Prepared for
Major Projects Canberra
ABN: 66 676 633 401

Preliminary Environmental Risk Assessment

02-Dec-2022
Light Rail City to Commonwealth Park

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Client: Major Projects Canberra

ABN: 66 676 633 401

Prepared by

AECOM Australia Pty Ltd
Civic Quarter, Level 4, 68 Northbourne Avenue, GPO Box 1942 ACT 2601, Canberra ACT 2601, Australia
T +61 2 6100 0551 www.aecom.com
ABN 20 093 846 925

02-Dec-2022

Job No.: 60656949

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1.0 Overview

Major Projects Canberra (MPC) proposes to extend the Canberra Light Rail (CLR) network from its current southern terminus at Alinga Street, Canberra City, to Woden (Light Rail to Woden). Light Rail to Woden is being progressed in two, self-contained stages for a faster project delivery: Stage 2A City to Commonwealth Park (the Project, the subject of this report), and Stage 2B Commonwealth Park to Woden.

The Project would involve extending the CLR network from the current southern terminus at Alinga Street to a proposed stop at Commonwealth Park.

2.0 Approach

A Preliminary Environmental Risk Assessment (PERA) workshop was undertaken in March 2022 with the objective of determining the significance of potential environmental risks associated with the construction and operation of the Project prior to mitigation, and to identify which risks required further investigation. This workshop was attended by representatives from the Proponent, the environmental assessment team including technical specialists, and the design team.

The inputs and outputs of the PERA were based on design progression at the time of the workshop, with potential risks assessed in accordance with the principles of *AS/NZS/ISO31000:2018 Risk Management – Principles and Guidelines*. The risk assessment process is outlined in **Figure 2-1**.

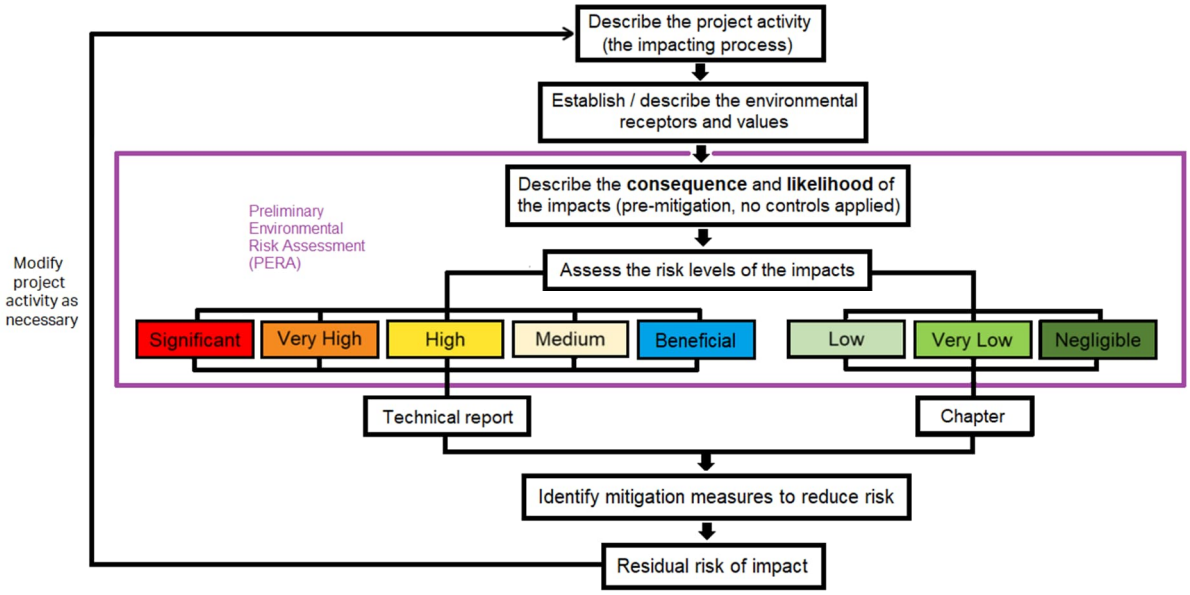

Figure 2-1 Risk assessment approach

Classifying the likelihood of occurrence (**Section 2.1**) and the consequences of impacts (**Section 2.2**) allows the ranking of potential impacts into one of eight risk levels (**Section 2.3**).

Risks which were assessed in the workshop as 'Medium', 'High', 'Very High' and 'Significant' are considered to require further assessment in a technical report. Risks which were assessed in the workshop as 'Negligible', 'Very Low', and 'Low' are considered to require assessment in a chapter within the Environmental Assessment (EA) for the Project. This approach may vary as design progresses and further assessment of potential impacts identified in the PERA is required.

2.1 Likelihood

The likelihood of an impact occurring is best described in terms of its associated probability. Typically, the probability of a particular outcome occurring is determined through qualitative assessment by experienced practitioners. However, in all qualitative assessments there is a degree of uncertainty associated with the ability for an accurate assessment to be made (i.e., reflecting the availability of knowledge, human error, etc.). Consequently, it is considered best practice to interpret potential risks assuming a reasonable worst-case scenario (i.e., overestimate the probability of impact occurrence) to account for the underlying uncertainty. **Table 2-1** illustrates the criteria used to determine the likelihood of an impact.

Table 2-1 Evaluating likelihood

Likelihood	Description
Remote	Extremely rare/unprecedented
Unlikely	Not expected to occur in most circumstances
Possible	Could occur
Likely	Probably would occur
Almost Certain	Expected to occur

2.2 Consequence

Assessing the consequences of an impact requires a degree of subjective assessment as the likely consequences of an impact may consist of several elements (i.e., environmental, economic, social). The consequence of an impact addressed in the risk assessment is assessed as being a reasonably foreseeable consequence. If there is a large amount of uncertainty, then the consequence may be assumed to be worse. For the purpose of an inherent risk assessment (i.e., before the efficacy of mitigation measures is assessed), elements that could be considered are illustrated in **Table 2-2**. Environmental, economic, and social elements are usually interrelated and therefore, the consequence would be considered major (or higher) if any one of the associated elements has a predicted major impact.

Table 2-2 Evaluating consequence

Consequence	Environment	Economic	Social
Beneficial	Enhancing, improving, or positively impacting the environment, economy and/or society		
Insignificant	No environmental damage	Minimal losses	No noticeable change experienced by people in the locality
Minor	Minor instances of environmental damage that could be reversed (e.g., negative impact on a specific species)	Several thousand dollars lost revenue or remediation costs	Mild deterioration, for a reasonably short time, for a small number of people who are generally adaptable and not vulnerable
Moderate	Isolated but significant instances of environmental damage that might be reversed with intense efforts	Half million dollars lost revenue or remediation costs	Noticeable deterioration to something that people value highly, either lasting for an extensive time, or affecting a group of people
Major	Severe loss of environmental amenities and a danger of continuing	One million dollars lost revenue or remediation costs	Substantial deterioration to something that people value highly, either lasting for an indefinite time, or affecting many people in a widespread area

Consequence	Environment	Economic	Social
Catastrophic	Major widespread loss of environmental amenity and progressive irrecoverable environmental damage	Several million dollars in lost revenue or remediation costs	Substantial negative change experienced in community wellbeing, livelihood, amenity, infrastructure, services, and/or health, permanent displacement of at least 20% of a community

2.3 Risk assessment

The risks associated with the impacts are analysed as a function of the likelihood of the risk occurring and the consequences associated with this risk occurring. The risks and impacts identified are assigned likelihood and consequence ratings generally based on the definitions set out in the *Proponent's Guide to Environmental Impact Statements* (published by ACT Planning and Land Authority). These combine to identify the risk rating as set out in the matrix presented in **Table 2-3**.

Table 2-3 Risk rating matrix

Likelihood	Consequence					
	Positive	Insignificant	Minor	Moderate	Major	Catastrophic
Almost certain	Beneficial	Medium	High	Very High	Significant	Significant
Likely	Beneficial	Low	Medium	High	Very High	Significant
Possible	Beneficial	Very Low	Low	Medium	High	Very High
Unlikely	Beneficial	Negligible	Very Low	Low	Medium	High
Remote	Beneficial	Negligible	Negligible	Very Low	Low	Medium

3.0 Traffic and Transport

3.1 Construction risks

Potential traffic and transport risks associated with the construction of the Project, prior to mitigation, are presented in **Table 3-1**.

Table 3-1 Potential traffic and transport risks during construction

Risk	Description	Likelihood	Consequence	Rating
Congestion of major roads	Land closures, road detours and reduced traffic speed as a result of construction activities will give rise to congestion on Commonwealth Avenue, London Circuit, Northbourne Avenue, Vernon Circle, and various other major roads in close proximity to the Project. Construction related heavy vehicles and worker traffic will also use major roads in the surrounding road network, which will contribute to congestion of the surrounding network. Technical traffic and transport assessment is required to understand the extent of these impacts, including extent of traffic delays, in particular during peak periods in the morning and afternoon.	Almost certain	Major	Significant

Risk	Description	Likelihood	Consequence	Rating
Congestion of minor roads	Road closures, road detours and reduced traffic speed as a result of construction activities will give rise to congestion on Edinburgh Avenue, Alinga Street, Marcus Clarke Street, and various other minor roads in close proximity to the Project. Construction related heavy vehicles and worker traffic will also use minor roads in the surrounding road network, which will contribute to congestion of the surrounding network. Technical traffic and transport assessment is required to understand the extent of these impacts, including timing of traffic delays during peak periods in the morning and afternoon.	Almost certain	Major	Significant
Loss of pedestrian and cycle paths	During construction, there may be some temporary closure of pedestrian and cycle paths, and although there are alternative access routes these may result in increased travels times. Technical assessment is required to understand the extent of loss of pedestrian and cycle paths.	Almost certain	Moderate	Very High
Temporary loss of parking	On-street public parking within the Project footprint would be temporarily lost during construction. The construction compounds will be situated in off-street parking lots at Acton waterfront, Marcus Clarke Street and the south-eastern side of London Circuit which will also result in the loss of carparking available to the public. Technical assessment is required to understand the extent of impact associated with temporary loss of parking.	Almost certain	Moderate	Very High
Loss of access to properties and businesses	Access to residences and businesses would be maintained and alternative access routes will be provided as necessary. Technical assessment is required to understand the extent of impact associated with the loss of access to properties and business.	Almost Certain	Minor	High

3.2 Operational risks

Potential traffic and transport risks associated with the operation of the Project, prior to mitigation, are presented in **Table 3-2**.

Table 3-2 Potential traffic and transport risks during operation

Risk	Description	Likelihood	Consequence	Rating
Increased travel times due to traffic growth and the Project	Weekday peak period travel times may increase due to the cumulative impacts of the Project, other planned projects, and traffic growth and congestion, including the performance of the London Circuit and Commonwealth Avenue intersection. To adequately understand impacts associated with traffic growth and congestion, technical assessment is required.	Almost certain	Major	Significant

Risk	Description	Likelihood	Consequence	Rating
Change to active transport provisions	The Project will provide an additional means of public transport by extending the existing light rail to Commonwealth Park and providing improved active transport infrastructure.			Beneficial
Movement of LRVs around stops and interaction with pedestrians	Signalised pedestrian crossings, continuous footpaths, and cycleways along the alignment will need to be adjusted to accommodate access to light rail stops. To understand potential impacts associated with these adjustments, technical assessment is required.	Almost certain	Major	Significant
Movement of LRVs and interaction with existing traffic	The signalisation of intersections along the alignment will need to be adjusted to cater for the movement of LRVs through the intersections. To understand the potential risks associated with these adjustments, technical assessment is required.	Almost certain	Major	Significant
Incident involving LRV	Protracted incident (i.e., breakdown of LRVs) may result in significant disruption to the light rail network, vehicular traffic, other public transport, on remote occasions.	Remote	Low	Low
Change in mode priorities	Change in mode priorities (i.e., towards public transport and active travel, away from private vehicle use) is likely to decrease travel times and increase amenity for some users. To understand the potential impacts associated, technical assessment is required.			Beneficial

4.0 Heritage

4.1 Construction risks

Potential heritage risks associated with the construction with the Project, prior to mitigation, are presented in **Table 4-1**.

Table 4-1 Potential heritage risks during construction

Risk	Description	Likelihood	Consequence	Rating
Compromised Aboriginal heritage along the alignment	Construction works are unlikely to have an adverse impact on known or unknown Aboriginal heritage due to the historically heavily disturbed environment along the corridor.	Unlikely	Moderate	Low
Destruction of potential archaeological deposits and human remains along the alignment	Construction works are unlikely to have an adverse impact on archaeological deposits and human remains due to the historically heavily disturbed environment along the corridor.	Unlikely	Moderate	Low
Compromised heritage features along the alignment	Construction works are not predicted to detrimentally interact with heritage features along the corridor.	Possible	Major	Low

4.2 Operational risks

Potential heritage risks associated with the operation with the Project, prior to mitigation, are presented in **Table 4-2**.

Table 4-2 Potential heritage risks during operation

Risk	Description	Likelihood	Consequence	Rating
Compromised heritage values and landscape setting of Canberra, the Planned National Capital	The Project could reduce the physical presence of City Hill as a topographical feature in the landscape. Technical assessment is required to understand the extent of this impact.	Possible	Moderate	High
Compromised heritage values of the Parliament House Vista and its landscape setting	The proposed new infrastructure, and modifications to existing infrastructure, are unlikely to cause adverse impacts on the heritage values of the Parliament House Vista.	Unlikely	Minor	Very Low
Compromised heritage values of the National Land Roads	The proposed new infrastructure, and modifications to existing infrastructure, will not cause adverse impacts on the heritage values of the National Land Roads.	Remote	Insignificant	Negligible
Compromised heritage values of City Hill as part of the broader landscape setting.	The proposed works may reduce the ability to read City Hill as a special feature in the landscape, as identified by the Griffins. However, light rail was part of the Griffin's visions. The proposed	Remote	Insignificant	Negligible

Risk	Description	Likelihood	Consequence	Rating
	works would not impact on the features intrinsic as identified by ACT Heritage.			

5.0 Biodiversity

5.1 Construction risks

Potential biodiversity risks associated with the construction with the Project, prior to mitigation, are presented in **Table 5-1**. Given all direct and indirect impacts to GSM and their associated management and mitigation measures have been approved under the EPBC Act (2019/8582) and are managed in accordance with the Conditions of Approval, risks to GSM have not been assigned a risk level in this PERA.

Table 5-1 Potential biodiversity risks during construction

Risk	Description	Likelihood	Consequence	Rating
Construction works may cause habitat loss, degradation, fragmentation, isolation and edge effect for GSM	Given all direct and indirect impacts to GSM and their associated management and mitigation measures have been approved under the EPBC Act (2019/8582) and are managed in accordance with the Conditions of Approval, risks to GSM have not been assigned a risk level.	-	-	-
Construction works may cause GSM species mortality	Given all direct and indirect impacts to GSM and their associated management and mitigation measures have been approved under the EPBC Act (2019/8582) and are managed in accordance with the Conditions of Approval, risks to GSM have not been assigned a risk level.	-	-	-
Removal of vegetation leading to a decrease in biodiversity value	Removal of vegetation may be required to facilitate the proposed works and site access. However, due to the highly urbanised environment of the Project area and surrounds, this is unlikely to cause an impact to the local biodiversity values.	Unlikely	Minor	Very Low
Impacts to native fauna and flora encountered during construction	During construction, it is likely native fauna and flora will be encountered and potentially impacted through activities such as vegetation clearing or earthworks.	Likely	Minor	Medium

5.2 Operational risks

Potential biodiversity risks associated with the operation with the Project, prior to mitigation, are presented in **Table 5-2**.

Table 5-2 Potential biodiversity risks during operation

Risk	Description	Likelihood	Consequence	Rating
Higher quality habitat	The rehabilitation of the Parkes Way east median to provide a native grassland would create more favourable GSM habitat compared with the existing habitat. This would benefit GSM.			Beneficial

6.0 Contamination and soil

6.1 Construction risks

Potential contamination and soil risks associated with the construction with the Project, prior to mitigation, are presented in **Table 6-1**.

Table 6-1 Potential contamination and soil risks during construction

Risk	Description	Likelihood	Consequence	Rating
Soil contamination from historical land uses, adjacent landfill and previous fill	Unexpected interaction with contaminated soils from historical land uses, adjacent landfill and previous fill may occur during construction.	Likely	Major	Very High
Mobilisation of existing contamination (known or unknown)	It is possible for the mobilisation of existing contamination (known or unknown) during construction.	Possible	Major	High
Liquid waste and hazardous material leading to soil and water contamination	During construction, uncontrolled handling and processing of liquid waste and hazardous material and sediment run off into stormwater infrastructure and surface water bodies may lead to adverse environmental impacts. Construction activities are unlikely to have a substantial impact on groundwater as the groundwater table is not expected to be intercepted.	Likely	Major	Very High
Encountering asbestos containing materials (ACMs)	ACMs may be encountered during construction due to their presence in building materials from the 1940s to the 1980s.	Almost Certain	Minor	High

6.2 Operational risks

Potential contamination and soil risks associated with the operation with the Project, prior to mitigation, are presented in **Table 6-2**.

Table 6-2 Potential contamination and soil risks during operation

Risk	Description	Likelihood	Consequence	Rating
Leaks and spills leading to soil and water contamination	Spills and leaks of various chemical products (e.g., oils, fuels, lubricants, cleaning agents, fire retardants) during operation leading to soil and water contamination.	Unlikely	Moderate	Low

7.0 Noise and vibration

7.1 Construction risks

Potential noise and vibration risks associated with the construction with the Project, prior to mitigation, are presented in **Table 7-1**.

Table 7-1 Potential noise and vibration risks during construction

Risk	Description	Likelihood	Consequence	Rating
Highly intrusive noise associated with bulk earthworks, drainage and pavement	There is potential for highly intrusive noise to impact the nearest noise-sensitive receivers when using high noise generating equipment, likely required during excavation, surface preparation, piling, earthworks, backfilling, profiling, leveling, and grading. Consideration of construction plant and equipment is required to understand the extent of noise impacts.	Likely	Moderate	High
Highly intrusive noise associated with utilities, demolition and structural work (including wall construction finishing works)	There is potential for highly intrusive noise to impact the nearest noise-sensitive receivers when using high noise generating equipment, likely required during utilities, demolition and structural work. Consideration of construction plant and equipment is required to understand the extent of noise impacts.	Likely	Moderate	High
Human comfort compromised	Construction noise impacts may be experienced by nearest sensitive receivers and further assessment is required.	Almost Certain	Moderate	Very High
Human comfort compromised	Construction vibration impacts may be experienced by nearest sensitive receivers and further assessment is required.	Possible	Moderate	Medium
Cosmetic damage to buildings	Construction vibration impacts resulting in cosmetic damage to buildings is considered possible and further assessment is required.	Possible	Moderate	Medium

7.2 Operational risks

Potential noise and vibration risks associated with the operation with the Project, prior to mitigation, are presented in **Table 7-2**.

Table 7-2 Potential noise and vibration risks during operation

Risk	Description	Likelihood	Consequence	Rating
Noise impacts from operation of the Project	Intrusive noise impacts from the operation of the Project are possible, for example through LRV movements and maintenance activities. Technical assessment is required to understand the extent of operation noise impacts.	Possible	Moderate	Medium
Vibration impacts from operation of the Project	Intrusive vibration from the operation of the Project has the potential to impact sensitive receivers. Technical assessment is	Possible	Moderate	Medium

Risk	Description	Likelihood	Consequence	Rating
	required to understand the extent of operation vibrational impacts.			

8.0 Landscape and visual realm

8.1 Construction risks

Potential landscape and visual risks associated with the construction of the Project, prior to mitigation, are presented in **Table 8-1**.

Table 8-1 Potential landscape and visual risks during construction

Risk	Description	Likelihood	Consequence	Rating
Compromised views along Edinburgh Avenue	Although other forms of construction are already occurring within the area, the construction of the Project would result in some variance of visual appearance compared with the existing environment. Technical assessment is required to understand the extent of this impact to the views along Edinburgh Avenue.	Possible	Moderate	Medium
Compromised views along London Circuit	Although other forms of construction are already occurring within the area, the construction of the Project would result in some variance of visual appearance compared with the existing environment. Technical assessment is required to understand the extent of this impact to the views along London Circuit.	Possible	Moderate	Medium
Compromised views along Commonwealth Avenue	It is likely that construction activities would create a visual shortening of the elongated view along Commonwealth Avenue. It is anticipated the construction activities would be viewed as a dark patch, creating contrast against the existing pale pavements on Commonwealth Avenue south of City Hill. Technical assessment is required to understand the extent of potential impacts to the views along Commonwealth Avenue.	Likely	Moderate	High
Compromised distant views towards the Project	It is anticipated only the largest and most visually prominent construction activities would be visible from this viewpoint due to its distance from the construction footprint. Construction of the Project would be partially screened from view due to the built and vegetated environment.	Possible	Minor	Low

8.2 Operational risks

Potential landscape and visual risks associated with the operation of the Project, prior to mitigation, are presented in **Table 8-2**.

Table 8-2 Potential landscape and visual risks during operation

Risk	Description	Likelihood	Consequence	Rating
Compromised landscape character along the alignment	The Project adheres to principles set out in the NCP and respects the geometry and intent of the Griffin Plan. The Project will harmonise with the surrounding areas, and preserve, if not improve, public access to various attractions such as Lake Burley Griffin, it's foreshore and Commonwealth Park. Technical assessment is required to understand the extent of benefits, and potential impacts, associated with the landscape character along the alignment.			Beneficial
Compromised views along Edinburgh Avenue	Light rail infrastructure including a Light Rail stop near the intersection of Edinburgh Avenue and London Circuit and the operation of LRVs would be highly visible and likely to impact the views along Edinburgh Avenue. Technical assessment is required to understand the extent of impact.	Likely	Minor	Medium
Compromised views along London Circuit (western section)	Light rail infrastructure including a Light Rail stop near the intersection of Edinburgh Avenue and London Circuit and the operation of LRVs would be highly visible and likely to impact the views along the western section of London Circuit. However, the addition of road infrastructure and vegetation would create an enhanced and unified road corridor. Technical assessment is required to understand the extent of benefits, and potential impacts, associated with the views along the western section of London Circuit.			Beneficial
Compromised views along Commonwealth Avenue	Light rail infrastructure including a Light Rail stops where Commonwealth Avenue and London Circuit meet and near Commonwealth Park, and the operation of LRVs would be visible and almost certain to impact the views along Commonwealth Avenue. However, street trees will line the verges of the Project aiding to visually unify the road corridor with the landscape. Technical assessment is required to understand the extent of benefits, and potential impacts, associated with the views along Commonwealth Avenue.	Almost Certain	Minor	High
Distant views towards the Project	It is possible that light rail infrastructure, including stops and operating LRVs, will be visible from some distant views towards the Project. However, there will be some screening from the built environment and most the alignment will be wire-free along Commonwealth Avenue. Technical assessment is required to understand the extent of impact.	Possible	Minor	Low

9.0 Socioeconomic

9.1 Construction risks

Potential socioeconomic risks associated with the construction of the Project, prior to mitigation, are presented in **Table 9-1**.

Table 9-1 Potential socioeconomic risks during construction

Risk	Description	Likelihood	Consequence	Rating
Temporary impacts to existing road network users to traffic congestion during construction	Several traffic changes are anticipated during the construction phase of the Project, including temporary road closures, reduced speed limits, changes to road signalling, traffic detours, increased traffic congestion, decreased road accessibility, and increased travel times. Where local area traffic diversions are required, these generally have similar lengths to the existing routes and would therefore result in negligible increases to travel distances. Although road users are likely to change their behaviours and travel patterns to avoid congestion, road closures and detours, this has the potential to impact road users' ability to move freely within the Canberra CBD, impacting on their commute to work and services such as education. Technical assessment is required to understand the extent of potential social impacts resulting from changes to the road network.	Likely	Moderate	High
Effects of temporary loss of parking on accessibility to services and business	There would be a temporary loss of carparking associated with construction of the Project. The impact of the temporary loss of parking, combined with anticipated changes to the road network, would reduce access to existing services and businesses in the locality. This would impact residents, service provides, businesses and people who have travelled from out of the area. Whilst traffic and parking impacts associated with the Project would be restricted to the construction period, the impact of lost trade and disconnection with community and social services may extend beyond this period. Vulnerable groups are at a higher risk of being negatively impacted by disconnecting with community and service providers. Technical assessment is required to understand the extent of parking lost during construction and associated impacts related to accessibility to services and businesses.	Likely	Moderate	High
Safety of pedestrians and commuters during construction	The safety of pedestrians and commuters during construction and the impact on pedestrian and cycling travel patterns is a key consideration in assessing the potential social impact of the Project, given almost 40% of the civic locality use active transport such as walking or cycling to get to work. Construction impacts such as noise, reduced lines of sight, increased vehicle	Possible	Moderate	Medium

Risk	Description	Likelihood	Consequence	Rating
	movements, dust, poor wayfinding, and the introduction of temporary uneven surfaces could increase safety risks. In terms of accessibility, cyclists and pedestrians are expected to experience some negative impacts during construction. This would require the use of alternate routes with increased travel times for pedestrians. Technical assessment is required to understand the full extent of impacts to the safety of pedestrians and commuters during construction.			
Delays and changes to accessibility for users of public transport.	Disruptions to bus services resulting from the construction of the Project may reduce people's ability to access other areas and increase travel times and traffic-related stress. The Project would have a temporary impact on existing public transport routes in the area. Technical assessment is required to understand the full extent of social impacts associated with delays and changes to accessibility for users of public transport.	Possible	Moderate	Medium
Potential impacts on health and wellbeing as a result of construction activities	Noise, odour, light pollution, vibration, and air quality are the primary source of health and wellbeing impacts associated with the construction activities. Potentially vulnerable receivers include local residents, local businesses and services, workers and people with existing chronic illnesses or a disability. Potential impacts include dust and air emissions, light pollution, and noise and vibration. Technical assessment is required to understand the extent of potential impacts.	Possible	Moderate	Medium
Changes to the aesthetic value of the existing surroundings during construction	Construction activities would likely impact the aesthetic value of the environment surrounding the construction footprint. This is due to the visual intrusion on the landscape including associated plant, equipment and ancillary facilities, removal of existing street furniture and vegetation, as well as the installation of temporary environmental treatments such as un-landscaped batters, silt socks, and sandbags.	Likely	Moderate	High
Social amenity and/or way of life for nearby residents	Any construction impacts associated with noise, odour, dust, light pollution, vibration, air quality, landscape character, and visual amenity would impact the quality of life of local stakeholders. There is the potential for one or more of these impacts to occur simultaneously, cumulatively impacting the social amenity in the locality. Impacts on residents would be associated with decreases in social amenity, and could impact how residents interact, move, and live. It is likely that work and study can be undertaken in other spaces other than home, reducing exposure to day-time construction activities. Technical assessment is required to understand the extent	Likely	Minor	Medium

Risk	Description	Likelihood	Consequence	Rating
	of effects the Project will have on social amenity and way of life for nearby.			
Social amenity and/or way of life for nearby accommodation providers and other local businesses	Within the locality there are a range of accommodation providers and local businesses. Reduced social amenity and access to businesses may impact customer experience, and in turn reflect poorly on accommodation providers. Negative customer experiences could impact accommodation providers through a combination of complaints. This could reduce repeat business and deter future customers.	Possible	Moderate	Medium
Employment and training opportunities and regional expenditure	The Project would provide new employment and training opportunities for workers, contractors, and developers. Construction operations specifically make a significant economic contribution to local communities through employment (direct impact) and business expenditure (direct impact), and employee household expenditure (indirect impact).			Beneficial

9.2 Operational risks

Potential socioeconomic risks associated with the operation of the Project, prior to mitigation, are presented in **Table 9-2**.

Table 9-2 Potential socioeconomic risks during operation

Risk	Description	Likelihood	Consequence	Rating
Intergenerational equity	The Project will provide a sustainable means of public transport for future generations. Technical assessment is required to understand the extent of intergenerational equity benefits, and potential impacts, associated with the Project.			Beneficial
Safety of pedestrians and commuters during operation	The safety of pedestrians and commuters during operation and the impact on pedestrian and cycling travel patterns is a key consideration in assessing the potential social impact of the Project. The introduction of moving LRVs and potentially altered surfaces and predestination of intersections and at light rail stops has the potential to impact on pedestrian and commuter safety. Technical assessment is required to understand the full extent of impacts to the safety of pedestrians and commuters during construction.	Possible	Major	High
Accessibility and connectivity for cyclists and pedestrians throughout the city	The Project would provide supporting infrastructure for pedestrians and cyclists. Connectivity improvements associated with the Project would also contribute to the city-wide active transport network, further strengthening connections within the city and between the city and other key destinations. This would benefit residents in the locality as well as commuters who use active transport methods to get to work.			Beneficial

Risk	Description	Likelihood	Consequence	Rating
	The Project would reduce the dominance of cars through London Circuit and Commonwealth Avenue by allocating more space for walking, cycling and public transport infrastructure.			
Enabling future transport infrastructure to Woden	The Project would future-proof the transport network by providing infrastructure that responds to current needs and also provides strategic capacity for future growth as development continues. The Project would directly facilitate the extension of the Canberra Light Rail network to Woden from its current terminus on Northbourne Avenue, near Alinga Street, along London Circuit and Commonwealth Avenue and southward to Woden.			Beneficial
The aesthetic value of the area	While areas of the construction area would be re-landscaped upon completion, there is an amenity impact between when landscaping is removed and until the new landscaping is mature and well established. Increased tree screening and landscaping would provide an overall net positive benefit. Improved landscaping and the Project's design both align with the strategic vision for the area. The proposed increase in vegetation and tree plantings along road medians is expected to soften the view of the Project. The Project has been flagged in strategic documents, making the visual changes part of the future vision for the area, and consequently part of the character of the local area. These longer-term operational benefits would strongly align with community values.			Beneficial

10.0 Surface water and hydrology

10.1 Construction risks

Potential surface water and hydrology risks associated with the construction of the Project, prior to mitigation, are presented in **Table 10-1**.

Table 10-1 Potential surface water and hydrology risks during construction

Risk	Description	Likelihood	Consequence	Rating
Frequency and extent of flooding events	The Project would include earthworks which will temporarily modify drainage direction and overland flow paths, changing the nature of flooding on site. There is potential for large quantities of sediment to be directed into the network of temporary drainage as it is progressively constructed. If not appropriately managed, this would result in blockage of the on-site stormwater management network, reducing its effectiveness and increasing the likelihood of flow breakouts and overland flow paths with the effect of causing on-site flooding or flooding downstream.	Unlikely	Minor	Very Low
The water quality of Lake Burley Griffin	The Project may indirectly impact nearby waterways as the construction footprint is drained by a stormwater pipe network which ultimately discharges to Lake Burley Griffin. There is potential for the water quality of the lake to be impacted by the Project during construction, such as during run-off or flood events where potential contaminants from spills and leaks of plants and equipment may be washed from the construction footprint into the lake. There is also the potential for disturbed soil during construction to increase sediment load runoff which can mobilise nutrients and potential contaminants which may be present in the soil, disrupting downstream aquatic habitats and potentially supporting algal blooms.	Unlikely	Minor	Very Low

10.2 Operational risks

Potential surface water and hydrology risks associated with the operation of the Project, prior to mitigation, are presented in **Table 10-2**.

Table 10-2 Potential surface water and hydrology risks during operation

Risk	Description	Likelihood	Consequence	Rating
Frequency and extent of flooding events	The Project is unlikely to impact on the frequency and extent of flooding events as the Project would not significantly change the landform and direction of water runoff.	Unlikely	Minor	Very Low
The water quality of Lake Burley Griffin	Potential contaminants include general litter and waste, sediment, minor discharges of hydrocarbons from vehicles (such as engine oil leaks), and wear products from vehicle parts (such as tyres and brakes). Potential contaminants would build up on impervious surfaces over time and during rainfall events may end up discharged into the	Unlikely	Minor	Very Low

Risk	Description	Likelihood	Consequence	Rating
	environment. However, it is unlikely that the Project will impacts on the water quality of Lake Burley Griffin.			

11.0 Resource management and waste minimisation

11.1 Construction risks

Potential resource management and waste minimisation risks associated with the construction of the Project, prior to mitigation, are presented in **Table 11-1**.

Table 11-1 Potential resource management and waste minimisation risks during construction

Risk	Description	Likelihood	Consequence	Rating
Waste generation	Increased waste generated during construction that could be disposed of outside landfill resulting in the generation of unnecessary waste.	Unlikely	Minor	Very Low
Recycling versus landfill	There is a possible risk of sending material to landfill rather than beneficial reuse.	Possible	Minor	Low

11.2 Operational risks

Potential resource management and waste minimisation risks associated with the operation of the Project, prior to mitigation, are presented in **Table 11-2**.

Table 11-2 Potential resource management and waste minimisation risks during operation

Risk	Description	Likelihood	Consequence	Rating
Other resource consumption and waste generation	Resource consumption and waste generation during the operational phase of the Project are anticipated to be minimal and limited to maintenance activities.	Remote	Insignificant	Negligible

12.0 Air quality

12.1 Construction risks

Potential air quality risks associated with the construction of the Project, prior to mitigation, are presented in **Table 12-1**.

Table 12-1 Potential air quality risks during construction

Risk	Description	Likelihood	Consequence	Rating
Site clearance and construction site establishment	Dust may be generated through vegetation and soil removal, excavation, construction traffic, exposed soil and stockpiles, and trucking materials to, from and around the site. This may impact the local air quality. With industry standard mitigation measures implemented, the risk is considered very low.	Possible	Minor	Low

Risk	Description	Likelihood	Consequence	Rating
Construction activities and spoil management	It is possible there will be dust generation from construction activities (e.g., earthworks and vehicle movements) and exposed surfaces. This may impact the local air quality.	Possible	Minor	Low
Climatic conditions	It is possible during dry and/or windy periods, dust can be generated at the site from exposed surfaces. This may impact the local air quality.	Possible	Minor	Low
Combustion emissions	It is possible that construction activities will produce emissions from the combustion of fuel, oil and/or gas which will have the potential to impact on the local air quality. This may impact the local air quality.	Possible	Minor	Low

12.2 Operational risks

No air quality risks associated with the operation of the Project are predicted.