Hyder

Technical Note 6
Strategic Rail Capacity Analysis

SIMTA

SYDNEY INTERMODAL TERMINAL ALLIANCE

Part 3A Concept Plan Application

November 2011

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SYDNEY INTERMODAL TERMINAL ALLIANCE (SIMTA)

MOOREBANK INTERMODAL TERMINAL FACILITY (MITF)

TECHNICAL NOTE 6

STRATEGIC RAIL CAPACITY ANALYSIS

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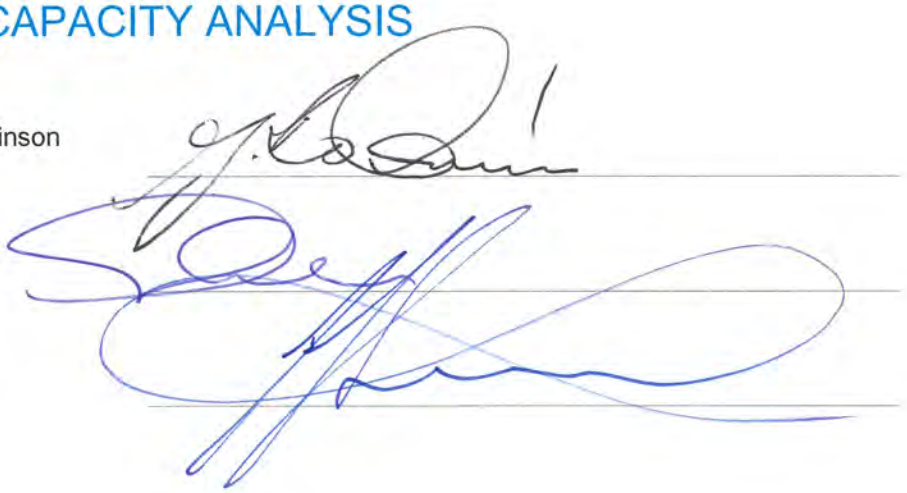

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1 INTRODUCTION

Hyder Consulting (Hyder) was engaged by Stockland, on behalf of the Sydney Intermodal Terminal Alliance (SIMTA), to assess the Concept Plan of the proposed Moorebank Intermodal Terminal Facility (SIMTA proposal). Hyder has prepared this technical note to document the rail transport and access issues associated with the site and to respond to the Director General's Requirements for the project.

1.1 Background

The Sydney Intermodal Terminal Alliance (SIMTA) is a joint venture between Stockland, Qube Logistics and QR National. The SIMTA Moorebank Intermodal Terminal Facility (SIMTA proposal) is proposed to be located on the land parcel currently occupied by the Defence National Storage and Distribution Centre (DNSDC) on Moorebank Avenue, Moorebank, south-west of Sydney. SIMTA proposes to develop the DNSDC site into an intermodal terminal facility and warehouse/distribution facility, which will offer container storage and warehousing solutions with direct rail access

The SIMTA site, approximately 83 hectares in area, is currently operating as a Defence storage and distribution centre. The SIMTA site is legally identified as Lot 1 in DP1048263 and zoned as General Industrial under Liverpool City Council LEP 2008.

The parcels of land to the south and south-west that would be utilised for a proposed rail link are referred to as the rail corridor. The proposed rail corridor covers approximately 65 hectares and adjoins the Main Southern Railway to the north. Existing land use includes vacant land, golf course, extractive industries, and a waste disposal depot.

Native vegetation includes woodland, forest and wetland communities in varying condition. Georges River and Anzac Creek intersect the proposed rail corridor. The supplementary lands area to the south of the SIMTA site to the north of the existing East Hills Rail Line are part of Lot 3001 DP1125930 and Lot 1 DP1125930. To the west of the Georges River, the Glenfield Waste Disposal site comprises several lots that are currently all used for the purposes of the waste facility.

The SIMTA site is located in the Liverpool Local Government Area. It is 27 kilometres west of the Sydney CBD, 16 kilometres south of the Parramatta CBD, 5 kilometres east of the M5/M7 Interchange, 2 kilometres from the main north-south rail line and future Southern Sydney Freight Line, and 0.6 kilometres from the M5 motorway.

Figure 1 shows the SIMTA proposal in the context of road and rail network.

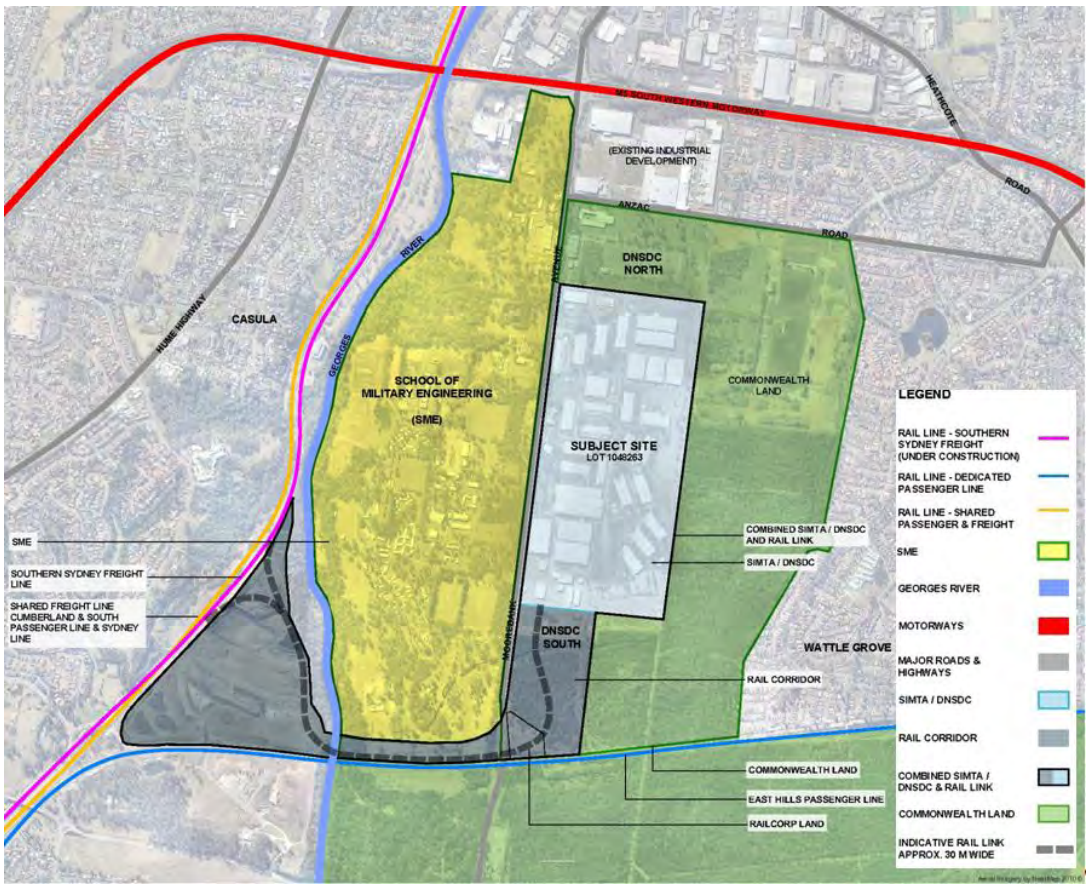

Figure 1: Moorebank Intermodal Terminal site

The SIMTA proposal comprises the following key components:

- **Indicative Rail Link and Rail Corridor**– connecting the SIMTA site with the Southern Sydney Freight Line (SSFL). The detailed design of the rail infrastructure comprising the rail link will be subject to further application and approval process.
- **Intermodal Terminal** – proposed to include on-site freight rail sidings to accommodate local freight trains to Port Botany. Containerised import freight will arrive from Port Botany by rail and be transported to the warehouse and distribution facilities within the SIMTA site, or be directly loaded on to trucks for transport to warehouses and nearby logistics centres. Exports and empty freight containers will be transported to the facility by truck and then loaded onto rail for transport back to Port Botany. The terminal is expected to contain four rail sidings, with areas for container handling and storage. The SIMTA proposal will be undertaken as a staged development. An annually operating capacity of 1,000,000 TEU throughput is anticipated in the ultimate stage, when fully developed.
- **Empty Container Storage** – will be provided within the SIMTA site. Empty containers would either be packed on-site ready for transport to the port by rail, or trucked to off-site locations where they would be packed and returned to the SIMTA site to be loaded onto rail and transported to the port.
- **Warehouse and Distribution Facilities** – approximately 300,000m^2 of warehouse and ancillary offices will be constructed to the east of the intermodal terminal. These buildings will be constructed in a staged development, responding to site servicing availability and market demands. Warehouses will range in size depending on market and tenant needs.

- **Freight Village** – approximately 8,000m^2 of support services will be provided on the SIMTA site. These may include site management and security offices, meeting rooms, driver facilities and convenience retail and business services.

The SIMTA proposal will be undertaken as a staged development and it is intended that an overall Master Plan for the entire site be undertaken for the purpose of applying for Concept Plan approval under Part 3A of the *Environmental Planning and Assessment Act 1979*.

1.2 Purpose of Technical Note

The purpose of this Technical Note is to respond to the Director General's Requirements addressing the key issues relating to the rail component of Transport and Access.

This will form part of a Transport and Accessibility Impact Assessment and will demonstrate how the project will facilitate rail freight transport objectives, meet freight infrastructure requirements and address impacts to local regional rail networks.

It will address access to and from the site and include interaction and integration with existing and planned rail infrastructure and services including the proposed Southern Sydney Freight Line (SSFL), in accordance with the key issues, Transport and Access point 2 of the DGR.

It will review the number of rail freight movements and the capacity of the existing rail system to cope with the predicted increase in traffic based on train modelling, discussions and advice from existing train operators and infrastructure owners that will be impacted by the SIMTA project, in accordance with the key issues, Transport and Access point 3 of the DGR.

It will discuss any likely rail infrastructure upgrades as a result of the SIMTA project initiatives.

1.3 Scope and Exclusions

Scope

The scope of this Technical Note 6 includes the following:

1. Review the operational requirements based on the business objectives of the SIMTA proposal. This will include impacts on other existing and potential future users of the site and also the impact on the existing ARTC and RailCorp rail infrastructure interfacing the site.

2. Review the access requirements, issues and solutions and overview the likely requirements for other potential users of the facility and describe how this has been allowed for in the track design proposed for the SIMTA proposal.

3. Review the interaction with other stakeholders including ARTC and RailCorp. Describe how the proposed integration of new rail operations generated by the project will impact on existing and forecast train modelling proposed by the SIMTA proposal. This will also look at the likely interfaces of other users within the facility.

4. Propose suitable rail infrastructure to suit the operational requirements of the SIMTA proposal that will preclude access by other users within the SIMTA site. This will include infrastructure requirements to connect with the ARTC/RailCorp main lines. We will also review the likely additional infrastructure requirements for other stakeholders (other users, ARTC and RailCorp) as a result of the SIMTA proposal.

Exclusions

It is not proposed to cover the details of any possible rail alignment options;

2 OPERATIONAL REQUIREMENTS

2.1 Need For The Rail Link

The rail link between SIMTA and the SSFL is an essential part of providing the rail connectivity between Port Botany and SIMTA.

The state government is committed to moving at least 40% of containers from Port Botany by rail, and whilst the timing of this objective has been amended it remains one of the most important parts of the freight strategy for Sydney and NSW.

The construction of the SSFL and the planned improvements to its link to Port Botany provides the spine for container movement to the south-west.

Whilst it may be possible to unload containers from rail at other locations across Sydney, and truck them to SIMTA, this would increase the total number of trucks on the road, albeit for relatively shorter distances, and would not meet the requirements inherent in the '40% of containers by rail'.

In addition, the logistics of bringing both in and out of SIMTA by road would severely limit the throughput of containers to this site.

It is therefore central to the policy of '40% of containers by rail' that a rail link be provided from the SSFL to, and into, the SIMTA site.

2.2 The Rail Link

The SIMTA intermodal terminal at Moorebank will be predominantly dedicated to receive trains from Port Botany.

The new rail alignment within the SIMTA site will be designed in accordance with ARTC standards, to accommodate critical port shuttle trailing load requirements 600 metres (minimum) which translates to a 650 metre total train length inclusive of locomotives at each end of the train.

This requirement conforms to the *2005 Freight Infrastructure Advisory Board (FIAB) Report and Recommendations.*

The rail operations proposed for the SIMTA site should include the requirement for easy access and to be able to cope with potentially one million TEU's per annum and the potential impact of this proposal on the capacity of the existing rail network between Port Botany and Moorebank.

The operations also need to take into consideration rail connections. In particular the timing of Stage 1 against the proposed SSFL construction schedule.

Subject to agreement with relevant stakeholders, the initial operation modelling anticipates the following train paths as the project develops:

TEU's per year	**Train Paths/Direction/Day**
200,000	5
500,000	11
800,000	17
1,000,000	21

These train paths assume 650 metre long port shuttle trains (inclusive of locomotives), operating 24 hours per day, 365 days of the year on reasonably regular headways.

The SSFL forms part of the ARTC's strategy for reducing transit times on the east coast interstate routes between Sydney-Melbourne and Sydney-Brisbane. An important part of this project runs adjacent to the SIMTA site.

SIMTA rail operations will need to be linked to this in order to fulfil their operational requirements.

The freight demand forecasts from ARTC along the SSFL based on current demand forecasts and interstate growth predictions are as follows:

Corridor	**Freight Demand (Million tonne-km/year)**		
	2005	**2015 low case**	**2015 high case**
Melbourne-Sydney	1,800	4,100	6,200
Sydney-Brisbane	1,700	3,900	4,700

Actual operating scenarios will inevitably be refined as planning for the project develops.

Recent discussions with ARTC indicated that they did not have a train path model at that stage, but initial calculations indicated that capacity on the SSFL may be limited to 12 minute headways and with release times, this could mean 15 minute headways.

This equates to about 32-35 train paths each way per day.

With the SIMTA proposal requiring 21-22 paths at its peak, this may severely limit train paths to other users if no improvements were carried out by ARTC to alleviate this limitation in the next 10 years. This could also limit train paths available for containers bound for other intermodals and therefore strengthens the state government's commitment to achieve '40% of containers by rail'.

It was concluded that further capacity reviews were required by ARTC and the project team as the SIMTA proposal progressed. Additional infrastructure on the main line may be required if the predicted projections were to come to fruition.

This would, however, be staged depending on ARTC's corridor capacity strategy development that would take into account ALL users between Port Botany and Moorebank (Sydney Melbourne).

3 ACCESS REQUIREMENTS

3.1 ARTC Corridor

ARTC advised (letter dated 17 October 2011) that they have undertaken some preliminary modelling that indicates that, although the SSFL in its initial configuration would not be able to accommodate up to the 21 port shuttles per day as proposed by the SIMTA project, it is likely to be feasible to accommodate this additional traffic with appropriate investment.

As such to accommodate 21 services in addition to other forecast traffic will require additional expansionary infrastructure.

ARTC's preliminary modelling indicates that the additional task may require two 750 metre loops between Leightonfield and Moorebank, the extension of the existing Moorebank loop and full duplication of the Botany line.

It is important to note that that this is based only upon an initial review and more detailed analysis to indicate that these are feasible projects.

Sites for the proposed loops have been identified based on the availability of adequate corridor width. However, the sites have not had any engineering or environmental feasibility undertaken on them at this stage and as such are conceptual solutions only.

The Moorebank loop extension and Botany duplication have previously had sufficient engineering analysis to indicate that these are feasible projects. None of the identified enhancement projects have been costed and no funding has been allocated toward them at this stage by ARTC.

ARTC advises that they are in a position to reserve capacity for these proposed potential future users. The *Interstate Access Undertaking* provides a mechanism by which capacity can be added to the network when sought by an applicant and for ARTC to identify what work must be undertaken to provide the sought capacity.

ARTC will be able to give a more detailed response on the scope, timing and cost implications of the requested capacity when SIMTA (or its nominated rail operator) is in a position to make a formal path request.

The 'Undertaking' also provides a framework for negotiating the funding of any required capacity enhancement, but ARTC notes that it is not obligated to itself provide such funding.

The required scope will vary from the indicative described by ARTC to the extent that the demand from other users is different to that assumed in ARTC's current modelling. In this regard, it is important to note that the 21 round-trip paths, together with other users of the rail line, will take the Moorebank – Sefton Park Junction section to around the practical capacity of a single-track railway. Capacity enhancements beyond those identified above are almost certainly possible, but are likely to require major civil works and property acquisition.

It should also be noted that ARTC will need to validate that the anticipated 21 services required by SIMTA will be sufficient to support a one million TEU terminal.

ARTC also advised that there is a considerable amount of attention being directed at the future transport solutions for the cross-metropolitan container task and that they are working closely with the NSW Government over the next six months to assist in identifying a preferred strategy for this task and this is likely to lead to a firmer assessment of the scope and timing of capacity enhancements.

ARTC acknowledges that they are very conscious of the opportunities that the proposed SIMTA development offers and they are happy to work with SIMTA to both assist in taking the project forward, and in capacity planning for the SSFL / Botany corridor.

3.2 SIMTA Site

Rail access to and from the SIMTA site has been reviewed in detail, especially given the potential impact and timing of the SSFL implementation.

The design will enable access by SIMTA users and whilst it does not preclude access from the School of Military Engineering site, the design does not include such access.

This enables direct access to the SIMTA site from Port Botany.

4 STAKEHOLDER INTERACTION AND PROJECT INTEGRATION

Preliminary discussions have been held with ARTC and RailCorp regarding the SIMTA proposal.

A letter has been sent to ARTC's CEO, John Fullerton, requesting access to the SSFL and seeking confirmation of train paths that are available to suit SIMTA's operational requirements.

As part of the detailed development requirements, RailCorp have advised that whilst the SSFL will be managed by ARTC, the SSFL is actually located on RailCorp land and as such SIMTA will be required to obtain both an agreement from ARTC for the connection to the SSFL in addition to RailCorp's land owner's consent to enable the SIMTA proposal to be approved.

An additional agreement may need to be obtained from RailCorp for access to various parcels of land affected by the rail line.

This decision will be made when development of the School of Military Engineering is clarified.

Operational impacts from the SIMTA proposal will be utilised by ARTC to input data into their strategic planning and operational modelling. This will in turn enable them to review any potential conflicts or timetabling limitations that will feed into their future growth plans for the SSFL.

This may mean that the design and construction of additional passing loops on the SSFL (or extension of existing designed loops) may need to be implemented sooner than anticipated in the current infrastructure growth plans.

This will further be realised when operational modelling from all potential users has been confirmed and agreed to by ARTC and the new operators.

5 INFRASTRUCTURE OVERVIEW

5.1 Connection between SSFL and SIMTA

The infrastructure design for SIMTA operations has been based on the operational parameters as mentioned in Section 1.2.1.

The track will be constructed in accordance with ARTC standards to the Class to suit the proposed freight operations and the design.

5.2 Potential works along SSFL

Additional infrastructure requirements external to the project scope will be the subject of more detailed modelling and investigation as the project develops.

It is envisaged that little additional rail infrastructure would be required in the early stages of the SIMTA proposal until operational forecasts can be confirmed. Additional passing loops (or extensions) however, may be required once the SIMTA proposal reaches its full momentum (2015-30).

ARTC will revisit and update their Main Southern Railway Corridor Capacity Strategy based on the proposed increase in freight from not only the SIMTA site, but also as a result of other potential new operators that will require use of the southern rail corridor between Port Botany and Moorebank (Sydney to Melbourne).

6 ENGINEERING CONSIDERATIONS

Access to the Glenfield Waste Disposal site and rail corridor was restricted and no field investigation was undertaken to substantiate the concept rail alignment. As a result, the engineering design for the rail link is limited to a concept alignment reflecting industry best practise within the rail corridor.

The full spectrum of engineering investigations will be undertaken at the project application stage. The detailed design phase will be subject to further application and approval process, and will be informed by the assessment process undertaken to date for the rail corridor and by subsequent assessment of the rail link.

The findings of this study have identified key engineering areas where mitigation measures may be required in detailed design. The following sections will provide the methodology and process to be followed when preparing the engineering detailed design for future project applications.

6.1 Stormwater and flooding

The first stage of the flooding and stormwater assessment (using DRAINS, HEC-RAS and MUSIC) will involve quantifying site runoff, any requirements for on-site detention, location of potential flooding impacts on neighbouring land holders and conveyance of stormwater from and around the proposed rail link within the identified rail corridor.

DRAINS software will be used to develop a rainfall runoff model to assess the performance of the proposed drainage system along the rail link with respect to mitigating potential flow impacts on neighbouring downstream areas. The DRAINS model will be developed to represent existing site conditions and post development conditions to enable comparison of discharges under the two development conditions. The DRAINS model will be run for storm durations of five minutes to 24 hours for the two year, five year, 10 year, 20 year, 50 year and 100 year ARI's, and 15 minute to six hours for probable maximum precipitation (PMP) events.

The Anzac Creek and Georges River flood plain modelling (using a TUFLOW model) will assess and evaluate the 100 year ARI rainfall events and flood levels within the Georges River and Anzac Creek. The results identified in the modelling process will be implemented within the detailed design, mitigating potential adverse flooding and stormwater impacts on neighbouring landholders and used to formulate the basis for the civil drainage design along a defined SIMTA rail link.

The following information will form the database for the flood assessment and stormwater management plan:

- Australian Rainfall and Runoff by the Institute of Engineers Australia (2001).
- NSW Floodplain Management Manual by DIPNR (2005).
- Bureau of Meteorology Rainfall Intensities for the Liverpool City Council Area.
- The Estimation of Probable Maximum Precipitation in Australia: Generalised Short-Duration Method by Commonwealth Bureau of Meteorology (June 2003).
- Services and Flood Investigation Report for Defence National Storage and Distribution Centre, Moorebank by Cardno Willing (December 2002).

- Anzac Creek Floodplain Risk Management Study and Plan by BMT WBM Pty Ltd (30 May 2008) for Liverpool City Council.
- Georges River Floodplain Risk Management Study & Plan by Bewsher Consulting (May 2004) for Liverpool City Council.
- Practical Consideration of Climate Change Floodplain Risk Management Guideline by DECC (25/10/2007).
- Aerial laser survey provided by AAM Hatch Pty Ltd (May 2008, LiDAR Data Base).
- Ground survey for the site prepared by Hard and Forester (dated 3rd August 2010)
- Liverpool City Council documents:
  - Liverpool Development Control Plan 2008;
  - Liverpool Development Control Plan 2008, Flood planning area map – sheet FLD-013, cadastre 31/7/2009.

The overall stormwater management objective for the rail link within the rail corridor seeks to:

- Adopt recognised standards reflecting current practises adopted for similar facilities around the world.
- Comply with recognised Australian Standards and Liverpool City Council's Development Control Plan 2008, and ensure that post development flows do not exceed the pre-development conditions for any rail link within the rail corridor.
- Provide engineering levels for the rail link above localised flood levels but do not impact upon capacity of existing floodplains.

6.2 Earthworks and Civil Structures

Whilst a proposed rail link has been nominated within the rail corridor, further engineering detail will be required. Once permissibility for rail is determined within the nominated rail corridor, detailed design and further impact assessment will be undertaken to verify the predicted level of impact made during the Concept Plan phase and to identify the need for any additional targeted investigations that may be required to appropriately inform a project application approval. The assessments will be able to consider the actual proposed structural elements identified for the rail link design. These assessments will inform the subsequent project application phase of the SIMTA proposal in order to gain approval to commence construction and operation.

The environmental reports prepared for the Concept Plan application have identified several values that will need to be considered when detailing the engineering design of the proposed rail link. These considerations will include, but not be limited to the following areas;

Civil Structures:

The proposed rail alignment will necessitate the construction of a new Georges River crossing, amendments to the existing Moorebank Road overbridge and several drainage culvert crossings under the proposed rail line, necessary for the management of stormwater and overland flows.

Further geotechnical investigations will be required along the proposed rail link to determine the geotechnical conditions likely to impact on the design of engineering foundations.

Environmental reports prepared for the EA submission have identified several constraints that will require mitigation measures during the engineering design development. The location and design of these structures would consider such findings as the proximity to, and crossing of,

riparian corridors along the Georges River and Anzac Creek, flora and fauna habitats within the rail corridor, location of bridge piles outside of the Georges River and threatened species located within the rail corridor.

Earthworks and Contamination:

With access to the Glenfield Waste Disposal site restricted, further site investigation and survey information for the proposed rail link location would be required when detailing the engineering design for the rail link. The locality of the capped contaminated cells within the Glenfield Waste Disposal site has been identified with their location providing the basis for the preferred alignment selected. Design consideration would be given to mitigate any requirements for piering of the rail link through the Waste facility by adopting a reinforced engineered solution subject to further investigation during detailed engineering design to mitigate any impact on the waste cells.

The current investigations undertaken for the rail corridor through the EA process have identified certain values that will need to be considered during the detailed engineering design development of the rail link. It also identifies where additional information and investigations will be required when preparing documentation for the project application for a defined rail link within the rail corridor. Current investigations and reports to date have identified measures that would need to be developed within the project application to minimise the impacts associated with the rail link.

A. APPENDIX A

ARTC Correspondence

AUSTRALIAN RAIL TRACK CORPORATION LTD

OUR REF: 15/555/20-11/67437

17 October 2011

Mr Michael Yiend
Development Manager
Stockland Development Pty Ltd
Level 25, 133 Castlereagh Street
Sydney NSW 2000

Dear Mr Yiend

Capacity and Access to the Southern Sydney Freight Line

Thank you for your letter of 12 July 2011 concerning capacity on the Southern Sydney Freight Line (SSFL) and access to that capacity.

ARTC has undertaken some preliminary modelling that indicates that although the SSFL in its initial configuration would not be able to accommodate up to the 21 port shuttles per day indicated in your letter, it is likely to be feasible to accommodate this additional traffic with appropriate investment.

As such to accommodate 21 services in addition to other forecast traffic will require additional expansionary infrastructure. ARTC's preliminary modelling indicates that the additional task may require two 750 metre loops between Leightonfield and Moorebank, the extension of the existing Moorebank loop and full duplication of the Botany line. It is important to note that this based only upon an initial review and more detailed analysis would be required to confirm this assessment.

Sites for the proposed loops have been identified based on the availability of adequate corridor width. However, the sites have not had any engineering or environmental feasibility undertaken on them and as such are conceptual solutions only. The Moorebank loop extension and Botany duplication have previously had sufficient engineering analysis to indicate that these are feasible projects. None of the identified enhancement projects have been costed and no funding has been allocated toward them.

Your letter correctly notes that ARTC is not in a position to reserve capacity for a future user. The Interstate Access Undertaking provides a mechanism by which capacity can be added to the network when sought by an applicant and for ARTC to identify what work must be undertaken to provide the sought capacity. ARTC will be able to give a more detailed response on the scope, timing and cost implications of the requested capacity when SIMTA (or its nominated rail operator) is in a position to make a formal path request. The Undertaking also provides a framework for negotiating the funding of any required capacity enhancement, but it should be noted that ARTC is not obligated to itself fund capacity enhancements.

Obviously the required scope will vary from the indicative scope described above to the extent that demand from other users is different to that assumed in ARTC's current modelling. In this regard it is important to note that 21 round-trip paths, together with other users of the rail line, will take the Moorebank – Sefton Park Junction section to around the practical capacity of a single-track railway. Capacity enhancements beyond those identified above are almost certainly possible, but are likely to require major civil works and property acquisition. Also please note that ARTC has not sought to validate

whether the anticipated 21 services will be sufficient to support a one million TEU terminal.

As you will be aware, there is a considerable amount of attention being directed at the future transport solutions for the cross-metropolitan container task. ARTC is working closely with the NSW Government over the next six months to assist in identifying a preferred strategy for the cross-metropolitan container task, and this is likely to lead to a firmer assessment of the scope and timing of capacity enhancements.

I can assure you that ARTC is very conscious of the opportunities that the proposed SIMTA development offers and we are happy to work with SIMTA to both assist in taking your project forward, and in capacity planning for the SSFL / Botany corridor.

I trust that this clarifies ARTC's views on this issue.

Yours faithfully

John Fullerton
Chief Executive Officer