7. Environmental management

This chapter describes how the proposal will be managed to reduce potential environmental impacts throughout detailed design, construction and operation. A framework for managing the potential impacts is provided. A summary of site-specific environmental safeguards is provided and the licence and/or approval requirements required prior to construction are also listed.

7.1 Environmental management plans (or system)

A number of safeguards and management measures have been identified in the REF in order to minimise adverse environmental impacts, including social impacts, which could potentially arise as a result of the proposal. Should the proposal proceed, these safeguards and management measures would be incorporated into the detailed design and applied during the construction and operation of the proposal.

A Construction Environmental Management Plan (CEMP) will be prepared to describe the safeguards and management measures identified. The CEMP will provide a framework for establishing how these measures will be implemented and who would be responsible for their implementation.

The CEMP will be prepared prior to construction of the proposal and must be reviewed and certified by the Transport for NSW Environment Officer, prior to the commencement of any on-site work. The CEMP will be a working document, subject to ongoing change and updated as necessary to respond to specific requirements. The CEMP would be developed in accordance with the specifications set out in the [adjust as necessary: QA Specification *G36 – Environmental Protection (Management System)*, QA Specification *G38 – Soil and Water Management (Soil and Water Plan)*, QA Specification *G40 – Clearing and Grubbing*, QA Specification *G10 – Traffic Management*.

7.2 Summary of safeguards and management measures

Environmental safeguards and management measures outlined in this REF will be incorporated into the detailed design phase of the proposal and during construction and operation of the proposal, should it proceed. These safeguards and management measures will minimise any potential adverse impacts arising from the proposed work on the surrounding environment. The safeguards and management measures are summarised in Table 7-1.

Table 7-1: Summary of safeguards and management measures

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
GEN1	General - minimise environmental impacts during construction	A CEMP will be prepared and submitted for review and endorsement of the Transport for NSW Environment Manager prior to commencement of the activity. As a minimum, the CEMP will address the following: • any requirements associated with statutory approvals • details of how the project will implement the identified safeguards outlined in the REF • issue-specific environmental management plans • roles and responsibilities • communication requirements • induction and training requirements • procedures for monitoring and evaluating environmental performance, and for corrective action • reporting requirements and record-keeping • procedures for emergency and incident management • procedures for audit and review. • The endorsed CEMP will be implemented during the undertaking of the activity.	Contractor / Transport for NSW project manager	Pre-construction / detailed design	Additional safeguard
GEN2	General – notification	All businesses, residential properties and other key stakeholders (eg schools, local councils) affected by the activity will be notified at least five days prior to commencement of the activity.	Contractor / Transport project manager	Pre-construction	Standard safeguard
GEN3	General – environmental awareness	All personnel working on site will receive training to ensure awareness of environment protection requirements to be implemented during the project. This will include up-front site induction and regular "toolbox" style briefings. Site-specific training will be provided to personnel engaged in activities or areas of higher risk. These include*:* • areas of non-Aboriginal heritage sensitivity	Contractor / Transport project manager	Pre-construction / detailed design	Standard safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		• threatened species habitat • adjoining residential areas requiring particular noise management measures • Blue Mountains National Park boundary protocols.			
GEN4	General – Blue Mountains National Park	A Blue Mountains National Park Management Framework will be prepared to collate and manage potential impacts to the national park. As a minimum the strategy will: • ensure demarcation of the national park boundary • outline water quality controls to be implemented during construction (refer to the Erosion and Sedimentation Control Plans (ESCP) prepared for the proposal) • identify requirements for ongoing management of stormwater runoff through operational water quality controls • apply tree protection protocols on the national park interface in accordance with *Australian Standard 4970-2009 Protection of Trees on Development Sites* • establish hygiene protocols for machinery, vehicles, equipment and materials working near the national park boundary to avoid introduction of any pests or diseases • require access to be maintained to the adjoining national park entry roads and management trails • inform communication between Transport and the NSW National Parks and Wildlife Service, including notice periods for construction work and notices of park access closure • identify additional risks to the national park and opportunities to maintain the conservation values of the national park during construction and operation of the proposal.	Contractor / Transport	Detailed design / Pre-construction / Construction	
Surface water and groundwater					
SGW1	Soil and water	A Soil and Water Management Plan (SWMP) will be prepared and implemented as part of the CEMP. The SWMP will: • identify all reasonably foreseeable risks relating to soil erosion and water pollution, including runoff and the design and construction of waterway crossings • describe how these risks will be addressed during construction • include a construction surface water quality monitoring plan prepared in accordance with the Guideline for Construction Water Quality (Transport, n.d.) and Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (NSW EPA, 2004) • include a construction groundwater monitoring plan, which will provide information on groundwater conditions for design, construction and operation of water quality basins and enable monitor pollution originating from the stormwater seeping into the groundwater	Contractor	Detailed design / pre-construction	Section 2.1 of QA *G38 Soil and Water Management*

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		The Soil and Water Management Plan (SWMP) will be reviewed by a soil conservationist on the Transport for NSW list of Registered Contractors for Erosion, Sedimentation and Soil Conservation Consultancy Services. The SWMP will then be revised to address the outcomes of the review.			
SGW2	Soil and water	The preliminary Erosion and Sedimentation Management Plan (ESMR) and Erosion and Sedimentation Control Plans (ESCP) produced for the proposal (Appendix D to the REF) will be updated during the detailed design phase to confirm the erosion and sedimentation controls for both sections of the proposal, including the construction of progressive ESCPs and the continual updating of these plans.	Transport / Contractor	Detailed design / Pre-construction	Section 2.2 of QA *G38 Soil and Water Management*
SGW3	Soil and water	An assessment of construction sediment basin discharges will be prepared during detailed design to assess the appropriate water quality limits for sediment basin discharges and ensure consistency with the Water Quality Objectives for this location or agreed upon guideline values in consultation with Blue Mountains City Council.	Transport	Detailed design	Additional safeguard
SGW4	Soil and water	An assessment to determine appropriate water quality limits for sediment basin discharges will be undertaken as part of detailed design, with reference to the Water Discharge and Reuse Guideline (Transport, 2016b).	Transport	Detailed design	Additional safeguard
SGW5	Soil and water	Periodic wet weather monitoring will be undertaken within the tributaries of Back Creek and Megalong Creek (Katoomba to Medlow Bath section) and Relton Creek and Adams Creek (Medlow Bath to Blackheath section) that intercept the proposal and the sedimentation discharge points, before and during construction.	Contractor	Pre-construction / Construction	Additional safeguard
SGW6	Soil and water	Where possible, permanent drainage structures will be installed as early as possible to facilitate effective separation of clean offsite and dirty onsite water.	Contractor	Construction	Additional safeguard
SGW7	Soil and water	The water quality treatment system will be developed further during detailed design in consultation with Water NSW and Blue Mountains City Council. This will include: • layout and detail of the drainage system including outlet design • minimisation of discharge flows should also be minimised in the basin outflows, to limit scouring in the drainage channels • design within and around the waterways • assessment of culverts and stormwater inlets in the local waterways and recommendation for scour protection within the Medlow Bath to Blackheath section.	Transport	Detailed design	Additional safeguard
Soils and contamination					
SC1	Contaminated land	A Contaminated Land Management Plan will be prepared in accordance with the *Guideline for the Management of Contamination* (Transport, 2013a) and implemented as part of the CEMP. The plan will include, but not be limited to:	Contractor	Detailed design / Pre-construction / Construction	Section 4.2 of QA *G36 Environment Protection*

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		• capture and management of any surface runoff contaminated by exposure to the contaminated land • further investigations required to determine the extent, concentration and type of contamination • management of the remediation and subsequent validation of the contaminated land, including any certification required • an unexpected finds protocol for incidental potential contamination finds during earthworks (such as illegally dumped wastes and stockpiles) • the work methodology to identify, manage, handle and dispose of any contaminated materials or wastes as part of the work • measures to ensure the safety of site personnel and local communities during construction.			
SC2	Accidental spill	A site-specific emergency spill plan will be developed and include spill management measures in accordance with the Transport for NSW *Code of Practice for Water Management* (Roads and Traffic Authority, 1999) and relevant EPA guidelines. The plan will address measures to be implemented in the event of a spill, including initial response and containment, notification of emergency services and relevant authorities (including Transport for NSW and EPA officers).	Contractor	Detailed design / Pre-construction	Section 4.3 of QA *G36 Environment Protection*
SC3	Contaminated land	Ancillary facility sites that have been historically developed should be subject to intrusive investigations to identify any contaminants of potential concern on the site to assess the suitability of the site and whether activities that would be undertaken on the site will warrant additional controls.	Contractor	Pre-construction / Construction	Additional safeguard
SC4	Contaminated land	Areas of cut material in the proposal area will be assessed through an intrusive investigation to inform a likely waste classification of materials to be excavated (if required), suitability for reuse and/or if offsite disposal is required.	Contractor	Pre-construction / Construction	Additional safeguard
SC5	Waste management	Any spoil produced during the construction phase will be assessed in accordance with the NSW EPA (2014) *Waste Classification Guidelines* and *Resource Recovery Order / Exemption under the Protection of Environment (Waste) Operations Act 2000* to determine necessary waste management practices. The CEMP will include the following hierarchy for reuse, recycling or disposal of spoil produced during construction: • If spoil produced during construction will remain within the Lot and DP from which it was produced, it can be reused if CoPC concentrations are below the applicable NEPM 2013 Tier I screening values for evaluation of potential risk to human health and the environment.	Contractor	Pre-construction / Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		• Spoil produced during construction can be reused within the Lot and DP boundaries from which it was produced or on another Transport or third party site if it meets the definition of virgin excavated natural material / excavated natural material in accordance with the applicable *Resource Recovery Order / Exemption under the Protection of Environment (Waste) Operations Act 2000*. • Spoil that does not meet either of the above definitions should be transported to an appropriately licenced facility for recycling if all CoPC concentrations are below the NSW EPA (2014) Waste Classification Guidelines contaminant threshold 1 (CT1) values for General Solid Waste. The soil can be recycled at an appropriately licenced facility in accordance with any current Transport contractual arrangements. • If CoPC concentrations are above the CT1 values, the soil waste should be classified per the Waste Classification Guidelines and disposed at an appropriately licenced facility			
SC6	Contaminated land	The risk of potentially impacted soil migrating from the future upgrade work including dust generation and runoff will be minimised utilising standard practices such as dust suppression, and erosion and sedimentation control. These measures along with other measures will be included in the CEMP. Other controls will include proper use of work health and safety equipment and monitoring of work where asbestos or other contamination is identified.	Contractor	Pre-construction / Construction	Additional safeguard
Biodiversity					
B1	Biodiversity	A Flora and Fauna Management Plan will be prepared in accordance with Transport's *Biodiversity Guidelines: Protecting and Managing Biodiversity on Projects* (Roads and Traffic Authority, 2011a) and implemented as part of the CEMP. It will include, but not be limited to: • plans showing areas to be cleared and areas to be protected, including exclusion zones around the proposal (including a five-metre exclusion zone around the Blue Mountains Swamp TEC), protected habitat features and revegetation areas • requirements set out in the *Landscape Guideline* (Roads and Maritime, 2008) • pre-clearing survey requirements, vegetation removal and habitat removal in line with Transport's vegetation clearance protocol • directions for survey, monitoring and management of key threatened species known or considered to be potentially impacted by the proposal • development of a habitat replacement or nest box strategy • procedures for re-establishment of native vegetation • procedures for unexpected threatened species finds and fauna handling • procedures addressing relevant matters specified in the *Policy and guidelines for fish habitat conservation and management* (DPI Fisheries, 2013)	Transport / Contractor	Detailed design / pre-construction / construction	Section 4.8 of QA *G36 Environment Protection*

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		• commitments relating to threatened species management, pest and weed management, and site hygiene practices.			
B2	Biodiversity	Measures to further avoid and minimise the construction footprint and native vegetation or habitat removal will be investigated during detailed design and implemented where practicable and feasible.	Transport / Contractor	Detailed design / pre-construction	Additional safeguard
B3	Biodiversity	Fencing and/or the use of highly visible rope or tape boundaries will be used to delineate the boundary of vegetation clearing at the edge of the proposed construction boundary. A buffer area of at least five metres will be established between the proposal area and boundary of the swamp. Signposting will be used to inform project personnel and site visitors of areas of conservation value to restrict entry or inform behaviour that will reduce incidental interactions with fauna.	Contractor	Construction	Additional safeguard
B4	Biodiversity	The Needle Geebung (*Persoonia acerosa*) individual identified during field surveys will be translocated prior to construction.	Contractor	Pre-construction	Additional safeguard
B5	Biodiversity	For flora species such as Needle Geebung (*Persoonia acerosa*), seed collection will be carried out in an effort to minimise impacts to the species and aid in re-establishment of individuals within protected areas in the vicinity of the study area. This would form part of the seed collection planned by Transport to occur across the Great Western Highway Upgrade Program.	Contractor	Construction / pre-construction	Additional safeguard
B6	Vehicle strike	Transport will monitor road kills along Great Western Highway before, during and after commencement of the proposal.	Transport / Contractor	Pre-construction / construction / operation	Additional safeguard
B7	Indirect impacts on native vegetation and habitat	Measures to further avoid and minimise the area of direct impact on all native vegetation will be investigated during detailed design and implemented where practicable and feasible, especially in sensitive environments and near the Blue Mountains National Park.	Transport	Detailed design	Additional safeguard
B8	Indirect impacts on native vegetation and habitat	Installation of stormwater/sediment and erosion control mechanisms to prevent sediment or dirty water discharging into the Blue Mountain Swamp TEC.	Contractor	Construction	Additional safeguard
B9	Wildlife connectivity, habitat fragmentation and fauna injury and mortality	A Fauna Connectivity Strategy will be developed for the proposal during detailed design to minimise the impacts of the proposal on connectivity. This will include consideration of: • fauna mitigation measures to provide safe passage across the road • fauna fencing.	Transport	Detailed design	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
B10	Changes to hydrology	Changes to existing surface water flows will be minimised during detailed design and mitigated via preparation and implementation of the following: • preparation of progressive Erosion and Sediment Control Plans (ESCPs) and their continual revision and update • preparation of a Storm Water Management Plan and other aspects of the Construction Environment Management Plan to manage water quality impacts during construction of the proposal • preparation of Water Quality Management Plan (surface and groundwater) to describe water quality monitoring before and during construction • design of scour protection at new stormwater outlets and culverts and drainage basins • stormwater drainage design which incorporated a treatment trains and drainage basing to achieve a neutral or beneficial effect on the surrounding waterways.	Transport	Detailed design	Additional safeguard
B11	Fragmentation of identified habitat corridors	Connectivity measures will be implemented in accordance with the *Wildlife Connectivity Guidelines for Road Projects* (Roads and Traffic Authority, 2011c). Any connectivity measures implemented will be installed under the supervision of an experienced ecologist.	Transport / Contractor	Detailed design / pre-construction / construction	Additional safeguard
B12	Invasion and spread of pathogens and disease	• Any excavated earth will be either disposed or reused appropriately with care taken to avoid spreading propagules of weeds or infested soil or plant material. • Correct plant hygiene will be minimised to minimise spread of weeds, Phytophthora and other contaminants, including wash down when moving between weedy and non-weedy parts of the proposal. • All weed material removed during the construction works will be disposed of in a suitable waste facility and not mulched onsite to avoid the reintroduction and further spread of weeds and pathogens in the area.	Contractor	Construction	Additional safeguard
B13	Noise, light and vibration	Shading and artificial light impacts on sensitive areas or areas adjacent to the Blue Mountains National Park will be minimised during detailed design.	Transport	Detailed design	Additional safeguard
B14	Threatened ecological community (TEC)	• During construction, dirty water from the bridge deck would be drained away from the Blue Mountains Swamp TEC and not flow over into the swamp. • pH levels of water in the nearby water quality basins will be monitored near the Blue Mountains Swamp TEC during construction.	Contractor	Construction	Additional safeguard
B15	Groundwater dependent ecosystems	Interruptions to water flows associated with groundwater dependent ecosystems (e.g. Upland Swamp) will be minimised through detailed design.	Transport	Detailed design	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
B16	Biodiversity offsets	Where required, Transport would offset vegetation removal in accordance with the Transport 'Guideline for Biodiversity Offsets' (Roads and Maritime, 2016b). Offsets would be sought for both this proposal and any other projects within the Great Western Highway Upgrade Program for which biodiversity impacts have not separately been offset.	Transport	Detailed design	Additional safeguard
Non-Aboriginal heritage					
NA1	Non-Aboriginal heritage	A Non-Aboriginal Heritage Management Plan (NAHMP) will be prepared and implemented as part of the CEMP. It will provide specific guidance on measures and controls to be implemented to avoid and mitigate impacts to Non-Aboriginal heritage.	Transport / Contractor	Detailed design / pre-construction	Section 4.10 of QA *G36 Environment Protection*
NA2	Non-Aboriginal heritage	The *Standard Management Procedure - Unexpected Heritage Items* (Transport, 2015d) will be followed in the event that any unexpected heritage items, archaeological remains or potential relics of Non-Aboriginal origin are encountered. Work will only re-commence once the requirements of that Procedure have been satisfied.	Transport / Contractor	Detailed design / pre-construction	Section 4.10 of QA *G36 Environment Protection*
NA3	Non-Aboriginal heritage	The proposed design will be further refined during detailed design to avoid and/or minimise non-Aboriginal heritage impact. Should detailed design result in changes to non-Aboriginal heritage impacts, this will be re-evaluated at that stage.	Transport	Detailed design	Additional safeguard
NA4	Non-Aboriginal heritage	A Photographic Archival Record of the current state of the Great Western Highway will be prepared prior to the commencement of construction. The archival recording will be submitted to Transport, local historical societies and Blue Mountains City Council.	Contractor	Pre-construction	Additional safeguard
NA5	Greater Blue Mountains Area – Additional Values	Removal of vegetation within the Greater Blue Mountains Area – Additional Values areas will be minimised as much as possible.	Transport	Detailed design	Additional safeguard
NA6	Pulpit Hill and Environs	• A Conservation Management Plan (CMP) will be prepared for Pulpit Hill and Environs to manage the heritage significance of the site and provide for ongoing management. • The proposed concept design will be further refined during detailed design to minimise adverse heritage impact on the Pulpit Hill and Environs curtilage (including Stone Arrangements site) and interpret the heritage significance of this site, including the role the Explorers Tree played as a waypoint. • If it is not possible to completely avoid the Stone Arrangements, then further information will be required to better understand the constraints and significance of the heritage site. This further study will include: – An Historical Archaeology Assessment including a Historical Research Study – An Archaeological Research Design (ARD) for archaeological work – An archaeological test excavation targeting a portion of the Stone Arrangements and a soil analysis of excavated soil to confirm the presence of graves	Transport / Contractor	Detailed design / pre-construction / Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		– Further remote sensing studies to verify previous study results. • The archaeological test excavation will be carried out to confirm whether a permit under Section 140 of the *Heritage Act 1977* will be required for the proposal. • A heritage interpretation strategy for the Pulpit Hill area will be developed to reinterpret the existing heritage interpretation area and communicate the heritage significance of the Pulpit Hill area. This will be integrated with the cultural interpretation strategy for the Great Western Highway Upgrade Program. The existing interpretation area will be retained as much as possible.			
NA7	Bonnie Doon Reserve	Vegetation removal within the Bonnie Doon Reserve curtilage will be limited to as little as needed and unobtrusive as possible.	Transport	Detailed design	Additional safeguard
NA8	Culvert XA6, XA7 and XA7a	A further vibration assessment will be prepared to assess the indirect impacts of the proposal near Culvert XA6, XA7 and XA7a.	Transport	Detailed design	Additional safeguard
NA9	House and Orchards (former Glenara Cottage)	An Historic (non-Aboriginal) Archaeological Assessment (HAA) will be carried out to the determine the nature, extent and significance of any archaeological resources associated with the House and Orchards (former Glenara Cottage) in this area and identify appropriate management measures.	Contractor	Pre-construction	Additional safeguard
NA10	The Pines and The Gatekeeper's Cottage	• A further vibration assessment will be prepared to assess the indirect impacts of the proposal near The Pines and The Gatekeeper's Cottage. • Should detailed design result in changes to the proposal near The Pines and The Gatekeeper's Cottage, visual impacts will be revaluated upon completion of detailed design.	Transport	Detailed design	Additional safeguard
Landscape character and visual impacts					
V1	Landscape character and visual impact	An Urban Design Plan will be prepared to support the final detailed project design and implemented as part of the CEMP. The Urban Design Plan will present an integrated urban design for the project, providing practical detail on the application of design principles and objectives identified in the environmental assessment. The Plan will include design treatments for: • location and identification of existing vegetation and proposed landscaped areas, including species to be used • built elements including retaining walls, bridges and noise walls • pedestrian and cyclist elements including footpath location, paving types and pedestrian crossings • fixtures such as seating, lighting, fencing and signs • details of the staging of landscape work taking account of related environmental controls such as erosion and sedimentation controls and drainage	Contractor	Detailed design/pre-construction	Standard safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		• procedures for monitoring and maintaining landscaped or rehabilitated areas.			
V2	Proposal design	• Rail infrastructure will be screened using shrubs and trees, where possible • Cut and fill batters will be rounded to help integrate into the existing landform and create a more naturalised appearance. • Opportunities to reduce the proposal footprint will be explored during detailed design • Connectivity and access to the existing and proposed heritage interpretation area will be enhanced. • Exposed rock faces will be retained in the rock cuttings	Transport	Detailed design	Additional safeguard
V3	Bridges	• The bridge design and the design of peripheral elements will be refined to reduce its visual impact.	Transport	Detailed design	Additional safeguard
V4	Bicycle and pedestrian	• Cyclist and pedestrian access will be improved through new and upgraded, multi-use access tracks • Visibility of proposed multi-use access tracks and adjoining residential properties will be improved.	Transport	Detailed design	Additional safeguard
V5	Structures	• Design of new retaining walls will have finishes of a high standard and quality that is in keeping with the Great Western Highway character.	Transport	Detailed design	Additional safeguard
V6	Landscape implementation	• Fill batters will be screened where possible using seeding, shrubs and trees, as well as bushland reconstruction techniques. • Buffer planting will be introduced in front of the retaining wall at the southern entry into Medlow Bath to minimise visual impacts. • Bushland reconstruction and bushland seeding will be maximised where possible. • Native and endemic plantings will be used along the highway outside of the village. • Revegetation with appropriate species will be maximised along the highway to reduce perceived corridor width. • The selection of plant species will complement and integrate with the existing environment. • Opportunities for additional tree plantings along the proposal corridor will be investigated.	Transport	Detailed design	Additional safeguard
V7	Construction visual impact	The layout of ancillary facility sites will be designed to limit impact. The design will consider: • screening of boundaries facing sensitive receivers or views • careful placement of structures and buildings to maintain viewpoints or provide additional screening of site activities.	Contractor	Pre-construction / Construction	Additional safeguard
V8	Construction visual impact	Ancillary facilities will be maintained, kept tidy and well-presented including sorting regular removal of excess materials to reduce visual impact.	Contractor	Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
V9	Construction visual impact	Ancillary facility sites and temporary construction areas will be progressively restored to at least their pre-construction conditions when no longer required.	Contractor	Construction	Additional safeguard
Noise and vibration					
NV1	Noise and vibration	A Construction Noise and Vibration Management Plan (CNVMP) will be prepared and implemented as part of the CEMP. The CNVMP will generally follow the approach in the Interim *Construction Noise Guideline* (ICNG) (DECC, 2009) and identify: • all potential significant noise and vibration generating activities associated with the activity • feasible and reasonable mitigation measures to be implemented, taking into account *Beyond the Pavement: urban design policy, process and principles* (Transport, 2014). • a monitoring program to assess performance against relevant noise and vibration criteria • arrangements for consultation with affected neighbours and sensitive receivers, including notification and complaint handling procedures • contingency measures to be implemented in the event of non-compliance with noise and vibration criteria.	Contractor	Detailed design / pre-construction	Section 4.6 of QA *G36 Environment Protection*
NV2	Noise and vibration	All sensitive receivers (e.g. schools, local residents) likely to be affected will be notified at least seven days prior to commencement of any works associated with the activity that may have an adverse noise or vibration impact. The notification will provide details of: • the project • the construction period and construction hours • contact information for project management staff • complaint and incident reporting • how to obtain further information.	Contractor	Detailed design / pre-construction	Additional safeguard
NV3	Noise and vibration	Less vibration emitting construction methods will be used where feasible and reasonable, for example vibratory rollers can, where practicable, be operated with the vibratory mode switched off to reduce vibration impact.	Contractor	Construction	Additional safeguard
NV4	Out of hours work	Out of hours works will be undertaken in accordance with the Construction Noise and Vibration Guideline (Roads and Maritime 2016). This includes: • Offer respite and/or restricted construction hours where noise intensive works are planned over extended periods, especially where they occur outside of standard hours. This may include moving the construction work front to different areas so that sensitive receivers are not impacted for longer than two consecutive days	Contractor	Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		No more than two consecutive nights of noise with special audible characteristics and/or vibration generating work may be undertaken in the same NCA over any 7-day period, unless otherwise negotiated with affected receivers.			
NV5	Out of hours work	Noisiest activities will be limited to standard construction hours, where practicable	Contractor	Construction	Additional safeguard
NV6	Noise and vibration	A register of most affected noise and vibration sensitive receivers (NVSRs) will be kept on site and maintained. The register will include the following details for each NVSR: • Address of receiver • Category of receiver (e.g. Residential, Commercial etc.) • Contact name and phone number. The register is to be included as part of the Proposal's Community Liaison Plan or similar document and maintained in accordance with the requirements of this plan.	Contactor	Construction	Additional safeguard
NV7	Noise and vibration	Source controls will be employed to minimise noise impacts, such as using noise screens and mufflers, maximising offset distance, and orienting plant away from sensitive receivers.	Contractor	Construction	Additional safeguard
NV8	Noise and vibration	The selection of plant and machinery will consider noise emissions, operated to reduce maximum noise levels, maintained regularly and turned off when not in use	Contractor	Construction	Additional safeguard
NV9	Operational road traffic noise	Further assessment of operational road traffic noise impacts will be carried out to inform consideration of appropriate noise mitigation during detailed design. Where a parcel of land would be impacted by multiple projects within the Great Western Highway Upgrade Program, noise treatment options will be considered for the greater of the predicted noise impacts.	Transport	Detailed design	Additional safeguard
NV10	Operational road traffic noise	Implement at-property noise mitigation treatments as early as feasible in the construction program in consultation with the property owner.	Transport / Contractor	Pre-construction / construction	Additional safeguard
NV11	Woodlands Road ancillary facility	During detailed design, further investigation will be carried out to confirm the use of the Woodland Road ancillary facility as well as traffic movements.	Transport	Detailed design	Additional safeguard
Traffic and transport					
TT1	Traffic and transport	A Traffic Management Plan (TMP) will be prepared and implemented as part of the CEMP. The TMP will be prepared in accordance with the Transport *Traffic Control at Work Sites Manual* (Transport, 2020c) and *QA Specification G10 Control of Traffic* (Transport, 2020b). The TMP will include: • confirmation of haulage routes • measures to maintain access to local roads and properties	Transport / Contractor	Detailed design / Pre-construction	Section 4.8 of QA *G36 Environment Protection*

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		• a provision for the monitoring of delays or queues forming at access points with a suitable response such as temporary detours or cessation of construction access movements to clear the queue • construction traffic control plans outlining site-specific traffic control measures (including signage) to manage and regulate traffic movement • measures to maintain pedestrian and cyclist access where possible • requirements and methods to consult and inform the local community of impacts on the local road network • access to construction sites including entry and exit locations and measures to prevent construction vehicles queuing on public roads • a response plan for any construction traffic incident • monitoring, review and amendment mechanisms.			
TT2	Construction site access	Construction site access will be designed and implemented in consideration of: • road design guidelines and turning paths for heavy vehicles • appropriate sight distances to allow traffic to safely enter and exit • visibility of compliant warning and way finding signs • use of accredited traffic controllers, where appropriate and/or other controls to separate, slow down or temporarily stop traffic for safe entry/exit • minimising use of local roads, where practical • provision of deceleration lanes at accesses next to highly trafficked roads.	Contractor	Pre-construction/ construction	Additional safeguard
TT3	Impact on bus stops or routes	For the Katoomba to Medlow Bath section, temporary and permanent bus stop relocation will be discussed with the relevant bus operator. Transport will discuss the temporary relocation of the Bonnie Doon Reserve and Foy Avenue bus stops. Transport will inform the community of the temporary relocation of the bus stops prior to the relocation.	Transport / Contractor	Detailed design / Pre-construction	Additional safeguard
TT4	Temporary access changes	Detours during temporary access changes will be implemented with directional signage along alternate routes.	Contractor	Construction	Additional safeguard
TT5	Traffic management measures	Any temporary traffic diversions or road closures will be implemented in accordance with Transport Management Centre (TMC) and Blue Mountains City Council requirements and notified to emergency services.	Contractor	Construction	Additional safeguard
TT6	Property access	Property access will be maintained where feasible and reasonable and property owners will be consulted well in advance of work starting that may temporarily restrict or control access.	Contractor	Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
TT7	Local road or shared path closures	Blue Mountains City Council will be consulted with prior to any local road or shared path closures to identify suitable mitigation measures such as detour routes.	Contractor	Construction	Additional safeguard
TT8	Damage to local roads	Any damage to the local road network identified to be caused by construction vehicles for the proposal will be remediated by the contractor to be similar to the existing road condition.	Contractor	Construction	Additional safeguard
Socio-economic, property and land use					
SE1	Socio-economic	A Communication Plan (CP) will be prepared and implemented as part of the CEMP to help provide timely and accurate information to the community during construction. The CP will include (as a minimum): • people or organisations to be consulted during the delivery of the proposal • procedures and mechanisms for the regular distribution of information about the proposal • mechanisms to keep relevant stakeholders updated on construction activities, schedules and milestones • avenues for the community to provide feedback (including a 24-hour, toll free proposal information and complaints line) or to register complaints through which Transport will respond to community feedback • a process to resolve complaints and issues raised. The CP will be prepared in accordance with the *Community Involvement and Communications Resource Manual* (Roads and Traffic Authority, 2008).	Contractor	Detailed design / pre-construction	Additional safeguard
SE2	Community consultation	Transport will continue to consult with the community until the completion of the proposal. Discussions would include the nature and timing of construction work.	Transport	Pre-construction / construction	Additional safeguard
SE3	Property acquisition	Land acquisition will occur in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991* and the *Local Government Act 1993*. Transport will continue to consult with Blue Mountains City Council regarding council owned land and assets. The design for the proposal will also be refined during detailed design to minimise impacts on community land, where possible.	Transport	Pre-construction	Additional safeguard
SE4	Amenity	Amenity impacts will be managed through other safeguards for the proposal (including those related to noise and vibration, visual changes, heritage and traffic)	Transport	Pre-construction / construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
SE5	Changes in access	Temporary and permanent changes in access will be discussed with impacted land occupiers (including Sydney Trains and NPWS) prior to commencement of construction and during construction activities should arrangements change. This includes properties which may be impacted by intersection upgrades at Nellies Glen Road, Explorers Road and Foy Avenue.	Transport	Pre-construction / construction	Additional safeguard
SE6	Social infrastructure	Transport will consult with local community groups that use facilities including the walking/ hiking trails throughout construction.	Transport	Pre-construction/ construction	Additional safeguard
SE7	Relocation of bus stops	Public transport users will be notified in advance of any changes to bus stop locations through signage at the existing bus stop during construction. Public transport users will also be notified of permanent bus stop relocations. Adequate way finding signage will be installed. Consultation with the relevant bus authorities will be undertaken to mitigate potential impacts to bus routes.	Transport	Pre-construction / construction	Additional safeguard
SE8	Traffic management for all road users, including pedestrians and cyclists	Transport will consider opportunities for alternative transport arrangements to provide access for vulnerable community members who would normally access the Great Blue Mountains Trail. Alternative routes for active transport users during construction will be clearly identified by signage and the use of traffic controllers where required.	Transport	Pre-construction / construction	Additional safeguard
SE9	Provision of parking	Transport will develop a car parking strategy to inform the operation of upgraded car parking opportunities (including near the Pulpit Hill interpretation area) in conjunction with the Great Western Highway Upgrade – Medlow Bath.	Transport	Detailed design / pre-construction	Additional safeguard
Aboriginal cultural heritage					
A1	Aboriginal heritage	An Aboriginal Heritage Management Plan (AHMP) will be prepared in accordance with the *Procedure for Aboriginal cultural heritage consultation and investigation* (Roads and Maritime, 2011) and *Standard Management Procedure - Unexpected Heritage Items* (Transport for NSW, 2015d) and implemented as part of the CEMP. It will provide specific guidance on measures and controls to be implemented for managing impacts on Aboriginal heritage. The AHMP will be prepared in consultation with all relevant Aboriginal groups.	Contractor	Detailed design / pre-construction	Section 4.9 of QA *G36 Environment Protection*
A2	Aboriginal heritage	*The Standard Management Procedure - Unexpected Heritage Items* (Transport for NSW, 2015d) will be followed in the event that an unknown or potential Aboriginal object/s, including skeletal remains, is found during construction. Work will only re-commence once the requirements of that Procedure have been satisfied.	Contractor	Construction	Section 4.9 of QA *G36 Environment Protection*

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
A3	Aboriginal heritage	Transport will develop a cultural interpretation strategy across the Great Western Highway Upgrade Program. This cultural interpretation strategy will look to interpret both Aboriginal and non-Aboriginal heritage along the highway alignment. The Pulpit Hill heritage interpretation area will be further developed as part of this strategy, in consultation with the Blue Mountains City Council, Heritage NSW, Aboriginal knowledge holders and the local community.	Transport	Detailed design	Additional safeguard
Other Impacts					
O1	Air quality	An Air Quality Management Plan (AQMP) will be prepared and implemented as part of the CEMP. The AQMP will include, but not be limited to: • potential sources of air pollution • air quality management objectives consistent with any relevant published EPA and/or Energy, Environment and Science (EES)/Department of Planning, Industry and Environment guidelines • mitigation and suppression measures to be implemented • methods to manage work during strong winds or other adverse weather conditions • a progressive rehabilitation strategy for exposed surfaces.	Transport / Contractor	Detailed design / pre-construction	Section 4.4 of QA G36 Environment Protection
O2	Waste and resource management	A Waste Management Plan (WMP) will be prepared and implemented as part of the CEMP. The WMP will include but not be limited to: • measures to avoid and minimise waste associated with the project • classification of wastes and management options (re-use, recycle, stockpile, disposal) • statutory approvals required for managing both on and off-site waste, or application of any relevant resource recovery exemptions • procedures for storage, transport and disposal of spoil and waste • monitoring, record keeping and reporting. The WMP will be prepared taking into account the *Environmental Procedure - Management of Wastes on Roads and Maritime Services Land* (Roads and Maritime, 2014) and relevant Transport for NSW Waste Fact Sheets.	Transport / Contractor	Detailed design / pre-construction	Section 4.2 of QA G36 Environment Protection
O3	Waste and resource management	If vegetation is to be mulched and transported off site for beneficial reuse, it is to be assessed for the presence of weeds, pest, and other disease and a Mulch Management Plan prepared in accordance with the Roads and Maritime Technical Procedure: Mulch Management	Transport / Contractor	Detailed design / pre-construction	Additional Safeguard
O4	Waste and resource management	Recycling facilities will be provided at site compounds for recycling paper, plastic, glass and other re-useable materials. Liquid wastes, such as paints and solvents, will be disposed of in accordance with the Waste Classification Guidelines Part 1: Classifying Waste (DECCW, 2009) and the POEO Act.	Transport / Contractor	Detailed design / pre-construction	Additional Safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
O5	Bushfire hazards and risk management	The CEMP will include a bushfire management plan prepared in accordance with Planning for Bush Fire Protection 2019 (NSW Rural Fire Service, 2019). Measures to be implemented to manage bushfire risk include: • monitoring of weather and local bushfire ratings • consultation requirements for community notifications in the event of a bushfire • maintaining equipment in good working order • ensuring plant and equipment are fitted with appropriate spark arrestors, where practicable • ensuring site workers are informed of the site rules including designated smoking areas and putting rubbish in designated bins. • obtaining hot work permits and implementing total fire bans as required • implementing adequate storage and handling requirements for potentially flammable substances in accordance with the relevant guidelines.	Contractor	Pre-construction / construction	Additional Safeguard
O6	Bushfire hazards and risk management	Consultation with emergency services, including the Rural Fire Service and Fire and Rescue NSW to: • ensure emergency access is maintained during construction • co-ordinate any bush fire emergency actions as outlined in the project's Bushfire Management Plan.	Contractor	Construction	Additional Safeguard
Cumulative impacts					
C1	Cumulative impacts	Ongoing consultation will be carried out between proponents and construction contractors of nearby projects to identify the potential for cumulative impacts to occur should construction occur concurrently with the proposal.	Transport / Contractor	Detailed design / Pre-construction / Construction	Additional Safeguard
C2	Cumulative impacts	Co-ordination of traffic management controls will be considered to minimise cumulative traffic impacts, particularly during peak holiday periods.	Transport / Contractor	Detailed design / Pre-construction / Construction	Additional Safeguard
C3	Cumulative impacts	Co-ordination of out of hours work will be considered across the Great Western Highway East – Katoomba to Blackheath and the Great Western Highway Upgrade – Medlow Bath in Medlow Bath to minimise out of hours work periods and minimise ongoing out of hours work noise to sensitive receivers and ensure respite periods are achieved where required.	Transport / Contractor	Detailed design / Pre-construction / Construction	Additional Safeguard

7.3 Licensing and approvals

Table 7-2: Summary of licensing and approvals required

Instrument	Requirement	Timing
Protection of the Environment Operations Act 1997 (s43)	Environment protection licence (EPL) for road construction within the Katoomba to Medlow Bath section from the EPA.	Prior to start of the activity.
Water Management Act 2000 (s304)	Notice to the Minister for Agriculture and Western NSW to exercise functions in special areas within the catchment area.	14 days prior to exercising functions.
Crown Land Management Act 2016 (Division 3.4, 5.5 and 5.6)	Lease or licence to occupy areas of Crown land.	Prior to start of the activity
National Parks and Wildlife Act 1974	Revocation of land reserved as a National Park to occur via an Act of Parliament.	Prior to the determination of any land reserved under the National Parks and Wildlife Act 1974
Roads Act 1933 (s138)	A Road Occupancy Licence would be required from the relevant roads authority by the contractor for prior to work on public roads	Prior to start of the activity.
Water NSW Act 2014 (s50)	Notice to Water NSW to exercise functions in the Katoomba and Blackheath special areas.	28 days prior to exercising functions.