



Australian Government



**Sydney Metro –
Western Sydney Airport**

EPBC Act Final Environmental Impact Assessment of on-airport proposed action (EPBC 2019/8541)

Volume 3 - Appendices D to J



Appendix D

Overarching Community Communications Strategy

Overarching Community Communications Strategy (OCCS)

A framework for communication and engagement during construction

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|-------------------|---|---------------------|-----------------|
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| 2 | 05/08/20 | | Updated roles and responsibilities for independent advisors | A/Deputy Executive Director Communications & Engagement | Anita Brown | <i>Anita Brown</i> |
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1 Introduction

1.1. Sydney Metro

Sydney's new world-scale metro system is the biggest program of public transport infrastructure currently under construction in Australia and the largest urban rail infrastructure investment in the nation's history.

A key part of delivering the NSW Government's Future Transport 2056 priorities, this customer-focused fully-accessible metro service will help grow the state's economy and help create vibrant places and communities. Sydney Metro has responsibility for delivering great places around metro stations so that precincts are designed, developed, activated and managed in line with the metro system to ensure the best outcomes for customers and communities.

Sydney Metro works collaboratively and in partnership with the Australian Government to deliver Sydney Metro – Western Sydney Airport which is a jointly-funded project.

1.2. Transforming Sydney

Sydney Metro is transforming Sydney, cutting travel times, reducing congestion and making it easier and faster to get around Australia's biggest city.

This new world-class mass transit system will evolve with the city it will serve for generations to come. Metro rail will catalyse development in Greater Western Sydney and serve as the transport spine for new communities.

Global Sydney's population will pass 6 million by 2036; an extra 1.7 million people will progressively move into to Australia's biggest city, which will support an extra 840,000 jobs and 680,000 homes.

Sydney Metro will help boost economic productivity by bringing new jobs and new educational opportunities closer to home.

Designed with customers at its centre, stations will be quick and easy to get in and out of, trains will be fast, safe and reliable, and technology will keep customers connected at every step of the journey.

Sydney Metro will integrate with new communities and transform existing urban centres.

1.3. Future Transport

In October 2017, the NSW Government announced Future Transport 2056 – Transport for NSW's 40-year blueprint for the future of the NSW transport system.

To support the Greater Sydney Commission's Greater Sydney Region Plan, the new transport strategy aims to improve public transport so that – by 2056 – 70 per cent of people will live within 30 minutes of work, study and entertainment.

Future Transport 2056 is a comprehensive strategy to ensure travel is more personal, integrated, accessible, safe, reliable and sustainable.

There are three parts to the strategy: programs that are committed to or funded by the NSW Government over the next 10 years; those that are under investigation; and visionary projects

in the 20 year-plus timeframe that are being identified now for future consideration as the population grows.

More information about Future Transport 2056 is available at:

<https://future.transport.nsw.gov.au/>

1.4. Sydney Metro values

At Sydney Metro our vision and values guide us in our interactions with each other, our stakeholders and our partners.

Our Vision is “Transforming Sydney with a world class metro”, and our Mission is to deliver Sydney a connected metro service: providing more choice to customers and opportunities for our communities now and in the future.

Culture is a critical enabler of an organisation’s success. To help develop a strong organisational culture, Sydney Metro has established a set of values that guides its approach to the procurement and delivery of Sydney Metro. These values are:



Figure 1: Sydney Metro Core Values

Sydney Metro has an expectation that contractors will adhere and uphold these values in their dealings with Sydney Metro, other contractors and stakeholders. Our values support us working together to achieve agreed outcomes supporting the delivery of our projects across our many diverse communities.

Sydney Metro has a number of programs and initiatives in place to embed these values and recognise individuals and teams for consistently demonstrating them.

1.5. Sydney Metro community and stakeholder engagement

We meet communities where they are based so we can build strong relationships and create opportunities for meaningful engagement.

Sydney Metro creates successful engagement outcomes by working closely and cooperatively with the community, Federal, State and local government, contractors, advisors, other service providers and key stakeholders.

Sydney Metro has been working with stakeholders and communities every step of the way since 2011, adapting to community needs and refining our approach to delivering community and stakeholder engagement to achieve better outcomes.

Key to the ongoing success of our engagement program has been a commitment to building personal relationships through face-to-face and digital engagement, supported by effective action and collaboration within multidisciplinary project teams.

Sydney Metro understands that the community and stakeholders want to communicate and access information in ways that are convenient and accessible. Our communication approach

continues to evolve to ensure our diverse communities have access to a variety of platforms that ensure a personalised approach to community engagement. Sydney Metro will continue to monitor the communication landscape to provide best practice solutions to engagement.

1.6. Our neighbours

New metro stations are a catalyst for development, regeneration and renewal of neighbourhoods, bringing to life placemaking opportunities. It can be exciting to watch the metro station and local precinct come to life but we also know that communities located immediately near construction sites will be more likely to notice construction works and associated impacts, and may potentially find the cumulative changes happening in their local area difficult to comprehend.

Sydney Metro's communication and engagement approach places particular emphasis on these communities whether they are residents, businesses, schools and childcare centres, or places of worship.

Sydney Metro has extensive experience working with a range of businesses located near our construction sites, and we ensure that tailored communication solutions are provided. Our approach ensures businesses are provided with engagement solutions for their type of business, operational hours of work and size of the organisation.

1.7. A new project delivery landscape

Sydney is growing and the NSW Government is delivering projects to reduce traffic congestion and improve public transport.

Sydney Metro is committed to working closely with other nearby projects, local councils, Federal and State Government agencies, and our stakeholders to manage and coordinate construction activities and traffic to help minimise impacts on the community.

Sydney Metro works with other nearby projects to enable close coordination of communication, sharing of information to streamline engagement, and assist the community to understand projects more holistically in their area.

1.8. Fostering strong relationships throughout the project lifecycle

Sydney Metro works with the community and its stakeholders throughout project development, planning, and project delivery. At all stages of this project lifecycle, Sydney Metro ensures engagement is open and transparent ensuring goodwill is established and strong relationships formed.

Sydney Metro will work with its delivery partners to ensure project commitments and community and stakeholder needs established during the planning phases are continued and considered during the delivery phase.

1.9. Statutory planning context

The delivery of the Sydney Metro network are predominately considered State significant infrastructure (SSI) projects under Division 5.2 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) requiring preparation and public exhibition of an Environmental Impact Statement and approval from the NSW Minister for Planning and Public

Spaces. The Minister for Planning and Public Spaces may approve the projects subject to conditions of approval.

In addition to approval under the EP&A Act, some Sydney Metro projects may also require assessment and approval under Commonwealth legislation, such as the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act). Specifically, Sydney Metro Western Sydney Airport also requires approval under the Commonwealth *Airports Act 1996* (Airports Act) for all works located within the footprint of Western Sydney International (Nancy Bird-Walton) Airport.

Sydney Metro projects associated with the delivery of integrated stations and precinct developments are generally subject to assessment and approval as State significant development (SSD) in accordance with Division 4.7 of the EP&A Act.

This Overarching Community Communication Strategy (OCCS) and the commitments provided within this strategy are intended to form part of any relevant planning approval for Sydney Metro projects. Following the approval of projects, contractor-specific community communication strategies will be prepared in accordance with this overarching strategy and any relevant project-specific conditions of approval.

1.10. Integrated stations and precinct developments

New metro stations create opportunities to provide for community needs in consideration of the future vision, relevant planning controls and local character of each area.

An integrated station and precinct development is made up of the metro station and building(s) above and/or around the station. Once built, these developments could deliver a range of uses like community facilities, new homes and green spaces, shops, restaurants and commercial office spaces.

All future integrated station and precinct developments would be subject to separate planning approval processes that would include community and stakeholder engagement in line with this OCCS and any statutory requirements of a State Significant Development.

Where required, early engagement would be undertaken with key project stakeholders to support the development of a two-way dialogue in relation to integrated station and precinct developments ahead of relevant planning approval processes.

2. About this plan

The Overarching Community Communication Strategy (OCCS) has been prepared to guide Sydney Metro's approach to stakeholder and community liaison including engagement with communities, stakeholders and businesses. This plan is intended to be used as a framework for community engagement across all Sydney Metro projects and contracts.

The OCCS considers all work activities and packages for Sydney Metro and its projects for the duration of work, and 12 months following the completion of construction.

Sydney Metro is responsible for the development and implementation of the OCCS to ensure there is a coordinated approach to stakeholder, business and community liaison across the entire program of work for Sydney Metro.

Contract specific Community Communication Strategies (CCS) will be developed by appointed project delivery communication teams (PDCT) to address contract and site specific needs of the community, stakeholders and businesses. These strategies will reflect the requirements of the OCCS (this plan) and they will adhere to the requirements outlined in the relevant contract specification – Stakeholder and Community Engagement, along with requirements identified in any relevant planning approval.

The OCCS and CCS' are supported by a Construction Complaints Management System (CCMS) which outlines the framework for managing complaints, enquiries and escalation processes throughout the project lifecycle. The CCMS also outlines the process for reporting complaints.

The Small Business Owners Engagement Plan (SBOEP) is a stand-alone plan which supports these strategies.



Figure 2: Communication strategy hierarchy

The communication strategy hierarchy is supported by the procedures and processes outlined in Section 8 and the Sydney Metro Integrated Management System's Communication and Engagement Management Plan, which outlines Sydney Metro's approach to stakeholder management, public affairs, public communication and strategic partnerships.

2.1. Accountabilities

The Deputy Executive Director Communication and Engagement, or delegate is accountable for this document. Accountability includes authorising the document, monitoring its effectiveness, and performing a formal document review.

Members of the team including Sydney Metro staff, contractors, subcontractors and consultants are accountable for ensuring the requirements of this plan are implemented within their area of responsibility. This document will be reviewed and reissued annually.

2.2. Purpose

This OCCS will guide Sydney Metro's interactions with stakeholders and the community and will outline the:

- Approach, objectives, principals, and tools to be used
- Team structure, roles and responsibilities
- Communication protocols and procedures to be followed
- Key stakeholders
- Approach to low impact works or preparatory activities
- Approach to reporting and evaluation.
- The commitments provided in this plan are intended to form part of, and satisfy the obligations of, any relevant planning approval for Sydney Metro projects.

2.3. Communication and engagement approach

Sydney Metro is committed to establishing genuine relationships with stakeholders and the community. This is underpinned by the belief that effective communication is a crucial element in the successful delivery of all our projects.

Sydney Metro recognises the diverse engagement and information needs of the community and stakeholders and commits to robust and transparent engagement processes that are inclusive in nature.

The International Association for Public Participation (IAP2) is used to guide engagement during different project phases with an emphasis on inform, consult and active participation levels as appropriate. The levels of consultation outlined in the spectrum are provided as a guide only, and the Project team will ensure an individual approach is taken when engaging with each stakeholder.

The spectrum may be considered in engagement with members of the community, stakeholders including Government agencies, members of parliament and public sector stakeholders.

IAP2'S PUBLIC PARTICIPATION SPECTRUM



Figure 3: The IAP2 public participation spectrum

2.4. Place managers

Sydney Metro ensures a personal approach is undertaken when undertaking community engagement by having dedicated community relations specialists called place managers. Their role is to act as a single, direct contact between members of the community and the project team.

Sydney Metro also has personal managers to provide support throughout any property acquisition process. Their role is to work closely with property owners or tenants and to make sure the process is as easy as possible.

2.5. Objectives

Sydney Metro's corporate strategic objectives are:

- Manage customer and community expectations
- Integration of 'place'
- Record infrastructure investment
- Technological change
- Drive towards long-term financial sustainability

The Sydney Metro project communication and engagement objectives are to:

- Minimise project impacts on stakeholders and the community where possible
- Minimise project impacts on local businesses recognising specific needs and requirements

- Provide adequate, timely and coordinated stakeholder and community communication and engagement
- Assist stakeholders and the community in their understanding of project construction including activities to be undertaken by project delivery partners and their objectives, benefits, potential impacts and expected outcomes
- Appropriately address stakeholder and community issues
- Provide consistency across our external communication activities and interfaces with stakeholders during delivery of all Sydney Metro projects
- Coordinate approach to manage project enquiries and complaints with interface projects where appropriate
- Act as a conduit and advocate between the project team and the broader community.

2.6. Roles and responsibilities

Figure 4 below demonstrates that throughout the project lifecycle Sydney Metro will begin engaging with the community and stakeholders in the early strategic planning stages of the project and will continue this relationship through to commissioning, and operation of metro services after which point some of these stakeholders and community members will become customers of metro.

The project lifecycle can involve several project phases occurring concurrently. Understanding this assists Sydney Metro and the PDCT(s) to work together to ensure communication is clear and consistent across the different facets of the project.

Figure 4: Potential stakeholder and community engagement touchpoints through the project lifecycle

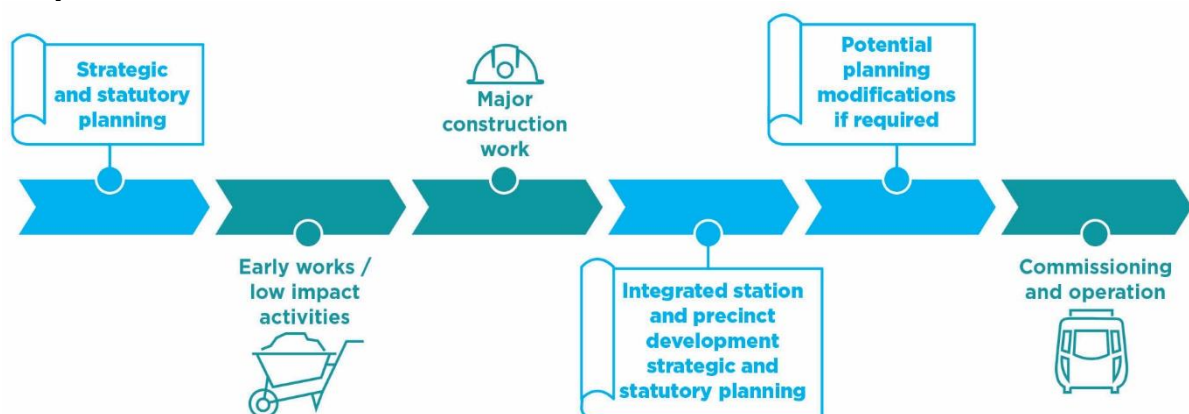


Figure 5 below outlines key responsibilities of Sydney Metro projects, and project delivery communications teams during project planning and delivery. Figure 5 is intended as a guide noting there would be times when responsibilities would overlap particularly in the pre-construction phase and in the transition between statutory planning and construction communication. The full suite of delivery partner responsibilities for the PDCT would be outlined in the contract general specification – stakeholder and community engagement.

Figure 5: Responsibilities during planning and construction

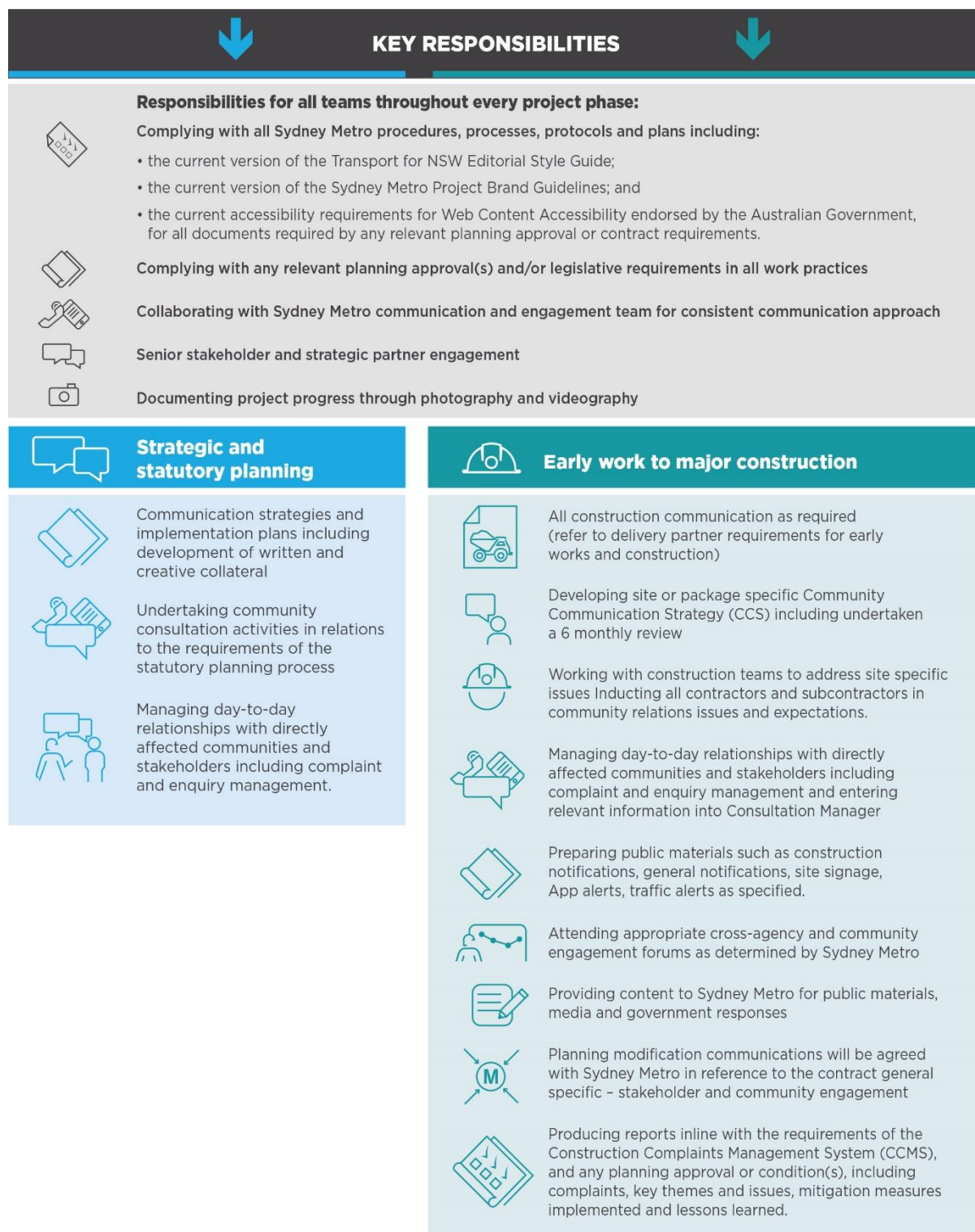


Table 1: roles and responsibilities in the planning and delivery phases of the project.

| Role | Responsibility |
|---|--|
| Environmental Representative | <p>A suitably qualified and experienced Environmental Representative is independent of the design and construction personnel and responsible for advising the Department of Planning, Industry and Environment on the environmental performance of projects. The Environmental Representative is engaged by the Sydney Metro for the duration of construction of the project and approved by the Secretary of the Department of Planning, Industry and Environment.</p> <p>The Environmental Representative may provide advice to the Sydney Metro Communication and Engagement teams in relation to environmental performance and mitigation measures.</p> <p>Provide an independent review to help resolve complaints about construction issues where a resolution has been unable to be reached by the contractor and the Sydney Metro project team</p> |
| Acoustic Advisor, if required according to planning approval | <p>A suitably qualified and experienced Acoustic Advisor is independent of the design and construction personnel and responsible for advising the Department of Planning, Industry and Environment specifically on noise and vibration performance of the project. The Acoustic Advisor is engaged by Sydney Metro for the duration of construction of the project and approved by the Secretary of the Department of Planning, Industry and Environment.</p> <p>The Acoustic Advisor may provide advice to the Sydney Metro Communication and Engagement teams in relations to acoustic performance and mitigation measures.</p> |
| Independent property impact assessment panel, if required according to planning approval | <p>An independent panel may provide assistance in the resolution of property damage concerns following investigation by Sydney Metro and technical specialists in consultation with the affected property owner.</p> |
| Western Sydney Airport or Airport Environment Officer, if required according to planning approval | <p>Western Sydney Airport is the lessee of Western Sydney International (Nancy Bird-Walton) Airport and have responsibility for the site.</p> <p>An Airport Environment Officer is responsible for the day to day regulatory oversight of compliance with the Commonwealth <i>Airport (Environment Protection) Regulations 1997</i> (AEPRs) at Western Sydney International (Nancy Bird-Walton) Airport and will have a role in relation to works for Sydney Metro – Western Sydney Airport on this site.</p> |
| Other project technical specialists | <p>Provide subject matter technical expertise for the duration of construction, or as otherwise agreed by the Secretary of the Department of Industry, Planning and Environment. This scope will include but not limited to: construction, noise, vibration, tunnelling and general project related issues</p> |
| Independent mediation | <p>Upon the recommendation of the Director, Project Communication or the Environmental Representative, provide independent mediation to</p> |

| | |
|--|---|
| service(s) (engaged as required) | <p>help resolve complaints about construction issues where a resolution has been unable to be reached by the contractor and the Sydney Metro project team.</p> <p>Any mediator engaged by Sydney Metro, to assist in resolving a complaint, would be required to hold suitable qualifications and have experience mediating similar matters.</p> |
| Deputy Executive Director Communication & Engagement | Overall responsibility for defining, developing and implementing the strategic direction of Sydney Metro in respect of all communication and engagement activities. |
| Director Project Communications | Responsible and accountable for authorising all communication and engagement documents, monitoring their effectiveness and performing formal document review. |
| Sydney Metro Communication and Engagement Team | <p>This team's key accountabilities and responsibilities include:</p> <ul style="list-style-type: none"> • Communication and engagement • Stakeholder management • Public affairs • Public communication • Strategic partnerships • Project communications |
| Project Communication teams (Sydney Metro and PDCT) | <ul style="list-style-type: none"> • Develop and/or implement this Overarching Community Communications Strategy • Provide Place Managers to engage with the local community during the design, planning approval and early work / low impact/major construction activity stages • Develop and implement project communication plans • Develop external facing project communication collateral • Proactively identify potential issues and work cooperatively to develop agreed management strategies |

2.7. Roles and responsibilities for complaint management during construction

The CCMS will outline the framework for managing complaints, enquiries and escalation processes throughout the project lifecycle.

Complaints are first managed by the PDCT and any unresolved complaints may then be escalated to Sydney Metro.

The Director, Project Communications is the designated complaints handling management representative for the escalation of complaints for independent review. Complaints would only be escalated for independent review following a full and thorough investigation by the PDCT and Sydney Metro. The Director, Project Communication may also refer a complaint to independent mediation at any stage in the complaint management process.

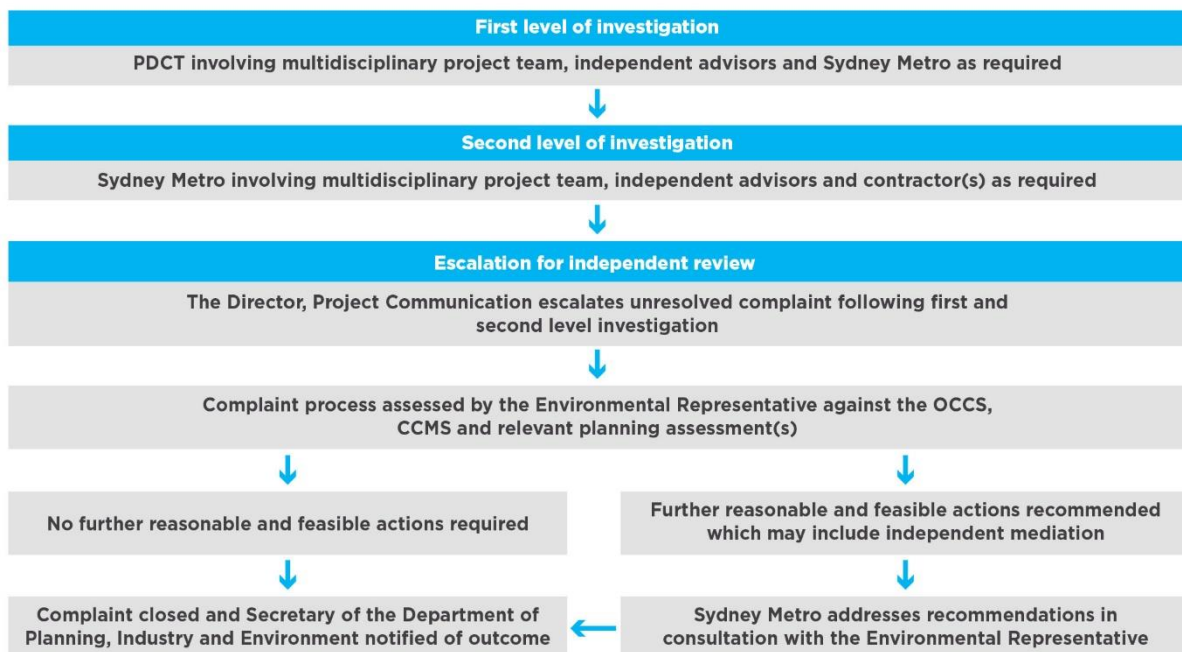
Following any escalation for independent review, the Environmental Representative would make an assessment on the adequacy of Sydney Metro's response to the complaint in accordance with this plan, the CCMS and the project's planning and assessment process, in consideration of what is fair and reasonable.

Following this review the Environmental Representative would either make a recommendation to close the complaint and notify the Secretary or provide recommendations for consideration by Sydney Metro on any additional actions that could be undertaken to assist in resolving the complaint.

The Environmental Representative may also refer any reasonable and unresolved complaint for independent mediation, at which time a qualified mediator would be engaged by the project. This process is outlined in figure 6.

This process does not apply to complaints specifically relating to the Western Sydney Airport site which would be managed and escalated to Western Sydney Airport in accordance with the CCMS.

Figure 6: complaint escalation process for Sydney Metro West



3. Our stakeholders

3.1. Our relationships

Effective relationships and consistent and accountable communication practices are crucial to the successful delivery of Sydney Metro. Sydney Metro is committed to providing proactive and positive interactions with all our stakeholders during the delivery of our projects. Our stakeholders include:

- Our colleagues across Transport for NSW
- Local, State and Federal government departments and agencies
- Media
- Industry partners
- Precinct partners and city deal partners
- Broader network users and customers
- The community across Sydney, including businesses.

Table 2: Sydney Metro stakeholders (as relevant to each Sydney Metro project)

| Sector | Stakeholders |
|------------|---|
| Community | Neighbours |
| | Residents and residents groups |
| | Businesses and business groups |
| | Property owners and tenants |
| | Business owners and tenants |
| Government | Land owners |
| | Interest groups |
| | Education and religious facilities |
| | Transport users |
| | Owners and managers of local social infrastructure and community facilities |
| | Peak community groups |
| | Multicultural support groups |
| Government | Federal Minister for Infrastructure, Transport and Regional Development |
| | Federal Minister for Population, Cities and Urban Infrastructure |
| | NSW Minister for Transport and Roads |
| | NSW Minister for Jobs, Investment, Tourism and Western Sydney |

| Sector | Stakeholders |
|-----------------------|--|
| | <p>State elected members and their electoral offices</p> <p>Local elected members</p> <p>Local Council General Managers/CEOs</p> <hr/> <p>Department of Infrastructure, Transport, Regional Development and Communications</p> <p>Department of Energy and Environment</p> <p>Western Sydney Airport</p> <hr/> <p>Department of Planning, Industry and Environment</p> <p>Sydney Coordination Office</p> <p>Transport for NSW (Motorways)</p> <p>Sydney Trains</p> <p>Infrastructure NSW</p> <p>Department of Premier and Cabinet</p> <p>NSW Treasury</p> <p>Port Authority of NSW</p> <p>NSW Health</p> <p>Department of Family and Community Services</p> <p>Department of Education</p> <p>Schools Infrastructure NSW</p> <p>Western City Aerotropolis Authority</p> <p>Planning Partnership Office</p> <p>Western Sydney City Deal Delivery Office</p> <hr/> <p>Council officers</p> <p>Emergency services</p> <ul style="list-style-type: none"> – Police – Ambulance – NSW Fire and Rescue – Rural Fire Services – State Emergency Services |
| Neighbouring projects | <p>Parramatta Light Rail</p> <p>Western Harbour Tunnel and Beaches Link</p> <p>WestConnex Rozelle Interchange</p> <p>Westmead redevelopment</p> <p>Glebe Island Multi-User facility</p> <p>Revitalisation of Blackwattle Bay and the new Fish Market</p> <p>Western Sydney International Airport</p> <p>M12 Motorway</p> |

| Sector | Stakeholders |
|--|--|
| Service providers | Sydney Water Water NSW Power utilities Telecommunication providers Local Councils |
| Industry | Academic institutions Contractors Peak bodies Transport associations Transport experts Unions |
| Precinct partners, City Deal partners | Local Councils State Government agencies Federal Government agencies Government-owned corporations |
| Media | All media |

4. Our communities

Sydney Metro recognises that our projects are undertaken across a range of diverse communities and our information needs to be accessible for all people. The project will continue to monitor, adapt and review communication streams, key messages and audiences to continue to connect with people in ways that are meaningful to them.

4.1. Community demographics

Sydney Metro uses area demographics and census data to better understand the communities in which we operate. The information we gather ensures we provide accessible information to people from all backgrounds including:

- People with languages other than English (LOTE)
- Culturally and linguistically diverse communities (CALD)
- Vulnerable communities
- Aboriginal and Torres Strait Islander Communities (ATSI)
- Diverse communities

The PDCT CCS must demonstrate how their communication approach will use tools and strategies that meet the needs of their diverse communities. Specific tools outlined below should be considered as appropriate.

4.2. Working with culturally and linguistically diverse (CALD) and languages other than English (LOTE) communities

The following processes and communication tools can be used to improve accessibility and outreach with people who come from CALD and LOTE backgrounds:

- Providing project information on the Sydney Metro website which can be translated into 58 different languages.
- Working closely with local councils and community groups to utilise existing CALD relationships.
- Continued outreach with targeted CALD community groups, and face-to-face meetings and briefings with CALD communities as required.
- Advertising project milestones in foreign language newspapers.
- Translating project milestone factsheets and newsletters into targeted languages.
- Ensuring that foreign language submissions can be received.
- Providing translators for meetings and engagements as required.

4.3. Working with vulnerable communities

Sydney Metro recognises that a range of community members may be vulnerable in relation to disabilities and health, age, employment and housing status, among other issues.

The following processes, communication tools and approaches would be used to improve accessibility and outreach with vulnerable communities:

- Engage with relevant support organisations to keep vulnerable communities informed of work occurring.
- Training construction personal that all interactions with vulnerable people should be respectful and courteous.
- Where required provide regular updates to rough sleepers about construction timing and impacts.
- Businesses impacted by people sleeping rough who may have been displaced by construction should also be kept informed and engaged.

Sydney Metro endorses the NSW Government approach to homelessness by incorporating the Sydney Metro Protocol for Homelessness within all community communication strategies.

4.4. Working with Aboriginal and Torres Strait Islander (ATSI) communities

The following key focus areas have been developed by the Transport for NSW Reconciliation Action Plan (RAP), and will be reflected and incorporated in all engagement objectives and activities undertaken by Sydney Metro:

- Build and strengthen relationships.
- Respect and celebrate culture.

The following processes and communication tools can be used to improve accessibility and outreach with ATSI communities:

- Working collaboratively and respectfully with our Aboriginal and Torres Strait Islander staff, Aboriginal Peak Bodies, and with the communities in which we operate.
- Continue working with our key stakeholders to further build upon existing relationships, and seek to invest in new partnerships to support our progress in delivering meaningful outcomes for Aboriginal and Torres Strait Islander peoples whilst delivering on our core business.

4.5. Working with diverse communities

Sydney Metro will continue to review its communication tools to ensure inclusive community engagement and the varied information requirements of our communities and stakeholders is prioritised.

The following processes and communication tools can be used to improve accessibility and outreach with diverse communities:

- Web and digital based engagement tools allowing people to engage with the project at a time that is convenient to them.
- Using multiple communication platforms to enhance communication reach, for example printed notifications, face-to-face doorknocks and email.
- Ensuring communities are providing with convenient options to access the project team such as providing multiple times for community information sessions and a 1800 number 24 hour a day, seven days a week.
- Harnessing a place management approach to understand the specific needs of communities and tailor communication accordingly.

All Sydney Metro communication materials will adhere to Web Content Accessibility Guidelines (WCAG 2.0).

5. Businesses

Sydney Metro would work with local businesses within project catchments to ensure communication and engagement is tailored to their specific needs.

Sydney Metro's overarching approach to business engagement is to:

- Identify and document potentially impacted businesses prior to project commencement
- Provide early advice to businesses of upcoming projects
- Provide businesses with information about the project and its long terms benefits.
- Provide businesses with information about construction progress.
- Ensure businesses understand the scope of the works and mitigation measures contractors can provide.
- Ensure businesses understand the proposed timing of the works.
- Consult with businesses and take steps to minimise potential impacts.
- Ensure the project team understands the operational requirements and sensitivities of businesses around each site.

The contractor CCS must include at a minimum the identification and details of specific businesses located within 50 metres of each relevant construction site.

Contractors must identify the specific needs of each business, any potential impacts associated with construction works, and proposed mitigation measures. These measures must also address if there is a need for translation or cultural and other specialists.

The CCS must also outline the approach and timing of holding regular business forums at each construction site.

Evaluation and monitoring of business engagement is outlined in section 11.

5.1. Small Business Owners Engagement Plan

The Sydney Metro PDCT will provide assistance if required to small business owners located within 50 metres of a Sydney Metro construction site, where they may be potentially impacted by construction activities. For the purposes of this program, a 'small business' is defined as a business that employs fewer than 20 people.

Sydney Metro activities to support to eligible businesses may include:

- Small business education and mentoring
- Activation events
- Business engagement events
- Marketing and promotion.

6. Communication tools

Sydney Metro uses a range of communication and engagement tools to ensure project information reaches a wide variety of people likely to be impacted by the project. Using a variety of tools provides our communities with options to engage with the project in ways that suit their needs and lifestyle.

When planning communication strategies the PDCT must consider the requirements of the General Specification – Stakeholder and Community Engagement along with the specific needs of their community as identified in their CCS. The CCS should then outline the specific tools used to reach their identified stakeholders.

The following communication tools matrix is provided as a guide only and other communication tools may be used with prior approval from the Director, Project Communication. CALD communication tools are also included in the table below.

Sydney Metro will provide a suite of project specific templates to the PDCT to assist in the development of communication collateral.

Table 3: Sydney Metro communication and engagement tools

| Tool | Explanation and purpose | Responsibility |
|--------------------------------|---|----------------|
| Community contact tools | | |
| Community information line | Operational 24 hours a day and included on all public communication materials Translation services are available for those with English as a second language. | SM |
| Community email address | This allows stakeholders and the community to have access to the project teams and to provide feedback and ask questions. All communication materials and the website will include the community email address. During construction, emails will be redirected to relevant contractors as required. | SM |
| Community post box | All stakeholders can use the postal address: PO Box K659, Haymarket NSW 1240 for all Sydney Metro enquires. | SM |
| CALD Translation services | All communication will promote our translation services for those with English as a second language. | SM |
| Information tools | | |
| Newsletters | Printed and web accessible online site-specific newsletters will include information on: <ul style="list-style-type: none"> • construction progress | SM/PDCT |

| Tool | Explanation and purpose | Responsibility |
|--|---|----------------|
| | <ul style="list-style-type: none"> • upcoming construction stages and milestones • environmental management achievements • community involvement achievements • three month look-ahead • community contact information. <p>Newsletters will be distributed to local communities, stakeholders and businesses and made available of the Sydney Metro website.</p> | |
| Sydney Metro direct mail email updates | The community, stakeholders and businesses will be offered the opportunity to register to receive Sydney Metro milestone updates. | SM |
| Construction email updates | The community, stakeholders and businesses will be offered the opportunity to register to receive construction updates. | PDCT |
| Fact sheets | Printed and/or web accessible fact sheets will be used as required to explain key aspects of Sydney Metro to the community and our stakeholders. | PDCT |
| Photography and videography | <p>Photos and videos will be used to record the construction process and assist with explaining aspects of Sydney Metro to stakeholders and the community.</p> <p>Images and footage will be used in notifications, newsletters, on the Sydney Metro website, presentations and reports as required.</p> | SM/PDCT |
| Information videos | Information videos can be used to highlight key project milestones, construction information or elements of the statutory planning process | SM/PDCT |
| Site signage and hoarding banners | Site signage and hoarding banners will identify Sydney Metro and provide contact information. | SM/PDCT |
| CALD Newsletters and fact sheets | Translating project milestone factsheets and newsletters into targeted languages where required. | SM/PDCT |
| Online tools | | |
| Sydney Metro website | <p>Information about the project will be uploaded to the Sydney Metro website.</p> <p>The website will be referenced in all communication materials as a source of information and will be updated on a regular basis. Information will include:</p> | SM |

| Tool | Explanation and purpose | Responsibility |
|----------------------------|---|----------------|
| | <ul style="list-style-type: none"> • Description of the Sydney Metro • Project information including: <ul style="list-style-type: none"> – description, current status and timing – newsletters – notifications – up-to-date project information – graphics and images on the project background and progress – copies of relevant reports – photos, images and maps – links to documents as required under the relevant projects Conditions of Approval – a link to Sydney Metro contractor webpages. • Contact information • Email subscription service • The Sydney Metro website is translatable into 58 different languages using the Google translate function at the bottom of the home page. | |
| Project interactive portal | <p>Sydney Metro may establish and maintain an online portal for the project displaying key project information including:</p> <ul style="list-style-type: none"> • statutory planning information • project map(s) • graphics and images of the project • newsletters and other project information • specific project information displays • contact information. | SM |
| Contractor webpage | <p>Each contractor will establish and maintain a web site to upload and maintain information to be published. Including copies of community, environmental, sustainability, transport, traffic and noise and vibration reports and plans. A link will be provided to the Sydney Metro website.</p> | PDCT |
| Social media | <p>Facebook, Twitter and Instagram may be used to provide updates to stakeholders.</p> <p>Stakeholders should be offered the opportunity to join social media feeds via public materials produced for Sydney Metro.</p> | SM |
| CALD | <p>Updating the Sydney Metro website with project information, which can be translated into 58 different languages.</p> | SM/PDCT |

| Tool | Explanation and purpose | Responsibility |
|--|---|----------------|
| Sydney Metro and Contractor website | Ensuring that foreign language submissions can be received. | |
| Face-to-face and interactive tools | | |
| Mobile information displays | Mobile information displays can be used at locations like community events, shopping centres and local public spaces to provide information about Sydney Metro, statutory planning processes or construction. | SM/PDCT |
| Virtual information rooms | Virtual information displays can be used to highlight project milestones, provide information about construction or statutory planning processes. | SM/PDCT |
| Door knock meetings | Individual door knock meetings will be used as required to discuss potential impacts of Sydney Metro with highly impacted stakeholders, especially residents, businesses directly neighbouring construction sites and owners or managers of nearby social infrastructure or community facilities. | SM/PDCT |
| In person and/or virtual meetings with individuals or groups | Stakeholder meetings will be used as required to discuss Sydney Metro activities including work in progress and upcoming work or any issues in connection with the activities. | SM/PDCT |
| Site visits | Site visits will be used where appropriate to inform select stakeholders about the progress of Sydney Metro and any key milestones or activities taking place. | SM/PDCT |
| In person and/or virtual presentations and forums | Presentations and forums will be used where appropriate to inform stakeholders about the progress of Sydney Metro and any key milestones or activities taking place. | SM/PDCT |
| In person and/or community and business based forums | Forums will be used to focus on key environmental management issues relating to construction activities with impacted community and business stakeholders. | SM/PDCT |
| CALD In persons and/or virtual tools | Providing translators for virtual and/or in person meetings and engagements as required. Working closely with local councils and community groups to utilise existing CALD relationships. | SM/PDCT |

| Tool | Explanation and purpose | Responsibility |
|--|---|----------------|
| | Continued outreach with targeted CALD community groups, and virtual and/or face-to-face meetings and briefings with CALD communities as required. | |
| CALD Presentations | Presentations will also be offered to local CALD community groups in multiple languages by bi-lingual team members or external translators. | SM/PDCT |
| Notifications | | |
| Emergency works – notification letter | <p>An emergency works* – notification letter will be used to advise properties immediately adjacent to or impacted by emergency works, within two hours of door knock commencing work.</p> <p>Notifications must be delivered by the PDCT, issued on Sydney Metro letterhead and include the following:</p> <ul style="list-style-type: none"> • scope of work • location of work • hours of work • duration of activity • type of equipment to be used • likely impacts including noise, vibration, traffic, access and dust • mitigation measures • contact information. <p><i>*Work required to repair damaged utilities and/or make an area safe after an incident outside standard construction hours.</i></p> | PDCT |
| 7 day notification - Community Signage | <p>Signage will be erected at least 7 days prior to any activity with the potential to impact stakeholders or the community. This includes:</p> <ul style="list-style-type: none"> • work in public areas such as a park • making changes to pedestrian routes • impacting on cycle ways • changing traffic conditions • disrupting access to bus stops. <p>Signage could include A-frames, mobile Variable Message Sign (VMS), hoarding or similar and be placed at either end of the corridor of work.</p> | PDCT |
| 7 day - Traffic alert email | Traffic alert email will be sent at least 7 days prior to any works requiring changes to traffic. Recipients should include: | PDCT |

| Tool | Explanation and purpose | Responsibility |
|------------------------------|---|----------------|
| | <ul style="list-style-type: none"> • relevant authorities • transport operators (including bus, coach and taxi operators). <p>The notification audience and content will be guided by the Traffic and Transport Liaison Group and Traffic Management Plans.</p> | |
| 7 day – utility notification | A notification will be sent to relevant utility service authorities at least 7 days before utility service work, to provide detailed information for their relevant call centre messaging. | PDCT |
| Notification letter | <p>Notification letters will be used to advise the community and stakeholders of any activity with the potential to cause impacts. The notification should be sent at least 7 days prior to the activity occurring to an area of 100 metres around the construction site for day works and 200 metres around the site for night works.</p> <p>Wherever possible works notifications should be combined for the month to include all proposed site activities. Following up communication should be implemented for night works including the use of email, door knock or MetroConnect App reminders.</p> <p>Notifications are required for:</p> <ul style="list-style-type: none"> • start of construction • significant milestones • changes to scope of work • night works • changes to traffic conditions • modifications to pedestrian routes, cycle ways and bus stops • out of hours work • changes to residential or business access • changes or disruptions to utility services • investigation activities. <p>Notifications will be issued on Sydney Metro letterhead and include the following:</p> <ul style="list-style-type: none"> • scope of work • location of work • hours of work • duration of activity • type of equipment to be used | PDCT |


























| Tool | Explanation and purpose | Responsibility |
|---|---|----------------|
| | <ul style="list-style-type: none"> likely impacts including noise, vibration, traffic, access and dust mitigation measures contact information. | |
| Advertisements | <p>Display advertisements will be used to notify the community prior to the start of construction, update on construction activity, notify of exhibitions and events and announce Sydney Metro and milestones.</p> <p>Advertisements will be used as required, to fulfil the requirements of any planning approval, or licences and that required by law.</p> <p>Advertisements in local newspapers, if possible (that cover the geographical areas of the contractor's activities) will be used to notify of significant traffic management changes, detours, traffic disruptions and work outside any working hours contained in the environmental documents at least 7 days before any detour, disruption or change occurs.</p> | SM |
| Notification email | Email notifications via Consultation Manager distribution lists are utilised once on the ground notification distribution has been completed. | SM/PDCT |
| MetroConnect App | A native digital application may be utilised to provide brief construction information updates to the community. Stakeholders will be offered the opportunity to sign up for 'App' updates. MetroConnect is expected to be available from late 2020. | SM |
| CALD Advertisements | Advertising project milestones in foreign language newspapers. | SM |
| Briefings and media | | |
| MP, local elected members and Ministerial briefings | MP, Local elected members and Ministerial briefings will be used to update these stakeholders on major Sydney Metro milestones. | SM |
| Media briefings and releases | Media releases, briefings and events will be used to update the community on major Sydney Metro milestones. | SM |
| Schools | | |
| School education program | A school education program developed by Sydney Metro will be used to engage with primary and high school students. | SM |

| Tool | Explanation and purpose | Responsibility |
|--|--|----------------|
| Other requirements | | |
| Site inductions | Site inductions will include communication and engagement requirements to ensure all members of the Sydney Metro and contractor teams are aware and respectful of our residential and business neighbours. | PDCT |
| Stakeholder database | A web-based program used for the collection and recording of details regarding stakeholder and community contact and correspondence. | PDCT |
| Communication Interface Coordination Group | <p>Members would include communications representatives from interfacing projects with project sites shared or adjacent to Sydney Metro.</p> <p>The role of the Communications Interface Coordination Group is to:</p> <ul style="list-style-type: none"> • Establish relationships between communications teams from interfacing projects to facilitate effective handling of enquiries and complaints where relevant. • Provide an update on current and upcoming milestones, construction program and stakeholder and community issues. • Provide a forum to exchange information and coordinate communication and consultation activities to ensure a consistent approach to stakeholders, the community and others is delivered. | SM/PDCT |

7. Site establishment communication

Establishing relationships with stakeholders and the community, including determining suitable forums for engagement is a key priority prior to site establishment for construction. During this stage of engagement the PDCT should prioritise face-to face communication as much as possible. Sydney Metro will provide support for these activities as outlined in Table 4.

Table 4: Pre-construction engagement priorities

| | Activity | Responsibility |
|---|--|---|
|  | Pre-construction communication planning | |
| | Prepare Community Communication Strategy (CCS) DRAFT for Sydney Metro |  |
| | Set up site specific community email and 1800 phone number to receive correspondence |  |
| | Set up project delivery webpage |  |
| | Set up communication management system (Consultation Manager) |  |
| | Prepare start of construction advertisement |  |
| | Establish Community Complaints Mediator (CCM) |  |
| | Establish area coordination groups |  |
|  | Early site engagement/post planning approval | |
| | Ministerial, stakeholder and government agency briefings |  |
| | Council briefings |   |
| | Prepare and seek approval from Sydney Metro for introductory communication material for community engagement |  |
| | Initial doorknock and introductory material delivered and follow up meetings established for consultation |  |
| | Conduct initial consultation with neighbouring properties, businesses and stakeholders to establish specific needs |  |
| | Refine CCS and submit to Sydney Metro |  |
| | Establish forums for business and community engagement based on needs assessment |  |
| | Publish start of construction advertisement |  |
| | Host coordination meeting with relevant projects |   |
|  | Pre-construction engagement | |
| | Prepare and distribute introductory newsletter and email noting early engagement outcomes, project update, and forums available to attend prior to construction starting |  |
| | Prepare and seek approval for forum collateral including project A0 boards, factsheets and presentations |  |
| | Hold first forums (prior to construction starting) inviting relevant local project representatives at each site |  |
| | Erect temporary site signage and shade cloth (prior to hoarding being erected) |  |

KEY

 Sydney Metro

 Project Delivery Communication Team

8. Managing issues

8.1. Issue identification

It would be expected that the PDCT would work collaboratively with SM during pre-construction communication planning to understand the key themes arising from the environmental assessment process. This includes gaining knowledge of the relevant environmental impact statement(s) or other planning approvals documentation, key mitigation measures, potential cumulative impacts, community or stakeholder issues raised during the statutory planning process.

Sydney Metro expects the PDCT would appoint dedicated place managers and use the following methods during early site engagement, pre-construction engagement and delivery to identify potential issues for their communities:

- Gather information about community, stakeholder and business needs and requirements to guide delivery communication approaches.
- Build relationships with local communities, stakeholders and businesses, particularly those in close proximity to the site with a priority on personal and face-to-face communication to encourage open communication about concerns.
- Communicate early and often providing accurate information about upcoming project works and potential impacts.
- Share information with other projects in the area (see cumulative impacts).

The PDCT would be expected to work collaboratively with their environmental and construction counterparts, the Sydney Metro project implementation group, the project Environmental Representative and/or Airport Environment Officer to understand potential issues and agree on appropriate management approaches prior to escalating any issues as per the Sydney Metro Construction Complaints Management System.

The CCS must identify strategies for proactively identifying issues and appropriate mitigation measures.

8.2. Tools to manage issues


There are a number of tools available to assist projects in managing issues relating to construction and environmental impacts. These can be found in the following plans:





- Construction Environmental Management Framework
- Construction Traffic Management Framework
- Construction Noise and Vibration Standard
- Applicable contract specific management plans.

8.3. Key issues and mitigation measures





The following communication and mitigation measures are considered a guide to managing potential issues. The PDCT must identify the unique issues related to individuals and outline tailored mitigation measures which would also incorporate mitigation measures from the project's relevant planning approvals documentation.

Table 5: Key issues and mitigation measures

| Issue | Communication and mitigation measures |
|--|---|
| Information about construction | |
|  <ul style="list-style-type: none"> • Lack of information • Coordination with other Transport Agencies • Temporary station closures at locations along the alignment where train possessions occur • Train replacement services | <ul style="list-style-type: none"> • Regular notifications and newsletters (including contributing to other project notifications including Sydney Trains notifications for work during possessions) • One on one meetings on request • Doorknocks as required - both prior to works and as stakeholder checks after works • Attend stakeholder meetings to communicate Project information to their client base • Community contact facilities • Coordinate with projects and existing transport operations in close proximity to Sydney Metro works, regarding replacement services and temporary transport plans |
| <ul style="list-style-type: none"> • Coordination of information for tenants and property owners (including business owners) | <ul style="list-style-type: none"> • Strata/building managers and owners notified of scheduled and emergency work in the area when necessary • Meetings arranged with strata/building managers and owners • Strata/building managers and owners informed of works before they commence • Coordinate communications through communication interface groups • Implement the Small Business Owners Engagement Program as required |

| Issue | Communication and mitigation measures |
|---|--|
|  <p>Utility relocation and continuity of supply</p> <ul style="list-style-type: none"> • Utility works affecting footpath or road access | <ul style="list-style-type: none"> • Detailed briefings for businesses potentially affected • Timing works, particularly service cutovers, to minimise potential impacts • Provide alternative service where necessary to maintain essential supply |
|  <p>Visual amenity and visibility</p> <ul style="list-style-type: none"> • Impacts to visual amenity (overlooking or directly next door to sites) • Vandalism of site hoarding • Visibility of retail signage and shopfronts | <ul style="list-style-type: none"> • Retain vegetation where possible or for as long as practical • Protection of trees to be retained • Hoarding designed in line with Sydney Metro Brand Style Guidelines • Prompt graffiti removal from hoarding, buildings, plant and surroundings kept well maintained and clean • Hoarding designed to maximise visibility of retail signage and shopfronts. • Explore opportunities for signage and wayfinding to maintain business visibility • Implement Small Business Owners Program to promote local businesses |
|  <p>Cumulative impacts</p> <ul style="list-style-type: none"> • Multiple works in the one location • Adjacent projects | <ul style="list-style-type: none"> • Coordinate communications through the communication interface group |
|  <p>Transport interruptions</p> <ul style="list-style-type: none"> • Temporary station closures | <ul style="list-style-type: none"> • Rail replacement services • Advertisements, notifications and station attendants redirecting passengers to alternative services |

| Issue | Communication and mitigation measures |
|---|--|
| <div data-bbox="204 416 309 533" data-label="Image"> </div> <p>Noise and vibration</p> <ul style="list-style-type: none"> • Effects on sensitive receivers • Effects on sensitive equipment • Effects on quiet enjoyment (particularly for food and beverage businesses) • Construction traffic noise (deliveries and spoil movements) • Vibration generated by construction activities | <ul style="list-style-type: none"> • Early engagement with neighbouring stakeholders on likely noise and vibration impacts • Implementation of mitigation measures in the Construction Noise and Vibration Management Plan, Minor Works Approval, Out of Hours Approval and other documents and plans where relevant • Noise minimised through use of appropriate plant, tools and techniques and adaptive programming, where possible. Information on specific noise and vibration reduction outcomes for each site can be found in the relevant Construction Noise and Vibration Impact Statement. Noise reduction strategies to be implemented with consideration given hours of operation and sensitive periods. • High impact noise works staged with respite periods as required by any applicable Environment Protection Licence or planning approval • Temporary noise screens used around equipment, where appropriate • Staff induction and toolbox meetings prior to noisy activities to highlight acceptable work force behaviour • Noise and or vibration monitoring offered in response to complaints • Vibration monitoring undertaken on any adjoining heritage structures if outlined in the relevant Construction Noise and Vibration Impact Statement • Referral to Small Business Owners Engagement Program for advice on small business complaints where appropriate |
| <div data-bbox="204 1339 309 1411" data-label="Image"> </div> <p>Dust</p> <ul style="list-style-type: none"> • Dust generated by construction activities • Concern about health impacts of dust | <ul style="list-style-type: none"> • Dust minimised by using water carts, water sprayers, street sweepers, chemical and organic ground cover, hard stands and limiting activities on windy days where necessary |

| Issue | Communication and mitigation measures |
|--|---|
|  <p>Access</p> <ul style="list-style-type: none"> • Access for deliveries and customers • Traffic changes on local roads • Impacts to local street parking • Traffic modifications including changes to footpaths • Utility works affecting footpath or road access | <ul style="list-style-type: none"> • Coordination of works with deliveries and business priorities, where possible • Installation of suitable signage to direct pedestrians, delivery drivers and customers where appropriate |
|  <p>Construction traffic</p> <ul style="list-style-type: none"> • Heavy vehicle movements on local roads | <ul style="list-style-type: none"> • Implement site specific Traffic Management Plans • Coordinate traffic management with the Sydney Coordination Office • Construction traffic movements minimised in peak times, where possible • Heavy vehicle specific access and egress locations and routes to minimise local congestion • Truck driver toolbox meetings on localised conditions • Out of hours deliveries to minimise impacts of oversized vehicles on local roads • Traffic Control Group |
|  <p>Property acquisition</p> <ul style="list-style-type: none"> • Concerns about property acquisition | <ul style="list-style-type: none"> • Personal Manager involvement and support • Detailed meetings with supporting Centre for Property Acquisition information and Sydney Metro newsletters and fact sheets |
|  <p>Property impacts</p> <ul style="list-style-type: none"> • Concerns about potential property damage • Potential effects of vibration and settlement | <ul style="list-style-type: none"> • Property Condition Surveys offered where eligible in line with relevant CNVIS for each site • Vibration modelling information • Distribute fact sheets • Protection of heritage items using hoarding |

9. Cumulative impacts

Sydney Metro will ensure coordination with interfacing projects to manage community and stakeholder issues. Specifically, on the Sydney Metro – Western Sydney Airport project, coordination with Western Sydney Airport is essential for issues raised about work on sites within shared project areas.

Sydney Metro recognises that communities and stakeholders may be experiencing or have experienced impacts relating to other projects in their local area. This section outlines approaches to ensure cumulative impacts are considered in communication and engagement.

9.1. Coordination for effective communication

Sydney Metro will host Communications Interface Coordination Groups for areas where projects interface. The purpose of these groups will be to provide a forum for exchange of information, understand any emerging concerns across the projects and to coordinate communication and engagement activities as appropriate.

Coordination and consultation with other projects will generally include:

- Provision of regular updates about the detailed construction program, construction sites and haul routes.
- Coordination of traffic notifications between projects.
- Coordination of engagement activities such as community information sessions, newsletters and notifications and complaint resolution.

This approach will support a range of other coordination forums to address coordinating works with traffic and noise impacts and identifying potential conflicts in construction programs.

All enquiries and complaints made by the community and stakeholders will be managed in accordance with the Sydney Metro Construction Complaints Management System. It would be expected that the place manager on call would have general knowledge of other projects in the area to provide a personal approach and knowledge of who the complainant should contact for further information.

All phone calls to the Sydney Metro's call centre, will be managed in accordance with the Sydney Metro call handling procedure. Community enquires that do not relate to Sydney Metro projects, will be forwarded to the relevant project.

Figure 7 illustrates the process for complaint and enquiry management across projects in similar areas.

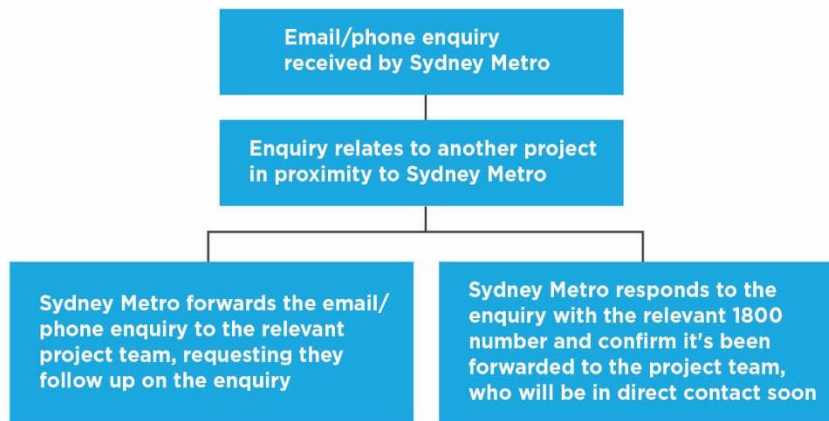


Figure 7: Project related email / phone coordination

9.2. Occurrence of cumulative impacts

The Contractor CCS must identify projects that Sydney Metro may interface within their project area including further opportunities for coordinated communication.

This may include:

- Other parts of Transport for NSW
- Local Councils
- State Government agencies
- Federal Government agencies
- Western Sydney Airport
- Sydney Coordination Office
- Department of Planning, Industry and Environment
- Sydney Trains
- NSW Trains
- Sydney Buses
- Sydney Water
- Water NSW
- Port Authority of NSW
- Sydney Motorways Corporation
- Emergency service providers
- Utility providers
- Construction contractors.

10. Crisis and incident communication processes

In the unlikely event that a crisis or incident occurs, the Sydney Metro Crisis Communications Management System will be in place. Any communication management system prepared by the PDCT as part of the Emergency Management Plan should align with Sydney Metro's Crisis Communications Plan.

Contract teams are required to invite the Director, Communications and the Deputy Executive Director, Communication and Engagement to attend and participate in formal incident and crisis communication exercises when they are conducted.

The CCS must reflect Sydney Metro's Crisis Communications Management Plan and Incident notification process.

The PDCT has the following responsibilities in relation to crisis communication:

- Immediately notify the Director, Communications within 10 minutes of any incident or issue that may have an impact on the community, environment, personnel, subcontractors or other stakeholders or may attract the attention of the media, the Minister for Transport, a local MP, council or the broader community. For any other incidents notify the Director, Communications within one hour of the incident occurring.
- Obtain approval from the Director, Communications before contacting or providing information to any person, other than that which is required to directly manage the incident or to comply with Law, including stakeholders, the media or the public.
- Make available suitably qualified and experienced personnel to support the Director, Communications in responding to the community, the media and other stakeholders.
- Provide all necessary communications materials that may need to be disseminated as a result of such incidents.

11. Monitoring, evaluation and reporting

The PDCT is responsible for monitoring the effectiveness of strategies to inform and to minimise impacts of construction on the community, including businesses. The PDCT is required to provide detailed information to Sydney Metro each month on performance criteria outlined in this plan and the site specific CCS including:

- Enquiry and complaint trends and how lessons learned are being applied across the project to avoid issues recurring, highlighting sensitive receivers and small businesses.
- The status of complaints and details of any escalation required.
- Communication tools used to engage with stakeholders and the community including doorknocks, meetings, presentations, notifications and newsletters.

11.1 Audit and review – site specific CCS'

Evaluation of the performance and effectiveness of the site specific CCS' will be undertaken every six months or as required. Key elements of the evaluation will include examining the adequacy of the CCS and its implementation in achieving the intent of the consultation as evidenced by the items in table 6.

Table 6: Six monthly CCS audit requirements

| Performance Parameters | Measures | Reporting |
|--|---|--|
| Identifying all potential local community, businesses and stakeholders that may be impacted by or have an interest in the project (based on the stakeholder categories provided in this plan) | Inclusion in the CCS of: <ul style="list-style-type: none">• A thorough stakeholder scan of local community, businesses and stakeholders including maps. | Accurate and up-to-date listings of local businesses noting changes of leases and ownership at least every six months. |
| Appropriateness of communication and engagement tools | Inclusion in the CCS of: <ul style="list-style-type: none">• A communication tool matrix and/or table detailing communication tools to be used for which stakeholders and why. | Communication matrix and/or table to be updated at least every six months to adjust approach to community needs and lessons learned. |
| Identifying appropriate mitigation measures to address issues | Inclusion in the CCS of: <ul style="list-style-type: none">• Mitigation measures that would be used in response to identified issues• A detailed complaint investigation process to ensure mitigation measures are considered before | Appropriateness of mitigation measures to accommodate community needs and lessons learned to be reviewed at least every six months and the |

| | | |
|-----------------------------------|---|---|
| | escalating complaints to the next level (as per the CCMS). | CCS to be updated accordingly. |
| Cumulative impacts process | Inclusion of: <ul style="list-style-type: none"> • Identified nearby projects and tools/forums to engage with projects • Processes for coordination of communication, including project collateral and face-to-face events. | Nearby project information to be reviewed regularly and updated as part of the CCS review, included any new processes, at least every six months. |

11.1. Audit and review - businesses

The PDCT is required to compile monitoring data on a bi-annual basis and include lessons learned based on the items in table 7.

Table 7: Six monthly monitoring program and performance measures for businesses

| Performance Parameters | Measures | Monitoring | Reporting |
|---|--|--|--|
| Awareness of construction activity and likely impacts. | <ul style="list-style-type: none"> • Notifications issued within required timeframes on 100% of occasions, unless otherwise agreed with Sydney Metro. • Number of business briefings, building-based information sessions and face-to-face meetings prior to works. • The objective is to make contact via these measures with 100% of businesses within 50 metres prior to works that have the potential to impact the owners. | <ul style="list-style-type: none"> • Records in Consultation Manager database on number and timing of notifications. • Records in Consultation Manager database on number of (and attendance at) briefings, information sessions and completed doorknocks/face-to-face meetings. • Feedback from meetings, presentations and briefings (documented in Consultation Manager). • Records in Consultation Manager database on complaints received from businesses | <ul style="list-style-type: none"> • Number of notifications issued. • Percentage of notifications issued on time. • Number of briefings, information sessions and completed doorknocks. • Percentage of businesses within 50 metres contacted prior to works. • Number of complaints received from businesses relating to lack of information about construction activities and impacts. • Lessons learned. |

| | | | |
|---|---|---|--|
| | | relating to lack of information about construction activities and impacts. | |
| Measures implemented to maintain business vehicle and pedestrian access, parking, visibility and amenity during construction activity. | <ul style="list-style-type: none"> • Potential issues identified in advance and mitigation measures implemented in consultation with affected businesses to address access, parking, visibility and/or amenity issues. • The objective is 100% implementation of agreed mitigation measures relating to access, parking, visibility and other amenity aspects. | <ul style="list-style-type: none"> • Consultation with businesses on potential impacts and mitigation measures (documented in Consultation Manager). • Feedback on effectiveness of mitigation measures (documented in Consultation Manager). • Records in Consultation Manager database on complaints received from businesses relating to vehicle and pedestrian access, parking, visibility and amenity, including details of any repeat complaints about the same issue. | <ul style="list-style-type: none"> • Number of businesses with mitigation measures agreed in advance to address access, parking, visibility or amenity issues. • Percentage of businesses where mitigation measures were implemented as agreed. • Details of mitigation measures implemented. • Business feedback on effectiveness of mitigation measures. • Number of repeat complaints received from businesses relating to vehicle and pedestrian access, parking, visibility and amenity. • Lessons learned. |
| Agreed measures to minimise noise and vibration impacts on noise and vibration sensitive businesses. | <ul style="list-style-type: none"> • Agreed mitigations implemented, including agreed respite, work methods, proactive engagement and ongoing communication. • Businesses identified as potentially affected by high noise for extended periods, and requests for at property treatment or relocation, referred to Sydney Metro if all negotiated solutions offered under the scope of the contract fail to provide | <ul style="list-style-type: none"> • Consultation with businesses on noise and vibration impacts and mitigation measures documented in Consultation Manager. • Documentation of affected businesses impacts and mitigation measures in site specific CNVIS reports. • Feedback on effectiveness of mitigation measures (documented in | <ul style="list-style-type: none"> • Number of businesses with agreed mitigation measures to address noise and vibration impacts. • Summary of non-standard mitigation measures implemented. • Number of referrals to Sydney Metro. • Number of repeat complaints from noise sensitive receivers relating to noise and vibration impacts. • Lessons learned. |

| | | | |
|--|--|--|--|
| | <p>an acceptable solution to the impacted businesses.</p> <ul style="list-style-type: none"> • The objective is for zero referrals to Sydney Metro over a six-month timeframe during standard construction. | <p>Consultation Manager).</p> <ul style="list-style-type: none"> • Records of businesses referred to Sydney Metro for additional assessment / treatment. • Records in Consultation Manager database on noise and vibration complaints from businesses. | |
|--|--|--|--|

12 Low impact or preparatory activities process

12.1 Purpose

This implementation process describes the approach Sydney Metro will use to manage engagement and ongoing consultation with stakeholders, and the community and businesses with an interest in, or potentially affected by Sydney Metro low impact or preparatory activities.

Low impact work is generally defined within State significant infrastructure conditions of approval for Sydney Metro projects as work that is not considered main construction works but will support main construction activities. Preparatory activities is a term defined within the Western Sydney Airport Plan and may apply to the variation to the Airport Plan for on-airport works for Sydney Metro – Western Sydney Airport. Each of these terms are described in more detail in table 8 below.

This low impact or preparatory activities plan must be implemented in conjunction with the overarching requirements outlined in this strategy.

12.2 Relationship to plans

The intention of this low impact or preparatory activities implementation process is to cover low impact or preparatory activities prior to the main construction works starting. Low impact activities may be conducted by Sydney Metro or its Contractors.

At the commencement of Construction, Contractor activities will be covered by the Contract Specific Community Communication Strategy.

12.3 Low impact and preparatory activities

For the purposes of this process, low impact activities are defined as:

- Survey, survey facilitation and investigations works (including geotechnical investigations, road and building dilapidation survey works, drilling and excavation).
- Treatment of contaminated sites.
- Establishment of ancillary facilities including construction of ancillary facility access roads and providing facility utilities.
- Operation of ancillary facilities that have minimal impact on the environment and community.
- Clearing and relocation of vegetation (including native).
- Installation of mitigation measures, including erosion and sediment controls, temporary exclusion fencing for sensitive areas and acoustic treatments.
- Property acquisition adjustment works, including installation of property fencing and utility relocation and adjustments to properties.
- Utility relocation and connections.
- Maintenance of existing buildings and structures.

- Archaeological testing under the Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW, 2010) or archaeological salvage and clearance undertaken in association with other Minor Works to ensure there is no impact on heritage items.
- Any other activities that have minimal environmental impact.

Preparatory activities are generally defined in the Western Sydney Airport Plan as the following:

- day to day site and property management activities
- site investigations, surveys (including dilapidation surveys), monitoring and related works (e.g. geotechnical or other investigative drilling, excavation, or salvage)
- establishing construction work sites, site offices, plant and equipment, and related site mobilisation activities (including access points, access tracks and other minor access works, and safety and security measures such as fencing but excluding bulk earthworks)
- enabling preparatory activities such as demolition or relocation of existing structures (including buildings, services, utilities and roads) and the disinterment of human remains
- any other activities which are determined Preparatory Activities.

Prior to low impact or preparatory activities taking place, a pre-construction work form will be completed for approval by the PDCT.

12.4 Monitoring and reporting

Due to the short-term and intermittent nature of low impact activities to businesses, business monitoring as outlined in Section 8 of this OCCS will not be undertaken for work covered by section 12.

Feedback received during proactive doorknocks and incoming correspondence (emails and phone calls) will be informally monitored and any dissatisfaction from businesses recorded and managed in accordance with the Construction Complaints Management System in the first instance. Complaints are reported on daily through the Daily Complaints Report and quarterly in the Construction Compliance Report.

Table 8: Communication tools for low impact or preparatory activities

| Activity | Communication tools | Stakeholder | Timing |
|---|----------------------------------|--|-------------------------------|
| Survey and site investigations, including geotechnical investigations | Notification letter ¹ | Delivered to properties within 50m or work in standard construction hours, 100m for out of hours work ² | 7 days prior to work starting |

¹ Where work is undertaken wholly within the rail corridor, during a possession, the notification will be distributed by Sydney Trains. See explanation for 'Work during rail possessions'.

² This 200m area will expand if the noise assessment shows a wider impact radius.

| Activity | Communication tools | Stakeholder | Timing |
|--|---|---|---|
| | Metro app connect | Sent to stakeholder distribution email lists for | |
| | Doorknock (if intrusive or loud) | Immediate neighbours | |
| Site establishment (including vegetation clearing, fencing, controls etc.) | Newsletter | Local council Local member Senior stakeholders Local groups Delivered to properties within 500m | At site establishment As required |
| | Notification letter | Delivered to properties within 200m for night work and 100m for day work ³ Local groups | 7 days prior to work starting |
| | Site signage Hoarding banners Directional signage | People passing by the site | As required |
| | Doorknock | Properties within 50m Educational and religious institutions | 7 days prior to work starting |
| Out of hours work | Notification letter ² | Delivered to properties within 200m ³ Local groups | 7 days prior to work starting |
| | Doorknock | Properties within 50m | 7 days prior to work starting |
| Planned service disruptions | Included in notification letter | Delivered to properties within 200m ³ | 7 days prior to disruption |
| Emergency work | Notification letter Doorknock | Affected properties | Within 2 hours |
| Work during rail possessions | Sydney Trains notification | Sydney Trains delivery area (250m on either side of the rail corridor) | Delivered prior to possession period by Sydney Trains |
| Construction milestones | Included in notification letter | Delivered to properties within 100m or work in | 7 days prior to new milestone |

| Activity | Communication tools | Stakeholder | Timing |
|---|--|--|--|
| | | standard construction hours, 200m for out of hours work ³ | |
| | Doorknock | Properties within 50m Educational and religious institutions | 7 days prior to new milestone |
| | Briefings | Local council Local member Senior stakeholders Local groups Government agencies Specific businesses as required | As required or requested |
| Traffic changes, including any public transport changes | Included in notification letter | Delivered to properties within 100m or work in standard construction hours, 200m for out of hours work ³ | 7 days prior to work starting 7 days prior to new milestone |
| | VMS Traffic alert Bus stop notices | Road users | 7 days prior to work starting 7 days prior to new milestone |
| Emergency work | Notification letter Doorknock | Affected properties | Within 2 hours |
| Transport infrastructure disruptions | Notification letter Bus stop notices Directional signage | Transport users Local council Transport agencies | As required |

Appendix E

Construction Traffic Management Framework

Construction Traffic Management Framework

Sydney Metro West and Sydney Metro – Western
Sydney Airport construction

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|-------------------|---------------------------------------|
| Author: | Ken Hind – Traffic Advisor |
| Date: | July 2020 |
| Version: | 1.1 |
| Reference: | Reference |
| Division: | Operations, Customer and Place-making |

Definitions and terminology

All terminology in this CTMF Document is taken to mean the generally accepted or dictionary definition. Other terms and jargon specific to this CTMF Document are defined within SM-17-00000203 Integrated Management System (IMS) Glossary. Terms and acronyms specific to this document are listed below.

Table 0-1: Definitions

| Term | Definition |
|---|---|
| Approval | Any licence, permit, consent or approval required to be obtained from any authority to perform the construction activities or required in relation to the construction site by the contractor. |
| Authority/authorities | Any authority or person that has a right to impose requirements on any part of the contractor's activities or over the construction site. |
| Construction site | The land where the contractor undertakes the contractor's activities. |
| Transport Coordination | The office established to lead the proactive planning and coordination of the operations and management of the transport network for major infrastructure projects on behalf of Transport for NSW. Transport Coordination includes the Transport Management Centre. |
| Construction Traffic Management Plan (CTMP) | The Construction Traffic Management Plan required by the SSI Approval. The CTMP is a plan showing how traffic will be managed when construction works are being carried out. It describes the work activities being proposed, their impact on the roadway and on road users, and how these impacts are being addressed. A CTMP must incorporate Traffic Staging Plans, Traffic Control Plans and Vehicle Movement Plans. Pedestrian Movement Plans may also be required to be incorporated. Sydney Metro site-specific CTMPs will need to be prepared for each construction site. These plans will be developed in consultation with the TTLG and TCG meetings. |
| Contractor | The organisation engaged by the Principal for the delivery of the Project Works and the Temporary Works. |
| Contractor's Activities | All things and tasks that the contractor is required to do under the contract, whether or not such things and tasks are performed by subcontractors. |
| Disability Discrimination Act (DDA) | The Disability Discrimination Act 1992. |
| Emergency | An unforeseen event which requires urgent action to protect life or property, or an occasion when emergency services (Police, Fire and Rescue, Ambulance or State Emergency Services) take control of a portion of the road network. |
| Hold Point | A point beyond which a work process must not proceed without the authorisation or release of a designated authority. |
| Local Traffic Committee (LTC) | A technical committee chaired by the local council under delegated authority from TfNSW, which considers matters related to prescribed traffic control devices and traffic control facilities for which the council has delegated authority. It is made up of four formal, or voting, members: Council, NSW Police, TfNSW, and the local state Member of Parliament. |

| Term | Definition |
|--|---|
| Long-term works | Works that impact on the road network for more than one shift. Traffic management measures will be installed on one day/night and remain in place for weeks or months but are removed on completion of the project or that work; for example, concrete barriers and signage. |
| Pedestrian Movement Plan | A diagram showing the allocated travel paths for workers or pedestrians around or through a construction site. A PMP may be combined with or superimposed on a Traffic Control Plan. |
| Planning Approval | The approval being sought under the EP&A Act and relevant Commonwealth legislation (if required) by Sydney Metro and which is required to be complied with by the contractor, as directed in respective Project Deeds. |
| Preferred Infrastructure Report (PIR) | The report prepared to address issues raised in submissions on the Environmental Impact Statement and any proposed changes to the project to minimise its environmental impact. |
| Principal | Sydney Metro |
| Project Works | Any permanent works that the contractor is required to design, construct, complete and hand over. |
| Reference documents | The codes, standards, specification and guidelines specified in this document. |
| Revised Environmental Mitigation Measures (REMM) | Mitigation measures, additional to the project design, which are identified through the Environment Impact Assessment. |
| Road occupancy | An activity that is likely to impact on the traffic flow of the road network, and may involve the closure of traffic lane(s) or parking lane(s). |
| Road Occupancy Licence (ROL) | A licence for Road Occupancy issued by TMC that allows the holder to use or occupy a specified road space at approved times, providing that certain conditions are met. |
| Road Safety Audit (RSA) | An assessment and report of a road's safety performance and crash potential at various stages of a road/project's life cycle. |
| Road user | All users of roads and public spaces including, but not limited to, pedestrians, pedal cyclists, public transport passengers, public transport operators and motorists. |
| Short-term works | Works that are undertaken for one shift only. They may return the next day/night but it is set up and packed entirely in one shift; for example, cones and signs for a lane closure. |
| Subcontractor | A subcontractor of the contractor and includes a supplier of goods or services (including professional services and construction plant hire) or both. |
| Transport for NSW (TfNSW) | Relates to those sections of the former Roads and Maritime Services (RMS), with regard to operations and impacts on State Roads, traffic signals and other road responsibilities of that organisation. RMS has been integrated into Transport for NSW from 1 December 2019, as part of the Greater Sydney Division. Where existing documents or procedures were published by RMS this reference has been retained. All references to either TfNSW or RMS in this document should be taken to mean the same thing. |
| Temporary works | Any temporary works required to carry out the contractor's activities but which do not form part of the Project works. |

| Term | Definition |
|--|---|
| TBM | Tunnel boring machine. |
| Traffic Control Plan (TCP) | A diagram showing signs and devices arranged to warn traffic and to guide it around, past or if necessary through a work site or temporary hazard. |
| Traffic Control Group (TCG) | A group chaired by the Transport Coordination and including the Principal, relevant contractor's traffic and transport representative and other stakeholders. |
| Traffic Management Plan (TMP) | The TMP is a plan showing how traffic will be managed when construction works which will impact on the surrounding road network are being carried out. It describes the work activities being proposed, their impact on the roadway and on road users, and how these impacts are being addressed. A TMP may incorporate Traffic Staging Plans, Traffic Control Plans and Vehicle Movement Plans. Pedestrian Movement Plans may also be required to be incorporated. These plans will be developed for activities such as OSOM routes to and from the construction sites and in consultation with the TTLG and TCG meetings. |
| Traffic Staging Plan | Road design drawings showing traffic lane configurations to be provided for traffic passing through the site during the various construction stages, including details of road alignment and geometry, intersection layouts, provision for buses and cyclists, work areas and pedestrian areas, drainage, signs and pavement markings, etc. |
| Traffic and Transport Liaison Group (TTLG) | The group formed by the Principal in accordance with the requirements in the Project Planning Approval. Meetings are chaired by Transport Coordination. |
| Traffic and transport representative | The person appointed to the position of traffic and transport representative by the contractor. |
| Vehicle Movement Plan (VMP) | A diagram showing the preferred travel paths for vehicles associated with a construction site entering, leaving or crossing the through traffic stream. A VMP may be combined with or superimposed on a Traffic Control Plan. |
| Verifier | A person appointed to the position of verifier by the contractor. |
| WAD | A Works Authorisation Deed, an agreement between TfNSW and the proponent authorising implementation of road works or other works for which TfNSW has a statutory interest and subject to identified requirements and conditions. |
| WHS | Workplace Health & Safety. |

1 Introduction

1.1 Purpose

This Construction Traffic Management Framework (CTMF) sets out the approach to managing traffic impacts during the construction of the Sydney Metro projects (the Project). The CTMF also outlines contractor requirements, with reference to third party agreements.

1.2 Scope

The CTMF provides the overall strategy and approach for construction traffic management for the Project, and an outline of the traffic management requirements and processes that will be common to each of the proposed work sites. It establishes the traffic management processes and acceptable criteria to be considered and followed in managing roads and footpaths adjacent to Project construction sites.

A site specific Construction Traffic Management Plan (CTMP), along with Traffic Control Plans (TCPs) as required, will also be documented based on this framework. These documents will be prepared by the Principal contractors responsible for each works package for Sydney Metro construction works to align with the contents, principles and objectives of this CTMF, as well as contractual requirements, Revised Environmental Mitigation Measures (REMM) and all other obligations of the relevant planning approval.

Some of the construction sites associated with the Sydney Metro Projects will be located within high-activity, densely developed, and in some cases congested sections of the road network, and any traffic management measures will need to consider all the potential impacts that might occur because of the construction activities, and deliver safe environments for all road users.

1.3 Metro West & Western Sydney Airport Project description

Sydney Metro is a key component of Future Transport 2056 (Transport for NSW, 2018), a plan to create and maintain a world class, safe, efficient and reliable transport system. The Sydney Metro network will consist of a number of metro lines.

- Sydney Metro Northwest is constructed and operational between Tallawong and Chatswood.
- Sydney Metro City and Southwest (Chatswood to Sydenham) is under construction between Chatswood and Sydenham Stations with operations planned to commence in 2024.
- Sydney Metro City and Southwest (Sydenham to Bankstown) is currently in initial stages of construction (early works) with operations planned to commence in 2024.
- Sydney Metro West (Westmead to Sydney CBD) is currently in planning with construction to commence in 2020.
- Sydney Metro – Western Sydney Airport (St Marys to Western Sydney Airport and Western Sydney Aerotropolis) is currently in the initial stages of planning with construction to commence in 2021.

Sydney Metro West will service the key precincts of Greater Parramatta, Sydney Olympic Park, The Bays Precinct and the Sydney CBD. Sydney Metro West includes:

- A new underground metro station at Westmead, to support the growing residential area as well as the health, research and education precinct
- A new metro station under an existing suburban station on the T1 Northern Line east of Sydney Olympic Park – allowing faster connections for customers from the Central Coast and Sydney's north to Parramatta and Sydney through a quick and easy interchange between suburban and metro services
- At least one Sydney Metro West station under the Sydney CBD, delivering an easy interchange between suburban rail, new light rail and the new metro stations currently under construction
- Further consultation is being undertaken on new intermediate metro stations between Parramatta and Sydney Olympic Park and between Olympic Park and the Sydney CBD.

Sydney Metro – Western Sydney Airport will service Greater Western Sydney and the new Western Sydney International (Nancy-Bird Walton) Airport. Sydney Metro – Western Sydney Airport will include:

- Stations at Western Sydney Airport and the Western Sydney Aerotropolis;
- A station at St Marys, interchanging with the existing station and connecting customers with the rest of Sydney's rail system;
- A station at Orchard Hills to service future commercial and mixed-use precinct;
- A station at Luddenham to service future education, innovation and commercial precinct.

The Projects will also include ancillary components, including stabling and maintenance facilities, new or upgraded overhead wiring, signalling, access tracks/paths, rail corridor fencing, noise walls, fresh air ventilation equipment, temporary and permanent alterations to the road network, facilities for pedestrians, and other construction related works.

1.4 Governance

The approved version of the CTMF will be available on the Sydney Metro website.

Sydney Metro will be the document owner of the approved CTMF. This CTMF will be part of the EIS for both Sydney Metro – Western Sydney Airport (SMWSA) and Sydney Metro West (SMW) submitted for approval by the Secretary, Department of Planning, Industry and Environment.

2 Traffic management objectives

This section outlines the approach, strategy and hierarchy of access required when managing traffic for Sydney Metro projects.

The Projects will require demolition and construction work to be undertaken within various local government areas (councils) and other road authorities within the Greater Sydney Region. At all locations, it is important that adequate consideration and emphasis is given to the operation of public transport, private vehicles, service vehicles, and pedestrian and cyclist management measures, to minimise impacts. It is also important that access for residents and businesses is maintained, where possible.

The design and operation of any proposed temporary traffic management measures will require careful planning, coordination and implementation.

Pedestrians, cyclists and vehicle drivers expect a high level of safety and service in using the existing road and pedestrian network. This requires efficient, effective and reliable traffic management strategies to be in place that:

- Achieve uniform traffic throughput.
- Minimise changes to pedestrian and cycle routes and movement.
- Ensure reliable and consistent travel times.
- Provide clear information to allow drivers and other road users to make appropriate decisions in relation to their journey.
- Support operation and use of sustainable transport modes to reduce on-road single occupant motor vehicle demand
- Minimise potential road safety risk, especially for pedestrians and cyclists.

These traffic management goals will be achieved by:

- Understanding the impacts of the Projects and identifying appropriate methods to mitigate these impacts.
- Strategic advanced planning of the traffic management.
- Taking an approach to traffic management that minimises traffic disruption.
- Ongoing stakeholder engagement and communication.

2.1 General traffic management approach

Sydney Metro is committed to achieving desired performance goals in relation to the health and safety of workers employed to construct Sydney Metro Projects, and to minimising the impacts of the works on road users and the community. The construction objectives that relate to the CTMF are outlined in **Table 2-1**.

Table 2-1: CTMF related construction objectives

| Key Result Area | Construction Objectives |
|--------------------|--|
| Transport network | <ul style="list-style-type: none"> • Minimise disruption to pedestrians, cyclists and motorists. • Ensure Sydney Metro construction traffic accesses the arterial network as soon as practicable on route to, and immediately after leaving, the construction site. • Keep Sydney moving. • Minimise impacts on route bus operations, routes and stops, where possible. • Minimise changes to traffic operation and kerbside access. • Minimise construction traffic generation during network peak periods (maximum peak period construction vehicle volumes should not exceed those outlined in the EIS). • Maintain access to properties and businesses where possible, or arrange alternative. • Maintain a safe environment for pedestrians and cyclists. |
| Safety | <ul style="list-style-type: none"> • No worker injury accidents during construction. • No injury accidents to members of the public because of construction. |
| Cumulative impacts | <ul style="list-style-type: none"> • Work collaboratively with other stakeholders and other major projects to mitigate traffic and transport impacts. |
| Amenity | <ul style="list-style-type: none"> • Minimise noise and other environmental impacts on the residents and businesses in the vicinity of the construction sites, in line with the Construction Noise and Vibration Strategy (CNVS) |

2.2 Traffic management strategy

There is the potential for activities associated with the construction of the Sydney Metro Projects to have an impact on the surrounding road network. Where possible, these impacts will be minimised through the provision of effective traffic management measures, in accordance with Sydney Metro's objectives and relevant guidelines and standards, to achieve the objectives of the Project. Development of the traffic management measures will be carried out in consultation with the Traffic Control Group (TCG), Traffic and Transport Liaison Group (TTLG), TfNSW, Transport Coordination and other relevant stakeholders.

Priority will be given to providing adequate guidance to pedestrians, cyclists, drivers and the community prior to the commencement of any works. Priority will also be given to responding appropriately to issues and events that may arise during the works. As part of this strategy, some key traffic management measures include:

- The provision of directional signage and line marking to safely direct and guide drivers, cyclists and pedestrians past work sites and to suitable alternative routes (if required) on the surrounding road network.
- Notification of proposed changes and duration using appropriate media e.g. newspapers (local or majors), radio, project website, social media and direct community engagement (as required).
- On-going or direct co-ordination with Transport Coordination, to mitigate congestion and provide rapid response should incidents or increased

congestion occur as a direct result of the works. Notification of incidents or congestion should also be relayed to Sydney Metro and relevant Transport Coordination representative immediately. The direct contact numbers of the contract-wide and site-specific lead contractors should be provided to Transport Coordination. The contract-wide lead contractor is responsible for ensuring the direct contact numbers are current during any stage of construction.

- Management and coordination of construction vehicle safe access to and from the work sites across pedestrian paths. The type of traffic management to be employed will be dependent on, and adjusted according to, the volume of pedestrians, passing traffic and the volume of construction vehicle activities for the site. The types of management could include manual supervision, physical barriers, temporary/portable traffic signals (where approved by TfNSW, council or other road authority) or modification to existing traffic signals (where approved by TfNSW).
- Ensuring that safe access to existing properties and businesses is maintained during the period of the works, or a suitable alternative is provided.
- Retain existing on-street parking and restrictions, as far as is practicable.

2.3 Hierarchy of access

In identifying the most appropriate form of traffic management for each site, consideration should be given to the priorities of the potential different users. The site specific CTMPs should be developed in line with the following hierarchy of access, listed from the highest to the lowest priority:

1. Incidents and emergency services access
2. Events (special and unplanned)
3. Pedestrians
4. Cyclists
5. Other public transport users – buses, coaches and light rail
6. Service vehicles
7. Coaches
8. Taxis
9. Kiss and ride and rideshare
10. Private cars

Roads are sometimes classified functionally as follows:

- Arterial/State road
- Sub-arterial or Regional road
- Collector road
- Local road

TfNSW publishes on its website a schedule of State and classified Regional roads with descriptions, which should be referred to in assessing the functional classification of any roads that may be potentially impacted by works. The document outlines the following:

“To manage the extensive network of roads for which councils are responsible for under the Roads Acts 1993, RMS in partnership with local government, established

an administrative framework of State, Regional and Local Road categories. State Roads are managed and financed by RMS whilst Regional and Local Roads are managed and financed by councils.

Regional Roads perform an intermediate function between the main arterial network of State Roads and council controlled Local Roads. Due to their network significance, RMS provides financial assistance to councils for the management of their Regional Roads. The Regional Road category comprises two sub-categories: those Regional Roads that are classified pursuant to the Roads Act 1993, and those Regional Roads that are unclassified. For completeness, the Schedule includes unclassified Regional Roads.

Local Roads are unclassified roads and therefore are not included in the Schedule.”¹

¹ Schedule of Classified Roads and Unclassified Regional Roads - RMS, April 2017

3 Implementation framework

3.1 Construction Environmental Management Framework (CEMF)

The Construction Environmental Management Framework (CEMF) sets out the environmental, stakeholder and community management requirements for construction. It provides a linking document between the planning approval documentation and the construction environmental management documentation to be developed by the Principal Contractors relevant to their scope of works. The CEMF outlines construction traffic management requirements.

3.2 Construction traffic management task

The Projects require construction work to be undertaken for the tunnels, viaducts, stations, ancillary facilities and connections to the stations at locations within various council areas.

Managing the impacts of construction traffic on the road and pedestrian networks near the surface construction works is vital to the success of the Project.

3.3 Implementation process

The Construction Traffic Management Framework (CTMF) is one of several management plans required for the Projects, in accordance with the CEMF. The hierarchy of the traffic management plans for the Projects, their purpose, and the responsible entity for each are outlined in the table below.

Table 3-1: Traffic Management Plans hierarchy, purpose and responsible entity

| Document | Purpose | Produced by |
|--|---|--------------|
| Construction Traffic Management Framework (CTMF) (this document) | Provides the approach within which subsequent site specific CTMPs will be prepared. | Sydney Metro |
| Site-specific Construction Traffic Management Plan (CTMP) | Site-specific CTMPs are to be prepared for each Sydney Metro construction site, for each contract. | Contractor |
| Traffic Control Plans (TCP) | Prepared as part of the site specific CTMP or as a standalone drawing for submission with Road Occupancy License applications and/or Council permits. | Contractor |
| Pedestrian Movement Plans (PMP) Vehicle Movements Plans (VMP) | Prepared, where required, as part of the site specific CTMP, combined with a TCP or as a standalone drawing for submission with Road Occupancy License applications and/or Council permits. | Contractor |
| Parking Management Plan (PkMP) | Prepared, where required, as part of the site specific CTMP or as a standalone document for submission with Road Occupancy License applications and/or Council permits. | Contractor |

| Document | Purpose | Produced by |
|-------------|--|--------------|
| Other plans | Refer to the Principal's General Specifications relating to Traffic and Transport Management | Sydney Metro |

3.3.1 Construction Traffic Management Framework (this document)

This CTMF provides the framework within which subsequent site-specific CTMPs will be prepared. The CTMF describes the traffic management objectives, principles and strategies to be implemented during construction of Sydney Metro Projects.

This CTMF identifies and outlines areas that will be potentially impacted by the construction works and will require traffic, cycling and pedestrian management. The development of suitable traffic management plans to minimise, as much as possible, the potential impacts of the works is a key component to managing any disruptions to vehicle and people movement and the efficient construction of the Projects.

3.3.2 Construction traffic management plans

Construction Traffic Management Plans (CTMP) will be prepared by contractors, covering the full spatial extent of their works for sites.

The CTMP's will comply with the Traffic Control at Worksites Manual, relevant Australian Standards, relevant Austroads guides, TfNSW supplements to Australian Standards and Austroads, Principal's General Specifications – Traffic and Transport Management and the EIS.

In addition, site specific CTMPs will be prepared and implemented having regard to the relevant Project specific REMMs and Conditions of Approval.

3.3.3 Site specific CTMP

Contractors will prepare detailed site-specific Construction Traffic Management Plans (CTMPs). These will be developed by the contractor for each work site and identify proposed heavy vehicle routes, traffic and parking management measures. These plans will be developed in consultation with the TTLG and TCG meetings. Details of the consultation including presentation dates to TTLG and TCG and stakeholder consultation are to be included in the CTMP.

Details of station and construction work sites are to be provided in the each of the site-specific CTMPs.

Site specific CTMPs will detail construction work sites, access points, relevant signage, parking changes (if required), vehicle numbers (heavy and light vehicles) and frequency, maximum vehicle size, swept paths, expected dates and duration of works, work times. Other information to be included includes bus stop relocations (if required), proposed heavy vehicle routes, traffic and parking management measures, relevant correspondence with stakeholders (e.g. bus operators, Australia Post, business owners) and all traffic management and mitigation measures required to implement any proposed works.

It must also include Traffic Control Plans (TCP), Vehicle Movement Plans (VMP), Pedestrian Movement Plans (PMP), Parking Management Plans and Traffic Staging Plans for the specific works, unless otherwise agreed in writing with the Principal's Representative and relevant Authorities. The Parking Management Plan will also provide details regarding on-site and off-site staff parking arrangements, including

any proposed busing to and from construction sites. The TCP's should include the intended timing of the proposed traffic management measures e.g. nights, weekends, 24/7.

It is an important consideration in the development and approval of a CTMP that sufficient time is allowed for the review process and consideration by Transport Coordination, TfNSW, local Council, bus operators and other stakeholders as required. The identified Project Document Management System (e.g. Teambinder) should be used to distribute documents to stakeholders for review and comment, where available. If not available for the stakeholder being consulted, then the CTMP is to be forwarded by email or hard copy. The Principal's representative is to be copied in on any submitted documentation.

The approval process for CTMP's is outlined in **Section 6.3**.

Once all comments have been addressed, the final version of the CTMP is then formally submitted to TfNSW for final approval of the CTMP, following Transport Coordination endorsement. Ten business days should be allowed for the final approval.

3.3.4 Traffic control plans and other plans

The site-specific CTMPs provide the basis for preparation of the Traffic Control Plans (TCP) and Road Occupancy Licence (ROL) applications.

3.3.4.1 Traffic control plans

All Traffic Control Plans (TCPs) prepared for construction activities will be developed in accordance with Australian Standard AS1742.3 and the TfNSW Traffic Control at Worksites Technical Manual.

TCPs must be prepared by a person who has completed and passed the '*Prepare a Work Zone Traffic Management Plan*' training course and has current certification to the required level.

All work sites and related TCPs will be implemented in compliance with the ROL issued by Transport Coordination for the approved times and appropriate standards.

Documents to be referenced in the preparation of TCPs include:

- Australian Standard AS1742.3 – Manual of uniform traffic control devices, Part 3, traffic control devices for works on roads.
- Roads and Maritime Services NSW – Traffic Control at Worksites Technical Manual
- Principal's General Specifications – Traffic and Transport Management.
- Relevant Austroads Guides.
- TfNSW Supplements to Austroads and Australian Standards.
- Sydney Metro Principal Contractor Health and Safety Standard

Early consultation with TfNSW and Transport Coordination may highlight site-specific requirements associated with the forecast heavy vehicle and light vehicle movements at proposed work sites along the Project corridor. These will be addressed by contractors during construction planning and CTMP preparation for each of the sites. On local roads, Councils may also have operational requirements and these should be determined in consultation with the Councils.

3.3.4.2 Vehicle movement plans

The Traffic Control at Work Sites Technical manual outlines a vehicle movement plan as “*a diagram showing the preferred travel paths for vehicles associated with a worksite entering, leaving or crossing the through traffic stream.*” The requirements for the provision of a VMP are detailed in chapter 7 of the Traffic Control at Worksites Technical Manual.

Vehicle movement plans should be included in site-specific CTMPs prepared by a suitably qualified person for the contractor. The VMP should also include the proposed site access points and how these are to be managed.

3.3.4.3 Pedestrian movement plans

The Traffic Control at Worksites Manual outlines a Pedestrian Movement Plan (PMP) as “*a diagram showing the allocated travel paths for workers or pedestrians around or through a worksite.*”

Wherever it is necessary to divert or warn pedestrians of works the PMP should be included in the CTMP prepared by the contractor. This may be a stand-alone document.

The needs of cyclists and other mobility devices (wheelchairs, mobility scooter) must also be considered and management measures documented in the pedestrian and cycle movement plan. This is particularly important where the work site is bounded by major roads such as State and Regional Roads.

PMPs are to be prepared for any work sites located where significant pedestrian activity occurs, e.g. shopping centres, commercial/office areas. Other construction sites may also require PMPs subject to site-specific assessments.

3.3.4.4 Parking management plans

Parking Management Plans identify parking requirements and also on-site and off-site parking arrangements and associated impacts; remote parking arrangements and associated access between sites and public transport nodes; alternate parking arrangements for displaced parking; and communication and parking management measures. For any proposed kerbside use impacts within a town centre or other activity centre, a proposal for relocation of impacted users may be required.

Changes to on-street parking restrictions will require the approval of the relevant road authority; either TfNSW or local council.

4 Consultation groups

The size of Sydney Metro projects requires effective and ongoing interaction between several different organisations, key stakeholders and the general public. This chapter outlines the consultation groups that will be convened to manage these interactions. Requirements for consultation with local businesses and the community are outlined in Chapter 5 Communication.

As the Project needs regular and ongoing discussions and distribution of information, the following groups will be convened to assist in traffic management planning, document review and stakeholder consultation:

- a) Traffic and Transport Liaison Group(s) (TTLG).
- b) Traffic Control Group(s) (TCG).

4.1 Traffic and Transport Liaison Group

A Traffic and Transport Liaison Group (TTLG) would operate, to ensure the stakeholders most affected are aware of the proposed construction activities, upcoming works and related traffic and transport implications. The participants in this group will reflect the location of the work site however, representation is anticipated to include, as relevant to the site:

- Sydney Metro
- Transport for NSW including:
 - Centre for Road and Maritime Safety
 - Sydney Light Rail
 - Parramatta Light Rail
 - Metro Bus and Ferry Planning and Development
 - Greater Sydney Planning and Programs
- Freight Strategy and Planning
- Transport Coordination
- Sydney Trains
- Port Authority of NSW
- Infrastructure NSW
- Department of Planning, Industry and Environment
- Western Sydney Airport
- Western Parkland City Authority (WPCA)
- Sydney Motorway Corporation (WestConnex)
- NSW Police
- NSW Fire and Rescue
- NSW Ambulance Service
- Local councils (depending on work site locations)
- Bus operators
- Sydney Metro contractors

The TTLG provides a forum for key stakeholders, contractors and Sydney Metro to discuss matters that could impact on the road network operations around the sites. The TTLG also provides a forum through which information on proposed traffic changes is made available to key stakeholders. It will allow key transport agencies, local councils and other authorities to inform the development of traffic management plans and construction staging by providing local and specialist knowledge and insights. The TTLG:

- Maintains good communication between Sydney Metro project team, contractors and other stakeholders.
- Discusses the construction traffic management arrangements for the Sydney Metro works and approvals.
- Assists in identification and refinement of potential measures to mitigate the impacts of the Sydney Metro works in an area.
- Assists coordination of works for Sydney Metro and other projects.
- Can request the provision of supplementary analysis and modelling for proposed traffic management measures to ensure any disruption to the traffic and pedestrian network is minimised
- Ensures that submitted plans are actioned and agreed in a timely manner in accordance with the overall Sydney Metro project program.
- Is consulted in the preparation of road safety audits before the completion and use of infrastructure.

4.1.1 Other organisations

Other organisations may be asked to attend the TTLG and/or receive relevant information depending on the matters under discussion or consideration. This may include:

- NSW Taxi Council
- NSW Taxi Drivers Association
- BusNSW
- Bicycle NSW
- Bicycle User Group(s)
- Pedestrian Council of Australia
- Sydney Buses
- Private bus operators (such as NightRide contractors)
- Property NSW
- Sydney Ferries, Harbour City Ferries and other relevant ferry operator(s)
- Disability Council of NSW
- Transurban
- NRMA
- NSW Trains
- NSW Health Infrastructure
- Managing Contractors of other adjacent major infrastructure projects

4.2 Traffic control group

For each (or multiple) Sydney Metro contract, a Traffic Control Group (TCG) will be convened to provide a technical forum for the discussion of proposed works that will impact on the surrounding road network and feedback on proposed TCPs prior to formal submission. This group would meet on regular occasions (weekly, fortnightly or as agreed by TCG members) to provide an assessment of the forthcoming traffic management measures and to ensure that any identified or potential issues are raised and addressed to ensure that works proceed in accordance with the agreed program. The participants in this group will vary depending on the contracts. Representation would be expected to include:

- Relevant Sydney Metro contractor's Traffic Manager and other construction staff as required.
- Sydney Metro
- Transport for NSW
- Transport Coordination
- Centre for Road and Maritime Safety
- Local councils
- Infrastructure NSW
- Western Sydney Airport
- Port Authority of NSW (Bays West Precinct)
- Western Parkland City Authority

The TCG will provide a forum for discussion on proposed traffic management measures during the various stages of each of the contracts, discussion of potential impacts on the road network operations around the sites, and how to address or minimise those impacts.

4.3 Government stakeholders

Consultation with Transport Coordination, Port Authority and TfNSW in the preparation of this CTMF document has been carried out, the outcomes of which have been incorporated into this document. A comments register is provided at Appendix A.

A summary of the comments and responses from the consultations has been provided to the Department of Planning, Industry and Environment.

5 Communication

All external communication with the community, including businesses, must follow the guidelines set out in the Sydney Metro Community Communication Strategy.

The community must be notified of any current and upcoming works, temporary works or contractor activities that have the potential to impact on stakeholders and the community before they happen.

An overview of the approach to stakeholder and community involvement during construction of the Project is provided in the Construction Environmental Management Framework and Community Communication Strategy. A key element of this strategy will relate to notifications to stakeholders, local Councils and the community that may be affected by changes to transport, access and local traffic arrangements.

5.1 Existing businesses and residents

Owners and operators of potentially affected properties and businesses will be consulted throughout the delivery of the Project and notified in accordance with the Community Communications Strategy (CCS) in advance of any works that may potentially disrupt access to their property.

Every endeavour is to be made to maintain safe access at all times to properties for both pedestrians and vehicles. If works will temporarily affect access to a property, consideration should be given to the staging of the works, to maintain safe access and limit the disruption. Any access restrictions for residents, tenants or property owners and alternative arrangements are to be undertaken and agreed with the occupiers.

Residents, property owners and businesses in the surrounding area will also be notified prior to the start of works.

5.2 Notification of traffic changes or disruptive works

Activity specific communications strategies are required to be developed prior to any traffic event. These strategies should include details of the work, impacts and proposed mitigation measures. In addition to the strategy, activity-specific notifications will need to be developed and issued to directly impacted properties prior to works commencing. Notification of proposed changes should also be included on the Project website. Other communication methods that may be implemented could include, but are not limited to:

- Doorknocks
- Letterbox drops
- Advertising (newspapers)
- Social media updates
- Radio

5.3 Responsibilities

The contractor's Stakeholder and Community Manager will be responsible for ensuring a system is in place to advise the Sydney Metro Project Communications Team, the TTLG and other key stakeholders each time proposed changes are to be made to traffic arrangements. Advice will include information about the changes to the

traffic operation, anticipated delays to traffic, any changes to the times and duration of the work, and any other potential major disruptions. This advice should be provided at the earliest opportunity, in accordance with the CCS and provide sufficient time for key agencies to provide comments or information as necessary.

5.4 Roadside messaging

Appropriate signposting, whether static or Variable Message Signs (VMS), should be located and installed to provide for the easy and safe passage of vehicles, pedestrians and cyclists. This also includes public transport users accessing facilities such as bus stops. The installation of signs will be detailed within the relevant CTMP.

Any signposting should be placed in accordance with relevant guidelines and standards. Messages should be clear and easily interpreted by drivers, pedestrians and cyclists, and should not create a safety hazard. The proposed location of any VMS would require the approval of the road authority.

6 Approvals

6.1 Policy context and legislative backing

Notwithstanding the Project SSI Approval being secured under Division 5.2 of the EP&A Act or other approval obtained under relevant Commonwealth legislation (where relevant), Sydney Metro contractors will be required to secure all other required statutory approvals prior to the commencement of works.

Any changes to traffic control devices (e.g. traffic signals or traffic signs) and traffic control facilities will require the approval from the road authority and arrangements with the road authority for the changes to occur. Regulatory sign and line-marking changes on local or Regional roads will require approval from the local council through a submission to the local traffic committee. Sign and line marking changes on State roads will require the approval of TfNSW.

6.2 Stakeholders

The agencies that may have a potential interest in the traffic management measures proposed for each Project construction site are outlined below:

- Transport Coordination
- Local council
- Sydney Trains
- Transport for NSW
- Department of Planning, Industry and Environment (for Sydney Olympic Park)
- Port Authority of NSW
- Western Sydney Airport
- Western City and Aerotropolis Authority

6.3 Construction traffic management plans approval process

Construction Traffic Management Plans will require approval and consideration by several key stakeholders. Contractors should assess the overall required approval times at the beginning of the Project to provide adequate scheduling of the preparation and submission of the CTMPs.

Construction Traffic Management Plans (CTMPs), consistent with this CTMF, must be prepared for each construction site in consultation with the TTLG(s), and submitted to TfNSW for approval following Transport Coordination endorsement before construction commences at the relevant construction site.

In addition, where construction results in conditions in excess of the forecast impacts or where traffic management measures cause excessive delays or impacts, the contractor must review the measures identified in the CTMPs in consultation with the TTLG(s), as relevant. Any changes to the CTMPs must be submitted to TfNSW for approval, following Transport Coordination endorsement, before implementing.

An overview of the approvals process for Sydney Metro is as follows:

- Site-specific CTMPs will be prepared consistent with this CTMF by the contractor for each site covered under the contract. These CTMPs must comprise other plans or drawings such as Traffic Staging Plans, Traffic Control Plans, Vehicle Movement Plans, Pedestrian Movement Plans, a

Parking Management Plan, unless otherwise agreed with the Principal's representative and the relevant Authorities, and address any changes from the EIS indicative haulage routes.

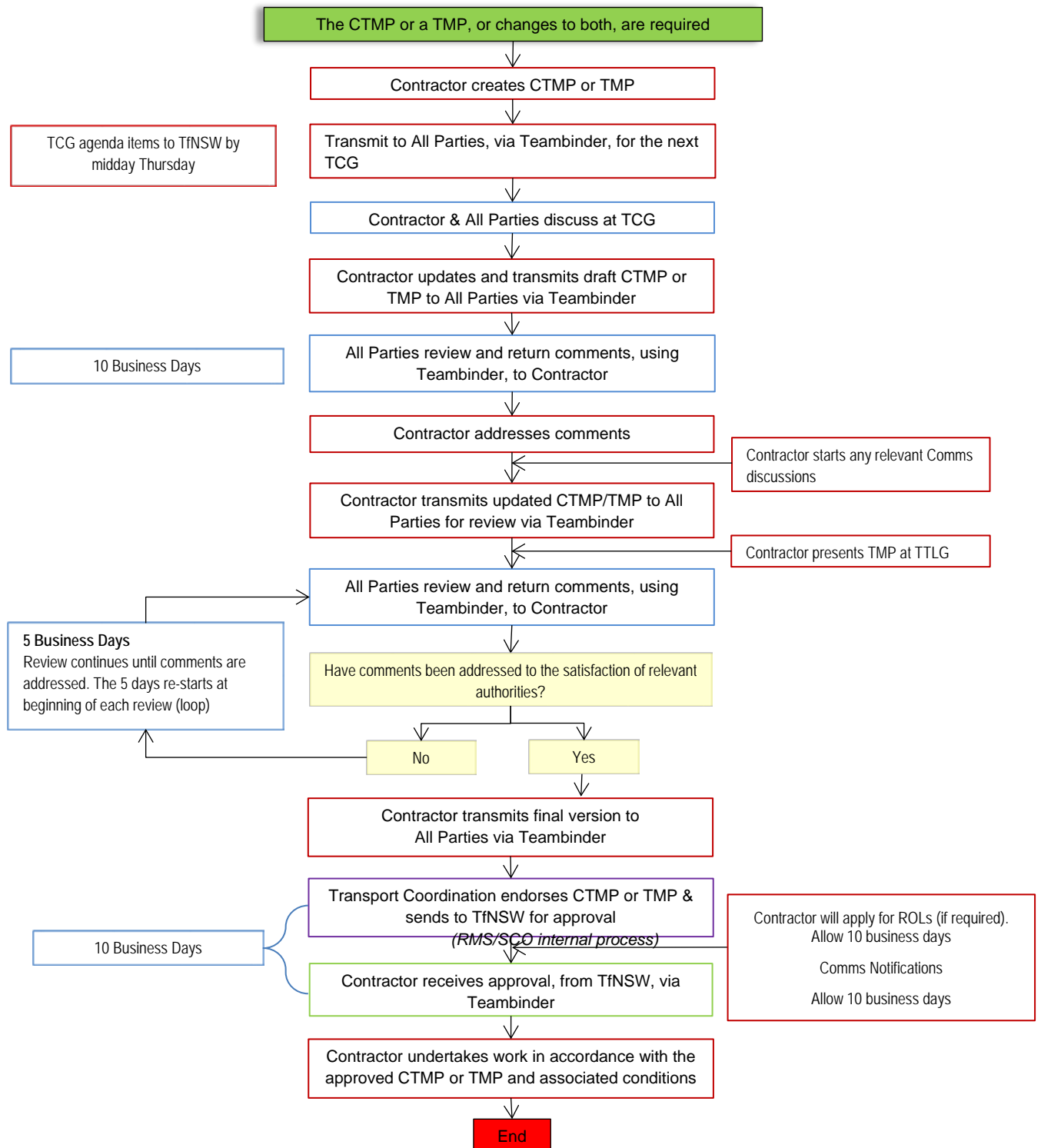
- Prior to the submission of the CTMP, the planned works and traffic management measures are presented to TfNSW, Transport Coordination and relevant Council at a TCG meeting. This will enable initial comments from the stakeholders to be considered in the preparation of the CTMP. The presentation should be distributed via email or the identified Project Document Management System at least five business days prior to the TCG meeting to enable informed discussion on the proposed traffic management measures.
- Planned works and traffic management measures also presented to TTLG, to obtain feedback from other key stakeholders. Notwithstanding presentation at the TTLG, the CTMP should be distributed to emergency services and other key stakeholders for information.
- The CTMP is modified in accordance with TCG and TTLG feedback
- This would then provide the basis for submission of the CTMP to Transport Coordination, TfNSW and relevant road authority for formal comments. Up to twenty business days should be allowed for the review of the CTMP by stakeholders and return of comments on the plan.
- Once comments have been received and the CTMP discussed at the next available TCG, a revised CTMP is submitted (if required) for review to the stakeholders, allowing ten business days for formal response.
- After review and resolution of issues, submitted to TfNSW for approval following the Transport Coordination endorsement, before construction commences at the relevant site. Ten business days should be allowed for the final approval.
- Sent to DPIE for information only, if required
- Published on the contractor's website prior to works commencing at the relevant site, if required.

The contractor will be responsible for documenting all stakeholder feedback and comments in a document specific issues register. These comments will be addressed and closed out by the contractor in consultation with the relevant stakeholders. Sydney Metro, TfNSW and Transport Coordination will not be responsible for processing or referring comments on behalf of the contractor

- Changes to traffic management requirements at a site which requires material changes to the existing CTMP will require re-submission of the revised CTMP (with tracked changes) to TfNSW, Transport Coordination and local road authority for approval as applicable

This CTMP approval process is outlined in the flow chart in **Figure 6-1**.

Figure 6-1: CTMP approval flowchart



6.4 Road Occupancy Licence process

Whenever it is proposed to occupy or close a lane or road during the construction program for each of the sites, the closure will require the contractor to apply for a Road Occupancy Licence (ROL) from Transport Coordination and/or the local council or designated road authority. ROLs are issued by the Transport Coordination for

approved times, following endorsement by the Transport Coordination, for TfNSW State roads or locations on Regional or local roads within 100 metres of traffic signals. It should be noted that due to the critical nature of the potential traffic impacts for local roads within the Sydney and Parramatta CBDs or other key centres that applications for ROLs on streets within these areas may be required to be submitted to Transport Coordination. The issuing of ROL's on local or Regional roads for lane or road closures in the CBD's above will also be subject to the approval of the local council.

The contractor will need to consult with stakeholders prior to submission of the ROL application and provide information as required.

For local roads, outside of the areas highlighted above, the approval of the local council or road authority will be required. This will require an application in the appropriate method to council or road authority.

The ROL requirements are outlined in the TfNSW Road Occupancy Manual (and in the Principal's General Specifications – Traffic and Transport Management).

The Contractor must allow a minimum of 10 business days for a response to an application from Transport Coordination. A minimum of 10 business days should also be assumed for responses to applications from other roads authorities.

ROLs will generally be issued for relatively short periods of time and Transport Coordination will require that an approved TCP or site CTMP for the work be in place.

Information on proposed and approved ROLs should also be provided to the Sydney Metro Project Communications Team for notification, prior to works commencement.

The general process for ROL's is outlined below:

- ROL and related applications are submitted by the contractor to Transport Coordination for occupation of roadway (other than approved work zones) on State and Regional roads and all works within 100m of traffic signals. These applications are approved by Transport Coordination for the times shown on the licence. A CTMP will be required to be approved prior to approval of the ROL.
- Application made to Transport Coordination for ROL.
- Transport Coordination assesses for potential conflicts, any identified conflicts to be resolved to satisfaction of Transport Coordination.
- Transport Coordination will review and assess prior to submission to TfNSW for approval
- Contractor may be requested by Transport Coordination to consult with other stakeholders including TfNSW (Infrastructure and Services)
- Contractors will require council or road authority approval of road occupancies/lane closures/permits to stand plant/road openings impacting Regional and local roads.

The contractor is to prepare and maintain a register of ROL applications and approvals providing stakeholders with status information throughout construction.

Upcoming ROL and related applications are to be discussed at TCG meetings for council and other stakeholder feedback prior to submission.

6.5 Speed zone authorisation

An application must be made to TfNSW for any proposed adjustment of the speed limit on the road network, whether they are proposed as temporary measures for work

zones and road occupancies or for longer periods such as the duration of the construction works at a site. A Speed Zone Authorisation application usually accompanies a ROL application where a change in speed limit is proposed as part of the road occupancy.

The TfNSW speed zone change process involves the submission of the appropriate form, available online from the TfNSW website, which is to be submitted to Transport Coordination's Planned Incident Unit. Depending on the extent of the works and project familiarity the application will be supported by the site specific CTMP or a TCP. Short-term speed zone changes can be dealt with via the CTMP process. Longer term (over six months) or permanent changes are included in the site specific CTMP and are to be referred to TfNSW for assessment, consideration and approval. Permanent speed zone changes can only be approved by TfNSW.

6.6 Special event coordination

There are many special events that occur in and around the Sydney CBD, Parramatta CBD, Sydney Olympic Park and other locations around Sydney which may impact on the Projects. These special events have an impact through increased visitor numbers, road closures and diversion of bus services. The major events such as New Year's Eve, Australia Day, Vivid Festival, Royal Easter Show, major sporting events and ANZAC Day all have significant impacts with increased visitor numbers and the need to provide additional rail and bus services, and impacts on the road network. At some sites this may include pedestrian marshals if increased pedestrian activity is identified in the preparation of the CTMP.

Class 1 and 2 events, outlined below, are to be facilitated in the planning of work programs as works may not be permitted during these classes of events. For example, works are not permitted to happen between 3pm and midnight during the Vivid Festival in and around the Sydney CBD, Pyrmont and parts of Chatswood. Other areas and times may be incorporated in these restrictions in the future.

In addition, pedestrian activity in CBD and shopping centres increases significantly during December and early January, in the lead up to Christmas and the post-Christmas sales. The City of Sydney has a policy of not permitting works that will cause disruption to the retail core of the city during December. Other councils may have similar restrictions during key periods. Works that would have a significant impact on pedestrian paths and station access should be minimised during these periods and/or additional and increased interface supervision should be provided between the site and the adjoining pedestrian network.

The TfNSW special event management guidelines identify four classes of special events. These classes provide direction on the approvals required, timeframes and methods of advertising measures such as road closures and other aspects of the event. The classes of events can be summarised as follows:

- Class 1 – Events that impact major traffic and transport systems and result in significant disruption to the non-event community. For example, an event that affects a principal transport route in Sydney, or one that reduces the capacity of the main highway through a country town.
- Class 2 – Events that impact local traffic and transport systems and result in low-scale disruption to the non-event community. For example, an event that blocks off the main street of a town or shopping centre but does not impact a principal transport route or highway.
- Class 3 – Events with minimal impact on local roads and negligible impact on the non-event community. For example, an on-street neighbourhood Christmas party.

- Class 4 – Events that are conducted entirely under Police control (but is not a protest or demonstration). For example, a small march conducted with a Police escort.

During the Project, special consideration and traffic planning will need to be undertaken for each of the sites to address the road user needs during programmed special events. It should also include the response to ad hoc events that may occur with minimal notice, including marches, protests and other public events.

The traffic management requirements of Special Events may require adjustments to times of operation and routes used for haulage or delivery operations as well as varying Road Occupancy Licence (ROL) conditions for Sydney Metro construction. The ROL approval and CTMP approvals will identify any time and day restrictions, taking in to account any known potential conflicts at the time of submission and approval. It should be noted that the contractor will be required to comply with any direction given by Transport Coordination regarding embargos that may be placed during Major / Special Events (all classes) and marches / special operations.

Sydney Metro contractors will be responsible for identifying special events that occur in the area of the work site, incorporating known special events into the construction program and detailing responses and contingencies in the CTMP for each site. This coordination will occur through Transport Coordination, approved event registers of councils, the TCG and the TTLG.

During development of the site specific CTMPs the proposed traffic management measures must take account of major and regular events, such as ANZAC Day or Royal Easter Show for example, to ensure that proposals do not impede or impact on these events.

6.7 Adjustments to traffic signals

Any temporary or permanent works that impact on the operation of, or require the reconstruction or adjustments to, traffic signals require close consultation with TfNSW and approval of the traffic signal design plans, prior to the commencement of any work.

The contractor will need to take account of potentially lengthy approval lead times in any works involving traffic signal construction or modifications. Additional time may also be required to facilitate the modification of the electronic hardware, in addition to undertaking any physical changes onsite. Approvals for modifications to existing traffic signals, or new traffic signals, can take up to six (6) months.

The contractor will be responsible for the preparation of any traffic signal designs and obtaining the necessary approvals, allowing sufficient time to maintain the works program. Designs will be required to be carried out by a TfNSW accredited signal designer and comply with the 'RMS Traffic Signal Design Manual' (RTA/Pub 08.092). Any works at a traffic signal site shall be carried out by a TfNSW accredited traffic signal contractor. A list of contractors for design and civil works can be found at <http://www.rms.nsw.gov.au/business-industry/partners-suppliers/tenders-contracts/prequalified-contractors.html>.

6.8 Over-size or Over-mass (OSOM) vehicle permits

Prior approval for the passage of any proposed over-size or over-mass vehicles is required from the National Heavy Vehicle Regulator, TfNSW for State roads, or councils for Regional or local roads, and an authorisation permit issued prior to the operation of the vehicle. A TMP is likely to be required that describes how an OSOM movement will be safely undertaken in NSW. Details can be found on the TfNSW website, which provides all requirements for applications.

6.9 Adjustments to bus routes and stops

Any proposed adjustments or relocation of bus routes and stops to facilitate construction works require the prior approval of TfNSW, Transport Coordination, the local council and affected bus operators.

Any proposed adjustments or relocation of bus shelters associated with bus stop changes or construction works require the approval of the local council and affected bus operators.

Customer information and wayfinding information for any relocated bus stops is to be provided before, and after, the relocation works have been carried out.

The following procedure for the relocation of bus stops and associated infrastructure is proposed:

1. Contractor consults with Transport Coordination, Transport Integration Section, on the proposal (which, in turn, consults with Infrastructure and Services Group of TfNSW and affected bus operators)
2. Contractor modifies proposal, as required
3. Contractor consults with Council(s)
4. Contractor documents bus stop change proposal in a CTMP
5. Contractor tables proposal at TCG and submits CTMP
6. Contractor to obtain approval through Local Traffic Committee (for local and Regional roads) or TfNSW (for State roads)

6.10 Adjustments to Australia Post mail boxes or other roadside furniture

Consultation regarding the relocation and/or adjustments to post boxes and the associated kerbside 'Mail Zone' will be required to be undertaken with Australia Post and the relevant road authority prior to any relocations occurring. In some instances, post boxes may be able to be relocated, however there will be instances where the post box, for heritage requirements, will not be able to be relocated. These post boxes will need to be protected to ensure that they are not damaged during construction works.

Adjustments or relocation of other roadside furniture or modifications to signposting such as advisory signs or regulatory signs will require consultation and approval of the owner. In most cases this will be the local council. Changes to regulatory signposting which defines the mail zone, and linemarking on local and Regional roads will require a submission to the Local Traffic Committee for agreement.

6.11 Local Traffic Committees (LTC)

Changes to regulatory signposting on local roads will require a submission to the Local Traffic Committee for council approval.

Each council is delegated authority by TfNSW on certain aspects for the control of traffic on Regional and local roads, including regulatory signposting. The delegation requires council to seek the advice of the NSW Police and TfNSW prior to exercising these delegated functions. This is usually done through the establishment and consultation with the Local Traffic Committee.

Councils can sub-delegate the approval of certain traffic control measures, such as Works Zones, to an appropriate staff member. These further delegations are

determined by each individual council. Contractors will need to consult with council on the extent of the delegations.

Where possible, the contractor should endeavour to secure all necessary council approvals under delegation to avoid the need for approvals to be secured through the Local Traffic Committee and council meetings.

The Local Traffic Committee is a technical committee that considers matters related to prescribed traffic control devices and traffic control facilities for which the council has delegated authority. It is made up of four formal, or voting, members:

- One representative of council (may be a councillor or council officer)
- One representative of the NSW Police
- One representative of TfNSW
- The local state Member of Parliament or their nominee

Matters that may need to be considered by the Local Traffic Committee include:

- Establishment of a kerbside work zone on a local or Regional road
- CTMP's if regulatory signposting is proposed to be changed
- Changes to parking restrictions
- Road closures

It should be noted that a TMP will need to be provided separately to council for the above matters irrespective of any Transport Coordination/ TfNSW approval of a CTMP. Submission and approval of matters through the LTC can involve an extended timeframe. Matters will need to be submitted to council for inclusion on the LTC agenda approximately 2-8 weeks prior to the meeting. Different councils will have different requirements and these should be determined by the contractor to ensure sufficient time is allowed.

The LTC does not have delegation to approve matters on behalf of the council. The LTC provides recommendations to the Council. Only once the council has approved the LTC recommendation can work proceed. The timeframe between the LTC meeting and council meeting for approval can be 1-4 weeks.

Traffic management changes or proposed amendments to the public domain (e.g. footpaths or access across reserves) will require submission to the relevant Council, including possible referral to the Local Traffic Committee.

Road closures will require a TMP to be submitted to TfNSW (through Council) for approval prior to submission to LTC. Once approved by TfNSW it would then be listed for LTC meeting.

7 Management of construction traffic

7.1 Haulage routes

Designated access routes for heavy vehicle movements during demolition, construction and spoil removal will be along the arterial (state) road network as much as practically possible.

Where proposed haulage routes in the CTMP differ from the routes shown in the EIS/Submissions Report/PIR, the contractor will undertake a review and where necessary document these in the contract wide and site-specific CTMPs and provide a justification for these changes. Approved EIS heavy vehicle hourly volumes shall not be exceeded, unless otherwise agreed with relevant road authorities.

Details of any proposed routes for heavy vehicle access will be developed in consultation with the TCG, TTLG, relevant state or local government authority and detailed in the appropriate section of the site-specific CTMP. The CTMP would be approved by TfNSW following endorsement by Transport Coordination and the relevant roads authority.

In addition, measures should be in place to avoid heavy vehicles queuing on the road network near the worksite. In general, the sites for the project have a very constrained road network surrounding the site and the parking of vehicles on the surrounding road network will not be possible.

It will be necessary for the contractor to manage arrivals and departures for each site to ensure a consistent and timely arrival and departure of vehicles for the site, for example, the use of timetables. This should be communicated to all sub-contractors and operators prior to commencement of works.

Heavy vehicle movements through designated school zones should be minimised when these zones are in operation (8:00am to 9:30am, 2:30pm to 4:00pm, school days).

7.2 Management of heavy vehicle movements

Heavy vehicle movements must be managed in accordance with construction and traffic management principles of the CTMF and in accordance with the relevant standards. Each site-specific CTMP will need to demonstrate, where applicable, how marshalling facilities will be used to safely manage truck movements and reduce congestion. The arrival of trucks should be scheduled so that there is no queuing of trucks on adjacent streets. Trucks must not park on State, Regional or local roads for the sole purpose of waiting to enter the site.

Vehicle and pedestrian access to each work site, including the locations of entries, exits, turning restrictions, slip lanes, traffic signals, signage and other site management requirements will be established in line with the requirements of the Project approvals and in consultation with TfNSW, Transport Coordination and councils.

All vehicles are to enter and exit the construction sites in a forward direction. If this cannot be achieved then traffic control is to be provided. Refer to Section 7 of the 'Traffic Control at Worksites Technical Manual'.

7.3 Work zones and heavy vehicle marshalling

During some stages of the works at each of the sites there may be a requirement for using kerb space on adjacent streets for short-term parking or unloading for deliveries

to the site. Applications for a Works Zone will be undertaken by the contractor to the relevant authority (council for local and Regional roads and TfNSW for State roads). The use of a Works Zone should be minimised as much as practicable. Where approved, Works Zone locations are to be included in site specific CTMPs. In general, Works Zones will not be permitted within existing bus zones and their operating times, unless arrangements have been approved for the relocation of the bus zone.

7.4 Construction/demolition vehicle types

To minimise the number of heavy vehicle movements on the road network, the selection of vehicle size will consider the number of movements required, the impact of the quantity of vehicles on road and pedestrian movements, road geometry and safety. It is recognised that CBD sites will have constraints on access routes, safety considerations and specific site constraints.

The types of truck to be used for the transporting of materials will be assessed in consultation with the relevant authorities in the preparation of the contract wide and site specific CTMPs.

Heavy vehicles used on the project must comply with the relevant standards including the safety requirements outlined in the SM PS-ST-221 Sydney Metro Principal Contractor Health and Safety Standard.

Higher mass and longer heavy vehicles will be required to transport certain materials to and from the sites (some under permit) and these would be subject to separate approvals.

It is anticipated that contractors will need to make use of truck and dog heavy vehicle combinations for the removal of spoil from tunnel or station excavation. Details of proposed truck and dog use are to be provided in the CTMPs.

'Truck and dog' combinations of 19m or less in length and up to 4.3m in height are classified as General Access Vehicles (GAV) in that they comply with mass and dimension requirements prescribed by TfNSW and do not require a notice or permit to operate on the road network. These vehicles have general access to the road network unless the road is sign-posted otherwise.

7.4.1 Worker access and parking

The constrained nature of the sites means car parking for construction personnel will not be possible at most sites. At each of the sites there may be the opportunity to provide minimal light vehicle parking spaces for engineers and other site management staff use.

The contractor may also be required to identify remote parking areas for workers, to minimise any impacts of workers parking on-street.

The assumption for all site specific CTMPs is that there will be no provision, either on the road or within the work site, for worker parking. Workers should be encouraged to use public transport in travelling to and from the work sites.

7.4.2 Construction consolidation centre/depot

To mitigate the potential impact of construction traffic the provision of a centralised Project centre should be considered. This centre could receive deliveries and arrange for combining of loads and materials for distribution to the various construction sites. This would have the potential to reduce construction traffic movements to the sites, particularly for small loads. Contractors may make use of their existing depots.

7.4.3 Driver training

Heavy vehicle drivers should be made fully aware by the contractor of the construction site traffic management arrangements and site-access requirements, including approach and departure routes and any heavy vehicle noise management measures required. Driver training should consider current best practice and information, including cycle awareness training.

The contractor is to ensure that regular briefings are provided to drivers on routes, potential changes and impacts on the routes in the form of toolbox talks.

Contractors must ensure mandatory completion of the Sydney Metro project-specific heavy vehicle driver introduction training.

Contractors are required to have systems in place to monitor vehicle locations (e.g. telematics) at all times and report and address any identified non-conformances.

7.4.4 Chain of responsibility and Heavy Vehicle National Law

Contractors must have systems in place to ensure compliance with 'Chain of Responsibility' legislation, including the Heavy Vehicle National Law and regulations, at all times. All necessary heavy vehicle approvals and permits (for example, over-size, over-mass, etc.) must be obtained from the relevant road manager. Specific 'Chain of Responsibility' requirements are further outlined in Sydney Metro Principal Contractor Health and Safety Standard.

8 Construction site traffic management requirements

8.1 Traffic control at construction sites

The contractor must develop and implement Construction Traffic Management Plans (CTMPs) to minimise and mitigate traffic impacts, including road safety impacts, caused by the contractor's activities. In consultation with the TTLG, TfNSW, Transport Coordination and the relevant local council or road authority, the contractor must develop, formalise and implement traffic management, control and operational protocols, procedures, processes, systems and communication between the contractor and Transport Coordination. Works within the road reservation will be identified in the CTMP.

This consultation will be initiated through the TTLG and TCG.

8.1.1 Policy and responsibilities

Work zones provide for the safe operation of road workers and the safe passage of vehicular and pedestrian traffic. Traffic control devices are provided to warn, instruct and guide road users safely through, around or past construction sites on roads and footpaths.

An important aspect is for the planning and staging of the works to ensure that any workers required to work on or near the road are separated from traffic as much as possible. Traffic control at construction sites is to be provided in accordance with the latest edition of the *Traffic Control at Work Sites Technical Manual (TfNSW)* and *Sydney Metro Principal Contractor Health and Safety Standard*. Australian Standard AS 1742.3 *Manual of uniform traffic control devices – Traffic control for works on roads*, is also to be referenced when determining traffic controls and signposting.

It is the responsibility of all personnel engaged on the Project and at construction sites to ensure that any works carried out on the road are done so in a safe and efficient manner. The contractor will prepare specific Traffic Control Plans (TCP) for all work that will impact on the road and traffic.

TCPs are required to be prepared by a suitably qualified person who holds a current TfNSW certificate – *Prepare Work Zone Traffic Management Plan*.

When temporary speed limits are required, the contractor will be required to make the necessary application to TfNSW. These may also be required to be outlined in the site CTMP, detailing the anticipated impacts and mitigation strategies. This application will need to be submitted with sufficient time prior to the proposed implementation, to allow for processing and authorisation, via the Transport Coordination (TMC) OpLinc system.

8.1.2 Traffic control techniques

There are several traffic control methods that can be used at construction sites, which must be selected in accordance with the hierarchy of controls to ensure safety risks to workers (including traffic controllers) and the public are minimised 'so far as is reasonably practicable' (SFAIRP). These include:

- (a) Temporary road deviations.
- (b) Line-marking with raised pavement markers to delineate proposed diversion.

- (c) The use of traffic cones, approved water filled barriers or other approved physical devices to delineate the required route.
- (d) Directional and information signposting to direct or advise drivers. This can include Variable Message Signs (VMS), directional arrows or static signs.
- (e) Portable traffic signals on local roads to control traffic flows if lane closures are required, subject to the relevant authority approval
- (f) Other traffic control devices as provided in the TfNSW 'Traffic Control at Worksites Technical Manual'.

Refer also to Sydney Metro Principal Contractor Health and Safety Standard.

For longer-term works, where traffic management devices are in place for an extended length of time, regular inspections are to be carried out by the contractor's works supervisor. This is to ensure that the controls in place continue to provide safe traffic management. All controls are to comply with the current TfNSW guidelines.

8.1.3 Approved clothing for work personnel

Any worker working near traffic will be required to wear clothing in accordance with the requirements of Australian Standard AS1742.3 and *Sydney Metro Principal Contractor Health and Safety Standard*.

8.1.4 Plant and equipment

Any plant used and working near traffic or pedestrians is to be suitably highlighted with physical protection and appropriate warning signs provided to ensure public safety. Refer also to the 'Plant and Equipment' section of *Sydney Metro Principal Contractor Health and Safety Standard*.

8.2 Frequency of inspections

For long-term works, that is, longer than one shift, traffic management road inspections will be carried out regularly by the contractor's works supervisor to ensure the safe movement of traffic and the protection of persons and property through and/or around the construction site. The required inspections of all temporary traffic control devices are detailed in the following section.

Inspections will ensure that all signs and devices are properly located, oriented and maintained in an effective condition, and that the layout is satisfactory and not confusing to motorists or pedestrians. Records will be maintained by the contractor of all traffic guidance facilities and any adjustments or changes made to such facilities, together with dates and times the facilities were installed, varied and removed. Inspection reports recording dates and times of inspections of the traffic management facilities are to be recorded on a suitable pro-forma and made available for inspection.

Incidents are to be reported, investigated and actioned in accordance with the *Sydney Metro Principal Contractor Health and Safety Standard*.

8.2.1 Inspections of roadwork traffic management schemes

The requirement to undertake inspections of traffic control measures is outlined in Section 6.1 of the *Traffic Control at Worksites Technical Manual (TfNSW)* and Appendix A of Australian Standard AS 1742.3 – *Manual of uniform traffic control devices – Traffic control for works on roads*. There are three main types of inspections to be carried out:

- (a) Pre-start and pre-close-down inspections of short-term traffic control.
- (b) Weekly inspections of long-term traffic control.
- (c) Night inspections of long-term traffic control.

Appendix E of the Traffic Control at Worksites Technical Manual provides inspection checklists and forms that can be used for all inspections, whether short term, long term or night. The responsibility and frequency of the inspections required is provided in Section 6.1 of the Traffic Control at Worksites Technical Manual.

8.3 Emergency incident planning

Incident management planning must be carried out in accordance with the *Sydney Metro Principal Contractor Health and Safety Standard*, and must include incidents that could occur on roads. An Incident Management Plan for on-road incidents, or incidents that impact on the public transport network should be submitted to Transport Coordination Emergency Transport Operation section for review and comment.

Examples of incidents could include the following:

- Traffic crashes
- Hazardous material spillage
- Power failure
- Terrorist attack
- Flooding
- Fire
- Structural damage to a rail line, building, road tunnel or bridge

The Incident Management Plan should include procedures such as:

- Duties of workers attending the site
- Procedures for contacting Police, emergency services, or back-up assistance from the relevant road authority
- Equipment that is to be ready always on potential call-out vehicles

All details of incidents that occur within the area of an approved ROL are to be recorded by the contractor, and reported and investigated in accordance with the requirements of the *Sydney Metro Principal Contractor Health and Safety Standard*.

8.3.1 Accidents/incidents and complaints

The contractor's ROL register will maintain records of traffic crashes and incidents reported at construction sites. Any complaints received regarding traffic delays at construction sites should be referred to the Principal. The contractor will be required to table the register, upon request, at TCG meetings.

The person in charge of the construction site will continue to be responsible for dealing with complaints regarding safety issues. Where action is considered necessary to address the matters of complaint, an appropriate recommendation will be forwarded to the Principal.

8.3.2 Chemical spills and leaks

Information on procedures to be followed and properties of hazardous chemicals are detailed in:

- NSW Environmental Protection Authority
(<http://www.epa.nsw.gov.au/licensing/Dutytonotify.htm>)
- Safe Work NSW codes of practice
- TfNSW policy procedure – Procedure for Managing Hazardous Chemicals
- Contractors' Construction Environmental Management Plans.

NSW Fire and Rescue is primarily responsible for rendering safe, and cleaning up after, incidents involving flammable or hazardous substances, vapours, gases or liquid spillage, as well as an actual fire or explosion.

NSW Fire and Rescue holds detailed information on dangerous goods and hazardous chemicals. Sydney Metro staff and contractors are to be instructed not to approach such spills until NSW Fire and Rescue have declared the site safe. In such cases the contractor will close the roadway at a safe distance until NSW Fire and Rescue arrives and issues appropriate instructions.

8.4 Traffic controllers and temporary traffic signals

The use of traffic controllers and/or temporary traffic signals to control traffic at construction sites is to be in accordance with the Traffic Control at Work Sites Technical Manual (TfNSW) and Sydney Metro Principal Contractor Health and Safety Standard.

Variable Message Signs (VMS) will be used to inform drivers, where necessary, to avoid particular roads or areas where activities associated with Sydney Metro construction would cause disruption. Where these are used, it is to be in accordance with documented Austroads Guidelines, TfNSW supplements, procedures, guidance and approval of the road authority.

The placement of temporary VMS must consider pedestrian safety and disabled access needs when placed on footpaths. A ROL may be required when a portable VMS is proposed to be in a parking or loading bay. VMS placement should conform to Austroads Guidelines, TfNSW supplementary material and approval processes of the road authority.

9 Management of construction sites

9.1 Construction site boundaries

Details of the proposed erection and maintenance of hoardings, scaffolds and associated structures will be documented in the site-specific Construction Traffic Management Plans. Where reasonable and feasible, all construction site boundaries will be clearly defined with the use of hoardings or fencing. The CTMPs will identify the boundaries and detail accesses for the site, the footpath and road controls. Activities within the construction site are excluded from the CTMPs, except in relation to ensuring the movement of construction traffic in and out of the construction site is physically possible and can be done safely. Construction sites include any gantries (e.g. Type B hoardings) or other structures associated with the site layouts. The site specific CTMPs will consider these interactions and the impacts of gantries, etc., on the road and footpaths.

9.2 Hoardings

Hoardings will be required to be erected around the construction sites to protect the site and any passing pedestrians and vehicles. These may also need to provide site facilities for the workers on the site due to the constrained nature of the sites. The erection of hoardings around the sites will require the consideration and approval of the local council if located within the road reserve, and other local authorities where applicable. Applications for scaffolds and hoardings would be to the relevant council with concurrent notifications to Sydney Metro, TfNSW and Transport Coordination.

In providing any hoarding and gantry structures, consideration will be given to ensuring sight-lines for side roads, vehicle accesses, signposting, and traffic signals are maintained. Respective councils may have published policies on hoardings on their website. While the policy document provides guidelines for the presentation of the hoarding, the branding and visual aspects of the hoarding are to be in line with TfNSW/Sydney Metro requirements.

Each council or other authority may specify requirements for the type of hoarding proposed within the road reserve and may require the submission and approval of an application prior to the commencement of the site establishment works. Detailed information should be obtained from the respective council websites. In some locations there may also be a requirement for the hoarding to comply with design guidelines.

All hoardings around Sydney Metro construction sites should comply with the TfNSW/Sydney Metro branding requirements. If it has been determined that an application for a hoarding is required to be submitted to a local council for approval, information that would be required to be submitted with the application can include, but is not limited to, the following:

- Plans of the proposed hoarding drawn to scale, elevations of hoardings and identifying any council or other asset that may be impacted
- An engineer's statement on the proposed hoarding and any facilities to be provided
- Approval from NSW Police
- Approval from TfNSW (for sites located on a state road or on any road within 100 metres of traffic signals)
- Structural certificate (for Class B hoarding)

Hoarding application forms for specific councils can generally be found on the council website. In addition, councils or other road authorities may have specific requirements for the type of hoarding and operational requirements. The contractor must check with the relevant council and road authority over any specific requirements.

The application for permits to erect hoardings may differ between councils or road authority, and this will need to be considered for each construction site.

9.3 Site security, site access and signage

The issues to be considered in determining the location of site accesses are:

- Safety of travelling public
- Safety of construction workers and equipment
- Efficient and safe entry and exit to the site including turning paths, consistent with the requirements of the relevant Australian Standard, Austroads or TfNSW guidelines
- Impact on local communities in terms of safety, noise and road damage
- Ease of access for emergency vehicles
- Site security

The construction sites will have appropriate arrangements to discourage entry without approval and minimise vandalism. All access points to construction sites will have lockable gates.

Appropriate information signs will be provided at construction sites to identify the Project and contact persons.

Contractors will be required to develop and prepare Security Management Plans based on the site-specific security threats (hazards) identified. Requirements for Security Management Plans are outlined in Sydney Metro Principal Contractor Health and Safety Standard.

9.4 Pedestrian security/safety/lighting

The consideration of safety and security issues for pedestrians will be considered at all construction sites. For those footpath or specific cycle facility areas which will be impacted by construction works the contractor is to undertake a condition assessment to ensure that they remain suitable for use. This would include an assessment of the paving and lighting of the footpath/cycleway to maintain a safe and suitable passage.

Any hoardings or other structures on the site boundaries will have lighting in accordance with current standards, particularly where existing street lighting is removed or obscured because of the site works. In those locations where this occurs, supplementary lighting is to be provided to meet the current standards.

Discussions will be carried out with the relevant authority or operator of CCTV cameras if the coverage or operation of CCTV cameras is impacted by the works. The relevant authority may be TfNSW, council, other authority or building owner.

9.5 Management of risks to vulnerable road users

The contractor is to adopt applicable vulnerable road user safety measures, as per Sydney Metro Principal Contractor Health and Safety Standard, to minimise the road

safety risks to pedestrians, cyclists and motorcyclists on route to, and near, construction sites. Such measures include, but are not limited to:

- (a) Assessing the suitability of construction haulage routes through sensitive land use areas with respect to road safety
- (b) Deployment of speed awareness signs in conjunction with variable message signs near construction sites to provide alerts to drivers
- (c) Providing community education and awareness about sharing the road safely with heavy vehicles
- (d) Specific construction driver training to understand route constraints, safety and environmental considerations such as sharing the road safely with other road users and limiting the use of compression braking
- (e) Requiring technology and equipment to eliminate heavy vehicle blind spots, monitor vehicle location and driver behaviour, and improve vehicle safety standards.

Where construction sites have an impact on footpaths, consideration must be given to the requirements of all pedestrians and especially where there is the potential for vulnerable road users, such as school children, elderly people and mobility impaired people. This is to include condition surveys of affected footpath areas to ensure that they are suitable and appropriate for use.

DDA requirements will be adopted with kerb ramps or other measures provided at road crossings. Footpath widths are required to provide for two-way pedestrian traffic allowing for prams or strollers and wheelchairs to pass each other without requiring temporary widening from their existing width prior to construction commencement. Narrowing of the footpath width, if required, is to be approved by the relevant authorities.

Where high numbers of vulnerable road users are using a footpath, special provision and design consideration may be required to mitigate any impacts.

10 Road safety audits

10.1 Purpose and benefits

A Road Safety Audit (RSA) “assesses a road’s safety performance and crash potential at various stages of a road/project’s life cycle” (Road Safety Audits Fact sheet – RTA 2010).

It is a formal procedure for checking the design, implementation and operation of road works and other traffic measures from a safety perspective. The establishment of quality systems provides the philosophy underpinning the RSA process. The overriding objective of the process is to ensure that all existing road schemes and future routes operate at an acceptable level of safety, with safety being an integral part of the road network development process.

The benefits of a RSA are that:

- (a) The likelihood of crashes on the road and the adjacent network can be reduced.
- (b) The severity of crashes can be reduced.
- (c) Road safety is given prominence in the minds of road designers.
- (d) The need for costly remedial work is reduced.
- (e) The total cost of a project to the community, including crashes, disruption and trauma, is reduced.

Road Safety Audits will be undertaken by the contractor during the three stages outlined below.

- Detailed design stage

At this stage, the geometric design, traffic signage scheme, line-marking plans, lighting plans and landscaping plans are available and will be reviewed in relation to the operation of the road.

- Pre-opening stage

Prior to the opening of a site, an inspection will be made for all relevant conditions during both the night and day for all likely road users, to ensure that the construction has addressed earlier audit concerns and to check for any hazardous conditions that were not apparent at the feasibility or design stages.

- Road safety audits of Construction Traffic Management Plans

Sydney Metro and/or its contractors will undertake Road Safety Audits for site-specific CTMPs, to be submitted with the CTMP to stakeholders. The contractor will be required to respond and address all RSA comments before endorsement of the CTMP by Transport Coordination and approval by TfNSW.

Regular safety audits of work zones are also to be undertaken to ensure all construction site safety arrangements are in place. These audits will be additional to the daily inspections by the site staff. Attention will be given to WHS guidelines, work areas adjacent to the road, movement of construction traffic, vehicle speeds and all warning devices or systems.

- Road safety audit procedure

All Road Safety Audits will be undertaken in accordance with the Guidelines for Road Safety Audit Practices (RMS, 2011), with reference to current practices outlined in

Guide to Road Safety Part 6, Road Safety Audit (Austroads, 2009) and Sydney Metro Principal Contractor Health and Safety Standard.

11 Related documents and references

Related documents and references

- SM PS-ST-221 Sydney Metro Principal Contractor Health and Safety Standard
 - Principal's General Specifications – Traffic and Transport Management
 - SM-17-00000203 Integrated Management System (IMS) Glossary
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Appendix A

Comments Register

COMMENTS REGISTER

| Report Name: | Construction Traffic Management Framework – SMW, SMGW | | |
|-------------------------------|---|--|--|
| Author: | Sydney Metro | | |
| Version: | 1 | | |
| Date: | September 2019 | | |
| Section | Issue | Stakeholder Comment | Response |
| Transport Coordination | | | |
| Table 2-1 and 3.3.3 | Impacts to bus operations | Traffic Management Plans must be developed in consultation with the relevant Bus Operators. | Bus operators included at 3.3.3. Table 2-1 relates to construction objectives and includes an objective to minimise impacts on bus operations, routes and stops. |
| 2.2 | Incident Notifications | Incidents and congestion should also be immediately notified to the relevant SCO representative. | Noted and edited |
| 2.2 | Local access | If appropriate, Local Access Plans are to be developed and submitted as part of the CTMP. | Access requirements would be covered with other plans required as part of the CTMP requirements outlined in Section 3.3.3 |
| 3.3.2 and 3.3.3 | CTMPs | CTMPs must also be compliant with the EIS. | Noted and included at 3.3.2. This provides the requirement for all CTMP's. |
| 3.3.3 | CTMPs | CTMPs should contain proposed schedules and durations for the traffic and transport arrangements proposed. TCP's should note the intended duration of their implementation eg, weekday nights, weekend days, 24/7 etc. | Noted and edited |

COMMENTS REGISTER

| | | | |
|------------------------|--------------------------------|--|---|
| 3.3.3 | Vehicle volumes | The site specific TMPs must provide the number of heavy and light construction vehicles entering and exiting the site access(es) as well as their frequencies. Swept paths are also to be provided for the largest vehicle entering and exiting the site access(es). | Noted and edited |
| 3.3.3, 6.3 and Fig 6-1 | TMP review time | Please note that CTMPs must be submitted for approval at least 20 Business Days (not 10) before commencing any works. If SCO requests further information or clarification, the 20 Business Days (not 5) review period will commence again from the date the CTMP is resubmitted. | Noted and edited |
| 5.1 , 5.2 and 5.3 | Notification of works | The affected residents, property owner and businesses must be notified at least 10 days prior to commencement of works. | Noted and edited |
| 6.4 | ROs | ROL timings will be issued as per SCO's review and assessment of the works/ TCP. | Applications for ROL would include an approved TCP or CTMP. |
| 6.6 | Working during Major Events | Contractor is to comply with any direction given by SCO and TMC re embargos that may be placed during Major/ Special Events (all Classes) and marches/Special Operations. | Noted and edited |
| 6.7 | Adjustments to traffic signals | As identified, there are lengthy approval lead times for any modifications to existing or proposal of new traffic signals. This could take up to six (6) months. | Noted and edited |
| 7.1 | Heavy vehicle movements | EIS hourly volumes for each haulage route shall not be exceeded. | Noted and edited |
| 7.2 and 7.3 | Truck Marshalling | The arrival of trucks should be scheduled so that there is no queuing of trucks on roads (as already captured). Please also note that trucks will not be permitted to park on State, Regional or Local roads for the sole purpose of waiting to enter the site. | Noted and edited at 7.2 |

COMMENTS REGISTER

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|-------|---------------------------------|---|-----------------------------------|
| 8.1.1 | Temporary Speed Zones | Temporary and long term Speed Zone reductions may be required to be covered in a site specific CTMP, detailing the anticipated impacts and mitigation strategies. | Noted and edited |
| 8.3 | Incident Management Plan | The Incident Management Plan must also be provided to SCO. | Noted and edited |
| 9.4 | Pedestrian and cyclists impacts | If there are significant closures of footpath/ pedestrian access, pedestrian and cyclist count/ analysis may be required. | To be included in Section 3.3.4.3 |
| 10.1 | Road Safety Audits | Contractor will be required to respond and address all RSA comments before the approval of the CTMP. | Noted and edited |

| Section | Issue | Stakeholder Comment | Response |
|------------------------------------|--|--|--|
| TfNSW-Planning and Programs | | | |
| 3.3.3 | Site Specific CTMP - content | Please add details indicating that the fundamental elements of CTMP should include vehicle numbers, maximum vehicle size, swept paths, expected dates and duration of works, time of day works will be undertaken, a table showing when the CTMP is presented to TCG, which stakeholders the CTMP has been sent to and when. | Noted and edited |
| 3.3.3 | Site Specific CTMP - approval | Revise wording of “Ten days should be allowed for final approval” to “Ten <i>business</i> days should be allowed for final approval” for clarity | Noted and edited |
| 3.3.4.3 | Pedestrian movement plans – cyclist considerations | Revise wording of “The needs of cyclists should also be considered” to “The needs of cyclists <i>must</i> also be considered” | Noted and edited |
| 6.3 | CTMP approval process | Revise wording of “Ten days should be allowed for final approval” to “Ten <i>business</i> days should be allowed for final approval” for clarity | Noted and edited |
| 6.3 | CTMP approval process - revisions | Changes to traffic management requirements at a site which requires material changes to the existing CTMP will require re-submission of the revised CTMP <i>with tracked changes</i> to RMS, SCO and local road authority for approval as applicable | Noted and edited |
| 6.11 | Local Traffic Committees (LTC) | Include a point indicating that regardless of the endorsement/approval of the CTMP by SCO/RMS, the contractor will need to prepare a separate TMP for road closures to be presented to LTC | Note added at end of 6.11 outlining approval requirements for road closures. |
| All | Stakeholder Review | Has this been submitted to TMC for consideration/comment? | Yes |

| Section | Issue | Stakeholder Comment | Response |
|-----------------------|---|--|--|
| Port Authority | | | |
| 4.1.1 | Port Authority of NSW (Port Authority) included in both the Traffic and Transport Liaison Group (TTLG) and list of other organisations the TTLG will consult with | As Port Authority is on the TTLG, it need not be included on the list of other organisations that may be asked to attend the TTLG and/or receive relevant information. Remove Port Authority from the list in Section 4.1.1. | Noted and edited |
| 4.2 | Traffic Control Group (TCG): Port Authority is not included in the list of participants of the TCG | The TCG for works at White Bay (Bays site) must include Port Authority as landowner, and so the list of TCG participants provided in Section 4.2 should include Port Authority. | Noted and edited |
| 6.2 | Stakeholders: Port Authority is not included in the list of agency stakeholders for the project(s) | Access to the White Bay (Bays) site will be via roads owned by Port Authority. These roads provide access to critical port businesses and activities. Port Authority will have an interest in measures proposed for accessing and exiting the Bays construction site. Section 6.2 should include Port Authority in the list of agencies that “may have a potential interest in the traffic management measures proposed for each Project construction site”. | Noted and edited |
| 6.3 | Construction Traffic Management Plans (CTMP) approval process: Port Authority does not have a role in approving/ endorsing the CTMP for the Bays site | The CTMP approval process in Figure 6-1 shows the RMS and SCO as the approval agencies for the CTMPs (“SCO endorses CTMP and sends to RMS for approval”). The CTMP to be prepared for the Bays site should also be endorsed by Port Authority, as Port Authority is the landowner, and as roads that provide access to the port would be used to access the Bays construction site. | Port Authority would review and approve as a stakeholder. RMS and SCO would require Port Authority approval of CTMP before approving. This has previously been a condition of approval. SCO and RMS would approve the CTMP following the agreement of relevant stakeholders. |

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|-----|---|---|------------------|
| 6.4 | Road Occupancy Licence process: Port Authority does not play any role in approving any proposed occupation or closure of port roads | Any closure or occupation of roads within the Glebe Island/White Bay port precinct would require approval from Port Authority. This should be reflected in Section 6.4. | Noted and edited |
|-----|---|---|------------------|

| Section | Issue | Stakeholder Comment | Response |
|---------------------------------------|--|---|--|
| TfNSW – Centre for Road Safety | | | |
| 1.2 Scope | Specifying delivering safe environments for all road users | Please consider extending paragraph three to “....and any traffic management measures will need to consider all the potential impacts that might occur because of the construction activities, and deliver safe environments for all road users.” | Noted and edited |
| 1.3 | Adding in safe connections | Dot point three under Metro West, please consider rewording to “delivering a safe and easy interchange between suburban rail.....” | Wording was extracted from Transport for NSW sources. Change not proposed. |
| 1.3 | Adding in safe connections | Dot point two under Sydney Metro Greater West, please consider rewording to “A station at St Marys, safely interchanging with the existing rail station and connecting.....” | Wording was extracted from Transport for NSW sources. Change not proposed. |
| 2 | Adding in safe | Under the fifth paragraph, please consider adding the following dot points: <ul style="list-style-type: none"> - Remove and reduce road safety risk, especially for pedestrians and cyclists. | Noted and edited |
| Table 2.1 | Add in safe | Please consider adding in a transport network objective of: <ul style="list-style-type: none"> - Maintain a safe environment for pedestrians, cyclists and motorists. | Noted and edited |
| 2.2 | Traffic management measures | Please consider rewording dot point one to “the provision of directional signage and line marking to safely direct and guide drivers, cyclists and...” | Noted and edited |
| 2.2 | Traffic management measures | Please consider rewording dot point four to “Management and coordination of construction vehicle safe access to and from the work sites across pedestrian paths”. | Noted and edited |
| 2.2 | Traffic management measures | Please consider rewording dot point five to “Ensuring that safe access to existing properties and businesses is maintained...”. | Noted and edited |

| Section | Issue | Stakeholder Comment | Response |
|---------|-------------------------------|---|--|
| 3.3.4.3 | Add in other mobility devices | Paragraph 3 refers to cyclists, can you please consider broadening to also include other mobility devices. | Noted and edited |
| 4.2 | Add CRSMS | Please consider adding Centres for Road and Maritime Safety to the TCG. | Noted and edited |
| 5.1 | Adding in safe | Please consider rewording of second paragraph to “Every endeavour is to be made to maintain safe access at all times to properties for both pedestrians and vehicles. If works will temporarily affect access to a property, consideration should be given to the staging of the works, to maintain safe access and limit the disruption....” | Noted and edited |
| 7.2 | Adding in safe | Please consider rewording second sentence in the first paragraph to “Each site-specific CTMP will need to demonstrate, where applicable, how marshalling facilities will be used to safely manage truck movements and reduce congestion and road safety risks”. | Noted and edited |
| 7.4 | Reference to SM PS-ST-221 | Does this include additional safety features on all newly purchased vehicles for the project? | The Health and Safety Standard provides a minimum requirement for heavy vehicles. |
| 7.4.3 | Driver training requirements | Please consider adding in training for drivers that covers site specific road safety risks along routes, for example areas of known risk such as schools, pubs and transport interchanges. | The contractor’s regular briefings and mandatory completion of the project specific heavy vehicle training would provide identification of specific road safety risks. |

Appendix F

Construction Noise and Vibration Standard



Integrated
Management
System

Sydney Metro Construction Noise and Vibration Standard

SM-20-00098866

Sydney Metro Integrated Management System (IMS)

| | |
|---------------------------------|-------------------|
| Applicable to: | Sydney Metro West |
| Author: | Sydney Metro |
| System owner: | Sydney Metro |
| Status: | Final |
| Version: | 4.3 |
| Date of issue: | 04/11/2020 |
| Security classification: | Open Access |
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1. PURPOSE AND SCOPE

This Standard applies to all Sydney Metro projects and covers all elements of the project lifecycle with the exception of operational activities. Additionally, this standard only applies to design activities insofar as design decisions affect construction-related noise and vibration impacts (such as route selection, at-grade or underground rail systems and tunnel depth).

1.1. Distribution and Use

This document may be used in the development of, or referred to in:

- Environmental Impact Assessment documents;
- Design and construction environmental management documents;
- Contract documents; or
- Approvals and licences (subject to the agreement of the relevant regulatory authority).

1.2. Strategic Objectives

Sydney Metro recognise that sources of Noise and Vibration originating from our activities have a significant impact to local communities. We have adopted several strategic objectives to understand and manage these impacts:

- Applying a risk-based approach and implementing an appropriate hierarchy of controls at each stage of the project lifecycle to minimise impacts.
- Building an approach to reducing Noise and Vibration risks within each stage of the project lifecycle through active collaboration with internal and external stakeholders.
- Developing a clear understanding of our Construction Noise and Vibration Impacts and applying best practice management techniques.
- Valuing genuine community engagement that is sensitive to the needs and expectations of local communities and businesses.
- Committing to the continual improvement of Noise and Vibration management.

1.3. Construction Noise and Vibration Terminology

Decibel (dB): Decibel, often expressed as an 'A – weighted' sound pressure level, which has been found to correlate well with human subjective reactions to moderate noise levels. For steady, broadband noise, an increase or decrease of approximately 10 dB corresponds to a subjective doubling or halving of the loudness and a change of 2 to 3 dB is subjectively barely perceptible.

Sound Pressure Level (SPL or Lp): Expressed in dB, it is the level of noise measured by a standard sound level meter. It must be accompanied by a description of the measurement distance from the source, if used in any noise predictions or calculations. In a free field (eg outside on flat ground), each doubling of distance results in approximately 6dB reduction in airborne sound pressure level due to distance attenuation.

Sound Power Level (SWL or L_w): Expressed in dB, it is the total acoustic energy radiated by a plant or equipment to the environment. Sound power level is independent of distance from the source of the noise.

Rating Background Level (RBL): Rating background level is the overall single-figure background level representing each assessment period (day/evening/night) over a measurement period. As defined in the EPA “Noise Policy for Industry” dated October 2017.

Vibration: Vibration may be expressed in terms of displacement, velocity and acceleration. Velocity (mm/s), acceleration (m/s²) and Vibration Dose Value (VDV, m/s^{1.75}) are most commonly used when assessing human comfort issues respectively. Peak Particle Velocity (PPV, mm/s) is typically used to assess impacts on structures.

Ground borne noise and Structure-borne noise: The transmission of noise energy as vibration travelling through the ground and / or structures and re-radiated as audible noise.

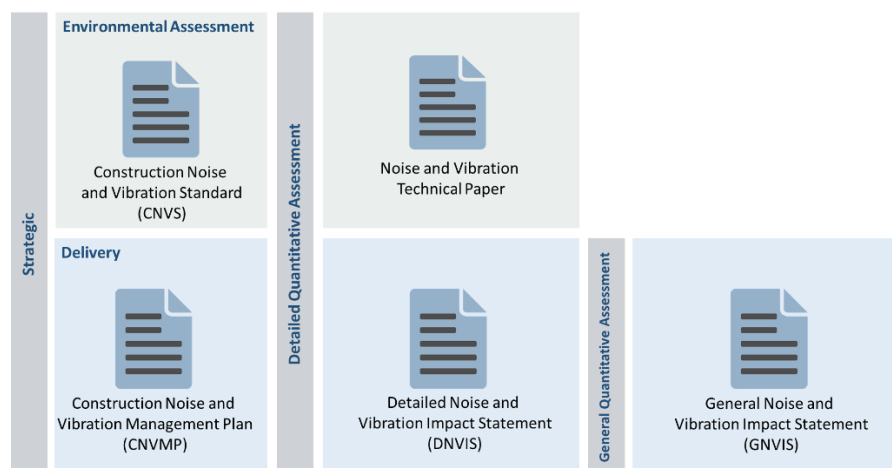
The three primary noise metrics used to describe construction noise emissions in the modelling and assessments are:

| | |
|----------------------------------|---|
| L_{A1(1minute)} | The typical ‘maximum noise level for an event’, used in the assessment of potential sleep disturbance during night-time periods. Alternatively, assessment may be conducted using the L _{Amax} or maximum noise level |
| L_{Aeq(15minute)} | The ‘energy average noise level’ evaluated over a 15-minute period. This parameter is used to assess the potential construction noise impacts. |
| L_{A90} | The ‘background noise level’ in the absence of construction activities. This parameter represents the average minimum noise level during the daytime, evening and night-time periods respectively. The L _{Aeq(15minute)} construction noise management levels are based on the L _{A90} background noise levels. |

1.4. Documentation Framework

There are five main documents (**Figure 1**) which comprise the noise and vibration documentation framework. Together they provide a comprehensive approach to the assessment and delivery of works which generate noise and vibration while mitigating the impacts.

Figure 1 - Noise and Vibration Documentation Framework



1.4.1. Construction Noise and Vibration Standard (CNVS)

The CNVS (this document) establishes a consistent strategy for the assessment, mitigation and monitoring of noise and vibration generated by construction activities. It defines a minimum standard for managing noise and vibration impacts that considers currently best practice guidelines and other regulatory requirements. It is included in all Sydney Metro Environmental Assessments.

1.4.2. Construction Noise and Vibration Management Plan (CNVMP)

Where works will cause significant noise and vibration impacts upon sensitive receivers Principal Contractors will be required to prepare and implement CNVMP's. These documents form part of the CEMP suite of documentation.

The function of the CNVMP is to provide a strategic overview of how the requirements of the CNVS will be applied to activities or locations under the control of the Principal Contractor. This overview includes an outline of how quantitative noise and vibration assessments will be undertaken across worksites and/or activities, and an indicative construction schedule.

The CNVMP also links to Community and Stakeholder consultation processes and explains how commercial and residential receivers will be consulted throughout the construction phase with regard to mitigating impacts upon them.

Further detail on the requirements for CNVMP's can be found in the Sydney Metro Construction Environmental Management Framework.

1.4.3. Noise and Vibration Technical Paper

The Noise and Vibration Technical Paper is produced as part of the Environmental Assessment carried out in the planning phase of Sydney Metro projects. This document is a Quantitative Noise Assessment based upon the information known at the time the assessment is undertaken and makes recommendations for mitigation.

Typically it will include a range of assumptions on equipment lists and construction methodologies on the basis of which the impact upon sensitive receivers will be determined. As such, these Quantitative Assessments are generally conservative and may over predict actual impacts during construction.

1.4.4. Detailed Noise and Vibration Impact Statements (DNVIS)

While quantitative noise assessments are documented in environmental assessments, Principal Contractors will have a better understanding of the exact equipment list and construction methodology to be used in carrying out their works. As a result, certain assumptions made in the Noise and Vibration Technical Paper can be clarified in a secondary quantitative assessment undertaken by the Principal Contractor. These documents are called Detailed Noise and Vibration Impact Statements.

They are typically written with a focus on specific activities or locations and consider works carried out inside and outside of standard working hours.

Where 24/7 works are approved under an SSI approval, a separate DNVIS should be carried out specifically for these activities.

Work described in a DNVIS's cannot proceed until the DNVIS is approved by an Acoustic Advisor appointed under an SSI approval or other delegate approved by Sydney Metro. Should the scope of work or the timing of works change, the Principal contractor must update the DNVIS and seek subsequent approval for the new version. See **Section 3.1** for more detail on DNVIS's.

1.4.5. General Noise and Vibration Impact Statements (GNVIS)

General Noise and Vibration Impact Statements are also secondary assessments and have the same purpose as DNVIS's except that the assessment process is simplified. A GNVIS may be undertaken for works not being carried out under an SSI Approval.

Work described in a GNVIS's cannot proceed until the GNVIS is approved by Sydney Metro. Should the scope of work or the timing of works change, the Principal contractor must update the GNVIS and seek subsequent approval for the new version. See **Section 3.2** for more detail on GNVIS's.

2. NOISE AND VIBRATION GUIDELINES

2.1. Construction Hours

Where possible, works will be completed during the standard day time construction hours of Monday to Friday 7.00 am to 6.00 pm and Saturdays 8.00 am to 1.00 pm. However, the nature of infrastructure projects means evening and night works are likely to be required throughout construction due to various considerations including avoiding sensitive periods for sensitive receivers, delivery of oversized plant or structures, emergency works, or other activities that require the temporary closure of roads. In some cases these standard working hours may be varied by the project planning approval in recognition that works will need to be consistently undertaken during certain times such as morning shoulders or Saturday afternoons. For other situations the impacts of works outside standard construction hours will be approved via updates to the relevant activities DNVIS or GNVIS.

In other cases there may be a need to assess activities that require 24 hour working for a significant portion of the construction period. Examples of construction scenarios that will require 24/7 works include:

- Excavation of station shafts;
- Truck movements to manage spoil;
- Excavation of the station caverns;
- Operation of tunnel boring machines;
- Spoil removal and transport from site; or
- Tunnel support works, including materials delivery.

Works requiring 24/7 activity are usually proposed in the environmental assessment and will be subsequently assessed in a secondary quantitative assessment during delivery. Where the need for 24 hours works arises post approval, a consistency assessment would be undertaken to determine if a modification to the planning approval is required.

2.2. Construction Noise Management Levels (NML)

Construction Noise Management Levels (NML) for all Sydney Metro projects are determined in accordance with the EPA's *Interim Construction Noise Guideline* dated July 2009 (ICNG) unless the planning approval recommends an alternate approach, or sets different NMLs. The following sections supplement this guideline with respect to Sydney Metro projects.

2.2.1. Residences and Other Sensitive Land Uses

Noise Management Levels and how they are applied is set out in **Table 1**. This approach is intended to provide respite for residents exposed to excessive construction noise whilst allowing construction to occur without undue constraints.

The Rating Background Level (RBL) is used when determining the management level and is the overall single-figure background noise level measured in each relevant assessment period (as defined in the EPA's *Noise Policy for Industry* dated October 2017).

Table 1: Noise Management Levels for different times of day and considerations on their application

| Time of Day | Noise Management Level LAeq (15minute) ¹ | Management Considerations |
|--|---|---|
| Recommended standard hours: Monday to Friday 7.00 am to 6.00 pm Saturday 8.00 am to 1.00 pm | Noise affected RBL + 10 dB | <p>The noise affected level represents the point above which there may be some community reaction to noise. Where the predicted or measured LAeq (15minute) is greater than the noise affected level, the proponent would apply all feasible and reasonable work practices to minimise noise.</p> <p>The proponent would also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.</p> |
| | Highly noise affected 75 dB | <p>The highly noise affected level represents the point above which there may be strong community reaction to noise.</p> <p>Where noise is above this level, the proponent would consider very carefully if there is any other feasible and reasonable way to reduce noise to below this level.</p> <p>If no quieter work method is feasible and reasonable, and the works proceed, the proponent would communicate with the impacted residents by clearly explaining the duration and noise level of the works, and by describing any respite periods that will be provided.</p> |
| Outside recommended standard hours | Noise affected RBL + 5 dB | <p>A strong justification would typically be required for works outside the recommended standard hours.</p> <p>The proponent would apply all feasible and reasonable work practices to meet the noise affected level.</p> <p>Where all feasible and reasonable practices have been applied and noise is more than 5 dBA above the noise affected level, the proponent would negotiate with the community.</p> <p>For guidance on negotiating agreements see Section 7.2.2 of the ICNG.</p> |

Note 1: Noise levels apply at the property boundary that is most exposed to construction noise. If the property boundary is more than 30 m from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30 m of the residence.

Non mandatory management levels for noise near properties which are sensitive to Noise Impacts are presented in **Table 2**. These values are set and based on the principle that the characteristic activities for each would not be unduly disturbed. The noise management levels apply only when the property is being used, for example, classrooms during school hours. Internal noise levels are to be assessed at the centre of the occupied room. External noise levels are to be assessed at the most-affected point within 50 m of the area boundary.

Table 2: Noise Management Levels for certain sensitive receivers

| Land Use | Management Level, LAeq (15minute) (Applies When Land Use is being Utilised) |
|--|--|
| Classrooms at schools and other educational institutions | Internal noise level 45 dB |
| Hospital wards and operating theatres | Internal noise level 45 dB |
| Places of worship | Internal noise level 45 dB |
| Active recreation areas (such as parks and sports grounds or playgrounds) | External noise level 65 dB |
| Passive recreation areas (such as outdoor grounds used for teaching, outdoor cafes or restaurants) | External noise level 60 dB |

Other noise-sensitive businesses require separate specific noise goals and it is suggested in the ICNG that the internal construction noise levels at these premises are to be referenced to the ‘maximum’ internal levels presented in AS 2107. Recommended ‘maximum’ internal noise levels from AS 2107 are reproduced in **Table 3** for other sensitive receiver types.

However, the ICNG and AS 2107 do not provide specific criteria for childcare centres. Childcare centres generally have internal play areas and sleep areas. For these facilities, where feasible and reasonable the objective should be to achieve levels for sleeping of 45 dB(A) (consistent with hospital wards/places of worship) and for play areas of 65 dB(A) (consistent with playgrounds).

Table 3 AS 2107 Recommended Maximum Internal Noise Levels

| Land Use | Time Period | AS 2107 Classification | Recommended “Maximum” Internal LAeq (dBA) |
|-------------------------|-------------------|--|--|
| Hotel | Daytime & Evening | Bars and Lounges | 50 dB |
| | Night-time | Sleeping Areas: - Hotels near major roads | 40 dB |
| Café | When in use | Coffee bar | 50 dB |
| Bar/Restaurant | When in use | Bars and Lounges / Restaurant | 50 dB |
| Library | When in use | Reading Areas | 45 dB |
| Recording Studio | When in use | Music Recording Studios | 25 dB |
| Theatre / Auditorium | When in use | Drama Theatres | 30 dB |

2.2.2. Commercial and Industrial Premises

Due to the broad range of sensitivities that commercial or industrial land can have to noise from construction, the process of defining Noise Management Levels is separated into three categories. The external noise levels would be assessed at the most-affected occupied point of the premises:

- Industrial premises (external): 75 dB LAeq(15minute)
- Offices, retail outlets (external): 70 dB LAeq(15minute)
- Other businesses that may be very sensitive to noise, where the noise level is project specific as discussed below.

Examples of other noise-sensitive businesses are theatres, studios and child care centres. The proponent would undertake a special investigation to determine suitable noise levels on a project-by-project basis; the recommended internal noise levels presented in Table 1 of AS 2107 “Acoustics - Recommended design sound levels and reverberation times for building interiors” (Standards Australia 2000) may assist in determining relevant noise levels; however, an acoustic consultant would be engaged in order to determine corresponding external noise levels based on the published internal noise levels. The proponent would assess construction noise levels for the project, and consult with occupants of commercial and industrial premises prior to lodging an application where required. During construction, the proponent would regularly update the occupants of the commercial and industrial premises regarding noise levels and hours of work.

2.3. Ground-Borne Vibration

The effects of vibration in buildings can be divided into three main categories; those in which the occupants or users of the building are inconvenienced or possibly disturbed, those where the building contents may be affected and those in which the integrity of the building or the structure itself may be prejudiced.

2.3.1. Human Comfort Vibration

The DECCW’s “Assessing Vibration: a technical guideline” dated February 2006 (DEC, 2006) recommends the use of BS 6472-1992 for the purpose of assessing vibration in relation to human comfort.

British Standard 6472-1992 “*Guide to evaluation of human exposure to vibration in building*” nominates guideline values for various categories of disturbance, the most stringent of which are the levels of building vibration associated with a “low probability of adverse comment” from occupants.

BS 6472-1992 provides guideline values for continuous, transient and intermittent events that are based on a Vibration Dose Value (VDV), rather than a continuous vibration level. The vibration dose value is dependent upon the level and duration of the short term vibration event, as well as the number of events occurring during the daytime or night-time period.

The vibration dose values recommended in BS 6472-1992 for which various levels of adverse comment from occupants may be expected are presented in **Table 4**.

Table 4: Vibration Dose Value Ranges above which various degrees of Adverse Comment may be expected in Residential Buildings

| Place and Time | Low Probability of Adverse Comment (m/s ^{1.75}) | Adverse Comment Possible (m/s ^{1.75}) | Adverse Comment Probable (m/s ^{1.75}) |
|----------------------------------|---|---|---|
| Residential buildings 16 hr day | 0.2 to 0.4 | 0.4 to 0.8 | 0.8 to 1.6 |
| Residential buildings 8 hr night | 0.13 | 0.26 | 0.51 |

2.3.2. Structural Damage Vibration

Most commonly specified ‘safe’ structural vibration limits are designed to minimise the risk of threshold or cosmetic surface cracks, and are set well below the levels that have potential to cause damage to the main structure.

In terms of the most recent relevant vibration damage goals, Australian Standard AS 2187: Part 2-2006 ‘Explosives - Storage and Use - Part 2: Use of Explosives’ recommends the frequency dependent guideline values and assessment methods given in BS 7385 Part 2-1993 ‘Evaluation and measurement for vibration in buildings Part 2’ as they “are applicable to Australian conditions”.

The Standard sets guide values for building vibration based on the lowest vibration levels above which damage has been credibly demonstrated. These levels are judged to give a minimum risk of vibration induced damage, where minimal risk for a named effect is usually taken as a 95% probability of no effect.

Sources of vibration that are considered in the standard include demolition, blasting (carried out during mineral extraction or construction excavation), piling, ground treatments (e.g. compaction), construction equipment, tunnelling, road and rail traffic and industrial machinery.

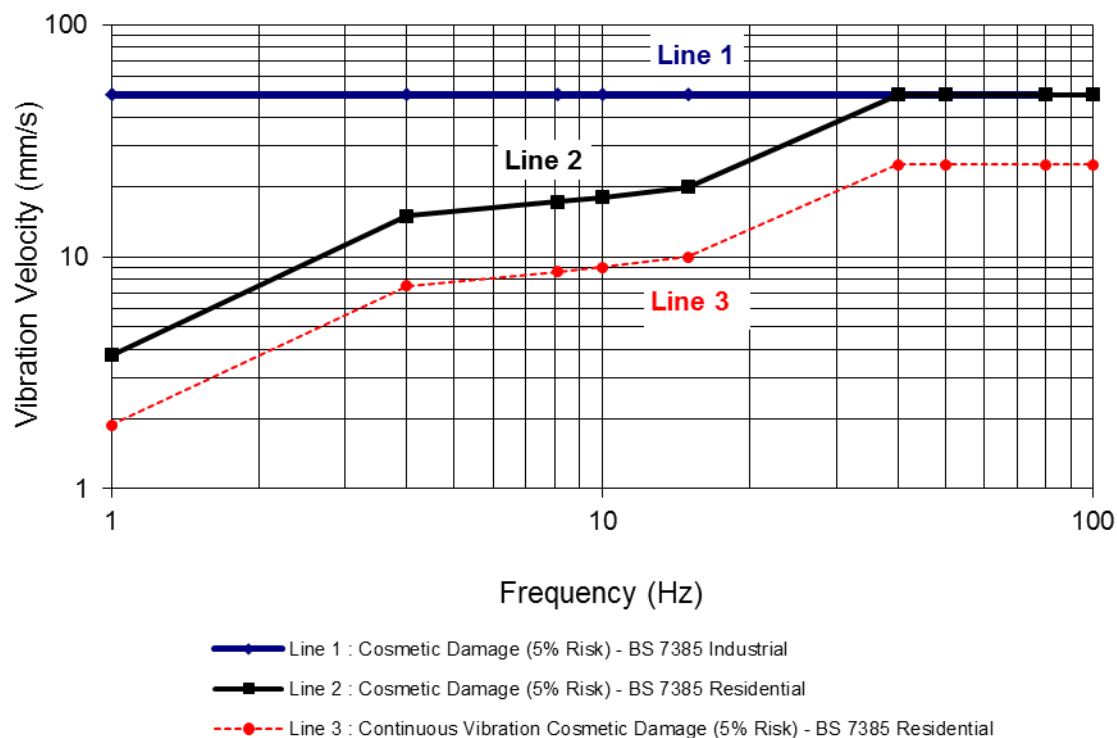
2.3.3. Cosmetic Damage Vibration

The recommended limits (guide values) for transient vibration to ensure minimal risk of cosmetic damage to residential and industrial buildings are presented numerically in **Table 5** and graphically in **Figure 2**.

Table 5: Transient Vibration Guide Values - Minimal Risk of Cosmetic Damage

| Line | Type of Building | Peak Component Particle Velocity in Frequency Range of Predominant Pulse | |
|------|---|--|---|
| | | 4 Hz to 15 Hz | 15 Hz and Above |
| 1 | Reinforced or framed structures Industrial and heavy commercial buildings | 50 mm/s at 4 Hz and above | |
| 2 | Unreinforced or light framed structures Residential or light commercial type buildings | 15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz | 20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above |

Figure 2: Graph of Transient Vibration Guide Values for Cosmetic Damage



The Standard goes on to state that minor damage is possible at vibration magnitudes which are greater than twice those given in **Table 5**, and major damage to a building structure may occur at values greater than four times the tabulated values.

Fatigue considerations are also addressed in the Standard and it is concluded that unless calculation indicates that the magnitude and number of load reversals is significant (in respect of the fatigue life of building materials) then the guide values in **Table 5** would not be reduced for fatigue considerations.

In order to assess the likelihood of cosmetic damage due to vibration, AS2187 specifies that vibration measured would be undertaken at the base of the building and the highest of the orthogonal vibration components (transverse, longitudinal and vertical directions) would be compared with the guidance curves presented in **Figure 2**.

It is noteworthy that extra to the guide values nominated in **Table 5**, the standard states that:

“Some data suggests that the probability of damage tends towards zero at 12.5 mm/s peak component particle velocity. This is not inconsistent with an extensive review of the case history information available in the UK.”

Also that:

“A building of historical value should not (unless it is structurally unsound) be assumed to be more sensitive.”

2.4. General Vibration Screening Criterion

The Standard states that the guide values in **Table 5** relate predominantly to transient vibration which does not give rise to resonant responses in structures and low-rise buildings.

Where the dynamic loading caused by continuous vibration may give rise to dynamic magnification due to resonance, especially at the lower frequencies where lower guide values apply, then the guide values in **Table 5** may need to be reduced by up to 50%.

Note: rock breaking/hammering and sheet piling activities are considered to have the potential to cause dynamic loading in some structures (e.g. residences) and it may therefore be appropriate to reduce the transient values by 50%.

Therefore for most construction activities involving intermittent vibration sources such as rock breakers, piling rigs, vibratory rollers, excavators and the like, the predominant vibration energy occurs at frequencies greater than 4 Hz (and usually in the 10 Hz to 100 Hz range). On this basis, a conservative vibration damage screening level per receiver type is given below:

- Reinforced or framed structures: 25.0 mm/s
- Unreinforced or light framed structures: 7.5 mm/s

At locations where the predicted and/or measured vibration levels are greater than shown above (peak component particle velocity), a more detailed analysis of the building structure, vibration source, dominant frequencies and dynamic characteristics of the structure would be required to determine the applicable safe vibration level.

2.5. Guidelines for Vibration Sensitive and Special Structures

2.5.1. Heritage

Heritage buildings and structures would be assessed as per the screening criteria in **Section 2.4** as they should not be assumed to be more sensitive to vibration unless they are found to be structurally unsound. If a heritage building or structure is found to be structurally unsound (following inspection) a more conservative cosmetic damage criteria of 2.5 mm/s peak component particle velocity (from DIN 4150) would be considered.

2.5.2. Sensitive Scientific and Medical Equipment

Some scientific equipment (e.g. electron microscopes and microelectronics manufacturing equipment) can require more stringent objectives than those applicable to human comfort.

Where it has been identified that vibration sensitive scientific and/or medical instruments are likely to be in use inside the premises of an identified vibration sensitive receiver, objectives for the satisfactory operation of the instrument would be sourced from manufacturer's data. Where manufacturer's data is not available, generic vibration criterion (VC) curves as published by the Society of Photo-Optical Instrumentation Engineers (Colin G. Gordon - 28 September 1999) may be adopted as vibration goals. These generic VC curves are presented below in **Table 6** and **Figure 3**.

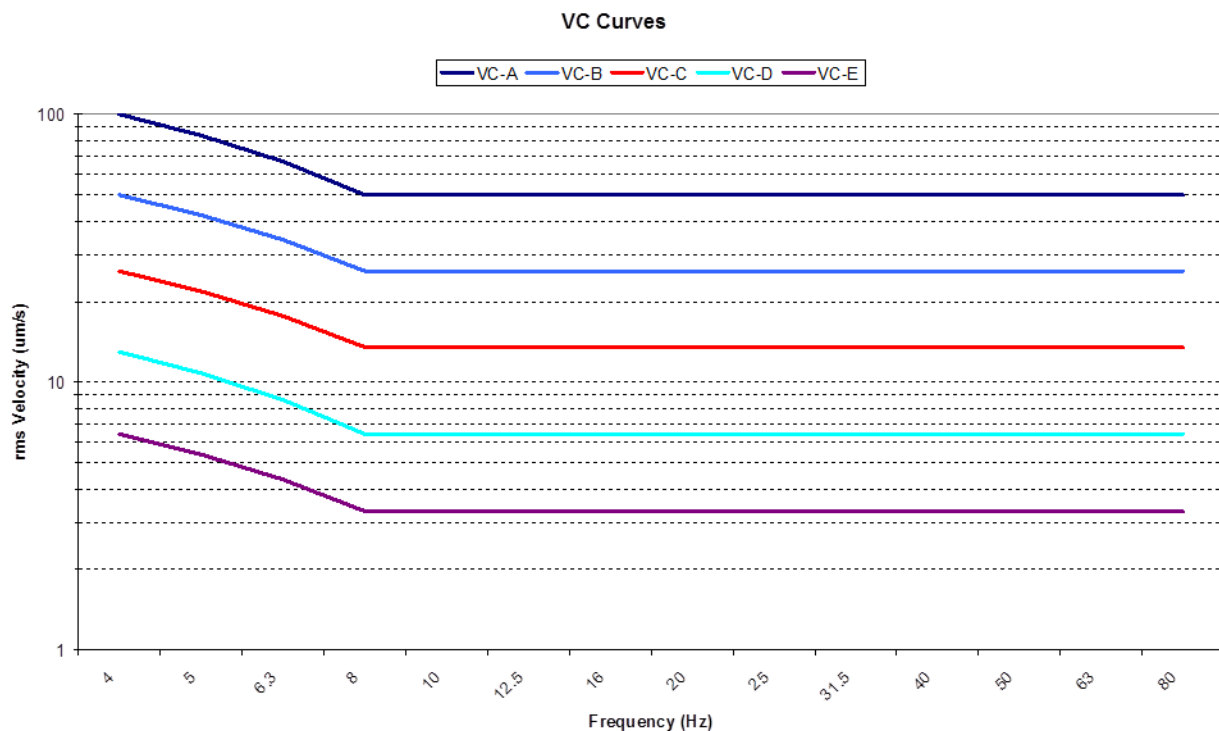
Table 6: Application and Interpretation of the Generic Vibration Criterion (VC) Curves
(as shown in Figure 3)

| Criterion Curve | Max Level ($\mu\text{m/sec, rms}$) ¹ | Detail Size (microns) ² | Description of Use |
|-----------------|---|------------------------------------|--|
| VC-A | 50 | 8 | Adequate in most instances for optical microscopes to 400X, microbalances, optical balances, proximity and projection aligners, etc. |
| VC-B | 25 | 3 | An appropriate standard for optical microscopes to 1000X, inspection and lithography equipment (including steppers) to 3 micron line widths. |
| VC-C | 12.5 | 1 | A good standard for most lithography and inspection equipment to 1 micron detail size. |
| VC-D | 6 | 0.3 | Suitable in most instances for the most demanding equipment including electron microscopes (TEMs and SEMs) and E-Beam systems, operating to the limits of their capability. |
| VC-E | 3 | 0.1 | A difficult criterion to achieve in most instances. Assumed to be adequate for the most demanding of sensitive systems including long path, laser-based, small target systems and other systems requiring extraordinary dynamic stability. |

Note 1: As measured in one-third octave bands of frequency over the frequency range 8 to 100 Hz.

Note 2: The detail size refers to the line widths for microelectronics fabrication, the particle (cell) size for medical and pharmaceutical research, etc. The values given take into account the observation requirements of many items depend upon the detail size of the process.

Figure 3: Vibration Criterion (VC) Curves



2.5.3. Other Vibration Sensitive Structures and Utilities

Where structures and utilities are encountered which may be considered to be particularly sensitive to vibration, a vibration goal which is more stringent than structural damage goals presented in **Section 2.4** may need to be adopted. Examples of such structures and utilities include:

- Tunnels
- Gas pipelines
- Fibre optic cables

Specific vibration goals would be determined on a case-by-case basis. An acoustic consultant would be engaged by the construction contractor and would liaise with the structure or utility's owner in order to determine acceptable vibration levels.

2.6. Vibration and Overpressure from Blasting

The DECC's ICNG recommends that vibration and overpressure from blasting be assessed against the levels presented in the Australian and New Zealand Environment Council's (ANZEC) Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration (ANZEC, 1990).

The criteria set by this standard were based on practices undertaken more than 30 years ago and were targeted at operations that occur for long periods of time such as those at mining sites and hence are targeted at protecting human comfort vibration levels. As a result the vibration levels are conservative and can introduce unnecessary constraints when applied to construction projects which typically occur for much shorter time periods. Recent NSW infrastructure project approvals have recognised the restrictive nature of these blasting criteria when applied to construction projects and have therefore allowed the following vibration and overpressure limits:

- Vibration (PPV): 25 mm/s
- Overpressure: 125 dBL

These upper limits are deemed acceptable where the proponent has a written agreement with the relevant landowner to exceed the criteria and the Secretary has approved the terms of the written agreement. These upper limits to vibration and overpressure are intended to target the protection of building structures from cosmetic damage rather than human comfort criteria as construction works are considered short-term.

2.7. Ground-Borne (Regenerated) Noise

Ground-borne (regenerated) noise is noise generated by vibration transmitted through the ground into a structure. Ground-borne noise caused, for example by underground works such as tunnelling, can be more noticeable than airborne noise. The following ground-borne noise levels for residences are nominated in the ICNG and indicate when management actions would be implemented. These levels recognise the temporary nature of construction and are only applicable when ground-borne noise levels are higher than airborne noise levels. Any levels exceeding objectives should be considered in the context of any existing exposure to ground-borne noise.

The ground-borne noise management levels are given below:

- Evening (6.00 pm to 10.00 pm)
Internal Residential: 40 dB LAeq(15minute)
- Night-time (10.00 pm to 7.00 am)
Internal Residential: 35 dB LAeq(15minute)

The evening and night-time criteria are only applicable to residential receivers.

The internal noise levels are to be assessed at the centre of the most-affected habitable room. For a limited number of discrete, ongoing ground-borne noise events, such as drilling or rock-hammering, The LAmax noise descriptor using a slow response on the sound level meter may be better than the LAeq noise descriptor (15 min) in describing the noise impacts. The level of mitigation of ground-borne noise would depend on the extent of impacts and also on the scale and duration of works. Any restriction on the days when construction work is allowed would take into account whether the community:

- Has identified times of day when they are more sensitive to noise (for example Sundays or public holidays).
- Is prepared to accept a longer construction duration in exchange for days of respite.

2.8. Traffic Noise Assessment Goals

When trucks and other vehicles are operating within the boundaries of the various construction sites, road vehicle noise contributions are included in the overall predicted LAeq(15minute) construction site noise emissions. When construction related traffic moves onto the public road network a different noise assessment methodology is appropriate, as vehicle movements would be regarded as 'additional road traffic' rather than as part of the construction site.

The ICNG does not provide specific guidance in relation to acceptable noise levels associated with construction traffic. For assessment purposes, guidance is taken from the RNP.

One of the objectives of the RNP is to apply relevant permissible noise increase criteria to protect sensitive receivers against excessive decreases in amenity as the result of a proposal. In assessing feasible and reasonable mitigation measures, an increase of up to 2 dB represents a minor impact that is considered barely perceptible to the average person.

On this basis, construction traffic NMLs set at 2 dB above the existing road traffic noise levels during the daytime and night-time periods are considered appropriate to identify the onset of potential noise impacts. Where the road traffic noise levels are predicted to increase by more than 2 dB as a result of construction traffic, consideration would be given to applying feasible and reasonable noise mitigation measures to reduce the potential noise impacts and preserve acoustic amenity.

In considering feasible and reasonable mitigation measures where the relevant noise increase is greater than 2 dB, consideration would also be given to the actual noise levels associated with construction traffic and whether or not these levels comply with the following road traffic noise criteria in the RNP:

- 60 dB LAeq(15hour) day and 55 dB LAeq(9hour) night for existing freeway/ arterial/ sub-arterial roads.
- 55 dB LAeq(1hour) day and 50 dB LAeq(1hour) night for existing local roads.

2.9. Sleep Disturbance and Maximum Noise Events

Maximum noise level events from construction activities during the night-time period can trigger both awakenings and disturbance to sleep stages. The approach to managing events that cause sleep disturbance shall be consistent with the Noise Policy for Industry (EPA, 2017). Where night-time noise levels at a residential location exceed the:

- LAeq,15min 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or the
- LAFmax 52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater,

a detailed maximum noise level event assessment is to be undertaken.

The detailed assessment will cover the maximum noise level, the extent to which the maximum noise level exceeds the RBL, and the number of times this happens during the night-time period.

Maximum noise level event assessments should be based on the LAFmax descriptor on an event basis under 'fast' time response. The detailed assessment will consider all feasible and reasonable noise mitigation measures with a goal of achieving the above trigger levels for night-time activities.

3. CONSTRUCTION NOISE & VIBRATION ASSESSMENT METHODOLOGY

There are planning processes at all levels of government that may apply to works carried out by Sydney Metro, some of these processes (particularly State and Federal planning processes) require a detailed Environmental Assessment of the construction phases for the proposal. As construction contractors are not typically appointed until later in a project's timeline, the exact construction methodology they will use for a particular project may not be known when the environmental assessment is being carried out (see Table 7).

With respect to the assessment of noise and vibration impacts in environmental assessments they are to include a detailed quantitative assessment that adopts conservative assumptions to account for uncertainty in the precise delivery methodology. In most circumstances the noise and vibration impacts predicted by an environmental assessment will overestimate real impacts during delivery. As a result, this strategy requires secondary quantitative assessments to be undertaken during delivery by the Principal Contractor to verify impacts and better inform how to mitigate impacts.

For construction works approved under Division 5.2 of the EP&A Act, further quantitative noise and vibration assessments will be undertaken for activities and/or locations where work will occur. These are called Detailed Noise and Vibration Impact Statements (DNVIS), and works subject to these assessments will not proceed until the DNVIS has been approved by an Acoustic Advisor appointed under an SSI approval, or where there is no SSI approval, approved by Sydney Metro. **Section 3.1** of this Standard provides information on the requirements for a DNVIS.

For construction works approved under any other planning approval pathway, the secondary quantitative noise assessment may take a less detailed approach and is referred to as a General Noise and Vibration Impact Assessment (GNVIS). **Section 3.2** of this Standard provides information on the requirements for a GNVIS.

In order to develop a comprehensive secondary assessment framework specific details of the construction methodology (including the size and type of equipment) is required. Detailed design, construction and engineering solutions are progressively developed and applied throughout the life-span of the project and consequently secondary assessments are to be updated to reflect changing design and/or construction methodologies. Secondary assessments may take one of two forms and each are updated when a change occurs:

- General Construction Activity for construction scenarios that are consistently the same and progressively move along the project alignment e.g. tunnelling, retaining walls.
- Location Specific for construction scenarios that are specific to a location.

How these statements are distributed across the scope of work is to be articulated in the Noise and Vibration Management Plan, or where one is not required, the CEMP.

In all cases the overriding objective of noise and vibration assessments is to firstly identify impact reduction techniques to reduce noise and vibration impacts below the NML using Standard Mitigation Measures (refer to **Section 4**) so that the reliance upon impact offset measures is removed or minimised (refer to **Section 5**).

Table 7: Summary of Assessment Detail Required During the Various Stages of the Project

| Assessment Input | Environmental Impact Statement / Environmental Assessment | In Delivery |
|--|---|--|
| Construction Scenarios / Equipment List | Construction scenarios defined by project team, based on potential construction methodologies known at the time. | Construction scenarios defined by construction team. These are expected to include finalised equipment lists, itemising the realistic worst-case plant proposed to be used at any one time, and in any one location. |
| Modelled works location | Works location by scenario (or group of scenarios) i.e. different locations for different works. | Works location by works scenario i.e. specific locations for each works. |
| Background noise monitoring | Background noise monitoring required to determine RBL and other noise metrics at locations representative of worst-affected receiver areas adjacent to the works areas. | Supplementary noise monitoring may be required to determine in more detail the RBL or other noise metrics required by the planning approval at locations representative of worst-affected receiver areas adjacent to the works areas where noise survey data is not current (i.e. more than 5 years old). |
| Study Area | The study area must, as a minimum, include receivers subjected to predicted $L_{Aeq}(15\text{minute}) \geq RBL + 5\text{dB}$ for the applicable time period. Vibration level predictions up to 100m. | Predict noise and vibration levels to the sensitive receivers within the area surrounding the works, to include all receivers where the $L_{Aeq}(15\text{minute}) \geq RBL + 5\text{dB}$ and the vibration screening criteria are exceeded during the applicable time periods. |
| Assessment of mitigation | Demonstration that assessment of this stage includes reasonable and feasible mitigation measures if required. | Based on these predictions the Construction Noise and Vibration Management Plan (CNVMP) shall identify all feasible and reasonable mitigation measures to minimise noise and vibration from construction. Sections 4 and 5 identify the standard and additional mitigation measures to be included where applicable in the CNVMP. Eg. Detailed vibration assessments to include dilapidation surveys, continuous vibration monitoring and accurate vibration transfer measurements (site law measurements) for all buildings with the potential to exceed the screening criteria for vibration. |
| Documentation | Environmental Assessment and associated documentation | Activity or location specific Construction Noise Impact Statements Construction Noise and Vibration Management Plans OOHW Applications |

3.1. Detailed Noise and Vibration Impact Statements

For all DNVIS reports the noise impacts are to be assessed based on construction scenarios. A construction scenario relating to noise impact is essentially a construction activity which is made up of the required plant and equipment. A number of construction scenarios will make up any one DNVIS report. In undertaking an assessment of the noise impact from a construction scenario(s) the following steps are to be taken:

- Identify all Noise and Vibration Sensitive Receivers (NSRs) which may be affected by the project.
 - Conduct background noise monitoring at representative NSRs to determine the rating background noise levels (RBLs) in accordance with the procedures presented in the EPA's Noise Policy for Industry, where RBLs have not been established in previous project stages.
 - Determine the appropriate noise and vibration management levels of each NSR.
 - Determine the source noise levels (Sound Power Levels) of each noise generating plant and equipment item required to undertake the construction scenario. Note: Sound Power Levels for each plant and equipment would be less than the maximum allowable levels found in Table 13 and Table 14.
 - Clearly indicate which mitigation measures identified in Section 4 have been/are to be incorporated into the noise assessment. Noise mitigation measures to be implemented will vary for reasons such as safety and space constraints, these are to be identified and the calculations adjusted accordingly.
 - For location specific construction scenarios and where applicable for generic scenarios, include the effects of noise shielding provided by site offices, residential fences, noise barriers or natural topographic features.
 - Where applicable include the effects of noise reflections and ground attenuation.
 - Calculate the L_{Aeq} noise or range of levels from construction scenarios at sensitive receiver groups, with the use of noise contour maps where appropriate and/or at 10 m, 25 m, 50 m, 75 m, 100 m and 200 m for more general construction activities.
 - Compare these against the goals identified for each NSR and identify predicted exceedances.
 - For night-time activities, calculate exceedances over the:
 - $L_{Aeq,15min}$ 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and
 - LAF_{max} 52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater.
- Where exceedances are predicted to occur, undertake a detailed maximum noise level event assessment in accordance with the Noise Policy for Industry (EPA, 2017).
- On completion of all DNVIS reports for the subjective classification of the noise impact is to be evaluated and documented as:
 - Low Impact
 - Moderate Impact
 - High Impact

The classifications are to be determined on a case-by-case basis with consideration of the following points:

- The location of the works in relation to NSRs with consideration of noise attenuation features such as noise barriers including topographical features (earth-mounds), buildings, dividing fences etc (distance of works from sensitive receiver(s)).
- The type and sensitivity of the NSRs:
 - Low Impact: e.g. Commercial buildings/ Scattered Residential (low density)

- Moderate Impact: e.g. Standard residential (typical density)
- High Impact: e.g. Residential home for the elderly/high density unit blocks/persistent complainers/residents deemed to have “construction noise fatigue”.
- Land use zoning and planning amenity objectives for the area.
- Construction and architectural design of impacted building, particularly the presence of any existing noise mitigation including that provided under a Noise Abatement Program or required by the ISEPP, Council DCP or other planning instrument.
- Existing ambient levels.
- The extent of noise exceedance above Noise Management Level.
- The likelihood for potential sleep disturbance (as described in the NPfI).
- The type of and intensity of noise emitted from works (i.e. tonal or impulsive):
 - Lower Impact: No high noise and/or vibration intensive activities
 - Moderate Impact: Short/intermittent high noise and/or vibration intensive activities
 - High Impact: Prolonged high noise and/or vibration intensive activities.
- The duration of any OOHW required.
- The time frames for any OOHW:
 - Lower Impact: 6.00 pm till 10.00 pm weekdays 1.00 pm till 10.00pm Saturdays 8.00 am till 6.00 pm Sundays or Public Holidays.
 - Moderate Impact: 10.00 pm to 7.00 am Weekday Nights 10.00 pm to 8.00 am Saturdays.
 - High Impact: 6.00 pm to 7.00 am Sundays and Public Holidays.
- As a result of noise classification and/or the noise level exceedances at sensitive receivers provided by the DNVIS reports, appropriate reasonable and feasible noise mitigation is to be adopted and implemented. For sites where works are predicted to significantly exceed noise goals and impact on receivers for a significant period of time, additional reasonable and feasible noise mitigation measures such as those outlined in Section 5 would be considered if practical to reduce the noise levels and impact on sensitive receivers.

3.2. General Noise and Vibration Impact Assessments

For works other than those carried out under an SSI Approval a more generalised approach is adopted to assess impacts, this is called a GNVIS. These assessments rely upon indicative Sound Power Level's from typical plant and equipment (Table 8), auditing of plant and equipment during delivery, and typical variables that modify the transmission of noise and vibration to determine a predicted impact at the most affected NSR.

Where a change occurs in relation to works described in a GNVIS, it will be updated and resubmitted to Sydney Metro for approval. For example, works during standard working hours being rescheduled outside standard working hours.

The first step in the GNVIS is to determine the relevant period of time during which the works will occur. This is either during standard working hours, or outside standard working hours

during daytime, evening or night. Depending on the timeframe there will be differing Noise Management Levels for the activity. Section 2.2 outlines how Noise Management levels (NML) are calculated.

Secondly, Table 8 is used to determine the Sound Power Level (SWL) of the Noisiest piece of Plant or Equipment. Each piece of plant or equipment is required by this standard to be audited regularly and the SWL confirmed to fall within the range indicated in Table 13 or Table 14.

Table 8 - Indicative SWL's for GNVIS Assessments

| Plant/Equipment Noise Level at 10m | | dBA |
|---|---|-----|
| Including non-continuous use reduction (-5dBA) and annoying activity penalty (+5dBA) for as per ICNG (refer to ICNG Appendix B for predicted noise level data). | Impact sheet piling rig | 100 |
| | Hand-held tamper, excavator with hammer, rock-breaker, driven/vibratory piling, concrete saw, diamond saw, air track drill, large dozer, hand-held rail grinder | 95 |
| | Jackhammer, rock crusher, angle grinder, pneumatic hammer, medium dozer, tracked loader, impact wrench | 90 |
| | Mainline tamper, ballast regulator, dynamic track stabiliser, vibratory roller, mainline rail grinder, ballast train (pour/fill ballast), chainsaw, tub grinder/large mulcher, scraper, grader, super-sucker/vacuum truck, large backhoe/wheeled front-end loader, bored piling, pavement profiler, fixed crane, tracked excavator | 85 |
| | Small bulldozer, small excavator, tower crane, truck-mounted crane, forklift, bobcat, skid-steer front-end loader, road truck/truck and dog, dump truck, concrete truck/pump/mixer, compressor, non-vibratory/large pad foot roller, whacker packer/compactor, water cart, pavement laying machine, asphalt truck and sprayer, line marking truck, standard penetration testing, welder, pin puller | 80 |
| | Concrete vibrator, cherry-picker scissor lift/elevated work platform/Franna crane, small backhoe, front end loader, fence post driver, electric drill rig, hand held rattle gun, generator (diesel/petrol), spreader | 75 |
| | Lighting tower, medium-rigid truck/semi-trailer, welding equipment, small front end loader | 70 |
| | Light vehicle, hand-tools (no impact), small cement mixer, attenuated generator (inside housing) | 65 |

Thirdly, the nearest residential and non-residential sensitive receivers are identified that are closest to the point at which the noisiest piece of plant or equipment will be operated.

Lastly, a series of factors are considered which have either exacerbating or mitigating effects (Table 10) on the transmission of noise and vibration to arrive at a predicted noise level at both the residential and non-residential receiver. The predicted level is then compared against the NML and an exceedance is calculated. The receiver with the highest exceedance determines the level of Additional Mitigation Measures which must be considered (see Section 5).

All this information is collated into a table similar to Table 9 below.

Table 9 - GNVIS Calculations

| Period | Noisiest Plant/Equipment SWL | Receiver Type | Enter the most applicable values from Table 8 , then add to determine the Predicted Noise Level | | | | Predicted Noise Level (1 + 2 + 3 + 4) | NML | Exceedance (Predicted Noise Level minus NML) |
|------------------|------------------------------|-----------------|--|-----------------------------|--------------------|-------------------------|---------------------------------------|-----|---|
| | | | 1. Plant/Equipment Noise Level | 2. Multiple Plant/Equipment | 3. Local Screening | 4. Distance Attenuation | | | |
| Standard Hours | | Residential | | | | | | | |
| | | Non-Residential | | | | | | | |
| Daytime OOH * | | Residential | | | | | | | |
| | | Non-Residential | | | | | | | |
| Evening OOH * | | Residential | | | | | | | |
| | | Non-Residential | | | | | | | |
| Night Time OOH * | | Residential | | | | | | | |
| | | Non-Residential | | | | | | | |

Table 10 - Exacerbating and Mitigating Factors

| Exacerbating and Mitigating Factors | | dBA |
|-------------------------------------|--|------|
| Multiple Plant | More than one of the noisiest plant being used simultaneously at roughly the same location | +5 |
| Local Screening | Existing screening between site and receiver (buildings, cuttings, canopies, etc.) | - 5 |
| | Temporary screening to be implemented near work site | - 10 |
| | Acoustic shed or enclosure | - 25 |
| Distance Attenuation | < 10 metres | 0 |
| | 10 to 20 metres | - 5 |
| | 20 to 35 metres | - 10 |
| | 35 to 60 metres | - 15 |
| | 60 to 100 metres | - 20 |
| | 100 to 180 metres | - 25 |
| | 180 to 350 metres | - 30 |
| | 350 to 1,000 metres | - 40 |

3.3. Noise and Vibration Sensitive Receivers

The sensitivity of occupants to noise and vibration varies according to the nature of the occupancy and the activities performed within the affected premises. For example, recording studios are more sensitive to vibration and ground borne noise than residential premises, which in turn are more sensitive than typical commercial premises.

Specific noise and vibration sensitive receivers (NSRs) relevant to individual construction sites would be identified and addressed in the Environmental Assessment of each Sydney Metro project. Each receiver would be identified as falling into one of the following categories:

- Commercial

- Educational
- Industrial
- Mixed residential/commercial
- Residential
- Residential occupied by shift workers
- Place of Worship
- Medical facilities
- Other sensitive receivers

3.4. Ground-Borne (Regenerated) Noise

Ground-borne noise as a result of construction activities is usually associated with tunnelling projects where equipment such as tunnel boring machines, road headers, rock hammers and drilling rigs are operated underground. It is therefore anticipated that ground-borne noise may be an issue during the construction of Sydney Metro projects.

If NSR's may be affected by ground-borne noise as a result of construction activities, a DNVIS or GNVIS report specifically in relation to the assessment of ground-borne construction noise would be undertaken.

In undertaking a DNVIS or GNVIS report for ground-borne construction noise the following steps are to be taken:

- Identify and quantify if necessary, any significant extraneous sources of ground-borne noise.
- Determine the location of each plant and equipment item in relation to each receiver.
- On the basis of ground-borne noise versus distance prediction algorithms for each plant item, determine the level of ground-borne noise at each building location. For highly sensitive building occupancies, such as recording studios, the assessment may need to incorporate the acoustic properties of the building space and the structural response of the building. This is to be determined by a qualified acoustic consultant, should ground-borne noise be a potential issue.
- Include the effect of all relevant standard mitigation measures as part of the construction scenario.
- Calculate the $L_{Aeq}(15\text{minute})$ noise levels from the proposed construction activities at each receiver and compare these to the ground-borne noise management levels.

3.5. Ground-Borne Vibration

Vibration as a result of construction activities is usually associated with tunnelling projects where equipment such as tunnel boring machines, road headers, rock hammers and drilling rigs are operated underground. It is therefore anticipated that ground-borne vibration may be an issue during the construction of Sydney Metro projects.

If vibration impacts are anticipated as a result of construction activities, a DNVIS or GNVIS report specifically in relation to the assessment of construction vibration would be undertaken.

In undertaking a DNVIS or GNVIS report for ground-borne construction vibration the following steps are to be taken:

- Determine the location of each plant and equipment item in relation to each receiver.
- On the basis of ground-borne vibration versus distance prediction algorithms for each plant item, determine the level of ground-borne vibration at each building location. For highly sensitive building occupancies, such as recording studios, the assessment may need to incorporate the vibration properties of the building space and the structural response of the building. This is to be determined by a qualified acoustic consultant, should ground-borne vibration be a potential issue.
- Include the effect of all relevant standard mitigation measures as part of the construction scenario.

Calculate the vibration levels from the proposed construction activities at each receiver and compare these to the ground-borne vibration criteria.

3.6. Vibration and Overpressure from Blasting

Vibration and overpressure as a result of construction activities is usually associated with tunnelling projects where blasting is required. If this construction is implemented then vibration and overpressure may be an issue during the construction of Sydney Metro projects.

If vibration and overpressure impacts are anticipated as a result of construction blasting, a DNVIS report, specifically in relation to the assessment of construction blasting would be undertaken regardless of the projects planning approval pathway.

In undertaking a DNVIS report for blasting vibration and overpressure the following steps are to be taken:

- Determine the location of blast charge in relation to each receiver.
- On the basis of vibration / overpressure versus distance prediction algorithms for blasting determine the level of vibration / overpressure at each receiver (building) location.
- Include the effect of all relevant standard mitigation measures as part of the construction scenario.

Calculate the vibration and overpressure levels from the proposed blasting activities at each receiver and compare these to the blasting criteria.

4. STANDARD NOISE AND VIBRATION MITIGATION MEASURES

4.1. Minimum Requirements

This section sets out the standard construction noise and vibration mitigation measures to be implemented on all Sydney Metro projects and delivered via relevant procedures, systems, environmental assessment, construction environmental management and all relevant contract documentation.

For all Sydney Metro construction projects, the standard mitigation measures in **Table 11** shall be applied by default where feasible and reasonable in order to minimise the potential noise and vibration impacts at the surrounding Noise Sensitive Receivers. The effect of applying standard mitigation measures may be considered in noise and vibration assessments to achieve NML's.

4.1.1. Management Strategies during Construction

- Construction hours would be in accordance with the ICNG, project approvals and the EPL if required, except where otherwise specified in an approved noise management plan.
- When working adjacent to schools, medical facilities and childcare centres, particularly noisy activities would be scheduled outside normal working hours, where feasible and reasonable.
- When working adjacent to churches and places of worship particularly noisy activities would be scheduled outside services, where feasible and reasonable.
- Avoiding the coincidence of noisy plant working simultaneously close together and adjacent to sensitive receivers will result in reduced noise emissions.
- Where feasible and reasonable, the offset distance between noisy plant items and nearby noise sensitive receivers would be as great as possible.
- Regular compliance checks on the noise emissions of all plant and machinery used for the project would indicate whether noise emissions from plant items were higher than predicted. This also identifies defective silencing equipment on the items of plant.
- Ongoing noise monitoring during construction at sensitive receivers during critical periods (i.e. times when noise emissions are expected to be at their highest - e.g. piling and hammering) to identify and assist in managing high risk noise events.
- Where feasible and reasonable heavy vehicle movements would be limited to daytime hours.
- The implementation of procedures to maximise the night-time onsite spoil storage capacity where spoil is produced between the hours of 10.00 pm and 7.00 am.
- Where feasible and reasonable, there will be coordination with any required ancillary works (utility relocations etc.) to minimise overall noise impacts and to avoid scheduling such activities during planned respite periods.

4.1.2. Site Induction for all Employees, Contractors and Subcontractors

The site induction would include the following as a minimum:

- All relevant project specific and standard noise and vibration mitigation measures
- Relevant licence and approval conditions
- Permissible hours of work
- Any limitations on high noise generating activities
- Location of nearest sensitive receivers
- Construction employee parking areas
- Designated loading/unloading areas and procedures
- Site opening/closing times (including deliveries)
- Identification of activities likely to cause complaint
- Environmental incident reporting and management procedures

4.1.3. Source Noise Control Strategies

- Engines and exhausts are typically the dominant noise sources on mobile plant such as cranes, graders, excavators, heavy vehicles, etc. In order to minimise noise emissions, residential grade mufflers would be fitted on all mobile plant utilised on Sydney Metro construction projects.
- The use of damped hammers is recommended such as the 'City' model Rammer hammers. These reduce the 'ringing' of the rock pick, cylinder and excavator arm that is commonly associated with rock breaking works. Approximately 10 dB attenuation can be achieved compared to undamped hammers of the same size.
- Regular maintenance of all plant and machinery used for the project will assist in minimising noise emissions, including the reporting of the results.
- Acoustic enclosure of plant items, if required, as identified during compliance monitoring.
- Use of engine exhaust brakes should be avoided where possible. Air brake silencers would be correctly installed and fully operational for any heavy vehicle that approaches and uses any Sydney Metro construction site.
- Non-tonal reversing alarms would be used for all permanent mobile plant operating on Sydney Metro construction projects. Whilst the use of non-tonal reversing alarms is suggested to ensure noise impacts are minimised, it is noted that OH&S requirements must also be fully satisfied.

4.1.4. Noise Barrier Control Strategies

Temporary noise barriers are recommended between the noise sources and nearby potentially affected noise sensitive receivers, wherever feasible. Typically, 5 dB to 15 dB attenuation can be achieved with a well designed and constructed barrier.

4.1.5. Acoustic Enclosures

Where significant noise impacts are predicted and/or long periods of construction works are planned, acoustic enclosures can be used as an effective mitigation method. Acoustic enclosures act to contain the sources of noise, whilst also providing the benefit of screening the construction site from view. An enclosure with no openings would be expected to provide attenuation the order of 20 dB.

4.1.6. Vibration Control Strategies

Attended vibration measurements are required at the commencement of vibration generating activities to confirm that vibration levels satisfy the criteria for that vibration generating activity. Where there is potential for exceedances of the criteria further vibration site law investigations would be undertaken to determine the site-specific safe working distances for that vibration generating activity. Continuous vibration monitoring with audible and visible alarms would be conducted at the nearest sensitive receivers whenever vibration generating activities need to take place inside the calculated safe-working distances.

4.1.7. Community Consultation

Active community consultation and the maintenance of positive, cooperative relationships with schools, local residents and building owners and occupiers assists in managing impacts from noisier operations and in alleviating concerns and thereby minimising disturbance and complaint. This includes, for example:

- Periodic notification of work activities and progress (e.g. regular letterbox drops, e-consult)
- Specific notification (letter-box drop) prior to especially noisy activities
- Comprehensive website information
- Project information and construction response telephone line
- Email distribution list

4.2. Summary of the Standard Mitigation Measures

The actions set out in **Table 11** must be implemented on all Sydney Metro construction projects.

Table 11: Standard Mitigation Measures to Reduce Construction Noise and Vibration

| Action required | Applies to | Details |
|---|--|--|
| Management Measures | | |
| Implementation of any project specific mitigation measures required | Airborne noise Ground-borne noise and vibration | In addition to the measures set out in this table, any <i>project specific</i> mitigation measures identified in the environmental assessment documentation (e.g. EA, REF, submissions or representations report) or approval or licence conditions must be implemented. |

| Action required | Applies to | Details |
|---|--|---|
| Implement community consultation measures | Airborne noise Ground-borne noise and vibration | Periodic Notification (monthly letterbox drop) ¹ Website Project information and construction response telephone line Email distribution list Place Managers |
| Register of Noise Sensitive Receivers | Airborne noise Ground-borne noise and vibration | A register of all noise and vibration sensitive receivers (NSRs) would be kept on site. The register would include the following details for each NSR: <ul style="list-style-type: none"> • Address of receiver • Category of receiver (e.g. Residential, Commercial etc.) • Contact name and phone number |
| Site inductions | Airborne noise Ground-borne noise and vibration | All employees, contractors and subcontractors are to receive an environmental induction. The induction must at least include: <ul style="list-style-type: none"> • All relevant project specific and standard noise and vibration mitigation measures • Relevant licence and approval conditions • Permissible hours of work • Any limitations on high noise generating activities • Location of nearest sensitive receivers • Construction employee parking areas • Designated loading/unloading areas and procedures • Site opening/closing times (including deliveries) • Environmental incident procedures |
| Behavioural practices | Airborne noise | No swearing or unnecessary shouting or loud stereos/radios; on site. No dropping of materials from height; throwing of metal items; and slamming of doors. No excessive revving of plant and vehicle engines Controlled release of compressed air. |
| Monitoring | Airborne noise Ground-borne noise and vibration | A noise monitoring program is to be carried out for the duration of the works in accordance with the Construction Noise and Vibration Management Plan and any approval and licence conditions. |

¹ Detailing all upcoming construction activities at least 14 days prior to commencement of relevant works

| Action required | Applies to | Details |
|---|--|--|
| Attended vibration measurements | Ground-borne vibration | Attended vibration measurements are required at the commencement of vibration generating activities to confirm that vibration levels satisfy the criteria for that vibration generating activity. Where there is potential for exceedances of the criteria further vibration site law investigations would be undertaken to determine the site-specific safe working distances for that vibration generating activity. Continuous vibration monitoring with audible and visible alarms would be conducted at the nearest sensitive receivers whenever vibration generating activities need to take place inside the applicable safe-working distances. |
| Source Controls | | |
| Construction hours and scheduling | Airborne noise Ground-borne noise and vibration | Where feasible and reasonable, construction would be carried out during the standard daytime working hours. Work generating high noise and/or vibration levels would be scheduled during less sensitive time periods. |
| Construction respite period | Ground-borne noise and vibration Airborne noise | High noise and vibration generating activities ² may only be carried out in continuous blocks, not exceeding 3 hours each, with a minimum respite period of one hour between each block ³ . |
| Equipment selection | Airborne noise Ground-borne noise and vibration | Use quieter and less vibration emitting construction methods where feasible and reasonable. For example, when piling is required, bored piles rather than impact-driven piles will minimise noise and vibration impacts. Similarly, diaphragm wall construction techniques, in lieu of sheet piling, will have significant noise and vibration benefits. |
| Maximum noise levels | Airborne-noise | The noise levels of plant and equipment must have operating Sound Power Levels compliant with the criteria in Table 13 . |
| Rental plant and equipment | Airborne-noise | The noise levels of plant and equipment items are to be considered in rental decisions and in any case cannot be used on site unless compliant with the criteria in Table 13 . |
| Plan worksites and activities to minimise noise and vibration | Airborne noise Ground-borne vibration | Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site. |
| Non-tonal reversing alarms | Airborne noise | Non-tonal reversing beepers (or an equivalent mechanism) must be fitted and used on all construction vehicles and mobile plant regularly used on site and for any out of hours work. |

² Includes jack and rock hammering, sheet and pile driving, rock breaking and vibratory rolling.

³ "Continuous" includes any period during which there is less than a 60 minutes respite between ceasing and recommencing any of the work.

| Action required | Applies to | Details |
|---|----------------|--|
| Minimise disturbance arising from delivery of goods to construction sites | Airborne noise | <p>Loading and unloading of materials/deliveries is to occur as far as possible from NSRs</p> <p>Select site access points and roads as far as possible away from NSRs</p> <p>Dedicated loading/unloading areas to be shielded if close to NSRs</p> <p>Delivery vehicles to be fitted with straps rather than chains for unloading, wherever feasible and reasonable</p> |
| Path Controls | | |
| Shield stationary noise sources such as pumps, compressors, fans etc | Airborne noise | <p>Stationary noise sources would be enclosed or shielded whilst ensuring that the occupational health and safety of workers is maintained.</p> <p>Appendix F of AS 2436: 1981 lists materials suitable for shielding.</p> |
| Shield sensitive receivers from noisy activities | Airborne noise | <p>Use structures to shield residential receivers from noise such as site shed placement; earth bunds; fencing; erection of operational stage noise barriers (where practicable) and consideration of site topography when siting plant.</p> |

Table 12: Minimum Requirements for Construction Methods

| Method | Minimum Requirements |
|-------------------------------|---|
| Excavator | Ensure that the Sound Power Levels given in Table 13 have been met. |
| Truck | Ensure that the Sound Power Levels given in Table 13 have been met. |
| Rock breakers and jackhammers | <p>Ensure that the Sound Power Levels given in Error! Reference source not found. have been met.</p> <p>Noise and vibration monitoring would be conducted at the nearest identified NSR where exceedances of the criteria have been predicted.</p> |
| PCF | <p>Where it has been predicted that vibration / regenerated noise is likely to be in excess of the nominated goals, specific notification would be given to all NSRs a minimum of 2 weeks prior to a shot being fired.</p> <p>Vibration and overpressure monitoring would be conducted at the nearest identified NSR.</p> |
| Blasting | <p>Where it has been predicted that vibration / overpressure is likely to be in excess of the nominated goals, specific notification would be given to all NSRs a minimum of 2 weeks prior to a shot being fired.</p> <p>Vibration and overpressure monitoring would be conducted at the nearest identified NSR.</p> |
| TBM | Noise and vibration monitoring would be conducted at the nearest identified NSR where levels are expected to exceed the relevant noise and vibration goals. |
| Road headers | Noise and vibration monitoring would be conducted at the nearest identified NSR where levels are expected to exceed the relevant noise and vibration goals. |

4.3. Maximum Allowable Plant Sound Power Levels

Plant or equipment operating on Sydney Metro project construction sites shall have an operating sound power level (SWL) which is no higher than the corresponding SWL presented in **Table 13** unless justified. The SWLs presented in **Table 13** have been compiled from a selection of field measurements conducted between 2004 and 2008 of plant and equipment operating on large construction projects throughout NSW and are therefore considered to be representative of plant and equipment SWLs which are readily achieved by current plant and equipment normally used in the construction industry.

Table 13: Maximum Allowable Sound Power Levels for Construction Equipment

| Equipment | Maximum Allowable Sound Power Level (dB) L _{Amax} | Maximum Allowable Sound Pressure Level (dB) L _{Amax} at 7 m |
|---------------------------------------|--|--|
| Excavator Hammer | 118 | 93 |
| Excavator (approx. 3 tonne) | 90 | 65 |
| Excavator (approx. 6 tonne) | 95 | 70 |
| Excavator (approx. 10 tonne) | 100 | 75 |
| Excavator (approx. 20 tonne) | 105 | 80 |
| Excavator (approx. 30 tonne) | 110 | 85 |
| Excavator (approx. 40 tonne) | 115 | 90 |
| Skidsteer Loaders (approx. 1/2 tonne) | 107 | 82 |
| Skidsteer Loaders (approx. 1 tonne) | 110 | 85 |
| Dozer (tracking) - equiv. CAT D8 | 118 | 93 |
| Dozer (tracking) - equiv. CAT D9 | 120 | 95 |
| Dozer (tracking) - equiv. CAT D10 | 121 | 96 |
| Backhoe/FE Loader | 111 | 86 |
| Dump Truck (approx. 15 tonne) | 108 | 83 |
| Concrete Truck | 112 | 87 |
| Concrete Pump | 109 | 84 |
| Concrete Vibrator | 105 | 80 |
| Bored Piling Rig | 110 | 85 |
| Scraper | 110 | 85 |
| Grader | 110 | 85 |
| Vibratory Roller (approx. 10 tonne) | 114 | 89 |
| Vibratory Pile Driver | 121 | 96 |
| Impact Piling Rig | 134 | 109 |
| Compressor (approx. 600 CFM) | 100 | 75 |
| Compressor (approx. 1500 CFM) | 105 | 80 |
| Concrete Saw | 118 | 93 |
| Jackhammer | 113 | 88 |
| Generator | 104 | 79 |
| Lighting Tower | 80 | 55 |
| Flood Lights | 90 | 65 |

| Equipment | Maximum Allowable Sound Power Level (dB) LAmax | Maximum Allowable Sound Pressure Level (dB) LAmax at 7 m |
|---------------|--|--|
| Cherry Picker | 102 | 77 |
| Mobile Crane | 110 | 85 |

Where an item of construction equipment is not listed in **Table 13**, generic sound power levels presented in **Table 14** may be adopted.

Table 14: Generic Equipment or System Sound Power Level Limit¹

| Equipment | Maximum Allowable Sound Power Level (dB) LAmax | Maximum Allowable Sound Pressure Level (dB) LAmax at 7 m |
|--|--|--|
| Motorised (<25kW) | 90 | 65 |
| Motorised (<50kW) | 95 | 70 |
| Motorised (<100kW) | 100 | 75 |
| Motorised (<200kW) | 105 | 80 |
| Motorised (>200kW) | 110 | 85 |
| All other Auxiliary Equipment or Systems | 90 | 65 |

Note 1: Sound Power Levels in dBA relative to 10 pW.

4.4. Auditing and Monitoring

All significant noise generating items of plant would have noise audits conducted upon arrival at a Sydney Metro construction site and at 6 month intervals thereafter. The purpose of these audits is to validate that individual items of plant and equipment fall within the Sound Power Level ranges identified in **Table 13**.

Where it has been identified within this strategy that noise and/or vibration monitoring is required at the nearest sensitive receiver; however, the nearest sensitive receiver has refused monitoring at their property, monitoring would be undertaken at the near point to that receiver within the site boundary or at another suitable location determined by an acoustic consultant.

5. ADDITIONAL NOISE AND VIBRATION MITIGATION MEASURES

The implementation of the standard management measures, compliance with maximum sound power levels for plant and equipment, construction hour management and standard community consultation measures in this Strategy should significantly reduce the noise and vibration impacts on nearby sensitive receivers.

Nevertheless, due to the highly variable nature of construction activities and the likelihood of work outside the standard construction hours on Sydney Metro projects, some exceedances of the construction noise and vibration management levels are likely to be unavoidable.

Where there is a potential exceedance of the construction noise and vibration management levels, a number of additional measures to mitigate such exceedances – primarily aimed at pro-active engagement with affected sensitive receivers – would be explored and have been included in this Strategy. The additional mitigation measures to be applied are outlined in **Table 15**.

Table 15: Additional Management Measures

| Measure | Description | Abbreviation |
|--------------------------------|--|--------------|
| Alternative accommodation | Alternative accommodation options may be provided for residents living in close proximity to construction works that are likely to incur unreasonably high impacts over an extended period of time. Alternative accommodation will be determined on a case-by-case basis. | AA |
| Monitoring | Where it has been identified that specific construction activities are likely to exceed the relevant noise or vibration goals, noise or vibration monitoring may be conducted at the affected receiver(s) or a nominated representative location (typically the nearest receiver where more than one receiver have been identified). Monitoring can be in the form of either unattended logging or operator attended surveys. The purpose of monitoring is to inform the relevant personnel when the noise or vibration goal has been exceeded so that additional management measures may be implemented. | M |
| Individual briefings | Individual briefings are used to inform stakeholders about the impacts of high noise activities and mitigation measures that will be implemented. Communications representatives from the contractor would visit identified stakeholders at least 48 hours ahead of potentially disturbing construction activities. Individual briefings provide affected stakeholders with personalised contact and tailored advice, with the opportunity to comment on the project. | IB |
| Letter box drops | For each Sydney Metro project, a newsletter is produced and distributed to the local community via letterbox drop and the project mailing list. These newsletters provide an overview of current and upcoming works across the project and other topics of interest. The objective is to engage and inform and provide project-specific messages. Advanced warning of potential disruptions (e.g. traffic changes or noisy works) can assist in reducing the impact on the community. Content and newsletter length is determined on a project-by-project basis. Most projects distribute notifications on a monthly basis. Each newsletter is graphically designed within a branded template. | LB |
| Project specific respite offer | The purpose of a project specific respite offer is to provide residents subjected to lengthy periods of noise or vibration respite from an ongoing impact. | RO |

| Measure | Description | Abbreviation |
|------------------------|---|--------------|
| Phone calls and emails | Phone calls and/or emails detailing relevant information would be made to identified/affected stakeholders within 7 days of proposed work. Phone calls and/or emails provide affected stakeholders with personalised contact and tailored advice, with the opportunity to provide comments on the proposed work and specific needs etc. | PC |
| Specific notifications | Specific notifications would be letterbox dropped or hand distributed to identified stakeholders no later than 7 days ahead of construction activities that are likely to exceed the noise objectives. This form of communication is used to support periodic notifications, or to advertise unscheduled works. | SN |

5.1. Applying Additional Mitigation Measures

In circumstances where following application of the standard mitigation measures, the $L_{Aeq}(15\text{minute})$ construction noise and vibration levels are still predicted to exceed the Noise Management Level, the relevant Additional Mitigation Measures (AMM) are considered to determine any offset strategies for these impacts (**Table 16**).

The following steps need to be carried out to determine the Additional Mitigation Measures to be implemented:

- Determine the duration (time period) when the work is to be undertaken.
- Determine the level of exceedance above the NML.
- From the AMM table, identify the additional mitigation measures to be implemented (abbreviation codes are explained in **Table 15**).

Table 16: Additional Mitigation Measures – Airborne Construction Noise

| Time Period | | Mitigation Measures | | | |
|----------------|---------------------------------|--|---------------|---------------------------|---------------------------|
| | | Predicted L_{Aeq} (15minute) noise level Above NML | | | |
| | | 0 to 10 dB | 10 to 20 dB | 20 to 30 dB | > 30 dB |
| Standard | Mon-Fri (7.00 am - 6.00 pm) | - | LB | LB, M, SN | LB, M, SN |
| | Sat (8.00 am - 1.00 pm) | | | | |
| | Sun/Pub Hol (Nil) | | | | |
| OOHW (Evening) | Mon-Fri (6.00 pm - 10.00 pm) | LB | LB, M | LB, M, SN, RO | LB, M, SN, IB, PC, RO |
| | Sat (1.00 pm - 10.00 pm) | | | | |
| | Sun/Pub Hol (8.00 am - 6.00 pm) | | | | |
| OOHW (Night) | Mon-Fri (10.00 pm - 7.00 am) | LB | LB, M, SN, RO | LB, M, SN, IB, PC, RO, AA | LB, M, SN, IB, PC, RO, AA |
| | Sat (10.00 pm - 8.00 am) | | | | |
| | Sun/Pub Hol (6.00 pm - 7.00 am) | | | | |

Table 17: Additional Mitigation Measures – Ground Borne Construction Noise

| Time Period | | Mitigation Measures | | |
|-------------------|---------------------------------|---|------------------------------|------------------------------|
| | | Predicted LAeq (15minute) noise level Above NML | | |
| | | 0 to 10 dB | 10 to 20 dB | > 20 dB |
| Standard | Mon-Fri (7.00 am - 6.00 pm) | No NML for GBN during standard hours, refer to Table 18 | | |
| | Sat (8.00 am - 1.00 pm) | | | |
| | Sun/Pub Hol (Nil) | | | |
| OOHW (Evening) | Mon-Fri (6.00 pm - 10.00 pm) | LB | LB, M, SN | LB, M, SN, IB, PC, RO |
| | Sat (1.00 pm - 10.00 pm) | | | |
| | Sun/Pub Hol (8.00 am - 6.00 pm) | | | |
| OOHW (Night) | Mon-Fri (10.00 pm - 7.00 am) | LB, M, SN | LB, M, SN, IB, PC, RO, AA | LB, M, SN, IB, PC, RO, AA |
| | Sat (10.00 pm - 8.00 am) | | | |
| | Sun/Pub Hol (6.00 pm - 7.00 am) | | | |

Table 18: Additional Mitigation Measures - Ground-borne Vibration

| Time Period | | Mitigation Measures |
|-------------------|---------------------------------|--|
| | | Predicted Vibration Levels Exceed Maximum Levels |
| Standard | Mon-Fri (7.00 am - 6.00 pm) | LB, M, RO |
| | Sat (8.00 am - 1.00 pm) | |
| | Sun/Pub Hol (Nil) | |
| OOHW (Evening) | Mon-Fri (6.00 pm - 10.00 pm) | LB, M, IB, PC, RO, SN |
| | Sat (1.00 pm - 10.00 pm) | |
| | Sun/Pub Hol (8.00 am - 6.00 pm) | |
| OOHW (Night) | Mon-Fri (10.00 pm - 7.00 am) | LB, M, IB, PC, RO, SN, AA |
| | Sat (10.00 pm - 8.00 am) | |
| | Sun/Pub Hol (6.00 pm - 7.00 am) | |

6. MONITORING, AUDITING AND REPORTING

6.1. Plant Noise Auditing, Compliance Evaluation and Reporting

In order to compare the noise levels of plant and equipment with the values in **Section 4.3**, the following guidelines are recommended:

- Measurements of Sound Pressure Level (SPL) at 7 m (with plant or equipment stationary) shall be undertaken using procedures that are consistent with the requirements of Australian Standard AS2012–1990 Acoustics – Measurement of Airborne Noise Emitted by Earthmoving Machinery and Agricultural Tractors – Stationary Test Condition Part 1: Determination of Compliance with Limits for Exterior Noise.
- Measurements of Sound Power Level (SWL) shall be determined using procedures that are consistent with the requirements of International Standard ISO 9614-2 1996 Acoustics – Determination of sound power levels of noise sources using sound intensity - Part 2: Measurement by scanning.
- If measuring the SPL at 7 m of moving plant, compliance measurements would be guided by the requirements of Australian Standard AS2012–1977 Method for Measurement of Airborne Noise from Agricultural Tractors and Earthmoving Machinery.

For all measurements, the plant or equipment under test would be measured while operating under typical operating conditions. If this is not practical, it may be appropriate to conduct a stationary test at high idle.

In the case of an exceedance in Sound Power Levels the item of plant would either be replaced, or the advice of an acoustic consultant would be sought to provide suitable mitigation measures, which may include:

- ensuring all bolts are tightened and no parts are loose
- cleaning and/or lubricating moving parts
- replacing old or worn parts
- implementing additional or upgrading existing muffling devices
- building enclosures around items of stationary plant (e.g. pumps or generators).

A register of measured sound power levels for each item of plant would be kept for reference where future noise audits are conducted. The register would be reviewed annually in conjunction with this strategy and corresponding revisions made to the Sound Power Levels presented in **Section 4.3** to represent contemporary plant noise emission levels.

6.2. Noise Monitoring

Where a DNVIS or GNVIS has been prepared for a Sydney Metro construction site and it has been predicted that noise levels may be in excess of the nominated construction noise goals at a noise sensitive receiver, noise monitoring would be conducted at:

- the affected receiver; or
- if more than one affected receiver has been identified, at the nearest affected receiver; or

- where the nearest affected receiver refuses noise monitoring on their property, at the near point to that receiver within the site boundary.
- If it can be demonstrated that direct measurement of noise from the construction site is impractical, alternative means of determining construction noise levels may be adopted in accordance with Chapter 7 of the Noise Policy for Industry.

All noise monitoring results would be assessed against the nominated noise goals and compiled into a report to be forwarded to the construction contractor and project manager. Reporting would be submitted to the construction contractor and project manager within one week of being undertaken or at weekly intervals for continuous monitoring. All noise monitoring reports would also be made available to the public through a publically accessible website.

6.3. Vibration Monitoring

Where it is anticipated that an item of plant will exceed the cosmetic damage criteria given in **Section 2.3.3**, vibration monitoring would be required at the nearest affected receiver. Where it is anticipated that an item of plant will exceed the human response / ground borne noise criteria and concerns have been raised regarding vibration, vibration monitoring would also be required at the receiver(s) under question.

All vibration monitoring results would be assessed against the nominated vibration goals and compiled into a report to be forwarded to the construction contractor and project manager. Reporting would be submitted to the construction contractor and project manager within one week of being undertaken or at weekly intervals for continuous monitoring. All vibration monitoring reports would also be made available to the public through the publically accessible website.

6.4. Blast Monitoring

As specified in the minimum requirements presented in **Section 3.6**, vibration and overpressure monitoring would be conducted for all PCF and blasting activities which take place on Sydney Metro construction sites.

Monitoring would be conducted as a minimum at the sensitive receiver(s) likely to receive the maximum vibration and/or overpressure emissions from the blast as identified by an acoustic consultant.

All blast monitoring results would be assessed against the nominated goals and compiled into a report to be forwarded to the construction contractor and project manager. All blast monitoring reports would also be made available to the public through the Sydney Metro website.

As the effect of vibration and overpressure from blasting have the potential to cause structural damage to buildings and services, accurate records of all blasts are required to be maintained. Such records would describe the location of the blast and all the blast holes, the design of the blast in terms of type of explosives, mass of explosives, initiating system used, ground vibration and overpressure measurement data.

Records of every blast would be kept for a minimum of seven years. A longer period of retention of the records may be warranted if a construction project is blasted over an extended or disrupted period.

For any section of tunnel construction where blasting is proposed, a series of initial trials at reduced scale shall be conducted prior to production blasting to determine site-specific blast response characteristics and to define allowable blast sizes to meet the airblast overpressure and ground vibration limits.

6.5. Dilapidation Surveys

If construction activities have the potential to cause damage through vibration to nearby public utilities, structures, buildings and their contents, an Existing Condition Inspection of these items is required to be undertaken in accordance with AS 4349.1 *“Inspection of Buildings”* except where a planning approval specifies an alternate process.

Prior to conducting the Existing Condition Inspections, the property owners will be advised of the inspection scope and methodology and the process for making a property damage claim. At the same time, maintain a register of all properties inspected and of any properties where owners refused the inspection offer.

The findings of all dilapidation surveys conducted for each Sydney Metro construction site would be compiled into a report to be forwarded to the construction contractor and project manager. Follow-up Condition Inspections would be required at the completion of certain major works (e.g. completion of shaft bulk excavation works).

7. COMPLAINT HANDLING

All complaints handling would be in accordance with the Sydney Metro Construction Complaints Management System.

8. COMMUNITY CONSULTATION AND LIAISON

All community consultation would be in accordance with relevant project communications plans.

9. DOCUMENTATION REQUIREMENTS

Any acoustic assessment, CNVIS or CNVMP undertaken for the Sydney Metro project must document the following as a minimum (where applicable):

- Acoustic Terminology / Glossary
- Overview of the Project / Works
- Secretary's Environmental Assessment Requirements
- EPL conditions (if applicable)
- Site Plan and Sensitive Receivers
- Ambient Noise Monitoring: methodology, locations, analysis and results
- Construction Noise and Vibration Criteria
 - Construction Airborne Noise Criteria
 - Construction Tunnelling Ground-borne Noise Criteria (if applicable)
 - Construction Ground-borne Noise Criteria
 - Construction Vibration Criteria
- Construction Noise and Vibration Assessment
 - Construction Airborne Noise Methodology / Predictions
 - Construction Tunnelling Ground-borne Noise Methodology / Predictions (if applicable)
 - Construction Ground-borne Noise Methodology / Predictions
 - Construction Vibration Methodology / Predictions
- Summary of Noise and Vibration Impacts
- Summary of all Standard and Additional Mitigation Measures
- References

All noise and vibration predictions are to be presented (as a minimum) as facade noise maps for a distance of at least 300 m in all directions from each work site / project area under assessment.

10. REFERENCES

Related Documents and References

- ANZEC, 1990, Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration. Australian and New Zealand Environment Council.
- APTA, 1981, Guidelines for Design of Rapid Transit Systems. American Public Transit Association.
- AS 2107, 2000, Acoustics - Recommended design sound levels and reverberation times for building interiors. Standards Australia.
- AS 2012 Part 1, 1990, Acoustics - Measurement of airborne noise emitted by earth-moving machinery and agricultural tractors - Stationary test condition - Determination of compliance with limits for exterior noise. Standards Australia.
- AS 2187, Part 2, 2006, Explosives - Storage and Use - Part 2: Use of Explosives. Standards Australia.
- AS 2436, 2010, Guide to Noise Control on Construction, Demolition and Maintenance Sites. Standards Australia.
- AS 4349, 2007, Inspection of buildings - General requirements. Standards Australia.
- BS 6472, 1992, Evaluation of Human Exposure Vibration in Buildings. The British Standards Institution.
- BS 7385 Part 2, 1993, Evaluation and Measurement for Vibration in Buildings Part 2. The British Standards Institution.
- Colin G. Gordon, 1999, Generic Vibration Criteria for Vibration-Sensitive Equipment. International Society for Optical Engineering.
- The Association of Australian Acoustical Consultants (AAAC) Technical Guideline on Child Care Centre Noise Assessments
- DECC, 1999, Environmental Criteria for Road Traffic Noise. NSW Environment Protection Authority.
- DEC, 2006, Assessing Vibration: a technical guideline. NSW Environment Protection Authority.
- DECC, 2009, Interim Construction Noise Guideline. NSW Environment Protection Authority.
- EN ISO 9641, Part 2, 1996, Acoustics - Determination of sound power levels of noise sources using sound intensity – Part 2: Measurement by scanning. International Organization for Standardization.
- EPA, 2017, NSW Noise Policy for Industry. NSW Environment Protection Authority.
- RTA, 2001, Environmental noise management manual, NSW Roads and Traffic Authority.
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Appendix G

Design Guidelines

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Sydney Metro - Western Sydney Airport

Design Guidelines

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- 1.6 Towards Aboriginal Cultural Design Principles for Sydney Metro - Western Sydney Airport
- 1.7 Customers
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- 1.10 A Commitment to Sustainability
- 1.11 Structure of the Guidelines
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4.4 Stabling and Maintenance and Ancillary Facilities

4.5 Service Facilities and Tunnel Portals

The background is a solid teal color. A diagonal trail of circles, in various shades of white, light blue, and pale green, starts from the bottom left and extends towards the top right, creating a sense of movement and depth.

Part 1

Introduction

1.1 Purpose of these Guidelines

The Guidelines establish the design standards for the Sydney Metro - Western Sydney Airport project (the project) by guiding the design of:

- The interface between stations and their surrounding locality, including:
 - Station entries
 - Transport interchange facilities (bicycle facilities, bus stops, kiss and ride, taxi ranks and connections to existing rail)
 - Landscaping and other public domain.
- Rail corridor works including tunnel, viaduct structures, viaducts, bridges, rail cuttings and embankments.
- Station and service buildings, including underground stations

Any development above, adjacent to or around Metro stations would be subject to a separate planning approval process and is not addressed in these guidelines.

The Guidelines have considered the strategic directions and/or urban design strategies of local and State government agencies, including *Better Placed - an integrated design policy for the built environment of New South Wales*. The Guidelines will be used by Transport for NSW (Transport for NSW) to guide the design development process for the project.



Concept for Central Station, Sydney

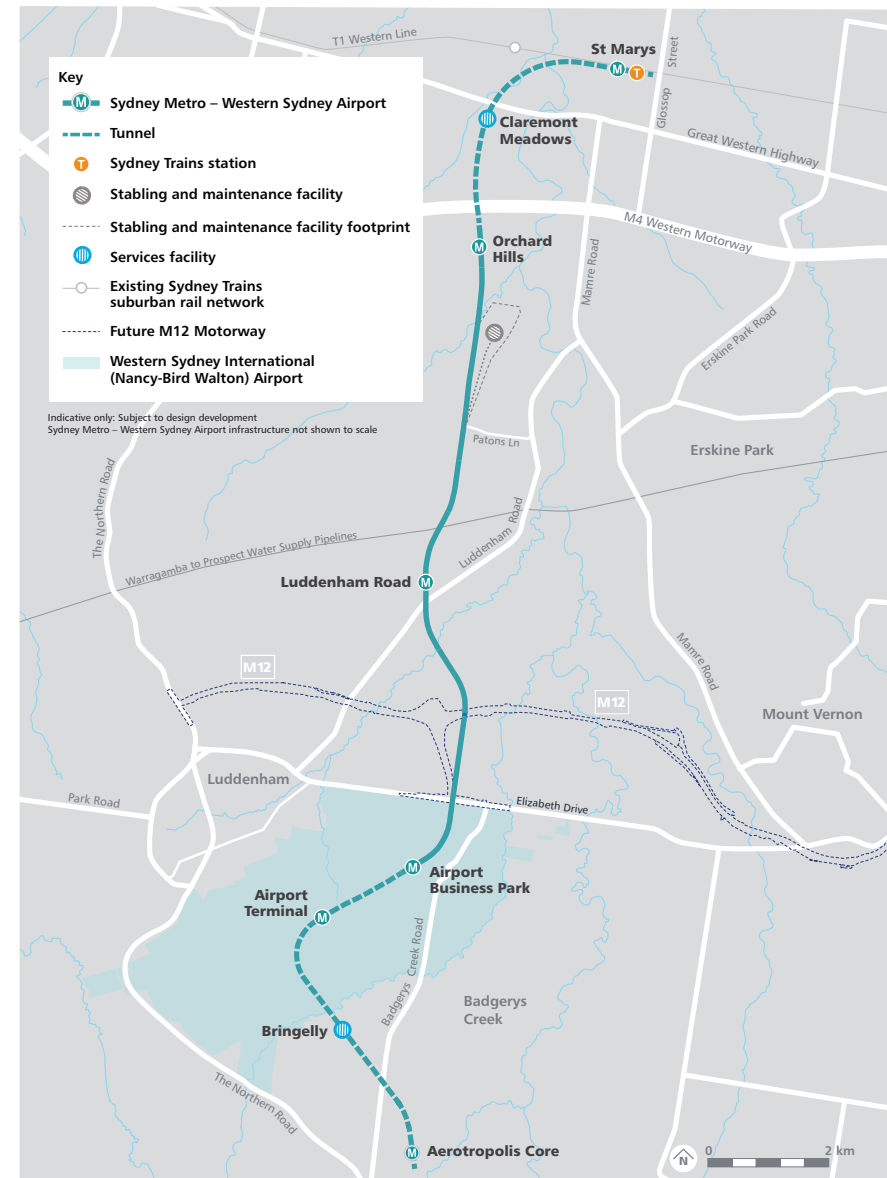
1.2 Project Scope

Sydney Metro - Western Sydney Airport involves the construction of a new metro rail line between St Marys and the Western Sydney Aerotropolis, servicing the new Western Sydney International Airport, currently under construction. The project will deliver six new metro stations at:

- St Marys
- Orchard Hills
- Luddenham Road
- Airport Business Park
- Airport Terminal
- Aerotropolis Core.

Key project features include:

- A new metro railway line around 23 kilometres in length between St Marys in the north and the Aerotropolis Core precinct in the south
- Around 4.3 kilometres of twin rail tunnels between St Marys and Orchard Hills
- Around 10 kilometres of rail alignment between Orchard Hills and Western Sydney International, consisting of a combination of viaduct and surface rail alignment
- Around two kilometres of surface rail alignment within Western Sydney International
- Around 3.3 kilometres of twin rail tunnels (including tunnel portal) within Western Sydney International
- Around three kilometres of twin rail tunnels between Western Sydney International and the Aerotropolis Core
- Convenient interchanges with other forms of transport including trains and buses.
- All stations will meet the needs of pedestrians, cyclists, customers catching or getting off buses and taxis, and people being dropped off and picked up in cars.
- Fully accessible stations with platform screen doors.
- New stations designed for passenger comfort including environmentally friendly features like natural ventilation and natural lighting.



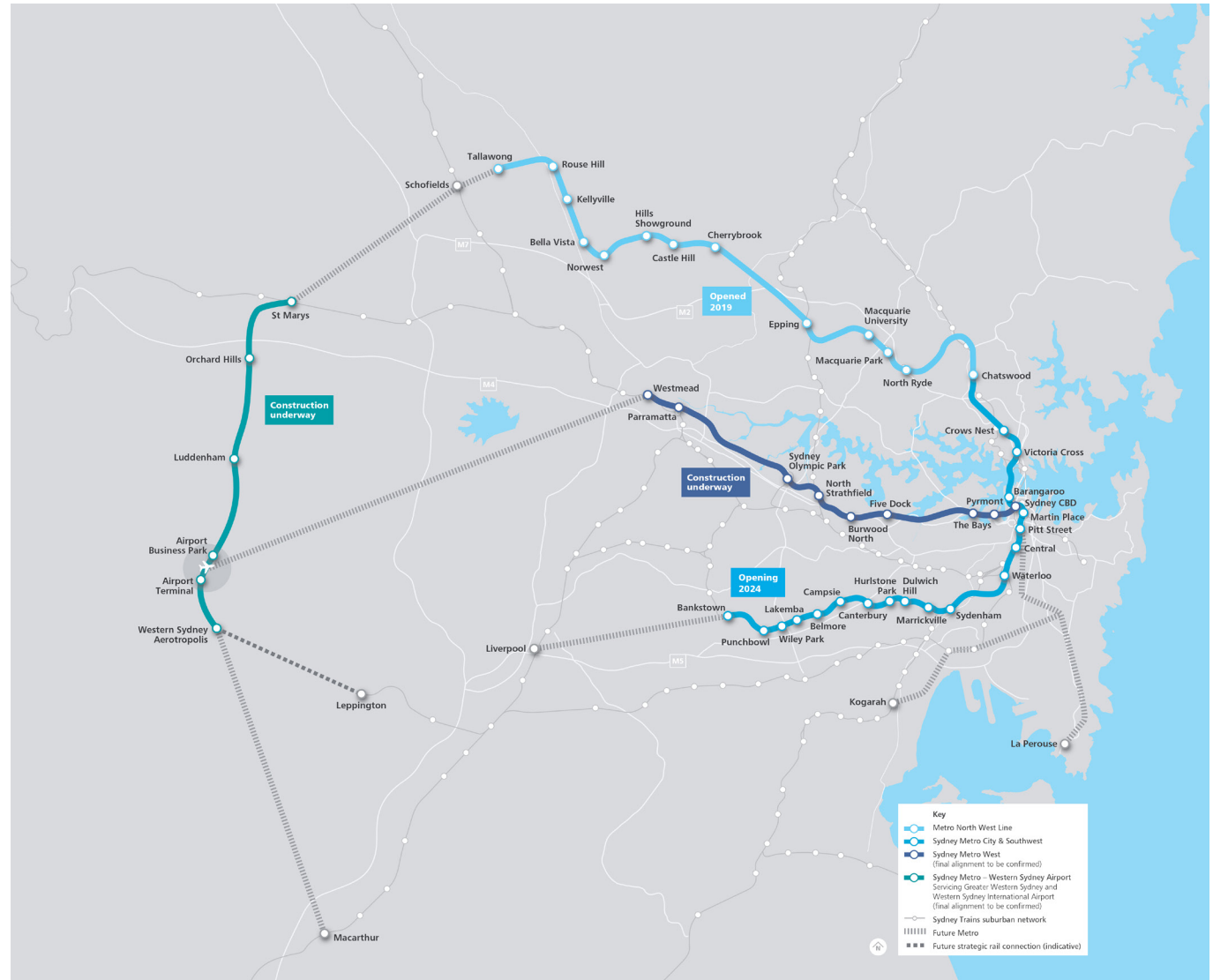
1.3 Project Vision

Transport for NSW's vision for Sydney Metro is:

“Transforming Sydney with a new world class metro.”

Sydney Metro's mission is to deliver a world class, connected metro, which will provide more choice to customers and opportunities for our communities now and in the future.

Sydney Metro presents a unique opportunity to demonstrate an exemplary approach to integrated transport and land use planning. Quality architecture, good urban design and a user friendly and inter-connected transport system are critical to ensuring that Sydney Metro meets customer needs and expectations and maximises their city shaping potential and broader urban benefits.



1.4 Sydney Metro Design Objectives

To help meet the transformational vision and world class aspirations of the project, five **Design Objectives** for the project have been developed to guide decision making and the design process for the Sydney Metro projects.

A **Design Principle** is prescribed under each design objective, describing the intention of the objective for the design of stations, station precincts and the wider Metro corridor.



Objective 1: Ensuring an easy customer experience.

Principle

Sydney Metro places the customer first. Stations are welcoming and intuitive with simple, uncluttered spaces that ensure a comfortable, enjoyable and safe experience for a diverse range of customers.

Objective 2: Being part of a fully integrated transport system.

Principle

Sydney Metro - Western Sydney Airport is a transit-oriented project that prioritises clear and legible connections with other public and active transport modes within the wider metropolitan travel network that intersect with this new spine.

Objective 3: Being a catalyst for positive change.

Principle

Sydney Metro - Western Sydney Airport provides a singular generative opportunity for Western Sydney. New stations that engage meaningfully with their context, and associated development in station precincts, will raise the quality of the urban environment and enhance the experience of the wider city.

Objective 4: Being responsive to distinct contexts and communities

Principle

Distinctive station architecture and public domain design will seek to express an appropriate sense of place that is relevant to existing and emerging Western Sydney communities.

Objective 5: Delivering an enduring and sustainable legacy for Sydney.

Principle

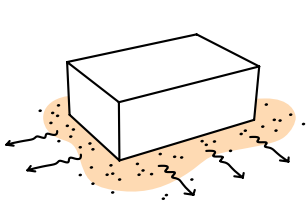
Sydney Metro will leave a positive legacy for future generations. A high standard of design and functionality across the corridor, stations and precincts is the means to ensure an enduring legacy.

1.5 Sydney Metro - Western Sydney Airport Urban Design Principles

A set of corridor-wide urban design principles have been developed to ensure that, while all stations contribute to local character, they are also part of a network and together contribute to a corridor of activity centres that offer social, employment and housing opportunities.

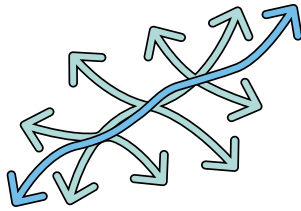
These principles will guide precinct design that speaks to the history and sense of place of the South Creek corridor. Design of places that also builds connections to, and between, station precincts. The principles underpin aspirations for best practice urban design and sustainable development.

The principles below have been developed to guide urban and precinct design for the project:



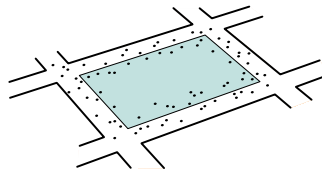
Interface and Activity

Activation of the urban realm of station precincts is important to ensure stations and supporting infrastructure are integrated with existing and future urban settings.



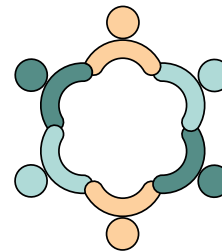
Connectivity

Walkable urban environments and integration with the planned Blue-green Grid of the Western Parkland City are best through the provision of safe, permeable and well-connected station precincts.



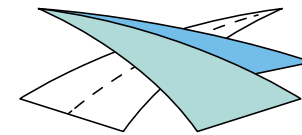
Place Making

Sydney Metro has the ability to support and contribute to the delivery of unique, attractive and vibrant urban centres, streets and spaces that provide a sense of connection and identity for local communities and visitors.



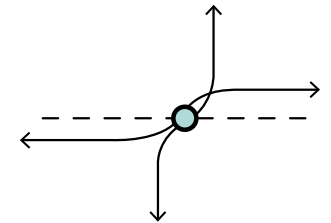
Culture

Opportunities to reflect and build on the rich Aboriginal and non-Aboriginal heritage of Western Sydney will strengthen design and place outcomes.



Sustainability

Sydney Metro will contribute to the evolution of a new urban development paradigm in which environmentally sustainable elements, processes and designs are incorporated in the project.



Transport Network

The Transport for NSW transport modal hierarchy will guide the design of stations, interchanges and associated developments, prioritising walking and other modes of active transport.

1.6 Towards Aboriginal Cultural Design Principles for Sydney Metro - Western Sydney Airport

In September 2019, as part of the Sydney Metro - Western Sydney Airport Definition Design, an initial 'Designing with Country' report was produced, the aim of which was to inform the development of appropriate Aboriginal Cultural Design Principles that might inform the design, public art and heritage interpretation of the project. This document outlined the policy, site and social context of the project. It drew attention to Transport for New South Wales Reconciliation Action Plan 2019-2021 deliverables, specifically the requirement for Transport cluster agencies to:

"...make a positive difference to Aboriginal and Torres Strait Islander peoples in areas such as employment, empowerment and economic development, and to enhance and develop cultural understanding".

The report also called out three particular actions with application to Sydney Metro projects:

Action 1: Establish and maintain mutually beneficial relationships with Aboriginal and Torres Strait Islander stakeholders and organisations...

Action 10: Promote respect for Aboriginal heritage and increase inclusion of Aboriginal art...

Action 11: Embed Aboriginal and Torres Strait Islander co-design principles across Transport Cluster projects...

The context of the Sydney Metro - Western Sydney Airport alignment was described in detail, with sections outlining the Aboriginal heritage of south-western Sydney, the corridor landscape and the archaeological, historical and contemporary social contexts. The project traverses the country of three Local Aboriginal Land Councils - the Deerrubbin, Gandangara and Tharawal. As noted elsewhere, Western Sydney is home to the largest Aboriginal population in the country, with approximately 9% of the national Aboriginal population.

The report also included a precedent or benchmarking review that illustrated projects where Aboriginal authority has been embedded in the planning of projects and/or Aboriginal designers or artists have been a part of design teams.

The recommendations and ideas that this preliminary piece of work generated included:

- Respective and collaborative engagement
- Interconnectedness with Country
- The reflection of Aboriginal cultural values and narratives at a range of levels and locations, in form, shape, colour, texture, materiality etc.
- That outcomes not be tokenistic or simplistic
- That outcomes be immediately visible to users as iconic markers
- Individual identities for each station, but with an overall unifying narrative or theme
- That responses be appropriate to an international gateway

The opportunities identified included:

- Line wide interpretation strategy identifying key stories, themes and opportunities
- Architectural form reflecting connection to Country
- Integrated design features
- Landscape design and interpretation - six Dharawal seasons
- Rolling stock - journeying or story images
- Naming of stations or components in Darug language
- Alignment features such as portals, cuttings, viaduct informed by design principles

1.6 (cont.) Aboriginal Cultural Design Principles - Government Architect NSW

Designing with Country

In March 2020 the Government Architect NSW published a discussion paper aimed at those involved in creating the built environment of the state. The paper is the prelude to a foreshadowed engagement process with Aboriginal community members, recognised cultural knowledge holders, design and planning industry experts and government representatives that will inform the development of Cultural Design Principles, and ultimately a framework for their application to government projects.

For Aboriginal people, Country is their place of origin, in cultural, spiritual and literal terms; it includes land, sky and water. Country incorporates both the tangible and the intangible. ⁽¹⁾

The design related ideas articulated in the discussion paper are:

Country

- Relates to the nation or cultural group, and the land they belong to, yearn for, find healing from and will return to

Landscape

- Aboriginal values of landscape cover multiple scales, from large scale meaning and symbolism, to detailed land management

Cultural Amnesia

- Colonisation, with its disruption to Aboriginal landscape, people and cultural practices, has over time created a collective amnesia regarding this history - gaps in memory can be restitched together if dormant Country can be reactivated

Designing with Country

- Three elements of integrated design - Biophilic,

Architectural and Passive design - a nature and people based approach

Connection to Country

- Walking Country and storytelling as the means to understand sites, cultural lore and wayfinding

Country centered design

- Consideration of all natural systems - people, animals, plants and resources

Mapping

- Beyond the physical - mapping an Aboriginal understanding of landscape

Concept and Detailed Design

The next design stages of the Sydney Metro - Western Sydney Airport project will commence ahead of Government Architect NSW's ongoing work on development of Cultural Design Principles. Given this, it is intended that the project will include, in design development, an engagement process with local Aboriginal communities, elders and knowledge holders to develop appropriate themes or narratives for use in either design, heritage interpretation or the public art components of the project.

Sydney Metro will seek to engage with people, and the place, in an effort to better understand the heritage, landscape, materials, stories and relationships of this part of western Sydney. At the same time, the design team will identify places, spaces and elements along the corridor, at stations and in precincts that are suitable for design, public art or interpretation interventions. It is intended the outcomes of this process will then inform the design briefs for the detailed design of the project.

(1) Dr Daniele Hromek (Budawang / Yuin), quoted in Designing with Country discussion paper, Government Architect New South Wales, March 2020

1.7 Customers

"The Customer is at the centre of everything we do."

Easy Sydney Metro experience

An experience can be defined as the absence of unnecessary effort.

This creates an experience that a customer does not have to think or work hard to achieve their goals. The easier an experience feels, the more likely a customer is to continue using a service.

Effort can be divided into two types:

- Physical effort: which is the energy a customer has to exert, and
- Cognitive effort: which is the thinking, planning, and physiological energy a customer expends

Designing for all customers

Our customers are at the centre of everything we do at Sydney Metro, and it's essential to recognise that not all customers are the same.

To design for a diverse group of customers, we have developed four personas to understand their needs, challenges, and expectations on how they will use the service.

Meet our customers



DIRECT DAVI

I am task driven, motivated and competitive. I'm always busy and can't afford to disrupt my routine by being late.

**SYNDEY METRO
CAN MAKE IT EASY
FOR ME BY:**

- Providing me with frequent and reliable trains
- Creating efficient station connections and clear sightlines



CURIOUS CHO

I am Inquisitive, logic driven but tend to over think things. I need mobility assistance, so before I travel anywhere, I must plan everything so I know I've made the right choice.

**SYNDEY METRO
CAN MAKE IT EASY
FOR ME BY:**

- Making station facilities accessible and available for me
- Creating well-lit spaces, and access to help when I need it



FRIENDLY FRED

I am community minded and observant. These days I've noticed that people can be unfriendly, rude or in a rush. I prefer to take my time

**SYNDEY METRO
CAN MAKE IT EASY
FOR ME BY:**

- Building available spaces for me to rest and avoid crowded areas
- Informing me through communications which have directional icons, landmarks and high contrast colours



PROTECTIVE PAT

I am organised, practical and caring. My loved ones rely on me to be there and keep them safe.

**SYNDEY METRO
CAN MAKE IT EASY FOR
ME BY:**

- Providing clearly marked help points which allow me to feel safe and secure
- Creating spacious areas that allow our group to move at a slower pace

1.7 Customers (cont.)

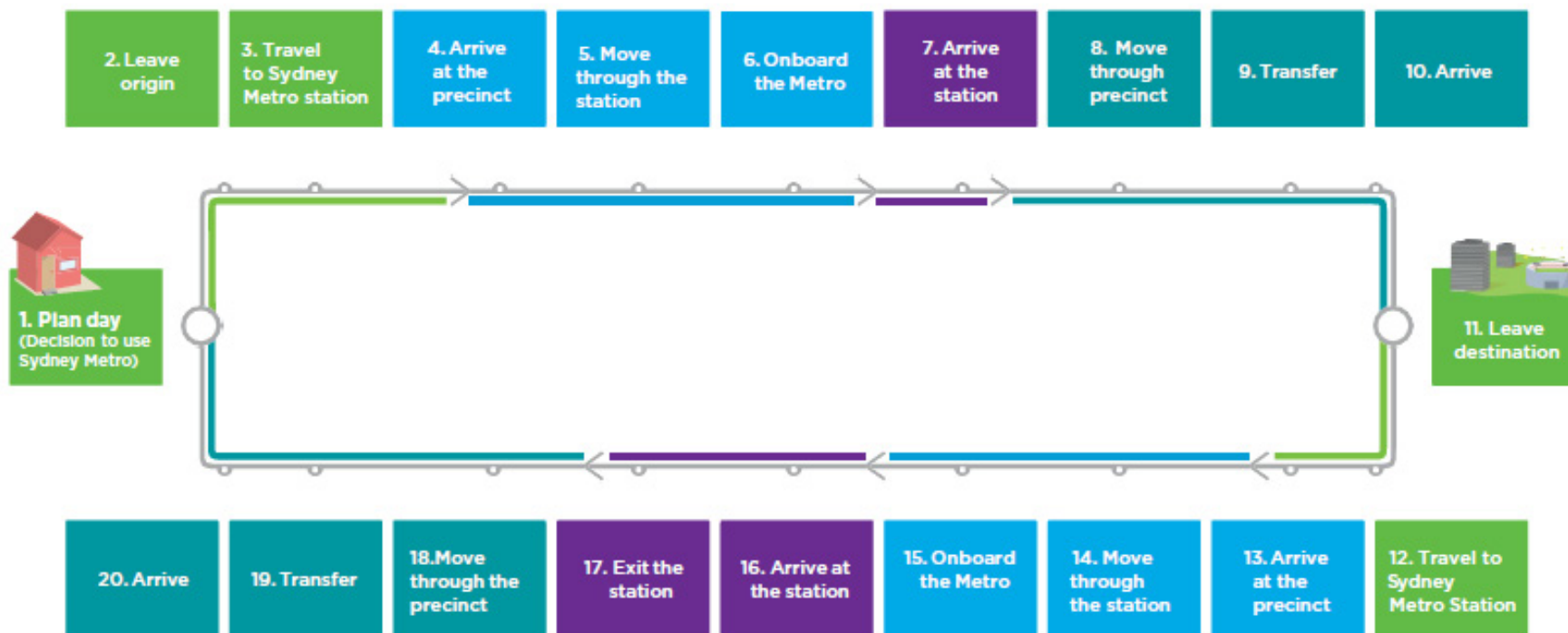
An easy customer journey

A customer's experience starts long before they arrive at a Sydney Metro station.

Research has shown that customers see their journey from door-to-door-to-door (from origin to destination and back again). Customers' decision to use Sydney Metro starts at home. Their choice of transport is based on their perception of ease across their door-to-door-to-door journey. A customer's experience begins when they establish a need to travel and plan how they will get to their destination whether

it's by car, walking, cycle, bus, train, metro or other means. If our stations are too hard to get to and use, customers may not use our service.

Customers will progress through many journey stages in their door-to-door-to-door journey. By considering customers' needs at each journey stage, we can design a whole journey experience and focus on stages where customers have to exert the most effort.

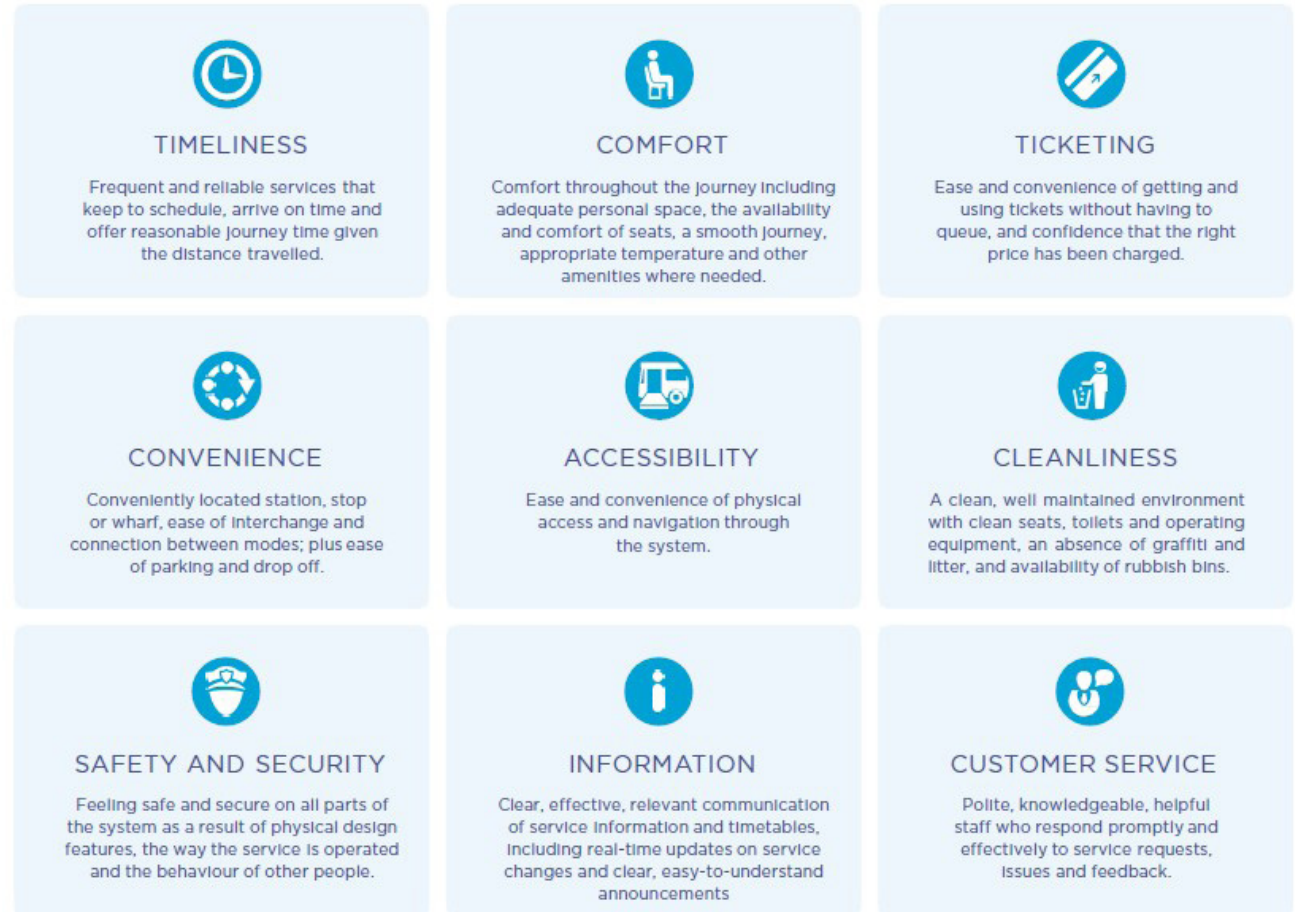


1.7 Customers (cont.)

Measuring customer satisfaction

Through engagement with customers across the network, Transport NSW has identified nine drivers of customer satisfaction.

These are fundamental outcomes that customers expect transport service to deliver. The customer satisfaction drivers are built into the operator contracts and set as key performance indicators (KPIs) across all of the transport services. The interactions that customers have with these drivers will directly impact how they perceive their experience when they use Sydney Metro. Understanding the performance of these drivers is critical to evaluate ease of experience.



1.8 Transport Integration

Transport integration considerations of the project delivers on Sydney Metro's commitment to a reliable 'door-to-door-to-door' transport solution for all customers. This is achieved by planning for a seamlessly integrated experience with all modes of transport that moves customers around safely, quickly and easily, and that is adaptive to change.

Within the Western Parkland City, the project has potential to act as an effective transport spine, both supporting and being supported by local road, bus, and active transport networks. Connections with Western Sydney International and the T1 Western Line at St Marys will also link the Western Parkland City to other key centres within and outside of NSW.

Well-functioning transport interchange facilities determine the overall effectiveness of the public transport network, particularly in increasingly complex urban environments. Effective transport integration includes well-designed interchanges, co-location of physical infrastructure, such as bus stops, bike storage and pedestrian connections near station entrances, and alignment of service delivery and operations across networks. These work to create synergies in the door-to-door-to-door journey and facilitate ease of use, creating a better experience for customers and reducing travel times. It also creates opportunities for efficiencies in delivering transport services.

1.9 A Commitment to Safety

Transport for NSW is committed to ensuring Sydney Metro is designed, constructed and operated in a manner that facilitates safe working and customer passage. The project will provide facilities for customers, staff and contractors that meet or exceed any required safety standards. Sydney Metro will also comply with all relevant statutory and regulatory requirements in respect of safe system design, delivery and operation.

Safety will be considered at all stages of design across all aspects of corridor and station planning, construction, operation and maintenance. In particular, the design of Metro infrastructure in the city must provide safe interfaces between stations and the existing urban environment. The safe movement of customers, staff and contractors through station areas needs to be facilitated through many aspects of physical design, including provision of adequate platform capacity and circulation space, clear routes, adequate lighting and slip resistant flooring, as well as by minimising obstructions and eliminating crush zones.

Station and public realm design will identify and reflect current architectural and engineering best practice with respect to safety. Guidelines and protocols, such as Crime Prevention through Environmental Design (CPTED), will also be important benchmarks in minimising the risks of personal harm, operational disruption and conflict.

Construction and operational safety will be managed through a rigorous safety in design process which will identify, develop and implement safety controls, and enhance the construction, operational and maintenance outcomes.

Maintenance and asset management strategies will be adopted that reduce risk through safety auditing and reporting. Sydney Metro will have a comprehensive framework to avoid or minimise risk, and to enhance safety, without unreasonably reducing amenity and functionality.

1.10 A Commitment to Sustainability

Sydney Metro has a clear vision to deliver and operate infrastructure and assets that are environmentally responsible, socially beneficial and demonstrate best practice environmental sustainability. This means ensuring sustainability informs and is core to the metro product.

Six sustainability principles govern the environmental and socio-economic outcomes and performance at Sydney Metro. These principles are designed to deliver on the Transport for NSW Environment and Sustainability Policy commitments, and are identified based on best practice endeavours on past metro projects, emerging needs and trends and wider government policy. The following project-specific principles will form part of the Sydney Metro - Western Sydney Airport Sustainability Plan.



Demonstrate leadership

Deliver a world class metro that is environmentally and socially conscious, and demonstrates innovation



Tackle climate change

Integrate a comprehensive climate change response, and drive excellence in low carbon solutions



Manage resources efficiently

Achieve whole-of-life value through efficient use and management of resources



Drive supply chain best practice

Collaborate with key stakeholders to drive a lasting legacy in workforce development, industry participation and sustainable procurement



Value community and customers

Respond to community and customer needs, promote heritage, liveable places and wellbeing for current and future generations



Respect the environment

Minimise impacts and take opportunities to provide environmental improvements

1.11 Structure of the Guidelines

The Design Guidelines are structured into four sections:

1. Introduction (this part)

Provides an overview of Sydney Metro - Western Sydney Airport, the project objectives, design principles, an understanding of our customers' needs and the importance of design in meeting those needs.

2. Stations

Outlines the key contextual factors and design drivers that inform the design of the station and surrounding environment.

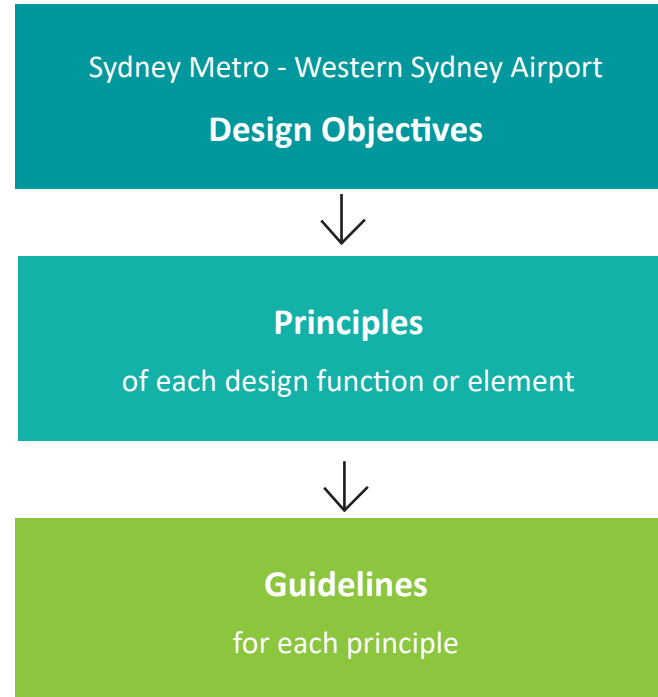
3. Function & Experience

Outlines the principles and design guidelines to be applied to the design strategies for stations and their interface with adjoining areas.

4. Elements

Outlines the principles and design guidelines to be applied to the elements of the new stations and their interface with adjoining areas.

Sections 3 and 4 are structured in the following way:



1.12 Application of the Guidelines

Review of Design

The design of Sydney Metro - Western Sydney Airport will be subject to internal review processes to ensure design responds to these Guidelines. The internal review process is one means to maintain a level of quality that will meet the needs and expectations of Sydney Metro customers and the people of NSW. The Guidelines will also be reviewed as the project moves through detailed design and procurement stages to keep them current and relevant.

The design of Sydney Metro and implementation of these Guidelines is also subject to independent review by the Sydney Metro Design Review Panel. The objective of the Design Review Panel is to provide independent, high-level design review of the project. This will assist in the project meeting design objectives and achieving quality design outcomes.

The Design Review Panel will be chaired and supported by suitably qualified and appropriately skilled professionals from the fields of architecture, urban design, landscape design and heritage architecture. The Design Review Panel will be supported by specialist advisers in the fields of community integration, transport integration, sustainability and cultural heritage, as required.

These panel members will provide independent design review and advice periodically throughout the development of the design. They will maintain an ongoing review role in the design process for the project, ensuring that as the design of individual components develops, it delivers on the principles contained in this document.

Updating the Guidelines

These Guidelines may be updated from time to time through the project delivery stage, including application of the Guidelines in relevant contracts. It is envisaged that future updates will provide additional detail and guidance as design progresses. The objectives and principles contained in this version of the document would continue to apply in subsequent versions. Updated versions of the Guidelines will be subject to the review and endorsement of the Design Review Panel.



Part 2

Stations

About this Section

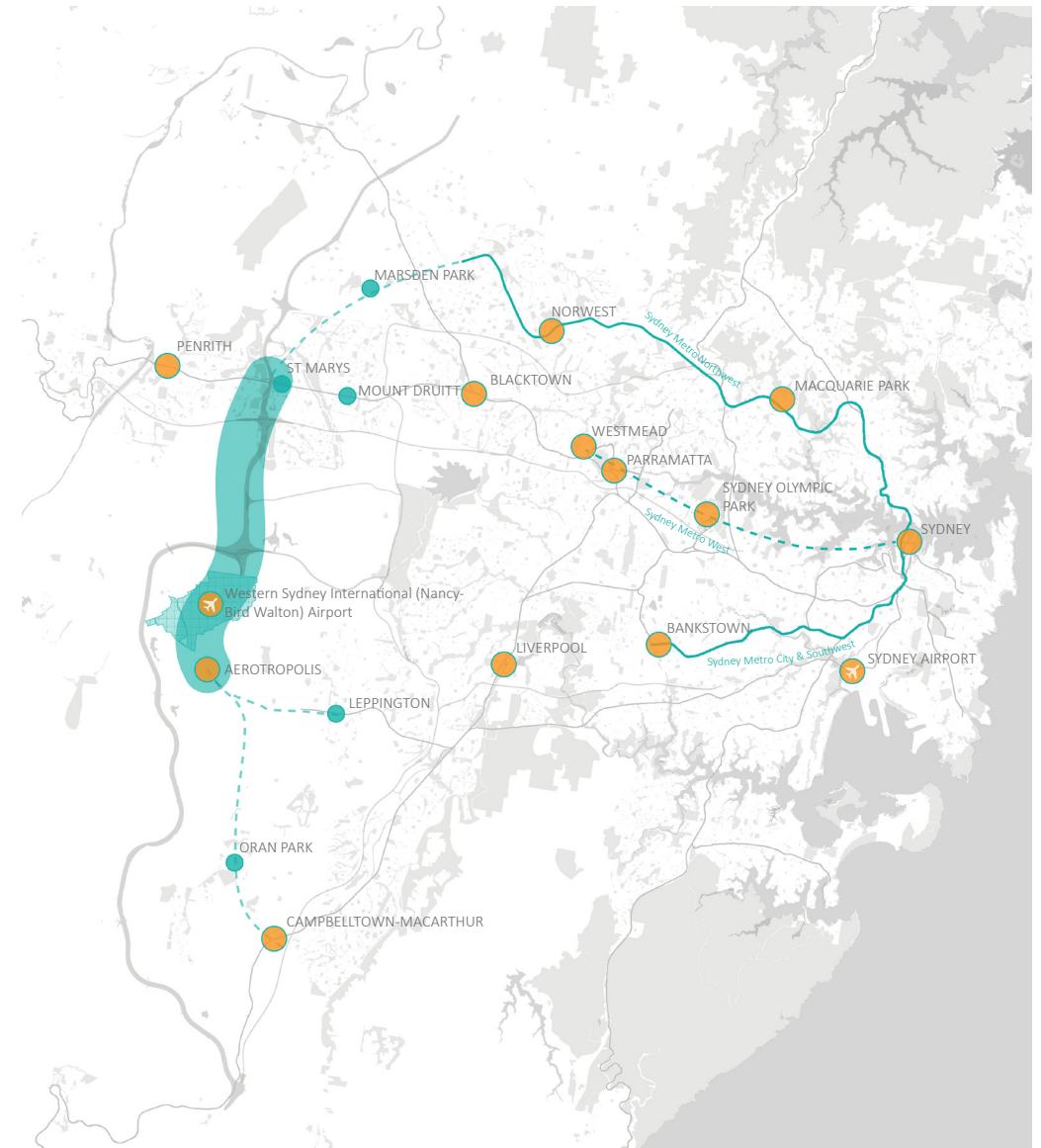
This section describes the context and functional character of the corridor and metro stations. It acknowledges the existing conditions and urban interfaces of each station in order to inform the delivery of contextually responsive and integrated environmental outcomes.

The urban and public domain design must be developed with reference to the existing or desired future / emerging urban context and infrastructure - including built form and public domain conditions, landscape character and existing and proposed services - as well as planned initiatives in the locality.

New metro stations are proposed at:

- St Marys
- Orchard Hills
- Luddenham Road
- Airport Business Park
- Airport Terminal
- Aerotropolis Core

Key descriptors for each station are noted in this section including; centre type, primary function (e.g. origin/destination), catchment type, and Local Government Area. An outline of the transport role and function and geographical catchment of each station, including the key design drivers for the station precinct, are also set out in the following pages.



The Sydney Metro - Western Sydney Airport corridor in the context of Greater Sydney. Source: COX

Corridor Context

Culture, Place and Character

The Sydney Metro - Western Sydney Airport line will traverse the future Western Parkland City (WPC). The Parkland City is the western complement to the central and eastern cities, as envisaged by the Greater Sydney Commission in the Greater Sydney Region Plan. The western city lies within the broader Greater Western Sydney (GWS) region that extends from Windsor in the north to Campbelltown in the south, and from Parramatta in the east, to Penrith and the Blue Mountains in the west. The Parkland City will cover over 800 square kilometres of this area.

The 2016 Western Parkland City population of 1,070,000 is forecast to increase by 43% by 2036.¹

The Greater Western Sydney region is home to more than 1.9 million people, 38.6% of whom were born overseas. Residents of Western Sydney are drawn from more than 170 countries and speak over 100 distinct languages. 60% of new immigrants to Australia settle in the Greater Sydney region. Between 2011 and 2016, the number of people born overseas increased by 18% and the greatest proportional growth in this period in overseas born populations was in people born in India, China, Iraq and Pakistan. Approximately 12% of the Greater Western Sydney population do not speak English well. The region also has the largest Indigenous community of any Australian region and is on average slightly younger than the rest of Sydney.²

Across the region, 41.6% of households were composed of couples with children in 2016, compared with 35.3% in Greater Sydney. 12.8% of households were one parent families while 16.7% were lone person households and couples without children made up 20%. 62% of these households were purchasing or owned their house, 24.25% were renting privately and 6.1% rented social housing. The region has a relatively high proportion of low income families and high school retention rates are the lowest in the Sydney

metropolitan area. Although Greater Western Sydney has higher than average employment levels, salaries are lower than average. The region is heavily car dependent, and 75% of workers who live in GWS also work there.³

The project alignment generally follows the South Creek corridor, from south of Badgerys Creek at its southern end to St Marys township in the north. It lies in the central zone of the Cumberland Plain of the Sydney Basin, an area of gently rolling hills, broad drainage lines and prominent rises. The South Creek system covers approximately 400 square kilometres. The creek's headwaters are in the Camden area to the south and it flows some 70 kilometres north to the Hawkesbury River. South Creek is Western Sydney's longest urban freshwater creek.⁴ Meandering and often ephemeral creek lines cross the alignment. A further distinctive feature of these plains is the mosaic of farm dams that dot the pastoral landscape. The average annual rainfall in the catchment is 750mm.

Indigenous Western Sydney

Sydney Metro - Western Sydney Airport traverses areas recognised as the traditional lands of the Darug and Gandangarra peoples. Lands traditionally belonging to the Dharawal people lie to the south of the alignment.

"The Dhar'rook (Darug) and Gun'dungur'ra tribes respectively occupied the country from the mouth of the Hawkesbury River to Mount Victoria, and thence southerly to Berrima and Goulburn, NSW. On the south and southeast they were joined by the Thurrawal."⁵

Of the Darug clans, the "... Gomerrigal-Tongarra clan have a particular association with South Creek, using this area as a meeting place".⁶

In the 1940s and 1950s as Australian cities urbanised, greater numbers of Aboriginal people migrated to Sydney where work was plentiful. The NSW Housing Commission provided

public housing in the city, including housing specifically for Indigenous people. Much of this housing was in western Sydney, particularly on estates at Green Valley and Mt Druitt.

Western Sydney today has the largest Aboriginal and Torres Strait Islander population of any Australian region⁷. While 9% of the national indigenous population live in Greater Sydney, more locally 4% of the overall population of the Penrith Council area are indigenous, as are 2.8% of the Blacktown Council area⁸.

Land Use

Current land uses in the WPC include established urban areas like St Marys, more recent urban development in places such as Caddens in the north and Harrington and Oran Park in the south, along with traditional rural, semi-rural and agricultural uses and extensive areas of rural/residential housing on larger lots.

Western Sydney is distinctive for its generally low-density suburban subdivisions and built form. More recent development, however, has included higher density infill development in town centres and a gradual movement towards smaller subdivision for detached dwellings and an increase in the contribution of dual occupancy and attached dwelling typologies to the overall housing mix.

Corridor Landscape

Typically, the pre-existing landscape of the Cumberland Plains was characterised by open woodland with trees well spaced and approximately 30% canopy coverage. A grassy understorey dominated by *Themeda triandra* (Kangaroo Grass) was common, and generally the understorey featured more herbs and grasses than shrubs. Cumberland Plains Woodland was generally found on heavier clay soils, with *Eucalyptus molucana* (Grey Box) the dominant tree on higher ground and *Eucalyptus tereticornis* (Forest Red Gum) on lower slopes and depressions. Shale Sandstone Transition Forest communities occurred at the edges of the Cumberland Plain where shale soils met sandstone while Sydney Coastal River Flat Forest (Alluvial Woodland) communities were found on the moister, more fertile, alluvial soils of the creek lines and floodplain. The Ironbarks – *Eucalyptus crebra* and *Eucalyptus fibrosa* were also found on hilly country while less well drained areas featured *Eucalyptus amplifolia* (Cabbage Gum), *Eucalyptus baueriana* (Blue Box) and *Eucalyptus bosistoana* (Coast Grey Gum), along with *Casuarina glauca* (Swamp Oak) and *Melaleuca decora* (Paperbark).⁹

Around Bringelly, where the Aerotropolis urban centre is proposed, the land is generally cleared with a covering of pasture grass. Fragmented stands of native vegetation remain, typically along creek lines. These remnant areas of riparian forest have been mapped as areas of the endangered Alluvial Woodland while other discrete areas of Plains Woodland are found on higher ground. These are associated, or sub-communities, of respectively, the Cumberland Plain and Shale Sandstone Transition Forest ecological communities, namely Shale Plains Woodland and Shale-Gravel Transition Forest.¹⁰

The topography of this southern zone is gently undulating, with the higher ground at Bringelly giving way to the low-lying areas along South Creek and Thompsons Creek.

The border between the future Aerotropolis Core and the Western Sydney International Airport is Badgerys Creek, along the banks of which are remnant areas of Alluvial Woodland, more specifically Sydney Coastal River Flat Forest, a community dominated by *Casuarina glauca* (Swamp Oak). The airport site itself will be gradually cleared and levelled.

North of the airport the floodplain of South Creek and its tributaries constitute the topography and landscape of the corridor. The ground is also undulating from Elizabeth Drive through Luddenham to Orchard Hills, with localised depressions where Claremont, Blaxland and Cosgroves Creeks join South Creek. Higher ground around Claremont Meadows grades down to a relatively flat plain between Werrington and St Marys.

The northern zone is also largely cleared, or disturbed, with relatively isolated patches of remaining native vegetation. Again, areas of Alluvial Woodland are concentrated on the alluvial soils of the riparian zone of the flood plain. There are also scattered areas of Shale Plains Woodland growing on the heavier clay soils found on higher ground.¹¹



Themeda triandra (Kangaroo Grass)
Source: Wikipedia



Melaleuca decora (Paperbark)
Source: Wikipedia

Western Parkland City

“The District is the hottest and driest part of Greater Sydney and its population will grow significantly over the next 40 years”.¹²

“As the South Creek corridor is developed, the creek and its tributaries will form the defining structural elements of the new Western Parkland City, its centres and its neighbourhoods.”¹³

Infrastructure NSW, in a collaboration with the Greater Sydney Commission (GSC), has been developing a whole of corridor approach to the urbanisation of the South Creek corridor, with landscape and water central to the urban vision of creating a “cool and green parkland city”.¹⁴

This work has a focus on integrated water management that aims to retain water in the landscape for its cooling, amenity and productive potential, as well as to regulate storm water flows. Related planning development objectives aim to orient urban development around the amenity of the region’s waterways and to provide green space and/or water bodies within 400 metres of all new housing. Further, a new urban development model proposed by the GSC envisages 8,000 trees per hectare compared the 2,000 trees cited in the Business as Usual model.¹⁵

“The NSW government has set a target to increase tree canopy cover across Greater Sydney to 40%”.¹⁶

Sydney Metro - Western Sydney Airport, as a lead project in the Parkland City, can contribute to this landscape vision. The project includes extensive areas of surface and elevated alignment with associated landscape areas adjacent to, or below, the alignment. Additionally, Sydney Metro will have a significant new presence in St Marys town centre and a formative influence in establishing the public domain in future town centres at Orchard Hills, Luddenham Road, Airport Business Park and Aerotropolis Core. At the airport

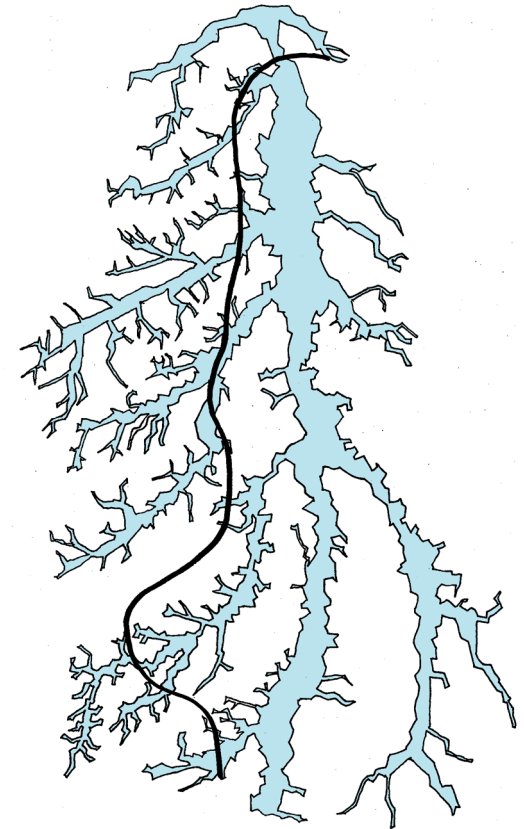
terminal the Metro station will become a key component of the landscaped urban plaza proposed between the terminals. This area will be developed by Western Sydney Airport Co.

Urban design and landscape vision

The project aims to contribute to the restoration of the natural qualities of the South Creek catchment as well playing a catalytic role in the urban landscape of town centres on the alignment. This will translate into woodland style plantings where space and function permits on areas of surface corridor and areas beneath, or adjacent to, viaducts. Species selection will largely be made from a palette drawn from local ecological communities, along with consideration of species suitability for local environmental/climatic conditions.

Street tree plantings will primarily draw on a Cumberland Plains palette while planting choices for station plazas will largely be driven by ornamental and amenity considerations. Landscape design in existing and future urban areas will help establish a distinctive character for each station precinct. Design will seek to maximise the tree canopy in line with broader development objectives for the Western Parkland City.

The design of corridor landscapes will be informed by natural landscape patterns – landform, hydrology, vegetation – as well as consideration of active uses and significant views. Revegetation will feature in disturbed areas along the corridor and especially between areas of remnant endemic vegetation.



The Sydney Metro - Western Sydney Airport alignment follows the South Creek corridor. Source: Sydney Metro

Active Transport

Active transport facilities will be investigated as part of the project, both local links to stations and linear paths along sections of surface alignment. Further links to adjacent open space and to waterways will be explored. Facilities should include rest stops at logical junctions or landscape areas where shade and views are available. Elements will be considered and delivered in accordance with the principles of the NSW Government's Draft Greener Places and The Sydney Green Grid.

Western Sydney International Airport

Sydney Metro - Western Sydney Airport runs through, and includes two stations within, the Western Sydney International (Nancy-Bird Walton) Airport . There are a range of national and international non-mandatory standards, requirements and guidelines that seek to control the nature of land use adjacent to airports and related landscaping, on and off airport. These are designed to prevent or control wildlife strikes with aircraft. In particular, the National Airports Safeguarding Framework (NASF) Guidelines includes risk categorisation of land uses in the vicinity of airports. The guidelines cover zones at 3, 8 and 13km radially from airports and recommend a range of actions including mitigation measures and monitoring processes.

Landscape Design of the rail corridor immediately north and south of the airport will need to consider the attraction that landscaped areas may present to birds and other wildlife.

The development of the airport is the responsibility of Western Sydney Airport, an Australian Government-owned company.

1. *Cultural Infrastructure Plan 2025+, Create NSW, 2019*
2. *Community Profile – The Centre for Western Sydney, Western Sydney University, 2016*
3. *Op. cit.*
4. *Western City District Plan, Greater Sydney Commission, p 111*
5. *Mathews R. H., The Gundungurra Language, as cited in Sydney Metro Greater West Definition Design Aboriginal Heritage Guidance Report, September 2019, Artefact, p11*
6. *Aboriginal History, Cumberland Council (2019), as cited in Sydney Metro Greater West Definition Design Aboriginal Heritage Guidance Report, September 2019, Artefact, p 12*
7. *City of Parramatta (2019), Aboriginal and Torres Strait Islanders, as cited in Sydney Metro Greater West Definition Design Aboriginal Heritage Guidance Report, September 2019, Artefact, p 31*
8. *Australian Bureau of Statistics (2016), Census Quick Stats, as cited in Sydney Metro Greater West Definition Design Aboriginal Heritage Guidance Report, September 2019, Artefact, p 31*
9. *Recovering Bushland on the Cumberland Plain: Best Practice Guidelines for the Management and Restoration of Bushland, Department of Environment and Conservation (NSW) 2005, Burton, Ruth. Chapter 1.*
10. *North South Rail Line and South West Rail Link occurred Corridors Draft Strategic Environmental Assessment, Transport for NSW, January 2018, pp 94-96*
11. *Op. cit, pp 68-70*
12. *Western City District Plan – Greater Sydney Commission, p 105*
13. *Op. cit., p 105*
14. *Western City District Plan – Objective 26, Greater Sydney Commission, p 112*
15. *A United Vision for the Western Parkland City, June 2018. Graus, P. Greater Sydney Commission Presentation*
16. *Western City District Plan, Greater Sydney Commission, (Objective 30), p 119*

2.1 St Marys

| | |
|---|----------------------------------|
| Centre type | Strategic centre |
| Station function | Destination, Origin, Interchange |
| Local Government Area | Penrith City |
| Precinct vision <i>A thriving mixed use strategic centre with a strong local identity, offering activity, smart connections and employment and housing diversity.</i> | |

St Marys 15-minute walking catchment

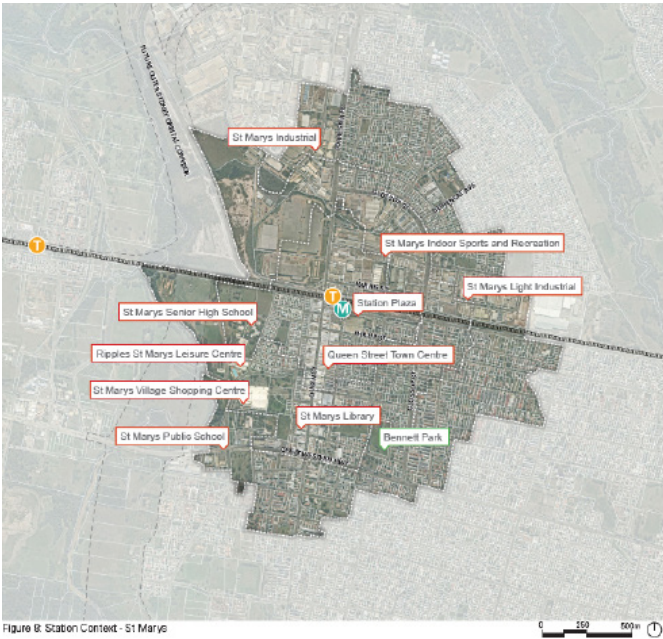


Figure 18: Station Context - St Marys

Context

The St Marys Metro underground station will be located immediately adjacent to the Sydney Trains station to facilitate efficient interchange with the T1 Western Line and regional bus services. The 15-minute walking catchment will anchor the local retail strip of Queen Street, extend into North St Marys, and stretch south past the Great Western Highway.

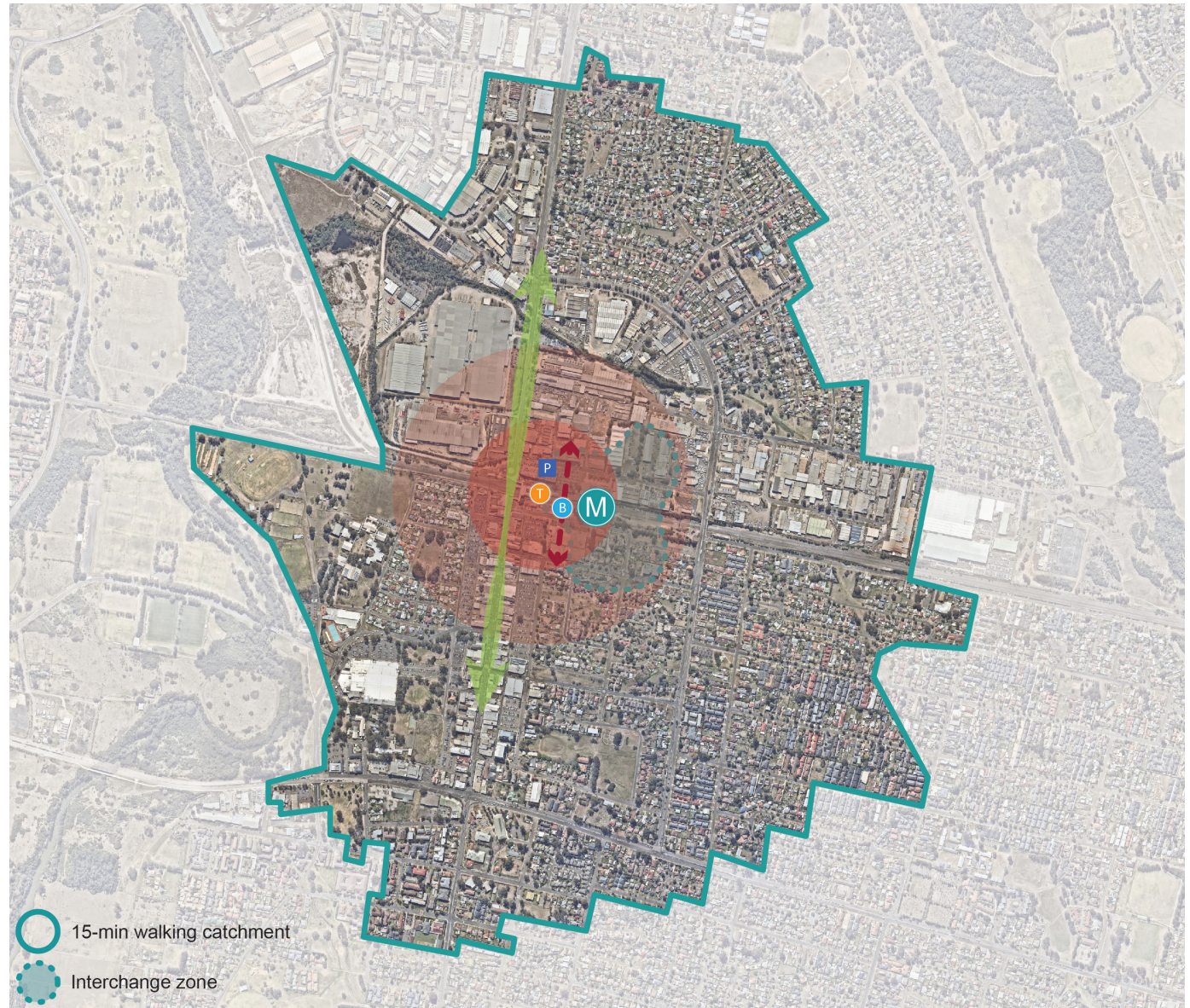
The walking catchment encompasses significant major attractors including the town centre, and local employment and residential areas. Many of the attractors in the surrounding region are currently accessible by rail, bus services and private transport.

Future Context

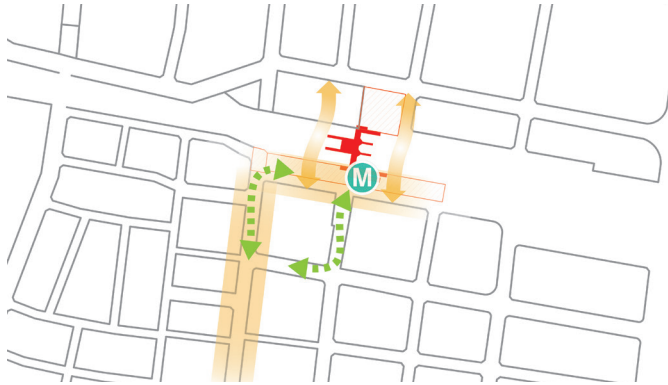
Movement will be facilitated by a walkable precinct layout and smart connections along high amenity green corridors. The preservation of heritage and environmental character will be the basis of a strong local identity, which will be further reinforced through an evolving creative and arts culture. The Queen Street corridor will be activated by attractive public spaces and a vibrant streetscape. This thriving mixed-use core will be buffered by transit-oriented medium- to high-density housing. A diversity of housing will be provided through a gradual outward transition into lower density uses. The employment function of the catchment will be further intensified and diversified as the existing industrial uses evolve in the long term into a mix of creative maker spaces, innovation and commercial uses.

Station and Design Drivers

- Provide an easy, efficient and accessible interchange with the T1 Western Line and bus services.
- Support St Marys strategic centre through promoting future employment growth and the Queen Street main street.
- Safeguard for future extension towards Schofields.
- Serve and support the revitalisation and continued renewal of the St Marys strategic centre both north and south of the T1 Western Line.
- Maintain and/or improve active cross corridor connections across the T1 Western Line.
- Consider integrated development opportunities.



Urban Design Strategies



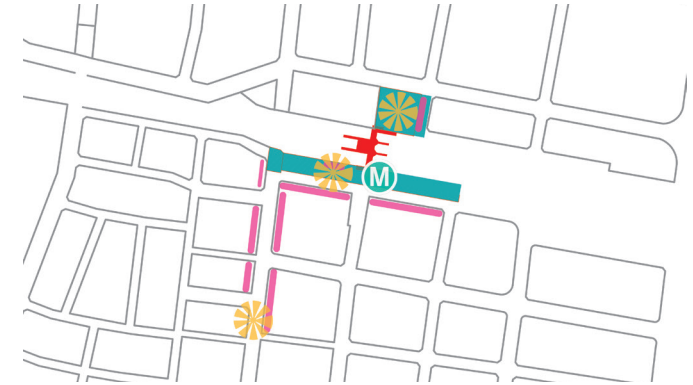
Connectivity

- Maximise opportunities to improve north-south connectivity
- Prioritise physical and visual connection to Queen Street and other key activity areas
- Support an easy customer connection between the station and all other transport modes through clear way-finding signage, direct pedestrian connections and direct sight lines.



Heritage, Environment and Sustainability

- Design station and surrounds to recognise, preserve and celebrate key heritage elements.
- Enable and prioritise the adaptive reuse of heritage assets to create a unique, interesting and active station precinct.
- Consider local landscape character in the design of the station precinct as well as the day and night time experience of the precinct.
- Plant trees within the station environment to soften the landscape, provide shade and reduce urban heat island effects.



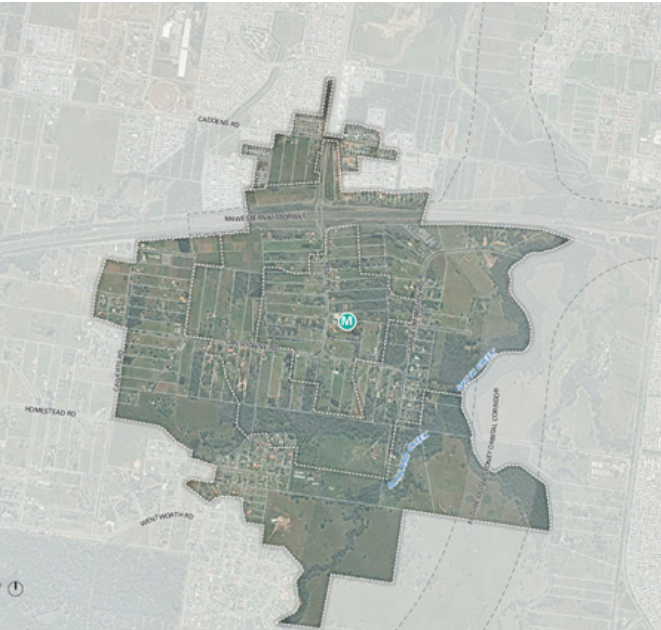
Interface, Activity and Place Making

- Metro-led development at St Marys will include active building frontages and a high quality public domain that contributes to a safe and permeable station precinct.
- The interface between the station and plazas and key pedestrian links should support activity, diversity of use and visual richness.
- Integrate the station into the strategic centre context and provide complementary public spaces and activity to support quality place outcomes
- Enhance the quality of the public domain on both the north and south side of the station, including new street trees, paving upgrades and public art, especially along Station Street.
- Design of the northern entry and plaza should facilitate safe, convenient and visually attractive station arrival, and contribute to an evolving urban identity for St Marys north.

2.2 Orchard Hills

| | |
|---|-------------------------------|
| Centre type | Transit-oriented local centre |
| Station function | Origin |
| Local Government Area | Penrith City |
| Precinct vision | |
| A compact, high-amenity and walkable new residential community. | |

Orchard Hills 15-minute walking catchment



Context

The proposed Metro station at Orchard Hills will be located adjacent to Kent and Lansdowne Roads, and south of the M4 Western Motorway. The 15-minute walking catchment will stretch north into Claremont Meadows and extends east towards the suburb of St Clair.

A metro station in this location will provide connectivity to an area previously unserved by rail. This location currently contains large lot rural residential properties.

The proposed station catchment does not encompass any major attractors, it being a largely residential, dormitory suburb.

Many attractors in the wider surrounding region are not accessible by rail although some may be reached by existing bus services and of course by private transport.

The introduction of Metro creates the potential for mixed-use development around the station that will ultimately offer a range of local services and a lively urban setting. Transit-oriented high density housing is envisaged adjacent to the mixed-use core. Diversity of housing choice will be provided as development transitions to lower density form as it moves further from the station.

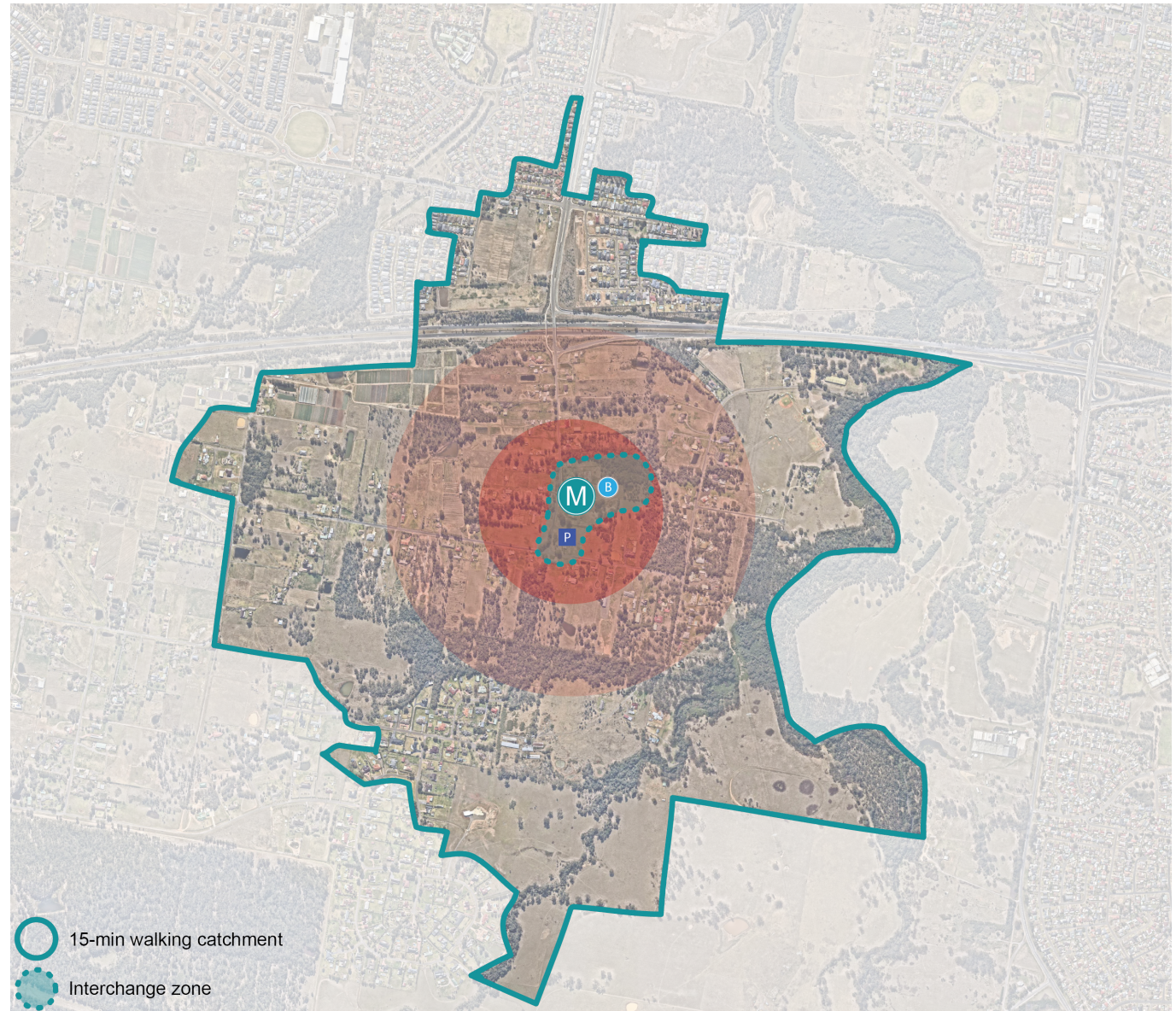
The precinct will be largely residential, providing compact housing in a key location with access to employment, education, recreation and other services.

Orchard Hills will be well-connected with accessible mass transit, offering opportunities for cross-regional transport connectivity. Orchard Hills will be a template for a new, sustainable approach to urbanism in Sydney, set within the blue and green grid of the Western Parkland City. The preservation of environmental character will support a sense of local identity, and generous green recreational spaces will form part of an expansive network of open space and active transport links.



Station and Design Drivers

- Transform the precinct by establishing a new town centre with mixed-use residential, commercial and retail development.
- Catalyse urban renewal surrounding the new town centre with a mix of diverse housing types.
- Consider opportunities to extend station catchment through transport integration establishing an interchange hub to serve catchment to the west (including Glenmore Park).



Urban Design Strategies



Environment and Sustainability

- Station, interchange and plaza design should reflect and provide visual and physical integration into adjoining and nearby areas of riparian zones and open spaces.
- Plant trees along precinct roads and around the station environment to soften the landscape, provide shade and reduce urban heat island effects.



Interface, Activity and Place Making

- Precinct design will achieve an integrated urban outcome.
- Interfaces with rail corridor should be designed to minimise visual impacts and mitigate acoustic impacts of rail infrastructure.
- Metro-led development at St Marys will include active building frontages and a high quality public domain that contributes to a safe and permeable station precinct.



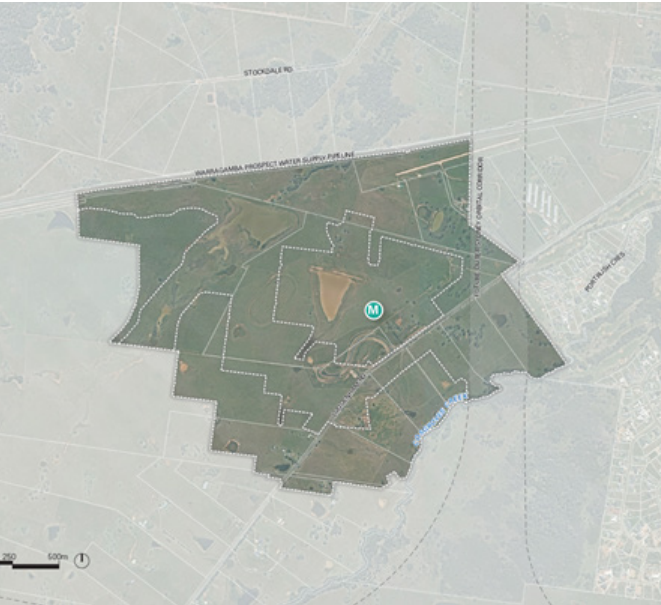
Connectivity

- Ensure north-south and east-west connections are provided to connect all modes of public transport, and ensure a permeable network for pedestrians.
- Provide a generous unpaid cross corridor connection at the station entry.
- Station interface with plazas and key pedestrian links should provide activity, a variety of uses and visual richness.

2.3 Luddenham Road

| | |
|--|------------------------------|
| Centre type | Employment and mixed use hub |
| Station function | Destination & Origin |
| Local Government Area | Penrith City |
| Precinct vision <i>A high-amenity, mixed-use community offering a diversity of housing, with a focus on employment and industry.</i> | |

Luddenham Road 15-minute walking catchment



Context

The proposed metro station for Luddenham Road will be located close to Luddenham Road. The 15-minute walking catchment extends north to the Warragamba Pipeline and stretches south towards Elizabeth Drive.

A metro station in this location will provide connectivity to an area previously unserved by rail. This location currently contains large-lot rural residential properties.

The walking catchment currently encompasses no major attractors, as it generally serves a large-lot rural living dormitory function.

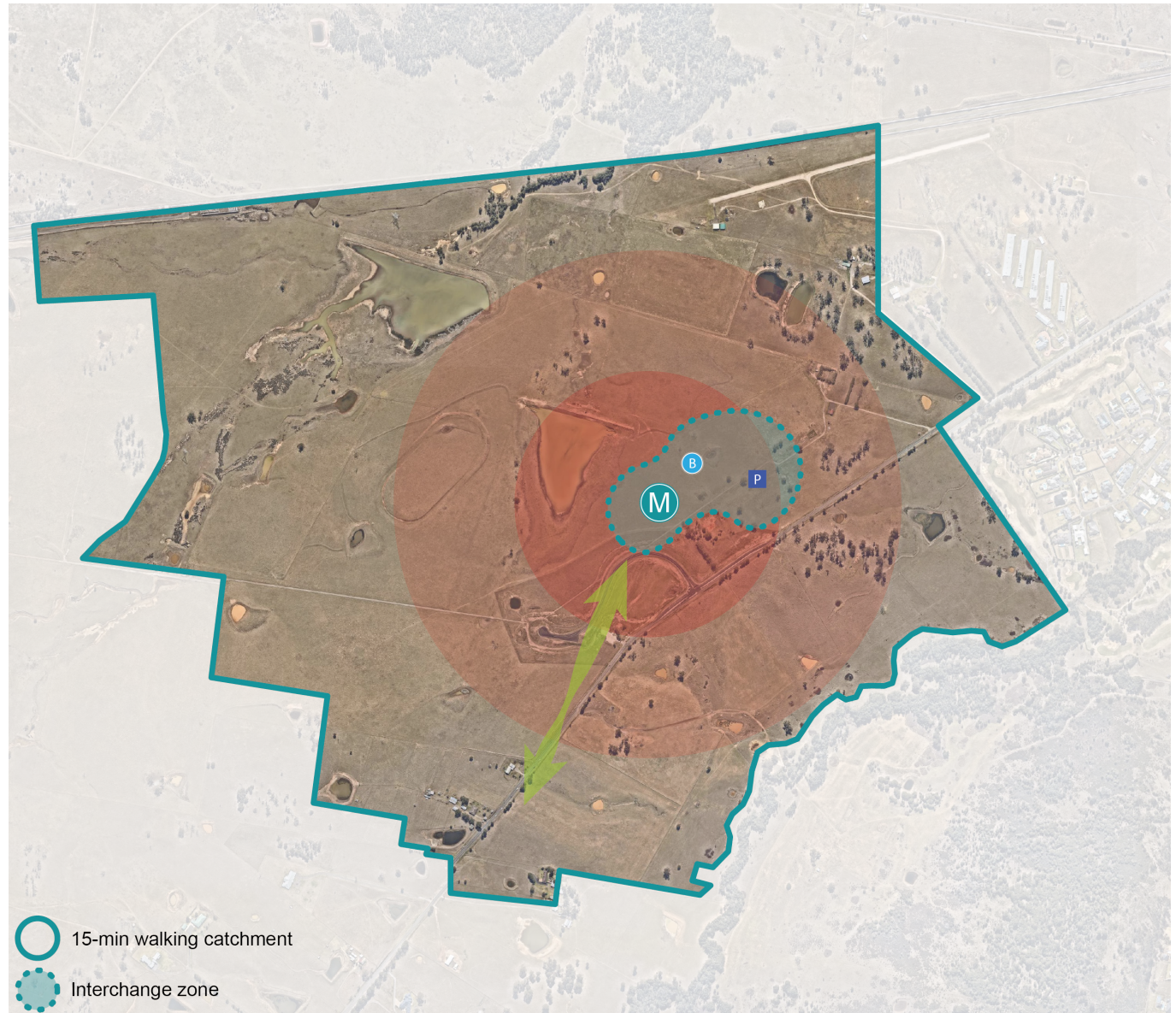
Forming the key part of the high-technology Western Economic Corridor, Luddenham Road will be a knowledge-based employment hub focused on health, education and research (Sydney Science Park). The catchment will feature key proximity and connectivity to Western Sydney International and the Aerotropolis. A mixed urban form will support a local residential population with access to jobs, transport and green space.

A metro station will deliver a walkable and connected mixed-use urban centre around the station, providing a range of local services in a way that makes it convenient and attractive for residents and workers to walk, cycle or use public transport for the majority of trips.



Station and Design Drivers

- Serve and support Western Parkland City Northern Gateway precinct focused on education, high technology and research and development.
- Ensure station design responds to the intended urban structure for Science Park.



Urban Design Strategies



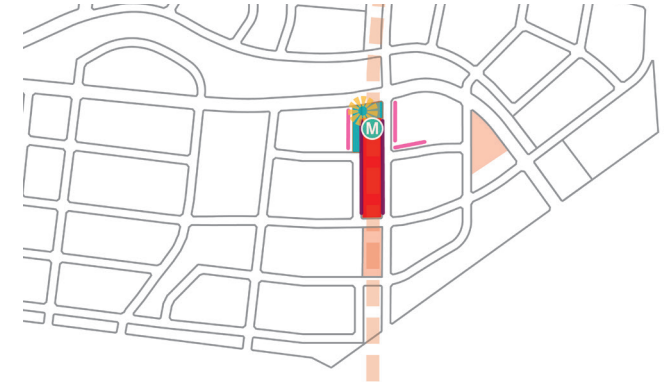
Environment and Sustainability

- Station, interchange and plaza design should reflect and provide visual and physical integration into adjoining and nearby areas of riparian zones and open spaces.
- Plant trees along precinct roads and within the station environment to soften the landscape, provide shade and reduce urban heat island effects.



Connectivity

- Ensure visual and physical linkages to east and west of the station and mitigate impacts of viaduct through design.
- Design of station and surrounds should include provision for active transport link under or adjacent to viaduct.



Interface, Activity and Place Making

- Landscape design to take advantage of spatial opportunities beneath and adjacent to viaduct.
- Station interface with plazas and key pedestrian links should provide activity, variety of uses and visual richness.
- Station and interchange design should be seamlessly integrated into new urban precinct.
- Any Metro-led development at Luddenham Road (subject to separate planning approvals) will include active building frontages and a high quality public domain that contributes to a safe and permeable station precinct.

2.4 Western Sydney International Airport Business Park and Airport Terminal

Airport Business Park

| | |
|-----------------------|--|
| Centre type | Airport-supporting business park |
| Station function | Destination, origin & interchange |
| Local Government Area | Liverpool LGA (Commonwealth) |
| Precinct vision | <i>The Airport Business Park Station precinct will be a major employment precinct and services hub within the Western Economic Corridor.</i> |

The proposed Metro stations are located within the Western Sydney International (Nancy-Bird Walton) Airport site. The site extends east to the Badgerys Creek corridor and north to the airport site boundary at Elizabeth Drive.

Context

The precinct is anticipated to change significantly with the delivery of Western Sydney International (Nancy-Bird Walton) Airport , supporting road network and development.

The Sydney Metro - Western Sydney Airport line will connect the business park to the airport terminal and the wider Parkland City, including the Aerotropolis, as well being linked to regional bus services.

The business park will be well connected as part of the Western Sydney International site, and its mix of commercial and industrial employment uses will service the international airport. The Western Sydney International Business Park is planned to be a walkable and high-amenity place to work, with excellent public and active transport connectivity and access.

Western Sydney Airport is responsible for master planning and urban development activities within the airport boundary.

Airport Terminal

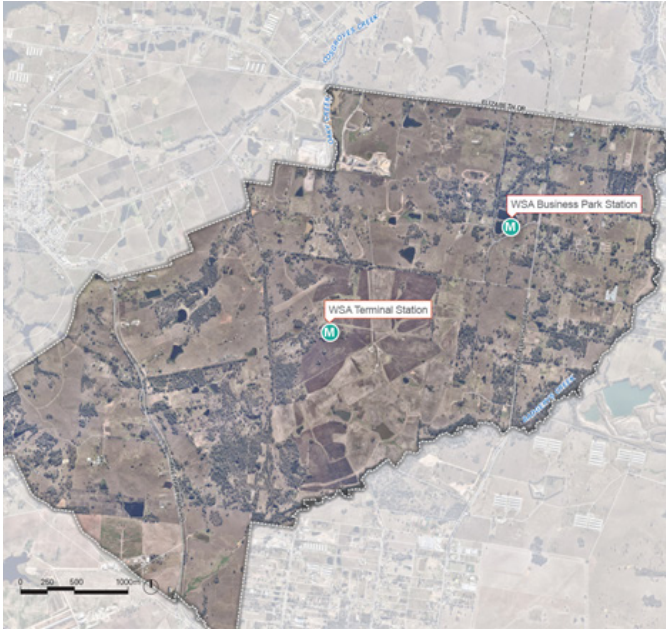
| | |
|-----------------------|--|
| Centre type | Airport |
| Station function | Destination & origin |
| Local Government Area | Liverpool LGA (Commonwealth) |
| Precinct vision | <i>The Airport Terminal Station precinct will connect workers and visitors to the international airport’s passenger terminal, Western Sydney’s gateway to Australia and the world.</i> |

Context

The Airport Terminal station is located in the heart of an existing rural area. This precinct is anticipated to change significantly with the delivery of Western Sydney International (Nancy-Bird Walton) Airport , supporting road network and development.

The precinct will be high-amenity, well-integrated and focused on the passenger experience, and will have easy and convenient movement and connections between the terminal and station. The Airport Terminal Station will be a gateway to key employment and living precincts across the Western Parkland City and throughout metropolitan Sydney.

Airport Business Park and Airport Terminal Station context



Airport Business Park

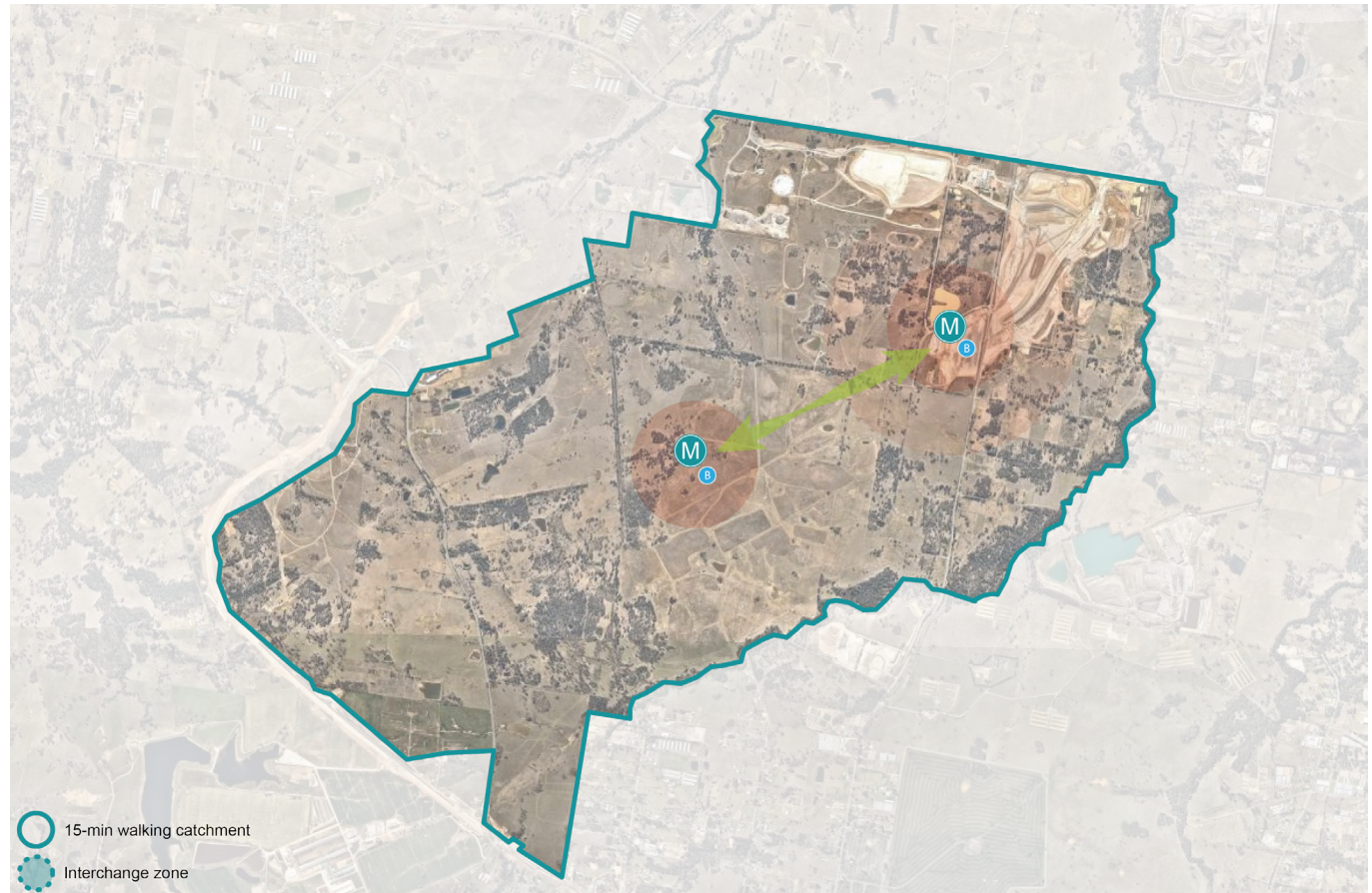
Station and Design Drivers

- Support easy and efficient interchange with local and rapid bus services and a future east-west rail connection.
- Integrate and support the Western Sydney International (Nancy-Bird Walton) Airport master plan outcomes for the airport precinct.
- Maintain flexibility for long-term airport development.
- Provide easy, efficient and safe cross-corridor active transport access into the north and south Business Park precinct from Day One and design to accommodate future widening to create a high amenity public domain.
- Safeguard for a future rail connection from the east.

Airport Terminal

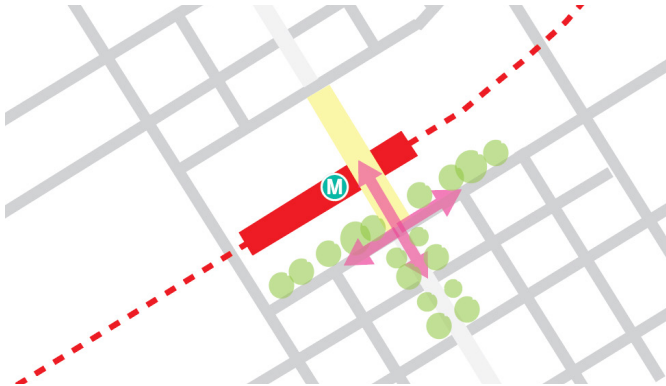
Station and Design Drivers

- Enable easy, efficient, safe, comfortable and intuitive customer access to the airport terminal/s for Day One of airport opening and safeguard for ultimate design.
- Integrate into and support the design outcomes for the airport.
- Maintain flexibility for long-term airport development.
- Safeguard for a future east-west rail connection.



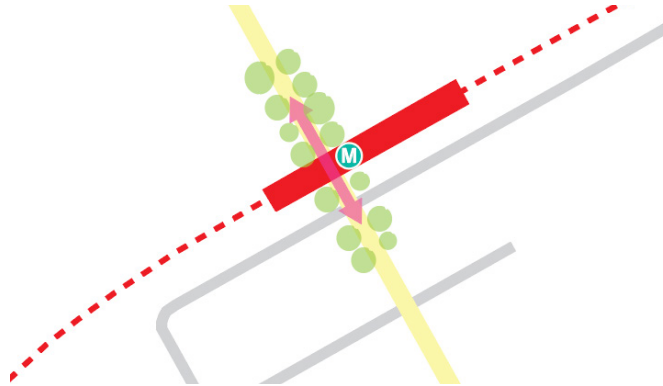
Urban Design Strategies

Airport Business Park



- Ensure seamless integration with pedestrian links and access points to the south
- Maximise station legibility and visual connectivity to and from the station to land beyond the transport corridor
- Utilise landscape or other elements to mitigate noise and heat impacts in and around station

Airport Terminal

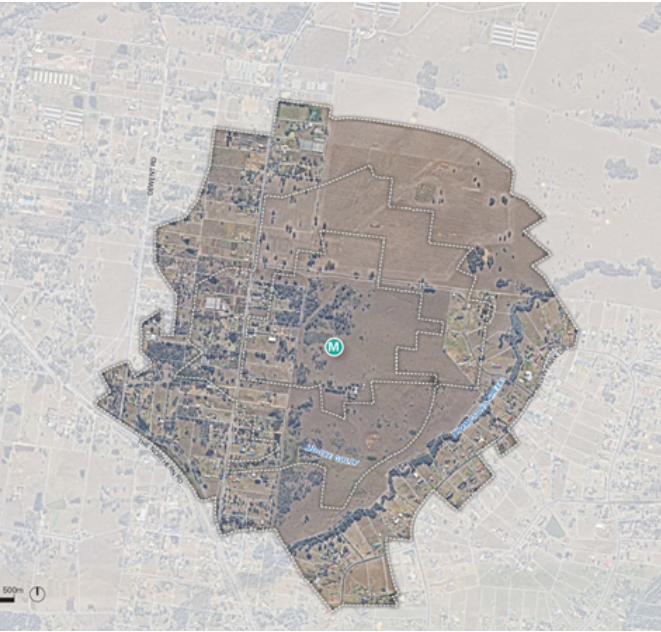


- Ensure easy and efficient integration with and connection to key pedestrian thoroughfares on both sides of station
- Ensure station is legible from terminals or the public domain
- Utilise landscape or other elements to mitigate noise and heat impacts in and around station

2.5 Aerotropolis Core

| | |
|---|--------------------------|
| Centre type | Metropolitan cluster |
| Station function | Destination, Interchange |
| Local Government Area | Liverpool |
| Precinct vision <i>Part of the Western Parkland City's metropolitan cluster. The Aerotropolis will be the commercial heart of the Western Parkland City, with a vibrant central business district around the station.</i> | |

Aerotropolis 15-minute walking catchment



Context

The Aerotropolis Core lies directly south east of the Western Sydney International Airport. The proposed station catchment will extend to the Northern Road in the west and Thompsons Creek in the east.

A metro station in this location will provide connectivity to an area previously unserved by rail. The Aerotropolis Core catchment currently contains large-lot rural living uses, however this precinct is anticipated to change significantly and develop into an 'Aerotropolis' city typology, based on its future level of proximity and access to Western Sydney International.

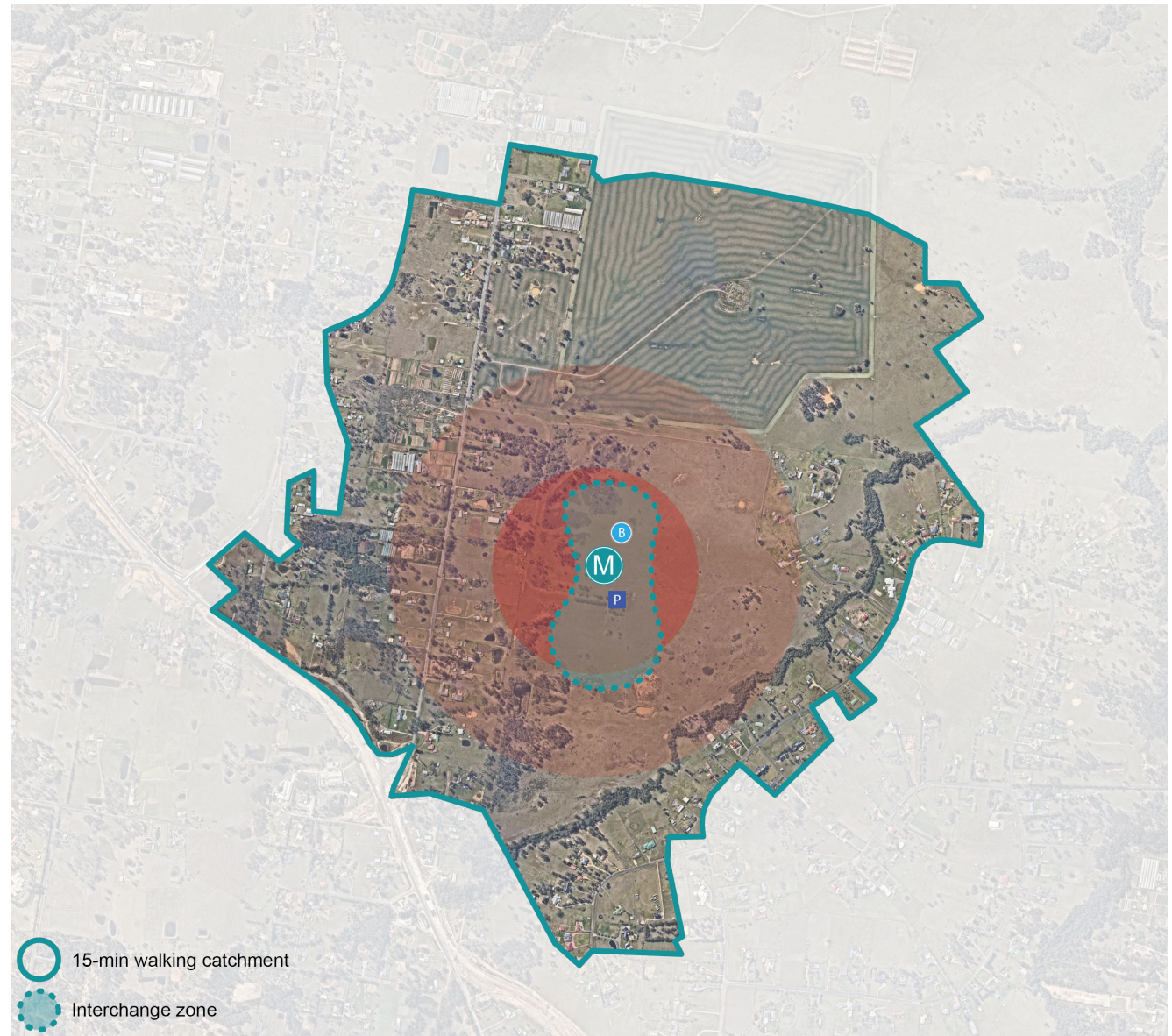
The station catchment encompasses no major attractors, as it currently provides a rural and large-lot residential, dormitory function. Many of the attractors in the surrounding region are not currently accessible by rail, with some bus services and private transport meeting current needs.

The Aerotropolis will form a major part of the Western Economic Corridor, as a knowledge-based employment hub focusing on health, education, innovation and research. A supporting local workforce will be established in a compact residential community, oriented towards the high-amenity green and blue grid. The Aerotropolis will approach urbanism in a new, sustainable way through a walkable and permeable layout that supports access to restored natural systems, open space and recreation. The precinct will have excellent metropolitan transport connectivity, while also making it convenient and attractive for residents and workers to walk, cycle or use public transport for the majority of trips.

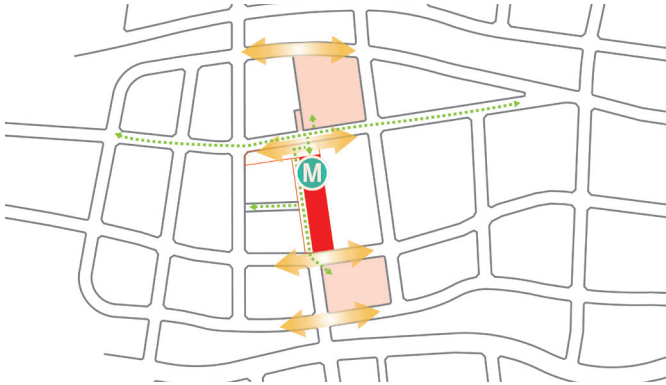


Station and Design Drivers

- Support and catalyse a thriving CBD precinct at the heart of the Western Parkland City.
- Contribute to a high-amenity public realm within the Aerotropolis that celebrates the Western Parkland City.
- Integrate interchange functions with place outcomes to support positive experience and amenity.
- Support CBD permeability by providing active cross-corridor connections.
- Minimise severance of the CBD precinct.
- Support easy, efficient and safe interchange with future South West Rail Link extension, East-West Rail Link and rapid and local bus services.

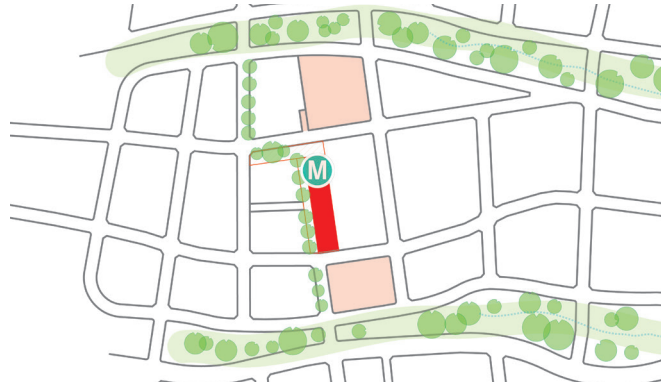


Urban Design Strategies



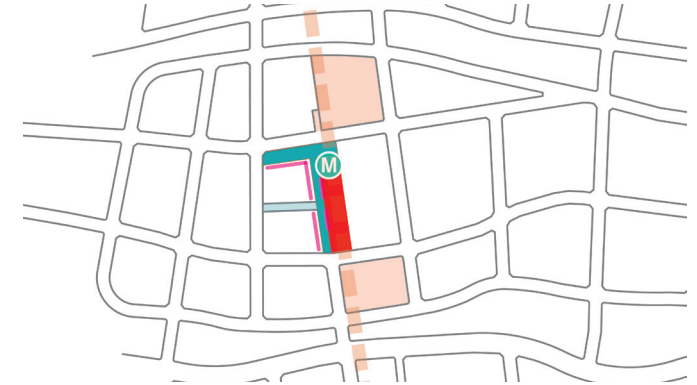
Connectivity

- Provide convenient and quality east-west connectivity through station precinct, particularly for pedestrians and active transport modes.
- Provide easy interchange between all modes of transport including active transport connections.
- Design of station and surrounds should include provision for active transport links.



Environment and Sustainability

- Design station, interchange and plaza areas to reflect extension of and integrate into connecting vegetation and riparian zones, and the regional open space system.
- Plant trees along precinct roads and within the station environment to soften the landscape, provide shade and reduce urban heat island effects.



Interface, Activity and Place Making

- Development around station will provide active edges to key areas of public domain.
- Consider amenity impacts of development on the public domain, and provide a safe and permeable station precinct.
- Public plazas and other spaces should be designed to integrate into planned land use and built form structures to ensure an active, safe, and attractive station environment.

The background is a solid teal color. A diagonal band of light blue circles of various sizes runs from the bottom-left towards the top-right, creating a sense of movement and depth.

Part 3

Function & Experience

About this Section

This section provides guidelines for the spatial and functional design of the urban and public domain in each station precinct, as well as the urban form of associated project development. The guidelines are articulated according to a number of core design strategies that guide the planning and design of Metro stations and their precincts. The strategies are grouped under the following family headings:

- An Easy Customer Experience
- Place Making and Identity
- Connectivity

More detailed design guidelines and key requirements for each of these strategies will be included in the scope and performance documents during the procurement stage.



Sydney Metro

3.1 An Easy Customer Experience

An easy customer experience is central to all aspects of the Sydney Metro design. A high quality customer transport product across the whole 'door-to-door' customer journey is critical to the customer experience. Sydney Metro will be a fast, safe, reliable, easy service for all customers.

Sydney Metro will cater to all customers including daily commuters, people with disabilities, families, visitors to Sydney and infrequent users. Sydney Metro - Western Sydney Airport will serve airport passengers specifically and all infrastructure, from rolling stock to stations, will be designed with this in mind.

The key public transport customer service design principles which underpin customer focused design are provided below.

This part of the document provides guidelines for the following areas of the customer experience:

- Door-to-Door Journey
- Customer Circulation
- Way-finding and Legibility
- Comfort and Amenity
- Customer Safety
- Accessibility

Public transport customer service design principles

Balanced: Functional performance is balanced with customer service to achieve high levels of customer satisfaction.

Efficient, assisted service: A self-service system that is designed for easy, intuitive use. Where assistance may be required, support is available and easy to get.

Universally accessible: Meet the needs of all members of the community, accommodate the distinct needs of key customer segments.

Flexible: Able to adapt to a range of typical usage patterns and services while delivering a consistent level of service outcomes.

Legible and consistent: Reflect a service style and tone that is easily understood and consistent with the experience of an integrated transport system.

Responsive: A service system open to feedback from customers, that adjusts over time as needs and preferences change, and continuously improves.

3.1.1 Door-to-Door Journey

Applicable Design Objectives

- Ensuring an easy customer experience

Principle

Ensure the customer experience is central to all aspects of Sydney Metro design by:

- *Responding to customer experience drivers*
- *Ensuring adequate space to meet peak and longer-term demands*
- *Providing a comfortable and safe environment.*

Guidelines

- Station designs should be developed in direct response to customer segments and user requirements. Customer journeys should be understood to appreciate their various requirements for their door-to-door journey.
- All aspects of design are to address the nine Public Transport Customer Experience Drivers - Timeliness, Convenience, Safety and Security, Comfort, Accessibility, Information, Ticketing, Cleanliness and Customer Service. All aspects of design should ensure an easy customer experience.
- The design of all elements of Sydney Metro is to cater for the diversity of customers including daily commuters and airport travelers. Customers will be more likely to travel in family groups and will have luggage, restricting their mobility. Sydney Metro - Western Sydney Airport Metro will need to design for infrequent users, first timers, tourists and non-English speakers.
- Facilities within stations and precincts are to be grouped and integrated to minimise clutter, promote quality design and provide a consistent and easy customer experience.
- The design should provide calm, simple and uncluttered platforms and concourses to emphasise a safe, welcoming customer environment.
- A high level of connectivity to the public domain, passive surveillance and activation to station entries should be provided.
- Minimising decisions and level changes supports an easy journey for fatigued or stressed airport customers. Careful consideration should be given to placement and function of lifts and escalators.



ORIGIN

Real time information, such as seat availability and lift status

FIRST MILE

Key pedestrian access routes to each station support active travel.

Customers that use buses or on demand public transport for their first or last mile will benefit from co-located services where changing mode is easy.

TRANSFER

All stations have accessible gradients to facilitate equal independent access. Station entrance plazas provide generous safe pedestrian zones and are sheltered from the weather so customers can get to their destination comfortably.

A standard carry-on piece of luggage can be placed underneath the metro train seats. Multi-purpose areas for strollers, luggage and bicycles are also available.

Level access between the platform and train assist smooth boarding without assistance. Platform screen doors keep people and objects safely away from the edge of the platform.

DESTINATION

Escalators, multiple lifts on platforms and wider gates at Airport Terminal Station help customers with strollers, luggage or mobility scooters to exit the station easily.

3.1.2 Customer Circulation

Applicable Design Objectives

- Ensuring an easy customer experience

Principle

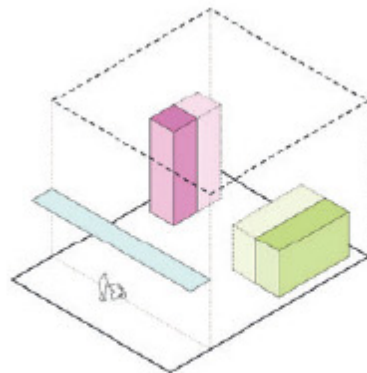
Provide adequate space to meet customer demands, both during peak periods and for long-term patronage demands.

Guidelines

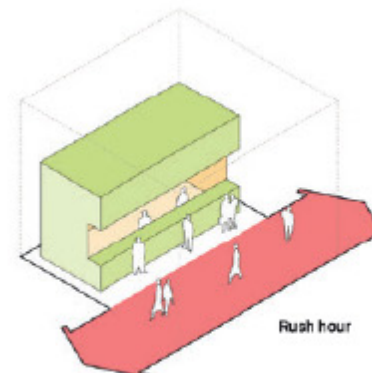
- Each part supports a different range of functions that must be addressed on station opening and in future scenarios.
- The movement capacity, configuration and spatial sequences of each of the Sydney Metro stations is to respond to patronage requirements as defined by a Level of Service (LOS) appropriate to the location and context.
- Pedestrian paths, crossings and spaces adjacent to Sydney Metro stations are to have sufficient capacity to meet potential demand with particular consideration of key decision points (gate lines, entrances, exits, customer queue zones) and information points. Where constrained, this may be met by extending the public domain into the station forecourt.
- The customer circulation paths within the station are to optimise timeliness for customers moving between concourse, platform, and station entries.
- Circulation paths are to be designed for convenience of connections into the station and from surrounding areas and other transport modes. These should reflect pedestrian desire lines as much as possible to enhance the convenience of circulation routes.
- Ancillary development and activities (retail, commercial or residential development, services areas and advertising structures) within Sydney Metro station sites are not to compromise efficient transport operations.
- All areas are to provide sufficient space for emergency access and movements in accordance with relevant design standards and legislation.
- Spatial envelopes of customers with luggage should be considered at stations that act as an interchange for the airport.



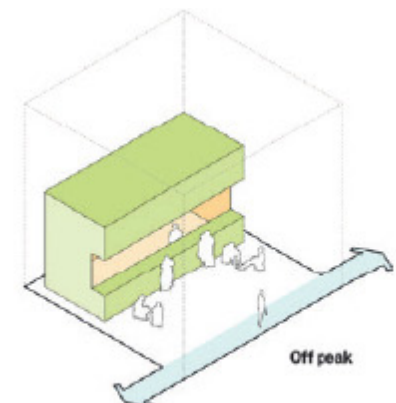
Station elements located to optimise permeability.



The effective space around each element can vary with the changing customer circulation requirements throughout the day.



Station design and capacity is to respond to primary customer flows and circulation during peak times.



3.1.3 Way-finding and Legibility

Applicable Design Objectives

- Ensuring an easy customer experience
- Being part of a fully integrated transport system

Principles

Provide intuitive, clear and consistent information and signage as well as legible, intuitive spaces to enhance customer journeys through efficient navigation and interchange.

Wayfinding is to create a seamless and intuitive customer journey from origin to final destination to support an easy customer experience.

Signage and wayfinding shall be tailored to cater specifically to airport passengers, noting that many customers will be first time users of the system.

Guidelines

- Planning for way-finding and legibility will support all customers to travel independently and easily on Sydney Metro. This is done by:
 - Anticipating the needs of customers
 - Providing the accurate information at the right time
 - Planning and creating predictable and intuitive environments
 - Applying consistent system of signs and information.
- Spaces are to be visually simple and intuitive to negotiate, to contribute to an easy customer experience. This is done by:
 - Providing visibility between station levels where possible
 - Using intuitive design to minimise way-finding choices and the need for signage
 - Providing safe, legible, efficient, convenient, obstruction free, level, direct and attractive routes for customer access.
- Way-finding signage and information is to be provided in accordance with the Transport for NSW guidelines. Ensure consistency with Transport for NSW signage.
- Customers are to be provided with way-finding and information when they are:
 - Interchanging between services or modes
 - Connecting to and from public transport by walking, cycling, catching a taxi, being dropped off or picked up in private vehicle or parking in their car.



Town Hall Station. Wayfinding signage enables easy navigation and interchange.
Source: TfNSW



Macquarie Park Station design provides a high level of visibility between concourse and platform level to aid wayfinding and legibility.
Architect: Hassell
Source: TfNSW

3.1.4 Comfort and Amenity

Applicable Design Objectives

- Ensuring an easy customer experience

Principle

Provide a comfortable customer environment that provides sufficient personal space and amenity and is well lit with effective and appropriate microclimate amenity for all users.

Guidelines

- Station entry orientation and design are to minimise adverse micro climate effects including wind tunnel impacts.
- Customer weather protection outside Sydney Metro stations is to be provided to ensure good levels of customer comfort are maintained and to provide usable spaces at ground level.
- A range of customer facilities and amenities is to be provided to grow patronage by making public transport a more attractive choice.
- A high level of amenity and security in customer waiting areas is to be provided to positively influence patronage and perceptions of the public transport system.
- Waiting areas, pedestrian walkways and cycle ways are to have adequate shade and day and night time lighting, while minimising energy consumption, providing an appropriate balance between sun access in winter and shade in summer.
- Minimise urban heat island effect through light coloured finishes, roofs and pavements, green walls, plantings* and shade trees.

* Plantings are subject to WSA's Airport Protection Requirements.



Chatswood Transport Interchange. Waiting and circulation areas outside the station entry are weather protected and have a high level of amenity and customer facilities.
Architect: CoxDesignInc.
Source: Cox Richardson, Photographer: John Gollings



9 Castlereagh Street, Sydney. Landscaped spaces provide shade in waiting areas.
Architect: Harry Seidler & Associates.
Source: Cox Richardson

3.1.5 Customer Safety

Applicable Design Objectives

- Ensuring an easy customer experience

Principle

Ensure stations and precincts provide a safe and secure environment for customers and also contribute to the overall public safety of urban places throughout the day and night.



Chatswood Transport Interchange, NSW. Design of the public domain enables passive surveillance with clear sight lines through the station areas.
Architect: CoxDesign Inc.
Source: Cox Richardson

Guidelines

General

- Safety issues are to be embedded in the design development process and optimised through the application of relevant Crime Prevention through Environmental Design (CPTED) principles and guidelines.
- Operators are to be consulted to advise on issues such as lighting, lines of sight and CCTV, based on their network experience.
- Integrated CCTV systems must be provided at entry and exits, stairways, ramps, bridges, tunnels, lifts, ticket office and vending machines, emergency help points, public telephones, waiting and seating areas in accordance with Australian Standards and Sydney Metro requirements.
- Interface with airport security systems will need to be considered at Western Sydney International Airport stations.
- Vandal-resistant fittings and fixtures are to be used throughout.
- Patronage will be lower in the initial life cycle of Sydney Metro - Western Sydney Airport stations. Scale of design needs to ensure that customers feel safe even when there are less people activating the transport hubs.

Public Domain

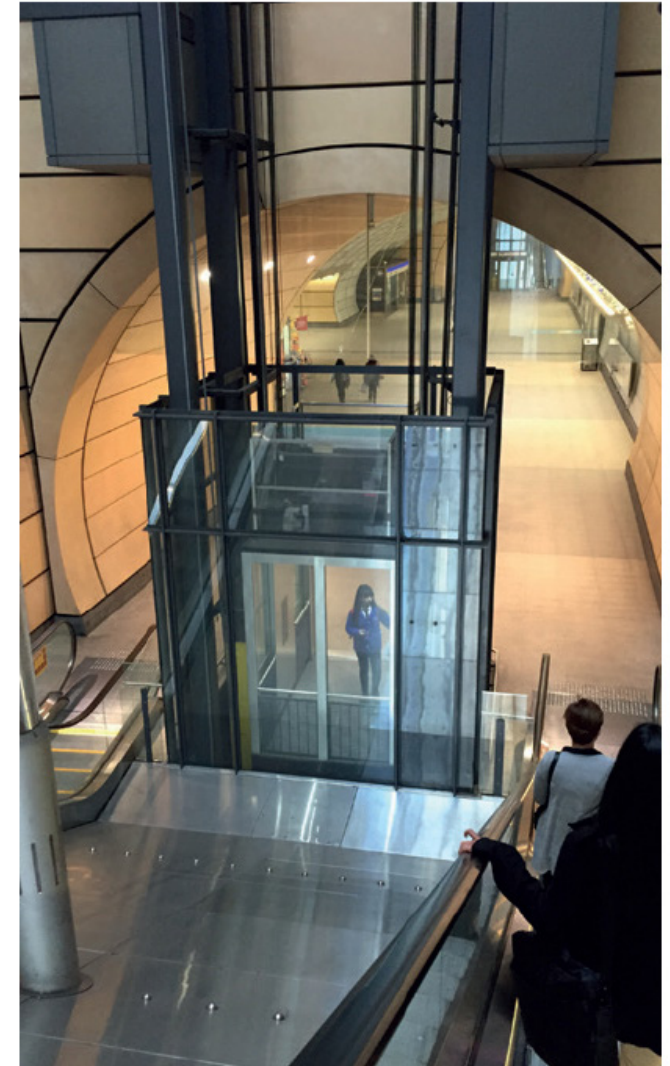
- An initial CPTED review of station precincts is to assess activity generators, edge effects, movement predictors, conflicting user groups, crime hot spots, the 'displacement phenomenon' and building elements
- All public domain areas are to be planned with guidance from CPTED experts, adopt a risk prevention design approach and eliminate entrapment and concealed space opportunities.
- A Crime Risk Assessment audit must be applied to the precinct design to ensure that all precinct areas comply with CPTED guidelines.

Stations

- The station design is to incorporate CPTED strategies:
 - Eliminating hidden spaces, recesses or voids that could provide a person with the ability to conceal themselves or others from general view.
 - Secured stations out of operating hours and during emergencies.
 - Ticket Vending Machines (TVMs) positioned to allow surveillance.
 - Minimising inadvertent or intentional access to hazardous or unauthorised areas of the station.
 - Physical barriers to minimise the risk of trespass or self harm by station users.
 - Protective screening to elevated walkways and concourse areas particularly where persons traverse above or immediately adjacent to the rail corridor.
 - Glazed lift car and lift shaft enclosures to maximise visibility and safety.
- Station designs are to support visible staff presence as close as possible to customer movement and decision making zones to enhance customer safety.
- The stations are to be designed to minimise obstructions and projections, providing clear routes for customers.
- Station designs are to eliminate crush zones and provide equipment at safe and accessible locations.

Help Points

- Help points should be easily identifiable, accessible components integrated into station cladding systems
- Help point enclosures should be integrated with the surrounding wall or equipment cabinet.



Macquarie Park Station, NSW. Glass sided lifts enable passive surveillance and sight lines through to the concourse.
Architect: Hassell
Source: Cox Richardson

3.1.6 Accessibility

Applicable Design Objectives

- Ensuring an easy customer experience
- Being part of a fully integrated transport system

Principle

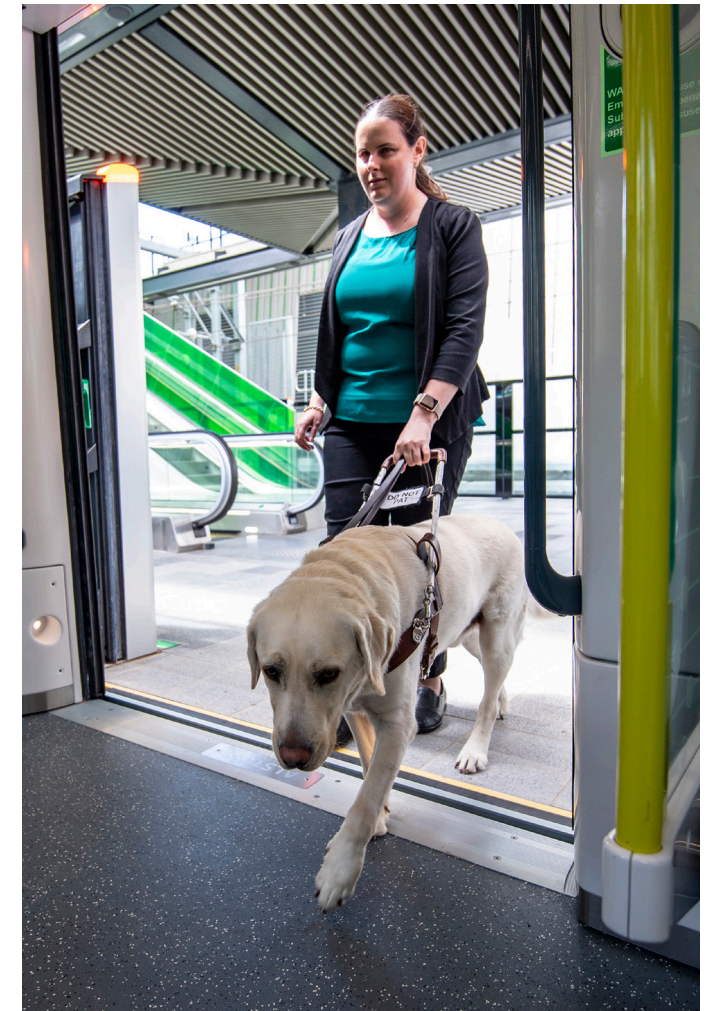
Ensure the stations and associated spaces are safe, efficient, universally accessible, legible and easy for customers and pedestrians, including those with luggage.

Guidelines

- Stations and precincts are to be easy, safe and accessible for all to use including the elderly, customers with disabilities, young children and those with prams and luggage.
- As far as possible, pedestrian pathways are to be obstacle and step free to maximise access for all customers. Where the use of stairs cannot be avoided, then they must be easy and safe to use.
- Where obstacles to universal access are unavoidable, clearly legible alternative routes must be provided as close as possible to the main travel path.
- Where the use of stairs is unavoidable, clearly legible, alternative accessible circulation routes are to be provided. These alternatives are to be as close as possible and not isolated from the primary circulation route.
- Where lifts and escalators are provided as an alternative to stair access they are not to result in a longer journey than the primary circulation route or compromise the

safety of customers who need to use them.

- Ramps may provide opportunities for universal access; however where possible, seek alternative means of effecting level changes, for example, by altering the path of travel.
- All facilities, furniture and fixings must be designed to be accessible to all customers. Accessible and ambulant toilets must be provided.
- Priority seats and adequate space should be provided in waiting areas and groups of seating to accommodate the elderly and customers with disabilities and prams.
- Information must be provided throughout the customer journey that considers user impairment, culture and language.
- Equivalent service and safety information must be provided for customers with disabilities in their preferred accessible format.
- Public transport information should be provided across a range of multimedia technologies including mobile phones, audio and visual and tactile signage, assisted listening for the hearing impaired and near field technologies to optimise accessibility for all users.
- The use of international icon protocols, colour coding and other graphic devices should also be considered to minimise the use of text-based signage and language difficulties.
- Comply with Disability Standards for Accessible Public Transport.
- All Metro service elements must comply with the Disability Discrimination Act 1992 and associated Public Transport and Premise Standards.



Sydney Metro

3.2 Place Making and Identity

For a project of this importance it is imperative that the design delivers not just on the project objectives but provides an architectural and urban design experience that connects with the city and its diverse communities so that they embrace and identify with the project, the rail line and the opportunities it unlocks.

The design of the project will seek to strike a balance between incorporating unifying design themes and elements to establish brand and product consistency, and responding appropriately and creatively to existing or envisaged urban contexts to provide unique and place-specific experiences.

This part of the document provides guidelines for the following areas of creating a Sydney Metro identity:

- Network and Station Legibility
- Place Making
- Culture and Character
- Heritage & Archaeology
- Environment & Sustainability
- Art
- Lighting
- Integrated and Precinct Development



3.2.1 Network and Station Legibility

Applicable Design Objectives

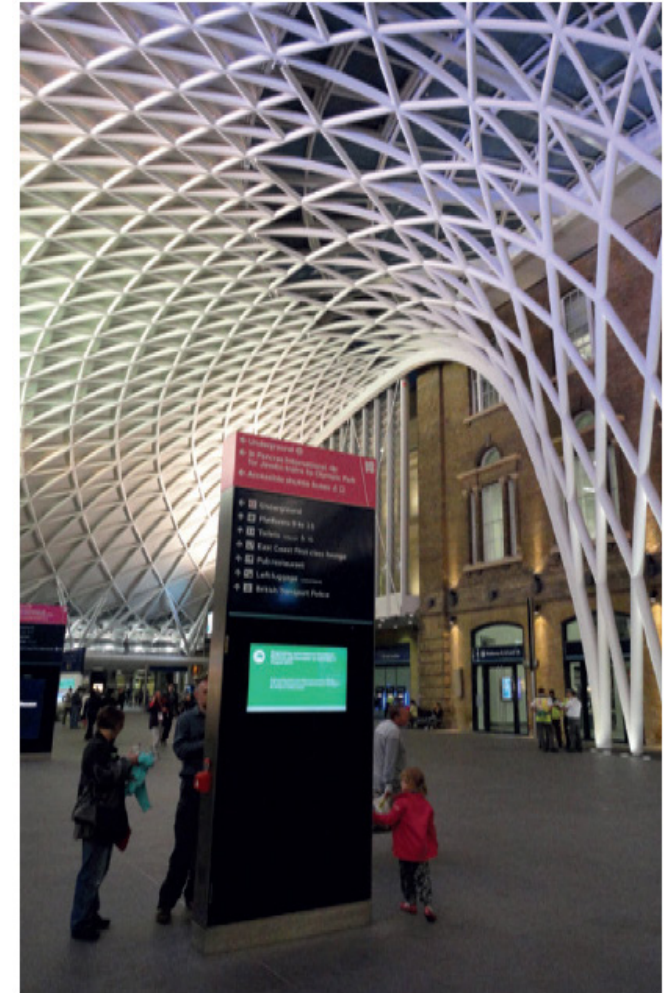
- Ensuring an easy customer experience
- Being part of a fully integrated transport system
- Being responsive to distinct contexts and communities

Principle

Create a line-wide identity for the Sydney Metro - Western Sydney Airport project that is recognisably part of the Sydney Metro network while enabling elements of station design to respond to context, character and environment to create locally distinctive sustainable outcomes.

Guidelines

- A line-wide identity is to be established through the architectural language and layout of the station types (cut and cover, at grade, viaduct).
- The architectural language and elements of the transport infrastructure and stations are to form a line-wide design that reinforces the Sydney Metro identity within the broader transport network.
- The stations are to maintain a coherent identity with consideration of:
 - Network identity
 - Line-wide identity
 - Station-specific local identity.
- Station buildings, service facilities, public domain elements and component elements are all to form part of the identity and project an image which evokes a modern, contemporary and efficient transport system providing an attractive, comfortable, safe and inspiring customer environment, while also responding to the local context and environment.
- Station should be identifiable when viewed from the train so as to support way-finding.
- Design should anticipate the needs of travellers and first time users of the system.



Kings Cross Station, London. Clear signage contributes to network and station legibility. The architectural quality of the space creates an attractive place for customers with a local identity.
Architect: John McAslan + Partners
Source: Cox Richardson

3.2.2 Place-making

Applicable Design Objectives

- Ensuring an easy customer experience
- Being responsive to distinct contexts and communities
- Delivering an enduring and sustainable legacy for Sydney

Principle

Create welcoming, safe and well maintained public domain spaces and station buildings which foster activity and a 'sense of place'.



"Solar Tree" St John's Square, London
Artist: Ross Lovegrove
Source: Ross Lovegrove

Guidelines

- Stations and associated spaces are to promote a welcoming image or identity that reinforces a positive sense of place.
- Station plazas are to be designed as both an extension of the internal station environment providing shelter, comfort, safety and security for customers, and a reflection of the local public realm context and character. Materials and elements should help achieve a seamless transition through these spaces.
- Water features provide opportunities for human interactivity, and facilitate integration of stations and interchanges into the blue green grid of the Western Parkland City. Design of public spaces should incorporate water wherever possible.
- Besides serving all movement and connective functions, station spaces can be further improved through the introduction of a range of uses, services and facilities such as retail, food and beverage, shade trees, landscaping and public art.
- Create public spaces that allow for spontaneous uses and activities by their occupants.
- Provide opportunities for informal recreation, considering how people of all age groups may use public spaces.
- Provide opportunities for temporary events, pop ups, retail spaces and the night time economy.
- Station public spaces are to be designed with a consistent hierarchy of landscape treatments. The treatment of these spaces is to reflect local character and context, integrate within their settings, and provide attractive space and streetscapes.
- Fixtures, including furniture and lighting, are to enrich site context and sense of place and contribute to way-finding.
- Use lighting to generate interest and activity at night times.
- A positive precinct image is to be developed around the particular heritage values of a place or build on the qualities of the existing urban context.
- Design of public spaces should embody a sense of discovery and invite users to dwell and interact in the space.
- Water features, landscaping and lighting, etc. at Airport stations will need to consider WSA's Airport Protection Requirements.

3.2.3 Culture, Place and Character

Applicable Design Objectives

- Being responsive to distinct contexts and communities
- Delivering an enduring and sustainable legacy for Sydney

Principle

Respond sensitively in the design of stations, precincts, the corridor and other project facilities to the environmental/physical and/or social/cultural context of the project. Seek to express in the design themes or forms that speak meaningfully to the diverse and evolving nature of the region.

Guidelines

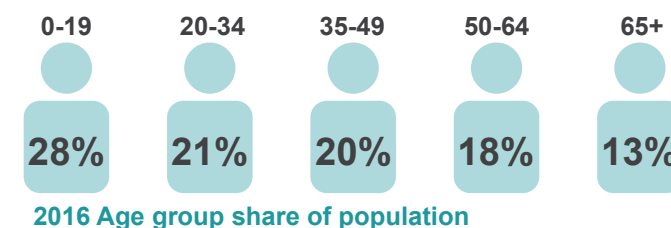
- Integrate Aboriginal cultural values in various aspects of design including landscape, project form, elements, interpretation as well as art works.
- Diverse and multicultural communities are a strength of Western Sydney. Design should therefore reflect and contribute to the multi-cultural nature of the Western Sydney region.
- Build and reinforce a meaningful connection between the stations and the communities they serve.
- Create equitable public spaces that all members of the community can access and contribute to.
- Consider relationship between stations and the blue & green grid in shaping and reflecting culture and character of places.

Western Parkland City

 1,070,000
2016 Population

 43% INCREASE
Percentage population change 2016-2036

25,893
Aboriginal and Torres Strait Islander population



Source: Cultural Infrastructure Plan 2025+

3.2.4 Heritage and Archaeology

Applicable Design Objectives

- Ensuring an easy customer experience
- Being a catalyst for positive change
- Being responsive to distinct contexts and communities
- Delivering an enduring and sustainable legacy for Sydney

Principle

Ensure elements and items of heritage significance are appropriately managed, respected, opportunities prioritised for heritage values to contribute to the celebration of local identity and place.

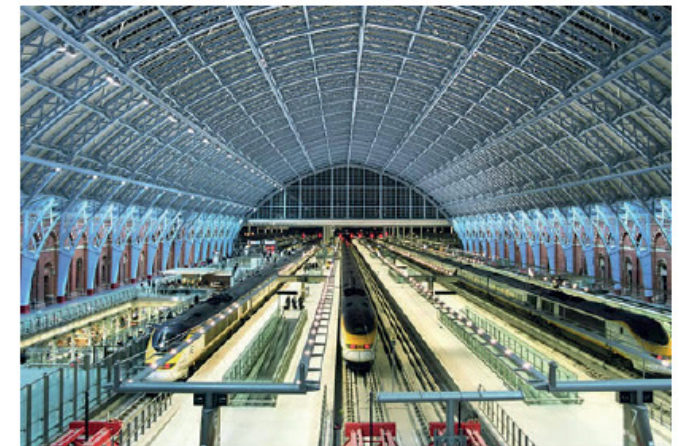
Guidelines

- Sydney Metro is to demonstrate sensitivity to the heritage context, including built and natural heritage, Aboriginal and non-Aboriginal archaeology, and ensure an integrated approach is maintained.
- Where Sydney Metro intercedes or interfaces with heritage places (such as St Marys or over tributaries), design excellence is to be implemented to support inventive, interpretive and contemporary responses to the heritage values of that place.
- Where appropriate, the design of the rail corridor and station precincts are to integrate and conserve existing heritage items and mitigate any negative impacts.
- Actively anticipate research, site investigations, salvage and culturally appropriate safekeeping of Aboriginal heritage uncovered by the Sydney Metro project.

- New work is to be based on an understanding of the heritage significance of heritage items, heritage conservation areas and places, and is also to take into consideration:
 - Siting - including urban grain, streetscape rhythm, setbacks, orientation and address of buildings, location of boundary walls, key views, significant natural features and archaeological remains,
 - Scale - including wall and floor to floor heights, modulation and façade rhythms, massing, density, proportions, relationship to ground plane, wall modulation including openings and roof planes,
 - Form – including proportion and number of openings, solid to void ratios, roof form, skyline and relationship between internal and external spaces,
 - Materials and colour – giving consideration to characteristic materials, textures, colours, light and shadow,
 - Details – creating complementary relationships between new and old elements to provide visual interest.
- Consideration is to be given to integrating heritage interpretation with Public Art.
- Retaining or interpreting heritage fabric to define and promote local identity



Newtown Station, Sydney. Heritage interpretation.
Architect: NSW Government Architects Office/Caldis Cook Group.
Source: TfNSW



St Pancras Station, London. Heritage building has been enhanced to accommodate new rail requirements.
Architect: Alistair Lansley
Source: Visit London

3.2.5 Environment and Sustainability

Applicable Design Objectives

- Ensuring an easy customer experience
- Being a catalyst for positive change
- Being responsive to distinct contexts and communities
- Delivering an enduring and sustainable legacy for Sydney

Principle

Ensure best practice sustainable design solutions are adopted for the public domain, stations and buildings, to minimise environmental impacts, provide environmental improvements and drive beneficial social outcomes for customers and local communities.



Central Park, Sydney. Landscaped facade treatment helps cool the microclimate.
Architect: Jean Nouvel
Source: Cox Richardson

Guidelines

- Achieve a high level of performance using sustainable design rating systems
- Incorporate emerging environmental and social trends, approaches and priorities key areas of concern for our community and customers into design approach
- Ensure resilience to climate change, by incorporating climate change adaptation measures which respond to weather extremes, including flood risk, and temperature increases.
- Reduce carbon emissions through adopting low carbon design solutions and construction methodology
- Ensure renewables energy solutions are delivered at stations, stabling facility, car parks, and in the public domain where feasible
- Prioritise energy efficiency, including for lighting and vertical transport solutions
- Prioritise reuse of materials, use of recycled materials, and selection of materials from sustainable sources, including engineered timber for structural and non-structural form
- Optimise opportunities for rainwater capture and reuse
- Optimise opportunities for beneficial reuse of spoil in landscape features and other uses on the Project
- Minimise waste through efficient design and material selections, and availability was waste collection avenues
- Provide opportunities for local businesses, social enterprises and Aboriginal businesses to engage with the construction and operational supply chains
- Provide a positive journey experience in station precincts by protecting users from the negative impacts of extreme weather
- Provide noise control measures (where required) to ensure appropriate and comfortable acoustic conditions for users.
- Ensure designs respond to the local micro-climate and incorporate opportunities to reduce heat island effects, including (as appropriate) light coloured finishes, roofs and pavements
- Incorporate passive design solutions
- Water Sensitive Urban Design (WSUD) initiatives are to include an integrated and site-responsive range of design solutions, influenced by urban design considerations and be adaptable into the future
- Minimise environmental impact through design and promote ecological function
- Provide and promote green infrastructure that is climate resilience in the form of green walls or roofs, plantings/ landscaping
- Contribute to green and blue grids legacy, and enhance tree canopy cover
- Sustainability elements at Airport stations will need to consider WSA's Airport Protection Requirements.

3.2.6 Art

Applicable Design Objectives

- Ensuring an easy customer experience
- Being responsive to distinct contexts and communities

Principle

Ensure public art is integrated within stations, plazas and corridors to elevate customer experience, enhance place-making, and help integrate the station with in the local area.

Guidelines

- Public art is to be a key feature of the customer experience, bringing joy to customers and adding value to the operation and success of Sydney Metro by contributing to station identity, beauty, amenity, way-finding, safety, security, community values and the public domain.
- Public art is to be integrated into the station and building designs to enliven and enrich the public realm and contribute to a sense of place.
- The design and location of art works is to be coordinated within the broader urban context of city stations and be reflective of the distinctive character of each place.
- Consider the re-installation of artworks present in existing buildings or streets to be changed as part of Sydney Metro works.
- Artworks are to contribute to the cultural identity of precincts and neighbourhoods and are to be developed in

consultation with the local community and stakeholders.

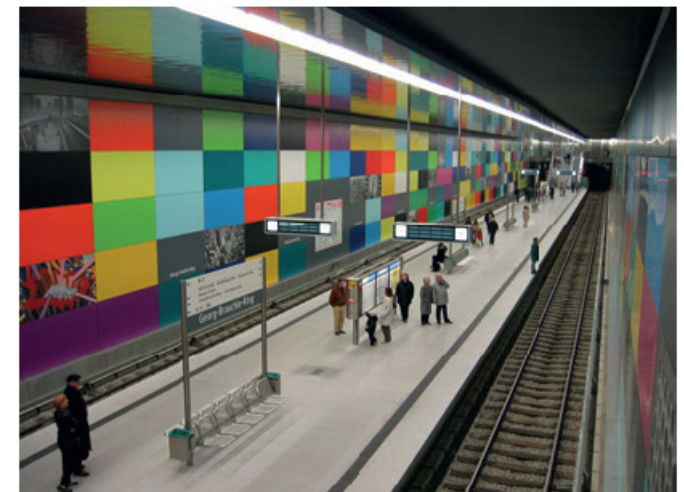
- Where appropriate, maximise community involvement/representation/ownership in public art.
- Art works must be located to support the safe intermodal function of precincts around Metro stations.
- In station concourse and precinct areas, appropriate integration is required of permanent artworks with station way-finding, information and other customer amenities.
- The Line's Public Art Approach and Public Art Procurement process are described in the Sydney Metro Public Art Master plan - Permanent Works.
- Public Art within the station and plaza area may include any or all of the following; these guidelines apply to A,B, and C.
 - A. New permanent public art commissioned by Sydney Metro and built as part of the station works.
 - B. Permanent, pre-existing artworks which were removed from the site and are reinstated
 - C. Heritage Interpretation undertaken by Artist(s)
 - D. Public art initiated by the Sydney Metro Operator and which may be less permanent, and
 - E. Public Art commissioned as part of the related over station development and commissioned by the development owner .
- Public art at Airport stations will need to consider WSA's Airport Protection Requirements.



Artwork may also be incorporated into the public realm as part of a building element.

Artist: Bronwyn Bancroft.

Source: TfNSW



Georg-Brauchle-Ring Station, Munich U-Bahn, Germany. Artwork on the trackside walls gives the station a distinctive identity and facilitates wayfinding.

Artist: Franz Ackermann

Source: Wikipedia

3.2.7 Lighting

Applicable Design Objectives

- Ensuring an easy customer experience
- Being responsive to distinct contexts and communities

Principle

Ensure a coordinated station, precinct and corridor lighting design that is appropriate for the local context, addresses CPTED and operational requirements and contributes to a positive image of Sydney Metro in the locality. Lighting should enhance station architecture, contribute to the quality of public spaces as well as the corridor landscape.



Britomart Transport Centre, Auckland. Lighting is designed to provide a safe, legible and comfortable environment for customers and users.
Architects: Mario Madaayag & Jasmax
Source: Opus

Guidelines

General

- Lighting design should form part of a coordinated approach to station access, way-finding and, where appropriate, public art and activation.
- Lighting design should be generally consistent, in both function and aesthetic intent, across stations.
- Public lighting should highlight station entry and approaches.
- Illumination levels should be fit for purpose, whether way-finding, reading or facial recognition, while minimising light spill.
- Efficiency in lighting design should be pursued and the number of luminaires minimised as far as possible without compromising design intent.
- Market leading energy efficient luminaires and systems must be specified.
- Glare is to be minimised through appropriate specification and location of luminaires.
- Lighting at Airport stations will need to consider WSA's Airport Protection Requirements.

Station Lighting

- Lighting design including placement of fittings should be integrated into and serve the station architecture.
- Station and lighting design should achieve a considered balance between natural and artificial light.
- Protection from intense summer sunlight must also be provided.

Public Domain Lighting

- Lighting in station precincts and at other facilities must contribute to safe, legible and comfortable environment for all staff and users.
- Public lighting should support a wide range of potential uses.
- All public areas must use a consistent, multi-function pole and associated luminaire.
- Lighting elements must be coordinated spatially and aesthetically with all other public domain elements and the public landscape.
- Precinct lighting must be of an appropriate scale and quality, distinct from adjacent street lighting.

3.2.8 Integrated and Precinct Development

Applicable Design Objectives

- Ensuring an easy customer experience
- Being a catalyst for positive change
- Being responsive to distinct contexts and communities
- Delivering an enduring and sustainable legacy for Sydney

Principle

Integrated and Precinct Development can, where viable, contribute to an active, safe and stimulating public realm around stations.

Guidelines

- Design plazas and public spaces to complement and integrate with integrated or precinct development opportunities.
- Integrated and precinct development should be designed to prioritise the activation of the public domain, particularly plazas and key pedestrian routes.
- Integrated and precinct development will consider and minimise potential negative impacts of development on public spaces, including the overshadowing of key spaces of congregation and activity.
- Plazas will be designed to facilitate active uses at the interface with integrated and precinct development. Consider the role of landscaping, level changes and outdoor dining space in activating the interface zone.

3.3 Connectivity

Safe and convenient connections to and from Sydney Metro stations are an important part of an easy customer experience. Connectivity between different transport modes including walking, cycling, rail, light rail, buses, taxis, kiss and ride, and park and ride must be legible and easy, acknowledging that Sydney Metro is part of an integrated transport system.

A modal hierarchy that prioritises pedestrian connections has been established to guide the Sydney Metro design and ensure the safety and wellbeing of customers and users of the station environment.

The design of the Sydney Metro stations and station precincts must facilitate safe, welcoming intuitive and accessible connections between transport modes.

This part provides guidelines for the following:

- Interchange
- Pedestrian Movement
- Bicycle Movement
- Vehicular Interface



Signage supports connectivity between different modes, and provides customer information to assist trip planning.
Source: TfNSW

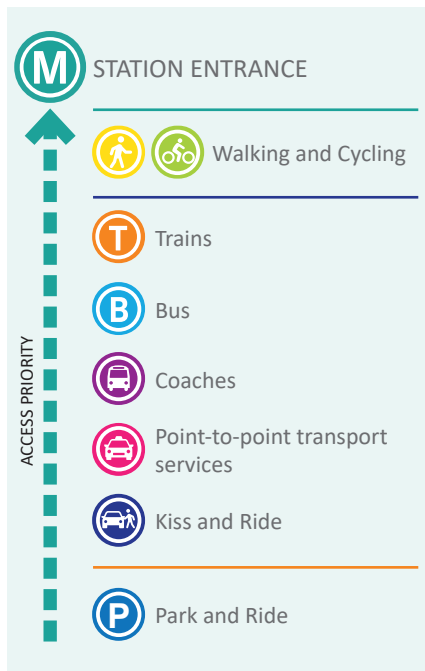
3.3.1 Interchange

Applicable Design Objectives

- Safe and customer-focused transport service
- Realising the 30-minute city

Principle

Provide an easy, accessible, safe and efficient transfer experience to serve a diverse set of customers.



*Sydney Metro - Western Sydney Airport
Station Access Hierarchy*

Source: Sydney Metro

Guidelines

- Station Planning and design is to acknowledge Sydney Metro - Western Sydney Airport will prioritise interchange movements from more equitable and sustainable modes, at each of their stations by applying the Sydney Metro modal access hierarchy:
 - Priority 1: Pedestrian, wheelchair and pram movement and access
 - Priority 2: Bicycle movement and access
 - Priority 3: Heavy Rail and Metro
 - Priority 4: Bus (including coach)
 - Priority 5: Point-to-Point transport services (including taxi and ride-share)
 - Priority 6: Kiss and Ride movement and access
 - Priority 7: Park and Ride movement and access
- Where feasible, providing a less than five-minute transfer between modes, aligning with Future Transport Strategy 2056 Customer outcomes. Where required, additional infrastructure to achieve safe and fast transfer between modes, such as signalised pedestrian crossings, subways and overbridges, has been identified for each station.
- Integration of interchange precincts with the surrounding urban structure is to facilitate cross and through movements, enhancing precinct permeability and access to the transport interchange functions of the locality.
- Stations and interchanges are to provide a safe, welcoming, intuitive and accessible environment, supporting independent travel for customers transferring between transport modes.
- Shelter and protection from extreme weather will be provided, where applicable, to improve the experience as customers transfer or wait to transfer to the next mode.
- Interchange design to minimise movement conflicts for customers between key transport modes.
- Station forecourt areas to accommodate adequate customer access and waiting spaces (as relevant), while ensuring customer confidence, sense of safety and wellbeing are not compromised.
- The varying spatial requirements of different transport modes, including third party operators, are to be prioritised and accommodated to avoid user conflicts.
- Provide point of decision way-finding signage to facilitate walking and cycling choices.
- Station and interchange designed to adapt to future technologies, such as micro-mobility and on-demand public transport, to improve the way people work and travel.
- Station interchange areas and facilities will be designed to cater for the needs of transferring airport passengers as well as commuters and other users.

3.3.2 Pedestrian Movement

Applicable Design Objectives

- Safe And customer-focused transport service

Principles

Provide pedestrian connectivity between transport modes that is safe, efficient, accessible, legible and enjoyable.

Provide pedestrian movement systems that clearly connect the stations with their surrounding locality.

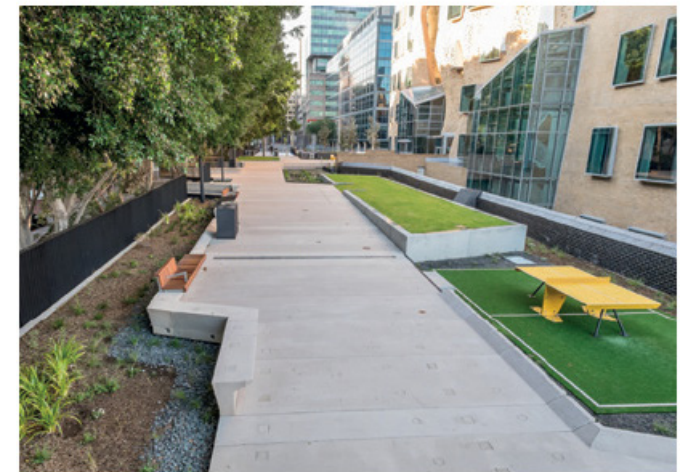
Ensure the vertical journey is a core element of the station architecture and provides step free access between the street and the platforms as it is integral to the stations design and has a major influence on the function and visual impact of the station environment.

Guidelines

- The station forecourts and associated areas are to adopt a clear hierarchy of movement functions that favour pedestrians ahead of vehicular circulation, thereby promoting opportunities for public transport patronage, walking and cycling.
- Interchange precincts are to provide pedestrian routes that connect people with places they want to go and provide clear sight lines through open, uncluttered spaces along pedestrian lines between key destinations.
- Easy-to-navigate connections and legible way-finding will facilitate interchange at stations and destinations, designed for customers with strollers, wheelchairs or luggage, through the use of elevators, minimising the need for going to different floors and level footways.
- Pedestrian movements are to accommodate an appropriate level of service in all areas of the station. Precinct designs are to optimise the variety of movement functions in order to minimise potential conflicts.
- Circulation systems are to respond to context and reinforce the character of precincts so they are easy and efficient to navigate.
- Design decisions affecting movement planning are to consider varying customer usage patterns including commuters, customers with disabilities, station employees, tourist customers and non-travelling visitors.



Wide, clear footpaths enable people to stop and wait without obstructing pedestrian movement flow.
Source: TfNSW



The Goods Line, Sydney. Design walkable attractive places with high visual amenity. Circulation systems that respond to context and reinforce the character of precincts should be easier to navigate and therefore more efficient.
Architect & Landscape Architect: CHROFI & Aspect Studios
Source: TfNSW

3.3.3 Bicycle Movement

Applicable Design Objectives

- Safe and customer-focused transport service

Principle

Prioritise bicycle movement consistent with modal access hierarchy by providing optimum connectivity and convenient, secure and accessible bicycle parking at stations to accommodate current and future demands.

Guidelines

- Bicycle paths to/from stations are to align with and be connected to master plans for precincts in the Western Parklands City.
- Bicycle infrastructure is to be responsive to the specific characteristics of the station precinct, address the bicycle network and storage requirements, and integrate them into the broader precinct movement networks.
- Provide convenient and safe bicycle storage facilities with good natural surveillance and weather protection, connected to cycle ways.
- Provide infrastructure to support shared mobility schemes, allowing users to access transport modes on an as-needed basis without requiring ownership of a vehicle.
- Design of bicycle paths and routes connecting directly to/from stations is to be legible, with a distinct and identifiable character and be safe for cyclists and other users.
- Conflicts between pedestrians and cyclists at stations are to be avoided through design, particularly at high activity zones such as station entries and retail areas.
- Sheltered and secure bicycle parking at stations is to be placed directly adjacent to movement paths to provide clear and legible access, without compromising safe, accessible paths for customers with mobility and vision impairment.
- Station design to enable through-access to allow for bicycles to be taken on metro trains.
- Design for bicycle facilities is to give priority to bicycle safety at road interfaces.



Attractive, secure, weather protected bicycle storage.
Source: Sydney Cycleways.



Provide for people with bicycles throughout the intermodal connections.
Source: TfNSW. Copyright: Glenn Duffus Photography

3.3.4 Vehicular Interface

Applicable Design Objectives

- Safe And customer-focused transport service

Principle

Establish a legible hierarchy of safe vehicular streets that respond to the varying customer and operational requirements for vehicular, bicycle and pedestrian movements in accordance with the modal hierarchy.



Sydney. Dedicated bicycle and bus lanes.
Source: TfNSW

Guidelines

- The design of stations and associated urban realm is to respond to the character of established streets and variations in carriageway width, on-street parking, existing and planned future cycle ways, and street tree planting and pedestrian amenity.
- Modifications to existing roads and development of new roads in station precincts are to consider:
 - Number of traffic lanes
 - Length and type of slip lanes
 - Intersection types and configuration signalling requirements
 - Speed environments and traffic calming measures
 - Kerbside zones
 - Cycling
 - Footpaths
 - Crossings
- Streets, footpaths, and bicycle paths are to contribute to the quality and character of urban area, and will heavily influence customer experience.
- Provide kerbside space in a flexible manner that can be reallocated according to changing access requirements. Kerbside allocation will also encourage efficient and complementary access routes for all modes, avoiding conflict and unnecessary circulation.
- Vehicular traffic planning is to be integrated with the built form and spatial planning of precincts.
- Bus stops are to be located close to the station in accordance with the modal hierarchy, to be accessed safely and efficiently by all customers.
- Design of streets adjacent to station entries that allow private vehicle and bus access are to prioritise the safe and efficient movement of the active transport network.
- Consider locker provision at stations to cater for storage of electric scooters, electric bicycles and batteries, and charging of personal electric transport.
- Taxi, ride-share and kiss and ride spaces to be located in accordance with the modal hierarchy, where safe and efficient vehicle access and high turnover is available, minimising conflicts with pedestrians, cycles, buses and other vehicles.
- Service vehicle access for all precinct functions is to be addressed as part of the broader station precinct movement strategies.
- Consider allowing adaptive use of kerbside spaces to accommodate rail replacement vehicles through design.



Part 4

Elements

About this Section

This section provides guidelines for the design of elements that make up the fabric of stations and the public domain around stations. These guidelines are covered in the following three topics:

- Stations
- Public Domain
- Operations and Services

Greater detail and project specific requirements for these elements will be included in the Scope and Performance Requirements during the procurement stage.

It is noted that design of Sydney Metro stations at Western Sydney International Airport will require consideration of WSA's Airport Protection Requirements and alignment with any relevant interface deed.



Sculptural plant extraction vents at One Shelley Street, Sydney.
Artist: Anton James
Source: TfNSW

4.1 Stations

Sydney Metro - Western Sydney Airport stations are part of a wider system that requires some degree of consistency in station planning, architecture and operations across lines. Although stations will be designed in response to their particular local context they will be recognisable as Metro stations. Station precincts and their interchange facilities will be well integrated with existing or emerging urban settings such that stations are central to a legible and accessible public transport system.

Station and precinct design should seek to deliver an easy, uplifting customer experience. Station entries, circulation and vertical transport zones, platforms and waiting areas must be designed to meet operational requirements and provide an easy customer experience. Stations are public buildings and their design and materiality must be of an appropriate quality. Structures and finishes must be sufficiently robust for the public and rail environment.

The design the Western Sydney Airport line stations must also consider the particular needs of airport travellers, many of whom will be first time users.

This section of the guidelines includes the following station areas and elements:

- Stations - General
- Station Entries
- Platforms
- Circulation and Vertical Transport
- Flooring and Pavement
- Walls, Ceilings and Platform Screen Doors
- Lighting



Macquarie Park Station. Clear sightlines and uncluttered spaces provide a safe and welcoming customer environment.
Source: TfNSW

4.1.1 Stations - General

Applicable Design Objectives

- Ensuring an easy customer experience
- Being part of a fully integrated transport system
- Delivering an enduring and sustainable legacy for Sydney

Principles

Station designs are to deliver consistent station planning and operations across the different station typologies. The architecture of the stations must establish a recognisable line-wide language for all stations whilst responding to it's individual urban context.

Sydney Metro - Western Sydney Airport includes underground, trough and viaduct stations.

Guidelines

- Station design is to be integrated with adjoining precinct design to ensure safe and efficient access to stations.
- Station design must allow for potential integration with appropriate adjacent developments or development sites.
- Station entries must be highly legible in their precinct.
- The legibility of the Airport Terminal Station, and its functional and visual relationship to the airport terminal and precinct, must be considered in design.
- Where space and other urban design considerations allow, entries and gate lines are to be located at in highly visible locations at street level.
- Entries and station concourses are to be transparent, generous and inviting spaces.
- Stations should, as far as possible, be naturally lit and ventilated.
- Station and precinct design should provide a seamless transition between transport modes.
- Key functional elements of stations and precincts should be consistent across stations.
- Operational and customer facilities are to be integrated in a consistent fashion, regardless of station typology, to ensure a consistent customer experience.
- Level changes between the street and station entries should be minimised.
- Station design must provide efficient, intuitive circulation between station entry and platforms.
- Precinct and station planning should allow for inclusion of affordable and flexible business premises, such as small scale retail, pop ups or micro-businesses.
- Design of station plazas, including any retail component, should consider and promote day and night time public use and activation.
- Permanent public art should be included in design of the station and/or precinct.

4.1.2 Station Entries

Applicable Design Objectives

- Ensuring an easy customer experience
- Being responsive to distinct contexts and communities
- Delivering an enduring and sustainable legacy for Sydney

Principle

The design of station entries, their canopies and concourses, is to create a strong, consistent line-wide identity. Concourse design must provide efficient and intuitive circulation and interchange spaces.



Canary Wharf Station, London. Natural light over entries and VT enhances wayfinding and creates a welcoming station environment.
Architect: Foster + Partners
Source: Cox Richardson

Guidelines

General

- Station canopy and entry design must consider existing or anticipated urban form, in terms of scale, character and heritage, where relevant.
- Station entries should be clearly visible in the locality.
- Design of station buildings is to avoid long, blank walls addressing the public domain. Articulation of built form and appropriate landscaping should be employed to mitigate building mass.
- Provision must be made for active street frontages wherever possible, particularly at station entries.
- Station entries must include adequate weather protection for customers at gate lines, queuing zones, amenities, ticketing and information areas.
- Entry concourses should present as simple volumes, be clutter-free and feature flush, continuous materials and clear directional signage that assist way-finding.
- Entry spaces should provide a safe, well lit, open and welcoming customer environment that has clear sight lines between the interior and exterior of the station.
- Wherever possible, vertical transport and concourse areas should be naturally lit.
- Sufficient space must be provided, separate to primary paths of travel, to meet anticipated patronage and to provide clear zones for queuing at ticket vending machines (TVMs), vertical transport and gate lines, including during special events.
- Design should seek to minimise the number of columns and avoid these and other obstacles on key sight lines and paths of travel.
- Lighting, communication, way-finding, information and security systems must be architecturally integrated, and recessed wherever possible.
- Unobtrusive maintenance access shall be allowed for in the design.
- The materials used in station entry areas should complement the adjacent public domain finishes.
- Station entries must include a well-integrated and secure means for shutting stations in non-operational hours.

Canopies and Awnings

- Protection from the elements at station entries and concourses should be provided by a single architectural element.
- Skylights should be included in the entry canopy, with a focus on the primary path of travel to vertical circulation zones.

4.1.3 Platforms

Applicable Design Objectives

- Ensuring an easy customer experience

Principle

Platform design must maximise efficiency, provide a high level of service and an easy customer experience, especially for customers with luggage.

Guidelines

- Efficient, safe access to metro services will be provided on platforms that have clear sight lines and generous, obstruction free circulation and waiting spaces.
- The location and distribution of vertical transport (lifts and escalators) is to be informed by anticipated customer demand and movement patterns.
- Platforms are to be free of any recesses that could offer hiding places, hinder CCTV coverage, become litter traps or disrupt continuous paths of travel for the visually impaired.
- Emergency egress must be provided in accordance with the Fire Life Safety requirements.
- Design of platform areas, using the architecture, materials and lighting, must have a clear relationship to the vertical circulation zone.
- Platform design should seek to minimise the number of columns and avoid these and other obstacles on key sight lines and in waiting and circulation zones.



Canary Wharf Station, London. Example of central columns and fixtures
Architect: Foster + Partners
Source: Cox Richardson



Macquarie Park Station. Example of transparent vertical circulation within an open platform that maximises sight lines.
Architect: Hassell
Source: Cox Richardson

4.1.4 Vertical Transport

Applicable Design Objectives

- Ensuring an easy customer experience
- Being part of a fully integrated transport system

Principle

Enable step free access between the street and the platform via lifts and escalators that are well-integrated in the design of station.

Guidelines

- All platforms are to be served by escalators and lifts that provide efficient access from entry concourse to platforms.
- Where stairs are included as a secondary means of access, they must be easy and safe to use.
- Where stairs form the primary means of access and ramps, lifts and escalators are an alternative, this alternative path must not result in a longer journey time than the primary path.
- Where feasible provide stairs adjacent to escalators to cater for higher levels of pedestrian movement and as an alternative when escalators are undergoing maintenance.
- Integrate lifts in station design such that they are expressed as strong, architectural elements in their own right.
- Vertical circulation elements are to be made from high quality materials.



Chatswood Transport Interchange, NSW. Good example of a glazed lift and shaft
Architect: CoxDesignInc.
Source: Cox Richardson

4.1.5 Flooring and Pavement

Applicable Design Objectives

- Ensuring an easy customer experience
- Being responsive to distinct contexts and communities

Principle

Allow for the safe and efficient movement of pedestrians, including people with disabilities, through the provision of high quality, robust flooring and paving suitable for public areas and the rail environment.

Guidelines

- Floor and pavement surfaces within and outside stations are to be of a consistent, high quality that reflects the Sydney Metro - Western Sydney Airport identity.
- Flooring must be durable, hard-wearing, easy to clean and slip resistant.
- Material selection is to consider sustainability factors such as dematerialisation, embodied carbon and replacement.
- Station flooring and plaza pavements are to be complement adjacent public domain finishes where these exist, or are planned.
- Station flooring must present a clean, attractive and uniform appearance and form part of a coordinated palette of station materials.
- Paving and flooring patterns or configuration should serve to indicate, if possible, the prevailing paths of travel.



Coordinate interior and exterior public domain pavements.
Source: AECOM



North Sydney Station, NSW. Example of an open clutter free concourse with directional flooring.
Architect: Cox Richardson
Source: Cox Richardson

4.1.6 Walls, Ceilings and Platform Screen Doors

Applicable Design Objectives

- Ensuring an easy customer experience
- Delivering an enduring and sustainable legacy for Sydney

Principle

Wall and ceiling materials should form part of a flexible system of elements that allows for a reasonable level of standardisation of components without precluding individual expression at any or all stations.



Copenhagen Metro, Denmark. Good example of full height PSD
Architect: KHRAS Architects
Source: Cox Richardson

Guidelines

Walls and Ceilings

- The structure, finish and appearance and of walls must be suitable for the public, rail environment.
- Durable cladding and or finishes that are suited to local environmental conditions must be specified.
- Wall systems, components and fixing details must be fit for purpose including appropriateness for the given acoustic environment.
- Design must consider ease of access for maintenance and replacement of wall and ceiling sections or panels.
- Wall and ceilings in the rail (track) zone should be subdued and simple.
- Feature walls or ceiling planes may be used as architectural elements to identify a station and/or highlight vertical circulation and primary paths of travel.
- Use of colour or texture should generally be deployed to assist in station way-finding.
- The balance of station finishes should be relatively neutral, or recessive, relative to areas of bolder expression.
- Wall and ceiling detailing must anticipate the integration of other station elements and fixtures, such as signage, speakers and cameras, and the placement of vending machines, help-points, bins and seating.

Platform Screen Doors

- Platform Screen Doors (PSDs) should be as transparent as practicable, with considered structural framing designed to achieve a minimal and elegant platform edge barrier.
- Platform Screen Door design must conform to the following requirements:
 - Minimum 1700mm height
 - Run for full platform length with fixed complementary panels on inactive parts of platform
 - Well resolved integration of end walls
 - Maximised extent of glazing
 - Meet security requirements
 - Be modular to facilitate ease of fabrication, installation repair and replacement
 - Well resolved junctions with adjacent surfaces

4.2 Urban Realm

The design principles to govern the integration of rail infrastructure, stations and related facilities into their existing or proposed future urban settings are outlined in this section.

The urban design of station precincts should establish the setting in which stations have a civic presence and become a focus for town centre activation and a catalyst for development. The project, especially in greenfield areas, can influence the configuration of roads and access pathways to, and around, stations. Design of station plazas, interchanges, local streets and pathways will extend the footprint and identity of stations into the precinct. Consideration of the quality and amenity of these elements becomes as important as the station itself, in the early formation and development of these urban areas.



The Goods Line, Sydney.
Architect & Landscape Architect: CHROFI & Aspect Studios
Source: TfNSW

4.2.1 Landscape Design

Applicable Design Objectives

- Ensuring an easy customer experience
- Being responsive to distinct contexts and communities
- Delivering an enduring and sustainable legacy for Sydney

Principles

The landscape design of the project will contribute to the restoration of the natural qualities of the South Creek corridor and its development as a series of high amenity public open spaces.

Station precincts will include significant tree planting and well-designed public spaces that set a high standard of public amenity, consistent with whole of government aspirations for the Western Parkland City.

The quality of the station precinct and corridor landscape design will be an important component of the public identity of Sydney Metro in the Parkland City.

Landscaping of the Sydney Metro - Western Sydney Airport corridor will contribute to revegetation of the South Creek catchment and to whole of government objectives to increase Sydney's urban tree canopy and create a high level of amenity in the Western Parkland City.

Water quality basins designed for the retention and treatment of storm water and drainage from the rail alignment will be a considered part of an integrated landscape design.

Guidelines

General

- Urban and landscape design should respond to existing local conditions, site history and the anticipated future character of the Parkland City, its residents and workers.
- Materials and planting selections should consider these contextual questions
- Landscape design must be functionally appropriate for an urban station environment and adequately address safety in design issues pertinent to the generic rail environment and the specific road and public realm environment of each station.
- Landscape design must result in appropriately scaled spaces and elements that provide a reasonable level of comfort to users across the seasons, with consideration of the regional and local micro-climate and any anticipated adjacent development.
- The design of plazas and associated spaces should be well-ordered and clearly legible to assist in way-finding.

Hard Landscape

- Paving design should aid legibility, in particular the principal paths of travel.
- The design of plazas, precincts and car parks must feature water sensitive urban design, including passive irrigation and permeable pavements.
- The design process must investigate the use of recycled materials, especially those derived from any demolition works.
- Landscape design and the choice of materials must seek to avoid slips, trips and falls.
- Materials, furniture and fixtures must be durable, high quality and contribute to a recognisably civic character for Metro stations.
- Material choice should maximise economies of scale and be designed for safe installation, low maintenance and long term durability.
- Elements and their detailing must meet all functional requirements including customer interface, and component and services integration.
- A hierarchy of paving types will be provided such that pavements are appropriate for their location and function, and include consideration of heat island effect mitigation.
- The paving palette is to be developed with reference to local Council public domain guidelines, where available.
- Paving on either side of gate line should be relatively seamless and if not the same, then clearly complementary.
- Paving must meet the required standards, design codes and specifications for visual and tactile contrast and slip resistance.

Soft Landscape

- Plant species must be suited to local environmental conditions and appropriate for the proposed urban or open space setting.
- Planting type, scale and configuration must be spatially appropriate for the scale of the setting and must not compromise the pedestrian capacity of circulation spaces.
- Street trees are to provide strong, legible structural planting in precincts and reinforce connections with adjacent streets or areas, contribute to visual continuity and local character.
- Depending on orientation and degree of urban enclosure, trees are to provide summer shade and good solar access in winter.
- Planting is to be low maintenance, with generally no irrigation requirements beyond the establishment phase.
- Planting design must seek to mitigate heat island effects and maximise public amenity.
- Screen planting is to be employed in the visual mitigation of engineered structures and service and ancillary buildings in the rail corridor.
- Planting design must achieve clear sight lines at road intersections, in plazas on main paths of travel and at interchange facilities.
- Planting design must observe the required offsets – clearance heights and distances – to rail infrastructure.

Corridor

- Landscape design in surface sections of the alignment will be based upon the appropriate Cumberland Plain Woodland vegetation communities.
- Riparian zones traversed by the alignment will be revegetated using endemic species from the appropriate vegetation community.
- Planting in viaduct sections of the alignment should mimic relatively open woodland to allow for recreational areas and activities to be included in the design.
- Landscape design will consider relevant guidelines regarding species selection to mitigate bird strike in identified areas around the Western Sydney International (Nancy-Bird Walton) Airport .

Water Quality Basins

- Basins will be designed to achieve these functions but also as landscape elements that contribute to local ecology and amenity.
- Generally basins will be naturalistic in shape and contoured to blend with adjacent landform.
- Basin planting will include selected indigenous grasses and sedges and appropriate trees and shrubs specified as part of the wider landscape design.

4.2.2 Civic Interface

Applicable Design Objectives

- Ensuring an easy customer experience
- Being part of a fully integrated transport system

Principles

Contribute to an urban framework that establishes stations as focal points in town centres.

Develop an architectural language for stations that lends a civic quality to the stations, at an appropriate scale in relation to the anticipated urban form of precincts.

Station and precinct design should, where appropriate, be informed by the landscape character of the region and the needs of existing and future communities that will be serviced by the line.

Guidelines

- Roads and pedestrian/cycle connections to stations that are clear, safe and attractive.
- Plazas adjacent to stations that provide a high level of public and landscape amenity.
- Architectural expression, material choices and appropriate scaling of elements to give the station a local civic presence.
- The development of architectural language or form at the Airport Terminal Station that is complementary to the terminal and precinct design.
- The design of the public landscape should also aim for a civic quality.
- Public art and cultural interpretation which explores local identity should be embedded in public domain or station design.

4.2.3 Plazas

Applicable Design Objectives

- Ensuring an easy customer experience
- Being a catalyst for positive change
- Being responsive to distinct contexts and communities
- Delivering an enduring and sustainable legacy for Sydney

Principles

Appropriately scaled plazas shall integrate the station entry, street frontages, pedestrian crossing points and transport interchange facilities to achieve a coherent public domain around stations.

Ensure pedestrian priority across local streets is aligned with station entry/s.

Plaza design shall provide unhindered access across plaza to the station entrance.

Guidelines

General

- Ground levels manipulated to allow gently graded walkways rather than stairs and ramps wherever possible.
- Design composition, furniture arrangement and finishes used to enhance legibility and way-finding.
- Weather protection at station entry and all interchange facilities.
- Architectural lighting used in plaza areas to enhance station identity.
- Shade trees and wider planting design must improve micro-climatic conditions.
- Design should include clearly defined entry points to mark a sense of arrival at station.

4.2.4 Access Streets

Applicable Design Objectives

- Ensuring an easy customer experience
- Being part of a fully integrated transport system

Principles

Provide a local street interface with the station that is commensurate with projected function and demand.

Promote walking and cycling to the station through provision of shaded, comfortable and safe access streets and/or paths and cycleways.

Connect access streets to the existing street network.

Guidelines

- Station entries aligned with street axis where possible to maximise visibility of the station.
- Setback and location of the station entrance to allow an appropriately sized public plaza.
- Minimum necessary vehicle carriageway widths (and maximum verge width) to allow for generous, landscaped approaches to stations and safe pedestrian crossings.
- Consideration of potential development sites which should be identified in precinct plans, including future access points and potential complementary urban settings to then station.

4.2.5 Accessible Pathways

Applicable Design Objectives

- Ensuring an easy customer experience
- Being part of a fully integrated transport system

Principle

Provide pathways to and from station entries and facilities that are accessible, safe and comfortable for all users.

Guidelines

- A system of appropriate pathway surfaces, widths and gradients is to provide safe and equitable pedestrian access throughout the public domain and to link transport modes.
- Station precincts must be easy and safe for all to use regardless of physical mobility; able bodied customers, wheelchair users, carers with strollers, the visually and cognitively impaired should all be provided with equal access.
- Stairs are to be avoided as far as possible as they reduce opportunities for universal access. Where the use of stairs cannot be avoided, then they must be short in length, easy and safe to use.
- Where the use of stairs is unavoidable, clearly legible alternative circulation routes should be provided. These alternatives should be as close as possible and not isolated from the primary circulation route.
- Ramps may provide opportunities for universal access; however, where possible, seek alternative means of effecting level changes, for example, by altering the path of travel.
- All alternative means of effecting level changes should be considered, for example by altering the path of travel.
- Selective use of colour, texture, lighting, finishes and customer information to further define paths of travel, circulation spaces and the location of key facilities.
- Tactile Ground Surface Indicators (TGSIs) should be used on paths of travel to warn customers with vision impairment of hazards and assist way-finding where required.
- Where possible, provide a consistent, clear path of travel for customers with vision and mobility impairments by keeping one side of paths of travel clear of fittings and fixtures.



Design paths and ramps for access for all. All modal connections must be located in convenient, safe, well-lit areas with good natural surveillance.
Source: AECOM.



Martin Place, Sydney. Carefully locate all street furniture to minimise potential obstructions and maximise use of circulation spaces.
Source: AECOM.

4.2.6 Furniture and Fixtures

Applicable Design Objectives

- Ensuring an easy customer experience
- Being a catalyst for positive change
- Being responsive to distinct contexts and communities
- Delivering an enduring and sustainable legacy for Sydney

Principles

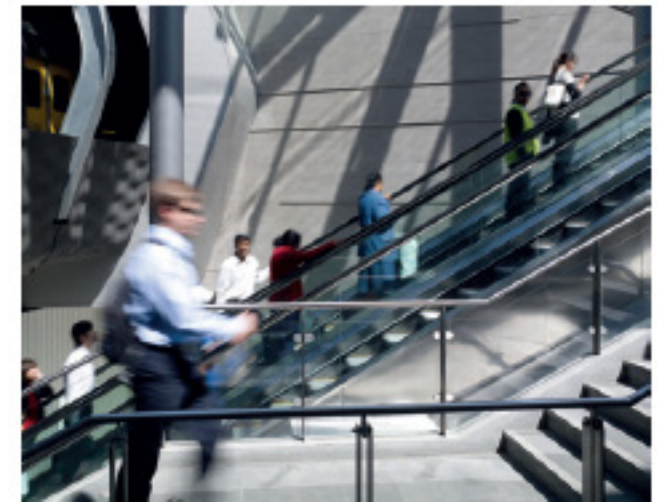
Furniture and related fixtures must be designed as an integrated suite of elements that are high quality, durable and fit for purpose.

Guidelines

- The design of elements should achieve clear, honest expression of materials.
- Natural and recycled materials should be used where feasible, without compromising aesthetic and performance outcomes.
- The use of durable, self-finished materials is desirable.
- The design of furniture and fixtures should be complementary to station architecture.
- Site furniture and fixtures such that they do not become obstructions to pedestrian movement in station plazas and interchange areas.
- Elements can be used to delineate functional areas or spatial arrangements.
- All elements should be accessible to the full range of potential users.
- Seating can be integrated with other landscape elements as appropriate to the design.
- Seating should be located along main paths of travel, adjacent to entrances and in interchange areas at a maximum spacing between seats of 60 metres.
- Litter and recycling bins are to be co-located in appropriate locations in stations and the public domain.



Barangaroo, Sydney. The furniture and fixing colour palette should be coordinated with architectural elements, surface finishes and pavements.
Architect: Tzannes Associates
Source: TfNSW



Chatswood Station, Sydney, NSW. Example of handrail and stanchion
Architect: CoxDesignInc.

4.2.7 Fencing

Applicable Design Objectives

- Ensuring an easy customer experience
- Being responsive to distinct contexts and communities
- Delivering an enduring and sustainable legacy for Sydney

Principles

Corridor and station precinct fencing and gates will comprise a simple, standardised family of elements that are of high quality, durable and fit for purpose.

Fencing location and alignment should be considered as part of the integrated landscape and urban design of stations and corridor.

Guidelines

- Fences and gates must be suitably robust and for the public and rail environment.
- Fixing details must be discreet and well resolved, not visually intrusive,
- Ease of maintenance access must be considered in design.
- Fencing should as far as possible be visually recessive, especially in the station precinct environment.
- Security fencing is to be set back from street edges to allow for a landscape buffer.
- Corridor security fencing must be efficiently integrated with other corridor structures such as bridges and retaining walls.
- Corridor access points must be designed to minimise potential conflicts between maintenance vehicles and open space users such as pedestrians and cyclists.



Terracotta louvred facade provides a vibrant wall surface.
Source: AECOM.



Glazed facades enable transparency and legibility.
Architect: The Buchan Group
Source: Apple

4.2.8 Earthworks and Engineered Structures

Applicable Design Objectives

- Being responsive to distinct contexts and communities
- Delivering an enduring and sustainable legacy for Sydney.

Principles

Visually integrate earthworks and retaining walls in the rail corridor with their urban or landscape setting, as part of a coordinated whole of corridor design.

Ensure safe maintenance access to corridor earthworks and structures

Guidelines

Earthworks and Embankments

- All earthworks should sit lightly in their context, exhibiting a 'natural fit' within their landscape setting.
- Use of retaining walls is preferred on batter slopes where gradients exceed 3H:1V.
- Planted batters should generally be 4H:1V wherever space allows.
- Earthworks to be rounded out at top and bottom of batters, and at ends of
- Formations, in order to achieve a 'natural' transition to adjacent landform.
- Where these requirements cannot be met due to limited space, the use of retaining walls is preferred.

Retaining Walls and Portals

- Retaining walls and related elements will form part a unified composition, integrated with other components such as fencing, guard rails, lighting, landscape, drainage, and noise walls.
- Retaining walls are only to be used where there is no other alternative.
- Cut and fill batters of 3H:1V or flatter will be vegetated.
- In elevation walls will present a consistent, modular pattern of vertical and horizontal joints expressed as shadow lines.
- Vertical joints are to be coordinated with vertical joints or stanchions of related, adjacent elements.
- Concrete retaining walls will have a smooth Class 2 concrete finish.
- The use of shotcrete is only permitted where there is no other acceptable retaining wall or vegetated embankment alternative.
- Shotcrete finishes will be detailed (smooth trowelled and jointed) to mimic adjacent structures.
- Surface finish of shotcrete will be consistent off-white or grey (according to specified and approved colour prototype) with no obvious patches or stains due to curing agents or the like.

Noise Walls

- Any noise walls are to be designed as part of a hierarchy of walls that includes retaining walls, abutments and parapet walls, such that each element appears to be visually coordinated.
- The height of noise walls will be sufficient only to satisfy noise and vibration mitigation requirements.

- Walls are to have long, even curvatures and run parallel with the rail track.
- The ground plane below noise walls should be as even and horizontal as possible.
- Rectilinear, modular walls are to be used for consistency of appearance.
- Ends of noise barriers will be terminated with a curved or raked wall section to allow integration with adjacent structures or landform, or alternatively terminate by over lapping with adjacent structures in a planned and considered way.
- Where steps in noise walls are necessary due to landform, they should present with a consistent and legible rhythm.
- Vertical post supports shall not be visible from the track side unless designed as a specific visual effect.
- Panels shall be made from robust, vandal resistant materials, with recycled materials prioritised.
- Coating systems and applied colours must be readily available, easily and exactly matched throughout the life of the wall.
- Colours selection must consider rail restrictions and not conflict with rail signal visibility.
- The apparent scale and visual impact of noise walls will be mitigated with suitable planting.
- A minimum 1.5m clearance will be provided from the outside of noise walls to any planting to enable inspection and maintenance access.

4.2.9 Viaducts and Bridges

Applicable Design Objectives

- Being responsive to distinct contexts and communities
- Delivering an enduring and sustainable legacy for Sydney.

Principles

Visually integrate the viaducts and bridges of the rail corridor with their urban or landscape setting, as part of a whole of corridor design.

The viaduct should be an elegant, consistent structure that is proportionally well-resolved with a clear relationship between elements.

Create a viaduct that is visually light, and one that allows for active uses below and adjacent to the structure.

Safe maintenance access to viaducts and bridges must form part of the design.



Viaduct piers, Sydney Metro Northwest. Sydney Metro

Guidelines

Bridges and Viaducts

- The design, form, materials and finishes of bridges and viaducts are to be consistent across the project to ensure visual continuity, unless particular bridges at certain locations require distinct structural or architectural solutions.
 - Viaducts and bridges must integrate structural and architectural elements to create high quality, simple and elegant pieces of infrastructure. They must present as coherent, well-proportioned, symmetrical structures.
 - The design must present smooth clean lines without unnecessary visual clutter and achieve visual slenderness through rational form and engineering.
 - The viaduct must adopt a single pier design without separate headstocks and achieve simply supported spans of segmental box girders.
 - Where spans of the viaduct are curved, precast concrete box girders must have a continuous form.
 - The viaduct must present a clear structural rhythm with consistent spans between piers.
 - The pier design must be proportionally elegant, considering the varying heights of piers from adjacent ground levels to the underside of viaduct girders.
 - Viaduct will include integrated parapets that provide effective noise mitigation.
 - Abutments must be visually integrated with the viaduct or bridge and sit comfortably in their landscape context.
- The design and height of viaducts and their piers should maximise opportunities for under viaduct activity, and/or landscaping and connectivity.
 - The platforms of elevated stations should be supported by the viaduct structure with any additional structure to be complementary in design to the primary form.
 - The design of structure associated with viaduct stations should maximise natural light penetration and minimise ground level obstructions, allowing for clear sightlines and unimpeded pedestrian flow.



Skytrain bridge, Sydney Metro Northwest. Sydney Metro

4.2.10 Shared User, Cycle and Pedestrian Paths

Applicable Design Objectives

- Ensuring an easy customer experience
- Being responsive to distinct contexts and communities

Principles

Shared user or cycle paths should be sympathetically integrated with their landscape setting, be safe and legible for all users.

A considered landscape design must form part of path design and tree planting opportunities should be maximised along the route.

Guidelines

- Paths must comply with Austroads requirements for dedicated and shared bicycle paths with acceptable minimum widths:
 - Pedestrian - 2 metres
 - Cycle - 2.5 metres
 - Shared Path - 4 metres
- Paths will have adequate lighting, sign-posting and line-marking.
- Paths will include occasional rest stops at logical junctions or landscaped areas that afford shelter and views.
- Rest stops will provide shade, seating, litter bins and drinking fountains as a minimum.
- As a minimum provision, in or adjacent to the rail corridor, new paths should be shared paths (desirable width 4 metres) or, where possible, separated paths.
- Planting design must consider mandatory offsets from rail infrastructure, sight lines for path users, other CPTED considerations and the views and policies of local Councils.
- Where walking or cycling routes have to cross roads/ intersections investigate dedicated crossings or other traffic management measures to create safe crossing points.
- Lighting provision should be solar powered (no reticulated supply) unless it is more practical/economical in certain areas to supplement existing street or park lighting from existing supply.
- Lighting design must minimise light spill to adjacent properties.
- Pathway bridges are to be pre-fabricated steel with a minimum 4000mm clear width if shared between pedestrians and cyclists.
- Bridges are to have fibre reinforced plastic (FRP) decking with a kick rail on each side.
- Bridge design should minimise the structural depth of bridges and maximise under bridge clearances.

4.3 Operation and Services

The design of project infrastructure must be tailored to operational requirements and transport functionality over the longer term. Similarly design must anticipate system management and maintenance functions over successive generations as Sydney grows and demands on the public transport network increase.

Stations, buildings, external areas and corridor structures must be suitable for a high capacity passenger rail service that will traverse a range of urban and open space areas with a range of physical interfaces. Stations will have consistent and reliable facilities to facilitate servicing and security functions, as well as to meet the needs of both regular and occasional customers.

This section of the guidelines covers the following elements:

- Way-finding and Signage
- Ticketing Equipment and Fixtures
- Engineering and Services Integration
- Management and Maintenance
- Security
- Emergency Requirements
- Service Vehicle Access

4.3.1 Way-finding and Signage

Applicable Design Objectives

- Ensuring an easy customer experience
- Being part of fully integrated transport system
- Being responsive to distinct contexts and communities

Principles

Provide intuitive, clear and consistent information and signage to ensure efficient navigation of the system and easy interchange with other transport modes.

Provide a seamless customer journey from point of origin to final destination.

Guidelines

- Way-finding design must comply with Transport for NSW Way-finding Planning Guide (Sydney Metro).
- Information must include but not be limited to, trip planning including real time information for all public transport modes, station and intermodal connection orientation information, station facilities and amenities and local destinations.
- A public address system will be provided that is capable of projecting clearly audible information throughout the station.
- Advertising must not compromise way-finding. Design and placement of customer information must be prioritised as follows:
 - Way-finding and customer information
 - Customer campaigns
 - Advertising



Circular Quay, Sydney. Signage and wayfinding enables clear sightlines of the interchange precinct.
Source: TfNSW

4.3.2 Ticketing Equipment

Applicable Design Objectives

- Ensuring an easy customer experience
- Being part of a fully integrated system

Principles

Provide integrated ticketing equipment and associated fixtures that are consistent with Sydney Trains and Sydney Metro standard equipment across the network.

Ticketing equipment will contribute to an efficient, high quality customer service.

Guidelines

General

- Common ticketing equipment and fixtures include:
 - Ticket gates
 - Ticket Vending Machines (TVM) and Opal Top-up Machines
- All components must be high quality, durable and suitable for the rail environment.
- Equipment and fixtures must be highly visible and easily accessible to customers and staff.
- Elements must be easily accessed for maintenance, future repairs or replacement.

Ticket Gates

- Opal ticket gates are to be used in all stations.
- The number of gates will be sufficient for peak periods.
- At least one wide aisle gate will be provided at each gate line.
- Wide aisle gates must be clearly visible and located on accessible paths of travel.
- All gates at the Airport Terminal Station will be wide aisle gates.
- Adequate runoff space outside of circulations zones will be provided on both sides of gate lines.

Ticket Vending and Opal Top-up Machines

- TVMs and Opal Top-up Machines must be clustered together to create a clear ticket sales zone in the unpaid area at the station entrance.
- Machines must be publicly accessible, outside primary circulation areas with sufficient queuing and manoeuvring space for people using mobility aids.
- Machines should be integrated with station architecture and other elements.
- TVMs and Opal Top-up Machines must be standard proprietary items and DDA compliant.



Sydney Trains Opal Only Gates
Source: TfNSW

4.3.3 Engineering and Services Integration

Applicable Design Objectives

- Ensuring an easy customer experience
- Being part of a fully integrated system
- Being responsive to distinct contexts and communities

Principle

Rail engineering and service elements in the corridor, at stations and at ancillary facilities will be part of an integrated design that still allows for ease of maintenance.



Macquarie Park Station. Services are concealed and integrated within the cavern structure, enabling the clean expression of the cavern form.
Architect: Hassell
Source: Cox Richardson

Guidelines

General

- Station structures and engineering elements will be designed holistically to achieve an integrated engineering and architectural outcome.
- The integrated design is to include all structural, civil, mechanical, electrical and rail systems elements.
- Placement and arrangement of elements for ease of operations and maintenance, including personnel access, must be a priority in the design.
- Minimise the visual impact of engineering and systems components by concealing all services.
- Dedicated service zones should be included in stations, including space proofing for future anticipated requirements.
- Architectural expression of primary structural elements of buildings or structures should be investigated in the design.

Service Buildings

- Service buildings must form part of the integrated design solution with station and precinct design.
- Material quality and architectural resolution should be complementary to station architecture.
- Active frontages to service facilities should be pursued as part of precinct planning.
- Service facilities in sited in urban public areas should be integrated with other functions such as ticketing and information, egress stairs, retail or community facilities, wherever possible.
- Consideration of visual, environmental and acoustic impacts of facilities must be included in the design solution.
- Design should allow for safe access to all areas of service buildings or facilities.

4.3.4 Management and Maintenance

Applicable Design Objectives

- Being part of a fully integrated system

Principles

Cost effective, adaptable, durable and easily maintained materials and assets that are fit-for-purpose for the rail environment will be designed and specified for use in the project.

Maintenance considerations are to be integral to the design process from an early stage.



Temporary or ancillary equipment, vending machines or any other structures (i.e. temporary signage) are not be placed in the primary pedestrian paths.

Source: Grimshaw.

Guidelines

- Adopt a consistent and coordinated palette of materials, furniture and fixtures to serve a cost effective management and maintenance approach.
- Public domain elements are to comply with any relevant local authority standards to facilitate consistent future management and maintenance.
- Public domain elements are to be consistent with adjacent public finishes - if of an appropriate standard – for ease of maintenance.
- Pavements and roads must be designed to take loads of the vehicle and equipment types that will use facilities.
- All signage, street furniture and operational equipment in the public domain, for e.g. Passenger Information Displays (PIDs) and CCTV systems, must be designed to minimise vandalism and simplify cleaning.
- The placement and detailing of furniture, fixtures and equipment should consider potential impacts from birds, insects and animals on operational assets and the customer environment.
- All assets, including paving, lighting, signage and street furniture, will be a standardised, modular design as far as practical, and be readily available with readily replaceable components.
- All elements must meet the required life cycle objectives of Sydney Metro and the specification of elements must consider sustainability objectives including dematerialisation and embodied energy.
- Materials and finishes must be easily cleaned and maintained and graffiti resistant in all customer interface areas.
- Furniture, fixtures and fittings are to be robust and durable, with consideration of potential vandalism in their detailing and placement.
- Station design must accommodate maintenance access to all elements, including components that require the use of heavy or large machinery or structures for installation of equipment, regular cleaning or repairs.
- Stations and station precincts should be designed to facilitate safe access for both operational staff and customers.

4.3.5 Security

Applicable Design Objectives

- Being part of a fully integrated system

Principles

Ensure adequate security for rail corridor infrastructure, station assets and for rail users.

Visually and physically integrate security elements as part of coordinated station, precinct and corridor design.



Homebush, Sydney. Rail corridor security fences should be robust, easily maintained, modular systems that are readily integrated with other urban design elements such as retaining walls.

Source: AECOM.

Guidelines

- Risk assessments must form part of the design process during all phases.
- A public address system is to be provided at emergency egress points, controllable from Station Control Rooms and Operational Control Rooms.
- CCTV must be provided throughout the station.
- CCTV must be provided at all corridor access/egress points and risk-sensitive areas.
- Security bollards may be provided where necessary but must not impede safe pedestrian movement. Where required, security bollards should adopt a rational layout in order to minimise visual clutter and maintain safe, accessible paths of travel.

Fencing and Gates

- Security fencing must be provided along surface (at-grade) sections of the corridor and include permanent gated access at controlled locations. Fencing and gate locations are to be coordinated with strategic emergency access and egress points.
- The selection and detailing of fencing should be fully coordinated throughout the corridor and consist of modular components.
- The choice of corridor fencing must also respond to corridor context, including for example, the provision for high quality fencing in station precincts.
- Fencing types must be robust, suitable for the rail environment and consider maintenance and future replacement.
- Fencing in station precincts and public domain areas must avoid creating dead ends.

4.3.6 Emergency Requirements

Applicable Design Objectives

- Being part of a fully integrated transport system

Principles

Ensure that station precincts, rail facilities and corridors are provide with clearly identified emergency access and egress zones.

Design zones to avoid potential conflict between emergency, maintenance and other vehicles as well as pedestrians and cyclists.

Guidelines

- All station precincts and public domain areas must comply with statutory requirements and emergency procedures and relevant guidelines for fire and safety.
- Emergency requirements are to include:
 - Effective and clearly signposted station emergency evacuation routes and assembly areas
 - Adequate zoning and space at emergency assembly points to ensure they are clutter free and accessible at all times
 - Fire safe refuge areas with CCTV and an accessible communication system in underground stations for people who are unable to self-evacuate
 - Emergency lighting to the immediate station curtilage
 - The appropriate location of firefighting equipment, clearly identified and readily accessible
 - Provision of emergency/security electronic help points

Hydrant Enclosures

- Hydrant enclosures should be easily identifiable, easily accessed modular components integrated with station/ wall cladding systems.



All station precincts must accommodate station evacuation and emergency procedures.
Source: AECOM

4.3.7 Service Vehicle Access

Applicable Design Objectives

- Being part of a fully integrated transport system
- Being responsive to distinct contexts and communities

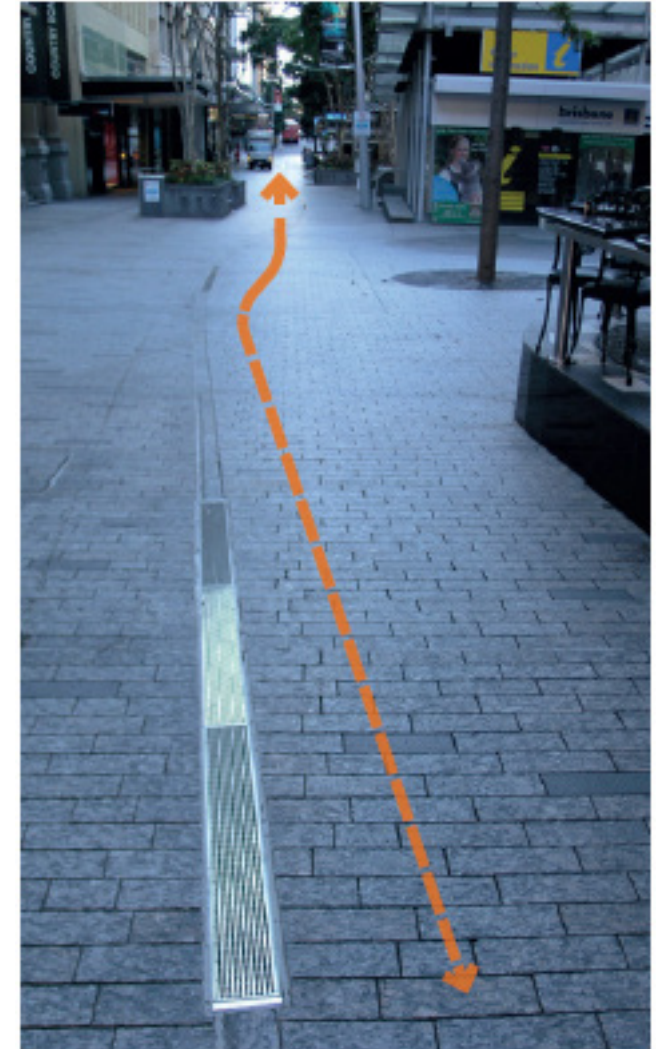
Principles

The station design is to include access for service vehicles.

Ensure service vehicle movement paths in precincts are well defined and efficient.

Guidelines

- Service vehicle access is not to compromise the public domain areas of the station forecourt or interchange and connectivity functions.
- Service vehicle access for all precinct functions must be addressed as part of the broader station precinct planning. This must address the project works requirements and any increased movements over the life of the project and precinct.
- The operational function and frequency of service vehicles should be considered to determine dedicated zones for daily or frequent access, or shared zones for occasional access within station precincts.



Queen St Mall, Brisbane. Emergency vehicle and service vehicle access through the mall has been provided.
Source: AECOM.

4.3.8 Commuter Car Parking

Applicable Design Objectives

- Safe and customer-focused transport service
- Realising the 30-minute city

Sydney Metro - Western Sydney Airport is designed in part as a catalyst for changing established car-dependent travel patterns in Western Sydney. In this context, commuter car parking should only be provided where no readily accessible transport alternative exists, or is planned to exist.

Principles

Parking facilities will be used to extend 30 minute station catchments without adversely affecting public transport patronage.

Car parking facilities should be designed with future flexibility or adaptability in mind so that structures can evolve in use if parking demand decreases.

Any surface car parking or parking structures must be sensitively integrated in the urban structure of station precincts. The form, scale and prominence of parking facilities should be appropriate to the anticipated urban form and well resolved architecturally and in terms of landscape design.

Parking structures must be secondary, in terms of visual prominence, to stations.

Guidelines

- Locate car parks in line with the Transport for NSW modal hierarchy while minimising distances between parking facilities and the station.
- The location and design of facilities must consider future stages of transport network development, future development potential and potential changes in customer preferences.
- Consolidate parking areas to reduce their impact on the urban and landscape setting, and minimise any impact to active street frontages without compromising interchange facilities and precinct amenity.
- The design of car parking structures must endeavour to minimise their perceived bulk, reflecting an appropriate scale for the precinct.
- Architectural and landscape screening must be used to visually soften and integrate parking facilities with their urban/streetscape setting.
- Natural and recycled materials must be considered in the design of parking facilities and associated screening details.
- Provide safe, accessible and legible, landscaped connections between car parks and station plazas.
- Provide sufficient space at car park entries to accommodate queueing zones and future potential access gates or other entry infrastructure.
- Provide safe, well-lit entrance lobbies to parking structures.
- Surface car parks will be designed to achieve a closed tree canopy within ten years of opening to shade all parking.
- Provision for future electric vehicle charging will be included in parking facilities, including space for pad mounts.
- Priority spaces must be included for accessible parking, compact vehicles and motorcycle parking.
- Water sensitive urban design principles will be incorporated into car park design
- Opportunities for rainwater harvesting and onsite renewables must be considered in car park design.

4.4 Stabling and Maintenance Facilities

Context

The proposed stabling and maintenance facility and operational control centre to support the operation of Sydney Metro - Western Sydney Airport will be located to the south of Blaxland Creek between the proposed metro alignment and the proposed corridor for the Outer Sydney Orbital at Orchard Hills. The facility will provide operational functions including the operations control centre and all infrastructure required to maintain a train fleet. Vehicular access will be provided via separate access/egress points on Luddenham Road and Patons Lane (for general staff access as well as delivery and large vehicle access). An internal access road network will provide for general circulation while providing appropriate separation to the main train fleet (with limited crossing points). The site would also be fenced from general public access and lit at night for safety and security. Other ancillary facilities required for the operation of Sydney Metro - Western Sydney Airport include the intermediate services facility, tunnel portal facility, and substations.

4.4.1 Stabling and Maintenance Facilities

Principle

Ancillary facilities will be architecturally designed and also given appropriate urban design consideration. Buildings will be robust and functional but modest objects that sit comfortably in their context.

Guidelines

General

- The design of ancillary facilities shall be visually unobtrusive and minimise adverse impacts on the surrounding environment, including the existing residential development to the west of the proposed stabling and maintenance facility.
- The design shall minimise visual and acoustic impacts to existing creek lines and fauna movement corridors, including Blaxland Creek.
- Landscape screening will be provided to reduce the visual impact of, and any light spill from, facilities.
- Landscape screening and/or climbing plants shall be used where feasible on facility buildings as a means to deter graffiti.
- The design of the stabling and maintenance facility shall allow for expansion to accommodate a larger, ultimate fleet capacity
- Stabling facilities will incorporate rainwater harvesting and onsite renewables.

4.5 Service Facilities and Tunnel Portals

4.5.1 Service facilities and tunnel portals

Principle

Ancillary facilities will be architecturally designed and also given appropriate urban design consideration. Buildings will be robust and functional, but modest objects that sit comfortably in their context.

Guidelines

General

- The design approach to portal buildings must include considered material choice and expression, appropriate articulation of built form and landscape screening to mitigate building mass.
- Material quality and architectural resolution should be complementary to station architecture.
- The design and materiality of portals must be sufficiently robust for the rail environment yet appropriate to an emerging urban context where they will be highly visible structures in the local environment.
- Consideration of visual, environmental and acoustic impacts of facilities must be included in the design solution.
- Architectural expression of primary structural elements of buildings or structures should be considered in the design.
- Unobtrusive maintenance access shall be allowed for in the design.



Australian Government



**Sydney Metro –
Western Sydney Airport**

Appendix H

Construction Environmental Management Framework



Construction Environmental Management Framework

February 2021

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1. Introduction

1.1 Purpose and Scope

This Sydney Metro – Western Sydney Airport Construction Environmental Management Framework (CEMF) is a Sydney Metro project framework that has been adapted specifically to set out the environmental, stakeholder and community management requirements for construction of the Sydney Metro Western Sydney Airport (SMWSA) project. It provides a linking document between the planning approval documentation and the construction environmental management documentation to be developed by the Principal Contractors relevant to their scope of works.

Sydney Metro Principal Contractors for SMWSA will be required to implement and adhere to the requirements of this CEMF. This CEMF will form part of the planning approval documentation and be included as a contract document in all design and construction contracts for SMWSA.

This CEMF differs from other Sydney Metro CEMF documents as it specifically incorporates the environmental management requirements applicable to SMWSA in relation to works to be undertaken on the Western Sydney International (Nancy-Bird Walton) Airport (Western Sydney International). These works are referred to as ‘on-airport’ works, whereas works outside Western Sydney International are referred to as ‘off-airport’ works.

Project elements located within the airport site (on-airport works) are subject to approval under the *Airports Act 1996* (Cth). Delivery of on-airport works would need to be undertaken in accordance with the Airport Plan, as varied, and other relevant Commonwealth legislation, including the *Airports (Environment Protection) Regulations 1997*.

Given the on-airport works of SMWSA would be constructed on airport land and at the same time as the construction works associated with Stage 1 of Western Sydney International (being delivered by Western Sydney Airport (WSA)), this CEMF has been prepared to align, where relevant, with the Site Environmental Management Framework prepared by WSA.

1.2 Status

This is a controlled document, please refer to the version register below which is updated as required.

| Version | Description | Date |
|---------|---|-----------------|
| 1.1 | Minor revision for SMWSA response to submission | 9 February 2021 |

1.3 Sydney Metro Environment and Sustainability Statement of Commitment

The Sydney Metro Environment and Sustainability Statement of Commitment (Appendix A) which applies to all Sydney Metro projects. Principal Contractors are required to undertake their works in accordance with this document. The Statement of Commitment reflects a commitment in the delivery of the project to:

- Optimise sustainability outcomes, transport service quality, and cost effectiveness.
- Develop effective and appropriate responses to the challenges of climate change, carbon management, resource and waste management, land use integration, customer and community expectation, and heritage and biodiversity conservation.
- Be environmentally responsible, by avoiding pollution, enhancing the natural environment and reducing the project ecological footprint, while complying with all applicable environmental laws, regulations and statutory obligations.
- Be socially responsible by delivering a workforce legacy which benefits individuals, communities, the project and industry, and is achieved through collaboration and partnerships.

2. Legislative and Other Requirements

The Project is characterised into components that are located outside Western Sydney International (off-airport) and components that are located within Western Sydney International (on-airport), to align with their different planning approval pathways required under State and Commonwealth legislation. In certain circumstances NSW legislative requirements may be applicable within the on-airport site. This will be reflected within the relevant Construction Environmental Manager Plan (CEMP) and sub-plans.

Table 1.1 identifies key NSW environmental legislative requirements and their application to SMWSA construction works off-airport, current as at the date of this document. Sydney Metro and its Contractors must regularly review their legislative and other requirements.

Table 1.1 NSW Legislative Requirements

| Legislation and Administering Authority | Requirements | Application to project |
|--|--|--|
| Biodiversity Conservation Act 2016 DPIE | The relevant purpose of the Act is to conserve biodiversity and maintain the diversity and quality of ecosystems. | Projects assessed under Part 5, Division 5.2 of the Environmental Planning and Assessment Act 1979 (EP&A Act) are exempt from an order or direction under Part 11 of the Act. The Act also established that other permits and approvals are not required for projects assessed and determined under Part 5, Division 5.2 of the EP&A Act. |
| Biosecurity Act 2015 | Under this Act, all plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable. | Control weeds as required on land under the management of the Contractor. |
| Contaminated Land Management Act 1997 NSW Environment Protection Authority (EPA) | The Act provides a process for the investigation and remediation of land where contamination presents a significant risk of harm to human health or some other aspect of the environment. The Act also outlines the circumstances in which notification to the Environment Protection Authority is required in relation to the contamination of land. | Follow the legislative process where contaminated land is identified. |
| Dangerous Goods (Road and Rail Transport) Act 2008 EPA / SafeWork NSW | A licence is required for the storage (SafeWork NSW) and /or transport (EPA) of prescribed quantities of dangerous goods. | Obtain a licence where storage of dangerous goods would exceed licensable quantities. |
| Environmental Planning and Assessment Act 1979 Department of Planning, Industry and Environment (DPIE) | Encourages proper environmental impact assessment and management of development areas for the purpose of promoting the social and economic welfare of the community and a better environment. | Adhere to performance outcomes, mitigation measures and Conditions of Approval within the planning approval documentation. Sydney Metro and their contractors must endeavour to deliver in a consistent manner within the assessed scope of works. |
| Heritage Act 1977 NSW Department of Premier and Cabinet | The Act aims to encourage the conservation of the State's heritage and provides for the identification and registration of items of State heritage significance. The Heritage Council must be notified 'of the location of the relic, unless he or she believes on reasonable grounds that the Heritage Council is aware of the location of the relic'. | Projects assessed under Part 5, Division 5.2 of the Environmental Planning and Assessment Act 1979 (EP&A Act) are exempt from approvals required under Part 4 and permits required under section 139. |

| Legislation and Administering Authority | Requirements | Application to project |
|--|---|---|
| National Parks and Wildlife Act 1974 DPIE | The objectives of the Act are for the conservation of nature and the conservation of objects, places or features (including biological diversity) of cultural value within the landscape. | Projects assessed under Part 5, Division 5.2 of the Environmental Planning and Assessment Act 1979 (EP&A Act) are exempt from obtaining an Aboriginal Heritage Impact Permit required under section 90. |
| Protection of the Environment Operations Act 1997 EPA | The relevant objective of the Act is to prevent environmental pollution. | Where Sydney Metro projects are scheduled activities under Schedule 1 of the Act an Environment Protection Licence (EPL) must be obtained. Further details on the requirements to obtain an EPL are provided in Section 2.3. |
| Roads Act 1993 Transport for NSW | The relevant objective of the Act is to regulate the carrying out of various activities on public roads. | Obtain consent under Section 138 for carrying out work in, on or over a public road, or digging up or disturbance of the surface of the road. Under Section 38N of the Transport Administration Act 1988, Section 138 of the Roads Act 1993 does not apply to Sydney Metro activities in relation to classified roads for which a council is the roads authority. However, consent from Transport for New South Wales is still required under Section 38N(2) of the Transport Administration Act 1988 for those activities described in Section 138(1) of the Roads Act 1993, when carried out in relation to a classified road. |
| Waste Avoidance and Resource Recovery Act 2001 EPA | The objectives of the Act are to reduce environmental harm, provide for the reduction in waste generation and the efficient use of resources. | Implement strategies to reduce waste volumes and report on waste generated. |
| Water Management Act 2000 DPIE | The relevant objective of the Act is to protect, enhance and restore water sources, their associated ecosystems, ecological processes and biological diversity and their water quality. | Sydney Metro projects assessed under Part 5, Division 5.2 of the Environmental Planning and Assessment Act 1979 (EP&A Act) are exempt from obtaining water use approval under section 89, a water management work approval under section 90 or an activity approval (other than an aquifer interference approval) under section 91. |

Table 1.2 identifies key Commonwealth environmental legislative requirements and their application to SMWSA construction works, current as at the date of this document. Sydney Metro and its Contractors should regularly review their legislative requirements. Some Commonwealth requirements, such as under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) apply to off-airport works, whilst other requirements such as under the *Airports Act 1996* only apply to on-airport works.

Table 1.2 Commonwealth Legislative Requirements

| Legislation and Administering Authority | Requirements | Application to the project |
|---|--|---|
| Airports Act 1996 Department of Infrastructure, Transport, Regional Development and Communications | The Act regulates federally leased airports and includes provision for planning and building activities on the airport site as well as environmental management for activities undertaken on airports. | Compliance with regulatory requirements and standards as required for on-airport works. |

| Legislation and Administering Authority | Requirements | Application to the project |
|--|--|--|
| Airports (Environment Protection) Regulations 1997 | Establishes a framework for the regulation and management of activities at airports that could have potential to cause environmental harm. | <p>Compliance with requirements for on-airport works that may generate pollution, duties to avoid pollution and preserve habitat and heritage. Improving environmental management practices.</p> <p>Management processes for minimising environmental impacts, monitoring and incident response processes for on-airport works.</p> |
| Airports (Building Control) Regulations 1996 WSA | Following variation of the Airport Plan and prior to construction, the Airports Act provides a regime requiring building approvals to be obtained from the Airport Building Controller (ABC) in respect of building activities on the airport site. WSA required to provide its consent to any applications for building approvals. Applications for building approvals must satisfy the requirements of the Airports (Building Control) Regulations 1996. | On-airport works to be undertaken in accordance with relevant building approvals. |
| Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) Department of Agriculture, Water and the Environment | The relevant objective of the Act is to provide for the protection of the environment, especially those aspects of the environment that are matters of national environmental significance. | <p>A referral was made under Part 7 of the EPBC Act for the off-airport works to the north of Western Sydney International. The Project has been deemed to be a controlled action by the Commonwealth Environment Minister and an assessment of impacts is required to be undertaken in accordance with the assessment requirements issued by the Minister, which is to be in the form of preliminary documentation.</p> <p>Part 13 of the EPBC Act requires a permit to be obtained for activities that may kill, injure, take, trade, keep or move a member of a listed threatened species or ecological community, a member of a list migratory species, or a member of a list marine species in or on a Commonwealth area.</p> |
| National Greenhouse and Energy Reporting Act 2007 Department of Climate Change and Energy Efficiency | The Act established a framework for reporting of greenhouse gas emissions, abatement actions, energy consumption and production data. | Report on greenhouse gas and energy usage data as required by the Act for both on and off airport works. |

2.2 Planning Approvals

There are three principal statutory schemes that govern the planning and assessment process for the Project which relate to works that are located outside the boundaries of Western Sydney International Airport (off-airport); and works that are located within the boundaries of Western Sydney International (on-airport).

The off-airport components of the Project are subject to assessment and approval under the provisions of both State and potentially the Commonwealth environmental planning requirements, being the *Environmental Planning and Assessment Act* (EP&A Act) (NSW), and the *Environment Protection and Biodiversity Conservation Act* (EPBC Act) (Cth) respectively.

The Project is State significant infrastructure (SSI) under section 5.12 of the EP&A Act and has sought a declaration to be critical State significant infrastructure under section 5.13 of the EP&A Act. Therefore, the Project is subject to assessment and approval by the NSW Minister for Planning and Public Spaces under Division 5.2 of the EP&A Act.

Approval under the EP&A Act and EPBC Act for impacts on Matters of National Environmental Significance (MNES) and Commonwealth land is not required for the on-airport elements of the Project. The on-airport elements of the Project, however, trigger requirements to vary the current Airport Plan for Western Sydney International under the *Airports Act 1996* (Airports Act) (Cth). The proposed variation must be referred to the Commonwealth Minister for the Environment for advice and agreement as relevant in respect of the variation before the Commonwealth Infrastructure Minister may vary the Airport Plan.

The requirements of the relevant approvals are required to be complied with by Sydney Metro. Responsibility for implementing performance outcomes, mitigation measures and conditions of approval will be allocated between Sydney Metro and Principal Contractors as appropriate.

Typically for projects approved under the EP&A Act, Sydney Metro are required to produce a Staging Report which sets out the applicability and allocation of NSW approval requirements within the project's program of works. For the purposes of SMWSA, Sydney Metro is expecting this requirement for the off-airport works, as well as a requirement to prepare a Construction (Rail) Plan for the on-airport works. Sydney Metro will prepare a combined Staging Report / Construction (Rail) Plan to identify the stages of construction of the project as well as the applicability and allocation of all NSW and Commonwealth requirements for each stage, including the:

- Performance outcomes identified in the planning documentation
- Mitigation measures identified in the planning documentation
- Any Conditions of Approval of the SSI approval
- Any conditions of the Airport Plan, as varied
- The requirements of this CEMF.

2.3 Environment Protection Licence Requirements (off-airport works)

Sydney Metro projects often meet the definition of a number of scheduled activities under Schedule 1 of the *Protection of the Environment Operation Act 1997* (POEO Act). Contractors for SMWSA need to review the applicability of Schedule Activities and assess the need to obtain an Environment Protection Licence (EPL) for off-airport works associated with SMWSA. In other circumstances, work may be undertaken under an existing EPL held by Sydney Trains.

Where required, Sydney Metro Principal Contractors undertaking off-airport works will:

- a. Apply for and be granted an EPL from the EPA.
- b. Hold an EPL which covers their scope of works as necessary under the POEO Act.

- c. Undertake their scope of works in accordance with the conditions of the applicable EPLs as issued by the EPA.
- d. Work under the existing Sydney Trains EPL.

2.4 Building Approvals (on-airport works)

Following variation of the Airport Plan and prior to construction for on-airport works, the Airports Act provides a regime requiring building approvals to be obtained from the Airport Building Controller (ABC) in respect of building activities on the airport site. WSA is required to provide its consent to any applications for building approvals. Applications for building approvals must satisfy the requirements of the Airports (Building Control) Regulations 1996. Once construction is complete, a certificate of compliance must be issued by the ABC before a building can be occupied or works used.

2.5 Other Licences and Permits

Other permits and licences will be required for SMWSA. These are applied across the project and include on and off airport works. EPBC Act Part 13 permits may be required in specific areas across the project, noting that such a permit is already in place for the impacts of the Stage 1 development of the Airport Site.

2.6 Standards and Guidelines

Numerous environmental publications, standards, codes of practice and guidelines are relevant to Sydney Metro construction and are referenced throughout this CEMF. A summary of key applicable standards and guidelines is provided in Table 1.3.

Table 1.3 Environmental Standards and Guidelines

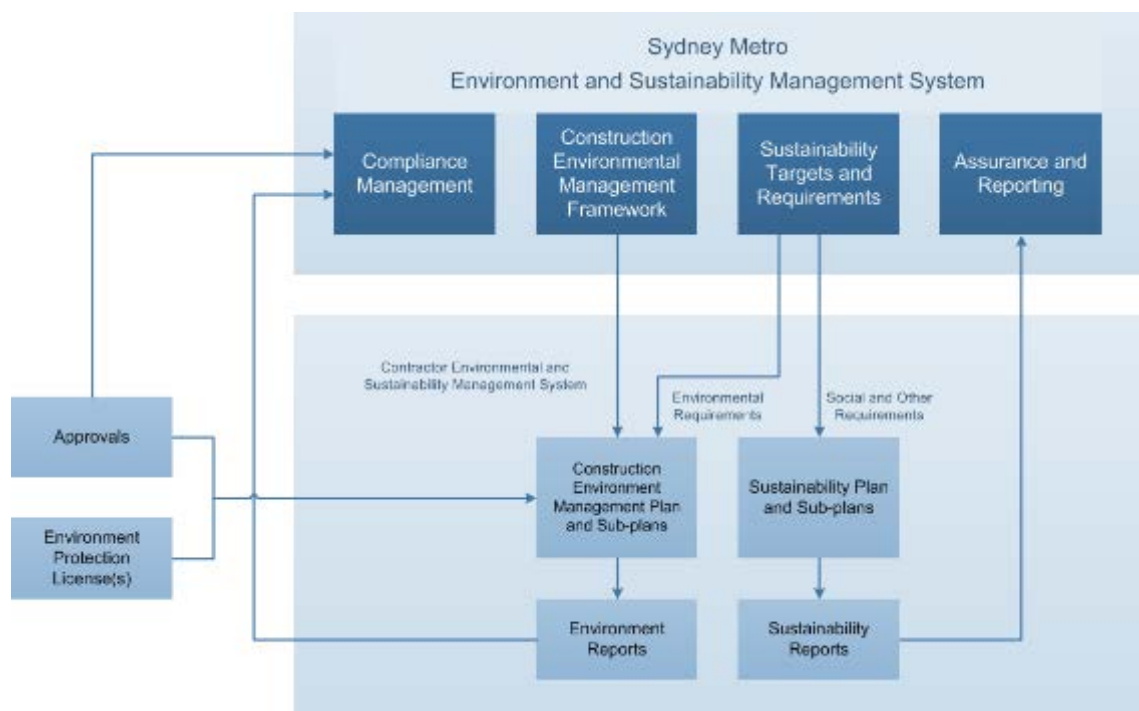
| Standard / Guideline | Relevant Authority | CEMF Reference |
|--|--------------------|----------------|
| ISO14001 Environmental Management System – Requirements with Guidelines for Use | DPIE | Section 3.1 |
| Interim Construction Noise Guidelines (Department of Environment and Climate Change, 2009) | EPA | Section 9.2 |
| Managing Urban Stormwater: Soil and Construction (Landcom, 2008) | EPA | Section 15.2 |
| AS4282:1997 Control of the Obtrusive Effect of Outdoor Lighting | DPIE | Section 12.2 |
| Waste Classification Guidelines (Department of Environment, Climate Change and Water, 2008) | EPA | Section 17.2 |
| AS 1742.3 Manual of uniform traffic control devices Part 3: Traffic control for works on roads | TfNSW | Section 8.2 |
| RMS Traffic Control at Worksites Manual | TfNSW | Section 8.2 |
| Australian and New Zealand Guidelines for Fresh and Marine Water Quality | ANZECC | Section 15.2 |

3. Environmental Management Requirements

3.1 Environmental and Sustainability Management System

- a. Principal Contractors are required to have a corporate Environmental Management System certified under AS/NZS ISO 14001:2016.
- b. Principal Contractors are required to develop a project based Environment and Sustainability Management System (E&SMS). The E&SMS will:
 - i. Be consistent with the Principal Contractors corporate Environmental Management System and AS/NZS ISO 14001:2016;
 - ii. Be supported by a process for identifying and responding to changing legislative or other requirements;
 - iii. Include processes for assessing design or construction methodology changes for consistency against the planning approvals;
 - iv. Include processes for tracking and reporting performance against sustainability and compliance targets;
 - v. Include a procedure for the identification and management of project specific environmental risks and appropriate control measures; and
 - vi. Be consistent with the Sydney Metro – Western Sydney Airport Sustainability Plan and the Sydney Metro Environment and Sustainability Statement of Commitment.
- c. All sub-contractors engaged by the Principal Contractor will be required to work under the Principal Contractor's Environment and Sustainability Management System.
- d. The relationship between the Sydney Metro Environment and Sustainability Management System and the Principal Contractor's Environment and Sustainability Management System is shown in Figure 1.

Figure 1 - Environmental Management and Sustainability Structure



3.2 Sustainability Management Plan

- a. Principal Contractors are required to prepare and implement a Sustainability Management Plan (SMP) relevant to the scale and nature of the Project Works.
- b. The SMP must, as a minimum, address and detail:

| Reference | SMP Requirements | Design | Construction |
|-----------|---|--------|--------------|
| SMP1 | The relevant requirements of the Sydney Metro Environment and Sustainability Statement of Commitment and the Sydney Metro – Western Sydney Airport Sustainability Plan | • | • |
| SMP2 | A sustainability policy statement | • | • |
| SMP3 | The sustainability management team structure, including key personnel authority and roles of key personnel, lines of responsibility and communication, minimum skill levels of each role and interfaces with the overall project organisation structure | • | • |
| SMP4 | How sustainability initiatives will be identified and integrated into the design of the Project Works | • | |
| SMP5 | The carbon and energy mitigation measures as detailed in the planning approval documentation that are applicable to the Project Works | • | • |
| SMP6 | The low carbon strategies and initiatives that will be implemented to minimise the carbon emissions | • | • |
| SMP7 | The energy efficiency strategies and initiatives that will be implemented to minimise energy use | • | • |
| SMP8 | Support innovative and cost effective approaches to energy efficiency, low carbon / renewable energy sources and energy procurement | • | • |
| SMP9 | The strategies and initiatives that will be implemented to enhance the biodiversity | • | |
| SMP10 | The processes and methodologies (including frequency) for assurance, monitoring, auditing, corrective action, continuous improvement and reporting on sustainability performance | | • |
| SMP11 | A process (or processes) for compliance record generation and management | | • |
| SMP12 | The processes and methodologies which will be used to achieve the required scores under rating systems identified in General Specification for Sustainability | • | • |
| SMP13 | The strategy and methodology for incorporating climate change adaption in designs that response to the climate change risks and baseline adaptation measures allocated to the Project Works | • | |

| Reference | SMP Requirements | Design | Construction |
|-----------|--|--------|--------------|
| SMP14 | The strategies and initiatives that will be implemented to reduce overall water use and wastewater discharge, and maximise the availability and use of non-potable water sources | • | • |
| SMP15 | Estimates of the quantity of potable water which will be consumed during construction | • | |
| SMP16 | Estimates of the quantity of water from non-potable sources which will be consumed during construction | • | |
| SMP17 | The strategy to reduce material use throughout the project life-cycle | • | • |
| SMP18 | The strategies and initiatives that will be implemented to maximise the use of recycled materials | • | • |
| SMP19 | The strategies and initiatives that will be implemented to recycle and reuse materials onsite | • | • |
| SMP20 | The strategies and initiatives to prioritise the use of materials with a lower environmental and social embodied impact | • | • |
| SMP21 | Estimates of the Portland cement reduction which will be achieved in concrete (averaged across all mixes) compared to a reference case | • | |
| SMP22 | The strategies and initiatives to prioritise the use of low-VOC, low emission materials | • | • |
| SMP23 | The use of sustainably sourced and certified timber and wood products | • | • |
| SMP24 | The development of a deconstruction plans to enable recycling and reuse at end-of-life | • | |
| SMP25 | Estimates of fuel consumption | • | |
| SMP26 | Estimates of electricity consumption | • | |
| SMP27 | Estimates of 'Scope 1', 'Scope 2', 'Scope 3' and total carbon emissions (Carbon Emission Targets) that incorporates direct and indirect emissions associated with electricity and fuel consumption, on-site process emissions and embodied emissions for all main materials used and undertaken in accordance with ISO 14064-1, ISO 14064-2 & ISO 14064-3. | • | • |
| SMP28 | Reporting of carbon and energy will be undertaken in accordance with the National Greenhouse and Energy Reporting Act 2007. | | • |
| SMP29 | The strategy and initiatives to influence subcontractors and materials suppliers to adopt sustainability objectives in their works and procurement | | • |

| Reference | SMP Requirements | Design | Construction |
|-----------|--|--------|--------------|
| SMP30 | <p>A Sustainable Procurement Policy that must, as a minimum, include:</p> <ul style="list-style-type: none"> ▪ The processes and procedures that will be used to provide environmental and social improvement ▪ The responsibilities of key project personnel with respect to the implementation of the policy ▪ Compliance record generation and management ▪ The processes and environmental and social criteria that will be used for the selection of Subcontractors ▪ The processes that will be used to ensure ethical sourcing of labour and materials ▪ Local sourcing ▪ Where equipment, materials or labour are procured from locations outside Australia, the processes that will be used to ensure human rights impacts and risks are identified and mitigated as well as processes to ensure compliance with modern slavery, and modern slavery reporting ▪ Engagement with social enterprises and local businesses | | • |
| SMP31 | The retention of records detailing the consideration of sustainability in the procurement of all materials | | • |

3.3 Construction Workforce Development and Industry Participation Plan

a. The Workforce Development and Industry Participation Plan will address and detail:

- i. The proposed response to State and Commonwealth requirements including but not limited to:
 - NSW Aboriginal Participation in Construction Policy
 - NSW Infrastructure Skills Legacy Program
 - Australian Jobs Act – Australian Industry Participation Plan
 - Western Sydney City Deal
- ii. Indigenous Participation Plan – National Partnerships Agreement Proposed appropriately skilled key personnel to support delivery of the workforce development and industry participation requirements;
- iii. Implementation approach, processes and systems to ensure delivery and reporting of workforce development and industry participation priority areas:
 - ♦ Jobs and Industry Participation;
 - ♦ Skills Development;

- ♦ Diversity and Inclusion including Aboriginal Participation; and
- ♦ Inspiring Future Talent.

3.4 Construction Environmental Management Plan(s)

- a. Sydney Metro will develop the Construction Environmental Management Plans (CEMPs) for the on-airport construction of the rail. These on-airport CEMPs will be developed in consultation with WSA and be consistent with existing WSA CEMPs. Figure 2 displays the relationship between the planning documentation and the environmental documentation required for SMWSA.

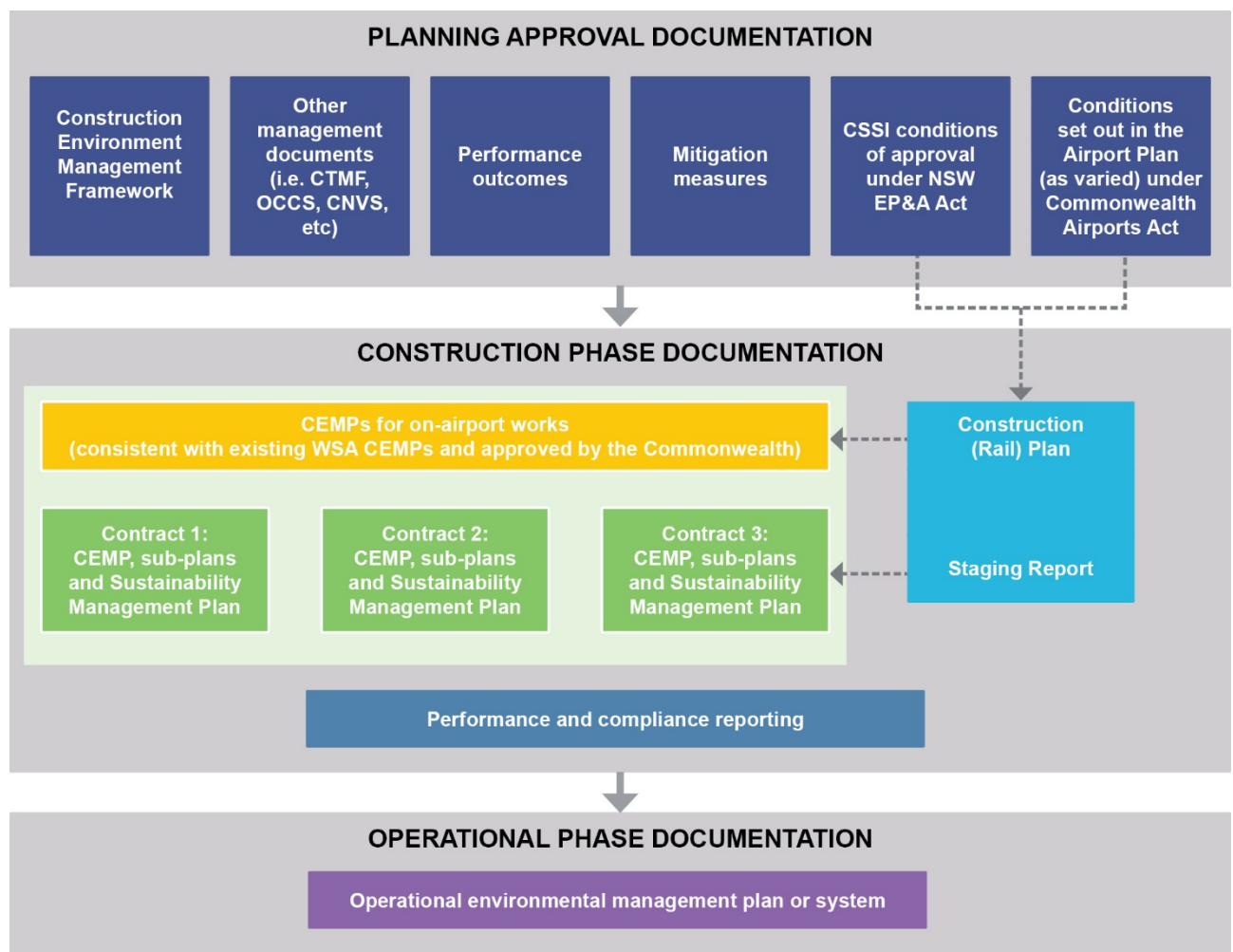


Figure 2 - Environmental Management and Sustainability Structure

- b. Sydney Metro will submit the on-airport CEMPs to the Commonwealth for approval. The approved SMWSA on-airport CEMPs will be implemented for all on-airport rail construction works and inform the Principal Contractor's environmental documentation where working on the airport site.

- c. Principal Contractors are required to prepare and implement a Construction Environmental Management Plan (CEMP) relevant to the scale and nature of their off-airport scope of works. The CEMP shall comprise of a main CEMP document, issue specific sub plans, activity specific procedures and site based control maps. The CEMP shall illustrate the relationship between other plans required by the contract, in particular those that relate to design management. The CEMP will address the specific requirements of scope of works and address the off-airport environmental requirements.
- d. Depending on the scope and scale of the works, Sydney Metro may decide to streamline the CEMP and sub-plan requirements for off-airport works. For example, depending on the risk associated with particular environmental issues it may be appropriate to remove the need for a sub plan, or replace with a procedure as part of the CEMP. The CEMP and sub-plan requirements from this CEMP for each construction stage / contract will be detailed in the Staging Report / Construction (Rail) Plan for the project.
- e. Environmental documentation prepared for works within the on-airport site will be in accordance with the approved SMWSA on-airport CEMPs.
- f. The Principal Contractor CEMP will cover the requirements of the relevant planning approval documentation, the conditions of all other permits and licences, the Principal Contractor's corporate EMS, the environmental provisions of the contract documentation and this Construction Environmental Management Framework.
- g. As a minimum the Principal Contractor CEMP will:
 - i. Include a contract specific environmental policy;
 - ii. Include a description of activities to be undertaken during construction;
 - iii. For each plan under the CEMP include a matrix of the relevant SSI Conditions of Approval referencing where each requirement is addressed;
 - iv. For each plan under the CEMP, set objectives and targets, and identify measurable key performance indicators in relation to these;
 - v. For each role that has environmental accountabilities or responsibilities, including key personnel, provide a tabulated description of the authority and roles of key personnel, lines of responsibility and communication, minimum skill level requirements and their interface with the overall project organisation structure;
 - vi. Assign the responsibility for the implementation of the CEMP to the Environment Manager, who will have appropriate experience. The Principal Contractor's Project Director will be accountable for the implementation of the CEMP;
 - vii. Identify communication requirements, including liaison with stakeholders and the community;
 - viii. Include induction and training requirements and a summary of the Training Needs Analysis required in Section 3.11(b);
 - ix. Management strategies for environmental compliance and review of the performance of environmental controls;
 - x. Procedures for environmental inspections and monitoring, auditing and review, and reporting on environmental performance including environmental compliance tracking;
 - xi. Include an annual schedule for auditing the CEMP and Sub-Plans that is updated at least monthly;
 - xii. Include procedures for emergency and incident management, non-compliance management, and corrective and preventative action; and

- xiii. Include procedures for the control of environmental records.
- h. The Principal Contractor CEMP and associated sub-plans will be reviewed by Sydney Metro prior to any construction works commencing. For off-airport works approved under the CSSI, the independent environmental representative (see Section 3.13) will also review the CEMP.
- i. Where a corresponding systems document exists within the Sydney Metro Integrated Management System, the Principal Contractor's procedures will be required to be consistent with any requirements in those documents.

3.5 Off-Airport Construction Environmental Management Sub-Plans

- a. Subject to Section 3.4(b) the Principal Contractors will prepare issue-specific environmental sub plans to the CEMP which address each of the relevant environmental impacts at a particular site or stage of the project. Issue specific sub plans will include as a minimum:

- i. Spoil management;
- ii. Groundwater management;
- iii. Traffic and transport management;
- iv. Noise and vibration management;
- v. Heritage management;
- vi. Flora and fauna management;
- vii. Visual amenity management;
- viii. Soil and water management;
- ix. Air quality management; and
- x. Waste management.

Some of these sub plans may also be informed by other environmental management documents included in the planning approval, for example the Construction Traffic Management Framework or Construction Noise and Vibration Standard.

- b. Additional detail on the minimum requirements for these sub plans is provided in Sections 6 to 14 of this CEMP.

3.6 Environmental Procedures and Control Maps

- a. The Principal Contractor will prepare and implement activity specific environmental procedures. These procedures should supplement environmental management sub plans, but may substitute for sub plans in agreement with Sydney Metro if a reasonable risk based justification can be made and the sub plan is not a requirement of any approval.
- b. The procedures will include:
 - i. A breakdown of the work tasks relevant to the specific activity and indicate responsibility for each task;
 - ii. Potential impacts associated with each task;
 - iii. A risk rating for each of the identified potential impacts;
 - iv. Mitigation measures relevant to each of the work tasks; and
 - v. Responsibility to ensure the implementation of the mitigation measures.

- c. The Principal Contractor will prepare and implement site based, progressive Environmental Control Maps (ECMs) which as a minimum:
 - i. Depicting the current representation of the site;
 - ii. Indicate which environmental procedures, environmental approvals, or licences are applicable;
 - iii. Illustrate the site, showing significant structures, work areas and boundaries;
 - iv. Illustrate the environmental control measures and environmentally sensitive receivers;
 - v. Is endorsed by the Principal Contractors Environmental Manager or delegate;
 - vi. Include all the training and competency requirements for relevant workers; and.
 - vii. Be communicated to relevant workers, including sign off the appropriate procedures prior to commencing works on the specific site and / or activity.

3.7 Additional Environmental Assessments

- a. Where the requirement for an additional environmental assessment is identified, this will be undertaken prior to undertaking any construction activities. The environmental assessment will include:
 - i. A description of the existing surrounding environment;
 - ii. Details of the ancillary works and construction activities required to be carried out including the hours of works;
 - iii. An assessment of the environmental impacts of the works, including, but not necessarily limited to, traffic, noise and vibration, air quality, soil and water, ecology and heritage;
 - iv. Details of mitigation measures and monitoring specific to the works that would be implemented to minimise environmental impacts; and
 - v. Identification of the timing for completion of the construction works, and how the sites would be reinstated (including any necessary rehabilitation).

3.8 Cumulative Impacts

- a. A cumulative construction impacts management plan would be developed. The plan would detail co-ordination and consultation requirements with the following stakeholders (as relevant) would occur where required to manage the interface of projects under construction at the same time:
 - i. Western Sydney Airport
 - ii. Transport for NSW
 - iii. Department of Planning, Industry and Environment
 - iv. Western Parkland City Authority (and their contractors)
 - v. Emergency service providers
 - vi. Utility providers
- b. Co-ordination and consultation requirements with these stakeholders would be detailed in the plan to include:
 - i. provision of regular updates to the detailed construction program, construction sites and haul routes
 - ii. identification of key interfaces with other construction projects
 - iii. Development of mitigation strategies to manage cumulative impacts associated with these interfaces.

3.9 Condition Surveys

- a. Prior to the commencement of construction the Principal Contractors are to offer Pre-construction Building Condition Surveys, in writing, to the owners of buildings where there is a potential for construction activities to cause any damage (regardless of severity). If accepted, the Principal Contractor will produce a comprehensive written and photographic condition report produced by an appropriate professional prior to relevant works commencing.
- b. Prior to the commencement of construction the Principal Contractor will prepare a Road Dilapidation Report for all local public roads proposed to be used by heavy vehicles. Dilapidation reports are to include other road infrastructure such as signs, curbs, applicable driveways and pedestrian paths.

3.10 Register of Hold Points

- a. Principal Contractors will identify hold points, beyond which approval is required to proceed with a certain activity. Example activities include vegetation removal and water discharge. Hold points will be documented in relevant CEMPs.
- b. Table 1.4 provides the structure for the register of hold points as well as a preliminary list of hold points which will be implemented.

Table 1.4 Preliminary Register of Hold Points

| Hold Point | Release of Hold Point | By Who |
|---|--|---|
| Prior to Vegetation Clearing / Ground Disturbance | Pre-clearing inspection Erosion and sediment control plan | Qualified Ecologist Contractor's Environmental Manager or delegate |
| Discharge of water | Water tested to verify compliance and approval to discharge | Contractor's Environment Manager or delegate |
| Out of hours works | Noise Assessment | Contractor's Environment Manager |
| Use of local roads by heavy vehicles | Road Dilapidation Report | Appropriate Professional nominated by Principal Contractor |
| Construction identified as affecting buildings | Building Condition Survey | Appropriate Professional nominated by Principal Contractor |

3.11 Training, Awareness and Competence

- a. Principal Contractors are responsible for determining the training needs of their personnel. As a minimum this will include site induction, regular toolbox talks and topic specific environmental training as follows:
 - i. The site induction will be provided to all site personnel and will include, as a minimum:
 - ♦ Training purpose, objectives and key issues;
 - ♦ Contractor's environmental and sustainability policy(s) and key performance indicators;
 - ♦ Due diligence, duty of care and responsibilities;
 - ♦ Relevant conditions of any environmental licence and/or the relevant conditions of approval;
 - ♦ Site specific issues and controls including those described in the environmental procedures;
 - ♦ Reporting procedure(s) for environmental hazards and incidents; and
 - ♦ Communication protocols for interactions with community and stakeholders.

- ii. Toolbox talks will be held on a regular basis in order to provide a project or site wide update, including any key or recurring environmental issues; and
 - iii. Topic specific environmental training should be based upon, but is not limited to, issue specific sub-plans required under Section 3.5 (a).
- b. Principal Contractors will conduct a Training Needs Analysis which:
- i. Identifies that all staff are to receive an environmental training;
 - ii. Identifies the competency requirements of staff that hold environmental roles and responsibilities documented within the Construction Environmental Management Plan and sub-plans;
 - iii. Identifies appropriate training courses/events and the frequency of training to achieve and/or maintain these competency requirements; and
 - iv. Implements and documents as part of the CEMP a training schedule that plans attendance at environmental training events, provides mechanisms to notify staff of their training requirements, and identifies staff who do not attend scheduled training events or who have overdue training requirements.

3.12 Emergency and Incident Response

- a. Principal Contractors undertaking off-airport work in accordance with an EPL must develop and implement a Pollution Incident Response Management Plan, in accordance with the requirements of the POEO Act. Contractor's emergency and incident response procedures will also be consistent with any relevant Sydney Metro procedures and, for on-airport works, consistent with the environmental incident and emergency management requirements identified in the Western Sydney Airport Site Environmental Management Framework, and will include:
- i. Categories for environmental emergencies and incidents;
 - ii. Notification protocols for each category of environmental emergency or incident, including notification to Sydney Metro, WSA (where required for on-airport works) and notification to owners / occupiers in the vicinity of the incident. This is to include relevant contact details;
 - iii. Identification of personnel who have the authority to take immediate action to shut down any activity, or to affect any environmental control measure (including as directed by an authorised officer of any regulator or government department);
 - iv. A process for undertaking appropriate levels of investigation for all incidents and the identification, implementation and assessment of corrective and preventative actions; and
 - v. Notification protocols of incidents to relevant regulators and stakeholders including (but not limited to) the EPA, DPIE, the AEO, WSA and DITRDC for incidents that are made by the Contractor or Sydney Metro.
- b. The Contractor will make all personnel aware of the plan and their responsibilities.

3.13 Independent Environmental Representatives

- a. Sydney Metro will engage Independent Environmental Representatives (ERs) as required under the SSI approval for off-airport works to undertake the following, along with any additional roles as required:
 - i. Review, provide comment on and endorse (where required) any relevant environmental documentation to verify it is prepared in accordance with relevant environmental legislation, planning approval conditions, Environment Protection Licences, relevant standards and this CEMF;
 - ii. Monitor and report on the implementation and performance of the above mentioned documentation and other relevant documentation;
 - iii. Provide independent guidance and advice to Sydney Metro and the Contractors in relation to environmental compliance issues and the interpretation of planning approval conditions;
 - iv. Be the principal point of advice for the DPIE in relation to all questions and complaints concerning the environmental performance of the project;
 - v. Ensure that environmental auditing is undertaken in accordance with all relevant project requirements; and
 - vi. Recommend reasonable steps, including 'stop works', to be taken to avoid or minimise adverse environmental impacts.

3.14 Airport Environment Officer

An Airport Environment Officer (AEO) is responsible for the day to day regulatory oversight of compliance with the Airports (Environment Protection) Regulations 1997 (AEPRs) at Western Sydney International and will have a role in relation to the on-airport works for SMWG.

The responsibilities of the AEO in relation to on-airport works of SMWSA include:

- i. Monitoring compliance with the AEPRs
- ii. Facilitate an understanding of the obligations of the AEPRs
- iii. Ensure the best possible outcomes are achieved
- iv. Complete site inspections to review monitoring requirements and completion of works
- v. Review and comment on incidents and remedial activities
- vi. Issue an environment protection order in accordance with Part 7 of the AEPR
- vii. Issue an infringement notice in response to an offence against the AEPR.

3.15 Roles and Responsibilities

- a. In relation to Roles and Responsibilities the Principal Contractor CEMP will:
 - i. Describe the relationship between the Principal Contractor, Sydney Metro, key regulatory stakeholders, the independent environmental representative and the independent certifier;
 - ii. For each role that has environmental accountabilities or responsibilities, including key personnel, provide a tabulated description of the authority and roles of key personnel, lines of responsibility and communication, minimum skill level requirements and their interface with the overall project organisation structure;
 - iii. Provide details of each specialist environment, sustainability or planning consultant who is employed by the Principal Contractor including the scope of their work; and

- iv. Provide an overview of the role and responsibilities of the Independent Environmental Representative, the Independent Certifier and other regulatory stakeholders.
- b. All sub-contractors engaged by the Principal Contractor will be required to operate within the EMS documentation of that Principal Contractor.

3.16 Environmental Monitoring, Inspections and Auditing

- a. Issue specific environmental monitoring will be undertaken as required or as additionally required by any approval, permit or licence conditions.
- b. The results of any monitoring undertaken as a requirement of a license or permit that is required to be published will be published on the Principal Contractor's, or a project specific, website within 14 days of obtaining the results.
- c. Environmental inspections will include:
 - i. Surveillance of environmental mitigation measures by the Site Foreman; and
 - ii. Periodic inspections by the Principal Contractor's Environmental Manager (or delegate) to verify the adequacy of all environmental mitigation measures. This will be documented in a formal inspection record.
- d. Regular site inspections by Sydney Metro, the ER for off-airport works and the AEO for on-airport works will be undertaken at a frequency to be agreed with the Principal Contractor, based on the risk of activity but as a minimum monthly.
- e. Principal Contractors must undertake internal environmental audits. The scope will include:
 - i. Compliance with any approval, permit or licence conditions;
 - ii. Compliance with the E&SMS, CEMP, SMP, sub-plans and procedures;
 - iii. Community consultation and complaint response;
 - iv. Environmental training records; and
 - v. Environmental monitoring and inspection results.
- f. Sydney Metro will also undertake periodic audits of the Principal Contractor's E&SMS and compliance with the environmental aspects of contract documentation, including this CEMF. These audits would cover both on- and off-airport works.
- g. Off-airport works approved under the SSI approval will be subjected to audits undertaken by the independent environmental auditor. Independent environmental audits will focus on compliance with the planning approval and the conditions of approval. The independent auditor is approved by DPIE and an audit schedule will be developed in consultation with the Principal Contractor and Sydney Metro.
- h. On-airport works approved under the Airport Plan, as varied, will be subject to environmental audits and compliance audits, noting unscheduled audits may also be undertaken. The environmental audits would audit the environmental systems and on-site performance of the on-airport works of SMWSA and be undertaken on a 6 monthly basis.

3.17 Environmental Non-compliances

- a. Principal Contractors will document and detail any non-compliances arising out of the above monitoring, inspections and audits. Sydney Metro will be made aware of all non-compliances in a timely manner.

- b. Principal Contractors will develop and implement corrective actions to rectify the non-compliances and preventative actions in order to prevent a re-occurrence of the non-compliance. Contractors will also maintain a register of non-compliances, corrective actions and preventative actions.
- c. Sydney Metro may raise non-compliances against environmental requirements. The Environmental Representative and Airport Environmental Officer also have the authority to raise a non-compliance for their respective areas of work.

3.18 Environmental Records and Compliance Reporting

- a. Principal Contractors will maintain appropriate records of the following:
 - i. Site inspections, audits, monitoring, reviews or remedial actions;
 - ii. Documentation as required by performance conditions, approvals, licences and legislation;
 - iii. Modifications to site environmental documentation (e.g. CEMP, sub-plans and procedures); and
 - iv. Other records as required by this Construction Environmental Management Framework.
- b. Records must be accessible onsite for the duration of works.
- c. Records will be retained by the Principal Contractor for a period of no less than 7 years. Records will be made available in a timely manner to Sydney Metro (or their representative) upon request.
- d. Compliance reports detailing the outcome of any environmental surveillance activity including internal and external audits (refer to Section 3.14) will be produced by the Principal Contractors Environmental Manager or delegate. These reports will be submitted to Sydney Metro at an agreed frequency.

3.19 Review and Improvement of the Environment & Sustainability Management Systems

- a. Principal Contractors will ensure the continual review and improvement of the management systems. This will generally occur in response to:
 - i. Issues raised during environmental surveillance and monitoring;
 - ii. Expanded scope of works;
 - iii. Environmental incidents; and
 - iv. Environmental non-conformances.
- b. A formal review of the management systems by the Principal Contractor's Senior Management Team will also occur on an annual basis, as a minimum. This review shall generate actions for the continual improvement of the systems and supporting management plans.

4. Stakeholder and Community Involvement

4.1 Overview

- a. Throughout construction, Sydney Metro and the Principal Contractors will work closely with stakeholders and the community to ensure they are well informed regarding the construction works.
- b. Stakeholders and the community will be informed of significant events or changes that affect or may affect individual properties, residences and businesses. These will include:
 - i. Significant milestones;
 - ii. Design changes;
 - iii. Changes to traffic conditions and access arrangements for road users and the affected public; and
 - iv. Construction operations which will have a direct impact on stakeholders and the community including noisy works, interruptions to utility services or construction work outside of normal work hours.

4.2 Community Communication Strategy

- a. An Overarching Community Communication Strategy (OCCS) has been developed for SMWSA. The OCCS incorporates both on and off-airport works, with the on-airport components being developed in consultation with WSA.
- b. Each Principal Contractor would be responsible for implementing their own Community Communication Strategy prepared in accordance with this overarching strategy.
- c. Key elements of the Community Communication Strategy, which will be implemented at appropriate times in the construction process, include:
 - i. Notification (including targeted letterbox drops and email) of any works that may disturb local residents and businesses (such as noisy activities and night works) at least seven days prior to those works commencing;
 - ii. Notification (including targeted letterbox drops and email) of works that may affect transport (such as road closures, changes to pedestrian routes and changes to bus stops);
 - iii. Traffic alerts (via email) to all key traffic and transport stakeholders advising of any changes to access and local traffic arrangements (at least seven days prior to significant events);
 - iv. Print and radio advertisements regarding major traffic changes;
 - v. 24-hour toll-free community project information phone line;
 - vi. Complaints management process;
 - vii. Community information sessions, as required;
 - viii. Regular updates to the Sydney Metro website (sydneymetro.info), including uploading of all relevant documents, and contact details for the stakeholder and community relations team;
 - ix. Provision of information to the Sydney Metro Community Information Centre including community newsletters, information brochures and fact sheets and interactive web-based activities;
 - x. Clear signage at the construction sites;
 - xi. Regular newspaper advertisements in local and metropolitan papers;
 - xii. Regular inter-agency group meetings;

- xiii. Community, business and stakeholder satisfaction surveys and feedback forms;
- xiv. Translator and interpreter services; and
- xv. The Principal Contractor's Community Relations Team will liaise with the Sydney Metro Project Communications team as the point of contact for the community.

4.3 Complaint Handling

- a. Community liaison and complaints handling will be undertaken in accordance with the Construction Complaints Management System and will include:
 - i. Principal Contractors will deal with complaints in a responsive manner so that stakeholders' concerns are managed effectively and promptly; and
 - ii. A verbal response will be provided to the complainant as soon as possible and within a maximum of two hours from the time of the complaint (unless the complainant requests otherwise). A detailed written response will then be provided, if required, to the complainant within one week.
 - iii. Community liaison and complaints handling for construction of on-airport works will be undertaken in accordance with the Integrated Complaint Handling Procedure. This Procedure will include a single integrated complaint handling telephone line and email address for all works on the airport site which will be managed so that any contact made by a stakeholder will be directed to the relevant party responsible for those works so that stakeholder's concerns are managed effectively and promptly.

4.4 Urban Design of Temporary Works

- a. Principal Contractors will ensure as a minimum:
 - i. Temporary construction works consider urban design and visual impacts, including:
 - ♦ Artwork, graphics and images to enhance the visual appearance of temporary works in high visibility locations;
 - ♦ Project information to raise awareness on benefits, explain the proposed works at each site and provide updates on construction progress;
 - ♦ Community information, including contact numbers for enquiries / complaints;
 - ♦ Signage and information to mitigate impacts on local businesses which may be obscured by the construction site;
 - ♦ Sydney Metro advertising / public awareness campaigns; and
 - ♦ Logos / branding, including Sydney Metro, NSW and Commonwealth Government, and Contractor branding.
 - ii. The design of all temporary works will require Sydney Metro approval in relation to urban design and visual impacts and Sydney Metro will stipulate the design of hording artwork, including:
 - ♦ Sydney Metro advertising / public awareness campaigns; and
 - ♦ Logos / branding, including Sydney Metro, NSW and Commonwealth Government, and Contractor branding.
- b. Construction hoardings, scaffolding and acoustic sheds will be regularly inspected and kept clean and free of dust build up. Graffiti on construction hoardings, scaffolding or acoustic sheds will be removed or painted over promptly.

- c. The principles of Crime Prevention through Environmental Design (CPTED) will be applied to all works, including temporary works that have a public interface.

4.5 Business and Property Impacts

- a. Principal Contractors will proactively work with potentially affected stakeholders to identify the likely impacts and put in place measures to minimise impacts.
- b. Construction works will be undertaken to meet the following objectives:
 - i. Minimise the potential impact of the project to businesses affected by construction works;
 - ii. Ensure businesses are kept informed of the project and consulted in advance of major works or factors that are likely to have a direct impact;
 - iii. Consult with all business directly affected by changes to access arrangements regarding specific requirements at least two weeks prior to those changes coming into effect; and
 - iv. Ensure that business stakeholder enquiries and complaints regarding the project are managed and resolved effectively.
- c. The Community Communication Strategy (Section 4.2) will document key issues relating to business impacts by locality with a particular focus on proactive consultation with affected businesses. Including:
 - i. Identification of specific businesses which are sensitive to construction activity disturbances;
 - ii. Summary of the commercial character of the locality, its general trading profile (daily and annually) and information gained from the business profiling such as:
 - ♦ Operating hours;
 - ♦ Main delivery times;
 - ♦ Reliance on foot traffic;
 - ♦ Any signage or advertising that may be impacted;
 - ♦ Customer origin; and
 - ♦ Other information specific to the business that will need to be considered in construction planning.
 - iii. Define the roles and responsibilities in relation to the control and monitoring of business disturbances;
 - iv. Identification of locality specific standard business mitigation measures which would be implemented;
 - v. Maps and diagrams to illustrate the information for easy identification of measures which would be implemented;
 - vi. Description of the monitoring, auditing and reporting procedures;
 - vii. Procedure for reviewing performance and implementing corrective actions;
 - viii. Description of the complaints handling process; and
 - ix. Procedure for community consultation and liaison.

5. General Site Works



Figure 3 - Aerial View of the Sydney Metro Norwest Station Site

5.1 Working Hours

- a. Standard working hours are between 7am – 6pm on weekdays and 8am – 1pm on Saturdays.
- b. Works which can be undertaken outside of standard construction hours without any further approval include:
 - i. Those which have been described and assessed in the environmental assessments. For example, tunnelling and underground excavations and supporting activities or works within Western Sydney International
 - ii. Works which are determined to comply with the relevant Noise Management Level at sensitive receivers;
 - iii. The delivery of materials outside of approved hours as required by the Police or other authorities (including Transport for NSW) for safety reasons;
 - iv. Where it is required to avoid the loss of lives, property and / or to prevent environmental harm in an emergency; and
 - v. Where written agreement is reached with all affected receivers.
- c. Where off-airport works are being undertaken under an Environmental Protection Licence, Principal Contractors may apply for EPA approval to undertake works outside of normal working hours.

5.2 Construction Traffic Management

- a. The management of traffic impacts due to construction is addressed in the Construction Traffic Management Framework (CTMF) which sets out system requirements for management plans and other associated documentation. This document applies to Principal Contractors and forms part of the contract documentation.
- b. The Construction Traffic Management Framework (CTMF) sets out the approach to managing traffic impacts during the construction of the Sydney Metro projects. The CTMF also outlines contractor requirements, with reference to third party agreements. Principal Contractors are required to produce these documents in accordance with the CTMF.
- c. For on-airport works, the Sydney Metro Western Sydney Airport Traffic and Access CEMP will detail all the management objectives and will be consistent with the WSA Traffic and Access CEMP , including all appendices to the CEMP

5.3 Site Layout

- a. Principal Contractors will consider the following in the layout of construction sites:
 - i. The location of noise intensive works and 24 hour activities in relation to noise sensitive receivers;
 - ii. The location of site access and egress points in relation to noise and light sensitive receivers, especially for sites proposed to be utilised 24 hours per day;
 - iii. The use of site buildings to shield noisy activities from receivers;
 - iv. The use of noise barriers and / or acoustic sheds where feasible and reasonable for sites proposed to be regularly used outside of daytime hours; and
 - v. Aim to minimise the requirement for reversing, especially of heavy vehicles.

5.4 Reinstatement

- a. Where measures for reinstatement are not stipulated in the contracts, mitigation measures for reinstatement of construction and ancillary lands will be produced in consultation with Sydney Metro, the landowner and stakeholders.
- b. Mitigation measures required for reinstatement will be incorporated into the CEMP and will include as a minimum:
 - i. Principal Contractors will clear and clean all working areas and accesses at project completion;
 - ii. At the completion of construction all plant, temporary buildings or vehicles not required for the subsequent stage of construction will be removed from the site;
 - iii. All land, including roadways, footpaths, loading facilities or other land having been occupied temporarily will be returned to their pre-existing condition or better; and
 - iv. Reinstatement of community spaces, infrastructure and services will occur as soon as possible after completion of construction.

6. Spoil Management



Figure 4 - Spoil and Excavation Works at the Showground Station Site

6.1 Spoil Management Objectives

- a. The following spoil management objectives will apply to the construction of the project:
 - i. Minimise spoil generation where possible;
 - ii. The project will mandate 100% reuse or recycling (on or off-site) of usable spoil;
 - iii. Spoil will be managed with consideration to minimising adverse traffic and transport related issues;
 - iv. Spoil will be managed to avoid contamination of land or water;
 - v. Spoil will be managed with consideration of the impacts on residents and other sensitive receivers; and
 - vi. Site contamination will be effectively managed to limit the potential risk to human health and the environment.

6.2 Spoil Management Implementation

- a. Principal Contractors will develop and implement a Spoil Management Plan for their scope of works. The Spoil Management Plan will include as a minimum:
 - i. The spoil mitigation measures as detailed in the planning approval documentation;
 - ii. The responsibilities of key project personnel with respect to the implementation of the plan;

- iii. Procedures and methodologies for the haulage and disposal locations, storage and stockpiling arrangements, including those for virgin excavated natural material, contaminated and unsuitable material;
 - iv. Procedures for the testing, excavation, classification, handling and reuse of spoil;
 - v. Measures that will be implemented to both reduce spoil quantities and maximise the beneficial reuse of spoil which will be generated during the performance of the Contractor's Activities, including how spoil generation is minimised through the design development process;
 - vi. Details, links or references to where traffic movements in relation to spoil are described, and measures that will be implemented to minimise traffic and noise impacts associated with haulage and disposal of spoil;
 - vii. quantities for reuse of spoil within the Construction Site or Western Sydney International, for beneficial reuse of spoil off site and for spoil disposal;
 - viii. Processes and procedures for the management of the environmental and social impacts of spoil transfer and reuse;
 - ix. A register of spoil receipt sites that includes the site or project name, location, capacity, site owner and which tier the site is classified as under the spoil reuse hierarchy;
 - x. Spoil management monitoring requirements; and
 - xi. Compliance record generation and management.
- b. Spoil management measures will be included in regular inspections undertaken by the Contractor, and compliance records will be retained. These will include:
- i. Records detailing the beneficial re-use of spoil either within the project or at off-site locations; and
 - ii. Waste dockets for any spoil disposed of to landfill sites.

6.3 Spoil Mitigation

- a. Examples of spoil mitigation measures include:
- i. Implementing the spoil re-use hierarchy;
 - ii. Handling spoil to minimise potential for air or water pollution; and
 - iii. Minimise traffic impacts associated with spoil removal.

7. Groundwater Management

7.1 Groundwater Management Objectives

- a. The following groundwater management objectives will apply to construction:
 - i. Reduce the potential for drawdown of surrounding groundwater resources;
 - ii. Prevent the pollution of groundwater through appropriate controls; and
 - iii. Reduce the potential impacts of groundwater dependent ecosystems.
 - iv. For on-airport works, the Sydney Metro Western Sydney Airport Soil and Water CEMP will detail all the groundwater management objectives and will be consistent with the WSA Soil and Water CEMP, including all appendices to the CEMP.

7.2 Groundwater Management Implementation

- a. For off-airport works, the following content may be provided within other sub plans such as the Soil and Water Management Plan and Flora and Fauna Management Plan. Groundwater management of on-airport works will be implemented through the groundwater management plan approved as part of the SMWSA Soil and Water CEMP. In particular the groundwater quality criteria will be in accordance to the WSA Soil and Groundwater CEMP Appendix G.
- b. Principal Contractors will develop and implement a Groundwater Management Plan for off-airport works. The Groundwater Management Plan will include as a minimum:
 - i. The groundwater mitigation measures as detailed in the planning approval documentation;
 - ii. The requirements of any applicable licence conditions;
 - iii. Details of proposed extraction, use and disposal of groundwater, and measures to mitigate potential impacts to groundwater sources, incorporating monitoring, impact trigger definition and response actions for all groundwater sources potentially impacted by SMWSA;
 - iv. Evidence of consultation with the relevant government agencies, such as DPIE for off-airport works or land;
 - v. The responsibilities of key project personnel with respect to the implementation of the plan;
 - vi. Procedures for the treatment, testing and discharge of groundwater from the site;
 - vii. Compliance record generation and management; and
 - viii. Details of groundwater monitoring if required.

7.3 Groundwater Mitigation

- a. The on-airport Soil and Water CEMP (with the groundwater management plan) and the off-airport Groundwater Management Plan will include the following groundwater mitigation measures as well as relevant Conditions:
 - i. Implementing all feasible and reasonable measures to limit groundwater inflows to stations and crossovers; and
 - ii. Undertaking groundwater monitoring during construction (levels and quality) in areas identified as 'likely' and 'potential' groundwater dependent ecosystems.

8. Construction Noise and Vibration Management



Figure 6 - Hebel Wall Noise Barrier at the Cheltenham Services Facility Site

8.1 Construction Noise and Vibration Management Objectives

- a. The following noise and vibration management objectives will apply to construction:
 - i. Minimise unreasonable noise and vibration impacts on residents and businesses;
 - ii. Avoid structural damage to buildings or heritage items as a result of construction vibration;
 - iii. Undertake active community consultation;
 - iv. Maintain positive, cooperative relationships with schools, childcare centres, local residents and building owners; and
 - v. For on-airport works, the Sydney Metro Western Sydney Airport Noise and Vibration CEMP will detail all the noise and vibration management objectives and will be consistent with the WSA Noise and Vibration CEMP, including all appendices to the CEMP.

8.2 Construction Noise and Vibration Management Implementation

- a. On-airport management of noise and vibration will be achieved through the implementation of the SMWSA Noise and Vibration CEMP and Principal Contractors will develop and implement a Construction Noise and Vibration Management Plan for all off-airport works consistent with the Interim Construction Noise Guidelines (Department of Environment and Climate Change, 2009). Both plans will include as a minimum:
 - i. Identification of work areas, site compounds and access points;
 - ii. Identification of sensitive receivers and relevant construction noise and vibration goals;
 - iii. Be consistent with, and include the requirements of the noise and vibration mitigation measures as detailed in the planning approval documentation and the Sydney Metro Construction Noise and Vibration Standard (CNVS), including the provision of respite;
 - iv. Details of construction activities and an indicative schedule for construction works, including the identification of key noise and/or vibration generating construction activities (based on representative construction scenarios) that have the potential to generate noise or vibration impacts on surrounding sensitive receivers, in particular residential areas;
 - v. Identification of feasible and reasonable procedures and mitigation measures to ensure relevant vibrations and blasting criteria are achieved, including a suitable blast program;
 - vi. The requirements of any applicable licence or approval (for example EPL);
 - vii. Additional requirements in relation to activities undertaken 24 hours of the day, 7 days per week;
 - viii. Pre-construction compliance requirements and hold points;
 - ix. The responsibilities of key project personnel with respect to the implementation of the plan;
 - x. Noise monitoring requirements;
 - xi. Compliance record generation and management; and
 - xii. An Out of Hours Works Protocol applicable to all construction methods and sites.
- b. Detailed Construction Noise and Vibration Impact Statements will be prepared for noise-intensive construction sites and or activities to ensure the adequacy of the noise and vibration mitigation measures. Specifically, Construction Noise and Vibration Impact Statements will be prepared for works proposed to be undertaken outside of standard construction hours and to support applications to undertake out of hours works (this includes variations of EPLs and applications to relevant agencies).
- c. Noise and vibration monitoring would be undertaken for construction as specified in the CNVS.
- d. The following compliance records would be kept by Principal Contractors:
 - i. Records of noise and vibration monitoring results against appropriate NMLs and vibration criteria; and
 - ii. Records of community enquiries and complaints, and the Contractor's response.

8.3 Construction Noise and Vibration Mitigation

- a. All feasible and reasonable mitigation measures would be implemented in accordance with the CNVS. The on-airport Noise and Vibration CEMP and the off-airport Noise and Vibration Management Plan will include the following noise and vibration mitigation measures as well as relevant Conditions:
 - i. Construction hours will be in accordance with the working hours specified in Section 5.1;
 - ii. Hoarding and enclosures will be implemented where required to minimise airborne noise impacts; and
 - iii. The layout of construction sites will aim to minimise airborne noise impacts to surrounding receivers
 - iv. Provision of respite periods.

9. Heritage Management



Figure 7 –White Hart Inn Excavation Site

9.1 Heritage Management Objectives

- a. The following heritage management objectives will apply to construction:
 - i. Embed significant heritage values through any architectural design, education or physical interpretation;
 - ii. Minimise impacts on items or places of heritage value;
 - iii. Avoid accidental impacts on heritage items;
 - iv. Maximise worker's awareness of indigenous and non-indigenous heritage; and
 - v. For on-airport works, the Sydney Metro Western Sydney Airport Aboriginal Cultural Heritage CEMP and the European and Other Heritage CEMP will detail all the heritage management objectives and will be consistent with the WSA Aboriginal Cultural Heritage CEMP and European and Other Heritage CEMP, including all appendices to these CEMP documents.

9.2 Heritage Management Implementation

- a. On-airport management of Aboriginal cultural heritage and European heritage will be achieved through the implementation of the SMWSA Aboriginal Cultural Heritage and the European and Other Heritage CEMPs. Principal Contractors will develop and implement a Heritage Management Plan for all off-airport works. Plans will include as a minimum:
 - i. Evidence of consultation with Registered Aboriginal Parties and the NSW Heritage Council;
 - ii. Identify initiatives that will be implemented for the enhancement of heritage values and minimisation of heritage impacts, including procedures and processes that will be used to implement and document heritage management initiatives;
 - iii. The heritage mitigation measures as detailed in the planning approval documentation;
 - iv. The responsibilities of key project personnel with respect to the implementation of the plan;
 - v. Procedures for interpretation of heritage values uncovered through salvage or excavation during detailed design;
 - vi. Procedures for undertaking salvage or excavation of heritage relics or sites (where relevant), consistent with and any recordings of heritage relics prior to works commencing that would affect them;
 - vii. Details for the short and / or long term management of artefacts or movable heritage;
 - viii. Details of management measures to be implemented to prevent and minimise impacts on heritage items (including further heritage investigations, archival recordings and/or measures to protect unaffected sites during construction works in the vicinity);
 - ix. Procedures for unexpected heritage finds, including procedures for dealing with human remains;
 - x. Heritage monitoring requirements; and
 - xi. Compliance record generation and management.
- b. The Contractor's regular inspections will include checking of Aboriginal and non-Aboriginal heritage mitigation measures.
- c. Compliance records will be retained by the Contractor. These will include:
 - i. Inspections undertaken in relation to heritage management measures;
 - ii. Archival recordings undertaken of any heritage item;
 - iii. Unexpected finds and stop work orders; and
 - iv. Records of any impacts avoided or minimised through design or construction methods.

9.3 Heritage Mitigation

- a. The on-airport Aboriginal Cultural Heritage and European and Other Heritage CEMPs and the off-airport Heritage Management Plan will include the following mitigation measures as well as relevant Conditions:
 - i. Induction courses for site workers will include training in the identification of Aboriginal artefacts and management of Aboriginal heritage values.
 - ii. Any heritage item not affected by the works will be retained and protected throughout construction;
 - iii. During construction undertake professional archaeological investigation, excavation, and reporting of any historical Indigenous heritage sites of state significance which will be affected. Reporting may be completed as construction progresses;

- iv. Undertake archival recordings of all non-Indigenous heritage items affected by the works prior to commencement of works; and
- v. Implement unexpected heritage find procedures for Indigenous and non-Indigenous heritage items.

10. Flora and Fauna Management



Figure 8 - Demarcation of Retained Flora

10.1 Flora and Fauna Management Objectives

a. The following flora and fauna management objectives will apply to construction:

- i. Minimise impacts on flora and fauna;
- ii. Design waterway modifications and crossings to incorporate best practice principles;
- iii. Retain and enhance existing flora and fauna habitat wherever possible;
- iv. Appropriately manage the spread of weeds and plant pathogens; and

- v. For on-airport works, the Sydney Metro Western Sydney Airport Biodiversity CEMP will detail all fauna and flora management objectives and will be consistent with the WSA Biodiversity CEMP, including all appendices to the Biodiversity CEMP.

10.2 Flora and Fauna Management Implementation

- a. On-airport management of flora and fauna will be achieved through the implementation of the SMWSA Biodiversity CEMP and Principal Contractors will develop and implement a Flora and Fauna Management Plan for all off-airport works. Both plans will include as a minimum:
 - i. The biodiversity mitigation measures as detailed in the planning approval documentation;
 - ii. The responsibilities of key project personnel with respect to the implementation of the plan;
 - iii. Procedures for the clearing of vegetation and the relocation of flora and fauna;
 - iv. Details on the locations, monitoring program and use of nest boxes by fauna;
 - v. Procedures for the demarcation and protection of retained vegetation, including all vegetation outside and adjacent to the construction footprint, and the protection of retained vegetation within the environmental conservation zone on the airport site;
 - vi. Plans for impacted and adjoining areas showing vegetation communities; important flora and fauna habitat areas; locations where threatened species, populations or ecological communities have been recorded;
 - vii. Vegetation management plan(s) for sites where native vegetation is proposed to be retained;
 - viii. Identification of measures to reduce disturbance to sensitive fauna;
 - ix. Rehabilitation details, including identification of flora species and sources, and measures for the management and maintenance of rehabilitated areas (including duration of the implementation of such measures);
 - x. Weed and disease management measures focusing on early identification of invasive weeds and diseases. Protocols to address the effective management of these risks;
 - xi. A procedure for dealing with unexpected threatened species identified during construction, including cessation of work and notification to the relevant government department for both on- and off-airport works. The procedure shall define how appropriate mitigation measures (including relevant relocation measures) and updating of ecological monitoring or off-set requirements;
 - xii. Details on the methodology for vegetation mapping and survey;
 - xiii. Ecological monitoring requirements; and
 - xiv. Compliance record generation and management.
- b. Principal Contractors would undertake the following ecological monitoring as a minimum:
 - i. A pre-clearing inspection will be undertaken prior to any native vegetation clearing by a suitable qualified ecologist and the Contractor's Environmental Manager (or delegate). The pre-clearing inspection will include, as a minimum:
 - ♦ Identification of hollow bearing trees or other habitat features;
 - ♦ Identification of any threatened flora and fauna;
 - ♦ A check on the physical demarcation of the limit of clearing;
 - ♦ An approved erosion and sediment control plan for the worksite; and

- ♦ The completion of any other pre-clearing requirements required by any project approvals, permits or licences.
 - ii. The completion of the pre-clearing inspection will form a HOLD POINT requiring sign-off from the Contractor's Environmental Manager (or delegate) and a qualified ecologist; and
 - iii. A post clearance report, including any relevant Geographical Information System files, will be produced that validates the type and area of vegetation cleared including confirmation of the number of hollows impacted and the corresponding nest box requirements to offset these impacts.
- c. The Principal Contractor's regular inspections will include a check on the ecological mitigation measures and project boundary fencing.
- d. The following compliance records would be kept by the Principal Contractor:
- i. Records of pre-clearing inspections undertaken;
 - ii. Records of the release of the pre-clearing hold point; and
 - iii. Records of ecological inspections undertaken.

10.3 Flora and Fauna Mitigation

- a. The on-airport Biodiversity CEMP and the off-airport Flora and Fauna Management Plan will include the following flora and fauna mitigation measures as well as any relevant Conditions:
- i. Areas to be retained and adjacent habitat areas will be fenced off prior to works to prevent damage or accidental over clearing;
 - ii. Clearing will follow a two-stage process as follows:
 - ♦ Non-habitat trees will be cleared first after sign-off of the pre-clearing inspection; and
 - ♦ Habitat trees will be cleared no sooner than 48 hours after non-habitat trees have been cleared. A suitably qualified ecologist will be present on site during the clearing of habitat trees. Felled habitat trees will be left on the ground for 24 hours or inspected by the ecologist prior to further processing.
 - iii. Weed management is to be undertaken in areas affected by construction prior to any clearing works. Off-airport weed management will be undertaken in accordance with the NSW *Noxious Weeds Act 1993*. On-airport weed management will also be undertaken in accordance with the NSW *Noxious Weeds Act 1993* and the NSW *Biosecurity Act 2015*, which is consistent with the approach adopted in the Western Sydney Airport Weed and Disease Management Plan (Appendix C of the Western Sydney Airport Biodiversity CEMP).

11. Visual Amenity Management

11.1 Visual Amenity Management Objectives

- a. The following visual and landscape management objectives will apply to the construction of the project:
- i. Minimise impacts on existing landscape features as far as feasible and reasonable;
 - ii. Ensure the successful implementation of the Landscape Design;
 - iii. Reduce visual impact of construction to surrounding community; and
 - iv. For on-airport works, the Sydney Metro Western Sydney Airport Visual and Landscape CEMP will detail all the visual amenity and landscaping management objectives and will be consistent with the WSA Visual and Landscape CEMP, including all the appendices to the CEMP.

11.2 Visual Amenity Management Implementation

- a. On-airport management of visual and landscaping will be achieved through the implementation of the SMWSA Visual and Landscape CEMP and Principal Contractors will develop and implement a Visual Amenity Management Plan for all the off-airport temporary works which will include as a minimum:
- i. The visual mitigation measures as detailed in the planning approval documentation for construction;
 - ii. Input from an experienced Landscape or Urban Designer;
 - iii. The maintenance of outward facing elements of site hoarding or noise barriers, including the removal of graffiti and weeds;
 - iv. Apply the principles of Australian Standard 4282-1997 Control of the obtrusive effects of outdoor lighting and relevant safety design requirements and detail mitigation measures to minimise lighting impacts on sensitive receivers for all permanent, temporary and mobile light sources;
 - v. Identify the processes and procedures that will be used for the incorporation of the principles of Crime Prevention Through Environmental Design (CPTED) in the design and construction of any temporary site facilities; and
 - vi. Compliance record generation and management.
- b. Visual and landscape measures will be incorporated into the Principal Contractor's regular inspections including checking the health of retained vegetation around site boundaries, checking the condition of any site hoarding and acoustic sheds, and checking the position and direction of any sight lighting.
- c. The Contractor will retain compliance records of any inspections undertaken in relation to visual and landscape measures.

11.3 Visual Amenity Mitigation

- a. The on-airport Visual and Landscape CEMP and the off-airport Visual Management Plan will include the following visual amenity mitigation measures as well as relevant Conditions:
- i. Wherever feasible and reasonable, vegetation around the perimeter of the construction sites will be maintained;
 - ii. Existing vegetation not affected by the construction works will be retained;
 - iii. Temporary construction works will be designed with consideration of urban design and visual amenity as per Section 4.4; and

- iv. Temporary site lighting, for security purposes or night works will be installed and operated in accordance with AS4282:1997 Control of the Obtrusive Effect of Outdoor Lighting.

12. Soil and Water Management



Figure 10 - Erosion and Sediment Controls at the Cudgegong Rd Site

12.1 Soil and Water Management Objectives

- a. The following soil and water management objectives will apply to construction:
 - i. Minimise pollution of surface water through appropriate erosion and sediment control;
 - ii. Minimise leaks and spills from construction activities;
 - iii. Maintain existing water quality of surrounding surface watercourses;
 - iv. Source construction water from non-potable sources, where feasible and reasonable; and
 - v. For on-airport works, the Sydney Metro Western Sydney Airport Soil and Water CEMP will detail all the soil and water management objectives and will be consistent with the WSA Soil and Water CEMP, including all appendices to the CEMP.

12.2 Soil and Water Implementation

- a. On-airport management of soil and water will be achieved through the implementation of the SMWSA Soil and Water CEMP and Principal Contractors will develop and implement a Soil and Water Management Plan for all off-airport works. Both plans will include as a minimum:
 - i. The soil and water mitigation measures as detailed in the planning approval documentation and sustainability requirements;
 - ii. Details of construction activities and their locations, which have the potential to impact on water courses, storage facilities, stormwater flows, and groundwater;
 - iii. Surface water and ground water impact assessment criteria consistent with the principles of the Australian and New Zealand Environment Conservation Council (ANZECC) guidelines for off-airport works and the *Airports (Environment Protection) Regulations 1997* for on-airport works (with due consideration of the ANZECC guidelines);
 - iv. Management measures to be used to minimise surface and groundwater impacts, including identification of water treatment measures and discharge points, details of how spoil and fill material required by the project will be sourced, handled, stockpiled, reused and managed; erosion and sediment control measures; salinity control measures and the consideration of flood events;
 - v. A contingency plan, consistent with the NSW Acid Sulphate Soils Manual (EPA 1998), to deal with the unexpected discovery of actual or potential acid sulphate soils both on and off-airport lands. The plan must including procedures for the investigation, handling, treatment and management of such soils and water seepage;
 - vi. Management measures for contaminated material (soils, water and building materials) and a contingency plan to be implemented in the case of unanticipated discovery of contaminated material, including asbestos, during construction;
 - vii. A description of how the effectiveness of these actions and measures would be monitored during the proposed works, clearly indicating how often this monitoring would be undertaken, the locations where monitoring would take place, how the results of the monitoring would be recorded and reported, and, if any exceedance of the criteria is detected how any non-compliance can be rectified;
 - viii. The requirements of any applicable licence conditions;
 - ix. The responsibilities of key project personnel with respect to the implementation of the plan;
 - x. Procedures for the development and implementation of Progressive Erosion and Sediment Control Plans;
 - xi. Identification of locations where site specific Stormwater and Flooding Management Plans are required; and
 - xii. Compliance record generation and management.
- b. Principal Contractors will develop and implement Progressive Erosion and Sediment Control Plans (ESCPs) for all active worksites in accordance with Managing Urban Stormwater: Soils & Construction Volume 1 (Landcom, 2004) (known as the “Blue Book”). The ESCPs will be approved by the Contractor’s Environmental Manager (or delegate) prior to any works commencing (including vegetation clearing) on a particular site. Copies of the approved ESCP will be held by the relevant Contractor personnel including the Engineer and the Site Foreman.

- c. ESCPs will detail all required erosion and sediment control measures for the particular site at the particular point in time and be progressively updated to reflect the current site conditions. Any amendments to the ESCP will be approved by the Contractor's Environmental Manager (or delegate).
- d. Principal Contractors will develop and implement Stormwater and Flooding Management Plans for the relevant construction sites. These plans will identify the appropriate design standard for flood mitigation based on the duration of construction, proposed activities and flood risks. The plan will develop procedures to ensure that threats to human safety and damage to infrastructure are not exacerbated during the construction period.
- e. Principal Contractors will undertake the following soil and water monitoring as a minimum:
 - i. Weekly inspections of the erosion and sediment control measures. Issues identified would be rectified as soon as practicable;
 - ii. Additional inspections will be undertaken following significant rainfall events (greater than 20 mm in 24 hours); and
 - iii. All water will be tested (and treated if required) prior to discharge from the site in order to determine compliance with the appropriate approvals and licencing. No water will be discharged from the site without written approval of the Contractor's Environmental Manager (or delegate). This is to form a HOLD POINT.
- f. The following compliance records will be kept by the Principal Contractors:
 - i. Copies of current ESCPs for all active construction sites;
 - ii. Records of soil and water inspections undertaken;
 - iii. Records of testing of any water prior to discharge; and
 - iv. Records of the release of the hold point to discharge water from the construction site to the receiving environment.
- g. The following water resources management objectives will apply to the construction of the project:
 - i. Minimise demand for, and use of potable water;
 - ii. Maximise opportunities for water re-use from captured stormwater, wastewater and groundwater;
 - iii. Examples of measures to minimise potable water consumption include:
 - ♦ Water efficient controls, fixtures and fittings in temporary facilities;
 - ♦ Collecting, treating and reusing water generated in tunnelling operations, concrete batching and casting facility processes;
 - ♦ Using recycled water or treated water from onsite sources in the formulation of concrete;
 - ♦ Harvesting and reusing rainwater from roofs of temporary facilities;
 - ♦ Using water from recycled water networks;
 - ♦ Collecting, treating and reusing groundwater and stormwater;
 - ♦ Using water efficient construction methods and equipment; and
 - ♦ Providing designated sealed areas for equipment wash down.

12.3 Soil and Water Mitigation

- a. The on-airport Soil and Water CEMP and the off-airport Soil and Water Management Plan will include the following surface water and flooding mitigation measures as well as any relevant Conditions:
- i. Clean water will be diverted around disturbed site areas, stockpiles and contaminated areas;
 - ii. Control measures will be installed downstream of works, stockpiles and other disturbed areas;
 - iii. Exposed surfaces will be minimised, and stabilised / revegetated as soon feasible and reasonable upon completion of construction;
 - iv. Dangerous good and hazardous materials storage will be within bunded areas with a capacity of 110 per cent of the maximum single stored volume;
 - v. Chemicals will be stored and handled in accordance with relevant Australian standards such as:
 - o AS 1940-2004 The storage and handling of flammable and combustible liquids
 - o AS/NZS 4452:1997 The storage and handling of toxic substances
 - o AS/NZS 5026:2012 The storage and handling of Class 4 dangerous goods
 - o AS/NZS 1547:2012 On-site domestic wastewater management
 - vi. Spill kits will be provided at the batch plants, storage areas and main work sites;
 - vii. A protocol will be developed and implemented to respond to and remedy leaks or spills.
 - viii. A remedial action plan and unexpected finds protocol would be established to facilitate the quarantining, isolation and remediation of contamination identified throughout the construction programme. Any asbestos identified on site would be managed in accordance with applicable regulatory requirements.

13. Air Quality



Figure 11 - Dust Mitigation at Norwest Station Site

13.1 Air Quality Management Objectives

- a. The following air quality management objectives will apply to construction:
 - i. Minimise gaseous and particulate pollutant emissions from construction activities as far as feasible and reasonable;
 - ii. Identify and control potential dust and air pollutant sources; and
 - iii. For on-airport works, the Sydney Metro Western Sydney Airport Air Quality CEMP will detail all the air quality management objectives and will be consistent with the WSA Air Quality CEMP including all appendices to the CEMP.

13.2 Air Quality Management Implementation

- a. On-airport management of soil and water will be achieved through the implementation of the SMWSA Soil and Water CEMP and Principal Contractors will develop and implement an Air Quality Management Plan for all off-airport works. Both plans will include, as a minimum:
 - i. The air quality mitigation measures as detailed in the planning approval documentation;
 - ii. The requirements of any approval and applicable licence conditions;
 - iii. Site plans or maps indicating locations of sensitive receivers and key air quality / dust controls;
 - iv. The responsibilities of key project personnel with respect to the implementation of the plan;
 - v. Air quality and dust monitoring requirements; and

- vi. Compliance record generation and management.
- b. Air quality and dust monitoring will involve the following as a minimum:
 - i. Meteorological conditions will be monitored and appropriate responses will be organised and undertaken periodically by the Principal Contractor;
 - ii. Regular visual monitoring of dust generation from work zones; and
 - iii. Monitoring emissions from plant and construction vehicles to ensure they have appropriate emission controls and are being maintained correctly.
- c. The following compliance records will be kept by the Principal Contractor:
 - i. Records of any meteorological condition monitoring;
 - ii. Records of any management measures implemented as a result of adverse, windy weather conditions; and
 - iii. Records of air quality and dust inspections undertaken.

13.3 Air Quality Mitigation

- a. The on-airport Air Quality CEMP and the off-airport Air Quality Management Plan will include the following air quality mitigation measures as well as any relevant Conditions:
 - i. Plant and equipment will be serviced and maintained in good working order to reduce unnecessary emissions from exhaust fumes;
 - ii. Plant and equipment to be switched off engines when not in use;
 - iii. The avoidance the use of diesel or petrol powered generators and instead using mains electricity or battery powered equipment, where practicable;
 - iv. Appropriate vehicle speeds on sealed and unsealed roads;
 - v. Development and implementation of a construction logistics plan to manage the sustainable delivery of goods and materials;
 - vi. Implementing measures to support and encourage sustainable travel for construction workers to and from the construction sites;
 - vii. Water suppression will be used for active earthwork areas, stockpiles, unsurfaced haul roads and loads of soil being transported to reduce wind-blown dust emissions;
 - viii. Wheel-wash facilities or rumble grids will be provided and used near the site exit points, as appropriate; and
 - ix. Dust extraction and filtration systems will be installed for tunnel excavation works and deep excavation with limited surface exposure.

14. Waste Management

14.1 Waste Objectives

- a. The following waste objectives will apply to construction:
 - i. Minimise waste throughout the project life-cycle;
 - ii. Waste management strategies for off-airport works will be implemented in accordance with the *Waste Avoidance and Resource Recovery Act 2001* management hierarchy as follows:
 - ♦ Avoidance of unnecessary resource consumption;
 - ♦ Resource recovery (including reuse, reprocessing, recycling and energy recovery); and
 - ♦ Disposal.
 - iii. Consistent with the Western Sydney Airport Waste and Resource Construction Environmental Management Plan, waste management strategies for on-airport works will also be aligned with the NSW Waste Avoidance and Resource Recovery Strategy under the NSW *Waste Avoidance and Resource Recovery Act 2001*; and
 - iv. For on-airport works, the Sydney Metro Western Sydney Airport Waste and Resources CEMP will detail all the waste management objectives and will be consistent with the WSA Waste and Resources CEMP including all appendices to the CEMP.
- b. Targets for the recovery, recycling or reuse of construction waste, and beneficial reuse of spoil will be provided by the Principal Contractor.

14.2 Waste Implementation

- a. On-airport management of waste and resources will be achieved through the implementation of the SMWSA Waste and Resources CEMP and Principal Contractors will develop and implement a Waste Management Plan for all off-airport works. Both plans will include as a minimum:
 - i. The waste management mitigation measures as detailed in the planning approval documentation;
 - ii. The responsibilities of key project personnel with respect to the implementation of the plan;
 - iii. Waste management monitoring requirements;
 - iv. A procedure for the assessment, classification, management and disposal of waste in accordance with Waste Classification Guidelines; and
 - v. Compliance record generation and management.
- b. Principal Contractors will undertake the following waste monitoring as a minimum:
 - i. Weekly inspections will include checking on the waste storage facilities on site; and
 - ii. All waste removed from the site will be appropriately tracked from 'cradle to grave' using waste tracking dockets.
- c. Principal Contractors will report all necessary waste and purchasing information to Sydney Metro as required for Sydney Metro to fulfil their WRAPP reporting requirements.
- d. Compliance records will be retained by the Principal Contractors in relation to waste management including records of inspections and waste dockets for all waste removed from the site.

14.3 Waste Mitigation

- a. The on-airport Waste and Resources CEMP and the off-airport Waste Management Plan will include the following waste management mitigation measures as well as relevant Conditions:
- i. A central waste area (or areas) would be established, at which waste (including recyclables) would be stored or stockpiled. Stockpiles and bins would be appropriately labelled, managed and monitored till being removed from site;
 - ii. All waste materials removed from the sites will be directed to an appropriately licensed waste management facility;
 - iii. The use of raw materials (noise hoarding, site fencing, etc...) will be reused or shared, between sites and between construction contractors where feasible and reasonable; and
 - iv. Recyclable wastes, including paper at site offices, will be stored separately from other wastes.

15. Acronyms

| Acronym | |
|----------|---|
| CEMP | Construction Environmental Management Plan |
| CNVS | Construction Noise and Vibration Standard |
| CPTED | Crime Prevention through Environmental Design |
| DPIE | Department of Planning, Industry and Environment |
| EIS | Environmental Impact Statement |
| EMF | Environmental Management Framework |
| EMS | Environmental Management System |
| EPA | Environment Protection Authority |
| EP&A Act | Environmental Planning and Assessment Act 1979 |
| EPL | Environment Protection Licence (issued by EPA under the NSW POEO Act) |
| ER | Environmental Representative |
| ESCP | Erosion and Sediment Control Plan |
| NOHSC | National Occupational Health and Safety Commission |
| POEO Act | Protection of the Environment Operation Act 1997 |
| TBM | Tunnel Boring Machine |
| TfNSW | Transport for NSW |

Appendix A – Environment and Sustainability Statement of Commitment



Environment & Sustainability Statement of Commitment

Sydney Metro will deliver great services, places and transport infrastructure for our customers while protecting the environment, contributing to economic prosperity and delivering social benefits for the communities we serve. We have a duty to undertake our activities in the interest of the greater good, to move beyond compliance and be a genuine leader in both environmental management and sustainability.

Sydney Metro is committed to:

- Minimising our impacts and leaving a positive environmental and social legacy;
- Delivering a resilient asset and service for our customers;
- Collaborating with stakeholders to innovate and drive sustainable outcomes; and
- Embedding sustainability into our activities;

To deliver on these commitments Sydney Metro will:

Leave an environmental and social legacy

- Protect the environment, prevent pollution and comply with legal and other requirements.
- Manage resources and waste efficiently, exploring opportunities to minimise waste, use recycled and low impact materials and reduce our environmental footprint.
- Promote a diverse and inclusive workforce and supply chain, build capability and capacity within industry, and increase Aboriginal participation.
- Responsibly minimise environmental and social risks in our supply chain.
- Create liveable places that are well integrated and promote active and sustainable transport.
- Conserve and enhance the natural environment and our built and cultural heritage.
- Work collaboratively with delivery partners to provide social benefits to the communities in which we work.

Drive resilience

- Tackle climate change and contribute to the NSW Government target of net zero emissions.
- Deliver Sydney Metro assets and operations that are resilient to a changing climate, and work with stakeholders to proactively respond to emerging challenges and opportunities.
- Promote the greening of our cities to help combat the 'urban heat island' effect.

Collaborate to deliver sustainable outcomes

- Align with and respond to Transport for NSW policy and other NSW Government priorities.
- Establish and maintain positive relationships with communities and stakeholders to harness local knowledge and maximise opportunities to add value across the project lifecycle.
- Collaborate and consult with Aboriginal stakeholders to understand how we can best respect and celebrate Aboriginal cultural values including Designing with Country.
- Provide industry leadership by setting benchmarks, encouraging innovation and driving continual improvement with our delivery partners.
- Increase environmental awareness amongst staff and customers to drive more sustainable behaviours.

Embed sustainability

- Establish robust objectives and targets that are measureable and take into account whole-of-life considerations.
- Maintain an environmental management system that is integrated into our projects and continually improved to enhance environmental performance.
- Apply effective assurance processes to monitor environment and sustainability performance including ensuring accountability, incentivising beyond compliance behaviours and implementing corrective actions as required.
- Embed sustainability considerations into key project decisions across the project lifecycle.
- Provide appropriate training and resources to meet our obligations and commitments.
- Publicly report on sustainability performance.



Jon Lamonte
Chief Executive, Sydney Metro

This Statement of Commitment supersedes previous versions of the Sydney Metro Environment & Sustainability Policy and aligns with the cluster wide TfNSW Environment and Sustainability Policy which has been adopted by Sydney Metro. It applies to all people working for Sydney Metro.

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Australian Government



**Sydney Metro –
Western Sydney Airport**

Appendix I

Transport for NSW Environment and Sustainability Policy

Transport Environment and Sustainability Policy

Transport is a key enabler of economic and social activity. We are committed to delivering transport which contributes to economic prosperity and social inclusion in an environmentally responsible and sustainable manner, consistent with the Future Transport Strategy 2056.

Transport for NSW's activities cover the whole State and its infrastructure will last for generations to come. We have a duty to undertake our activities in the interest of the greater good, moving beyond compliance, and being a genuine leader in environment and sustainability performance.

We will work towards achieving this for NSW by:

- Leadership – contributing to and influencing the strategic environment and sustainability agenda of the NSW Government
- Environmental protection – being accountable for addressing and minimising the environmental impacts of our activities to satisfy the expectations and legislative requirements of the NSW Government and community
- Energy and carbon – improving energy efficiency and working towards net zero carbon emissions
- Resilience – embedding climate risk and resilience considerations in our activities
- Sustainable procurement – procuring and delivering sustainable, efficient and cost effective transport options, including responsible supply chains
- Whole of life – considering whole of life benefits and impacts from our activities across all life cycle stages - demand/need, plan, acquire, operate/maintain and disposal
- Social – recognising the social impacts and benefits of our activities, and working for healthy liveable communities
- Awareness – raising the awareness and capacity of our workforce to be accountable for implementing the Policy through their activities to achieve enhanced environmental outcomes and a culture of environmental responsibility
- Communication – communicating openly, responsively and empathetically with our customers, partners and stakeholders on environmental matters and report on our performance

This Policy applies to the agencies listed below:

- Transport for NSW
- Department of Transport
- Sydney Trains
- NSW Trains
- RailCorp
- State Transit Authority
- Sydney Metro

This Policy applies to permanent, temporary and casual staff of the above agencies, staff seconded from another organisation and contingent workers including labour hire, professional services contractors and consultants.



Rodd Staples
Secretary

13 January 2020

Appendix J

Sydney Metro Environment and Sustainability Statement of Commitment

Environment & Sustainability Statement of Commitment

Sydney Metro will deliver great services, places and transport infrastructure for our customers while protecting the environment, contributing to economic prosperity and delivering social benefits for the communities we serve. We have a duty to undertake our activities in the interest of the greater good, to move beyond compliance and be a genuine leader in both environmental management and sustainability.

Sydney Metro is committed to:

- Minimising our impacts and leaving a positive environmental and social legacy;
- Delivering a resilient asset and service for our customers;
- Collaborating with stakeholders to innovate and drive sustainable outcomes; and
- Embedding sustainability into our activities;

To deliver on these commitments Sydney Metro will:

Leave an environmental and social legacy

- Protect the environment, prevent pollution and comply with legal and other requirements.
- Manage resources and waste efficiently, exploring opportunities to minimise waste, use recycled and low impact materials and reduce our environmental footprint.
- Promote a diverse and inclusive workforce and supply chain, build capability and capacity within industry, and increase Aboriginal participation.
- Responsibly minimise environmental and social risks in our supply chain.
- Create liveable places that are well integrated and promote active and sustainable transport.
- Conserve and enhance the natural environment and our built and cultural heritage.
- Work collaboratively with delivery partners to provide social benefits to the communities in which we work.

Drive resilience

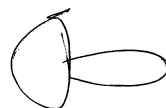
- Tackle climate change and contribute to the NSW Government target of net zero emissions.
- Deliver Sydney Metro assets and operations that are resilient to a changing climate, and work with stakeholders to proactively respond to emerging challenges and opportunities.
- Promote the greening of our cities to help combat the 'urban heat island' effect.

Collaborate to deliver sustainable outcomes

- Align with and respond to Transport for NSW policy and other NSW Government priorities.
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Embed sustainability

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- Apply effective assurance processes to monitor environment and sustainability performance including ensuring accountability, incentivising beyond compliance behaviours and implementing corrective actions as required.
- Embed sustainability considerations into key project decisions across the project lifecycle.
- Provide appropriate training and resources to meet our obligations and commitments.
- Publicly report on sustainability performance.



Jon Lamonte
Chief Executive, Sydney Metro