Public Transport Authority

Bayswater to Malaga Rail Works - Native Vegetation Clearing Permit Report

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1.INTRODUCTION

METRONET is the largest State Government rail construction and expansion program to be undertaken in the Perth metropolitan area in recent times. Several projects are included within the METRONET program, one of the most significant being the new Morley-Ellenbrook railway line (MEL). The Public Transport Authority (PTA) is proposing to develop the MEL proposal, a 21 kilometre (km) rail line which will spur off the existing Midland rail line at Bayswater train station and continue in a north-easterly direction via the Tonkin Highway central road corridor, through land north of Marshall Road and then travel through the western section of Drumpellier Drive and directly into Ellenbrook's town centre. Several new rail stations will be built along the rail line; including Morley, Noranda, Malaga, Whiteman Park and Ellenbrook stations.

The MEL proposal will be delivered in two parts; Part 1 is known as the Bayswater to Malaga Rail Works and Part 2 is known as the Malaga to Ellenbrook Rail Works. Part 1 of the proposal was referred to the Environmental Protection Authority (EPA) in November 2019 and the EPA determined not to formally assess the proposal (CMS 17730, Decision: 39A - Not Assess). Part 2 of the proposal was referred to the EPA in December 2019 and the EPA determined to formally assess the proposal as a Public Environmental Review.

With regards to the Part 1 proposal, the EPA's decision stated that the likely environmental effects of the proposal are not so significant as to warrant formal assessment. This decision was based on the existing environment which is highly modified and urbanised and contains the Tonkin Highway road corridor. The extent and consequence of the predicted impacts as a result of the proposal were also considered to be small scale and of a short duration.

The EPA's decision stated that the potential impacts associated with the proposal can be adequately managed through implementation of the proposal in accordance with the referral documentation, the PTA's management and mitigation measures and associated legislation. The EPA also noted that other statutory processes may be used to implement the proposal including the granting of a Native Vegetation Clearing Permit (NVCP) under Part V of the *Environmental Protection Act 1986* (EP Act).

This NVCP report and associated clearing permit application is relevant to the Part 1, Bayswater to Malaga Rail Works only (herein referred to as the proposal) and is provided in accordance with the EPA's decision and the requirements of the EP Act. The report provides an assessment of native vegetation clearing required for the proposal and is prepared in accordance with Department of Water and Environmental Regulation (DWER) guidance.

2. THE PROPOSAL

The proposal requires the construction of 9 kilometres (km) of permanent rail infrastructure, two rail stations at Morley and Noranda, each with intermodal rail, bus, carparks and active transport facilities (cycling and walking) at each station and a rail turnback facility.

As part of the proposal, some project works will be undertaken within the Tonkin Highway road reserve to enable the rail construction (referred to as the rail enabling works). These rail enabling works include protection to existing road and pedestrian bridges, modification to drainage (connections to existing drainage), construction of barriers to protect the rail corridor, earthworks and modifications to Tonkin Highway and Broun Avenue to accommodate the future Morley Station. These rail enabling works are all located within the proposal's development envelope (Figure 1) and will be undertaken by a Main Roads of Western Australia (MRWA) nominated contractor as part of the MEL Part 1 proposal, on behalf of, and under the direction of the PTA. Therefore, all clearing activities for these rail enabling works and rail construction will be undertaken using one stand-alone clearing permit.

2.1 Development Envelope

The development envelope is 204 hectares (ha) in area and was used to provide a broad context for the assessment of potential impacts to native vegetation within the full extent of the proposal and the surrounding area. However, the area of native vegetation required to be cleared for the proposal is in a much smaller area. There are nine areas of native vegetation required to be cleared for the proposal and these are depicted on Figure 2. These native vegetation clearing areas are located north of Marshall Road, near the proposed Noranda Station (north and south of Benara Road) and near Morley station (north and south of Walter Road East). The area applied to be cleared is therefore much smaller than the development envelope, up to 1.23 ha in area, and should be used for the NVCP assessment and clearing permit application.

The development envelope has been shown in the attached figures to provide context to the proposal, as this is very close in extent to the development envelope that was provided in the EPA referral document. However, there have been three minor modifications to the development envelope since the proposal was referred to the EPA, which are outlined below:

1. One additional area is needed near the proposed Morley Station for the purpose of an access road (bus transportation) on the far eastern portion of Lot 1, 60 Embleton Avenue, Embleton. Lot 1 is owned by the City of Bayswater and is used as playing fields and a drainage sump. No native vegetation exists in this portion of Lot 1 needed for the access road;
2. The exclusion of Lots 5 and 6 (No's 5 and 7) Durham Road, Bayswater located north of the existing Midland rail line in an industrial area; and
3. The exclusion of Lots 27, 26 and 24 (No's 55, 57 and 63) Mitra Loop, Bennett Springs, in the City of Swan, located south of Marshall Road in an urban area.

The PTA is seeking a clearing permit to clear up to 1.23 ha of native vegetation for the purpose of constructing a railway, new rail stations and associated works for the proposal

(Figure 2). A purpose clearing permit is needed to undertake all clearing activities for the proposal.

3.EXISTING ENVIRONMENT

The development envelope 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 including; the City of Bayswater, the City of Swan and the Town of Bassendean.

The development envelope is located predominantly within the Tonkin Highway road reserve and is surrounded by urban and industrial development. Industrial areas are located on the west and east of the development envelope between Guildford Road and Broun Avenue in Bayswater, and on the west of the development envelope between Reid Highway and Marshall Road in Malaga. This location consists of largely urbanised and developed land which has been previously disturbed and cleared (Figure 1). Limited environmental values remain within the development envelope and the proposal has been designed so that minimal clearing will occur.

The existing environment is further summarised below using the following environmental factors; geology and soils, surface and groundwater, watercourses and wetlands, flora, vegetation and ecological communities, conservation reserves, and threatened fauna and fauna habitats.

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). The Bassendean dune system is relatively featureless, comprising low hills of unconsolidated sediments and sandy swamps between the dunes (Gozzard, 2007). The aeolian deposits within the Bassendean dune system consist of:

- 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.

Soils comprise leached sands and are made up of non-calcareous pale sands (grey and yellow) with some wet soils (Northcote et al, 1960-68). Natural landforms located within the development envelope have been significantly altered and replaced by road, urban and industrial infrastructure.

3.2 Surface and Groundwater

Due to extensive disturbance and clearing undertaken for recent major infrastructure projects including the Tonkin Highway upgrades and Perth to Darwin National Highway, there are no surface water features with ecological values that occur within the development envelope.

One constructed open water drain, the Bayswater Main Drain is located in the development envelope. Bayswater Main Drain is located in the southern most extent near Railway Road in

Bayswater and is utilised by the Water Corporation to convey stormwater from developed areas. This area was once a natural drainage line and has been modified to become an artificial drainage channel. The vegetation within the drain is completely degraded. No vegetation clearing will occur at this location or in the vicinity of this location.

The development envelope lies above the Perth, Leederville, Mirrabooka and Yarragadee aquifers. These are overlaid by superficial formations including the transmissive Bassendean Sand deposits which comprise a superficial aquifer. The Perth Groundwater Atlas shows the depth to groundwater gradually increases southwards within the development envelope. North of the Tonkin / Reid highway interchange, groundwater levels are shallow and reported to be at depths of approximately 4.2 m below ground level. Groundwater at the Tonkin highway / Collier Link intersection is at a depth of approximately 23.8 m below ground level (DWER, 2020).

Given the unconfined nature of the superficial aquifer, groundwater levels change with seasonal rainfall patterns and recharge is rapid (Coffey, 2015). Groundwater monitoring indicates groundwater levels peak during winter with seasonal variations of up to 3 m (DWER, 2020). Groundwater generally flows from the Gnangara Mound (in the north) in an easterly to southerly direction, with groundwater discharging to Bennett Brook to the east or the Swan River to the south (DWER, 2020).

3.3 Watercourses and Wetlands

The development envelope has historically contained wetland areas 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, cleared or highly modified as a result of previous urban and road infrastructure development.

The nearest mapped wetlands which occur in the development envelope include; Lightning Swamp (UFI 8451 and 15416) and Victoria Road Swamp (UFI 15033). Lightning Swamp is an intact wetland located adjacent and west of the development envelope. The remaining portion of Victoria Road Swamp is located adjacent and north-east of the development envelope. Most of Victoria Road Swamp has been previously cleared and modified as part of the Tonkin Highway Upgrade project. Both Victoria Road Swamp and Lightning Swamp are ephemeral wetlands that are located outside the development envelope. No clearing will be undertaken at either of these locations or in the vicinity of these locations.

There are no recorded perennial or ephemeral wetlands or watercourses in the development envelope. No wetland dependant vegetation will be cleared as part of the proposal.

3.4 Flora, Vegetation and Ecological Communities

Most of the development envelope (approximately 90 percent) has been highly disturbed and previously cleared of native vegetation. Little intact native vegetation remains and the remaining vegetation has been significantly altered by urban development. Clearing activities for the Tonkin Grade Separations Project were undertaken by MRWA under clearing permit CPS 6456/1. Most of the vegetation was cleared under CPS 6456/1 for the project and very

little native vegetation remains in the development envelope. The remaining vegetation has also been significantly altered by urban development.

The vegetation is mapped as the following Beard Vegetation Association:

- 1001: Medium very sparse woodland; jarrah, with low woodland; banksia and casuarina (Government of Western Australia, 2019).

The vegetation systems within the development envelope are mapped as the following Heddle complexes:

- Bassendean Complex Central and South, and
- Southern River Complex.

Eight flora and vegetation surveys have been undertaken across the development envelope by 360 Environmental (2014), Coffey (2015), Woodman (2015), RPS (2019) and GHD (2014a, 2014b; 2019 and 2020). A comprehensive list of the flora and vegetation surveys which have been completed over the development envelope are provided below:

- Level 1 Flora and Vegetation Assessment undertaken in 2013 by 360 Environmental (360 Environmental, 2014) (indicative survey of footprint area),
- Level 1 Flora and Vegetation Assessment undertaken in 2014 by GHD (GHD, 2014a),
- Level 2 Targeted Flora Assessment undertaken in 2013 by GHD (GHD, 2014b,
- Level 2 Flora and Vegetation Assessment undertaken in 2014 by Coffey (Coffey, 2015),
- Level 2 Supplementary Biological Studies and Analysis, undertaken in 2015 by Woodman Environmental (Woodman, 2015),
- Level 2 Flora and Vegetation Assessment undertaken in 2018 by RPS (RPS, 2019),
- Level 2 Flora and Vegetation Assessment undertaken in 2019 by GHD (GHD, 2019) (survey and verification of knowledge gaps), and
- Level 2 Flora and Vegetation Assessment undertaken in 2020 by GHD (ground truthing of vegetation in development envelope) (GHD, 2020).

Further details of the extensive surveys that have been completed over the development envelope and a summary of the locations of these flora surveys, as these relate to the development envelope are provided in Table 1 below:

Table 1: Summary of flora and vegetation surveys undertaken within the development envelope

Report No.	Report Title and Author	Summary of Survey, Relevance and Location to Proposal
1	Tonkin Grade Separations, Flora, Vegetation and Fauna Survey (360 Environmental, 2014).	A flora survey was undertaken as part of the Tonkin Grade Separations (MRWA) Project. The flora survey area was undertaken of the road reserve and this area overlies much of the development envelope. The flora survey area has been largely cleared of native vegetation by MRWA for the Tonkin Grade Separations Project.
2	Level 1 Flora and Vegetation Assessment, Forrestfield Airport Link Environmental Investigation (GHD, 2014a).	A reconnaissance survey was undertaken as part of the Forrestfield Airport Link Project. The survey area is located in the southern-most portion of the development envelope, near Bayswater Station (Whatley Crescent and Tonkin Highway). Most of the vegetation at this location has been previously cleared, contains parkland and planted vegetation and is completely degraded in condition. A viaduct will be constructed at this location which will avoid the clearing of vegetation.
3	Level 2 Targeted Flora Assessment, Forrestfield Airport Link Environmental Investigation (GHD, 2014b).	A targeted flora survey was undertaken as part of the Forrestfield Airport Link Project. The survey area is the same as Report No. 2 above and the clearing of vegetation will be avoided as above.
4	Level 2 Flora and Vegetation Assessment, Perth-Darwin National Highway (Coffey, 2015).	A detailed flora and vegetation survey was undertaken of the road reserve as part of the Perth - Darwin National Highway (MRWA Project). The survey area overlies the northern most portion of the development envelope north of Reid Highway and south of Hepburn Avenue (west of Whiteman Park). The flora survey area has been largely cleared of native vegetation at this location for the extension of Tonkin Highway. There is only one small area of native vegetation (Vegetation type: Mp3) on Lot 30, Hepburn Avenue Ballajura, north of the Marshall Road intersection which remains in the northern portion of the development envelope.
5	Perth-Darwin National Highway (Swan Valley Section), Supplementary Biological Studies 2015 (Woodman, 2015).	A detailed assessment of the environmental values of Vegetation Type Mp3 (on Lot 30 as detailed above) was undertaken by Woodman Environmental (2015) for the Perth - Darwin National Highway (MRWA) Project. The assessment was completed to confirm the presence of a potential State-listed Threatened Ecological Community (TEC) known as

		SCP02; Southern wet shrublands. The flora assessment confirmed that the vegetation at this location did not represent the State listed TEC SCP02.
6	Morley-Ellenbrook Line Stage 1, Vegetation and Black Cockatoo Habitat Assessment for the Provided Survey Area (GHD, 2019).	A survey was undertaken by GHD to verify knowledge gaps, assess areas that had not been previously surveyed and rationalise areas that have been cleared within the development envelope following initial flora surveys. The GHD verification survey area was comprehensive (included an area of 74.55 ha in total) and covered most of the development envelope. The survey identified large areas within the development envelope that have been previously cleared for road infrastructure and associated works as well as revegetation and planted areas. The survey also identified that most of the vegetation was highly disturbed and considered to be completely degraded in condition.
7	Detailed Flora and Vegetation Assessment METRONET Morley-Ellenbrook Line (RPS, 2020).	A detailed flora survey was undertaken by RPS over multiple years (2017-2019) which included an area immediately adjacent to and in the northern portion of the development envelope, east of Tonkin Highway and north of Marshall Road. Most of the flora survey area is outside the development envelope. Vegetation within the northern most portion of the development envelope has been previously cleared for the extension of Tonkin Highway.
8	Targeted Vegetation Assessment (GHD, 2020).	A survey was undertaken by GHD to ground truth, verify and map native vegetation, non-native vegetation and cleared areas within the development envelope to ensure accurate vegetation data was included in this NVCP application. Broad vegetation types were also recorded and mapped within the development envelope. The GHD survey area was comprehensive (included an area of 204 ha in total) and covered the entire development envelope.

There are several areas of fragmented vegetation within the development envelope. Some of these vegetated areas contain remnant native vegetation or areas of native vegetation combined with understorey plantings of local and/or non-local plant species. Several locations within the Tonkin Highway road reserve contain revegetation.

For the purposes of assessing the native vegetation for the clearing permit application, all locations within the development envelope were ground truthed on 22 and 23 April 2020 to evaluate the vegetation, map and record the vegetation types and condition. The vegetation in the development envelope has been characterised into the following two groups (GHD, 2020):

1. **Native Vegetation** - areas that contain existing remnant native vegetation; and
2. **Non-native Vegetation –** areas that contain planted vegetation (mix of introduced species and native species) and revegetation (local native and non-local native plant species).

The survey was comprehensive and included the entire 204 ha development envelope (GHD, 2020). The areas of native and non-native vegetation, including native vegetation types, are mapped on Figure 3.

The flora survey recorded 2.70 ha of native vegetation, 12.60 ha of non-native vegetation and 188.63 ha of cleared areas. According to the GHD survey, most of the vegetation within the development envelope (0.879 ha) was described as Vegetation Type 09; Parkland cleared, individual trees or small patches of native Eucalyptus species including *Corymbia calophylla*, *Eucalyptus rudis*, and *Eucalyptus gomphocephala* over completely cleared understorey (GHD, 2020).

A list of the 11 mapped vegetation types and total area in hectares remaining in the development envelope recorded from the GHD (2020) flora survey is provided in Table 2 below and Figure 3.

Table 2 – Vegetation types and total area of vegetation mapped within the development envelope from the GHD (2020) flora survey

Vegetation Types	Vegetation Description	Total Area (ha)
VT01	*Melaleuca preissiana* low woodland with scattered *Corymbia calophylla.* High weed cover with edge effects.	0.128
VT02	*Eucalyptus rudis* open woodland over **Acacia longifolia* tall shrubland over mixed low shrubland/sedgeland. Highly modified, mixed with some planted species. High weed cover with edge effects.	0.169
VT03	*Melaleuca preissiana* scattered trees over *Jacksonia furcellata* **Acacia longifolia* and *Adenthanthos cygnorum* open shrubland. Highly modified, some planted species, high weed cover with edge effects.	0.120
VT04	*Banksia attenuata, Banksia menziesii* and *Nuytsia floribunda* low open woodland. High weed cover and reduced understorey with edge effects and rubbish dumping.	0.241
VT05	*Corymbia calophylla* open woodland over *Melaleuca preissiana* and *Banksia grandis* low open woodland. High weed cover and limited understorey with edge effects and rubbish dumping.	0.295
VT06	*Eucalyptus todtiana, Corymbia calophylla, Allocasuarina fraseriana* and *Banksia menziesii* low open woodland. Some planted species, high weed cover and reduced understorey with edge effects and rubbish dumping.	0.384
VT07	*Melaleuca preissiana* open woodland over *Hakea varia* and *Acacia saligna* over *Xanthorrhoea preissii* and *Regelia ciliata* open shrubland. High weed cover and reduced understorey with edge effects.	0.192
VT08	*Corymbia calophylla* open woodland over *Allocasuarina humilis* and *Xanthorrhoea preissii* open shrubland. High weed cover and limited understorey with edge effects.	0.293
VT09	Parkland cleared. Individual trees or small patches of native Eucalyptus species including *Corymbia calophylla*, *Eucalyptus rudis*, and *Eucalyptus gomphocephala* over completely cleared understorey.	0.879
Non-native Vegetation		
Planted/Non-native	Areas which have previously been cleared and revegetated with a mix of introduced and native species (local and non-local species). Established planted trees include *Eucalyptus camaldulensis* and *Melelaueca quinquenervia*.	12.602
Cleared	Completely cleared or modified areas. Includes existing road network infrastructure and recently revegetated areas. Some scattered planted trees but no intact native vegetation.	188.632

Source: GHD (2020).

The vegetation condition in the development envelope has been mapped by GHD (2020) and is provided in Figure 6. The condition of the vegetation in the development envelope is also described in Table 3 below:

Table 3: Condition of vegetation recorded within the development envelope

Vegetation Condition	Area (ha)
Very Good	NA
Good	NA
Good to Degraded	0.31
Degraded	0.55
Degraded to Completely Degraded	0.83
Completely Degraded	1.02
Not Applicable (i.e. Planted/revegetation/Cleared)	201.23
Total	**203.94**

Source: GHD (2020).

The recent ground truthing vegetation survey by GHD recorded that of the 2.70 ha of remnant native vegetation in the Development Envelope, 1.02 ha was described as 'Completely Degraded' in condition (GHD, 2020), consistent with the vegetation condition mapped in Figure 6. Historical vegetation clearing, edge effects, weeds, rubbish dumping and road infrastructure use within and adjacent to the Development Envelope are the primary contributions to the poor vegetation condition.

There are no vegetation communities that represent Threatened Ecological Communities (TECs) within the development envelope. However, the State listed Priority Ecological Community (PEC) (Priority 3) known as the 'Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region' occurs at two locations in the development envelope (identified as vegetation type VT06) (GHD, 2019; GHD, 2020) (Figure 4). One of these PEC locations which is in degraded condition is proposed to be cleared.

No conservation significant flora species (Threatened or Priority) have been recorded in the development envelope.

3.5 Threatened Fauna and Fauna Habitats

Several ecological investigations have been undertaken over the development envelope including Level 1 and 2 fauna surveys and habitat assessments for Threatened Black Cockatoo species. The most recent of these was a ground truthing survey and Black Cockatoo habitat assessment undertaken by Eco Logical Australia (ELA) (ELA, 2020). The survey was comprehensive and included the entire development envelope (Figure 5).

Three conservation significant fauna species have previously been recorded within the development envelope. These species include the Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) (listed as Vulnerable under the *Environment Protection and*

Biodiversity Conservation Act (EPBC Act) and *Biodiversity Conservation Act* (BC Act) and Carnaby's Cockatoo (*Calyptorhynchus latirostris*), (listed as Endangered under the EPBC Act and BC Act) (Coffey 2015; GHD 2019; ELA, 2020). The Southern Brown Bandicoot (*Isoodon fusciventer*) (Priority 4, BC Act) was also previously recorded in the development envelope (ELA, 2020). However, the Southern Brown Bandicoot is unlikely to occur given the lack of suitable habitat for the species. No terrestrial fauna have been recorded in the development envelope (ELA, 2020).

Given the extensive prior disturbance within and in the vicinity of the development envelope, limited fauna habitats exist for fauna species in the development envelope. The remaining fauna habitats consist of small linear patches along the edge of the highly disturbed and modified Tonkin Highway road reserve. The quality and value of this remnant habitat is not considered to be suitable for conservation significant fauna due to historic clearing, impacts from road infrastructure and surrounding urban development (ELA, 2020).

Ten broad fauna habitats have been mapped within the development envelope by ELA (2020). The mapped fauna habitat comprises approximately 8.9 ha of the development envelope and provide limited value to terrestrial fauna (ELA, 2020). Three of the fauna habitats known as the Mixed Eucalyptus/Corymbia Woodland, Mixed Banksia/Eucalyptus/Corymbia Woodland and Scattered Trees/Shrubs habitats are important for fauna species as these provide suitable foraging and potential breeding habitat for Black Cockatoo species (ELA, 2020).

Seven trees contain artificial nesting boxes, two of which are located south of the proposed Noranda Station, one is located in the Tonkin Highway road reserve (north of Morley Drive) and four are located near the proposed Morley Station (GHD, 2020). The artificial nesting boxes at the proposed Morley Station were assessed by a fauna specialist who confirmed that the artificial nesting boxes were unsuitable for Black Cockatoos due to their small entrance size or small internal space (Kirkby, 2020). None of the artificial nesting boxes were used by Black Cockatoo species (Kirkby, 2020).

3.6 Conservation Reserves

The nearest conservation reserve, Bush Forever Site 307 is located adjacent and to the north-western extent of the development envelope. Bush Forever Site 307 is known as Lightning Swamp and is a 72.6 ha 'A Class Reserve' which contains important plant communities, flora species and wetlands. Bush Forever Site 304, known as Whiteman Park, is located to the north-east and adjacent to the development envelope. The proposal has been designed to avoid potential impacts to Bush Forever Sites 307 and 304. No vegetation clearing will occur within or near these sites as part of this proposal.

There was one historically mapped Bush Forever site located within the northern portion of the development envelope. Bush Forever Site 480 known as Victoria Road Bushland has been completely cleared of native vegetation for road development. No other Bush Forever sites intersect the development envelope.

4.PERMIT APPLICATION DETAILS

The proposal is located within the Perth metropolitan area approximately 8 km north-east of the Perth Central Business District (CBD) and extends in a northerly direction for approximately 9 km (Figure 1). The development envelope is located in an urban environment, predominantly within the Tonkin Highway road reserve and is surrounded by residential and industrial development. The development envelope intersects three local government areas including; the City of Bayswater, the City of Swan and the Town of Bassendean. However, the areas of native vegetation to be cleared are located within the City of Bayswater and the City of Swan.

Details of the permit application are summarised in Table 4 below:

Table 4 - Summary of Permit Application Details

<table>
<tr><td colspan="4">Permit Application Details</td></tr>
<tr><td>Permit Application Type</td><td colspan="3">Purpose Permit</td></tr>
<tr><td colspan="4">Proponent Details</td></tr>
<tr><td>Proponent Name</td><td colspan="3">Public Transport Authority of Western Australia</td></tr>
<tr><td colspan="4">Property Details</td></tr>
<tr><td>Property</td><td colspan="3">
<table>
<tr><th></th><th>Land ID</th><th>Lot / Description</th><th>Volume / Folio</th></tr>
<tr><td>1</td><td>3010798</td><td>Lot 800 on Deposited Plan 26706</td><td>LR3169/951</td></tr>
<tr><td>2</td><td>3612199</td><td>Lot 461 on Plan 21673</td><td>LR3153/593</td></tr>
<tr><td>3</td><td>4309286</td><td>Public Road – Tonkin Highway</td><td></td></tr>
<tr><td>4</td><td>4309287</td><td>Public Road – Tonkin Highway</td><td></td></tr>
<tr><td>5</td><td>4309290</td><td>Public Road – Broun Avenue</td><td></td></tr>
<tr><td>6</td><td>4278457</td><td>Lot 807 on Deposited Plan 407965</td><td>2925/217</td></tr>
<tr><td>7</td><td>1276617</td><td>Lot 1 on Diagram 68888</td><td>1753/716</td></tr>
</table>
</td></tr>
<tr><td>Local Government Area</td><td colspan="3">City of Bayswater and City of Swan.</td></tr>
<tr><td>Colloquial Name</td><td colspan="3">Bayswater to Malaga Rail Works</td></tr>
<tr><td colspan="4">Application</td></tr>
<tr><td>Clearing Area (ha): 1.23 ha</td><td>Method of Clearing: Mechanical removal</td><td colspan="2">Clearing Purpose: Construction of railway infrastructure, rail stations with intermodal rail, bus, carpark and active transport facilities, rail turnback, rail enabling and associated works.</td></tr>
</table>

The PTA is applying to clear up to 1.23 ha of native vegetation over nine clearing areas (this is the area applied to clear) (Figure 2). As described in Section 3, the development envelope contains vegetation that has been urbanised and highly disturbed. Extensive areas within the development envelope have already been cleared for road projects and related infrastructure. These existing cleared areas were quantified and mapped as part of the ground truthing of the development envelope. According to GHD (2020), approximately 188.63 ha has already been cleared of native vegetation within the development envelope (GHD, 2020). Of the remaining vegetation within the development envelope, GHD (2020) recorded 2.70 ha of native vegetation and 12.60 ha of non-native vegetation (i.e. planted vegetation or revegetation areas) (Figure 3).

Whilst non-native vegetation will be cleared for the MEL Part 1 proposal, these planted and revegetation areas are not included in the NVCP application, as the PTA does not consider this vegetation to meet the definition of native vegetation under Section 51A of the EP Act. For the purpose of this NVCP application the vegetation proposed to be cleared relates to areas of native vegetation only.

Whilst a limited amount of native vegetation will be cleared for the proposal, there are several remaining areas of native vegetation that will be retained within the development envelope (Figure 4).

4.1 Clearing Application Areas

A summary of the nine areas that are proposed to be cleared including the vegetation type, condition and Black Cockatoo habitat information as these relate to each clearing area is provided in Table 5 below.

Table 5 – Vegetation types and condition, fauna habitat and potential breeding trees within the areas applied to clear

Clearing Area No. (Figure 2)	Size (in ha)	Vegetation Type (Figure 3)	Vegetation Condition (Figure 6)	Black Cockatoo Habitat		
				Foraging Area (in ha)	Foraging Quality	Potential Breeding Trees (count)
1	0.169	VT02: *Eucalyptus rudis* open woodland over **Acacia longifolia* tall shrubland over mixed low shrubland/sedgeland.	Degraded	0.159	Low	0
2	0.074	VT04: *Banksia attenuata, Banksia menziesii* and *Nuytsia floribunda* low open woodland.	Completely Degraded	0.000	N/A	0
3	0.125	VT09: Parkland cleared. Individual trees or small patches of native Eucalyptus species including *Corymbia calophylla*, *Eucalyptus rudis*, and *Eucalyptus gomphocephala* over completely cleared understorey.	Completely Degraded	0.105	Moderate	4
4	0.024	VT06: *Eucalyptus todtiana, Corymbia calophylla, Allocasuarina fraseriana* and *Banksia menziesii* low open woodland.	Completely Degraded	0.000	N/A	0
5	0.047	VT06: *Eucalyptus todtiana, Corymbia calophylla, Allocasuarina fraseriana* and *Banksia menziesii* low open woodland.	Completely Degraded	0.000	NA	1
6	0.311	VT06: *Eucalyptus todtiana, Corymbia calophylla, Allocasuarina fraseriana* and *Banksia menziesii* low open woodland.	Completely Degraded, Degraded	0.241	Moderate/ High	1
7	0.117	VT08: *Corymbia calophylla* open woodland over *Allocasuarina humilis* and *Xanthorrhoea preissii* open shrubland.	Completely Degraded	0.116	Moderate	2
8	0.192	VT07: *Melaleuca preissiana* open woodland over *Hakea varia* and *Acacia saligna* over *Xanthorrhoea preissii* and *Regelia ciliata* open shrubland.	Completely Degraded, Degraded, Good	0.023	Moderate	2
9	0.176	VT08: *Corymbia calophylla* open woodland over *Allocasuarina humilis* and *Xanthorrhoea preissii* open shrubland.	Degraded	0.159	Moderate	2
Total	**1.236**			**0.804**		**12**

4.2 Native Vegetation Retention Areas

Many of the vegetation areas contain important environmental values despite their degraded condition as they contain large trees which are important for fauna habitat. Within these areas are planted trees (some with non-endemic species) which are also considered valuable to fauna species. These fauna habitat areas vary in vegetation condition from good to completely degraded (GHD, 2019).

At least 24 of these areas with important environmental values will be retained within the development envelope. These areas are known as Native Vegetation Retention Areas (NVRAs) and are designated within the development envelope and excluded from the disturbance footprint. The purpose of these areas is to retain patches of native and non-native vegetation with potential fauna breeding trees. These NVRAs are depicted on Figure 4.

The PTA will avoid clearing of vegetation within these areas by implementing the following controls during construction:

- Identification on project mapping and demarcation in the field;
- Each patch will be demarcated with fencing/flagging for retention; and
- Weekly inspections of the NVRAs will be conducted to ensure all demarcated vegetated areas are retained.

5. ASSESSMENT AGAINST THE CLEARING PRINCIPLES

The PTA has assessed the native vegetation within the entire development envelope of 204 ha. The assessment was completed against the ten clearing principles using the DWER guideline 'A Guide to the Assessment of Applications to Clear Native Vegetation, Under Part V Division 2 of the *Environmental Protection Act 1986'* (DWER, 2014). The clearing of 1.23 ha of native vegetation is required in nine clearing areas (which is the clearing application area) (Figure 2). As the clearing impacts are directly associated with the nine native vegetation areas, the clearing impacts will be contained to these specific locations. Native vegetation clearing will only be undertaken within the areas applied to clear (Figure 2).

The native vegetation clearing impacts have been assessed against the following environmental factors:

- Biological diversity,
- Flora, vegetation and ecological communities,
- Threatened fauna and fauna habitats,
- Local and regional vegetation,
- Watercourses and wetlands,
- Geology and soils,
- Conservation reserves, and
- Surface and groundwater.

The relevant project environmental aspects and an assessment against each of the clearing principles are provided below:

(a) Native vegetation should not be cleared if it comprises a high level of biological diversity

Several Level 1 and Level 2 flora surveys have been undertaken over the development envelope (360 Environmental, 2014; Coffey, 2015; Woodman, 2015; RPS, 2019; GHD, 2019 and GHD, 2020). The flora and vegetation surveys did not record any TECs within the development envelope (360 Environmental 2014; Coffey, 2015; Woodman, 2015; GHD 2019 and GHD, 2020). However, one PEC (Priority 3) known as the 'Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region' occurs at two locations within the development envelope (total area of 0.558 ha) (GHD, 2019). One of these PEC locations contains vegetation in good condition and will be retained (0.185 ha) and the other location contains vegetation in completely degraded condition and will be cleared (0.373 ha).

The vegetation within the development envelope consists of 11 mapped vegetation types. However, two of the vegetation types consist of non-endemic planted species and revegetation species that are not considered in this application. Most of the vegetation within the development envelope was mapped as Vegetation Type 09; Parkland cleared, individual trees or small patches of native Eucalyptus species including *Corymbia calophylla, Eucalyptus rudis*, and *Eucalyptus gomphocephala* over completely cleared understorey followed by Vegetation Type 06; *Corymbia calophylla* open woodland over *Allocasuarina*

humilus and *Xanthorrhoea preissii* open shrubland over *Dasypogon bromeliifolius* over introduced grasses (GHD, 2020).

A total of 102 taxa from 82 genera and 34 families were recorded in the Level 1 flora survey undertaken by 360 Environmental (360 Environmental, 2014). This flora survey included a large portion (99 ha) of the development envelope. Many of the remaining flora survey areas have been cleared for road projects or contain areas of revegetation. Most of the development envelope (90 percent) has been highly disturbed. Little intact native vegetation remains, and the remaining vegetation has been significantly altered and fragmented. As the development envelope has been subject to previously clearing, edge effects and weeds, the flora diversity is low. No Threatened or Priority flora species were recorded during any of the flora surveys.

The development envelope includes Completely Degraded (18.84 ha), Degraded (0.92 ha), Good to Degraded (0.19 ha), Good (0.42 ha) and Very Good (0.13 ha) condition vegetation (360 Environmental, 2014 Coffey, 2015 and GHD 2019). Limited vegetation clearing is required for the proposal and many of the existing native vegetation areas will be retained. Several of the vegetated areas in Very Good, Good and Good to Degraded condition will be retained as NVRAs.

A total of 24 conservation significant fauna species were recorded as possibly occurring from previous fauna surveys and desktop biological searches (ELA, 2020). Of these species, only four conservation significant fauna species occur or potentially occur in the development envelope (ELA, 2020). The fauna surveys identified a low fauna diversity, consistent with the cleared and fragmented landscape of the development envelope.

A Black Cockatoo Habitat Assessment of the development envelope was undertaken by GHD (2019) and ELA (2020) and found suitable foraging and potential breeding habitat for both Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) and Forest Red-tailed Cockatoo (*Calyptorhynchus banksii naso*) (GHD, 2019 and ELA, 2020). Suitable foraging habitat for both Black Cockatoo species (3.5 ha in moderate to high quality) was recorded in the development envelope. No evidence of breeding by Black Cockatoo species was recorded in the development envelope. However, up to 12 potential breeding trees (Marri and Tuart trees) were recorded and will be cleared. Four of the potential Black Cockatoo trees (all Marri trees) contained small hollows (>10 cm) which will also be retained within NVRA's. Up to 12 potential Black Cockatoo trees including the Marri trees with small hollows will be retained within NVRAs.

The development envelope contains a small amount of moderate to good quality foraging habitat (3.5 ha) and potential breeding trees for Carnaby's Cockatoos and Forest Red-tailed Cockatoos. However, suitable and higher quality foraging and breeding habitat for Carnaby's Cockatoos is located in surrounding areas including in the Gnangara-Pinjar pine plantation, pine plantations north of Ellenbrook and Whiteman Park (ELA, 2020). Forest Red-tailed Cockatoos feed on Jarrah, Marri, Blackbutt, Casuarina, introduced Eucalyptus species and Cape Lilac trees over an extensive range when visiting the Perth metropolitan area (ELA, 2020). Forest Red-tailed Cockatoos are often recorded breeding in the outskirts of urban areas in Perth. The nearest known breeding tree for this species is recorded 18 km south-west of the development envelope at Murdoch University (ELA, 2020). Given the large areas

of higher quality habitat in surrounding areas, the cleared and highly modified development envelope, Carnaby's Cockatoos and Forest Red-tailed Cockatoos are unlikely to rely on the area.

There are no known TECs, Threatened or Priority flora within the development envelope. Low fauna diversity and limited fauna habitats occur within the development envelope. A small portion (0.37 ha) of the PEC in degraded condition will be cleared. Approximately, 2.46 ha of moderate to high quality fauna habitat and four trees with small hollows will be retained within NVRAs.

A small amount of 1.23 ha is required to be cleared and the majority of this vegetation is in degraded to completely degraded condition. The remnant vegetation does not contain high biological diversity due to historic clearing, impacts from road infrastructure and surrounding urban development (ELA, 2020). The small amount of clearing of 1.23 ha in degraded to completely degraded condition is unlikely to have a significant impact on biological diversity in a regional or local context.

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

(b) Native vegetation should not be cleared if it comprises the whole or part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.

Several Level 1 fauna surveys have been undertaken over the development envelope by 360 Environmental (2014), GHD (2019) and Ecological Australia (ELA) (2020). A Level 2 targeted fauna survey was also undertaken by Coffey (2015) for the Perth-Darwin National Highway project which included the northern portion of the development envelope. The most recent fauna survey undertaken by ELA (2020) is considered the most relevant to the development envelope as this required a desktop review of databases and existing survey reports as well as a comprehensive field survey to ground truth the areas proposed to be cleared. The ELA (2020) survey was consistent with a Level 1 fauna survey.

A fauna habitat assessment was conducted over the development envelope which identified the following ten habitats (ELA, 2020):

1. Mixed Eucalyptus/Corymbia Woodland,
2. Mixed Banksia/Eucalyptus/Corymbia Woodland,
3. Paperbark Woodland,
4. Wetland/watercourse (open water areas),
5. Shrubland,
6. Scattered trees/shrubs,
7. Constructed wetland/drainage,
8. Modified vegetation,
9. Parkland cleared, and
10. Revegetation.

Most of the development envelope has been previously cleared and contains existing transport infrastructure; therefore, very little habitat remains for fauna. The fauna habitats that remain are highly degraded and fragmented from urbanisation, previous vegetation

clearing, weeds and rubbish dumping. The condition of fauna habitat varies from 'Completely Degraded' to 'Very Good or Excellent'.

A broad 20 km buffer area was applied to desktop biological and threatened fauna searches. A total of 24 conservation significant fauna species were recorded as part of the database searches and from previous biological surveys. Many of the species were considered unlikely to occur due to the degraded and limited fauna habitat in the development envelope. Of these conservation significant species, only two species were recorded within the development envelope and two other species had the potential to occur in the development envelope. The conservation significant fauna species known to occur in the development envelope include Carnaby's Black Cockatoo listed as Endangered under the EPBC Act and the BC Act and Forest Red-tailed Cockatoo listed as Vulnerable under the EPBC Act and the BC Act (ELA, 2020). The two other species with the potential to occur include: the Rainbow Bee-eater (*Merops ornatus*) listed as Marine under the EPBC Act and the Peregrine Falcon (*Falco peregrinus*) listed as Other Specially Protected Fauna under the BC Act.

A Black Cockatoo Habitat Assessment of the development envelope was undertaken by ELA in November 2019 (ELA, 2020). The assessment found suitable foraging habitat (8.9 ha) for Carnaby's and Forest Red-tailed Black Cockatoos, associated with remnant patches of Mixed Eucalyptus/Corymbia Woodland, Mixed Banksia/Eucalyptus/Corymbia Woodlands and Scattered Trees/Shrubs habitats within the development envelope. Most of the foraging habitat was highly degraded (low to moderate quality) and approximately 3.5 ha was assessed as moderate to high quality habitat (ELA, 2020) (Approximately 0.80 ha of Black Cockatoo habitat will be cleared within the ten clearing areas). Foraging habitat suitable for Carnaby's Cockatoos included Banksia, Casuarina, Eucalyptus, Xanthorrhoea and Proteaceae shrub species. Some of these species (Casuarina and Eucalyptus) were also suitable foraging habitat for Forest Red-tailed Black Cockatoos.

Suitable foraging habitat also exists for Baudin's Cockatoo within the development envelope. However, Baudin's Cockatoo has not been recorded in the development envelope and this species is unlikely to rely on the area for foraging (ELA, 2020). Approximately, 2.46 ha of moderate to high value foraging habitat will be retained within NVRAs in the development envelope.

Potential breeding habitat occurs in the development envelope for Black Cockatoo species with 143 potential breeding trees recorded (trees with a diameter at breast height of ≥500mm) (ELA, 2020). Trees considered to be suitable as potential breeding trees for Carnaby's and Forest Red-tailed Cockatoos included Tuarts, Flooded Gum, Blackbutt, Marri and non-native and planted Eucalyptus species (ELA, 2020). Up to 12 potential breeding trees will be cleared. No known breeding trees have been recorded and there is no evidence of breeding by Black Cockatoo species within the development envelope (ELA, 2020). There are no known breeding sites recorded for Baudin's Cockatoo in the Perth metropolitan area (ELA, 2020).

ELA (2020) chose a precautionary approach to the assessment of potential Black Cockatoo nesting hollows and recorded hollows with an entrance diameter of >10cm. Of the potential breeding trees, only four Marri trees contained small hollows with a hollow size of >10cm in diameter. These four trees are located near the proposed Noranda Station and will be

retained within an NVRA. According to EPA and DBCA fauna guidance, none of the potential breeding trees contained hollows of a suitable size for Black Cockatoos (approximately 27 cm in size for Carnaby's Cockatoos or approximately 30 cm in size for Forest Red-tailed Cockatoos) (ELA, 2020). No trees with nesting hollows will be cleared within the development envelope.

Some of the potential breeding trees (Marri and Eucalyptus species) also represented suitable roosting habitat for Carnaby's and Forest Red-tailed Black Cockatoos (ELA, 2020). According to ELA (2020), approximately 10 ha of roosting habitat occurs in the development envelope and approximately 17.4 ha of roosting habitat occurs in surrounding areas. However, there is no evidence of roosting by Black Cockatoo species within the development envelope. Given the larger patches of remnant vegetation in surrounding areas, Black Cockatoo species are more than likely to use these surrounding areas for roosting.

The Rainbow Bee-eater is found in open forests, woodlands and shrublands, cleared areas and often near permanent water sources (DAWE, 2020). Limited habitat for this species occurs in the development envelope and it is unlikely that the Rainbow Bee-eater would rely on the vegetation in the development envelope to survive.

The Peregrine Falcon was not recorded in the development envelope, however it may potentially occur as a transitory species through the landscape. The species is unlikely to solely rely on habitats within the development envelope (ELA, 2020).

The development envelope contains foraging and potential breeding habitat for Carnaby's and Forest Red-tailed Black Cockatoos which is considered important habitat for the species. Up to 1.23 ha of Cockatoo foraging habitat, most of which is in degraded to completely degraded condition is proposed to be cleared. However, most of the moderate to high quality foraging habitat (2.46 ha) and 104 potential breeding trees will be retained within NVRAs. Given the small amount of clearing of 1.23 ha, small number of potential breeding trees proposed to be cleared (up to 12 trees) and the large areas of surrounding vegetation which contain high quality foraging and potential breeding habitat, the native vegetation remaining is not likely to be significant habitat for fauna species.

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

(c) Native vegetation should not be cleared if it includes or is necessary for the continued existence of rare flora.

Several flora and vegetation surveys (Level 1 and 2) have been undertaken over the development envelope by 360 Environmental (2014); Coffey (2015); Woodman (2015); RPS (2019) and GHD (2019; 2020). No conservation significant flora species listed under the EPBC Act or BC Act were recorded within the development envelope during these surveys. The nearest recorded conservation significant flora species is *Caladenia huegelli* (Threatened) which was located approximately 127 metres west of the development envelope.

The vegetation in the development envelope has been extensively cleared, is highly modified and mostly degraded in condition. It is unlikely that Threatened flora will occur within the development envelope.

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

(d) Native vegetation should not be cleared if it comprises the whole or part of or is necessary for the maintenance of a threatened ecological community.

The flora and vegetation surveys undertaken by 360 Environmental (2014); Coffey (2015); Woodman (2015); RPS (2019) and GHD (2019; 2020) did not identify any State or Commonwealth listed TECs within the development envelope. The Commonwealth listed TEC Banksia Woodlands of the Swan Coastal Plain is recorded adjacent to but outside of the north-eastern extent of the development envelope (RPS, 2019).

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

(e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.

The development envelope is located with the Perth subregion of the Interim Biogeographic Regionalisation for Australia (IBRA) Bioregion of the SCP. The vegetation under application is mapped as Heddle vegetation complexes; Bassendean Complex Central and South and Southern River Complex and the Beard vegetation association 1001, of which 26.9 percent, 18.42 percent and 22.05 percent respectively of the pre-European vegetation extents remain (Table 5) (Government of WA, 2019).

The vegetation complexes identified within the development envelope have less than the recommended 30 per cent threshold remaining under the National Objectives and Targets for Biodiversity Conservation (Commonwealth of Australia, 2001). However, the development envelope is located within a constrained area. The EPA (2006) recognises the Perth Metropolitan Region as a ‘constrained area’, allowing for the variation of the minimum percentage of vegetation complexes remaining to 10 percent of the pre-European extent. All the vegetation communities have more than 10 percent of the pre-European vegetation extent remaining.

The local area has been extensively cleared with approximately 15 percent native vegetation remaining. Native vegetation within the City of Bayswater has been extensively cleared with less than 3 percent remaining of Vegetation Association 1001 in the Local Government Authority. Given that the local area is highly cleared, any native vegetation remaining is likely to contain important habitat for local fauna species.

There are two locations within the development envelope (0.558 ha) that represent the PEC Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region (GHD, 2019). One of these PEC locations contains vegetation in good condition and will be retained (0.185 ha) and the other contains vegetation in completely degraded condition and will be cleared (0.373 ha). The majority of the vegetation proposed to be cleared is in degraded to completely degraded condition. Most of the vegetation that is in very good to good condition will be retained in NVRAs.

The vegetation within the development envelope contains foraging habitat for Carnaby's and Forest Red-tailed Cockatoos. Approximately 143 potential Black Cockatoos breeding trees occur in the development envelope (Up to 12 potential breeding trees within the area applied to clear). Clearing of Carnaby's Cockatoo feeding habitat on the Swan Coastal Plain is considered a major threat to the species. Therefore, the development envelope contains potential Black Cockatoo breeding trees and a portion of the 1.23 ha may be a significant remnant in a highly cleared landscape.

Table 6 - Summary of Vegetation Data within the development envelope

	Pre-European area (ha)*	**Current Extent (ha)***	**Pre-European Extent Remaining %***	**Conservation Status****	**Extent Remaining in All DBCA Managed Lands (%)*****
IBRA Bioregion					
Swan Coastal Plain	1,501,221.93	579,813.47	38.62	Depleted	38.45
Local Government Authority					
City of Bayswater	2,848.37	75.18	2.64	Endangered	0.00
City of Swan	8,868.19	2,321.48	26.18	Vulnerable	3.98
Beard Vegetation Associations in IBRA Bioregion					
1001	57,410.23	12,660.76	22.05	Vulnerable	14.19
Beard Vegetation Association in Local Government Authority					
City of Bayswater	2,848.37	75.18	2.64	Endangered	0.00
City of Swan	8,868.19	2,321.48	26.18	Vulnerable	3.98
Heddle Vegetation Complexes – Swan Coastal Plain					
Bassendean Complex Central and South	87,476.25	23,533.09	26.90	Vulnerable	1.86%
Southern River Complex	58,781.48	10,828.04	18.42	Vulnerable	1.18%

*Government of Western Australia (2019)
**Department of Natural Resources and Environment (2002)
***Department of Biodiversity, Conservation and Attractions (DBCA)

Based on the above, the proposed clearing may be at variance to this Principle.

(f) Native vegetation should not be cleared if it is growing in, or in association with an environment associated with a watercourse or wetland.

There are no permanent wetlands located within the development envelope. A review of wetland databases recorded 12 wetlands mapped within the development envelope (GIS Database). Two of these are categorised as Conservation Category, one is Resource Enhancement and nine are Multiple Use Wetlands. All of these wetlands have been highly modified, cleared or filled for road infrastructure or urban development.

The nearest mapped watercourses which exist in the development envelope include Lightning Swamp (UFI 8451 and 15416) and Victoria Road Swamp (UFI 15033). Most of Victoria Road Swamp has been previously cleared and modified as part of road infrastructure. Both Victoria Road Swamp and Lightning Swamp are ephemeral wetlands that are located outside the development envelope.

There are no recorded perennial or ephemeral wetlands or watercourses in the development envelope and no wetland dependant vegetation will be cleared as part of the proposal.

Given the above, no vegetation is growing in or in association with an environment associated with a watercourse or wetland.

The proposed clearing is not at variance to this Principle.

(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.

The soils within the development envelope are part of the Bassendean Dune System which comprise of leached sands (Northcote et al. 1960 – 68). These soils are sandy and have a high risk of wind erosion and a low risk of water erosion due to their high water infiltration rates. Clearing activities may cause wind erosion due to the sandy nature of the topsoil and removal of ground cover. However, the cleared areas will be replaced with infrastructure associated with rail construction, rail stations or hard stand areas. Given the clearing area is small and will be replaced with permanent infrastructure and occurs in an urban area that is already highly modified, the risk of wind erosion is low.

Groundwater salinity is low and ranges from less than 250mg/L – 500mg/L throughout the development envelope (DWER, 2020). There is a low risk to increasing salinity in the development envelope. As the clearing is small and occurs in an area that has been extensively cleared, the proposed clearing is unlikely to cause an increase in wind or water erosion or increase salinity or cause appreciable land degradation.

Given the above, the proposed clearing is not likely to be at variance to this Principle.

(h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation reserves.

Bush Forever Site 307 (Lightning Swamp) is located adjacent to (north-west) of the development envelope while Bush Forever Site 304 (Whiteman Park) is located 233 m to the north-east of the development envelope. Bush Forever Site 480; Victoria Road Bushland is located within the development envelope but has been completely cleared of native

vegetation following road construction. No other conservation reserves intersect the development envelope.

The vegetation within the development envelope is highly fragmented and has been previously cleared for road infrastructure. Minimal vegetation will be cleared and several areas will be retained as NVRAs within the development envelope. The development envelope is not connected to the conservation reserves through continuous vegetation and does not provide an ecological linkage between conservation areas.

Given the above, the proposed clearing is not likely to have an impact on the environmental values of the conservation areas and is not likely to be at variance to this Principle.

(i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.

Due to extensive disturbance and clearing undertaken for recent road projects there are no surface water features with ecological values that occur within the development envelope. As the development envelope occurs in a previously disturbed area with no wetlands or watercourses intersecting the area, no sedimentation, erosion, eutrophication, turbidity or impacts to surface waters are expected. Surface water will be managed using the existing stormwater drainage network therefore no off-site impacts to surface waters are expected.

A Public Drinking Water Source Area (PDWSA) occurs over the northern most portion of the development envelope. However, this area has been previously cleared of vegetation as part of road infrastructure and no clearing is proposed at this northern location. Groundwater salinity is low and ranges from less than 250mg/L in the northern portion of the development envelope and 250-500 mg/L across the southern portion of the development envelope (DWER, 2020).

Acid Sulfate Soils (ASS) are recorded as moderate to low risk over most of the development envelope (DWER, 2020). The potential disturbance to ASS is not considered likely to have a significant impact on surface or groundwater in the development envelope.

Given the limited and small areas of clearing proposed (total clearing of 1.23 ha) and that the clearing will occur in a highly modified landscape with has already been extensively cleared, it is unlikely that the proposed clearing will increase the risk of salinity or a deterioration in the quality of groundwater either on-site or off-site.

The proposed clearing is not likely to cause deterioration in the quality of surface water or underground water.

Given the above, the proposed clearing is not likely to be at variance to this Principle.

(j) Native vegetation should not be cleared if clearing the vegetation is likely to cause or exacerbate the incidence or intensity of flooding.

Perth has a mean annual rainfall of 732 millimetres with the majority of rainfall falling between June to August (BoM, 2020). Soils in the development envelope are Bassendean Sands (quartz sands) which are highly permeable, free draining and not subject to flooding.

Limited clearing is proposed and several areas will be retained as NVRAs within the development envelope.

Wetland areas in the development envelope have been previously cleared and significantly altered due to urban and industrial development. Flooding impacts associated with the clearing of vegetation are considered unlikely. Given the permeable soil type, small amount of clearing proposed and altered wetland landscape, the clearing is not likely to impact the incidence or intensity of flooding on a local or regional scale.

The proposed clearing is not likely to be at variance to this Principle.

6. ENVIRONMENTAL MANAGEMENT

Early decision making and associated planning design has enabled the PTA to avoid the clearing of native vegetation, minimise the amount of vegetation to be cleared and reduce the impact of clearing on environmental values. Several strategies have been developed to manage the environmental impacts associated with the proposal. Further methods to avoid, minimise and reduce the impacts of clearing will be determined, where practicable, during the detailed design phase.

Environmental management measures will be employed by the PTA to reduce the impacts on environmental values including flora, vegetation, ecological communities, fauna, fauna habitat and biological diversity. Dieback and weed management protocols will also be implemented to minimise impacts on these environmental values.

6.1 Flora, Vegetation and Ecological Communities

To manage the impacts of clearing on flora, vegetation and ecological communities several strategies have been developed and these are provided below:

To avoid native vegetation clearing:

- The development envelope has been aligned with the Tonkin Highway road reserve, where most of the native vegetation has already been cleared and the landform is significantly altered by the construction of road infrastructure,
- The PTA has applied 24 NVRAs within the development envelope, which will not be cleared or disturbed to implement the proposal. Many of these areas are described as 'Very Good', 'Good' and 'Good to Degraded' in condition. Approximately 11.42 ha of vegetation will be retained within the NVRAs and
- Approximately 0.185 ha of vegetation that is representative of the 'Banksia dominated woodlands of the Swan Coastal Plain IBRA region' PEC will be retained within a NVRA.

To minimise native vegetation clearing:

- Existing cleared areas will be utilised for temporary construction areas, where practicable, and
- The PTA will aim to minimise the native vegetation clearing footprint further during the detailed design phase, where practicable, to minimise the overall clearing impacts associated with the proposal.

6.2 Fauna

To manage the impacts of clearing on fauna and fauna habitat several strategies have been developed and these are provided below:

To avoid native vegetation clearing:

- Approximately 2.83 ha of fauna habitats, including 2.46 ha of moderate to high quality Black Cockatoo foraging habitat, will be retained within the NVRAs within the development envelope,
- Up to 104 potential Black Cockatoo breeding trees (Marri and Red Gum) will be retained within NVRAs,

- Rail infrastructure will predominantly be located within the existing road reserve, and
- Existing cleared areas will be used for laydown and temporary construction to avoid additional clearing.

To minimise native vegetation clearing:

- The clearing footprint has been minimised so that only a small amount of native vegetation clearing of 1.23 ha will be required to implement the proposal,
- The native vegetation clearing footprint will be further evaluated and if practicable minimised during the detailed design phase, to reduce potential impacts on fauna and fauna habitats and
- The PTA will minimise the clearing of Black Cockatoo foraging habitat and potential breeding habitat, where practicable.

6.3 Dieback

The development envelope is likely to be described as "Unmappable" for Phytophthora Dieback, due to the historic ground disturbance within the area. Dieback may be present within the site, even if it is not detectable through dieback mapping due to the highly modified nature of the vegetation and lack of indicator species or protectable vegetation.

Although no mapped occurrence has been determined within the development envelope, a precautionary approach will be used to evaluate the risk of spreading dieback to adjacent areas of vegetation. Therefore, hygiene protocols will be in place to ensure the risk of spreading dieback is carefully managed.

6.4 Weeds

No Weeds of National Significance (WONS) have been mapped within the development envelope. One weed species, *Zantedeschia aethiopica*, was recorded which is listed as a Declared Pest and assigned a C3 (management) status under the *Biosecurity and Agriculture Management Act 2007* (BAM Act).

The proposal area has been heavily disturbed by urban development and road construction. There is the potential for Declared Pest plants to be present within the development envelope due to the proximity to heavily modified areas and major road arteries. Weed management protocols will be implemented to control individuals of *Zantedeschia aethiopica* and weed species within the development envelope.

6.5 Construction Environmental Management Plan

A Construction Environmental Management Plan (CEMP) will be developed which will include the following measures to mitigate direct and indirect impacts to environmental values including flora, vegetation, ecological communities, fauna, and fauna habitat. Dieback and weeds will also be managed to mitigate the impacts on environmental values.

Management strategies for flora, vegetation and ecological communities include:

- Provision of coordinates for clearing extents;
- Clearing protocols including demarcation of native vegetation clearing boundaries;
- In field demarcation of clearing extents;
- In field demarcation of NVRA's (inclusive of the northern PEC extent) to be retained;

- Environmental inductions for all site staff and sub-contractors;
- Access control measures to restrict access to environmentally sensitive areas;
- Waste management protocols including regular inspections;
- Procedures to manage risk of causing fire during construction;
- Soil and wind erosion control;
- No dewatering or abstraction will occur between Reid Highway and Hepburn Avenue, to avoid potential impacts to the adjacent vegetation,
- Dust prevention and control measures; and
- Planning of site access, wash down areas, parking areas, drainage and fencing.

Management strategies for fauna include:

- Demarcation of potential Black Cockatoo breeding trees to be retained,
- Native vegetation clearing is demarcated in the field and will be restricted to the areas to be cleared,
- Potential, indirect impacts to surrounding native fauna habitat are appropriately managed,
- Vegetation to be cleared will be searched by a fauna specialist prior to clearing and any fauna species found will be relocated to an appropriate location,
- Trees with artificial nesting boxes proposed to be removed for construction will be relocated or replaced to an appropriate location following advice from the local government authority and the DBCA, and
- Fauna mortality from construction activities or vehicle strike will be documented during construction and reported to the DBCA.

Management strategies for dieback and weeds include:

- Document and implement weed and pathogen hygiene management protocols,
- Instruct and educate construction personnel on weed and pathogen management protocols,
- Earth moving machines vehicles and equipment will be cleaned of soil and vegetation prior to entering and leaving areas to be cleared,
- No weed affected soil, mulch fill or other material will be moved into the area to be cleared, and
- The movement of machinery, vehicles and equipment will be restricted to the limits of the areas to be cleared.

6.6 Rehabilitation and Offsets

As this proposal is for the construction and operation of permanent linear rail infrastructure there are limited opportunities for rehabilitation. Operational and safety requirements within the railway corridor further limit the ability for land to be rehabilitated. However, potential landscaping opportunities will be investigated surrounding rail stations. The PTA will implement landscaping activities where these opportunities are practical and meet operational safety requirements.

The operational railway corridor will be managed by the PTA in perpetuity, in accordance with the PTA's Urban Rail Reserve Vegetation Management Plan (PTA, 2016). Where

practicable, landscaping around rail stations will use local native species. The PTA will also reinstate construction laydown areas commensurate with pre-construction conditions.

Given the highly disturbed landscape, degraded and fragmented condition of the native vegetation and application of the proposed mitigation measures, the small amount of clearing of 1.23 ha required for this proposal will not result in significant impacts to flora, vegetation, ecological communities, fauna and fauna habitats. As it is unlikely that significant residual impacts will remain following implementation of the proposal, a biodiversity offset is not warranted for the proposal.

7. PLANNING INSTRUMENTS AND OTHER RELEVANT MATTERS

The proposal was referred to the EPA in November 2019 and the EPA determined not to formally assess the proposal (CMS 17730, s. 39A - Not Assess). The EPA determined that the proposed native vegetation clearing was to be dealt with under Part V Division 2 of the EP Act, 1986.

The proposal was not referred to the Commonwealth Department of Agriculture, Water and the Environment (DAWE) as the action was deemed not to have a significant impact on a matter protected under the EPBC Act. The clearing footprint has been extensively reduced to avoid impacts to Commonwealth listed Threatened species including Carnaby's Black Cockatoos and Forest Red-tailed Black Cockatoos. Areas considered to contain important Black Cockatoo habitat will be retained as NVRAs within the development envelope. The total vegetated area to be retained within the NVRAs is 11.42 ha. By reducing the clearing footprint, the clearing of 104 potential Black Cockatoo breeding trees has been avoided. A detailed assessment of potential and actual impacts to matters of national environmental significance has been undertaken by GHD (2020) and is provided in Appendix 3.

The development envelope is located within the Perth proclaimed groundwater area. Under the *Rights in Water and Irrigation Act 1914* (RIWI Act), it is illegal to take water in a proclaimed groundwater aquifer without a licence. The PTA's and/or MRWA's construction contractors will seek a groundwater abstraction licence as well as a dewatering licence prior to commencing abstraction and dewatering activities.

There are two known contaminated sites occurring within the development envelope and several possibly contaminated sites within or adjacent to the development envelope. The management of these areas and contaminated soils will be undertaken in accordance with the *Contaminated Sites Act 2003.* Prior to the commencement of earthworks, a Detailed Site Investigation (DSI) will be undertaken of the development envelope to identify areas that have the potential to intersect ASS or known or suspected contamination areas.

Acid Sulfate Soils (ASS) are recorded as moderate to low risk over most of the development envelope (DWER, 2020). The potential disturbance to ASS is not considered likely to have a significant impact on environmental values due to mitigation strategies and the highly modified urban landscape within and adjacent to the development envelope. The proposal has been developed to avoid excavation and large-scale dewatering in ASS risk areas. The PTA will develop and implement an ASS and Dewatering Management Plan to manage risks associated with earthworks and dewatering.

Development of the rail stations, car parks and public transport interchange facilities outside the rail corridor will be undertaken via a development application under the *Planning and Development Act, 2005.* The railway (and facilities in connection with the railway) will be constructed under the *Railway (METRONET) Act, 2018* (as amended in 2020).

There are three Registered Aboriginal Heritage Sites which occur within the development envelope. Site ID 20058 (Temporary Camp) and Site ID 3426 (South Ballajura Camp) have been previously cleared for the Tonkin Highway Upgrade project and no longer represent the former campsites (DPLH, 2020). Site ID 3692 (Bennett Brook in toto) has a large buffer area which covers the development envelope. Site ID 3692 is associated with Bennett Brook which is located approximately 3.2 km to the east of the development envelope. Clearing activities will not impact Site ID 3692 given the large buffer area and as the name suggests, it is located near Bennett Brook (DPLH, 2020). No Aboriginal Heritage sites of significance will be impacted by the proposal and no approvals are needed under the *Aboriginal Heritage Act, 1972*.

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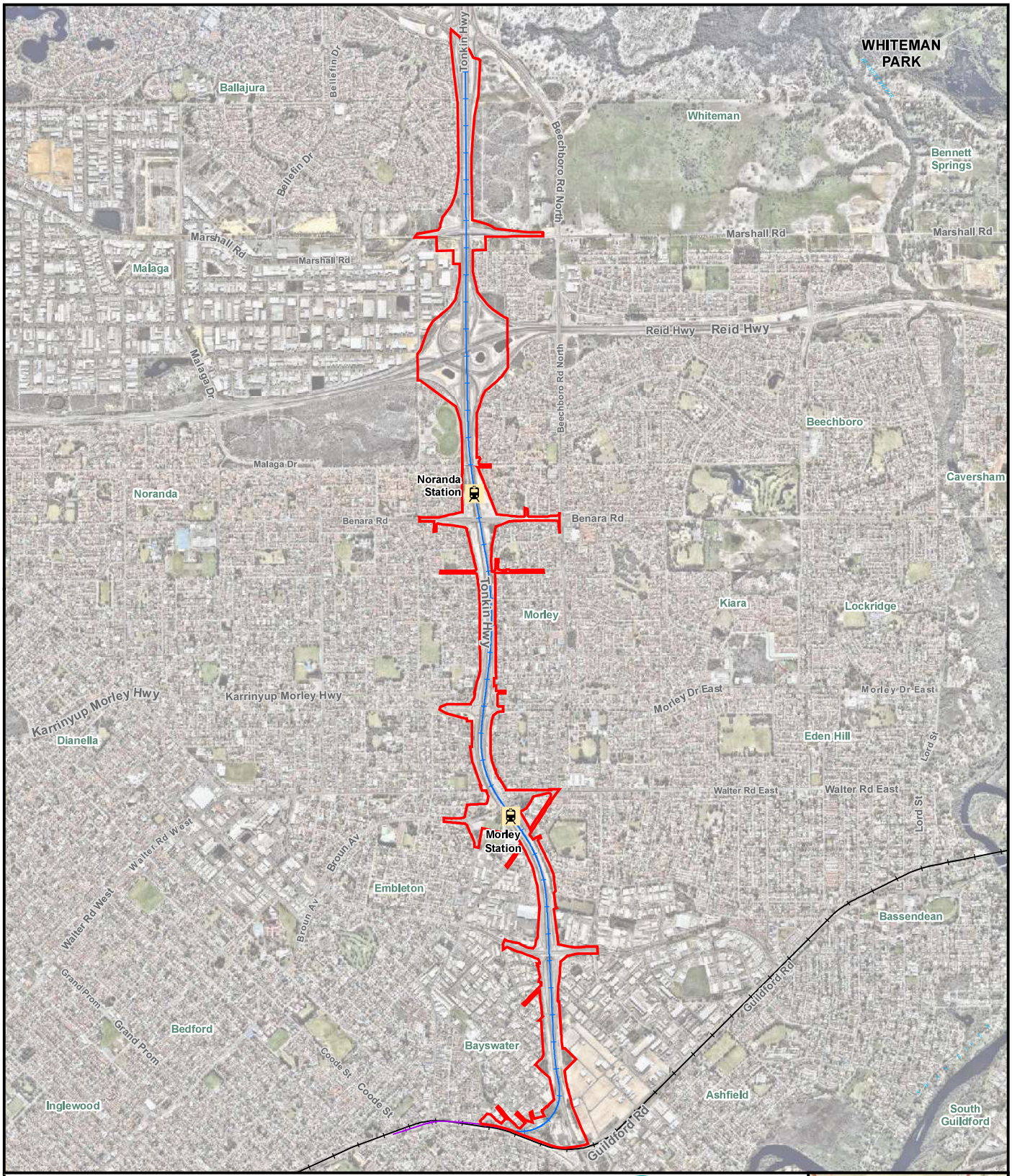
Figure 1 – Regional Location



METRONET | Morley Ellenbrook Line Part 1 - Bayswater to Malaga NVCP

Figure 1 **Regional Location**

Public Transport Authority

Legend

- Development Envelope
- Proposed Railway Station
- Existing Railway Line
- Proposed Railway Alignment within Existing Rail Reserve
- Proposed Railway Line

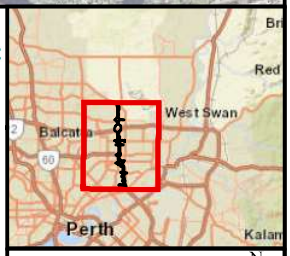


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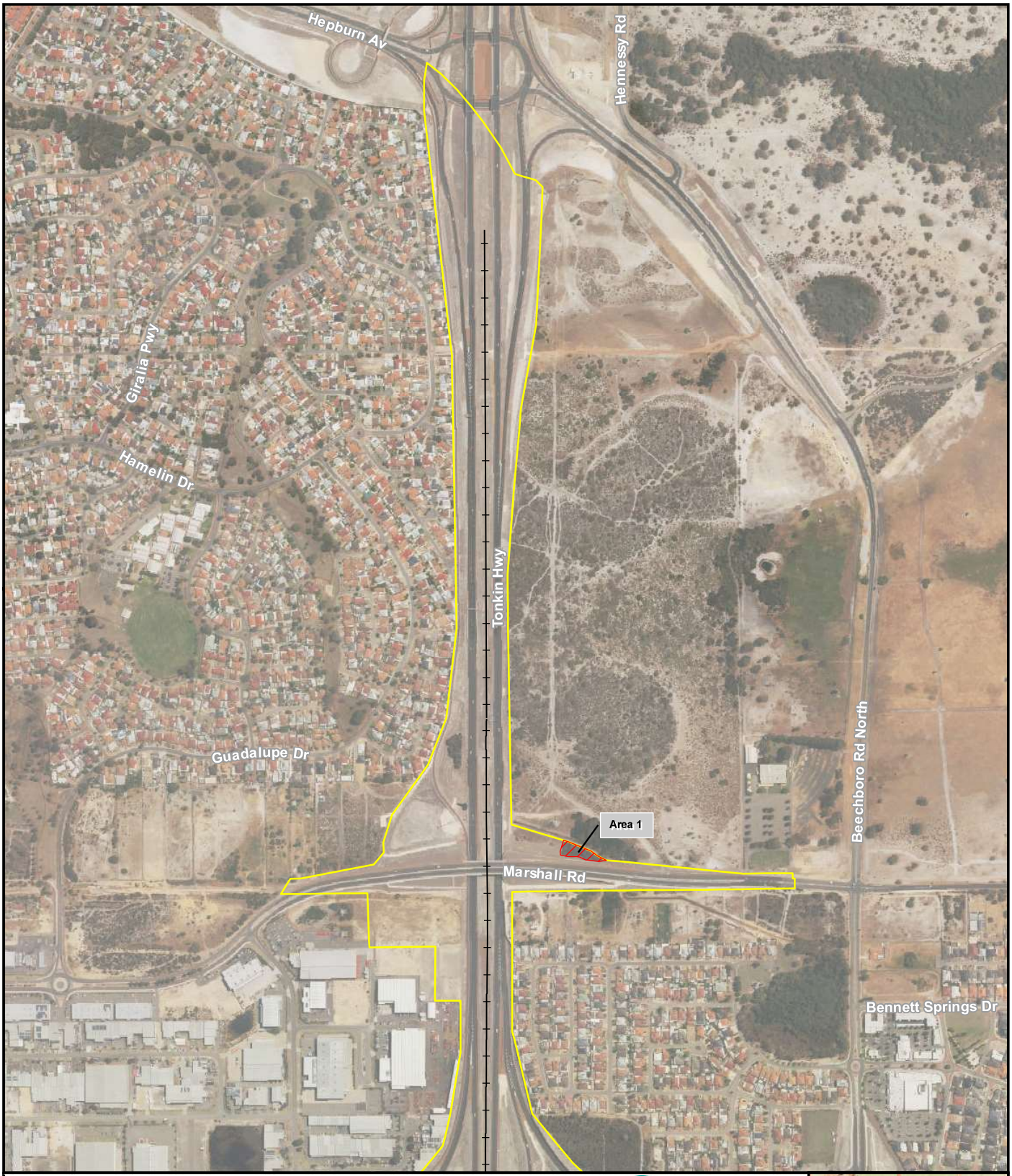
Figure 2 – Proposed Clearing within the Development Envelope



METRONET | Morley Ellenbrook Line Part 1 - Bayswater to Malaga NVCP

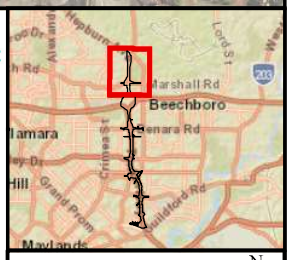
Figure 2A **Proposed Clearing within Development Envelope**

Legend

- Development Envelope
- Native Vegetation Clearing Area
- Indicative Railway Alignment

Public Transport Authority

A
B
C
D



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METRONET | Morley Ellenbrook Line Part 1 - Bayswater to Malaga NVCP

Figure 2B **Proposed Clearing within Development Envelope**

Public Transport Authority

Legend

- Development Envelope
- Native Vegetation Clearing Area
- Proposed Railway Station
- Indicative Railway Alignment

A
B
C
D

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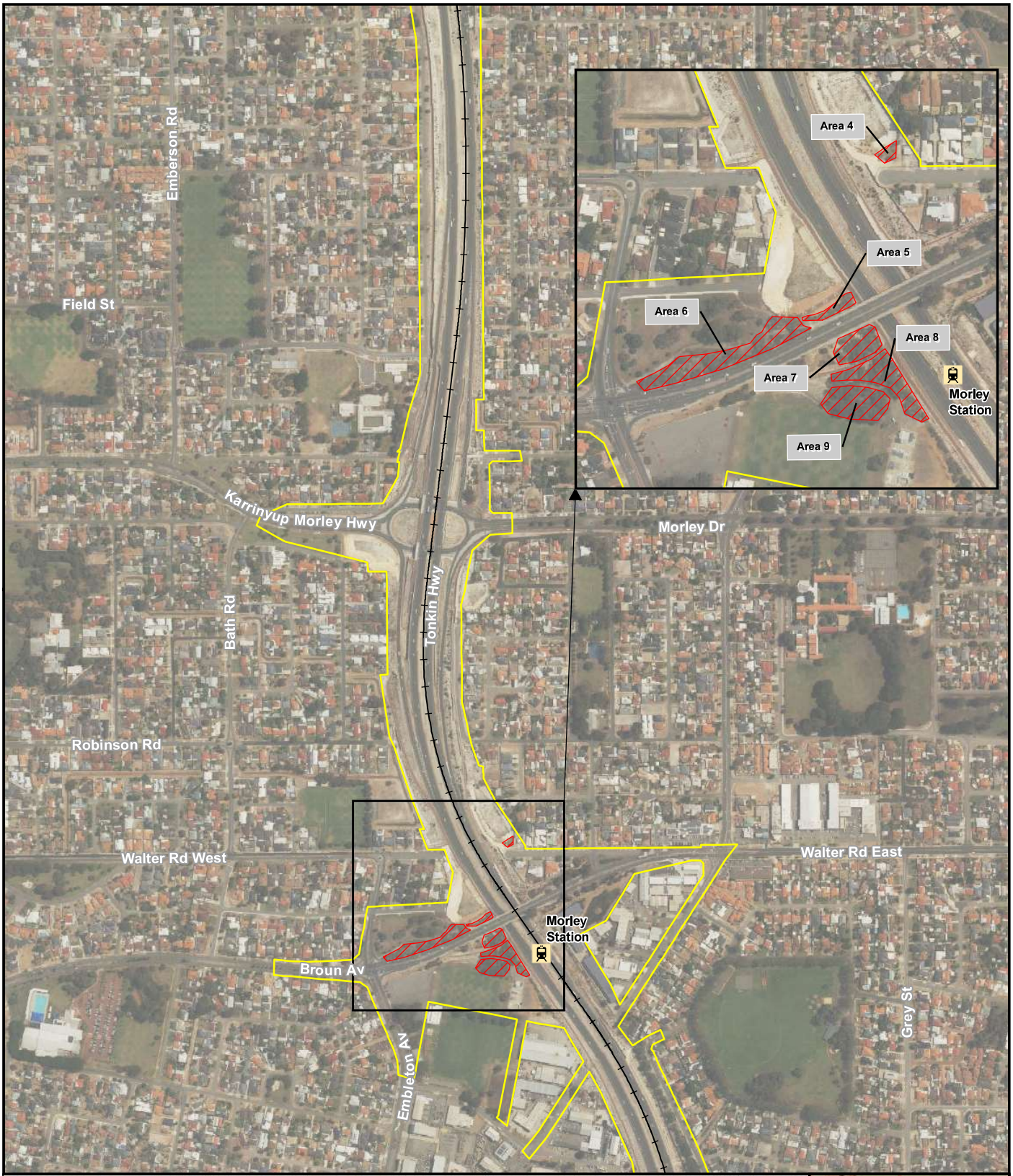

METRONET | Morley Ellenbrook Line Part 1 - Bayswater to Malaga NVCP

Figure 2C **Proposed Clearing within Development Envelope**

Public Transport Authority

Legend

- Development Envelope
- Native Vegetation Clearing Area
- Proposed Railway Station
- Indicative Railway Alignment

A
B
C
D

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Figure 2D **Proposed Clearing within Development Envelope**

Legend

- Development Envelope
- Indicative Railway Alignment

Public Transport Authority

A
B
C
D

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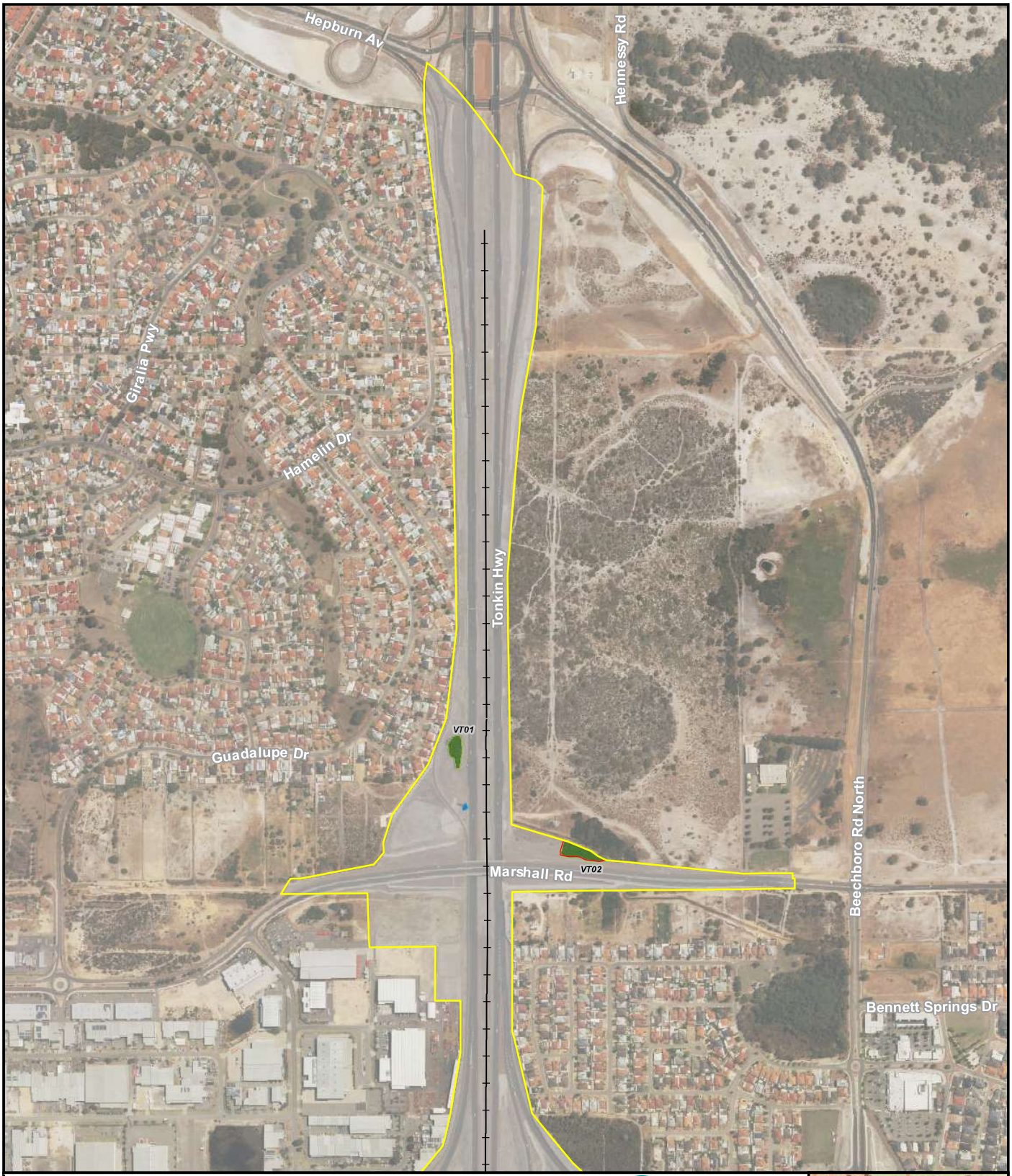
Figure 3 – Location of Native, Non-native Vegetation and Mapped Vegetation Types



METRONET | Morley Ellenbrook Line Part 1 - Bayswater to Malaga NVCP

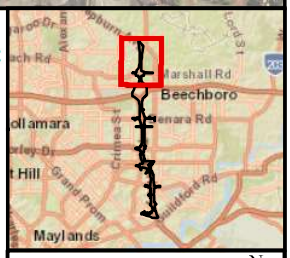
Figure 3A **Location of Native, Non-native Vegetation and Mapped Vegetation Types**

Public Transport Authority

Legend

- Development Envelope
- Indicative Railway Alignment
- Native
- Non Native
- Cleared
- Native Vegetation Clearing Area

A
B
C
D



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METRONET | Morley Ellenbrook Line Part 1 - Bayswater to Malaga NVCP

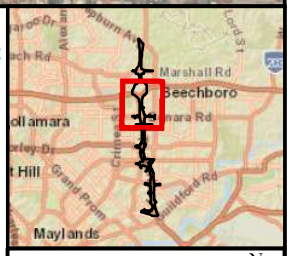
Figure 3B **Location of Native, Non-native Vegetation and Mapped Vegetation Types**

Public Transport Authority

Legend

- Development Envelope
- Proposed Railway Station
- Indicative Railway Alignment
- Native
- Non Native
- Cleared
- Native Vegetation Clearing Area

A
B
C
D



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METRONET | Morley Ellenbrook Line Part 1 - Bayswater to Malaga NVCP

Figure 3C **Location of Native, Non-native Vegetation and Mapped Vegetation Types**

Public Transport Authority

Legend

- Development Envelope
- Proposed Railway Station
- Indicative Railway Alignment
- Native
- Non Native
- Cleared
- Native Vegetation Clearing Area

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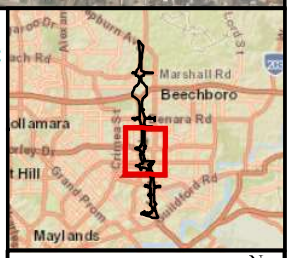

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Figure 3D **Location of Native, Non-native Vegetation and Mapped Vegetation Types**

Public Transport Authority

Legend

- Development Envelope
- Indicative Railway Alignment
- Non Native
- Cleared

A
B
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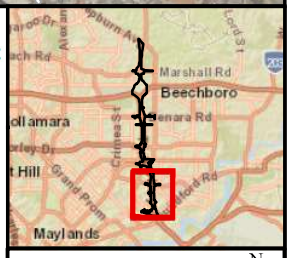

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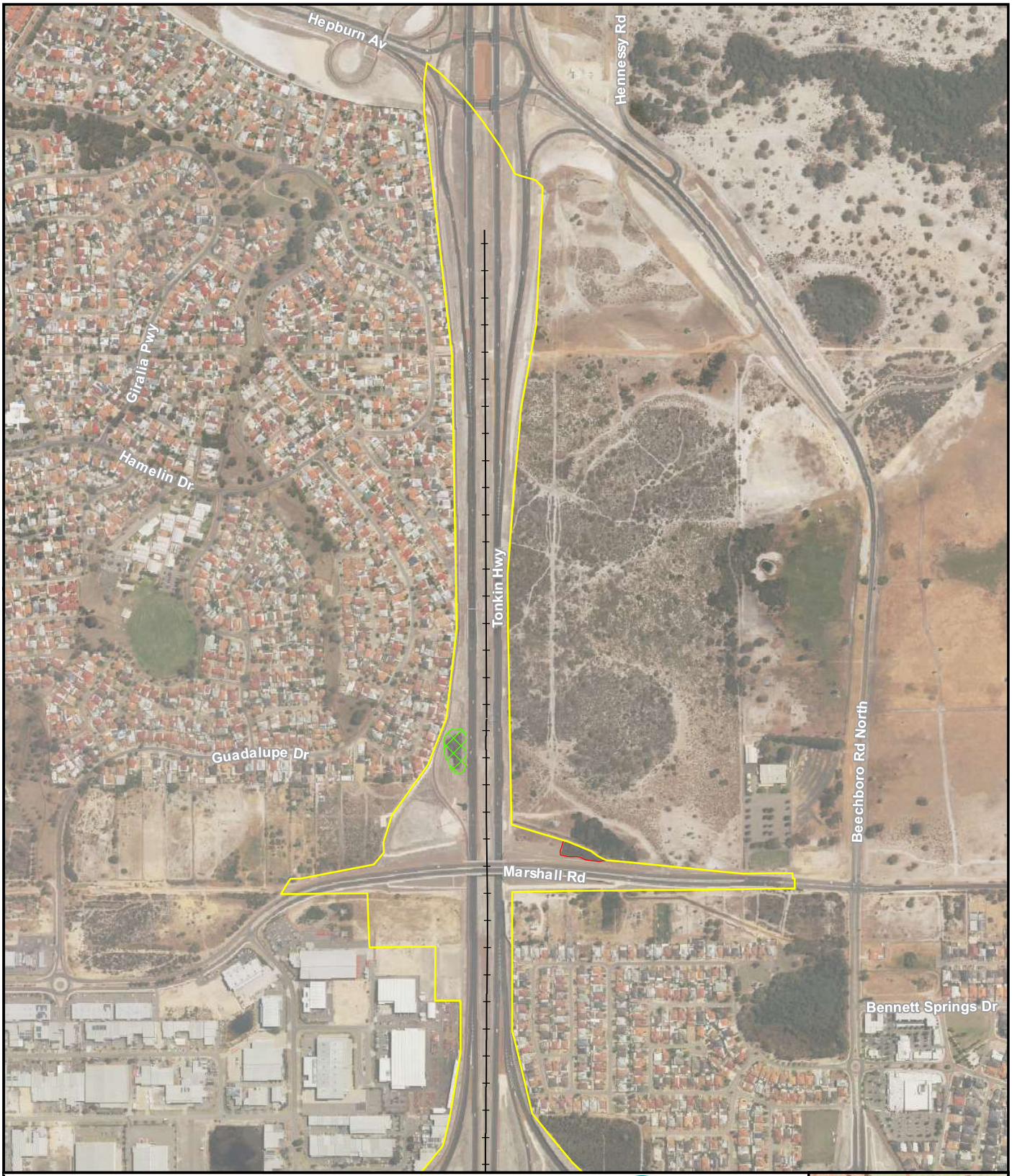
Figure 4 – Location of Native Vegetation Retention Areas and Priority Ecological Communities



METRONET | Morley Ellenbrook Line Part 1 - Bayswater to Malaga NVCP

Figure 4A **Location of Native Vegetation Retention Areas**

Legend

- Development Envelope
- Indicative Railway Alignment
- Native Vegetation Retention Area
- Native Vegetation Clearing Area

Public Transport Authority

A
B
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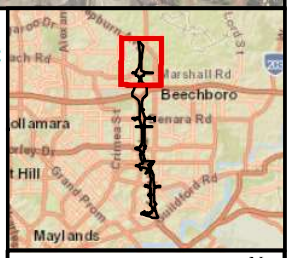
D



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METRONET | Morley Ellenbrook Line Part 1 - Bayswater to Malaga NVCP

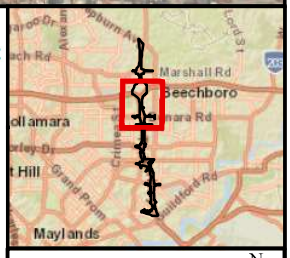
Figure 4B **Location of Native Vegetation Retention Areas**

Public Transport Authority

Legend

- Development Envelope
- Indicative Railway Alignment
- Native Vegetation Retention Area
- Banksia dominated woodlands of the Swan Coastal Plain IBRA region PEC
- Native Vegetation Clearing Area

A
B
C
D



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METRONET | Morley Ellenbrook Line Part 1 - Bayswater to Malaga NVCP

Figure 4C **Location of Native Vegetation Retention Areas**

Public Transport Authority

Legend

- Development Envelope
- Indicative Railway Alignment
- Native Vegetation Retention Area
- Banksia dominated woodlands of the Swan Coastal Plain IBRA region PEC
- Native Vegetation Clearing Area

A
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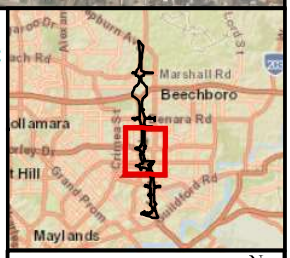

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METRONET | Morley Ellenbrook Line Part 1 - Bayswater to Malaga NVCP

Figure 4D **Location of Native Vegetation Retention Areas**

Public Transport Authority

Legend

- Development Envelope
- Native Vegetation Retention Area
- Indicative Railway Alignment

A
B
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D

Date Printed: 22/05/2020
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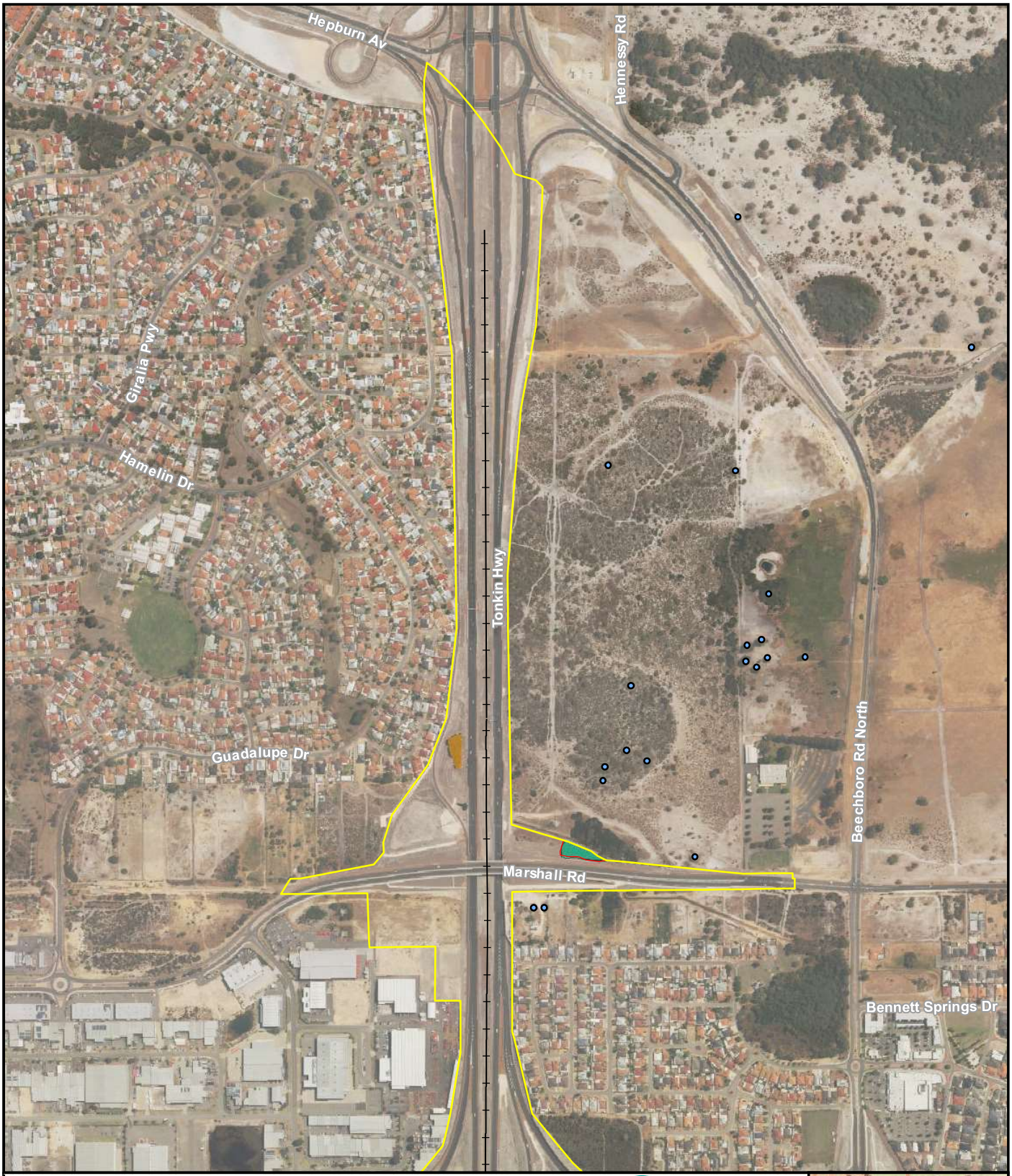
Figure 5 – Location of Fauna Habitat Trees and Foraging Habitat



METRONET | Morley Ellenbrook Line Part 1 - Bayswater to Malaga NVCP

Figure 5A **Location of Fauna habitat trees and Foraging Habitat**

Public Transport Authority

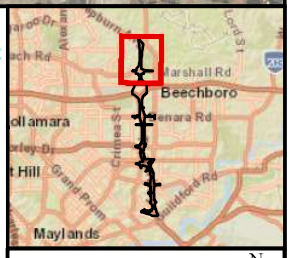
Legend

- Development Envelope
- Indicative Railway Alignment
- Potential Black Cockatoo Breeding Trees
- Native Vegetation Clearing Area

Black Cockatoo Foraging Habitat Quality

- Moderate
- Low

A
B
C
D



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METRONET | Morley Ellenbrook Line Part 1 - Bayswater to Malaga NVCP

Figure 5B **Location of Fauna habitat trees and Foraging Habitat**

Public Transport Authority

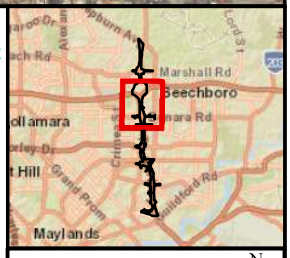
Legend

- Development Envelope
- Indicative Railway Alignment
- Potential Black Cockatoo Breeding Trees
- Native Vegetation Clearing Area

Black Cockatoo Foraging Habitat Quality

- Moderate
- Low

A
B
C
D



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METRONET | Morley Ellenbrook Line Part 1 - Bayswater to Malaga NVCP

Figure 5C **Location of Fauna habitat trees and Foraging Habitat**

Public Transport Authority

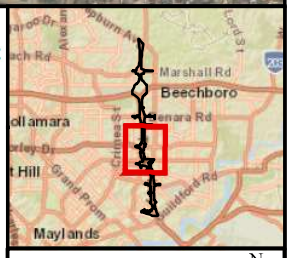
Legend

- Development Envelope
- Indicative Railway Alignment
- Potential Black Cockatoo Breeding Trees
- Native Vegetation Clearing Area

Black Cockatoo Foraging Habitat Quality

- High
- Moderate
- Low

A
B
C
D



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METRONET | Morley Ellenbrook Line Part 1 - Bayswater to Malaga NVCP

Figure 5D **Location of Fauna habitat trees and Foraging Habitat**

Public Transport Authority

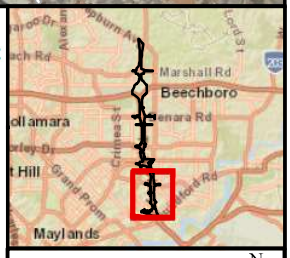
Legend

- Development Envelope
- Indicative Railway Alignment
- Potential Black Cockatoo Breeding Trees

Black Cockatoo Foraging Habitat Quality

- Low

A
B
C
D



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Created By: K.Du
Approved by: T.C

Scale: 1:10,000 @A4
Coordinate System: GDA 1994 MGA Zone 50

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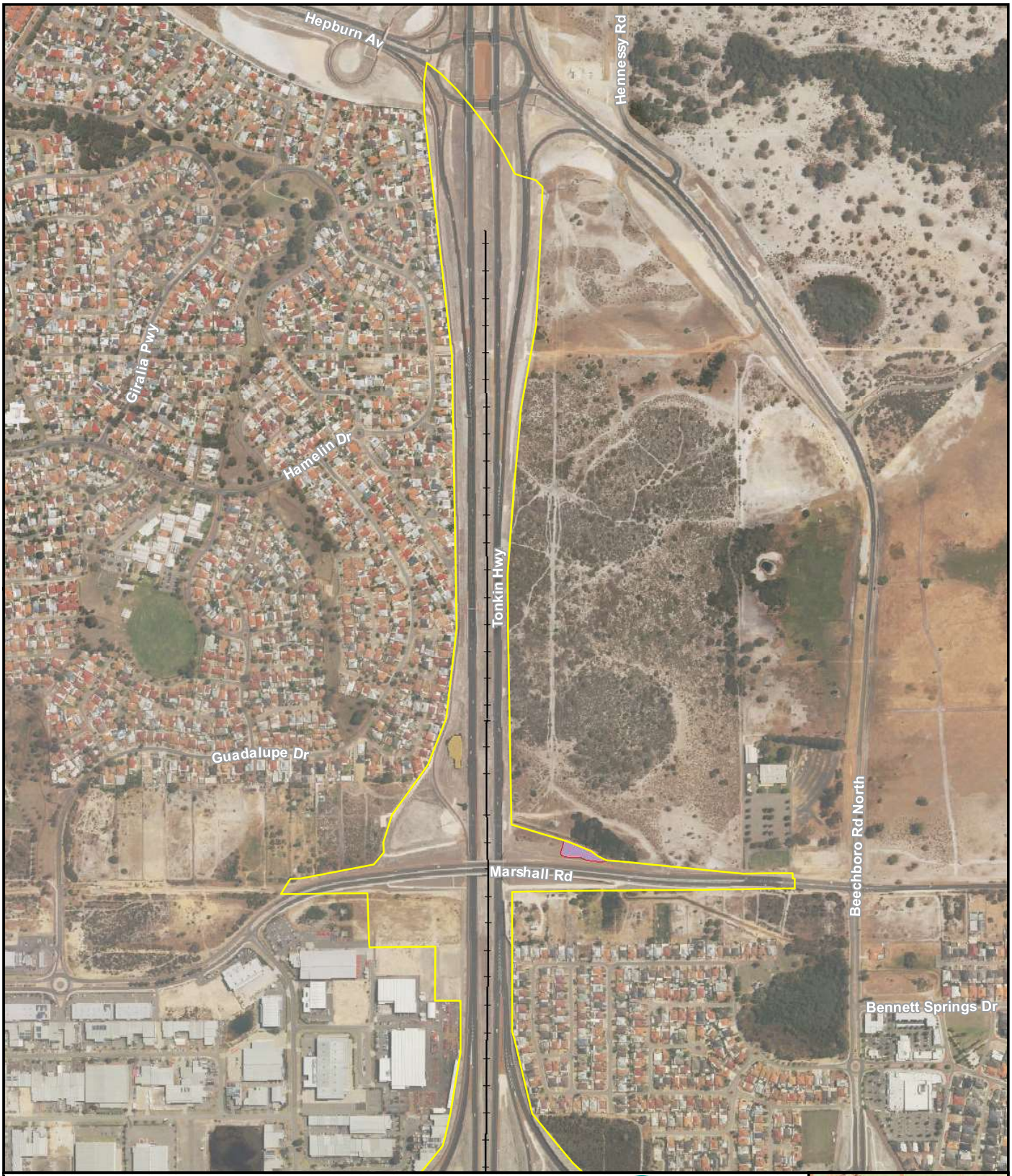
Figure 6 – Vegetation Condition



METRONET | Morley Ellenbrook Line Part 1 - Bayswater to Malaga NVCP

Figure 6A **Vegetation Condition**

Public Transport Authority

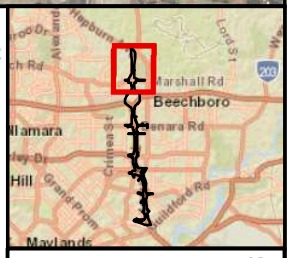
Legend

- Development Envelope
- Indicative Railway Alignment

Vegetation Condition

- D - Degraded
- DC - Degraded to Completely Degraded
- Native Vegetation Clearing Area

A
B
C
D



Date Printed: 22/05/2020
Created By: K.Du
Approved by: T.C

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METRONET | Morley Ellenbrook Line Part 1 - Bayswater to Malaga NVCP
Figure 6B **Vegetation Condition**

Public Transport Authority

Legend

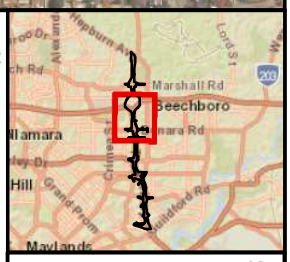
- Development Envelope
- Proposed Railway Station
- Indicative Railway Alignment

Vegetation Condition

- GD - Good - Degraded
- D - Degraded
- DC - Degraded to Completely Degraded
- CD - Completely Degraded

- Native Vegetation Clearing Area

A
B
C
D



Date Printed: 22/05/2020
Created By: K.Du
Approved by: T.C

Scale: 1:10,000 @A4
Coordinate System: GDA 1994 MGA Zone 50

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Base Data: Nearmap 2019, Landgate 2019, Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

METRONET | Morley Ellenbrook Line Part 1 - Bayswater to Malaga NVCP
Figure 6C **Vegetation Condition**

Public Transport Authority

Legend

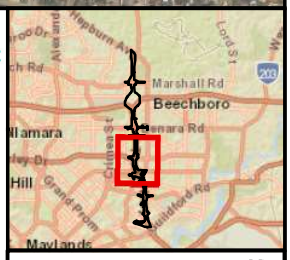
- Development Envelope
- Proposed Railway Station
- Indicative Railway Alignment

Vegetation Condition

- GD - Good - Degraded
- DC - Degraded to Completely Degraded
- CD - Completely Degraded

- Native Vegetation Clearing Area

A
B
C
D



Date Printed: 22/05/2020
Created By: K.Du
Approved by: T.C

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Scale: 1:10,000 @A4
Coordinate System: GDA 1994 MGA Zone 50

0 50 100 150 m

Document Path: Y:\ENVIRONMENTAL\Sam\04_MorleyEllenbrookLink\02_MXDs\MAPS_001_200\PTA-GIS-MEL-0033_A4P_Mapbook_v6.mxd
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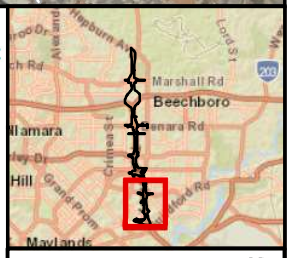
Figure 6D **Vegetation Condition**

Public Transport Authority

Legend

- Development Envelope
- Indicative Railway Alignment

A
B
C
D



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Approved by: T.C

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