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Suburban Rail Loop Stabling Facility Location Options Assessment

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1. Introduction

Suburban Rail Loop (SRL) will change the way people move around Melbourne, boost productivity and deliver urban renewal outcomes for Greater Metropolitan Melbourne.

SRL will connect the Monash, La Trobe, Sunshine and Werribee National Employment and Innovation Clusters (NEICs) with key precincts such as Box Hill, Burwood, Broadmeadows and Melbourne Airport, providing a catalyst for urban renewal across Melbourne's middle suburbs.

Stage One (Cheltenham to Box Hill) will connect our growing health, education, retail and employment precincts in Melbourne's south east between Cheltenham and Box Hill.

As part of the development of Stage One, Suburban Rail Loop Authority (SRLA) needed to identify a suitable site for a primary stabling and maintenance facility at the southern end of the line (Southern Stabling Facility).

The facility will provide stabling and maintenance for SRL trains, as well as an operational control centre and associated facilities such as a train wash and power supply substation. An additional secondary stabling and maintenance facility will be delivered at the northern end of the line (Northern Stabling Facility) as part of future stages.

The facility will be the primary location for the storage and upkeep of all rolling stock for the first stage of operations and will likely house all engineering vehicles that are track mounted. The facility must be within close proximity to the main SRL line and will be designed to facilitate the launching and recovery of trains in a timely and efficient manner. The facility will also cater for office accommodation to support the SRL railway operation. Based on the technical requirements and review of comparable facilities worldwide, it is expected this facility needs an area of approximately 40 hectares.

A detailed site options assessment process considering 10 options has been completed. This process identified suitably sized land parcels in appropriate locations that could accommodate the functional requirements of the stabling facility and determined the best site.

Key requirements for the Southern Stabling Facility

- Stabling roads for up to 30 trains
- Train maintenance and storage facilities (heavy and light maintenance)
- Track and tunnel maintenance equipment workshops and associated vehicles
- Train wash facility
- Administration building
- SRL Operations Control Centre (OCC)
- Power supply substation
- Test track minimum 850m long
- Close to or on the main line. Remote locations from the mainline connection will significantly impede the operational flexibility and comprise reliability
- Close proximity to terminus station (distance to be validated by modelling) to minimise "dead running" and achieve train frequencies and reliability requirements
- Sufficient length to allow trains to rise to surface from tunnels (minimum site length of approx. 1200m depending on topography)

2. Approach to stabling site options assessment

2.1. Assessment methodology

SRLA developed an assessment process to determine precinct locations to form the baseline SRL route, and specifically focuses on Stage One (Cheltenham to Box Hill). The same assessment methodology used to determine the route was also used to determine the best site for the stabling facility.

However, 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 Table 1 below.

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. Rapid 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

2.2. Assessment criteria

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

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

Criteria	Key considerations / sub-criteria
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 Provides optionality for future at-grade train station (where applicable)

3. Site Options

3.1. Site identification, appraisal and shortlisting

From an operational perspective, it is necessary for the Stabling Facility 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 Stage One 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).

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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.

SRL received three suggested alternative stabling location options as part of an assessment from the City of Kingston. Technical advisors conducted a rapid 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.

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).	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). Capped and uncapped landfill cells are present.	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.
Option 3: Carroll Rd Landfill, Heatherton	This site is located north of Old Dandenong Road and west of Carroll Road. It includes a closed landfill with ongoing site rehabilitation works. Industrial buildings are to the north, and Mavis Hutter Reserve is immediately south of the landfill.	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 tunnel 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.	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, however it would require significant residential and commercial property acquisitions and displace many local residents, businesses and jobs. This option will require relocation of the Western Port-Altona-Geelong (WAG) pipeline and will impact Old Dandenong Road. Progressed to detailed assessment.

Site option	Location description	Key considerations (non-exhaustive)
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.	<p>Located within a regionally significant industrial area, which poses significant acquisition issues.</p> <p>Access to the site will require a spur track connection (as it is perpendicular to the main line), which will increase operational complexity.</p> <p>This option will require large cut and cover structure to connect to the mainline tunnels, with impacts to commercial properties and residents.</p> <p>Not shortlisted.</p>
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 site and also includes a nursery, dog park and one residential property.	<p>This option is primarily a clean-fill site, which will require engineered ground improvement, relocation of WAG pipeline and Old Dandenong Road works.</p> <p>This option is considered to meet the functional requirements and have limited impacts on existing businesses / properties.</p> <p>Progressed to detailed assessment.</p>
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.	<p>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 rapid appraisal).</p> <p>This option is considered to meet the functional requirements, however it would require significant acquisitions and demolition and cause the potential loss of existing significant employment and regional industrial services.</p> <p>Estimated to directly impact 100 businesses and cause the potential loss of existing employment.</p> <p>Progressed to detailed assessment.</p>
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 characterised by industrial / commercial on the east, agricultural in the centre and a former landfill on the west.	<p>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 higher capex costs and further ventilation shafts due to fire life safety issues.</p> <p>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.</p> <p>Not shortlisted.</p>
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.	<p>Under this option, track infrastructure does not fit within the site boundary and will extend into Mordialloc Freeway property.</p> <p>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.</p> <p>The available footprint does not meet the functional requirements and overall, is considered too constrained to accommodate stabling facilities.</p> <p>Not shortlisted.</p>

Site option	Location description	Key considerations (non-exhaustive)
Option 10: East of Mordialloc Freeway	The proposed site is east of Mordialloc Freeway.	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 Yard. 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.

3.2. Detailed assessment

Shortlisted site options:



- **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 Western Alton Geelong (WAG) oil 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 Stage One construction.

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

1. 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.

2. 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.

3. 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.

4. 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.

5. 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.

6. Productivity & Liveability

Sites within a Green Wedge Zone will result in lower displacement of employers/employees compared to an Industrial area and are 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 directly impact a number of residential / commercial properties and is expected to have 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.

3.3. Recommendation

Based on outcomes of the six assessment criteria, SRLA recommends **Option 6 – Heatherton Cleanfill** as the baseline Southern Stabling Yard 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 is 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, including drop-in information sessions over the coming weeks.

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.