SYDNEY PORTS

Intermodal Logistics Centre at Enfield

MODIFICATION APPLICATION

ILC –E – PT3A – Modification Application No. 4
REV A

31 August 2009

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Abbreviations

CEMP	Construction Environmental Management Plan
CLM Act	*Contaminated Land Management Act 1997*
DECC	Department of Environment and Climate Change
DoP	Department of Planning
EA	Environmental Assessment: Intermodal Logistics Centre at Enfield (prepared by SKM on behalf of Sydney Ports and dated October 2005)
ECS	Empty Container Storage
EP&A Act	*Environmental Planning and Assessment Act 1979*
ILC	Intermodal Logistics Centre
IMT	Intermodal Terminal
LIC	Light Industrial Commercial
PPR	Preferred Project Report prepared for the Intermodal Logistics Centre by SKM and dated June 2006
RAP	Remedial Action Plan
SAS	Site Audit Statement
TEU	Twenty foot equivalent unit – one TEU equals one twenty foot container
WSUD	Water Sensitive Urban Design

1 INTRODUCTION

Sydney Ports submits this application to the Department of Planning (DoP) to modify the Project Approval granted by the Minister for Planning on the 5 September 2007 under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for the development of an Intermodal Logistic Centre (ILC) at Enfield (Application Number 05_0147).

This application, submitted under Section 75W of the EP&A Act, applies to some project changes resulting from the detailed design phase and to a number of conditions related to the construction phase of the project. The detailed design of the project was carried out for Sydney Ports by Maunsell AECOM.

In this document, the site is defined as the land to be developed as part of the ILC project and defined in the project approval as the land to which Major Project Application 05_0147 applies.

2 NOISE WALLS

2.1 Approved Development

Noise barriers/walls were originally proposed as follows:

- to the north-west of the Site;
- on the south-eastern boundary of the Site; and
- on the eastern boundary of the Site, west of the Light Industrial and Commercial (LIC) area.

The location of the approved noise barriers/walls is shown on Figure 1 (originally Drawing SEDP017F, contained in SKM Project Notes dated 14 July 2007 and 6 August 2007 which are referred to in Condition of Approval 1.1.). The description of the approved noise barriers/walls provided in the approval documentation is summarised below.

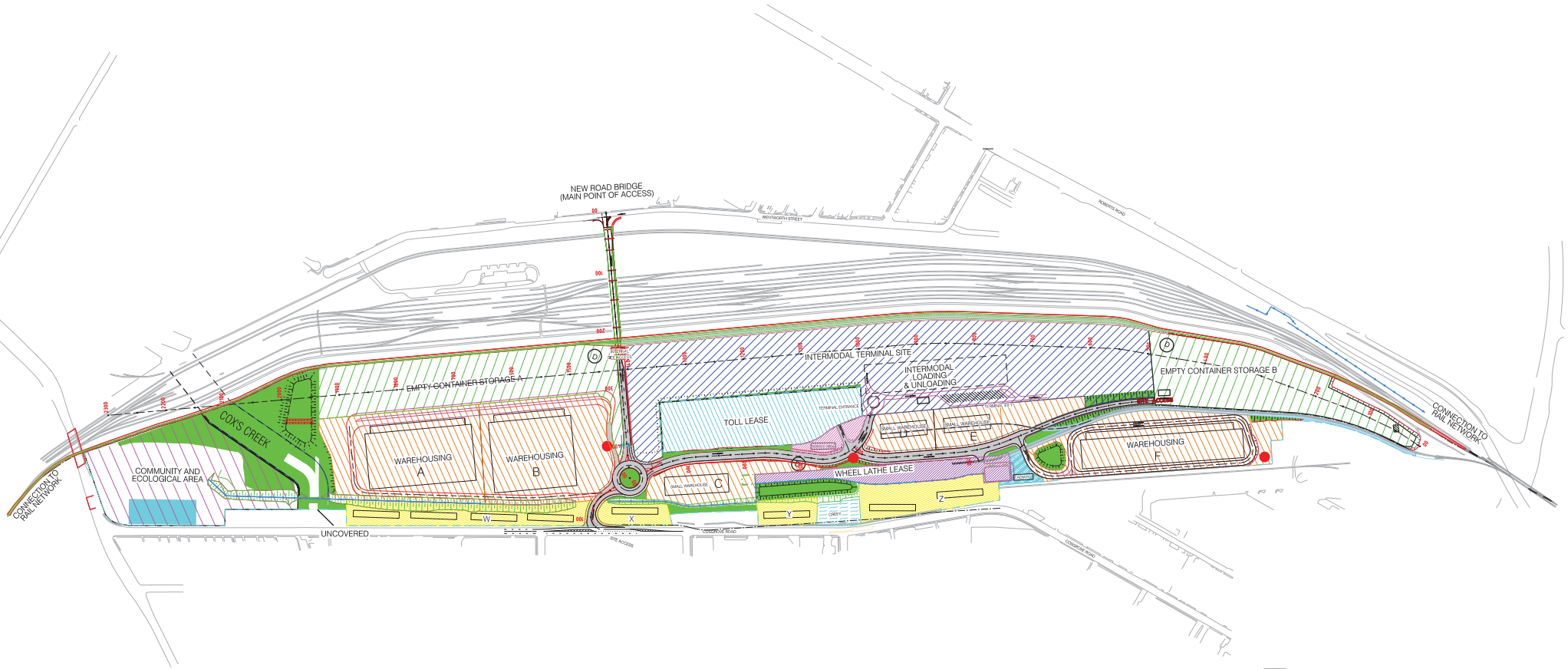
The Statement of Commitments in the Preferred Project Report (PPR) (SKM, June 2006) stated that the final height and length of the barriers would be determined during the detailed design stage of the development.

Northern Noise Wall

A noise wall, around 5 m high, was proposed north-west of RailCorp's Marshalling Yard, within a narrow strip of land next to Roberts Road. The wall was to be approximately 375 m in length and located mainly within RailCorp land and partially within Strathfield Council land.

South-Eastern Noise Wall

A noise barrier/mound, around 5 m high, was proposed within the south-eastern boundary of the Site. The barrier was to extend approximately from Coxs Creek to "Mt Enfield", the mound in the south of the Site.



MODIFICATION APPLICATION 3

50m 0 50 100 150 200 250 300 350 400 450 500m
Scale in Metres

SYDNEY PORTS
FIRST PORT, FUTURE PORT

PLAN PRODUCED ON MGA GRID

SYDNEY
ILC ENFIELD
FIGURE 1 APPROVED SITE LAYOUT

DRAFTED BY: J.T.	DATE: 28/08/2009	PLAN SCALE: AS PER SCALE BAR
PROJECT CODE: ILC-E-C FIG 1 MOD 3		DWG NO: SEDP128A

Eastern Wall near the Light Industrial Commercial Area

A 2 - 5 m high mound was proposed west of the LIC area within the ILC Site. A fence structure approximately 350 m long and 2 m high, comprising double sided metal cladding, was to be located on the top of the mound. The exact location of the fence was not defined in the approval documentation.

2.2 Proposed Development

In accordance with the requirements of the Statement of Commitments in the PPR, the final height and length of the proposed noise barriers was determined as part of the detailed design. The performance of the noise barriers was assessed by noise modelling of the final ILC design. The noise modelling report is contained in Appendix A to this report. Sydney Ports has also consulted with RailCorp regarding the location of the northern noise wall (refer Appendix B).

Northern Noise Wall

Sydney Ports proposes to relocate the northern noise wall east of the approved location to a location on the boundary of the ILC Site and RailCorp's New Marshalling Yards, as shown in Figure 2.

As for the approved noise wall, the proposed noise walls would be 5 m in height above the existing ground level. It would involve two overlapping noise wall sections totalling no less than 375m in length and would be located along the western boundary of Empty Container Storage (ECS) B within the ILC Site. One section will run approximately 195 m south from the northern-most point of ECS B and other section would run a further 178 m to the south. Each section will be contiguous and free from openings and gaps.

South-Eastern Noise Wall

A noise wall 1.8 m high on top of an earth mound approximately 2.5 m high (total noise barrier heights of 4.3 m) is proposed in the south-east of the ILC Site, as shown in Figure 2. The proposed noise barrier would extend from the southern part of Coxs Creek towards the Tarpaulin Shed.

It is noted that since the ILC project was approved in 2007, additional light industrial commercial development has occurred between the ILC Site and the residential area located to the south-east of the site. This includes the construction of a large warehouse, about 10 m in height, between the Tarpaulin Shed and LIC Area W, immediately south of Coxs Creek. This building provides additional noise protection to the residences located south-east of the Site.

Eastern Noise Walls/Barriers

The noise barriers in the east of the Site, north of Coxs Creek, have been modified to include the following (refer also to Figure 2):

- A 5 m high L-shaped (in plan) noise wall 80 m in length at the south-eastern corner of the Warehouse A hardstand area. The barrier will be located 60 m to the north and

20 m to the west of the corner of the hardstand area. The barrier will be contiguous and free from openings and gaps.

- Stacked shipping containers (10 containers long by 4 containers high) at the south-eastern and south-western perimeters of ECS A, whenever reach stacker operations are occurring in ECS A.

These noise barriers are designed to protect the residential areas to the south-east of the site.

It is noted that the area to the east of the ILC site (north of Cox Creek) includes Cosgrove Road and Industrial landuses. There are no residential or other sensitive landuses in this location. Consequently, except for the noise barriers described above, no noise walls/barriers are proposed along the eastern part of the site (north of Warehouse A).

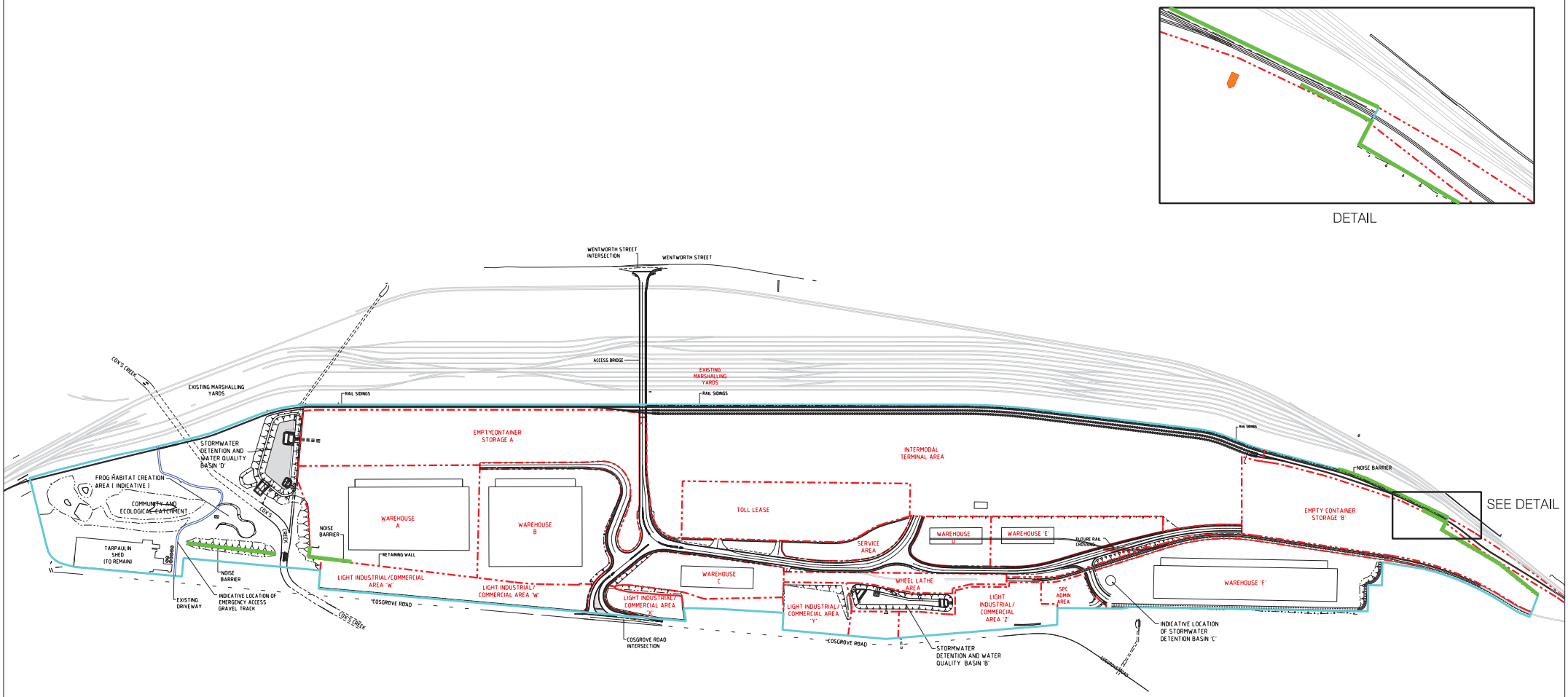
2.3 Assessment

Northern Noise Wall

The justification for the relocation of the northern noise wall is as follows:

- RailCorp advised Sydney Ports that it favours the relocation of the wall to the ILC Site (refer Appendix B);
- Access to the construction area for the approved northern noise wall next to the operational Marshalling Yard would have to be undertaken from the north (ie via Centenary Drive and Roberts Road underbridge, or Hume Highway and Roberts Road underbridge). Roberts Road carries around 60,000 vehicles per day and the Hume Highway about 44,000 vehicles per day near Cosgrove Road. The strip of land next to Roberts Road is small, it is vegetated and would require clearing. There could be potentially significant traffic issues associated with construction trucks and machinery accessing the strip of Council land from Roberts Road.
- The visual amenity of the residential areas west of Roberts Road and people travelling along Roberts Road could be impacted by the (approved) noise wall near Roberts Road. By relocating the noise wall, the trees in the strip of land next to Roberts Road will be retained and the existing south-easterly district views from the area north-west of the Site will be maintained.

Quantitative noise modelling was carried out to assess the performance of the relocated noise wall. The noise modelling report is contained in Appendix A. The results of the modelling showed that the proposed noise wall arrangement will perform to a similar standard as the original Roberts Road noise wall arrangement and will meet the noise criteria specified in Condition 2.17 during daytime operation. Marginal exceedances of the noise criteria (of 1 – 3 dB(A)) could occur at full ILC operations at the eastern end of Jean Street during evening and night operations, largely associated with adverse meteorological conditions. These minor exceedances are the same as those experienced with the EA stage Roberts Road barrier of the same height and length but different location and would be difficult to perceive under field conditions. Moreover, the noise criteria for this region of receivers were derived from unattended noise logging conducted at a shielded location in



MODIFICATION APPLICATION 3

PLAN LIMITATION STATEMENT

This plan has been prepared in accordance with accepted practice for the use only of Sydney Ports Corporation for a specific purpose. No Warranty or representation, expressed or implied is made to any other party regarding this survey and plan. This plan should not be relied upon for any other purpose or use by any party including Sydney Ports Corporation as the plan may not contain sufficient information for that purpose or use.

THIS NOTE IS AN INTEGRAL PART OF THIS PLAN

NOTE : STATED MEASUREMENTS ARE INDICATIVE ONLY AND SUBJECT TO SURVEY

ILC Boundary

Location of Noise Walls/Barriers

20m 0 20 60 100 160m

Scale in Metres

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PLAN PRODUCED ON MGA GRID

SYDNEY ILC ENFIELD FIGURE 2 SITE LAYOUT

DRAFTED BY: J.T.	DATE: 09/09/2009	PLAN SCALE: AS PER SCALE BAR
	PROJECT CODE: ILC-E-C FIG 2 MOD 3	DWG NO: SEDP127D

the rear yard of 6 Jean Street, so their application to receivers exposed to road traffic noise and existing industrial sources is conservative. The marginal exceedances of the criteria under infrequent adverse wind conditions and full ILC operations are considered negligible and inconsequential.

The noise modelling indicated that sleep disturbance noise events during the night-time period from 'clangs' (associated with picking up and putting down containers at height; ie. 10.4 m above ground) and certain meteorological conditions could result in exceedances above the established 'background plus 15 dB(A)' criterion at the eastern end of Jean Street. The predicted noise levels do not, however, exceed the existing maximum average noise levels in this location. In addition no LA1 noise levels exceeded 65 dB(A), which is the screening criterion provided by the DECC Environmental Criteria for Road Traffic Noise (ECRTN) (which represents the most recent NSW DECC advice on the subject of sleep disturbance due to noise events). The noise modelling report concludes that it is unlikely that sleep disturbance would occur. Further, the source and nature of the potential exceedance (ie. night time clangs at height during certain meteorological conditions) make such potential exceedance easily manageable through the implementation of the Operational Noise Management Plan, in accordance with Condition 6.5.

Noise modelling also indicated that any reflected noise from rail noise sources within RailCorp's existing Marshalling Yard on the proposed noise wall would not cause a noticeable increase in noise levels at the receivers west of Roberts Road.

Eastern Noise Barrier

The noise modelling showed that the original noise barrier proposed along the eastern part of the Site is redundant. This conclusion was based on modelling full Site operation and the latest understanding of likely operations in the context of the site design as it has developed since the time of the EA assessment.

All receivers adjacent to the Site frontage in the east are classified as 'Industrial' receivers according to the *NSW Industrial Noise Policy*, 2000. They would therefore be subject to an industrial noise criterion of 70 dB(A) 'when in use'. The noise modelling results suggest daytime amenity noise levels of no greater than 55 dB(A) from the predicted ILC operation at these receivers. The noise levels at receivers further to the east (St Anne's School and western end of Gregory Street) would be below the respective criteria.

Consequently, noise barriers along the eastern part of the site (see above and Figure 2) have been modified to protect the residential area located to the south-east of the ILC site, with no noise walls proposed along the eastern part of the site to the north of Warehouse A.

South-Eastern Noise Barrier

The quantitative noise modelling showed that the proposed noise wall arrangement at the south-east of the Site will enable compliance with the amenity and intrusive noise criteria during day, evening and night operation.

The noise modelling indicated that sleep disturbance noise events during the night-time period from 'clangs' (associated with picking up and putting down containers) could result in small exceedances above the established criterion at the western end of Blanche Street. The predicted noise levels do not, however, exceed the existing night-time maximum noise levels in this location. Therefore it is unlikely that sleep disturbance would occur to residents in this location.

Residual operational noise issues at the Site will be managed by the implementation of an Operational Noise Management Plan, in accordance with Condition 6.5.

Conclusion

The modelling shows that the proposed noise barrier/wall arrangement allows the established intrusive and amenity noise criteria to be met in all assessment periods and locations, with some marginal exceedances at full ILC operations (maximum throughput) which are considered negligible and inconsequential.

The modelling report also concludes that the potential for sleep disturbance is minimal. Although some exceedances of the sleep disturbance criteria (ie. Background plus 15 dB(A)) were modelled at some sites and under certain meteorological conditions due to metal-on-metal 'clangs' at height (ie. 10.4 m above ground), the noise modelling report concludes that no LA1 noise levels are shown to exceed 65 dB(A), which is the screening criterion provided by the DECC Environmental Criteria for Road Traffic Noise (ECRTN) (which represents the most recent NSW DECC advice on the subject of sleep disturbance due to noise events). It has also been concluded that the source and nature of any potential exceedance (ie. night time clangs at height during certain meteorological conditions) make such potential exceedance easily manageable through the implementation of the Operational Noise Management Plan, in accordance with Condition 6.5.

Further, the noise modelling report also concludes that an analysis of existing maximum noise levels at residential receivers A1 to A6 revealed that existing maximum night-time noise levels exceeded both the predicted maximum noise levels due to ILC operation and the adopted sleep disturbance criteria for each location. In addition, the frequency of potential 'clangs' during night-time is low, or even nil when considering the hours commencing 3am to 4am. The period during which the prevalence of container 'clangs' would be greater is the night-time 'shoulder' period (ie. 6am to 7am) during which there is a corresponding increase in background noise levels in the order of 5-10 dB(A). This has the corresponding effect of diminishing the impact of 'clang' events by 5 to 10 dB(A).

Sydney Ports will implement the additional measures to manage any potential residual noise issues:

- Preparation and implementation of an Operation Noise Management Plan in accordance with Condition of Approval 6.5;
- On-going noise monitoring/auditing at different annual throughput stages (50,000 TEU, 150,000 TEU and 250,000 TEU) in accordance with Conditions of Approval 2.18 and 3.3; and

- Implementation of any additional measures required by the Director-General to address any issues identified during noise monitoring/auditing as required in Condition of Approval 3.4.

2.4 Proposed Modification

Sydney Ports requests that Condition 1.1 of the Project Approval refer to the modified noise wall arrangement discussed in this document and shown in Figure 2.

3 IMPROVEMENTS IN INTERNAL ROAD LAYOUT

3.1 Approved Development

The approved internal road layout for the ILC Site is shown on Figure 1 (originally Drawing SEDP017F, contained in SKM Project Notes dated 14 July 2007 and 6 August 2007).

The approved internal road layout comprised new road infrastructure within the ILC Site to enable vehicle movements between the Intermodal Terminal, warehouses and empty container storage areas, without vehicles having to travel off-site.

The primary site access road was designed to run east-west across the ILC Site connecting to both Wentworth Street (main entry point) and Cosgrove Road. The Wentworth Street access would connect to the ILC Site via an overbridge across RailCorp's Marshalling Yard. The secondary access from Cosgrove Road was configured to ensure that heavy vehicles were only able to enter or leave the Site from/to the northern end of Cosgrove Road.

The primary access road included a two lane circulating roundabout located approximately 50 m into the Site from Cosgrove Road. The roundabout provided access to all parts of the Site via internal access roads.

The internal access road heading north from the roundabout provided new access to the existing leased areas (Toll and Wheel Lathe area) and access to the Intermodal Terminal, northern container area and northern warehouse facilities. This road would also be used to depart from the Intermodal Terminal after container transfer/pick up. It was to be constructed as a two-way paved road.

The internal access road heading south from the roundabout provided access to the southern warehouse areas.

3.2 Proposed Development

The detailed design has resulted in improvements in the internal road layout as shown in Figure 2. In general, changes in the internal road are considered minor and generally consistent with the approved layout. The internal road improvements are listed below.

Cosgrove Road site access intersection

The Cosgrove Road exit lane has been split from the entry lane via a concrete median and a merge taper to the north created for the exit lane. This allows exiting vehicles to be parallel with Cosgrove Road prior to merging, which will allow them to use their rear view mirrors to check for northbound traffic.

Central Roundabout

The originally approved central roundabout has been replaced with a combined Y and T intersection. The new 'T' junction (Cosgrove Road access and IMT/Overbridge access)

clearly defines the main through route between ILC and the overbridge, with traffic entering from Cosgrove Road required to give way to these through movements.

Other minor road improvements

Other improvements include:

- Minor changes in the internal road layout routes as shown in Figure 2. For example, a section of the main intermodal access road has been moved marginally to the east so that it is located adjacent to the existing Wheel Lathe lease.
- Driveway access for the existing Toll lease area has been changed. The original access road to the north of the lease area has been deleted and two new driveway accesses have been added to connect to the existing southern-most driveways.
- Changes have been made to the widths of the internal roads and to the radii of the kerb returns to allow for B-Double turning movements throughout the Site. This will ensure that B-Double swept paths for left hand turns do not cross the oncoming traffic lane.
- A driveway for Sydney Ports' Administration Area has been added and the location of the driveway for the wheel lathe area has been relocated to the south.

RailCorp/ARTC Access Track

There are currently three access points to the south end of the Enfield site which are used by vehicles and workers for maintenance and emergency access to rail and land infrastructure for Sydney Port's Enfield site (Lot 14 DP. 1007302) and the adjacent New Marshalling Yards (Lot 3 DP. 1006861). Although Sydney Port's wishes to retain all three access points, and following agreement between rail stakeholders, there is a desire to designate the Cosgrove Road access point north of the Tarpaulin Shed as the primary means of access for maintenance and operational/ emergency purposes for authorised rail stakeholders wishing to gain access to the eastern side of the New Marshalling Yards.

The existing access track will be gravelled (Figure 2). Sydney Ports and its rail stakeholders (namely Australian Rail Track Corporation and RailCorp) are currently preparing a Development Deed which will identify the terms and operational protocols for use of the access track.

3.3 Assessment

As discussed above, changes in the internal road layout are considered minor and generally consistent with the approved layout. The design changes will result in improvements in road layout which will improve the internal road traffic circulation. As per the approved development, the internal road infrastructure has been designed to enable vehicle movements between the Intermodal Terminal, warehouses and empty container storage areas without vehicles having to travel off-site. Further details are provided below.

Cosgrove Road site access intersection

During detailed design, the approved design was found to be inadequate due:

- 140 degree observation angle of trucks exiting the site exceeds the maximum allowable 120 degree angle as defined in the RTA Road Design Guide; and
- adverse cross fall on the exit lane and a small radius bend of 22 m. This is a safety concern, particularly for trucks entering Cosgrove Rd.

To address the above issues, the detailed design incorporates the following:

- The exit lane is split from the entry lane via a concrete median and created a merge taper for the exit lane to the north. This allows vehicles to exit parallel with Cosgrove Road prior to merging, which will allow them to use their rear view mirrors to check for northbound traffic.
- The cross fall on the exit ramp remains at a constant 3%, acting as superelevation around the enlarged 33 m radius bend.
- Pedestrian movements have been catered for in the design.

Central Roundabout

During detailed design it was found that the approved concept roundabout design was sub-standard due to the proximity of a T intersection, used for the access to Warehouses A and B, to the eastern leg of the roundabout. Attempts at integrating this warehouse access into the roundabout were unsuccessful due to B-Double turning requirements and the constraints associated with moving the access bridge and Cosgrove Road access. The original dual lane roundabout was also considered inadequate as it did not cater for two circulating B-Double trucks. The roundabout concept also had the following disadvantages:

- Roundabout operation tends to equalise priority between approaches, so that favouring movements between the ILC access road and the overbridge/ Wentworth Street access may require intervention, such as signals or manual site supervision/ traffic control.
- The alignment for semi-trailers and B-Doubles exiting the ILC Site requires a difficult 270 degree turn through the roundabout to proceed toward the overbridge. The adverse cross fall, although minor, on the circulating roadway, will increase the difficulty of the turn for large trucks.

These factors may increase delays and contribute to increased use of the Cosgrove Road access by trucks.

Consequently, the roundabout was replaced with a combined Y and T intersection. The 'T' junction (Cosgrove Road access and IMT/Overbridge access) clearly defines the main through route between ILC Site and the overbridge. Traffic entering from Cosgrove Road is required to give way to these through movements. Under the proposed arrangement there may be a slight deterrent to through traffic using the internal road network, due to the deviation of the road alignment indicating that the Cosgrove Road to Wentworth Street alignment is not the priority route.

Other minor road improvements

Other improvements discussed above are minor and consistent with the approved internal road layout. These improvements provide better access to operational areas and existing leases, and will improve the internal circulation for heavy and non-heavy vehicles.

RailCorp/ARTC Access Track

The existing driveway access from Cosgrove Road, immediately north of the Tarpaulin Factory, to the access track will be maintained, and the existing access track across the ILC site will be gravelled. Sydney Ports will continue providing access for maintenance and operational/emergency purposes to the RailCorp's Marshalling Yards via this existing driveway and gravelled access (Figure 2).

The driveway and access for maintenance and operational/emergency purposes will be formalised via Development Deed which will identify the terms of ARTC and RailCorp's use of the access track.

It should be noted that historically the most desirable and convenient access point for rail stakeholders is the access point north of the Tarpaulin Shed, and is the one that Sydney Port's proposes as the primary means of access for rail stakeholders for maintenance and operational/emergency purposes.

The predicted cumulative traffic usage along the access track will be between 2 to 6 vehicle movements per day. Except for emergency purposes, the gross vehicle mass of vehicles accessing the track is predominantly less than 5 tonnes.

On this basis there are no significant change to traffic impact arising from the desire to make one of the existing gates the primary means of access for rail stakeholders.

3.4 Proposed Modification

Sydney Ports requests that Condition 1.1 of the Project Approval refer to the improved ILC Site layout, including the internal road layout, presented in this document and on Figure 2.

4 STORMWATER DETENTION AND STORMWATER QUALITY TREATMENT

4.1 Approved Development

Stormwater Detention

The approved development incorporated three detention basins as shown on Figure 1 (originally Drawing SEDP017F, contained in SKM Project Notes dated 14 July 2007 and 6 August 2007). The basins were designed to ensure that peak discharges from the Site did not increase as a result of the development for each recurrence interval assessed (2, 10 and 100 years ARI). The site catchment areas and basins volumes from the EA are summarised in Table 4.1. The catchments modelled in the EA (SKM, 2005) are shown in Figure 13 of Appendix D of the EA.

Table 4.1: Site Catchment Areas and Basin Volumes

Catchment	Area (ha)	Basin Volume (m^3)
A	2.6	N/A
B	16.9	8,000
C	7.1	700
D	29.1	16,600
Total	**55.7**	**25,300**

In addition, the approved development allowed for each individual precinct within the LIC area to develop and maintain appropriate detention systems in accordance with Strathfield Council's On-Site Detention Policy.

Water Quality Treatment

Water quality investigations carried out for the EA recommended that development capture and treat the first 10 mm of runoff (Appendix D of the EA). The Statement of Commitments in the PPR indicated that this runoff would be contained within a water quality detention basin located adjacent to the proposed peak flow detention basin at the southern end of the Site. The proposed stormwater treatment would include medium filtration and separation of sediments and oil and grease.

Spill Containment

The Statement of Commitments indicated that the on-site drainage system would be designed so that a chemical spill of up to 20,000 L could be contained within the first flush containment basin.

4.2 Proposed Development

Stormwater Detention

Some adjustments have been made to the detention basin catchment areas, locations and sizes (refer drawings MA-MD-CI-DR-170001 to 170003 in Appendix C) as part of the detailed design. The modified detention basin arrangement remains consistent with the approved development, comprising three above ground basin storages located downstream

of the internal catchment areas (B, C and D) with similar storage capacities to those provided in SKM's Project Note dated 14 July 2007. As for the approved development, the detention systems have been designed so that the post-development peak discharges do not exceed the pre-development peak discharges.

The changes to the stormwater detention system include:

- The volume of Basin B has increased from 8,000 m^3 to 8,582 m^3.
  Basin B has been relocated to a position approximately 100 m to the north of its approved location to avoid encroachment on the existing central stormwater culvert and to improve access to the basin for maintenance. This has resulted in an increase in the area of the Light Industrial Commercial (LIC) precinct Y and a reduction in LIC Precinct Z (further described in Sections 5 and 6).
- The volume of Basin C has increased from 700 m^3 to 1,400 m^3.
- The volume of Basin D has reduced from 16,600 m^3 to 14,760 m^3.

For basin details, refer to Drawings MA-MD-CI-DR-172001 to 172003 in Appendix C.

As for the approved development, individual precincts within the LIC area will develop and maintain appropriate on-site detention systems in accordance with Strathfield Council's On-Site Detention Policy.

Water Quality Treatment

The proposed stormwater quality treatment train is described below.

Primary treatment of stormwater will be provided through proprietary gross pollutant traps (GPT) and sediment traps to capture and remove gross pollutants, coarse and fine sediment, suspended solids, particulate bound phosphorus, and oil and grease.

The GPTs will be installed at the end of the pipe outlets prior to discharging into the detention basins. The GPTs have been designed to capture 11% of pollutants with a diameter greater than 0.15 mm to 91% of gross pollutants with a diameter greater than 19 mm. .

Coarse sediments (defined as particles greater than 125 microns in diameter) not retained in the GPT will enter the detention basin sediment trap and spill containment forebay area. The inlet forebay will be concrete lined and sized to retain coarse sediment and to contain accidental spills. The forebay will also provide energy dissipation to ensure a slow and distributed delivery of stormwater to the downstream bioretention area.

Secondary treatment of the stormwater will be provided using bioretention basins integrated within the stormwater detention basins. The stormwater will pass through a vegetated filter bed of sandy loam that traps fine sediment and dissolved nutrients and heavy metals. The bioretention basin will be driven by gravity and has been designed with a free draining zone and an anoxic (or anaerobic) zone to improve total nitrogen removal.

The filtration rate through the media is approximately 100 mm/hour, ensuring the captured runoff is drained from the basin within several hours. Treated runoff is collected through a network of underlying perforated pipes and discharged to the downstream stormwater system or any storage facilities for reuse. Each basin outlet pipe will be at least 1.1 m below the basin floor level to allow effective drainage of the bio-retention layers within the basin.

The bioretention basins have been designed to the following specifications:

- 300 mm extended detention depth (to be maintained below detention depth);
- 600 mm filter media depth;
- 400 mm submerged layer (anoxic/anaerobic zone depth).

The basin areas were sized to achieve the required water quality improvements using the Model for Urban Stormwater Improvement Conceptualisation (MUSIC).

Bioretention will enable the removal of fine particles, hydrocarbons, heavy metals and dissolved pollutants to a standard beyond that achieved by non-vegetated filter systems. Vegetation within the system will ensure that the conductivity of the filtration media is maintained so that frequent replacement of media is avoided. Removal of suspended solids will result in a reduction in heavy metal and hydrocarbon loads.

The bio-retention system achieves the Best Practice Stormwater Targets adopted by the Cooks River Sustainability Initiative, of which Strathfield Council is a member, for the South Strathfield catchment and the targets set by the NSW DECC (2008) in the draft *Managing Urban Stormwater Guidelines*. These targets are the reduction of the following pollutant levels:

- Gross Pollutants 90%
- Total suspended solids (TSS) 85%
- Total phosphorus (TP) 65%
- Total nitrogen (TN) 45%.

The overall treatment performance of the water quality system comprising bioretention basin areas, inlet forebay areas and GPTs, is summarised in Table 4.2.

Table 4.2: Water Quality System Performance

Catchment Basin	Bioretention Basin Area (m^2)	% Load Reduction		
		TSS	TP	TN
Target Reduction[1]		85	65	45
B	1,500	92	74	47
C	600	90	73	45
D	3,000	92	74	47

[1] Best Practice Stormwater Targets Cooks River Sustainability Initiative & NSW DECC (2008)

The system will also achieve a 90% reduction in gross pollutants and no visible oil or hydrocarbon contamination. It can be seen that the proposed water quality system achieves reduction in pollutant levels better than the current best practice targets.

Spill Containment

Although chemical spills are unlikely to occur on the ILC Site because of the nature of operations, the onsite drainage has been designed to contain at least 20,000 L spillages.

Spill containment facilities of that capacity will be located within the three stormwater detention basins, which are downstream of the intermodal terminal, container storage areas and warehouse sites, where there is potential for accidental spillages to occur.

4.3 Assessment

Stormwater Detention

On-site detention systems are required to offset increases in runoff and peak discharge from the Site resulting from the increase in impervious and hardstand areas associated with the development.

Hydrologic and hydraulic modelling of pre- and post-development conditions was undertaken by Maunsell as part of the detailed design to identify the required basin sizes. Consistent with the approved development, the detention systems were designed such that the post-development peak discharges do not exceed the pre-development peak discharges. The 2, 10 and 100 year ARI events were assessed.

The catchment areas modelled for the detailed design are shown in drawings attached in Appendix C. Pre- and post-development catchment areas are provided in Table 4.3.

Table 4.3: Pre- and Post-Development Catchment Areas

Catchment	Sub-Catchment	Catchment Area (ha)	
		Pre-Development	Post-Development
A	A1 (area W)	4.2	1.6
	A2 (Cosgrove Rd entrance)		1
	A3 (area X)		0.6
	A4 (area Y)	0.5	1
	A5 (area Z)	0.8	1.3
B	Area B	9.4	13.3
C	Area F	15.8	5.4
D	D1 (Intermodal area)	21.2	27.6
	D2 (Rail siding)		0.4
Community and Ecological Catchment		7.3	7.3
TOTAL		**59.2**	**59.5**

Note that the slight increase in the post-development is due to additional catchments from the main access road (0.1 ha) and the Cosgrove Road intersection catchment (0.1 ha)

As for the approved development, the developers/owners of the LIC areas within Catchment A for Areas W, X, Y and Z will be required to incorporate on-site detention within their stormwater drainage systems. Note that under Condition 1.11, final designs and layouts of each LIC area will be reported to the Director-General prior to the commencement of construction of each precinct.

A portion of Catchment A (sub-catchment A2 in Appendix C) includes the site entrance road from Cosgrove Road comprising approximately 1.04 ha. Stormwater runoff from this area drains to the Cosgrove Road drainage system. A comparison of pre- and post-development peak flows, obtained using the DRAINS model, from Catchment A2 are provided in Table 4.4.

Table 4.4: Catchment A2 - Cosgrove Road Entrance Area

		Pre-Development	Post-Development
Catchment Area	(ha)	1.7	1.03
Percentage impervious	(%)	20%	80%
2 year ARI Peak Discharge	(m^3/s)	0.24	0.22
10 year ARI Peak Discharge	(m^3/s)	0.39	0.38
100 year ARI Peak Discharge	(m^3/s)	0.73	0.67

It can be seen that post-development flows are less than the pre-development flows. Therefore no on-site detention is required for Catchment A2.

Peak discharges for catchments B, C and D were modelled using the DRAINs model. The modelled catchment boundaries are shown in drawings attached in Appendix C. The performance of the basins is summarised in Table 4.5.

Table 4.5: Performance of Detention Basins

Catchment	Area (ha)		Basin Vol (m^3)	Basin Discharges (m^3/s)					
				2 year ARI		10 y ARI		100 y ARI	
	Pre	Post		Pre	Post	Pre	Post	Pre	Post
B	9.4	13.3	**8,582**	0.7	0.52	1.5	0.60	2.3	0.70
C	15.8	5.4	1,400	0.9	0.6	1.5	0.8	2.3	1.8
D	21.2	27.6	14,760	1.3	1.1	2.3	1.3	3.9	3.3

As shown in Table 4.5, the proposed basins will result in post-development peak discharges lower than the pre-development peak discharges.

As noted above, Basin B has been moved to a position approximately 100 m to the north of its original location to avoid encroachment on the existing central stormwater culvert and to improve access to the basin for maintenance. Basin B is located north of Warehouse C and west of the existing Wheel Lathe lease area. The low level outlet of this basin will discharge into the existing open channel downstream of the Central Culvert outlet headwall.

As for the approved development, Basin C will be located to the south of area F. The low level outlet in this basin will discharge into the existing reinforced box outlet headwall prior to discharging to the stormwater system beneath Cosgrove Road to the east.

As for the approved development, Basin D will be located downstream of catchment D immediately to the north-west of Cox's Creek. Outflow from the basin will drain into Cox's Creek via the low level outlet pipe.

The proposed changes to the detention basins are consistent with the approved detention basin arrangement (ie above ground basin storages located downstream of the internal catchment areas and with similar storage capacities). Basin sizes and locations have been adjusted to take into account final catchment areas and site constraints. As shown in Table 4.5, the modified detention basins will result in post-development peak discharges that are less, in some cases significantly, than the pre-development peak discharges for the modelled events.

Water Quality

The main differences to the water quality system proposed in the concept design in the EA are:

- that a vegetated, rather than non-vegetated, treatment system has been adopted;
- that the detention basin and water quality treatment system are integrated, that is the capture and treatment of runoff within the vegetated biofiltration basin is proposed to be co-located within the stormwater detention basins.

The MUSIC model was run to compare the performance of the proposed design with the performance of the Concept Design for Basin D. The Concept Design was modelled by adopting a filtration system without a vegetated surface layer. The comparison of results is presented in Table 4.6.

Table 4.6: Comparison of Performance of Vegetated vs Non-Vegetated Water Quality System

Pollutant	Adopted Water Quality Targets	Percentage load reductions	
		Non-vegetated system (Concept Design)	Vegetated system (Detailed Design)
TSS	85%	58%	92%
TP	65%	43%	74%

TN	45%	5%	47%

The results in Table 4.6 indicate a better reduction in TSS, TP and TN for the bioretention basin than achieved by the Concept Design. Vegetated treatment systems are also considered effective in removing heavy metals and PAHs. A large proportion of heavy metals are particulate bound, and will be removed through sedimentation. Furthermore, a vegetated system also provides for chemical sorption of dissolved heavy metals, improving the overall performance of the system in removing heavy metals.

In conclusion, the proposed stormwater quality treatment will be better able to meet the State Government and Cooks River Sustainability Initiative water quality targets and perform better compared with the previously proposed system. In addition, the integration of the stormwater detention basin and the stormwater water quality system has the following advantages over the concept design:

- separate drainage infrastructure is not required to direct flows to stormwater detention and water quality treatment;
- separate Site areas do not need to be provided to achieve reductions in peak discharges and water quality management objectives; and
- aesthetic benefits can be gained from a planted treatment system compared to a grassed or concrete lined basin.

4.4 Proposed Modification

Sydney Ports requests that Conditions 1.1 and 2.31 of the Project Approval refer to the modified basin arrangement discussed in this document.

5 AREAS OF ILC SITE PRECINCTS

5.1 Approved Development

SKM's Project Note dated 14 July 2007 identified the approximate areas of operational precincts at the ILC Site including the Intermodal Terminal (IMT) Area, Empty Container Storage (ECS) Area B (North), ECS Area A (South) and warehouses. The Light Industrial Commercial (LIC) Areas were identified in SKM's Project Note dated 6 August 2007. These areas are provided in Table 5.1.

5.2 Proposed Development

Revised operational areas, resulting from adjustments made during detailed design, and approved operational areas are shown in Table 5.1.

Table 5.1: Operational Areas within the ILC Site

Operational Area	Approved Operational Areas (Project Notes SKM 14 July 2007 and SKM 6 August 2007)	Proposed Detailed Design Operational Areas
IMT	**12 ha (approx)**	**13 ha (approx) (including rail line and 2 sidings)**
ECS A (South)	4.7 ha (approx)	4.5 ha (approx)
ECS B (North)	3.8 ha (approx)	3.7 ha (approx)
ECS Total	**8.5 ha**	**8.2 ha**
Warehouse A	41,186 m^2 land area (building footprint 20,500 m^2)	41,174 m^2
Warehouse B	39,624 m^2 land area (building footprint 20,500 m^2)	38,990 m^2
Warehouse C	14,526 m^2 land area (building footprint 4,000 m^2)	13,232 m^2
Warehouse D	7,792 m^2 land area (building footprint 3,000 m^2)	8,418 m^2
Warehouse E	13,650 m^2 land area (building footprint 4,500 m^2)	14,534 m^2
Warehouse F	38,551 m^2 land area (building footprint 13,500 m^2)	39,434 m^2
Warehouse Total	**155,329 m^2 land area (building footprint 66,00 m^2)**	**155,782 m^2 (no change in building footprint proposed)**
LIC W (land area)	16,750 m^2	16,491 m^2
LIC X (land area)	5,250 m^2	4,114 m^2
LIC Y (land area)	4,800 m^2	7,791 m^2
LIC Z (land area)	13,200 m^2	12,678 m^2

LIC Total	**40,000 m^2**	**41,074 m^2**
Service Area (adj to Toll Lease)	**3,527 m^2**	**6,148 m^2**

The warehouse buildings will be designed later in the project by the developer in accordance with Conditions 1.6 and 1.8. Similarly buildings in the LIC area will be designed at a later stage by the developer in accordance in Conditions 1.9 and 1.11.

The detailed design site layout retains the existing site driveway access immediately north of the Tarpaulin Shed, as shown in Figure 2. This driveway will provide access to the Heritage Interpretation Area and the Frog Habitat Creation Area for maintenance purposes, and will provide access to the access track through the Site to the RailCorp Marshalling Yard for RailCorp and ARTC (refer to discussion in Section 3).

5.3 Assessment

The detailed design has resulted in some minor adjustments in the final layout of the ILC Site. The design changes resulted from the need to accommodate adjustment in the general layout (eg. avoid construction over the existing high pressure Qenos pipeline, consideration of existing site conditions, etc) and improve site operability (eg. improve access to stormwater detention basins).

The changes in the areas of the operational portions of the Site are not significant and do not change the impact assessment carried out for the EA (SKM, 2005) and in subsequent documents. Furthermore, it is considered that these changes are generally consistent with the Project Approval.

5.4 Proposed Modification

Sydney Ports requests that Conditions 1.1, 1.6, 1.9 and 1.11 of the Project Approval be reworded to refer to this document and attached drawings.

6 LAYOUT OF LIGHT INDUSTRIAL COMMERCIAL PRECINCTS

6.1 Approved Development

The approved layout of the LIC area is provided in SKM's Project Note dated 6 August 2007. The drawings attached to the Project Note identified the following buildings, incorporating office space, warehousing and loading docks, in each LIC Area:

LIC Area W

Three buildings were to be located in Area W (refer dwg no G01 in SKM's Project Note dated 6 August 2007). The two buildings located in the southern portion of Area W were positioned on the eastern and western side of the Qenos pipeline. The third building was located in the north of Area W over the Qenos pipeline.

LIC Area X

One building was to be located in Area X (refer dwg no G02 in SKM's Project Note dated 6 August 2007), north of the Cosgrove Road access to the ILC Site.

LIC Area Y

Two buildings were to be located in Area Y (refer dwg no G03 in SKM's Project Note dated 6 August 2007). The buildings were to be located to the east and west of the Qenos gas pipeline.

LIC Area Z

Two buildings were to be located in Area Z (refer dwg no G04 in SKM's Project Note dated 6 August 2007). The buildings were to be located to the east and west of the Qenos gas pipeline.

6.2 Proposed Development

The detailed design has resulted modifications to the layout and floor areas of the buildings within the LIC Areas. The revised layout is shown in the following drawings, which are contained in Appendix C:

- MA-MD-CI-SK-0101 - Area W
- MA-MD-CI-SK-0102 - Area X
- MA-MD-CI-SK-0103 - Area Y
- MA-MD-CI-SK-0104 - Area Z.

The concept design layout is also shown on these drawings.

Modification to the land area of the LIC is described in Table 5.1 above. The proposed floor space, building footprint and car spaces to be provided is summarised in Table 6.1 below.

Table 6.1: LIC Floor Space Areas and Building Footprints

LIC Area	Floor Space Area (m^2)		Bldg Footprint (m^2)	Car spaces Provided
	Concept Design	Detailed Design		

W	16,750	18,010	9,005	90
X	5,250	4,749	2,374	24
Y	4,800	6,996	3,498	33
Z	13,200	10,859	5,429	65
Total	**40,000**	**40,614**	**20,306**	**212**

Overall, there is only a minor increase in the gross floor space area to be provided as part of the detailed design. Variations have occurred in the distribution of the floor space areas between the LIC Areas to make allowance for the location of the Qenos gas line, Detention Basin B and improvements in sight lines. The proportion of the floor space area allocated to office space, warehousing and loading dock has not been altered. Specifically, the changes are as follows:

LIC Area W

The detailed design proposes four buildings in Area W. The location of the two buildings in the southern portion of Area W has not altered. The original building in the north of Area W has been split into two buildings, located on the eastern and western side of the Qenos gas pipeline, to avoid construction of the building over this pipeline.

LIC Area X

One building of similar layout is retained in Area X. The south-eastern corner of the building has been modified to improve site lines for site safety purposes.

LIC Area Y

The two buildings to the east and west of the Qenos pipeline are retained. The land area and buildings building footprint in LIC Area Y have increased, and the area of Area Z has decreased, to make allowance for the location of Detention Basin B, which has been moved north from the position proposed in the concept design.

LIC Area Z

The two buildings to the east and west of the Qenos pipeline are retained. The land area and buildings building footprint in LIC Area Z have decreased, and the area of Area Y has increased, to make allowance for the location of Detention Basin B.

6.3 Assessment

The new layout of the LIC areas is required to avoid construction above the high pressure gas pipeline, to allow for the location of Detention Basin B, to improve sight lines for traffic and to adjust the buildings to the changes in land area for each precinct (as discussed in Section 5 above).

The changes in the layout of the LIC areas do not change the impact assessment carried out for the EA documentation. The increase in Gross Floor Area of the ILC (from 40,000 to 40,614 m^2) is not considered significant. As required under Condition 1.11, final designs and layouts of the LIC area will be submitted to the Director-General prior to the commencement of construction of the LIC precincts.

6.4 Proposed Modification

Sydney Ports requests that Condition 1.9 reflects the new maximum gross floor areas identified in this document.

7 CONSTRUCTION CONDITIONS AND MODIFICATION APPLICATION

Sydney Ports has identified a number of construction related conditions that are requested to be updated or reworded as outlined below.

7.1 Condition 2.3

Current Status

Condition 2.3 states "*The Proponent shall design, construct and maintain all internal road works, including the associated **300 parking facilities** and loading bays….*".

Reason for Modification

The documentation submitted by Sydney Ports for the Part 3A Project Approval and referred to in Condition 1.1 b) (EA) and Condition 1.1 e) (SKM Project Note dated 6 August 2007) identified the following site parking requirements:

- **300 car park spaces** for the operational areas associated with the Intermodal Terminal, warehouses and empty container storage areas (refer Section 4.10.2 and Figure 4-2a of the EA) for the estimated workforce of the Intermodal Terminal and warehouse sites; and
- **204 car park spaces** for the LIC area (refer Table 1 of SKM's Project Note dated 6 August 2007).

Figure 4-2a of the EA shows the indicative location of the 300 IMT car park spaces and the drawings attached to SKM's Project Note dated 6 August 2007 show the location of car park spaces for the LIC.

The intent of Condition 2.3 is to reflect the requirement for 300 car parking spaces for the Intermodal Terminal, warehouses and empty container storage areas described in the EA, but **not** the LIC car parking.

Following completion of the LIC detailed design and prior to commencement of construction of this area, final designs and layouts, including car parking spaces, for the LIC will be submitted to the Director-General in accordance with Condition 1.11.

Proposed Modification

Sydney Ports requests that Condition 2.3 be reworded to clarify that the 300 parking facilities apply to the Intermodal Terminal, warehouses and empty container storage areas, but **not** the Light Industrial Commercial area.

7.2 Condition 2.25

Current Status

Condition 2.25 states "*The Proponent shall seal and maintain all internal haulage roads with bitumen, gravel or other material agreed to by the Director-General".*

Reason for Modification

Condition 2.25 is located under the heading "Dust Emissions". It is therefore assumed that the intention of the condition is to prevent dust emissions due to trucks using internal haulage roads during construction.

All roads within the ILC Site will be sealed during operation.

Figure 4.12 of the EA (SKM, 2005) shows the notional haul roads at the construction site.

Sealing haulage roads on construction sites is not a common practice as it is impractical and costly. The ILC Site will be subject to cut and fill activities and the layout of internal roads will constantly change during the construction phase of the project. In addition, these internal roads will be used by various types of machinery (excavators, bulldozers, etc) and equipment which would damage sealed roads and cause them to become muddy during wet weather. Gravel roads also require intensive maintenance as the gravel gets muddy and silty during wet weather and requires regular replacement.

Dust emissions from unsealed internal haul roads would only occur if road disturbance (eg. truck movement) occurs during dry weather and if the surface conditions of the road were dry. Furthermore, any dust emissions from internal haulage roads would only impact on adjacent landuses if there is adverse wind speed and direction conditions during the dry weather and the internal haulage are not managed to prevent such dust emissions (eg. no dust controls in place such as the use of water carts, speed limits on trucks, etc).

The two main access roads to the Site during construction are from Cosgrove Road: (i) via the DELEC area and (ii) via the access located west of Hope Street. Sealed sections of these access roads extend for more than 100 m within the Site and there is a 1.3 km long sealed central internal road. These roads will remain sealed for as long as practicable within the cut and fill program of the construction phase.

Sydney Ports will require all construction contractors working on the Site to apply and enforce a 25 km/h speed limit at the Site in accordance with Condition 2.26. Sydney Ports will also require all construction vehicles and equipment to pass through a wheel wash prior to leaving the Site in accordance with Condition 2.27.

Sydney Ports maintains two real-time dust monitors at the NW and SE boundaries of the Site, near the most affected residential receptors, to continuously monitor dust levels in accordance with Condition 3.2. Sydney Ports also maintains an on-site meteorological station that provides real time continuous weather information in accordance with Condition 3.1. Dust Management Plans are required to be prepared as part of all Site CEMPs, in accordance with Conditions 6.2 and 6.3.

Proposed Modification

Sydney Ports requests that Condition 2.25 be reworded to a less prescriptive requirement which focuses on the required outcome, that is to prevent dust emissions from the use of haulage roads. Proposed wording:

The Proponent shall manage, maintain and use all internal haulage roads in order to prevent dust emissions. The measures for the management of potential dust emissions from internal roads during construction shall be incorporated in the CEMP required under Condition 6.3 for construction works at the site.

7.3 Condition 2.30

Current Status

Condition 2.30 states "*All stockpiled construction materials shall be adequately stabilised and covered to prevent erosion or dispersal of the materials".*

Reason for Modification

Condition 2.30 is located under the heading "Water Quality and Hydrological Impacts" and therefore it is assumed that the intention of the condition is to prevent water quality impacts from stockpiles.

The wording of the condition does not make clear what is meant to be covered. Many construction materials are not dispersible (eg. bricks, ballast) and do not create water quality issues. On the other hand, excavated material may not be considered a construction material.

Covering stockpiles of dispersible construction materials (eg. fill, cement, etc) or excavated materials is impractical and is not a standard practice on construction sites. Stabilisation, location of stockpiles in designated areas away from waterways or drainage lines and installation of sediment and erosion controls are standard and appropriate measures to prevent water quality impacts from the erosion of stockpile material.

Construction at the ILC Site will involve relatively large earth movement activities. Covering stockpiles of excavated material or dispersible construction materials would be logistically unfeasible, costly and impractical.

Sydney Ports will require the construction contractor to employ soil and water management controls to minimise soil erosion and the discharge of sediment and other pollutants to lands and/or waters during construction in accordance with Condition 2.29. The CEMP required for the ILC construction phase under Conditions 6.2 and 6.3 will include water management controls developed in accordance with Conditions 2.28 and 2.29.

Proposed Modification

Sydney Ports requests that Condition 2.30 be reworded to a less prescriptive requirement which focuses on the required outcome, that is to prevent water quality impacts from stockpiles. Proposed wording:

All stockpiled construction materials shall be adequately located, stabilised and maintained to prevent erosion or dispersal of the materials.

7.4 Condition 2.40

Current Status

Condition 2.40 states that "*The Proponent shall ensure that all liquid and/ or non-liquid waste generated and/ or stored on the site is assessed and classified in accordance with the EPA's*

Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-Liquid Wastes (Waste Guidelines) in force as at 1 July 1999.

Reason for Modification

In April 2008 DECC replaced the *Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-liquid Wastes* with the *Waste Classification Guidelines* (DECC, April 2008).

Proposed Modification

Sydney Ports requests that Condition 2.40 be reworded to reflect new guideline updates.

7.5 Condition 2.42

Current Status

Condition 2.42 states "*The Proponent shall ensure that contaminated areas of the site are remediated prior to the commencement of site preparation and construction works associated with the project that may directly disturb those areas. All remediation works shall be undertaken in accordance with the requirements of the Contaminated Land Management Act 1997 and Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites (EPA, 1997).*"

Reason for Modification

Condition 2.43 was modified by the delegate for the Minister for Planning on 30 March 2009 under Section 75W of the EP&A Act. The modification allowed the commencement of construction activities with either a Section A or Section B Site Audit Statement (SAS) verifying that the area *has been* (Section A SAS) or *can be* (Section B SAS) remediated to a standard consistent with the intended land use. The modified condition required the final SAS (Section A) to be submitted to the Director-General prior to operation of the remediated site(s). The modified condition provides flexibility in the remediation/ project program process, consistent with Guidelines prepared under the CLM Act.

The modified condition 2.43 specifically states "*Prior to the commencement of site preparation and construction works associated with the project that may directly disturb known contaminated areas of the site, the Proponent shall submit to the Director-General a Site Audit Statement(s), prepared by an accredited Site Auditor under the Contaminated Land Management Act 1997, verifying that the area of the site on which construction is commencing has been or can be remediated to a standard consistent with the intended land use. A final Site Audit Statement(s), prepared by an accredited Site Auditor, certifying that the contaminated areas have been remediated to a standard consistent with the intended land use is to be submitted to the Director-General prior to operation of the remediated site(s).*"

In accordance with Condition 2.43, a SAS dated 2 July 2009 was submitted to the Director-General on the 14 July 2009 verifying that the site can be remediated to a standard consistent with the intended land use. The SAS was based on the implementation of the Site Remedial Action Plan (RAP) (dated 23 June 2009) prepared by Sydney Ports' Environmental Consultant, Coffey Environments, and endorsed by the Site Auditor in the

SAS. The endorsed remediation strategy includes a combination of approaches, depending on the nature and extent of contamination. These remediation approaches include excavation and disposal of material, landfarming and containment of contaminated materials, with the final cap in some areas being the approximately 0.5 m thick paving, such as bitumen or concrete or a mix of both, over the clean-fill capped areas.

Based on the above, the current Condition 2.42 is inconsistent with Condition 2.43. Under Condition 2.42 remediation must be completed prior to commencement of construction, while under Condition 2.43 commencement of construction is allowed subject to a SAS verifying that the area can be remediated to a standard consistent with the intended land use. Under the RAP, construction of parts of the ILC final surface may be considered part of the remediation strategy and therefore remediation would not technically be completed until part of the cap, including pavement, has been constructed over some areas.

Proposed Modification

Sydney Ports requests that Condition 2.42 be modified to make it consistent with Condition 2.43 and to allow the undertaking of some construction activities that are part of the remediation strategy (ie. pavement capping over some contaminated areas). Proposed wording:

The Proponent shall ensure that contaminated area(s) of the site are remediated prior to the commencement of site operations at these area(s). All remediation works shall be undertaken in accordance with the requirements of the Contaminated Land Management Act 1997 and Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites (EPA, 1997).

7.6 Land Applicable to Conditions 2.42 and 2.43

Current Status

As discussed above, Conditions 2.42 and 2.43 require the remediation of contaminated areas of the Site and the preparation of Site Audit Statement (s) (SAS) by an accredited auditor under the CLM Act for those areas subject to remediation.

The approval defines the "site" as the Land to which the project application applies, identified in Schedule 1 of the Project Approval. Schedule 1 includes land where relatively minor construction works outside the ILC Site will be carried out, including land owned by RailCorp, for:

- road bridge foundations (Lot 3 DP1006861 and Lot 15 DP1007302);
- northern noise wall (as currently approved) and northern rail connection (Lot 15 DP1007302);
- southern rail connection (Lot 1 DP950438 and Lot 15 DP1007302).

Schedule 1 also identifies a small area of land owned by Strathfield Council, where freight rail connection works will be carried out (DP242426).

Under current Conditions 2.42 and 2.43, remediation and preparation of SASs are required for remediation works at the Site. Under the Project Approval these requirements may apply to the land not owned by Sydney Ports, as listed above. Works outside the land not owned by Sydney Ports are generally minor. Excavation works for the road and rail connections will be negligible.

Although there is no known contamination in the land not owned by Sydney Ports, it is possible that excavated material may be contaminated. Contamination studies at the ILC Site undertaken as part of the EA (SKM 2005) detected no contamination above industrial/commercial criteria, except for some hot spots largely at former operational areas. The off-site areas where project works are proposed are adjacent to the ILC Site and therefore it is likely that soil quality would be similar to that found in previous investigations at the ILC Site.

Reason for Modification

The intent of the Part 3A Project Approval and assessment documentation was to address contamination and remediation requirements at the ILC Site, where the majority of the works are to occur. Any material from minor excavation works occurring outside the ILC Site were not intended to be subject to statutory SASs and remediation programs, but managed in accordance with current waste management guidelines.

In addition, there are no real benefits in having SASs for small and isolated areas associated with minor excavation works within larger lots and operational areas.

Waste generated by minor excavation activities for bridges, road or rail works are generally managed in accordance with the current Waste Classification Guidelines (ie. sampling, waste classification and management of the waste in accordance with the classification). A similar approach is proposed for the minor project works outside of the ILC Site.

Proposed Modification

Sydney Ports requests that the Project Approval be modified to exclude the application of Conditions 2.42 and 2.43 to minor works areas outside Sydney Ports' ILC Site. Sydney Ports proposes to manage excavated material for works off-site in accordance with the waste classification guidelines. This will involve the sampling of excavated material, classification and off-site disposal in accordance with DECC requirements. Off-site disposal from these areas may involve reuse of soils at the ILC Site, in accordance with the RAP and any DECC requirements.

7.7 Condition 6.2

Current Status

Condition 6.2 i) refers to "*the issue-specific management plans listed under condition 6.5 of this approval.*"

Reason for Modification

This is a typographical error. This item should cross-reference to the issue specific management plans listed under Condition 6.3.

Proposed Modification

Sydney Ports requests that Condition 6.2 i) be reworded as follows: "*the issue-specific management plans listed under condition 6.3 of this approval."*

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Appendix A

DETAILED DESIGN ACOUSTIC ASSESSMENT

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AECOM

Enfield Intermodal Logistics Centre
Detailed Design Acoustic Assessment

Sydney Ports Corporation

30 September 2009
Document No.: 60051533 MV001.REP.06

Detailed Design Acoustic Assessment

Prepared for

Sydney Ports Corporation

Prepared by

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Quality Information

Document Detailed Design Acoustic Assessment

Ref 60051533

Date 30 September 2009

Prepared by Matthew Verth

Reviewed by Patrick Martinez and Darren Jurevicius

Revision History

Revision	Revision Date	Details	Authorised	
			Name/Position	Signature
00	10/06/2009	For Review	Darren Jurevicius Principal Acoustic Engineer	
01	16/06/2009	Final	Darren Jurevicius Principal Acoustic Engineer	
02	18/06/2009	Client Edits	Darren Jurevicius Principal Acoustic Engineer	
03	21/07/2009	DoP submission	Darren Jurevicius Principal Acoustic Engineer	
04	10/08/2009	Client Edits	Darren Jurevicius Principal Acoustic Engineer	
05	24/08/2009	Cosgrove Barrier and Client Edits	Darren Jurevicius Principal Acoustic Engineer	
06	30/09/2009	Remove 'Commercial in Confidence'	Darren Jurevicius Principal Acoustic Engineer	

Table of Contents

1.0 Introduction

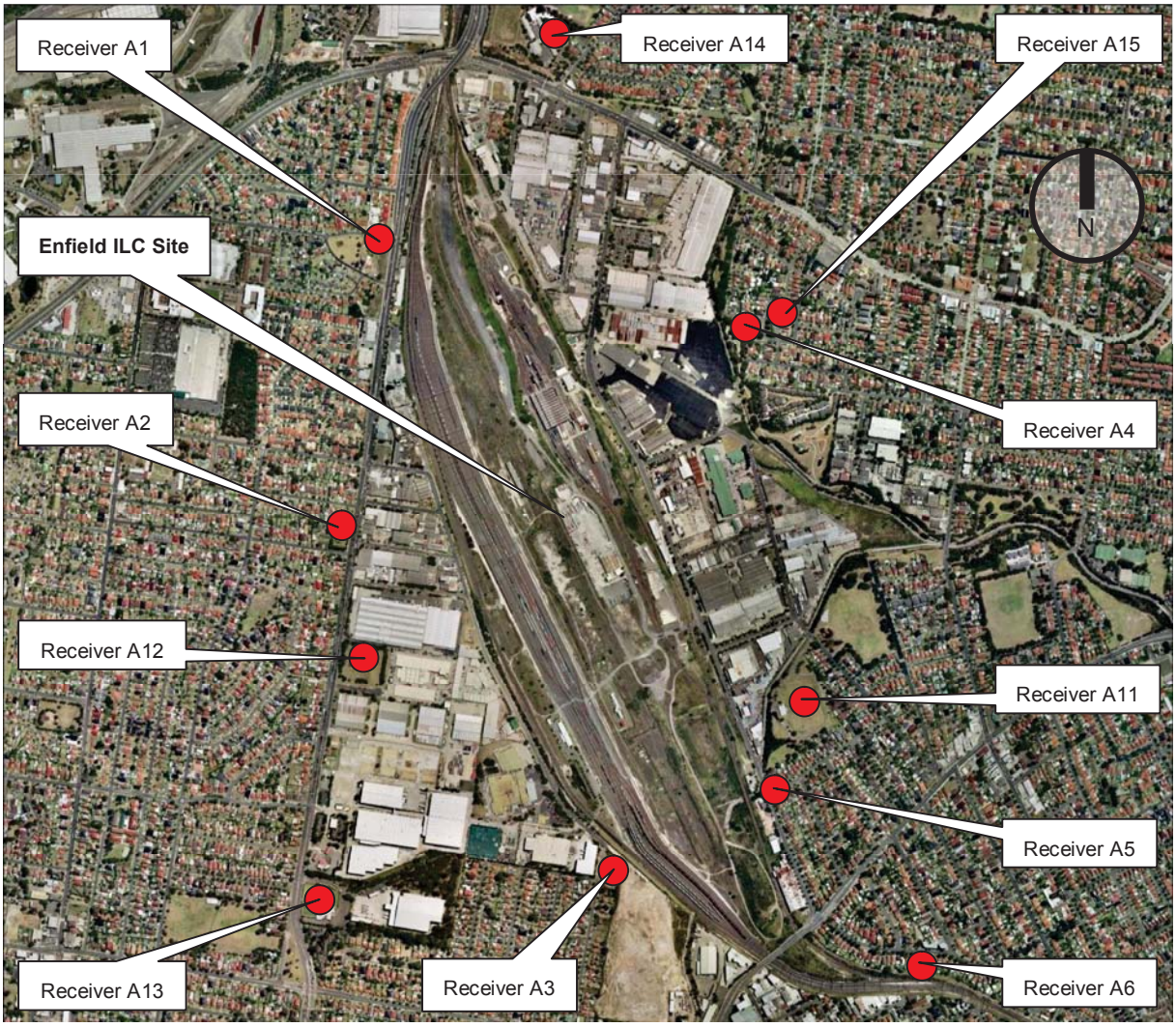
AECOM (formerly Bassett Acoustics) has been engaged by Sydney Ports Corporation (SPC) to undertake a detailed-design stage acoustic study of the approved Enfield Intermodal Logistics Centre (Enfield ILC) at Enfield, NSW.

The purpose of the study is to:

- Develop noise control designs proffered at the Environmental Assessment (EA) Stage (by others) or investigate acoustically-equivalent alternatives to allow noise emission from likely operations at the site to satisfy the noise emission criteria established at the EA stage;
- Assess the acoustic impact of design development undertaken by AECOM since the time of the EA assessment and amend the design of noise controls accordingly; and
- Document the engineering measures required in the detailed design and construction of the Enfield ILC to allow the established noise criteria to be met.

For reference, an aerial photograph of the site (with assessment locations relevant to this study identified) is presented in Figure 1-1:

Figure 1-1 – Aerial photograph of Enfield ILC site



Note: The receiver locations presented in Figure 1-1 are those used in the Environmental Stage reports prepared by others and also in the Project Approval Conditions.

2.0 Project Noise Criteria

Site specific noise criteria for the Enfield ILC project were derived by others based on unattended noise measurements undertaken during the EA stage. These noise criteria have been Conditioned in the Project Approval for the Enfield ILC ('Operation Noise' Conditions 2.17, Condition 2.18 and Condition 2.19) dated 5 September 2007.

The Conditions relevant to this acoustic study are presented in the following sections, including the numerical industrial noise emission criteria which are represented in Table 2-1.

2.1 Specific environmental conditions

Operation Noise
2.17:

The proponent shall design, construct, operate and maintain the project to ensure that the operational noise contributions from the project do not exceed the maximum allowable noise levels specified…below, at those locations and during those periods indicated. The maximum allowable noise contributions apply under:

a) wind speeds up to 3 ms-1
b) temperature inversion conditions up to 3°C per 100 metres and wind speeds up to 2 ms^{-1} (measured at 10 metres above ground level)

Table 2-1 – Condition 2.17 – Maximum allowable noise contribution (dBA)

Location[1]	Day		Evening		Night		
	L_{Aeq} (15 min)[2]	L_{Aeq} (period)[3]	L_{Aeq} (15 min)	L_{Aeq} (period)	L_{Aeq} (15 min)	L_{Aeq} (period)	L_{A1}[4] (1-minute)
A1 Eastern end of Jean Street	54	54	54	49	48	42	58
A2 Eastern end of Ivy Street	53	52	52	51	47	45	57
A3 Wentworth Street (South)	49	52	47	53	42	38	52
A4 Western[5] end of Gregory Street	49	52	47	46	45	37	55
A5 Western end of Blanche Street	46	58	46	50	43	43	53
A6 40 Bazentin Street	46	58	45	54	41	39	51
A11 Begnell Park	-	50	-	50	-	50	-
A12 Matthews Park	-	50	-	50	-	50	-
A13 Greenacre Bowling Club	-	55	-	55	-	55	-
A14 Strathfield High School (Internal)	-	35	-		-	-	-
A15 St. Anne's Schools (internal)	-	35	-		-	-	-

Note 1 The alpha-numeric references are those used in the EA stage reports prepared by others and also in the Project Approval Conditions.

Note 2 The 15 minute criterion for each period refers the 'Intrusiveness' criterion, derived according to procedures set out in the Industrial Noise Policy.

Note 3 The 'period' criterion for each period refers to the 'Amenity' criterion derived according to procedures set out in the Industrial Noise Policy.

Note 4: The L_{A1} noise descriptor is an approximation of the maximum noise level and is used to assess the potential for sleep disturbance by reviewing its emergence above the prevailing background noise level. The EA stage report expands on the criteria derived for each residential receiver by noting that *'Where the emergence level is less than 65 dB(A), a* (sleep disturbance criterion) *value of 65 dB(A)* (applies) *outdoors'.* Refer to Section 4.1.2.

Note 5: The receivers at the *western* end of Gregory Street are potentially the most noise-affected of the receivers in Gregory Street (although by a very small margin, less than 1 dB(A)). The EA stage report called up the *eastern* end of Gregory Street.

2.18:

For the purpose of assessment of noise contributions specified under Condition 2.17 of this consent, noise from the development shall be:

a) *measured at the most affected point on or within the site boundary at the most sensitive locations to determine compliance with $L_{Aeq(15\ minute)}$ and $L_{Aeq(period)}$ noise limits;*
b) *measured in the free-field at least 3.5 metres from any vertical reflecting surface in line with the worst affected dwelling facade to determine compliance with the $L_{A1(1\ minute)}$ noise limits; and*
c) *subject to the modification factors provided in Section 4 of the New South Wales Industrial Noise Policy (EPA 2000), where applicable.*

Notwithstanding, should direct measurement of noise from the development be impractical, the Proponent may employ an alternative noise assessment method deemed acceptable by the DECC (refer to Section 11 of the New South Wales Industrial Noise Policy (EPA 2000)). Details shall be submitted to the Director-General prior to the implementation of the assessment method.

2.19:

To avoid any doubt, the proponent shall ensure that locomotives located on the site and associated with the operation of the project do not cause an exceedance of the noise limits specified under condition 2.17 of this approval. This shall include, where necessary, measures to mitigate and manage noise associated with locomotive idling and any shunting operation occurring on the site.

2.2 Environmental monitoring and auditing conditions

Noise Auditing

Condition 3.3:

Within 90 days of the project reaching annual throughput of 50,000 TEU, 150,000 TEU and 250,000 TEU, or as may be directed or agreed by the Director-General, and during a period in which the project is operating under normal operating conditions, the Proponent shall undertake a program to confirm the noise emission performance of the project. The program shall include, but not necessarily be limited to:

a) *Noise monitoring, consistent with the guidelines provided in the New South Wales Industrial Noise Policy (EPA, 2000), to assess compliance with condition 2.17 of this consent;*
b) *Methodologies, locations and frequencies for noise monitoring;*
c) *Identification of monitoring sites at which pre- and post-project development noise levels can be ascertained;*
d) *Details of any complaints received in relation to noise generated by the project;*
e) *An assessment of night-time use of audible alarm systems;*
f) *Details of any noise mitigation measures and timetables for implementation;*
g) *A statement of whether the site is in compliance with the noise limits outlined in condition 2.17; and*
h) *Recommendations and timetables for implementation for any reasonable and feasible additional measures necessary to ensure compliance with the relevant noise-related conditions of this approval.*

Condition 3.4:

Within 28 days of conducting the noise monitoring referred to under condition 3.3 of this approval, the Proponent shall provide the Director-General with a copy of the report. If the noise monitoring report identifies any non-compliance with the noise limits specified under this approval, the Proponent shall detail what additional measures would be implemented to ensure compliance, clearly indicating who would implement these measures, when these measures would be implemented, and how the effectiveness of these measures would be measured and reported to the Director-General.

Condition 3.5:

Following consideration of the outcomes of the noise audits referred to under conditions 3.3 and 3.4 of this approval, the Director-General may require the Proponent to implement additional noise mitigation, monitoring or management measures to address noise associated with the project. The Director-General may require any or all of the measures proposed by the Proponent in the noise audit report, or other measures considered appropriate by the Director-General (including on-site and off-site acoustic treatments, noise bunding, noise walls or noise attenuation works for plant and equipment) to be implemented.

The Proponent shall implement the measures required by the Director-General within such period as the Director-General may specify.

3.0 Methodology

The basis for the detailed design stage acoustic assessment is the EA stage acoustic work conducted by others. In this respect, and where appropriate, design inputs have been kept consistent with those at the EA stage, including:

- Receiver locations;
- Sound power levels of plant and equipment;
- Heavy vehicle movements within the site;
- Location of equipment on site; and
- Full operation of the development.

Deviations from the inputs used at the EA stage have been implemented where:

- It has been Conditioned to do so; (e.g.: moving trains as well as idling trains – refer Condition 2.19);
- More realistic operating scenarios have been determined based on information learned during the design development phase; and
- SPC has advised AECOM of a greater probability of use of a certain item of container facility plant over another type; e.g.: reach stackers in lieu of gantry cranes.

The principal change in modelling input is the ground topography, which, through civil design work during the design development stage, has advanced with respect to that used as the basis of computer noise modelling at the EA stage. Additionally, it is understood that many intervening buildings between the site and receiver locations were not present in the EA stage model – these have been included in the current model.

3.1 Modelling

Computer noise modelling of the proposed development and likely operating scenarios have been undertaken using *Braunstein + Berndt GmbH 'SoundPLAN' v 6.5* software, using an implementation of the CONCAWE industrial noise modelling algorithm.

3.1.1 Topography

Topographical information has been provided by AECOM (formerly Maunsell | AECOM) as follows:

- Civil design within the site boundaries (contours provided at 0.2 m intervals); and
- Topographical information beyond the boundaries of the site (contours provided at 2.0 m intervals).

The surface of the Enfield ILC northern Empty Container Storage (ECS) area, main unloading/loading area and southern ECS area have been modelled using the 'ground absorption' function in SoundPLAN. In this way the surface of the ILC has been modelled to replicate an acoustically 'hard' surface (i.e.: reflective), with an absorption coefficient of 0.1. This is on the basis that the ground surface in the majority of the ILC will be concrete.

3.1.2 Purpose-designed noise barriers

As a starting point, purpose-designed noise barriers have been located where recommended in the EA stage acoustic reports. Where modelling results from this current study indicate under or over-design of these barriers, these barriers have been refined to accommodate the noise emission from the most up-to-date understanding of scenarios, equipment types, locations and duration of operation, etc.

3.1.3 Buildings

Buildings and other incidental (non purpose-designed) noise barriers have been incorporated into the model as follows:

- Existing buildings within the boundaries of the site that will remain after the site has been developed, for example the building located within the *Toll* lease; (obtained from digital survey information and/or digitisation of aerial photography);
- Existing buildings beyond the site boundaries including industrial, commercial and residential buildings (obtained from digital survey information and/or digitisation of aerial photography);
- Proposed buildings within the Enfield ILC site boundaries including warehouses and administrative buildings. The plan locations of these buildings has been provided electronically by the detailed design team at AECOM (based on preliminary EA stage designs), whilst heights have been conservatively estimated or set at the heights permitted by the Project Approval Conditions (e.g.: Warehouses A and B are 12 m high – refer to Condition 1.6, 'Warehousing and Distribution').

3.1.4 Receivers

Receivers have been placed in the computer noise model at the same locations detailed in the EA stage assessment. AECOM is not in possession of the previous noise model and as such, in some cases (where the EA stage description is inexact, e.g.: 'western end of', 'eastern end of'), the receiver has been placed at the most affected (often closest) location consistent with the location described.

Specifically, these locations are:

- 'Eastern end of Jean Street' - located at the Roberts Road facade of **3 Lawford Street**, Greenacre;
- 'Eastern end of Ivy Street' - located at the Roberts Road facade of **90 Roberts Road**, Greenacre;
- 'Wentworth Street (South)' – located at the northern facade of **2 Wentworth Street**, Greenacre;
- 'Western end of Gregory Street' – located at the western facade of **30 Therry Street**, Strathfield; and
- 'Western end of Blanche Street' – located at the western facade of **53 Blanche Street**, Belfield.

3.1.5 Meteorological conditions

AECOM has undertaken modelling of industrial noise emission from the site under the following adverse meteorological conditions:

- Wind at 1.5, 2.0 and 2.5 m/s from the west;
- Wind at 1.5, 2.0 and 2.5 m/s from the north west;
- Wind at 1.5, 2.0 and 2.5 m/s from the south west; and
- Wind at 1.5, 2.0 and 2.5 m/s from the south-east.

Note that:

- The wind speed is taken to be measured at 10 m above the ground.
- The wind speed of 1.5 m/s was found (during the Preferred Project Report (PPR)) to be '*the highest mean and median wind speed from all four seasons analysed from data obtained from the Lidcombe hourly wind data*[1]*'.*
- The Noise Technical Memorandum presented as part of the PPR stated, *'the noise model was corrected to have a wind speed of 1.5 m/s at night and 2 m/s in the day and evening (being the highest mean and median wind speeds per period from all four seasons analysed from data obtained from the Lidcombe hourly wind data); representing the wind speeds over most of a typical day, evening and night 'amenity assessment period, and 2.5 m/s wind speed assumed for most of the time during the day/evening/night 'intrusive' periods.'*[2] Therefore not all wind speeds apply to all assessment periods.

[1] Refer to page **3** of the Renzo Tonin report dated 5 April 2006 presented as *Appendix F 'Noise Technical Memorandum'* from the EA stage Enfield ILC Preferred Project report by SKM.

[2] Refer to page **4** of the Renzo Tonin report dated 5 April 2006 presented as *Appendix F 'Noise Technical Memorandum'* from the EA stage Enfield ILC Preferred Project report by SKM.

- The wind directions above are the four directions considered in the PPR (expanded from the original two directions considered in the original EA stage acoustic report).

3.2 Noise sources

3.2.1 Industrial noise sources

During the detailed design stage acoustic assessment, it has been determined that the most likely type of container moving equipment that will be used at the site is a reach stacker. Octave band sound power levels for this equipment are as per the EA stage assessment, presented in Table 3-1:

Table 3-1 – Sound power level – reach stacker

Source	Sound Power Level (SWL, dB) at Octave Band Centre Frequency, Hz									Overall SWL dB(A)
	32	63	125	250	500	1000	2000	4000	8000	
Reach Stacker	110	111	107	103	105	101	97	96	87	106

Additionally, the following sundry industrial noise sources were incorporated into the model:

- Metal clangs;
- Commercial power washer; and
- PA system (one location).

Octave band sound power levels for this equipment are as per the EA stage assessment, presented in Table 3-2:

Table 3-2 – Sound power level – Sundry industrial sources

Source	Sound Power Level (SWL, dB) at Octave Band Centre Frequency, Hz									Overall SWL dB(A)
	32	63	125	250	500	1000	2000	4000	8000	
Metal Clang[1]	88	91	91	82	82	80	73	67	60	84
Commercial Power Washer	86	86	87	87	88	87	87	86	85	94
PA System	85 dB(A) at 1 metre									93

Note 1: The power of the metal clang is assumed to be normalised to 15 minutes.

3.2.2 Metal clang L_{A1} sound power levels

At the EA stage, the potential for high-level short-duration noise events to cause sleep disturbance was assessed. It was determined that the predominant source of such events was the 'clangs' which can occur when containers are picked up and put down by lifting equipment (reach stackers). The L_{A1} sound power of such an event, (consistent with that in the EA stage report) is shown in Table 3-3:

Table 3-3 – L_{A1} Sound power level – Metal clang

Source	L_{A1} Sound Power Level (SWL, dB) at Octave Band Centre Frequency, Hz									Overall SWL dB(A)
	32	63	125	250	500	1000	2000	4000	8000	
Metal Clang L_{A1}	120	123	123	114	114	112	105	99	92	116

3.2.3 Heavy vehicle noise sources

During the detailed design stage acoustic assessment, the following heavy vehicle noise sources have been incorporated into the model (within the Enfield ILC site):

- Idling trucks – large trucks idling; and
- Moving trucks – large trucks transporting 1-2 containers at low speed (up to 20 kph).

Idling trucks have been modelled as a point source with the following octave band and overall sound power level (based upon corrected EA stage power levels, see table note) as presented in Table 3-4:

Table 3-4 – Sound power level – Idling truck

Source	Sound Power Level (SWL, dB) at Octave Band Centre Frequency, Hz									Overall SWL dB(A)
	32	63	125	250	500	1000	2000	4000	8000	
Idling Truck	96[1]	94	98	92	91	92	91	86	82	97

Note: 1 The octave band values for an idling truck presented in the EA stage report, although reported as Linear values, appear to be A-weighted. Further, the 32 Hz sound power appears to have been duplicated from the 63 Hz value and as such, when made Linear, is very high (at 107 dB, or 11 dB greater than the equivalent value for a moving truck). AECOM has substituted the 32 Hz value with the octave band sound power of a moving truck (96 dB).

Moving trucks have been modelled as line sources, with the sound power expressed as power per metre. This has been derived from the sound power of a moving truck and adjusted to account for:

- The number of trucks traversing the line source path in the assessment period;
- The proportion of the assessment period that the trucks are moving; and
- The length of the line source.

The adjustment has been applied using the following equation:

$$SWL_{metre} = SWL_{truck} + (10 \log_{10} (t_{event}/t_{assessment}) + (10 \log_{10} n_{sources}) - (10 \log_{10} l_{line}))$$

Where:

SWL = Sound Power in dB (or dB(A))
t_{event} = duration of the event in seconds (s)
$t_{assessment}$ = duration of the assessment period in seconds (s)
$n_{sources}$ = number of sources
l_{line} = length of the line source in metres (m)

The purpose of the adjustment is to capture all the noise energy from all the noise events during the assessment period (including any breaks in activity if appropriate) and spread the energy equally over the length of the line source/truck route. Note that the base sound power level used for a moving truck is consistent with that used for the EA stage assessment and is presented in Table 3-5:

Table 3-5 – Sound power level – Moving truck (base power)

Source	Sound Power Level (SWL, dB) at Octave Band Centre Frequency, Hz									Overall SWL dB(A)
	32	63	125	250	500	1000	2000	4000	8000	
Moving Truck (base power)	96	96	101	104	99	97	94	88	82	102

3.2.4 Rail noise sources

During the detailed design stage acoustic assessment, the following rail traffic noise sources were incorporated into the model (within the site):

- Moving train (two locomotives), with the power based upon attended noise measurements previously undertaken (according to Australian Standard AS 2377:2002 – *Acoustics – Methods for the measurement or rail bound vehicle noise*) by AECOM of a heavily laden (gross weight 1040 tonnes) Class 81 locomotive accelerating on Notch 5; and
- Idling trains (two locomotives); the power level used is consistent with that used for the EA stage assessment.

The sound power levels for these sources are presented in Table 3-6:

Table 3-6 – Sound power levels - Rail sources

Source	Sound Power Level (SWL, dB) at Octave Band Centre Frequency, Hz									Overall SWL dB(A)
	32	63	125	250	500	1000	2000	4000	8000	
Moving Train	142	126	113	99	91	86	83	80	80	105
Idling Train	103	107	104	101[1]	98[1]	93[1]	89[1]	88[1]	90[1]	100[1]

Note 1: These octave band and overall values for the idling train taken from the EA stage assessment appear to be high in relation to the moving train power level, and also in relation to AECOM's measurements of other low speed rail manoeuvres. However, the values have been kept consistent with the EA stage power levels to permit a conservative (and consistent) assessment.

The sound power level tabled above for the moving train is the base power of one locomotive. The moving train has been modelled as a line source with two locos pulling away to the south, taking 425 seconds of a 900 second (15 minute) period to travel 1.769 kilometres within the site (i.e.: travelling at 15 kph). The power per metre of the line source has been calculated using the same formula as for the heavy vehicle line sources (refer to Section 3.2.3).

3.2.5 Source quantities – heavy vehicles and equipment on site

Heavy vehicle numbers have been based upon traffic profiles for the site established at the EA stage (refer EA report Chapter 7, page 7-11 and 7-12, SKM, October 2005).

Most other industrial noise sources modelled on site are proportional in quantity to the number of truck movements during the relevant assessment period. An exception is the quantity of rail movements for the intrusive scenarios. The daytime and night-time intrusive scenarios are modelled with one idling train (two locomotives) and one moving train (two moving locomotives) in each. This is on the basis that there could be a pair of idling locomotives and a pair of moving trains on site during a busy 15 minute daytime period and also during a busy night-time 15 minute period.

This proportional increase or decrease in the quantity of sources can then be used to add or subtract noise energy in any given assessment period.

3.2.5.1 Daytime intrusive scenario

Table 7-4 of the EA report shows that there are 103 heavy vehicle movements during the daytime 'peak 1 hour' (between 2:00 pm and 3:00 pm in the afternoon). This equates to 13 truck movements (rounded up to the nearest integer) *into* and 13 truck movements *out of* the Enfield ILC in any one 15 minute period in a 'peak' period and can be used to assess noise emission against the 'intrusive' daytime noise emission criteria. These movements are again distributed over the site in the same proportions as above:

- 60% (7.7) use the 2987 m truck route forming a complete loop from the site bridge to the ILC loading area and back across the bridge;
- 30% (3.9) use the 2548 m truck route forming a complete loop from the site bridge to Warehouses A and B and back across the bridge; and
- 10% (1.3) use the 2754 m truck route forming a complete loop from the site bridge to the ILC loading area and back to the bridge.

A summary of all the industrial noise sources, (rounded to the nearest 0.1) modelled on site during any one 15 minute period in this intrusive assessment period are as follows:

Table 3-7 - Daytime 15minute intrusive scenario – Industrial source quantity summary

Source	Quantity, 15 minutes
Idling trucks (distributed over the site)	13
Moving trucks (distributed over three routes)	12.9
Reach stackers, northern ECS area	1
Elevated 'bangs', northern ECS area	6
Reach stackers, main loading area	2
'Bangs' at 4.1 m unloading train	6
Elevated 'bangs', main loading area	6
Reach stackers, southern ECS area	1
Elevated 'bangs', southern ECS area	6
Idling train (two Class 81 Locomotives 600 m apart)	1
Moving train (two Class 81 Locomotives 600 m apart)	1

The daytime *intrusive* scenario has been used as the 'baseline' calculation. In this way it has been possible to run one 'physical' computer noise model and scale all the other less-energetical scenarios compared to the daytime intrusive scenario.

The purpose of identifying and reporting the equivalent number of sources/movements/events in any one 15 minute period is to reduce the number of sources that need to be modelled (thus allowing more efficient and timely modelling) but it is important to note that modelling the reduced number of sources in a 15 minute period provides exactly the same numerical outcome as modelling the actual (larger) number of events in a (longer) amenity assessment period.

3.2.5.2 Daytime amenity scenario

Based upon the traffic numbers presented in Table 7-4 of the EA report, it has been determined that:

- 1089 truck movements occur in the 15 hour period between 7:00 am and 10:00 pm (encompassing the Daytime and Evening INP periods); and
- This equates to 9.1 movements *into* and 9.1 movements *out of* the site in any one 15 minute period between 7:00 am and 10:00 pm.
- Of these movements:
  - 60% (5.4) use the 2987 m truck route forming a complete loop from the site bridge to the ILC loading area and back across the bridge;
  - 30% (2.7) use the 2548 m truck route forming a complete loop from the site bridge to Warehouses A and B and back across the bridge; and
  - 10% (0.9) use the 2754 m truck route forming a complete loop from the site bridge to the ILC loading area and back to the bridge.

The quantities of industrial noise sources, (rounded to the nearest 0.1 for a 15 minute period and the nearest integer for the 15 hour period) modelled on site during this amenity assessment period are summarised in Table 3-8:

Table 3-8 – Daytime amenity scenario – Industrial source quantity summary

Source	Proportional quantity, 15 minutes	Quantity, 15 hours
Idling trucks (distributed over the site)	9.1	545
Moving trucks (distributed over three routes)	9.1	1089 movements
Reach stackers, northern ECS area	0.7	1 operating 70% of the time
Elevated 'bangs', northern ECS area	4.2	508
Reach stackers, main loading area	1.4	2 operating 70% of the time
'Bangs' at 4.1 m unloading train	4.2	508
Elevated 'bangs', main loading area	4.2	508
Reach stackers, southern ECS area	0.7	1 operating 70% of the time
Elevated 'bangs', southern ECS area	4.2	508
Idling train (two Class 81 Locomotives 600 m apart)	0.1	10
Moving train (two Class 81 Locomotives 600 m apart)	0.1	20 movements

The daytime *intrusive* scenario has been used as the 'baseline' calculation. In terms of acoustic energy, the daytime *amenity* scenario has been scaled by the following amounts compared to the daytime intrusive scenario:

- Heavy vehicle sources: -1.5 dB
- Industrial/Container facility sources: -1.5 dB
- Rail sources: -9.8 dB

3.2.5.3 Night-time intrusive scenario

Table 7-4 of the EA report shows that there are 57 heavy vehicle movements during the night-time 'peak 1 hour' between 6:00 am and 7:00 am in the morning. This equates to 7.1 truck movements *into* and 7.1 movements *out of* the Enfield ILC in any one 15 minute period in a 'peak' period and can be used to assess noise emission against the 'intrusive' night-time noise emission criteria. These movements are again distributed over the site in the same proportions as above:

- 60% (4.3) use the 2987 m truck route forming a complete loop from the site bridge to the ILC loading area and back across the bridge;
- 30% (2.1) use the 2548 m truck route forming a complete loop from the site bridge to Warehouses A and B and back across the bridge; and
- 10% (0.7) use the 2754 m truck route forming a complete loop from the site bridge to the ILC loading area and back to the bridge.

A summary of all the industrial noise sources, (rounded to the nearest 0.1) modelled on site during any one 15 minute period in this intrusive assessment period are as follows:

Table 3-9 – Night-time intrusive scenario – Industrial source quantity summary

Source	Quantity, 15 minutes
Idling trucks (distributed over the site)	7.1
Moving trucks (distributed over three routes)	7.1
Reach stackers, northern ECS area	0.6
Elevated 'bangs', northern ECS area	3.3
Reach stackers, main loading area	1.1
'Bangs' at 4.1 m unloading train	3.3
Elevated 'bangs', main loading area	3.3
Reach stackers, southern ECS area	0.6
Elevated 'bangs', southern ECS area	3.3
Idling train (two Class 81 Locomotives 600 m apart)	1
Moving train (two Class 81 Locomotives 600 m apart)	1

The daytime *intrusive* scenario has been used as the 'baseline' calculation. In terms of acoustic energy, the night-time *intrusive* scenario has been scaled by the following amounts compared to the daytime intrusive scenario:

- Heavy vehicle sources: -2.6 dB
- Industrial/Container facility sources: -2.6 dB
- Rail sources: -0.0 dB

3.2.5.4 Night-time amenity scenario

Based on a review of the traffic numbers presented in Table 7-4 of the EA report, it has been determined that:

- 131 truck movements occur in the 9 hour period between 10:00 pm and 7:00 am (encompassing the Night-time INP period);
- This equates to 1.8 movements *into* and 1.8 movements *out of* the site in any one 15 minute period between 7:00 am and 10:00 pm.
- Of these movements:
  - 60% (1.1) use the 2987 m truck route forming a complete loop from the site bridge to the ILC loading area and back across the bridge;
  - 30% (0.5) use the 2548 m truck route forming a complete loop from the site bridge to Warehouses A and B and back across the bridge; and
  - 10% (0.2) use the 2754 m truck route forming a complete loop from the site bridge to the ILC loading area and back to the bridge;

The quantities of industrial noise sources, (rounded to the nearest 0.1 for a 15 minute period and the nearest integer for the 9 hour period) modelled on site during this amenity assessment period are summarised in Table 3-10:

Table 3-10 – Night-time amenity scenario – Industrial source quantity summary

Source	Proportional quantity, 15 minutes	Quantity, 9 hours
Idling trucks (distributed over the site)	1.8	66
Moving trucks (distributed over three routes)	1.8	131 movements
Reach stackers, northern ECS area	0.1	1 operating 14% of the time
Elevated 'bangs', northern ECS area	0.8	61
Reach stackers, main loading area	0.3	2 operating 14% of the time
'Bangs' at 4.1 m unloading train	0.8	61
Elevated 'bangs', main loading area	0.8	61
Reach stackers, southern ECS area	0.1	1 operating 14% of the time
Elevated 'bangs', southern ECS area	0.8	61
Idling train (two Class 81 Locomotives 600 m apart)	0.1	6
Moving train (two Class 81 Locomotives 600 m apart)	0.1	12 movements

The daytime *intrusive* scenario has been used as the 'baseline' calculation. In terms of acoustic energy, the night-time *amenity* scenario has been scaled by the following amounts compared to the daytime intrusive scenario:

- Heavy vehicle sources: -8.5 dB
- Industrial/Container facility sources: -8.5 dB
- Rail sources: -12.0 dB

4.0 Results and Assessment

4.1 Outcomes with no mitigation beyond EA Stage recommendations

4.1.1 Intrusive and amenity outcomes

The daytime intrusive scenario, as detailed in Section 3.2.5.1, has been modelled in SoundPLAN v 6.5.

As previously noted, the starting point ('no mitigation scenario') for the model included the treatments recommended at the EA stage and upon which the project was granted approval on the basis of acoustics.

These mitigation measures include:

- 5 m high barrier at Roberts Road to the north-west of the site on non-SPC land;
- 2-5 m high barrier near Cosgrove Road in the middle portion of the site; and
- 5 m high barrier near Cosgrove Road at the south-east extremity of the site ;

In addition, all existing (purpose-built and non-purpose-designed barriers) and incidental (non-purpose-designed barriers) were incorporated into the model.

The model was run and used to provide Single Point Receiver (SPR) results at each of the relevant receiver locations. In addition, the model has been used to generate a noise contour plot ('Grid Noise Map' or GNM) for the daytime intrusive scenario (Refer to Appendix A). Based on the energetical corrections detailed in Sections 3.2.5.2, 3.2.5.3 and 3.2.5.4, the SPR results have been calculated for each of the daytime intrusive, daytime amenity, night-time intrusive and night-time amenity scenarios.

The 'no mitigation' scenario results are presented in Table 4-1. Non-compliant results are shown in **bold** type.

Table 4-1 – Outcome with no additional treatment beyond EA stage recommendations – neutral meteorological conditions

Receiver	Location	Daytime[1] intrusive, dB(A)			Daytime amenity, dB(A)			Night-time intrusive, dB(A)			Night-time amenity, dB(A)		
		Result	Criterion	Exceed	Result	Criterion	Exceed	Result	Criterion	Exceed	Result	Criterion	Exceed
A1	Eastern end of Jean St.	52	54	0	51	49	**2**	50	48	**2**	44	42	**2**
A2	Eastern end of Ivy St.	43	52	0	41	51	0	41	47	0	34	45	0
A3	Wentworth Street (South)	50	47	**3**	48	52	0	47	42	**5**	41	38	**3**
A4	Western end of Gregory St.	41	47	0	39	46	0	38	45	0	32	37	0
A5	Western end of Blanche St.	51	46	**5**	50	50	0	49	43	**6**	43	43	0
A6	40 Bazentin Street	30	45	0	24	54	0	30	41	0	19	39	0
A11	Begnell Park	-	-	-	41	50	0	-	-	-	34	50	0
A12	Matthews Park	-	-	-	41	50	0	-	-	-	34	50	0
A13	Greenacre Bowling Club	-	-	-	36	55	0	-	-	-	29	55	0
A14	Strathfield High School (int)	-	-	-	25	35	0	-	-	-	-	-	-
A15	St. Anne's School (int)	-	-	-	31	35	0	-	-	-	-	-	-

Note 1: The daytime criteria are based upon the lower (more stringent) of the daytime and evening criteria.

A review of Table 4-1 reveals that for the most part; (with the previously recommended mitigation measures from the EA stage and under neutral meteorological conditions) likely operations at the site will satisfy the established noise criteria.

The exceptions to this trend are:

- the receiver(s) at the eastern end of Jean Street (with criteria derived from unattended noise logging at 6 Jean Street) which experience marginal exceedances of up to 2 dB(A) during the daytime amenity, night-time intrusive and night-time amenity assessment periods;
- the receiver(s) at the southern end of Wentworth Street (with criteria derived from unattended noise logging at 14 Wentworth Street) which experience an exceedance of up to 5 dB(A) during the night-time intrusive assessment period; and
- the receiver(s) at the western end of Blanche Street (with criteria derived from unattended noise logging at 43 Blanche Street) which experience an exceedance of up to 5 dB(A) during the daytime intrusive period and 6 dB(A) during the night-time intrusive period.

The exceedance(s) under neutral meteorological conditions at Blanche Street and Wentworth Street warrant the investigation of additional mitigation measures beyond those proposed at the EA stage. The implementation of these measures and additional development to the model is discussed in Section 4.2.

Table 4-2 – Outcome with no additional treatment beyond EA stage recommendations –wind at 1.5 m/s, night-time amenity period

Receiver	Location	Westerly			North-westerly			South Westerly			South-Easterly		
		Result	Criterion	Exceed	Result	Criterion	Exceed	Result	Criterion	Exceed	Result	Criterion	Exceed
A1	Eastern end of Jean St.	43	42	**1**	43	42	**1**	43	42	**1**	44	42	**2**
A2	Eastern end of Ivy St.	31	45	0	33	45	0	31	45	0	35	45	0
A3	Wentworth Street (South)	40	38	**2**	41	38	**3**	39	38	**1**	40	38	**2**
A4	Western end of Gregory St.	35	37	0	33	37	0	36	37	0	32	37	0
A5	Western end of Blanche St.	44	43	**1**	43	43	0	43	43	0	42	43	0
A6	40 Bazentin Street	22	39	0	22	39	0	20	39	0	17	39	0
A11	Begnell Park	36	50	0	36	50	0	35	50	0	32	50	0
A12	Matthews Park	31	50	0	33	50	0	30	50	0	35	50	0
A13	Greenacre Bowling Club	27	55	0	30	55	0	26	55	0	29	55	0

Note 1: The daytime criteria are based upon the lower (more stringent) of the daytime and evening criteria.

Westerly

A review of Table 4-2 (and comparison with the neutral conditions in Table 4-1) reveals that under 1.5 m/s westerly wind conditions:

- The night-time amenity exceedance at the eastern end of Jean Street reduces from a marginal 2 dB(A) to a negligible 1 dB(A);
- The night-time amenity exceedance at Wentworth Street (south) decreases by 1 dB(A) from 3 dB(A) to a marginal 2 dB(A); and
- There is a negligible night-time amenity exceedance at the western end of Blanche Street of 1 dB(A).

The exceedance at Blanche Street (under a westerly wind at 1.5 m/s condition) warrants the investigation of additional mitigation measures beyond those proposed at the EA stage. The implementation of these measures and additional development to the model is discussed in Section 4.2.

North- Westerly

A review of Table 4-2 (and comparison with the neutral conditions in Table 4-1) reveals that under 1.5 m/s north-westerly wind conditions:

- The night-time amenity exceedance at the Eastern end of Jean Street reduces from a marginal 2 dB(A) to a negligible 1 dB(A); and
- The night-time amenity exceedance at Wentworth Street (south) increases by 1 dB(A) from a marginal 2 dB(A) to 3 dB(A),

The exceedance at Wentworth Street (south) under a north-westerly wind at 1.5 m/s north-westerly condition warrants the investigation of additional mitigation measures beyond those proposed at the EA stage. The implementation of these measures and additional development to the model is discussed in Section 4.2.

South-Westerly

A review of Table 4-2 (and comparison with the neutral conditions in Table 4-1) reveals that under 1.5 m/s south-westerly wind conditions:

- The night-time amenity exceedance at the Eastern end of Jean Street decreases by 1 dB(A)from a marginal 2 dB(A) to a negligible 1 dB(A); and
- The night-time amenity exceedance at Wentworth Street (south) decreases by 2 dB(A) from 3 dB(A) to a negligible 1 dB(A).

South-Easterly

A review of Table 4-2 (and comparison with the neutral conditions in Table 4-1) reveals that under 1.5 m/s south-easterly wind conditions:

- The night-time amenity exceedance at Wentworth Street (south) decreases by 1 dB(A) from 3 dB(A) to a marginal 2 dB(A).

Table 4-3 – Outcome with no additional treatment beyond EA stage recommendations –wind at 2.0 m/s, daytime amenity period

Receiver	Location	Westerly			North-westerly			South Westerly			South-Easterly		
		Result	Criterion	Exceed	Result	Criterion	Exceed	Result	Criterion	Exceed	Result	Criterion	Exceed
A1	Eastern end of Jean St.	50	49	**1**	50	49	**1**	41	49	0	51	49	**2**
A2	Eastern end of Ivy St.	38	51	0	40	51	0	38	51	0	42	51	0
A3	Wentworth Street (South)	47	52	0	48	52	0	46	52	0	47	52	0
A4	Western end of Gregory St.	43	46	0	40	46	0	43	46	0	39	46	0
A5	Western end of Blanche St.	51	50	**1**	51	50	**1**	51	50	**1**	49	50	0
A6	40 Bazentin Street	28	54	0	28	54	0	25	54	0	21	54	0
A11	Begnell Park	44	50	0	43	50	0	43	50	0	39	50	0
A12	Matthews Park	37	50	0	40	50	0	37	50	0	42	50	0
A13	Greenacre Bowling Club	33	55	0	37	55	0	33	55	0	36	55	0
A14	Strathfield High School (int)	25	35	0	21	35	0	29	35	0	29	35	0
A15	St. Anne's School (int)	35	35	0	33	35	0	35	35	0	30	35	0

Note 1: The daytime criteria are based upon the lower (more stringent) of the daytime and evening criteria

Westerly

A review of Table 4-3 (and comparison with the neutral conditions in Table 4-1) reveals that under 2.0 m/s westerly wind conditions:

- The daytime amenity exceedance at the eastern end of Jean Street decreases by 1 dB(A) from a marginal 2 dB(A) to a negligible 1 dB(A); and
- A daytime amenity exceedance of a negligible 1 dB(A) is experienced at the western end of Blanche Street where no exceedance was predicted under neutral conditions.

North-Westerly

A review of Table 4-3 (and comparison with the neutral conditions in Table 4-1) reveals that under 2.0 m/s north-westerly wind conditions:

- The daytime amenity exceedance at the eastern end of Jean Street decreases by 1 dB(A) from a marginal 2 dB(A) to a negligible 1 dB(A); and
- A daytime amenity exceedance of a negligible 1 dB(A) is experienced at the western end of Blanche Street (where no exceedance was predicted under neutral conditions).

South-Westerly

A review of Table 4-3 (and comparison with the neutral conditions in Table 4-1) reveals that under 2.0 m/s south-westerly wind conditions:

- The daytime amenity exceedance at the eastern end of Jean Street decreases by 2 dB(A) from a marginal 2 dB(A) to no exceedance; and
- A daytime amenity exceedance of a negligible 1 dB(A) is experienced at the western end of Blanche Street (where no exceedance was predicted under neutral conditions).

South-Easterly

A review of Table 4-3 (and comparison with the neutral conditions in Table 4-1) reveals that under 2.0 m/s south-easterly wind conditions:

- No acoustically-significant changes.

Table 4-4 – Outcome with no additional treatment beyond EA stage recommendations – wind at 2.5 m/s, daytime intrusive period

Receiver	Location	Westerly			North-Westerly			South-Westerly			South-Easterly		
		Result	Criterion	Exceed	Result	Criterion	Exceed	Result	Criterion	Exceed	Result	Criterion	Exceed
A1	Eastern end of Jean St.	51	54	0	51	54	0	52	54	0	53	54	0
A2	Eastern end of Ivy St.	39	52	0	42	52	0	39	52	0	44	52	0
A3	Wentworth Street (South)	48	47	1	50	47	3	47	47	0	49	47	2
A4	Western end of Gregory St.	44	47	0	43	47	0	45	47	0	40	47	0
A5	Western end of Blanche St.	52	46	6	52	46	6	52	46	6	50	46	4
A6	40 Bazentin Street	33	45	0	33	45	0	31	45	0	28	45	0

Note 1: The daytime criteria are based upon the lower (more stringent) of the daytime and evening criteria

A review of Table 4-4 (and comparison with the neutral conditions in Table 4-1) reveals that under 2.5 m/s wind conditions:

Westerly

- The daytime intrusive exceedance at Wentworth Street (south) decreases by 2 dB(A) from 3 dB(A) to a negligible 1 dB(A);
- The daytime intrusive exceedance at the western end of Blanche Street increases by 1 dB(A) from 5 dB(A) to 6 dB(A);

North-Westerly

- The daytime intrusive exceedance at the western end of Blanche Street increases by 1 dB(A) from 5 dB(A) to 6 dB(A);

South-Westerly

- The daytime intrusive exceedance at Wentworth Street (south) reduces by 3 dB(A) and is negated;
- The daytime intrusive exceedance at the western end of Blanche Street increases by1 dB(A) from 5 dB(A) to 6 dB(A);

South-Easterly

- The daytime intrusive exceedance at Wentworth Street (south) decreases by 1 dB(A) from to 3 dB(A) to a marginal 2 dB(A);
- The daytime intrusive exceedance at the western end of Blanche Street decreases by1 dB(A) from 5 dB(A) to 4 dB(A);

Table 4-5 – Outcome with no additional treatment beyond EA stage recommendations – wind at 2.5 m/s, night-time intrusive period

Receiver	Location	Westerly			North-Westerly			South-Westerly			South-Easterly		
		Result	Criterion	Exceed	Result	Criterion	Exceed	Result	Criterion	Exceed	Result	Criterion	Exceed
A1	Eastern end of Jean St.	49	48	**1**	49	48	**1**	50	48	**2**	51	48	**3**
A2	Eastern end of Ivy St.	37	47	0	40	47	0	37	47	0	42	47	0
A3	Wentworth Street (South)	46	42	**4**	48	42	**6**	45	42	**3**	47	42	**5**
A4	Western end of Gregory St.	42	45	0	40	45	0	42	45	0	38	45	0
A5	Western end of Blanche St.	50	43	**7**	50	43	**7**	50	43	**7**	48	43	**5**
A6	40 Bazentin Street	32	41	0	32	41	0	31	41	0	27	41	0

Note 1: The daytime criteria are based upon the lower (more stringent) of the daytime and evening criteria

A review of Table 4-5 (and comparison with the neutral conditions in Table 4-1) reveals that under 2.5 m/s wind conditions:

Westerly

- The night-time intrusive exceedance at the eastern end of Jean Street decreases by 1 dB(A) from a marginal 2 dB(A) to a negligible 1 dB(A);
- The night-time intrusive exceedance at Wentworth Street (south) decreases by 1 dB(A) from 5 dB(A) to 4 dB(A); and
- The night-time intrusive exceedance at western end of Blanche Street increases by1 dB(A) from 6 dB(A) to 7 dB(A).

North-Westerly

- The night-time intrusive exceedance at the eastern end of Jean Street, decreases by 1 dB(A) a marginal 2 dB(A) to a negligible 1 dB(A); and
- The night-time intrusive exceedances at Wentworth Street (south) and the western end of Blanche Street increase by1 dB(A) to 6 dB(A) and 7 dB(A) respectively.

South-Westerly

- The night-time intrusive exceedance at Wentworth Street (south) decreases by 2 dB(A) from to 5 dB(A) to 3 dB(A); and
- The night-time intrusive exceedance at the western end of Blanche Street increases by 1 dB(A) from 6 dB(A) to 7 dB(A).

South-Easterly

- The night-time intrusive exceedance at the eastern end of Jean Street increases by 1 dB(A) from a marginal 2 dB(A) to 3 dB(A); and
- The night-time intrusive exceedance at the western end of Blanche Street decreases by 1 dB(A) from to 6 dB(A) to 5 dB(A).

4.1.2 Sleep disturbance (L_{A1}) outcomes with no mitigation beyond EA Stage recommendations

The potential for sleep disturbance is assessed only at residential receivers (A1 to A6) during the night-time period, against the criteria presented in the last column of Table 2-1.

A summary of the sleep disturbance outcomes under all the specified meteorological conditions (in the absence of additional mitigation beyond the EA stage recommendations) is presented in Table 4-6.

Sleep disturbance has been considered under a 2.5m/s wind condition for each receiver.

Non-compliant results are shown in **bold** type.

Table 4-6 – Sleep disturbance outcomes – no mitigation beyond EA stage recommendations

Receiver	Location	Sleep disturbance criterion $L_{A1(1\ minute)}$, dB(A)	Highest predicted $L_{A1(1\ minute)}$ noise levels, dB(A)					Greatest Exceedance, dB(A)
			Neutral	Westerly	North-westerly	South-westerly	South-easterly	
A1	Eastern end of Jean St.	58	**64**	**64**	**64**	**64**	**64**	**6**
A2	Eastern end of Ivy St.	57	50	46	48	46	51	0
A3	Wentworth Street (South)	52	**59**	**59**	**59**	**59**	**59**	**7**
A4	Western end of Gregory St.	55	42	47	46	46	42	0
A5	Western end of Blanche St.	53	**59**	**59**	**59**	**59**	**58**	**6**
A6	40 Bazentin Street	51	34	37	37	35	31	0

With no additional mitigation beyond that proposed at the EA stage, L_{A1} noise events during the night-time period from elevated 'clangs' at 10.4 m above ground level (associated with picking up and putting down containers stacked four high) result in exceedances of up to 7 dB(A) above the 'Background plus 15 dB(A) criterion. It is noted that these exceedances would be lower if containers were not stacked as high AND strategically-located stacks of containers (higher than the clang source height) were located between the clangs and receivers – refer to Section 4.3.2).

The NSW DECC document Environmental Criteria for Road Traffic Noise (ECRTN) contains an assessment of sleep disturbance which represents the most recent NSW DECC advice on the subject of sleep disturbance due to noise events. Section B5 of Appendix B concludes, having considered the results of four research papers by *Pearson et al (1995)*, *Bullen et al (1996)*, *Greifahn (1992)* and *Finegold et al (1994)* with the statement, *'Maximum internal noise levels below 50-55 dB(A) are unlikely to cause awakening reactions'*. Therefore given that an open window provides 10 dB(A) noise attenuation from outside to inside, external noise levels of 60-65 dB(A) are unlikely to result in awakening reactions. This is in agreement with the screening criterion of 65 dB(A) used at the EA stage by others. On this basis, the predicted L_{A1} noise levels from metal on metal *'clangs'* as a result of operation at the Enfield site are unlikely to result in sleep disturbance.

It is noted that the predominant source of these noise events is the clangs at the greatest height above the ground (i.e.: those modelled at 10.4 m above ground or at the top of a stack of four containers). It is anticipated that noise mitigation measures such as barriers will not control such noise sources to the point of compliance, as the noise source height is significantly above the height of any reasonable barrier.

If control of these noise events is considered beneficial to the operation of the site, alternative mitigation measures should be considered, including management practices. Refer to Section 4.3.1.

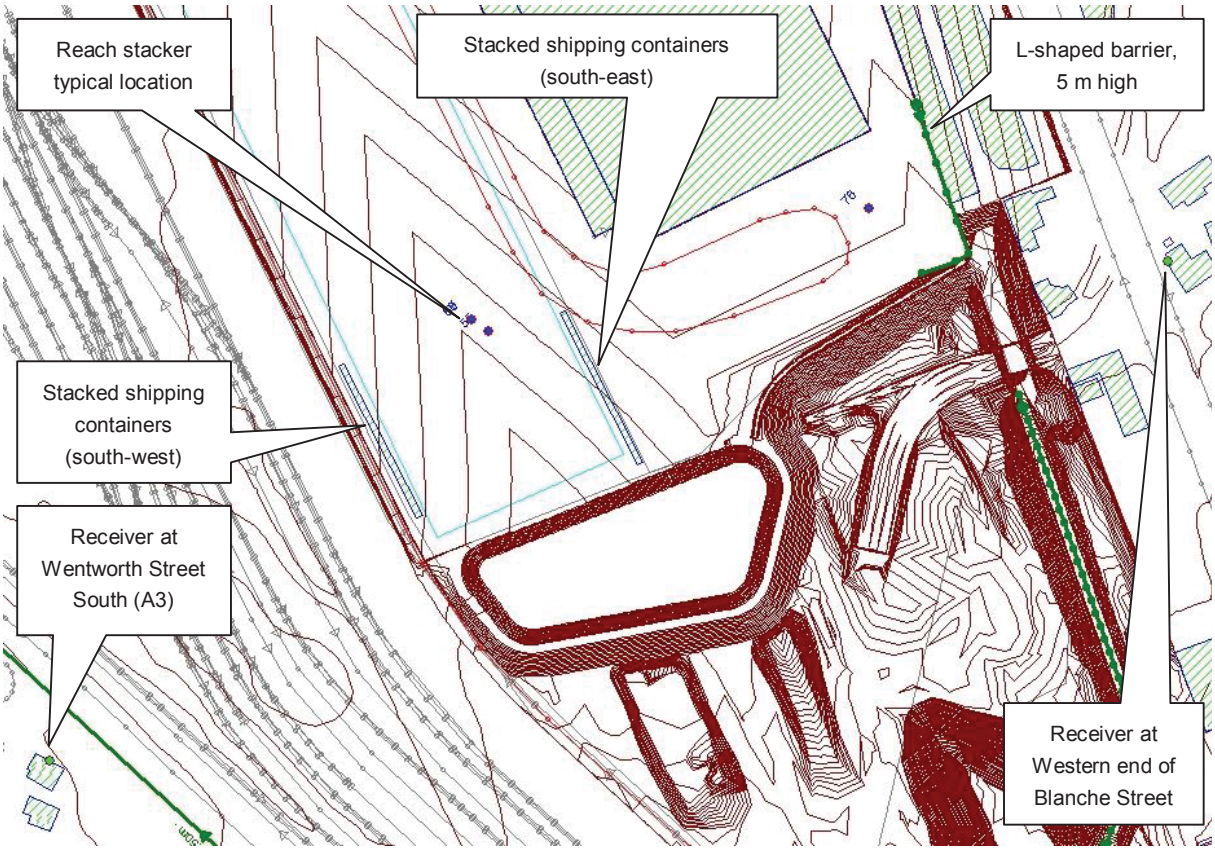
4.2 Detailed design mitigation and rationalisation

4.2.1 Mitigation

The SoundPLAN computer noise model has been modified to investigate additional mitigation measures necessary to permit the established noise criteria to be met, specifically:

- 5 m high L-shaped noise barrier at the south-eastern extremity of the hard-stand area to the south-east of Warehouses A and B as shown in Figure 4-1;
- Stacked shipping containers (10 containers long by 4 containers high) at the south-eastern perimeter of the southern empty container area (between the empty container area and the hardstand adjacent to Warehouses A and B) as shown in Figure 4-1; and
- Stacked shipping containers (10 containers long by 4 containers high) at the south-western perimeter of the southern empty container area as shown in Figure 4-1.

Figure 4-1 – L-shaped barrier at south-east of hard-stand area

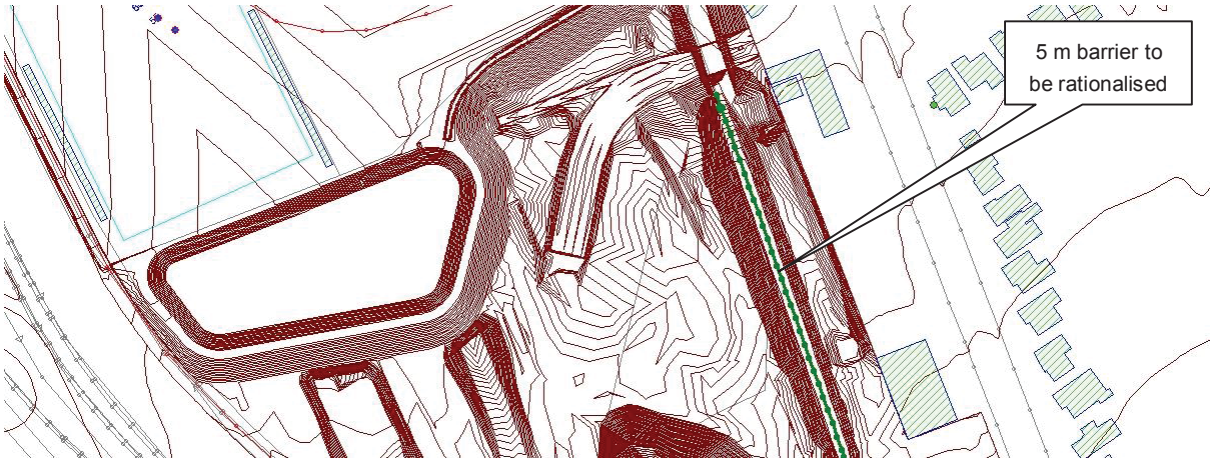


4.2.2 Rationalisation

Some EA-stage noise control measures have been rationalised for the following reasons:

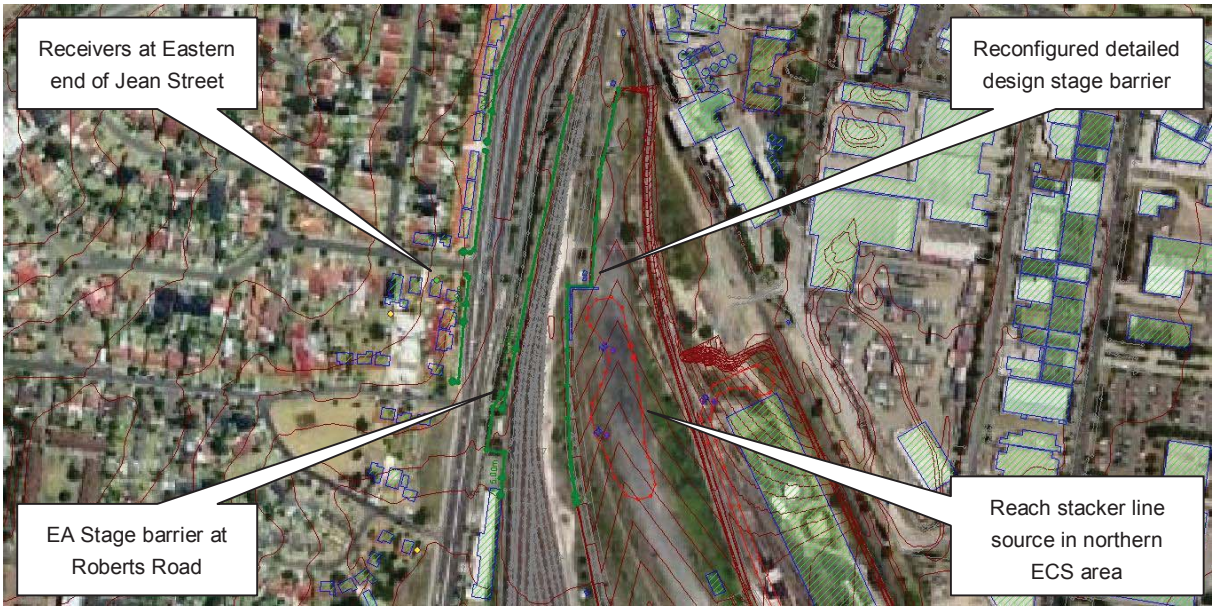
- The 2-5 m high barrier adjacent to Cosgrove Road appears to be redundant based on modelling and the latest understanding of likely operations in the context of the site design as it has developed since the time of the EA assessment (and modelling results of the 'no mitigation beyond the EA stage' scenario presented in Section 4.1 above). All receivers nearest to this site frontage (east) are industrial in nature and would be classed as 'Industrial' receivers according to the NSW Industrial Noise Policy (INP, 2000). In this respect they would be subject to an industrial noise criterion of 70 dB(A)[1] 'when in use', and preliminary results suggest daytime amenity noise levels of no more than 55 dB(A) due to the likely ILC operation. The residential receivers further to the east (St Anne's School and 'Western end of Gregory Street') experience noise levels below their respective criteria and this warrants investigation of removing the purpose-designed noise barrier at this location. For the purpose of testing this theory, the barrier has been deleted from the model in the 'with mitigation/rationalisation' scenario. Note that the model includes a schematic design of light industrial units between the ILC and Cosgrove Road, and these units have been modelled at 6 m high.
- The 5 m high barrier at the eastern perimeter of the landscaped area at the southern extremity of the Enfield ILC site appears, (on the basis of detailed design noise modelling) not to control any exceedances, i.e.: does not provide a required acoustic function. SPC has informed AECOM that the barrier will remain for non-acoustical reasons (such as security) and as such a barrier of 1.8 m on top of the 2.5 m mound at that location has been included in the model. Refer to Figure 4-2:

Figure 4-2 – Barrier at south-east southern landscaped area



- AECOM understands that the 'Roberts Road barrier' proposed at the EA stage to control noise emission from the northern area to receivers on the western side of Roberts Road (and on the basis of detailed design stage modelling results in marginal exceedances under neutral meteorological conditions of up to 2 dB(A)) cannot be considered further, due to non-acoustical reasons. It is therefore necessary to investigate alternative barriers at the northern end of the site and the 'with mitigation model' incorporates a barrier of the same height (5 m) and length (approx 390 m) which has been positioned at the western-most boundary of the northern ECS area – refer to Figure 4-3:

Figure 4-3 – Roberts Road barrier reconfiguration



The resultant noise levels after the implementation of the above measures in the noise model are presented in Section 4.4. Non-compliant results are shown in **bold** type.

4.3 Outcomes with additional mitigation measures and rationalisation

Table 4-7 – Outcome with mitigation measures and rationalisation - neutral meteorological conditions

Receiver	Location	Daytime[1] intrusive, dB(A)			Daytime amenity, dB(A)			Night-time intrusive, dB(A)			Night-time amenity, dB(A)		
		Result	Criterion	Exceed.	Result	Criterion	Exceed.	Result	Criterion	Exceed.	Result	Criterion	Exceed.
A1	Eastern end of Jean St.	52	54	0	51	49	**2**	50	48	**2**	44	42	**2**
A2	Eastern end of Ivy St.	43	52	0	41	51	0	41	47	0	34	45	0
A3	Wentworth Street (South)	45	47	0	42	52	0	44	42	**2**	36	38	0
A4	Western end of Gregory St.	41	47	0	39	46	0	38	45	0	32	37	0
A5	Western end of Blanche St	45	46	0	43	50	0	42	43	0	36	43	0
A6	40 Bazentin Street	30	45	0	22	54	0	29	41	0	18	39	0
A11	Begnell Park	-	-	-	41	50	0	-	-	-	34	50	0
A12	Matthews Park	-	-	-	41	50	0	-	-	-	34	50	0
A13	Greenacre Bowling Club	-	-	-	35	55	0	-	-	-	28	55	0
A14	Strathfield High School (int)	-	-	-	25	35	0	-	-	-	-	-	-
A15	St. Anne's School (int)	-	-	-	31	35	0	-	-	-	-	-	-

Note 1: The daytime intrusive and daytime amenity criteria are based upon the lower (more stringent) of the daytime and evening criteria

Table 4-7 shows that the mitigation measures tested in the 'with mitigation' SoundPLAN noise model, (under neutral meteorological conditions and full site operations) allow the established noise criteria to be met in all assessment periods, at most locations. The exceptions are:

- Exceedances up to 2 dB(A) at the Jean Street receivers. It is noted that:
  - These exceedances are the same as those experienced with the EA stage Roberts Road barrier of the same height and length (but different location). In moving the barrier it was not anticipated that the marginal exceedances would be negated, rather that the situation would not be made worse. In any case, 2 dB(A) would be difficult to perceive under field conditions.
  - Moreover, the noise criteria for this region of receivers were derived from unattended noise logging conducted at a shielded location in the rear yard of 6 Jean Street, so their application to receivers exposed to road traffic noise and existing industrial sources is, arguably, conservative.
- A negligible 2 dB(A) exceedance at Wentworth Street (south) during the night-time intrusive assessment period. This is considered insignificant, as a 2 dB(A) change in noise levels is difficult to perceive under field conditions. Increasing the height of the stacked south-west containers (modelled at 4 containers high or 10.4 m) would not provide a meaningful increase in shielding due to the distances involved and the presence of the containers at the mid-point between the (typical) source location and the receivers. It is noted that the source that contributes most to this exceedance is the reach stacker in the southern ECS area, and had this been modelled nearer to the south-west boundary (i.e.: closer to the stacked containers, it is likely that the shielding would be greater and as such the exceedance would not occur.

In conclusion, the above exceedances at full site operations are considered marginal and inconsequential. Nevertheless, it is recommended that these negligible exceedances of the criteria could be mitigated and managed by the implementation of an Operational Noise Management Plan (ONMP) in accordance with Minister's Condition 6.5.

Table 4-8 – Outcome with mitigation measures and rationalisation –wind at 1.5 m/s, night-time amenity period

Receiver	Location	Westerly			North-Westerly			South-Westerly			South-Easterly		
		Result	Criterion	Exceed	Result	Criterion	Exceed	Result	Criterion	Exceed	Result	Criterion	Exceed
A1	Eastern end of Jean St.	43	42	**1**	43	42	**1**	43	42	**1**	44	42	**2**
A2	Eastern end of Ivy St.	31	45	0	33	45	0	31	45	0	35	45	0
A3	Wentworth Street (South)	36	38	0	37	38	0	34	38	0	34	38	0
A4	Western end of Gregory St.	35	37	0	33	37	0	36	37	0	32	37	0
A5	Western end of Blanche St	37	43	0	37	43	0	37	43	0	35	43	0
A6	40 Bazentin Street	20	39	0	21	39	0	19	39	0	16	39	0
A11	Begnell Park	36	50	0	36	50	0	35	50	0	32	50	0
A12	Matthews Park	31	50	0	33	50	0	31	50	0	35	50	0
A13	Greenacre Bowling Club	27	55	0	29	55	0	26	55	0	28	55	0

Note 1: The daytime criteria are based upon the lower (more stringent) of the daytime and evening criteria

A review of Table 4-16 (and comparison with the neutral conditions in Table 4-7) reveals that under 1.5 m/s wind conditions:

Westerly

- The night-time amenity exceedance at the eastern end of Jean Street decreases by 1 dB(A) from a marginal 2 dB(A) to a negligible 1 dB(A).

The residual exceedance at the eastern end of Jean Street, after treatment, under a 1.5 m/s westerly wind condition is considered negligible and inconsequential.

North-Westerly

- The night-time amenity exceedance at the eastern end of Jean Street decreases by 1 dB(A) from a marginal 2 dB(A) to a negligible 1 dB(A).

The residual exceedance at the eastern end of Jean Street, after treatment, under a 1.5 m/s north-westerly wind condition is considered negligible and inconsequential.

South-Westerly

- The night-time amenity exceedance at the eastern end of Jean Street decreases by 1 dB(A) from a marginal 2 dB(A) to a negligible 1 dB(A).

The residual exceedance at the eastern end of Jean Street, after treatment, under a 1.5 m/s south-westerly wind condition is considered negligible and inconsequential.

South-Easterly

- No acoustically significant changes.

The residual exceedance at the eastern end of Jean Street, after treatment, under a 1.5 m/s south-easterly wind condition is considered marginal and inconsequential.

Table 4-9 – Outcome with mitigation measures and rationalisation –wind at 2.0 m/s, daytime amenity period

Receiver	Location	Westerly			North-Westerly			South-Westerly			South-Easterly		
		Result	Criterion	Exceed	Result	Criterion	Exceed	Result	Criterion	Exceed	Result	Criterion	Exceed
A1	Eastern end of Jean St.	50	49	**1**	50	49	**1**	50	49	**1**	51	49	**2**
A2	Eastern end of Ivy St.	38	51	0	40	51	0	38	51	0	42	51	0
A3	Wentworth Street (South)	42	52	0	44	52	0	40	52	0	40	52	0
A4	Western end of Gregory St.	43	46	0	41	46	0	43	46	0	39	46	0
A5	Western end of Blanche St	44	50	0	44	50	0	44	50	0	42	50	0
A6	40 Bazentin Street	26	54	0	26	54	0	23	54	0	20	54	0
A11	Begnell Park	43	50	0	43	50	0	42	50	0	39	50	0
A12	Matthews Park	37	50	0	40	50	0	37	50	0	42	50	0
A13	Greenacre Bowling Club	33	55	0	37	55	0	32	55	0	35	55	0
A14	Strathfield High School (int)	25	35	0	21	35	0	29	35	0	29	35	0
A15	St. Anne's School (int)	35	35	0	33	35	0	35	35	0	30	35	0

Note 1: The daytime criteria are based upon the lower (more stringent) of the daytime and evening criteria

A review of Table 4-9 (and comparison with the neutral conditions in Table 4-7) reveals that under 2.0 m/s wind conditions:

Westerly

- The daytime amenity exceedance at the eastern end of Jean Street decreases by 1 dB(A) from a marginal 2 dB(A) to a negligible 1 dB(A).

The residual exceedance at the eastern end of Jean Street, after treatment, under a 2.0 m/s westerly wind condition is considered negligible and inconsequential.

North-Westerly

- The daytime amenity exceedance at the eastern end of Jean Street decreases by 1 dB(A) from a marginal 2 dB(A) to a negligible 1 dB(A).

The residual exceedance at the eastern end of Jean Street, after treatment, under a 2.0 m/s north-westerly wind condition is considered negligible and inconsequential.

South-Westerly

- The daytime amenity exceedance at the eastern end of Jean Street decreases by 1 dB(A) from a marginal 2 dB(A) to a negligible 1 dB(A).

The residual exceedance at the eastern end of Jean Street, after treatment, under a 2.0 m/s south-westerly wind condition is considered negligible and inconsequential.

South-Easterly

- No acoustically significant changes.

The residual exceedance at the eastern end of Jean Street, after treatment, under a 2.0 m/s south-easterly wind condition is considered marginal and inconsequential.

Table 4-10 – Outcome with mitigation measures and rationalisation –wind at 2.5 m/s, daytime intrusive period

Receiver	Location	Westerly			North-Westerly			South-Westerly			South-Easterly		
		Result	Criterion	Exceed	Result	Criterion	Exceed	Result	Criterion	Exceed	Result	Criterion	Exceed
A1	Eastern end of Jean St.	51	54	0	51	54	0	52	54	0	53	54	0
A2	Eastern end of Ivy St.	39	52	0	42	52	0	39	52	0	44	52	0
A3	Wentworth Street (South)	45	47	0	47	47	0	43	47	0	44	47	0
A4	Western end of Gregory St.	44	47	0	43	47	0	45	47	0	40	47	0
A5	Western end of Blanche St	46	46	0	46	46	0	45	46	0	44	46	0
A6	40 Bazentin Street	32	45	0	32	45	0	30	45	0	27	45	0

Note 1: The daytime criteria are based upon the lower (more stringent) of the daytime and evening criteria

A review of Table 4-10 (and comparison with the neutral conditions in Table 4-7) reveals that under 2.5 m/s wind conditions:

Westerly, North-Westerly, South-Westerly, South Easterly

- No acoustically-significant changes

Table 4-11 – Outcome with mitigation measures and rationalisation – wind at 2.5 m/s, night-time intrusive period

Receiver	Location	Westerly			North-Westerly			South-Westerly			South-Easterly		
		Result	Criterion	Exceed	Result	Criterion	Exceed	Result	Criterion	Exceed	Result	Criterion	Exceed
A1	Eastern end of Jean St.	49	48	**1**	49	48	**1**	50	48	**2**	51	48	**3**
A2	Eastern end of Ivy St.	37	47	0	40	47	0	37	47	0	42	47	0
A3	Wentworth Street (South)	44	42	**2**	45	42	**3**	42	42	0	43	42	**1**
A4	Western end of Gregory St.	42	45	0	40	45	0	42	45	0	38	45	0
A5	Western end of Blanche St	44	43	**1**	43	43	0	43	43	0	42	43	0
A6	40 Bazentin Street	32	41	0	32	41	0	30	41	0	27	41	0

Note 1: The daytime criteria are based upon the lower (more stringent) of the daytime and evening criteria

A review of Table 4-11 (and comparison with the neutral conditions in Table 4-7) reveals that under 2.5 m/s wind conditions:

Westerly

- The night-time intrusive exceedance at the eastern end of Jean Street decreases by 1 dB(A) from a marginal 2 dB(A) to a negligible 1 dB(A);
- The night-time intrusive exceedance at Wentworth Street (south) remains a marginal 2 dB(A); and
- The receiver at the western end of Blanche Street experiences a negligible 1 dB(A) exceedance whereas no exceedance was experienced under neutral conditions.

The residual exceedances at the eastern end of Jean Street, Wentworth Street (south) and the western end of Blanche Street, after treatment, under a 2.5 m/s westerly wind condition are considered marginal at most, and inconsequential.

North-Westerly

- The night-time intrusive exceedance at the eastern end of Jean Street decreases by 1 dB(A) from a marginal 2 dB(A) to a negligible 1 dB(A); and
- The night-time intrusive exceedance at Wentworth Street (south) increases by 1 dB(A) from a marginal 2 dB(A) to 3 dB(A).

The residual exceedance at the eastern end of Jean Street, after treatment, under a 2.5 m/s north-westerly wind condition is considered negligible and inconsequential.

It is considered that the potential 3 dB(A) exceedance at Wentworth Street (south) due to rail activity during the night-time period does not warrant additional mitigation measures due to the infrequency of such wind events and the marginal nature of the increase which may result under full site operations and infrequent adverse wind conditions. Further, there is already an existing 4.5 m noise barrier providing shielding to this location and it would be impractical to increase the height of this barrier. In addition, there is an existing rail noise source in the area that lies between the ILC site and the receiver.

South-Westerly

- The night-time intrusive exceedance at the eastern end of Jean Street remains a marginal 2 dB(A); and
- The night-time intrusive exceedance at Wentworth Street (south) decreases by 2 dB(A) and is negated.

The residual exceedance at the eastern end of Jean Street, after treatment, under a 2.5 m/s south-westerly wind condition is considered marginal and inconsequential.

South-Easterly

- The night-time intrusive exceedance at the eastern end of Jean Street increases by 1 dB(A) from a marginal 2 dB(A) to 3 dB(A); and
- The night-time intrusive exceedance at Wentworth Street (south) decreases by 1 dB(A) from a marginal 2 dB(A) to a negligible 1 dB(A).

The residual exceedance at Wentworth Street (south) after treatment, under a 2.5 m/s south-easterly wind condition is considered negligible and inconsequential.

It is considered that the 3 dB(A) exceedance at the eastern end of Jean Street does not warrant the investigation of additional mitigation measures because, as noted in Section 4.3, the noise criteria for this region of receivers were derived from unattended noise logging conducted at a shielded location in the rear yard of 6 Jean Street, so their application to receivers exposed to existing road traffic noise and other existing industrial sources is, arguably, conservative.

It can be concluded that modelled worst-case scenario exceedances of up to 3 dB(A) under infrequent meteorological conditions and full operation of the ILC site are marginal and insignificant, and if they are confirmed during noise monitoring/auditing required under condition 3.3, they could be managed through the implementation of an Operational Noise Management Plan.

4.3.1 Sleep disturbance (L_{A1}) outcomes with additional mitigation measures

The potential for sleep disturbance was assessed at residential receivers (A1 to A6) during the night-time period, against the criteria presented in the last column of Table 2-1.

A summary of the sleep disturbance outcomes under all the specified meteorological conditions (with additional mitigation measures) is presented in Table 4-12.

Non-compliant results are shown in **bold** type.

Table 4-12 – Sleep disturbance outcomes – with additional mitigation

Receiver	Location	Sleep disturbance criterion $L_{A1(1\ minute)}$, dB(A)	Highest predicted $L_{A1(1\ minute)}$ noise levels, dB(A)					Potential Greatest exceedance, dB(A)
			Neutral	Westerly	North-westerly	South-westerly	South-easterly	
A1	Eastern end of Jean St.	58	**64**	**65**	**65**	**65**	**64**	**7**
A2	Eastern end of Ivy St.	57	50	46	48	46	51	0
A3	Wentworth Street (South)	52	**59**	**59**	**59**	**59**	**59**	**7**
A4	Western end of Gregory St.	55	42	47	46	46	42	0
A5	Western end of Blanche St.	53	**56**	**57**	**57**	**57**	**56**	**4**
A6	40 Bazentin Street	51	34	37	37	35	31	0

With additional mitigation measures in place, L_{A1} noise events during the night-time period from 'clangs' (associated with picking up and putting down containers) result in exceedances of up to 7 dB(A) above the established 'Background plus 15 dB(A) criterion.

As anticipated, this represents no acoustically significant change from the 'no additional mitigation' scenario, (Refer to Section 4.1.2).

It is again noted that none of these noise events are predicted to result in L_{A1} noise levels greater than 65 dB(A) at any receiver and consequently (based on the findings of the ECRTN – refer to Section 4.1.2), sleep disturbance is unlikely to occur, irrespective of the prevailing background (L_{A90}) noise level.

The predominant source of these L_{A1} noise events is the clangs modelled at 10.4 m above ground (at the top of a stack of four containers). Modelling has shown that noise mitigation measures such as barriers will not control such noise sources to the point of compliance, as the noise source height is significantly above the height of any reasonable barrier. Further, the source and nature of the potential exceedance (i.e. night time clangs at height during certain meteorological conditions) make such potential exceedance easily manageable through the implementation of the Operational Noise Management Plan required under Condition 6.5.

4.3.2 Sleep disturbance discussion

During the Environmental Assessment stage acoustic study *Preferred Project Report* (*Renzo Tonin and Associates*, April 2006), it was found that whilst the 'Background plus 15 dB(A)' criterion was exceeded at some residential assessment locations under neutral and certain adverse weather conditions, the likelihood of sleep disturbance due to the operation of the ILC site was minimised by a number of mitigating factors including:

1) The night-time background noise level used for assessment of sleep disturbance is the Rating Background Level (RBL) which is most influenced by the quietest (lowest 10th percentile

background) period during the night-time, typically 2 am to 4 am. The frequency of hourly truck movements at the ILC (and therefore movement of containers and resultant 'clangs') during this period is low, or even nil when considering the hours commencing 3 am and 4am (refer to EA stage report *Chapter 7 Road Traffic and Transport*, SKM, October 2005). The period during which the prevalence of container 'clangs' would be greater is the INP night-time 'shoulder' period, i.e.: 6 am to 7 am, during which there is a corresponding increase in background noise levels – in the order of 5 to 10 dB(A). This has a corresponding effect of diminishing the impact of 'clang' events by 5 to 10 dB(A).

2) An analysis of existing night-time maximum noise levels at all residential receivers A1 to A6 revealed that existing maximum noise levels exceeded both the predicted maximum noise levels due to ILC operation and the 'Background plus 15 dB(A)' criterion for each location. A repeat analysis of this for the newly predicted L_{A1} noise levels for the detailed design stage study is presented below in Table 4-13:

Table 4-13 – Sleep disturbance outcomes – comparison with existing night-time maximum noise levels

Receiver	Location	'Background plus 15 dB(A)' criterion $L_{A1(1\ minute)}$, dB(A)	Highest predicted $L_{A1(1\ minute)}$ noise levels, dB(A)					Existing average L_{Amax} noise levels	
			Neutral	Westerly	North-westerly	South-westerly	South-easterly	Min	Max
A1	Eastern end of Jean St.	58	**64**	**65**	**65**	**65**	**64**	**67**	**74**
A2	Eastern end of Ivy St.	57	50	46	48	46	51	**72**	**83**
A3	Wentworth Street (South)	52	**59**	**59**	**59**	**59**	**59**	**68**	**81**
A4	Western end of Gregory St.	55	42	47	46	46	42	**67**	**72**
A5	Western end of Blanche St.	53	**56**	**57**	**57**	**57**	**56**	**67**	**72**
A6	40 Bazentin Street	51	34	37	37	35	31	**67**	**77**

This analysis shows that, similarly to the EA stage, the predicted L_{A1} noise levels due to ILC operation are consistently lower than existing L_{Amax}, (including existing average minimum L_{Amax}) noise levels. Consequently, it is considered that the potential for sleep disturbance is minimal, irrespective of the prevailing background noise levels.

Notwithstanding the above points, and the fact that the predicted L_{A1} noise levels satisfy the DECC ECRTN screening criterion of 65 dB(A), additional management measures will be put in place at the Enfield ILC site, including:

1) Preparation of a Noise Management Plan (in accordance with Minister's Condition 6.5);
2) On-site noise monitoring (in accordance with condition 3.3) will be implemented at different annual throughput stages (i.e. 50,000, 150,000 and 250,000 TEU) to determine ongoing compliance of noise emission from the site, including L_{A1} noise events during the night-time period; and
3) Implementation of any additional measures required by the Director-General to address any residual issued identified during noise monitoring as required under condition 3.4.

Should the above measures dictate the need to do so, it would be possible to limit the height of container stacks during the night-time period and thus the height of the 'clang' noise sources. A suitable stack height would be three containers high where purpose-stacked containers (four high) at perimeter locations are strategically located. The contribution of 'clangs' at the top of the third container can be up to 6 dB(A) lower than the contribution of clangs at the top of the fourth container in a stack, when working close to stacks of four containers high that are strategically located between the clang source location and receivers. This margin would diminish the L_{A1} noise exceedance to no more than 1 dB(A) which is considered negligible and inconsequential .

5.0 Detailed Design Mitigation Requirements

5.1 Additional mitigation measures

Based on the modelling carried out as part of this assessment, the following additional mitigation measures (above and beyond those recommended at the EA stage):

- A barrier of 5.0 m in height and no less than 80 m in length at the south-eastern extremity of the hard-stand area to the south east of Warehouses A and B, refer Figure 4-1, *L-shaped barrier, 5 m high*. The barrier shall, from the south-eastern corner of the hard-stand area, run for no less than 60 m to the north and 20 m to the west. The barrier shall be contiguous and free from openings and/or gaps. Any material necessary to meet the Project Scope and Technical Requirements (PSTR) of having a 50 year design life is likely to provide the required transmission loss (TL); however, the anticipated material for a barrier of this height and length is a concrete tilt-up panel or similar. The intent and purpose of the barrier is to provide shielding to the receivers at the western end of Blanche Street from vehicle movements south of Warehouses A and B and supplement shielding from reach stacker operations provided by:
- Stacked 40-foot shipping containers at the south-eastern corner of the southern ECS area, stacked 10 long and four high, refer Figure 4-1, *Stacked shipping containers(south-east)*. The presence of the barriers is required whenever reach stacker operation is occurring in the southern ECS area. The intent and purpose of the containers is to block direct line of sight from reach stacker operations to the receivers at the western end of Blanche Street; (note the actual location would be dependent upon the area of any concentrated activity on any given night of operation); and
- Stacked 40-foot shipping containers at the south-western corner of the southern ECS area, stacked no less than 10 long and four high, refer Figure 4-1, Stacked shipping containers (south-west). The presence of the barriers is required whenever reach stacker operation is occurring in the southern ECS area. The intent and purpose of the containers is to block direct line of sight from reach stacker operations to the receivers at the southern end of Wentworth Street (note the actual location would be dependent upon the area of any concentrated activity on any given night of operation).

5.2 Rationalised mitigation measures

The following rationalised and/or adapted noise mitigation measures are permissible on the basis of acoustics:

- A barrier (in one or two sections) of 5.0 m in height and no less than 375 m in total length running along the western boundary of the northern ECS area (i.e.: west of the rail sidings), refer Figure 4-3, 'Reconfigured detailed design stage barrier'. The barrier shall, from the northern-most point of the northern ECS area run 157 m south (following the site boundary) form a return of 21 m to the west and then follow the western boundary of the site for 178 m to the south. Alternatively, it is permissible to provide two overlapping barriers with an opening between (to enable rail access from the ILC to the rail corridor) on the condition that the overlap distance is equal to or greater than four (4) times the distance between the two barriers. The northern-most section would extend for approximately 197m and overlap the 178 m long southern section by approximately 40 m. The barrier(s) shall be contiguous and free from openings and/or gaps. Any material necessary to meet the Project Scope and Technical Requirements (PSTR) of having a 50 year design life is likely to provide the required transmission loss (TL); however, the anticipated material for a barrier of this height and length is a concrete tilt-up panel or similar; and
- Deletion of the acoustically-redundant barrier adjacent to Cosgrove Road.

Other barriers in the design include:

- A noise wall 1.8 m high on top of an earth mound approximately 2.5 m high (totalling 4.3 m high) in the south-east of the ILC site extending from Cox's Creek towards the Tarpaulin Shed.

Note that during the detailed design stage, it was identified that reflected noise from rail activity using the rail lines west of the proposed barrier (from trains NOT associated with the operation of Enfield ILC) was raised as a potential concern for receivers west of Roberts Road. Simulated rail events in the SoundPLAN noise model indicate that reflected noise from such rail noise sources would not cause a noticeable increase in noise levels at these receivers.

It is recommended that should the project proponent wish to mitigate the community *perception* of reflected noise impacts, absorptive finishes are available and could be applied to the western face of the northern ECS area noise barrier. Such finishes include 'Woodtex' by *Woodtex Australia*. It is not a requirement of this study to implement any such measures.

6.0 Conclusions

6.1 Intrusive and amenity criteria noise assessment

This report presents the assessment methodology and outcomes of a detailed design assessment of industrial noise emission from the approved Enfield Intermodal Logistics Centre at Enfield, NSW.

Criteria to limit industrial noise emission from operations at this site have previously been derived based on noise monitoring of existing ambient noise levels conducted by others at the Environmental Assessment stage of the project.

The acoustic impact of physical developments made to the site design since the time of the Environmental Assessment stage acoustic study have been investigated. In addition, more up–to-date and more likely operational scenarios have been modelled to examine noise emission from the site under neutral meteorological conditions as well as under the same adverse wind conditions considered at the EA stage (in the Preferred Project Report).

The outcome of this process is that the previously recommended noise mitigation measures, for the most part, allow the modelled scenarios to meet the established noise criteria. Additional mitigation measures (and rationalisation of previously recommended measures) in the form of permanent barriers and strategically stacked containers have been proposed where exceedances have been identified or the previously recommended measures could otherwise not be further developed.

In summary modelling shows that the recommended mitigation measures allow the established intrusive and amenity noise criteria to be satisfied in the majority of assessment periods and at the majority of locations. There are some residual exceedances, largely during infrequent adverse wind conditions and full site operations, of no more than 3 dB(A) and typically only 1-2 dB(A). Such exceedances are considered marginal at most and inconsequential.

6.2 Sleep disturbance noise assessment

The potential for sleep disturbance due to metal-on-metal ‘clangs’ during the night-time period has been assessed. Whilst modelling shows that the established ‘Background plus 15 dB(A)’ criterion can be exceeded at three of the residential assessment locations, no L_{A1} noise levels are shown to exceed 65 dB(A), which is the screening criterion for sleep disturbance provided by the DECC ECRTN.

It is also noted that the frequency of potential ‘clangs’ during the night-time period is low, and nil in the hours commencing 3 am and 4 am. The period during which the prevalence of containers ‘clangs’ would be greater is the night-time shoulder period (i.e. the hour commencing 6 am), during which there is a corresponding increase in ambient background noise levels in the order of 5-10 dB(A). This has a corresponding effect of diminishing the impact of clang events by 5-10 dB(A).

In addition, an analysis of existing maximum noise levels during the night-time period indicates that the predicted L_{A1} noise levels due to ILC operation are consistently lower than the existing L_{Amax} noise levels.

Consequently it is concluded that the potential for sleep disturbance is minimal, irrespective of the prevailing background (L_{A90}) noise level.

To manage any residual noise issues, several other mitigating factors set out in Section 4.3.2 will be implemented including:

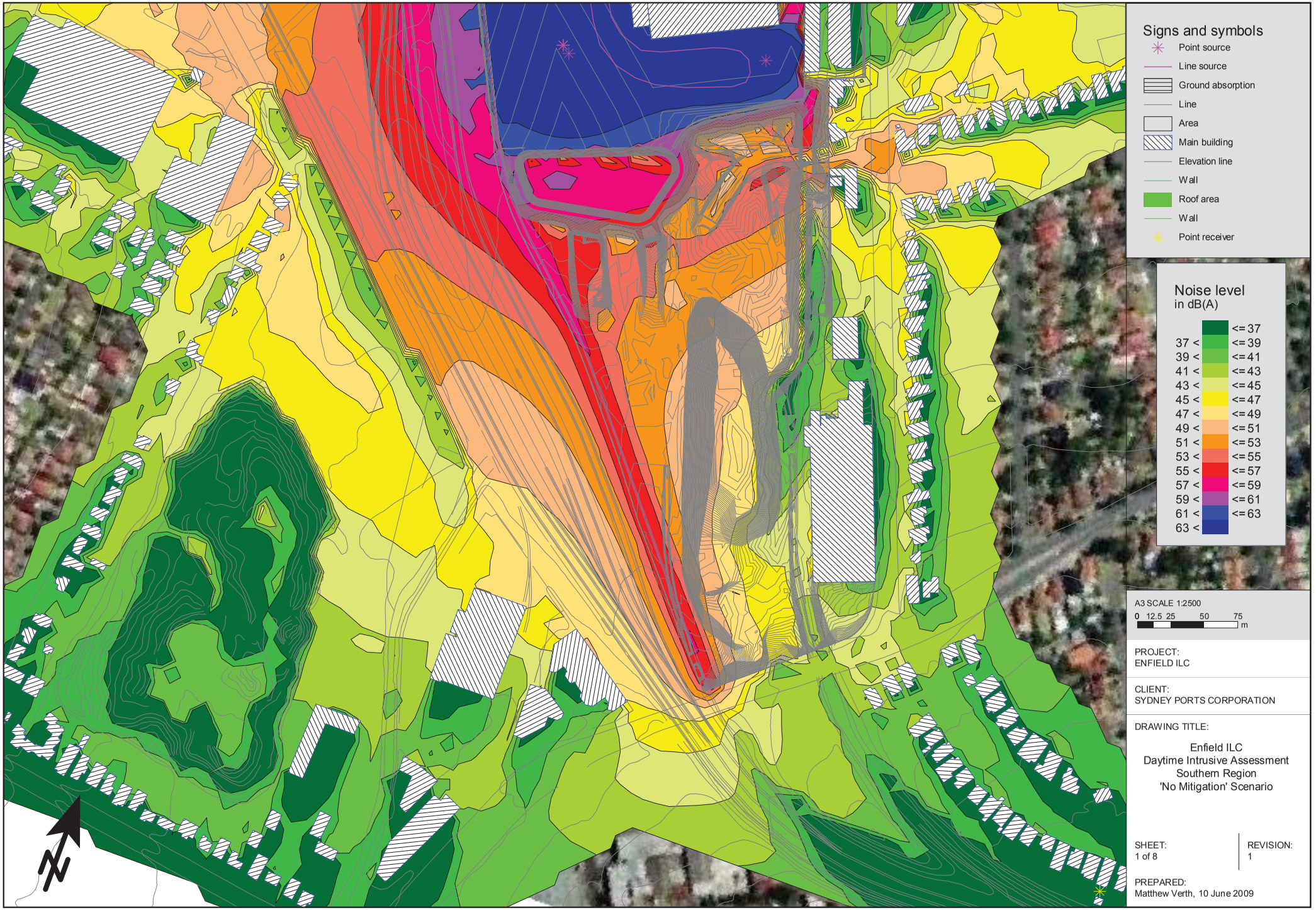
- the commitment to implement an Operational Noise Management Plan in accordance with Minister’s Condition 6.5;
- on-going noise monitoring/auditing at different annual throughput stages (i.e. 50,000 TEU, 150,000 TEU and 250,000 TEU) , in accordance with Minister’s Condition 3.3;

- implementation of additional measures required by the Director-General to address any issues identified during noise monitoring/auditing, as required under condition 3.4; and,
- if deemed necessary by the above measures, the ability to limit container stack heights and thus the 'clang' noise source height during the night-time period (in combination with strategically-located perimeter container stacks). The predicted exceedances can be negated utilising such measures.

It is a recommendation of this report that:

- the measures recommended herein are incorporated into the design and construction of the Enfield Intermodal Logistics Centre; and
- the selected operator of the site develops and implements an Operational Noise Management Plan in accordance with Minister's Condition 6.5 to mitigate and manage any residual noise issues.

Appendix A SoundPLAN Noise Contour Plots No Mitigation Scenario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Roof area
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CLIENT:
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Daytime Intrusive Assessment
Southern Region
'No Mitigation' Scenario
SHEET:
1 of 8
REVISION:
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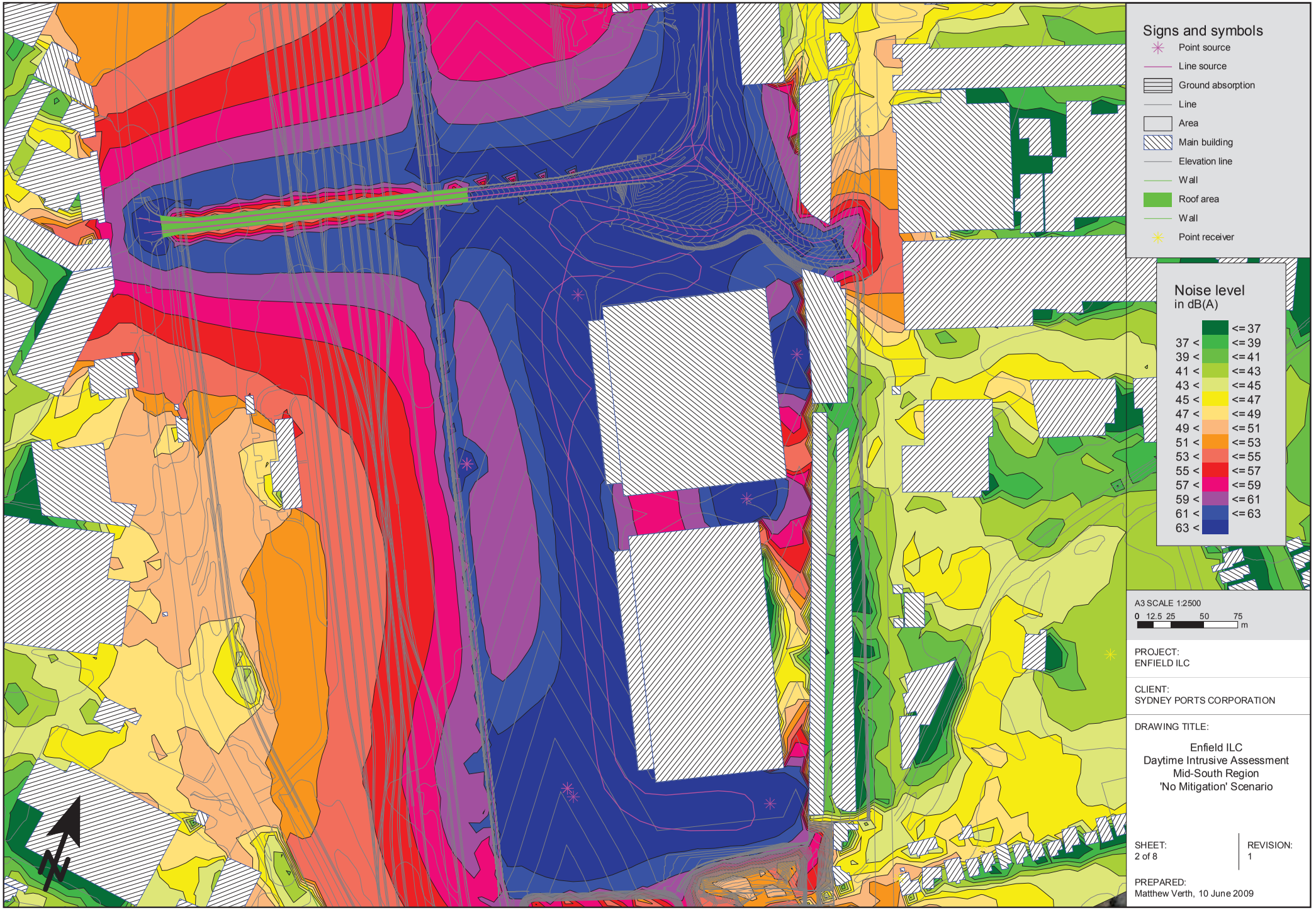
PREPARED:
Matthew Verth, 10 June 2009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Ground absorption
Line
Area
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Elevation line
Wall
Roof area
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Point receiver
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PREPARED:
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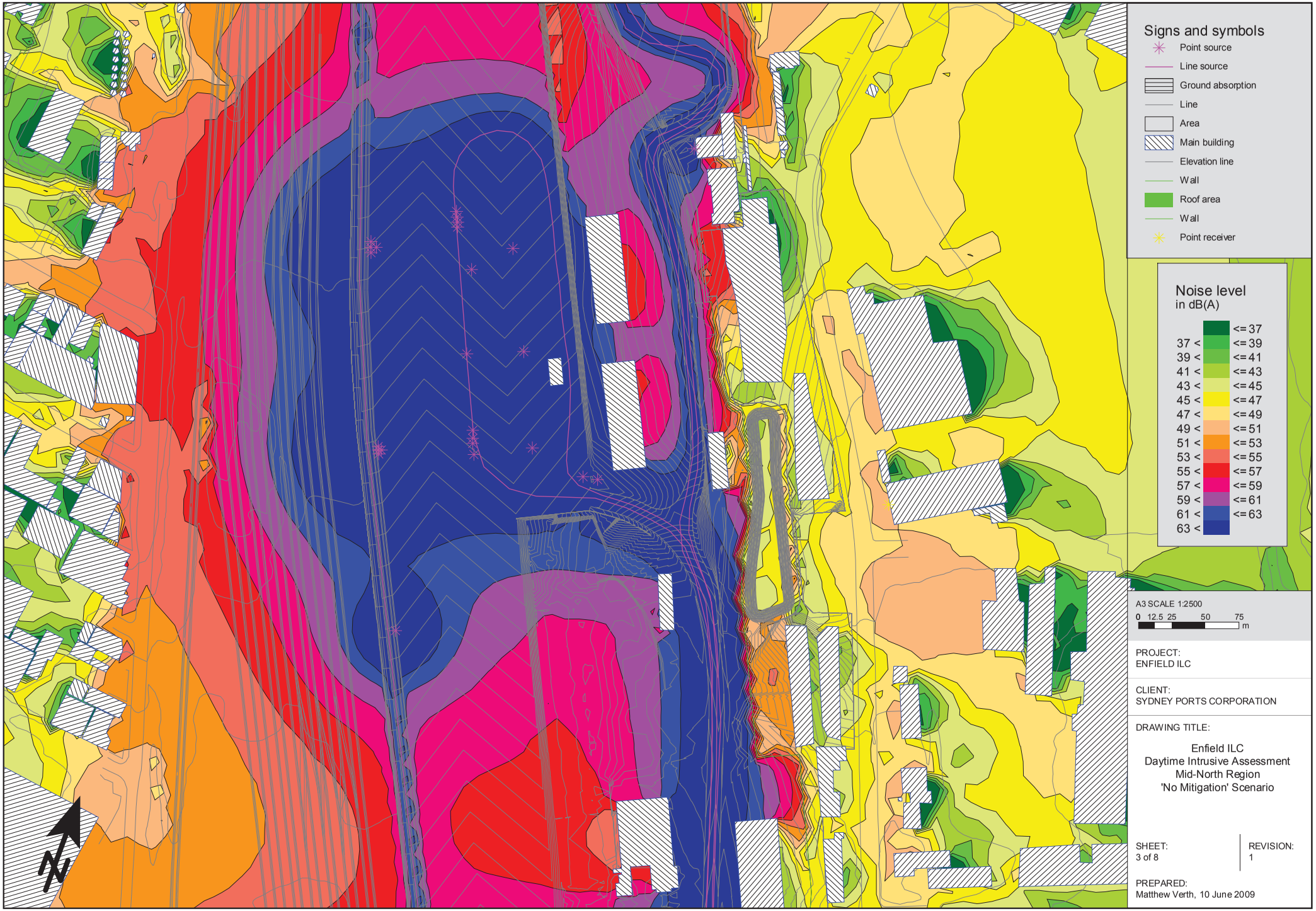
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Area
Main building
Elevation line
Wall
Roof area
Wall
Point receiver
Noise level
in dB(A)
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37 < <= 39
39 < <= 41
41 < <= 43
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DRAWING TITLE:
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REVISION:
1
PREPARED:
Matthew Verth, 10 June 2009
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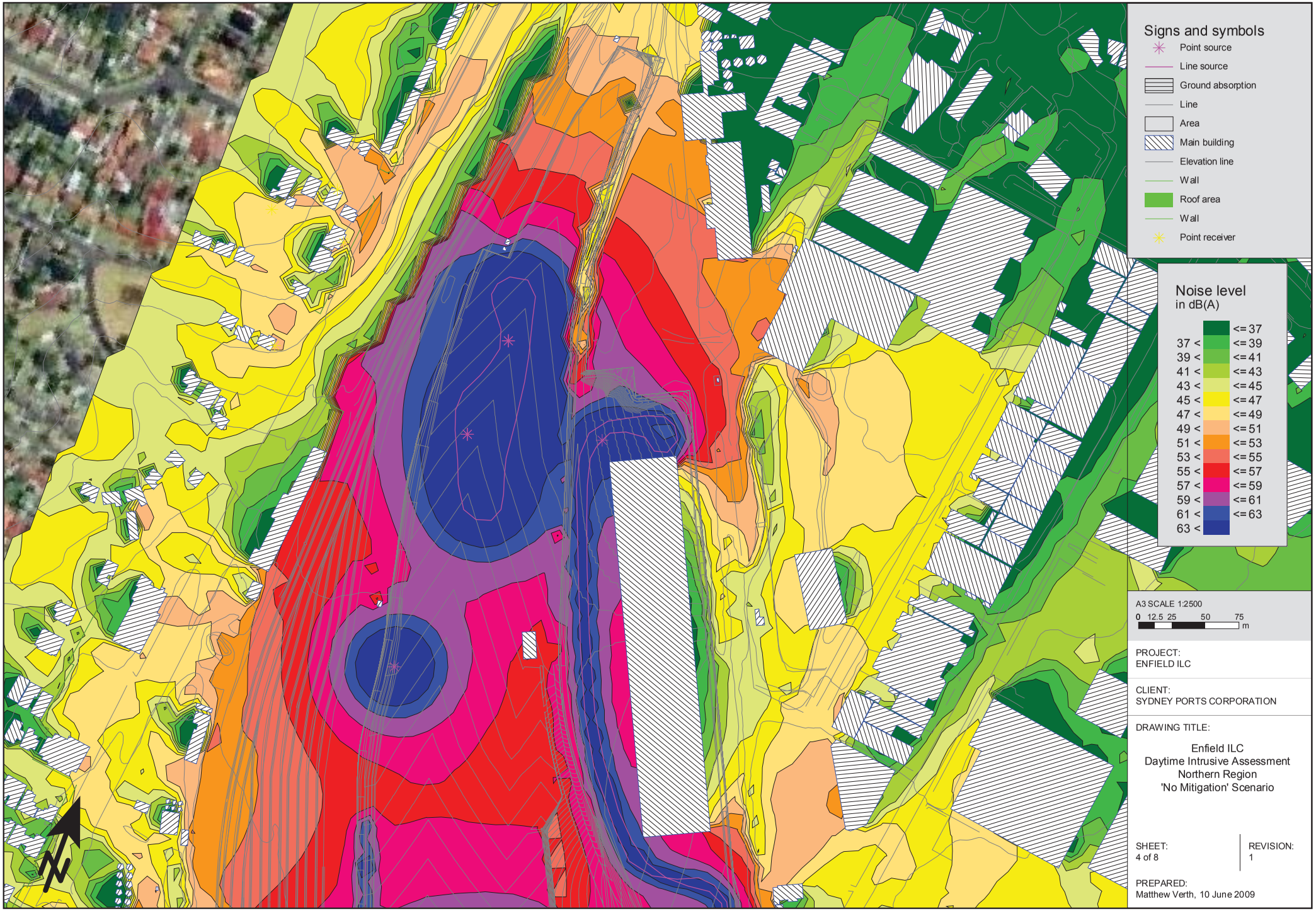
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Line source
Ground absorption
Line
Area
Main building
Elevation line
Wall
Roof area
Wall
Point receiver
Noise level
in dB(A)
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37 < <= 39
39 < <= 41
41 < <= 43
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4 of 8
REVISION:
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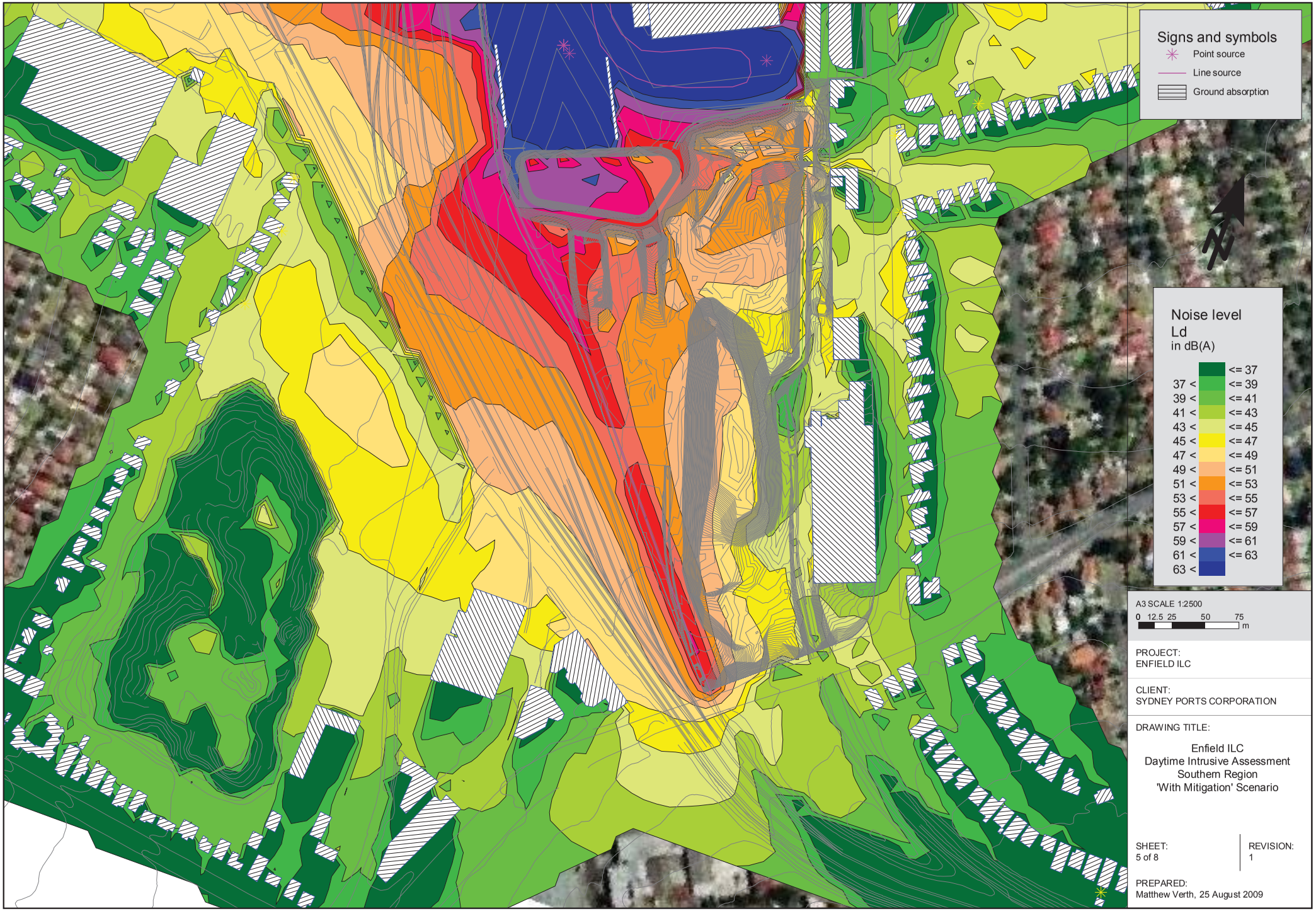
PREPARED:
Matthew Verth, 10 June 2009

Appendix B SoundPLAN Noise Contour Plots With Mitigation Scenario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Line source
Ground absorption
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Noise level
Ld
in dB(A)
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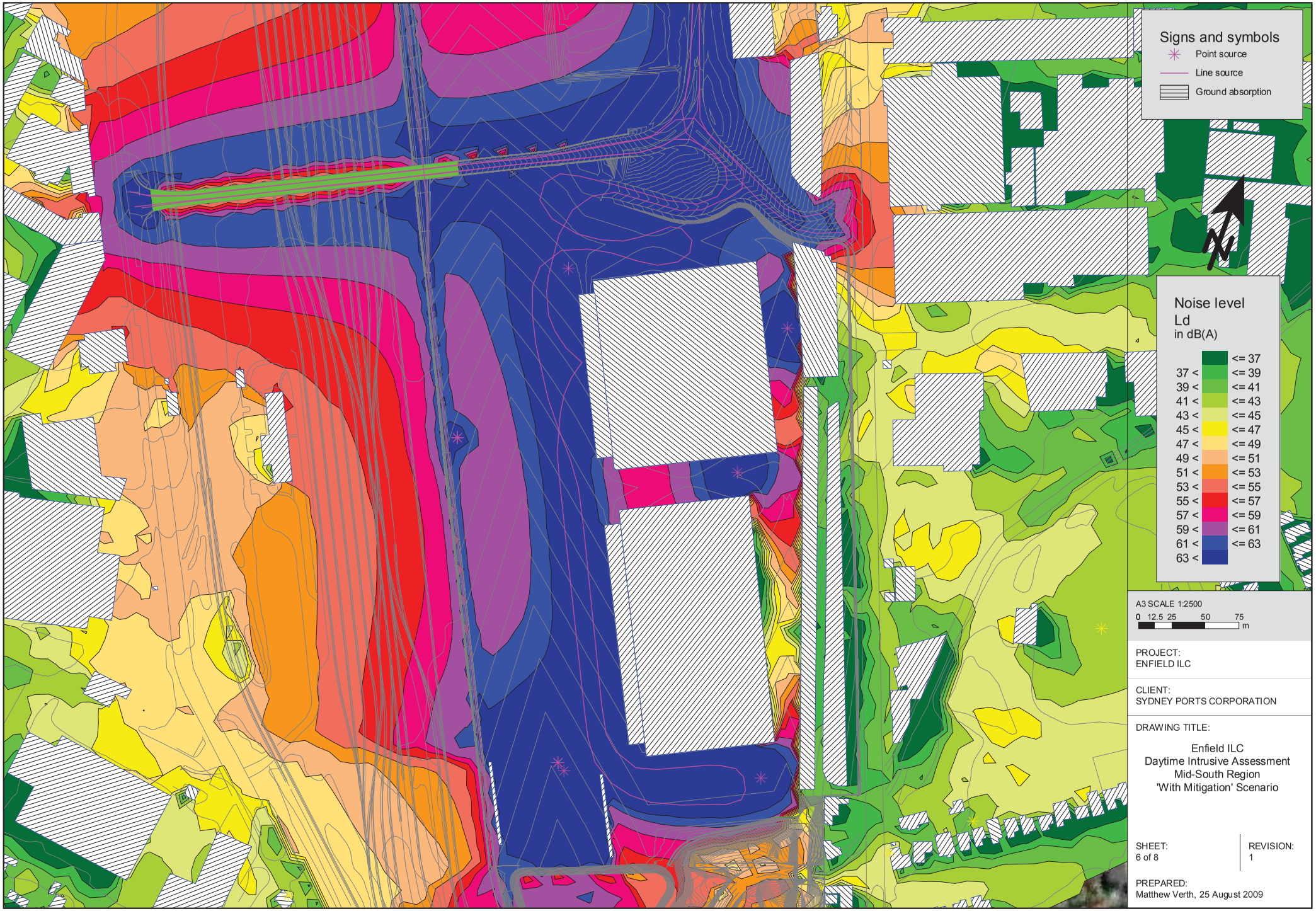
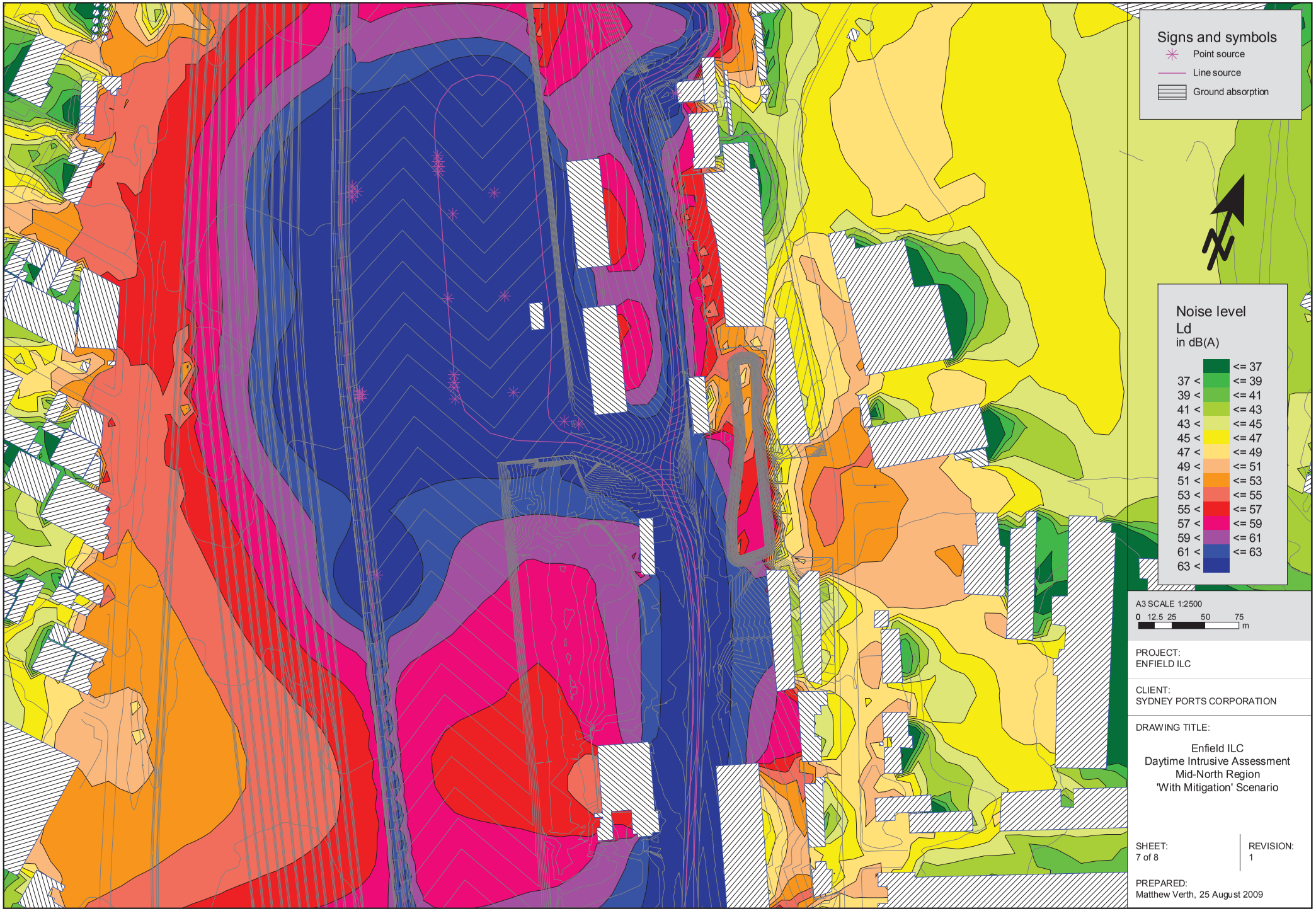
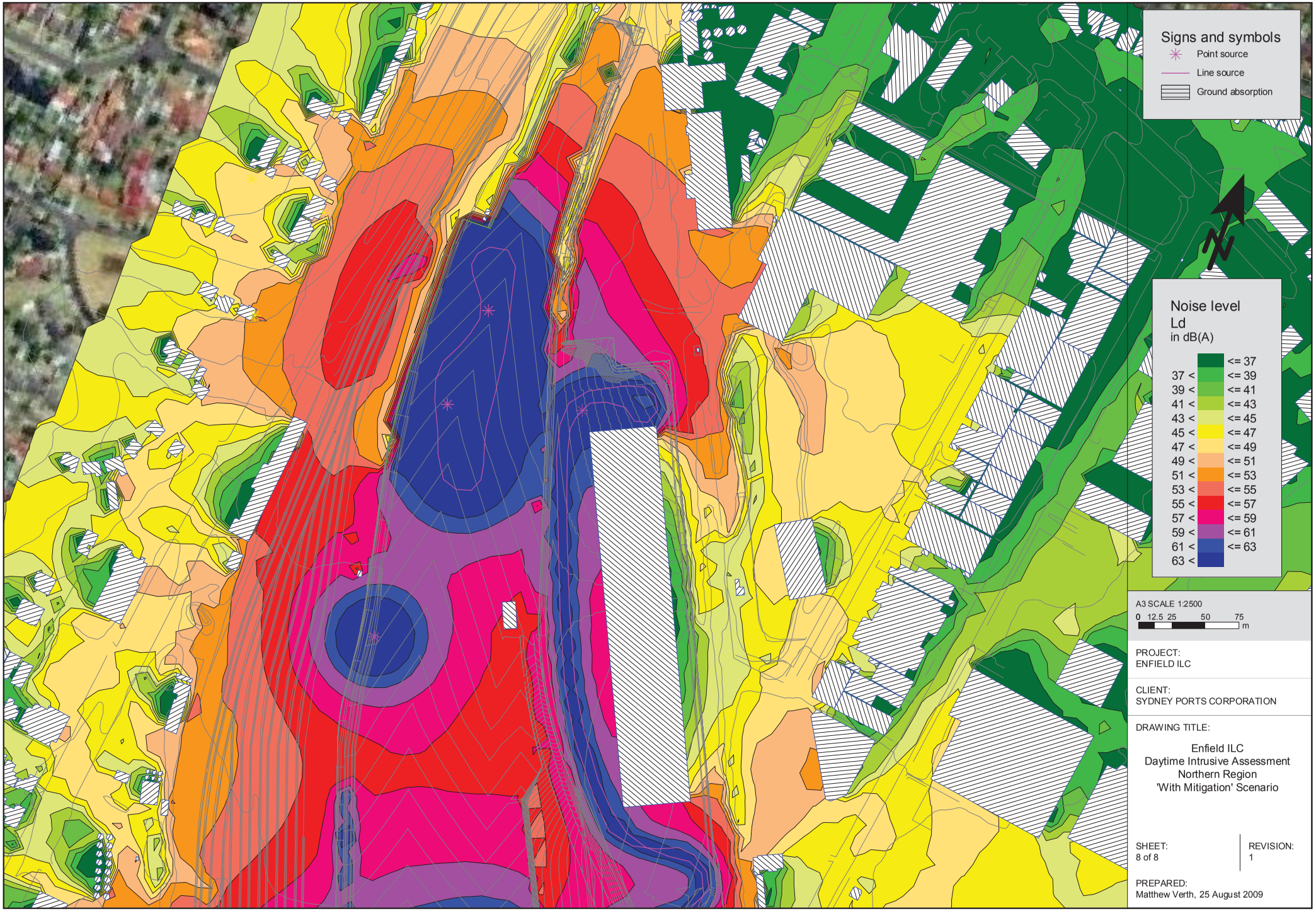
SYDNEY PORTS CORPORATION
DRAWING TITLE:
Enfield ILC
Daytime Intrusive Assessment
Southern Region
'With Mitigation' Scenario
SHEET:
5 of 8
REVISION:
1
PREPARED:
Matthew Verth, 25 August 2009


Signs and symbols
Point source
Line source
Ground absorption
N
Noise level
Ld
in dB(A)
<= 37
37 < <= 39
39 < <= 41
41 < <= 43
43 < <= 45
45 < <= 47
47 < <= 49
49 < <= 51
51 < <= 53
53 < <= 55
55 < <= 57
57 < <= 59
59 < <= 61
61 < <= 63
63 <
A3 SCALE 1:2500
0 12.5 25 50 75
m
PROJECT:
ENFIELD ILC
CLIENT:
SYDNEY PORTS CORPORATION
DRAWING TITLE:
Enfield ILC
Daytime Intrusive Assessment
Mid-South Region
'With Mitigation' Scenario
SHEET:
6 of 8
REVISION:
1
PREPARED:
Matthew Verth, 25 August 2009

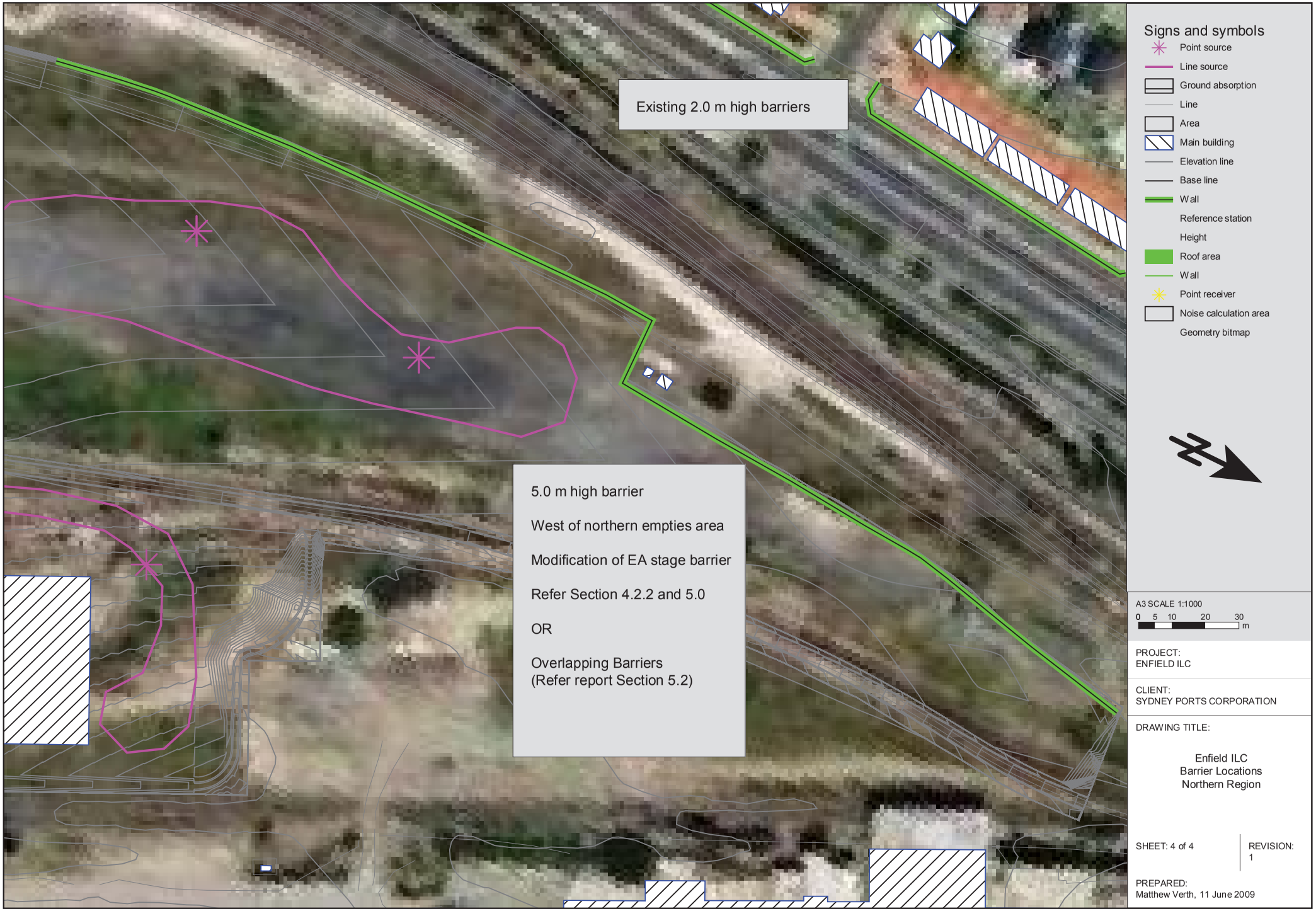

Signs and symbols
Point source
Line source
Ground absorption
Noise level
Ld
in dB(A)
<= 37
37 < <= 39
39 < <= 41
41 < <= 43
43 < <= 45
45 < <= 47
47 < <= 49
49 < <= 51
51 < <= 53
53 < <= 55
55 < <= 57
57 < <= 59
59 < <= 61
61 < <= 63
63 <
A3 SCALE 1:2500
0 12.5 25 50 75
m
PROJECT:
ENFIELD ILC
CLIENT:
SYDNEY PORTS CORPORATION
DRAWING TITLE:
Enfield ILC
Daytime Intrusive Assessment
Mid-North Region
'With Mitigation' Scenario
SHEET:
7 of 8
REVISION:
1
PREPARED:
Matthew Verth, 25 August 2009


Signs and symbols
Point source
Line source
Ground absorption
N
Noise level
Ld
in dB(A)
<= 37
37 < <= 39
39 < <= 41
41 < <= 43
43 < <= 45
45 < <= 47
47 < <= 49
49 < <= 51
51 < <= 53
53 < <= 55
55 < <= 57
57 < <= 59
59 < <= 61
61 < <= 63
63 <
A3 SCALE 1:2500
0 12.5 25 50 75
m
PROJECT:
ENFIELD ILC
CLIENT:
SYDNEY PORTS CORPORATION
DRAWING TITLE:
Enfield ILC
Daytime Intrusive Assessment
Northern Region
'With Mitigation' Scenario
SHEET:
8 of 8
REVISION:
1
PREPARED:
Matthew Verth, 25 August 2009

Appendix C Noise Barrier and Stacked Container Locations


Signs and symbols
Point source
Line source
Ground absorption
Line
Area
Main building
Elevation line
Base line
Wall
Reference station
Height
Roof area
Wall
Point receiver
Noise calculation area
Geometry bitmap
1.8 m high barrier, on top of 2.5 m landscaped mound.
Eastern perimeter of landscaped area.
Modification of EA stage barrier.
Refer Section 4.2.2
Existing 4.5 m Barrier, west of rail corridor
A3 SCALE 1:1000
0 5 10 20 30 m
PROJECT:
ENFIELD ILC
CLIENT:
SYDNEY PORTS CORPORATION
DRAWING TITLE:
Enfield ILC
Barrier Locations
Southern Lanscaped Region
SHEET:
1 of 3
REVISION:
1
PREPARED:
Matthew Verth, 25 August 2009


5.0 m high L-shaped barrier.
South-east of Warehouses A and B
Additional to EA stage mitigation
Refer Section 4.2.1 and 5.0
40 foot shipping containers
South-west of southern empties area
Stacked 10 long and 4 high
40 foot shipping containers
South-east of southern empties area
Stacked 10 long and 4 high
Signs and symbols
Point source
Line source
Ground absorption
Line
Area
Main building
Elevation line
Base line
Wall
Reference station
Height
Roof area
Wall
Point receiver
Noise calculation area
Geometry bitmap
A3 SCALE 1:1000
0 5 10 20 30
m
PROJECT:
ENFIELD ILC
CLIENT:
SYDNEY PORTS CORPORATION
DRAWING TITLE:
Enfield ILC
Barrier and
Container Stack Locations
Southern Region
SHEET:
2 of 3
REVISION:
1
PREPARED:
Matthew Verth, 25 August 2009


Existing 2.0 m high barriers
5.0 m high barrier
West of northern empties area
Modification of EA stage barrier
Refer Section 4.2.2 and 5.0
OR
Overlapping Barriers
(Refer report Section 5.2)
Signs and symbols
Point source
Line source
Ground absorption
Line
Area
Main building
Elevation line
Base line
Wall
Reference station
Height
Roof area
Wall
Point receiver
Noise calculation area
Geometry bitmap
A3 SCALE 1:1000
0 5 10 20 30 m
PROJECT:
ENFIELD ILC
CLIENT:
SYDNEY PORTS CORPORATION
DRAWING TITLE:
Enfield ILC
Barrier Locations
Northern Region
SHEET: 4 of 4
REVISION:
1
PREPARED:
Matthew Verth, 11 June 2009

Appendix B:

CONSULTATION

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RailCorp
Network Access: GPO Box 47 Sydney 2001
Level 15, 55 Market Street, Sydney NSW 2000
Tel: 02 9224 2311 Fax: 02 9224 3984
www.railcorp.info

29 April 2009

Letter Ref: D2009/27722
File Ref: F2008/20465

Mr Steve Zaczkiewicz
Senior Development Manager
Sydney Ports Corporation
Level 8, 207 Kent Street
SYDNEY NSW 2000

Dear Steve

Subject: Enfield Intermodal Logistics Centre (ILC)

I am writing in relation to the SPC ILC development at Enfield and in particular the construction of an acoustic wall on RailCorp property in the Roberts Road area.

I understand that following discussions in the ILC Rail Co-ordination Group (attended by ARTC, SPC and RailCorp) an alternative option has been developed by SPC which locates the acoustic wall within the ILC environs.

It is RailCorp's preference and we support in principle the relocation of the acoustic wall to the ILC subject to appropriate measures being undertaken to mitigate any potential noise reflectivity from operations in RailCorp's Enfield Yard or the Metropolitan freight main lines within the footprint of the proposed acoustic wall.

It would be appreciated if, at the appropriate design stage, advice can be provided that outlines the actions taken to mitigate any reflection noise.

It should be noted that RailCorp's response to Department of Planning on SPC's Environmental Assessment Report October 2005 included numerous conditions associated with the proposed Roberts Road noise mitigation.

RailCorp would consider those conditions being superseded if this option was pursued subject to a satisfactory resolution of any reflective noise issues that arise.

Yours sincerely

TONY GAUSDEN
General Manager, Network Access

Appendix C

DRAWINGS

DRAINAGE CATCHMENTS	MA-MD-CI-DR-170001 MA-MD-CI-DR-170002 MA-MD-CI-DR-170003
SEDIMENT BASINS	MA-MD-CI-DR-172001 BASIN B MA-MD-CI-DR-172003 BASIN D
LAYOUT OF LIC AREA	MA-MD-CI-SK-0101 AREA W MA-MD-CI-SK-0102 AREA X MA-MD-CI-SK-0103 AREA Y MA-MD-CI-SK-0104 AREA Z

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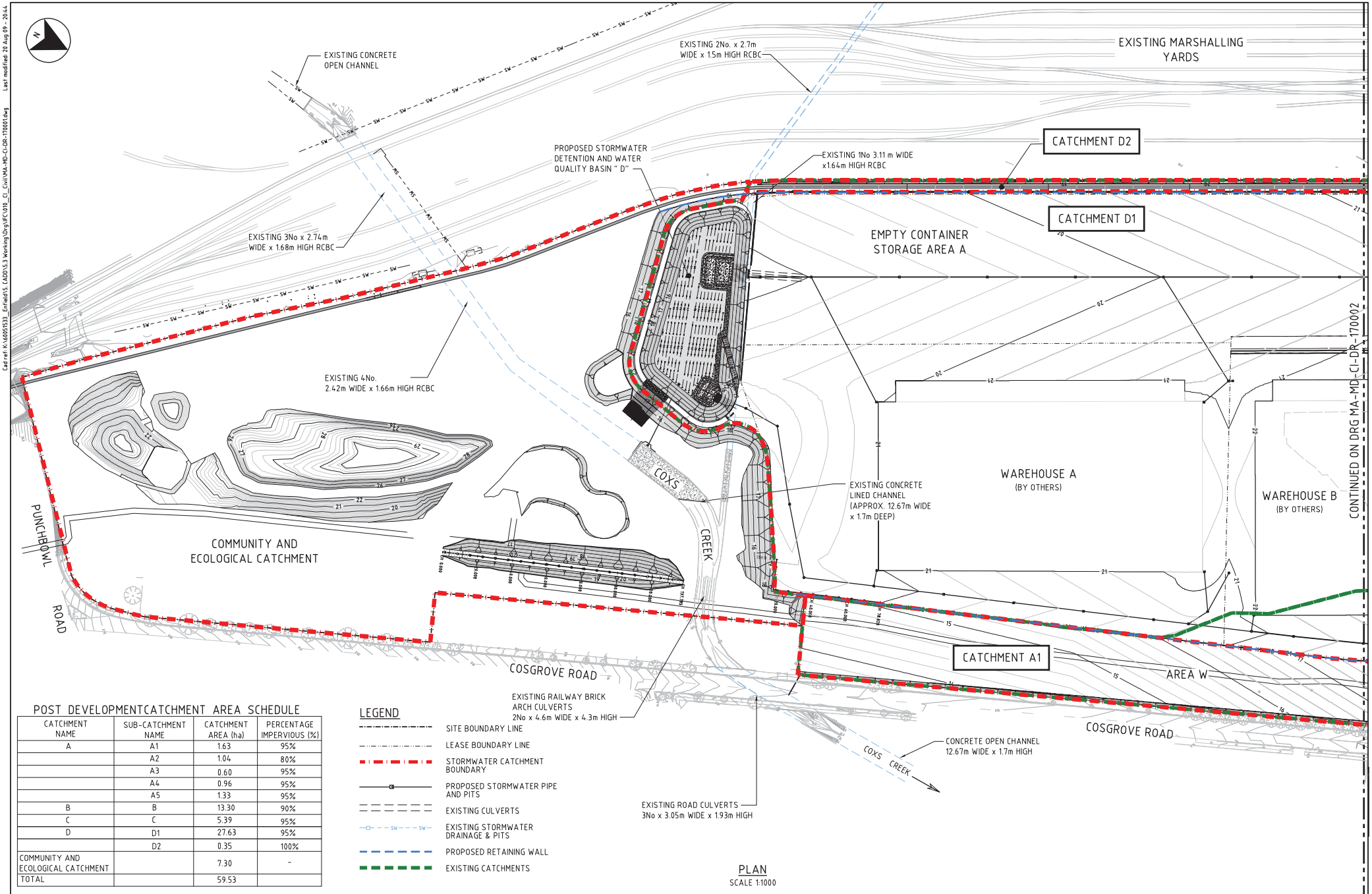


POST DEVELOPMENTCATCHMENT AREA SCHEDULE

CATCHMENT NAME	SUB-CATCHMENT NAME	CATCHMENT AREA (ha)	PERCENTAGE IMPERVIOUS (%)
A	A1	1.63	95%
	A2	1.04	80%
	A3	0.60	95%
	A4	0.96	95%
	A5	1.33	95%
B	B	13.30	90%
C	C	5.39	95%
D	D1	27.63	95%
	D2	0.35	100%
COMMUNITY AND ECOLOGICAL CATCHMENT		7.30	-
TOTAL		59.53	

LEGEND

- SITE BOUNDARY LINE
- LEASE BOUNDARY LINE
- STORMWATER CATCHMENT BOUNDARY
- PROPOSED STORMWATER PIPE AND PITS
- EXISTING CULVERTS
- EXISTING STORMWATER DRAINAGE & PITS
- PROPOSED RETAINING WALL
- EXISTING CATCHMENTS

PLAN
SCALE 1:1000

No.	BY	DATE	DESCRIPTION	APPD
01	MT	20.08.09	ISSUED FOR CONSTRUCTION	CS

THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED IN ACCORDANCE WITH THE MAUNSELL QUALITY ASSURANCE SYSTEM TO ISO 9001-2000

DESIGNED	A. KIELNIACZ	CHECKED	B.WITHNALL
DRAWN	T.TORJINSKI	CHECKED	P. STUART
APPROVED	CS	DATE	20.08.09

SCALES: 10 0 10 20 30 40 50m
1: 1000 FULL SIZE A1

CLIENT: SYDNEY PORTS — FIRST PORT, FUTURE PORT

DESIGNER: MAUNSELL AECOM
Maunsell Australia Pty Ltd A.B.N. 20 093 846 925

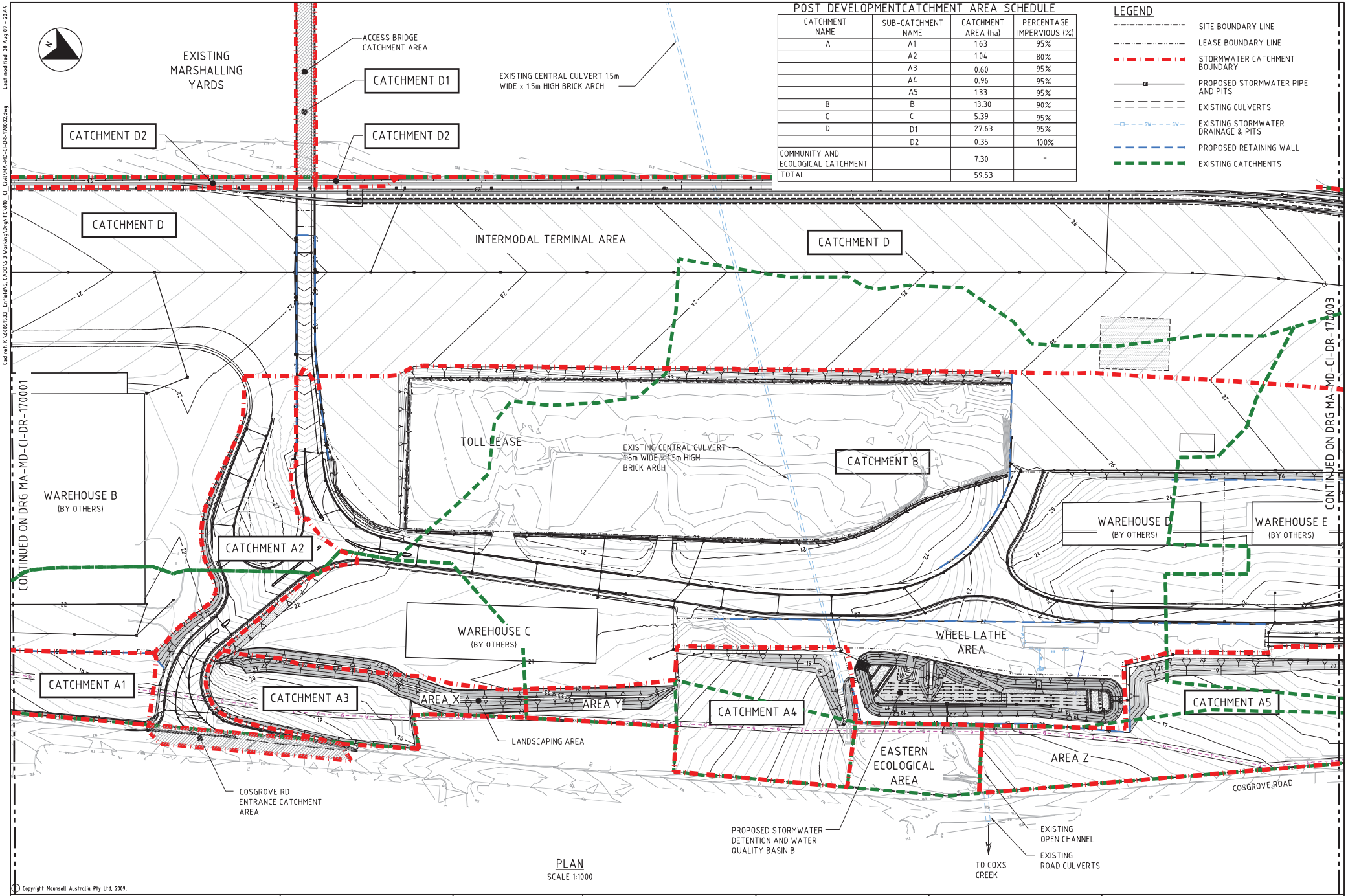
ILC AT ENFIELD

CIVIL WORKS PACKAGE
DRAINAGE CATCHMENT AND OVERALL SITE PLAN

SHEET 1

STATUS: FOR CONSTRUCTION
DRAWING NO: MA-MD-CI-DR-170001
REV: 01

Cad ref: K:\60051533_Enfield\5. CADD\5.3 Working\Dry\EC\010_CI_Civil\MA-MD-CI-DR-170001.dwg Last modified: 20 Aug 09 - 20:44



PLAN
SCALE 1:1000

POST DEVELOPMENTCATCHMENT AREA SCHEDULE

CATCHMENT NAME	SUB-CATCHMENT NAME	CATCHMENT AREA (ha)	PERCENTAGE IMPERVIOUS (%)
A	A1	1.63	95%
	A2	1.04	80%
	A3	0.60	95%
	A4	0.96	95%
	A5	1.33	95%
B	B	13.30	90%
C	C	5.39	95%
D	D1	27.63	95%
	D2	0.35	100%
COMMUNITY AND ECOLOGICAL CATCHMENT		7.30	-
TOTAL		59.53	

LEGEND

- SITE BOUNDARY LINE
- LEASE BOUNDARY LINE
- STORMWATER CATCHMENT BOUNDARY
- PROPOSED STORMWATER PIPE AND PITS
- EXISTING CULVERTS
- EXISTING STORMWATER DRAINAGE & PITS
- PROPOSED RETAINING WALL
- EXISTING CATCHMENTS

THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED IN ACCORDANCE WITH THE MAUNSELL QUALITY ASSURANCE SYSTEM TO ISO 9001:2000

DESIGNED	A. KIELNIACZ	CHECKED	B.WITHNALL
DRAWN	T.TORJINSKI	CHECKED	P. STUART
APPROVED	CS	DATE	20.08.09

No.	BY	DATE	DESCRIPTION	APPD
01	MT	20.08.09	ISSUED FOR CONSTRUCTION	CS

SCALES:
10 0 10 20 30 40 50m
1: 1000 FULL SIZE A1

CLIENT: SYDNEY PORTS — FIRST PORT, FUTURE PORT

DESIGNER: MAUNSELL AECOM
Maunsell Australia Pty Ltd A.B.N. 20 093 846 925

ILC AT ENFIELD

CIVIL WORKS PACKAGE
DRAINAGE CATCHMENT AND OVERALL SITE PLAN

SHEET 2

STATUS: FOR CONSTRUCTION
DRAWING NO: MA-MD-CI-DR-170002
REV: 01

POST DEVELOPMENTCATCHMENT AREA SCHEDULE

CATCHMENT NAME	SUB-CATCHMENT NAME	CATCHMENT AREA (ha)	PERCENTAGE IMPERVIOUS (%)
A	A1	1.63	95%
	A2	1.04	80%
	A3	0.60	95%
	A4	0.96	95%
	A5	1.33	95%
B	B	13.30	90%
C	C	5.39	95%
D	D1	27.63	95%
	D2	0.35	100%
COMMUNITY AND ECOLOGICAL CATCHMENT		7.30	-
TOTAL		59.53	

LEGEND

- SITE BOUNDARY LINE
- LEASE BOUNDARY LINE
- STORMWATER CATCHMENT BOUNDARY
- PROPOSED STORMWATER PIPE AND PITS
- EXISTING CULVERTS
- EXISTING STORMWATER DRAINAGE & PITS
- PROPOSED RETAINING WALL
- EXISTING CATCHMENTS

EXISTING DELEC CULVERT 2.02m WIDE x 1.84m HIGH BRICK ARCH

EXISTING MARSHALLING YARDS

CATCHMENT D

EMPTY CONTAINER STORAGE AREA

CATCHMENT B

CATCHMENT C

AREA F

PROPOSED SWALE DRAIN

DISCHARGE SWALE INTO PROPOSED DETENTION BASIN. 1400m³ APPROX. STORAGE REQUIREMENT.

EXITSING CESS DRAIN (BY OTHERS)

RAIL SIDING CATCHMENT AREA

EXISTING TRANSMISSION TOWER

PROPOSED DIVERSION DRAIN AT OF BATTER

EXISTING RCBC

COSGROVE ROAD

EXISTING ROAD CULVERTS

CONTINUED ON DRG MA-MD-CI-DR-170001

PLAN
SCALE 1:1000

No.	BY	DATE	DESCRIPTION	APPD
01	MT	20.08.09	ISSUED FOR CONSTRUCTION	CS

THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED IN ACCORDANCE WITH THE MAUNSELL QUALITY ASSURANCE SYSTEM TO ISO 9001-2000

DESIGNED	A. KIELNIACZ	CHECKED	B.WITHNALL
DRAWN	T.TORJINSKI	CHECKED	P. STUART
APPROVED	CS	DATE	20.08.09

SCALES: 10 0 10 20 30 40 50m
1: 1000 FULL SIZE A1

CLIENT: SYDNEY PORTS FIRST PORT, FUTURE PORT

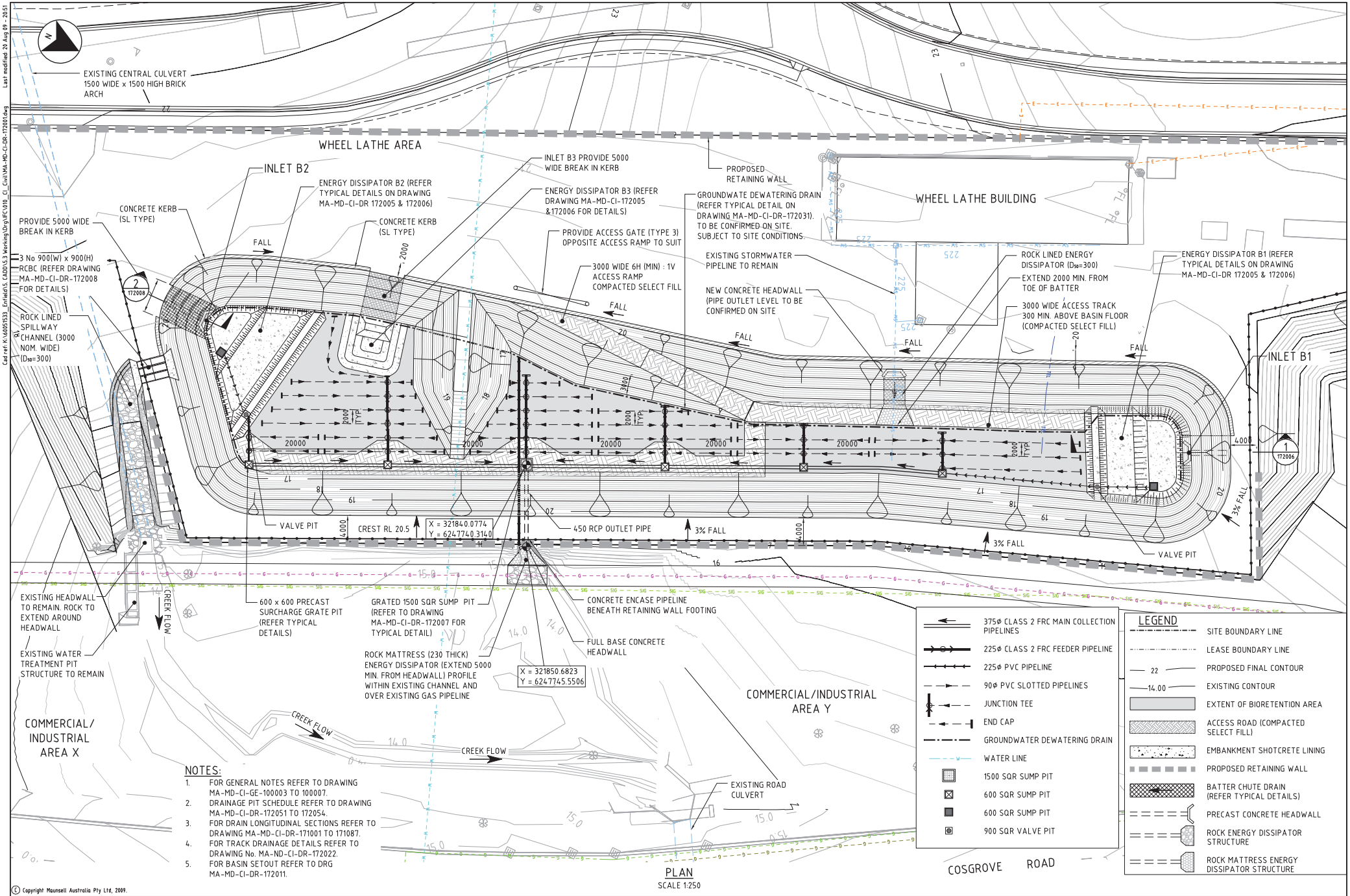
DESIGNER: MAUNSELL AECOM
Maunsell Australia Pty Ltd A.B.N. 20 093 846 925

ILC AT ENFIELD

CIVIL WORKS PACKAGE
DRAINAGE CATCHMENT AND OVERALL SITE PLAN

SHEET 3

STATUS: FOR CONSTRUCTION
DRAWING NO: MA-MD-CI-DR-170003
REV: 01



PLAN
SCALE 1:250

NOTES:

1. FOR GENERAL NOTES REFER TO DRAWING MA-MD-CI-GE-100003 TO 100007.
2. DRAINAGE PIT SCHEDULE REFER TO DRAWING MA-MD-CI-DR-172051 TO 172054.
3. FOR DRAIN LONGITUDINAL SECTIONS REFER TO DRAWING MA-MD-CI-DR-171001 TO 171087.
4. FOR TRACK DRAINAGE DETAILS REFER TO DRAWING No. MA-MD-CI-DR-172022.
5. FOR BASIN SETOUT REFER TO DRG MA-MD-CI-DR-172011.

No.	BY	DATE	DESCRIPTION	APPD
01	MT	20.08.09	ISSUED FOR CONSTRUCTION	CS

THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED IN ACCORDANCE WITH THE MAUNSELL QUALITY ASSURANCE SYSTEM TO ISO 9001-2000

DESIGNED	A. KIELNIACZ	CHECKED	B.WITHNALL
DRAWN	T.TORJINSKI	CHECKED	P. STUART
APPROVED	CS	DATE	20.08.09

SCALES: 2.5 0 5 10m
1 : 250 FULL SIZE A1

CLIENT: SYDNEY PORTS FIRST PORT, FUTURE PORT

DESIGNER: MAUNSELL AECOM
Maunsell Australia Pty Ltd A.B.N. 20 093 846 925

ILC AT ENFIELD

CIVIL WORKS PACKAGE
STORMWATER DETENTION AND WATER QUALITY BASIN B

STATUS: FOR CONSTRUCTION
DRAWING NO: MA-MD-CI-DR-172001
REV: 01

Last modified: 20 Aug 09 - 20:51
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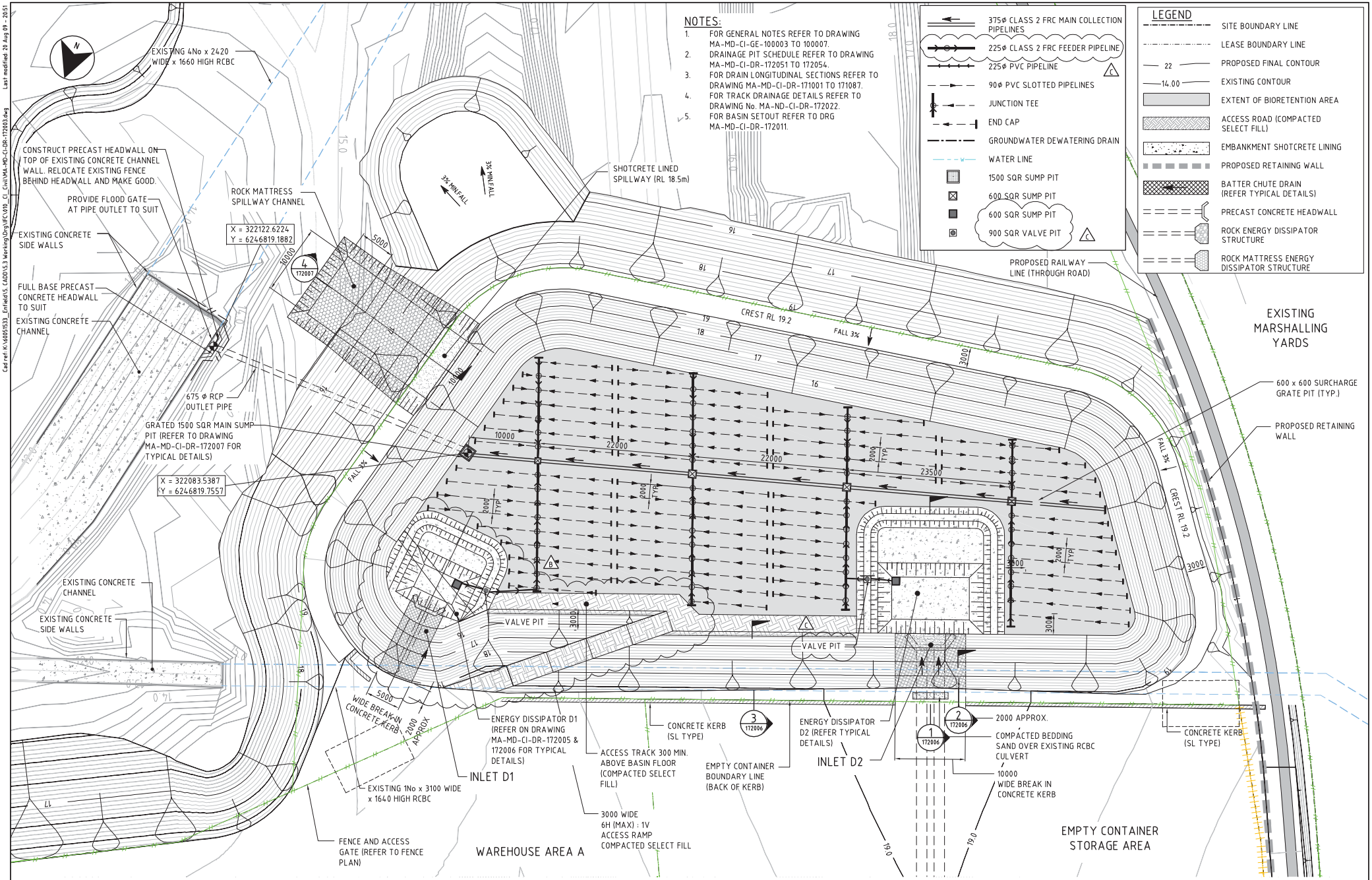

PLAN
SCALE 1:250

THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED IN ACCORDANCE WITH THE MAUNSELL QUALITY ASSURANCE SYSTEM TO ISO 9001-2000

DESIGNED	A. KIELNIACZ	CHECKED	B.WITHNALL
DRAWN	T.TORJINSKI	CHECKED	P. STUART
APPROVED	CS	DATE	20.08.09

No.	BY	DATE	DESCRIPTION	APPD
01	MT	20.08.09	ISSUED FOR CONSTRUCTION	CS

SCALES:
2.5 0 5 10m
1 : 250 FULL SIZE A1

CLIENT: SYDNEY PORTS
FIRST PORT, FUTURE PORT

DESIGNER: MAUNSELL AECOM
Maunsell Australia Pty Ltd A.B.N. 20 093 846 925

ILC AT ENFIELD
CIVIL WORKS PACKAGE
STORMWATER DETENTION AND WATER QUALITY BASIN D

STATUS: FOR CONSTRUCTION
DRAWING NO: MA-MD-CI-DR-172003
REV: 01

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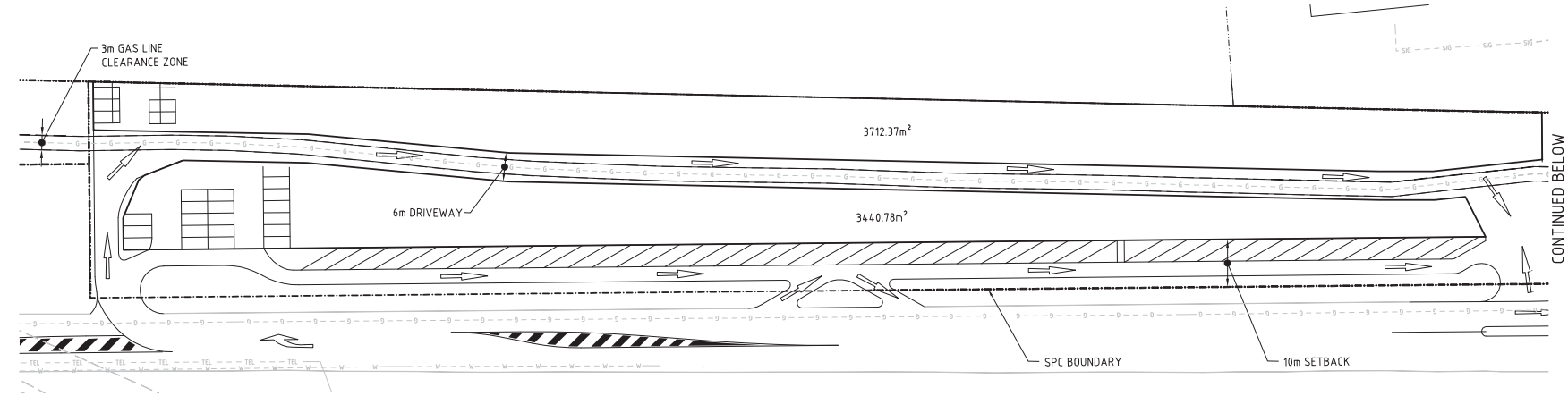
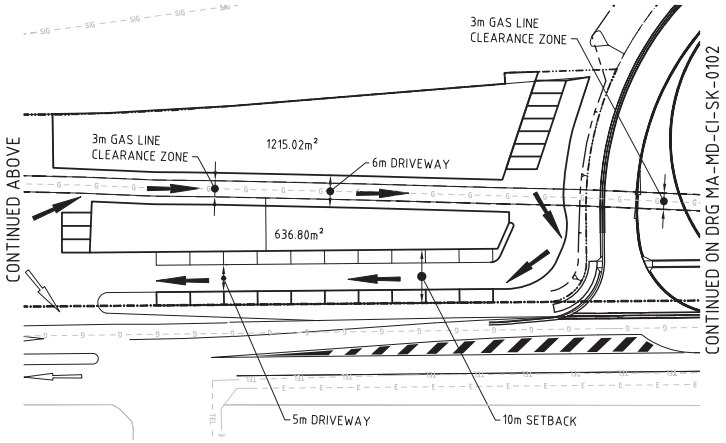
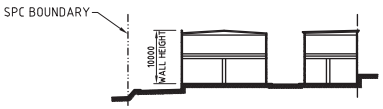


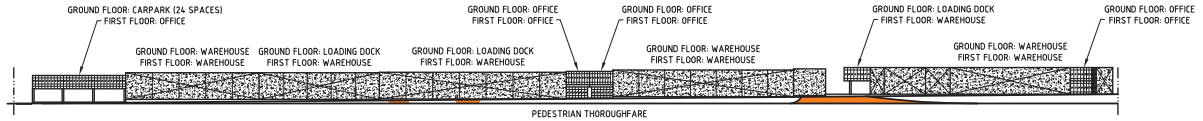
PLAN
SCALE 1:500

FLOOR SPACE ALLOWED = 16750m²
FLOOR SPACE PROVIDED = 18010m²
BUILDING FOOTPRINT = 9005m²
CAR SPACE REQUIRED = 1 SPACE PER 200m² (90)
CAR SPACE PROVIDED = 90 SPACES
FRONT SET BACK = MIN. 10m





INDICATIVE SECTION
(BY OTHERS)
SCALE 1:500



INDICATIVE AREA 'W' DEVELOPMENT PLAN
(BY OTHERS)
SCALE 1:1000

NOTES:

1. DRAWING TO BE REVIEWED IN CONJUNCTION WITH ORIGINAL CONCEPT LAYOUT DRAWINGS COMPLETED BY SKM (COSGROVE ROAD LIGHT INDUSTRIAL DEVELOPMENT DATED 27.07.07).
2. PLAN VIEW BOLD LINES INDICATE MODIFICATIONS TO BUILDING, PARKING AND SITE LAYOUT REVISIONS.
3. BUILDING AND PARKING MODIFICATIONS ARE BASED ON IMPACTS FROM EXISTING QENOS GAS LINE THAT RUNS THROUGH THE SITE.
4. LAYOUT AS PREVIOUSLY PROVIDED BY OTHERS HAS NOT BEEN VERIFIED FOR CODE COMPLIANCE (I.E. TURNING PATHS, DRIVEWAY LOCATIONS, SET BACKS). PLAN IS CONCEPT ONLY.

No.	BY	DATE	DESCRIPTION	APPD
C	JS	17.08.09	RE-ISSUE TO SPC-SPC COMMENTS	LD
B	JS	07.07.09	RE-ISSUE TO SPC-SPC COMMENTS	LD
A	SS	25.04.09	ISSUE TO SPC	CF

THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED IN ACCORDANCE WITH THE MAUNSELL QUALITY ASSURANCE SYSTEM TO ISO 9001-2000

DESIGNED	CF	CHECKED	CS
DRAWN	JS	CHECKED	JA
APPROVED	LD	DATE	17.08.09

SCALES:
1 : 500 FULL SIZE A1
1 : 1000 FULL SIZE A1

CLIENT: SYDNEY PORTS
FIRST PORT, FUTURE PORT

DESIGNER: MAUNSELL AECOM
Maunsell Australia Pty Ltd A.B.N. 20 093 846 925

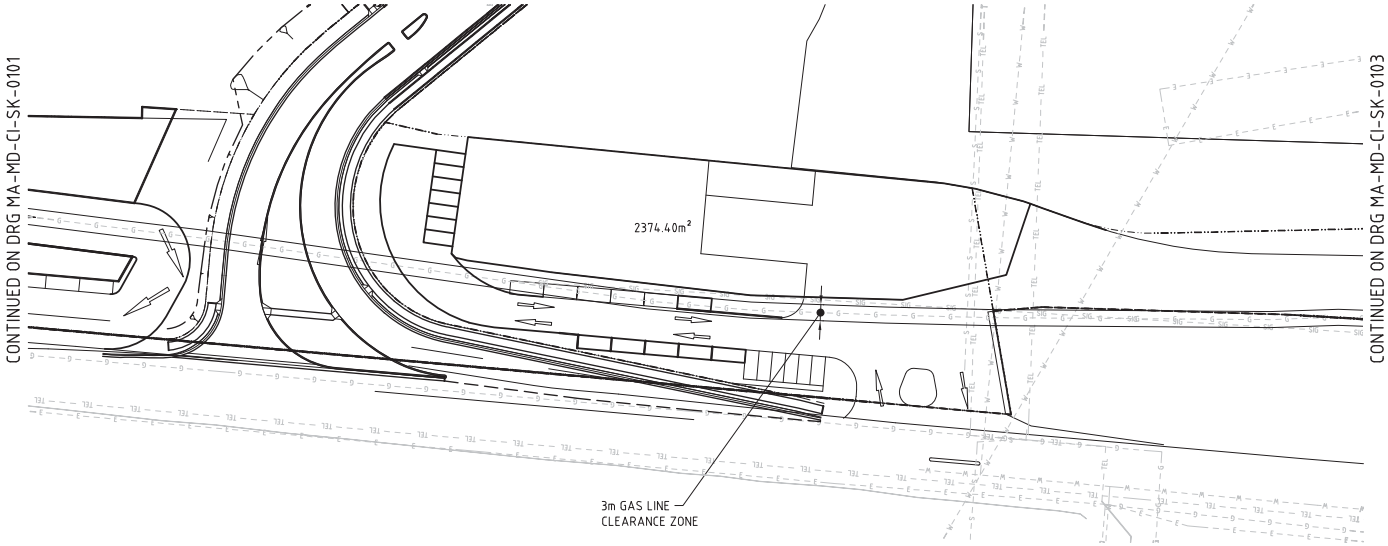
ILC AT ENFIELD

CONCEPT LAYOUT
COSGROVE ROAD LIGHT INDUSTRIAL
DEVELOPMENT AREA W

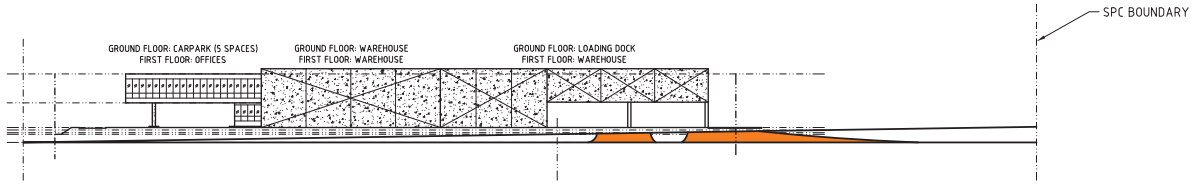
STATUS: SKETCH
DRAWING NO: MA-MD-CI-SK-0101
REV: C

Cad ref: K:\60055533_Enfield\5. CAD\5.3 Working\Drg\Sketches\MA-MD-CI-SK-0102.dwg Last modified: 21 Aug 09 - 14:10

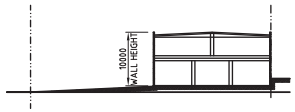
FLOOR SPACE ALLOWED = 5250m²
FLOOR SPACE PROVIDED = 4749m²
BUILDING FOOTPRINT = 2374m²
CAR SPACE REQUIRED = 1 SPACE PER 200m² (26)
CAR SPACE PROVIDED = 24 SPACES
FRONT SET BACK = MIN. 10m



PLAN
SCALE 1:500



INDICATIVE AREA 'X' DEVELOPMENT PLAN
(BY OTHERS)
SCALE 1:500



INDICATIVE SECTION
(BY OTHERS)
SCALE 1:500

NOTES:
1. DRAWING TO BE REVIEWED IN CONJUNCTION WITH ORIGINAL CONCEPT LAYOUT DRAWINGS COMPLETED BY SKM (COSGROVE ROAD LIGHT INDUSTRIAL DEVELOPMENT DATED 27.07.07).
2. PLAN VIEW BOLD LINES INDICATE MODIFICATIONS TO BUILDING, PARKING AND SITE LAYOUT REVISIONS.
3. BUILDING AND PARKING MODIFICATIONS ARE BASED ON IMPACTS FROM EXISTING QENOS GAS LINE THAT RUNS THROUGH THE SITE.
4. LAYOUT AS PREVIOUSLY PROVIDED BY OTHERS HAS NOT BEEN VERIFIED FOR CODE COMPLIANCE (I.E. TURNING PATHS, DRIVEWAY LOCATIONS, SET BACKS). PLAN IS CONCEPT ONLY.

No.	BY	DATE	DESCRIPTION	APPD
C	JS	17.08.09	RE-ISSUE TO SPC-SPC COMMENTS	LD
B	JS	07.07.09	RE-ISSUE TO SPC-SPC COMMENTS	LD
A	SS	25.04.09	ISSUE TO SPC	CF

THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED IN ACCORDANCE WITH THE MAUNSELL QUALITY ASSURANCE SYSTEM TO ISO 9001-2000

DESIGNED	CF	CHECKED	CS
DRAWN	JS	CHECKED	JA
APPROVED	LD	DATE	17.08.09

SCALES: 5 0 10 20m
1:500 FULL SIZE A1

CLIENT: SYDNEY PORTS
FIRST PORT, FUTURE PORT

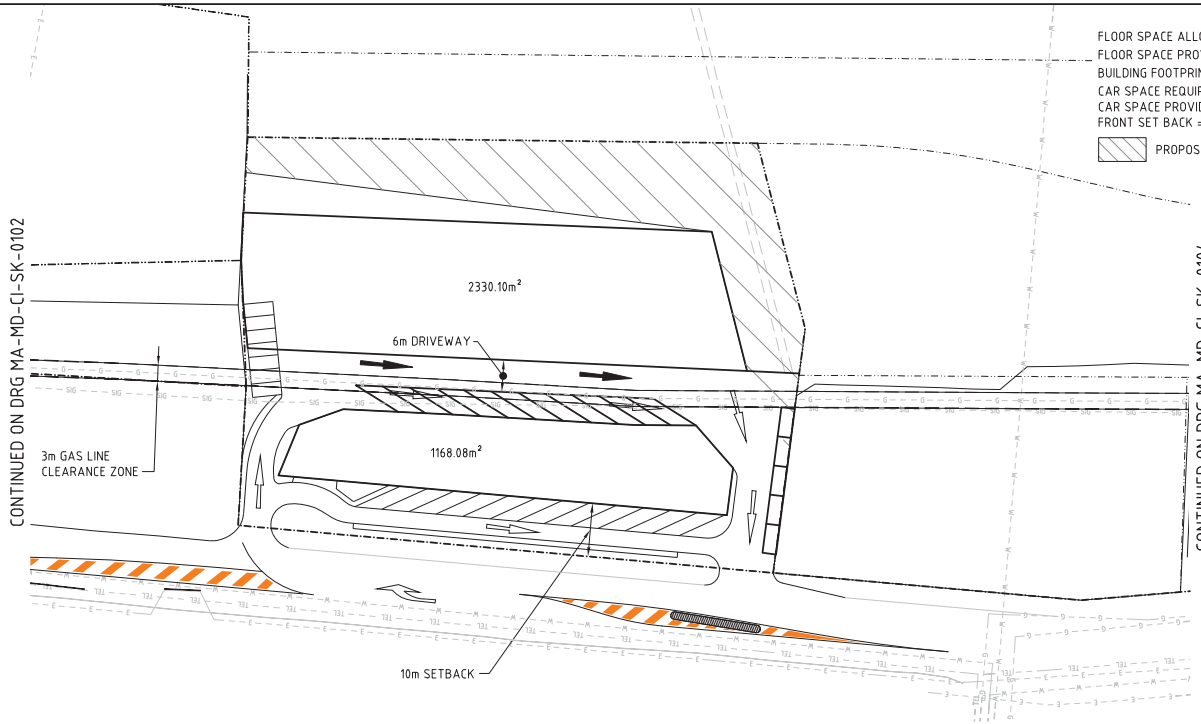
DESIGNER: MAUNSELL AECOM
Maunsell Australia Pty Ltd A.B.N. 20 093 846 925

ILC AT ENFIELD

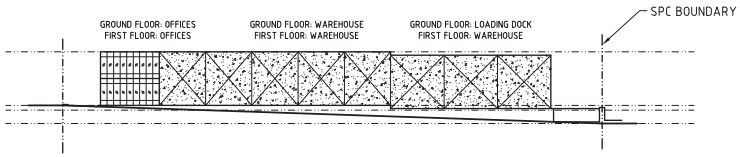
CONCEPT LAYOUT
COSGROVE ROAD LIGHT INDUSTRIAL
DEVELOPMENT AREA X

STATUS: SKETCH
DRAWING NO: MA-MD-CI-SK-0102
REV: C

Cad ref: K:\60055533_Enfield\5. CAD\5.3 Working\Drg\Sketches\MA-MD-CI-SK-0103.dwg Last modified: 21 Aug 09 - 14:10



PLAN
SCALE 1:500



INDICATIVE AREA 'Y' DEVELOPMENT PLAN
(BY OTHERS)
SCALE 1:500

INDICATIVE SECTION
(BY OTHERS)
SCALE 1:500

NOTES:

1. DRAWING TO BE REVIEWED IN CONJUNCTION WITH ORIGINAL CONCEPT LAYOUT DRAWINGS COMPLETED BY SKM (COSGROVE ROAD LIGHT INDUSTRIAL DEVELOPMENT DATED 27.07.07).
2. PLAN VIEW BOLD LINES INDICATE MODIFICATIONS TO BUILDING, PARKING AND SITE LAYOUT REVISIONS.
3. BUILDING AND PARKING MODIFICATIONS ARE BASED ON IMPACTS FROM EXISTING QENOS GAS LINE THAT RUNS THROUGH THE SITE.
4. LAYOUT AS PREVIOUSLY PROVIDED BY OTHERS HAS NOT BEEN VERIFIED FOR CODE COMPLIANCE (I.E. TURNING PATHS, DRIVEWAY LOCATIONS, SET BACKS). PLAN IS CONCEPT ONLY.

No.	BY	DATE	DESCRIPTION	APPD
C	JS	17.08.09	RE-ISSUE TO SPC-SPC COMMENTS	LD
B	JS	07.07.09	RE-ISSUE TO SPC-SPC COMMENTS	LD
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DESIGNED	CF	CHECKED	CS
DRAWN	JS	CHECKED	JA
APPROVED	LD	DATE	17.08.09

SCALES:
5 0 10 20m
1 : 500 FULL SIZE A1

CLIENT: SYDNEY PORTS
FIRST PORT, FUTURE PORT

DESIGNER: MAUNSELL AECOM
Maunsell Australia Pty Ltd A.B.N. 20 093 846 925

ILC AT ENFIELD

CONCEPT LAYOUT
COSGROVE ROAD LIGHT INDUSTRIAL
DEVELOPMENT AREA Y

STATUS: SKETCH
DRAWING NO: MA-MD-CI-SK-0103
REV: C

Last modified: 21 Aug 09 - 14:10

Cad ref: K:\60055533_Enfield\5_CADD\5.3 Working\Drg\Sketches\MA-MD-CI-SK-0104.dwg

CONTINUED ON DRG MA-MD-CI-SK-0103

FLOOR SPACE ALLOWED = 13200m²
FLOOR SPACE PROVIDED = 10859m²
BUILDING FOOTPRINT = 5429m²
CAR SPACE REQUIRED = 1 SPACE PER 200m² (65)
CAR SPACE PROVIDED = 65 SPACES
FRONT SET BACK = MIN. 10m

PROPOSED BATTER SLOPES

MIN. 6m DRIVEWAY

MIN. 3m CLEARANCE

3m GAS LINE CLEARANCE ZONE

4009.65m²

1419.65m²

10m SETBACK

PLAN
SCALE 1:500

GROUND FLOOR: CAR PARK (16 SPACES)
FIRST FLOOR: OFFICES

GROUND FLOOR: OPEN SPACE
FIRST FLOOR: WAREHOUSE

GROUND FLOOR: WAREHOUSE
FIRST FLOOR: WAREHOUSE

GROUND FLOOR: OFFICES
FIRST FLOOR: OFFICES

GROUND FLOOR: LOADING DOCK
FIRST FLOOR: WAREHOUSE

GROUND FLOOR: WAREHOUSE
FIRST FLOOR: WAREHOUSE

GROUND FLOOR: WAREHOUSE
FIRST FLOOR: WAREHOUSE

GROUND FLOOR: LOADING DOCK
FIRST FLOOR: OFFICE

SPC BOUNDARY

INDICATIVE AREA 'Z' DEVELOPMENT PLAN (BY OTHERS)
SCALE 1:500

10000 WALL HEIGHT

INDICATIVE SECTION (BY OTHERS)
SCALE 1:500

NOTES:

1. DRAWING TO BE REVIEWED IN CONJUNCTION WITH ORIGINAL CONCEPT LAYOUT DRAWINGS COMPLETED BY SKM (COSGROVE ROAD LIGHT INDUSTRIAL DEVELOPMENT DATED 27.07.07).
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DESIGNED	CF	CHECKED	CS
DRAWN	JS	CHECKED	JA
APPROVED	LD	DATE	17.08.09

SCALES: 5 0 10 20m — 1:500 FULL SIZE A1

CLIENT: SYDNEY PORTS — FIRST PORT, FUTURE PORT

DESIGNER: MAUNSELL AECOM

Maunsell Australia Pty Ltd A.B.N. 20 093 846 925

ILC AT ENFIELD

CONCEPT LAYOUT
COSGROVE ROAD LIGHT INDUSTRIAL
DEVELOPMENT AREA Z

STATUS: SKETCH

DRAWING NO: MA-MD-CI-SK-0104

REV: C