contaminated stockpiles with a spray-on cover to minimise germination and spread of seeds.

- Removing small seedlings by hand.
- Using a suitable herbicide to target weeds, ensuring overspray does not impact on endemic species.

Caution should be taken to ensure only weeds and not endemic species are impacted through weed control measures.

6 Monitoring and Maintenance

Perdaman will undertake regular reviews of construction and environmental management systems. Site inspections to assess the effectiveness of weed management will be undertaken and corrective actions implemented.

6.1 Review of Procedures

This WMP will be reviewed periodically throughout the life of the Project (at least every 12 months) to assess effectiveness of its measures and maintain relevance to current works or operations.

Should performance of controls be inadequate then the measures will be updated to achieve performance objectives. Additional review will be required in the event of an environmental incident or change in activities.

6.2 Inspections, Monitoring and Maintenance

Regular inspections and audits are required to assure the environmental protection outcomes outlined in this WMP. Inspection and maintenance activities will follow the Monitoring and Compliance requirements outlined in the PEMP and this WMP.

7 Compliance

Compliance with this Weed Management Plan will be monitored and documented by Project personnel, with evidence of compliance made available to Perdaman's Environmental Representative for inspection and auditing purposes.

8 Reporting

Compliance with this WMP will be reported in a timely manner to the Environment and Heritage Manager after each inspection and audit. Corrective actions will be recorded and monitored as per the non-conformance tracking system to ensure continual improvement and enable the close out of incidents.

Any breaches of this WMP will be reported to the Environment and Heritage Manager (or their representative) as soon as possible.

Annual reports will be prepared by Perdaman for submission to the appropriate Regulators to assure compliance with the WMP and appropriate management of weed species. These will include general conformance, new risks and hazards identified, corrective actions implemented, monitoring results and incident and investigation reports.

9 Definitions

Contractor

The Contractor on the Project is any individual or party engaged directly or indirectly by Perdaman, that is not an employee of Perdaman, to carry out the Project.

Environmental Representative

The Environmental Representative includes Perdaman's Environment and Heritage Manager, the Environmental Coordinator or their delegated representative.

Endemic

Native plant or animal, naturally occurring in a certain area.

May

Indicates that Project personnel are permitted to do something or Perdaman reserves the right to do something according to the text.

Project Personnel

Project Personnel includes all persons working on the Project directly employed by Perdaman, or its Contractors.

Project Work Sites

The Project work sites include Area C, Area F, the causeway linking these two areas, the conveyor corridor to the Port and the Port storage and loading infrastructure. It can also include any other Project relevant location under operational control of Perdaman.

Will

Indicates that a statement is mandatory.

Should

Indicates a recommendation.

Works

Works includes all work which Perdaman and or its Contractors are required to perform to comply with its obligations under their relevant scope of works pertaining to the Project.

10 Abbreviations

Abbreviation	Description
PEMP	Project Environmental Management Plan
EPA	Environmental Protection Authority
GDP	Ground Disturbance Permit
LNG	Liquefied Natural Gas
Mtpa	Million tonnes per annum
QA/QC	Quality Assurance / Quality Control
WMP	Weed Management Plan

11 Reference Documents

Document Number / Reference	Document Title
CW1055600-EN-PL-001	Perdaman Project Destiny Environmental Management Plan
DEC, 1999	Environmental Weed Strategy for Western Australia
Animal Plant Mineral, 2018	Perdaman Urea Project – Pre-wet Season Biological Survey

12 Codes and Standards

Document Number	Document Title

13 Project Delivery Applicability

☒	Proposals	☒	EPC	☒	Construction
☐	Studies	☒	Project Management	☒	Commissioning
☐	Preliminary Engineering	☐	Technical Services	☒	Site Services
☒	FEED	☒	Procurement	☒	Ops and Maintenance
☒	Detailed Design	☒	Construction Management	☐	