

Hunter Expressway

**Stage 2 Construction
Hazard and Risk Management
Sub Plan**

July 2010



Hazard and Risk Management

Seahampton to Kurri Kurri Section

HEA-PL-GL-HRP-001-00-03

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HAZARD AND RISK MANAGEMENT

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ABBREVIATIONS

HRMSP	Hazard & Risk Management Sub Plan
CoA	Planning Minister's Conditions of Approval
CEMP	Construction Environmental Management Plan
DECCW	Department of Environment, Climate Change and Water
HEA	Hunter Expressway Alliance

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1 INTRODUCTION

1.1 Purpose

This Hazard and Risk Management Sub Plan forms part of the Construction Environmental Management Plan (CEMP) for the Hunter Expressway Alliance (HEA) project.

The purpose of this Hazards and Risk Management Sub Plan (HRMP) is to describe how the HEA proposes to manage and control potential hazards and risks associated with the Alliance section of the Hunter Expressway project.

Some construction activities have the potential to cause pollution events involving hazardous materials, or environmental incidents requiring emergency response. Potential hazards and risks are assessed during internal risk workshops to identify and assess construction related risks to the Project. The issues identified have been considered in the preparation of this Sub Plan.

In addition to this Sub Plan the following documentation will be prepared which includes hazards, risks and controls:

- **Work Method Statements (WMS)** provides the structure for documenting major areas of the work including risk and quality and aligns design and constructability early in the process. It is the WMS that draws together or references other related documentation (including JSEA's and ECMS) to demonstrate to all stakeholders that all relevant issues have been considered in planning the works.
- **Job Safety Environmental Analyses (JSEA)** will be prepared that will detail the specific safety and environmental risks and controls for each work area or specific construction activity for the Project.
- **Environmental Construction Method Statements (ECMS)** are developed to show the environmental controls that will be in use on the site at any given time.

This Sub Plan is applicable to all HEA activities during the design and construction phases of the Project.

1.2 Conditions of Approval

Relevant conditions applicable to hazards and risks required by the Conditions of Approval (CoA) are listed in Table 1.1 below with a cross reference to where the condition is addressed in this Sub Plan or other project management documents. Condition 117 is the specific CoA to which this Sub Plan applies.

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Table 1.1 Ministers Condition of Approval Requirements

CoA No.	Ministers Condition of Approval Requirements	Sub Plan / Document Reference
117	<p>The Proponent shall prepare and implement a Hazards and Risk Management Sub Plan. This Sub Plan shall include, but not be limited to the following:</p> <ul style="list-style-type: none"> i. details of the hazards and risks associated with the proposal; and ii. pro-active and reactive mitigation measures including contingency plans to be implemented in the event of a pollution incident. 	<p>Appendix A</p> <p>Section 5.4, 6 & Appendix A*</p>
Note * - OH&S risks are only covered in a broad sense in this Plan but are covered comprehensively through the OH&S Management Plan and JSEA processes.		
118	<p>The Proponent shall prepare and implement an On-Site Refuelling Protocol to manage on-site refuelling of vehicles during the construction. The Protocol shall include, but not necessarily be limited to:</p> <ul style="list-style-type: none"> i. a decision-making algorithm to determine whether on-site or off-site refuelling is appropriate in a given situation; ii. arrangements for the transport of diesel to the refuelling site, including vehicle types, volumes, movement times and routes where relevant; iii. procedures for refuelling to address the potential for spills, collisions with refuelling vehicles or other hazardous incidents; and iv. procedures to be followed in the event of a diesel spill, including containment and clean-up measures. <p>The On-Site Refuelling Protocol shall be submitted for the approval of the Director-General prior to the commencement of any refuelling activity, or within such period otherwise agreed by the Director-General. Should the Proponent decide not to undertake any on-site refuelling activity during construction, the Proponent may satisfy this condition by certifying in writing, to the Director-General, that such refuelling activities will not be conducted.</p>	Appendix C
120	<p>The Proponent shall prepare and implement an Emergency Plan to manage emergency events that may arise. The Plan shall include, but not necessarily be limited to:</p> <ul style="list-style-type: none"> i. identification of emergencies that may arise in relation to the proposal and associated infrastructure; ii. procedures to be followed to address potential emergencies and minimise the impacts of emergencies on surrounding land uses; iii. monitoring and communication systems installed to indicate an emergency; iv. details of fire safety measures where relevant; v. procedures for the notification of relevant emergency services, authorities and affected receptors of an emergency situation; and vi. a system to investigate and address the cause(s) of any emergency to prevent recurrence. 	To be prepared prior to operation

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CoA No.	Ministers Condition of Approval Requirements	Sub Plan / Document Reference
	The Emergency Plan shall be submitted for the approval of the Director-General prior to the commencement of operation of the proposal, or within such period otherwise agreed by the Director-General.	
121	<p>121. The Proponent shall prepare and implement a Security and Crime Management Strategy to prevent unauthorised public ingress or access, and to minimise the potential for crime in the vicinity of proposal (eg vandalism, loitering, illegal dumping etc). The Strategy shall be generally in accordance with the principles outlined in the joint Department and Police Service publication Crime Prevention and the Assessment of Development Applications, and be developed in consultation with the NSW Police Service and relevant councils. The Strategy shall include, but not necessarily be limited to:</p> <ul style="list-style-type: none"> i. details of security arrangements to prevent unauthorised access, including physical exclusion measures, detection devices and management mechanisms; ii. procedures for addressing security issues, should they arise; iii. specific design features intended to discourage the incidence of crime at and in the immediate vicinity of relevant components of the proposal and associated infrastructure (eg. fencing on overpasses); iv. lighting considerations, including light intensity, direction and hours of operation at and in the immediate vicinity of the proposal, with the aim of minimising areas that may encourage crime; v. policies and procedures for the management and removal of graffiti, amelioration of vandalism, should it occur at or on any component of the of relevant components of the proposal; and vi. policies and procedures for the management and removal of illegal or inappropriate billposting and illegally dumped materials, should it occur at or on any component of relevant components of the proposal. <p>The Security and Crime Management Strategy shall be submitted for the approval of the Director-General prior to the commencement of construction or within such period otherwise agreed by the Director-General.</p> <p>This condition only applies to "relevant" components of the proposal. That is, this condition only applies to those components that may be subject to security or crime issues.</p>	HEA-MP-GL-OHS-020

1.3 Objectives

The objectives of the Hazard and Risk Management Sub Plan are to:

- provide an organised, integrated and systematic approach to effectively address all hazards and risks during the project;
- provide staff with an increased level of understanding and awareness of all management issues associated with hazards and risks;
- identify pro-active and reactive mitigation measures including contingency plans for possible pollution events.

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- Detail an On-Site Refuelling Protocol to manage on-site refuelling of vehicles during construction
- ensure potential hazards and risks encountered during pre-construction, construction and post-construction phases of the project are managed in accordance with the Hunter Expressway Alliance's Environmental Policy, and
- implement best management practice for identifying, controlling and containing hazards and risks.

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2 LEGISLATIVE REQUIREMENTS AND GUIDELINES

2.1 Relevant Legislation

The primary legislation and guidelines relating to the management of hazards and risk on the HEA project is summarised in Table 2.1 below:

Table 2 1: Key Legislation and Guidelines

Relevant key legislation and guidelines	Relevant to project
<i>NSW Occupational Health and Safety Act 2000</i>	
<i>NSW Occupational Health and Safety (OH&S) Act 2000 & Regulations 2001</i>	Sets out objectives to promote a safe and healthy work site, ensure risks are identified, assessed and eliminated or controlled and to protect people against risks to health and safety resulting from the use of construction plant
<i>State Emergency and Rescue Management Act 1989</i>	Relates to preparation for an emergency, response to emergency and recovery of affected community.
<i>Protection of the Environment Operations Act, 1997 (POEO Act)</i>	This Act provides for the control of polluting activities in NSW in order to prevent pollution of the environment. Offences exist in relation to activities that cause water, soil and air pollution. Soil, water and air pollution associated with potential spills of fuel/oil and other chemicals are controlled through the CEMP and other Sub Plans.
<i>Protection of the Environment Operations (General) Regulation, 1998</i>	Provides details on everyday implementation of the POEO Act to control pollution of the environment including the following areas: <ul style="list-style-type: none"> identifies scheduled activities, premises, and licence requirements, and situations where remedial notices and orders can be issued; creates a framework for managing licence requirements; and identifies appropriate regulatory authorities to administer licences and pollution controls and issue notices. Applies to the control of pollution for all project activities including hazard and risk events.
<i>Environmentally Hazardous Chemicals Act, 1985</i>	The Act sets up the Hazardous Chemicals Advisory Committee. Its functions include advising DECCW in relation to the assessment and control of chemicals that are environmentally hazardous such as asbestos. Applies only if asbestos materials or asbestos contaminated soils are encountered during the project.
<i>Environmentally Hazardous Chemicals Regulation, 1999</i>	This Regulation sets fees for licences to carry out prescribed activities in relation to environmentally hazardous chemicals or declared chemical waste such as asbestos, and specifying the matters to be included in notices issued by the DECCW about

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Relevant key legislation and guidelines	Relevant to project
	<p>applications for licences.</p> <p>Applies only if PCB, dioxins or other organo-chlorine contamination is encountered during the project.</p>
Road and Rail Transport (Dangerous Goods) Act 1997	<p>s37 – general duty to ensure that dangerous goods are transported in a safe manner.</p> <p>A dangerous goods transportation licence is required when carrying bulk containers with a total capacity of 3000L. (e.g. 3 Intermediate Bulk Containers (IBCs) each with a capacity of 1000L may be transported without the need for a licence). Warning signs and record keeping requirements apply when transporting dangerous goods.</p>
Contaminated Land Management Amendment Act 2008	<p>Depending on the category of remediation required, the Alliance may be required to provide the Council with specific information.</p> <p>Development consent may be required for contaminated land remediation work carried out.</p> <p>Duty to report contamination may be triggered.</p> <p>Relevant sections include:</p> <p>s60 – duty to report to contamination is required to DECCW if:</p> <ul style="list-style-type: none"> ▪ contamination exceeds guideline level on land; ▪ contamination enters or may enter neighbouring land and exceeds guideline level; and ▪ contamination otherwise meets criteria in regulations.
Pesticides Act, 1999	<p>Governs the use of pesticides in an environmentally satisfactory manner:</p> <p>s12 - and s13 prohibit the use of an unregistered pesticide without a permit.</p> <p>s14 - requires that you read or have read to you the label or permit for the pesticide.</p> <p>s15 - requires that you use the registered pesticide in accordance with instructions on the label.</p> <p>s16 - states the pesticide container must have the approved label attached.</p> <p>s17 - prohibits the use or possession of any restricted pesticides unless authorised by a certificate of competency or a pesticide control order under the Act.</p> <p>Applies to storage, handling and use of pesticides (including herbicides) on the project.</p>
Waste Classification Guidelines 2008 (DECCW publication)	<p>These guidelines are required by the POEO Act, and define types of wastes, procedures for assessing waste, waste storage and disposal requirements, record keeping and licence requirements.</p> <p>Applies to the disposal of waste from the project.</p>
Australian Standard 1940 – 2004 the	<p>This Standard sets out requirements and recommendations for the</p>

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Relevant key legislation and guidelines	Relevant to project
<i>Storage and Handling of Flammable and Combustible Liquids</i>	safe storage and handling of flammable liquids of dangerous goods Class 3 and combustible liquids such as hydrocarbons and industrial solvents. Applies to material storage in construction compounds.
<i>Acid sulfate Soil Manual (Acid sulfate Soil Management Advisory Committee, 1998)</i>	The acid sulfate soil manual outlines the strategies to manage potential impacts of development works that are likely to disturb acid sulfate soils. Applies only if acid sulfate soils are encountered during the project.
<i>The Rural Fires Act, 1997</i>	The objects of this Act are to provide: <ul style="list-style-type: none"> ▪ for the prevention, mitigation and suppression of bush and other fires in local government areas, (or parts of areas) and other parts of the State constituted as rural fire districts; ▪ for the co-ordination of bush fire fighting and bush fire prevention throughout the State; ▪ for the protection of persons from injury or death, and property from damage, arising from fires; and ▪ for the protection of the environment by requiring certain activities to be carried out having regard to the principles of ecologically sustainable development.
<i>Rural Fire Regulation, 2002</i>	Provides details on everyday implementation of the <i>Rural Fires Act, 1997</i> .
<i>DECC (2007) Storing and Handling Liquids: Environmental Protection – Participants Manual</i>	Provides details on the correct storage and handling of liquids
<i>DEC (2005) Environmental Compliance Report: Liquid Chemical Storage, Handling and Spill Management – Part B Review of Best Practice and Regulation.</i>	Provides best practice details on liquid chemical storage, handling and spill management
<i>AS 4801 - Occupational health and safety management systems - Specification with guidance for use</i>	This Standard sets out the specifications and recommendations for the implementation of occupational health & safety management systems
<i>WorkCover (1996) : Managing Chemical Hazards in the Workplace</i>	outlines how you can protect yourself and others in the workplace from the harmful effects of chemicals and other substances. It suggests ways in which you can manage the health hazards posed by the use of substances which are classified as hazardous.
<i>NSW WorkCover Guidelines</i>	Guidelines to the implementation of occupational health & safety management systems and adoption of safe working procedures

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3 PERFORMANCE CRITERIA

The performance criteria for the Hazard and Risk Management Sub Plan are:

- no injury or loss of life;
- no damage to plant and machinery;
- no offsite damage to flora and fauna;
- no fuel / oil and other chemicals spills;
- no contamination of soil or groundwater from site activities;
- Meeting all licence and environmental approval requirements.
- All hazards and risks are identified and addressed in the sub plan
- Best management practices used to identify control and manage hazards.
- ensure controlled and approved methods are used for hot works during extreme or very high fire danger periods;
- minimise disturbance of potentially contaminated soil, surface and groundwater and acid sulfate soils;
- ensure staff are aware of the requirements of relevant sections of documents to be adhered to including: the CEMP, any associated Environmental Construction Method Statements (ECMS), environmental control plans and all other statutory requirements to be met whilst on site; and
- ensure effective communication is maintained with statutory authorities and all statutory requirements are carried out to control impacts on the environment and prevent pollution.

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4 HAZARDS AND RISK ASSESSMENT

4.1 Project Hazards and Risk Assessment

Overall hazards and risk for the Project are determined through HEAs Risk/Opportunities Management System (CURA) and reflected in the Project Risk Management Plan. Occupational Health and Safety (OH&S) considerations are dealt with in the Project OH&S Management Plan.

4.2 Hazard and Risk Assessment Procedure

On a work task level, individual risks are managed through the Job Safety Environmental Analysis (JSEA) Procedure. This procedure identified hazards associated with a work task and develops solutions for each hazard that either eliminates or controls such hazards

4.2.1 Evaluation Criteria

Qualitative measures are used to estimate the consequence or impact of an event, along with the estimate of likelihood, to produce consistent risk rankings across the identified risks. These values are described in Tables 4.1 and 4.2 below.

Table 4.1 Likelihood Criteria

	Occurrence (likelihood)	Description
A	Rare/improbable	The event may only occur in exceptional circumstances.
B	Unlikely/remote	The event may occur at some time (about once every five years).
C	Possible	The event is likely to occur at some time (about once every year).
D	Likely	The event will probably occur in most circumstances (at least once every six months).
E	Almost certain	The event is expected to occur in most circumstances (at least once every month).

Table 4.2 Consequence criteria

	Consequence (impact)	Description
1	Insignificant/negligible	Short-term disturbance with minor environmental release or damage that is non-reportable. No impact outside site boundary. No community complaints or media reports.
2	Minor/low	Minor violation of regulation or guideline with minimal damage to the environment and small clean-up. Immediately contained on site. Local government action, minor community complaints. Potential or actual breach of legislation.

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	Consequence (impact)	Description
3	Moderate	Violation of regulation or guideline with moderate damage to the environment and significant clean-up costs. Release of pollution off site. Detrimental media reports, community concerns and complaints.
4	Major	Significant environmental damage – potentially permanent. Release of pollution off site. Significant loss of environmental resources. Detrimental media reports in the national or state media, organised community concern. High likelihood of DECCW fine or court action.
5	Catastrophic	Long-term environmental harm. Permanent irreparable damage to the environment. Sustained detrimental state and national media reports. Sustained community outrage. Penalty Infringement Notice/court action.

4.2.2 Risk Rating Table

A Risk Rating Table (Table 4.3) was used to evaluate the severity of the risk for each environmental aspect. As shown, the matrix axes are those of likelihood and consequence using the measures given above. A scale of consequences from 1 to 5 is used to indicate increasing severity. The consequences are potential outcomes as a result of a hazard occurring. The severity of the risk determines the level of management action required as detailed in Table 4.4.

Table 4.3 Risk Rating

		Likelihood						
		A	B	C	D	E		
Consequence	1						Risk Severity	<div>Priority</div> <div>High</div> <div>Moderate</div> <div>Low</div>
	2							
	3							
	4							
	5							

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Table 4.4: Risk severity

Risk severity	Management required
Priority	Immediate management action required.
High	Priority management action warranted.
Moderate	Management action warranted.
Low	Management action should be considered, particularly for low-level impacts that nevertheless occur on a continual basis.

The hazards and risk assessment uses Table 4.3 to consider the potential consequences, probability and risk of a number of hazards and allows management of specific risks to be prioritised. The risk rankings were developed further by taking control and mitigation measures into consideration and providing a subsequent risk ranking based on the implementation of these measures. The results of the initial hazards and risk assessment and the proposed management controls to negate or minimise risks are presented in Appendix A, as well as being discussed in more detail in the relevant Sub Plans to the Construction Environmental Management Plan.

4.2.3 Approach to Risk Assessment

The intent of the hazard assessment is to identify key hazards and risks and to identify appropriate risk management to mitigate or minimise the identified risks.

The hazard assessment and risk management strategies identify and rate the hazards involved with the design and construction of the project with respect to impacts on people, assets, costs, timing and the environment.

All hazards with priority or high rating were automatically considered to be key risks with the need for assigned risk mitigation initiatives. Moderate level hazards and all those with a low classification do not necessarily need to be addressed with risk mitigation measures, if they can be managed through normal management functions. However, risk mitigation measures assigned to the moderate and low level hazards should be implemented if considered necessary.

4.3 Key Risk Areas

The risk assessment processes have resulted in the identification of a number of key risk areas and associated mitigation measures to be employed to reduce the level of risk. Please refer to Appendix A for the Initial Hazard and Risk Assessment. A summary of the results is presented as follows:

4.3.1 Environmental Performance

It is imperative that all staff on the project are aware of the key environmental issues pertaining to the works and are aware of their legal obligations regarding the identification,

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reporting and response to potential pollution incidents. These risks are managed generally via adoption of the Construction Environmental Management Plan and more specifically via the individual Sub Plans.

4.3.2 Heritage Items

The key risk for this category relates to construction delays associated with working around known heritage items or discovering potential heritage items when excavating the site. This risk is managed through the implementation of the Historical Heritage Management Sub Plan and the Indigenous Heritage Management Sub Plan.

4.3.3 Noise & Vibration Management - Heritage

The key risks for this category relate to the protection of both the Richmond Vale Railway Tunnel and numerous Aboriginal heritage sites adjacent throughout the construction process and more particularly during any nearby blasting activities. These risks are managed via the Noise & Vibration Management Sub Plan, Indigenous Heritage Management Sub Plan and the Historical Heritage Management Sub Plan.

4.3.4 Flora & Fauna

The key risks relate to clearing in excess of our allocated clearing quota and outside project boundaries and poor preparation of soil for landscaping. These risks are managed via the Flora & Fauna Management Sub Plan and the Landscape Management Plan.

4.3.5 Soil & Water Management

The primary risk to soil water management is potential erosion and sedimentation issues given the highly dispersive soils in the area. This will be managed via the Soil & Water Management Plan and associated Erosion and Sediment Control Plans. In addition hazardous materials will be managed through storage in designated, bunded areas, appropriate training for all personnel using these materials and the use of licensed transporters.

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5 HAZARDS AND RISK MANAGEMENT

Environmental controls and mitigation measures have been developed following the risk assessment process to address each of the key risks. These controls and measures will be implemented throughout the design and construction of the project using the following.

5.1 Emergency Procedures

All emergency responses will be conducted as detailed in the OHS Management Plan for the project. The OHS Management Plan describes actions to be taken in incidents and emergencies, details of personnel responsible for preventing, preparing for and responding to incidents and includes 'out of hours' contact details.

An emergency situation can be defined as an actual or imminent event that endangers or threatens to endanger the safety or health of any person, the environment or property and requires a significant and coordinated response.

Specific environmental incident response procedures are details in Appendix B

5.2 Implementation

Implementation of construction risk mitigation initiatives is the responsibility of all HEA site personnel and their subcontractors. The following risk management measures will be implemented to enable acceptable levels of risk to be maintained:

- undertake a hazard assessment of the design and the complete project prior to commencement of operation
- give particular attention to those hazards that remain unchanged or at a priority / high level, even after the application of the risk treatment initiative. These risk elements would need to be monitored on a more frequent basis
- ensure that all management plans and mitigating measures identified are in place and operating as intended
- all personnel to undergo a documented site induction to include:
 - location of sensitive receivers
 - incident management plans and procedures
 - environmental management plans and controls
 - procedures for handling dangerous goods and hazardous materials

5.3 Risk and Hazard Communication

Risk and hazard communications will be conducted as detailed in the OHS Management Plan. HEA will implement, operate and maintain an incident management system that provides an appropriate level of response to any planned or unplanned incident occurring on the designated site area for which it is responsible.

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Under Section 148 of the Protection of the Environment Operations Act 1997, the following people have a duty to notify the Environmental Protection Agency about a pollution incident occurring in the course of an activity that causes or threatens material harm to the environment, as soon as practicable after the person becomes aware of the incident:

- the person carrying on the activity;
- an employee or agent carrying on the activity
- an employer carrying on the activity
- the occupier of the premises where the incident occurs

5.4 Contingency Planning in Response to Environmental Incidents

Please refer to Appendix B for specific details on procedures, notifications and responses to environmental Incidents

5.5 Hazardous Materials and Dangerous Goods

Appropriate transport, storage and use of hazardous materials and dangerous goods are essential for controlling risk relating to the project. Dangerous goods include those materials classified under the Australian Dangerous Goods Code such as diesel or petroleum, paint thinners, compressed natural gas and explosives. The use of such materials will comply with the relevant standards and WorkCover guidelines. WorkCover NSW will be consulted where storage of dangerous goods is proposed.

Hazardous substances include items which may represent a threat to the environment or community health. Substances may include herbicide or pesticides, acidic or corrosive chemicals (such as concrete curing agents). The use and management of such substances will be strictly controlled and appropriate guidelines, legislation and procedures adhered to.

Specific management actions for the control of dangerous goods and hazardous substances are detailed in Table 7.1

5.6 Training

Every person working on site will be inducted into the specific environmental, safety and community relations requirements for the Project. There will be a continual system of addressing relevant matters through Toolbox meetings that will be held regularly during the course of the Project.

Training and awareness will be provided to site personnel involved in specific tasks that have been assessed to have a higher level of risk. The following information will be conveyed:

- Name and contact numbers for the Safety Manager, Environment Manager and Project Engineer(s)
- Emergency contact numbers for external and site personnel

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- Requirements for Excavation Procedures and Permits
- Requirements for conducting Job Safety and Environmental Analyses
- Project safety requirements and PPE
- Locations of sensitive sites and sensitive receivers
- Vehicle parking and speed limits
- Plant refuelling, maintenance and clean down.

Additional training will be conducted as required, when new project areas commence, new procedures are implemented, new staff or contractors commence or at the discretion of the Project Engineer(s), Safety Manager or Environment Manager.

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6 POTENTIAL IMPACTS

6.1 Hazard and Risk Identification

Hazards and risks have been identified by reviewing the information and studies related to the project. These are summarised in Table 6-1.

Full details regarding all initial risks and hazards identified for the HEA project are included in Appendix A

Table 6 1: Potential Hazards and Risks

Category	Hazard	Risk
Fuel/oil and other chemicals	<ul style="list-style-type: none"> vegetation clearing; removal, stockpiling and respreading of soil; site establishment - site compounds, access points and access routes; mine void grouting works adjustments of existing public utilities; plant and equipment maintenance; vehicle washdown; handling, storage and disposal of hazardous materials; concreting activities; watercart operations; and dismantling of existing structures. 	<ul style="list-style-type: none"> air pollution due to emissions from fuel/oil and other chemicals spills during use of plant and equipment; water and soil pollution due to fuel/oil and other chemicals spills from the use of plant and equipment; water and soil pollution due to spills from inappropriate storage of fuel/oil and other chemicals; and water, soil and air pollution from inappropriate disposal of fuel/oil and other chemicals.
Bushfire	<ul style="list-style-type: none"> vegetation clearing; handling, storage and disposal of hazardous materials; dismantling of existing structures; construction activities involving hot works (open flame equipment); and adjustments of existing public utilities. 	<ul style="list-style-type: none"> air pollution due to ash/dust generation from fire caused by electrical sparks from plant and equipment operations; air pollution from spontaneous combustion of vegetation due to fuel build-up from vegetation clearing; build up of fuel at edges of easement if cleared vegetation is not removed; flora and fauna damage due to open fires caused by construction personnel; flora and fauna damage due to hot works during constructing of new infrastructure and decommissioning of existing infrastructure; and surface water and soil pollution due to ash deposits.
Acid Sulfate Soils Contaminated soils Contaminated surface water and/or	<ul style="list-style-type: none"> vegetation clearing; removal, stockpiling and respreading of soil; site establishment - site compounds, access points and access routes; 	<ul style="list-style-type: none"> air pollution due to dust generation from contaminated spoil stockpiles/exposed surfaces; water pollution due to sediment runoff from contaminated spoil stockpiles/exposed surfaces;

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Category	Hazard	Risk
groundwater Asbestos Containing Materials	<ul style="list-style-type: none"> ▪ operation of site compound; ▪ mine void grouting works ▪ plant and equipment maintenance; ▪ vehicle washdown; ▪ handling, storage and disposal of hazardous materials; ▪ concreting activities; and ▪ site revegetation. 	<ul style="list-style-type: none"> ▪ air pollution due to odour generation from inappropriate storage of contaminated soils, surface water and/or groundwater; and ▪ water, soil and air pollution from inappropriate disposal of contaminated soils, surface water and/or groundwater.
Pollution Incidents	<ul style="list-style-type: none"> ▪ vegetation clearing; ▪ removal, stockpiling and respreading of soil; ▪ site establishment - site compounds, access points and access routes; ▪ operation of site compound; ▪ mine void grouting works ▪ plant and equipment maintenance; ▪ vehicle washdown; ▪ handling, storage and disposal of hazardous materials; ▪ concreting activities; and ▪ site revegetation. 	<ul style="list-style-type: none"> ▪ Inadequate response to pollution incidents ▪ Failure to have appropriate spill response materials in place and in appropriate locations ▪ Inadequate training in incident response resulting in poor management
Construction Occupational Health & Safety	<ul style="list-style-type: none"> ▪ Viaduct / Bridge Construction ▪ Mine Void Treatment Activities ▪ Transport ▪ Survey Work ▪ Plant & Equipment ▪ Noise Impacts ▪ Identified and Unidentified Utilities ▪ Worker Safety ▪ Hazardous Materials ▪ Manual handling ▪ Electrical hazards ▪ Blasting ▪ Confined spaces ▪ Plant Rollover 	<ul style="list-style-type: none"> ▪ Bridge collapses with the potential for injury, loss of life and damage to assets, plant and equipment. ▪ Loss of material from trucks transporting construction materials causing injury to pedestrians and cyclists. ▪ Personal injury or fatality from traffic accident. ▪ Injury or death to operators. ▪ Hearing impairment to workers. ▪ Injury or death resulting from potential electrocution. ▪ Injury or death as a result of poor OH&S procedures. ▪ Mishandling of hazardous materials leading to personal injury or death.

Note: OH&S risks are only covered in a broad sense in this Plan but are covered comprehensively through the OH&S Management Plan and JSEA processes.

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7 MANAGEMENT MEASURES AND MITIGATION STRATEGIES

Table 7.1 below outlines management measures and mitigation strategies to be undertaken as far as practicable to mitigate the potential impacts as they relate to pre-construction and construction phases of the project.

Table 7.1: Management Measures and Mitigation Strategies

Management measures and mitigation strategies	Responsibility	Source of requirement
Pre-construction		
This Hazard and Risk Management Sub Plan has been prepared in accordance with MCoA 117.	Environment Manager	MCoA 117
<p>The Alliance shall prepare and implement an On-Site Refuelling Protocol to manage on-site refuelling of vehicles during the construction. The Protocol shall include, but not necessarily be limited to:</p> <ul style="list-style-type: none"> i) a decision-making algorithm to determine whether on-site or off-site refuelling is appropriate in a given situation; ii) arrangements for the transport of diesel to the refuelling site, including vehicle types, volumes, movement times and routes where relevant; iii) procedures for refuelling to address the potential for spills, collisions with refuelling vehicles or other hazardous incidents; and iv) procedures to be followed in the event of a diesel spill, including containment and clean-up measures. <ul style="list-style-type: none"> ▪ The On-Site Refuelling Protocol shall be submitted for the approval of the Director-General prior to the commencement of any refuelling activity, or within such period otherwise agreed by the Director-General. 	Environment Manager	MCoA 118

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Management measures and mitigation strategies	Responsibility	Source of requirement
<ul style="list-style-type: none"> Refer to Appendix C for the On-site Refuelling Protocol. 		
<ul style="list-style-type: none"> A Construction Framework Environmental Management Plan shall be prepared, following consultation with the RTA, DECCW, I&I NSW (Fisheries), relevant Councils, and all relevant utility/service providers. The Construction Framework EMP shall be prepared in accordance with the conditions of approval, all relevant Acts and Regulations and accepted best practice management Sub Plans. 	Environment Manager	MCoA 24
Construction		
<ul style="list-style-type: none"> Education of site personnel as to the requirements for control measures regarding management of hazards and risks associated with the project will be implemented and maintained on site. 	Environment / Safety Managers	
This shall be undertaken through daily hazard pre-start meetings and checks, development and implementation of Job Safety and Environmental Analysis (JSEA) procedures and toolbox training as required.		
Bushfire and fire		
<ul style="list-style-type: none"> No 'burning off' will be conducted without approval of Local Fire Officer of NSW Bushfire Brigade, and/or a 'Hazard Reduction Certificate'. 	Senior Project Engineer / Environment Manager	
<ul style="list-style-type: none"> Bushfire danger risk rating information will be identified prior to work activity commencement and communicated to the project team. 	Senior Project Engineer / Environment Manager	
Comply with the management requirements within		

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Management measures and mitigation strategies	Responsibility	Source of requirement
Appendix A, including the following measures:		
<ul style="list-style-type: none"> Controlled methods for hot work will be used during extreme or very high fire danger periods, where approved. Refer to Appendix D for further detail. 	Project Managers / Environment Manager	
<ul style="list-style-type: none"> A fire extinguisher will be provided in all vehicles, where practicable. 	Environment / Safety Managers	
<ul style="list-style-type: none"> Hot work will be located in areas away from flammable material, including dry grass and vegetation. Refer to Appendix D for further detail. 	Superintendent	
<ul style="list-style-type: none"> If a fire approaches a worksite, hazardous materials and fuels will be secured immediately, and Construction Manager / Site Superintendent will be notified immediately. 	All staff	
<ul style="list-style-type: none"> Any unattended fire will be extinguished as soon as observed in accordance with the Environment Incident Response Procedure (Refer to Appendix B). Authorities will be contacted immediately where this is beyond the ability of site staff. 	All staff	
<ul style="list-style-type: none"> All staff will follow instruction given by Site Superintendent and NSW Fire Brigade. 	All staff/Superintendent	
Refuelling and storage of fuels and oils, hazardous substances and dangerous goods		
<ul style="list-style-type: none"> All machinery must be inspected daily for leaks and any leaks immediately repaired. 	Superintendent / Foremen	
<ul style="list-style-type: none"> Handling, storage and disposal of fuel, oil, and other chemicals will be undertaken in accordance with AS1940 – 2004 (or relevant update), the Storage and Handling of Flammable and Combustible Liquids. 	Environment Manager / Construction Manager	
<ul style="list-style-type: none"> Appropriate detention systems for containment of spills 	Environment Manager / Construction Manager	MP CoA 95

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Management measures and mitigation strategies	Responsibility	Source of requirement
and materials arising from accidents that are consistent with the RTA's Code of Practice for Water Management - Road Development and Management will be provided, in consultation with EPA.		
<ul style="list-style-type: none"> Cabins, containers, workshops, plant, materials stores and storage tanks will not be sited on the floodplain of watercourses. 	Senior Project Engineer / Superintendent	
<ul style="list-style-type: none"> Areas for storage of oils and other hazardous liquids used during construction will be bunded and secure, and any spillage will be collected and disposed off-site at a licensed facility 	Senior Project Engineer / Superintendent	Reps Report Vol 1 No. 139 & 146
<ul style="list-style-type: none"> Bunded area will be sized to contain spillage of least 120% of the largest liquid storage container. 	Superintendent	
<ul style="list-style-type: none"> Bunded areas will be constructed in accordance with EPA Technical Bulletin Bunding and Spill Management, November 1997, or current version. 	Construction Manager	
<ul style="list-style-type: none"> The design and location of any bunded areas will be incorporated as part of the CEMP. 	Environment Manager	Reps Report Vol 1 No. 146
<ul style="list-style-type: none"> Weekly inspection and monitoring (as part of weekly environmental inspection checklists) of the bunded areas will be undertaken to ensure proper maintenance of tanks and containment of any spills. 	Environment Manager / Superintendent	
<ul style="list-style-type: none"> Keep quantities of dangerous goods stored on site as per relevant guidelines 	Superintendent	
<ul style="list-style-type: none"> Only compatible dangerous goods will be stored adjacent to each other. 	Superintendent	
<ul style="list-style-type: none"> Drip trays will be placed under standing machinery i.e. generators, compressors etc. 	Superintendent	
<ul style="list-style-type: none"> All repair and maintenance work to plant and vehicles would be subjected to the same precautions as fuel 	Superintendent	

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Management measures and mitigation strategies	Responsibility	Source of requirement
storage.		
<ul style="list-style-type: none"> Spill kits will be readily available. Trucks must carry spill kits sufficient in capacity to contain fuel or other fluids carried on board. 	Environment Manager	
<ul style="list-style-type: none"> Material safety data sheets will be readily available for all chemicals to be present and accessible on site. 	Environment / Safety Managers	
Acid sulfate soils		
<ul style="list-style-type: none"> If potential acid sulfate soils are identified and avoidance is not possible, soils will be managed and disposed in accordance with the Acid sulfate Soil Manual (Acid sulfate Soil Management Advisory Committee, 1998) and the HEA Acid Sulfate Soil Management Strategy (Appendix C of the Soil & Water Management Sub Plan). 	Project Manager / Environment Manager	
Contaminated soils, surface and groundwater		
<ul style="list-style-type: none"> If suspected contaminated materials are encountered during construction, work will stop at the site until the material has been assessed and removed, or stabilised, in accordance with the Waste Classification Guidelines 2008 (DECCW publication) and the <i>Protection of the Environment Operations Act 1997</i>. 	Superintendent / Environment Manager	
Asbestos containing materials		
<ul style="list-style-type: none"> If suspected asbestos containing materials are encountered, work will stop at the site until the material has been assessed by an appropriately qualified person. 	Superintendent / Environment Manager	
<ul style="list-style-type: none"> If suspected asbestos containing materials are encountered, they will be managed and disposed of by a licensed sub-contractor. 	Superintendent / Environment Manager	

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Management measures and mitigation strategies	Responsibility	Source of requirement
Pollution incidents		
<ul style="list-style-type: none"> Pollution incidents will be managed in accordance with the Environment Incident Response Procedure (refer to Appendix B) And the relevant Sub Plans 	Superintendent / Environment Manager	
<ul style="list-style-type: none"> All staff to be trained in spill response and incident reporting procedures. 	Environment Manager	
<ul style="list-style-type: none"> Designated staff will be trained in the storage, handling, use and safe disposal of dangerous goods and other chemicals. 	Environment Manager	
Occupational Health and Safety		
<ul style="list-style-type: none"> All aspects of Occupational Health and Safety on the project will be managed in accordance with the Project OHS Management Plan 	Safety Manager	

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8 MONITORING AND REPORTING

Monitoring and reporting of hazards and risk will be conducted as part of the overall environmental management processes of the project. A series of documents will be utilised including Job Safety and Environmental Analyses, Environmental Construction Method Statements, Excavation Permits and procedures, incident reports and regular site safety and environmental audits.

All forms will be maintained by the Environment Manager, Safety Manager, the Project Engineer(s) or their delegates. Documents will be updated regularly to reflect any changes as they become available.

The following protocols for monitoring of hazards and risk during the construction works will be established:

- **Identification and review of hazards:** health, safety and environmental inspections will be conducted weekly to identify hazards, including storage areas for hazardous or dangerous goods, associated with works performed under the contract
- **Monitoring of compliance:** Compliance against the Conditions of Approval will be demonstrated 6-monthly CoA Construction Compliance Report (CCR) for the Project.
- **Inspection reports:** these will be acted on immediately (where action is required)
- **Non-conformances:** all non-conformances noted during the monthly inspections will be documented in inspection reports and acted on immediately by the most appropriate site personnel.

All environmental incidents will be reported in accordance with Section 3.10 of the CEMP. The reporting process is based on the protocols detailed in the OHS Management Plan.

Table 8.1 below outlines the monitoring and reporting requirements

Table 8.1: Monitoring and Reporting Requirements

Monitoring and reporting requirements	Responsibility	Source of requirement
Construction		
<ul style="list-style-type: none"> ▪ Pollution incidents will be investigated and reported in accordance with the Section 3.10 of the CEMP. 	Environment Manager/ Alliance Director	
<ul style="list-style-type: none"> ▪ Risks and hazards will be monitored in order to identify and manage any new risks and hazards that may arise during the construction phase of the project (refer to Section 4 of this Sub Plan). 	Environment Manager/ Construction Manager	
<ul style="list-style-type: none"> ▪ Aspect and impact risk assessment of any new construction activities that were not assessed previously in the CEMP will be assessed in 	Environment Manager/ Construction Manager	

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accordance with Section 4 of this Sub Plan		
<ul style="list-style-type: none"> Following the risk assessment, appropriate mitigation measures will be developed to minimise the impact on the environment. 	Environment Manager/ Construction Manager	
<ul style="list-style-type: none"> Audits of Work Method Statements, Daily Hazard Pre-start documentation and JSEAs shall be carried out as determined in the OHS Management Sub Plan 	Environment Manager/ Construction Manager	

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9 CORRECTIVE ACTION

Possible non-conformances with this Sub Plan will include non-compliance with the management measures and mitigation strategies outlined in Section 7.

All non-conformances with this Sub Plan will be reported, investigated and corrected in accordance with Section 4.7 of Volume 1 of the CEMP (HEA-PL-GL-EMP-001-00-00) to ensure effective hazard and risk management practices at all times on site.

Where non-conformances and breaches of the requirements of the CoA, the Construction Environmental Management Plan (CEMP) and Sub Plans or legislation are identified, the following corrective actions will be employed depending on the nature of the situation and the level of risk:

- Investigation and reporting on the nature of the non-conformance (Internal)
- Notification of authorities and external investigation and reporting
- Conduct immediate or delayed inspection and rectification depending on risk level
- Modify work practices, conduct repairs, or remediate areas where necessary
- Conduct training and induction, issue memos
- Update procedures and documentation where required.

HAZARD AND RISK MANAGEMENT

APPENDIX A -

Initial Risk Assessment

Appendix A – Initial Hazards and Risk Assessment

Category	Activity / Hazard	Risk	Controls / Mitigation	Risk Ranking with Controls		
				Likelihood	Consequence	Priority
Environmental - General	Culture	Poor environmental culture leading to increased enviro incidents	Detailed project induction to include emphasis on culture. Regular toolbox talks / training in environmental issues.	Unlikely	Major	Moderate
	Performance	Poor non-conformance systems	Environmental incident avoidance, learning and response. Separate training to be given on this topic.	Unlikely	Moderate	Moderate
		Issues not actioned	People - training/ resources / Commitment leadership	Possible	Major	High
		Issues are not identified	Inspection issues actioned within 5 working days.	Unlikely	Major	Moderate
		Poor relationships with relevant Government Agencies and Councils.	Regular consultation. Environmental review group meetings.	Possible	Moderate	Moderate
		Breach of Environmental Protection Licence (identify specific risks i.e.)	Monthly assessment of compliance against EPL. Audits / inspections.	Possible	Major	High
		Working hour conditions not complied with.	Induction, toolbox, surveillance	Possible	Moderate	Moderate
		Failure to comply with Minister of Planning Conditions of Approval and applicable legislation.	CEMP, Audit, Inspection, surveillance	Possible	Major	High
Noise, vibration and blasting.	General	Exceedance (complaint) of construction noise limits within approved working hours	Monthly (or more) monitoring to be undertaken at the nearest potentially affected receiver.	Likely	Minor	Moderate
		Structural damage due to vibration (heritage listed tunnel + aboriginal artefacts)	CNVMSP, structural / vibration assessment of heritage items	Possible	Major	High
		Inadequate consideration of noise impacts from construction traffic	Undertake monitoring at relevant locations to check compliance	Possible	Minor	Moderate

Category	Activity / Hazard	Risk	Controls / Mitigation	Risk Ranking with Controls		
				Likelihood	Consequence	Priority
	Piling	Noise impacts on sensitive receivers during construction	Undertake monitoring at relevant locations to check compliance. Work within approved hours.	Possible	Minor	Moderate
	Blasting	Exceedance of overpressure and vibration	NVMSP, Blast Management Strategy	Possible	Moderate	Moderate
	Saw cutting	Generating complaints due to out of hours work activities	Gain approval of hours and advertise activities	Possible	Minor	Moderate
	Design/construction of compounds / batch plant	Inadequate design / location of site compounds / batch plants	Undertake noise modelling	Unlikely	Moderate	Moderate
	Notifications	Failure to notify local community of noisy works resulting in complaints	Site awareness training / environmental inductions to include a section on noise mitigation measures. Supplement with tool box talks.	Possible	Minor	Moderate
Aboriginal cultural heritage	Vegetation clearing. Removal, stockpiling and respreading of soil. Site establishment - site compounds, access points and access routes. Dismantling of existing structures. Adjustments of existing public utilities. Site revegetation.	Disturbance / destruction of identified Aboriginal objects and places (Minmi Creek)	Indigenous Heritage Sub Plan fencing, training, induction, inspection	Possible	Major	High
		Disturbance / destruction of unidentified Aboriginal objects and places	Initiate protocols in Indigenous Heritage Sub Plan	Unlikely	Moderate	Moderate
		Poor relationships with Aboriginal communities	Invite Aboriginal community to help design induction. Regular and focused AFG meetings. Invite aboriginal community to be present during specific areas of land clearing.	Unlikely	Moderate	Moderate
		Breach of approvals	Invite aboriginal community to be present during specific areas of land clearing. Regular monitoring of approval conditions via inspection / audit CEMP	Unlikely	Moderate	Moderate
		Failure to notify appropriate authorities in case of Aboriginal relics disturbance	Training in notification protocols as per Indigenous Heritage Sub Plan	Rare	Moderate	Moderate

Category	Activity / Hazard	Risk	Controls / Mitigation	Risk Ranking with Controls		
				Likelihood	Consequence	Priority
		Structural damage to Aboriginal heritage items (Minmi Creek)	Assess prior to works. Undertake vibration monitoring where necessary	Possible	Major	High
		Inadequate protection of identified Aboriginal sites	Undertake fencing / protection in conjunction with Aboriginal community. Regular inspection.	Unlikely	Minor	Low
		Interference from dissatisfied groups	Aboriginal Focus Group consultation,	Possible	Moderate	Moderate
		Delay in negotiating outcomes	Aboriginal Focus Group consultation,	Likely	Minor	Moderate
Historical Heritage	Vegetation clearing. Removal, stockpiling and respreading of soil. Site establishment - site compounds, access points and access routes. Dismantling of existing structures. Adjustments of existing public utilities. Site revegetation.	Disturbance / destruction of identified historical heritage objects and places	Induction, training, fencing (where required) Historical Heritage Management Sub Plan	Possible	Moderate	Moderate
		Disturbance / destruction of unidentified historical heritage objects and places	Initiate protocols in Historical Heritage Management Sub Plan	Unlikely	Minor	Low
		Breach of approvals	Regular audit / inspection	Unlikely	Minor	Low
		Failure to obtain timely approvals/responses from Heritage Office	Early consultation where necessary	Unlikely	Minor	Low
		Failure to notify appropriate authorities in case of historical heritage relics disturbance	Training in notification protocols as per Historical Heritage Management Sub Plan	Unlikely	Minor	Low
		Structural damage to historical heritage items	Undertake structural assessment prior to works and vibration monitoring where necessary	Possible	Moderate	Moderate
		Inadequate protection of identified historical heritage sites	Regular inspection.	Unlikely	Minor	Low
Air Quality	Vegetation clearing. Removal, stockpiling and respreading of soil.	Impacts on adjacent properties from dust and emissions from heavy construction machinery & traffic	Speed restrictions on un-sealed construction roads to be implemented. Use of adequate dust management controls (water carts, crusting agents etc)	Possible	Moderate	Moderate

Category	Activity / Hazard	Risk	Controls / Mitigation	Risk Ranking with Controls		
				Likelihood	Consequence	Priority
	Site establishment - site compounds, access points and access routes. Dismantling of existing structures. Adjustments of existing public utilities. Mine grouting works. Site revegetation. Plant and equipment maintenance.	Exceedance of dust deposition limits (EPL)	Investigate source and action	Possible	Moderate	Moderate
		Reduced visibility / safety due to dust in air	Use of adequate dust management controls (water carts, crusting agents etc)	Possible	Minor	Moderate
		Poor stockpile management	Long-term topsoil stockpiles and cleared areas to be protected by establishment of quick growth cover crops	Possible	Minor	Moderate
		Inadequate dust suppression measures	Use of adequate dust management controls (water carts, crusting agents etc)	Possible	Minor	Moderate
		Poor maintenance of plant / equipment	Pre-start checks and regular maintenance	Possible	Minor	Moderate
		Batch plant / crushers dust emissions	Install dust suppression sprays at Batch Plant. Water carts to regularly spray water over the construction route, unsealed local roads, batch plant sites and stockpile areas (if necessary) to maintain surfaces in a damp condition	Likely	Minor	Moderate
Flora and Fauna	Vegetation clearing Site establishment - site compounds, access points and access routes. Removal, stockpiling and respreading of soil.	Clearing, removal and disturbance of threatened species or populations including riparian vegetation outside of approval. i.e. access tracks/ ancillary sites ..	Pre-clearing surveys, ground disturbance permit system	Possible	Major	High
		Damage to vegetation or areas outside of designated construction sites and work compounds.	Site induction, fencing, ground disturbance permitting system	Possible	Moderate	Moderate
		Sediments illegally entering waterways.	Adequate erosion and sediment control as per Soil & Water Management Sub Plan	Likely	Major	High
		Death of animals during clearing.	Pre-clearing surveys undertaken by ecologists / WIRES	Possible	Minor	Moderate
		Loss and degradation of fauna habitat.	Inspection / audit. No work outside project boundaries	Likely	Minor	Moderate

Category	Activity / Hazard	Risk	Controls / Mitigation	Risk Ranking with Controls		
				Likelihood	Consequence	Priority
	Site revegetation	Introduction and spreading of noxious weeds and feral fauna species.	Engagement of ecologist	Possible	Minor	Moderate
		Poor soil preparation for revegetation	Engagement of soil scientist	Likely	Major	High
Waste	Vegetation clearing. Adjustments of existing public utilities. Removal, stockpiling and respreading of soil. Operation of site compound. Operation of asphalt and concrete batch plants. Plant and equipment maintenance. Mine grouting works. Vehicle wash down. Concreting activities. Dismantling of existing structures. Site revegetation.	Excess generation of waste during construction activities including building materials, excess unsuitable spoil material, vegetation material.	Education and encouragement of employees on good housekeeping via training programs and induction	Likely	Minor	Moderate
		Inappropriate management and storage of waste	All wastes generated on site to be sorted and stored separately where possible to maximise recycling. General recycling contractor (paper, glass, aluminium cans, etc) to be engaged for collection of recyclables from site	Unlikely	Moderate	Moderate
		Inappropriate disposal of waste	Waste management audits to be undertaken to assess extent of waste hierarchy in use	Unlikely	Moderate	Moderate
		Failure to adopt waste hierarchy	Regular inspection to assess waste management	Unlikely	Minor	Low
		Non compliance with legislation	Excess spill materials to be kept on-site for re-stocking and regular spill kit audits to be undertaken	Unlikely	Minor	Low
		Inappropriate spill and spill absorbent material management	Check via inspection	Unlikely	Minor	Low
Soil and Water	Vegetation clearing. Removal, stockpiling and respreading of soil. Site establishment - site compounds, access points and access routes. Mine grouting works. Adjustments of	Erosion and subsequent sedimentation leading to water contamination and fish kills.	Induction, ESC training, location specific Erosion and Sediment Control Plans, ground disturbance permitting system	Likely	Moderate	High
		Unauthorised release of water particularly during heavy rain events.	Training, development of water management procedure. Control dewatering and pumping out.	Likely	Moderate	High
		Inadequate management of contaminated soils leading to water, soil and air pollution.	Induction, ESC training, location specific Erosion and Sediment Control Plans, ground disturbance permitting system	Unlikely	Minor	Low

Category	Activity / Hazard	Risk	Controls / Mitigation	Risk Ranking with Controls		
				Likelihood	Consequence	Priority
	existing public utilities. Dismantling of existing structures. Operation of site compound. Site revegetation	Poor construction works staging leading to erosion and sedimentation.	water pollution / lack of programing / areas left open to long	Possible	Major	High
		Failure to separate clean and dirty water on site leading to water pollution.	Early design. Erosion & Sed Control Plans prepared and inspected by soil conservationist	Possible	Moderate	Moderate
		Mud tracking	Wheel wash facilities at site exits, provision of road sweeper	Almost Certain	Minor	High
	Management of erosion and sedimentation controls.	Inadequate ESC resources leading to poor management of erosion and sedimentation controls.	Dedicated erosion and sed control team to manage controls	Unlikely	Moderate	Moderate
	Plant and equipment maintenance.	Failure of plant / equipment leading to soil and water pollution	Daily pre-start checks of all plant in use. Adequate access to oil spill controls.	Possible	Minor	Moderate
	Vehicle wash down.Handling, storage and disposal of hazardous materials.	Accidental spills and leaks of oils, lubricants, fuels, chemicals, herbicides or other pollutants onsite or into nearby watercourses.	Adequate oil/chemical spill response kits / equipment with workforce trained in its use and response.	Possible	Minor	Moderate
	Sediment basin construction	Poor design and location of sediment basins.	Design in conjunction with soil scientist	Possible	Moderate	Moderate
	Concreting activities.	Concrete wastes and washing out concrete mixers as well as slurry from saw cutting impacting upon adjacent water quality.	Dedicated wash out locations to be installed.	Unlikely	Moderate	Moderate
	Batch plant construction.	Inadequate design / management of batch plant.	Design	Unlikely	Minor	Low
Topsoil	Topsoils storage locations and management	Insufficient space for storage of topsoil	Focused design and programming of topsoil management. Dedicated materials manager on project.	Almost Certain	Minor	High
		Poor vegetation establishment due to dispersive / sodic soils	Engagement of soil scientist	Likely	Moderate	High
Occupational Health & Safety Considerations (refer to OH&S Management Plan for details)						

Category	Activity / Hazard	Risk	Controls / Mitigation	Risk Ranking with Controls		
				Likelihood	Consequence	Priority
OHS	Viaduct / Bridge Construction	Bridge collapses with the potential for injury, loss of life and damage to assets, plant and equipment.	Implement appropriate traffic control measures and educate drivers about their responsibilities and duty of care.	Unlikely	Major	Moderate
	Transport	Loss of material from trucks transporting construction materials causing injury to pedestrians and cyclists.	Implement appropriate traffic safety controls and educate personnel in appropriate OH&S procedures. Tool box workers on safe working practices and wear clothing that is clearly visible.	Unlikely	Major	Moderate
	Survey Work	Personal injury or fatality from traffic accident.	Ensure loads are secure and dust suppression has been implemented. Implement appropriate traffic control measures and educate drivers about their responsibilities and duty of care. Inform Councils and cycle groups about proposed construction works.	Unlikely	Major	Moderate
	Plant & Equipment	Injury or death to operators.	Undertake appropriately detailed geotechnical investigations. Provide adequate temporary structures during bridge construction. Ensure that appropriate permanent ground support structures are constructed.	Unlikely	Major	Moderate
	Noise Impacts	Hearing impairment to workers.	Implement appropriate OH&S training.	Unlikely	Major	Moderate
	Identified and Unidentified Utilities	Injury or death resulting from potential electrocution.	Educate workers in OH&S procedures. Ensure workers wear protective devices and adhere to OH&S procedures.	Unlikely	Major	Moderate
	Worker Safety	Injury or death as a result of poor OH&S procedures.	Adopt appropriate OH&S procedures and educate staff in their implementation.	Unlikely	Major	Moderate
	Hazardous Materials	Mishandling of hazardous materials leading to personal injury or death.	Adopt safe handling and transport practices and comply with manufacturers instructions	Unlikely	Major	Moderate

HAZARD AND RISK MANAGEMENT

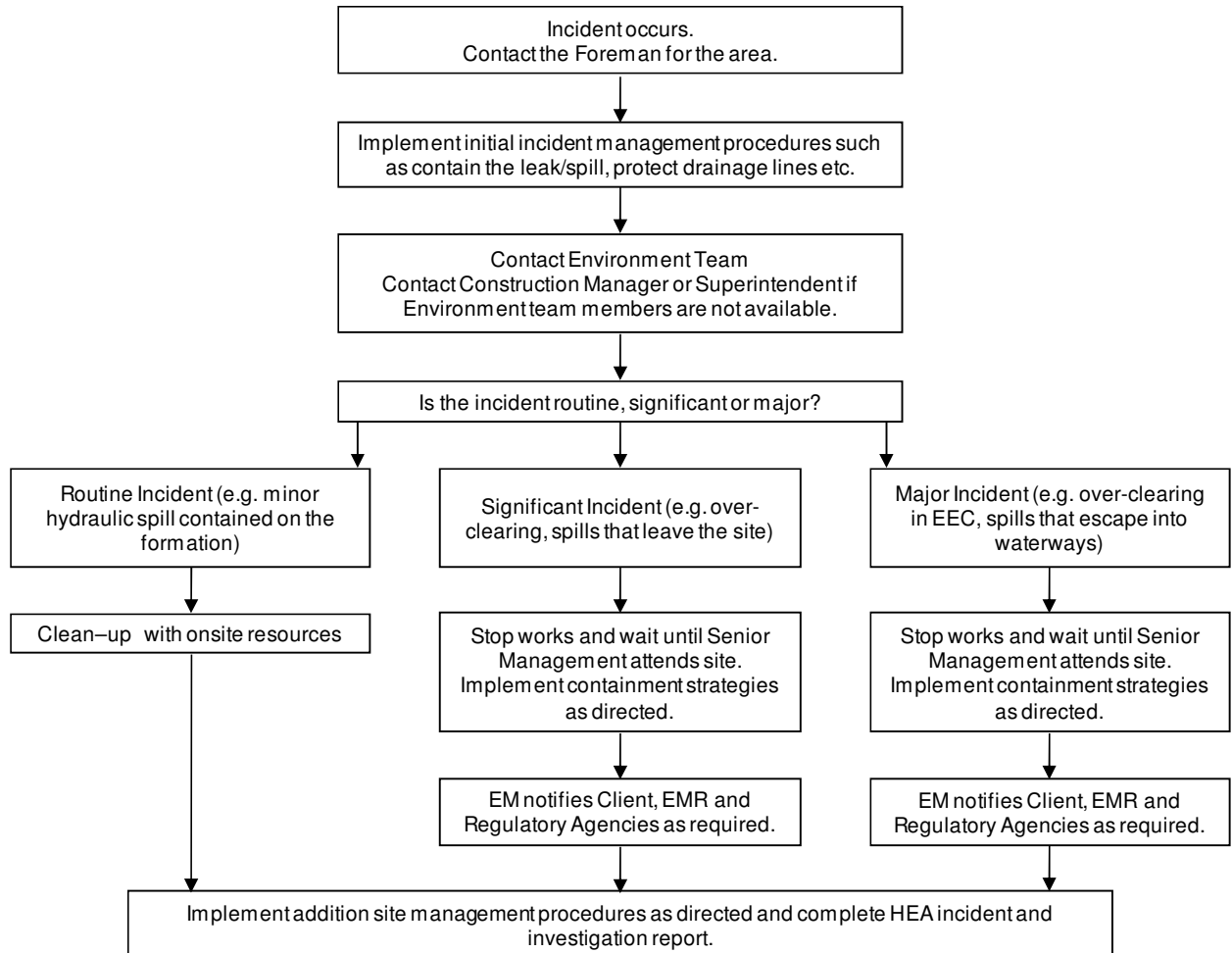
APPENDIX B -

Incident Response / Contingency Plan

APPENDIX B - INCIDENT RESPONSE

1 INITIAL ENVIRONMENTAL INCIDENT RESPONSE

(see additional specific incident management flowcharts at for spills and ESCs at 3 and 4. below)



APPENDIX B - INCIDENT RESPONSE**2 EMERGENCY CONTACT LIST**

Organisation	Name	Number/s	Address	Other details
Emergency Controller (HEA)	TBA			
RTA	Tony Gant			
Project Director	Peter Chatburn	0418233905		
Environmental Manager	Tracey Doczy	0439 300 118		
Environmental Coordinator	TBA			
Community Liaison Manager	TBA			
NSW Police		000		
NSW Fire Brigade		000		
NSW Ambulance Service		000		
Hospital	John Hunter Hospital	02 4921 4960	Lookout Road New Lambton NSW 2305	
Rural Fire Services		000		
SES		132 500		
Poisons Information		131 126		
DECCW (DECCW)	Rebecca Scrivener	4908 6830		
DECCW Pollution Line		131555		
DII (Fisheries)	Scott Carter	0419 185 508		
Local contractor services (e.g. waste collection, spill clean-up)	TBA			

APPENDIX B - INCIDENT RESPONSE

3 ENVIRONMENTAL INCIDENT MANAGEMENT PROCEDURES FOR SPILLS

PRIOR TO ANY ACTION, IDENTIFY MATERIALS INVOLVED & OBTAIN PERSONAL PROTECTIVE EQUIPMENT

	Action	Responsibilities	Comments
1	Stop further leak	Person causing/finding leak	If leak from oil drum, roll drum so that leak area is uppermost. If leak from pipe, close valve etc.
2	Inform supervisor	Supervisor/Person	Stop human and vehicular traffic and isolate area.
3	Determine the site of the leak	Environmental Manager/Construction Manager	For major leaks ring 1300 851 050 and notify superintendent. If spill has escaped offsite/into creek/ring Environmental Manager
4	Form barrier around leak/spill	Foreman / Superintendent	Use foam barrier material in kit. Use soil/sand if kit not available.
5	Stop the spreading of leak	Foreman / Superintendent	Transfer fuel/oil from spill drum into another drum etc.
6	Put barrier around drains/outlets	Foreman / Superintendent	Seal drain grates by putting sand bags etc. around them.
7	Obtain oil spill kit *and apply oil absorbent on spill	Foreman / Superintendent	Use "absorbent W" or equivalent.
8	Clean up/remove absorbent material to bin **	Foreman / Superintendent	Use "Chem -Oil-A-Way" or equivalent for clean-up of area. Use brush/pan provided in kit.
9	Clean up hard surface by excavating contaminated soil	Foreman / Superintendent	Stockpile contaminated material in designated area
10	Clean up soft surface by excavating contaminated soil	Foreman / Superintendent	Stockpile contaminated material in designated area
11	Inform Environmental Manager and fill in Incident Log Form	Environmental Manager	Record incident and review procedures

* oil spill kit available at both compounds.

** bin located at Construction Compounds.

APPENDIX B - INCIDENT RESPONSE

4 PROCEDURE FOR THE REMEDIATION OF SEDIMENT CONTROL DEVICES

	Action	Responsibilities	Comments
1.	Inform area supervisor of problem/ exact location and the magnitude.	Person causing/ discovering the problem	Assess whether the problem can be promptly rectified.
2.	If uncontrollable, notify sediment control crews.	Foremen/superintendents	State the magnitude of the problem and the materials required.
3.	Divert flow away from existing waterways.	Foremen/superintendents and available machinery	Stop vehicular traffic and construct an earth bund or diversion drain.
4.	Form a barrier around the affected area. Establish emergency berm (earth or sandbags) to trap sediment or reduce flow.	Emergency response unit	-
5.	Work on the restoration of original control device.	Foremen/superintendents /Operators	Stem the flow and replace damaged control device.
6.	Assess impact and devise remedial action for affected waterway and embankment.	Environmental Manager	Proceed with water quality monitoring.
7.	Apply buffering solutions/agents if required.	Emergency response unit	Monitor affects of this application
8.	Clean away sediment build-up deposits before leaving area.	Foremen/superintendents /Operators	Use available machinery.
9.	Record all stages of event on Environmental Incident Report form and investigate causes.	Environmental Manager/ Foremen/superintendents	Witness accounts/ photographs/ monitoring results
10.	Review remedial actions and find out if response process can be improved.	Environmental Manager/ Foremen/superintendents	Initiate change in the process if required.
11.	Review incident to determine if environmental system failure. Improve system if required.	Environmental Manager/ Foremen/superintendents	Initiate change in system if required.

APPENDIX C -

Refuelling Protocol

APPENDIX C - REFUELLING AND LIQUID STORAGE PROTOCOL

1 INTRODUCTION

The *Protection of the Environment Operations Act 1997 (POEO Act)* sets requirements for protecting the environment from pollution, in addition the *Contaminated Land Management Act 1997* regulates the investigation and clean up of land contamination. The HEA Alliance and its contractors therefore have a legal obligation to ensure their fuel and chemical storage comply with the relevant legislation.



It's important to get refuelling right the first time!

2 YOU AND THE LAW

When using and storing liquid substances you should be aware of your obligations!

The *Protection of the Environment Operations Act 1997* defines water pollution very broadly. 'Waters' can include creeks, rivers, oceans but also dry creek beds, dams, groundwater and stormwater channels. 'Pollution of waters' not only means placing any substance into 'waters' **but also placing any substance in a position where it is likely to 'fall, descend, be washed, be blown or percolate into any waters'**. (Section 120 POEO Act).

Relevant sections with regards to Fuel/Chemical use and storage under the POEO Act:

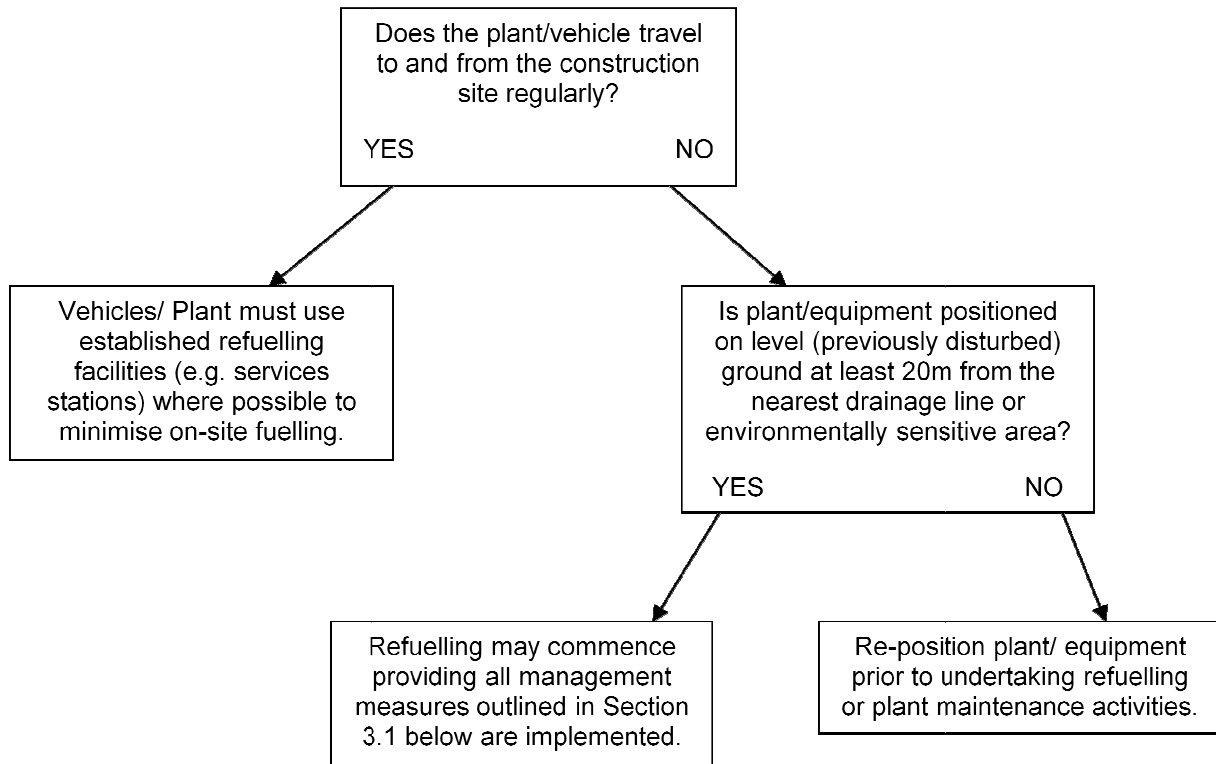
- **Section 116** - makes it an offence to allow a substance to leak, spill or otherwise escape (Whether or not from a container) in a manner that harms or is likely to harm the environment.
- **Section 142A:** Land Pollution - It is an offence to pollute land. Land pollution includes placing in or on or otherwise introducing into or onto the land (whether through act or omission) any substance that could degrade the land and cause actual or potential harm to the health of humans, animals or ecosystems.
- **Section 167** - requires the occupier of any premises to maintain and operate any pollution control equipment installed at the premises in a proper and efficient condition or manner.

Maximum penalties: for individuals: \$1,000,000 or 7 years' imprisonment, or both, for an offence that is committed wilfully or \$500,000 or 4 years' imprisonment, or both, for an offence that is committed negligently. Maximum penalty for corporations: \$5,000,000 for an offence that is committed wilfully or \$2,000,000 for an offence that is committed negligently

APPENDIX C - REFUELLING AND LIQUID STORAGE PROTOCOL

3 REFUELLING

The following decision tree shall be implemented to determine adequate refuelling measures to prevent harm to the environment:



3.1 Refuelling Management Measures

3.1.1 Refuelling at site compound or workshop facility

Refuelling plant and equipment at either a site compound or workshop facility is preferred. If refuelling is carried out at a site compound or workshop facility, the following controls must be implemented:

- Adequate stormwater separation:
 - Bund the refuelling area to prevent stormwater.
- If practical, locate the refuelling area in an undercover facility to prevent rain falling onto the refuelling area.
- Ensure adequate run-off treatment:
 - Direct all run-off from inside the bunded area into an oil separator.
- Ongoing management:
 - Ensure regular maintenance of the oil separator is carried out.
 - Ensure all refuelling is carried out within a bunded area.

APPENDIX C - REFUELLING AND LIQUID STORAGE PROTOCOL

3.1.2 REFUELLING ONSITE

Refuelling should always take place within the designated refuelling area/ workshop. If this is not possible (such as, plant cannot be readily taken off the works area), the following management strategies must be implemented:

1. Refuel on the level ground at least 20m from drainage lines, waterways and/or environmentally sensitive areas.
 - If refuelling on barges or piling platforms is unavoidable then ensure hose, refuelling tank and machine refuelling inlet are bunded at all times.
 - If refuelling on level ground is not possible, always place a temporary bund (such as a gravel-filled sausage) downhill of the refuelling hose in a U-shape to trap any spilled liquid
2. Refuelling should always take place within the designated refuelling area.
3. **NEVER** refuel in vegetated areas (even roadside grasses).
4. **NEVER** leave the refuelling activity unattended.
5. **KNOW** where your spill kit is kept and **ENSURE** you know how to use it. Keep a spill kit on the refuelling truck.
6. All repair and maintenance work to plant and vehicles would be subjected to the same precautions as fuel storage.
7. Handling, storage and disposal of fuel, oil, and other chemicals will be undertaken in accordance with the Waste Guidelines (DECCW 2008) and AS1940 – 2004, the Storage and Handling of Flammable and Combustible Liquids.
8. Emergency Incident Procedures outlined in the CFEMP (**Volume 1 Appendix E**) shall be implemented in the event of a spill or other environmental incident.

All refuelling operations shall be undertaken in accordance with HEA-PP-GL-OHS-038-00.

3.1.3 Transportation of Fuel

1. Transportation of fuel must only be carried out on established access pathways
2. Drivers must be licensed to transport fuels in accordance with the Dangerous Goods (Road and Rail Transportation Act 2008 and associated Regs.
3. Vehicles/Trucks used to transport fuels and chemicals must be maintained to prevent spillage of loads.
4. Any container used to transport fuel must be secured on the vehicle carrying the container.

4 STORAGE AND HANDLING

What type of chemicals should be stored in bunded areas?

Any liquid substance that has the potential to cause harm to the environment. You need to ensure that all liquids stored or used at your site are managed so that they do not enter the environment (unless permitted to do so by a licence, or by approval or agreement from the relevant authority).

Storage and handling must meet the requirements set out in the MSDS plus any other requirements such as Australian Standard 1940 “The storage and safe handling of flammable and combustible liquids”. No subcontractor or Project personnel is to store any

APPENDIX C - REFUELLING AND LIQUID STORAGE PROTOCOL

hazardous substance or dangerous good on the site outside of the designated storage areas.

1. Keep quantities of dangerous goods stored on site to a minimum.
2. Chemicals must be stored in the original containers or a container that has been checked for suitability.
3. Chemicals should be stored in secure designated areas.
4. Chemicals of any quantity shall not be stored in crib rooms, change rooms, ablutions etc. unless they are used in that area and storage requirements are met.
5. MSDS's are to be consulted for storage requirements and if necessary, further advice is to be obtained from the Chemwatch data base.
6. The compatibility of substances is to be verified through consulting the MSDS prior to storage.
7. The quantities of chemicals stored at the workplace are to be kept to a minimum
8. Storage areas must not be located within 20 metres of natural or built drainage lines, flood prone areas, or on slopes steeper than 1:10, or near vegetated areas.
9. Effective storage capacity is 25% of the total storage volume or 120% volume of the largest single container (whichever is greater).

5 GOOD SITE MANAGEMENT /END OF DAY MEASURES

- Frequently check the site for leaks?
- Frequently check the integrity of containers and secondary containment infrastructure
- Regularly maintain containment and secondary containment infrastructure(Dewatering)
- Train all personnel in incident response and spill management (Contact Environment Staff to arrange Training)
- Conduct environmental audits of your whole site
- Check whether any changes to your activity (for example, increased production, new products) have increased your risk of pollution
- Think about how you will improve the environmental performance of and the implementation of plans at your site over time
- Place all onsite fuels and chemicals in there correct areas and within secure storage sheds where possible
- Where necessary drip trays would be placed under standing machinery i.e. generators, compressors etc.

6 ADDITIONAL INFORMATION:

Minor Limits for the Storage of Flammable and Combustible Substances. (Extracted from AS1940:1993), Minor Limits for the Storage of Flammable and Combustible Substances. (Extracted from AS1940:1993)

HAZARD AND RISK MANAGEMENT

APPENDIX D -

Environmental Fact Sheet – Working during the Fire Season

Environment Update Number 02:
Working During the Fire Season
Document Number: HEA-WP-GL-ENV-002-00-00

There are two types of fire restrictions that may be declared under the *Rural Fires Act 1997*. These are Fire Danger Periods and Total Fire Bans.



Figure 1: Oxy Torches and welders generate open flame therefore require a Hot Works Permit.

Under the *Rural Fires Act 1997* the Fire Danger Period normally runs from 1st October to 31st March but can be extended by the Rural Fires Commissioner. During Fire Danger Periods a permit from the Local RFS Control Centre is generally required to carry out burning for land clearing, creating a fire break or lighting fires presenting danger to any building (e.g. hot works). Total Fire Bans (TFB) are also declared by the Rural Fires Commissioner. These apply to selected fire weather zones. The declaration is made in the Government Gazette and announced on local radio and TV the day prior to the ban. Call **1800 679 737** for information on TFB currently in force or visit the RFS website.

During TFB, permits are suspended as they are declared as **NO BURN DAYS** and no open flame is permitted to be lit, maintained or used unless an exemption applies. **Please Note this includes Hot Works.**

All HEA activities where **hot works** are required, must be subjected to a risk assessment process and a judgement made as to whether the work activity creates a low, medium or high risk situation. Refer to the Hot Works Procedure HEA-PP-GL-OHS-019-00-00

For all situations where the risk has been assessed as medium or high, the responsible person must obtain a **Hot Works Permit** from the works foreman (or relevant HEA Manager) using form *Hot Works Permit* (HEA-FM-GL-OHS-019)

It should be noted that hot works conducted indoors are not subject to this additional approval.

Exemptions that are relevant to road construction works are detailed below:

GENERAL EXEMPTIONS

1. Works Urgent in Nature

Urgent or essential repairs or maintenance of roads, bridges or transport facilities to maintain the continuation of that service.

2. Bitumen road works

Fires lit for the purpose of heating bitumen in tankers, sprayers, storage units, mobile asphalt plants, mobile asphalt pavers and pavement recycling machines for road repair and construction works are permitted even during Total Fire Bans.

3. Electric & Gas BBQs

An electric or gas BBQ may be used during Total Fires Bans provided that the appliance is,

- Under the constant control of a responsible adult.
- No combustible material is within 2m of the appliance.
- An adequate system for applying a constant stream of water is available for immediate and continuous use.
- The appliance is located on land within 20m of a permanent private dwelling or on

land approved for that purpose by local council.

No hot works are to be conducted outdoor on the surface on the HEA Project without first obtaining a Hot Works Permit approved by the Safety Manager on days of total fire ban.

Any such works will only be approved if they are of an urgent nature and cannot be rescheduled to a later date outside the ban period.

4. Other exemptions

While it is possible to obtain exemptions for other works on Total Fire Ban days in writing from the RFS Commissioner, it is Alliance policy that this be avoided wherever possible and that such works be postponed until more suitable weather is present.

Conditions for working under an exemption

- Work must first be approved by the Safety Manager *HEA-PP-GL-OHS-019-00-00*.
- The fire must be lit and maintained in a manner which will prevent the escape of fire, sparks or incandescent or burning material from the site of the works.
- Adequate fire fighting equipment (minimum 500L water tank, pump and hoses) must be present and in working order at the site of the work.

Smoking and Fire Danger Periods

- You are not permitted to light a cigarette, or carry a lit cigarette, within 15m of any stack

of grain, hay, mulch, corn or straw or any standing crop, cleared vegetation, dry grass or stubble field during the Fire Danger Period.

- Increased fines apply for disposing of lit cigarettes on the ground during a Fire Danger Period. Penalties up to \$5500 OR an on-the-spot penalty of \$330 may be issued.

Management Measures and Mitigation Strategies

- A fire extinguisher will be provided in all vehicles, where practicable.
- Wherever possible, hot works will be located in areas away from flammable material, including dry grass and vegetation (no hot works are permitted on a Total Fire Ban day outdoors unless an exemption is obtained).
- Onsite mulching during periods of extreme fire danger will be avoided.
- Vegetation waste will be dispersed to reduce fuel build-up and to reduce the potential for spontaneous combustion.
- If a fire approaches a worksite, hazardous materials and fuels will be secured immediately, and the Construction Manager/Site Superintendent will be notified immediately.
- Any unattended fire will be extinguished as soon as observed in accordance with the Environment Incident Response Procedure. Authorities will be contacted immediately where this is beyond the ability of site staff.
- All staff will follow instruction given by Construction Manager/Site Superintendent or NSW Fire Brigade