



Proposed Waurn Ponds Train Maintenance and Stabling Facility Site Investigation Summary

Site Investigation Chronology

In summary, the site investigation process was undertaken as follows:

- **2007-2015:** various investigations undertaken on the suitability of Sites A, B, C, D, E, F, G, and H1/H2, the results of which were summarised and integrated in the Waurm Ponds Depot Development Project Concept of Operations Report (COO Report 2015). Other formal reports prepared in this period were the Site E Report 2009, Site G Report 2010, and Site G Report 2015.
- **2016:** further investigations undertaken specifically in relation to:
 - Site F, which resulted in the Site F Report 2016; and
 - new Site X, resulting in the Site X Report 2016.
- **2017:** further investigations undertaken on Site D, and on new Sites I and J, and compared with the findings of investigations for Site G. This led to the Sites D, I and J Report 2017.

Why Was the Waurm Ponds Locality Chosen

The Waurm Ponds area was selected as the most appropriate location in the Geelong Region for the proposed Facility. This was based on the principle that a train maintenance and stabling facility should be located beyond the outer reach of regular commuter services to and from Melbourne so that trains can be efficiently “fleeted” into their starting position for morning trips to Melbourne, with the reverse process applying during late afternoons and evenings, avoiding the interruption of commuter services. Waurm Ponds Station is expected to be the outer terminus for Geelong line commuter services for the foreseeable future. Providing the Facility in this location would provide higher service frequencies at Waurm Ponds Station to cater for the forecasted patronage growth in the area (COO Report 2015).

It is also critical that the proposed facility is located on a site where planning and construction of a Stage 1 development can proceed, and which allows for future further development/expansion (including full or part duplication of the line between Geelong and the Facility). A large greenfield site was preferred for this reason. Due to its location beyond the end of the Geelong urban area, Waurm Ponds presents a number of greenfield sites.

A greenfield site of large proportions also allows for implementation of best practice working and logistics arrangements as to maintenance and stabling processes. Such a site could substantially improve on the efficiency and productivity of these processes when compared with other locations, most of which face difficult site constraints (ie. lack of land for facility expansion, close proximity of sensitive receptors such as residential development etc.) and consequential lack of clear delineation between operational and maintenance accountabilities (COO Report 2015). Again, given Waurm Ponds’ location beyond the edge of the Geelong urban area, this consideration also favoured a site in the Waurm Ponds locality.

The land chosen now for this critical Facility will be a key factor in providing an efficient and reliable service between Melbourne and Waurm Ponds station for the next 30 years and beyond (COO Report 2015; D, I and J Report 2017).

Site Investigation Matters

The following matters were considered relevant in the investigation of the various sites for the proposed Facility:

<i>Site Investigation Matters</i>	<i>Explanation</i>
Design and Operational Matters	
Distance of site from Waurm Ponds Station	A close proximity to Waurm Ponds Station would minimise the time, cost and timetabling impacts associated with the “dead-running” of trains (i.e. trains travelling without fare paying passengers).
Land gradient	A relatively flat piece of land is required for train operations.
Size and shape of the site	<p>A site which is large and long enough for the required stabling and maintenance infrastructure and associated facilities, and current and future train length requirements, allowing trains to arrive in quick succession and be processed in a “best-practice” efficient, functional and logical sequential progression through the necessary servicing facilities without the risk of queueing back onto the main railway line. For maximum efficiency, these steps are best physically arranged in a linear fashion.</p> <p>Longitudinal separation and required clearance between the required number of parallel tracks is the principal driver of desired site length and width.</p> <p>The peculiarities of rail track geometry and related facilities require land parcels that are relatively long and narrow, and either roughly rectangular or triangular in shape. Where site length is constrained but ample site width is available, some unusual track configurations become necessary such as semi-circular loops that endeavour to fold the layout into half the normally required length. Such layouts may be feasible in specific cases but create other constraints and are generally more expensive to construct.</p> <p>A site which can be “future-proofed”; being large enough for future Facility expansion, with neutrality and flexibility to cater for different types of trains in the future and allowing for impact mitigation (i.e. areas for screening vegetation).</p>
Grade of the land where it accesses the main railway line	A relatively even grade is required for where the site accesses the main railway line.
Location of the site	A site located parallel to the main railway line is an important consideration; direct train access into the facility is highly desirable. There are often difficulties in gaining rail access to sites which do not directly abut the main railway line, such as land availability, the cost of constructing rail access alignments where there are significant distances between the Facility and main railway line, dealing with multiple stakeholders etc.
Potential rail access points	<p>Having multiple rail access points into the site allows for the Facility to operate in the event of degraded operations when normal access/egress routing is unavailable due to point failure, derailment etc.</p> <p>Having rail access in both directions (i.e. toward Melbourne and toward Warrnambool) is important for future flexibility.</p>
Constraints to rail access	Existing roads, bridges and services/utilities may have to be crossed, modified, replaced, removed, or new infrastructure provided, to facilitate rail access into the Facility (including grade separations etc.).

<i>Site Investigation Matters</i>	<i>Explanation</i>
Operational constraints to rail access	Such as the need to reverse trains, construct tight loop lines (which may result in above normal wheel wear, generate wheel noise and limit train speed) etc.
Allowing for future rail duplication	It is critical that the Facility be located on a site that allows for future development of track and facilities, including full or part duplication of the line between Geelong and the Facility.
New mainline turnouts	Whether an existing rail turnout from the main railway line can be used, or will a new turnout, and associated signalling, be required.
Site readiness	The amount of work required to prepare land for development of the Facility, and associated cost and timeframe considerations based on the procurement of new trains and/or patronage growth.
Road access	Direct road access, and multiple access points for regular and emergency access purposes.
Geographic Matters	
Land topography	Undulating land may require significant earthworks to create a relatively flat piece of land required for train operations. Cost, time, risks and uncertainties associated with the rehabilitation and use of previous mining/quarry land. Suitable land compaction may not be guarantee-able.
Waterways	Rivers, creeks, dams etc. on the site.
Geotechnics	Suitability of the ground conditions for construction of the Facility.
Geology	Presence of important earth resources (i.e. limestone).
Flora, fauna and habitat	Existing flora, fauna and habitat on the site.
Dust	Potential for dust impacts from nearby land uses (i.e. quarries).
Existing mitigation	Existing bunding and vegetation which may help mitigate impacts of the Facility.
Land and Planning Matters	
Existing development and business impacts	Avoiding sites which require the acquisition of residences. Consideration of noise and light impacts on surrounding residences/sensitive receptors due to the 24/7 operation of the proposed Facility. Consideration of impacts on farming business infrastructure and buildings (ie. dams, sheds, access tracks etc.). Consideration of impacts on mining business infrastructure and buildings (ie. site offices, plant and equipment, car parking etc.).
Aboriginal Cultural Heritage and Post-Contact Heritage	Heritage aspects of the site.
Zoning	Potential Special Use Zones for earth resources which may not be available, suitable or supported for development. Overlays, such as vegetation protection, which would need to be considered and may impact on Facility design. Nearby residential or urban growth zones, within which sensitive receptors may be impacted by the Facility.

<i>Site Investigation Matters</i>	<i>Explanation</i>
Land ownership	Land acquisition from multiple owners may present difficulties.
Number of stakeholders	Difficulties associated with dealing with multiple stakeholders/landowners to deliver the Facility.

Sites Investigated

The following sections summarise the outcomes of the investigation of each site for the proposed Facility.

Site A

Site A is located north of and adjacent to the main railway line, between Ghazeepore Road and Anglesea Road. The site is very close to Waurn Ponds Station. However, it is short in length, restricting its ability to fit all of the required stabling and maintenance components of the Facility. The adjoining rail line and site itself is on a reasonably steep gradient, which is not ideal for the establishment of the Facility. Many sensitive receptors may be impacted by a Facility being located on this site given that the Waurn Ponds residential area immediately adjoins the site to the north. In addition, a watercourse runs through the northern part of the site, an electrical switch station encroaches on the site, and road access is constrained (COO Report 2015).

Based on the above, site A was deemed unsuitable for the proposed Facility, and was not investigated further.

Site B

Site B is located to the south of the rail line between Ghazeepore Road and Anglesea Road, and is close to Waurn Ponds Station. The site has good road access, however, rail access to the site is constrained by two road bridges and the relatively steep gradient of the adjoining rail line. The adoption of a circular Facility design, less proximate to the main rail line (as opposed to a preferred rectangular and linear/longitudinal Facility design adjacent to the main rail line) would be difficult given the falling grade of the site. It would be necessary to construct the facility in two parts on either side of the site, and link these with a loop line. A circular track configuration could be adopted however, it would be expensive and inefficient (COO Report 2015).

In addition to these Facility design considerations, a watercourse runs through the middle of site B, and the land has been set aside for future mining operations. The site is zoned Special Use Zone 7 – Earth and Energy Resources Industry under the Greater Geelong Planning Scheme. The purpose of this zone is to provide for the use and development of land for the earth and energy resources industry (COO Report 2015).

Having regard to the above matters, site B was not investigated further.

Site C

Located to the north of the rail line between Anglesea Road and a rail underpass serving the Boral quarry, site C is located approximately 1,900m from Waurn Ponds Station. Rail entry to the land would be relatively level, however approximately half the site is on a reasonably steep gradient, and there would be significant operational constraints to achieve train access to the site. The site is also short and narrow and is therefore constrained with a limited potential for future expansion. The site may not be able to provide for both a maintenance facility and the required train stabling. It may also be difficult to achieve acceptable road access to the site given the alignment of the Anglesea Road flyover. Furthermore, the site may potentially be susceptible to dust from manufacturing and mining operations (Site E Report 2009; COO Report 2015; Sites D, I and J Report 2017).

Site C was rejected and not investigated further as it failed to meet key design and engineering requirements for the proposed Facility.

Site D

Site D is the previous location of Boral mining operations bound by the rail corridor to the north, Reservoir Road to the south, Anglesea Road to the east, and the mining plant to the west. The site is located approximately 1,900 metres from Waurn Ponds Station and contains a substantial under-track crossing from the southern to northern quarry areas, at 8.9 metres height clearance. Dense screening plantations have been established on the adjacent road reserves.

Site D has been extensively quarried, millions of cubic metres of material having been removed, as such the site is not suitable for development without substantial rehabilitation. On this basis, it was concluded that site D should not be further considered for this project (Sites D, I and J Report 2017).

Site E

Site E is located to the north of the Boral manufacturing facility and rail line, is bounded by Reservoir Road to the south, and is located upon a disused open cut mining area. Draytons Road is located to the west of the site.

A longitudinal Facility layout is not able to be adopted on Site E because of restrictions on land availability. Accordingly, a “U” shaped track layout would be needed to minimise land use and ensure that all requirements of the proposed Facility can be achieved. The “U” layout adopted is operationally efficient and has some advantages over a longitudinal layout, such as:

- Better utilisation of available land.
- Improved security and monitoring of the facility.
- Consolidation of functional activities within the compound.
- Reduction in walking times for train crew and maintenance personnel.

Site E includes provision for future proofing with respect to additional train stabling in the future and can be designed and developed in a staged manner with, as far as practical, a seamless transition between stages. Two access roads can be provided to the site for vehicles (Site E Report 2009).

The Facility would need to cross existing as well as future planned large water mains. Access to the mains in the event of a failure would need to be taken into consideration, as well as construction timeframes given Barwon Water's preference to construct water mains prior to rail works. The site E Report (2009) identifies that the site is removed from a high concentration dust plume area.

Mining has been occurring at the site since 1960 (Site E Report 2009). The site E area has been mined and would therefore require filling (4 million cubic metres) and compaction to allow for construction of the proposed Facility. Discussions commenced with Boral in June 2008 and were terminated in October 2010 due to excessive costs to buy the land, transport fill to the site, and undertake civil works to compact and rehabilitate the site. Compaction of the site was very expensive, would take 3 to 4 years, and could not be guaranteed (Site G Report 2010; COO Report 2015).

Based on these matters related to the rehabilitation and preparation of the land, site E was ruled out as a practical option and rejected for the proposed Facility.

Site F

Located 4,000 metres from Waurn Ponds Station, site F is on the north side of the main railway line, bounded to the northeast by Reservoir Road and west by Pettavel Road. The site is triangular in shape, 1,600 metres long, and located adjacent to site G on the other side of the main railway line. Site F is owned by the same landowner as site G.

Key aspects of the site include:

- The landowner's residence, farm shearing shed, and various outbuildings.
- Rail access from the main railway line into the site is reasonably level.
- The site slopes upwards toward Reservoir Road and would require excavation of approximately 5 metres near the northern boundary.
- A fibre optic cable is located along the south side of the site and would need to be crossed for access to the site.
- Flora, fauna and geology was anticipated to be similar to that of site G.
- Due to envisaged ground conditions, site preparation and foundation works are likely be required. Geotechnical investigations are recommended.
- Multiple road access points into the site are possible due to the site abutting Reservoir Road to the northeast, and Pettavel Road to the west (Site F Report 2016).

A concept design was prepared for site F in 2016, and compared to that prepared for site G in 2015. The overall length of site F is less than site G, and the concept design reflects a track layout shorter in length than site G. This would result in some reduction in operations functionality. However, this should not be seen as a significant issue. The concept design confirms feasibility of site F, and with some adjustment of length, the site meets the proposed Facility functionality and scope requirements for the short and longer term. The concept design provides a route along the west end boundary of the site to enable the movement of livestock between north and south of the main railway line.

A residence, shearing shed and other outbuildings are located on the site and, regardless of buffering and any other noise attenuating action taken, development of the Facility would significantly impact the landowner. In addition, given the slope of the land, there would be a cost of extensive excavation (COO Report 2015; Site F Report 2016).

Site G

Site G runs parallel along the south of the railway line between Reservoir Road and Bogans Lane for approximately 1,700 metres. The site is 4,000 metres from Waurin Ponds Station. The north-eastern corner of the site adjoins the level crossing at the junction of Reservoir Road and Bogans Lane which is actively protected by flashing lights and boom barriers. The site of the former Pettavel station and siding (closed in 1952) is immediately west of the Pettavel Road level crossing (Site G Report 2015).

The major Boral cement works and associated rail sidings are located immediately to the east of the Reservoir Road/Bogans Lane level crossing on the south side of the railway. Boral also owns the land to the south of Reservoir Road and east of Bogans Lane. It is reserved for future extractive purposes (Site G Report 2015).

Site G is privately owned and comprises predominately open farmland used for sheep grazing purposes (COO Report 2015).

The following matters are noted for Site G:

- The site is reasonably flat and open. The topography of the site generally follows the grade of the railway line. It is relatively level on its east-west axis, rising from Bogans Lane to mid-length of the site, and falls at approximately the same grade to Pettavel Road, forming a hump in the middle. The site slopes down from the rail reserve from north to south.
- Main railway line access into the site is reasonably level.
- The characteristics of the site allow for the potential acquisition of a strip of land over the full distance of the site.
- The site will allow for future provision for a second connection between the main railway line and the Facility. This would allow flexibility for trains entering or leaving the stabling to bypass the normal access points during degraded operations (e.g. point failure, derailment etc.), for use in emergency situations, or when unacceptable train queuing is likely to disrupt services. This will ensure that the main line is not compromised.
- The site will allow future provision for a main line turnout facing the west direction, giving access to trains approaching from Warrnambool. This is a long-term possibility.
- Separation is possible to adjoining development to minimise noise and lighting impact.
- The Facility being located on this site will further sever an existing farm (the farm is already severed by the existing railway line). Dependent on staging and design, development of the Facility on the site will also impact an occupational crossing (i.e. a farm track crossing of the rail corridor) used by the owner of the property.
- Multiple road access points into the site are possible due to the site abutting Bogans Lane to the east, and Pettavel Road to the west.
- Pettavel Road, at the western extremity of the proposed site, has a Vegetation Protection Overlay in the Greater Geelong Planning Scheme, and is deemed a Significant Roadside and Linear Reserve to protect remnant species and flora and fauna habitat that may be found on the road reserve.
- A communications cable runs between the railway line and the site.

- Natural vegetation has been almost totally cleared from the farmed area on and near the site.
- There are no items of heritage significance shown on the Greater Geelong Planning Scheme near the site.
- Due to envisaged ground conditions, site preparation and foundation works are likely to be required. Geotechnical investigations are recommended. It is estimated that some fill material would be required to be brought in to balance the earthworks on site (Site G Report 2010; COO Report 2015; Site G Report 2015).

A concept design prepared for the site in 2015 confirmed that the site met the proposed facility functionality and scope requirements for the short and longer term. The site would provide adequate capacity for long term usage and further expansion if needed (Site G Report 2010; Site G Report 2015). This site is the best of the options available in that it is relatively flat and can accommodate all of V/Line's requirements for the next 50 years. It is also the closest site to Waurn Ponds that meets V/Line's requirements (i.e. it minimises dead running) (COO Report 2015).

Site H1 and Site H2

Site H1 is located to the west of Pettavel Road and north of the rail line, and site H2 is located on the opposite side of the rail line to the south. Both sites are long and wide enough to cater for the proposed Facility, however, the topography of the sites does not suit a stabling yard and maintenance facility. While entry from the rail line into each site is reasonably level, the site is uneven, dips down to a creek, and is not level over the required distance for the Facility. The sites are also located far from Waurn Ponds Station (5,800m away), increasing the amount of dead running of trains (COO Report 2015).

Based on the above, sites H1 and H2 were deemed unsuitable for the proposed Facility, and not investigated further.

Site I

Site I is south of the mining plant, is owned by Boral, and is currently leased for livestock grazing. The site is rectangular in shape, approximately 1,600m long, and is located approximately 4,000 metres west of Waurn Ponds Station. The site is bound to the north by Reservoir Road, Mt Duneed Road to the south, and Bogans Lane to the west.

In the course of studying the feasibility of site I, two Facility concept options were identified for comparison and consideration (Sites D, I and J Report 2017). The differences between the options are mainly to do with identification and evaluation of train access. Site I could accommodate the proposed Facility layout and general engineering requirements, however, train access to each site presents difficulties associated with land availability, particularly with respect to land which is being used by Boral. The cost of constructing the access alignment is also a concern.

The following matters are noted for site I:

- There is existing bunding and trees at the southern boundary of the site – a positive for the site in terms of impact mitigation.
- Access could be achieved from an existing siding, meaning that there would not be a need for any new rail connections to the main rail line.
- The site can be future proofed with room for additional stabling.
- Direct road access is available.

However, there are numerous disadvantages of site I, including:

- The Facility would be 150 metres away from the rail line for concept option 1, and approximately 300 metres away for concept option 2.
- The site slopes to the south toward Mt Duneed Road.
- Infrastructure, including a communications cable and water main, would need to be crossed for access to the site.
- Any rail access to the site will involve grade separation of Reservoir Road. This would block the entrance to the Boral site, and finish close to the Reservoir Road level crossing.
- A new rail bridge would need to be constructed.
- Rail access to the Facility would cut through and require a significant portion of the Boral site which is occupied by site offices, plant and equipment, and car parking.
- There are remnant species of native vegetation along the northern boundary.
- Due to envisaged ground conditions, site preparation and foundation works are likely be required. Geotechnical investigations are recommended (Sites D, I and J Report 2017).
- The site is zoned Special Use Zone 7 – Earth and Energy Resources Industry under the Greater Geelong Planning Scheme. The purpose of this zone is to provide for the use and development of land for earth and energy resources industry. The geology of that area consists of Tertiary Barwon Group Waurin Ponds Limestone, and it is unmined (Site G Report 2015).

The investigation identified that concept option 2 is the preferred access arrangement for site I. However, in summary, the investigation did not support either of the Facility concept design options for site I based on the disadvantages outlined above. It was further highlighted that there may be difficulties associated with dealing with a number of different stakeholders (including, but not limited to Boral, VicRoads and the community), as well as problems and difficulties of gaining access to the area of Boral's current operations (Sites D, I and J Report 2017).

Site J

Site J is south of site D and east of site I and is currently used for livestock grazing. The site is bound to the north by Reservoir Road, Mt Duneed Road to the south, and Anglesea Road to the east.

In the course of developing feasibility of site J, two Facility concept options were identified for comparison and consideration. The differences between the options are mainly to do with identification and evaluation of train access. Site J could accommodate the proposed Facility layout and general engineering requirements, however, train access to each site presents difficulties associated with land availability, particularly with respect to land which is being used by Boral. The cost of constructing the access alignment is also a concern.

Option 1

The following matters are noted for site J option 1:

- There is existing bunding and trees along the eastern boundary of Anglesea Road – a positive for the site in terms of impact mitigation.
- Rail access to the site could be achieved from existing sidings, meaning that there would not be a need for any new rail connections to the main rail line.
- The site could be future proofed with room for additional stabling.
- Direct road access is available.

However, there are numerous disadvantages of site J option 1:

- The site is approximately 1,200 metres distant from the rail line, requiring a significant amount of new rail track.
- Land acquisition within site D would be required for rail access between the site J option 1 and the main rail line.
- The site slopes south towards Mt Duneed Road and is undulating, which may require more earthworks.
- Infrastructure, including a high pressure gas pipeline, fibre optic cable, communications cable and water main would need to be crossed for access to the site.
- Access involves grade separation of Reservoir Road, 150m longer than other options, and would finish close to the Anglesea Road intersection.
- There is an existing dam in the middle of the site.
- This option would involve a number of different stakeholders including VicRoads, Boral and the community.
- Due to envisaged ground conditions, site preparation and foundation works are likely be required. Geotechnical investigations are recommended (Sites D, I and J Report 2017).
- The site is zoned Special Use Zone 7 – Earth and Energy Resources Industry under the Greater Geelong Planning Scheme. The purpose of this zone is to provide for the use and development of land for earth and energy resources industry. The geology of that area consists of Tertiary Barwon Group Waurin Ponds Limestone, and it is unmined (Site G Report 2015).

Based on the disadvantages outlined above, the investigation did not recommend site J option 1 (Sites D, I and J Report 2017).

Option 2

The following matters are noted for site J option 2:

- There is existing bunding and trees at the southern end of the boundary – a positive for the site in terms of impact mitigation.
- Rail access to the site could be achieved from existing sidings, meaning that there would not be a need for any new rail connections to the main rail line.
- The site could be future proofed with room for additional stabling.
- Direct road access is available.
- Rail access will pass through the Boral site but with less disruption compared to option 1.

However, there are numerous disadvantages of site J option 2:

- The site is some 400m distant from the main rail line.
- The site slopes towards Mt Duneed Road.
- Infrastructure, including a high pressure gas pipeline, communications cable and water main would need to be crossed for access to the site.
- Access involves grade separation of Reservoir Road.
- There may be difficulties associated with dealing with a number of different stakeholders.
- Access involves grade separation of Reservoir Road, which would block the entrance to the Boral site, however, it will not impact Anglesea Road or the Reservoir Road level crossing.
- A new rail bridge will need to be constructed (Sites D, I and J Report 2017).
- There are remnant species of native vegetation along the northern boundary.
- Due to envisaged ground conditions, site preparation and foundation works are likely be required. Geotechnical investigations are recommended (Sites D, I and J Report 2017).
- The site is zoned Special Use Zone 7 – Earth and Energy Resources Industry under the Greater Geelong Planning Scheme. The purpose of this zone is to provide for the use and development of land for earth and energy resources industry. The geology of that area consists of Tertiary Barwon Group Waurin Ponds Limestone, and it is unmined (Site G Report 2015).

Conclusion

Of both concept design options for site J, as well as both options for site I (which were considered as part of the same investigation report), it was concluded that site J option 2 is the preferred concept because it provides more acceptable train operations functionality for train access, and results in minimum disruption to existing Boral operations. However, the investigation reiterated that it would be necessary to deal with a number of stakeholders, and there may be potential difficulties associated with this. The cost associated with the required infrastructure was also a concern (Sites D, I and J Report 2017).

Comparison of Site G and Site J Option 2

Having established that site J option 2 was the best option from the investigation of sites I and J, and that site G appeared to be very favourable based on the investigations to date, a comparison was then made between site G and site J option 2.

Advantages of site G (relative to site J option 2):

- The site is well located parallel to the Warrnambool main line.
- Direct access from and to the mainline at both ends is achievable within the site.
- No road grade separation is required.
- Stakeholder involvement is significantly reduced.

Disadvantages of site G (relative to site J option 2):

- Significant signalling of the mainline is required.
- Road access is off a gravel road (Bogans Lane).
- Arrangements will be required that allow the landowner to move livestock between property north and south of the Facility (Sites D, I and J Report 2017).

Alternative Option

Considering one of the main advantages of site G is the fact that no grade separation is required, an additional Facility concept design was prepared across sites I and J which sought to avoid the requirement for a grade separation. It was determined that this concept design could provide better access/egress to the Facility and would not require a grade separation, but it would require the closure, relocation and realignment of Reservoir Road (D, I and J Report 2017).

Site X

Site X (commonly referred to in the site investigation reports as “the site South of Blue Circle”) is rectangular and approximately 1,600 metres long. It is located approximately 4,000 metres west of Waurm Ponds Station, between Anglesea Road (east) and Bogans Lane (west), south of the Warrnambool main railway line and Reservoir Road.

Key aspects of the site include:

- The site is some 150 metres distant from the main line.
- Rail access will involve the grade separation of existing roads and rail alignments.
- The site slopes towards Anglesea Road.
- Road access for light and heavy vehicles would be provided off Anglesea Road, which may require alterations for turning vehicles.
- A communications cable is located along the northern side of the site (south of the main railway line) and would need to be crossed for access to the site.
- A fibre optic cable is located along the northern side of the site.
- A water main runs north/south on Bogans Lane.
- Flora, fauna and geology was anticipated to be similar to that of site G.
- There are remnant species of native vegetation along the northern boundary of the affected property.
- Due to envisaged ground conditions, site preparation and foundation works would likely be required. Geotechnical investigations are recommended (Site X Report 2016).

A concept design was prepared for site X to determine the feasibility of the site for the Facility. Four variations of this design (1, 2A, 2B, and 3) were prepared to consider alternative rail access into the site. Strengths and weaknesses of the four layouts were identified.

Option 1

Site X option 1 is based on the preferred concept design layout for Site G. The design clearly confirms the site itself would accommodate the proposed facility layout and general engineering requirements; however, significant engineering impediments were identified relative to development of the site, particularly associated with train access. These include:

- Train access and egress is only achieved by a reversing manoeuvre off the main railway line. To facilitate the alignment of this track, it will be necessary to acquire approximately 0.2ha of land from the adjoining farm property presently included in site G.
- Train access/egress will cross Bogans Lane, either at grade, or Bogans Lane could be closed at the northern end.
- There is no secondary (emergency) access/egress to or from the main railway line (Site X Report 2016).

The option 1 concept design could be accommodated within Site X; however, significant train operation impediments exist, which would significantly impact the functionality of both the Facility and the Waurnd Ponds - Geelong – Melbourne regional train services. These include:

- The reversing manoeuvre required to access the Facility means that every train arriving at or departing from the facility will need to have its driver swap ends. This manoeuvre is time consuming and does not facilitate efficient “fleeting” of trains. It is not recommended for a short headway, regional passenger service which is expected to increase in train services over time.
- The design means that only one access could be provided to the facility, which leaves the facility and the Geelong train service vulnerable to cancellation and/or serious delays in the event of an infrastructure failure or incident that prevents use of the usual access point. Such a situation should be avoided in the development of a large train stabling and maintenance facility.
- Access to the facility via a reversing manoeuvre reduces options for future duplication of the line between Waurnd Ponds Station and the Facility (Site X Report 2016).

Option 2A

Concept design option 2A for site X provides direct access between the main railway line and the Facility via a loop line (single line) with grade separation of Reservoir Road (road over rail) and part closure of Bogans lane. It has been concluded that this design would result in significant engineering and train operations impediments which would significantly impact the functionality of both the Facility and the Waurnd Ponds – Geelong – Melbourne regional train services. These include:

- Direct access and egress are provided from the main railway line to the Facility via a loop track. The radius of the proposed access loop track is 150 metres which is the minimum acceptable. The loop access track with a 150 metre radius curve may result in above normal wheel and rail wear and generate wheel noise. The loop access track would limit train speed to 15km/h.
- The loop access would be the only train access/egress point for the facility.
- Grade separation of Reservoir Road would be required (road over rail) and Bogans Lane would be closed at the north end (Site X Report 2016).

In terms of train operations, and as per option 1, construction of a Facility with only one train access/egress point is not prudent planning, particularly when the Facility will have an ultimate capacity of a large number of trains. The majority of trains utilised on the Melbourne – Waurn Ponds line are likely to be serviced, stabled and maintained at this Facility. Total reliance on a single access/egress point would leave the Melbourne - Geelong train service vulnerable to cancellation and/or serious delays in the event of an infrastructure failure, incident or derailment within the Facility that prevents use of the only access point. In addition, access to the Facility via a loop track reduces options for future duplication of the line between Waurn Ponds Station and the Facility (Site X Report 2016).

Option 2B

Concept design option 2B is similar to 2A in that it provides a loop line (single line) allowing direct access/egress to the Facility. The design avoids the grade separation of Reservoir Road but uses 4.5ha of the farming property to the west (site G), and creates a grade separation along Bogans Lane, or a closure of Bogans Lane.

As per the other options, option 2B would result in significant engineering and train operations impediments. Direct access and egress would be provided from the main railway line to the Facility via a loop track which may result in above normal wheel and rail wear and generate wheel noise. The loop access track would be the only train access/egress point for the facility, which is not prudent planning in the instance of infrastructure failure or an incident which prevents use of the one access point. Provision of the loop will also require acquisition of 4.5ha of the farming property to the west, along with approximately 1km of new rail track, and would reduce options for the future duplication of the rail line between Waurn Ponds Station and the Facility (Site X Report 2016).

Option 3

Site X option 3 provides access to the proposed Facility at the eastern end of the site. This option provides access/egress to the Facility via a new alignment constructed (single line) beneath the Anglesea Road Overpass with grade separation of Reservoir Road (road over rail) and the Anglesea Road intersection. The concept design confirms that the site can accommodate the facility, however, significant engineering and train operations impediments exist which would significantly impact the functionality of both the Facility and the Waurn Ponds – Geelong – Melbourne regional train services.

Direct access and egress from the main railway line to the facility would be provided via a new alignment constructed (single line) commencing beneath the recently constructed Anglesea Road overpass continuing along the western side of Anglesea Road within Boral owned land, with grade separation of Reservoir Road (road over rail) and the Anglesea Road intersection. There is a significant cost involved with the grade separation of Reservoir Road, alterations at the nearby intersection of Anglesea Road and Reservoir Road, and land acquisition from Boral.

In the same manner as the other options for Site X, train operations functional impediments for option 3 relate to the existence of a single rail line access point. Direct rail access to the Facility via Anglesea Road would also need to consider future duplication of the line between Geelong and the Waurn Ponds Facility (Site X Report 2016).

Conclusion

Opus Rail consultants (formerly Coffey Rail Pty. Ltd.) were engaged by DoT and PTV and were involved since 2009 in investigating possible sites in the Waurrn Ponds area that could be acceptable for constructing the Facility. Opus Rail prepared the majority of the site investigation material.

With due consideration of the different sites investigated over time, Opus Rail considered Site G to be the preferred site and recommended accordingly (D, I and J Report 2017). The concept design prepared for Site G confirmed that the site met the proposed facility functionality and scope requirements for the short and longer term (Site G Report 2015).

The site is the best of the options available in that it is relatively flat and can accommodate all of V/Line's requirements for the next 50 years. It is also the closest site to Waurrn Ponds Station that meets V/Line's requirements (ie. it minimises dead running) (COO Report 2015).

As identified above, DoT and PTV investigated 12 sites for the proposed Facility between 2007 and 2017. Procurement and delivery of the project was transferred from PTV to Rail Projects Victoria (RPV) in 2017, followed by the transfer of planning and development responsibilities in 2018.

In continuing to progress the design and development of the proposed facility, RPV reviewed the information collected from the DoT and PTV investigations, and upon review came to the same conclusion with regard to sites that should not be considered for selection, leaving RPV to proceed with review only of sites F, G, I, J and X.

Site G was selected, with further site analysis conducted as part of the design as it progressed through to a completed reference design. To inform this process, from 2018 onwards, RPV engaged with the directly affected landowners and identified stakeholders, including local councils, government agencies, statutory authorities and other key groups.

Utilising the completed Reference Design for the Stabling Facility at Site G, RPV has revisited the 'Site Investigation Matters' used to select this site to ensure that assumptions remained true. Through this exercise it was reaffirmed that Site G remains the most appropriate site, and that the facility has been designed complying to Australian and V/Line standards with acceptance from V/Line operations.

References

- Geelong Blue Circle Site Rolling Stock Facility, prepared for Department of Transport by Coffee Rail Pty Ltd.
(Site E Report 2009)
- Waurm Ponds Train Maintenance and Stabling Facility, prepared for Department of Transport for Coffey Rail Pty Ltd.
(Site G Report 2010)
- Waurm Ponds Depot Development Project Concept of Operations Report June 2015, prepared for Public Transport Victoria by Raylink Consulting and John Hearsch Consulting Partnership.
(COO Report 2015)
- Waurm Ponds Stabling & Maintenance Facility Future Land Use Assessment, prepared for Public Transport Victoria by Opus International Consultants (Australia) Pty Ltd.
(Site G Report 2015)
- Addendum No. 2 to the: Waurm Ponds Stabling & Maintenance Facility Report dated 3/9/15, prepared for Public Transport Victoria by Opus International Consultants (Australia) Pty Ltd.
(Site F Report 2016)
- Feasibility Study – Site South of Blue Circle: Waurm Ponds Stabling & Maintenance Facility Report dated 15/07/16, prepared for Public Transport Victoria by Opus International Consultants (Australia) Pty Ltd.
(Site X Report 2016)
- Feasibility Study Sites D, I and J: Waurm Ponds Stabling & Maintenance Facility, prepared for Public Transport Victoria by Opus International Consultants (Australia) Pty Ltd.
(Sites D, I and J Report 2017)