# SIMTA Intermodal Terminal Project – Moorebank Precinct West

## Peer review of Proposed Modification

Project Number: 8201701801/Report 001 Ver 1

Prepared for
Liverpool City Council

22 August 2016

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# Document Information

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# Executive Summary

The Sydney Intermodal Terminal Alliance (SIMTA) plan to construct and operate of an intermodal freight terminal (IMT) and associated infrastructure on the western side of Moorebank Avenue at Moorebank, NSW. The Commonwealth government in the form of the Moorebank Intermodal Company previously obtained approval for the development of an IMT on the site with a capacity of 1.05 million Twenty-foot Equivalent Units (TEUs) per annum, subject to SSD_5066 under Division 4.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). SIMTA have subsequently reached agreement with the Commonwealth Government to take over the site, which is referred to as Moorebank Precinct West (MPW).

The SIMTA have an existing Concept Approval (MP 10_0193) as a transitional project under Part 3A of the EP&A Act, with subsequent staged Project Approvals for an IMT on the eastern side of Moorebank Avenue. This site is referred to as the Moorebank Precinct East (MPE).

A modification is now proposed by the SIMTA under Section 96(2) of the EP&A Act to the existing Project Approval SSD_5066 for the MPW IMT. The primary aim of the modification is to address the assumption that the development would result in a cut/fill balance, as further investigations have identified that the import of 1,600,000m$^3$ of fill material, with associated on-site crushing and screening is required.

The Modification Proposal has been detailed in the *Moorebank Precinct West Intermodal Terminal Facility – Concept Plan Approval (SSD 5066) Modification* Report (Arcadis, 2016) (Modification Report). The NSW Department Planning and Environment have invited Liverpool City Council (Council) to make a submission to the modification by 22 August 2016, with this submission prepared by Cardno on behalf of Council.

The submission considered the proposed modification comparative to the existing Project Approval inclusive of early works and the potential for additional environmental impact. The review found that the proposed modification, particularly the import and crushing of spoil material has the potential for extensive environmental impacts, primarily on Moorebank, surrounding suburbs and associated transit corridors.

Key issues associated with the project include:

- **An approximate 37-fold increase in the number of heavy vehicle moments during the early works phase. This is a significant increase which will cause amenity impacts during the early works period that were not considered in the Project Approval.**
- **The proposal would significantly increase on-site dust emissions during construction, with the residential area of Casula located directly to the west across the Georges River, as well as residential areas further to the north and south potentially subject to reduced air quality.**
- **The import of 1,600,000 m$^3$ of fill is anticipated to create a substantial increase in noise impacts on the community, with noise increasing by 4 - 6 dB during the day time and extending the hours of construction activity to 10pm at night.**
- **Far greater consideration of constructability is required due to the substantially different earthworks model now proposed, which indicates the need for importation of 1,600,000 m$^3$ of fill occurring over a six to nine-month period. Unless this consideration is given, there is the potential for further modifications to be required to address the final design and construction process.**
- **The importation and emplacement rates are ambitious, particularly given that the anticipated unsuitable ground conditions will be 'treated' on an ad-hoc basis. This poses a high environmental impact risk, with further traffic, noise, dust and constructability assessments necessary to demonstrate the feasibility of works on this scale.**
- **The modification at the scale proposed is not considered to satisfy the 'substantially the same' test as defined by legal precedent under Section 96(2) of the EP&A Act. Therefore, it is deemed inappropriate for the development as modified to obtain approval under Section 96 of the EP&A Act.**

The review identified the potential for extensive environmental impacts, some of which are yet to be adequately assessed by the proponent. Furthermore, it is questionable whether these impacts can be mitigated without the identification and preparation of supporting infrastructure, management plans, operating procedures and compensation schemes, which the current scheme and associated assessment fails to do.

The review has identified that the proposed modification is not 'substantially the same' as the existing approved development. Consequently, a Section 96(2) modification is not the appropriate approval pathway. A formal request for Secretaries Environmental Assessment Requirements should be lodged, with a subsequent Environmental Impact Statement prepared to fully consider the extent of impact.

Furthermore, it is recommended that a precinct wide, master planned approach to earthworks is considered. This approach reflects previous comments from the Planning and Assessment Commission and Council, which would allow more orderly development and aid the understanding of the full extent of environmental impacts.

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# 1 Introduction

The Sydney Intermodal Terminal Alliance (SIMTA), comprising a consortium of Qube Holdings and Aurizon, plan to construct and operate an intermodal freight terminal (IMT) and associated infrastructure at Moorebank, NSW. Project Approval for the works has been granted under SSD_5066.

A memorandum from NSW Department Planning and Environment (DP&E), dated the 6 July 2016, states that SIMTA has submitted a request to modify the approval of Moorebank Intermodal Stage 1 (early works) under Section 96(2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The Modification Proposal has been detailed in the *Moorebank Precinct West Intermodal Terminal Facility – Concept Plan Approval (SSD 5066) Modification* Report (Arcadis, 2016) (Modification Report).

The proposal made by SIMTA seeks approval to make modifications comprising:

> Vegetation removal beyond that provided within early works

> Import, by truck, of approximately 1,600,000m$^3$ of fill (from offsite locations)

> Cut, fill and stockpiling of excess fill within the primary earthworks areas

> Crushing and screening of oversized materials and demolition materials stockpiled during Early works, for direct placement on site

> Temporary sediment and erosion control works, including onsite detention basins

> Establishment of temporary internal haulage routes, construction compounds inclusive of a materials crusher and other plant and equipment additional to those included within the approved early works.

DP&E have invited Liverpool City Council (Council) to make a submission to the modification by 22 August 2016. Subsequently, Council have engaged Cardno to undertake a peer review of the documentation for the modification to the Moorebank Precinct West (MPW) IMT proposed by the SIMTA.

## 1.1 Background

MPW is located on Commonwealth land, which accommodated the School of Military Engineering (SME) on the western side of Moorebank Avenue. The land on the eastern side of Moorebank Avenue is referred to as Moorebank Precinct East (MPE). SIMTA have previously obtain approval for an IMT on this site. The subsections below provide further background to both the MPW and MPE sites.

### 1.1.1 Moorebank Precinct West

The Commonwealth government in the form of the Moorebank Intermodal Company (MIC) previously obtained approval for the development of an IMT on the site with a capacity of 1.05 million Twenty-foot Equivalent Units (TEUs) per annum, subject to SSD_5066. SIMTA have subsequently reached agreement with the Commonwealth Government to take over the site.

The project has been identified as State Significant Development (SSD) subject to *State Environmental Planning Policy (State and Regional Development) 2011* (State and Regional SEPP) with an EIS informed by Secretaries Environmental Assessment Requirements (SEARs) prepared in support of the original approval. A Modification Report (Arcadis, 2016) has been prepared in support of the proposed modification. The Environmental Assessment identifies the proposed modification and assesses the potential for impact.

The MPW site, which is the subject of this application is located on the western side of Moorebank Avenue, with the Georges River running along the western boundary of the site. The IMT comprises a rail spur linking the site to the Southern Sydney Freight Line (SSFL), with sidings on site serviced by trucks via Moorebank Avenue. The MPW project is proposed to service Port Botany, with freight received by rail and then distributed via truck (refer to **Figure 1-1** for the Greater Sydney Regional context).

The MPW site borders are defined by:

> North – existing manufacturing (ABB Australia) immediately to the north, with commercial, residential and industrial areas north of the M5

> East – Moorebank Avenue, with the MPE beyond. The residential suburb of Wattle Grove is further east.

> South – the East Hills Line Railway, with heavily vegetated land beyond.

> West – the Georges River, with the River foreshore recreational area including the Casula Powerhouse Arts Centre and the suburb of Casula beyond.

The MPE site is to the east and has approval for the staged development of an IMT by SIMTA as discussed in **Section 1.1.2** below.

### 1.1.2 Moorebank Precinct East

MPE site was previously Commonwealth owned, operating as the Defence National Storage and Distribution Centre (DNSDC). However, SIMTA has taken ownership of this land and obtained Concept Approval (MP 10_0193) as a transitional project under Part 3A of the EP&A Act, with subsequent staged Project Approvals obtained by SIMTA under Division 4.1 of the EP&A Act.

The MPE IMT is approved to accommodate a container freight volume of 250,000 TEUs per annum. The 250,000 TEU capacity is the maximum permitted freight road volume subject to the Concept Approval. However, SIMTA have previously identified the potential for additional throughput.

### 1.1.3 Context

**Figure 1-1** shows the MPW and MPE sites in the context of other IMT's within the Greater Sydney Region, with **Figure 1-2** illustrating the proximity of the two sites. The SIMTA *Intermodal Terminal Facility- Stage 1: Environmental Impact Statement* prepared by Hyder Consulting (2015) to inform the MPE Stage 1 development identified that MIC, the previous proponents of the MPW site and SIMTA the proponents of the MPE site had reached an agreement to develop the two IMT sites through a precinct wide approach, with SIMTA subsequently becoming the proponent for both sites. This agreement has not yet resulted in a master planned approach for both sites being put forward.

The physical proximity and common operator for both Moorebank IMT sites suggests that there may be a shared rail link to the SSFL and associated infrastructure. Such a scheme has not yet been put forward, with separate rail connections and road interfaces proposed.

It is acknowledged that the scope of this review is focused on the MPW proposal. However, given the proximity of the two IMT's, there is the potential for large scale and wide ranging cumulative environmental impacts. Consequently, such impacts and opportunities for further integration of the proposals has previously been raised by both the Planning Assessment Commission and Council, with further comment in this submission. The consideration of cumulative impacts would ensure the most efficient and coordinated use of the land, while gaining a clear understanding of the potential impacts of both projects on the Liverpool community and Council assets.

Council and its community have raised significant concerns about the scale of impacts associated with the proposal and have raised their strongest objection to the development scheme. Cardno has previously been engaged to prepare a submission on behalf of and in conjunction with Council to the public exhibition period.

## 1.2 Review Objectives

The review objectives comprise:

> Review the adequacy of the environmental assessment within the EIS and supporting documentation

> Identify the potential impacts resulting from the proposed modification

> Identify the potential disparity between the initial development and the proposed modification to establish if the development is 'substantially the same' as required by Section 96 of the EP&A Act

> Identify if the Concept Approval requirements (State and Commonwealth) have been satisfactorily addressed

> Identify whether the proposed modification is considered appropriate for support.

Cardno have previously worked with Council to provide submissions on both the MPW and MPE intermodal terminal schemes. Consequently, we are aware of and understand the implications of the planned IMT's both individually and through combined impacts. Due to the large scale of these facilities there are potential impacts at both the local and regional level that requires consideration in the developments entirety.

## 1.3 Methodology

The assessment has considered the following key areas for environmental aspects for review. These aspects were identified due to the potential for impact.

> Statutory Planning

> Traffic and Transport

> Air Quality

> Noise and Vibration

> Stormwater and Flooding

> Geotechnical

> Contamination

> Heritage

> Biodiversity

> Waste.

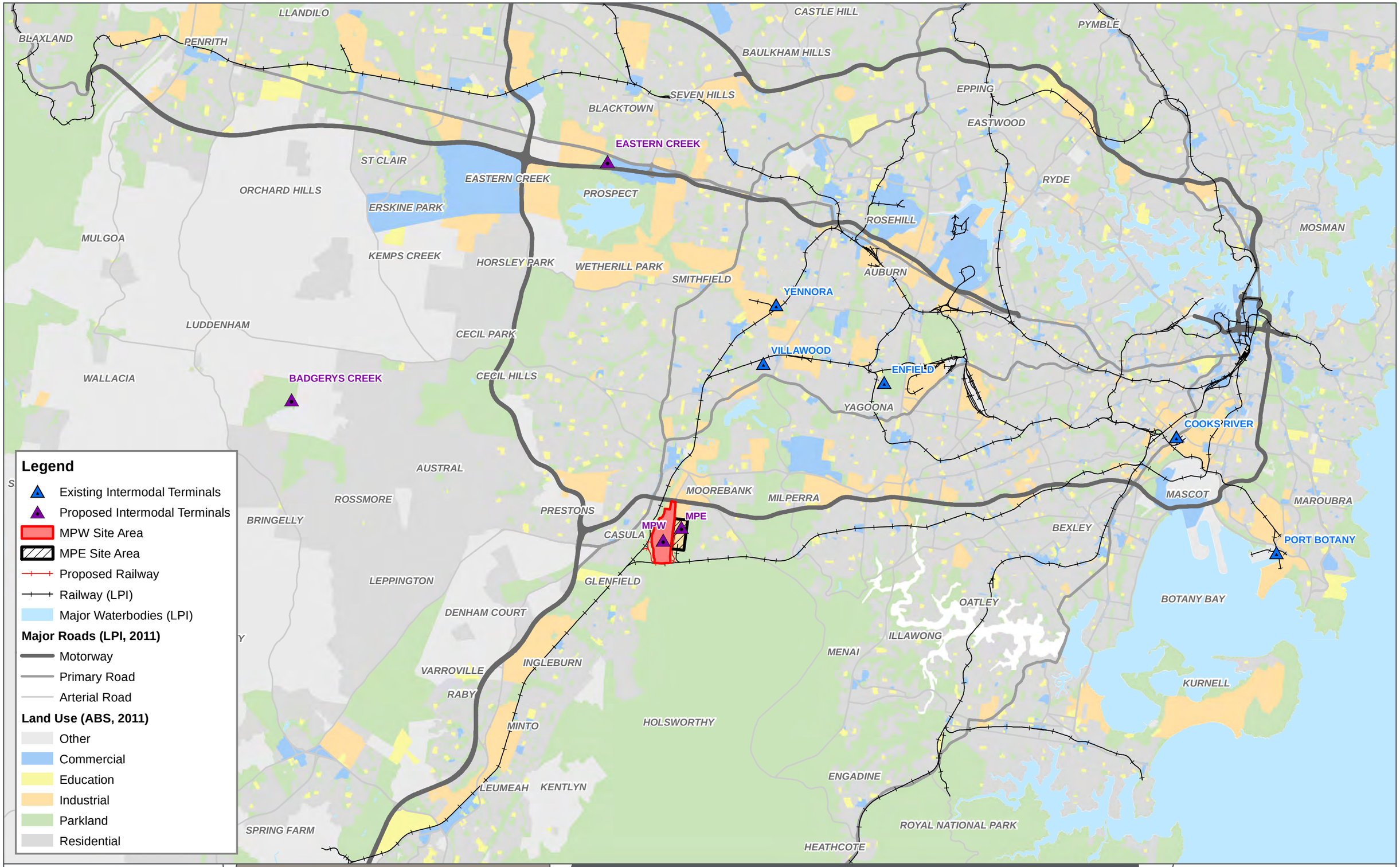


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FIGURE 1-1

1:160,000 Scale at A3

Kilometres

0 2 4 6 8

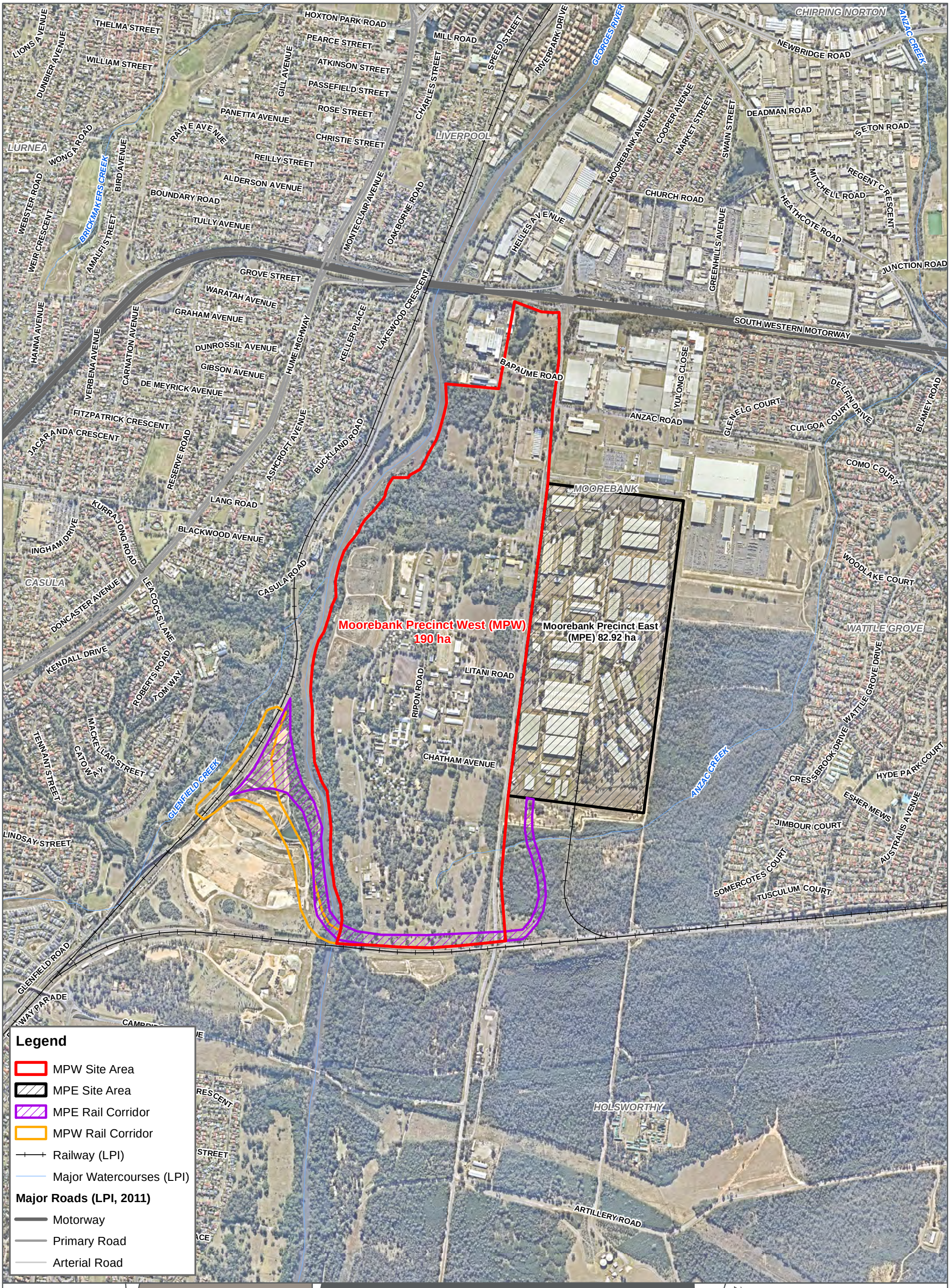
# Location Plan: Greater Sydney Context

## MOOREBANK INTERMODAL SITES

N

Cardno

Map Produced by Cardno NSW/ACT Pty Ltd (WOL)
Date: 2016-08-15 | Project: 82017018-01
Coordinate System: GDA 1994 MGA Zone 56
Map: 8201701801-GS-002-LocationPlan.mxd 01


Moorebank Precinct West (MPW)
190 ha
Moorebank Precinct East
(MPE) 82.92 ha
LIVERPOOL
CHIPPING NORTON
MOOREBANK
LURNEA
CASULA
WATTLE GROVE
HOLSWORTHY
HOXTON PARK ROAD
THELMA STREET
LIONS AVENUE
DUNBIER AVENUE
WILLIAM STREET
PEARCE STREET
ATKINSON STREET
PASSEFIELD STREET
ROSE STREET
PANETTA AVENUE
CHRISTIE STREET
REILLY STREET
ALDERSON AVENUE
BOUNDARY ROAD
TULLY AVENUE
GROVE STREET
WARATAH AVENUE
GRAHAM AVENUE
DUNROSSIL AVENUE
GIBSON AVENUE
DE MEYRICK AVENUE
FITZPATRICK CRESCENT
JACARANDA CRESCENT
WONGA ROAD
BIRD AVENUE
WEBSTER ROAD
WEIR CRESCENT
AMALFI STREET
HANNA AVENUE
VERBENA AVENUE
CARNATION AVENUE
GILL AVENUE
RAINE AVENUE
MILL ROAD
CHARLES STREET
SPEED STREET
RIVERPARK DRIVE
GEORGES RIVER
MONTECLAIR AVENUE
OAKBORNE ROAD
KELLER PLACE
HUME HIGHWAY
LAKEWOOD CRESCENT
HELLES AVENUE
MOOREBANK AVENUE
COOPER AVENUE
MARKET STREET
SWAIN STREET
NEWBRIDGE ROAD
ANZAC CREEK
DEADMAN ROAD
SETON ROAD
MITCHELL ROAD
REGENT CRESCENT
CHURCH ROAD
HEATHCOTE ROAD
GREENHILLS AVENUE
JUNCTION ROAD
SOUTH WESTERN MOTORWAY
BAPAUME ROAD
YULONG CLOSE
ANZAC ROAD
GLENELG COURT
DELFIN DRIVE
CULGOA COURT
BLAMEY ROAD
COMO COURT
WOODLAKE COURT
WATTLE GROVE DRIVE
CRESSBROOK DRIVE
HYDE PARK COURT
ESHER MEWS
JIMBOUR COURT
AUSTRALIS AVENUE
SOMERCOTES COURT
TUSCULUM COURT
ARTILLERY ROAD
BRICKMAKERS CREEK
GLENFIELD CREEK
LANG ROAD
BLACKWOOD AVENUE
KURRAJONG ROAD
INGHAM DRIVE
CASULA ROAD
DONCASTER AVENUE
LEACOCKS LANE
KENDALL DRIVE
ROBERTS ROAD
TOM WAY
RESERVE ROAD
ASHCROFT AVENUE
BUCKLAND ROAD
RIPON ROAD
LITANI ROAD
CHATHAM AVENUE
MACKELLAR STREET
CATOWAY
TENNANT STREET
LINDSAY STREET
GLENFIELD ROAD
GLENFIELD WAY PARADE
Legend
MPW Site Area
MPE Site Area
MPE Rail Corridor
MPW Rail Corridor
Railway (LPI)
Major Watercourses (LPI)
Major Roads (LPI, 2011)
Motorway
Primary Road
Arterial Road
FIGURE 1-2
1:15,000 Scale at A3
Metres
0
150
300
450
600
Location Plan
MOOREBANK INTERMODAL SITES
Liverpool city council
Cardno
Map Produced by Cardno NSW/ACT Pty Ltd (WOL)
Date: 2016-08-15 | Project: 82017018-01
Coordinate System: GDA 1994 MGA Zone 56
Map: 8201701801-GS-001-LocationPlan2.mxd 01
Aerial imagery supplied by nearmap (June 2016)

## 1.4 Structure of the Report

This submission has been arranged as follows:

> **Section 2** – assesses the proposal against the statutory planning framework, identifying and implications.

> **Section 3** – reviews the technical assessments and recommendations contained within the EIS in accordance with legal and best practice guidelines. The potential impact of the scheme, whether they be positive, negative or negligible, with information gaps, mitigation and management measures identified.

> **Section 4** – summarises and concludes the review to identify the potential impacts for the Liverpool local government area and it's community, as well as providing recommendations for the next step in the assessment process.

## 1.5 Limitations

This assessment is based on secondary information (i.e. already readily available) gathered over a limited period, and is therefore subject to limitations. This information has not been individually verified and is therefore subject to the limitations of its original purpose.

*This report does not constitute an alternative environmental assessment of the proposal or propose a determination of the application. Rather, it is a peer review to determine if the application has addressed all statutory and legal requirements, and appropriately considered the merits and justifications for the project. This report is intended to guide further discussion with State agencies, Councils, relevant stakeholders, the community and the applicant.*

# 2 Statutory Compliance

Commonwealth, State and Local legislation and policy is applicable to MPW. However, the review contained within the following sub-sections is limited to identifying key legislative considerations, with further environmental aspect specific legislation considered in the relevant parts of **Section 3** below.

## 2.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) applies to matters of national environmental significance. The EPBC Act requires approval from the Department of Environment (DoE) for any action that has, will have or is likely to have a significant impact on the nine listed matters of national environmental significance.

The Concept Approval for the MPW Project was referred to DoE as a controlled action (EPBC 2011/6086), with Arcadis (2016) identifying that approval is anticipated during 2016. There is potential for the works proposed by the modification to be re-referred to the DoE for consideration due to the magnitude of change and associated potential for impacts on matters of national environmental significance as discussed in **Section 3**.

## 2.2 Environmental Planning & Assessment Act 1979

The EP&A Act provides the legislative framework for the assessment and approval of the proposed modification. The MPW Concept Plan and early works Approval SSD_5066 was obtained in June 2016 under Part 4, Division 4.1 of the EP&A Act. A modification is now proposed subject to Section 96(2) of the EP&A Act.

There are two legal tests applicable to Section 96 that need to be considered before a consent authority can determine a modification. These comprise:

1. The proposed modification must not involve "*alteration without radical transformation*" (*Sydney City Council v Ilenace Pty Ltd [1984]*). Consequently, a proposed radical transformation to the approved development cannot be determined under Section 96.
2. The proposed modification, as required by Section 96(2)(a), must be 'substantially the same development' as authorised by the original development consent.

The radical transformation test is very broad and hard to qualify, therefore, this review focuses on the second test.

To establish whether the development is 'substantially the same' as the original, a comparison between the approved Concept Plan and early works development and the proposed modification is required. This comparison has been undertaken within **Section 3** of this document. The comparison includes identification of the modification, consideration of the magnitude of change and the associated impacts. The comparison focuses on the early works component of the approval, as this is the portion of the Concept Approval proposed to be modified.

The comparison requires a threshold of similarity being identified. In the 1999 case, *Moto Projects (No 2) Pty Ltd v North Sydney Council,* the Land and Environment Court (Court) noted that a comparison exercise involves consideration of the quantitative and qualitative elements of the development. It is key to note that it is the Concept Approval that is being modified. Consequently, all changes to the Approval should be considered including the interim construction process, rather than just the overall outcome, which in this case is the development of an IMT. Consequently, a proposed modification can fail the 'substantially the same' test for just one change to a feature of the development, especially if that feature is important, material or essential.

The following should be considered in identifying whether the change is 'substantially the same':

> The numerical differences in all key aspects of the development e.g. amount of fill and associated truck movements

> The non-numerical factors e.g. visual impact, congestion

> The changes relating to a material and essential feature of the approved development e.g. import and crushing of fill material on site.

The Court has considered the extent of changes and whether they are considered to be 'substantially the same' in a number of cases. In the case of *The Satellite Group (Ultimo) Pty Ltd v Sydney City Council [1998]*. A nine storey residential building was proposed, with a modification to introduce a retail component at street level. The size and shape of the residential building did not change. Furthermore, the Court found that the changes were a critical element of the intrinsic character of the building. The Court noted that while the quantitative change (bulk and scale) was identical, the 'qualitative' change was fundamental, due to the introduction of the retail component.

The proposed MPW modification would not be a quantitative change to the final form. However, it would result in a substantial quantitative change during the construction phase, with fill that was previously not proposed to be imported, requiring import, with an associated order of magnitude change in truck movements required to facilitate this. The additional truck movements, along with the on-site crushing would result in a quantitative change in the approved early works package. Consequently, it does not appear that the proposed modification would satisfy the 'substantially the same test' within this case.

The development consent in the case of *Iris Diversified Property Pty Ltd v Randwick City Council*, was sought for alterations to the Clovelly Hotel, plus 4 levels of residential apartments. A section 96 modification proposing an additional storey of apartments was lodged. The Court found that: "*While the additional units provided for in the modification application may not be seen in some circumstances as significant in quantitative terms, the qualitative impacts of the additional storey in my view support the conclusion that the modification is not substantially the same…"*

In the context of the proposed MPW modification. The import of substantial amounts of fill, as opposed to the originally Approval scheme comprising a cut/fill balance for the site would result in an order of magnitude quantitative change in the development. The magnitude change is due to the associated truck movements and impacts on amenity and human health. Consequently, the extent of quantitative change would far exceed the approximate one fifth change in the Iris Diversified Property Pty Ltd v Randwick City Council case. Furthermore, the proposed modification would result in qualitative changes due to the additional impacts to human health from congestion, noise and air quality.

The Modification Report in Section 4.2 considers the 'substantially the same' criteria, noting that the modification "*will not alter the approved use for an IMT and warehousing facility*" (Arcadis, 2016), with assessments identifying that subject to "*appropriate mitigation measures, environmental impacts associated with the proposed modification would be minor and of a short duration*" (Arcadis, 2016). The environmental assessments undertaken within **Section 3** do not concur with this conclusion, due to the magnitude of change, the extent of environmental impacts, or a lack of information and assessment provided in the Modification Proposal. Consequently, it is not considered that the proposed modification is 'substantially the same' as the approved development.

# 3 Review of Modification Documents

## 3.1 Traffic and Transport Assessment

The MPW Modification Proposal documentation, prepared by Arcadis (2016), provides an outline of the modification works that are proposed to the MPW Concept Plan approval.

Specifically, *Appendix B – Construction Traffic Impact Assessment* (CTIA) summarises the potential traffic impacts that may occur as a result of those proposed modifications. This review considers the analysis provided within that annexure.

### 3.1.1 Proposed Modification

The MPW Concept Approval determined that all the fill material required for the project (with the exception of fill material imported to the MPW site for remediation of on-site contamination) could be sourced from within the MPW site. That is, there would be a balanced cut and fill, and all fill required would be derived from on-site excavations.

The Modification Proposal document (Arcadis, 2016) states that recent civil detailed design has identified a substantial deficit of available fill on the site. As a result, the fill now required to be imported to the site is estimated at 1,600,000m$^3$.

Given the above, it is now proposed that additional preparatory works be undertaken at the site as a modification to the approved 'early works' stage. This is the first of the five stages (early works, Project Phase A, Project Phase B, Project Phase C and Full Build) which were outlined in the approved concept plan.

Further to the proposed modifications described in **Section 1**, it is proposed that the works (for certain activities) be undertaken during extended working hours to those outlined in the MPW Concept Plan documents. The extended working hours include 6:00am to 7:00am and 6:00pm to 10:00pm on weekdays, and 7:00am to 8:00am and 1:00pm to 6:00pm on Saturdays.

In effect, these additional hours will extend operations at the site to 16 hours (6:00am to 10:00pm) on weekdays and 11 hours (7:00am to 6:00pm) on Saturdays.

### 3.1.2 Cardno Assessment

The following sub-sections address components of the Arcadis Construction Traffic Impact Assessment (CTIA).

#### *3.1.2.1 Increased Construction Traffic Volumes*

The CTIA (Section 4.1) has identified that:

> 1,600,000 m$^3$ of fill will be required to be brought to the site by trucks during the early works stage

> These works are anticipated to commence in the last quarter of 2016 and last for 6 to 9 months

> During peak early works operations, a maximum 22,000 m$^3$ of fill will be brought to the site per day. A ramp up and ramp down period is anticipated either side of this peak.

Based on the above information, Arcadis has estimated that up to 745 heavy vehicles (truck and dog or semi-trailer) will be required to move fill to/from the site daily during the peak early works stage. This equates to 1,490 heavy vehicle movements per day.

The daily fill volume during peak operations (22,000 m$^3$) and number of trucks required to transport this quantity of fill (745 no.) is reasonable, equating to an average of around 30 m$^3$ per truckload.

Clarification is sought as to whether these heavy vehicle movements are in addition to those already considered in the early works outlined in the concept plan approval. The Arcadis modification report (Section 3.1) cites the Parsons Brinckerhoff (2014) documentation prepared for the Concept Plan approval which estimated around 64 heavy vehicle movements would be generated by the site per day. It is further explained that construction deliveries to the site were subsequently restricted in the Response to Submissions to a maximum of 40 heavy vehicle movements per day.

Therefore, the proposed modification will increase the daily number of heavy vehicle moments generated during the early works by around 37 fold. This is a significant increase which will cause amenity impacts during the early works period that were not considered in the concept plan approval.

#### *3.1.2.2 Increased Light Vehicle Volumes*

The CTIA (Section 4.1) states that approximately 105 construction personnel will be required during the peak modification works period. Of these, it has been assumed that 1 in 3 workers will car-pooling to the site, i.e. 105 workers will arrive to the site in 70 vehicles.

The daily light vehicle traffic generated by the modification works has been estimated at 190 movements, which comprises the 70 inbound and 70 outbound movements at the beginning and end of shift, as well as an allowance for an additional 50 movements generated by delivery vehicles.

Peak hour light vehicle traffic has been estimated at 53 vehicle movements during the AM peak (equivalent to 28% of the daily construction worker movements) and around 46 vehicle movements during the PM peak (equivalent to 24% of the daily construction worker movements).

The number of employees car-pooling to the site (33%) is considered high. The 2014 traffic report prepared by Parsons Brinkerhoff for the concept plan approval (Section 11.4) estimated that around 90% of employees would drive to the site in their own motor vehicle. This is considered a more realistic estimate given the nature of the project and limited public transport connectivity to the site. Further, the Parsons Brinkerhoff report estimated that around 50% of the workforce would leave the site and return in the middle of the day.

Based on these assumptions, the additional 105 staff members would arrive and depart the site in around 94 vehicles, with around 47 vehicles leaving and returning to the site during the middle of the day. This equates to (94+47+47+94) 282 daily vehicle movements. When allowing for the 50 delivery vehicle movements cited in the CTIA, (Section 4.1), daily light vehicle traffic is estimated at around 332 vehicle movements, or 142 more vehicle movements than estimated in the Arcadis report.

It is not clear if these vehicle movements are in addition to, a full or a partial replacement of the early works traffic volumes outlined in the Concept Plan EIS and supporting documentation (Parsons Brinkerhoff, 2014). Section 11.4 of that report suggested that the early works stage would generate in the order of 810 light vehicle movements a day, inclusive of 54 vehicle movements during the peak 1-hour periods.

If modification works are proposed to occur simultaneously with the approved early works, then the daily light vehicle traffic volume generated by the site would be around 1,000 vehicle movements based on the Arcadis CTIA (2016) assumptions or 1,142 vehicle movements based on the Parsons Brinkerhoff (2014) assumptions.

With regard to peak hour operations, Arcadis CTIA (2016) suggested a peak hour traffic volume of 53 and 36 vehicle movements during the AM and PM peak periods respectively. If the peak hour traffic outlined in the Parsons Brinkerhoff (2014) report is also considered, peak hour traffic would be in the order of 107 and 90 light vehicle movements during the AM and PM peak periods respectively.

Clarification is sought with regard to the proposed staging of works and whether the activities considered in the Parsons Brinkerhoff (2014) report will occur concurrently or subsequent to those now outlined under the proposed modification.

#### *3.1.2.3 Distribution of Modification Vehicle Movements*

The CTIA (Section 4.2) has distributed all light vehicle movements generated by the modification proposal to/from the north, with 90% passing through the Moorebank Avenue / M5 intersection and 10% arriving / departing via Anzac Road.

The report also distributes all heavy vehicle movements (with the exception of those removing ACM material to the Glenfield Waste Facility south of the site) to/from the Moorebank Avenue / M5 intersection to the north.

This light vehicle traffic distribution does not allow for any staff traffic to arrive or depart to the south. This is considered inaccurate given the tidal traffic flows observed along Moorebank Avenue and the location of the site relative to residential development.

The distribution of heavy vehicle traffic to/from the north is accepted given the truck size restrictions on Moorebank Avenue south of the site. It is noted however that heavy vehicle movements have been directionally split 50/50 to and from the east and west (CTIA, Appendix A) which appears arbitrary.

Justification for these distributions should be provided given that an uneven split may have an impact on the operation of the M5 Interchange.

#### *3.1.2.4 Base Traffic Volumes*

The CTIA (Section 3.2) cites traffic volume data collected for SIMTA, MIC and Roads and Maritime's wider Liverpool Moorebank Arterial Road Investigations (LMARI) traffic model in 2015 for use in the assessment. These volumes have been factored up to allow for growth and represent the base case background traffic volumes for 2017.

Using growth factors to estimate current traffic volumes from dated surveys is common practice, however conflicting growth rates are quoted in Section 5.1.2 of the modification document (1.8%) and Section 3.2 of the Construction Traffic Impact Assessment (1.65%). A comparison of the 2015 and 2017 traffic volumes presented in Appendix A of the CTIA indicates that differing growth factors are applied to the approach legs of the intersections within the study area.

Background information should be provided to justify these growth factors and the forecast traffic volumes, particularly the negative growth forecast on the Moorebank Avenue south of Anzac Road during the AM peak period.

The Arcadis report *(CTIA, Section 5.4)* includes analysis of several intersections within the study area (M5 Interchange, Bapaume Road, Anzac Road, the northern MPE access and Chatham Road) under existing conditions.

A review of the SIDRA files made available indicates that the traffic volumes used for the existing conditions analysis do not exactly reflect the base traffic volumes presented in Appendix A of the CTIA for either the AM or PM peak conditions. Reason for this discrepancy should be provided.

#### *3.1.2.5 Suggested Intersection Mitigation Measures*

The CTIA (Section 5.1) indicates two (2) points of vehicular access are proposed to the site during the early works stage:

> A northern access point which is proposed approximately 118 m south of the DNSDC signalised intersection

> The signalised Chatham Avenue / Moorebank Avenue intersection, which is proposed to serve as the southern access point to the site.

The CTIA (Section 5.13) has recommended the following mitigation measures at these intersections to accommodate the forecast construction traffic:

> The northern MPE access be reconfigured to a three-leg signalised seagull intersection at which the western approach facilitates access to/from the site. The intersection arrangement is proposed to accommodate an 85 metre right-turn storage lane for inbound traffic on the northern approach and provide two full approach lanes (one for left-turn inbound movements and one for through movements) on the southern approach.

> The lane configuration at the signalised Chatham Avenue / Moorebank Avenue intersection be modified such that the southbound right turn lane is extended from 20 metres (existing) to 200 metres (proposed), and the northbound left-turn lane is increased from 15 metres (existing) to 25 metres (proposed).

No concept layout plans are provided within the Arcadis report to illustrate the proposed mitigation works.

Given the above, it is unclear where the northern access point is proposed to be situated. The diagram presented in the Arcadis report *(CTIA, Figure 1.1)* suggests the access will be located approximately 118 metres south of the DNSCD access, as described in Section 5.1 of the same report. This is in the place of an existing two-way vehicle crossover on the western side of Moorebank Avenue.

However, the SIDRA files made available for review have modelled the vehicle movements generated by this access at the existing signalised intersection approximately 230 metres south of the DNSCD access.

Clarification is sought as to whether this existing intersection will be used for access during the modification works, or whether the stated remedial works are proposed 118 metres south of the DNSDC access to accommodate an 85 metre right-turn storage lane as discussed in the CTIA.

If the latter arrangement is proposed a concept layout plan should be made available to allow a thorough assessment, as it is unclear if adequate width is provided within the existing carriageway to accommodate the proposed intersection arrangement. On the basis that the southbound lane remains in its current alignment and the existing northbound lane is modified to serve as a southbound right-turn lane, then the northbound through and proposed left-turn lane will be required to the west of these lanes. This may impact on the location of power poles along the western side of the carriageway and potentially the bridge to the north of the access. It is also likely that the existing bicycle lanes provided in these locations will need to be removed despite Section 5.9 of the CTIA stating that impacts on cyclists would be minimal. There is also the potential that the taper of the 85 metre right-turn lane will impact on the existing median strip at the DNSDC intersection.

The extension of the southbound right-turn lane at the Chatham Avenue intersection will require removal of the right turn lane into the MPE site. This modification should consider the early works construction stage of the adjacent project. It is also noted that the extension will require that all northbound through traffic utilise the sealed shoulder of the carriageway for approximately 200 metres of travel. This will reduce the capacity and attractiveness of Moorebank Avenue as a cycling route.

#### *3.1.2.6 Traffic Analysis*

The CTIA (Section 5.4) has assessed the intersections within the study area (M5 Interchange, Bapaume Road, Anzac Road, the northern MPE access and Chatham Road) under four (4) scenarios:

> Scenario 1: 100% of construction traffic enters at the southern access and exits at the northern access;

> Scenario 2: 100% of construction traffic enters and departs via the southern access;

> Scenario 3: 100% of construction traffic enters and departs via the northern access;

> Scenario 4: As per Scenario 2, but with the cumulative impacts of traffic generated by the approved early works and MPE Stage 1.

Under each scenario the heavy vehicle movements to the Glenfield Waste Facility arrive and depart via the southern access.

The CTIA states that the intersections have been analysed using a network SIDRA model with signal coordination to facilitate a green wave of traffic.

The outputs for each scenario are represented below:

**Table 3-1 Without Modification (2017 Base Volumes)**

| Intersection | LOS | |
|---|---|---|
| | AM Peak | PM Peak |
| **M5 Interchange / Moorebank Avenue** | C | B |
| **Bapaume Road / Moorebank Avenue** | A | A |
| **Anzac Road / Moorebank Avenue** | B | B |

**Table 3-2 Scenario 1 – 2017 With Modification Traffic**

| Intersection | LOS | |
|---|---|---|
| | AM Peak | PM Peak |
| **M5 Interchange / Moorebank Avenue** | C | B |

| | | |
|---|---|---|
| **Bapaume Road / Moorebank Avenue** | A | A |
| **Anzac Road / Moorebank Avenue** | B | B |
| **MPW Access Road / Moorebank Avenue** | A | A |
| **Chatham Avenue / Moorebank Avenue** | B | A |

**Table 3-3 Scenario 2 – 2017 With Modification Traffic**

| Intersection | LOS | |
|---|---|---|
| | AM Peak | PM Peak |
| **M5 Interchange / Moorebank Avenue** | C | B |
| **Bapaume Road / Moorebank Avenue** | A | A |
| **Anzac Road / Moorebank Avenue** | B | B |
| **MPW Access Road / Moorebank Avenue** | B | A |
| **Chatham Avenue / Moorebank Avenue** | B | A |

**Table 3-4 Scenario 3 – 2017 With Modification Traffic**

| Intersection | LOS | |
|---|---|---|
| | AM Peak | PM Peak |
| **M5 Interchange / Moorebank Avenue** | C | B |
| **Bapaume Road / Moorebank Avenue** | A | A |
| **Anzac Road / Moorebank Avenue** | B | B |
| **MPW Access Road / Moorebank Avenue** | B | A |
| **Chatham Avenue / Moorebank Avenue** | A | A |

**Table 3-5 Scenario 4 – 2017 With Modification Traffic and Cumulative Traffic**

| Intersection | LOS | |
|---|---|---|
| | AM Peak | PM Peak |
| **M5 Interchange / Moorebank Avenue** | C | B |
| **Bapaume Road / Moorebank Avenue** | A | A |
| **Anzac Road / Moorebank Avenue** | C | B |
| **MPW Access Road / Moorebank Avenue** | B | A |
| **Chatham Avenue / Moorebank Avenue** | C | A |

In summary, the Arcadis SIDRA assessment indicates:

> The level of service at the M5 Interchange, Bapaume Road and Anzac Road intersections remain unchanged from the 2017 base traffic volumes under the first 3 scenarios. Only under the fourth scenario (with cumulative traffic) does the level of service for the Anzac Road intersection drop from 'B' to 'C';

> The northern and southern access points operate with level of service B or better under the first three scenarios. Only under the fourth scenario (with cumulative traffic) does the level of service for the southern access drop to 'C'.

In contrast to the analysis provided within the Arcadis report, the Parsons Brinkerhoff report prepared for the concept approval in 2014 *(*Section 11.4.3) identified that under existing 2014 conditions, and during the early works stage of the proposal (originally planned to occur in 2015), the Bapaume Road and Moorebank Avenue intersection (without the proposed modification traffic) would operate with a Level of Service 'F' during both the AM and PM peak periods.

It is therefore unclear how under the forecast 2017 traffic volumes, and with the additional traffic proposed by the modification works, this intersection could operate with a Level of Service 'A' during both the AM and PM peak periods as presented in the CTIA. This is particularly so as no remedial measures are proposed at this intersection and no additional traffic signals are proposed between Anzac Road and the M5 Interchange.

A further review of the traffic volumes used for analysis at the Bapaume Road / Moorebank Avenue intersection indicate that the through volumes (northbound and southbound combined) presented as the 2014 'base case' in Appendix C of the PB report are 15%-18% higher than those used for analysis in the more recent Arcadis report. Whilst a decrease in through traffic may be justifiable, supporting evidence should be presented to demonstrate this.

Further to the above, the SIDRA files made available for review indicate the gap acceptance parameter (the gap in traffic flow on the major road in which a queued motorist waiting on a minor approach will enter the traffic stream) and follow-up headway parameter (the additional gap in traffic flow on the major road in which a second motorist queued on a minor approach will enter the traffic stream) at the Bapaume Road intersection have been reduced to below AustRoads Standards.

This error in the adopted gap acceptance values being different to the input values is likely a result of manually entering the AustRoads parameters whilst retaining the 'two-way sign control' feature recently added to the Sidra modelling program. This is likely to have a significant impact on the outputs which are generated from the analysis.

Electronic SIDRA files have been received for the five (5) intersections within the study area (M5 Interchange, Bapaume Road, Anzac Road, the northern MPE access and Chatham Road) for the following scenarios:

> Existing Conditions;

> Scenario 1, whereby 100% of construction traffic (excluding Glenfield Waste movements) enters at the southern access and exits at the northern access ; and

> A third 'cumulative' scenario. This scenario allows for some additional traffic (presumably related to the approved early works and MPE Stage 1) but which appears to provide access to the subject site as per scenario 1 with construction traffic entering at the southern access and exiting at the northern access.

A review of these SIDRA files has been carried out against the *Sidra Intersection User Guide for Version 7 (Sidra Solutions 2016)* and generally accepted industry practice. General comments in relation to the inputs used and comments relating to specific intersections/scenarios are provided in the next section.

The review reveals a number of inconsistencies and departures from accepted industry practice. Whilst by themselves, each error may not have a significant effect, the cumulative effect of all errors would have a significant impact on the reported performance metrics of each intersection. It is recommended that SIDRA files be modified in line with the above comments. Where SIDRA inputs are inconsistent or depart from accepted industry practice, justification should be provided for the input utilised in the assessment.

#### *3.1.2.7 Review of SIDRA Analysis*

Cardno carried out a review of the SIDRA files provided by Arcadis against the *SIDRA Intersection User Guide for Version 7* (SIDRA Solutions, 2016) and generally accepted industry practice. General comments in relation to SIDRA inputs used are provided below, with comments relating to specific intersections/scenarios provided in the subsequent sections.

**General comments**

Comments are provided below under site input headings:

*Intersection*

Extra bunching should be specified for upstream signalised intersections in accordance with Table 5.2.1 of the SIDRA 7 user guide. A number of sites have had incorrect extra bunching values input, which can artificially boost the performance of the intersection,

*Movement Definitions*

Large trucks have been added to the vehicle user classes. This is appropriate considering the nature of construction traffic.

*Lane Geometry*

Lane lengths have generally been coded conservatively.

*Pedestrians*

Pedestrian volumes have been reduced from the default SIDRA settings (50 pedestrians per hour). Given the location of the intersections and nature of surrounding land uses, this may be appropriate, however survey data should be provided to justify this. Pedestrian volumes can have a significant effect on the performance of the intersection.

The peak flow period has been changed from the default setting of 30 minutes to 60 minutes, which has in turn changed the Peak Flow Factor (PFF) from 95% to 100%. This results in a reduced pedestrian demand being considered for the intersection analysis. (See PFF comments under 'volumes').

*Volumes*

The 'Peak Flow Period' has been changed from the default SIDRA setting of 30 minutes to 60 minutes. This has in turn changed the Peak Flow Factor (PFF) from 95% to 100%, resulting in a reduced traffic demand being considered for the intersection analysis. This can have a significant effect on the performance of the intersection.

Whilst it may be acceptable for non-peak hour periods, the PFF is not usually reduced (numerically increased) for analysis of peak hour periods. It is highly unlikely that intersections would not experience 'peaks' within the peak hour periods.

The peak flow period (and peak flow factor) should not be changed from the default setting unless data is provided to justify this. It is highly unlikely that intersections would not experience 'peaks' within the peak hour periods. A PFF of 95% is the minimum factor that should be applied for analysis of peak hour periods.

*Vehicle Movement Data*

Under the signals tab>signal coordination, the arrival type for the approaches to a number of the signalised intersections have been changed to arrival type 4. Given the vast difference in signal cycle times ('see phasing and timing') utilised in the SIDRA analysis of the various intersections modelled along the Moorebank Avenue corridor, there is no evidence of signal co-ordination. Unless evidence of signal coordination is produced (e.g. time distance diagrams), the default setting (program) should be used for signal coordination.

*Gap Acceptance*

For the priority Moorebank Avenue /Bapaume Road intersection, the gap acceptance settings (critical gap and headway) have been reduced below that of the default SIDRA settings. Where the two-way stop control (TWSC) tab option has been checked, the gap acceptance parameters should not be modified from the default settings.
If the TWSC box is checked for a movement, when processing the intersection, SIDRA automatically calculates (i.e. reduces) the gap acceptance parameters for each movement based upon the modification of

intersection geometry from that of the default template. It is noted that previous versions of SIDRA did not do this, and hence the gap acceptance parameters for each movement required manual modification according to the intersection geometry.
Lowering the gap acceptance settings manually, before the TWSC option is selected, further reduces the gap acceptance to below Austroads or default SIDRA parameters, artificially improving the performance of the intersection (see detailed output results).
If the TWSC boxes are checked for a movement, the gap acceptance should be reset to the default settings, and the SIDRA models re-processed.

*Phasing and Timing*

A number of the cycle times specified for the signalised intersections are quite low (50-60 seconds). The phase times have been set manually, and may not represent a realistic scenario. SCATS signal data (phase/cycle times) for peak hour periods should be provided to verify phase times are correct (average for the peak hour periods).

The cycle times specified for signalised intersections along the corridor vary significantly, casting doubt on the CTIA claim that the signals have been coordinated. In Cardno's experience, intersections along coordinated signal corridors run identical cycle times to facilitate optimised vehicle platoon progression.
A number of signal phase and cycle times have been modified between the 'existing' and 'existing + construction' traffic scenarios. This is misleading, as it does not present a like for like comparison. This has not been stated in the Arcadis report, and has a significant result on the performance (and reported outputs) of the signalised intersections .The use of modified phase times should be clearly stated in the report and justified.

*Parameter Settings*

The 'Site Level of Service Method' has been changed from the default setting to Delay (RTA NSW). This is appropriate given the location of the site.
The 'Passenger Car Equivalent' settings have been modified:

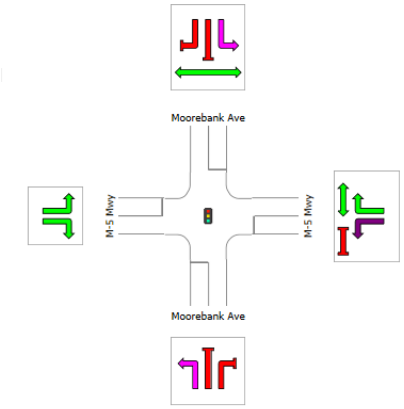
- LV: 1.0 pcu/veh (default 1.0 pcu/veh);
- HV: 2.6 pcu/veh (default 1.65 pcu/veh);
- TR: 2.5 pcu/veh (default 2.5 pcu/veh).

This may be appropriate given the design vehicles intended to be utilised for construction activities.

**Site 1: Moorebank Avenue/M5 Motorway Interchange**

- Intersection:
  - No extra bunching has been applied to southern approach. There is a distance of 420m to the upstream signals, therefore 10% extra bunching can be applied.
- Lane geometry:
  - Lane lengths have generally been coded conservatively with the exception of the west approach auxiliary left turn lane, which has been coded as 120m. Cardno measures the length to be 115m. Whilst this is very minor, if this is a critical movement, this may have a significant effect on intersection performance.
  - No medians ('strip islands') have been coded on northern and southern intersection approaches. This can effect pedestrian crossing time calculations, and could therefore effect intersection performance outputs.

- Pedestrians:
  - Pedestrian volumes have been reduced from default volumes (50/hour) to 30/hour.
  - Peak flow period change from default to 60 minutes.
  - No crossing distance has been input. The program would not be able to calculate the crossing distance, as lane and medians widths have not been input into 'lane geometry'. This may artificially reduce the delay to vehicles movements opposing the subject pedestrian movements.
  - A minimum green time of 25 seconds has been specified for the northern crossing. This may be appropriate
- Volumes:
  - As per general comments.
- Phasing and timing:
  - **AM period:** Uses 3 signal phases with fixed phase times, total cycle time = 86 seconds.
  - **PM period:** Uses 4 signal phases with fixed phase times, total cycle time = 66 seconds.
  - SCATS data for peak hour periods should be provided to verify that only three phases run in peak periods, and phase times are correct (average for the peak hour periods).
  - Phase E: East approach right turn filters through northern approach pedestrian movement.




This does not appear to be correct.

  - Phase times have been changed for the 'Existing + Construction' traffic scenarios.
    - AM period:
      - Existing (A|E|F): 40|19|27. Cycle time = 86 sec.
      - Existing + Construction: 40|21|25. Cycle time = 86 sec.
    - PM period:
      - Existing (A|C|E|F): 12|20|13|21. Cycle time = 66 sec.
      - Existing + Construction: 12|24|15|18. Cycle time = 86 sec.

**Site 2: Moorebank Avenue/Bapaume Road Intersection**

- Intersection:
  - No extra bunching has been applied to the southern approach. There is a distance of 100m to the upstream signals, therefore 20% extra bunching can be applied.
- Volumes:
  - As per general comments.
- Gap acceptance:
  - As per general comments
  - The gap acceptance settings have been changed as follows:
    - North approach :
      - Critical gap = 4.5s → 4s
      - Follow up headway = 2.5s → 2s
    - West approach :
      - Critical gap = 7s → 5s
      - Follow up headway = 4s → 3s
  - The above could have a significant result on performance metrics.

**Site 3: Moorebank Avenue/Anzac Road Intersection**

- Intersection:
  - 20% extra bunching has been applied to northern approach. This is incorrect. There is a distance of 420m to upstream signals (intersection 1), and hence 10% extra bunching can be applied.
- Lane Geometry:
  - **PM Existing:** Southern exit auxiliary short lane coded as 100m. Should be 50m.
  - **AM/PM Existing + Construction:** Southern exit auxiliary short lane extended from 50m to 100m.
- Volumes:
  - As per general comments.
- Pedestrians:
  - As per general comments.
  - Pedestrian volumes have been reduced from default volumes (50/hour) to 30/hour
- Priorities:
  - The eastern approach pedestrian crossing movement is not opposed by the northern approach left turn.
- Phasing & Timing:
  - Phase times have been changed for the 'Existing + Construction' traffic scenarios.
  - **AM period:**
    - Existing (A|B|C): 14|18|20. Cycle time = 52 sec.
    - Existing + Construction: 20|19|22. Cycle time = 61 sec.
  - **PM period:**
    - Existing (A|B|C): 21|12|18. Cycle time = 51 sec.
    - Existing + Construction: 30|12|20. Cycle time = 62 sec.

**Site 4: Moorebank Avenue/MIC Access Road Intersection**

- Pedestrians:
  - No pedestrian crossings modelled.
- Volumes:
  - As per general comments.
- Vehicle Movement Data:
  - Under the signals tab/signal coordination, the arrival type for the northern approach through movement has been changed to arrival type 4.
  - No evidence of signal coordination provided.
- Phasing & Timing:
  - **AM period:**
    - Phase times:
    - Existing + Construction (A|B): 60|14. Cycle time = 74 sec.
  - **PM period:**
    - Phase times:
    - Existing + Construction (A|B): 57|16. Cycle time = 73 sec.

**Site 5: Moorebank Avenue/MIC Access Road Intersection**

- Pedestrians:
  - No pedestrian crossings modelled.
- Volumes:
  - As per general comments.
- Vehicle Movement Data:
  - Under the signals tab/signal coordination, the arrival type for the northern approach through movement has been changed to arrival type 4.
  - No evidence of signal coordination provided.

- Phasing & Timing:
    - **AM period:**
        - Phase times:
        - Existing + Construction (A|B): 51|12. Cycle time = 63 sec.
    - **PM period:**
        - Phase times:
        - Existing + Construction (A|B): 138|12. Cycle time = 150 sec.

**Summary**

The review of the SIDRA files provided by Arcadis revealed a number of inconsistencies and departures from accepted industry practice. Whilst by themselves, each error may not have a significant effect, the cumulative effect of all errors would have a significant impact on the reported performance metrics of each intersection. It is recommended that SIDRA files be modified in line with the above comments. Where SIDRA inputs are inconsistent or depart from accepted industry practice, sufficient justification should be provided for the input utilised in the assessment.

### 3.1.3 Recommendations

The recommendations below are proposed to address identified impacts and allow a comprehensive assessment of the proposal:

> The proposed modification will increase the daily number of heavy vehicle moments generated during the early works by approximately 37 fold, which is a significant increase requiring further consideration via the modelling of noise and air quality impacts to identify potential effects on human health and amenity.

> Further justification for heavy and light vehicle distribution should be provided, particularly in relation to heavy vehicles travelling east and west due to the potential for impacts on the operation of the M5 Interchange.

> Background information should be provided to justify the identified traffic growth factors and the forecast traffic volumes, particularly the negative growth forecast on the Moorebank Avenue south of Anzac Road during the AM peak period.

> Conceptual plans of these intersection layouts should be provided to allow the impacts on existing road users and cyclists be assessed, as well as allow cross checking of the Sidra analysis.

> SIDRA files should be modified in line with the above comments in **Section 3.1.2**. Where SIDRA inputs are inconsistent or depart from accepted industry practice, sufficient justification should be provided for the input utilised in the assessment.

> The assessment is considered to have been made without comprehensive network wide assessment. Consequently, a determination should not be made until the RMS road network modelling has been completed and considered.

## 3.2 Air Quality

The proposed SIMTA MPW Concept Plan Modification provides analysis of the Modification Proposal's impacts on Air Quality. This review considers information in the Modification Report and Appendix F – *Modification Proposal Assessment of Air Quality Impacts* prepared by Ramboll Environ (2016). It also considers information contained in the following documents:

> ENVIRON (2014). Proposed Moorebank Intermodal Terminal – Local Air Quality Impact Assessment. Prepared for Parsons Brinkerhoff. Prepared by ENVIRON Australia Pty Ltd. 29 September 2014. Project Number AS121562.

> ENVIRON (2015a). Moorebank Intermodal Terminal – Revised Project - Local Air Quality Impact Assessment. Prepared for Parsons Brinkerhoff. Prepared by ENVIRON Australia Pty Ltd. 20 April 2015. Project Number AS121562.

> ENVIRON (2015b). SIMTA Moorebank Intermodal Facility - Air Quality Impact Assessment. Prepared for Hyder Consulting. Prepared by ENVIRON Australia Pty Ltd. 26/05/2015. Project Number AS121793.

### 3.2.1 Proposed Modification

The following proposed changes to the concept design have the potential to increase the level of impact on air quality as a result of the proposed works:

> Minor vegetation removal slightly above that provided within early works

> Import, by truck, of approximately 1,600,000 $m^3$ of fill from offsite locations

> Crushing and screening of oversized materials and demolition materials stockpiled during early works or direct placement on site.

> Stripping and stockpiling of topsoil within the area of impact, cut and fill (within the primary earthworks area) and stockpiling of clean fill within the primary earthworks areas

> Temporary sediment and erosion control works, including onsite detention basins (greater than those envisaged within the early works)

> Establishment of temporary internal haulage routes, construction compounds (including, but not limited to, a materials crusher and other plant and equipment) (additional to those included within the early works).

In addition to the above, there is also an extension to operating hours identified.

### 3.2.2 Environmental Assessment

There are no detailed maps showing the location of specific activities, such as on site stockpiling, crushing and screening, or haul routes to gain an understanding of how the assessment has been completed.

Only high-level detail has been provided regarding the emissions inventories which does not allow the reader to review the validity assumptions used in the emissions calculations for the Modification. Additionally, Ramboll Environ (2016) states that emissions associated with early works are included for the cumulative assessment and would coincide with the Engineering Fill phase for the MPE Stage 1 Proposal. Furthermore, Ramboll Environ (2016) states:

> *"Emissions are estimated based on an additional 46,134 m3 (~800 tonnes per day) of material handling (excavators), an additional 2 dozers operating for 16 hours at 70% utilisation and an additional 21 hectares of exposed area for wind erosion".*

Table 4-1 of Ramboll Environ (2016) summarises emissions estimates for the Modification and emission estimates associated with early works. A comparison of emissions from early works as given in ENVIRON 2015(b) is presented in **Table 3-6**. Total emissions from the early works are slightly higher in ENVIRON 2015(b) than for the proposed Modification, yet the text suggests additional activities are occurring which would typically result in higher dust emissions. This potential inconsistency between the studies should be considered further before determination can be made, with the modelling data and assumptions made available for review. This will allow full assessment of the potential impacts associated with a 37 fold

increase in truck movements to be considered, due to the potential for impacts on human health resulting from reduced air quality.

Based on the findings of this review it is anticipated that the Modification would not change the final project. However the proposed changes would significantly increase on site dust emissions during construction, with residential areas located directly to the west across the Georges River, as well as further to the north and south.

**Table 3-6 Emission estimates for Modification Proposal and early works compared with ENVIRON 2015(b)**

| Source / Activity | TSP (kg/annum) | | PM10 (kg/annum) | | $PM_{2.5}$ (kg/annum) | |
|---|---|---|---|---|---|---|
| | Modification | Table 16 in ENVIRON 2015(b) | Modification | Table 16 in ENVIRON 2015(b) | Modification | Table 16 in ENVIRON 2015(b) |
| **Modification Proposal** | | | | | | |
| Hauling on unsealed roads - fill | 86,740 | N/A | 22,288 | N/A | 2,229 | N/A |
| Trucks unloading fill | 1,217 | | 575 | | 87 | |
| Material handling ( re-handle with excavators, FEL, stockpile loading) | 1,217 | | 2,302 | | 87 | |
| Dozers - on fill | 7,950 | | 1,676 | | 835 | |
| Crushing | 634 | | 285 | | 52.8 | |
| Screening | 1,162 | | 391 | | 26.4 | |
| Grader | 7,527 | | 2,630 | | 233.3 | |
| Diesel exhaust (onsite equipment) | 6,408 | | 6,408 | | 6,052 | |
| On-road trucks diesel exhaust | 278 | | 278 | | 220 | |
| Wind erosion (area of fill) | 15,254 | | 7,627 | | 1,144 | |
| **Total** | **128,387** | | **44,461** | | **10,966** | |
| **Early Works** | | | | | | |
| Material handling (excavators on EW) | 70 | 771.6 | 66 | 364.9 | 5 | 55.3 |
| Dozers - on EW | 29,761 | 7,987 | 6,276 | 1,684 | 3,125 | 836 |
| Wind erosion (additional area for early works) | 18,199 | 8,662 | 9,099 | 4,331 | 1,365 | 650 |
| Scrapers/Graders | N/A | 3,781 | | 1,321 | | 2,642 |
| **Total** | | | | | | |
| **MPE Stage 1 Engineering Fill Phase** | **20,828** | **21,202** | **7,524** | **7,701** | **4,159** | **4,183** |

### 3.2.3 Recommendations

The recommendations below are proposed to address identified impacts and allow a comprehensive assessment of the proposal:

> Include detailed source location maps to enable the reader to understand how the air quality modelling was completed.

> Include detailed emission inventories to enable to reader to cross-check calculations and understand all assumptions made.

> Clarify the changes to the MPE Stage 1 Engineering Fill Phase activities to explain the lower emissions compared with ENVIRON (2015b).

> Consideration of the air quality impacts and subsequent human health implications resulting from the 37 fold increase in off-site truck movements is required.

## 3.3 Noise and Vibration

The proposed SIMTA MPW Concept Plan Modification includes an assessment of noise and vibration impacts on residences and noise sensitive receivers surrounding the Proposed Intermodal site in Moorebank. This review considers information in the Concept Plan Modification, as well as construction noise impact assessment components of the Moorebank Intermodal Terminal EIS and SIMTA Stage 1 EIS.

Documents referenced in undertaking this review have included:

> Wilkinson Murray (2015) *MPW Concept Plan Modification Noise and Vibration Impact Assessment*. Prepared for Arcadis by Wilkinson Murray Pty Limited June 2015. Report No 15324-MO Version B.

> SLR (2014). *Moorebank Intermodal Terminal EIS – Noise and Vibration Impact Assessment*. Prepared for Parsons Brinkerhoff by SLR Consulting Australia Pty Ltd, 1 October 2014. Report Number 620.10816.

> SLR (2015). *Moorebank Intermodal Terminal – Revised Project Report – Noise and Vibration Impact Assessment*. Prepared for Parsons Brinkerhoff by SLR Consulting Australia Pty Ltd. 27 April 2015. Report Number 620.10816 R2.

> Wilkinson Murray (2015b). *SIMTA Moorebank Intermodal Facility Stage 1 – Noise and Vibration Impact Assessment.* Prepared for Hyder Consulting by Wilkinson Murray Pty Limited. 25/05/2015. Report Number 12186 S1 Version D.

### 3.3.1 Proposed Modification

The proposed modification to the MPW increase noise emissions during the initial construction stages of the project. The additional activities are expected to increase noise impact on surrounding residential and noise sensitive receivers when compared with the approved construction activity. Key noise generating activities include:

> Import, by truck, of approximately 1,600,000 $m^3$ of fill from offsite locations.

> Stock piling and emplacement of the imported fill.

> Crushing and screening of oversized materials prior to emplacement.

> Temporary sediment and erosion control works, including onsite detention basins (greater than those envisaged within the early works).

> Establishment of temporary internal haulage routes, truck marshalling areas, construction compounds (including, operation of crushing and mobile plant additional to those included within the early works assessment).

> The construction activity would be extended into the weekday early morning (night time 6am to 7am), evening 6pm to 10pm periods and Saturday morning (7 am to 8am) and afternoon 1pm to 6pm periods.

The Noise and Vibration Impact assessment (Wilkinson Murray 2015) presented the results of noise modelling for the additional construction activity during the day time, evening and night time out of hours scenarios.

### 3.3.2 Environment Assessment

The Modification Noise and Vibration Impact Assessment (NVIA) provides a high level assessment of construction activity. Minimal detail is provided with regard to noise sources or model assumptions applied. To verify the findings of the assessment additional information would be required to understand the assessment inputs and outputs. Aspects of the assessment requiring clarification are detailed below.

Out of standard hours (OOH) noise criteria should consider background noise levels relative to the out of hours period. The outside standard hours (OOH 1) 6am to 7am night time period has adopted the day time rating background levels (RBL) when setting assessment criteria. The reasoning for adopting the day time period RBL has not been justified. Further, the RBL's adopted during the weekend periods should consider background noise conditions specific to the weekends for each noise catchment area and whether lower ambient levels occur during weekends when a greater proportion of residents are home. Long term background monitoring data appears to be available for the project area with recent data presented on the MICL website that should be considered.

Number, type of equipment and duration adjustments included in modelling are not presented in the construction noise assessment. An example is for the OOH1 period, if 100 heavy vehicle movements occur (as described in the traffic noise assessment) this equates to approximately 12 trucks on site during a 15 minute period. Assuming a single dozer, compactor and water cart are operating at the same time and adopting the sound power levels (SWLs) described in Table 3.4 of the assessment this equates to a greater overall SWL than the 117 dB(A) presented in Section 3.4.3 of the NVIA.

Annoyance adjustments for particularly annoying activities as described in the Interim Construction Noise Guideline (DECC 2009) have not been discussed. Where annoying noise sources are anticipated penalties should be applied to these sources.

Meteorological effects on noise propagation are not qualified in the assessment of noise impacts. As the construction works are proposed to be extended into the evening period over a six to nine month time frame, and the separation distances are such that meteorological effects can have a significant influence on receiver noise levels, the assessment should consider whether noise enhancing temperature inversion conditions as identified in the Moorebank Intermodal Terminal (SLR 2015) would be applied to construction activities. The Moorebank EIS predicted noise increases of 3 – 5 dB(A) during inversion conditions.

The Modification to the project does not change the final project. However, the import of 1,600,000 $m^3$ of fill is anticipated to create a substantially increase in noise impacts on the community as noise will increase by 4 - 6 dB during the day time and extend the hours of construction activity to 10pm at night, with residential areas located directly to the west across the Georges River, as well as further to the north and south.

### 3.3.3 Recommendations

The recommendations below are proposed to address identified impacts and allow a comprehensive assessment of the proposal:

> Justification of the background levels adopted for out of standard hours works should be provided.

> Assessment input data, including numbers and type of equipment referenced in each assessment scenario, duration adjustments and model assumptions applied should be clearly documented for clarity in the acoustic assessment.

> Annoying noise sources which would require the consideration of penalty adjustments should be clarified.

> Consideration of noise enhancing meteorological conditions.

> Consideration of the air quality impacts and subsequent human health implications resulting from the 37 fold increase in off-site truck movements is required.

## 3.4 Stormwater and Flooding (Hydrology)

The Modification Report (Arcadis, 2016) provides analysis of the proposal's impacts on Flooding and Stormwater. This review considers information in the Modification Report and Appendix D – *Stormwater Assessment* prepared by Hyder Consulting.

### 3.4.1 Proposed Modification

The Modification Proposal will result in an increased requirement for fill importation to site, with approximately 1,600,000$m^3$ of fill now required. The proposed modifications are located outside of flood extents for the site. Therefore, it is stated that no implications for flooding are anticipated (Arcadis, 2016). Also given that the proposed modifications are relevant to construction phase works only, no implications to water quality and quantity were anticipated for the operational phase of the project.

A preliminary bulk earthworks design for the imported fill placement area has been prepared as part of the Modification Proposal. This includes an erosion and sediment control plan and details, and earthworks plans. The plans propose swales/earth banks to collect all runoff generated from the top of the proposed stockpile. All runoff collected from the stockpile and the immediate surrounds will be directed to sediment basins prior to discharge via the existing stormwater systems.

### 3.4.2 Cardno Assessment

#### *3.4.2.1 Erosion & Sediment Control*

Section 4.1 of the Assessment notes that a number of ESC impacts were identified in the approved early works, including:

> Increased turbidity of waterways and drainage lines

> Increased nutrient loads to receiving waterways

> Changes to groundwater levels and systems

> Changed concentration of stormwater pollutants

> Changes to volume and velocities of surface water drainage

> Sedimentation of creeks and drainage lines

It is unclear where the above list of impacts were previously identified. Section 16.3.3 of the EIS (Parsons Brinkerhoff, 2014) advises that impacts would be minor, as long as a comprehensive ESCP is developed for the project site. Section 8.8.12 of the document advises that ESC measures would be determined on-site before construction, and no ESCP was provided on this basis. Section 4.1 of the Surface Water assessment (Technical Paper 6) also reiterated this approach.

The approach to adopt appropriate ESC measures to mitigate surface water contamination during stockpiling and construction is considered acceptable. However, the recommendations provided in Section 3.4.3 should be considered.

In summary, the proposed modification relates to construction stage works only. Provision of an appropriately detailed SWMP is considered sufficient to mitigate any additional impacts associated with the modification. No additional impacts to flooding, water quantity or (operational phase) water quality would be anticipated.

### 3.4.3 Recommendations

The recommendations below are proposed to address identified impacts and allow a comprehensive assessment of the proposal:

> Given that the development works area far exceeds 2,500 m², development of a Soil and Water Management Plan (SWMP) would be appropriate, rather than an ESCP, as per guidance contained within the Blue Book (Landcom, 2004).

> A SWMP typically provides more detail than an ESCP. As such, the following should be included in the SWMP, or additional supporting documentation provided in the report as necessary:

- High-flow bypass weir designs for sediment basins.
- Sediment basin overflow discharge locations and connections. The note provided advising that this be determined by the contractor is not considered to be sufficient for a project of this scale and significance.
- Expected clean-out frequency of basins.
- The “Remarks” column included in the ESCP tables provide reference to a number of report sections, where presumably more information is available to support the results presented. It is unclear as to which report(s) are being referenced, this should be elaborated on the plan.

## 3.5 Geotechnical and Soil

This review considers information in the *Geotechnical and Contamination Memorandum* (Appendix C) supporting the MPW Modification Proposal for Fill by Golder Associates (Golder, 2016).

### 3.5.1 Proposed Modification

The Modification Proposal earthworks civil design development, undertaken by Arcadis, indicates that fill importation (1,600,000m$^3$) is required at MPW; with the earthworks proposed to occur over a period of approximately six to nine months.

### 3.5.2 Cardno Assessment

The proposed modified volume of fill to be imported comprises a significant and substantially different design and earthworks model to that previously proposed.

The following comments can be made based on the information in the Golder modification memorandum.

**Ground Conditions**

Golder (2016) report that a significantly different performance can be expected from the foundation conditions. Particularly between the granular (i.e. sand), cohesive (i.e. clay) and anthropogenic (i.e. fill) materials.

At selected (unconfirmed) investigation locations, it is observed that there is evidence of:

> Prior topsoil layers being filled over (i.e. buried soil layers)

> Deep, uncontrolled anthropogenic fill up to 4 m deep (including timber, steel and concrete building debris and general rubbish)

> Sand seams or bands within a clay profile, with the foundation for filling anticipated to typically comprise sand fill, clay fill, alluvial clay and alluvial sand.

> Variable depth to bedrock in the range of 10m below ground surface to 25m below ground surface.

> Groundwater at around 9 to 12 m below surface, with some inflows recorded at 2.9 m below surface

**Earthworks**

The modification proposes to place bulk fill over the existing ground conditions, with the rationale that unspecified poor geotechnical and contaminated materials will be 'capped' by imported sandstone fill; to improve the subgrade and contain contaminated materials. The proposed imported fill will likely be sourced from a local Sydney tunnel (excavated with road headers), producing a spoil mix comprising sands, gravels and cobbles. Some fine grained materials will also be present but are expected to make up less than 10% by weight.

Whilst the imported sandstone when compacted can provide a competent engineered fill, its performance as a subgrade is dependent on the performance of its foundation conditions. If unsuitable materials (e.g. with poor CBRs or swell potential) are left in-situ, these would have a detrimental effect on the performance of the overlaying 'structural' fill' (e.g. differential settlement or uplift). In some unspecified instances, Golder (2016) suggest that the significantly different performance of the foundation can be addressed by 'cut and replace' methods, whereby poor materials are excavated and re-compacted. However, it is not clear how contaminants and /or groundwater will be managed in this scenario, as there is a high risk of cross-contamination and mobilisation. Geotechnical observations by Golder (2016) report that the depth to competent material could be up to 10 to 25 m below ground surface. Excavation to this depth would have significant impact on groundwater and slope stability.

Cardno consider that the potential for significantly different performance of the existing subgrade (Golder, 2016) needs to be addressed in the design. This must take into consideration the response to groundwater, ground improvement of geotechically unsuitable material, removal of contaminants (if removed), or otherwise the containment (capping) of contaminants with a suitable non-permeable material (e.g. clay or liner).

Notwithstanding previous comments made by Cardno on Golder's Geotechnical Interpretive Report (GIR) in Appendix Q of the EIS prepared by Hyder (2015); it is inadequate to novate the former design parameters to

a substantially different earthworks model, whereby foundation preparation requirements are only addressed in a later Earthworks Specification.

**Contamination**

Contamination issues may provide the overarching constraint to the geotechnical earthworks solution. The proposed imported sandstone alone would not comprise a suitable containment (capping) material. The compacted sandstone will have a high permeability that will allow high surface water / groundwater interaction, and potential to mobilise 'contained' contaminants.

Furthermore, no context is given for the Golder (2016) statement that "*Importation of sandstone fill presents a number of benefits for the management of asbestos contamination, potential UXO/EOW and subgrade performance issues*". In our experience far greater consideration of this issue is required.

**Design**

Given the unknown extent, depth of contaminants and significantly different geotechnical performance of the soils, we would consider that greater surety is required to confirm the design is still applicable and that construction can be undertaken without adverse impact on the environment.

Many of the required works that would constitute a design modification have been deferred to later documents, not yet prepared, including:

> Earthworks Specification

> Stage specific Remediation Action Plans (RAPs)

> Stage specific Remediation and Validation Reports (RVR)

> Sediment and Erosion Control Plan

> Construction Environmental Management Plan (CEMP)

> EOW and UXO Management Plan

> Asbestos in Soils Management Plan (AMP); and

> Long Term Environmental Management Plan (LTEMP).

**Constructability**

With the substantially different earthworks model indicating importation of 1,600,000 $m^3$ of fill occurring over a period of six to nine months; far greater consideration of constructability is required.

Based upon a nominal density of 2.4 $t/m^3$ for sandstone, a design for 1,600,000 $m^3$ would require 3,840,000 tonnes of imported sandstone fill. This equates to approximately 96,000 truck movements. The modification discusses a peak of 22,000 tonnes per day import, which is 550 one-way truck movements per day. For the early works, total required import was 46,134 m3 (110,721 tonnes). No import was required for Phases A-C (i.e. 914,927 $m^3$ cut to fill). In addition, truck movements identified within the MPW Response to Submissions (Parson Brinkerhoff, 2015) were restricted to 40 heavy vehicle (truck) movement per day, for the duration of the early works period.

In terms of development and earthworks project scale, this is a significantly large project. The importation and emplacement rates are ambitious, particularly given that the anticipated unsuitable ground conditions will be 'treated' on an ad-hoc basis. This poses a high environmental impact risk. Further traffic, noise, dust and constructability assessments will also be required to demonstrate the feasibility of works on this scale.

### 3.5.3 Recommendations

The recommendations below are proposed to address identified impacts and allow a comprehensive assessment of the proposal:

> Further geotechnical investigation to confirm severity and performance of the poor foundation conditions

> Further analysis and modelling of the impacts and expected differential settlements of the foundation conditions under load from imported fill.

> Additional assessment on the magnitude of material excavation required to provide suitable foundation condition for imported fill including how contamination and groundwater interaction be managed.

> Additional assessment of the erosion potential of the sandstone fill particularly around existing watercourses

> Confirmation on the suitability of the geotechnical design parameters based upon a substantially different earthworks model

> Further elaboration on the design, particularly in relation to information that should be determined in the design, not in the following:

- Earthworks Specification; and
- Construction Environmental Management Plan (CEMP)

## 3.6 Contamination

The Modification Report provides analysis of the Modification Proposal's impacts associated with contamination. This review considers contamination specific information in the Concept Plan Modification and Appendix C – *Geotechnical and Contamination Memorandum* prepared by Golder Associates.

### 3.6.1 Proposed Modification

In addition to the general soil and geotechnical components described in **Section 3.5** above, the Memorandum briefly describes the contamination investigations which have been undertaken on the site to date. These include:

> Phase 1 and 2 Environmental Site Assessment Reports

> Remediation Action Plan

> Post Phase 2 Environmental Site Assessment Report and Validation plan

Subsequently as part of the early works, the site is to be remediated under the Concept Plan Approval. This will include an audit statement certifying the remediation works by an accredited contaminated land auditor. A number of management plans and documents are also proposed to be developed and implemented in accordance with the Concept Plan Approval to manage the abovementioned contamination risks, as identified in **Section 3.5.2** above.

The proposed modification works will include the importation of approximately 1,600,000m$^3$ of fill from offsite locations. The Memorandum identifies that the fill is understood to be clean, non-expansive, sandstone fill, in general accordance with a material derived from the sandstone bedrock indicated in borehole logs collected on site. It states that in general the material would also need to be equivalent to Class 1 of 2 materials (i.e. compliant with BSW EPA definitions of Virgin Excavated Natural Materials (VENM) or Excavated Natural Materials (ENM)). Laboratory testing of the imported fill is proposed however the tests recommended are based around assessing the geotechnical features of the fill not contamination.

### 3.6.2 Cardno Assessment

The Memorandum does not include any discussion regarding the proposed changes to the bulk earthworks footprint. Detailed information should be provided which compares the extent of bulk earthworks and how this interacts with known areas of potential contamination. As discussed above in **Section 3.5.2**, the contamination issues previously identified on site may provide a significant overarching constraint to the

geotechnical earthworks solution. Due to a lack of this information it cannot be determined if the proposal is likely to increase or decrease risk of exposing contamination know to occur on the site.

In addition to this, with the proposed increase in the volume of fill to be imported on site, a commitment to have VENM or ENM certification of the imported fill has not been included. This requirement is key to ensuring the use of uncontrolled fill is prevented and needs to be include as a condition of approval for the project.

### 3.6.3 Recommendations

The recommendations below are proposed to address identified impacts and allow a comprehensive assessment of the proposal:

> The Memorandum is modified prior to approval to include greater detail regarding any changed to the extent of bulk earth works and include detailed diagrams showing the extent changes.

> Any fill to be imported on site must have VENM or ENM certification.

> A detailed unexpected finds protocol (understood to be completed as part of the CEMP).

## 3.7 Non Indigenous Heritage

The Modification Report provides analysis of the Modification Proposal's impacts on non-indigenous heritage. This review considers information in the Concept Plan Modification and Appendix I – *Non-Aboriginal (Historic) Heritage Memorandum* prepared by Artefact Heritage.

### 3.7.1 Proposed Modification

The approved Concept Plan would result in the complete removal of items of Non-Aboriginal Heritage from the site. This includes the demolition of World War 2 buildings, and the removal of all remaining military structures.

The following proposed changes to the concept design have the potential to increase the level of impact on Non-Aboriginal (historic heritage) as a result of the proposed works:

> Minor vegetation removal slightly above that provided within early works

> Cut and fill and stockpiling of excess fill within the primary earthwork areas

> Temporary sediment and erosion control works, including onsite detention basins (greater than those envisaged within the early works)

> Establishment of temporary internal haulage routes, construction compounds (including, but not limited to, a materials crusher and other plant and equipment) (additional to those included within the early works).

The Memorandum considered the proposed additional works and aimed to determine if there is an increase in impacts from the works proposed earlier. The Memorandum concluded that the Non-Aboriginal Heritage impacts associated Modification Proposal are expected to be consistent with the Concept Plan EIS through the implementation of the mitigation measures approved for the Concept Plan and the Conditions of Approval.

### 3.7.2 Cardno Assessment

In comparison to the extent of impacts of the already approved Concept Plan, the impact assessment provided within the Memorandum is very limited. There is no discussion on how the proposed modification will increase or decrease the heritage values of the area, the level of impact is simply assessed in a table stating existing impacts on heritage significance. The lack of information provided in this Memorandum does not serve to mitigate or limit already extensive impacts on the heritage significance of this location and relies on existing mitigation measures to control or limit the impacts on the heritage environment.

The simplicity of this Memorandum is not consistent with key environmental protection principles such as the precautionary principle which should utilize this opportunity to try and improve heritage outcomes and protection through the revision of the proposed works.

### 3.7.3 Recommendations

The recommendations below are proposed to address identified impacts and allow a comprehensive assessment of the proposal:

> The Memorandum should be revised to include a detailed discussion of the proposed changes to the development and associated impacts on heritage values.

> An effort should be made within the Concept Plan Modification to review and improve, as required, existing mitigation measures

> Retention of the heritage listed buildings, with integration into the scheme should be the intent with justification provided where this goal is not achieved. Building retention and integration into the future built form should be detailed in the Heritage Management Plan for the site

> Mitigation measures should be redefined as clear measurable commitments rather that generic measures utilised in the project.

> Agency consultation should be undertaken to verify the appropriateness of the proposed modifications in the context of the heritage setting, with agency responses considered prior to determination.

## 3.8 Aboriginal Heritage

The proposed Modification Report provides analysis of the Modification Proposal's impacts on Aboriginal Heritage. This review considers information in the Concept Plan Modification and Appendix H – *Aboriginal Heritage Memorandum* prepared by Artefact Heritage.

### 3.8.1 Proposed Modification

The approved Concept Plan EIS identified 23 Aboriginal Sites and 1 Aboriginal Place within proximity to the project site. Of these two Aboriginal sites (MA5 and MA13) are within the area of impact of the Modification. The location of site MA13 could not be identified and the Memorandum identifies it is suspected that the coordinates listed against the site are erroneous. MA5 is located on the edge of the Modification Proposal area. Some of this site (within the proposed works area) was identified to be directly impacted as a result of the proposed works which is consistent with the original assessment for the Concept Approval.

### 3.8.2 Cardno Assessment

Limited information has been provided to determine the level of interaction between the proposed modification works and the identified Aboriginal sites. The Memorandum is also particularly absent of any discussion of how works within site MA5 have changed and how these changes interact with identified features of the registered site. If the detailed design of this project has identified the need for this modification, then greater information should be available regarding the proposed project design such as cut and fill areas and proposed building footprints. This information should be integrated with an understanding of Aboriginal site extents to allow the archaeologists to quantify the proposed increased level of impact on the site. The limited information in the Memorandum is unclear as to the level of analysis undertaken to determine if the impacts are increased and so it is assumed that the conclusion is based on an assessment of boundaries rather than an assessment of the proposed works.

In addition to this, based on the information provided, there has been no consultation undertaken with the relevant Aboriginal community representatives to detail and discuss the proposed modification. Despite the lack of impact as a result of the project footprint, other changes as a result of the modification may result in increased impacts on the heritage significance of the surrounding environment such as changing the heights of stockpiling or undertaking activities which change the acoustic environment. This approach is inconsistent with the relevant heritage guidelines, specifically the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW, 2010). Here it is defined that consultation should be undertaken where "*there is uncertainty about potential harm to Aboriginal objects and Aboriginal Places*" (DECCW, 2010).

### 3.8.3 Recommendations

The recommendations below are proposed to address identified impacts and allow a comprehensive assessment of the proposal:

> The Memorandum should be revised to include a detailed discussion of the proposed changes to the development and how impacts on Aboriginal heritage have increased/decreased.

> Consultation with the local Aboriginal community should be undertaken explaining the proposed modification and providing opportunities for any questions or comments.

> Mitigation measures should be redefined as clear measurable commitments rather that generic measures utilised in the project.

## 3.9 Biodiversity

The Modification Report provides analysis of the Proposal's impacts on Biodiversity. This review considers information in the Concept Plan Modification and Appendix G – *Biodiversity Impact Assessment* prepared by Arcadis.

### 3.9.1 Proposed Modification

The MPW Concept EIS identified the significant biodiversity values that existed on the site, including three ecological communities, two threatened flora species and the potential for 25 threatened fauna species. The works were defined as unlikely to result in the clearing of any native vegetation communities, however native and introduced trees and shrubs scattered across the highly modified grounds would be required to be removed. The vegetation to be cleared was not identified as part of a threatened ecological community, nor did it include any threatened flora. The vegetation was also defined as having relatively poor habitat value for threatened species.

Across the MPW site greater impacts on the local biodiversity are proposed which are not discussed in the Modification documents. These include:

> Clearing approximately 44 - 53 ha of threatened ecological communities.

> Removal of 46 hollow-bearing trees.

> Degradation of aquatic habitats.

> Removal of approximately 83.89 ha of threatened vegetation

The modification proposal area has been described as being designed with a 10m set back from all areas mapped as native vegetation. Vegetation within the additional areas included in the modification area are described as comprising of mostly scattered native and introduced trees; and shrubs over mown grassland. Potential impacts to threatened species, population and communities by the Modification Report were described as being limited to indirect impacts on adjoining areas. These indirect impacts include:

> Edge effects – such as changes to humidity, light, moisture, wind, temperature and noise and soil profile conditions

> Weed invasion

> Sedimentation and erosion

> Noise impacts on fauna

> Dust pollution; and

> Ecological light pollution – such as from the use of artificial light

Some increased impacts on local mobile fauna may occur as a result of increased clearing of scattered trees and increased truck movements.

Mitigation measures identified in the previous Concept Plan Approval are considered to still be relevant with the addition of one mitigation measure to reduce light impacts on the Georges River Riparian corridor.

### 3.9.2 Cardno Assessment

The Modification Report identifies that the proposal would result in an increase in the number of truck movements through the site increasing the risk of impact on mobile fauna. There does not however, appear to be any response to this increase in the mitigation measures proposed. An increase in the risk to fauna should result in an increase in mitigation of mobile fauna though methods such as animal exclusion fencing, driver education during inductions and the use of signage.

The Assessment does not discuss if the proposed increased risk to mobile fauna and potential edge effects will result in changes to the early works being required to be assessed under the *NSW Framework for Biodiversity Assessment* (FBA). Assessment under the FBA is currently not required for the early works however, the modification will result in an increase in impacts on ecology. This Assessment should be modified to discuss if consideration under the FBA is now required and justify why if not, so that the impacts on ecology can be fully assessed.

Additionally as discussed in **Section 2.1**, there is the potential for the works proposed by the modification to require changes to the current referral to the DoE seeking approval under the EPBC Act due to the magnitude of change and associated potential for impacts on matters of national environmental significance. This has not been discussed in the Assessment with the Modification Report simply stating no additional assessment or approval is required under the EPBC Act for the Modification. The basis for this conclusion is not identified elsewhere in the documents provided.

### 3.9.3 Recommendations

The recommendations below are proposed to address identified impacts and allow a comprehensive assessment of the proposal:

> Mitigation measures should be developed to address the increased risk to mobile fauna such as the use of animal exclusion fencing, driver education during inductions and the use of signage.

> The Assessment should be revised to include an assessment of the proposed impacts against the FBA or if not required justify why this has not been undertaken.

## 3.10 Waste and Resource Management

The proposed SIMTA MPW Concept Plan Modification provides analysis of the Proposal's impacts on waste and resource management. This review considers information in the Modification Report by Arcadis (2016).

### 3.10.1 Proposed Modification

A Waste Management Strategy (WMS) was identified in the Concept Plan EIS (Parsons Brinkerhoff, 2014) identifying reuse opportunities for waste generated by the Proposal during demolition, construction and operation, with the intent of maximising reuse and minimising waste to landfill. The Revised Statement of Commitments, committed to a number of strategies that were incorporated into the WMS. Further details have been provided in the Waste and Resource Management assessment undertaken in Section 5.9 of the Modification Report (Arcadis, 2016).

The Modification Report notes that the early works assessed under the MPW Concept Plan EIS included the following waste generating and resource utilising activities:

> Establishment of construction facilities

> Demolition of existing buildings, structures and contaminated buildings

> Contaminated land remediation including removal of unexploded ordnance and explosive ordnance waste (if found), removal of asbestos contaminated buildings and remediation of an area known to contain asbestos

> Relocation of trees

> Service utility terminations and diversions

> Establishment of a conservation area

> Heritage impact mitigation works.

Arcadis (2016) argued that under the MPW Response to Submissions Report (Parsons Brinkerhoff, 2015), the above activities were not modified and hence the EIS assessment remained relevant to these activities. However, the MPW Response to Submissions Report introduced rehabilitation works into the scope of early works, which include:

> Decontamination and demolition of buildings identified with asbestos containing material

> Remediation of contamination hotspots including underground storage tanks

> Site stabilisation and establishment of the proposed conservation area on the site of the plant and equipment operator training area

> Construction of secure perimeter fencing

> Ancillary operations including establishment of construction facilities and amenities on existing areas of hardstand.

Arcadis (2016) also identify Key Waste Streams likely to be generated as a result of the Modification that include:

> Contaminated soil, topsoil, VENM, Excavated material

> ENM; some of which will be suitable for on-site reuse Vegetation

> Demolition waste from buildings – concrete, brick and tile, much of which will be crushed and reused on-site

> Surplus building materials (from compound establishment)

> Concrete waste from in-situ concrete pours (from compound establishment).

Waste water streams likely to be generated by the Modification Proposal include:

> Sewage from worker amenities.

A summary of waste generation and utilisation of project resources is provided in Table 5-24 of the Modification Report. This report identified that the key waste management activity that will differ from the MPW Concept Plan Approval is the crushing of building demolition waste, such as concrete, brick and tile. The applicant argues that this additional waste processing activity on site will have the beneficial impact of replacing raw construction materials with reprocessed materials. They also note that negative environmental impacts from this modified activity may include dust, noise and vibration. **Sections 3.2** and **3.3** of this document provide a review of the respective impact assessments provided in the Modification Report.

### 3.10.2 Cardno Assessment

The proposal to reuse fill materials on site rather than off-site disposal is in accordance with guiding principles and hierarchy of the *Waste Avoidance and Resource Recovery Strategy 2014-21* (EPA, 2014a) as it will reduce the diversion of waste to landfill.

The subsections below provide further details.

#### Life Cycle Analysis

Best practice waste management during construction and operation requires consideration of the full project lifecycle, with the end use of the site and associated opportunities for reuse and recycling considered. Although the footnote of Table 5.24 states "*Embodied energy of selected materials is beyond the scope of the assessment*" (Arcadis, 2016), the waste assessment should identify the embodied energy associated with the development materials and identify opportunities to reduce the embodied energy footprint of the proposal. By considering future uses for the material either on or off site the amount of embodied energy is diluted between both the currently proposed and future uses, reducing the impact solely attributed to this development. Strategies that could be considered to achieve this reduction include:

> Identify potential future site uses and uses for site components off site in a deconstruction plan. The design should allow potential future uses to be accommodated.

> Identity and use materials with lower embodied energy across the life cycle. Examples include the substitution of cement for compacted industrial waste product, or oversized aggregate, with a capping layer of cement provided in lower intensity use areas. Ideally recycled aggregate should be used either from the site or a location in close proximity.

**Contaminated Waste**

The proponent advises the filling works required as part of early works for the MPW Project are required to achieve the desired stormwater outcomes, meet geotechnical requirements, and minimise offsite disposal of contaminated waste materials. All materials to be imported or reused as fill on site will need to be classified as VENM or ENM in accordance with *NSW Waste Classification Guidelines* (EPA, 2014b). The beneficial reuse of suitable (non-contaminated) fill materials on site is encouraged as long as appropriate investigations and lab analysis prove that the material is suitable for reuse.

Any contaminated fill material identified that is deemed unsuitable for reuse will need to be transported and disposed of at a licenced waste receiving facility in accordance with the *Protection of the Environment Operations (Waste) Regulation 2014.*

Further details associated with Contamination assessment are included in **Section 3.6**.

**Waste Tracking**

Tracking of any waste taken off site (i.e. that cannot be reused on site) should be undertaken during construction and operation, with external audit to ensure waste streams are being effectively managed.

### 3.10.3 Recommendations

The recommendations below are proposed to address identified impacts and allow a comprehensive assessment of the proposal:

> Assess the project's operational life including consideration of embodied energy and an end of life strategy in the form of a deconstruction plan that identifies potential future site uses and uses for components on and off site.

> Develop a WMS encompassing the MPW Project and incorporating an integrated waste management system to ensure the project complies with the waste hierarchy of avoidance, recovery, reuse and recycle prior to disposal.

> Demolition and construction waste is to be classified and recorded in accordance with *NSW Waste Classification Guidelines* (EPA, 2014) throughout the construction process so that the overall waste diversion performance achieved can be quantified.

> Any contaminated fill material identified that is deemed unsuitable for reuse will need to be transported and disposed of at a licenced waste receiving facility in accordance with the *Protection of the Environment Operations (Waste) Regulation 2014.*

> Identify a waste tracking, auditing, assessment and project review process that is continually undertaken through the project lifecycle.

# 4 Conclusions and Recommendations

## 4.1 Conclusions

A modification is proposed to the existing Project Approval SSD_5066 for the Moorebank Precinct West (MPW) intermodal terminal. The primary aim of the modification is to address the assumption that the development would result in a cut/fill balance, as further investigations have identified that the import of 1,600,000m$^3$ of fill material, with associated on-site crushing and screening is required.

This review has considered the proposed modification comparative to the existing Project Approval inclusive of early works and the potential for additional environmental impact. The following subsections summarise the key environmental impacts and issues resulting from the proposal that should be considered in the assessment and determination of the modification.

### 4.1.1 Traffic

The proposed modification would increase the daily number of heavy vehicle moments generated during the early works approximately 37-fold. This is a significant increase which will cause amenity impacts during the early works period that were not considered in the Project Approval. These additional movements can generally be accommodated within the local road network, assuming material is brought from the M5 and then along Moorebank Avenue. However, it is recommended that the electronic SIDRA files are reviewed to confirm the assumptions used. Furthermore, it is recommended that a revised assessment is undertaken considering the RMS network wide modelling once available, to provide a more rigorous assessment.

### 4.1.2 Air Quality

It is not anticipated that the Modification would change the final project impact. However, the proposed changes would significantly increase on-site dust emissions during construction, with the residential area of Casula located directly to the west across the Georges River, as well as residential areas further to the north and south potentially subject to reduced air quality as a result of dust generated from on-site truck movements, screening and crushing. Furthermore, no consideration has been given to air quality impacts resulting from the 37-fold increase in the off-site truck movements proposed by the modification, which has the potential for wider impacts on human health due to reduced air quality.

### 4.1.3 Noise

The Modification to the project does not change the impacts associated with the final project. However, the import of 1,600,000 m$^3$ of fill is anticipated to create a substantial increase in noise impacts on the community, with noise increasing by 4 - 6 dB during the day time and extend the hours of construction activity to 10pm at night.

### 4.1.4 Geotechnical and Soils

Far greater consideration of constructability is required due to the substantially different earthworks model now proposed, which indicates the need for importation of 1,600,000 m$^3$ of fill occurring over a six to nine-month period.

Based upon a nominal density of 2.4 t/m$^3$ for sandstone, a design for 1,600,000 m$^3$ of fill would require 3,840,000 tonnes of imported sandstone, equating to approximately 96,000 truck movements. The modification discusses a peak of 22,000 tonnes per day import, which is 550 one-way truck movements per day, compared to the 40 heavy vehicle movements identified within the MPW Response to Submissions (Parsons Brinckerhoff, 2015) per day, for the duration of the early works period. In terms of development and earthworks this is a significantly larger project. The importation and emplacement rates are ambitious, particularly given that the anticipated unsuitable ground conditions will be 'treated' on an ad-hoc basis. This poses a high environmental impact risk. Further traffic, noise, dust and constructability assessments will also be required to demonstrate the feasibility of works on this scale.

#### 4.1.5 Statutory Planning

The modification is proposed under Section 96(2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act), which requires the modification to be 'substantially the same' as the approved development. The scale of impact, resulting primarily from the magnitude change in the number of construction truck movements proposed, as a result of the modification and the resultant noise, air quality and human health impacts, create a step change in the development. Consequently, it is considered that the proposed development is not 'substantially the same' as that approved. Therefore, it is deemed inappropriate for the development as modified to obtain approval under Section 96 of the EP&A Act. Furthermore, it is recommended that due to the potential for impact, revised Secretaries Environmental Assessment Requirements should be issued for consideration in an Environmental Impact Statement.

## 4.2 Recommendations

The review identified the potential for extensive environmental impacts, some of which are yet to be adequately assessed by the proponent. Furthermore, it is questionable whether these impacts can be mitigated without the identification and preparation of supporting infrastructure, management plans, operating procedures and compensation schemes, which the current scheme and associated assessment fails to do. Consequently, it is considered that additional information is required before a comprehensive assessment and subsequent determination of the proposal can be made.

The extent of the proposed modification is beyond what legal precedent has identified as being 'substantially the same'. Consequently, it is considered that a Section 96(2) modification is not the appropriate approvals pathway. A formal request for Secretaries Environmental Assessment Requirements should be lodged, with a subsequent Environmental Impact Statement prepared to fully consider the extent of impact.

It is recommended that a precinct wide, master planned approach to earthworks be considered. This approach reflects previous comments from the Planning and Assessment Commission and Council, which would allow more orderly development and aid the understanding of the full extent of environmental impacts.

# 5 References

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