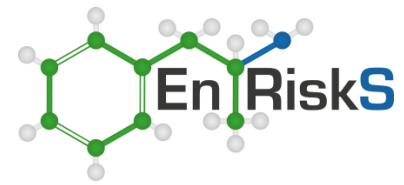


Appendix H

Health Impact Assessment and Human Health Risk Assessment





21 April 2015

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Technical Working Paper: Health Impact Assessment – Moorebank Intermodal Terminal – Revised Project

1.0 Introduction

The Environmental Impact Statement (EIS) for the Moorebank Intermodal Terminal (the Project) was placed on public exhibition between the 8 October and 8 December 2014. Following the public exhibition a Response to Submissions Report has been prepared to address issues raised in community and agency submissions, describe proposed amendments to the development, and document additional investigations undertaken since the EIS public exhibition.

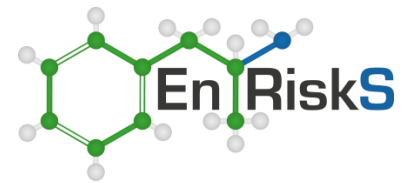
The Response to Submissions Report, which this report accompanies, documents and assesses proposed amendments to the Moorebank Intermodal Project ('the Project') following the public exhibition of the EIS. The revised Project has been developed as a result of an agreement being reached between the Moorebank Intermodal Company (MIC) and Sydney Intermodal Terminal Alliance (SIMTA) that will result in the development of both the Moorebank Intermodal Terminal (IMT) site ('the Project site') (the subject of the EIS summary and the Response to Submissions Report) and the SIMTA IMT site to create an intermodal precinct solution.

The proposed development of the precinct has resulted in changes to some of the key technical studies presented in the EIS. This letter has been prepared to evaluate how these changes affect the assessment presented in EIS Technical Paper 16: Health Impact Assessment (HIA) compared to the revised Project.

2.0 Overview of the Proposed Amendments to the Project

Amendments to the Project layout and built form comprise:

- changes to the layout and operation of the IMT terminal, including the location of the warehousing, working tracks and storage tracks, IMT freight village precinct, IMEX and interstate equipment storage and repair area and detention ponds;
- confirmation that the southern rail access into the site will be required (the EIS summary sought flexibility to build either a southern, central or northern rail access into the site from the SSFL) and a minor amendments to the alignment and a reduction in the southern rail access corridor;
- changes to the upgrade of Moorebank Avenue as described in the EIS summary (changes in the extent and timing of the upgrade works;
- changes to access and circulation including heavy and light vehicle access to the facility via the Moorebank Avenue and Anzac Road intersection along a dedicated road at the north and along the western boundary of the Project site; and
- an increase in the size of the conservation area as a result of the new IMT.

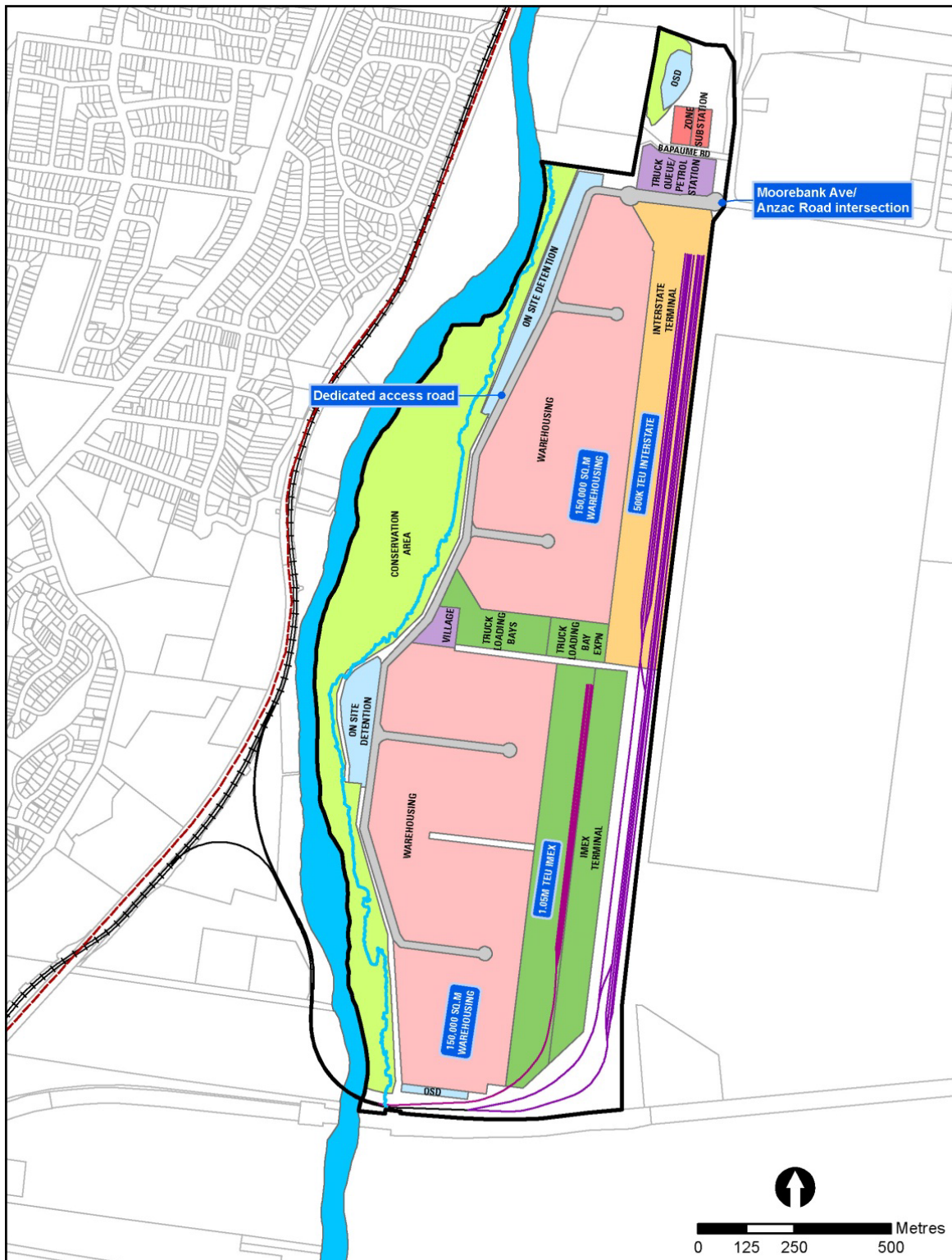


In terms of warehousing, the site built form controls associated with heights, setbacks and floor space ratio remain unchanged (refer section 7.7.2 of the EIS); however the setback control on Moorebank Avenue is no longer required as warehouses are no longer proposed on the eastern boundary of the site. To supplement the setback controls, asset protection zones will be established between the conservation area and the proposed warehouse buildings to safeguard against bushfire risk.

The revised terminal layout consists of (refer to **Figure 1** for full build layout):

- Confirmation of the development of a southern rail access from the SSFL to the western boundary of the Project site.
- Reorientation of the terminal layout to place warehousing (approximately 300,000 sq. metres) on the western area of the Project site bordering the proposed conservation area and set-back for bushfire control. Final layout and footprint of the individual warehouse buildings will be confirmed as part of the Stage 2 SSD process.
- Reorientation to place the intermodal infrastructure including rail tracks (working tracks and storage tracks) on the eastern side of the Project site adjacent to the terminals and bordering Moorebank Avenue.
- Changes to the site access and vehicle circulation within the Project site.
- Modification to the locations and footprint of the detention basin and administrative office

As a result of the above changes there are also changes in the Project development phasing and timing.

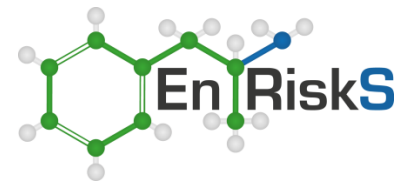


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**Revised IMT layout
at Full Build (2030)**

Figure 1



Based on the revised Project the technical studies have been amended to consider the following four scenarios (as illustrated in **Figure 2**):

- **Scenario 1** (2016) during **Phase A** (construction only – construction of 250,000 TEU IMEX terminal and 100,000 sq. m of warehousing).
- **Scenario 2a** (2019) during **Phase B** (construction and operation - operation of 250,000 TEU IMEX terminal and 100,000 sq. m of warehousing, construction and operation of 250,000 TEU of interstate rail and terminal, and construction of additional 250,000 TEU IMEX terminal).
- **Scenario 2b** (2023) (construction and operation - operation of 500,000 TEU IMEX terminal, 100,000 TEU warehousing, operation of 250,000 TEU Interstate Terminal, and construction of 150,000 sq. m warehousing).
- **Scenario 3** or Full Build (2030) (operation only - operation of 1.05m TEU IMEX terminal and 500,000 TEU interstate terminal, 300,000 sq. m of warehousing).

In addition, the following cumulative scenarios have been assessed which are relevant for operations on both the SIMTA and Moorebank site have been considered.

- **Cumulative Scenario A** (previously Scenario 1 in the EIS) – at 2030 full build:

Cumulative Scenario A assumes that the SIMTA site would operate as an intensified warehousing development that would support the operation of the Moorebank IMT Project. A number of assumptions have been made to define and assess cumulative scenario A including:

- The Moorebank IMT would operate as proposed in the EIS;
- The SIMTA development would have indicative warehouse capacity of 300,000 sq. m gross floor area (GFA)
- Both sites would operate 24 hours a day, seven days a week; and
- The SIMTA development would have an operational workforce of 1,470 staff on site per day (three shifts).

- **Cumulative Scenario B** (previously Scenario 3 in the EIS) at 2030 full build:

Cumulative Scenario B consists of an IMEX terminal on the SIMTA site only with throughput of 1 million TEU per year, as well as 300,000 sq. m of warehousing. An interstate terminal of 500,000 TEU per year and 300,000 sq. m of warehousing would be located on the Project site. The following assumptions were made for cumulative Scenario B:

- Both sites would operate 24 hours a day, seven days a week;
- The SIMTA development would have an operational workforce of 2,258 staff on site per day (three shifts per day)
- The Moorebank IMT site would have an operational workforce of 1,800 staff per day.

- **Cumulative Scenario C:**

Cumulative scenario C has been split into C1 (an interim scenario at 2020) and C2 (final scenario from 2030):

- Cumulative scenario C1: consisting of the Moorebank IMT site operating at 250,000 TEU IMEX, 250,000 TEU Interstate and 100,000 sq. m warehousing. The SIMTA site would operate at 250,000 TEU IMEX (asper the SIMPTA Stage 1 DA) and 200,000 sq. m warehousing.
- Cumulative scenario C2: consisting of the Moorebank IMT site operating at 550,000 TEU IMEX, 500,000 TEU Interstate and 300,000 sq. m warehousing. The SIMTA site would operate at 500,000 TEU IMEX (their ultimate capacity under the PAC determination) and 300,000 sq. m warehousing.

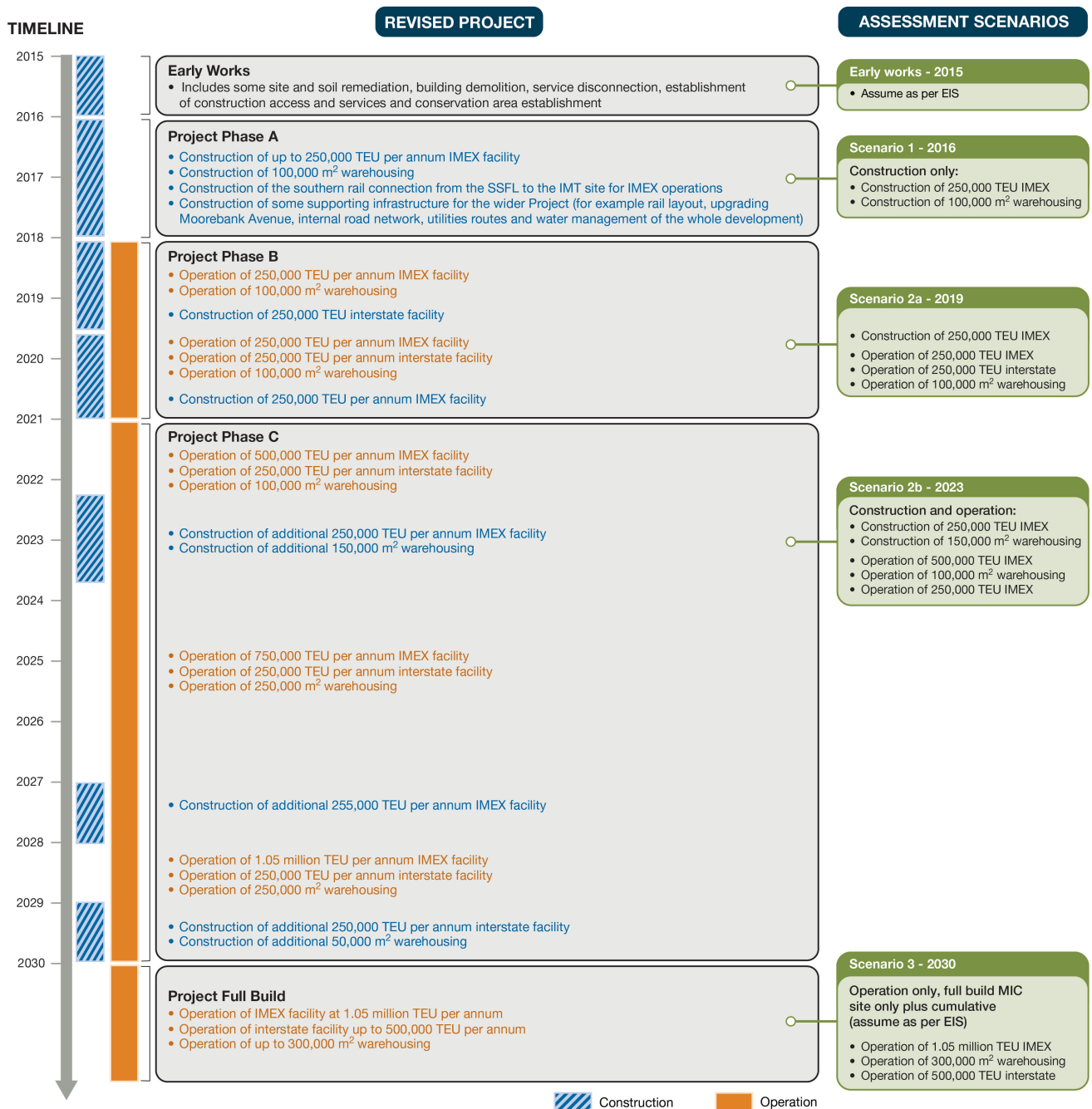


Figure 2 Revised Project Timeline and Assessment Scenarios

3.0 Changes to the HIA

3.1 General

The HIA presented in the EIS provided a structured desk-top assessment of the direct and indirect impacts associated with the Project on the health of the community. The HIA considered all aspects of the Project in relation to community health and well-being and hence draws on the technical assessments presented in the EIS to identify positive and negative impacts. Outcomes of the HIA were used to determine recommendations for the collection of further data and/or measures that may be able to be implemented in the Project to minimise or mitigate identified negative impacts, and maximise positive impacts.

The methodology, approach and community profile adopted for the conduct of the HIA is outlined in the EIS and has not changed. Some of the key technical studies have been revised to assess the revised Project, with Scenarios 1, 2a, 2b and 3 evaluated (where relevant to the technical study) and the cumulative scenarios (Scenarios A, B, C1 and C2). The key technical studies that have been revised relate to traffic, noise, local air quality and human health risks. These were the key aspects identified that required detailed evaluation within the HIA. The following sections present a review of the changes to the technical assessments presented in relation to traffic, noise, air quality and human health risk, and how these may affect the assessment, outcomes and recommendations presented in the HIA in the EIS.

3.2 Traffic

Specialist Study

The assessment of the revised Project in relation to traffic has been assessed by Parsons Brinckerhoff. This assessment outlines the changes to the assessment of traffic assessment presented in the EIS as a result of the assessment of the revised Project.

Moorebank IMT

The proposed upgrade of Moorebank Avenue has changed significantly since the EIS. The EIS design proposed an upgrade for Moorebank Avenue (including duelling and signalisation) between the M5 and East Hills rail line, as well as numerous entry and egress points from the Project site onto Moorebank Avenue. The revised Project consists of a single entry point only – at the intersection of Moorebank Avenue and Anzac Road. The revised design provides for the upgrading of Moorebank Avenue to a four-lane carriageway from the M5 to that entry point, with no further upgrade to the south, on the basis that no truck traffic will travel to and from the south of Anzac Road along Moorebank Avenue. In addition to the upgrade of the Anzac Road intersection, relocation and upgrade of Bapaume Road and its intersection with Moorebank Avenue will be undertaken.

Impacts of the revised Project on the operation of Moorebank Avenue as well as congestion on other intersections and roadways in the surrounding area have been evaluated. For the revised Project the assessment has identified the following:

- Some aspects of the traffic assessment, particularly in relation to rail movements, parking provisions and public transport, remain unchanged from the EIS.
- Upgrading of Moorebank Avenue north of Anzac Road, and the upgrading of the Anzac Road intersection to a major signalised intersection in order for this to function as the main entry point into the Project site, is essential to the effective functioning of traffic access and egress. The proposed modifications to Moorebank Avenue include widening Moorebank Avenue to a dual carriageway, four-lane road (two lanes in each direction), between the M5 intersection and the southernmost Project site access road; and the expansion of the Moorebank Avenue/Anzac Road intersection.

- While the traffic impacts at 2030 are a slight improvement relative the predictions made in the EIS, the analysis continues to show that by 2030, all intersections will have experienced a reduced level of service as a result of background traffic growth and the impacts of the Project. Some of these will have deteriorated to an unacceptable level of service without mitigation.
- The percentage increase from the traffic generated by Moorebank IMT on the M5 Motorway is under 3.3% of total M5 traffic during the 2030 AM and PM peak hours.
- Mitigation measures in the form of intersection treatments are prescribed by the report in order to ensure that by 2030, current (2015) levels of service are maintained.

Cumulative Assessment:

An assessment was undertaken of traffic impacts associated with Cumulative Scenarios A, B, C1 and C2. Overall, the combined traffic associated with the Moorebank IMT and an adjacent SIMTA operation could be accommodated within the proposed upgrades to Moorebank Avenue for Cumulative Scenarios A, B, C1 and C2. However Cumulative Scenario B would require further modifications to the following intersections to relieve queue lengths for the right turn from Moorebank Avenue onto Anzac Road and the right turn out of both the SIMTA Northern and Central Accesses:

- Moorebank Avenue and Anzac Road
- Moorebank Avenue, DNSDC Access and SIMTA Northern Access
- Moorebank Avenue and SIMTA Central Access.

The cumulative scenarios are not likely to have a substantial impact on the operation of the M5 Motorway or the regional road network.

Assessment of Health Outcomes

Congested traffic has the potential to impact on health in a number of ways. Increased anxiety, reduced air quality, increased noise, and poor perceptions of an area due to safety issues are all possible. The assessment in relation to the revised Project has identified some changes to the proposed upgrade of Moorebank Avenue, however the traffic impacts present in the EIS have not changed. From a health impact perspective the conclusions presented in the EIS remain unchanged, that is the health outcomes of the Project relating to traffic congestion should be positive as long as all the proposed mitigation measures are implemented.

Can the Outcomes be Enhances/Mitigated?

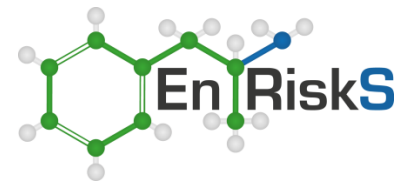
A range of measures are outlined in the HIA of the EIS to mitigate impacts of changes in traffic on the local community. These mitigation measures have not changed as a result of the changes considered for the revised Project.

3.3 Noise

Specialist Study

The assessment of the revised Project in relation to noise and vibration is presented in the “Revised Project Report, Noise and Vibration Impact Assessment” (SLR, 2015). This assessment outlines the changes to the assessment of noise and vibration presented in the EIS as a result of the assessment of the revised Project.

The existing noise environment and the noise assessment criteria, which are based on the protection of community health, remain unchanged from those presented and considered in the EIS. The assessment has considered the changes to the revised Project and has undertaken a detailed assessment of potential impacts during construction and operational phases of the revised Project, as well as the cumulative scenarios.



Noise Impacts during Construction

Construction activities have been assessed during Scenarios 1 to 3, where the following impacts were identified:

- Scenario 1 (2016): noise impacts above the noise management levels were identified at Casula (during piling, excavation, compaction and construction of the SSFL rail access and on-site track), Wattle Grove (during piling, excavation, compaction and concreting), Glenfield (during piling and construction of the SSFL rail access and on-site track) and Liverpool (during piling).
- Scenario 2a (2019): noise impacts above the noise management levels were identified at Casula (during piling), Wattle Grove (during piling, excavation and compaction) and Liverpool (during piling).
- Scenario 2b (2023): noise impacts above the noise management levels were identified at Casula (during piling, excavation and compaction), Wattle Grove (during piling, excavation and compaction) and Glenfield (during concreting).

The revised assessment has resulted in some redistribution of noise impacts from those presented in the EIS, however reasonable and feasible noise management measures to reduce the noise to acceptable levels during construction activities will still need to be implemented as presented in the EIS.

Noise Impacts during Operations

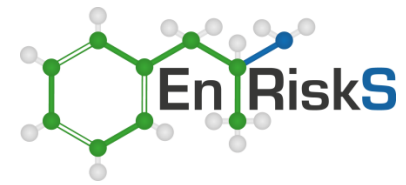
Operational activities have been assessed on the site during Scenario 2a, Scenario 2c and Scenario 3 (full build) and the cumulative SIMTA scenarios:

- Scenario 2a: Under adverse meteorological condition, predicted noise impacts complied with the noise criteria at all assessed receptors, with the exception of the western extent of Anzac Road where a marginal 1 to 2 dBA L_{Aeq} exceedance of the noise criteria was predicted. Predicted noise levels comply with noise criteria at the majority of receptors, but exceed the noise criteria by 2 to 3 dBA L_{Aeq} at nearest receptors at the northern extent of Casula and by 2 dB L_{Aeq} at nearest receptors at Wattle Grove. At the western extent of Anzac Road noise levels exceed the night-time noise criteria by up to 5 dBA L_{Aeq} .
- Scenario 2b: Under adverse weather conditions, the assessment identified noise levels comply with daytime and evening noise criteria at all assessed receptors with the exception of the western extent of Anzac Road where the noise levels exceed the criteria by 1 to 2 dBA L_{Aeq} . The Project should consider feasible and reasonable noise mitigation measures to reduce night-time noise levels by up to 4 dBA L_{Aeq} at the northern extent of Casula and the nearest receptors in Wattle Grove.
- Scenario 3: Under adverse weather conditions, the assessment identified noise levels comply with the daytime and evening noise criteria at all assessed receptors in Casula, Glenfield and Wattle Grove with the exception of the western extent of Anzac Road, where noise levels are up to 2 to 3 dBA L_{Aeq} in exceedance of the daytime and evening noise criteria. The Project should consider feasible and reasonable noise mitigation measures to reduce night-time noise levels by up to 6 dBA L_{Aeq} at the nearest Casula, by up to 4 dBA L_{Aeq} at the northern and southern most extents of Wattle Grove and by 6 dBA L_{Aeq} at the western extent of Wattle Grove.

An assessment of sleep disturbance associated with operations at the Project site determined that the maximum predicted noise impacts comply with the sleep disturbance criteria in all offsite community locations.

Assessment of the rail access connection indicated that all predicted noise levels in assessment Scenario 2a, Scenario 2b and Scenario 3 complied with daytime, evening and night-time noise criteria at all receptors for noise related to the movement of rail engines and cars.

The revised assessment has resulted in some redistribution of noise impacts from those presented in the EIS, however reasonable and feasible noise management measures to reduce the noise to acceptable levels during operations will still need to be implemented as presented in the EIS.



To demonstrate that noise mitigation would be effective, the assessment evaluated noise impacts at full build, Scenario 3, with noise mitigation measures (low noise plant and equipment and placement of noise barriers) in place. Under this scenario the noise criteria were met under all conditions and over all hours of the day.

In relation to the assessment of road noise, there are no changes to the assessment presented in the EIS.

Cumulative Assessment

For the cumulative scenarios evaluated the following noise impacts were identified:

- Cumulative Scenario A: the assessment identified noise impacts in excess of the adopted night-time noise level criteria at Casula. The Project should consider feasible and reasonable noise mitigation measures to reduce noise levels by up to 4 dBA LAeq.
- Cumulative Scenario B: the assessment identified noise impacts in excess of the adopted night-time noise level criteria at Wattle Grove. The Project should consider feasible and reasonable noise mitigation measures to reduce noise levels by up to 5 dBA LAeq.
- Cumulative Scenarios C1 and C2: the assessment identified noise impacts in excess of the adopted night-time noise level criteria at Casula and Wattle Grove. The Project should consider feasible and reasonable noise mitigation measures to reduce noise levels by up to 2 dBA LAeq for Scenario C1 and up to 3 dB LAeq for Scenario C2.

The revised assessment has resulted in lower noise impacts (up to 7 dB less) from those presented in the EIS, however the requirement to undertake reasonable and feasible noise management measures to reduce the noise to acceptable levels as presented in the EIS remains unchanged.

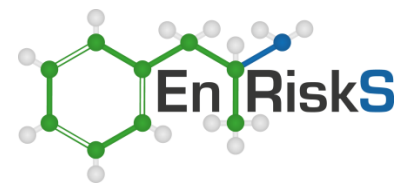
Assessment of Health Outcomes

The assessment presented in the EIS identified that where the noise criteria were not met there was the potential for adverse effects on the health of the community. For the revised scenarios, as with the other scenarios presented in the EIS, the worst case assessment predicts that noise criteria would be exceeded at some locations without additional noise mitigation measures. Such measures have been included in the plans for the Project. It will be essential to adopt proposed noise mitigation measures to ensure the health outcomes related to noise are neutral for the Project.

Can the Outcomes be Enhanced/Mitigated?

As outlined in the EIS, a range of mitigation measures are proposed during construction and operations to ensure compliance with the noise criteria. These remain unchanged, however the noise assessment has indicated the need for some noise mitigation measures for the revised Project that are in addition to those outlined in the EIS, and include:

- Automated container handling areas in the IMEX and interstate terminals to avoid the use of alarms or beepers on the RMGs.
- Electrification of all plant and equipment at the IMEX and interstate terminals, or alternatively sourcing plant and equipment with noise emission levels equivalent to electrified plant.
- Permanently coupled wagons to limit impact noise events from wagon bunching on the freight trains.
- Minimise the need for reversing of vehicles operating within the Main IMT site equipment to prevent nuisance caused by reversing alarms. This can be achieved through one-way traffic systems and the use of traffic lights which can also limit the use of vehicle horns.
- To further mitigate potential noise from vehicle horns, the practical application of radio contact between operators and limiting the use of vehicle horns to the daylight hours only would be investigated.



- Broadband reversing alarms are to be used instead of tonal reversing alarms, in particular between the hours of 6.00 pm to 7.00 am. This requirement would extend to the heavy vehicles (trucks) entering and leaving the site and where possible (particularly for night works). This should be included as a contractual requirement for all operators accessing the main IMT site.

3.4 Air Quality and Human Impacts

Specialist Studies

Assessment of local air quality has been revised (“Proposed Moorebank Intermodal Terminal – Revised Project Design – Local Air Quality Impact Assessment” prepared by Environ 2015) to evaluate the revised Project design. In addition, the assessment of the impacts of the changes in local air quality on community health has been considered (“Technical Working Paper: Human Health Risk Assessment – Moorebank Intermodal Terminal – Revised Project”, prepared by enRiskS 2015).

The methodology adopted for the assessment of local air quality has not changed and is outlined in detail in the EIS.

The assessment of local air quality has been revised to address the following scenarios on the Project site:

- Scenario 1 (Phase A); and
- Scenario 3 (Full Build)

These scenarios have been evaluated for all the air pollutants addressed in the EIS.

In addition, the local air quality assessment has been revised to address the 4 cumulative scenarios (Cumulative Scenarios A, B, C1 and C2). The cumulative scenarios have considered impacts from key pollutants (indicator) only, namely nitrogen dioxide and particulates (as PM_{10} and $PM_{2.5}$).

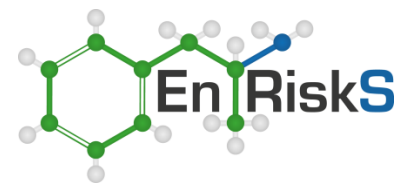
For these scenarios the air quality assessment has been revised to account for the changes to the Project construction and operations that affect emissions to air of the pollutants assessed. The modelling of changes in air quality in the surrounding community have then been revised. The assessment provides revised ground level concentrations at the sensitive receptor locations (as addressed in the EIS) in the surrounding community. These ground level concentrations have been further evaluated in conjunction with relevant regulatory criteria as well as health based criteria/assessment methods as outlined in the EIS.

Potential for Impacts

Predicted air quality impacts from both the revised Project in isolation and cumulative operations at the Project and SIMTA sites showed minor variance from the impacts predicted in the EIS. The levels of oxides of nitrogen, sulfur dioxide, carbon monoxide, volatile organic compounds and polycyclic aromatic hydrocarbons during construction and operation are all estimated to be acceptable for all Project and cumulative scenarios evaluated. That is, the estimated concentrations (incremental and cumulative) in air within the surrounding community (assessed at the sensitive receiver locations) were smaller than National and International guidelines that are based on the protection of all adverse health effects for all members of the population including sensitive subpopulations.

Exceedance of the $PM_{2.5}$ advisory reporting goals for the cumulative concentrations are predicted, but only at a receptor location that is likely to be within the SIMTA development. The assessment of health impacts associated with changes in both $PM_{2.5}$ and PM_{10} concentrations in the local community has been revised based on the changes in the ground level concentrations predicted for the assessment scenarios evaluated. The assessment has identified minor variations in the health risks and impacts presented in the EIS, however the conclusions presented in the EIS remain unchanged, which are:

- In relation to the assessment of key phases of the revised Project, potential health impacts are low (not significant) in the surrounding community. Regardless of this assessment, where best available technology and mitigation measures should be implemented to minimise exposures to particulates in the community.



- In relation to the assessment of cumulative impacts from the operation of both the Moorebank and SIMTA sites, the predicted health impacts are generally considered to be low (not significant); however there is the potential for risks in adjacent commercial/industrial areas to be at a level that are considered unacceptable. Mitigation measures need to be implemented to minimise exposure to particulates in the adjacent workplaces.

Can the Outcomes be Enhances/Mitigated?

The EIS presents a range of mitigation measures and emission controls that can be implemented during construction and operations to minimize air quality impacts. No additional mitigation measures have been identified in relation to the revised Project.

The HIA presented in the EIS also provided a range of other recommendations to minimise impacts of the project on the health of the community. These recommendations remain unchanged.

4.0 Conclusions

Following public exhibition of the EIS in relation to the Moorebank Intermodal Terminal, MIC and SIMTA have reached in-principle agreement for SIMTA to develop and operate a precinct-wide intermodal facility and associated warehousing across the Moorebank and SIMTA sites. The revised Project design relevant to the Moorebank site as well as revised cumulative scenarios associated with the operation of both the SIMTA and Moorebank site have been further evaluated in relation to health impacts to the community.

Based on the revised Project scenarios considered, the conclusions presented in the EIS in relation to impacts on the health of the local community are unchanged. In addition, the recommendations presented in the EIS in relation to mitigation or enhancing health benefits remain unchanged. Some additional noise mitigation measures have been outlined for the revised Project and these should be considered in conjunction with other mitigation measures outlined in the relevant assessments.

5.0 Limitations

Environmental Risk Sciences has prepared this letter for the use of Parsons Brinckerhoff in accordance with the usual care and thoroughness of the consulting profession. It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this letter.

It is prepared in accordance with the scope of work and for the purpose outlined in this letter.

The methodology adopted and sources of information used are outlined in this letter. Environmental Risk Sciences has made no independent verification of this information beyond the agreed scope of works and assumes no responsibility for any inaccuracies or omissions. No indications were found that information provided for use in this review was false.

This letter was prepared in February 2015 and is based on the information provided and reviewed at that time. Environmental Risk Sciences disclaims responsibility for any changes that may have occurred after this time.

This letter should be read in full. No responsibility is accepted for use of any part of this letter in any other context or for any other purpose or by third parties. This letter does not purport to give legal advice. Legal advice can only be given by qualified legal practitioners.



Please contact Jackie on (02) 9614 0297 or 0425 206 295 if you require any additional information in relation to the above.

Yours sincerely,

Jackie Wright
Principal/Director
Environmental Risk Sciences Pty Ltd