



**SUBURBAN
RAIL LOOP**

Appendix B.1: Suburban Rail Loop (SRL) Precinct Location Options Assessment Summary

Security Classification: Public (Unclassified)

Appendix B.1: SRL Precinct Location Options Assessment Summary

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1 Introduction

1.1 Purpose of this appendix

This appendix sets out the methodology and analysis undertaken in relation to the assessment of Suburban Rail Loop (SRL) Precinct location options, which is Decision 6 of the Program Development Process described in Chapter 4 of this Business and Investment Case.

2 Precinct location options assessment approach

2.1 Options assessment methodology

The purpose of the precinct location options assessment process is to determine precinct locations to form the baseline SRL route, and specifically focuses on SRL East and SRL North between the Frankston line and Melbourne Airport.

The precinct location options presented in this Business and Investment Case have evolved through technical analysis and consultation and are based upon the work undertaken to inform the development of the Concept Design for SRL East and the advanced feasibility design for SRL North. These options may be refined through ongoing technical work (including development of the Reference Design), further consultation, planning approval processes and market engagement.

The precinct location options assessment process is based on a Multi-Criteria Assessment (MCA) framework and utilises a set of assessment criteria, as outlined in section 2.2.

The options assessment process draws on the Suburban Rail Loop Authority's (SRLA) internal optioneering methodology, which provides for a two-phase options assessment approach (comprising appraisal and detailed assessment) through the 'development phase' of the project development cycle.

An overview of the precinct location options assessment process is presented in Table B1-1 below.

Table B1-1: Precinct location options assessment process

Assessment phase	Assessment approach	Description
Phase 1	Appraisal	1. Identification of precinct location options
		2. Appraisal of precinct location options
		3. Shortlisting of precinct location options to be considered for detailed assessment
Phase 2	Detailed assessment	4. Detailed assessment of shortlisted precinct location options, including:
		a) Analysis of precinct location options by subject matter experts (SMEs) (incl. preparation of underlying technical reports)
		b) Options assessment workshops:
		i. Initial workshop
		ii. Review workshop
		c) Review and finalisation of option rankings and outcomes

5. Recommendation of preferred precinct locations for SRL East

The following provides a more detailed description of each step:

Phase 1 - Appraisal

- **Step 1: Identification of precinct location options**

This step involves identifying a long list of potential precinct location options by overlaying the SRL Objectives (productivity, connectivity and liveability) identified in the SRL Strategic Assessment 2018 across the middle corridor of Melbourne. This involves consideration of interchange opportunities along the existing radial rail network and identification of key precincts within the middle corridor of Melbourne that would benefit from a greenfield station.

For the purpose of undertaking an appraisal of precinct location options, a number of investigation zones are established.

- **Step 2: Appraisal of precinct location options**

This step involves an appraisal of the long list precinct location options (identified in Step 1) against a set of options assessment criteria. Information, analysis and assessment of precinct location options is provided by SMEs assigned to each criterion. Inputs from SMEs underpin the appraisal.

On the basis of SME inputs, the long list of precinct location options are assessed and ranked against each criteria in a relative sense within their respective investigation zone.

- **Step 3: Shortlisting of precinct location options**

The output of the appraisal process is a shortlist of precinct location options within each investigation zone to be progressed for more detailed assessment (where required). Where a single precinct location option is shortlisted within a given investigation zone, a detailed assessment of precinct location options within that investigation zone is not required.

Phase 2 – Detailed assessment

- **Step 4: Detailed assessment of shortlisted precinct location options**

This step involves a detailed assessment of shortlisted precinct location options (where multiple precinct location options are shortlisted as part of Step 3). This involves detailed technical analysis and studies by SMEs, including preparation of underlying technical reports, followed by a series of options assessment workshops to rank the options on the basis of this technical analysis and recommend a preferred option.

- **Step 5: Recommendation of preferred precinct locations**

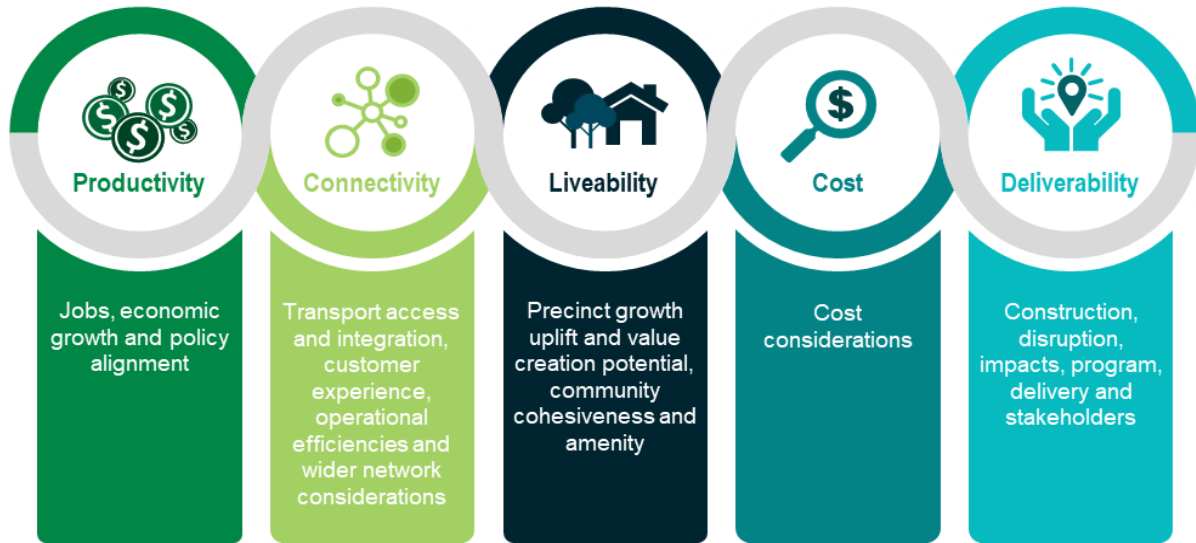
This step involves the recommendation of preferred precinct locations for the SRL route.

Note: The preferred precinct locations for SRL East are confirmed as part of this process. However, SRL North Precincts are at an earlier stage of the design process (advanced feasibility), as compared to SRL East (concept design). Therefore, the preferred precinct locations for SRL North are preliminary only and subject to further technical investigations and consultations.

2.2 Options assessment criteria

A set of options assessment criteria were developed to enable the assessment of precinct location options against a consistent set of criteria. The options assessment criteria were developed to align with the SRL Objectives (productivity, connectivity and liveability), together with cost and deliverability considerations. These criteria are summarised in Figure B1-1 below.

Figure B1-1: Options assessment criteria



The key considerations (or sub-criteria) within each of the options assessment criteria are outlined in the following table.

Table B1-2: Options assessment criteria

Options Assessment Criteria	Key considerations / Sub-criteria
Productivity	<ul style="list-style-type: none"> Alignment to <i>Plan Melbourne</i> as the policy blueprint to promote economic development, economic growth and economic inclusion Employment generation potential (access to jobs including opportunities to unlock employment growth within the precincts, markets, and provision of services closer to where people live) Improves productivity in Regional Victoria (supports jobs, economic activity, growth)
Connectivity	<ul style="list-style-type: none"> Improves access to public transport (e.g. demand, size of catchment area, local public transport options) Integrated transport outcomes and improved passenger movements (integration with existing lines / wider rail network per Transport for Victoria Integrated Transport Journey Requirements (TFV ITJR) and between transport modes, i.e. creation of interchanges and transport hubs) Customer experience outcomes and service reliability (station to station and interchange journey times, service frequency, punctuality) Operational efficiencies and maintainability (train speed, tunnel depth, route implications) Wider network considerations including SRL line-wide connectivity and wider network future proofing, resilience and safety
Liveability	<ul style="list-style-type: none"> Growth potential (gross floor area capacity, population uplift potential) Precinct development, urban renewal and value creation opportunities (potential contribution to enable precinct vision) Opportunity for enhanced community cohesiveness, amenity and safety (community facilities, open spaces) and minimises potential displacement / community impacts Opportunities for improved built form, resilient design solutions, better environmental outcomes
Cost	<ul style="list-style-type: none"> Minimises costs (Land acquisition costs; Design and Construct (D&C) costs; recurrent Operations and Maintenance (O&M) / whole of life costs)
Deliverability	<ul style="list-style-type: none"> Stakeholder engagement / stakeholder impact considerations

Options Assessment Criteria	Key considerations / Sub-criteria
	<ul style="list-style-type: none"> • Ease of constructability (ground / technical considerations) • Program and timing implications • Minimises disruption to community and existing transport network (rail and road disruptions) • Minimises environmental and water impacts • Minimises electro-magnetic interference (EMI) and vibration impacts on existing adjacent facilities (e.g. hospitals) • Minimises indigenous and heritage impacts • Minimises impacts to existing essential services infrastructure (sewers, water pipes, utilities) • Potential to reduce greenhouse gas emissions and adaptability to the effects of climate change / extreme weather events

3 Precinct location options identification

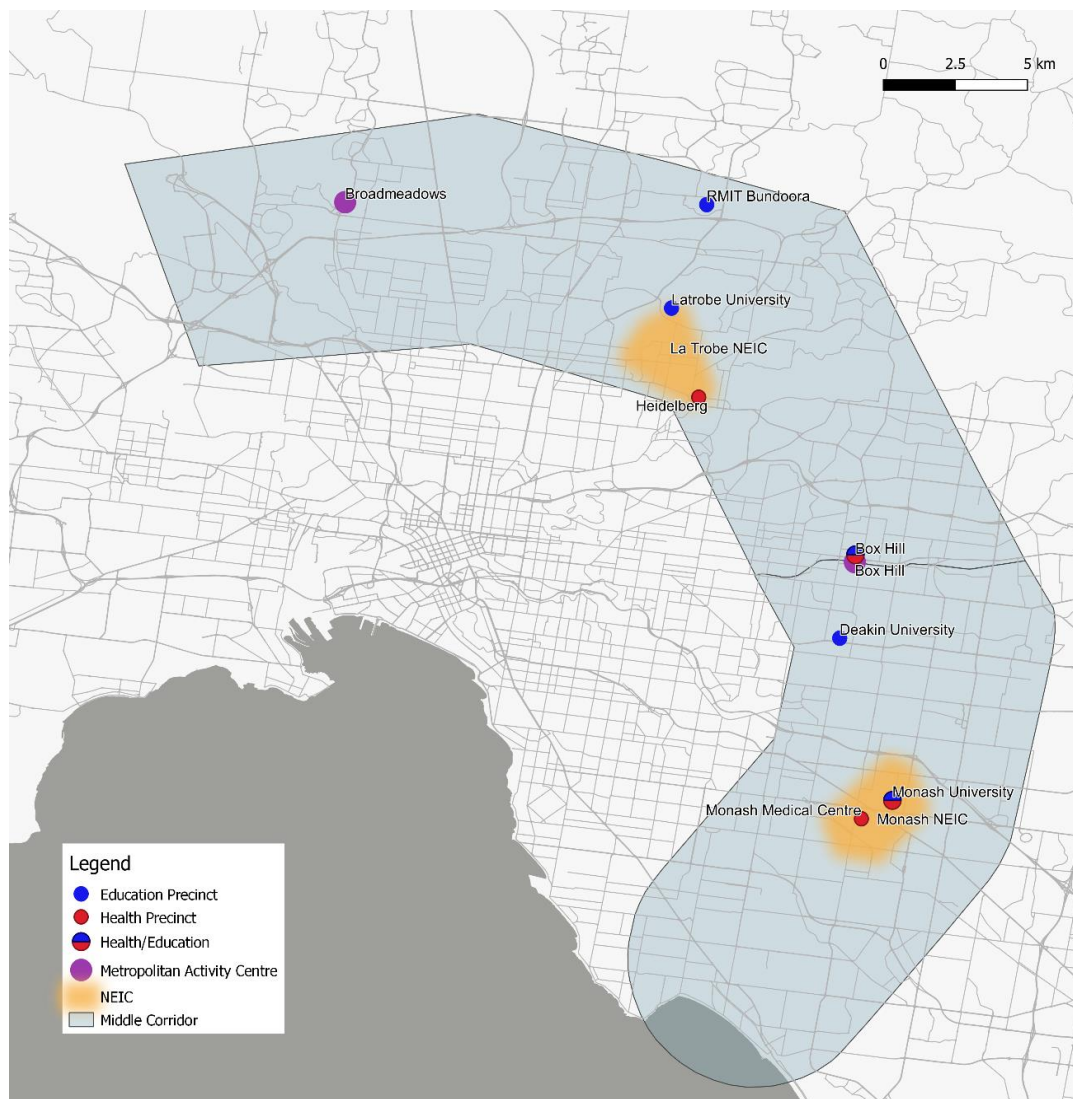
3.1 Identification of precinct location options

The potential precinct location options for SRL East and SRL North were identified by overlaying the SRL Objectives over the middle corridor footprint identified at Decision 3 of the Program Development Process outlined in Chapter 5 of the Business and Investment Case (as per the Strategic Assessment). This process is outlined in the following sub-sections.

3.1.1 SRL Objective 1: Productivity

This step involves overlaying *Plan Melbourne* policy guidance in respect of productivity outcomes, including specifically, National Employment and Innovation Clusters (NEICs), Metropolitan Activity Centres (MACs) and Health and / or Education Precincts. These are key areas to attract investment, support innovation, create jobs, and therefore deliver productivity outcomes. These are illustrated in Figure B1-2 below.

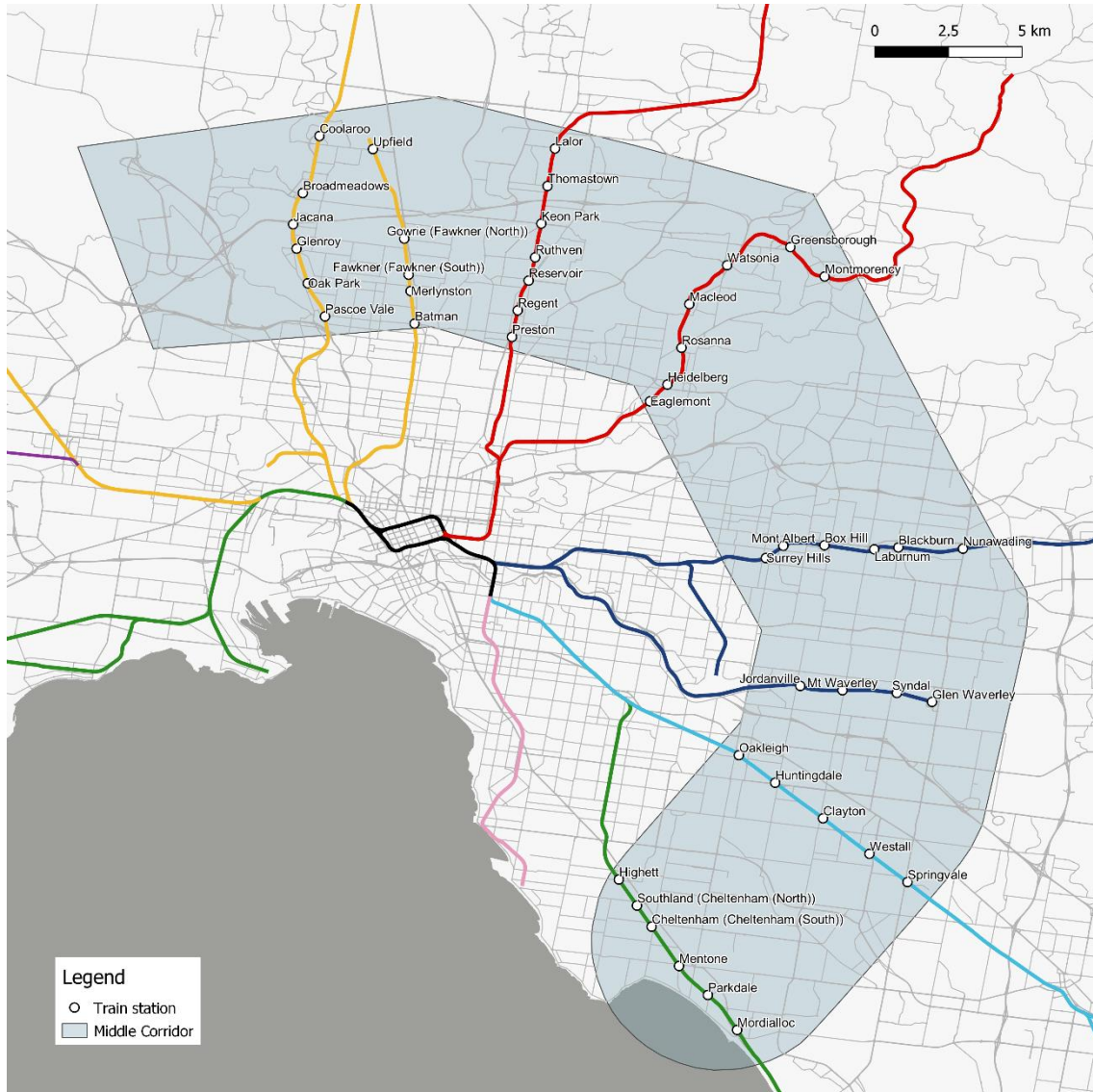
Figure B1-2: SRL Precinct option identification – Productivity overlay



3.1.2 SRL Objective 2: Connectivity

This step involves overlaying Melbourne's metropolitan radial rail network along the footprint of the middle corridor to identify potential interchange options, and therefore deliver connectivity outcomes. The existing radial rail network and potential interchange opportunities are illustrated in Figure B1-3 below.

Figure B1-3: SRL Precinct option identification – Connectivity overlay



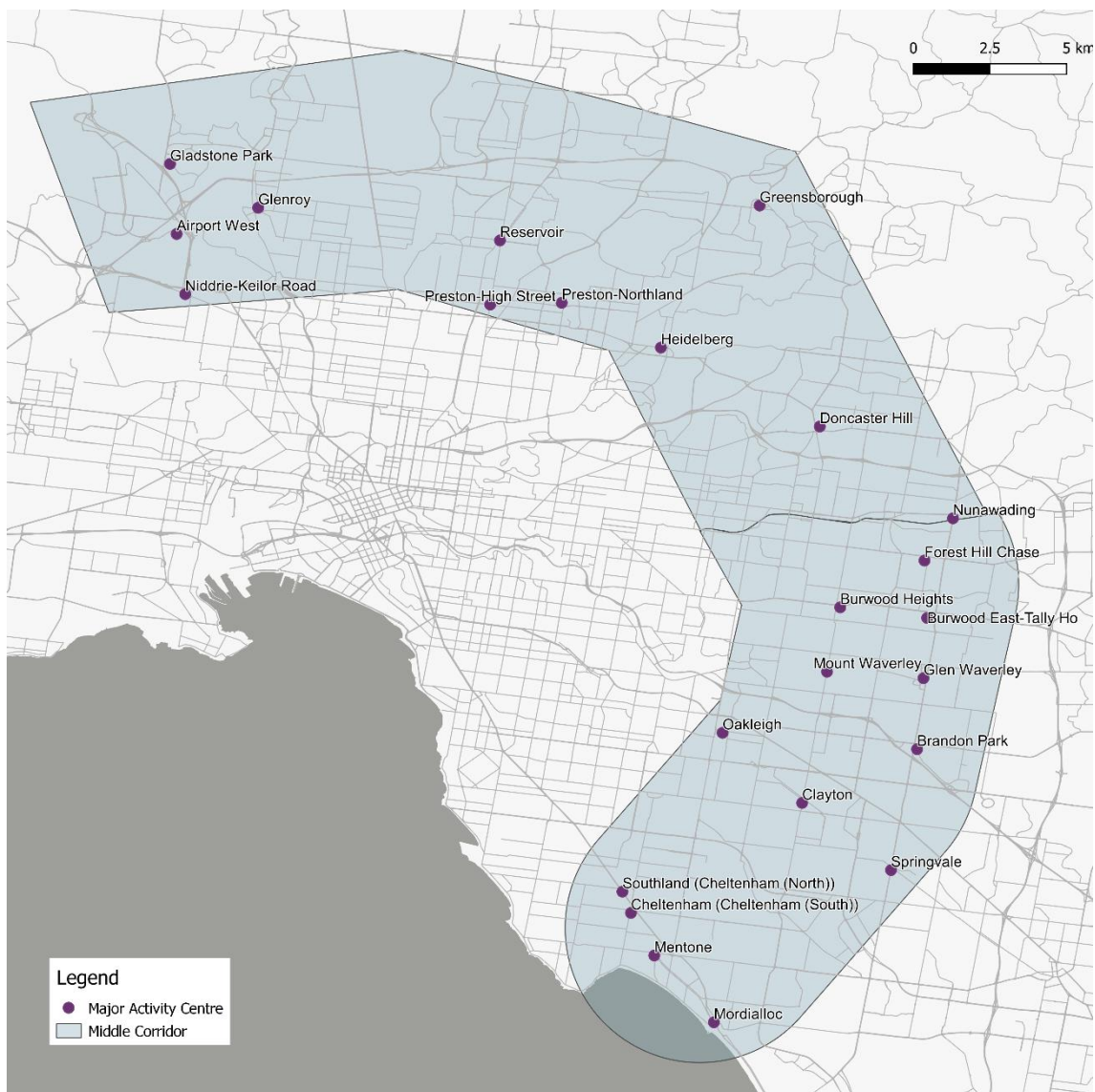
3.1.3 SRL Objective 3: Liveability

This step involves overlaying *Plan Melbourne* policy guidance in respect of liveability outcomes, including specifically Major Activity Centres. These are key suburban centres that are currently characterised by mixed use activity (including retail, commercial and residential) and therefore provide housing closer to jobs and public transport and access to a wide range of goods and services, including shopping centres. As such, these centres offer potential to deliver stronger liveability outcomes if an SRL station was connected to them.

It is noted that NEICs and MACs also offer the potential to deliver liveability outcomes. However, as these have already been captured within the productivity overlay, they have not been reconsidered here (i.e. because NEICs and MACs have already been identified as priority areas for the precinct location options assessment).

Major Activity Centres within the middle corridor are illustrated in Figure B1-4 below.

Figure B1-4: SRL Precinct option identification – Liveability overlay

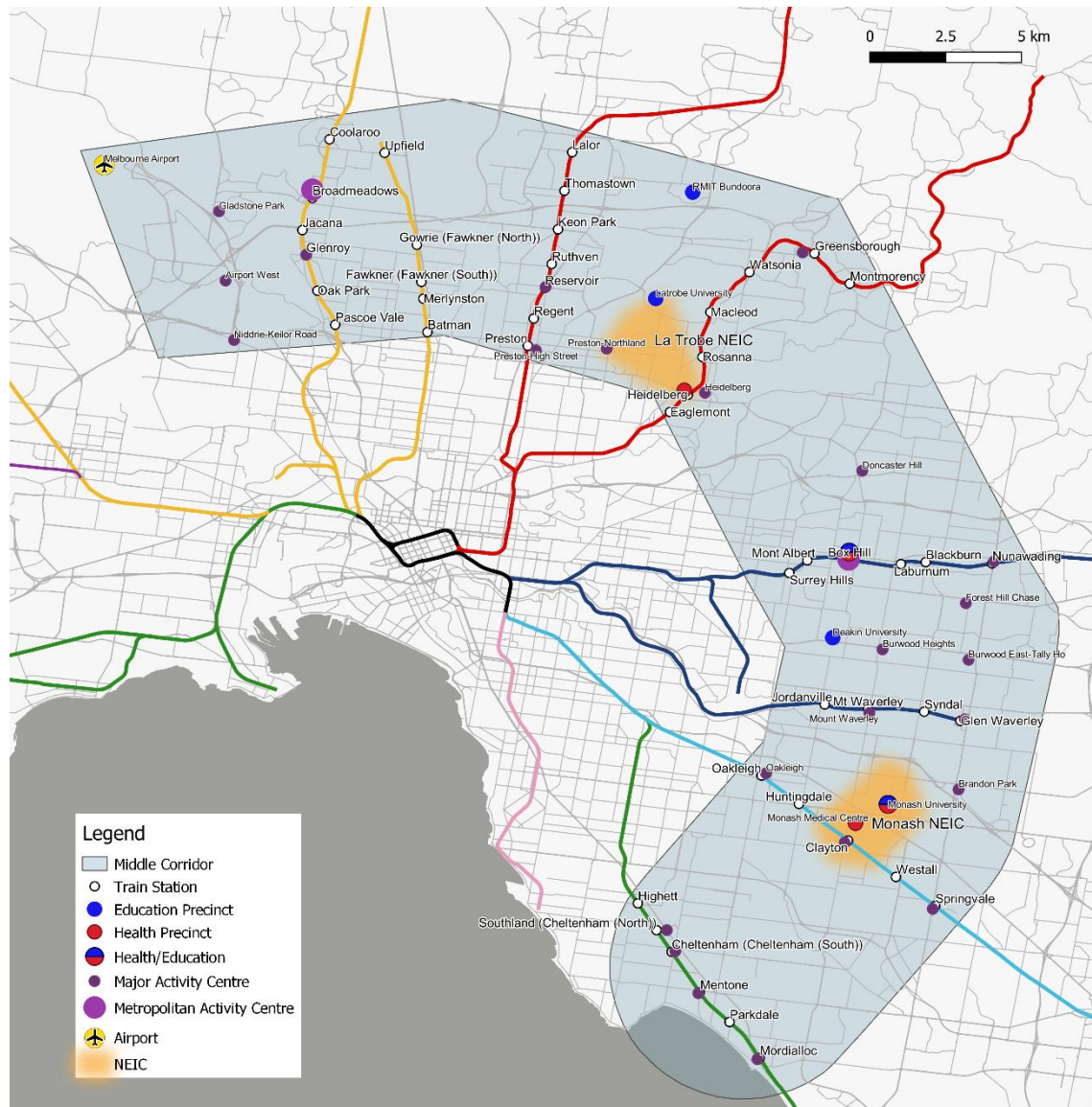


3.1.4 SRL Precinct location options – summary

Figure B1-5 below overlays all three SRL Objectives (productivity, connectivity and liveability) onto the middle corridor of Melbourne. In addition, a key strategic purpose of SRL is a connection to Melbourne Airport (a key Transport Gateway). Melbourne Airport is therefore overlaid as an anchor destination onto the middle corridor of Melbourne – noting also that a rail connection between Melbourne Airport and the CBD (via Sunshine) is being delivered by RPV as part of the MAR project.

Figure B1-5 illustrates the long list of potential precinct location options for SRL East and SRL North.

Figure B1-5: SRL East and SRL North long list of precinct location options

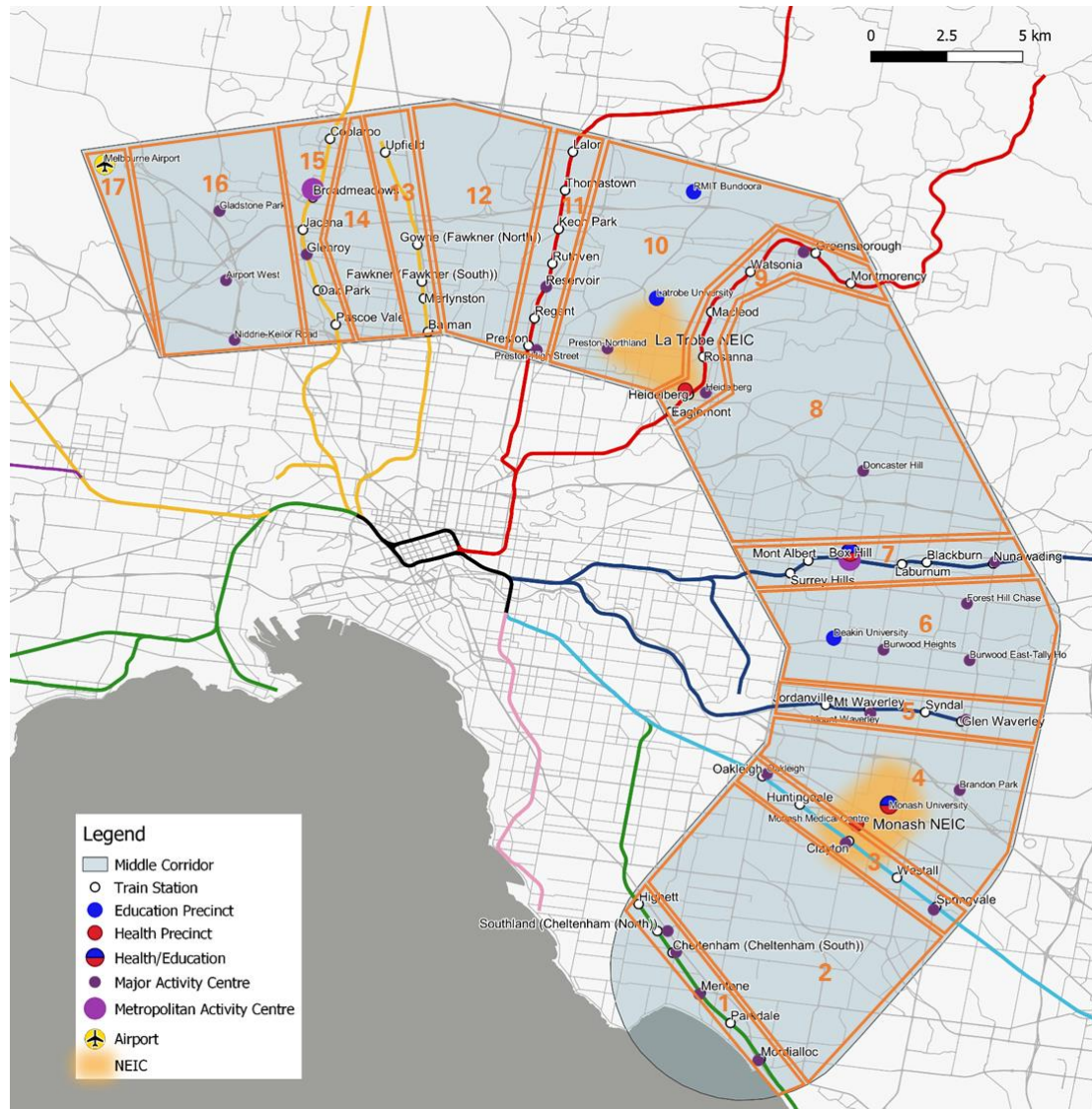


3.2 Investigation zones

In order to assess the long list of potential SRL East and SRL North precinct location options, 17 investigation zones were established to enable the grouping of identified precinct location options into interchange options (along Melbourne's existing metropolitan radial rail network) and greenfield options. This grouping of precinct location options into investigation zones enabled a relative assessment and ranking of options within each investigation zone.

The investigation zones are shown in Figure B1-6 below.

Figure B1-6: SRL East and SRL North investigation zones



While 17 investigation zones were identified (as shown above), there were a number of investigation zones that did not require (for varying reasons, which are explained below) a relative assessment and ranking of precinct location options. These include:

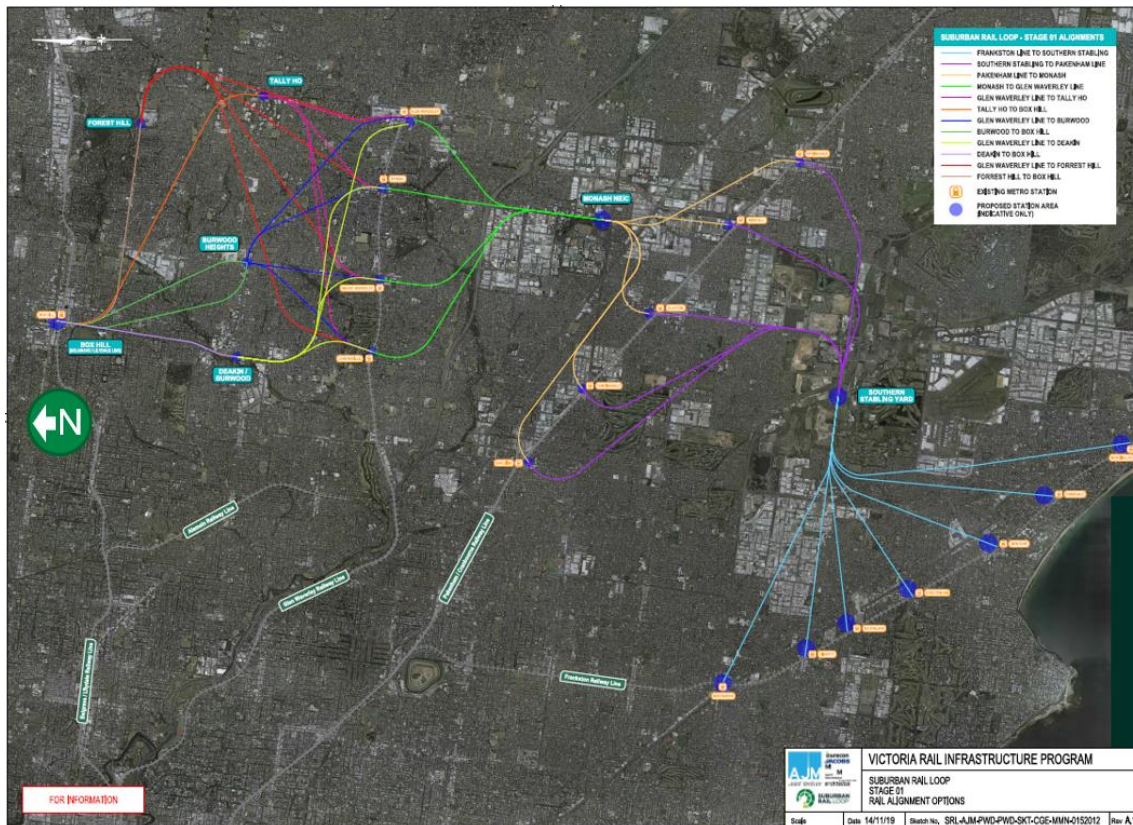
- **Investigation Zones 2 and 16 (stabling and maintenance facility sites)** – These investigation zones are the locations of SRL East's southern and SRL North's northern stabling and maintenance facilities, and therefore are not subject to the precinct location options assessment process (i.e. each of these zones will accommodate a stabling and maintenance facility, however designs will not preclude a future station should the demand exist in future). Details of the stabling and maintenance facility site options assessment is provided in section 6.

For completeness, it is noted (as shown in Figure B1-6) that there are no potential precinct location options identified within Investigation Zone 2. However, there are three potential precinct location options identified within Investigation Zone 16. As Investigation Zone 16 is located within the area of the longer term SRL North, these potential precinct location options will be retained going forward, to be considered as further technical investigation and analysis is undertaken for SRL North.

- **Investigation Zones 4, 7, 10, 15 and 17 (anchor precincts)** – These investigation zones are the location of the anchor precincts for the SRL (as defined in Decision 4 of the Program Development Process) – Monash, Box Hill, Bundoora, Broadmeadows and Melbourne Airport – and are therefore not subject to the precinct location options assessment process.
- **Investigation Zone 8 (single option identified)** – Doncaster is the only precinct option identified within Investigation Zone 8, and therefore this zone is not subject to the precinct location options assessment process.
- **Investigation Zones 12 and 14 (no options identified)** – No precinct location options were identified in these investigation zones.

In this context, there are a number of potential alignment permutations between investigation zones. These are shown in Figure B1-7 below.

Figure B1-7: SRL East alignment permutations



Section 4 provides a summary of the precinct location options assessment for each investigation zone, with a summary of all outcomes provided in Section 0.

4 Precinct location options assessment

4.1 SRL East

The SRL East precinct locations identified within the Business and Investment Case were publicly announced by the Victorian Government in September 2019. The announced locations were informed by the Suburban Rail Loop Strategic Assessment (2018), which examined potential location options against existing Victorian government priorities and policies. These locations were the subject of the assessment process outlined in this section.

The below sub-sections present the assessment of SRL East precinct location options and identify the confirmed precinct locations for each investigation zone.

4.1.1 Investigation Zone 1: Frankston line

4.1.1.1 Overview of Investigation Zone 1

The precinct location options identified in Investigation Zone 1 are Moorabbin, Highett, Cheltenham (North), Cheltenham (South), Mentone, Parkdale and Mordialloc. These are shown in Figure B1-8 below, noting Cheltenham (North) refers to the existing Southland station area and Cheltenham (South) refers to the existing Cheltenham station area.

Figure B1-8: Investigation Zone 1 – Frankston line



It is noted that Investigation Zone 2 (shown in Figure B1-8 above) is the location of the southern stabling and maintenance facility (Southern Stabling Facility). During the precinct options

assessment process, the preferred site location for the Southern Stabling Facility was used as a baseline for the SRL route (however noting this was an iterative process as described in Section 6.2.1). Specifically, the location and indicative orientation of the preferred stabling site option were considered as constraints on the possible route alignments from the precinct location options within Investigation Zone 1.

4.1.1.2 Options assessment summary

Cheltenham (North) produces the most favourable outcomes on balance across the options assessment criteria, relative to the other options within Investigation Zone 1. A summary of the outcomes of the precinct location options assessment is provided below.

Productivity

Cheltenham (North) is expected to provide the most favourable productivity outcomes of the options in this investigation zone. Cheltenham (North) is a *Plan Melbourne* designated Major Activity Centre (Southland) with medium to high potential for major precinct development, economic growth and future employment. Whilst Cheltenham (South), Moorabbin, Mentone and Mordialloc are also Major Activity Centres, it is considered that they have lower potential for major precinct development, economic growth and future employment, relative to Cheltenham (North) which is in proximity to a number of major strategic sites along Bay Road that present an opportunity to deliver mixed-use development along a Bay Road spine.

Connectivity

Cheltenham (South) and Cheltenham (North) are expected to produce similar connectivity outcomes. Cheltenham (South) and Cheltenham (North) produce similar journey times as the shortest and second shortest respectively, and both have sizeable population and employment catchments forecast in 2051 (based on VIF 2016). Cheltenham (North) benefits from its location close to Westfield Southland Shopping Centre, which generates greater demand for transport services.. The new underground Cheltenham station as part of Level Crossing Removal Project is expected to provide a better passenger interchange opportunity.

Liveability

Moorabbin, Cheltenham (North) and Cheltenham (South) are expected to provide favourable liveability outcomes. Moorabbin, Cheltenham (North), Cheltenham (South), Mentone and Mordialloc are *Plan Melbourne* designated Major Activity Centres, suggesting that there is growth potential in respect of gross floor area and population uplift. However, relevant structure plans and policies for Moorabbin, Cheltenham (North) and Cheltenham (South) anticipate more significant opportunities relative to the other options for increased residential densities and mixed-use development, supported by improvements to community facilities.

Cost

Cheltenham (North) is expected to provide the most favourable cost outcomes. Whilst Cheltenham (South) and Cheltenham (North) have the shortest alignment lengths of all options in this investigation zone, Cheltenham (South) is expected to require a deeper station depth (compared to Cheltenham (North)). Cheltenham (North) is also expected to provide opportunities to construct a station box in existing Crown land and therefore limit the extent and cost and impact of property acquisitions, relative to that which would be required in the centre of Cheltenham (South).

Deliverability

Cheltenham (North) is expected to provide the most favourable deliverability outcomes of all options in this investigation zone. The short alignment lengths for both Cheltenham (North) and Cheltenham (South) support favourable program outcomes relative to all other options in this investigation zone. However, Cheltenham (North) is expected to provide marginally more favourable deliverability outcomes compared to Cheltenham (South) given the quality of access

available for construction and therefore ability to minimise direct disruptions to the community and existing precinct during construction phase. It is expected that there would be much more significant disruption at Cheltenham (South) during construction, as compared to Cheltenham (North).

Summary

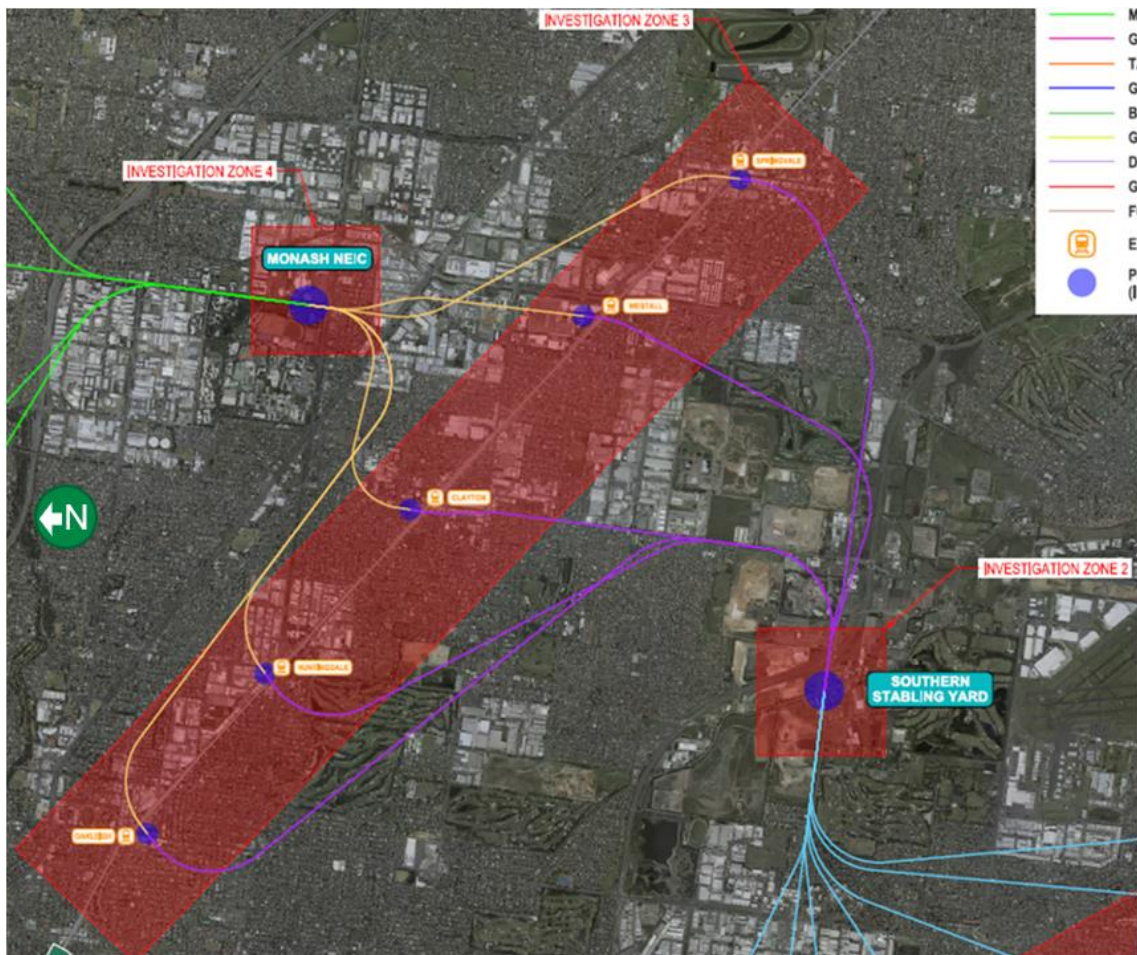
The preferred precinct option for Investigation Zone 1 is Cheltenham (North).

4.1.2 Investigation Zone 3: Cranbourne / Pakenham line

4.1.2.1 Overview of Investigation Zone 3

The precinct location options identified in Investigation Zone 3 are Oakleigh, Huntingdale, Clayton, Westall and Springvale. These are shown in Figure B1-9 below.

Figure B1-9: Investigation Zone 3 – Cranbourne / Pakenham line



It is noted that Investigation Zone 2 and Investigation Zone 4 (shown in Figure B1-9 above) are the locations of the Southern Stabling Facility and Monash NEIC respectively, which act as anchor points (including the preferred location and indicative orientation of the Southern Stabling Facility) for the SRL route.

4.1.2.2 Options assessment summary

Clayton produces the most favourable outcomes, on balance, across the options assessment criteria, relative to the other options within Investigation Zone 3. A summary of the outcomes of the precinct location options assessment is provided below.

Productivity

Clayton is expected to provide the most favourable productivity outcomes of all options in this investigation zone. Clayton is a *Plan Melbourne* designated Major Activity Centre with high potential for major precinct development, economic growth and future employment. Whilst Oakleigh and Springvale are also Major Activity Centres, Clayton is expected to provide marginally higher potential for major precinct development, economic growth and future employment. Clayton structure plans and policies promote the development and intensification of the centre, and the rezoning of land in and around the centre to support retail and mixed-use developments, including office, health, medical and residential uses. There are a number of large under-utilised sites in proximity to the centre with potential to deliver high yield developments. Clayton is also the only option within this investigation zone which provides a direct interchange to the regional rail network, thus offering the potential for creation of a transport super hub to connect to, and support the prosperity of, Regional Victoria.

Connectivity

Clayton is expected to provide the most favourable connectivity outcomes of all options in this investigation zone. Clayton has the shortest journey time of all options within this investigation zone. Clayton has the highest population, employment and tertiary enrolment catchments forecast in 2051 (based on VIF 2016), supporting demand potential. In addition, Clayton has quality integrated transport connections, including notably, to both metropolitan and regional train services (no other option in this investigation zone is directly serviced by the regional rail network) and six bus routes.

Liveability

Clayton is expected to provide the most favourable liveability outcomes of the options in this investigation zone. Whilst Clayton, Oakleigh and Springvale are all *Plan Melbourne* designated Major Activity Centres, relevant structure plans suggest a higher opportunity for precinct development, value creation and improvements to community facilities at Clayton and Springvale. Clayton structure plans and policies promote the expansion of the residential growth zone in proximity to the existing railway station and activity centre, to facilitate redevelopment of single dwellings into medium density apartments and townhouses. This is in addition to streetscape improvements to create a high-quality pedestrian environment and outdoor dining spaces. Springvale structure plans and policies also promote higher density housing options with mixed use lower levels to support the commercial component of the centre, as well as improved urban character.

Cost

Clayton and Westall are expected to provide the most favourable cost outcomes of the options in this investigation zone. This is a result of Clayton producing the shortest alignment length, but with a marginally deeper station depth compared to Westall. The cost outcomes are therefore considered broadly comparable between these two options. All other options produce longer alignment lengths, which leads to greater cost.

Deliverability

Clayton and Westall are expected to provide the most favourable deliverability outcomes of the options in this investigation zone. The short alignment lengths for Clayton supports favourable program durations relative to all other options in this investigation zone. In addition, both Clayton and Westall provide comparatively good access for construction.

Summary

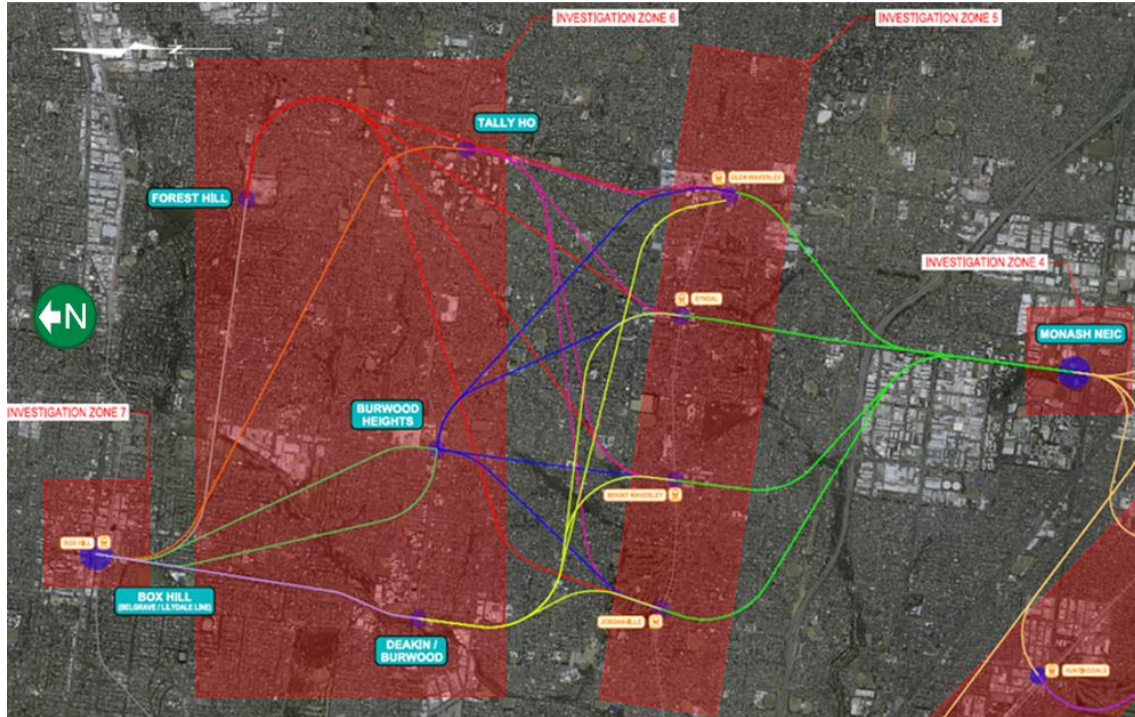
The preferred precinct option for Investigation Zone 3 is Clayton.

4.1.3 Investigation Zone 5: Glen Waverley line

4.1.3.1 Overview of Investigation Zone 5

The precinct location options identified in Investigation Zone 5 are Jordanville, Mount Waverley, Syndal and Glen Waverley. These are shown in Figure B1-10 below.

Figure B1-10: Investigation Zone 5 – Glen Waverley line



It is noted that Investigation Zone 4 and Investigation Zone 7 (shown in Figure B1-10 above) are the locations of the Monash NEIC and Box Hill MAC respectively, which act as anchor points for the SRL route. The intermediate investigation zones (Investigation Zones 5 and 6), each offer a number of precinct location options, which gives rise to various permutations for point-to-point alignment.

4.1.3.2 Options assessment summary

Glen Waverley produces the most favourable outcomes, on balance, across the options assessment criteria, relative to the other options within Investigation Zone 5. A summary of the outcomes of the precinct location options assessment is provided below.

Productivity

Glen Waverley is expected to provide the most favourable productivity outcomes of all options in this investigation zone. Whilst Glen Waverley and Mount Waverley are both *Plan Melbourne* designated Major Activity Centres, relevant structure plans suggest that Glen Waverley provides a greater potential (medium to high potential) for major precinct development, economic growth and future employment, as compared to Mount Waverley (low to medium potential). Glen Waverley structure plans and policies seek to promote the centre as a major multi-functional activity centre servicing the south eastern metropolitan areas, with high rise development and a mix of retail, entertainment, office, residential and medical services. The intention is to build on the range of employment generators that already exist within the precinct – including hotels, cinemas, restaurants, The Glen shopping centre and small-scale retail. The other precinct location options in this investigation zone are either not identified in *Plan Melbourne* as activity centres (Jordanville) or as Neighbourhood Activity Centres (NAC) (Syndal), suggesting more limited potential for major precinct development, economic growth and future employment.

Connectivity

Glen Waverley, Mount Waverley and Syndal are expected to provide relatively favourable connectivity outcomes. Whilst Mount Waverley and Syndal produce shorter alignment lengths compared to Glen Waverley, these options have much more limited integrated transport outcomes (train, bus, road and active transport) compared to Glen Waverley. Glen Waverley has quality integrated transport outcomes, including a dedicated off-street bus interchange and 10 bus routes servicing the precinct (including SmartBus route 902). This is compared to Mount Waverley and Syndal which is serviced by two bus routes each. The Glen Waverley and Syndal catchments have much higher population, employment and tertiary enrolments forecasted in 2051 (based on VIF 2016), compared to Mount Waverley. This is expected to support demand potential.

Liveability

Glen Waverley is expected to provide the most favourable liveability outcomes of the options in this investigation zone. Whilst Mount Waverley and Glen Waverley are both *Plan Melbourne* designated Major Activity Centres, relevant structure plans suggest a higher opportunity for precinct development, value creation and improvements to community facilities at Glen Waverley than for all other options in this investigation zone. Glen Waverley structure plans and policies envisage a transformation of the precinct into a more vibrant, intensive and active urban centre, with high rise residential development to support growth. A key policy is to establish Kingsway as a vibrant and highly active civic spine by strengthening its hospitality, entertainment and retail focus and creating attractive public space to integrate with the library, community hub and future public square.

Cost

Mount Waverley and Syndal are expected to provide the most favourable cost outcomes as a result of their shorter alignment lengths. Glen Waverley is expected to have a greater cost than Mount Waverley or Syndal, as a result of its longer alignment length. Station depths are not considered to be a key differentiating factor for the options within this investigation zone.

Deliverability

Mount Waverley and Glen Waverley are expected to provide favourable deliverability outcomes. Mount Waverley has a short alignment length, therefore supporting favourable program outcomes (from a tunnelling perspective). However, whilst the Glen Waverley option will involve a longer tunnelling program, the overall construction program for SRL East is expected to be driven by other critical path activities. It is also noted that Glen Waverley is expected to provide better access for construction and limit the disruption impact on residential properties. On balance, the deliverability outcomes are considered at par between the Mount Waverley and Glen Waverley options.

Summary

The preferred precinct option for Investigation Zone 5 is Glen Waverley.

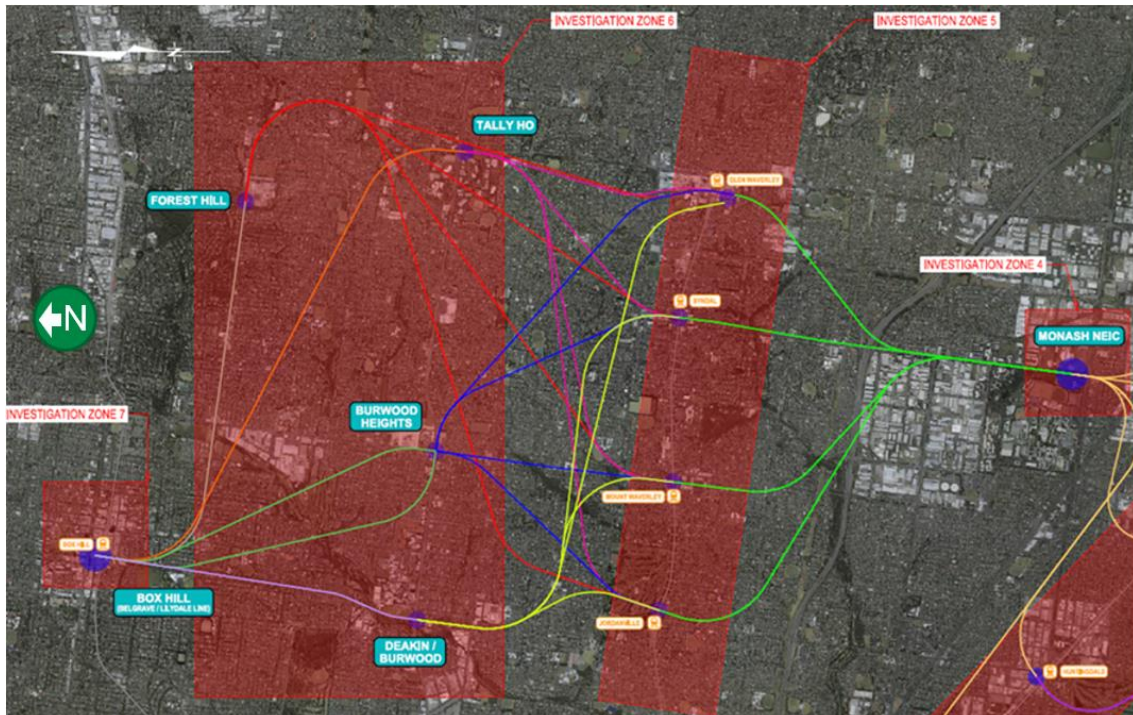
On balance, it is considered that Glen Waverley offers a significantly greater opportunity (relative to other options in this investigation zone) to deliver on SRL's productivity and liveability objectives, which justify the additional alignment length and its associated impact on cost and duration of the tunnelling program (noting that the overall construction program is expected to be driven by other critical path activities).

4.1.4 Investigation Zone 6: Glen Waverley line to Belgrave / Lilydale line

4.1.4.1 Overview of Investigation Zone 6

The precinct location options identified in Investigation Zone 6 are Burwood, Burwood Heights, Forest Hill Chase and Burwood East (Tally Ho). These are shown in Figure B1-11 below.

Figure B1-11: Investigation Zone 6 – Glen Waverley line to Belgrave / Lilydale line



It is noted that Investigation Zone 4 and Investigation Zone 7 (shown in Figure B1-11 above) are the locations of the Monash NEIC and Box Hill MAC respectively, which act as anchor points for the SRL route. The intermediate investigation zones (Investigation Zones 5 and 6), each offer a number of precinct location options, which gives rise to various permutations for point-to-point alignment.

4.1.4.2 Options assessment summary

Burwood produces the most favourable outcomes, on balance, across the options assessment criteria, relative to the other options within Investigation Zone 6. A summary of the outcomes of the precinct location options assessment is provided below.

Productivity

Burwood is expected to provide the most favourable productivity outcomes of all options in this investigation zone. Burwood (Deakin University) is a *Plan Melbourne* designated Education Precinct with significant potential for major precinct development, economic growth and future employment. This includes opportunities to the south west of the Deakin University campus for a mix of higher-density commercial, residential and local retail uses. Whilst all other options in this investigation zone are designated Major Activity Centres, they are considered to have only low to medium potential for major precinct development, economic growth and future employment, particularly due to their existing subdivision patterns.

Connectivity

Burwood is expected to provide the most favourable connectivity outcomes of all options in this investigation zone. Burwood has the second shortest journey time of the options within this investigation zone. Burwood has significant demand potential, with the second highest forecast employment in 2051 and is the only option within this investigation zone with a sizeable tertiary enrolled student catchment – forecast to be 42,000 by 2051 (based on VIF 2016). Burwood also has quality integrated transport connections, including notably, four bus routes, connecting through to Box Hill and Chadstone.

Liveability

Burwood is expected to provide the most favourable liveability outcomes of all options in this investigation zone. Burwood (Deakin University) is a *Plan Melbourne* designated Education Precinct and relevant structure plans and policies suggest a continued increase in student accommodation and expansion of neighbouring facilities. A significant increase in international student enrolments has already led to planning permit applications and development intensification around the Deakin University campus for student accommodation. Whilst all other options in this investigation zone are designated Major Activity Centres, it is considered that these will provide lower precinct development and uplift, value creation and improvements to community facilities, relative to that which could be expected at Burwood.

Cost

Burwood Heights is expected to provide the most favourable cost outcomes as a result of its short alignment length. Burwood is expected to have a marginally higher cost than Burwood Heights.

Deliverability

Burwood is expected to provide the most favourable deliverability outcomes of all options in this investigation zone. Burwood has the second shortest alignment length, supporting program outcomes. In addition, Burwood provides quality access for movement of construction materials and spoil, with only moderate disruption to the community and existing precinct expected during construction.

Burwood Heights has constrained access for movement of construction materials and spoil, with more significant disruption to the community and the existing precinct expected during construction.

Summary

The preferred precinct option for Investigation Zone 6 is Burwood.

4.2 SRL North

The SRL North precinct locations identified within the Business and Investment Case are preliminary only. The below sub-sections present the assessment of SRL North precinct location options and identify these preliminary preferred precinct locations, as well as a number of other shortlisted precinct location options for each investigation zone.

Given the long-term nature of SRL East and SRL North and its staged delivery over multiple decades, the preliminary preferred precincts and other shortlisted precinct location options for SRL North will be subject to further planning and development work for SRL North. This will include:

- Further options analysis, including to update the preliminary analysis for any changes in circumstances over time;
- Additional technical investigations; and
- Ongoing stakeholder consultation processes.

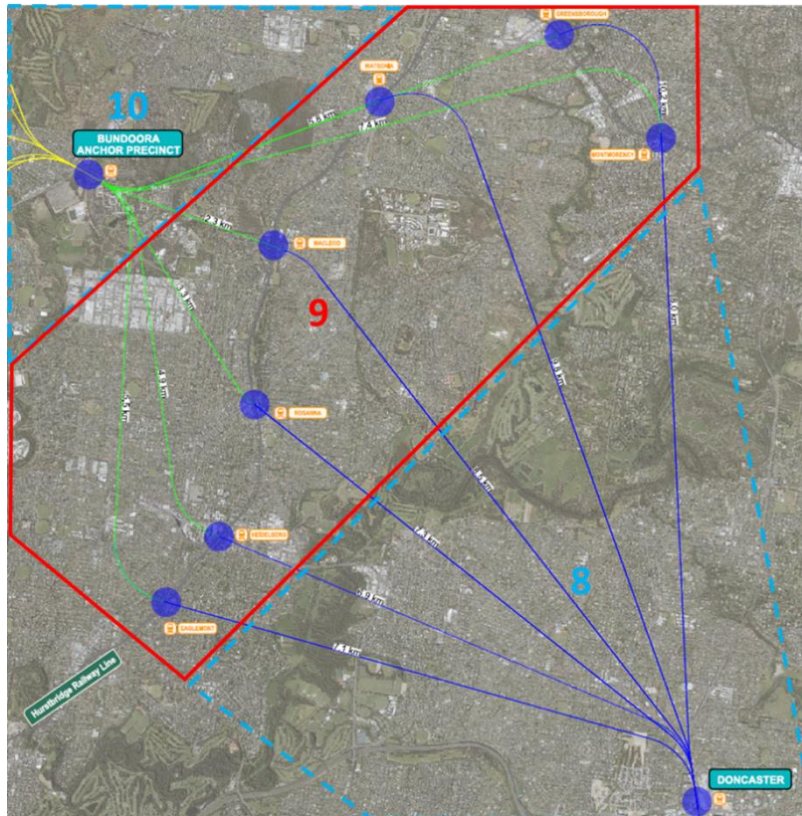
There is no concept design for SRL North at this point in time. This level of design work will not be completed until further options analysis, technical investigations and stakeholder consultations have been undertaken.

4.2.1 Investigation Zone 9: Hurstbridge line

4.2.1.1 Overview of Investigation Zone 9

The precinct location options identified in Investigation Zone 9 are Eaglemont, Heidelberg, Rosanna, Macleod, Watsonia, Greensborough and Montmorency. These are shown in Figure B1-12 below.

Figure B1-12: Investigation Zone 9 – Hurstbridge line



It is noted that Investigation Zone 8 (shown in Figure B1-12 above) is the location of the Doncaster precinct, which is the only precinct option identified in that investigation zone. In addition, Investigation Zone 10 (shown in Figure B1-12 above) is the location of the Latrobe NEIC, which acts as an anchor point for the SRL route.

4.2.1.2 Options assessment summary

Heidelberg produces the most favourable outcomes on balance across the options assessment criteria, relative to the other options within Investigation Zone 9. Heidelberg is therefore the preliminary preferred precinct location for this investigation zone. In addition, Rosanna is also shortlisted for ongoing consideration as further planning and development work for the SRL North is progressed.

A summary of the outcomes of the precinct location options assessment is provided below.

Productivity

Heidelberg is expected to provide the most favourable productivity outcomes of the options in this investigation zone. Heidelberg is a *Plan Melbourne* designated Major Activity Centre and Health Precinct with high potential for major precinct development, economic growth and future employment in health, medical and allied sectors, with associated benefits for commercial employment growth in retail and commerce. Whilst Greensborough is also a Major Activity Centre,

it is considered that Greensborough has marginally lower potential for major precinct development, economic growth and future employment, relative to Heidelberg.

Connectivity

Heidelberg and Rosanna are expected to produce the most favourable connectivity outcomes of the options in this investigation zone. Whilst Rosanna produces a shorter alignment length compared to Heidelberg and therefore a shorter journey time, Rosanna has more limited integrated transport outcomes (train, bus, road and active transport) compared to Heidelberg. Heidelberg has quality integrated transport outcomes, including connections to existing metro train service, numerous bus routes, roads and numerous designated cycling and walking routes. Heidelberg has the highest employment and tertiary enrolment catchment forecasts in 2051 (based on VIF 2016) in this investigation zone, whilst Rosanna has a sizeable population catchment forecast in 2051 (based on VIF 2016).

Liveability

Heidelberg is expected to provide the most favourable liveability outcomes of the options in this investigation zone. Heidelberg is a *Plan Melbourne* designated Major Activity Centre and Health Precinct, suggesting that there is significant growth potential in respect of gross floor area and population uplift. Local planning schemes, structure plans or policies relevant to Heidelberg show that increased density and diversity of residential housing stock should be encouraged, with greater height and scale at the centre to enable mixed uses such as retail, commercial and residential.

Cost

Rosanna and Macleod are expected to provide the most favourable cost outcomes as a result of their short alignment lengths (shortest and second shortest respectively) and relatively shallow station depths (second shallowest and third shallowest respectively). Heidelberg presents the next most favourable cost outcome, with the third shortest alignment length.

Deliverability

Rosanna and Macleod are expected to provide the most favourable deliverability outcomes of the options in this investigation zone. The shorter alignment lengths for both Rosanna and Macleod support favourable program outcomes relative to all other options in this investigation zone. In addition, Rosanna is expected to provide quality access for movement of construction materials and spoil, whilst Macleod is expected to provide somewhat constrained access. Both Rosanna and Macleod are expected to provide moderate disruption to the community or operation of the existing precinct. The only option expected to be less disruptive than Rosanna and Macleod is Watsonia (minimal disruption). However, the Watsonia option requires additional tunnelling length (compared to Rosanna as the shortest option) which could add time to the program.

Summary

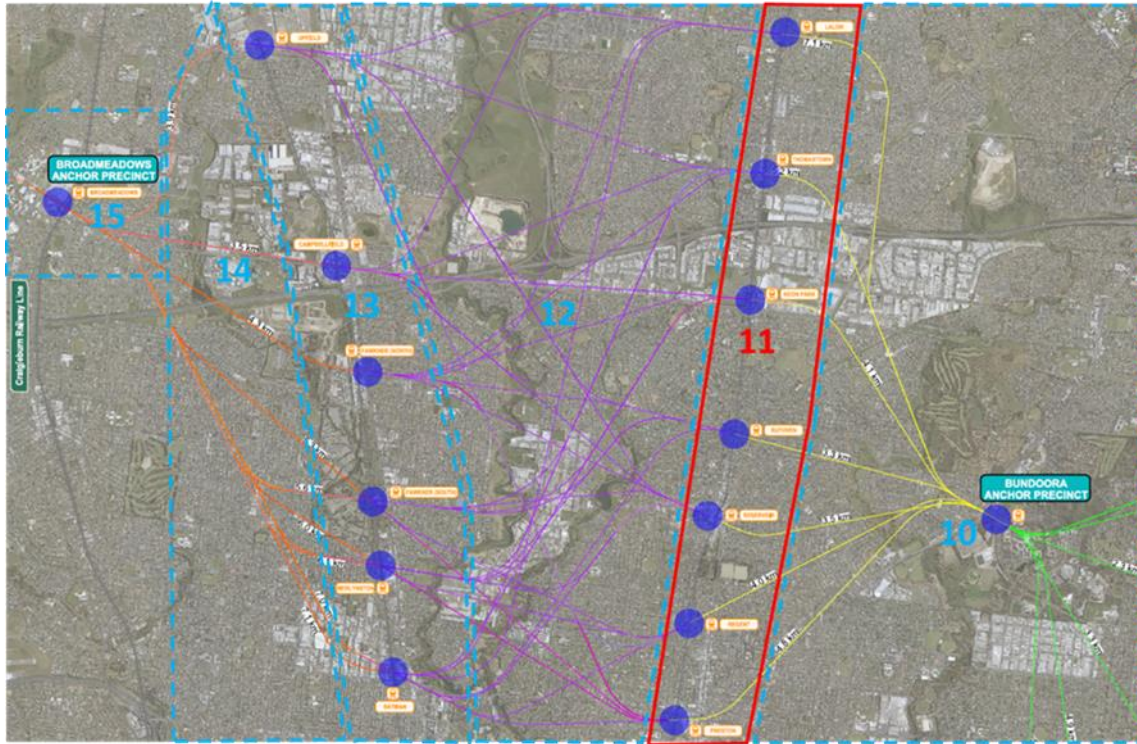
The shortlisted precinct location options for Investigation Zone 9 are Heidelberg and Rosanna. The preliminary preferred precinct option for Investigation Zone 9 is Heidelberg.

4.2.2 Investigation Zone 11: Mernda line

4.2.2.1 Overview of Investigation Zone 11

The precinct location options identified in Investigation Zone 11 are Preston, Regent, Reservoir, Ruthven, Keon Park, Thomastown and Lalor. These are shown in Figure B1-13 below.

Figure B1-13: Investigation Zone 11 – Mernda line



It is noted that Investigation Zone 10 and Investigation Zone 15 (shown in Figure B1-13 above) are the locations of the Latrobe NEIC and Broadmeadows MAC respectively, which act as anchor points for the SRL route. The intermediate investigation zones (Investigation Zones 11 and 13) each offer a number of precinct location options (noting that no precinct location options were identified within Investigation Zones 12 and 14), which gives rise to various permutations for point-to-point alignment.

4.2.2.2 Options assessment summary

Reservoir produces the most favourable outcomes on balance across the options assessment criteria, relative to the other options within Investigation Zone 11. Reservoir is therefore the preliminary preferred precinct location for this investigation zone. In addition, Preston is also shortlisted for ongoing consideration as further planning and development work for the SRL North is progressed.

A summary of the outcomes of the precinct location options assessment is provided below.

Productivity

Preston is expected to provide the most favourable productivity outcomes of the options in this investigation zone. Preston is a *Plan Melbourne* designated Major Activity Centre with comparatively higher potential for major precinct development, economic growth and future employment. Whilst Reservoir is also a Major Activity Centre, it is considered that Reservoir has marginally lower potential for major precinct development, economic growth and future employment, relative to Preston. All other options within this investigation zone are either NACs or not designated as activity centres in *Plan Melbourne*. In addition, all other options are

considered to have lower potential for major precinct development, economic growth and future employment (based on relevant local planning schemes, structure plans and/or policies), relative to Preston and Reservoir.

Connectivity

Preston and Reservoir are expected to provide the most favourable connectivity outcomes of the options in this investigation zone. Reservoir produces the second shortest journey time of all options in this investigation zone. Reservoir also provides quality integrated transport outcomes (train, bus, road and active transport). However, Reservoir has relatively low population, employment and tertiary enrolment forecasts in 2051 (based on VIF 2016), compared to other options in this investigation zone. Whilst Preston produces a longer journey time (relative to Reservoir), it provides quality integrated transport outcomes and has the second highest population, third highest employment and highest tertiary enrolment forecasts in 2051 (based on VIF 2016).

Liveability

Preston is expected to provide the most favourable liveability outcomes of the options in this investigation zone. Whilst Preston and Reservoir are both *Plan Melbourne* designated Major Activity Centres, relevant local planning schemes, structure plans and/or policies suggest a higher opportunity for precinct development and uplift, value creation and improvements to community facilities at Preston than for all other options in this investigation zone. Preston is nominated within relevant local planning schemes and structure plans as a strategic development precinct and the foremost location for residential growth in the municipality. Relevant local planning policies suggest that increased housing density and mixed-use developments should be encouraged, with greater height and scale in the activity centre. Reservoir is designated within relevant local planning schemes and structure plans as a secondary Activity Centre relative to Preston.

Cost

Ruthven and Reservoir are expected to provide the most favourable cost outcomes as a result of their shorter alignment lengths (shortest and second shortest respectively). Ruthven also has the second shallowest average station depth. Whilst Reservoir has a deeper average station depth relative to other options within this investigation zone, the cost savings associated with its shorter alignment length materially outweigh the increased costs of a deeper station box.

Deliverability

Reservoir, Ruthven and Keon Park are expected to provide the most favourable deliverability outcomes of the options in this investigation zone. The shorter alignment lengths for these three options support favourable program outcomes relative to the other options in this investigation zone. In addition, all three of these options are expected to provide quality access for movement of construction materials and spoil. Keon Park is expected to provide minimal disruption to the community or operation of the existing precinct, whilst Reservoir and Ruthven are expected to provide a moderate level of disruption. Preston is expected to provide less favourable program outcomes as a result of its longer alignment length (and therefore tunnelling duration). Whilst Preston is expected to provide quality access for movement of construction materials and spoil, it is expected to result in greater relative disruption to community and operation of the existing precinct.

Summary

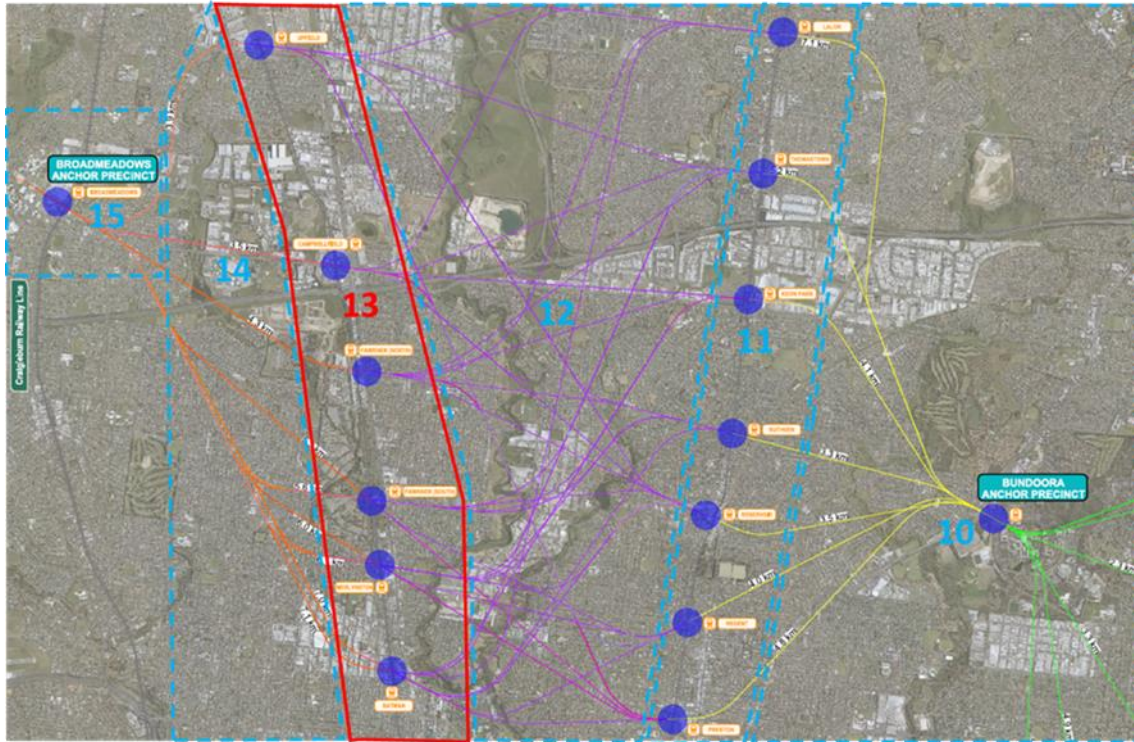
The shortlisted precinct location options for Investigation Zone 11 are Reservoir and Preston. The preliminary preferred precinct option for Investigation Zone 11 is Reservoir.

4.2.3 Investigation Zone 13: Upfield line

4.2.3.1 Overview of Investigation Zone 13

The precinct location options identified in Investigation Zone 13 are Batman, Merlynston, Fawkner (South), Fawkner (North), Upfield and Campbellfield. These are shown in Figure B1-14 below.

Figure B1-14: Investigation Zone 13 – Upfield line



**Note: There is not currently a railway station located at Campbellfield. However, Level Crossing Removal Project (LXRP) works undertaken during 2017 at Camp Road, Campbellfield allowed for the possibility of future infrastructure improvements in the area, including a potential future station at Campbellfield (located along the Upfield line between Gowrie and Upfield stations). In recognition of the long-term nature of SRL North, the Campbellfield precinct has therefore been included as a potential interchange option within Investigation Zone 13 (subject to construction of a Campbellfield station along the Upfield line in future).*

It is noted that Investigation Zone 10 and Investigation Zone 15 (shown in Figure B1-14 above) are the locations of the Latrobe NEIC and Broadmeadows MAC respectively, which act as anchor points for the SRL route. The intermediate investigation zones (Investigation Zones 11 and 13) each offer a number of precinct location options (noting that no precinct location options were identified within Investigation Zones 12 and 14), which gives rise to various permutations for point-to-point alignment.

4.2.3.2 Options assessment summary

Fawkner (North) produces the most favourable outcomes on balance across the options assessment criteria, relative to the other options within Investigation Zone 13. Fawkner (North) is therefore the preliminary preferred precinct location for this investigation zone. In addition, Batman and Campbellfield are also shortlisted for ongoing consideration as further planning and development work for the SRL North is progressed.

A summary of the outcomes of the precinct location options assessment is provided below.

Productivity

Batman, Merlynston, Upfield and Campbellfield are expected to provide the most favourable productivity outcomes of the options in this investigation zone (noting that none of these options are considered to provide optimal outcomes). None of the options in this investigation zone are designated as NEICs, MACs, Health and/or Education Precincts or Major Activity Centres within *Plan Melbourne*. Merlynston, Upfield and Campbellfield are *Plan Melbourne* designated NACs and are therefore considered to have greater potential for major precinct development, economic growth and future employment relative to other options such as Fawkner (South) and Fawkner (North) which are not designated as activity centres in *Plan Melbourne*. Whilst Batman is not designated as an activity centre in *Plan Melbourne*, it is within 100 metres of the Coburg Major Activity Centre. Coburg is the 'Principal Activity Centre' of the municipality and identified to accommodate the most significant change of all activity centres in the municipality. Its proximity to Batman indicates potential for major precinct development, economic growth and future employment.

Connectivity

Batman and Fawkner (North) are expected to produce the most favourable connectivity outcomes of the options in this investigation zone. Fawkner (North) and Campbellfield produce the shortest journey times of the options in this investigation zone. However, Fawkner (North) provides more favourable integrated transport outcomes (train, bus, road and active transport), compared to Campbellfield. Whilst Batman produces a relatively longer journey time, it provides the most favourable integrated transport outcomes of all options within this investigation zone due to connections to the existing metro train service, numerous bus routes, a tram route, major arterial roads and numerous designated cycling and walking routes. In addition, Batman has the highest population and second highest employment forecasts in 2051 (based on VIF 2016).

Liveability

Batman is expected to provide the most favourable liveability outcomes of the options in this investigation zone. Whilst Batman is not designated as an activity centre in *Plan Melbourne*, it directly abuts the Coburg Major Activity Centre and local structure plans and policies suggest there is growth potential in respect of gross floor area and population uplift. Expanding the boundaries of the Coburg Major Activity Centre to include Batman could create a centre of metropolitan scale and significance.

Cost

Fawkner (North) and Campbellfield are expected to provide the most favourable cost outcomes of all options in this investigation zone. This is due to their shorter alignment lengths (equal shortest) and relatively shallow average station depths (second shallowest and third shallowest respectively). Batman is expected to provide less favourable cost outcomes (as compared to Fawkner (North) and Campbellfield) due to its longer alignment length and station depth.

Deliverability

Fawkner (North) and Campbellfield are expected to provide the most favourable deliverability outcomes of the options in this investigation zone. The shorter alignment lengths for both Fawkner (North) and Campbellfield support favourable program durations relative to all other options in this investigation zone. In addition, both Fawkner (North) and Campbellfield are expected to provide good access for movement of construction materials and spoil, with minimal disruption to the community or operation of the existing precincts. Batman is expected to provide less favourable program outcomes (as compared to Fawkner (North) and Campbellfield) as a result of its longer alignment length (and therefore tunnelling duration). In addition, whilst Batman provides good access for movement of construction materials and spoil, it is expected to result in more disruption to the community or operation of the existing precinct than Fawkner (North) and Campbellfield.

Summary

The shortlisted precinct location options for Investigation Zone 13 are Fawkner (North), Batman and Campbellfield. The preliminary preferred precinct option for Investigation Zone 13 is Fawkner (North).

5 Summary

5.1 Precinct location options assessment outcomes

The purpose of the precinct location options assessment is to establish the preferred precinct locations for SRL East and SRL North. The precinct location options within each investigation zone were assessed in Section 4 against the options assessment criteria in a relative manner to determine the preferred option. The preferred precinct option within each investigation zone is summarised in Table B1-3.

Table B1-3: Preferred SRL Precincts

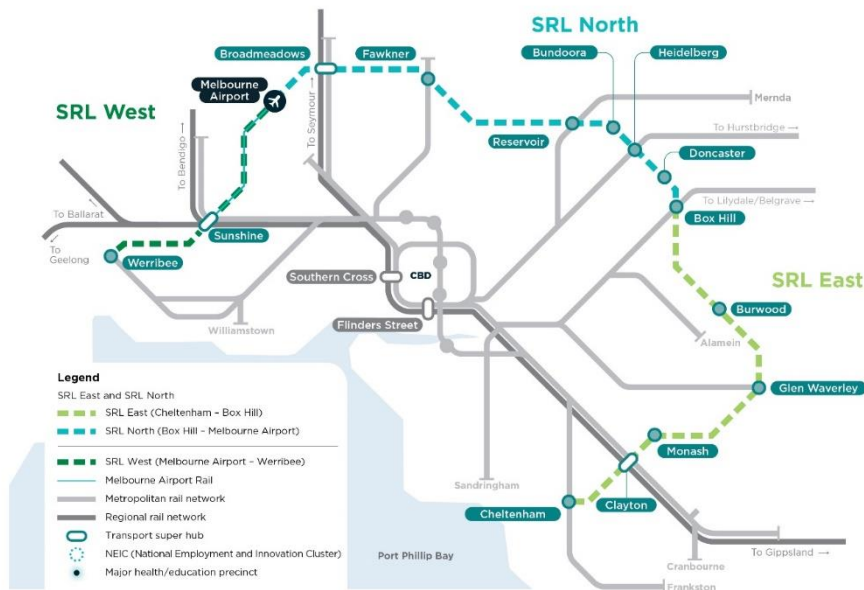
SRL East	
Investigation Zone 1: Frankston line	Cheltenham (North)
Investigation Zone 2: Frankston line to Cranbourne / Pakenham line	Southern Stabling Facility
Investigation Zone 3: Cranbourne / Pakenham line	Clayton
Investigation Zone 4: Cranbourne / Pakenham line to Glen Waverley line	Monash
Investigation Zone 5: Glen Waverley line	Glen Waverley
Investigation Zone 6: Glen Waverley line to Belgrave / Lilydale line	Burwood
Investigation Zone 7: Belgrave / Lilydale line	Box Hill
SRL North*	
Investigation Zone 8: Belgrave / Lilydale line to Hurstbridge line	Doncaster
Investigation Zone 9: Hurstbridge Line	Heidelberg (Shortlisted: Heidelberg, Rosanna)
Investigation Zone 10: Hurstbridge line to Mernda line	Bundoora
Investigation Zone 11: Mernda line	Reservoir (Shortlisted: Reservoir, Preston)
Investigation Zone 12: Mernda line to Upfield line	-
Investigation Zone 13: Upfield line	Fawkner (North) (Shortlisted: Fawkner (North), Batman, Campbellfield)
Investigation Zone 14: Upfield line to Craigieburn line	-
Investigation Zone 15: Craigieburn line	Broadmeadows
Investigation Zone 16: Craigieburn line to Melbourne Airport	Northern Stabling Facility
Investigation Zone 17: Melbourne Airport	Melbourne Airport

* Note: The SRL North precinct locations are preliminary only and subject to further analysis, technical investigations and consultations. This Appendix presents a shortlist of precinct location options for SRL North, which along with the preliminary preferred SRL North precinct locations, will continue to be re-assessed over time.

5.2 Baseline SRL route

The baseline SRL route, including the confirmed SRL East segment is illustrated in Figure B1-15 below. The SRL North precinct locations are preliminary only and subject to further analysis, technical investigations and consultations.

Figure B1-15: Baseline SRL route



Source: SRLA

Detailed station location options assessment has been undertaken for all SRL East preferred precinct locations. This is provided in Appendix B.2.

6 Stabling site options assessment

6.1 Introduction

To enable the development of concept layouts for the SRL East and SRL North stabling and maintenance depots as part of the feasibility design phase, a number of site options were identified and considered by SRLA.

The purpose of the stabling and maintenance facilities is to provide operational and maintenance functions required for the SRL rail infrastructure, with sufficient capacity to accommodate the SRL East and SRL North rolling stock. A primary stabling and maintenance depot facility will be designed and delivered at the southern end of the line (Southern Stabling Facility) as part of SRL East, while an additional secondary stabling and maintenance facility will be delivered at the northern end of the line (Northern Stabling Facility) as part of SRL North. The Northern stabling facility site options are preliminary only and subject to further analysis, technical investigations and consultations.

The objective of the stabling site options assessment is to identify suitably sized land parcels in appropriate locations that can accommodate the functional requirements of each of the stabling and maintenance facilities. While not explicitly considered as part of this assessment process, provision for potential future stations at the stabling sites will not be precluded.

6.2 Approach to stabling site options assessment

6.2.1 Assessment methodology

Consistent with the precinct location options assessment approach, the methodology to assessing stabling site options is also based on the MCA framework and applies a set of assessment criteria in analysing various site options.

To reflect the technical nature of the facility, the assessment methodology was tailored having regard to an evaluation framework previously developed and used for other stabling facilities across the State.

The optioneering methodology provides for a two-phase options assessment approach (comprising appraisal and detailed assessment) as is illustrated in the table below.

Table B1-4: Stabling site options assessment process

Assessment phase	Assessment approach	Description
Phase 1	Appraisal	1. Identification of stabling site options (and consultation with key transport and local government stakeholders)
		2. Appraisal of stabling site options and shortlisting
Phase 2	Detailed assessment	3. Detailed assessment of shortlisted stabling site options (and further stakeholder consultations, as required)
		4. Recommendation of preferred stabling site location (Southern Stabling Facility)

6.2.2 Assessment criteria

A set of options assessment criteria was developed to enable the assessment of stabling site options in a consistent manner.

Table B1-5: Stabling site options assessment criteria

Criteria	Key considerations / sub-criteria
Deliverability – technical considerations	<ul style="list-style-type: none"> Stakeholder considerations (e.g. ease of engagement, type of stakeholder, potential stakeholder impact) Ease of constructability (e.g. ground conditions, technical considerations, flooding risk, suitability for Tunnel Boring Machine (TBM) launch site) Disruption to transport network (road, rail etc.) and community (accessibility, amenity and safety impacts) Indigenous and heritage impacts (avoids / minimises impacts to sensitive sites and objects) Impacts to existing essential services infrastructure (e.g. existing water, sewerage infrastructure, utilities) Sustainability considerations (potential to reduce greenhouse gas emissions and adaptability to the effects of climate change / extreme weather events) Program and duration / timing implications
Deliverability – land and planning	<ul style="list-style-type: none"> Space available to accommodate all infrastructure requirements Constraints and considerations relevant to the site Victorian Government policy consideration (e.g. optimal land use in line with desired policy outcomes) Land use suitability (i.e. suitability of site conditions for rail infrastructure uses, including consideration of settlement issues, hazardous materials etc.) Environmental and water impacts (e.g. avoids / minimises impacts on vegetation, ecosystem, water resources and quality) Land acquisition – extent of land requirements for construction
Connectivity – network considerations	<ul style="list-style-type: none"> Line-wide connectivity consideration with respect to baseline alignment Customer experience (e.g. journey times) and service reliability (e.g. frequency, punctuality) Network considerations (e.g. future proofing, resilience and safety)
Connectivity – operability	<ul style="list-style-type: none"> Land configuration requirements (meets minimum land / space requirements for facilities, and to support the intended site function and operations) Facilitate future expansions (e.g. required capacity to meet full scheme / scope outcomes) Supports operational requirements and outcomes (i.e. minimises dead-running, supports north-south access, train speed, route implications) Residual safety aspects (e.g. opportunities to eliminate and/or mitigate risks) Maintenance requirements and outcomes (e.g. supports around-the-clock ease of access for maintenance crew and equipment)
Cost	<ul style="list-style-type: none"> Minimises land and property acquisition costs; design and construction costs; recurrent / Operation and Maintenance (O&M) and whole-of-life costs (if relevant)
Productivity and Liveability	<ul style="list-style-type: none"> Minimises impacts on jobs (e.g. generation of local jobs, impact on existing jobs) Land acquisition and displacement impacts Potential for precinct development, urban renewal and value creation opportunities (as applicable) Opportunity for enhanced community cohesiveness Opportunities for improved built form, resilient design solutions and better environmental outcomes

Criteria	Key considerations / sub-criteria
	<ul style="list-style-type: none"> Provides optionality for future at-grade train station (where applicable)

6.3 Southern Stabling Facility site options (Investigation Zone 2)

6.3.1 Site identification, appraisal and shortlisting

From an operational perspective, it is desirable for the Southern Stabling Facility to be located as close as practicable to the 'end of line' station (i.e. Cheltenham) in order to minimise dead-running (the distance between the yard and the end of the line) and main line operations by trains moving to/from stabling. If it was to be located beyond the 'end of line' station it would result in inefficient operations and additional costs (for example, additional tunnelling, extended line-wide works and land acquisition). Further, to facilitate operational requirements, a large surface footprint is needed. Intensive land use beyond Cheltenham and between Clayton and Box Hill limits the number of potentially suitable land parcels on the SRL East alignment in these areas.

A number of potential sites between Cheltenham and Clayton were considered. Seven sites were initially identified as potential locations; pursuant to stakeholder consultations, three additional sites were further investigated (i.e. Options 8, 9 and 10 below).

Early consultation with stakeholders involved an overview of the requirement for a stabling facility at the southern end of the SRL railway line, between Cheltenham and Clayton Precincts. This included consultation with the Department of Environment, Land, Water and Planning (DELWP), City of Kingston officers and Councillors.

SRLA received three suggested alternative stabling location options as part of an assessment from the City of Kingston. Technical advisors conducted an appraisal of these alternative stabling locations using the assessment criteria. The analysis found the additional options not suitable, with available site area, geotechnical risk and estimated additional cost key amongst factors.

A summary of the appraisal findings is provided in the table below.

Table B1-6: Appraisal of southern stabling site options

Site option	Location description	Key considerations (non-exhaustive)
Option 1: Kingston Rd, Clarinda	This site is located east of Dingley Bypass and north of Kingston Road. The site intersects the Victory Road landfill cells (Baxter Tip) and market gardens (agriculture).	<ul style="list-style-type: none"> Construction of rail infrastructure on top of the existing mixed-fill landfill is not recommended due to geotechnical considerations and environmental issues. Potential to remove the existing landfill materials and construct a concrete box structure was identified and considered. This site option does not meet the functional requirements. Not shortlisted.
Option 2: Clayton Rd, Clayton South	This site is located east of Clayton Road and north of Heatherton Road. A concrete supply business and industrial warehouses are located at the northern end of the site, while the southern area of the site is market gardens (agriculture).	<ul style="list-style-type: none"> Relatively large mixed-fill landfill site, underlain by lined and unlined landfill cells. To construct in this area will require lowering the existing waste mounds beneath the landfill caps and for the excavated waste to be disposed offsite to another landfill. This option raises complex environmental, constructability and cost implications. Not shortlisted.

Site option	Location description	Key considerations (non-exhaustive)
	Capped and uncapped landfill cells are present.	
Option 3: Carroll Rd Landfill, Heatherton	This site is located north of Old Dandenong Road and west of Carroll Road. There is a closed landfill with ongoing site rehabilitation works. Industrial buildings are to the north, and Mavis Hutter Reserve is immediately south of the landfill.	<ul style="list-style-type: none"> Relatively large mixed-fill landfill site, underlain by lined and unlined landfill cells. To construct in this area will require lowering the existing waste mounds beneath the landfill caps and for the excavated waste to be disposed offsite to another landfill. This option raises complex environmental, constructability and cost implications. This option will require spur tracks from the main line given the site is perpendicular to potential alignments. Not shortlisted.
Option 4: Heatherton Farmland	This site is located on Old Dandenong Road (south of Kingston Road) in Heatherton. The area is currently a mix of residential and agricultural uses and is located within the Green Wedge Zone.	<ul style="list-style-type: none"> Relatively undisturbed ground, with an urban floodway located west of Boundary Road. Ground conditions are expected to be favourable given the historic agricultural uses in the area. This option is considered to meet the functional requirements. This option will require relocation of the Western Port-Altona-Geelong (WAG) pipeline and will impact Old Dandenong Road. Progressed to detailed assessment.
Option 5: Fairbank Rd, Clayton South	This site is located east of Fairbank Road and east of Clayton Road. The area is currently industrial in character.	<ul style="list-style-type: none"> Located within a regionally significant industrial area, which poses significant acquisition issues. Access to the site will require a spur track connection (as it is perpendicular to the main line), which will increase operational complexity. This option will require large cut and cover structure, with impacts to commercial properties and residents. Not shortlisted.
Option 6: Heatherton Cleanfill (Kingston Rd)	This site is located north of Kingston Road, west of Old Dandenong Road and south of Henry Street in Heatherton. The option is primarily a clean-fill landfill and also includes a nursery, dog park and one residential property.	<ul style="list-style-type: none"> This option is a clean-fill site, which will require engineered ground improvement, relocation of WAG pipeline and Old Dandenong Road works. This option is considered to meet the functional requirements and have limited impacts on existing businesses / properties. Progressed to detailed assessment.
Option 7: Moorabbin Industrial Precinct	This site is located between Chesterville Road and Warrigal Road, south of Levanswell Road in Moorabbin. The site is within an industrial estate and comprises a large number of industrial properties.	<ul style="list-style-type: none"> This is an active commercial industrial precinct and will impact a large number of commercial properties. Further studies on the impact to existing uses and future development potentials were ongoing (at the time of the appraisal). This option is considered to meet the functional requirements. Progressed to detailed assessment.
Option 8: North of Dingley Bypass	The proposed site is north of Dingley Bypass bordered by Tootal Road, Boundary Road and Heatherton Road. The site is currently a mixed-used area	<ul style="list-style-type: none"> Due to the position of the site relative to Cheltenham and Clayton stations, this option produces an alignment length that is significantly longer than some other options (~3km longer). The additional tunnel length will result in significantly

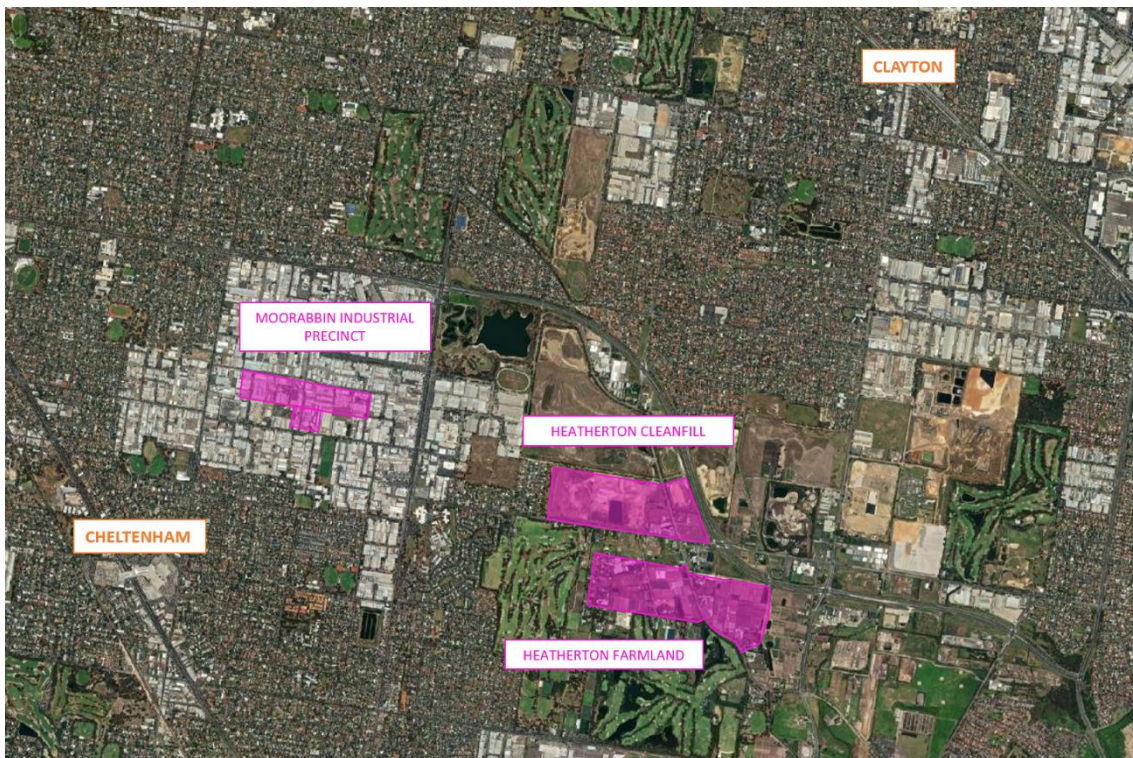
Site option	Location description	Key considerations (non-exhaustive)
	characterised by industrial / commercial on the east, agricultural in the centre and a former landfill on the west.	<ul style="list-style-type: none"> higher capex costs and further ventilation shafts due to fire life safety issues. This option is considered to meet the functional requirements but with reduced area for laydown and retarding basins (which would require further investigation). Portal construction through former landfill may also present construction challenges. Not shortlisted.
Option 9: West of Mordialloc Freeway	The proposed site is immediately west of Mordialloc Freeway, bordered by Old Dandenong Road, Dingley Bypass and Boundary Road. The site is currently mixed-use characteristics by industrial, commercial and agricultural land, with a former landfill in the centre.	<ul style="list-style-type: none"> Under this option, track infrastructure does not fit within the site boundary and will extend into Mordialloc Freeway property. The total length of the site cannot accommodate a surface connection. Therefore, a spur connection will need to be considered outside of the site boundary. The available footprint does not meet the functional requirements and overall, is considered too constrained to accommodate stabling facilities. Not shortlisted.
Option 10: East of Mordialloc Freeway	The proposed site is east of Mordialloc Freeway.	<ul style="list-style-type: none"> A detailed consideration of this site option was not undertaken as it provides limited footprint and cannot meet all the functional requirements or allow a surface connection to the SRL tunnels. Not shortlisted

Following the appraisal, **Options 4, 6 and 7** were shortlisted and progressed to detailed assessment. The shortlisted stabling site options were all considered to be capable of supporting the draft functional requirements of the Southern Stabling Facility. As part of the detailed assessment (described in the next section), these three options were investigated through the concept design phase to determine a recommended solution.

6.3.2 Detailed assessment

The shortlisted southern stabling site options are shown in the figure below.

Figure B1-16: Southern stabling site options



An overview of each shortlisted site option is provided below:

- Option 4: Heatherton Farmland (Green Wedge Zone / Public Use Zone)** – The proposed site footprint is ~25.5ha and is within a Green Wedge Zone – Schedule 2, and also partly within Public Use Zone and is subject to a Land Subject to Inundation Overlay (LSIO). The area is currently a mix of agricultural and residential use. The site's distance to Cheltenham is ~4.4km, and total rail alignment length between Cheltenham and Clayton via this stabling site option is ~10km. Utilities likely to be impacted under this option include the WAG pipeline (relocation required), Clayton South Drain and HV/LV power poles.
- Option 6: Heatherton Cleanfill (Green Wedge A Zone)** – The proposed site footprint is ~27.9ha and is within a Green Wedge A Zone. The area is primarily a clean fill site. Part of the site footprint is on land to be acquired by Parks Victoria to provide public open space, and also earmarked for City of Kingston's Chain of Parks concept. The site's distance to Cheltenham is ~4km, and total rail alignment length between Cheltenham and Clayton via this stabling site option is ~9.4km. Utilities likely to be impacted under this option include the WAG pipeline (relocation required) and HV/LV power poles. Given the potential for differential ground movement due to deep deposits of uncontrolled fill, the site will require significant ground improvement works to support a stabling facility.
- Option 7: Moorabbin Industrial Precinct (Industrial Zone)** – The proposed site footprint is ~23ha and is within an Industrial Zone. The site is within an industrial estate and will require acquisition (and demolition) of a number of industrial properties. The site's distance to Cheltenham is ~2km, and total rail alignment length between Cheltenham and Clayton via this stabling site option is ~8.5km. Given the existing ground profile, this option will require a large volume of earthworks to flatten the site and make it suitable for train stabling.

For all shortlisted options, at-grade stabling adjacent to the main line is proposed, with tunnel portal structures provided at either end of the stabling site. The selected stabling site will be used as a TBM launch site prior to the construction of the stabling and maintenance facilities, which is likely to be on the critical path for SRL East construction.

Key outcomes from the detailed assessment workshops are summarised below. Consistent with the options assessment methodology, this process involved a relative assessment and ranking of the three options.

Deliverability (technical)

Option 4 is considered to provide the best deliverability outcome because it involves fewer complexities than the other sites, excluding managing the impacts from the adjacent flood plain. Option 6 is the next preferred but will require significant ground improvement works prior to construction commencement (this will not impact the critical path TBM launch); however, the site configuration does provide flexibility to address the technical requirements. Option 7 is the least preferred as it will likely involve significant program delays due to property acquisitions, business relocations, building demolitions and asbestos management.

Deliverability (land and planning)

The strategic land use impact of Option 6 is considered more favourable than Option 4, as it will not impact upon productive agricultural area to the same extent as Option 4. However, Option 6 is on land earmarked for Kingston Council's Chain of Parks concept, and will require significant ground improvement to prepare the site for rail infrastructure. On balance, Options 6 and 4 are considered on par in terms of deliverability outcomes from a land and planning perspective. Of the three options, Option 7 is considered the least preferred given its impact on industrial land employment and the direct displacement of businesses.

Connectivity (network)

Option 7 is considered the most preferred, given its relative proximity to the proposed Cheltenham and Clayton stations, and therefore provides the shortest rail alignment (which supports a faster journey and better customer experiences). In contrast, Option 4 is the least preferred option given it is the furthest from Cheltenham and produces the longest rail alignment. Option 6 is the middle-preferred option.

Connectivity (operability)

All three options meet the minimum land configuration requirements for rail infrastructure and provide around-the-clock site access from the arterial road network and are therefore considered to provide equally favourable connectivity outcomes from an operability perspective. However, if a larger footprint is required, Options 4 and 6 would not preclude the potential for expansion subject to necessary approvals, whilst Option 7 offers limited potential given existing site constraints.

Cost

Based on an indicative costing exercise aimed at providing a relative comparison between the three stabling site options, Option 6 was assessed as the lowest overall cost option due to comparatively lower land acquisition (based on available land estimate) and tunnelling costs. Option 4 is the next preferred, primarily driven by significantly higher tunnelling costs compared to Option 6. Option 7 is by far the least preferred option due to significant costs associated with property acquisitions within the industrial estate.

Productivity & Liveability

Sites within a Green Wedge Zone will result in lower displacement of employers/employees compared to an Industrial area and therefore considered to produce comparatively better productivity and liveability outcomes. Option 6 is considered more favourable than Option 4 because the site for Option 6 is predominantly vacant. Option 4 will impact a moderate number of residential / commercial properties and is expected to have moderate impacts to agricultural businesses associated with market gardens. Option 7 is the least preferred given significant displacement of jobs within a regionally significant industrial precinct.

6.3.3 Recommendation

Based on outcomes of the six assessment criteria, SRLA recommends **Option 6 – Heatherton Cleanfill** as the baseline Southern Stabling Facility site location.

The site is recommended due to its reduced impacts to residential properties and agricultural businesses as well as comparatively lower land acquisition and tunnelling costs resulting in overall lower costs. Based on further analyses and concept design, Option 6 is considered to provide the most flexibility to accommodate varying design parameters and depot features and confirmed as the baseline.

Site investigations of the recommended site have been carried out, along with impact assessment studies. Community and stakeholder consultation will be ongoing.

Supported by a range of technical investigations and studies, the Environment Effects Statement (EES) will carefully consider potential impacts on people, structures and the environment, including at the recommended site.

The EES will include investigations into social impacts, construction impacts (including tunnelling) on the local environment, including noise, vibration, air quality and ground movement, and include measures to minimise potential impacts.

6.4 Northern Stabling Facility site options (Investigation Zone 16)

6.4.1 Site identification, appraisal and shortlisting

It is desirable for a stabling and maintenance yard to be located as close as practicable to the 'end of line' station from an operational perspective, which reduces dead-running and main line occupations by trains moving to/from stabling. For the Northern Stabling Facility, SRLA considered a number of potential sites within, and in the vicinity of, Investigation Zone 16 (as identified in section 3.2). This process identified 15 potential site options, each of which was investigated through the initial planning and development phase of the project.

To facilitate an appraisal of the stabling site options for the Northern Stabling Facility, technical reports were prepared, with further analyses and investigations undertaken during the feasibility design stage. Given the number of potential site options identified for appraisal, the 'long list' of options was filtered during the appraisal phase based on an initial land, planning and environmental review to determine the applicability of the land parcels identified, each option's distance to Melbourne Airport and/or other relevant considerations (such as site requirements).

A summary of the appraisal findings is provided in the table below.

Table B1-7: Appraisal of northern stabling site options

Site option	Location description	Key considerations (non-exhaustive)
Option 1	This option is on land occupied by industrial and commercial properties, east of Ford site and east of Sydney Road.	<ul style="list-style-type: none"> The site's distance to Melbourne Airport is significantly longer than other options and therefore provides sub-optimal operational outcomes. Not shortlisted.
Option 2	This option is on the old Ford site (disused industrial properties), located east of Upfield Station and north of Barry Road.	<ul style="list-style-type: none"> The site's distance to Melbourne Airport is significantly longer than other options and therefore provides sub-optimal operational outcomes. Not shortlisted.
Option 3	This option is on land occupied by industrial and commercial properties west of Ford site, west of Upfield Station and north of Barry Road.	<ul style="list-style-type: none"> The site's distance to Melbourne Airport is significantly longer than other options and therefore provides sub-optimal operational outcomes. Not shortlisted.

Site option	Location description	Key considerations (non-exhaustive)
Option 4: East of Mickleham Rd	This site option is within the Green Wedge Zone to the east of Mickleham Road, between Attwood and Westmeadows.	<ul style="list-style-type: none"> Options 4 and 5 are similarly located, with one to the north of the baseline alignment between Broadmeadows and Melbourne Airport, and the other to the south. On this basis, the two options were amalgamated into one option (as Option 4). The site is under the flight path to Melbourne Airport (but does not impose on the flight cone of the runway), with the Green Wedge Zone allowing railway use. The site may contain protected species and is adjacent to several Aboriginal sites. This location could accommodate an elevated option north or south of a stabling facility (to be explored further through concept design). Option 4 progressed to more detailed assessment.
Option 5	This option is within the Green Wedge Zone to the east of Mickleham Road, north of Westmeadows.	
Option 6 + variant	This option is within the Green Wedge Zone to the west of Mickleham Road, north of Westmeadows and north of Moonee Ponds Creek. A variant of this site option was also explored, located north of Moonee Ponds Creek and south of Woodlands Historic Park.	<ul style="list-style-type: none"> Option 6 will require additional infrastructure to accommodate any stabling facility in this location, with either an additional large bridge structure over Moonee Ponds creek from the tunnel baseline alignment or a widening of the bridge from an elevated alignment. The site topography poses design complexities. The variant option is within the Public Conservation and Resources Zone (i.e. a planning scheme amendment will be required to allow the project to occur). The area is identified as bushfire prone, is subject to high levels of aircraft noise and inundation and is partially within Woodlands. Not shortlisted.
Option 7: Farmland	This site is on farmland between Tullamarine Freeway and Moonee Ponds Creek, to the west of Wright Street and adjacent to the Tullamarine Landfill.	<ul style="list-style-type: none"> This site is primarily within Farming Zone, with part of the northern boundary zoned as Public Use Zone. A heritage overlay applies to the eastern portion of the site, and an environmental significance overlay also applies to some parts. The site is not in a bushfire prone area and not in an inundation area. The option is adjacent to Tullamarine Landfill, which is known to contain contaminations due to previous use as a liquid waste landfill. Investigations into the impacts of this on Option 7 will be undertaken. Progressed to more detailed assessment.
Option 8	This option is within Woodlands Historic Park area.	<ul style="list-style-type: none"> This option is on land that intersects with the Woodlands Historical Park, which contains endangered / threatened species and also native vegetation. The option is within an area of Aboriginal cultural sensitivity and in a designated bushfire prone area. A heritage place is also present on site. Not shortlisted.
Option 9	This option is on land currently disused, located south of Tullamarine Freeway, between Mercer Drive and Springbank Street.	<ul style="list-style-type: none"> This option is located on Melbourne Airport land (Commonwealth land), and any works will require approval through a Major Development Plan under the <i>Airports Act 1996</i>. Any Commonwealth land required will need to be acquired via agreement with the landowner and Melbourne Airport as the

Site option	Location description	Key considerations (non-exhaustive)
		<p>lessee. Several known Aboriginal sites present and should be avoided.</p> <ul style="list-style-type: none"> • Not shortlisted.
Option 10: Commercial Site Western Ave	This site option is on land currently occupied by industrial and commercial properties north of Tullamarine Freeway, between Mickleham Road and Hillcrest Drive.	<ul style="list-style-type: none"> • Options 10 and 11 are similarly located, with one to the north of Tullamarine Freeway and the other to the south. • Due to restrictions associated with Commonwealth land acquisition near Melbourne Airport, main line connection to any stabling facility under Option 11 will only be made by a single track, which is operationally restrictive compared to the two-track connection that can be provided under Option 10. • Option 10 is not in a bushfire prone area and not in an inundation area. It has good access from the current road network, is protected from general public by utilising industrial / commercial spaces, but is in proximity of some residential areas. • Option 10 progressed to more detailed assessment.
Option 11	This option is on land occupied by industrial and commercial properties, located south of Tullamarine Freeway and west of Mickleham Road.	
Option 12	This option is on farmland located to the west of Tullamarine Airport.	<ul style="list-style-type: none"> • The option is predominantly on Melbourne Airport land (Commonwealth land), which will need to be acquired via agreement with the landowner and Melbourne Airport as the lessee. The option is also partially located on Green Wedge Zone, which can be acquired under Victorian legislation. Several known Aboriginal sites are located on this land and should be avoided. • Not shortlisted.
Option 13	This option is on parkland and land occupied by industrial properties, located to the east of Railway Crescent, south of King William Street and west of Blair Street.	<ul style="list-style-type: none"> • This option requires acquisition of commercially and residentially zoned land, in an area earmarked for a local activity centre and future mixed-use development in the Greater Broadmeadows Framework Plan. The option may have amenity impacts on adjacent residential properties and education institutions, and is located on land that may be prone to inundation by overland flows. • Not shortlisted.
Option 14 + two variants	<p>This option is on parkland and land occupied by industrial and commercial properties, crossing Merlynston Creek, south of Belfast Street and Broadfield Road, and north of Kitchener Street.</p> <p>Two variants of this site option were also explored, both on land currently occupied by industrial and commercial properties.</p>	<ul style="list-style-type: none"> • The option is partially located within Commonwealth Land. The option also requires acquisition of public open space and facilities, may impact on adjacent residential properties and education institutions. Further, the option is located on land prone to flooding and intersects with an area of Aboriginal cultural sensitivity. • The two variants were not progressed due to their relatively long distances to Melbourne Airport and therefore sub-optimal operational outcomes. • Not shortlisted.
Option 15	This option is on parkland and land occupied by industrial and commercial properties, and also an old landfill. The site is located north of Western Ring	<ul style="list-style-type: none"> • The site is located on land prone to flooding, on active quarry and land partially zoned for Public Use – Transport alongside the Hume Freeway. • Several known Aboriginal sites located within this option, which should be avoided. This option is also

Site option	Location description	Key considerations (non-exhaustive)
	Road, west of Hume Freeway and east of Merri Creek.	likely to negatively impact on Merri Creek's environmental and recreational values. <ul style="list-style-type: none"> • Not shortlisted.
Other	Tullamarine Landfill	<ul style="list-style-type: none"> • The Tullamarine Landfill area was also considered during initial identification of potential site options, however not progressed due to known contamination and geotechnical issues. • Not shortlisted.

Following the appraisal process, **Options 4, 7 and 10** were shortlisted for a detailed assessment, however, will be subject to further analysis, technical investigations and consultations at later time.

All three options can facilitate main line access from either a tunnelled or elevated alignment between Broadmeadows and Melbourne Airport. There is no concept design for SRL North and this work will not be completed until further analyses, technical investigations and stakeholder consultations have been undertaken.

6.4.2 Detailed assessment

An overview of each shortlisted site option is provided below:

- **Option 4: East of Mickleham Rd (Green Wedge Zone)** – Preliminary design of a stabling layout indicates an area of ~10ha, with additional land required for alignment section and tunnel dive structure. The site's distance to Melbourne Airport is ~3.7km, and total rail alignment length between Melbourne Airport and Broadmeadows via this stabling site option is ~7.8km. The site may contain protected species and is adjacent to several Aboriginal sites. No critical utilities have been identified as directly impacted.
- **Option 7: Farmland (Farming Zone)** – Preliminary design of a stabling layout indicates an area of ~32ha, given this option is on farmland and requires acquisition of the full land parcels (notwithstanding SRLA may potentially seek to negotiate partial purchases, or otherwise dispose of and/or return the surplus land post-construction). The constraints of the site will require a sub-surface connection to the main line. The site's distance to Melbourne Airport is ~1.8km, and total rail alignment length between Melbourne Airport and Broadmeadows via this stabling site option is ~6.6km. No critical utilities have been identified as directly impacted.
- **Option 10: Commercial Site, Western Ave (Commercial Zone)** – Preliminary design of a stabling layout indicates an area of ~13ha. The site's distance to Melbourne Airport is ~400m, and total rail alignment length between Melbourne Airport and Broadmeadows via this stabling site option is ~6.4km. Some localised contamination may be present. A number of utilities may be impacted including gas mains, stormwater pipes, LV/HV electricity, telecommunication cables, water mains and sewer mains.

Given the timeline of delivery for SRL North, **Options 4, 7 and 10** will be subject to further analysis, technical investigations and consultations at later time.