2.2.1 Location and the Existing Environment

The Proposal is located approximately 8 km north-east of the Perth CBD, and will connect the existing Midland railway line from Bayswater Station to Malaga with two new stations in the City of Bayswater and the City of Swan. It will be located predominantly within the median of Tonkin Highway between Guildford Road in Bayswater and Hepburn Avenue in Ballajura.

The PTA commissioned an environmental constraints desktop analysis in early 2019 to review existing information relating to the EPA's environmental factors in a larger study area, that generally encompasses the development envelope within the southern section of the study area (ELA 2019) (Appendix A). The constraints analysis identified few environmental constraints to this Proposal, due in large part to the predominantly developed, cleared and urbanised nature of the development envelope.

The Proposal is situated in an urban environment that is highly modified from existing development, with 90 percent (%) of the development envelope already cleared of native vegetation or already occupied by permanent infrastructure. To avoid and further minimise native vegetation disturbance, the PTA ensured that the majority of the development envelope occurs within the road reserve of Tonkin Highway. This area has been historically cleared and extensively impacted upon by existing infrastructure and surrounding development, and has been recently disturbed to facilitate Main Roads road upgrades.

Due to the PTA's approach to avoiding and minimising disturbance, limited environmental values will therefore be impacted by the implementation of this Proposal, as minimal native vegetation clearing is required. The high degree of disturbance in this area is evidenced by the recently referred Main Roads Tonkin Highway Hepburn Avenue to Guildford Road Proposal that has a similar footprint to the Proposal's development envelope, which received a 'not assessed' decision by the EPA in August 2019.

The Proposal is required to support the demand for improved public transport options within the inner north-eastern corridor of Perth.

2.2.2 Key Proposal Characteristics

A summary of the proposal is presented in Table 3.

Table 3: Summary of the Proposal

Item	Details
Proposal title	Bayswater to Malaga Rail Works
Proponent name	Public Transport Authority of Western Australia
Short description	The Proposal is to construct and operate a 9 km new dual railway track, which extends off the existing Midland railway line from the existing Bayswater Station to Malaga. The Proposal includes the construction and operation of two new stations at Morley and Noranda with intermodal rail, bus, carpark, and active mode (cycling and walking) facilities at each station and a turnback facility.

The key physical and operational elements of the Proposal and the locations and proposed extents of these elements are presented in Table 4.

Table 4: Key Proposal Characteristics

Element	Location	Proposed extent
Physical elements		
Railway tracks and associated infrastructure	A 9 km dual track railway which spurs off the existing Midland railway reserve east of Bayswater Station via a rail bridge, generally following the land reserved 'Primary regional Reserved Road' in the Metropolitan Region Scheme (MRS) before terminating at a turnback facility, north of the Noranda station in Malaga, as shown on Figure 1.	Construction of permanent infrastructure for maintenance and emergency vehicle access, drainage, overhead electrification for traction power, signalling, communications and other services, access roads and pathways, and access control (e.g. fences and gates). Disturbance of up to 19.88 ha within the development envelope of 205 ha.
Morley Station	Located approximately 2.5 km north of the existing Midland line, where Broun Avenue passes over Tonkin Highway (Figure 1).	Construction of a railway station within the Tonkin Highway road reserve and associated facilities including intermodal rail, bus, 'park and ride', 'kiss and ride' and active mode (walking/cycling) facilities adjacent the Tonkin Highway road reserve. Disturbance of up to 4.7 ha within the development envelope of 205 ha (Figure 3).
Noranda Station	Located approximately 2.5 km north of the proposed Morley Station where Benara Road passes over Tonkin Highway (Figure 1).	Construction of an at-grade railway station and associated facilities including intermodal rail, bus, 'park and ride', 'kiss and ride' and active mode facilities within the Tonkin Highway road reserve. Disturbance of up to 8.7 ha within the development envelope of 205 ha (Figure 3).
Construction and access areas	Construction and access areas have been selected at locations of proposed future urban development or roads reserved in the MRS or as detailed within other approved or draft local structure plans.	The construction and access areas will be located within the 205 ha development envelope (Figure 3).
Operational elements		

Rail and Bus Services	A passenger railway is proposed to operate on a 9 km dual railway track from Bayswater Station to Malaga, as shown in Figure 1. Rail and bus services are proposed to operate at Morley Station and Noranda Station.	Rail services will operate along the full length of the railway up to 24 hours per day, seven days per week. Railway Stations will operate up to 24 hours per day, seven days per week. Bus services may operate to/from the stations up to 24 hours per day, seven days per week. Rail and bus services at each station are included within the development envelope of 205 ha.

Railway tracks and associated infrastructure

Up to 9 km of dual track narrow gauge railway will be constructed from the southern boundary of the development envelope in Bayswater to the northern end of the development envelope in the Tonkin Highway road reserve north of Marshall Road (Figure 3).

The Proposal also includes permanent infrastructure for overhead electrification for traction power, signalling, communications and other services, access roads and pathways, drainage, maintenance and emergency vehicle access, and access control (e.g. fences and gates). Minor amendments will occur to the existing PSP, along the existing Tonkin Highway.

The Proposal includes a turnback facility and connection to Western Power electrical infrastructure in the median of Tonkin Highway between Marshall Road and Hepburn Avenue, enabling the Proposal to operate as a standalone railway spur.

Stations

The Proposal includes two new railway stations (Figure 3):

- The proposed Morley Station will be located approximately 2.5 km north of the Midland line (approximately 3 km by rail from the Midland line) where Broun Avenue passes over Tonkin Highway. Primary access to the station will be via the existing Broun Avenue overbridge. The station will include intermodal interchanges for bus services, 'park and ride', 'kiss and ride', active mode facilities and associated infrastructure adjacent to the Tonkin Highway road reserve.
- The proposed Noranda Station will be located approximately 2.5 km north of the proposed Morley Station where Benara Road passes over Tonkin Highway. Primary access to the station will be via the existing Benara Road overbridge. Minor modifications to the existing pedestrian bridge over Tonkin Highway connecting Sewell Court with Acacia Court may be required to provide additional pedestrian and cycling connections into the station from the adjacent Noranda and Morley suburbs. Bus stops will be provided on Benara Road to enable transfer between rail and bus services.

Bayswater Station will be upgraded as part of another project and does not form part of this Proposal.

Bridges

To achieve grade separation of the Proposal from existing roads, several bridges and/or viaducts will be required. These works are related to a number of parallel infrastructure projects being undertaken in part by the PTA as part of this Proposal, and in part by Main Roads as part of its Tonkin Highway Modifications: Guildford Road to Hepburn Avenue proposal. A summary of bridges required and their relationship to the Proposal is provided in Table 5. Refer to Figure 3 for spatial context.

Table 5: Bridges

Location	Structure	Relationship to the Proposal
Railway Parade and Clavering Road, Bayswater (Figure 3).	Rail bridge over road.	Included in this Proposal.
Morley Station (proposed bus interchange bridge adjacent to Broun Avenue).	Road bridge over rail and Tonkin Highway.	Not part of this Proposal.
Morley Station (existing Broun Avenue road bridge).	Road bridge over rail.	Not part of this Proposal.
Morley Drive, Morley.	Rail bridge over road.	Not part of this Proposal.
Noranda Station (existing Benara road bridge).	Road bridge over rail and Tonkin Highway.	Not part of this Proposal.

Temporary construction areas

Temporary construction areas will be required within the development envelope, for site offices and to temporarily store materials and equipment during construction of the Proposal. Temporary construction areas will be preferentially located in existing cleared areas (Figure 3).

Construction activities that may occur within the temporary construction areas include but are not limited to:

- Laydown area for temporary placement of construction materials (e.g. steel, concrete sleepers, crushed rock ballast, limestone, rails, pipes, overhead line equipment components, stockpiles of materials, kerbing, lighting infrastructure, fencing materials, signage, landscaping materials, etc.).
- Water storage ponds and basins for the storage of dewatering effluent, displaced water, stormwater runoff from hardstands and production water.
- Access tracks for machinery and plant to access the construction area.
- Parking of vehicles and machinery.
- Storage of chemicals and dangerous goods in bunded, suitably sized areas.
- Storage and use of heavy equipment including: trucks, plant piling rigs, front end loaders, excavators, water trucks, graders and static and vibrating rollers, delivery trucks, concrete trucks and pumps, concrete vibrators, cranes and tools.
- Storage and use of other equipment including: portable toilets, site offices, sea containers for secure storage, concrete wash down bunds and rubbish skip bins.
- Site offices, crib rooms, portable toilet blocks, and parking.

Where practicable the PTA will locate construction laydown areas in areas of existing or planned future disturbance.

Stormwater drainage infrastructure

Stormwater infrastructure will be installed to service new station precincts and infrastructure. In addition, drainage of the railway formation within the Tonkin Highway median will be integrated with existing Tonkin Highway drainage maintained by Main Roads (Figure 3). The drainage infrastructure will provide adequate stormwater storage and infiltration to cater for storm events and to prevent adverse impacts to proposed and existing infrastructure. The drainage design will incorporate water-sensitive urban design (WSUD) elements and integrate with the existing drainage networks to prevent adverse impacts on the receiving environment.

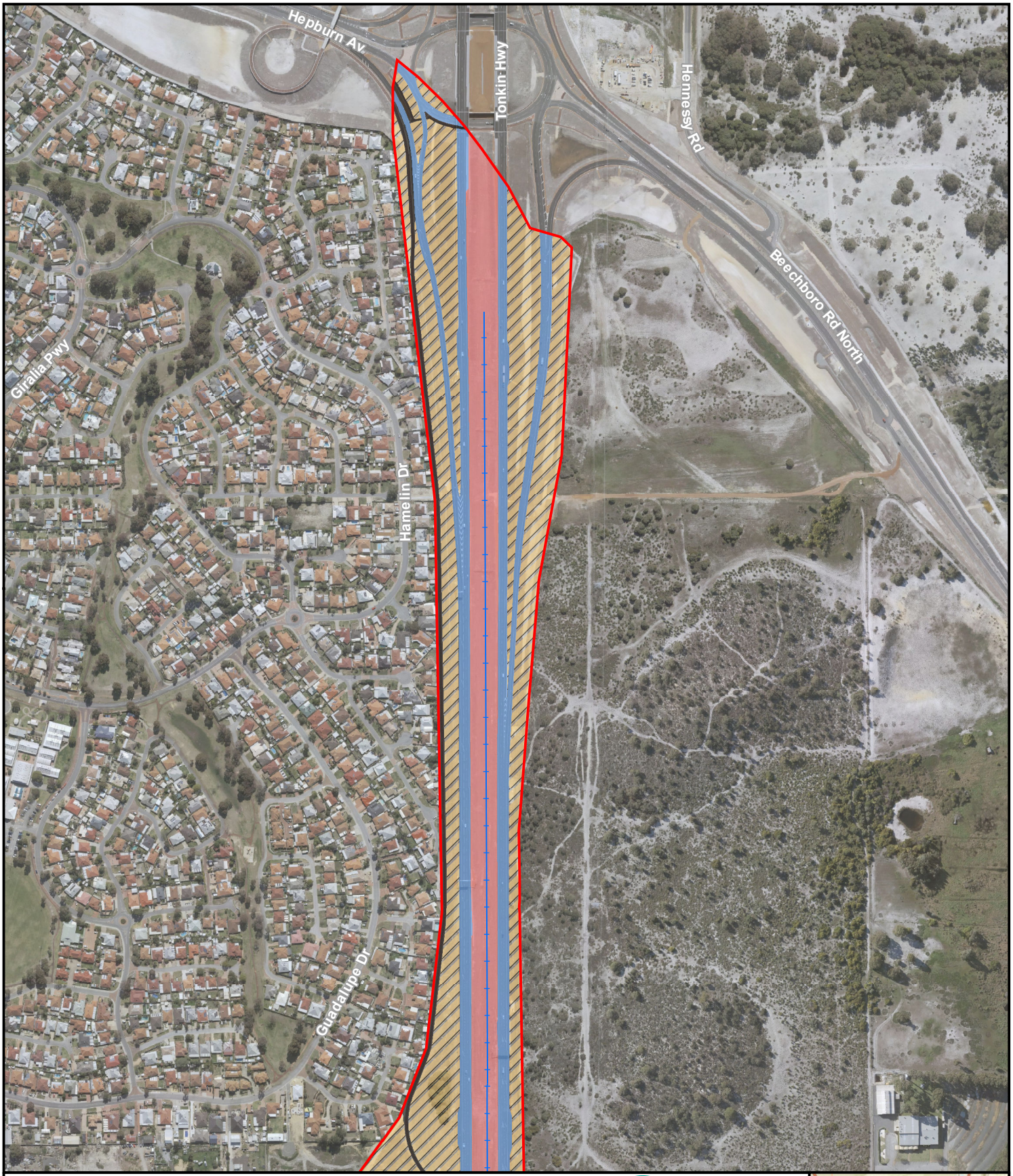
Dewatering and groundwater abstraction requirements

The depth to groundwater varies within the development envelope, with groundwater closest to the surface in the northern portion of the development envelope, increasing in depth in the southern section of the development envelope.

Dewatering and/or abstraction may be required for the construction of the rail bridge over Railway Parade and Clavering Road Bayswater and at Morley and Noranda stations. The dewatering and/or abstraction requirements for the Proposal will not be fully defined until detailed design has been completed.

The Proposal may also require the abstraction of groundwater for use during construction, including for dust suppression.

If dewatering or groundwater abstraction is required, the relevant licences to construct wells and take water will obtained from DWER as set out in Section 1.1.3. Refer to Section 8.5 for more information.



METRONET | Bayswater to Malaga Rail Works
Figure 3A **Indicative Project Activities**

Public Transport Authority

Legend

- Development Envelope (The Proposal)
- Proposed Railway Line

Existing Infrastructure

- Principle Shared Path
- Road

Indicative Project Activities

- Rail Infrastructure
- Temporary Construction Area

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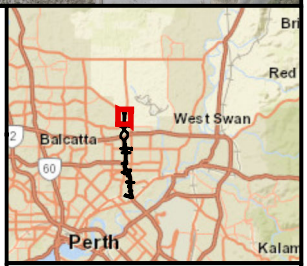

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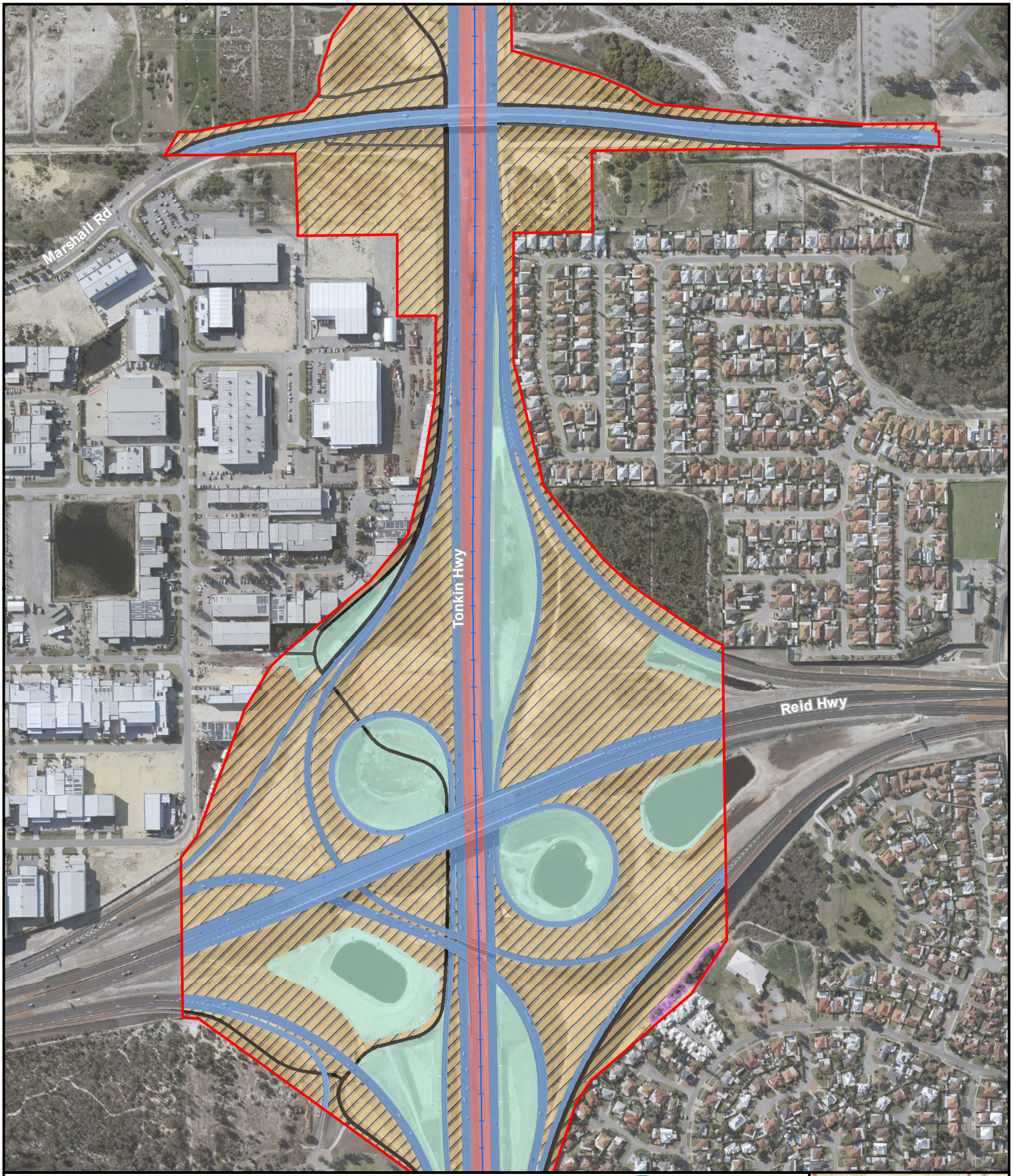

METRONET | Bayswater to Malaga Rail Works
Figure 3B **Indicative Project Activities**

Public Transport Authority

Legend

- Development Envelope (The Proposal)
- Proposed Railway Line

Existing Infrastructure

- Principle Shared Path
- Road
- Stormwater Drainage

Indicative Project Activities

- Rail Infrastructure
- Temporary Construction Area
- No Activity

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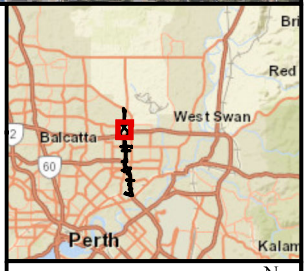

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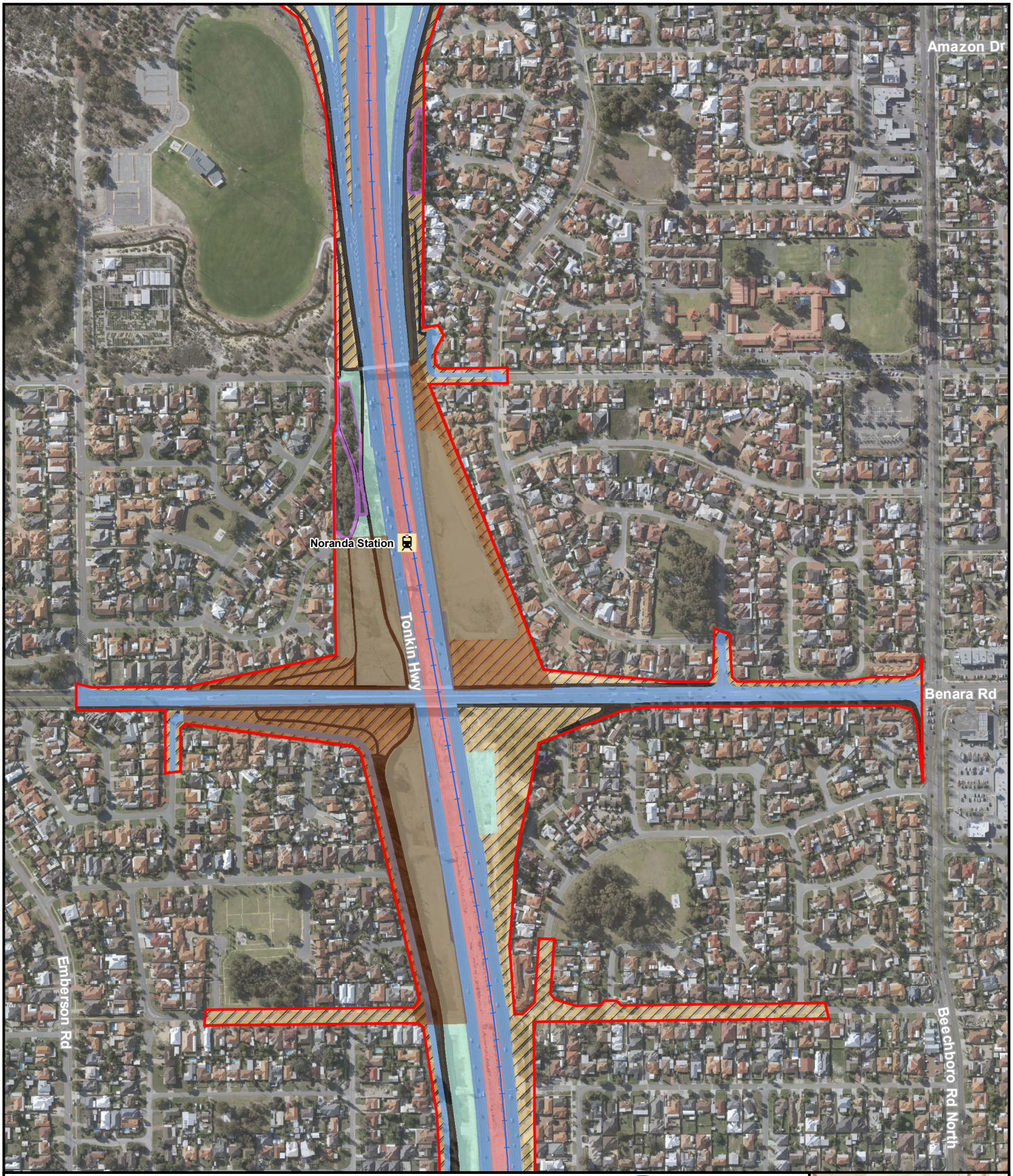

METRONET | Bayswater to Malaga Rail Works
Figure 3C **Indicative Project Activities**

Public Transport Authority

Legend

- Development Envelope (The Proposal)
- Proposed Railway Line

Existing Infrastructure

- Principle Shared Path
- Road
- Stormwater Drainage

Indicative Project Activities

- Rail Infrastructure
- Temporary Construction Area
- No Activity
- Station Extents

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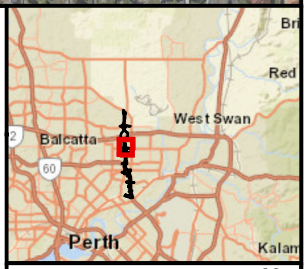

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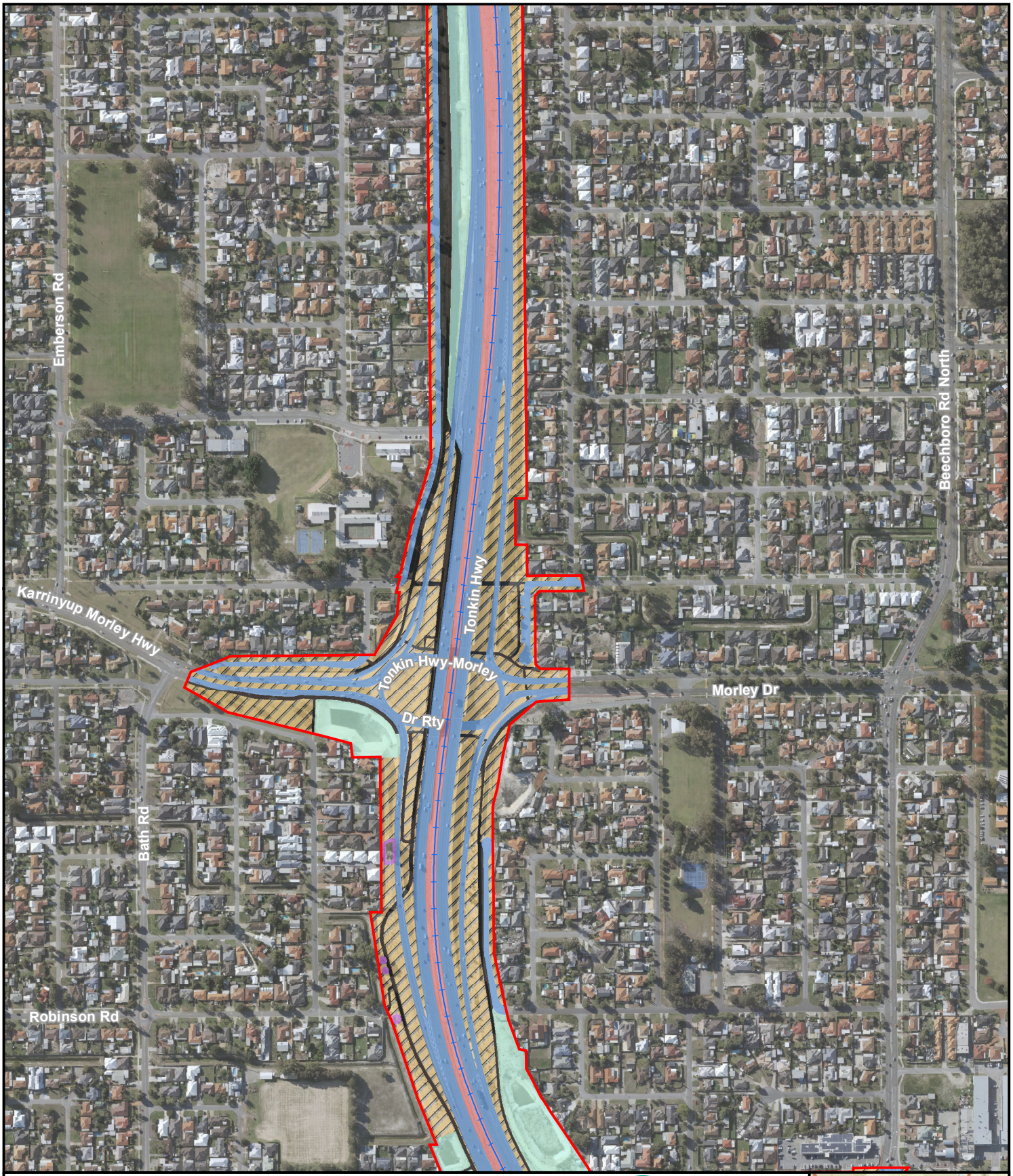

METRONET | Bayswater to Malaga Rail Works
Figure 3D **Indicative Project Activities**

Public Transport Authority

Legend

- Development Envelope (The Proposal)
- Proposed Railway Line

Existing Infrastructure

- Principle Shared Path
- Road
- Stormwater Drainage

Indicative Project Activities

- Rail Infrastructure
- Temporary Construction Area
- No Activity

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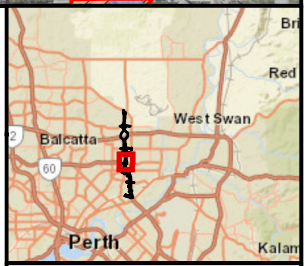

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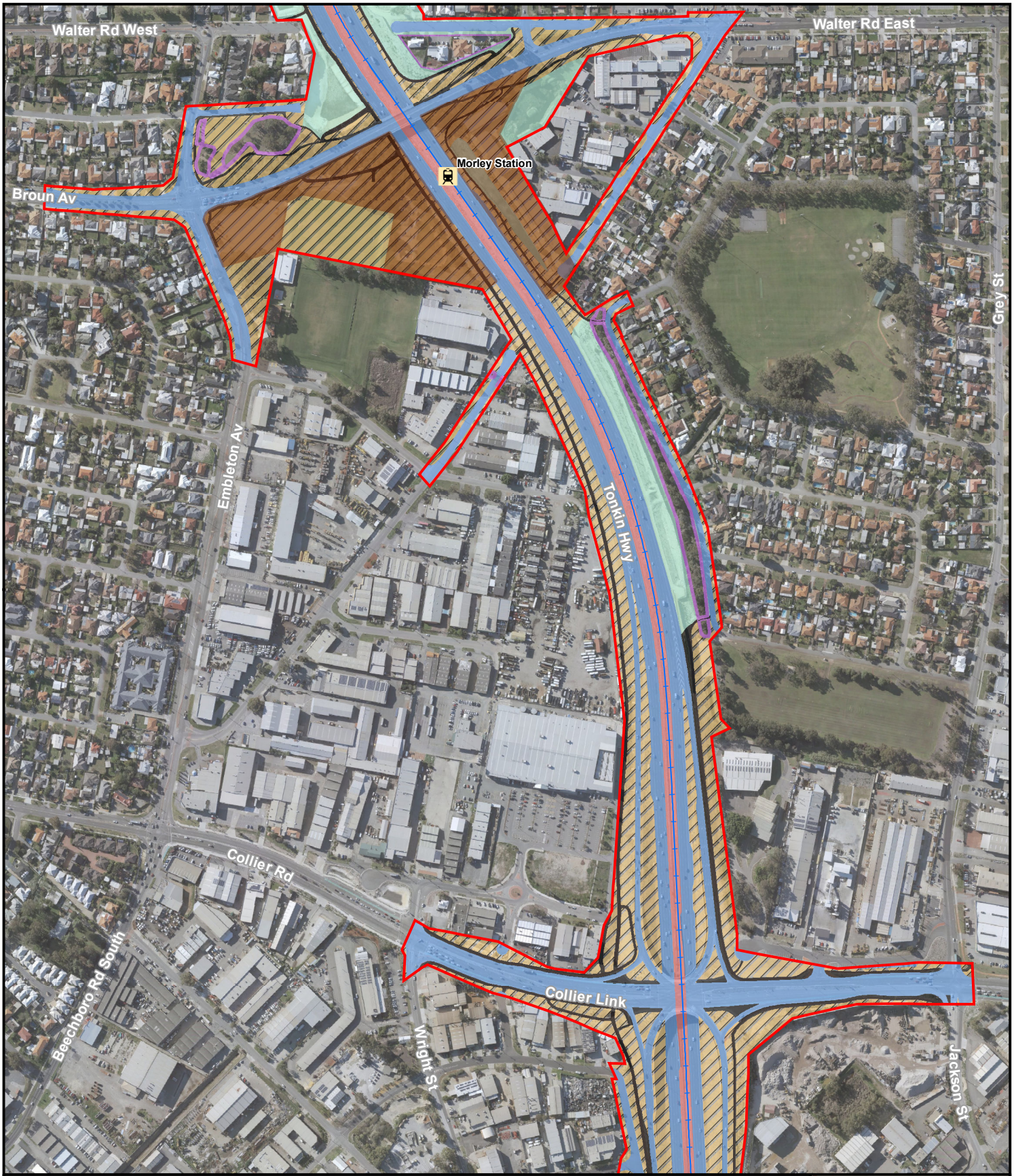

METRONET | Bayswater to Malaga Rail Works
Figure 3E **Indicative Project Activities**

Public Transport Authority

Legend

- Development Envelope (The Proposal)
- Proposed Railway Line

Existing Infrastructure

- Principle Shared Path
- Road
- Stormwater Drainage

Indicative Project Activities

- Rail Infrastructure
- Temporary Construction Area
- No Activity
- Station Extents

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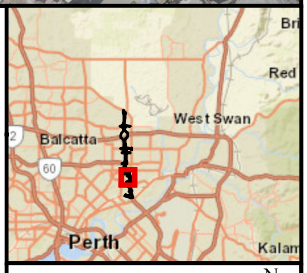

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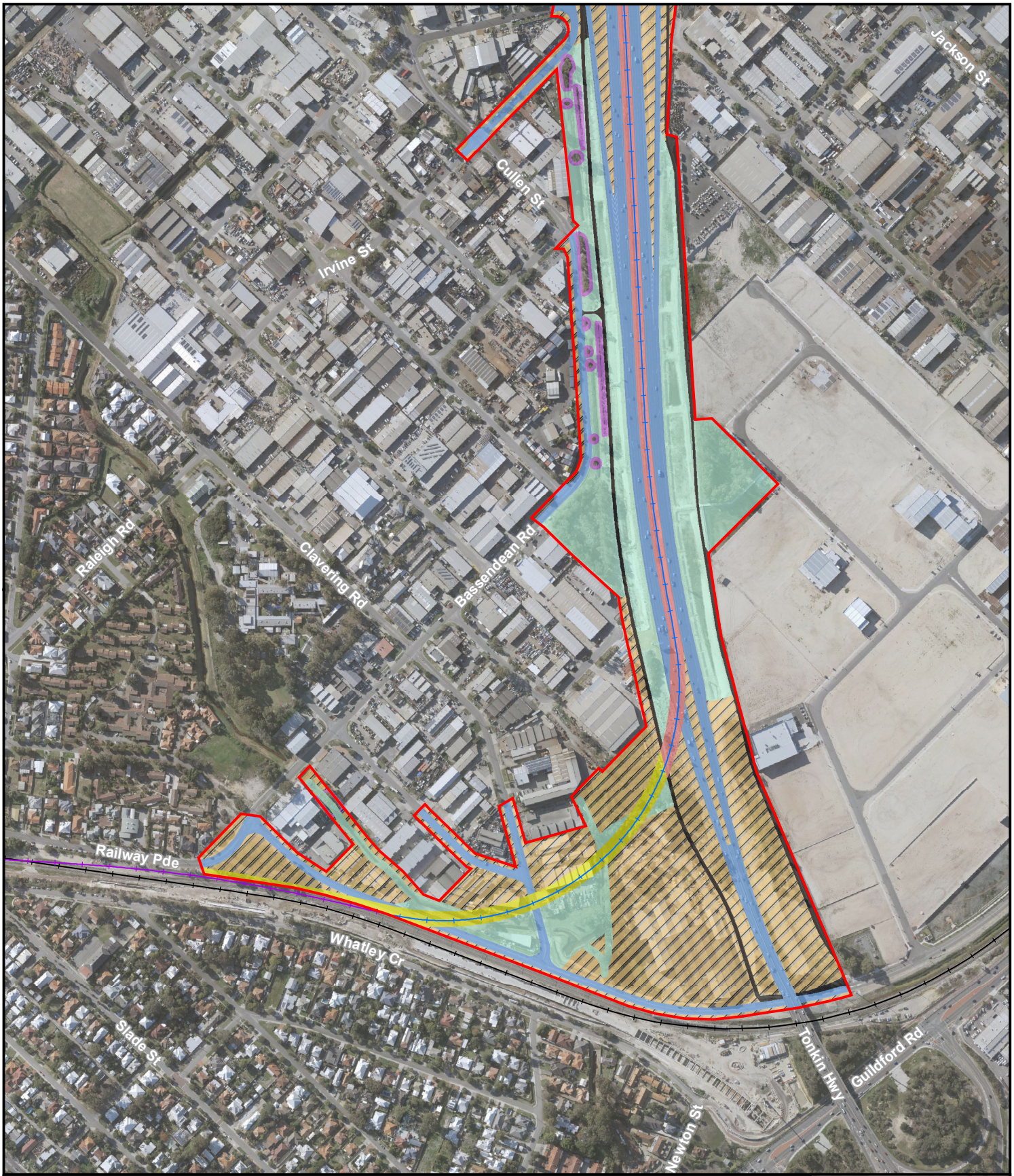

METRONET | Bayswater to Malaga Rail Works
Figure 3F **Indicative Project Activities**

Public Transport Authority

Legend

- Development Envelope (The Proposal)
- Existing Railway Line
- Proposed Railway Alignment within Existing Rail Reserve
- Proposed Railway Line

Existing Infrastructure

- Principle Shared Path
- Road
- Stormwater Drainage

Indicative Project Activities

- Rail Infrastructure
- Rail Bridge
- Temporary Construction Area
- No Activity

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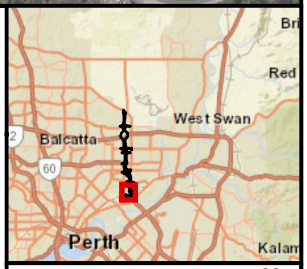

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2.3 Local and regional context

The Proposal is located within the Perth subregion of the Interim Biogeographic Regionalisation for Australia (IBRA) Bioregion of the Swan Coastal Plain (SCP). It intersects three local government areas: the City of Bayswater, the City of Swan and the Town of Bassendean (Figure 4).

The Proposal development envelope is predominantly within the Tonkin Highway road reserve, and is surrounded by urban and industrial development. Industrial areas are on the west and east of the Proposal between Guildford Road and Broun Avenue in Bayswater, and on the west of the Proposal between Reid Highway and Marshall Road in Malaga. The Lightning Park and recreational facilities are to the west of the Proposal in Noranda, while a parcel of land east of the Proposal in Whiteman is undeveloped zoned Urban Deferred. All other adjacent land is residential urban.

2.3.1 Geology and Soils

The development envelope is located within the Bassendean dune system, classified as an extensive system of shoreline deposits and coastal dunes running in a north-south direction that covers a 15 km wide zone of the SCP (Gozzard 2007). Typically, the Bassendean dune system is relatively featureless, comprising of low hills of unconsolidated sediments and sandy swamps between the dunes. The aeolian deposits within the Bassendean dune system consist of (360 Environmental 2014a):

- Southern River: sandplain with low dunes and occasional intervening swamps, iron and humus podzols, peats and clays; and
- Bassendean: sand plains with low dunes and occasional swamps, iron or humus podzols and areas of complex steep dunes.

The vegetation within the Proposal has been altered and cleared significantly as a result of development. Further discussion is in Section 5.

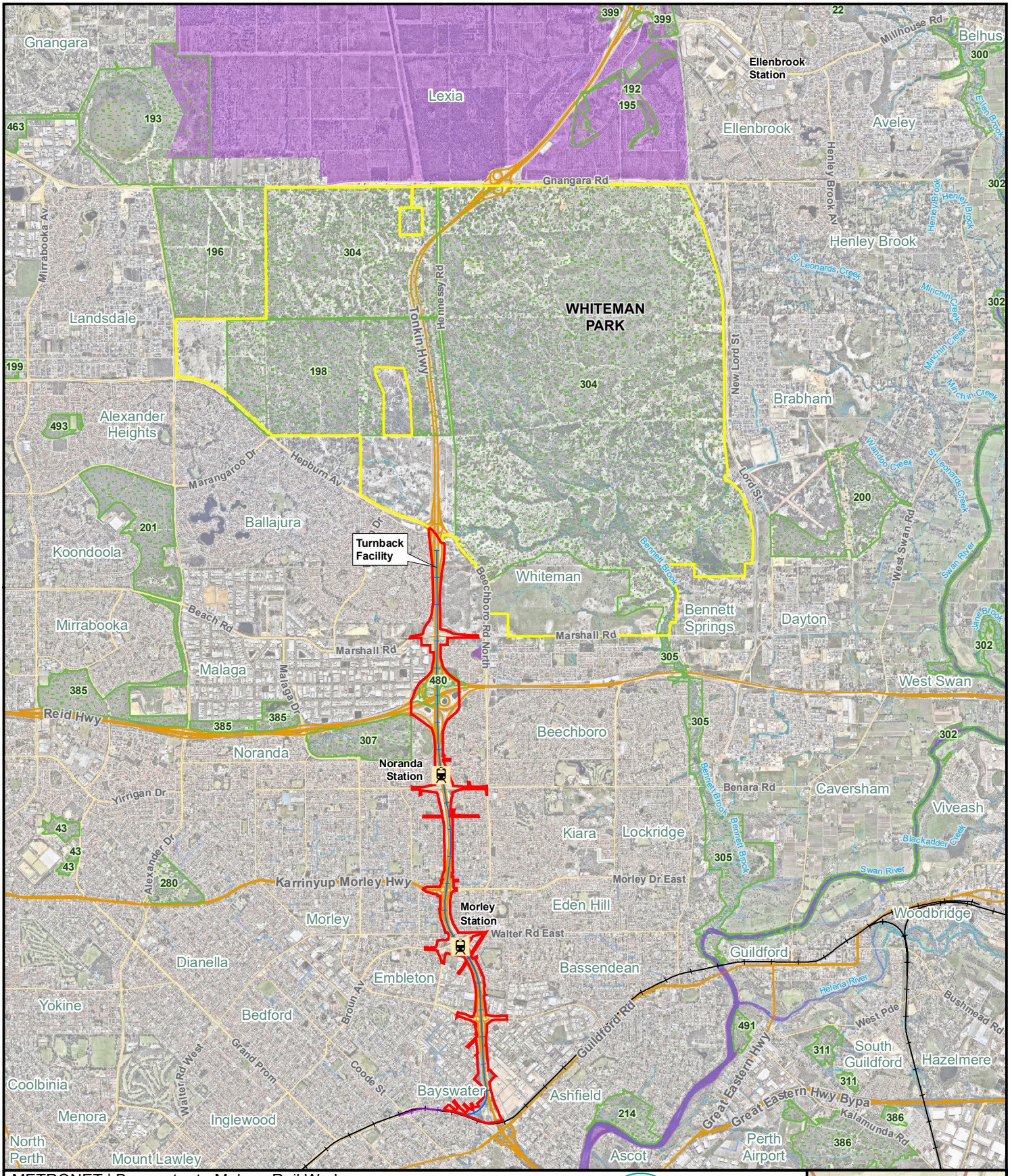
Natural landforms located within the development envelope have been replaced by road, urban and industrial infrastructure.

Given the historic clearing that has occurred within the development envelope (for major projects such as the Tonkin Highway upgrades and Perth Darwin National Highway (PDNH), there are few ecological values remaining. Bush Forever site 480 (Victoria Road Bushland) in the northern portion of the development envelope has been completely cleared of native vegetation. Conservation significant wetlands within the development envelope have been significantly altered due to previous major infrastructure projects (Sections 5 and 9).

2.3.2 Hydrology

The Department of Water (DoW) Perth Groundwater Atlas (DWER 2019c) indicates that the topography of the development envelope is relatively flat, ranging between approximately 15 m and 40 m Australian Height Datum (AHD). Elevation within the development envelope has a gentle north to south slope, with the gradient identified as across the broader area gently sloping from east to west (with a total variation of approximately 1 to 2 m).

The development envelope has historically contained areas of wetlands, principally in the north where groundwater is shallower. Wetlands within the development envelope, including those mapped in the Department of Biodiversity, Conservation and Attractions (DBCA) geomorphic wetlands dataset, have been heavily impacted or cleared as a result of previous urban and road infrastructure development. Hydrology of the Proposal is discussed further in Section 8.



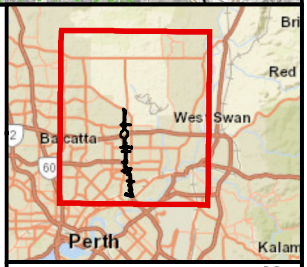
METRONET | Bayswater to Malaga Rail Works

Figure 4 **Regional Context**

Public Transport Authority

Legend

- Development Envelope (The Proposal)
- Proposed Railway Station
- Existing Railway Line
- Proposed Railway Alignment within Existing Rail Reserve
- Proposed Railway Line
- Highway / Major Road
- Road
- Drain
- Perennial Watercourse
- Nonperennial Watercourse
- Bush Forever
- Whiteman Park Management Boundary
- DBCA Legislated Lands and Waters



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3. Stakeholder consultation

The PTA is committed to engaging with stakeholders to ensure that all stakeholders' views can be considered during the development of the Proposal. The PTA has undertaken consultation in regard to the broader METRONET portfolio of works, including for this Proposal, and for the broader MEL Project which is a future proposed 13 km of railway works that will connect Malaga and Ellenbrook.

3.1 Key stakeholders

The PTA has identified a number of key stakeholders for this Proposal:

Federal Government

- Department of the Environment and Energy.
- Department of Infrastructure, Transport, Cities and Regional Development (DITCaRD).

State Government

- Environmental Protection Authority.
- Department of Water and Environmental Regulation.
- Department of Biodiversity Conservation and Attractions.
- Department of Planning, Lands and Heritage.
- Western Australian Planning Commission.
- Main Roads Western Australia.
- Department of Communities.
- Department of Local Government, Sport and Cultural Industries.
- Department of Transport.
- Development WA (formerly Landcorp and Metropolitan Redevelopment Authority).
- Water Corporation.

Local Government

- City of Bayswater.
- City of Swan.
- Town of Bassendean.

Industry

- Western Power.
- Water Corporation.
- ATCO Gas.
- Telstra.
- Optus.
- NBN Co.
- Dampier Bunbury Pipeline (DBP).

Other Stakeholders

- Infrastructure Australia.
- Infrastructure Western Australia.
- Whadjuk Working Party.
- South West Aboriginal Land and Sea Council (on behalf of the Whadjuk People).
- Registered Knowledge Holders for Aboriginal heritage sites under the *Aboriginal Heritage Act 1972*.
- METRONET Noongar Reference Group.

- Friends of Lightning Swamp.
- Wildlife Care WA.
- Northern Valleys Wildlife.
- Perth Wildlife Rescue Network.
- Wildlife Society, eastern Hills Branch.
- Urban Bushland Council.
- Conservation Council of WA.
- South East Regional Central for Urban Landcare (SERCUL).

3.2 Stakeholder engagement process

The PTA has a dedicated community consultation team that has extensively consulted with key stakeholders to inform the portfolio of METRONET Projects. Community engagement has been centred around communities along the Proposal's alignment as well as those that may benefit from the Proposal. A dedicated METRONET website has been established, providing a detailed overview of the projects, allowing interested parties to inquire about METRONET and register for project updates.

The PTA, DWER and DBCA attend a monthly Environmental Stakeholder Reference Group (ESRG) to consult on environmental matters pertaining to the Proposal and seek technical and strategic advice on key environmental factors and investigations relevant to the Proposal's environmental approvals. The ESRG includes technical officers from DWER and the DBCA. ESRG meetings have been held on a monthly basis since March 2019 and will continue for the foreseeable future.

Environmental community groups were sent letters in August 2019, providing an environmental update on the broader MEL Project. Further consultation and briefings with the key environmental community groups are scheduled to occur in early 2020.

3.3 Stakeholder consultation

As part of the development of the Proposal, the PTA has already conducted extensive consultation across a range of stakeholder groups represented by the stakeholders identified in Section 3.1.

A number of pre-referral meetings have been held with officers of the EPA Services Unit of the DWER on 6th June 2019, 22nd August 2019, 3rd October 2019 and 28th October 2019, with further consultation on 4th November 2019 to provide an overview of this Proposal and key environmental factors considered. PTA will continue to consult with relevant stakeholders before, during and after the environmental assessment process.

A summary of all consultation is provided in Table 6.

Table 6: Stakeholder Consultation

Stakeholder	Date	Engagement	Summary	Outcome/Proponent Response
Pre-Project announcement				
Community / Residents	January 2018	Consultation Survey	• Community priorities were to increase public transport, more entertainment and leisure options, while they also wanted restaurants/cafes/bars, parks/recreation areas and retail near stations. • Concerns raised were safety and noise.	• Survey results were collated and shared with the planning team to inform the analysis of options for the rail alignment, as well as the precincts within a walkable area from each station. • Community concerns expressed through the survey were addressed at an information event with the Minister for Transport providing an update on the project and leading a Q&A session. • The presentation and Q&A summary were uploaded to the METRONET website the following day and promoted through electronic direct mail and social media. • The survey results were also distributed in a fact sheet to the 46,000 residences within the project area. • The survey results and feedback were also provided to the METRONET Office and Minister's Office.
Environmental Community / Businesses	September 2018	Consultation Survey	• Feedback on sentiment was very positive from all groups.	• Interview notes and feedback was shared with the planning team to inform the analysis of options for the rail alignment, as well as the

Stakeholder	Date	Engagement	Summary	Outcome/Proponent Response
			• Concerns around construction timelines and impacts, as well as local crime, bus routes and environmental factors at Whiteman Park.	precincts within a walkable area from each station. • The participating community groups were provided with 'third-party presentation packs' that included fact sheets, talking points and presentation guidelines to inform them of the project to date and help them discuss the project with their members/stakeholders.
EPA	November 2018	Meeting	• Initial discussion introducing the Proposal. • Presentation on known environmental values and proposed studies.	• Arrange a site visit to the key environmental values within and adjacent the Proposal. • PTA to continue liaison throughout the Project.
EPA, DWER & DBCA	December 2018	Site visit	• Representatives from EPA Services Unit, DBCA and DWER undertook a site visit to the broader METRONET Program, including aspects of this Proposal.	• Further consultation with DBCA Wetland Assessment branch to advise on potential impacts to nearby Wetlands, in particular Horse Swamp.
EPA, DWER & DBCA	December 2018	Meeting	• Discussion on Conservation Category Wetland mapping, ecological values and mapped boundary extents to inform design considerations.	• Further assessment of wetland values and extents. • Design considerations to avoid potential impacts to wetlands within Whiteman Park.
City of Bayswater	December 2018	Meeting	• Initial discussions introducing the Proposal. • Discussion of known and potential environmental values within the Proposal area.	• PTA to continue liaison throughout the Project.

Stakeholder	Date	Engagement	Summary	Outcome/Proponent Response
City of Swan	January 2019	Meeting	• Initial discussions introducing the Proposal. • Discussion on the known and potential environmental values within the Proposal area.	• PTA to continue liaison throughout the Project.
DBCA (Wetlands Assessment Branch)	January 2019	Site Visit	• A representative from DBCA wetlands assessment branch undertook a site visit the broader MEL Project.	• Further assessment of wetland values and extents. • Design considerations to avoid potential impacts to wetlands within Whiteman Park.
DWER (Noise & Vibration Assessment branch)	January 2019	Meeting	• Initial discussions introducing the Proposal. • Summary of adopted design criteria, inputs and modelling methodology for the operational noise and vibration assessment.	• Preliminary noise and vibration modelling to be reviewed by DWER (Noise and Vibration Assessment branch).
Community / Residents	February 2019	Door Knock Survey	• Half of the resident's report being likely to use the proposed MEL for entertainment and events with around a third using it weekly. • Also, that the proposed MEL would encourage around a quarter of residents who currently use the train (driving to Midland Line) less than once every three months for their work commute, to use the train more often if a station was located within 3 km from their home.	• Positive sentiment towards the broader Morley-Ellenbrook Line Project. • Residents wanting improved public transport connections to Perth CBD, with majority of the residents currently driving to the CBD.

Stakeholder	Date	Engagement	Summary	Outcome/Proponent Response
Community / Residents	February – April 2019	Shopping Centre pop-up displays	• General positive feedback but also looking for exact alignment, station locations and start dates. • Minor concerns raised around direct impacts, location of stations, parking and lack of consultation.	• Feedback forms collected from community members were individually responded to following each pop-up session. • Feedback (both formal and anecdotal) was used to inform the alignment announcement communications. • A summary of feedback was provided to the project team, METRONET Office and Minister's Office. • Community members who signed up to receive more information were registered in the EDM database to keep them informed of the project's progress.
Community Residents	February – April 2019	Story collection	• Collection of community history, stories and visions for the future of the area. Promoted through EDM/website, social media, community groups and schools.	• Collection of stories were shared with the METRONET Station Precincts team as background information for precinct planning, public art etc. • This was the first stage of story collection and will be expanded as the project progresses.
DBCA & DWER	March 2019 - Ongoing	Meeting	• Technical officers from DWER & DBCA advise on proposed environmental scopes and studies to support the environmental approvals process of the broader MEL Project.	• PTA to continue liaison throughout the Project. • DWER & DBCA technical officers have reviewed scope of works associated with Terrestrial Flora and Vegetation, Terrestrial

Stakeholder	Date	Engagement	Summary	Outcome/Proponent Response
				Fauna, Terrestrial Environmental Quality and Inland Waters. • PTA to continue monthly liaison the throughout Project
DPLH	April 2019	Meeting	• Initial discussions introducing the Proposal • Discussion prior to request for Section 18 consent to partially disturb registered Aboriginal Heritage sites.	• Request for Section 18 consent to partially disturb Aboriginal Heritage Sites (Site ID 551 & 552). • Section 18 Application to partially disturb the registered Aboriginal Heritage Site 'Bennett Brook in Toto' (Site ID 3942) would be undertaken upon final design.
SWALSC and Registered Knowledge Holders	April 2019	Survey	• Ethnographic and archaeological survey of the Proposal area. • Request for Section 18 consent to partially disturb three registered Aboriginal Heritage sites.	• Conditional approval for the proposed railway alignment. • Monitors to be engaged for all new ground disturbance associated with railway construction. • A further heritage survey to be undertaken once proposed railway station designs are finalised.
DITCaRD (then DIRDaC)	April 2019	Site visit	• Key DITCaRD officers undertook a site visit to look at the METRONET Program, including the broader MEL Project with senior members of the METRONET and PTA team.	• Further discussion regarding the projects, including environmental approvals required.
DoEE	July 2019	Site visit	• DoEE undertook a site visit to look at the METRONET Program, including the broader MEL Project.	• Further discussion regarding the environmental approvals strategy required.
Post-Project announcement				

Stakeholder	Date	Engagement	Summary	Outcome/Proponent Response
Main Roads WA	August 2019	Meeting	• Project design restrictions and land access interface. • Environmental approvals strategy.	• Collaboration between PTA and Main Roads WA to undertake the associated works for a future transit corridor. • PTA to continue liaison throughout the Project.
Environmental Community Groups	2 August 2019	Letters	• Letters sent to key environmental community groups inviting each community group to meet and work collaboratively.	• Future environmental community briefing to be undertaken with interested environmental community groups.
Community	August – September 2019	Community drop-In sessions	• General community feedback included seeking exact alignment, station locations and operational start dates. • Minor community concerns included location of stations, parking and lack of consultation.	• Feedback (both formal and anecdotal) has been shared with the project team for consideration during the project definition phase. • Feedback forms collected from community members were individually responded to following each drop-in session. • A summary of feedback was provided to the project team, METRONET Office and Minister's Office.
METRONET Noongar Reference Group	February 2019 - ongoing	Meeting	• Input into the METRONET Gnarla Biddi Strategy. • Input into Project Noongar Cultural Context Document.	• Development of the Proposals Noongar Cultural Context Document (NCCD) that facilitates Noongar input into placemaking and design. • PTA to continue liaison throughout the Project.

4. Environmental principles

4.1 Environmental principles

Table 7 lists how each of the principles for environmental management outlined in Section 4A of the EP Act has been considered for this Proposal.

Table 7: Environmental principles

Principle	Consideration
The Precautionary Principle *Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.* *In this application of the precautionary principle, decisions should be guided by:* *a. careful evaluation to avoid, where practicable, serious or irreversible damages to the environment; and* b. *an assessment of the risk-weighted consequences of various options.*	The Proposal will be developed within a development envelope that is largely occupied by existing infrastructure and established development. As such, scientific certainty around the few existing environmental values and likely impacts is relatively high. The PTA has also undertaken consultation with relevant government agencies to minimise any uncertainty surrounding any environmental impacts of the Proposal. The preferred alignment has been determined through a process which has drawn on detailed environmental information. Modifications to the development envelope have been made to avoid in the first instance, and then to minimise environmental impacts, where practicable to do so. Detailed design plans, when coupled with the development and implementation of a Construction Environmental Management Plan (CEMP) and PTA standard operating procedures, will largely avoid or minimise impacts to the identified environmental factors within the development envelope.
The Principle of Intergeneration Equity *The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.*	Infrastructure Australia has recognised the low density in Perth's north-east corridor as contributing to high car dependency. By better integrating transport and long-term land use planning, the Proposal will encourage more sustainable development and intensify development near activity centres and railway stations through this area benefiting current and future residents. At a local scale, the Proposal will result in longer term denser urban development around station precincts, making more sustainable and active forms for travel such as walking and cycling more attractive. The resulting reduced reliance on cars and other road transport will lead to lower emissions and less traffic congestion in the local area. On a larger scale, a shift towards the use of mass transit such as this Proposal will lead to lower emissions and less traffic congestion generally. The information contained in this referral demonstrates that the Proposal can be implemented to avoid significant impacts on the health, diversity or productivity of the environment for the benefit of future generations.
The Principle of the Conservation of Biological Diversity and Ecological Integrity	Environmental factors were considered when evaluating design options for the Proposal. Minimising potential impacts to the identified ecological attributes has been a fundamental factor in the consideration of alternative alignments and will inform

Conservation of biological diversity and ecological integrity should be a fundamental consideration.	detailed design considerations within the development envelope. The development envelope largely corresponds to an existing infrastructure corridor and cleared areas. The PTA has iteratively modified the development envelope during planning, to avoid or minimise ecological impacts outside of existing cleared areas. The Proposal will not substantially reduce the extent of any vegetation type, habitat or conservation area within the local area.
Principles in relation to Improved Valuation, Pricing and Incentive Mechanisms. *Environmental factors should be included in the valuation of assets and services.* *The polluter pays principle – those who generate pollution and waste should bear the cost if containment avoidance or abatement.* *The users of goods and services should pay prices based on the full life cycles costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any wastes.* *Environmental goals, having been established, should be pursued in the most cost-effective way, by establishing incentive structures, including market mechanisms, which enable those best placed to maximise benefits and/or minimise costs to develop their own solutions and responses to environmental problems.*	The PTA recognises that costs are may be incurred in the management and monitoring of environmental values associated with the development envelope. This has been incorporated into considerations of the feasibility of the project. All available information on environmental factors surrounding the development envelope has been sought and included in the consideration of alternative alignment options. Minimising potential impacts to the identified ecological attributes has been a fundamental factor in the consideration of alternative alignments and will inform detailed design considerations within the development envelope. The PTA will be responsible for funding the Proposal's costs of environmental avoidance, mitigation and management. The PTA has also prepared a Sustainability Strategy for the METRONET Program which will ensure that waste and life cycle costs are appropriately considered in the design, construction and operation of the Proposal.
The Principle of Waste Minimisation *All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.*	In developing the Proposal, the PTA has been considerate of the principle of waste minimisation, including the destination and use of removed materials. The railway will be constructed largely at-grade, avoiding the need for removal of large amounts of fill typically associated with greenfield developments. Where excavation is required, the PTA's objective is to reuse all excess fill which is determined to meet criteria for reuse. The contractor will be required as part of a CEMP to take all reasonable and practicable measures to reduce waste generation and disposal of construction wastes appropriately. In general, waste will be minimised during construction by adopting the hierarchy of waste controls: avoid, minimise, reuse, recycle and safe disposal.

4.2 Environmental factors

The PTA commissioned an environmental constraints desktop analysis in early 2019 to review existing information relating to the EPA's environmental factors in a larger study area, that generally encompasses the development envelope within the southern section of the study area (ELA 2019) (Appendix A). The analysis considered information in a range of reports completed, studies and investigations undertaken for other projects in the same area. Spatial datasets were also reviewed to determine the extent of mapping available and potential gaps in knowledge. Additional information was obtained through consultation with stakeholders where necessary.

The constraints analysis found that there are few environmental constraints to this Proposal, due in large part to the predominantly developed, cleared and urbanised nature of the development envelope. The construction and operation of the railway and two stations are the main components of this Proposal and these are located predominantly in the highly disturbed median of Tonkin Highway. While the development envelope extends to some surrounding areas, these are principally for modifications to existing local roads, construction of related facilities such as car parks, and for temporary construction and laydown areas which will be preferentially located in cleared areas. The Tonkin Highway road reserve has minimal environmental values due to clearing from recent and planned Tonkin Highway upgrade projects undertaken by Main Roads.

Through the constraints analysis process, a number of the EPA's environmental factors were identified as being not relevant to the Proposal and were excluded from further consideration. In accordance with the Statement of Environmental Principles, Factors and Objectives (EPA 2018c), the relevant environmental factors for this Proposal and included in this referral are:

- Flora and vegetation.
- Terrestrial environmental quality.
- Terrestrial fauna.
- Inland waters.
- Social surroundings.

Sections 5 to 9 provide further information on the environmental factors listed above. See Table 8 below for other environmental factors considered not relevant to this Proposal.

Table 8: Assessment of other Environmental Factors

EPA theme	Factor	Objective	Relevant to the Proposal
Land	Subterranean Fauna	To protect subterranean fauna so that biological diversity and ecological integrity are maintained.	Given the narrow linear nature of the Proposal, and the low subterranean habitat values present within the development envelope, it is considered unlikely that the Proposal would result in any significant impacts to subterranean fauna (Invertebrate Solutions 2019). No impacts, not a relevant factor.
	Landforms	To maintain the quality of land and soils so that environmental values are protected.	There are no natural landforms within the Proposal, with the majority of the Proposal situated within highly disturbed urban and industrial areas. Not a relevant factor.
Sea	All factors	To protect benthic communities and habitats so that biological diversity and ecological integrity are maintained. To maintain the geophysical processes that shape coastal morphology so that the environmental values of the coast are protected. To maintain the quality of water, sediment and biota so that environmental values are protected. To protect marine fauna so that biological diversity and ecological integrity are maintained.	Marine and coastal values are not present within the vicinity of the Proposal. Not a relevant factor.
Air	Air quality	To maintain air quality and minimise emissions so that environmental values are protected.	Impacts to air quality as a result of the Proposal are expected to be positive based on a comparison with the conventional vehicle modes of transport. Not a relevant factor.
People	Human health	To protect human health from significant harm.	EPA assessment of the Human Health factor is limited to consideration of radiation. Radiation will not be generated

			or encountered during the construction or operation of the Proposal. Not a relevant factor.

The PTA is proposing a development envelope of 205 ha for this Proposal, however the majority (90%) is highly disturbed containing no native vegetation. The PTA has also defined Vegetation Retention Areas that protect vegetation that is not required to be cleared for the Proposal. Although vegetation clearing has been minimised, in order to deliver this Proposal up to 17.8 ha of vegetation clearing is required. Where practicable the PTA will endeavour through final design to further avoid the clearing of vegetation.

Assessments of environmental factors in the following sections have been undertaken using a conservative approach for the entirety of the development envelope and therefore represent the uppermost extent of potential impacts that may occur as a result of the Proposal. The PTA is committed to further minimising the extent of impacts within the development envelope through the detailed design process to the lowest practicable extent. Vegetation Retention Areas within the development envelope have been identified to be avoided, and are discussed in Section 5. It is predicted that the development footprint of the Proposal will be significantly less, and in turn, impacts will be less than is assessed in this document.

All works undertaken for the Proposal will occur within the development envelope. Given the minimal clearing of up to 17.8 ha required within the development envelope and the minimal environmental values that occur, it is considered that the impacts of this Proposal on the EPA factors are able to be mitigated or managed as described within the following sections of this Supporting Document (Sections 5 to 9).

5. Flora and vegetation

5.1 EPA Objective

To protect flora and vegetation so that biological diversity and ecological integrity are maintained.

5.2 Policy and guidance

The following policies and guidance are relevant to the flora and vegetation factor:

- *Biodiversity Conservation Act 2016* (WA).
- *Biosecurity and Agriculture Management Act 2007* (BAM Act) (WA).
- Environmental Factor Guideline: Flora and Vegetation (EPA 2016).
- Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016d).
- Environmental Protection Bulletin 20 – Protection of naturally vegetated areas through planning and development (EPA 2013a).
- State Planning Policy No. 2.8 Bushland Policy for the Perth Metropolitan Region (WAPC 2010).
- Environmental Protection (Clearing of Native Vegetation) Regulations 2004.
- Guidance Statement 6 – Rehabilitation of Terrestrial Ecosystems (EPA 2006).

5.3 Environmental Investigations

Table 9 lists the relevant environmental investigations used to assess the terrestrial flora and vegetation factor within the development envelope (Figure 5).

Table 9: Summary of the Environmental Investigations relevant to terrestrial flora and vegetation

Title	Author	Year	Summary of Scope	Project
Forrestfield Airport Link Environmental Investigation	GHD	2014	Level 1 Flora Assessment (Reconnaissance survey) and Level 2 Targeted spring flora survey.	Forrestfield Airport Link (PTA)
Tonkin Grade Separations: Flora, Vegetation and Fauna Survey	360 Environmental	2014	Level 1 Flora and Vegetation Assessment to identify potential constraints and assist the preliminary evaluation of potential impacts to flora and vegetation communities.	Tonkin Grade Separations (Main Roads)
Level 2 Flora and Vegetation Assessment: Perth-Darwin National Highway (PDNH)	Coffey	2015	To identify and assess the values and significance of the flora and vegetation, describe and assess the potential direct and indirect impacts.	PDNH (Main Roads)
Detailed Flora and Vegetation Assessment	RPS	2019	Detailed flora and vegetation survey aimed to describe the flora and vegetation values of the broader MEL Project and determine the spatial location and conservation significance of these values. RPS surveyed immediately adjacent to the northern portion of the development envelope east of Tonkin Highway, providing information on surrounding values.	Morley-Ellenbrook Line (PTA)

Vegetation and Black Cockatoo Habitat Assessment	GHD	2019	A rapid vegetation and Black Cockatoo habitat assessment for targeted survey areas within the Bayswater to Malaga Rail Works development envelope. The purpose of the survey was to describe and map the vegetation types and condition, and undertake a Black Cockatoo habitat assessment for the survey area, to support environmental assessment and approval process. The survey area covered 74.55 ha of the development envelope.	Bayswater to Malaga Rail Works (PTA)