Appendix F Construction Environmental Management Framework

M2 Upgrade Project

Construction Environmental Management Framework

1. Introduction

1.1 Purpose and scope

This Construction Environmental Management Framework (CEMF) describes the NSW Roads and Traffic Authority (RTA) and the construction contractor's approach to environmental management on the M2 Upgrade.

The CEMF is designed to be a high-level overview document that outlines the statutory provisions, relevant standards and guidelines applicable to the M2 Upgrade during the construction stage. This CEMF sets out the framework for the completion of a Construction Environmental Management Plan (CEMP). A CEMP would be developed prior to commencement of construction, with the purpose of capturing all environmental management aspects, to a level of detail that would enable effective implementation on-site.

Additionally, the CEMP would be amended to incorporate relevant requirements in the Statement of Commitments (SoC), Submissions Report, Minister's Conditions of Approval (MCoA) and any other approvals or licenses, as they are approved.

1.2 Overview of M2 Upgrade environmental assessment and approval

The M2 Upgrade is subject to the process defined under Part 3A of the Environmental Planning and Assessment Act 1979. An Environmental Assessment (EA), developed as part of this process, identifies environmental impacts and mitigation measures for the M2 Upgrade.

1.3 Project description

The M2 Upgrade would extend for 14.5 km along the M2 Motorway from Windsor Road, Baulkham Hills to Lane Cove Road, North Ryde. The M2 Upgrade would be undertaken within a broader study area which extends from Abbott Road, Baulkham Hills, to the western portal of the Lane Cove Tunnel in North Ryde.

The proposed upgrade would include the following key components:

- Widening and/or provision of a third lane along sections of the eastbound and westbound carriageways between Windsor Road and Lane Cove Road.
- Provision of new on/off ramps at Windsor Road, Christie Road and Herring Road.
- Widening and provision of a third lane eastbound and westbound in the Norfolk Tunnel.
- Restoration of the westbound breakdown lane and provision of wider lanes between Beecroft Road and Lane Cove Road.
- Removal of the Beecroft Road bus on/off ramp.
- Intersection capacity improvement at Windsor Road.
- Upgrade to M2 Motorway/Windsor Road intersection, Christie Road and Talavera Road.
- Upgrade to the M2 Motorway Intelligent Transport System.

1.4 Environmental management framework

1.4.1 Environmental management system

The environmental management system (EMS) for the M2 Upgrade would be developed within the framework of the construction contractor's integrated management system.

The construction contractor's integrated management system incorporates the requirements for an EMS and is ISO14001:2004 certified.

1.4.2 Construction Environmental Management Plan

The CEMP would describe the EMS by which the environmental aspects of the M2 Upgrade would be delivered. The environmental management framework is presented in Figure 1-1. The purpose of the CEMP is to create a robust EMS for the M2 Upgrade that is also an effective tool for onsite implementation.

The CEMP would address all environmental management aspects relating to the M2 Upgrade. The CEMP would apply to all areas where physical works are to occur and areas that have potential to be impacted by works. The CEMP would be applicable to all personnel of the construction contractor and its sub-contractors. The CEMP would apply to the M2 Upgrade before, during and after construction.

The environmental aspects of the M2 Upgrade that the CEMP would address include:

- Environment policy.
- Environmental objectives.
- Legislative and other requirements.
- Roles and responsibilities.
- Sub-contractor management.
- Document and records management.
- Communication.
- Risk management.
- Implementation of controls.
- Review and monitoring.
- Incident management.

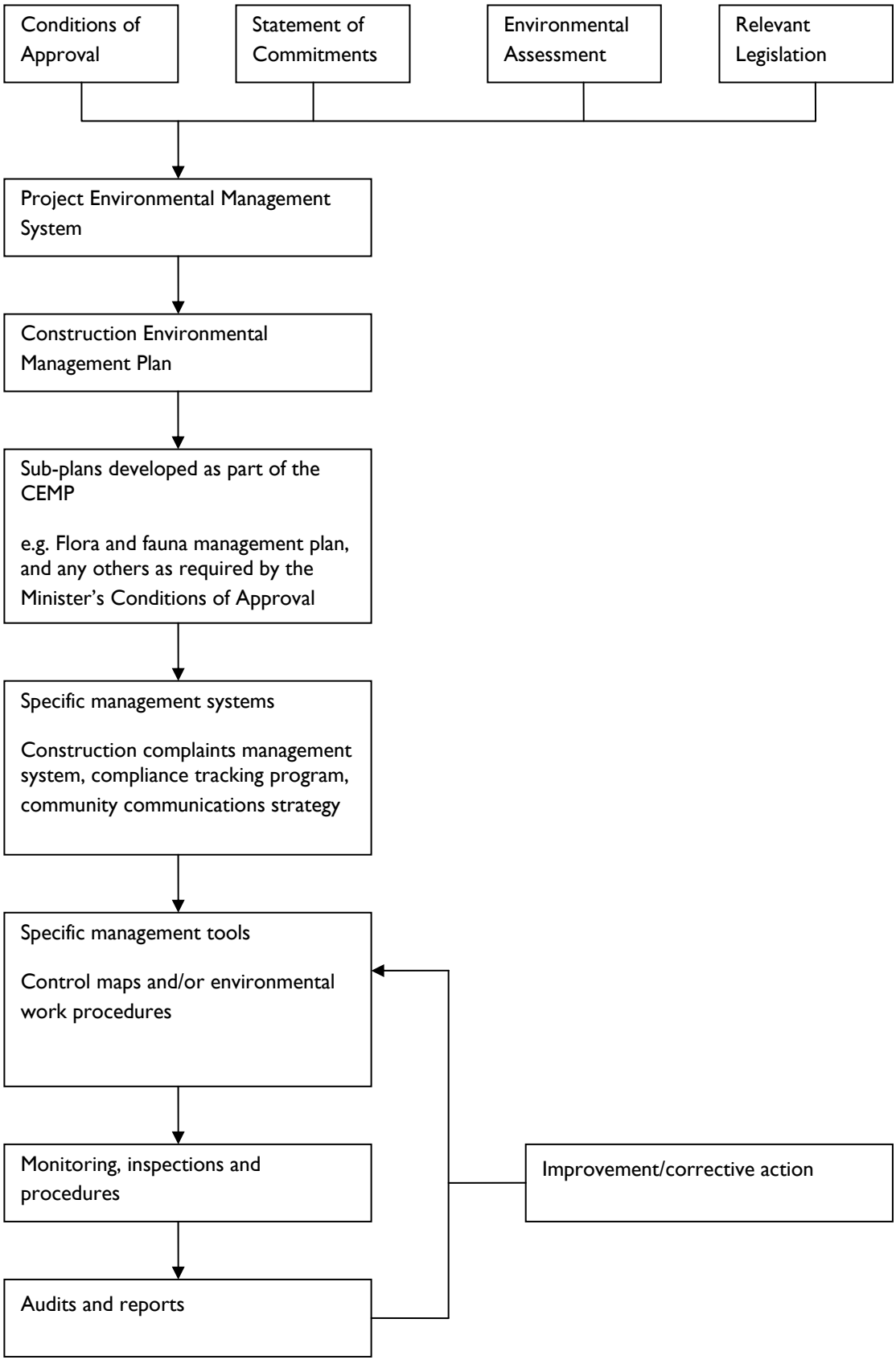
1.4.3 Environmental management sub-plans and tools

The CEMP would be supported by a suite of environmental management sub-plans that document the detailed management of specific environmental risks/aspects of the M2 Upgrade. The sub-plans are either required (by the SoC and/or MCoA) to be developed as part of the CEMP or represent a key risk for the M2 Upgrade.

In conjunction with the sub-plans, specific management tools would be developed to assist in implementation. Such tools would capture environmental risks peculiar to specific work locations or work activities, and would include the following:

- Inspection checklists.
- Report and register templates.
- Control maps and plans.
- Environmental procedures.

Figure 1-1 Environmental management framework



1.4.4 Environmental management of key issues

As part of the Environmental Assessment, a number of key issue areas have been identified where specific management strategies are required to ensure that potential impacts are adequately managed and reduced to acceptable levels. These key issue areas include:

- Construction noise and vibration management (**Attachment C**).
- Construction traffic and transport management (**Attachment D**).
- Construction soil and water management (**Attachment E**).

As part of this framework, management strategies have been prepared or each of these key issue areas. These strategies are presented in Appendix C of this framework. The CEMP and associated sub-plans and tools to be developed will be consistent with these management strategies.

Table 1-1 describes the approach to the management of key environmental issues on the M2 Upgrade.

Table 1-1 Management of key environmental issues

Environmental issue	Objective	Management approach	Location	Timing
Construction Noise and Vibration	Minimise noise and vibration impacts during construction.	• A management plan would be developed to ensure noise and vibration impacts are mitigated. Further impact assessment would be conducted for major noise-intensive construction activities.	Full length	Prior to construction
		• Community liaison would aim to ensure that the local community is kept informed. Communication methods would be developed such as internet-based information, community meetings, local newsletters and community notice boards.	Full length	Prior to, during and after construction
		• Noise impact mitigation would be considered during scheduling of works. Particular consideration would be given to identified noise-intensive equipment.	Full length	Prior to construction
		• Controls would be developed to mitigate noise from plant, considering aspects such as warming up locations, reversing alarms, noise compliance checks and work practices.	Full length	Prior to construction
		• Controls would be developed to mitigate noise from construction equipment, considering such aspects as fit-for-purpose equipment, noise attenuation devices and maintenance.	Full length	Prior to construction
		• Assessment of noise impacts from compound sites would be carried out to understand specific issues.	Compound sites	Design
		• Strategies would be developed to minimise noise generated from compound sites, such as temporary hoardings or other noise barriers.	Compound sites	Prior to construction
		• Mitigation measures would be developed to address noise generated along local roads, such as timing of movements, driving methods and noise attenuation devices.	Local roads	Prior to construction
		• Baseline mitigation strategies would be developed for sections where noise goals are exceeded, such as temporary hoardings, location of noisy plant and equipment, timing of works, site access points, location of maintenance work and source noise mitigation.	Sections where noise goals are exceeded	Prior to construction

Environmental issue	Objective	Management approach	Location	Timing
		• Noise and vibration monitoring would be undertaken prior to construction.	Full length	Prior to construction
		• Noise and vibration monitoring would be undertaken during key phases of construction.	Full length	During construction
		• Work methods for demolition and construction of noise walls would be planned to mitigate noise impacts where reasonable and feasible.	Noise walls	Prior to construction
		• Noise management strategies would be developed to mitigate ground-borne noise.	Full length	Prior to construction
		• Strategies would be developed to mitigate vibration impacts, such as location of plant and equipment, scheduling of works, selection of plant and equipment, provision of respite periods.	Full length	Prior to construction
		• Plans, strategies and processes would be communicated and implemented by construction personnel. Communication tools include inductions, tool-box talks and work method statements would be utilised.	Full length	During construction
Flora and Fauna	• Manage impacts on flora and fauna. • Water crossings designed to incorporate best practice principles. • Enhance existing habitat. • Manage the spread of weeds and plant pathogens	• Planning and route selection process would aim to avoid impacts on flora and fauna habitats.	Full length	Design
		• A management plan would be developed to control and mitigate potential impacts to flora and fauna.	Full length	Prior to construction
		• The extent of clearing would be minimised wherever possible.	Full length	During construction
		• Pre-clearing surveys will be undertaken to identify issues such as: o Hollow bearing trees. o Threatened flora (including *Epacris purpurascens var .purpurascens*). o Threatened fauna (including Green and Golden Bell Frog and Red-crowned Toadlet).	Full length	Prior to and during construction
		• Works around waterways would be managed using suitable erosion and sediment controls.	Works near waterways	During construction
		• A strategy for revegetation would be developed.	Full length	During construction
		• Weed management would be undertaken in areas affected by construction.	Full length	During construction

Environmental issue	Objective	Management approach	Location	Timing
Aboriginal Heritage	Minimise potential for impacts on Aboriginal heritage in accordance with the strategies described in the EA.	• If Aboriginal objects are identified during the course of construction, work should cease in that part of the study area and DECCW and relevant Local Aboriginal Land Council (LALC) would be notified immediately.	Full length	As required
		• If Aboriginal skeletal materials are identified during construction, work would cease immediately and Police, DECCW and the relevant LALC are to be notified immediately.	Full length	As required
		• If previously unknown items a of Aboriginal archaeological heritage significance are uncovered as part of construction works, no further works would occur at that locations until relevant clearance has been granted regarding the heritage issues.	Specific find locations	Prior to recommencement of work
		• A Heritage Management Plan (HMP) would be prepared which would provide detailed guidance regarding known Aboriginal sites in the vicinity of the M2 corridor (e.g. detailed location mapping, fencing specifications, etc). The plan would include, but not be limited to, the following protective measures:	Works in vicinity of known Aboriginal sites	Prior to construction
		• Erecting temporary protective fencing at identified Aboriginal sites where required.	Relevant identified Aboriginal sites	During construction
		• Erecting temporary sedimentation barriers and fencing along the banks of creeks to minimise potential for indirect impacts to site M2A1 through sedimentation and/or personnel access during construction.	Works in vicinity of known Aboriginal sites	During construction
		• Toolbox talks conducted prior to works in the vicinity of known sites and areas of Aboriginal cultural heritage.	Full length	Prior to and during construction
		• Specific access controls and exclusions in the vicinity of the identified sensitive Aboriginal sites where required and appropriate.	Works in vicinity of known sensitive Aboriginal sites	During construction
Water Management and Soils	• Minimise erosion and sedimentation.	• A management plan would be developed to control and mitigate potential surface water quality impacts.	Full length	Prior to construction

Environmental issue	Objective	Management approach	Location	Timing
	• Minimise contamination risk for receiving waters. • Minimise impacts on waterways. • Minimise scour impacts.	• Management measures would be developed in accordance with the requirements of: o Water Policy and Code of Practice for Water Management (RTA 1999). o Managing Urban Stormwater - Soils and Construction Volumes 1 and 2 (often referred to as The Blue Book - Landcom 2004 and 2006).	Full length	Prior to construction
		• A qualified soil conservationist would be used to provide technical advice on soil and water management.	Full length	Prior to and during construction
		• Plans would be developed to manage works in sensitive areas, such as works in or around waterways.	Full length	Prior to construction
		• Soil and water risks would be considered during programming and staging of works to minimise the duration of works undertaken in the vicinity of watercourses.	Full length	Prior to and during construction
		• Physical controls would be utilised, such as silt fencing, straw bales, check dams, sediment basins (new & existing), diversion berms, levees, bunds, scour protection, water diversions.	Full length	During construction
		• Strategies would be developed to facilitate soil stabilisation, such as minimising areas of disturbance.	Full length	Prior to construction
		• Plans, strategies and processes would be communicated and implemented by construction personnel. Communication tools include inductions, tool-box talks and work method statements would be utilised.	Full length	During construction
Construction Traffic and Transport	• Minimise road user delays. • Maintain access for road users.	• A Traffic management plan would be developed with the aim of minimising traffic impact on the M2 carriageway and local traffic. Measures that would be considered include timing of works outside peak traffic times, off-site parking areas, development of traffic control plans, vehicle management plans, and pedestrian control plans.	Full length and surrounding areas	Prior to construction

Environmental issue	Objective	Management approach	Location	Timing
	• Minimise impacts to local residential areas.	• Undertake planning and consultation to consider the appropriate strategies. Strategies would be developed to minimise the impact of construction vehicles on the local road environment, such as preference for the motorway network, arterial roads and other higher order roads, size restrictions, consideration and consultation with sensitive communities.	Full length and surrounding areas	Prior to and during construction

2. Objectives and targets

The RTA's Environment Policy (Attachment A) and the construction contractor's environment policy would be aligned and adopted in the EMS.

The RTA's Environment Policy includes a commitment to undertake its activities in an environmentally responsible manner and effectively manage any risks that could adversely affect the environment. Key elements of the Policy include effective environmental management of all activities, on-going communication and awareness raising, active reporting of environmental incidents, continuous learning from experience, assigning accountabilities and responsibilities, and continuous improvement in environmental performance.

Consistent with the RTA's Environment Policy, preliminary environmental objectives and targets have been established for the M2 Upgrade and are detailed in Table 2-1. These objectives and targets, and the strategies for achieving the targets, would be reviewed following project approval and incorporated into the CEMP and sub-plans, with detailed specifications provided in environmental work plans as required. Additionally, so that the objectives and targets remain realistic and relevant for maintaining or improving environmental performance, a systematic review of objectives and targets, in the CEMP and sub-plans, would be performed when one of the following occurs:

- Changes in environment policy.
- Changes in relevant legislation that impact on environmental control limits.
- Action by a regulatory authority.
- Changes in environmental risk.
- Relevant environmental objectives have been met or repeatedly not achieved, as identified by audits and site inspections.
- Following project environmental management reviews.

Table 2-1 Preliminary project environmental objectives and targets

Environmental issue	Objective	Target
Environmental Management	Compliance and continuous improvement in environmental management.	• The construction contractor has an EMS which is implemented for the M2 Upgrade. • Environmental management plans are developed and implemented by suitably qualified and experienced personnel and incorporate the mitigation and management measures adopted in the Environmental Assessment (EA).
	Provide a consistent method for managing environmental issues.	• Environmentally sensitive areas relevant to the construction site boundary are marked on sensitive area maps as well as being demarcated and signposted where required. • Maps be made available during on-site briefings to applicable construction personnel.
Community Engagement	Informed community	• The community is informed via a range of measures such as letter box drops, media releases, community updates, project website, road signs, and targeted consultation with affected individuals or groups. • Information provided includes changes to access and traffic conditions, details of future works programs, and general construction progress. • An enquiries and complaints management system is implemented and maintained throughout construction.
Construction Traffic and Transport	Minimise traffic disruption on M2 Motorway	• Impact on traffic flow during construction minimised by restricting lane occupancies to off peak periods. • Maintain a minimum of two traffic lanes available every weekday during peak periods.
	Minimise traffic disruption on non Motorway roads	• Access worksites by using the M2 Motorway where possible.
	Minimise disruption to bus services on M2 Motorway	• Minimise disruption of bus services by use of appropriate traffic management arrangements. • Access to M2 Motorway bus stops is maintained during the construction phase.
	Minimise impact to cyclists	• Prior to commencement of construction, provide a sign posted off-motorway alternative route for cyclists.
Operational Traffic and Transport	Minimise impacts on access to the local road network	• Maintain efficient and safe access routes to/from the local road network and properties.

Environmental issue	Objective	Target
Construction Noise and Vibration	Minimise noise and vibration impacts during construction.	• Implement feasible and reasonable mitigation and management measures to minimise construction noise and vibration at sensitive receivers. • Noise and vibration monitoring to be undertaken at key locations along the M2 Motorway to assess noise levels and the effectiveness of adopted noise mitigation measures. • Prior to undertaking out of hours work at nearby sensitive receivers, appropriate noise mitigation and management measures would be implemented, including notification to affected communities.
Operational Noise	Operational noise and vibration managed.	• Feasible and reasonable mitigation measures are developed and implemented to meet the applicable noise criteria. • Operational noise would be monitored within one year of project opening. If monitoring indicates traffic noise levels exceed those predicted, further measures would be implemented in consultation with affected sensitive receivers.
Flora and Fauna	Manage impacts on flora and fauna.	• Native vegetation retained where possible. • Minimise clearing for construction compounds and retain mature trees where feasible within compound sites. • Minimise impacts to native fauna, including the engagement of an ecologist during clearing if required. • Minimise impacts on threatened frogs, particularly in detention basins. • Prior to the commencement of construction in the area containing *Epacris purpurascens ssp. purpurascens* would be marked by an ecologist. Clearing would aim to avoid this species. • Manage and minimise impacts to other threatened species and endangered ecological communities.
	Water crossings designed to incorporate best practice principles.	• Works adjacent to waterways are designed and developed in accordance with the fish habitat classifications of each waterway.
	Enhance existing habitat.	• Revegetation of areas disturbed as a result of construction activities is conducted by suitably qualified and experienced persons. • Suitable felled native trees are reused for habitat. Seeds are collected in the corridor prior to and during clearing and used as part of the landscape plan.
	Manage the spread of weeds and plant pathogens	• Weed management occurring throughout the extent and duration of the M2 Upgrade.

Environmental issue	Objective	Target
Urban Design, Visual and Landscape	Minimise the visual impact and enhance the character of the road corridor.	• Detailed design, implementation of built elements undertaken with consideration of the visual and urban design objectives and principles for the M2 Upgrade.
Aboriginal Heritage	Minimise potential for impacts on Aboriginal heritage in accordance with the strategies described in the EA.	• Protect items of Aboriginal heritage significance. This would be done by: o General project induction would include appropriate responsibilities, and site-specific briefings would be given to relevant personnel when working in the vicinity of identified heritage items. o If any skeletal remains are encountered, all works that would potentially impact the find would stop immediately. Works would not re-commence until appropriate clearance has been received. o Aboriginal heritage items and sites are managed as environmentally sensitive areas. o Should any previously unidentified Aboriginal objects or items be located during the works, all work would cease in the vicinity of the find until specialist Aboriginal heritage advice is received.
Non-Aboriginal Heritage	Minimise impacts on non-Aboriginal heritage.	• Protection items of non-Aboriginal heritage significance. This would be done by: o If previously unidentified non-Aboriginal heritage items are encountered during construction, all works that would potentially impact the find would stop immediately. Works would not recommence until appropriate clearance has been received. o Physical and procedural measures to mitigate potential impacts upon the heritage significance of the Farmhouse are developed and implemented prior to and during construction at that location. o Reasonable physical and procedural construction management measures would be developed and implemented to minimise adverse heritage impacts on the heritage causeway beneath Beecroft Road bus ramp.
Water Management and Soils	Minimise erosion and sedimentation.	• All discharges of water off-site complies with the EPL (if required). • Maximise the diversion of stormwater runoff onto the construction site. • Effective soil and water management during construction.
	Minimise contamination risk for receiving waters.	• No spills of chemical or fuels into waterways.
	Minimise impacts on waterways.	• No significant impacts on waterways.

Environmental issue	Objective	Target
	Minimise scour impacts.	• Provide permanent stream protection and/or energy dissipation measures at affected culverts downstream of transverse culvert outlets if required and where sufficient space is available.
Contamination	Protection of the environment, workers and public.	• Potential contamination in the site corridor during construction is addressed with risk management measures. • Collection, testing and classification of sediments in sediment basins would be undertaken. Appropriate management strategies would be implemented prior to works in sediment basins. • Develop and implement an 'Unexpected Finds' protocol.
Socio-Economic	Avoid, minimise and manage adverse amenity impacts on residents during construction.	• Manage movement of vehicles (especially outside of standard working hours), construction noise, visual intrusion, dust and light spill.
	Minimise amenity impacts on residents during operation.	• Provide vegetative planting at key locations to screen M2 Motorway, if appropriate.
Air Quality	Minimise air quality impacts.	• Minimise the generation of emissions. • Minimise the generation of dust and its movement off site. • Undertake dust monitoring at a number of locations along the M2 Motorway for comparison to pre-construction levels.
Waste Management	Waste production minimised.	• Maximised 'waste hierarchy' during construction and incorporated into work programs, purchase strategies and site inductions. This would be assessed periodically to identify opportunities for improvement.
Hazards and Risks	Minimise risks and hazards to the environment and community.	• Prevent contamination of watercourses by locating storage areas for hazardous materials an adequate distance away from watercourses and entry points to the stormwater system. Spillages to be contained and collected for disposal. • Site specific safety issues and personnel responsibilities included as part of the project induction. Safety issues and responsibilities would be included in activity specific briefings as required.
Sustainability	Minimise greenhouse gas (GHG) emissions and energy consumption.	• Energy efficient equipment and management measures would be used where feasible and reasonable.

Environmental issue	Objective	Target
Property and Land Use	Minimise impacts on property and land use.	• Minimise property and land use impacts by conducting property inspections where required, maintaining a register of properties inspected, and where appropriate rectifying any property damage caused directly or indirectly by construction or operation. • Maintain property access for the duration of construction. Temporary access requirements would be assessed, designed, managed and rehabilitation prepared in consultation with affected landholders.
Ancillary Facilities	Minimise adverse impacts associated with ancillary facilities.	• Ensure the sites for ancillary facilities satisfy the criteria provided in the EA, unless otherwise approved though the CEMP.
Environmental Training	All work personnel to be informed of the M2 Upgrade environmental requirements, including the requirements and responsibilities for implementing impact mitigation and management measures and reporting environmental incidents.	• Site-specific environmental inductions provided to all work personnel before starting work on-site. • Specialised training in environmental management procedures (such as erosion and sediment control) provided to all relevant personnel prior to starting work on-site.
Environmental Approvals	M2 Upgrade to be constructed in accordance with planning, environmental and other approvals.	• No identified non-conformances with approvals.

3. Legislative and other requirements

3.1 Key legislative requirements

Table 3-1 below identifies NSW legislative requirements and their application to the M2 Upgrade.

Table 3-1 NSW legislative requirements

Legislation and administering authority	Requirement	Project application
Contaminated Land Management Act 1997 NSW Department of Environment, Climate Change and Water (DECCW)	Process for investigation and remediation of land to be followed where contamination presents a significant risk of harm to human health or some other aspect of the environment.	M2 Upgrade must follow process where contaminated land identified.
Crown Lands Act 1989 NSW Land and Property Management Authority	Ministerial approval required to grant a 'relevant interest' over a Crown Reserve.	M2 Upgrade must obtain approval prior to granting a relevant interest over Crown Reserve.
Dangerous Goods Act 1985 DECCW WorkCover	License required for storage and/or transport of prescribed quantities of dangerous goods.	M2 Upgrade must obtain a licence where storage of dangerous goods for construction is in licensable quantities.
Environmental Planning and Assessment Act 1979 NSW Department of Planning (DoP)	Part 3A process to be followed for 'critical infrastructure projects'.	M2 Upgrade declared to be a 'critical infrastructure project' (Ministerial Order published in NSW Government Gazette No.44 on 27 February 2009). M2 Upgrade must comply with SoC and MCoA.
	Section 75W process to be followed for future modifications to Minister's Approval.	M2 Upgrade must undertake any modifications through the completion and approval of appropriate EA/REF, prior to construction of the modified/varied M2 Upgrade component.
Fisheries Management Act 1994 Industry & Investment NSW (I&I)	Permits required under section 201, 205 or 219.	M2 Upgrade exempt from permit requirements.
Heritage Act 1977 Department of Planning – Heritage Branch	Approval required under Part 4. Excavation permit required under section 139.	M2 Upgrade exempt from approval/permit requirements.

Legislation and administering authority	Requirement	Project application
	Heritage Council to be notified if a relic is uncovered during construction and it is reasonable to believe that the Heritage Council is unaware of the location of the relic.	M2 Upgrade must notify Heritage Council in the event of a notifiable discovery.
National Parks and Wildlife Act 1974 DECCW	Permit required under section 87. Consent required under section 90.	M2 Upgrade exempt from permit/consent requirements.
Native Vegetation Act 2003 DECCW	Section 12 authorisation required to clear native vegetation or State protected land.	M2 Upgrade exempt from authorisation requirements.
Noxious Weeds Act 1993 I&I	Control noxious weeds on controlled lands in accordance with relevant control categories.	M2 Upgrade must control weeds as required on lands under the control of the M2 Upgrade.
Protection of the Environment Operations Act 1997 DECCW	Environment Protection Licence (EPL) required for scheduled activities.	M2 Upgrade, being 'road construction' is a scheduled activity and requires an EPL.
	Notification to DECCW in the event of a pollution incident causing or threatening material harm to the environment	M2 Upgrade must notify DECCW in the event of a notifiable incident.
Roads Act 1993 RTA	Section 138 consent required for erection of a structure, or carrying out of work in, on or over a public road or digging up or disturbance of the surface of the road.	M2 Upgrade must obtain consent.
Waste Avoidance and Resource Recovery Act 2001 DECCW	Reduce environmental harm and provide for reduction in waste generation in line with ecologically sustainable development principles.	M2 Upgrade must reduce and report waste monthly.
Water Management Act 2000 DECCW	Water use approval required under section 89. Water management work approval required under section 90. Activity approval required under section 91.	M2 Upgrade exempt from approval requirements.

Table 3-2 below identifies Commonwealth legislative requirements and their application to the M2 Upgrade

Table 3-2 Commonwealth legislative requirements

Legislation and administering authority	Requirement	Project application
Environment Protection and Biodiversity Conservation Act 1999 Department of Environment, Water, Heritage and the Arts	Approval required for a 'controlled action'.	M2 Upgrade must submit EPBC referral where controlled action required.
National Greenhouse and Energy Reporting Act 2007 Department of Climate Change	Requirements for reporting of greenhouse emissions, abatement actions, energy consumption and production data.	M2 Upgrade must report greenhouse and energy use monthly.

3.2 M2 Upgrade environmental obligations

The M2 Upgrade environmental obligations would be sourced from a collection of documents and approvals, including the following:

- Environmental Assessment, including the draft Statement of Commitments.
- Submissions Report.
- Minister's Conditions of Approval.
- Environmental Protection Licence.

3.3 Standards and guidelines

Various environmental publications, standards, codes of practice and guidelines that are relevant to the M2 Upgrade would be incorporated into the CEMP, including the following:

- ISO 14001:2004 Environmental Management Systems.
- Guideline for the Preparation of Environmental Management Plans (Department of Infrastructure, Planning and Natural Resources, 2004).
- RTA QA Specification G36 – Environmental Protection (Management System) (October 2009).
- RTA QA Specification G38 – Soil and Water Management (Soil and Water Management Plan) (September 2004).

4. Environmental risk assessment

4.1 Environmental risk assessment for CEMP preparation

The identification of the environmental aspects and impacts associated with construction is a key step in the development of an EMS for a construction project. Environmental procedures and systems can then be developed to address the significant risks faced by the M2 Upgrade. The risk assessment process involves first identifying the aspects of the proposed activities that could interact with the environment and the potential environmental impacts that could result.

Aspects and impacts must be identified for all proposed construction activities that have the potential to:

- Impact flora and fauna.
- Cause ground instability leading to erosion, sedimentation and water quality impacts.
- Generate noise in the vicinity of sensitive receivers.
- Generate vibration levels experienced by adjacent structures and sensitive receivers.
- Impact on items of heritage significance, both Aboriginal and non-Aboriginal.
- Result in release of potentially contaminating substances to air, soil and water.
- Detract from the general amenity of sensitive receivers in the vicinity of the proposed works locations.
- Create environmental hazards and/or risks.
- Generate wastes.

Once the environmental aspects and impacts have been identified, each impact is evaluated based on:

- The environmental aspect.
- The potential impact.
- The likelihood or probability of the impact occurring.
- The severity or consequence of the impact.

The relative risk of the impact is then determined using the likelihood, consequence and risk descriptions presented in Figure 4-1.

A two stage risk assessment process would be adopted. This process would involve first evaluating the 'untreated' risk (i.e. with no management measures or other controls adopted or implemented to control and reduce the risk levels). Then the management measures are outlined that would be implemented to control the risk. The final step would then involve re-evaluating the risk to determine the effectiveness of the proposed management measures and to determine the 'residual' risk.

For this an aspects and impacts register would be developed and appended to the CEMP. This register would be used to develop the impact mitigation and management strategies for the CEMP and sub-plans.

Figure 4-1 Risk Assessment Process

Consequence Descriptions

Consequence	Environmental Impact
Substantial	Permanent widespread ecological damage
Major	Heavy Ecological damage, costly restoration
Medium	Major but recoverable ecological damage
Minor	Limited but medium term negative effects
Negligible	Short-term damage

Likelihood Descriptions

Likelihood	Description	Probability
Almost Certain	This threat can be expected to occur	>75%
Likely	This threat will quite commonly occur	51% - 75%
Possible	This threat may occur occasionally	26% -50%
Unlikely	This threat could infrequently occur	10% - 25%
Rare	This threat may occur in exceptional circumstances	<10%

Risk Matrix

Almost Certain	5	10	18	23	25
Likely	4	9	17	20	24
Possible	3	8	13	19	22
Unlikely	2	7	12	15	21
Rare	1	6	11	14	16
	Negligible	Minor	Medium	Major	Substantial

Risk Description

Extreme Threat
Very High Threat
High Threat
Moderate Threat
Low Threat

4.2 Preliminary risk analysis

A preliminary environmental risk assessment has been undertaken as part of the environmental assessment process. This risk analysis was used to confirm whether the risk identified in the key issues in the Director-General's Requirements have been adequately covered and whether or not there are additional issues that needed to be addressed. The results of the preliminary environmental risk assessment would be used and considered when undertaking the more detailed environmental risk for the M2 Upgrade.

4.3 Ongoing risk assessment

The environmental risk assessment for the M2 Upgrade would be reviewed throughout the constructions period. The risk assessment would be reviewed:

- If a significant incident or impact occurs.
- If activities or the M2 Upgrade changes.
- Following CEMP audits if significant or ongoing non-conformances with the CEMP and Project approval conditions are noted.

Following the completion of the environmental risk assessment reviews, the CEMP, sub-plans would be amended accordingly.

4.4 Activity specific environmental risk assessment

Additional risk assessments would be undertaken during the development of site or activity specific environmental work procedures.

5. Roles and responsibilities

5.1 Project team

To ensure implementation of the requirements of the CEMP, environmental responsibilities must be assigned to key project personnel. The responsibilities of key project personnel with respect to the CEMP and implementation of an EMS is outlined in Table 5-1 below.

These responsibilities outlined would be reviewed:

- When the final Statement of Commitments is issued.
- On receipt and review of the MCoA following Project approval.
- On development of the CEMP.

It is likely the appointment of an Environmental Representative would be a condition of project approval. The Environmental Representative would be independent of the construction contractor and have the responsibility of reviewing construction management documentation, implementation of the EMS and providing advice and feedback. Other responsibilities of the Environmental Representative could include:

- Review and endorsement of the CEMP prior to the commencement of work on-site.
- Review of early works assessments.
- Regular environmental site inspections.
- Auditing of compliance and/or implementation of construction management plans.
- Approval of minor modifications to the CEMP and sub-plans and other environmental management documents.
- Compliance reporting in accordance with requirements of the CEMP and MCoA.
- Liaison with other government agencies as required.

Table 5-1 Key project roles and environmental responsibilities

Role	Responsibility
Project Manager	• Overall responsibility for obtaining and compliance with MCoA, Environmental Protection Licence(s) and other licences, permits, approval and consents required for the Project, prior to the commencement of construction. • Overall responsibility for ensuring that CEMP and sub-plans are developed and approved in conjunction with the Construction Manager, Environment Manager and relevant government agencies. • Ensuring appropriate consultation and liaison with government agencies including DoP, DECCW, and I&I. • Ensure that a program of auditing is implemented and reviewed the outcomes and findings of all environmental audits.

Role	Responsibility
Construction Manager	• Understand, provide input into and be responsible for on-site implementation of the CEMP and sub-plans. • Ensure that appropriate resources are made available to ensure compliance with the MCoA, all other approvals and the CEMP. • Ensure that all project personnel are inducted and are of their individual responsibilities regarding environment management and compliance. • Ensure compliance of sub-contractors with requirements of the CEMP and sub-plans. • Ensure that non-conformance processes are implemented. • Ensure that all environmental incidents are identified, reported and investigated. • Participate in the CEMP audit process and ensure that audit findings are adequately addressed.
Environment Manager	• Responsible for the development all environmental management plans including sub-plans to meet the commitments and requirements of all project environmental documentation and approval conditions. • Provide advice to the construction teams regarding implementation of the CEMP, compliance with approval condition and licences and general environmental issues. • Implementation of the CEMP audit program. • Continuous improvement of the CEMP and sub-plans. • Ensure that corrective actions plans (or similar) are developed following each audit and that corrective actions are implemented. • Receive and respond to complaints. • Ensure that appropriate environmental content is included within the General Project Induction. • Ensure that task-specific environmental training (Toolbox talks) are developed and delivered prior to environmental sensitive works. • Investigate environmental incidents as required and assist in developing appropriate corrective actions.
Project Engineer	• To provide specific direction to the construction personnel on CEMP requirements and general environmental issues, in consultation with the Environment Manager and Construction Manager. • Ensure that regular site inspections are carried out to check adequate implementation of CEMP and sub-plan requirements and general environmental controls. • Ensuring that the outcomes of audits and incident investigations and any corrective actions are communicated to the construction personnel and that corrective actions are implemented. • Ensuring that environmental (and other) incidents are reported by all construction personnel. • Notifying the Construction Manager and Environment Manager if situations arise that are outside the scope of the CEMP and sub-plans.

Role	Responsibility
Foreman/Superintendent	• On-site implementation of CEMP and sub-plans. • Ensure that all environmental (and other) incidents are reported immediately. • On-site implementation of corrective actions arising from audits, incidents and other identified non-conformances. • Routinely checking and maintaining all environmental controls • Ensure that all project personnel under their direction have received the General Project Induction. • Ensure that personnel attend appropriate task-specific environmental training (Toolbox talks) prior to commencement of that activity. • Stopping work and reporting to the Project Engineer immediately if situations arise that are outside the scope or not covered by the CEMP and sub-plans.
Construction personnel and other staff	• Attend all relevant project inductions and environmental training required. • Understand and comply with environmental responsibilities. • Implement all directions given by Foreman/Superintendent regarding environmental issues and compliance. • Undertake all activities in accordance with agreed procedures and work methods. • Not starts any environmentally sensitive work until appropriate has been granted by a direct supervisor. • Report any environment (and other) incidents, near misses and hazards to their direct supervisor (or higher) immediately.

5.2 Sub-contractors

Sub-contractors present the greatest environmental risks to a project due to:

- Their absence of direct involvement in the environmental assessment and approval process.
- Their lack of direct knowledge of and direct responsibility regarding the SoC and the MCoA.
- The potential for miscommunication between the construction team and on-site sub-contractor personnel.
- The numbers of sub-contractors spread across the project works areas.
- Lack of familiarity with the specific EMS that would be developed for the project.

5.2.1 Sub-contractor assessment and selection

The construction contractor has an ongoing sub-contractor assessment program that assesses the sub-contractor on the basis of past performance on similar projects. Environmental compliance and performance is a key component of this assessment and evaluation process. Sub-contractors that perform poorly in the past are excluded from the selection process for future projects. This ensures that only sub-contractors with a proven track record would be chosen for the M2 Upgrade. Sub-contractors are aware of the construction contractor's assessment and evaluations process, which add further incentive to perform well in all areas, including environmental compliance.

5.2.2 Environmental compliance for sub-contractors

Sub-contractors would be obliged contractually to comply with the requirements of the CEMP and sub-plans. In addition, sub-contractors would be required to follow any direction given by the construction contractor regarding environmental management and compliance.

All sub-contractor personnel would attend the general project induction and any task-specific environmental training (toolbox talks) relevant to the activities they are involved in.

Routine and documented environmental site inspections by the construction contractor would be undertaken for all sub-contracts. Sub-contractors would be subject to environmental compliance audits as part of the project audit program.

Where the sub-contractors are responsible for large components of the construction works or works that are environmentally sensitive, consideration would be given for a key person to be nominated by the sub-contractor to be responsible for ensuring compliance with the CEMP and sub-plans. The nominated person would be responsible for:

- Undertaking site documented site inspections.
- Reporting to the construction contractor on environmental matters.
- Participating in audits and incident investigations.
- Implementing corrective actions arising from audits and inspections.

6. Training awareness and competence

6.1 Project induction

A Project induction would be delivered to provide personnel with a general understanding of the local conditions, site constraints, rules, procedures, risks and responsibilities, relating to the M2 Upgrade and the environment.

All personnel, including sub-contractors would be inducted prior to commencing work on the M2 Upgrade.

The induction would include the following topics:

- Soil and water management requirements.
- Water quality protection.
- Vegetation clearing protocols and requirements.
- Fauna protection requirements.
- Heritage issues and management.
- Site access controls.
- Traffic management.
- Waste management.
- Storage and handling of chemicals, fuels and oils.
- Spill prevention and response.
- Complaints handling procedures.
- Environmental incident reporting requirements.

6.2 Line management training

Prior to the commencement of site works, line management training would be delivered to relevant management personnel regarding environmental issues, protocols and requirements for the M2 Upgrade. The training would focus on:

- Vegetation clearing protocol requirements.
- Soil and water management requirements.
- Weed management/equipment wash down requirements.
- Environmental inspection, reporting and documentation protocols and requirements.
- Environmental incident reporting requirements.

6.3 Toolbox talks

Toolbox talks would be delivered to communicate site-specific or task-specific environmental procedures, protocols, risks and requirements to relevant personnel.

Toolbox talks may also be developed to provide additional environmental training to personnel. Training topics would include:

- Heritage sensitivities.
- Night-works and associated risks.
- Riparian works and associated risks and mitigation measures.
- Changes to the CEMP.

- Reinforcement of CEMP requirements to address improvement opportunities in environmental performance.

7. Incident and emergency preparedness and response

7.1 Emergency preparedness

Emergency preparedness would be managed with monitoring, surveillance and training. Preventative actions would include the following:

- Daily inspections of active work sites.
- Completion of routine environmental site inspection checklists (see example in Attachment B).
- Issue and quick close-out of non-conformance notices.
- Maintenance of constant supervision on site.
- On-going environmental training.
- Environmental audits of work sites, sub-contractors and conformance issues.

Environmental and safety information on hazardous substances (e.g. Material Safety Data Sheets) would be available at the main site office and where such substances are to be stored.

Spill kits and other emergency response equipment would be strategically located throughout the M2 Upgrade site.

Testing of environmental response procedures would be conducted in areas where a pollution risk is present. Personnel with potential to be involved in emergency response activities would be provided with specific training.

7.2 Incident management

The CEMP would describe an incident management process that ensures the interfacing ability between the RTA incident management process and the construction contractor's incident management process. Key aspects of the process would be described and include the following:

- Immediate response actions.
- Notification triggers.
- Incident reporting (internal and external).
- Incident investigation.
- Corrective, remedial and preventative action generation and tracking (e.g. review of CEMP and risk registers).
- Communication of incident outcomes (e.g. lessons learnt).

8. Environmental monitoring, inspections and auditing

8.1 Inspections

There would be a number of different types of inspection programs. These may include:

- Construction diaries.
- Audits.
- Non-conformance investigations.
- Incident investigations.
- Erosion and sediment inspections.
- Regular, routine reporting against environmental site inspection checklists (refer to Attachment B).

8.2 Environmental monitoring

Environmental monitoring, involving the collection and analysis of data, may be undertaken for key environmental issues to:

- Assess the effectiveness of environmental protection measures being implemented through the CEMP and sub-plans.
- Identify the need for addition environmental management measures or modifications to existing strategies.

The scope, timing, methodology and responsibilities for environmental monitoring programs would be specified in the respective sub-plans for each key issue. Monitoring may range from formal sample collection, analysis and measurement, through to more qualitative assessments based on observations.

8.3 Audits

8.3.1 Internal audits

A program of internal audits would be undertaken. Elements that may be audited include:

- Compliance with the MCoA and SoC.
- Compliance with the CEMP.
- Compliance with other approval, permit and licence obligations.
- Compliance with environmental work procedures.
- Complaint response.
- Sub-contractor activities.
- Training records.
- Non-conformances.
- Monitoring results.
- System documentation such as checklist completion.

These internal audits would be performed within three months of commencement of construction and at least once every six months thereafter.

8.3.2 External audits

External audits may be required as part of the MCoA and/or by the RTA. It would cover the same elements as those covered by the internal audit. A program of external audits would be developed by the construction contractor.

8.4 Reporting

Typical reporting requirements that are likely to be applicable to the M2 Upgrade are summarised in Table 8-1.

Table 8-1

Report	Details	Timing
Internal audit results	Audit for compliance against the MCoA, relevant licenses and approvals.	First internal audit within 3 months of start of construction, and then at least 6 monthly thereafter
External audit results	Audit for compliance against the MCoA, relevant licences, permits and approvals.	As required
Monitoring results/data	Potential exceedances against criteria reported by environment officers, filed electronically and in hard copy.	As required
Project team meeting	Project team meeting to include environmental component, and minutes of meetings to be recorded and distributed to project team.	1-2 weekly
Corrective action, environmental inspection report, environmental improvement notice, stop work notice	Non-conformances/corrective action/notices/inspection reports registered by environment team.	As required
Environmental site inspection checklists	Completed weekly and kept on site. Major repeated non-conformances reported to Environment Manager.	Weekly
Complaints report	Monthly summary report, filed electronically.	Monthly

9. Environmental non-conformances

A system for identifying environmental non-conformances and implementing corrective actions to address the non-conformances would be developed as part of the EMS and documented in the CEMP.

The system would include:

- A program of documented environmental site inspections.
- An environmental compliance auditing program.
- Environmental incident reporting and investigation procedures.
- An environmental compliance tracking program.
- Corrective action processes.

The non-conformances and corrective actions system and procedures would be communicated to all relevant project personnel.

10. Review and improvement of the CEMP

10.1 Environmental management review

Implementation of the CEMP and sub-plans would be reviewed throughout the duration of construction. The review would generally occur:

- Following environmental compliance audits.
- Following significant environmental incidents.
- Following regulatory action due to environmental non-conformances.
- As a result of repeated non-conformance identified during the environmental site inspection program.

The environmental management review would be undertaken by the construction contractor's management team with input from the RTA, regulatory agencies and sub-contractors as required. The review would comprise:

- A review of audit results.
- A review of environment incidents investigations and coactive actions.
- A review of project environmental non-conformances and related procedures/system tools.

The CEMP and sub-plans would be updated as required based on the outcomes of the environmental management review to ensure continual improvement.

Attachment A – RTA Environment Policy

Commitment

The Roads and Traffic Authority of NSW is committed to undertaking its activities in an environmentally responsible manner and effectively managing any risks that may lead to an impact on the environment. The RTA will do all that is reasonably practical to ensure that there is continuous improvement in environmental performance, including ongoing communication and awareness raising, active reporting of environmental incidents and continuous learning from experience.

The RTA is committed to environmental management being an essential element of effective road and traffic related infrastructure planning, construction, maintenance and operation that must be properly considered and integrated into all phases of RTA projects.

Accountability

Senior executive management is accountable for the RTA's overall environmental performance. This includes providing leadership, direction, and resources and support, to ensure the RTA's activities are undertaken in a manner that at all times considers and effectively manages potential environmental risks and always strives for environmental performance improvement.

Responsibility

Line managers and supervisors are responsible, within their work areas, for implementing the RTA's environmental policies and guidelines. They must proactively address issues that may adversely affect environmental performance at project worksites and workplaces for which the RTA is responsible.

Cooperation

The RTA requires its employees to cooperate in the management of environmental matters, including responding to the reasonable directions of external environmental regulators. Employees must monitor the continued effective installation and operation of environmental controls within the scope of their day to day work.

Consultation

The RTA will consult with management, employees, relevant regulatory agencies and where appropriate, the community, on the development, implementation and refinement of its environmental function.

Compliance

The RTA will conduct all its operations, whether carried out by or on behalf of the RTA, in accordance with relevant legislation and government policy and agreements.

Management

The RTA will demonstrate due diligence in the provision of its services, manage its work activities in a manner that is consistent with the principles of ecologically sustainable development, and will deliver continuous improvement in environmental performance through:

- Setting and reviewing environmental objectives and targets for the RTA.
- Implementing the RTA's environmental management system.
- Assessing likely environmental outcomes before deciding to proceed with activities.
- Considering environmental outcomes when making decisions, in the same way that consideration is given to safety, cost, quality and time.
- Minimising pollution and managing potential environmental impacts resulting from the RTA's activities and promoting the efficient use, reuse and recycling of resources.
- Monitoring, reviewing and reporting publicly on the environmental performance of the organisation.
- Building constructive and collaborative working relationships with external stakeholders.

Employees

All RTA staff have a responsibility to actively contribute towards avoiding or minimising environmental impacts in their day to day work.
To do this staff must:

- Work carefully at all times to protect the environment.
- Report any environmental impacts, hazards or potential environmental management issues of which they become aware to the responsible officer, including poorly installed or poorly operating equipment they encounter in their working day.
- Work in a manner consistent with the RTA's legal environmental obligations.
- Work in accordance with all RTA environmental management programs and follow specified systems of work.
- Participate in relevant environmental management consultation and training initiatives, and use effective environmental management measures in their work.

This environmental policy will be reviewed in 2012.

Michael Bushby

Chief Executive

Locked Bag 928 North Sydney NSW 2059 DX-10516
www.rta.nsw.gov.au | 13 22 13

Attachment B – Example environmental site inspection checklist

Environmental Checklist

Project:	**Project No:**	
Date:	**Time:**	☐ AM ☐ PM
Weather:	**Rain:**	

Site Activity:
e.g. working east wall

1. Water Quality

- ☐ Assess general protection with reference to the sediment / erosion control plan / ESWMS (detail below)
- ☐ Monitor pH, turbidity, temp., dissolved oxygen, electro conductivity, and oil and petrochemicals (visual inspection or films or odours) at water courses as required
- ☐ Monitor TSS at discharge of basins or dammed water if required

Comments:

Control	Action	New / Maintain

2. Air Quality

- ☐ Constant visual observation for excessive dust production
- ☐ Random monitoring of regularly trafficked access roads, exit to site and residences within 300m of site
- ☐ Weather station monitoring for wind speed and direction
- ☐ Monthly dust monitoring equipment in place
- ☐ Rumble grids/rock rumbles/wheel washes being used to minimise dirt tracked onto roads
- ☐ Are streets near exit to site clean / swept?

Comments:

3. Noise

- ☐ Check site for significant noise sources (noisy equipment rock dumping)
- ☐ Monitor sensitive receptors monthly or as required
- ☐ Spot checks at random locations with hand held meter

Comments:

4. Vibration

- ☐ Monitor during heavy vibrating rolling within 60m of a dwelling

☐ Monitor during piling operations
☐ Spot checks of sensitive locations within 300m

Comments:

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5. Waste Management

☐ Recycling bins available and being used
☐ Oil and petrochemical leaks, spills or uncontrolled discharges cleaned up and/or managed properly
☐ Are spill kits at each designated location?
☐ Are spill kits fully stocked / scaled?
☐ Servicing and refuelling practices meet environmental plan requirements
☐ Assess plant wash down pit and daily visual inspection of outlet drain and silt trap devices
☐ Is the site tidy and waste collection areas being used appropriately

Comments:

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6. Hazardous Waste

☐ Identify and record any leaks, spills or uncontrolled discharges

Comments:

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7. Flora and Fauna

☐ No disturbance of flora outside work areas
☐ Inspect mulching/chipping operations to ensure the invasive weed species are not being chipped: e.g. Privet, Camphor Laurel, Coral Tree, Poplar, Chinese Elm, Willow
☐ Presence of noxious weeds
☐ Cleared organic material is stockpiled as per mulch plan and at least 50m from watercourses with appropriate bunds on upstream side and sediment control downstream (if required)
☐ Stockpiles to be no greater than 2m high
☐ Control of declared pest e.g. Fire Ants, dieback / weeds.

Comments:

Location	Fauna Noted

---

8. Cultural Heritage

☐ Daily inspection of works area for cultural heritage 'finds'

Comments:

9. Contaminated Land and Acid Sulphate Soils

☐ Sampling and testing performed as per management plan

☐ Certificate from suppliers that materials are free from contamination

Comments:

10. Summary of Actions

No.	Action
1	
2	
3	
4	

11. Inspection Details

Inspected By: **Signature:**

Name

Other Comments:

Attachment C – Construction Noise and Vibration Management Strategy

Construction Noise and Vibration Management Strategy

Management objectives

Construction of the M2 Upgrade project has the potential to generate elevated noise and vibrations with the potential to adversely affect the amenity of adjacent receivers. Construction noise and vibration will need to be actively managed to ensure the levels experienced by adjacent receivers are reduced where reasonable and feasible to acceptable levels. The construction noise and vibration objectives for the project are:

- To reduce noise and vibration levels experienced by receivers adjacent to the motorway and project areas due to construction activities.
- To reduce the durations of elevated noise and vibration levels experienced by receivers adjacent to the motorway and project areas due to construction activities.
- To limit wherever practicable noise and vibration impacts due to construction activities to less sensitive times of the day.
- To provide timely and accurate information to receivers in the vicinity of the motorway regarding construction works and potential noise and vibration impacts.

Management principles – construction noise

In general the management of construction noise impacts can focus on reducing noise at the source or addressing and/or reducing potential impacts at the receiver. The project has more direct control and influence over noise generation at the source. As such noise source control is the favoured strategy. The following hierarchy of control strategies is proposed for the M2 Upgrade project:

- Reduce noise levels generated due to construction (source measures.)
- Reduce the propagation noise from the works locations wherever practicable (propagation measures).
- Treat or otherwise address residual noise impacts at the receiver (receiver measures).

Due to the location of the Motorway in a predominantly urban environment and the nature of the proposed works, managing and reducing construction noise will be a key challenge for the project. Also, the Motorway must remain operational at all times. As such, due to space restrictions, potential safety risks to road users and construction personnel, potential traffic implications and other technical reasons, certain activities would be required when traffic volumes are low, i.e. during the late evening and night time periods.

The specific management principles that would be adopted to reduce and manage potential construction noise impacts throughout the construction phase of the project (with reference o the hierarchy to control strategies identified above) are outlined below:

- Consider changes to construction methodologies to reduce the level of noise generation.
- Consider potential noise impacts when selecting plant.
- Avoid the operation of multiple items of noise intensive equipment simultaneously in close proximity, wherever practicable.
- Consider sensitive noise receivers when determining trucks routes to and from works sites and compounds.
- Schedule noise intensive works to less sensitive time of the day wherever practicable.

- Set-up work sites and traffic management arrangements to facilitate as much construction activity as possible during the day.
- Consider the location of sensitive noise receivers when setting up works sites and compounds, with particular reference to the placement noisy plant and activities.
- Investigate options for temporary noise barriers and other measures to prevent propagation of noise from construction locations.
- Undertake noise monitoring for noise intensive activities to confirm that predicted noise levels are not exceeded.
- Implement suitable respite periods for noise intensive and high impact noise activities.
- Investigate options for reducing noise levels at receivers adjacent to the works locations.
- Consult with the potentially affected receivers regarding noise intensive activities, timing and durations.

Strategic approach

Noise management strategy for general construction

Each works location would be reviewed with the intention of identifying potential opportunities to minimise noise generation. The following approach would be adopted:

- Review each works location and identify potential noise sources and potential noise receivers.
- Review the proposed construction methodology to determine potential impacts, with particular reference to noise intensive activities and equipment and identify any opportunities to modify construction methodologies to reduce potential noise impacts.
- Review works staging to minimise the need to operate multiple items of noise intensive equipment simultaneously in close proximity.
- Set up work sites and traffic management arrangements wherever practicable to maximise day time construction activities.
- Review the required plant and investigate the options for elimination or substitution of noisy plant and options for reducing noise using silencers and mufflers.
- Identify noise intensive equipment and high impact noise activities for which respite periods will be required.
- Identify procedural and behavioural changes that could be implemented to reduce noise emissions (for example, switching off equipment when not in use).

Identify options for the use of temporary and portable noise controls such as hoarding.

When a strategy has been developed for each work location, the outcomes would be communicated to all relevant personnel. The responsibility for implementing appropriate noise control strategies at each work location would be assigned to key project personnel.

Noise management strategy for strategy for compounds

Given the urban environment in which the Motorway is situated, many of the proposed compound locations would be in close proximity to sensitive noise receivers. The following strategies would be adopted at each compound to reduce potential noise impacts:

- Plant selection with consideration of potential noise generation and impacts with substitution and/or elimination of potentially noisy plant wherever practicable.
- Position noisy plant as far as practicable from adjacent residences.

- Position locations for unloading and loading of equipment and materials as far away from adjacent residences.
- Schedule potentially noisy activities during less noise sensitive times of the days if practicable.
- Position crib huts and site offices etc between general compound area and adjacent residents to provide noise attenuation.
- Install noise hoarding along compound perimeters to protect adjacent residences.
- Assign a key person responsibility for the management of noise at each compound location.

Some works would be required to be undertaken outside of standard construction hours. As such, the use of some compounds outside of standard construction hours would be required to support these activities. The following strategies would be adopted to address potential noise impacts from use of those compounds:

- Favour the use of compounds that are not is close proximity to residents (i.e. within 200m) to support night works wherever practicable.
- Review proposed activities that occur at the compound with the potential to cause elevated noise levels and prohibit certain activities during certain times.
- Investigate additional options to those described above to provide further attenuation of noise at the compound perimeter if required.

The key personnel responsible for the respective compound would be responsible for ensuring that appropriate strategies are implemented.

Noise management strategy for works outside of standard construction hours

As the Motorway must remain operational and space within the Motorway in which to set up work zones is limited certain activities need to be undertaken at night, particularly to reduce potential safety risks to road users and construction personnel and to limit potential traffic disruptions. The following strategy would be adopted in for these activities:

- Each work location would be investigated on a case by case basis and the potential noise impacts assessed, with reference to the proposed construction methodology, site specific equipment lists and scheduling and local conditions that would affected the propagation of noise for the work site.
- For each location, noise level predictions would be made potential impacts to adjacent residences assessed against appropriate noise management levels.
- Site specific noise management strategies and controls would be developed for each location, guided by the general noise management principles identified above.
- A Construction Noise Impact Statement (CNIS) would be prepared for each location.

Prior to the commencement of the works at each location, the content and specific requirements of each CNIS would be communicated to all relevant project personnel.

The potentially affected residents in the vicinity of the works location would be consulted with about the work and potential noise impacts. The focus of the consultation would be on the nature, timing and duration of the works. The consultation would continue for the duration of the issue at each location.

Noise monitoring would be undertaken during the start up of works outside standard construction hours at each location to confirm noise performance against predicted noise levels and licence conditions if applicable. If non-compliances are detected, construction

methodologies and adopted noise management strategies and controls would be reviewed to address the non-compliance.

Vibration management strategy

Potential vibration impacts were assessed as part of the Environmental Assessment. The major potential sources of construction vibration related to the M2 Upgrade project include the use of excavators, rock breakers, vibratory rollers, rock grinders and rock bolting.

In general the environmental assessment concluded that vibration produced by earthworks and road forming operations is expected to lie below structural damage criteria at the nearest sensitive receptors. Vibration may be perceptible for relatively short periods of time when construction activities are immediately adjacent to specific dwellings.

Where vibration-intensive operations are being conducted in close proximity to buildings nearest to the road works (e.g. construction of the Windsor Road ramps), judicious selection of plant and equipment will be necessary to minimise the potential for perceptible vibrations at the adjacent buildings.

Noise and vibration management strategy for tunnelling

Managing the potential air-borne and ground-borne noise impacts associated with tunnelling and modification of the tunnel portals represents a key challenge for the project, due to the noise intensive nature of the works and the need to tunnel continuously a certain times to maintain structural integrity of the tunnel and address potential safety risk to road users and construction personnel.

The strategy outlined for works outside of standard construction hours would also be adopted for tunnelling works. In addition, key works scheduling strategies are proposed to reduce potential noise impacts to acceptable levels.

Information from the environmental assessment regarding predicted noise levels compare to appropriate noise management levels for tunnelling works is summarised below:

- Maximum predicted noise levels associated with works at the tunnel portals are predicted to be 62 dB(A), slightly above the day time noise management level.
- Maximum predicted noise levels associated with works at the tunnel entrances with an acoustic shed in place but without a acoustic curtain to control noise leaving the shed are predicted to be 51 dB(A), slightly above the evening noise management level.
- Maximum predicted noise levels associated for work that would occur entirely within the tunnel tubes with acoustic sheds and acoustic curtains in place are predicted to be 39 dB(A) slightly higher than the night time noise management level.
- The exceedances of relevant noise management are predicted at the few houses around each portal with a direct line of sight to the tunnel entrances and proposed work locations. As the works would occur within the deep existing excavations of the tunnel portals, construction noise levels are predicted to fall away sharply with increasing distance from the edge of the portals.
- For grinding works, the nearest affected receivers, with a slant distance of around 15m from the cutting face, would potentially experience maximum exceedances of night time noise management levels due to ground-borne noise of around 5 dBA.
- For residences with slant distance of less than 29m from the cutting face, exceedances of night time noise management levels (by less than 5 dBA) might be experienced for a period of 10-12 days.

Based on the above assessment, the following strategy is proposed to manage potential noise impacts associated with the tunnelling and widening of the tunnel portals:

- Work associated with widening of the tunnel portals would occur during the day time period until such time as the works can occur within an acoustic shed.
- Works that could occur within the acoustic shed at the tunnel entrances would occur during day time and evening time periods until such time as works could occur with the acoustic curtain in place.
- Works that could occur immediately inside the tunnel with the shed and curtain in place would be undertaken during the day, evening and night time periods.
- A detailed CNIS would be prepared to support the above staging arrangements and to re-evaluate predicted maximum noise levels, noise management levels and potential noise impacts based on a more detailed understanding of the proposed construction methodology as it becomes available.
- Noise modelling would be undertaken to confirm compliance of actual noise levels against predicted maximum noise levels identified in the CNIS. Where non-compliance is identified, a review of staging and noise management strategies would occur and work practices would be modified accordingly.
- Targeted consultation would occur prior to the commencement of works outlining the nature of the works, the proposed timings, durations and the expected noise impacts.

Documentation

The documentation described below would be prepared regarding noise and vibration impacts and management.

Construction Noise and Vibration Management Plan

A detailed Construction Noise and Vibration Management Plan (CNVMP) would be developed for the project based on the strategy outlined above. The Plan would contain as a minimum the noise and vibration management strategies and controls outlined in this strategy. The following would be included in this plan:

- Site specific investigation and assessment processes
- Pre-construction compliance requirements and hold points
- The responsibilities of key project personnel with respect to the implementation of noise and vibration management strategies and controls
- Noise compliance monitoring requirement
- Compliance record generation and management
- Relevant noise and vibration related procedures

Construction Noise and Vibration Impact Statements (CNISs)

To ensure the adequacy of the noise and vibration mitigation measures for the actual design and construction method, detailed Construction Noise and Vibration Impact Statements (CNISs) would be prepared for major noise-intensive construction activities. In particular, CNISs would be prepared for areas where construction of new noise walls prior to the removal of existing noise walls is not possible, noise intensive activities during standard construction hours with the potential to exceed appropriate noise management levels and for works proposed outside of standard construction hours.

CNISs would review the proposed construction methodology, scheduling, equipment lists, activities and the surrounding environment. Detailed noise and vibration level predictions would be undertaken and a suite of management strategies to deal with specific impacts on a location by location basis would be developed. The CNIS would also outline appropriate noise monitoring requirements. CNISs would be revised as required.

Compliance records

Noise and vibration monitoring would be undertaken as part of the Project. Detailed records of measured noise levels reported against appropriate noise management or predicted maximum noise levels as outlined in the Environmental Assessment, CNISs or licence conditions would be generated as required. Records would be retained as evidence of compliance for the duration of construction as a minimum.

Strategy Implementation

General project induction

As all project personnel would have the potential to influence construction noise and vibration associated with the project, relevant information regarding this strategy and the contents of the CNVMP would be included in the general project induction delivered to all construction personnel prior to their involvement in the project. The induction would cover (as a minimum) the potential impacts, behavioural and other options reduce construction noise and vibration, general do's and don'ts and personal responsibilities with respect to construction and vibration.

Construction planning

Prior to the commencement of construction, the final detailed design and construction methodology would be reviewed. All locations where noise intensive activities are proposed would be identified to ensure that appropriate planning of those activities occurs with consideration of the content of this strategy and the CNVMP. The identified locations and activities would be cross-checked against the environmental assessment to ensure that no locations or activities had been missed and to confirm the likely maximum noise levels, noise management levels and predicted potential exceedances. This would be used to determine the requirements for the preparation of CNISs.

The list of locations and activities would be communicated to the relevant Construction Manager and project engineers as required to ensure that potential noise and vibration impacts, CNISs and the principles and strategies outlined in the document are considered in the detailed construction planning.

CNISs

CNISs would be prepared as described in this strategy for noise intensive activities with detailed input from the construction team and assistance from specialist consultants. This would occur prior to the commencement of construction at the specific location or in response to changing site conditions and activities.

Pre-start talks prior to noise intensive activities

Immediately prior to the commencement of noise intensive activities for which CNISs have been developed, a pre-start talk would be delivered to all relevant construction personnel. The talk would cover relevant details from the CNIS, including the required noise and vibrations control strategies which must be implemented. Noise and vibration issues would also addressed in additional pre-start talks where non-compliances have been measured against maximum noise levels predictions/compliance goals or changes in the construction methodology or noise and vibration management strategies are warranted.

Noise and vibration compliance monitoring

As described in relevant CNISs for noise intensive activities, noise and vibration compliance monitoring would be implemented as required. Monitoring would generally occur at the start up of activities to confirm noise and vibration levels against pre-work predictions. Processes would be developed during development of the CVMP to address and report non-compliances and to amend work practices and noise and vibration management strategies as appropriate.

Community Consultation

From the environmental assessment and the construction planning process, the residents and other sensitive noise receivers in the vicinity of the construction zones would be identified. A general noise catchment around each activities or locations would be identified. Targeted and specific community consultation would be undertaken prior to and for the full duration of any noise and vibration issues associated with the activity the works location. Details of the work activity, the proposed equipment, the likely extent, magnitude and duration of the likely noise and vibration impacts and the proposed management options and strategies to be implemented would be included in this consultation as required.

Attachment D – Construction Traffic Management Strategy

Construction Traffic Management Strategy

Management objectives

It is recognised that effective management of construction impacts on the road network is critical to the success of the M2 Upgrade project. The traffic and access management objectives for the project are:

- To provide a safe environment for road users and construction personnel.
- To minimise traffic disruption to road users, particularly in peak traffic conditions.
- To maintain access for the local community, transport operators and commercial developments.
- Provide timely and accurate information to road users and local communities regarding changed traffic conditions.

Management Principles

The management principles that would be adopted to manage traffic and access impacts throughout the construction phase of the project are outlined below.

- Separate work and active traffic areas to promote safety for road users and construction personnel.
- Stage the works and the implementation of traffic management controls to minimise potential disruption to road users.
- Set-up work sites and develop construction methodologies to minimise potential road occupancy requirements and other potential impacts on the trafficable portions of the motorway and local road network.
- Maintain current road conditions and lane alignments as far as reasonably practicable.
- Modify existing road conditions, traffic controls (such as lane markings) and public transport arrangements where original traffic conditions cannot be maintained.
- Develop appropriate road speed limits in the vicinity of work zones to maximise safety and minimise potential traffic disruption and delays.
- Communicate proposed changed traffic conditions to motorists and other road users and provide appropriate signage immediately before work zones with details of modified traffic conditions.

Strategic approach

The general strategic approach to effective traffic and access management that would be adopted for the project is outlined below:

- Assess the existing environment to understand how the Motorway is used and the traffic characteristics of both the Motorway and the adjacent local and arterial roads. This has been undertaken as part of the environmental assessment for the project.
- Identify the potential impacts associated with proposed works. Whilst a general assessment of potential impacts is provided in the environmental assessment for the project, further investigations of potential impacts is warranted on a work site by work site basis. This will require an in-depth review and understanding of the final detailed design and proposed construction methodology to determine the specific impacts at each location.

- Develop appropriate traffic and access management measures to address site-specific impacts, which may include overall staging strategies to manage traffic and access across the entire project area for the duration of the project through to the introduction of site-specific procedural and physical controls that would be implemented at individual work sites. The detailed design and proposed construction methodologies may also be reviewed and amended as part of the process.
- Liaise with key stakeholders including the RTA, Motorway operators, NSW Police, Local Council(s), emergency service agencies and transport operators regarding the proposed traffic and access management strategies to maximise effectiveness, minimise potential disruption and ensure these groups are informed about proposed changes to the road network.
- Document the proposed control and management strategies and measures in a clear and concise manner to allow effective implementation. The responsibilities of key project personnel with respect to traffic and access management would be outlined and the timing of implementation would be documented.
- Communicate proposed strategies and control measures both to external stakeholders and within the project team including:
    - the timely dissemination of information regarding project staging and proposed modifications to traffic conditions and controls to the general public and other users of the Motorway.
    - Signage and other such devices would be installed along the Motorway on the approach to work sites to alert road users to altered traffic conditions ahead.
    - All project personnel would be provided with relevant information about their personal responsibilities with respect to traffic and access management. More specific training would be provided to personnel with key responsibilities regarding traffic management and prior to the implementation of specific traffic management measures on site.
- Obtain real time information for the Motorway operator regarding traffic volumes and other relevant data to assist with timely staged implementation of control strategies and management measures to minimise the potential for traffic disruption.
- Implement the proposed control strategies in accordance with the overall Traffic Management Plans and site-specific Traffic Control Plans, using experienced personnel to direct the implementation process and to ensure compliance with these plans.
- Monitor the performance of implemented traffic management strategies and controls to determine their effectiveness and adequacy in achieving the project objectives.
- Refine traffic management strategies and controls in a timely manner to address any issues that are identified during the monitoring process.

Documentation

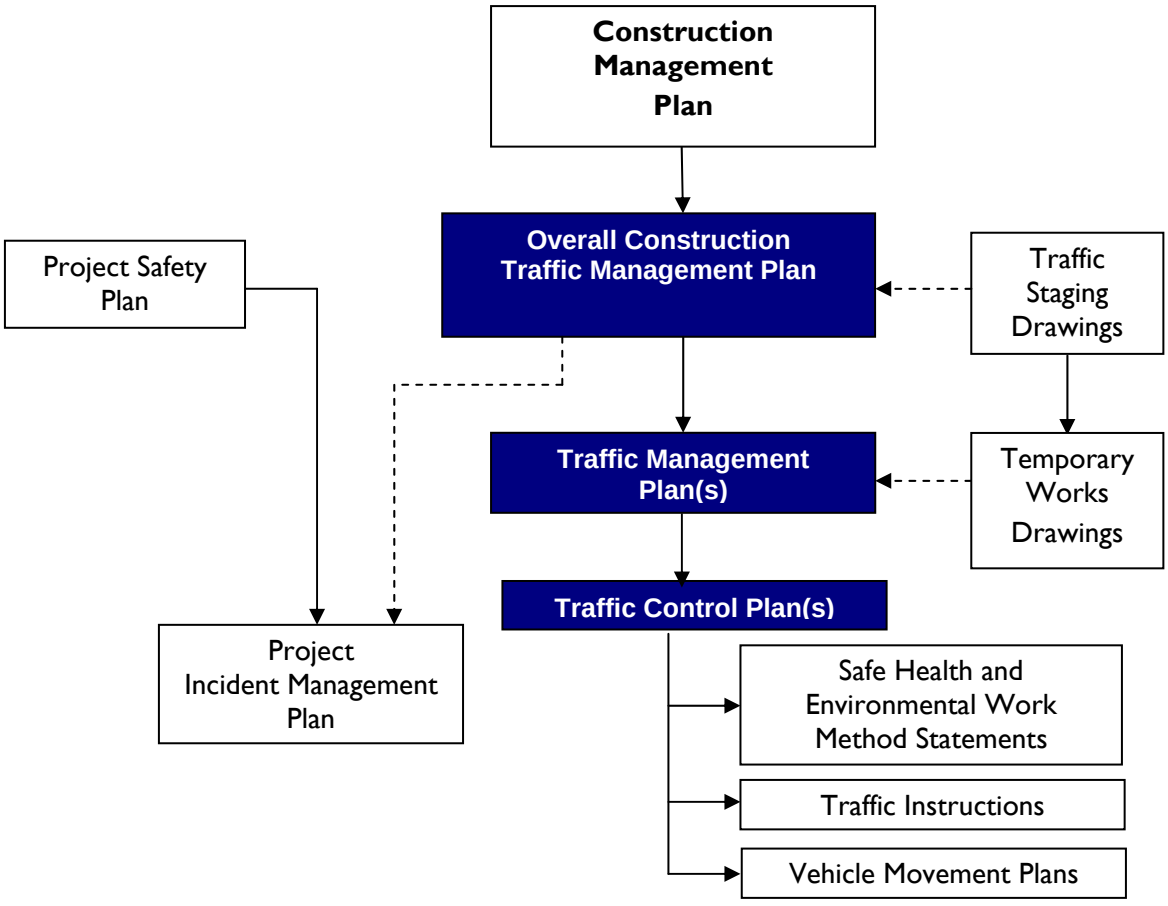
A Construction Traffic Management Plan (CTMP) would be developed for the project based on the strategy outlined above. This plan will operate as the master document in a set of plans, drawings and topic instructions dealing with the safe and effective management of traffic and access during the design and construction phase of the project. The Plan would interface with other associated plans developed and implemented as part of the overall Project Management System.

The following documents and associated operational procedures would be integrated with, and referenced in the CTMP:

- Traffic management plans.
- Traffic staging drawings.

- Temporary works drawings.
- Traffic control plans.
- Process instructions.
- Traffic instructions.
- Safe health and environmental work method statements.

The relationship of these documents and procedures to the overall CTMP is outlined in the flowchart below.



Strategy Implementation

Traffic staging concept development

Staging of construction works and traffic management implementation are the most critical measures in minimising the overall impact of the project with respect to traffic and access. The development of an overall Traffic Staging Concept is therefore an integral component of the construction planning phase of the project. The overall Staging Strategy must be developed concurrently with the detailed design process, the development of the proposed construction methodologies and the formulation of the overall construction program.

This strategy would be developed by the Project Traffic Manager in consultation with the Design Manager and the Construction Managers prior to the commencement of construction. The traffic staging concept, detailed design, overall construction program and proposed construction methodologies at each work location would be amended accordingly in an iterative process.

Identifying location specific information

The construction of this project will impact on the existing traffic flows along the M2 Motorway and the various local roads in close proximity to the M2 corridor. These potential impacts will be minimised by adopting the strategy outlined above.

Specific work locations and proposed construction activities will be assessed on a case by case basis to provide the detailed information required to develop site and activity specific management and control plans. The information that would be collected (where available and applicable) would include but not be limited to information in respect of:

- Existing on-street parking (including type and associated time limits).
- Existing traffic controls.
- Traffic control signals (TCS) at intersections.
- Existing junction configurations.
- Restrictions on existing traffic movements (right turn bans).
- Local area traffic management schemes (LATMS).
- Existing road occupancies.
- Public transport (buses (including stops), taxis, rail, trams).
- Traffic generating developments, (e.g. schools, shopping centres, churches, industrial areas, hospitals, airports, sporting complexes, clubs).
- Temporary access arrangements or restrictions for local residents, businesses, traffic generating developments, major and special events.
- Emergency vehicle access point.
- Heavy vehicle movement restrictions, including over dimension vehicle loads.
- Pedestrians, including disabled persons.
- Cyclists (general road, cycle and share way facilities).

Preparation of traffic staging drawing from temporary works drawings

On the basis of the information collected and from a review of the proposed construction methodology at each work locations, temporary works drawings and traffic staging drawings would be prepared by the Traffic Manager. These drawings would then be used to develop site-specific traffic management and control plans in accordance with the strategy outlined above. The traffic management and control plans would be developed in consultation with the Motorway operator and would require approval by the RTA prior to implementation.

Consultation

A Traffic and Transport Liaison Group (TTLG) would be formed and would provide a forum for discussion of all traffic, transport and road safety matters associated with the M2 Upgrade project. It would include representation from Motorway operators, transport service operators, emergency services and local councils.

The contents of traffic management plans and control plans would be developed and amended with consideration of matters discussed by the Traffic and Transport Liaison Group.

Implementation of site-specific controls

Immediately prior to the implementation of site-specific traffic management controls, the appropriate project personnel would be assembled. The content of the relevant plans for implementation would be outlined, including identification of personal responsibilities, staging of works, and key issues and risks. The plans would then be implemented in a co-ordinated manner with appropriate input and approval for the Motorway operator and other key stakeholders as required.

The construction works for which the traffic management would be required would not commence until the appropriate plans have been implemented and the required traffic conditions instated.

Attachment E – Construction Erosion and Sediment Control Management Strategy

Erosion and Sediment Control Strategy

Management objectives

The following Erosion and Sediment Control Strategy has been developed with reference to Chapter 3 of Managing Urban Stormwater, Soils and Construction Volume 2 (DECC 2008).

The overall objectives of erosion and sediment control are to:

- Prevent the pollution of surface and ground waters through erosion control.
- Prevent erosion.
- Retain sediment within the work site.

Management principles

In general, it is noted that pollution prevention is a more effective strategy than pollution control, as techniques for retaining eroded sediment are limited in their effectiveness. Therefore the following hierarchy of control strategies is proposed:

- Limit potential erosion and sediment transport within the work sites to prevent pollution.
- Intercept run-off from site and capture sediment to control pollution.

The following principles adopted from Volume 1 of the Blue Book would be applied to the Project:

- Implement the relevant statement of commitments and management measures identified in the environmental assessment for the project.
- Plan for erosion and sediment control during the design phase.
- Minimise the area of soil disturbance.
- Conserve topsoil for site rehabilitation.
- Intercept and divert water from upslope areas around or through work sites.
- Stabilise all discharge locations.
- Rehabilitate or otherwise stabilise disturbed areas as soon as practicable following the disturbance.
- Capture or intercept and filter/treat sediment laden water from site prior to discharge.
- Maintain erosion and sediment control measures.
- Continually monitor the condition and effectiveness of controls and improve control strategies where required.

Planning and design strategy considerations

Effective erosion and sediment control requires activities to be carried out during the life of the project including:

- Planning and design.
- Construction.
- Operation.

The commitments and measures in the environmental assessment and the requirements of EPL conditions would be adopted.

The effectiveness of construction stage control measures can be enhanced during the detailed design stage of the project. The following would be considered in the development surface water control during the detailed design for the project:

- Capture of 'clean' water from upslope areas.
- Inclusion of catch drains and berm drains to divert 'clean' water through or away from the motorway areas.
- Design and augmentation of the existing surface water capture and reticulation systems to capture and treat potentially polluted water from the motorway areas.

The motorway already has an extensive surface water drainage capture, reticulation and treatment system which could potentially be affected as part of the works. The surface water drainage system would also require modification as part of the works. The following is proposed to address these issues:

- Identify potential impacts to the existing surface water control systems due to the concept design and construction methodologies.
- Review the predicted changes to the hydrologic characteristics of the motorway as outlined in the Environmental Assessment.
- Identify and assess the performance of existing water quality basins due to changed hydrologic conditions and specify changes to the basins to address any changes in run-off characteristics (volume and quality).
- Specify changes to the drainage system to address any changes in hydrologic conditions.
- Identify options for early construction of operational controls during the construction phase to assist with the management of construction related erosion and sedimentation issues.

The outcomes of the detailed design process with respect to surface water control, erosion and sedimentation would be documented in design drawings and be included in specifications for the works and site-specific erosion and sediment control plans, to ensure that they are implemented during construction.

Construction phase strategy considerations

Erosion and sedimentation risk is directly related to the area of soil exposed to potential erosion and the duration of that exposure. In accordance with the hierarchy of control strategies outlined above, the prevention of pollution would be favoured over the control of pollution. As such, the staging and scheduling of land disturbance and subsequent stabilisation works is essential in order to minimise the potential for erosion to occur. In order to achieve this, the strategies relating to works staging and scheduling that would be employed on a location by location basis at work sites include:

- Minimise forward clearing, especially immediately adjacent to watercourses, until just prior to works in the location.
- Staging of construction activities where practicable to confine land disturbance to the minimum area possible.
- Define clearing limits and delineate to reduce the risk of disturbance additional area.
- Progress rehabilitation planning prior to the commencement of disturbance at each location wherever practicable.
- Stabilise disturbed areas as soon as practicable following the disturbance with temporary or permanent measures as required.
- Rehabilitate progressively and as soon as practicable after works are complete.

To limit the amount of run-off from site and the potential for sediment transport, the following surface water control strategies would be developed and implemented on a location by location basis at each work site to limit the volume of run-off water from site and the potential for sediment transport from site and water pollution:

- Intercept and divert 'clean' water from upslope areas around or through disturbed areas and works locations to minimise potential run-off and sediment transport from the work site.
- Provide suitable stabilised discharge points for any collected run-on water to prevent scour and sedimentation.
- Break up slope lengths within the work sites to reduce surface water run-off velocities and erosive potential within the work sites.
- Minimise catchment areas within work sites to reduce run-off volumes.
- Capture and reuse stormwater run-off wherever practicable.

Wherever practicable, permanent operational control measures identified and specified during detailed design would be integrated with temporary construction measures. For example, catch drains located at the top of cut batters would be installed prior to earthworks at the cut commencing wherever practicable.

It is inevitable that even with the above pollution prevention strategies implemented that some sediment laden run-off from the site would need to be managed. The pollution control strategies that would be implemented on location by location basis at each work site would include:

- Capture surface water run-off from the work site wherever practicable.
- Filter sediment from the run-off wherever practicable.
- Treat any captured run-off to remove sediment (through the use of flocculants etc) prior to discharge (when water is of a reasonable quality in accordance with discharge limits specified in any licence conditions).

A monitoring and maintenance program would be essential to ensure effective pollution prevention and control for the duration of the proposed works at each location. Daily inspections of all works sites would occur to assess the condition and effectiveness of implemented erosion and sedimentation control strategies. These would be undertaken by the project construction personnel responsible for the specific work sites. Maintenance would occur on an as needed basis to address any issues identified during these inspections. More intensive inspection and maintenance regimes would be implemented during periods of wet weather, at assess how the controls are performing and to address any damage that has occurred.

Weekly inspections of all works sites would be undertaken by project environmental personnel. The condition and effectiveness of implemented erosion and sedimentation control strategies would be a key focus during these inspections.

Site inspections of key works sites in sensitive areas (as a minimum) would also be undertaken a soil conservationist or similarly qualified external specialist to assess the condition and effectiveness of implemented erosion and sedimentation control strategies and identify any potential options for improvement.

As potential erosion and sedimentation issues would continue at rehabilitated areas until such time as persistent soil stability is achieved, an ongoing monitoring program would be developed for the post-construction period. This program would assess the condition and effectiveness of installed erosion, define maintenance requirements and responsibilities and

provide a mechanism staged removed of continual improvement of the installed controls as required.

Documentation

A thorough and detailed Primary Erosion and Sediment Control Plan (ESCP) would be developed as part of the project's Construction Environmental Management Plan prior to works commencing. The Primary ESCP would outline the general approach to surface water management and erosion/sedimentation prevention and control across the entire project area. This Plan would outline the overall strategies to develop and manage site specific erosion and sedimentation controls at each works location. The responsibilities of key project personnel with respect to erosion and sedimentation control planning, design and implementation would be outlined. Training requirements and personal responsibilities for all project personnel with respect to erosion and sedimentation control would also be outlined.

A soil conservationist or similarly qualified and experience specialist would be engaged to assist in the development of this Primary ESCP.

Using the Primary ESCP as the basis, site specific ESCPs would be developed. In the preparation of these plans the final detailed design and proposed construction methodology and staging at each work location would be reviewed and assessed. Each ESCP would specify the strategies and measures that would be implemented at each work sites to prevent and control potential erosion and sedimentation issues. Relevant controls outlined in the environmental assessment, the Construction Environmental Management Plan and the Blue Book to prevent and control pollution would be included in each ESCP as necessary.

Site specific ESCPs would be modified as the proposed work progresses to capture and address changing site conditions and suitable control strategies. Changes to each site specific ESCP would be prepared by project environmental personnel in consultation with the project soil conservationist as required. Any changes would be communicated to all relevant site personnel. A copy of the current site-specific ESCP for kept onsite at all times.

Implementation strategy

Under contractual obligations all contractors involved in the project would be obliged to undertake their activities in compliance with the Construction Environmental Management Plan and all subordinate plans, including this strategy. All project personnel would be made aware of their personal responsibilities with respect to erosion, sedimentation and pollution prevention and control as part of the general project induction that would be provided to all project personnel prior to their involvement in the project.

Site specific Erosion and Sediment Control Plans (ESCPs) would be developed by the Project Team prior to any works commencing in the particular area. The project Soil Conservationist would liaise with the Project Team during the development of the ESCPs to ensure appropriate and effective controls are proposed.

The site specific ESCPs would be provided to the Site Foreman prior to works commencing. The site specific controls and personal responsibilities would be communicated to all relevant construction personnel prior to the commencement of construction at each location.

The Site Foreman would be responsible for ensuring that all proposed erosion and sediment controls are implemented as per the ESCP. The Environmental Co-ordinator would be available during this stage provide guidance to the Site Foreman where required.

The Site Foreman would inspect their specific work area daily and undertaken repair work as required. The Environmental Co-ordinator would undertake weekly inspections, with additional inspections after a rainfall event that causes run-off from the construction site. The Soil Conservationist would undertake periodic inspections of the construction site to ensure effective erosion and sediment controls are implemented. The current site specific ESCP would be reviewed as part of these site inspections programs.

An actions list would be developed from each of these inspections and provided to the Site Foreman to undertake the remedial work. This actions list would prioritise the remedial actions in relation to the level of risk. The implementation of actions arising out of site inspections would added to a register of issues and the close out of each action monitored and tracked until it is adequately closed out or no longer required.