# Rail Safety
# Bushfire Management Plan

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# Contents

# 1. Introduction

This Bushfire Management Plan (BMP) is a living document that should be reviewed annually in preparation of the Queensland Bushfire season and identifies at a strategic level, guiding principles to protect the rail corridor, rail operations and the corridor's neighbours against an uncontrolled vegetation (bush or grass) fire. The BMP has been designed to provide guidance and establish principles by which Adani can manage the likelihood and consequence from vegetation fires. This BMP should be used to inform the development of site BMPs and establish principles and practices to be utilised in the reduction and mitigation of and the response to bushfires across the entire rail corridor.

The aim of this BMP is to provide guidance, which, if applied across the Adani project, will minimise the likelihood, consequence and risk of adverse impacts arising from vegetation fires on life, property and the environment.

# 2. Scope

The BMP provides for the effective management of the risk of bushfire to Adani Operations and/or as a consequence of Adani Operations on or directly associated with the rail corridor.

# 3. Objectives

The objectives of this plan are to:

- Develop an increased understanding of the bushfire risk profile and contemporary bushfire risk management across the Adani project and its operations.
- Enable constructive consultation with the community, all relevant fire management authorities and other key stakeholders.
- Take all necessary action to prevent eliminate or mitigate fire ignition sources.
- To eliminate or mitigate the risk of bushfire by proactively managing vegetation along the corridor, reduce the likelihood, the rate of spread and intensity of bushfire, while minimising environmental / ecological impacts.
- Increase Adani resilience to vegetation fires by improving its preparedness, through appropriate planning, mitigation activities and suppression capabilities.
- Effectively contain fires with a potential to cause damage to life, property and the environment, through an appropriate response capability, and through active support of local Queensland Rural Fire Service or Queensland Fire and Rescue Service elements.

# 4. Rail Safety Committee

The Adani Safety Committees (Strategic, Operational and Site) carry responsibility for a range safety, risk, security and emergency management issues including Bushfire Risk Management. In respect of bushfire risk management the Rail Safety Committee shall:

- Establish the context
- Ensure that the interests of stakeholders are understood and considered
- Help ensure that risks are adequately identified
- Bring different areas of expertise together for analysing risks
- Ensure that different view are appropriately considered when defining risk criteria and in evaluating risks
- Secure endorsement and support for a treatment plan
- Develop an appropriate external and internal communication and consultation plan.

# 5. Communication and Consultation Plan

The management of bushfire risk along the Adani Rail Corridor is dependent upon shared responsibility. The development of shared responsibility requires effective engagement with relevant stakeholders and this shall be achieved through an ongoing program of communication and consultation. This ongoing program of communication and consultation is critical to the management of bushfire risk and development of a truly effective Bushfire Management Plan. It is also integral to the requirements of the QLDSPP 01/03 and the Environmental Impact Study (EIS).

All internal and external consultation shall be conducted in accordance with the Communication, Consultation and Involvement Standard (HSS-ST-06).

A preliminary stakeholder scan has been conducted through desktop research and review of existing information. The preliminary list was expanded through ongoing stakeholder identification as part of the consultation program.

Communication materials were developed to help facilitate the two-way flow of information between Adani and stakeholders and to record all feedback. These materials included:

- Stakeholder database
- Project newsletters
- 1800 free call telephone information line
- Reply paid post address
- Project email address
- Community feedback forms
- Project website
- Paid advertising/ public notices

In 2011, consultation meetings and briefings were held with stakeholders and the community with a view to identifying potential social impacts and mitigation measures.

The program of communications and consultation that has been established will form the foundations for a program of ongoing engagement to ensure that issues impacting upon bushfire management can be managed effectively and with a view to shared responsibility.

# 6. Definitions

| Term | Definition |
|---|---|
| **Bushfire** | A bushfire is an uncontrolled fire burning in a forest, scrub of grassland vegetation, also referred to as a wildfire. |
| **Bushfire Threat** | The threat of harm to rail infrastructure and/or rolling stock as a consequence of a bushfire. |
| **Emergency** | An emergency incident is any incident, which has occurred or is likely to occur, which causes injury to any person, damage to property, damage to the environment or significant disruption to normal business operations and which requires urgent or coordinated response. Emergency incidents include disasters. |
| **Fire Break** | Narrow constructed barriers of bare ground intended to stop bushfires. |
| **Fire Suppression** | Activities connected with restricting the spread of a fire following its detection and before making it safe. |
| **Fuel Management** | Modification of fuel levels through prescribed burning or by other means. |
| **Hazard** | Something with the potential to cause harm, including plant, work processes and work environment. |
| **High Risk Activities** | Ay activity which increases the likelihood of a bushfire associated with those operations, including thermit welding, welding, rail grinding and slashing. |
| **Ignition Source** | A source of energy sufficient to initiate combustion. |
| **Initial Attack** | The first fire suppression work on a fire. |
| **Preparation** | Preparation involves taking measures which enable risks to be identified, controls applied, response plans, strategies and measures tailored to risks, and response measures rehearsed and practiced to ensure effectiveness. |
| **Prescribed Burning** | The controlled application of fire under specified environmental conditions to a predetermined area and at the time, intensity, and rate of spread required to attain planned resource management objectives. |

| Term | Definition |
|---|---|
| **Prevention** | Prevention includes the identification of hazards, the assessment of threats to life and property, and ensuring protective measures are in place to reduce potential loss of life and property damage. |
| **Recovery** | The long-term activities beyond the initial crisis period beyond the initial crisis period and emergency response phase of disaster operations. During recovery, focus is on returning all systems in the community to a normal status or to reconstitute these systems to a new condition that is less vulnerable. |
| **Response** | Response involves taking effective measures immediately prior to and immediately following an emergency incident to minimise the effects and to prevent further escalation. For example, the actions directly associated with fighting a fire. |
| **Risk** | The likelihood that harm may occur when exposed to the hazard. |
| **Vegetation Fires** | Refers to all unplanned Bush and Grass fires for the purposes of the BMP, refer to the definition of Bushfire contained in this BMP. |

# 7. References

## 7.1. Legislation

- Fire and Rescue Service Act 1990
- Transport (Rail Safety) Act 2010
- Transport (Rail Safety) Regulation 2010
- Work Health and Safety Act 2011
- Work Health and Safety Regulation 2011
- Vegetation Management Act 1999
- Sustainable Planning Act 2009
- Nature Conservation Act 1992
- Environmental Protection Act 1994

## 7.2. Australian Standards

- AS 3959-2009 Construction of Buildings in Bushfire Prone Areas
- AS 3745-2010 Planning for Emergencies in Facilities
- AS24191-2005 Fire hydrant installations – system design, installation and commissioning
- AS 1851.1:2012 Maintenance of Fire Protection Equipment
- AS 1019-2000 Internal combustion engines – spark emission control devices
- AS 1940-2004 for the storage & handling of flammable & combustible liquids

## 7.3. Other References

- State Planning Policy 1/03 – Mitigating the Adverse Impacts of Flood, Bushfire and Landslide
- Understanding Bushfire: Trends in Deliberate Vegetation Fires in Australia
- Northern Australia Seasonal Bushfire Assessment 2012 Bushfire CRC 2012
- Southern Australia Seasonal Bushfire Outlook 2012-13 Bushfire CRC 2012
- NSWRFS – Standard Asset Protection Zones
- CSIRO – Fire Danger and Spread Calculator - www.csiro.au/en/Outcomes/Safeguarding-Australia/Fire-Danger-And-Spread-Calculator.aspx
- North East Queensland Savanna - www.savanna.org.au/nq/index.html
- North Australian Fire Information - firenorth.org.au/nafi2/
- Fire Weather - www.bom.gov.au/weather-services/bushfire/about-bushfire-weather.shtml
- DERM – Erosion Control on Fences and Fire Breaks
- DERM – Vegetation Clearing Guide
- FESA WA – Firebreak Location, Construction and Maintenance Guideline
- CSIRO – Bushfire Risk Planning Project

# 8. Geographic Location

## 8.1. Proposed Project

Adani is proposing to develop a thermal coal mine in the north Galilee Basin approximately 160 kilometres north-west of the town of Clermont, Central Queensland. All coal will be railed via a privately owned rail line connecting to the existing QR National rail infrastructure, and shipped through coal terminal facilities at the Port of Abbot Point and the Port of Hay Point (Dudgeon Point expansion). The project comprises of two major components; mine and rail network.

### 8.1.1. Rail Network

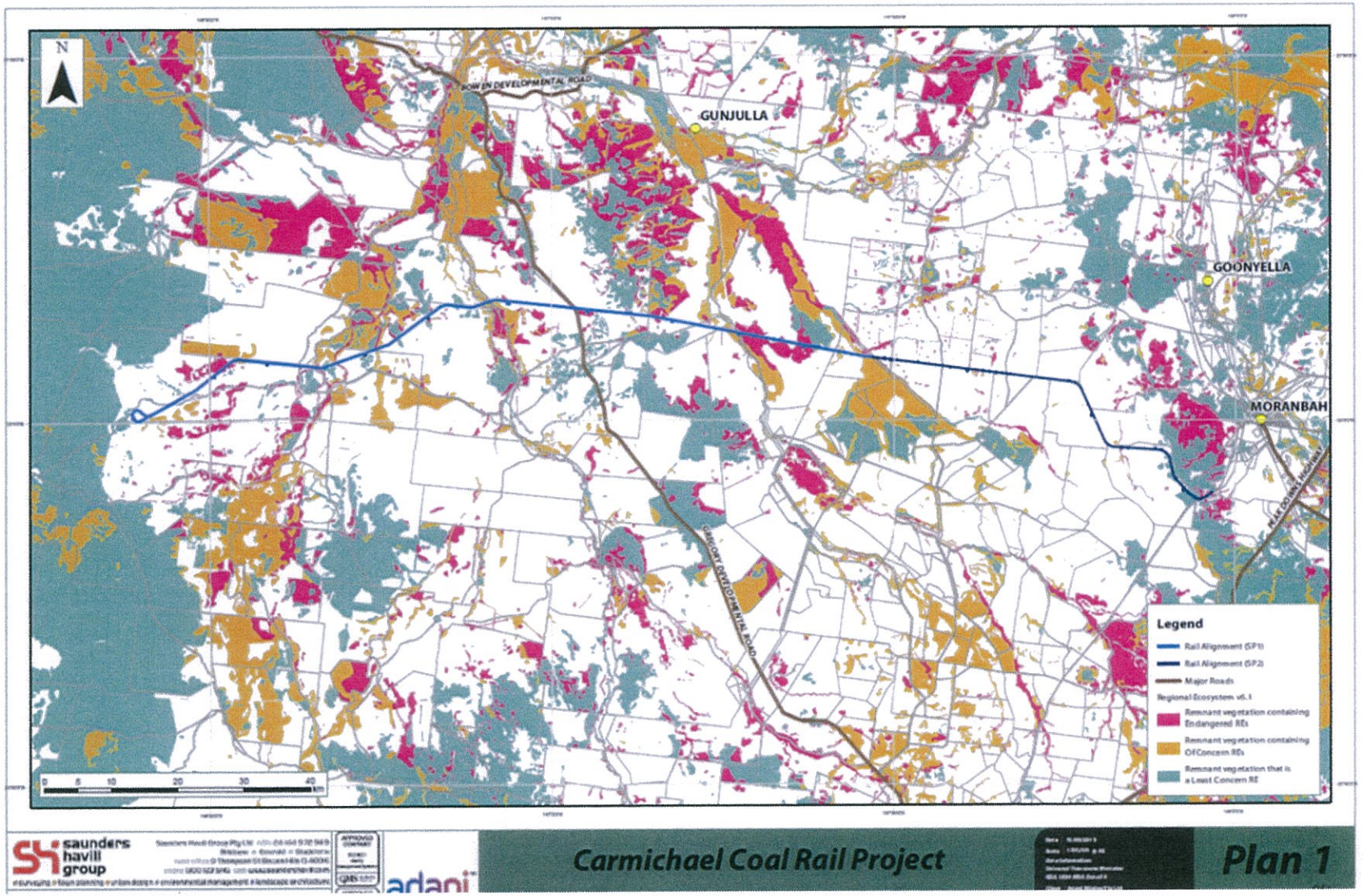
The rail network is a greenfield rail line connecting the Mine to the existing Goonyella and Newlands rail systems to provide for the export of coal via the Port of Hay Point (Dudgeon Point expansion) and the Port of Abbot Point, respectively; including:

- Rail (west): a 120 km dual gauge portion from the Mine site running west to east to Diamond Creek
- Rail (east): a 69 km narrow gauge portion running east from Diamond Creek connecting to the Goonyella rail system south of Moranbah

### 8.1.2. Rail Facilities

The rail network will incorporate two major facilities (yards) which will adjoin the rail network and have direct access to the rail network. These will consist of a rail construction yard approximately 13 km east of the mine site (95.90 KM to 99.30 KM) and locomotive maintenance yard approximately 70 km east of the mine site (165.25 KM).

### 8.1.3. Rail Corridor Map



# 9. Bushfire Risk Context

## 9.1. General Bushfire Risk

Adani will operate over an area of approximately 195 kilometres with a widely diverse range of vegetation types, topography and land use. Adani does not operate in isolation in these areas with numerous other entities and stakeholders who share a responsibility to manage the bushfire risk and hazards, including government agencies, rural producers, private forestry companies and rural residential landowners.

### 9.1.1. Climate

The climate in the project area is warm year round, with two main seasons; a dry winter, during which temperatures are commonly slightly lower than the rest of the year, and a hot humid summer. Daytime temperatures increase from the coast towards the mine, whilst rainfall drops from the coast towards the mine.

The climactic conditions of a place over an extended period of time have a direct impact on the behaviour and severity of a bushfire; typically hotter temperatures, lower humidity, stronger wind and an unstable atmosphere create more severe fire behaviour. These are conditions that could be experienced along the corridor.

### 9.1.2. Bushfire Season

The bush fire season generally occurs during winter and spring (August to November), with the majority of fires occurring in September[1]. However in recent years the fire season has continued well into summer due to abnormally low summer rainfalls. Furthermore, due to fuel load variability's the bushfire season may commence as early as May. Prevailing weather conditions associated with the bush fire season in the project area typically:

- West to north-west winds with gusts of 15-35kph
- Very high daytime temperatures (40°)
- Low relative humidity (< 15%).
- Frequent dry lightning storms

See Appendix 1 for Fire Season Map.

[1] AIC (2011) Queensland Understanding bushfire: trends in deliberate vegetation fires in Australia. Available at http://www.aic.gov.au/documents/4/8/4/%7B4848DAE8-BB71-420E-9D5A-12B851BFB53E%7Dtbp027_04_qld.pdf. accessed on 11-08-2011

### 9.1.3. Bushfire History

Queensland is typically a state that sustains greater losses from cyclones and floods than it does from bushfires. However, it has experienced several devastating bushfires that have resulted in loss of life and property, as well as very large areas that were burned without extensive loss of life or property. During 2002–03, approximately 8 million hectares of land was burnt through a combination of controlled and uncontrolled fires in Queensland[2].

Across Queensland, the Queensland Fire and Rescue Service (QFRS) attend in excess of 13,000 vegetation fires annually, of these 13,000; very few could be considered major fires. It is indeterminable how many of this number occur within the areas covered by this BMP, as there is little if any formally documented fire history for the project area.

### 9.1.4. Bushfire Fire Risk Map

Bushfire risk maps were developed for the project area by QRFS in 2008. Whilst there has been a lessening in bushfire risk since the development of the maps due to extended periods of rainfall, they still provide some general context the bushfire risk. The 2008 maps indicate a predominately low fire risk (yellow) across the project area, with pockets of medium fire risk (orange) due principally to changes in topography at those locations (steeper sloping ground).

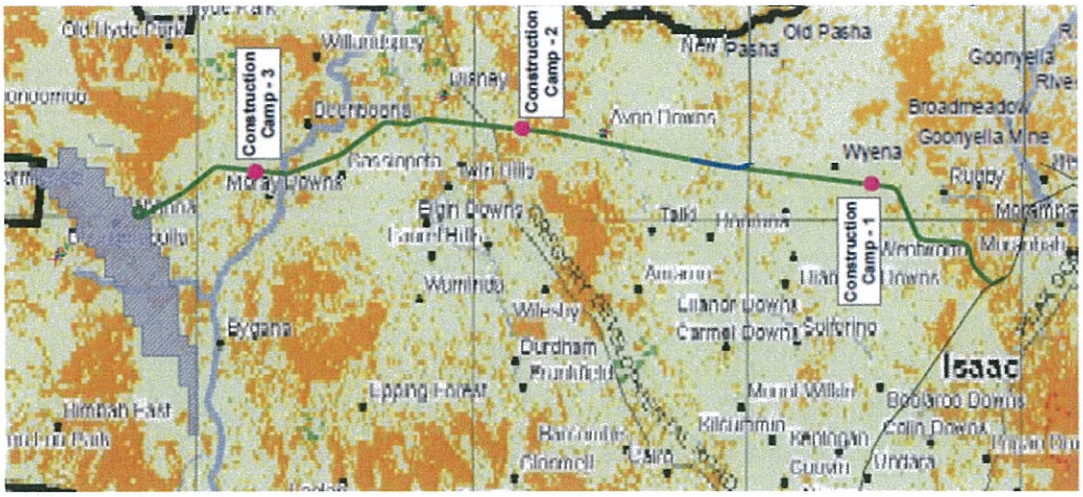



**Figure 9.1 Isaac Regional Council Fire Risk Map[3]**

### 9.1.5. Current Bushfire Risk

Discussions with relevant stakeholders would indicate that due to the above average rainfall for an extended period that the overall bushfire risk in the area is low, however this may change if a period of drought ensues which would cause the vegetation which has grown during the wet period to eventually dry and increase fuel loads. This process would most likely take a number of years to occur once the wet period ends.

[2] AIC (2011) Ibid.
[3] Queensland Rural Fire Service
www.ruralfire.qld.gov.au/Bushfire%20Planning/Building_in_Bushfire_Prone_Areas/Risk_Isaac.pdf

### 9.1.6. Known Fire Paths

Across the geographic area covered by the rail corridor there are no clearly discernible, identifiable or regular Fire Paths. However, local knowledge, which might highlight known fire paths, shall be included in the future development of this plan and site specific BMPs.

### 9.1.7. Fuel Loads

The quantity of fuel is another critical factor in determining the behaviour and severity of a bushfire; this is usually calculated by measuring the fine fuels (those less than 6mm in diameter) in tonnes per hectare per $1m^2$ square. Typically across the area of this risk assessment the fuel loads for grasslands are around 3 - 5 tonnes per hectare and the forest fuel loadings typically <15 tonnes per hectare. Further information on current fuel loads shall be gathered from QRFS/RFB and DERM in revision of the BPM and development of the HRP and site specific BMP's.

### 9.1.8. Topography

Fires can burn substantially faster uphill than they do downhill; the steeper the incline the faster the fire will burn. The project area is largely characterised as flat to low gradient, with some areas of moderate gradient. A further analysis of topography shall be conducted for individual sites and facilities to determine the fire risk rating at those locations prior to support design considerations.

### 9.1.9. Vegetation Types

The type of vegetation also has a direct bearing on the behaviour and severity of any bushfire. Grassland vegetation is typically 100% cured (dead) during the fire season making it more susceptible to any ignition sources. Bush land area might hold their fuel moisture content well into the fire season and may not present a significant risk until the year following substantial rainfall (refer Appendix D). Grassfires are typically fast moving, hot fires with flame heights not exceeding 2 metres. Bush fires burn hotter and slower producing much higher flame heights and burning embers that can start fires well in advance of the main fire. This is called spotting.

Analysis of the vegetation adjacent to the corridor indicates that the majority of the corridor passes through vegetation with a low foliage protective cover, with some pockets of low to medium protective cover and few confined isolated pockets of medium protective cover.

### 9.1.10. Fire Danger Ratings

Bushfire danger is generally calculated using a variety of data (as outlined below). The Fire Danger Index (FDI) ranges from low to catastrophic (refer appendix C) and is often different between vegetation types (bush and grassland areas). QFRS calculate and produce maps (http://www.ruralfire.qld.gov.au/FDRG.html) of the Fire Danger Index (FDI) regularly during the fire season / danger period (typically September through to December).

Refer Appendix E - Forest Fire Danger ratings 10 March 2013
Refer Appendix F - Grassland Fire Danger ratings 10 March 2013

#### 9.1.11. Containment Potential

With the work being carried out on the corridor and any future right of way, opportunities exist to develop containment lines whereby an uncontrolled bushfire might be restricted. When developing the site specific BMP these containment lines shall be designated and addressed during the risk mitigation process.

# 10. Strategic Bushfire Risk Assessment

## 10.1. Bushfire Risk Assessment Process

Adani has employed the services of an expert in bushfire management who has conducted a strategic assessment of the bushfire risk. The strategic bushfire risk assessment was conducted as a desktop assessment. The risk assessment has been completed utilising available data, information gained from previous bushfire risk assessments and consultations with the QFRS/RFB, DERM, Local Government, Adani personnel and other interested parties.

The Australia/New Zealand and International Standard AS/NZS ISO 31000:2009 Risk Management- Principles and Guidelines and the Adani Hazard and Risk Management Standard (HSS-ST-05) are the basis for the risk management process.

It should be noted at the time of developing this BMP the Bushfire and Grassland Fire Danger index and associated risks are considered Low.

### 10.1.1. Sources of Ignition

The strategic risk assessment has identified the following possible sources of ignition as posing a risk to bushfire on or about Adani operations:

- High Risk Activities
- Locomotive exhaust
- Hot wheel bearings and skidded wheels (Rollingstock)
- Hot Coal
- Malfunction of fixed electrical infrastructure
- Portable Machinery (internal combustion engines)
- Combustion of flammable materials
- Discarded cigarettes
- Lightning
- Deliberate acts

### 10.1.2. Risk Scenarios

During the process of identifying the risk of bushfire to Adani it was determined to identify the scenarios in which a bushfire could impact on Adani, the corridor and or its neighbours. The risk scenarios are as follows:

- Bushfire from neighbouring site impacting Adani Facilities
- Bushfire from neighbouring site impacting Adani Network
- Fire from Adani Network impacting neighbouring site
- Fire from Adani Facility impacting neighbouring site

### 10.1.3. Likelihood

An assessment was undertaken against each of the risk scenarios to determine the likelihood of an uncontrolled bushfire affecting Adani operations or being caused by Adani operations. The assessment of likelihood considered:

- History of events
- Local knowledge and experience
- Incident investigations
- Ignition causes and patterns
- Containment potential
- Known fire paths
- Climate and weather conditions
- Access and egress

### 10.1.4. Impacts

The following impacts were considered as the most likely to arise from the identified risk scenarios:

| Category | Impacts |
|---|---|
| **People** | • Adani staff and contractors<br>• Rural landowners<br>• Rural residential areas including interface areas<br>• Travellers |
| **Property** | • Agricultural/grazing land<br>• Commercial/industrial land<br>• Public infrastructure<br>• Commercial forests<br>• Adani Camp infrastructure<br>• Adani Construction equipment<br>• Adani Support infrastructure<br>• Adani Primary infrastructure |

| Category | Impacts |
|---|---|
| **Environment** | • Threatened species, populations and ecological communities<br>• Locally important species and ecological communities, such as species and ecological communities especially sensitive to fire<br>• Indigenous significance<br>• Non-indigenous heritage<br>• Other cultural assets |
| **Community & Reputation** | • Adani reputation<br>• Contractors reputation<br>• Industry reputation |

# 11. Bushfire Risk

The determination of bushfire risk is a complex task which requires an understanding of the cumulative effect of sources of ignition, the bushfire hazard and the likelihood and consequences. The following risk scores have been generated in consideration of the cumulative risk and are based upon the current fire risk rating for the project area. Whilst the risk assessment enables a strategic understanding of risk and development of suitable controls to eliminate or mitigate that risk, this plan will require annual review and supplementation with site specific risk assessments.

## 11.1.Overall Bushfire Risk Rating

The overall bushfire risk for the project area has been determined to be moderate.

## 11.2. Risk Controls

Bushfire risk controls are specific to the particular risk, and are prioritised in the order of reduction, mitigation, and suppression activities. All risk controls shall be reviewed annually in accordance with the Adani Hazard and Risk Management Standard (HSS-ST-05). Risk treatment shall seek to:

- Eliminate all possible ignition sources
- Eliminate or restrict available fuel sources
- Enable a prompt and effective suppression response to an outbreak
- Enable situational awareness of current circumstances (fire risk)
- Encourage partnerships with adjoining landowners
- Enable safer work practices aligned to Fire Danger Ratings

## 11.3. Risk and Control Table

The following table outlines the activity and risk control options to be applied by Adani:

| Activity | Unmanaged | Controls | Residual |
|---|---|---|---|
| **High Risk Operations** | H | • Fire Rating Display Boards at site entry<br>• Issue of Permit to Work (High Risk Ops)<br>• Fixed Fire/Spark Suppression<br>• Portable Fire Suppression Equipment<br>• Assess Fire Conditions<br>• Operational Risk Assessment<br>• Operational Fire Management Plan<br>• Notification of QFRS/QRFS<br>• Emergency Response Team<br>• Fire Guards<br>• Pre-Start Briefing<br>• Bushfire Procedure (AD-RSM-PRO-022.1)<br>• Vigilance | L |

| Activity | Unmanaged | Controls | Residual |
|---|---|---|---|
| **Locomotive Exhaust** | M | • Safety in design (Spark Suppression)<br>• Regular inspection and maintenance<br>• Supportive defect reporting culture<br>• Locomotive operating practices | L |
| **Hot Wheels (Rollingstock)** | M | • Risk based inspection and maintenance<br>• Defect reporting procedure and culture<br>• Hot wheel bearing detectors<br>• Roll-by examinations<br>• Bearing acoustic monitoring | L |
| **Hot Coal** | M | • Loading procedures<br>• Temperature detection<br>• Visual inspection | L |
| **Malfunction of fixed electrical infrastructure** | M | • Safety in design (Insulation)<br>• Safety in design (Cut-Out Switches)<br>• Regular inspection and maintenance<br>• Supportive defect reporting culture | L |
| **Transport Vehicles** | M | • Suitability and compliance with appropriate operational requirements and the AS 1019-2000<br>• Reduce off-road use<br>  ◦ Suitable width to enable two way travel<br>  ◦ Parking Bays<br>  ◦ Driving procedures<br>• Risk based inspection and maintenance<br>• Defect reporting procedure and culture<br>• Fire extinguishers in vehicles | L |
| **Portable Machinery (Internal Combustion Engines)** | H | • Suitability and compliance with appropriate operational requirements and the AS 1019-2000<br>• Regular inspection and maintenance<br>• Supportive defect reporting culture<br>• Certified and component operators | L |
| **Combustion of Flammable Materials** | M | • Compliance with appropriate operational requirements and the AS 1940-2004<br>• Defined storage areas<br>• Defined refuelling areas<br>• Reduce and control the use of all flammable materials<br>• Optimise use of diesel | L |

| Activity | Unmanaged | Controls | Residual |
|---|---|---|---|
| **Discarded Cigarette** | H | Rail Corridor<br>• Total ban on smoking travelling to site and on-site<br>Facilities<br>• Designated smoking areas that comply with asset protection zone requirements local legislative requirements | L |
| **Lightning Strike** | H | • See hazard reduction<br>• See external bushfire | L |
| **Deliberate Acts** | M | • Minimum Fencing and Security Requirements<br>• Liaison with QPS<br>• Security Management Standard (AD-RSM-STD-021)<br>• Adani HSS-ST-12 Safe Systems of Work<br>• Incident Reporting<br>• Vigilance | L |
| **Facility Fire** | M | • Safety in Design<br>• Fixed Fire Suppression Systems<br>• Portable Fire Suppression<br>• Site Emergency Management Plan<br>• State Planning Policy 1/03 – Mitigating the Adverse Impacts of Flood, Bushfire and Landslide<br>• AS 3959-2009 Construction of Buildings in Bushfire Prone Areas<br>• Operation Procedures (Plant) | L |
| **External Bushfire** | M | • State Planning Policy 1/03 – Mitigating the Adverse Impacts of Flood, Bushfire and Landslide<br>• AS 3959-2009 Construction of Buildings in Bushfire Prone Areas<br>• Emergency Preparedness and Response Standard (HSS-ST-10).<br>• Network Rules (Bushfire)<br>• Site Emergency Management Plan | L |

# 12. Bushfire Prevention and Mitigation

## 12.1. Annual Bushfire Risk Assessment

Due to the inherent nature and seasonal variability of bushfire hazards a scheduled annual risk assessment will be conducted to inform the development of an annual Adani Bushfire Hazard Mitigation and Management Plan. The risk assessment will consider:

- Local knowledge
- Existing and predicted fuel loads
- QFRS and other relevant agency advice and recommendations
- BOM and Bushfire CRC seasonal predictions
- Existing and predicted fire danger rating/s
- Status of the project and project activities
- Geographic location of project works
- Fire history

## 12.2. Hazard Management

### 12.2.1. Hazard Reduction Plan

Due to the variable nature of the bushfire hazard an Annual Risk Assessment will be conducted to inform the development of the Hazard Reduction Plan (HRP). The risk assessment will consider:

- The scope and objectives of the plan
- Hazard reduction activities and scheduling (including cost benefit analysis)
- Hazard reduction responsibilities
- Consultation and stakeholder engagement strategy
- Interface agreements with the owners of adjoining properties
- QFRS/QRFB engagement
- Community and stakeholder engagement
- Maps that identify:
  - Fire danger areas
  - Strategic and localised fire breaks
  - Programmed hazard reduction activities
  - Environmentally sensitive areas

## 12.3. Hazard Reduction

Hazard reduction involves a reduction or modification of fuel levels through prescribed burning or by other means. All hazard reduction will be conducted with reference to the Vegetation Management Act 1999 and Nature Conservation Act 1992.

The following hazard reduction methods shall be employed for Adani operations:

- Maintain the rail corridor (95 meters) free of shrubs/tress
- Development of strategic and operational firebreaks
- Selective planting of indigenous and fire retardant vegetation
- Mechanical activities such as slashing and grading
- Spraying (glyphosate)
- Prescribed Burning (subject to approval)

## 12.4. Fire Breaks

Fire Breaks will be utilised to control the spread and potential impact of a bushfire. Where determined, these fire breaks will serve the purpose of preventing the escape of a wayside or facility fire to adjoining property and preventing the impact of a bushfire into the rail corridor, rail infrastructure and facilities.

Adani shall establish interface agreements with the owners of adjoining properties to manage a range of safety and risk issues, including the establishment and maintenance of fire breaks. All firebreaks shall be constructed with reference to local knowledge, best practice, local government bylaws and state government legislation, regulations and guidelines.

## 12.5. Asset Protection Zones

Asset protection zones will be determined and established at all facilities on a specific risk and site basis. Asset protection zones will serve the purpose of protecting the facility from the impacts of a bushfire and to contain any uncontrolled fire escaping the facility and impacting areas outside of the Adani site.

## 12.6. Construction of Facilities

All facilities will be constructed in accordance with the requirements of relevant local bylaws, state legislation, regulations and guidelines and the specific requirements of the State Planning Policy 1/03 – Mitigating the Adverse Impacts of Flood, Bushfire and Landslide and AS 3959-2009 Construction of Buildings in Bushfire Prone Areas as required according to the risk.

## 12.7. Incident Investigations

All unplanned fires or wayside fires ignited or suspected of being ignited as a consequence of Adani operations will be subject to an internal incident investigation (Incidents and Performance Measurement Standard HSS-ST-06) and may be subject to a formal investigation by the relevant authorities such as the QFRS, QPS and/or the Department of Environment and Heritage Protection (DHP). The aim of the internal incident investigation is to determine the root cause of the incident and to ensure that corrective action is undertaken to ensure the incident does not occur again or to better mitigate against the impacts of the fire. All such unplanned or wayside fires should be treated as a high potential incident.

# 13. Bushfire Preparation

## 13.1. Consultation and Engagement

Adani is committed to establishing an ongoing program of consultation and engagement with all relevant stakeholders to achieve a reduction in the risk of bushfire across its area of operations.

### 13.1.1. Queensland Fire and Rescue Service and Rural Fire Brigades

Adani shall establish and maintain a close working relationship with the local QFRS/RFB in its area of operations, including:

- Participate in ongoing liaison with QFRS/RFB, including membership of appropriate consultative groups and committees
- Review of this BMP and site BMPs
- Provision of local knowledge for inclusion in BMP and site BMP's
- Review of Hazard Reduction Plans
- Review of Emergency Response Plans and Procedures
- Operational communication protocols
- Sharing of fire risk intelligence
- Consideration of resource support
- Providing location of staging areas
- Providing location of corridor access roads
- Providing location information regarding the corridor
- Corridor and Rollingstock familiarisation
- Conduct of emergency response exercises and joint training activities

### 13.1.2. Stakeholders

Adani shall actively engage with relevant stakeholders and the local community to promote and support effective bushfire management through shared responsibility. To achieve this, Adani shall establish a close working relationship the following stakeholders:

- Owners and occupiers of adjoining properties
- Other land managers
- Indigenous communities where appropriate and identified
- Government agencies and departments
- Managers of roads
- Safety interface operators

Adani shall actively engage with stakeholders to ensure the following issues are managed effectively:

- Fire break establishment and management plans
- Hazard reduction plans (including prescribed burns on rail corridor)
- Emergency contact lists
- Advice to Adani in relation to planned prescribed burns

### 13.1.3. Emergency Contact Lists

Up to-date emergency contact list shall be compiled and maintained for owners and occupiers of all properties adjoining Adani operations and the corridor enabling relevant stakeholders to be contacted and advised of any bushfire related activity, threat or issues. Emergency contact lists will be available at all sites, camps train operations and other facilities.

## 13.2. Accessibility

Adani acknowledges that access to a bushfire is critical in successfully combating the bushfire and its impact. Adani will aid the QFRS/RFB in gaining access to bushfire by providing up-to-date maps and locations of:

- Corridor access roads
- Corridor connection roads
- Access to corridor access gates
- Signed staging areas

All access roads will be constructed to enable two way travel with passing loops at intervals of 200 meters. All access roads will be signed.

## 13.3. Fire Suppression Equipment

Adani shall provide and maintain in operational condition the following fire suppression equipment for use in fire suppression activities, which will be compatible with QFRS/RFB:

- Fire extinguishers (appropriate to the hazard)
- Knapsacks
- Water Tankers (can be used for dust control and fire fighting)
- Slip-on Units for Four Wheel Drive vehicles
- Fire Hydrants (Facilities)
- Fast Fill Hoses/Connectors
- Earthmovers

In addition to general fire suppression equipment, the following fire suppression equipment will be utilised for high risk operations:

- Spark skirts, curtains and guards
- Fixed water canons
- Water support vehicle fitted with water tank, hoses and connections

This equipment will only be used by trained and competent personnel.

## 13.4. Fire Fighting Capability

Adani will maintain a standing fire fighting capability which can be deployed to support the local QFRS/RFB units to contain and supress wayside fires or fires which threaten Adani assets or the general community. Adani fire fighting units will operate under the coordination of the QFRS/RFB.

### 13.4.1. Adani Fire Crews

Adani will delegate suitable operational workers who will be assigned fire fighting responsibilities in the advent of a bushfire on a risk basis.

### 13.4.2. Training

All Adani fire fighting personnel will receive appropriate training in the use of portable fire extinguishers and bushfire fire fighting techniques and practices, to an agreed level in accordance to QFRS recommendations. Key personnel will be trained in advanced rural fire management and fire fighting techniques by an appropriate training provider.

### 13.4.3. Emergency Response Exercises

Adani is committed to a program of exercises and practice that test internal bushfire emergency response procedures. This will ensure that all Adani staff and key stakeholders are aware of the response procedures, understand their roles and responsibilities and maintain proficiency in fire fighting considerations and techniques.

## 13.5. Preparation for High Risk Activities

### 13.5.1. High Risk Activities

High risk operations are those operations which elevate the risk of bushfire associated with those operations:

- Thermit Welding
- Welding
- Rail Grinding
- Grass Slashing
- Grinding

### 13.5.2. Preparations

High risk operations pose a greater risk of igniting a bushfire; therefore require a higher level of preparedness. In addition to general preparations, the following preparations shall apply:

- Operational Risk Assessment
- Operational Fire Management Plan
- Permit to Work
- Take Five
- Place of Safety
- Emergency Response Team
- First Response Fire Fighting Equipment
- Pre-Start Briefing

### 13.5.3. Permit to Work

All high risk operations will be subject to approval by operational management prior to the commencement of operations. In approving high risk operations operational management will consider the fire risk rating and gain assurance that all relevant risks have been identified and that the Operational Bushfire Management Plan effectively controls the risks.

### 13.5.4. Advice to QFRS and RFB

QFRS or RFB will be advised of the conduct of all activities that may increase the fire risk, including the location and nature of those activities.

# 14. Bushfire Response

## 14.1. Emergency Management System

The emergency management system details the processes and procedures that shall be utilised to manage emergencies which impact upon Adani Operations, including bushfires.

## 14.2. Rail

### 14.2.1. Emergency Management Standard

The Adani Emergency Preparedness and Response Standard (HSS-ST-10) provides guidance on the management of emergencies through prevention, preparation, response and recovery.

### 14.2.2. Emergency Management Structure

The Adani Emergency Management Structure provides for effective coordination and control of emergency response and recovery actions at the tactical, operational and strategic levels. The structure details roles and responsibilities of the tiers of the structure and within the structure to provide for clear lines of control, coordination and communications.

### 14.2.3. Emergency Procedures

Emergency procedures are developed for identified risks and risks to safety arising from the identified emergency risks. The Emergency Procedure for Bushfires (AD-RSM-PRO-024.1) provides detailed procedures to be followed, including:

- Advice to Emergency Services
- Advice to Train operations
- Advice to Facilities
- Advice to Stakeholders (Internal/External)
- Advice to Regulatory Bodies
- Initial Attack
- Support to QRFS/RFB

## 14.3. Facilities

### 14.3.1. Emergency Response Plan

All facilities shall develop and maintain an Emergency Response Plan which shall detail the structure and protocols to be utilised to respond to an emergency at the facility. The Site Emergency Response Plan shall also detail site specific arrangements and hazards to enable emergencies to be managed effectively at that site.

### 14.3.2. Emergency Management Structure

All facilities shall utilise an Emergency Control Organisation in accordance with AS 3745-2010 - Planning for Emergencies in Facilities.

### 14.3.3. Emergency Procedures

Emergency procedures are developed for identified risks and risks to safety arising from the identified emergency risks. The Emergency Procedure for Fire and Bushfires provides detailed procedures to be followed, including:

- Advice to Emergency Services
- Initial Attack
- Advice to Stakeholders
- Secure Facility
- Evacuation
- Support to QRFS

## 14.4. Bushfire Response

### 14.4.1. Priorities

The following priorities shall guide response to a bushfire emergency:

- Safety of Persons
- Safety of Property
- First Response
- Emergency Services

Workers engaged in fighting fires shall only continue to fight the fire to the extent that their safety and/or the safety of others is preserved. Where danger exists as a consequence of attempting to fight the fire, personnel are to withdraw to a place of safety.

### 14.4.2. Community Support

Adani will provide support to the local community in the advent of a bushfire threat where appropriate, where trained and capable resources are available and where risk to safety is effectively controlled. All support activities will be initiated by Train Operations and managed by the Emergency Management Structure. Adani fire fighting units will operate under the coordination of the QFRS/RFB.

# 15. Bushfire Recovery

The following issues shall be considered following a bushfire emergency:

- Train Operations shall determine when it is safe to recommence rail operations based on advice from QFRS/RFB.
- Operational management shall determine when it is safe to return to facilities based on advice from QFRS/RFB.
- Operational management shall determine when it is safe to travel through areas via access roads based on advice from QFRS/RFB.
- An inspection shall be conducted following a bushfire incident which crosses the corridor to ensure that there is no damage which may impact upon the safety of operations.
- Inspections shall include inspection of any trees which may be fire damaged and which may pose a risk to rail operations and/or infrastructure.
- All workers shall remain vigilant for flare-ups and report immediately.
- An internal investigation will be conducted into any fires started or suspected to have started within the corridor or as a consequence of Adani operations to ensure that any causes are identified and corrective action taken as soon as reasonably practicable.

# 16. Roles and Responsibilities

## 16.1. Director Rail

- Supporting the effective implementation of the plan.
- Providing resources to support the plan.
- Providing training and awareness programs to support the plan.

## 16.2. Manager Safety - Rail

- Assure the currency and validity of the Emergency Management Standard, Procedures and Plans.
- Coordinate completion of Annual Bushfire Risk Assessment and Hazard Reduction Plan.
- Coordinate provision of relevant emergency management equipment.
- Assure establishment and maintenance of the Emergency Management System.
- Coordinate the engagement of all relevant stakeholders including rail stakeholders and emergency services.
- Coordinate development of emergency management capability, including training and exercises.
- Assure the effective communication of Emergency Management requirements to relevant personnel.
- Coordinate the effective monitoring, audit and review of the Emergency Management System and Bushfire Management Plan.

## 16.3. Managers

- Coordinate completion of Hazard Reduction activities, including obtaining licenses and/or approvals.
- Assure participation in engagement activities with stakeholders and emergency services.
- Assure appointment of workers to fulfil emergency management roles and responsibilities, including fire officers.
- Prepare for a Bushfire Emergency in accordance with the Emergency Management Standard, Procedures and Plans.
- Assure that resources and personnel required to support this plan are available, trained and exercised.
- Respond to a Bushfire Emergency in accordance with the Emergency Management Process and Manual.

# 17. Monitor and Review

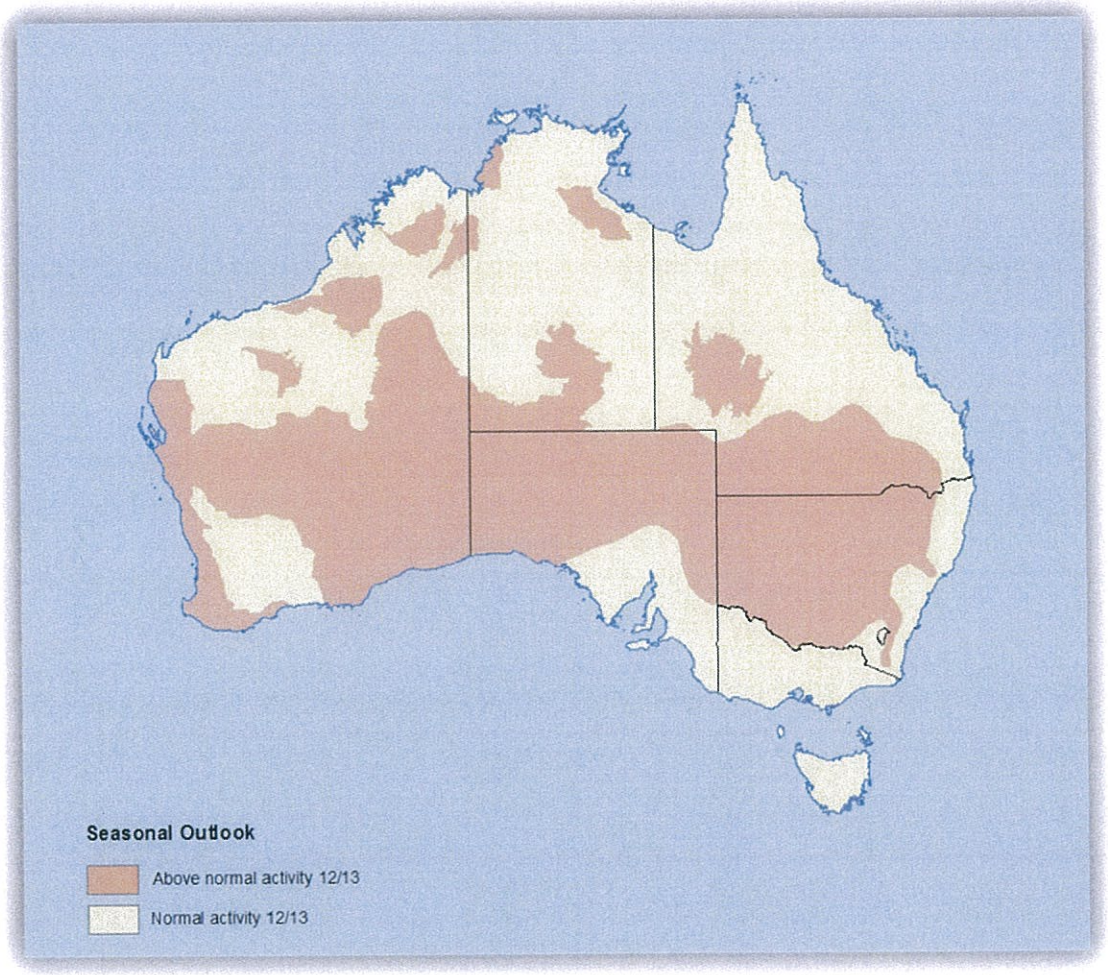
The content of this plan will be reviewed under the following circumstances:

- Change to operations or facilities
- Following a fire emergency
- As component of an incident investigation
- As a result of a significant change in the risk context (i.e. extended drought)
- Annually

**End of Document**

# 18. Appendix A

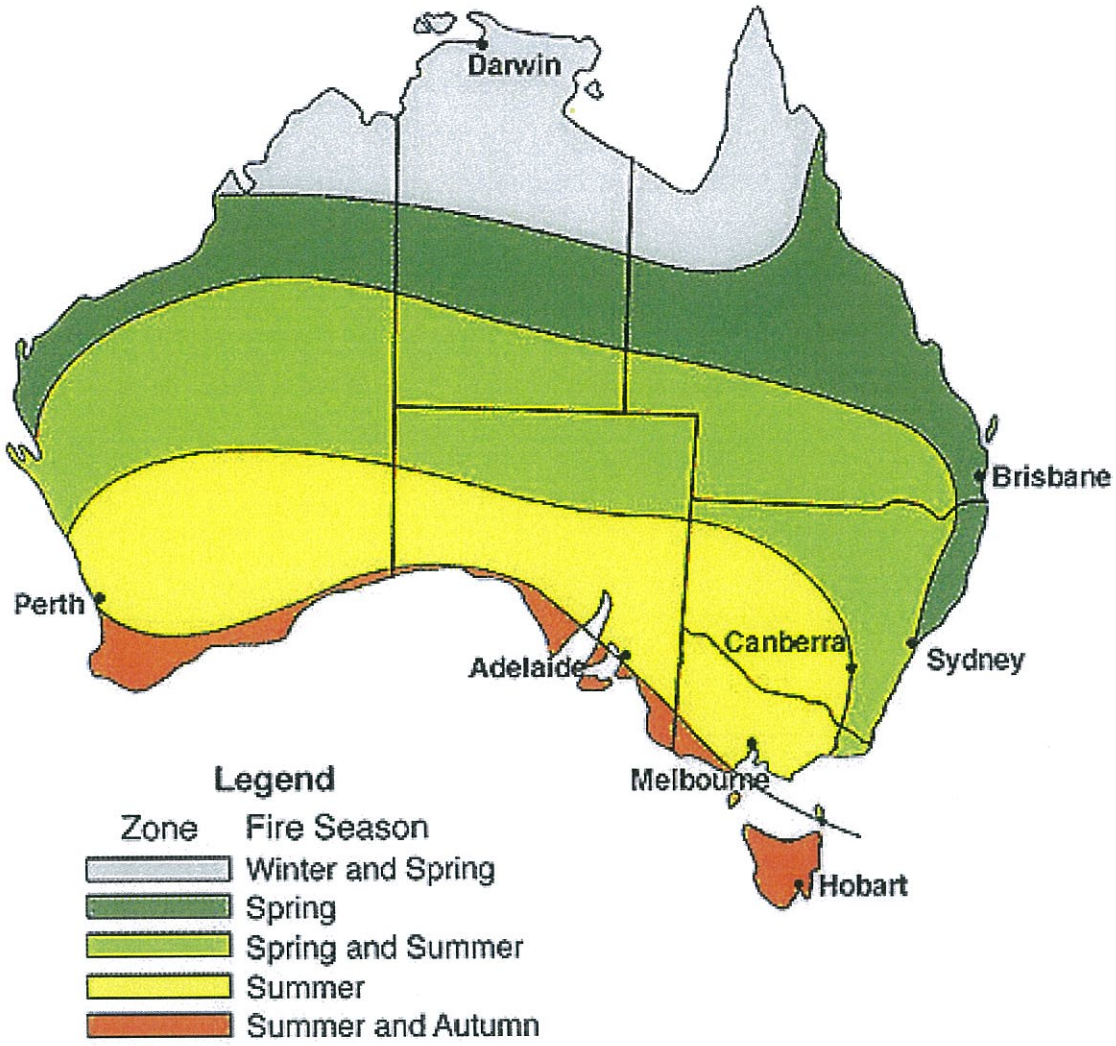
## Seasonal Outlook 2012/13[4]




[4] Fire Note Issue 95 – Bushfire CRC (August 2012)

# 19. Appendix B

## Australian Fire Season[5]




[5] CSIRO (2011) the Months of a Fire Season. Available at http://www.csiro.au/resources/Fire-Season-Months.html accessed on 06/03/2013

# 20. Appendix C

## Australian Fire Danger ratings

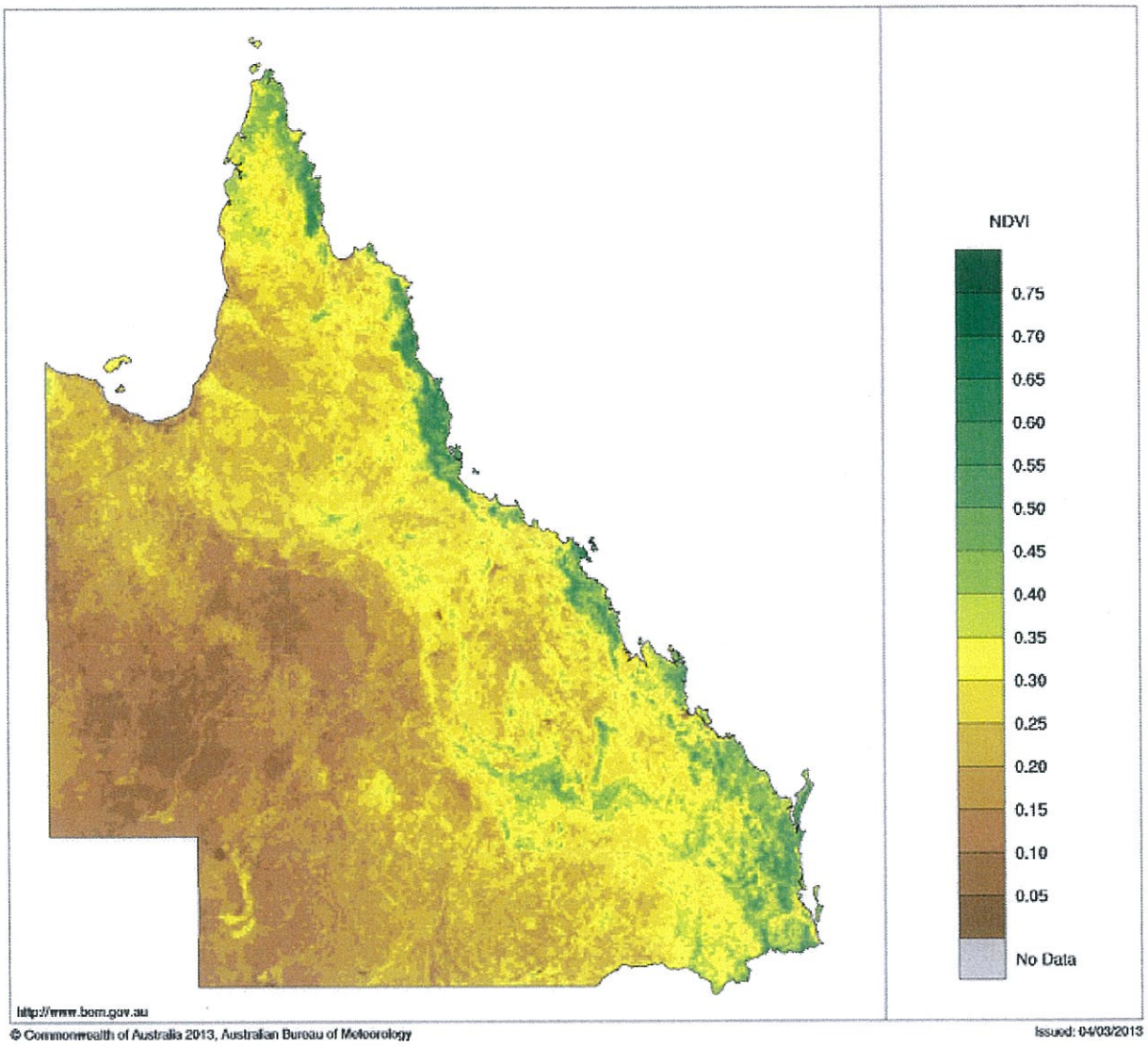
| Fire Danger Rating | Recommended Action and Potential Fire Behaviour and Impact |
|---|---|
| CATASTROPHIC FDI 100+ | ACTION: For your survival, leaving early is the best option.<br>▪ Fires will be uncontrollable, unpredictable and fast moving. Flames will be higher than roof tops. Thousands of embers will be blown around. Spot fires will move quickly and come from many directions, up to 20 km ahead of the fire.<br>▪ There is a very high likelihood that people in the path of the fire will die or be injured. Thousands of homes and businesses will be destroyed.<br>▪ House construction standards do not go beyond a Fire Danger Index of 100.<br>▪ Well prepared, constructed and actively defended homes may not be safe during a fire. |
| EXTREME FDI 75-99 | ACTION: Leaving early is the safest option for your survival.<br>▪ Fires will be uncontrollable, unpredictable and fast moving. Flames will be higher than roof tops. Thousands of embers will be blown around. Spot fires will move quickly and come from many directions, up to 6 km ahead of the fire.<br>▪ There is a likelihood that people in the path of the fire will die or be injured. Hundreds of homes will be destroyed.<br>▪ Only well prepared, well constructed and actively defended houses are likely to offer safety during a fire. |
| SEVERE FDI 50-74 | ACTION: Leaving early is the safest option for your survival. Only stay if you and your home are well prepared and you can actively defend it during a fire.<br>▪ Fires will be uncontrollable and move quickly. Flames may be higher than roof tops. Expect embers to be blown around. Spot fires may occur up to 4 km ahead of the fire.<br>▪ There is a chance people may die or be injured. Some homes and businesses will be destroyed.<br>▪ Well prepared and actively defended houses can offer safety during a fire. |
| VERY HIGH FDI 25-49 | ACTION: Only stay if you and your home are well prepared and you can actively defend it.<br>▪ Fires can be difficult to control. Flames may burn into the tree tops. Expect embers to be blown ahead of the fire. Spot fires may occur up to 2 km ahead of the fire.<br>▪ There is a low chance people may die or be injured. Some homes and businesses may be damaged or destroyed.<br>▪ Well prepared and actively defended houses can offer safety during a fire. |
| HIGH FDI 12-24 | ACTION: Know where to get more information and monitor the situation for any changes.<br>▪ Fires can be controlled. Expect embers to be blown ahead of the fire. Spot fires can occur close to the main fire.<br>▪ Loss of life is highly unlikely and damage to property will be limited.<br>▪ Well prepared and actively defended houses can offer safety during a fire. |
| LOW - MODERATE FDI 0-11 | ACTION: Know where to get more information and monitor the situation for any changes.<br>▪ Fires can be easily controlled.<br>▪ Little to no risk to life and property. |

# 21. Appendix D

## Queensland 6 month Vegetation Index (greenness)[6]

Normalised Difference Vegetation Index 1 September 2012 to 28 February 2013

Product of the National Climate Centre



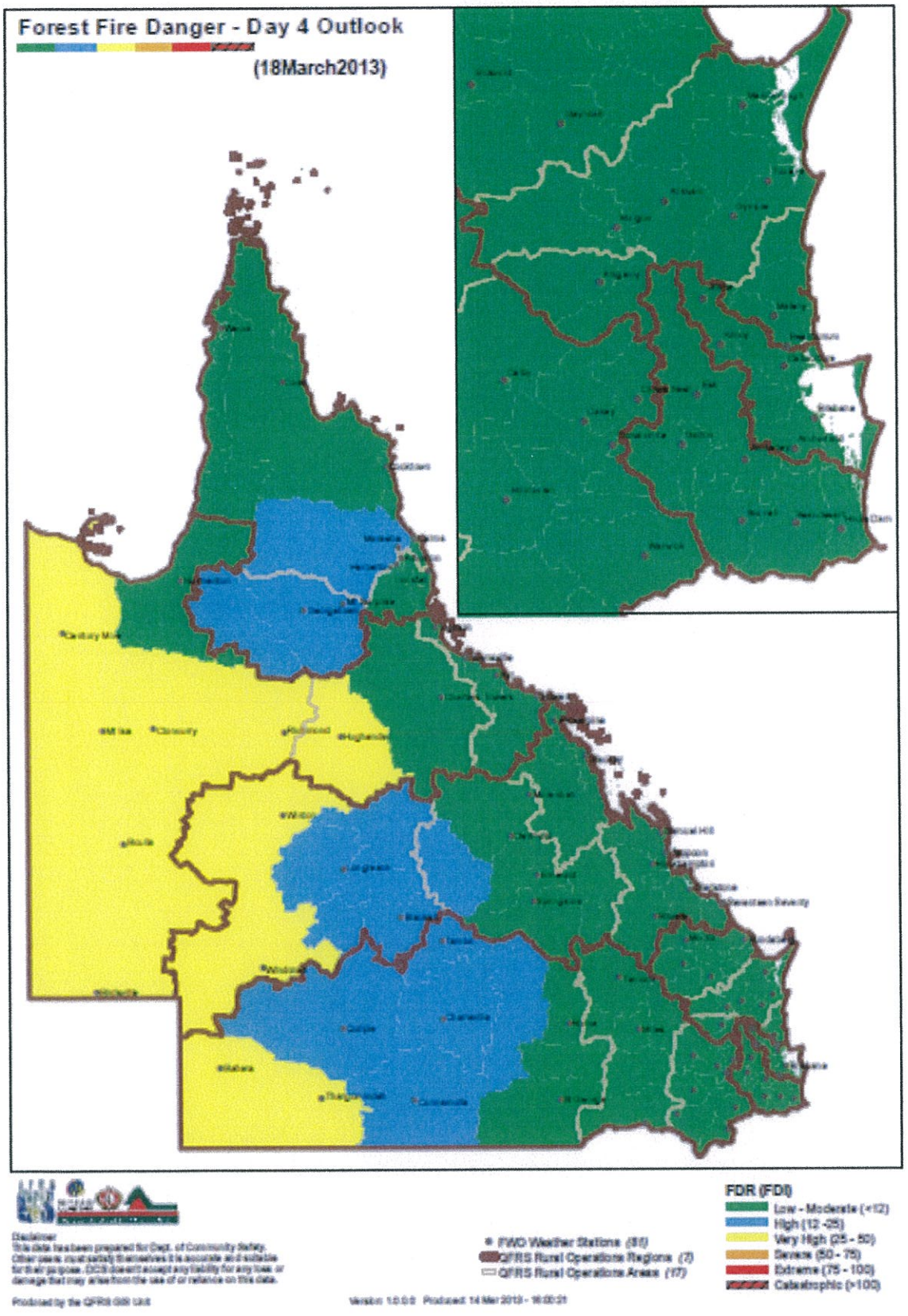



Issued: 04/03/2013

[6] Bureau of Meteorology (2013) Monthly NDVI Average for Australia http://www.bom.gov.au/jsp/awap/ndvi/index.jsp accessed on 06/03/2013

# 22. Appendix E

## Forest Fire Danger ratings 18 March 2013



# 23. Appendix F

## Grassland Fire Danger ratings 18 March 2013