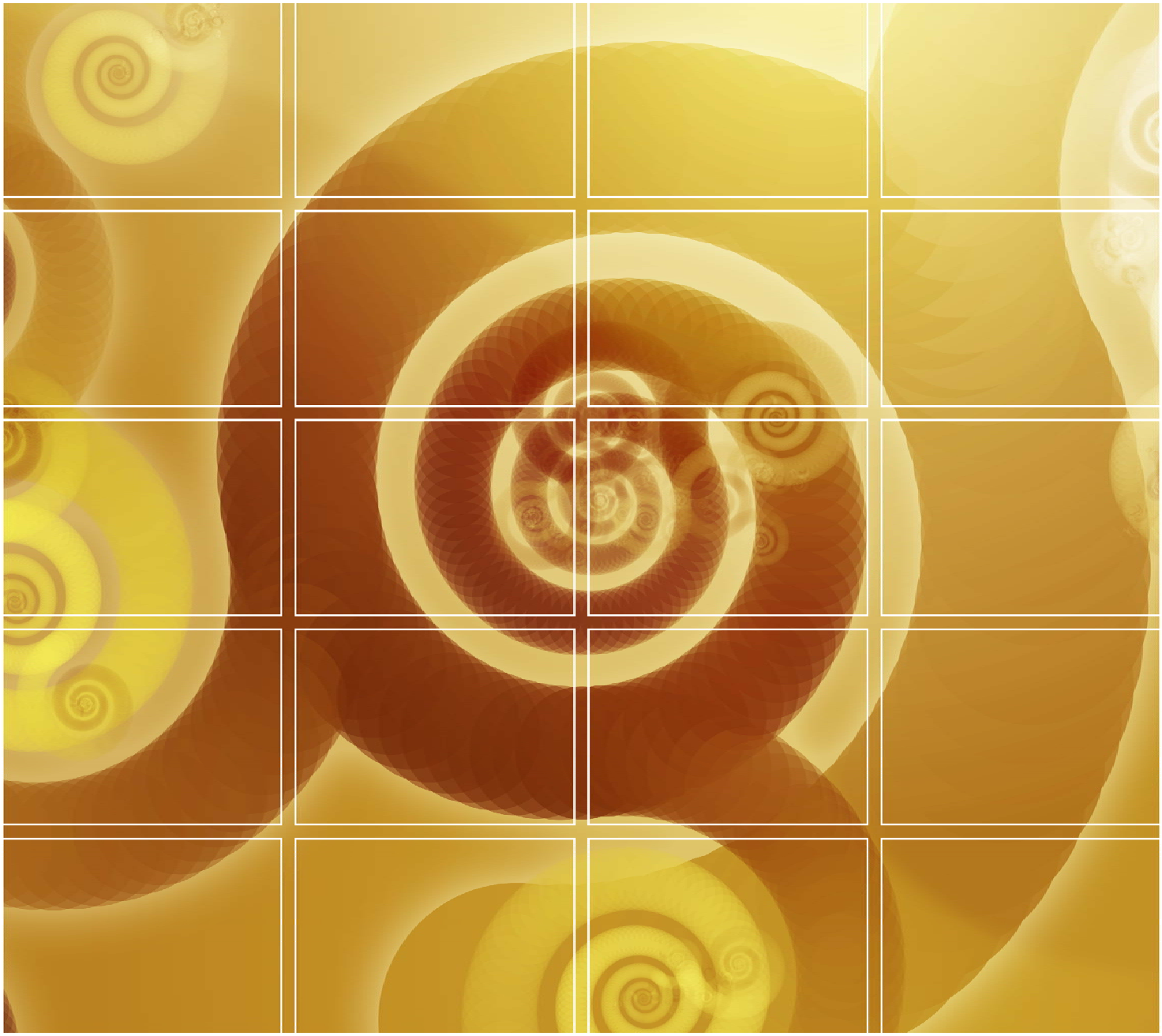
Annex K

Bushfire Hazard Assessment



Crawfords Ammonium Nitrate Distribution and Storage Facility, Sandgate NSW

Bush Fire Hazard Assessment

For Crawfords Freightlines Pty Ltd

July 2012

0143175 BFHA Final

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Crawfords Ammonium Nitrate Distribution and Storage Facility, Sandgate NSW

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Environmental Resources Management Australia Pty Ltd Quality System

Quality-ISO-9001-PMS302

Final REPORT

Crawfords Freightlines Pty Ltd

Crawfords Ammonium Nitrate Distribution and Storage Facility, Sandgate
Bush Fire Hazard Assessment

July 2012

Reference: 0143175_BFHA

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1 INTRODUCTION

1.1 BACKGROUND

Environmental Resources Management Australia Pty Ltd (ERM) has been engaged by Crawfords Freightlines Pty Ltd (Crawfords) to prepare a Bush Fire Hazard Assessment (BFHA) for the Crawfords Ammonium Nitrate Distribution and Storage Facility (the site) at Sandgate, NSW.

1.2 THE SITE AND SURROUNDING AREAS

The site is located at Lot 12 Old Maitland Rd, Sandgate, in the Newcastle Local Government Area (LGA) of NSW (*Figure 1.1*). The area is zoned as IN3 – Heavy Industrial in Newcastle Local Environment Plan 2011 (City of Newcastle 2011).

The site is situated within the southern apex of a small industrial area (see *Figure 1.1*). The site is to the north of Sandgate Cemetery and the Shortland to Sandgate bypass (which is currently under construction), and to the west of Pacific Highway (Maitland Road) and the Hunter River. The Main Northern Railway forms the western boundary of the site with industrial development and St Joseph's Nursing Home to the north (see *Figure 1.1*). Between the site and Maitland Road is a freshwater wetland (known as '2HD Swamp') while to the west of the railway are brackish wetlands associated with Ironbark Creek and beyond the creek is Hexham Swamp (see *Figure 1.1*). To the west, south-west of the site is the former Astra Street landfill. Part of the landfill site is occupied by the Newcastle Golf Practice Centre (see *Figure 1.1*).

The industrial premises on which the site is located is owned by Sierra Sun Pty Ltd and Crawfords currently lease several of the buildings on the site. Crawfords currently occupies the lease over Shed C and Shed D and all outdoor storage areas. Crawfords are negotiating to take over the lease of Shed A and Shed B (previously occupied by Impact Fertilisers) in mid-2012. Scafflink Australia occupies a small fenced off yard area and associated offices in the eastern corner of the site. *Figure 1.2* shows the layout of the site and surrounding areas.

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Figure 1.1 - Site Locality Plan

Crawfords Freightlines Pty Ltd - Ammonium Nitrate Distribution & Storage Facility Bushfire Hazard Assessment

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Figure 1.2 - Site Layout Plan

Crawfords Freightlines Pty Ltd - Ammonium Nitrate Distribution & Storage Facility Bushfire Hazard Assessment

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1.3 DEVELOPMENT DESCRIPTION

Crawfords have been operating the distribution and storage facility since 2009 and the site is currently licensed for the storage and transportation of up to 13,500 tonnes of ammonium nitrate which supplies Hunter Valley mines and other industries. Shed C and Shed D are licenced to store 10,000 tonnes of ammonium nitrate (5,000 tonnes in each shed), and the area to the south of Shed B is licenced to store 3,500 tonnes of ammonium nitrate in shipping containers.

At present the site receives shipments of ammonium nitrate in containers by rail from Sydney (Botany Bay) and in bulk bags brought to the site by truck from the Port of Newcastle. The site receives regular shipments and likewise transport this chemical via truck several times a day mainly to mine sites in the Hunter Valley.

As mentioned, Crawfords are currently in negotiation to take over the lease of Shed A and Shed B. Hence, the proposed storage is ammonium nitrate in Shed A (4,500 tonnes), Shed B (4,500 tonnes), and Shed C (4,500 tonnes). It is proposed to have general storage in Shed D and in the outdoor storage areas.

The proposed development will utilise the existing buildings and sheds on site. There are no plans for any new buildings on site.

1.4 LEGISLATIVE REQUIREMENTS

1.4.1 *Rural Fires Act 1997*

The main objectives of the *Rural Fires Act 1997* (RF Act) are to:

- prevent, mitigate and suppress bush and other fires in NSW;
- co-ordinate bushfire fighting and bushfire prevention throughout the State;
- protect people from injury or death and property from damage as a result of bushfires; and
- protect the environment.

The south eastern and western perimeters of the site are identified as bush fire prone land on the Newcastle LGA Bush Fire Prone Land Map. It should be noted that these areas are mapped as Vegetation Buffer, as opposed to Vegetation Category 1 or 2. Nonetheless, consideration must be given to the overall aims and objectives of *Planning for Bushfire Protection* (NSW Rural Fire Service (RFS) 2006) for the development.

The proposed development does not require subdivision of land and is not defined as a special fire protection purpose (SFPP) development as defined under Section 100B of the RF Act and does not require the issue of a bushfire safety authority under section 100B of the RF Act.

It is also noted that under Section 63 of the RF Act, owners and occupiers of land have a duty to take practicable steps to prevent the occurrence of bush fires on, and to minimise the danger of the spread of bush fires on or from, that land. This bush fire hazard assessment considers the risk of spread of bush fires from the site to the surrounds and measures to minimise the risk of bush fires.

1.4.2 Environmental Planning and Assessment Act 1979

Development consent is being sought under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). In keeping with Section 79BA of the EP&A Act, development consent cannot be granted for developments (other than subdivision or special fire protection purposes), on bush fire prone land unless the consent authority is satisfied that the development conforms to the specifications and requirements of *Planning for Bush Fire Protection* (2006) that are relevant to the development.

This bush fire hazard assessment has been prepared to address the specifications and requirements of *Planning for Bush Fire Protection* (2006) that are relevant to the development.

2 METHODOLOGY

The bush fire hazard assessment methodology addresses the matters listed in Clause 44 of the Rural Fires Regulation 2008 and *Planning for Bushfire Protection* guidelines (NSW RFS 2006). The assessment has been undertaken based on site visits by ERM and review of aerial photographs. A number of reports were also consulted to inform this BFHA, including;

- Health and Safety Essentials (May 2012) *Lot 12 Old Maitland Road, Sandgate (NSW) Ammonium Nitrate Storage Facility Hazard Analysis, Revision 2;*
- ERM (April 2012) *Lot 12 Old Maitland Road, Sandgate NSW Phase 1 Environmental Site Assessment;* and
- Hunter Wetlands Research (HWR) (2006) *Ecological Assessment for Proposed Upgrade of SH23 Shortland to Sandgate.*

The main tasks in determining the extent to which the development provides asset protection zones were:

- identifying the distribution and structure of vegetation communities within the development area and for a distance of 140 metres;
- identifying the predominant vegetation type being the vegetation that presents the greatest hazard;
- assessing the effective slope of the land under the predominant vegetation for a distance of at least 100 metres;
- determining appropriate fire (weather) areas; and
- using the above information to determine asset protection zone (APZs).

According to *Planning for Bushfire Protection* (NSW RFS 2006) slope should be assessed using the following guiding principle:

> *'In assessing the slope, it may be found that there are a variety of slopes covering different distances. Determine the gradient within the hazard (vegetation) which will most significantly influence the fire behaviour of the site having regard to vegetation class found.'*

Specifications for water supplies, access and egress were assessed against the proposed development.

3 BUSH FIRE ENVIRONMENT

3.1 FIRE WEATHER DISTRICT

Planning for Bushfire Protection (NSW RFS 2006) has categorised areas of the state into LGAs for ease of determining a Forest Fire Danger Index (FDI). The site is located within the Newcastle LGA within the Greater Hunter fire area which is attributed an FDI of 100.

3.2 VEGETATION

Ecological investigations undertaken by ERM as part of this development application and the *Ecological Assessment for Proposed Upgrade of SH23 Shortland to Sandgate* (HWR 2006) have been referenced to provide a description of the vegetation across and surrounding the site.

The site itself, being an industrial facility, lacks vegetation. To the west of the site is the Main Northern Railway and beyond that is grassland and regrowth of introduced species on the former Astra Street landfill site. The vegetation to the north-west of the site, along tributaries of Ironbark Creek, is forested wetland dominated by Swamp Oak (*Casuarina glauca)* and Grey Mangrove (*Avicennia marina)*. The vegetation to the north, north-east of the site is freshwater wetland dominated by Cumbungi (*Typha orientalis)*, Common Reed (*Phragmites australis),* Lantana *(Lantana camara)* and Pampas Grass (*Cortaderia selloana)* and the vegetation to the east of the site is freshwater wetland (including areas of open wetland) dominated by Cumbungi and *Panicum repens*.

The Shortland to Sandgate Bypass corridor has been cleared of vegetation and is under development. Sandgate Cemetery does not support any native vegetation and vegetation within the curtilage of the cemetery is managed and is not a hazard.

The predominant vegetation affecting fire behaviour is considered to be Forested Wetland, as classified in the system adopted by Keith (2004) and used in *Planning for Bushfire Protection* (NSW RFS 2006), to the north-west of the site. The wetland to the north, north-east of the site is classified as a Freshwater wetland formation class.

3.3 TOPOGRAPHY

The site is on a broad estuarine plain and is surrounded by standing water bodies in wetlands to the north, east and west. These water bodies are associated with tributaries of Ironbark Creek. The surface of the site itself has been reshaped over time with the use of fill to provide a relatively flat area.

Slopes from the site boundary, vegetation type and landscape features have been assessed and are provided in *Table 3.1*.

Table 3.1 Vegetation Formation, Landscape Features and Slope from the Site Footprint

Vegetation Formation Class	Landscape Feature	Direction from Site Footprint	Effective Slope from the Site Footprint
Freshwater Wetland	Industrial and nursing home.	North	Upslope and flat land (0°)
Freshwater Wetland	Freshwater Wetland/Pacific Hwy	North-east	Upslope and flat land (0°)
cleared and managed vegetation	Sandgate Bypass, Sandgate Cemetery	South-east	Upslope and flat land (0°)
cleared and managed vegetation	Sandgate Bypass, Sandgate Cemetery, Residential area	South	Upslope and flat land (0°)
Cleared Land	Driving Range and former Astra Street Landfill site	South-west	Upslope and flat land (0°)
Forested Wetlands	Tributary of Ironbark Creek	North-west	Upslope and flat land (0°)

Vegetation Formation Class based upon Table A2.1 in Appendix 2 of Planning for Bush Fire Protection (NSW RFS 2006)

4 BUSH FIRE PROTECTION METHODS

4.1 PREAMBLE

There are six key bush fire protection measures:

- provision of clear separation between buildings and bush fire hazards in the form of fuel-reduced Asset Protection Zones (APZs);
- construction standards and design;
- appropriate access standards for residents/employees and emergency services;
- adequate water supply and pressure;
- emergency management; and
- suitable landscaping to limit fire spreading to a building.

For the purposes of this assessment and in keeping with *Planning for Bush Fire Protection* guidelines (NSW RFS 2006), the site has been assessed as 'other development', as the site is not a residential subdivision, residential infill, or Special Fire Protection Purpose (SFPP). The development is a Class 5-8 building (e.g. shops, warehouses, factories, offices, car parks), and as such, the Building Code of Australia (BCA) does not provide for any bush fire specific performance requirements and thus *Australian Standard 3959 Construction of Buildings in Bushfire-prone Areas* does not apply as a set of 'deemed to satisfy' provisions. The general fire safety construction provisions are taken as acceptable solutions, but the aims and objectives of *Planning for Bush Fire Protection* (NSW RFS 2006) apply in relation to other matters such as access, water and services, emergency planning and landscaping/vegetation management. These bush fire protection methods are discussed in the following sections.

4.2 SEPARATION DISTANCE

Planning for Bush Fire Protection (NSW RFS 2006) requires that where a bush fire hazard exists on or adjacent to a development site, an asset protection zone (APZ) or defendable space should be established on the hazard side of the development. The APZ serves as a buffer zone between the development and the hazard and should be located within the boundaries of the development. Whilst no specific minimum APZ requirements are prescribed for developments that do not fit into the classifications of residential/rural residential subdivisions, SFPPs, or residential infill, *Planning for Bush Fire Protection* (NSW RFS 2006) recommends a combination of protection measures with evidence that the intent of each measure is satisfied. Thus, the performance criteria and acceptable solutions for APZs in both Residential

Subdivisions and SFPP are addressed here. However, it should be noted that SFPP developments are classed as those whose occupants are highly vulnerable to the effects of bush fire events because of their susceptibility to the effects of certain factors such as fire, lower mobility and adverse health effects (e.g. schools, hospitals). The site, being a commercial and industrial facility, does not fit into the category of SFPP and therefore the performance criteria for residential/rural residential subdivision are considered adequate for this assessment.

The site has no vegetation and is primarily surrounded by managed land such as other industry, a railway line, a cemetery, and roads. The main bush fire hazard is approximately 100 metres to the north-west of the site associated with the forested wetland.

The predominant vegetation formation, slope and direction towards the hazard relative to the development footprint were used to determine minimum APZs. The results are shown in *Table 4.1*.

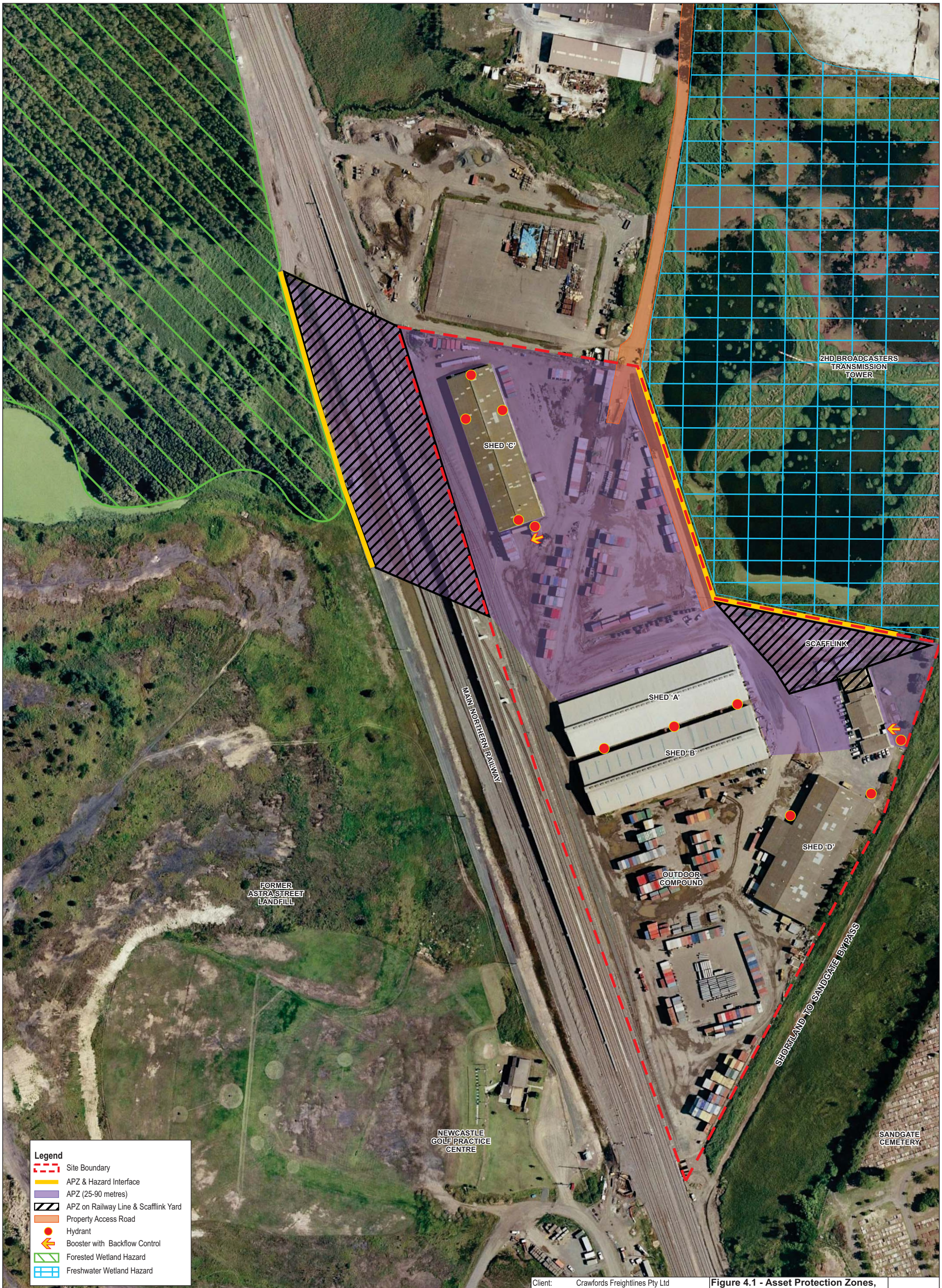
Table 4.1 Minimum APZ in each Direction from the Site Footprint.

Vegetation Formation	Direction from Site	Effective Slope	APZ for residential	APZ for SFPP
Industrial park, Nursing home	North	Upslope and flat land (0°)°	Defendable space required	Defendable space required
Freshwater Wetland, Pacific Hwy	North-east	Upslope and flat land (0°)	10 m	35 m
Sandgate Bypass, Sandgate Cemetery	South-east	Upslope and flat land (0°)	Defendable space required	Defendable space required
Sandgate Bypass, Sandgate Cemetery, Residential area	South	Upslope and flat land (0°)	Defendable space required	Defendable space required
Driving Range, Cleared Land	South-west	Upslope and flat land (0°)	Defendable space required	Defendable space required
Forested Wetlands	North-west	Upslope and flat land (0°)	15 m	50 m

APZ requirements for residential and SFPP based upon Table A2.4 and Table A2.6 of Planning for Bush Fire Protection (2006). These have been provided as a guide for likely separation distance requirements for the site.

APZs and defendable spaces for the site are shown in *Figure 4.1*. The location of Shed C (in the north of the site) affords a separation distance of over 80 m to the north-west to the predominant forested wetland hazard. This is made up of perimeter roads around the boundary of the site (ranging from 15 to 20 m wide) and the Main Northern Railway that extends along the western boundary of the site. As identified in *Table 4.1*, this separation distance meets the minimum requirement of APZs for both Residential/Rural Residential Subdivisions and SFPP.

The location of Shed C, Shed A, Shed B and the Administration Office affords a separation distance of between approximately 25 to 90 m to the freshwater wetland to the north-east of the site. As shown in *Table 4.1,* this separation distance meets the minimum requirement for APZs for Residential/Rural Residential Subdivision but does not meet the minimum requirement for SFPP for all sheds.



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Date:	13/06/2012	Drawing size: A3	
Drawn by:	JD	Reviewed by: EL	

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Figure 4.1 - Asset Protection Zones, Hydrant Locations and Site Access

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4.3 CONSTRUCTION STANDARDS

The buildings to be used for storing ammonium nitrate on the site are large, open, single-story warehouses located at ground level with multiple means of access and egress. These buildings are constructed of non-combustible material:

- Shed A has walls of corrugated metal sheeting (existing timber is to be removed and replaced prior to the storing of ammonium nitrate). The roof is made of corrugated metal sheeting and the floor is concrete (HSE 2006);

- Shed B has walls of corrugated metal sheeting (existing timber is to be removed and replaced prior to the storing of ammonium nitrate). The roof is made of gel-coated polyester sheeting enforced with heavy gauge woven glass matting suitable for use in corrosive environments. The floor is made of concrete (HSE 2006); and

- Shed C & D have walls of corrugated metal sheeting. The roof of both Shed C & D is made of fibrous asbestos sheeting, and the floors made of concrete.

In keeping with *Planning for Bush Fire Protection* guidelines (NSW RFS 2006), the site has been assessed as 'other development', as the site is not a residential subdivision, residential infill, or SFPP. In NSW, the BCA bush fire protection provisions are applied to Class 1, 2, 3 buildings, Class 4 parts of buildings, some Class 10 structures and Class 9 Buildings that are SFPP. The development is a Class 5-8 building, and as such, the BCA does not provide for any bush fire specific performance requirements and thus *Australian Standard 3959 Construction of Buildings in Bushfire-prone Areas* does not apply as a set of 'deemed to satisfy' provisions. The general fire safety construction provisions are taken as acceptable solutions, but the aims and objectives of *Planning for Bush Fire Protection* (NSW RFS 2006) apply in relation to other matters such as access, water and services, emergency planning and landscaping/vegetation management which are discussed in this chapter.

4.4 ACCESS

The site is accessed off Old Maitland Road via an internal property access road that services the industrial area (see *Figure 4.1*).

To meet acceptable solutions for property access roads for Residential and Rural Residential Subdivisions, as identified in *Planning for Bush Fire Protection* (NSW RFS 2006), the internal property access road to the site needs to enable safe access for emergency services and allow crews to work with equipment around the vehicle.

The property access road is a two-wheel drive, two-way, sealed, all-weather road allowing for traffic to pass in opposite directions (approximately seven

metres in width). A minimum vertical clearance of four metres to any overhanging obstructions, including overhanging tree branches is provided and the road surface the capacity to carry fully-loaded fire fighting vehicles (15 tonnes) (the road currently carries trucks with load quantities up to 37.5 tonnes)(HSE 2012).

Table 4.2 demonstrates how the proposed development meets the criteria for property access roads for Residential and Rural Residential Subdivisions as specified in *Planning for Bush Fire Protection (*NSW RFS 2006*).*

Table 4.2 Performance Criteria for Property Access Roads

Performance Criteria	Acceptable solutions	Compliance
Access to properties is provided in recognition of the rick to fire fighters and/or evacuating occupants	• At least one alternative property access road is provided for individual dwellings (or groups of dwellings) that are located more than 200 metres from a public though road.	• Does not comply. Only one access road to site and site is approximately 500 metres from public through road.
The capacity of road surfaces and bridges is sufficient to carry fully loaded fire fighting vehicles and all-weather access is provided.	• Bridges clearly indicate load rating and pavements and bridges are capable of carrying 15 tonnes	• N/A – no bridges or pavements.
	• Roads do not traverse a wetland or other land potentially subject to periodic inundation (other than a flood or storm surge).	• Complies – although road traverses a modified wetland, the site is built up and not subject to periods of inundation.
Road widths and design enable safe access for vehicles	• A minimum carriageway width of four metres for rural-residential areas with a distance greater than 70 metres from the nearest hydrant point to the most external part of a proposed building (or footprint)	• Complies
	• In forest, woodland and heath situations, rural property access roads have passing bays every 200 metres that are 20 metres long by 2 metres wide, making a minimum trafficable width of six metres at the passing bay.	• N/A – not a forest, woodland or heath situation.
	• A minimum vertical clearance of four metres to any overhanging obstructions, including tree branches.	• Complies.
	• Internal roads for rural properties provide a loop road around any dwelling or incorporate a turning circle with a minimum 12 metre outer radius.	• N/A
	• Curves have a minimum inner radius of six metres and are minimal in number to allow for rapid access and egress.	• Complies.
	• The minimum distance between inner and outer curves is six metres.	• Complies

Performance Criteria	Acceptable solutions	Compliance
	• The crossfall is not more than 10 degrees.	• Complies.
	• Maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads.	• Complies. • N/A
	• Access to a development comprising more than three dwellings have formalised access by dedication of a road and not by right of way.	

Source: Section 4.1.3 *Planning for Bush Fire Protection* (NSW RFS 2006)

There is currently only one property access road for access and egress from the site and this does not meet the acceptable solutions for Residential and Rural Residential Subdivisions. However, the intent of separation of access and egress is to avoid congestion at times of fire. In an emergency the movement of staff from the site can be managed through site specific emergency planning to avoid any potential conflict with fire fighting appliances and personnel.

4.5 WATER AND UTILITIES

Ensuring that utility services are adequate to meet the needs of fire fighters (and others assisting in bushfire fighting) is an objective of *Planning for Bush Fire Protection* (NSW RFS 2006). Adequate water supply is critical for any fire fighting purposes. In addition, gas, electricity and fuel storage should be located so as not to contribute to the risk of fire or so that it impedes fire fighting. Acceptable solutions for the supply of services are identified in *Section 4.1.3* of *Planning for Bush Fire Protection* (NSW RFS 2006).

Water supplies must be easily accessible and located at regular intervals. A reticulated water supply is available on site. The site is provided with a series of fire hydrants with 2 booster stations, one located close to the Administration Office and the other outside Shed C. Shed C is also fitted with 4 internal hydrants. A series of three hydrants are located between Shed A and Shed B. However, the location of these hydrants is currently under review as access to them is through the corridor between the two sheds, which may present a hazard to fire fighters in the event of an emergency. These hydrants will be relocated (or decommissioned and new hydrants installed) to allow for water application in the vicinity of Shed A, Shed B and the Outdoor Compound (HSE 2012). Shed D is fitted with two external hydrants. *Figure* 4.1 shows the location of the hydrants and boosters on the site.

Planning for Bush Fire Protection (NSW RFS 2006) prescribes that where practicable it is recommended that electricity transmission lines are underground. There is one main above ground electricity line to the site along the access road. Vegetation is well clear of the overhead line and there are no overhanging obstructions. Spacing of the overhead transmission line poles

range from 45 to 100 m and all other electricity lines on the site are located underground.

If required, gas services and fuel storage need to be installed to minimise risk of ignition of surrounding bushland or the buildings. Acceptable solutions for the supply of electrical and gas services are identified in *Section 4.2.7* of *Planning for Bush Fire Protection* (NSW RFS 2006).

Table 4.3 demonstrates how the development meets the criteria for supply of services for Residential and Rural Residential Subdivisions as specified in *Planning for Bush Fire Protection (*NSW RFS 2006*).*

Table 4.3 Performance Criteria for Supply of Services

Performance Criteria	Acceptable solutions	Compliance
Reticulated water supplies Water supplies are easily accessible and located at regular intervals.	• Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads.	• N/A – no perimeter roads
	• Fire hydrant spacing, sizing and pressures comply with AS 2419.1 – 2005. Where this cannot be met, the RFS will require a test report of the water pressures anticipated by the relevant water supply authority. In such cases, the location, number and sizing of hydrants shall be determined using fire engineering principles.	• It is recommended that a test report of water pressures be undertaken.
	• hydrants are not located within any road carriageway	3 hydrants are located between Sheds A and B which is an access corridor, but not a road carriageway. However, the location of these hydrants is currently under review. It is recommended that these hydrants are relocated.
	• all above ground water and gas service pipes external to the building are metal, including and up to any taps.	Complies
	• the provisions of parking on public roads are met	Complies - No parking bays along access road. Booster and Hydrant to the east of Admin Office are obstructed by, but not within parking bay.

Performance Criteria	Acceptable solutions	Compliance
Electricity services Located to limit risk of ignition and regular inspection of lines is undertaken to ensure they are not fouled by branches.	• where practicable, electricity transmission lines are underground; • where overhead electrical transmission lines are proposed; lines are installed with short pole spacing (30 metres) unless crossing gullies, gorges or riparian area; and no part of a tree is closer to a power line than the distance set out in accordance with the specifications in 'Vegetation Safety Clearances' issued by Energy Australia (NS179, April 2002).	• An overhead line is located along the main access drive, off Old Maitland Rd. Spacing of the poles ranges from 45 to 100 m. All other lines on the site are located underground. There are no trees near the overhead transmission line.
Gas services Located so as to not lead to ignition of the surrounding bushland or the fabric of buildings.	• reticulated or bottled gas installed and maintained in accordance with AS 1596-2002 and local authorities. Metal piping to be used.	• N/A
	• All fixed LPG tanks are kept clear of all flammable materials and located on the non-hazard side of the development.	• N/A
	• if gas cylinders need to be kept close to the building, the release valves are directed away from the building and away from any combustible material, so they do not act as catalysts to combustion.	• N/A
	• polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not used.	• N/A

Source: Section 4.1.3 *Planning for Bush Fire Protection* (NSW Rural Fire Service 2006)

4.6 EMERGENCY PLANNING

The development does not fall under the category of Special Fire Protection Purposes (SFPP) and thus an Emergency and Evacuation Plan consistent with RFS Guidelines *Planning for Bush Fire Protection* and *Preparation of Emergency/Evacuation Plan* is not a requirement for the site.

However, the site is required to have an Emergency Plan that is consistent with Fire and Rescue NSW Guidelines *Emergency Plans at Sites Having Dangerous Goods, Explosives and Major Hazards Facilities* and Safe Work Australia Guidelines *Guide for Major Hazards Facilities Emergency Plans.* This is outside the scope of *Planning for Bush Fire Protection* (NSW RFS 2006) and this BFHA. However, the Site Emergency Plan that currently exists for the site (Crawfords Freightlines Pty Ltd, dated 21st October 2011) embodies a risk assessment and the majority of the procedures prescribed in the RFS Guidelines *Preparation of Emergency/Evacuation Plan.* This will help to minimise the potential impacts of a bushfire.

4.7 LANDSCAPING AND VEGETATION MANAGEMENT

Currently, the site has no vegetation or landscaping. Defendable spaces encompass the site grounds (asphalt and cement stabilised road base). Considering the industrial nature of the site, it is unlikely that any gardens or other landscaping will be established within the defendable spaces.

4.8 PROPERTY MAINTENANCE

In accordance with Appendix 5 of *Planning for Bushfire Protection* (NSW RFS 2006), the following maintenance actions should be implemented in advance of the bush fire season:

- check hydrants are available and in working order;
- ensure hoses and hose reels are not perished and fittings are tight and in good order;
- ensure driveways are in good condition with trees not forming an obstacle during smoky conditions;
- ensure perimeter roads are free of obstacles to provide access for firefighting appliances and personnel;
- check roof lines for dislodged roofing materials;
- ensure screens on windows and doors are in good condition without breaks or holes in fly screen material and frames are well fitted into sills and window frames;
- ensure that where fitted drenching or spray systems are regularly tested before the commencement of the fire season;
- ensure doors are fitted with draught seals and well maintained (if applicable);
- ensure mats are of non-combustible material or in areas of low potential exposure;
- ensure combustible materials are located down slope and well away from the buildings;
- Ammonium Nitrate is an oxidizing agent and will support fires involving combustible material by providing oxygen, but will not burn itself (HSE 2012). It is essential to ensure that combustible materials are located well away from buildings. The Hazard Analysis for the site (HSE 2012) prescribes that stores will be kept clear of vegetation and any other combustible materials for a distance of a least 5m around the external perimeter of the store; and

- Ammonium Nitrate can also explode by heating and confinement or detonation (in certain scenarios) (HSE 2012). The Hazard Analysis for the site (HSE 2012) prescribes that vehicles powered by internal combustion engines (eg. Forklifts) operated within the stores should be diesel-powered, fitted with a battery isolation switch and insulated cover over the battery, and be fitted with a spark arrestor and dry-powder extinguisher. Vehicles should be kept outside the store when not in use, be started outside the store and be garaged at least 10m from the store.

5 CONCLUSION

The development can be managed to provide acceptable bush fire protection measures such that it meets the aims and objectives of *Planning for Bush Fire Protection* (NSW RFS 2006) and such that the development minimises the risk of spread of fire to the nearby wetlands.

The development does not require subdivision of land and is not defined as a special fire protection purpose development (SFPP) as defined under Section 100B of the RF Act and accordingly, does not require the issue of a bush fire safety authority under section 100B of the RF Act.

The development is a Class 5-8 building, and as such, the BCA does not provide for any bush fire specific performance requirements and thus *Australian Standard 3959 Construction of Buildings in Bushfire-prone Areas* does not apply as a set of 'deemed to satisfy' provisions. The general fire safety construction provisions are taken as acceptable solutions, but the aims and objectives of *Planning for Bush Fire Protection* (NSW RFS 2006) apply in relation to other matters such as access, water and services, emergency planning and landscaping/vegetation management.

The main bush fire hazard for the site is expected to be from the north-west and correctly managed APZs should reduce the hazard at the site for fire-fighting personnel. Required APZs, based on the forested wetland hazard to the north-east and the freshwater wetland hazard to the east, range from 10 to 50 metres and in most cases these requirements are met. The location of Shed C, Shed A, Shed B and the Administration Office affords an APZ to the north-east freshwater wetland hazard that meets the requirements for residential/rural residential subdivision but not for SFPP. However the site, being a commercial and industrial facility, does not categorically fit into the SFPP development class and thus the performance criteria for residential/rural residential subdivision is considered adequate for the APZs within the site.

The property access road provides for safe access and egress of fire fighting personnel and site staff. There is currently only one property access road for the site and this does not meet the acceptable solutions for residential and rural residential subdivisions.

Services to the site are located to provide adequate water supply to all structures. A series of three hydrants are located between Shed A and Shed B and the location of these hydrants is currently under review as access to them is through the corridor between the two sheds, which may present a hazard to fire fighters in the event of an emergency. Electricity supply is located so as not to contribute to the risk of fire or so that it impedes fire-fighting. If required, gas services and fuel storage need to be installed to minimise risk of ignition of surrounding bushland or the buildings.

The development does not fall under the category of SFPP and thus an Emergency and Evacuation Plan consistent with RFS Guidelines *Planning for Bush Fire Protection* and *Preparation of Emergency/Evacuation Plan* is not a requirement for the site. However, the site does have an Emergency Plan that is consistent with Fire and Rescue NSW and Safe Work Australia Guidelines that embodies a risk assessment and the majority of the procedures prescribed in the RFS Guidelines *Preparation of Emergency/Evacuation Plan.*

Currently, the site has no vegetation or landscaping and APZs are made up of the site grounds (asphalt and cement stabilised road base). If landscaping is to be established in the APZs in the future, it should consider the aims and principles of landscaping for bush fire protection as outlined in *Planning for Bushfire Protection* (NSW RFS 2006). Property maintenance such as maintaining unobstructed access along the western property boundary and checking that water supplies are available should also be undertaken in accordance with these guidelines.

Implementation of these bush fire protection measures not only afford protection of the existing buildings on site but also provide for adequate separation distance and management of the site to minimise the spread of fire from the site to adjoining areas of natural vegetation, in particular the forested wetlands to the north-west of the site.

REFERENCES

City of Newcastle (2011) *Newcastle Local Environment Plan 2011*, Map 3.

Crawfords Freightlines Pty Ltd (2011) *Site Emergency Plan, Crawfords Freightlines Sandgate Site, Russells Transport Depot, Lot 12 Old Maitland Rd, Sandgate, NSW.* Third Draft dated 21 October 2011.

Environmental Resources Management (ERM) (2012) *Lot 12 Old Maitland Road, Sandgate NSW Phase 1 Environmental Site Assessment.*

Health and Safety Essentials (HSE) (2012) *Lot 12 Old Maitland Road, Sandgate (NSW) Ammonium Nitrate Storage Facility Hazard Analysis, Revision 2.*

HWR Pty Ltd (2006) *Ecological Assessment for Proposed Upgrade of SH23 Shortland to Sandgate.*

NSW Rural Fire Service (2006) *Planning for Bush Fire Protection. A Guide for Councils, Planners, Fire Authorities and Developers.* Prepared by NSW Rural Fire Service in cooperation with the Department of Planning.

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USA
Venezuela
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Environmental Resources Management

PO Box 71
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Thornton NSW 2322

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ERM

Annex L

AHIMS Search Tool

AHIMS Web Services (AWS)
Search Result

Your Ref Number : crawfords

Client Service ID : 72278

ERM
53 Bonville Street
Thornton New South Wales 2322
Attention: Jackson Grant
Email: jackson.grant@erm.com

Date: 12 June 2012

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 12, DP:DP625053 with a Buffer of 50 meters. conducted by Jackson Grant on 12 June 2012

A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	**Aboriginal sites are recorded in or near the above location.**
0	**Aboriginal places have been declared in or near the above location. ***

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (http://www.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Office of Environment and Heritage's Aboriginal Heritage Information Unit upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Office of Environment and Heritage and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date .Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

Annex M

EPBC Search Tool

Australian Government

Department of Sustainability, Environment, Water, Population and Communities

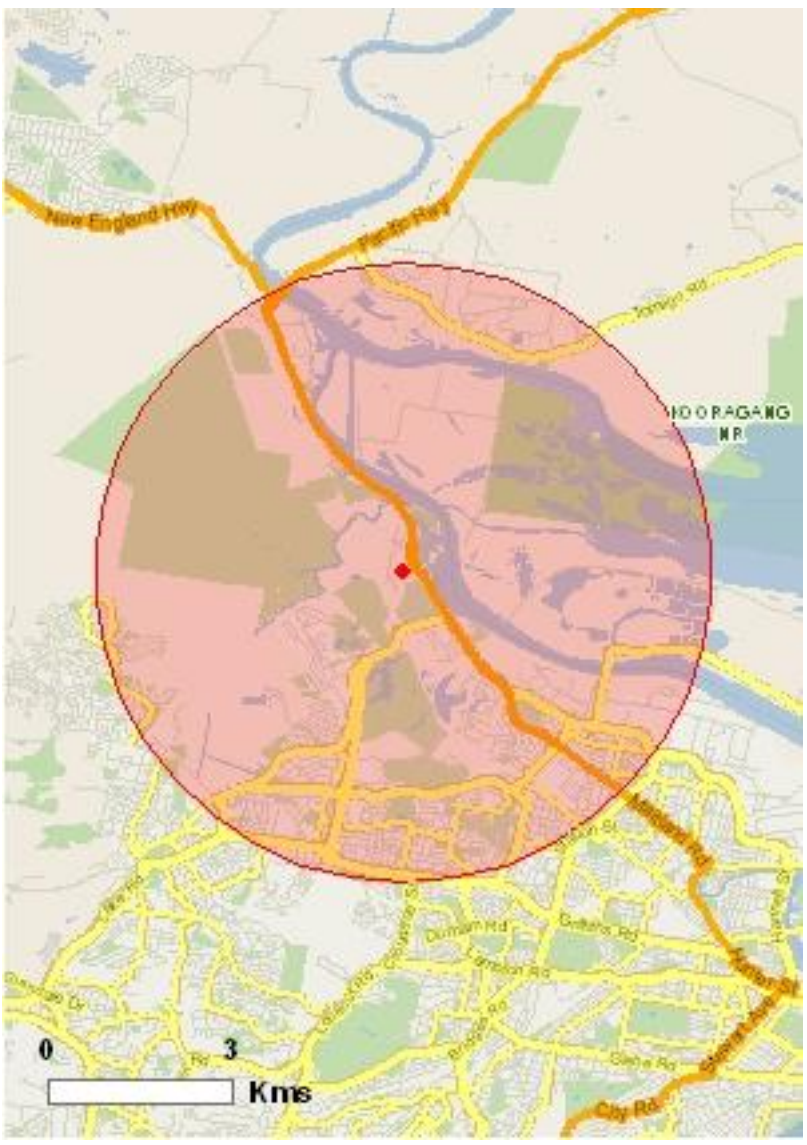
EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information about the EPBC Act including significance guidelines, forms and application process details can be found at http://www.environment.gov.au/epbc/assessmentsapprovals/index.html

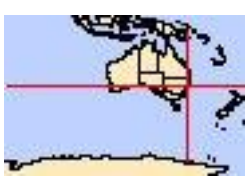
Report created: 04/05/12 15:10:11



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates

Buffer: 5.0Km



Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance - see http://www.environment.gov.au/epbc/assessmentsapprovals/guidelines/index.html

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Areas:	None
Threatened Ecological Communities:	1
Threatened Species:	24
Migratory Species:	40

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place and the heritage values of a place on the Register of the National Estate. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage/index.html

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species. Information on EPBC Act permit requirements and application forms can be found at http://www.environment.gov.

Commonwealth Lands:	7
Commonwealth Heritage Places:	None
Listed Marine Species:	44
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

Place on the RNE:	2
State and Territory Reserves:	1
Regional Forest Agreements:	1
Invasive Species:	15
Nationally Important Wetlands:	3

Details

Matters of National Environmental Significance

Wetlands of International Significance (RAMSAR)	[Resource Information]
Name	Proximity
Hunter estuary wetlands	Within Ramsar site

Threatened Ecological Communities	[Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
White Box-Yellow Box-Blakely's Red Gum Grassy	Critically Endangered	Community may occur

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Woodland and Derived Native Grassland		within area

Threatened Species [Resource Information]

Name	Status	Type of Presence
BIRDS		
Anthochaera phrygia		
Regent Honeyeater [82338]	Endangered	Species or species habitat likely to occur within area
Botaurus poiciloptilus		
Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Dasyornis brachypterus		
Eastern Bristlebird [533]	Endangered	Species or species habitat likely to occur within area
Lathamus discolor		
Swift Parrot [744]	Endangered	Species or species habitat likely to occur within area
Rostratula australis		
Australian Painted Snipe [77037]	Vulnerable	Species or species habitat likely to occur within area
Sternula nereis nereis		
Fairy Tern (Australian) [82950]	Vulnerable	Species or species habitat may occur within area
FISH		
Epinephelus daemelii		
Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area
FROGS		
Litoria aurea		
Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat likely to occur within area
Litoria littlejohni		
Littlejohn's Tree Frog, Heath Frog [64733]	Vulnerable	Species or species habitat may occur within area
MAMMALS		
Chalinolobus dwyeri		
Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat may occur within area
Dasyurus maculatus maculatus (SE mainland population)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat may occur within area
Petrogale penicillata		
Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus		
Long-nosed Potoroo (SE mainland) [66645]	Vulnerable	Species or species habitat may occur within area
Pseudomys novaehollandiae		
New Holland Mouse [96]	Vulnerable	Species or species habitat known to occur within area

Name	Status	Type of Presence
[Pteropus poliocephalus](#)		
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
PLANTS		
[Allocasuarina defungens](#)		
Dwarf Heath Casuarina [21924]	Endangered	Species or species habitat likely to occur within area
[Melaleuca biconvexa](#)		
Biconvex Paperbark [5583]	Vulnerable	Species or species habitat may occur within area
[Pterostylis gibbosa](#)		
Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood [4562]	Endangered	Species or species habitat may occur within area
[Tetratheca juncea](#)		
Black-eyed Susan [21407]	Vulnerable	Species or species habitat likely to occur within area
REPTILES		
[Caretta caretta](#)		
Loggerhead Turtle [1763]	Endangered	Species or species habitat may occur within area
[Chelonia mydas](#)		
Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
[Dermochelys coriacea](#)		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat may occur within area
[Eretmochelys imbricata](#)		
Hawksbill Turtle [1766]	Vulnerable	Species or species habitat may occur within area

Migratory Species	[Resource Information]	
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
[Apus pacificus](#)		
Fork-tailed Swift [678]		Species or species habitat may occur within area
[Ardea alba](#)		
Great Egret, White Egret [59541]		Breeding likely to occur within area
[Ardea ibis](#)		
Cattle Egret [59542]		Breeding likely to occur within area
Migratory Marine Species		
[Caretta caretta](#)		
Loggerhead Turtle [1763]	Endangered	Species or species habitat may occur within area
[Chelonia mydas](#)		
Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
[Dermochelys coriacea](#)		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat may occur within area
[Eretmochelys imbricata](#)		
Hawksbill Turtle [1766]	Vulnerable	Species or species habitat may occur within area
[Lamna nasus](#)		
Porbeagle, Mackerel Shark [83288]		Species or species

Name	Threatened	Type of Presence
		habitat may occur within area
Migratory Terrestrial Species		
[Haliaeetus leucogaster](#) White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
[Hirundapus caudacutus](#) White-throated Needletail [682]		Species or species habitat may occur within area
[Merops ornatus](#) Rainbow Bee-eater [670]		Species or species habitat may occur within area
[Monarcha melanopsis](#) Black-faced Monarch [609]		Species or species habitat known to occur within area
[Myiagra cyanoleuca](#) Satin Flycatcher [612]		Breeding likely to occur within area
[Rhipidura rufifrons](#) Rufous Fantail [592]		Breeding may occur within area
[Xanthomyza phrygia](#) Regent Honeyeater [430]	Endangered*	Species or species habitat likely to occur within area
Migratory Wetlands Species		
[Actitis hypoleucos](#) Common Sandpiper [59309]		Roosting known to occur within area
[Ardea alba](#) Great Egret, White Egret [59541]		Breeding likely to occur within area
[Ardea ibis](#) Cattle Egret [59542]		Breeding likely to occur within area
[Arenaria interpres](#) Ruddy Turnstone [872]		Roosting known to occur within area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]		Roosting known to occur within area
[Calidris canutus](#) Red Knot, Knot [855]		Roosting known to occur within area
[Calidris ferruginea](#) Curlew Sandpiper [856]		Roosting known to occur within area
[Calidris ruficollis](#) Red-necked Stint [860]		Roosting known to occur within area
[Calidris tenuirostris](#) Great Knot [862]		Roosting known to occur within area
[Charadrius bicinctus](#) Double-banded Plover [895]		Roosting known to occur within area
[Charadrius leschenaultii](#) Greater Sand Plover, Large Sand Plover [877]		Roosting known to occur within area
[Charadrius mongolus](#) Lesser Sand Plover, Mongolian Plover [879]		Roosting known to occur within area
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]		Roosting known to occur within area
[Heteroscelus brevipes](#) Grey-tailed Tattler [59311]		Roosting known to occur within area

Name	Threatened	Type of Presence
Limicola falcinellus Broad-billed Sandpiper [842]		Roosting known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Roosting known to occur within area
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area
Numenius madagascariensis Eastern Curlew [847]		Roosting known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]		Roosting known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Vulnerable*	Species or species habitat likely to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area
Xenus cinereus Terek Sandpiper [59300]		Roosting known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land -
Commonwealth Land - Australian Postal Corporation
Commonwealth Land - Australian Telecommunications Commission
Commonwealth Land - Commonwealth Trading Bank of Australia
Commonwealth Land - Defence Housing Authority
Commonwealth Land - Defence Service Homes Corporation
Commonwealth Land - Director of War Service Homes

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Roosting known to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat may occur within area
Ardea alba Great Egret, White Egret [59541]		Breeding likely to occur within area
Ardea ibis Cattle Egret [59542]		Breeding likely to occur within area

Name	Threatened	Type of Presence
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]		Roosting known to occur within area
Calidris ferruginea Curlew Sandpiper [856]		Roosting known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Roosting known to occur within area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area
Calidris tenuirostris Great Knot [862]		Roosting known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]		Roosting known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]		Roosting known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Roosting known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Heteroscelus brevipes Grey-tailed Tattler [59311]		Roosting known to occur within area
Himantopus himantopus Black-winged Stilt [870]		Roosting known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat may occur within area
Lathamus discolor Swift Parrot [744]	Endangered	Species or species habitat likely to occur within area
Limicola falcinellus Broad-billed Sandpiper [842]		Roosting known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Roosting known to occur within area
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within

Name	Threatened	Type of Presence
		area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Breeding likely to occur within area
Numenius madagascariensis Eastern Curlew [847]		Roosting known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Roosting known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]		Roosting known to occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Roosting known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Breeding may occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Vulnerable*	Species or species habitat likely to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area
Xenus cinereus Terek Sandpiper [59300]		Roosting known to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat may occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat may occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat may occur within area

Extra Information

Places on the RNE	[Resource Information]

Note that not all Indigenous sites may be listed.

Name	State	Status

Name	State	Status
Natural		
Hunter Estuary Wetlands	NSW	Registered
Historic		
Tomago House Chapel	NSW	Registered

State and Territory Reserves [Resource Information]

Name	State
Hunter Wetlands	NSW

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included.

Name	State
North East NSW RFA	New South Wales

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit,

Name	Status	Type of Presence
Frogs		
Bufo marinus Cane Toad [1772]		Species or species habitat likely to occur within area
Mammals		
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat may occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within

Name	Status	Type of Presence
		area
Rubus fruticosus aggregate		
Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii		
Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta		
Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area

Nationally Important Wetlands	[Resource Information]
Name	State
Hexham Swamp	NSW
Kooragang Nature Reserve	NSW
Shortland Wetlands Centre	NSW

Coordinates

-32.86436 151.70351

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World Heritage and Register of National Estate properties, Wetlands of International Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Department of Environment, Climate Change and Water, New South Wales

-Department of Sustainability and Environment, Victoria

-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment and Natural Resources, South Australia
-Parks and Wildlife Service NT, NT Dept of Natural Resources, Environment and the Arts
-Environmental and Resource Management, Queensland
-Department of Environment and Conservation, Western Australia
-Department of the Environment, Climate Change, Energy and Water
-Birds Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-SA Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Atherton and Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
-State Forests of NSW
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Annex N

MSDS

CSBP

ABN: 81 008 668 371

MATERIAL SAFETY DATA SHEET

Ammonium Nitrate

Section 1 – Identification of the Material and Supplier

Product Name
Ammonium nitrate

Other names
Detapril, Nitropril, porous prill. Company product code 1720.

Recommended use
Production of explosives and fertiliser manufacture.

Company name
CSBP Limited

Address	State	Postcode
Kwinana Beach Road, KWINANA	Western Australia	6167

Telephone number	Emergency telephone number
(08) 9411 8777 (Australia), +61 8 9411 8777 (Overseas)	1800 093 333 (Australia), +61 8 9411 8444

Section 2 – Hazard Identification

Hazard Classification, including a statement of overall hazardous nature

HAZARDOUS SUBSTANCE.

Ammonium nitrate is not classified as hazardous and is not specified in the NOHSC List of Designated Hazardous Substances [NOHSC:10005(1999)].

DANGEROUS GOODS.

Ammonium nitrate is classified for physicochemical hazards and specified as dangerous in the Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG Code), 6th Edition, (FORS, 1998).

Risk Phrases

Ammonium nitrate is classified as an oxidizing agent.

R22	Harmful if swallowed
R31	Contact with acid liberates toxic gas
R36	Irritating to eyes

Safety Phrases

Ammonium nitrate is classified as dangerous goods.

S14/S15	Keep away from heat, sources of ignition – No smoking, combustible material
S21	When using do not smoke
S29	Do not empty into drains
S41	In case of fire and /or explosion do not breathe fumes
S50	Do not mix with minerals acids, chlorine, oxidizing agents, alkalis, diesel, oils and greases.
S56	Dispose of this material and its container to hazardous o special waste collection point
S57	Use appropriate containment to avoid environmental contamination
S59	Refer to manufacturer for information on recovery/recycling
S60	This material and its container must be disposed of as hazardous waste

Poison Schedule

Ammonium nitrate is not listed as a poison in the Standard for the Uniform Scheduling of Drugs and Poisons.

Section 3 – Composition/Information on Ingredients

Chemical identity of ingredients	Proportion of ingredients	CAS Number for ingredients
Ammonium nitrate	99 % ($^{wt}/_{wt}$)	6484 -52-2
Moisture and additives	Remainder	

Section 4 – First Aid Measures

First Aid

Ammonium nitrate is moderately toxic if large amounts are swallowed. If more than a small quantity has been swallowed seek medical attention. Training on handling ammonium nitrate incidents using this MSDS should be provided before any ammonium nitrate handling or use commences.

First Aid Facilities

First aid procedures, equipment, medication and training for the treatment of injury by ammonium nitrate should be in place BEFORE the use commences.

Equipment in place should be:

- Safety shower and eyewash stations immediately accessible in the workplace;
- Eye-wash bottle;
- Fresh, clean cool drinking water;
- Oxygen;
- "Space" or thermal blankets for treating patients for shock;
- Personal protective equipment for use by first aid personnel.

FIRST AID PROCEDURES FOR DEALING WITH THIS PRODUCT AND EXPOSURE TO IT

1. Personal Protection By First Aid Personnel

First aid personnel providing first aid treatment to a patient injured by ammonium nitrate should observe the following precautions for their own personal protection:

- Avoid contact with ammonium nitrate by wearing protective gloves;
- Wear chemical goggles to prevent ammonium nitrate particles entering eyes;
- Wear P2 type canister respirator if rescue area is contaminated by airborne ammonium nitrate dust.

2. Swallowed

If person is conscious, rinse mouth thoroughly with water immediately and give water or milk to drink. DO NOT induce vomiting. Seek medical assistance if more than a small quantity has been swallowed, when relevant symptoms occur after swallowing.

3. Eyes

Immediately irrigate with copious quantities of water, while holding eyelids open, for at least 15 minutes. Seek medical attention if irritation persists.

4. Skin

Wash affected areas with copious amounts of water. Remove all contaminated clothing and launder before re-use.

5. Inhalation

Remove affected person from exposure to a well ventilated area. Keep warm and at rest. In emergency, if breathing is difficult give oxygen. If the affected person suffers cardiac arrest commence cardio-pulmonary resuscitation immediately. Seek urgent medical attention.

ADVICE TO DOCTOR.

This product contains nitrates, which may be reduced to nitrites by intestinal bacteria. Nitrites may affect the blood (methaemoglobinaemia) and blood vessels (vasodilation and a fall in blood pressure). Effects peak within 30 minutes. Clinical signs of cyanosis appear before other symptoms because of the dark pigmentation of methaemoglobin. Institute cardiac monitoring, especially in patients with coronary, artery or pulmonary disease.

Long Term Complications

No long term complications are known.

Further information about the treatment for exposure to this product can be obtained from the Poisons Information Centre on (08) 13 1126 (Australia only)

Section 5 – Fire Fighting Measures

Product flammability

Ammonium nitrate is not flammable under normal applications and is not considered a fire risk, but will support combustion in an existing fire by liberating oxygen – even if smothered. It is for this reason that fires involving ammonium nitrate cannot be extinguished by the prevention or air ingress (for example, smouldering with steam) because of the *in situ* provision of oxygen from the ammonium nitrate itself. Thermal decomposition may result in toxic gases, such as oxides of nitrogen and ammonia, being produced.

Suitable extinguishing media

Extinguish fires with large amounts of water.

Hazard from combustion products

Fire will cause ammonium nitrate to decompose giving off fumes of nitrogen oxides and ammonia.

Special protective precautions and equipment for fire fighters

Wear full protective clothing, including respiratory protection.

Inert chemical absorbent and substantial amounts of water will be required to clean up a large spill.

Portable showers and eyewash may also be needed.

Prevent run-off into drains and waterways.

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Section 6 – Accidental Release Measures

Emergency procedures

Hazardous conditions may result if an ammonium nitrate spill is managed improperly. Make plans in advance to handle possible emergencies, including obtaining stocks of inert absorbent materials, to avoid both human and environmental exposure. Always wear recommended personal protective equipment and respiratory protection.

Methods and Materials for containment and clean up

For all spills, evacuate unprotected personnel upwind and out of danger. Remove sources of heat and ignition. Restrict access to spill site. Any spillage should be contained and recovered. Do not allow to mix with sawdust and other combustible organic substances.

Small Leaks

If possible contain the area of the spill, sweep into a clean labelled open container and recycle.

Large Spills

If possible contain the area of the spill. A front end loader may be required to scoop up spill into a clean container. Depending on the degree and nature of contamination, dispose of by use as fertilizer on farm or authorised waste facility.

Wash down area and prevent run-off into drains, sewers or waterways. Soak up wet material using absorbent material such as vermiculite or sand and dispose at authorised waste facility.

Section 7 – Handling and Storage

Precautions for safe handling

Regulated dangerous goods as Oxidizing Agent Class 5·1.

Avoid excessive generation of dust. Avoid contamination by combustible (e.g., diesel oil, grease, etc.) and incompatible materials, which may cause fires. Avoid unnecessary exposure to the atmosphere to prevent moisture pick up, which makes the material difficult to handle. When handling ammonium nitrate over long periods use appropriate personal protective equipment, e.g., gloves.

Conditions for safe storage, including any incompatibilities

Store in accordance with Australian Standard AS 4326 *The storage and handling of oxidizing agents.*

Store away from sources of heat or fire, especially in a confined space – the heating may cause an explosion. Keep away from combustible materials and substances mentioned in *Precautions for safe handling* section above. Avoid storage and contamination with chlorine bleaches, pool chlorine and hypochlorites as a reaction, leading to the formation of explosive nitrogen trichloride, may occur. Dry ammonium nitrate has been reported to detonate in fires with dry ammonium sulfate. Ensure that ammonium nitrate fertiliser is not stored near hay, straw, grain, diesel oil, greases, etc., as these are incompatibles and may cause fires. Do not permit smoking and the use of naked lights in the storage area for ammonium nitrate. Restrict stack size for bagged product (according to local regulations). Any building used for the storage of ammonium nitrate should be dry and well ventilated. Where the nature of the bagged product and climatic conditions so require, store under conditions that will avoid breakdown by thermal cycling (wide variation in temperature). The product should not be stored in direct sunlight to avoid physical breakdown due to thermal cycling.

Section 8 – Exposure Controls/Personal Protection

National exposure standards

ES-TWA		ES-STEL		ES-Peak	
No data available	10 mg/m^3	No data available	No data available	No data available	No data available

Biological limit values

No data available.

Engineering controls

Avoid high dust concentration and provide ventilation where necessary.

Personal protective equipment

Personal protective equipment (PPE) should be used where other control measures are not practicable or adequate to control exposure. It should be chosen to prevent routine exposure and to protect workers in the case of accidental contact with ammonium nitrate.

Eye/face protection: Wear chemical safety glasses to prevent eye contact.

Skin protection: Wear PVC gloves when handling the product to prevent contact. Wear long trouser and long sleeves to prevent contact.

Respiratory protection: Use P2 type canister respirator where dust is a problem.

Personal hygiene: Change and wash clothing and PPE, if contaminated, or before storing and/or re-using. Wash hands and face thoroughly after handling and before work breaks, eating, drinking, smoking and using toilet facilities.

Section 9 – Physical and Chemical Properties

Appearance (colour, physical form, shape)
White odourless prills, with strong disagreeable acrid taste.

Odour
Odourless

pH
pH of 10% solution: > 4·6

Vapour pressure
Ammonium nitrate does not exert significant vapour pressure.

Vapour density
Not applicable.

Boiling point/range
Decomposes from 170 °C before boiling.

Freezing/melting point
170 °C.

Solubility
Solubility in water: 118·3 g/100g of water at 0 °C; slightly soluble in alcohol; not soluble in acetone.

Specific gravity or density
Bulk density: 755 ± 25 kg/m^3.

Flash point and method of detecting flash point
Ammonium nitrate does not give off flammable vapours.

Upper and lower flammable (explosive) limits in air
Ammonium nitrate is not flammable.

Ignition temperature
Not applicable.

Viscosity
Not applicable.

Section 10 – Stability and Reactivity

Chemical stability
When stored and handled in accordance with Australian Standard AS 4326 *The storage and handling of oxidizing agents,* ammonium nitrate remains stable.

Conditions to avoid
Store away from sources of heat or fire, especially in a confined space. Keep away from combustible materials and organic substances. Avoid storage and contamination with chlorine bleaches, pool chlorine and hypochlorites. Dry ammonium nitrate has been reported to detonate in fires with dry ammonium sulfate. Ensure that ammonium nitrate fertiliser is not stored near hay, straw, grain, diesel oil, greases. Do not permit smoking and the use of naked lights in the storage area for ammonium nitrate. Restrict stack size for bagged product (according to local regulations). Any building used for the storage of ammonium nitrate should be dry and well ventilated. Where the nature of the bagged product and climatic conditions so require, store under conditions that will avoid breakdown by thermal cycling (wide variation in temperature). The product should not be stored in direct sunlight to avoid physical breakdown due to thermal cycling. Avoid excessive generation of dust. Avoid contamination by combustible (e.g., diesel oil, grease, etc.) and incompatible materials. Avoid unnecessary exposure to the atmosphere to prevent moisture pick up.

Incompatible materials
Ammonium nitrate is incompatible with copper, zinc, or their alloys (i.e., bronze, brass, galvanised metals, etc.), aluminium powder and mild steel.

Hazardous decomposition products

When heated to decomposition (unconfined) ammonium nitrate produces nitrous oxides, white ammonium nitrate fumes and water.

Hazardous reactions

Contamination of ammonium nitrate with chlorine bleaches, pool chlorine and hypochlorites may result in the formation of explosive nitrogen trichloride. Dry ammonium nitrate has been reported to detonate in fires with dry ammonium sulfate. When mixed with strong acid ammonium nitrate produces toxic brown nitrogen dioxide gas. When molten, ammonium nitrate may decompose due to shock or pressure. Ammonium nitrate may react violently with nitrites, chlorates, chlorides and permanganates.

Section 11 – Toxicological Information

HEALTH EFFECTS

When handled in accordance with the guidelines in this material safety data sheet, ammonium nitrate should not present any health effects. If this product is mishandled, symptoms that may arise are:

Acute:

Ammonium nitrate has moderate toxicity if swallowed. It is not classified as hazardous according to criteria of WorkSafe Australia.

Inhalation:

High mist concentration of air-borne material may cause irritation to the nose and upper respiratory tract, symptoms may include coughing and sore throat. Prolonged exposure may be harmful.

Skin:

Prolonged contact may cause some irritation, including redness and itching.

Eye:

May cause irritation, redness and pan following contact due to abrasive nature of material.

Swallowed:

Presents moderate toxicity, unless large amounts are ingested. Large amounts give large to gastro-intestinal irritation, with symptoms such as nausea, vomiting and diarrhoea. Large amounts may also cause dilation of blood vessels by direct smooth muscle relaxation and methaemoglobinaemia (excessive conversion of haemoglobin to methaemoglobin, which is incapable of binding and carrying oxygen – methaemoglobin is formed when iron in the haem molecule is oxidised from the ferrous to the ferric state). Symptoms include dizziness, abdominal pain, vomiting, bloody diarrhoea, weakness, convulsions and collapse. LD_{50} (Oral, rat) = 2,217 mg/kg.

Chronic:

Prolonged or repeated exposure may cause drying of the skin with cracking and irritation that may lead to dermatitis.

Section 12 – Ecological Information

Ecotoxicity

Ammonium nitrate is a plant nutrient and large contamination may kill vegetation and cause poisoning in livestock and poultry.
Ammonium nitrate is of low toxicity to aquatic life and spills may cause algal blooms in static waters.

Persistence and degradability

When released into the soil, ammonium nitrate is not expected to evaporate significantly, but is expected to leach into groundwater. In damp soil the ammonium ion, NH_4^+, is adsorbed by the soil. When released into water, ammonium nitrate is expected to readily biodegrade; the nitrate ion, NO_3^-, is mobile in water. The nitrate ion is the predominant form of plant nutrition. It follows the natural nitrification/denitrification cycle to give nitrogen.

Mobility

Very soluble in water. The NO_3^- ion is mobile. The NH_4^+ ion is adsorbed by the soil.

Environmental fate (exposure)

Low toxicity to aquatic life. TL_m 96 between 10 – 100 ppm.

No effects on growth or feeding activities were observed in largemouth bass and channel catfish exposed to concentration of 400 mg NO_3^-/L.

Acute Toxicity to Fish

48 hr LC_{50} (*Cyprinus carpio*): 1·15 - 1·72 mg un-ionised NH_3/L; 95 – 102 mg total NH_3/L;

96 hr LC_{50} (Chinook Salmon, rainbow trout, bluegill): 420 -1,360 mg NO_3^-/L;

TL_m (Tadpoles): 910 mg NH_3/L.

Chronic Toxicity to Fish

7 day LC_{50} (Fingerling rainbow trout): 1,065 mg/L.

Acute Toxicity to Aquatic Invertebrates

EC_{50} (*Daphnia magna*): 555 mg/L; 124·9 mg total NH_3/L.

Chronic Toxicity to Invertebrates

Up to 7 days NOEC (*Bullia digitalis*): 300 mg/L.

Bioaccumulative potential

Ammonium nitrate does not show any bio-accumulation phenomena.

Section 13 – Disposal Considerations

Disposal methods and containers

Refer to local State Land Waste Management Authority. Depending on degree and nature of contamination, dispose of by use as fertiliser on farm or to authorised waste facility. Empty containers (bulka bags) must be decontaminated by rinsing thoroughly with water. Rinsing water needs to be disposed of carefully. Avoid contaminating waterways.

Special precautions for landfill or incineration

No data available.

Section 14 – Transport Information

UN Number

1942

UN Proper shipping name

Ammonium Nitrate

Class and subsidiary risk

5·1 Oxidizing Agent

Packing group

III

Special precautions for user

Not to be loaded with explosives (Class 1), flammable gases (Class 3), toxic gases (class 2·3), Flammable liquids (Class 3), flammable solids (Class 4·1), spontaneous combustible substances (Class 4·2), dangerous when wet substances (Class 4·3), organic peroxides (Class 5·2), toxic substances, where the toxic substances are fire risk substances (Class 6), radioactive substances (Class 7), corrosives (Class 8), miscellaneous dangerous goods, where the miscellaneous dangerous goods are fire risk substances (Class 9), and fire risk substances other than dangerous goods; however, exemptions apply.

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Section 15 – Regulatory Information

Australian regulatory information

Ammonium nitrate is not classified as hazardous and is not specified in the NOHSC List of Designated Hazardous Substances [NOHSC:10005(1999)].

Ammonium nitrate is not listed as a poison in the Standard for the Uniform Scheduling of Drugs and Poisons.

Additional national and/or international regulatory information

OSHA: Hazardous by definition of Hazard Communication Standard (40 CFR Part 370).

Section 16 – Other Information

Key / legend to abbreviations and acronyms used in the MSDS

NOHSC	National Occupational Health and Safety Commission
SUSDP	Standard for the Uniform Scheduling of Drugs and Poisons
ES-TWA	Exposure Standard – Time weighted average
ES-STEL	Exposure Standard – Short term exposure level
ES-Peak	Exposure Standard – Peak level
FORS	Federal Office of Road and Safety
LC_{50}:	Lethal concentration 50, median lethal concentration
LD_{50}	Lethal dose 50. The single dose of a substance that causes the death of 50% of an animal population from exposure to the substance by any route other than inhalation
$\%(^{wt}/_{wt})$	Percent amount on a weight per weight basis
$\%(^{wt}/_{vol})$	Percent amount on a weight per volume basis
PPM	Parts per million
Zone 1 Class 1	An area in which an explosive gas atmosphere can be expected to occur periodically or occasionally during normal operation. (More than 10 hours per year but less than 1000 hours per year)

Literature references

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Chemwatch www.chemwatch.net

Guidance for the Compilation of Safety Data Sheets for Fertilizer Materials, European Fertilizer Manufacturers Association, online at www.efma.org/Publications/Guidance/Index.asp

Sources for data

No data available.

Important Notes

1. To the best of our knowledge this document complies with the National Code of Practice for the Preparation of Material Safety Data Sheets 2nd Edition [NOHSC:2011 (2003)].
2. This material safety data sheet summarises our best knowledge of the health and safety hazard information of the product and how to safely handle and use the product in the workplace. Each user should read this material safety data sheet and consider the information in the context of how the product will be handled and used in the workplace, including in conjunction with other products.
3. If clarification or further information is needed to ensure that an appropriate risk assessment can be made, the user should contact the Safety and Emergency Services Department, CSBP Limited on (08) 9411 8777 (Australia), +61 8 9411 8777 (Overseas).
4. Our responsibility for products sold, is subject to our terms and conditions, a copy of which is sent to our customers, and is also available on request.
5. CSBP reserves the right to make change to material safety data sheets without notice.

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