Intermodal Logistics Centre at Enfield

Modification Application 05_0147 – Project Adjustments

Supporting Information to Modification Application

ILC – E – PT3A – Supporting Information to Modification Application

26 March 2010

Revision A

SYDNEY PORTS

FIRST PORT, FUTURE PORT

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1 Background

1.1 Introduction

Sydney Ports Corporation **(Sydney Ports)** submitted an application, and associated report dated 31 August 2009, 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).

The modification application was submitted under Section 75W of the EP&A Act and applied to project changes resulting from the detailed design phase (ie. project adjustments) and to a number of Conditions of Approval related to the construction phase of the project.

As part of its assessment process, DoP has requested Sydney Ports to provide additional information with regard to potential operational noise impacts and proposed noise controls. Sydney Ports has prepared this report to address DoP's comments.

DoP's comments are summarised in Section 1.2. Section 2 provides Sydney Ports' response to the comments made by DoP. Appendix A contains a report with additional noise modelling undertaken in response to DoP's comments.

1.2 Summary of DoP's Comments

The comments made by DoP in regards to the proposed noise wall arrangement presented in the Modification Application report (Sydney Ports, August 2009) are summarised below:

1 Extent of the eastern noise wall: justification for the removal of part of the eastern noise wall.

2 Proposed south-east noise wall arrangement and potential impacts of operational noise on residential areas located to the south-east of the ILC site.

3 The noise assessment in the modification application is based on warehouses and buildings in the Light Industrial Commercial (LIC) area being constructed before the terminal and empty container storage (ECS) areas commence operations. DoP requested information on noise impacts and temporary noise controls in the event that the terminal commences operations before the warehouses and LIC buildings are in place.

4 DoP asked if the operational noise criteria stipulated in Condition of Approval (CoA) 2.17 apply to the results obtained for the adverse meteorological conditions modelled in the modification application.

Responses to items 1 to 4 are provided in Sections 2.1 to 2.4 respectively.

2 Response to DoP's Comments

In response to DoP's comments, Sydney Ports has revised the proposed noise controls at the south-eastern part of the site. Additional modelling has been carried out to address the revised design at the south-eastern part of the site (item 2 above, with modelling results provided in Section 2.2) and to assess impacts of site operations without warehouses and the buildings of the LIC area (item 3 above, with modelling results provided in section 2.3). Details are provided below.

2.1 Extent of Eastern Noise Wall

2.1.1 Surrounding Landuses to Proposed ILC Industrial Development

Landuses adjacent to the east of the operational areas of the ILC site are industrial premises (refer to Figure 1). Residential development occurs to the south-east of the ILC site (south of Coxs Creek). No industrial or commercial development is proposed at the south-eastern part of the ILC site which will remain as a buffer zone (ie. proposed ecological and heritage area) (refer to Figure 1). Noise controls in the south-east area are discussed in Section 2.2. The justification for the removal of large part of the eastern noise wall, based on the acoustic assessment, is discussed below.

2.1.2 Modeling Results - Eastern Frontage

AECOM's detailed design acoustic assessment (August 2009) states that all receivers on the eastern frontage of the ILC site are classified as 'Industrial' receivers according to the NSW Industrial Noise Policy (INP, 2000). These receivers would be subject to an industrial criterion of 70 dB(A) 'when in use'. AECOM (August 2009) reported daytime amenity noise levels due to the likely ILC operation at these industrial receivers of no more than 55 dB(A), which is significantly below the industrial criteria.

Based on modelling operational noise from the site, the residential receivers further east of the existing industrial area (St Anne's School and 'Western end of Gregory Street') would experience noise levels below their respective criteria during all meteorological conditions modelled. These conclusions were based on modelling all operational noise from the site, including any noise emission escaping from the 'gaps' between the ILC warehouses (AECOM, November 2009).

Based on the model results, AECOM (August 2009) found that the great majority of the eastern noise wall was redundant and served no function as a noise barrier. Consequently the section of the noise wall next to the industrial landuses was removed from the design. A L-shaped noise wall at the south-eastern corner of the Warehouse A hardstand area (as shown in Figure 2 of the Modification Application Report (Sydney Ports, August 2009)) was proposed in AECOM (August 2009) to provide shielding to the receivers at the western end of Blanche St from vehicle movements south of Warehouses A and B and supplement shielding from reach stacker operations. The revised arrangement to protect residences to the south-east of the ILC site is discussed in Section 2.2.

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NOTE : STATED MEASUREMENTS ARE INDICATIVE ONLY AND SUBJECT TO SURVEY

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

Scale in Metres

N

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PLAN PRODUCED ON MGA GRID

ILC ENFIELD
FIGURE 1: SITE AND SURROUNDING LAND USE

DRAFTED BY: A.K.	DATE: 17/03/2011	PLAN SCALE: AS PER SCALE BAR
PROJECT CODE: ILC-E-C-FIG 1 MOD 4 DoP RESPONSE		DWG NO: SENP085A

2.2 South-East Noise Control Arrangement

2.2.1 Landuse Considerations

The residential areas to the south-east of the Sydney Ports' site are currently shielded from the proposed operational areas of the ILC site by (see Figure 1):

- the Tarpaulin Factory (a building more than 120 m long and 6-8 m high);
- a large vegetated and stabilised mound more than 10 m high located within the south-eastern part of the ILC site ('Mt Enfield'); and
- existing warehousing development outside the Sydney Ports' site, located along Cosgrove Rd between the south-eastern residential area and the south-eastern part of the ILC site (refer to Figure 1). A new large warehouse at least 6 m high and about 80 m long was built in 2009 in the area immediately south of Coxs Creek. The new warehouse provides a significant barrier between the residential development and the ILC site.

Once the ILC site has been developed, the south-eastern residential area will also be shielded from noise generated by the ILC operations by (see Figure 2):

- the buildings in the LIC Area W, which are 10 – 12 m high (refer to Figure 2 of this report and Drawing MA-MD-CI-SK-0101C attached in Appendix C of the Modification Application Report (August 2009));
- Warehouse Buildings A and B, which are up to 12 m in height; and
- noise walls located south and north of Coxs Creek (refer to Figure 2).

No noise wall is proposed to be constructed over the Coxs Creek Channel and the areas immediately adjacent to the channel.

The land adjacent to Coxs Creek within the ILC site form part of the Coxs Creek floodplain. During high flow events greater than 10 year average recurrence interval (ARI), the capacity of the Coxs Creek channel is exceeded and the excess flow surcharges overland across RailCorp's Marshalling Yards and onto the Coxs Creek floodplain within the ILC site. The overland flow eventually rejoins the open channel section of Coxs Creek within the ILC site before flowing under Cosgrove Road. A more detailed description of the Coxs Creek drainage system and flood regime is provided in the Enfield ILC Hydrology and Hydraulics study report attached to the ILC Environmental Assessment (SKM, 2005).

Consequently, the detailed design does not include any structures over the Coxs Creek Channel, including noise walls, that could potentially have a negative impact upon the Coxs Creek's floodplain.

2.2.2 Revised South-East Noise Control Arrangement and Modelling Results

The noise control arrangements at the south-eastern part of the site have been subject to additional review and assessment. This has resulted in some layout changes as discussed below.

Sydney Ports' design engineers and acoustic experts have advised that moving Warehouse A to the south will provide an effective measure to mitigate noise emission from the ILC and southern ECS area to the south-east residential area. Consequently Warehouse A has been moved 37m to the south.

Figure 2 shows the proposed revised location for Warehouse A in the south-eastern area of the site. The previously proposed L-shaped 80m long 5m high noise wall located at the south-eastern corner of the Warehouse A hardstand area (as shown in Figure 2 of Sydney Ports' Modification Application Report (August 2009)) has been shortened by 37 m at its northern end. This section of the noise wall, which is located between the 10 – 12 m high building in the LIC area and Warehouse A, would be made redundant and would not perform any noise mitigation function due to the relocation of Warehouse A. Figure 2 also shows the layout of the 10-12m high buildings in the LIC area.

AECOM has modelled the noise generated from site operations under the revised arrangement (refer Appendix A).

Under this scenario, the stacked containers at the eastern edge of the southern ECS area, which were previously suggested to mitigate sleep disturbance events, have been removed from the model. Table 2.1 below contains the model results, together with the day-time and night-time intrusive and amenity criteria and the sleep disturbance criteria (the latter under the worst case meteorological conditions) for the residential receiver location A5 in Blanche Street to the south-east of the site.

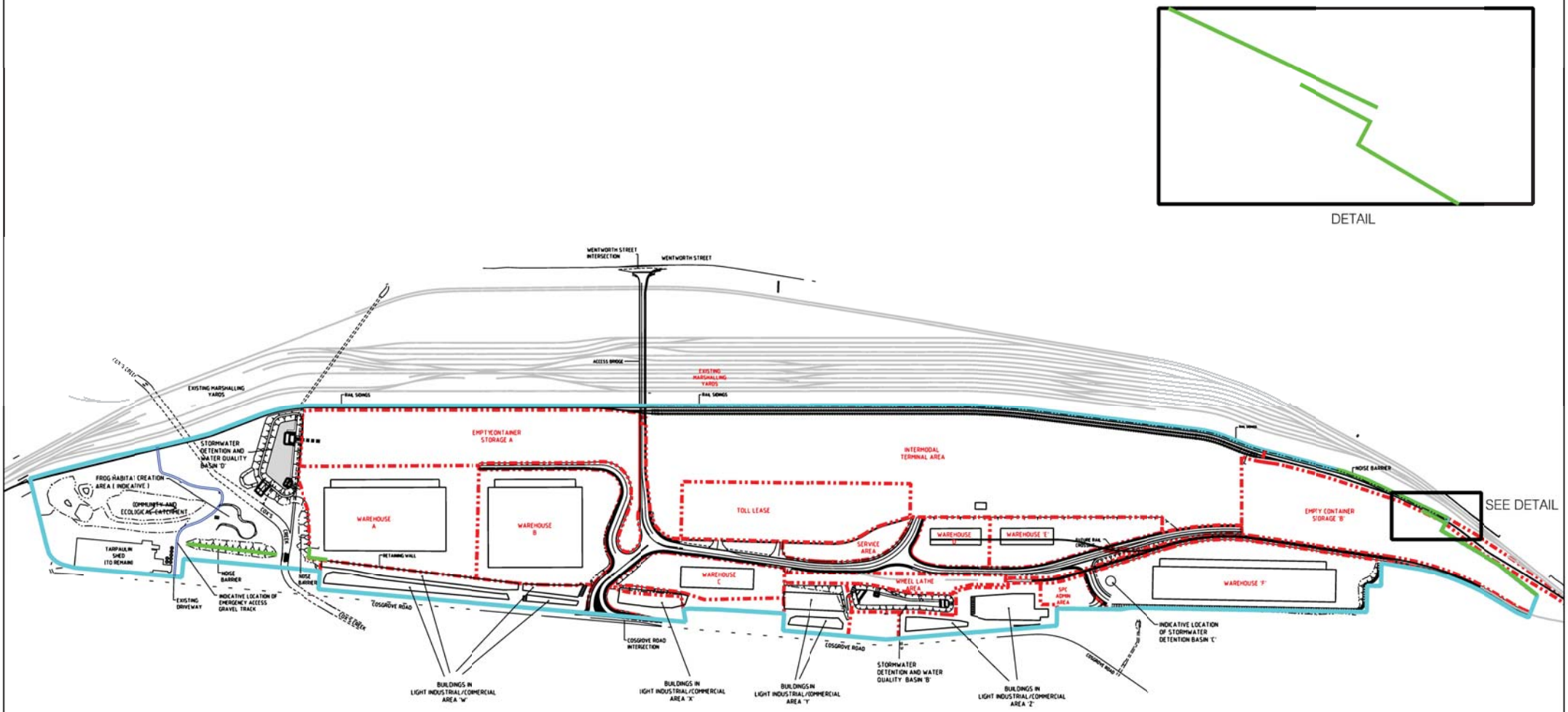
Table 2.1: Noise Levels at Residential Receiver Location A5 (Western end of Blanche St) (with Warehouse A relocated 37 m to the south)

Scenario	Criterion	Result	Compliance
Neutral Conditions			
Daytime Intrusive	46	40	Yes
Daytime Amenity	50	38	Yes
Night-time Intrusive	43	38	Yes
Night-time Amenity	43	31	Yes
North-westerly wind 2.5 m/s			
Daytime Intrusive	46	42	Yes
Daytime Amenity	50	40	Yes
Night-time Intrusive	43	40	Yes
Night-time Amenity	43	33	Yes
Sleep Disturbance	53	47	Yes

The results in Table 2.1 show that the relocation of Warehouse A to the south achieves compliance at location A5 with the criteria under all of the meteorological conditions and assessment periods modelled.

The AECOM modelling showed whilst the relocation of Warehouse A could result in noise benefits at the Blanche Street receivers, it may also result in higher operational noise levels at receivers to the east of the site in the vicinity of Madeline Street, east of Jim Begnell Park. This is due to the larger 'gap' between the warehouses and, principally, the increased exposure of this receiver catchment to the truck line source that would pass across this gap.

Calculation results show that whilst noise levels at the most potentially-affected receiver in Madeline Street are up to 3 dB(A) higher than at Blanche Street (with the



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ILC Boundary

Location of Noise Wall / Barriers

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PLAN PRODUCED ON MGA GRID

SYDNEY FIGURE 2: ILC ENFIELD SITE LAYOUT

DRAFTED BY: J.T. APPROVED: [illegible] PLOTTED AT 1:[illegible] ER SCALE BAR

PROJECT CODE: [illegible] DRAWING: SEDP150A

night-time intrusive noise emission equalling the criteria), the noise levels comply with the project amenity, intrusive and sleep disturbance criteria derived from the Blanche Street unattended noise logging location from the EA (SKM, 2005) stage.

2.2.3 Summary – Proposed changes in South-East Layout area

In accordance with the modelling and assessment carried out by AECOM (Appendix A), Sydney Ports has revised the layout of the south-eastern part of the ILC as discussed above. This change in summary involves (refer to Figure 2):

- Moving Warehouse A 37m to the south;
- Optimising the L-shape noise wall located at the south-eastern corner of the Warehouse A hardstand area. This wall been shortened by 37 m at its northern end as this section, which is located between the 10 – 12 m high building in the LIC area and Warehouse A, would not perform any noise mitigation function with the relocated Warehouse A.

The layout in Figure 2 replaces the layout shown in Figure 2 of Sydney Ports (August 2009)'s Modification Application assessment report.

2.3 Operational Site Noise without Buildings

The noise assessment in the modification application report (Sydney Ports, August 2009) was based on warehouses and buildings in the LIC area being in place during the operation of the IMT and the ECS areas. Warehouses and buildings in the LIC areas will be constructed by the tenants and operators of these buildings during the staged delivery of the project. DoP requested additional information to assess potential temporary noise impacts of terminal operations before the warehouses and LIC buildings were constructed.

2.3.1 Program and Throughput Considerations

Table 2.2 below provides the anticipated completion dates for the development of the various areas within the ILC site.

Table 2.2: Predicted Completion Dates under ILC Program

ILC Area	Expected completion date (current program)
LIC area south	April 2011
Warehouses A and B	May 2011
Warehouses C, D and E	July 2011
Warehouse F	August 2011
LIC area north	December 2011
ECS	October 2011
IMT	December 2011

Unless the program is subject to significant changes, the IMT and the ECS areas will not commence operations prior to completion of the construction of the warehouses and buildings in the LIC areas.

The EA (SKM, 2005) predicted that the throughput of the ILC would be 100,000 TEU in its first year of operation. The maximum capacity of 300,000 TEU per annum would be gradually reached within 8 to 10 years of operation. Should the development of warehouses and/or buildings in the LIC areas be delayed, the IMT and ECS areas would only operate at one third of capacity in the first year and about 50% capacity in the second year.

The operation of the ILC at maximum throughput capacity (ie. 300,000 TEU) was based on the assumption that the entire development, including warehouses, was complete. Therefore, any temporary noise impacts due to the operation of the IMT and ECS areas without buildings present would occur under a scenario where the IMT and ECS areas were operating at a reduced throughput capacity.

2.3.2 Model of Operations without Warehouses and LIC Buildings

Notwithstanding the program and throughput considerations discussed above, AECOM (March 2010) modelled ILC operations without the warehouses and LIC buildings present. The results of the modelling are presented in Appendix A and summarised below.

Sub-scenario: No warehouses and ILC buildings present and operations occurring in the entire southern ECS

This section examines noise levels at the south-east residential area under the scenario where Warehouses A and B and ILC buildings at the south east of the site adjacent to Cosgrove Road have not yet been built.

It is important to note that typically, the majority of noise sources that were included in the original noise model (AECOM, August 2009) in the south end of the ILC site would be absent, given that there are no warehouses to serve and that the facility would not be operating at capacity. However, for the purposes of this assessment, all noise sources in the southern area have been retained in the noise model. This represents a conservative assessment to examine the potential necessity for noise controls under a worst-case scenario. All noise sources in the centre of the site and the north of the site remain as per the original noise model.

This scenario has been modelled under three meteorological conditions, being neutral conditions, north-westerly wind at 2.5m/s and a westerly wind of the same speed. The last two represent worst-case scenarios.

Table 2.3 contains the model results compared with the day-time and night-time intrusive and amenity criteria and the sleep disturbance criteria (the latter under the worst case meteorological conditions) for the residential receiver location A5 in Blanche Street to the south-east of the site.

Table 2.3: Noise Levels at Residential Receiver Location A5 (Western end of Blanche St) (without Warehouses A and B or LIC buildings, and with all southern ECS noise sources and no mitigation measures)

Scenario	Criterion	Result	Comment
Neutral Conditions			
Daytime Intrusive	46	48	Marginal exceedance (2 dB(A))
Daytime Amenity	50	46	Complies
Night-time Intrusive	43	45	Marginal exceedance (2 dB(A))
Night-time Amenity	43	39	Complies
North-westerly wind 2.5 m/s			
Daytime Intrusive	46	49	Exceedance of 3 dB(A)
Daytime Amenity	50	48	Complies
Night-time Intrusive	43	47	Exceedance of 4 dB(A)
Night-time Amenity	43	41	Complies
Sleep Disturbance	53	59	Exceedance of 6 dB(A)
Westerly wind 2.5 m/s			
Daytime Intrusive	46	50	Exceedance of 4 dB(A
Daytime Amenity	50	48	Complies
Night-time Intrusive	43	47	Exceedance of 4 dB(A
Night-time Amenity	43	41	Complies
Sleep Disturbance	53	59	Exceedance of 6 dB(A)

Table 2.3 shows that under the scenario where Warehouses A and B and the LIC buildings are absent and the ILC sources are operating at capacity as detailed in AECOM (August 2009), compliance is achieved for day-time and nigh-time amenity periods under neutral conditions. However, with no mitigation measures, there is a trend of non-compliance for intrusive periods (ie. busy 15 minute periods) and under adverse source to receiver wind conditions.

AECOM has recommended that 'temporary' barriers (in the form of stacked shipping containers) are considered to mitigate the temporary exceedances shown in Table 2.3. AECOM notes that stacked shipping containers are considered appropriate as the exceedances will only occur until such time the warehouse buildings are constructed.

Therefore stacked shipping containers (stacked four high, effectively a 10.4m high barrier) have been included in the model. These are located where the western facades of Warehouses A and B are proposed, extending from the north-western corner of Warehouse B to within 20m of the southern-most boundary of the southern ECS area. Given that the westerly wind condition is the controlling meteorological factor in this scenario, the effectiveness of the barrier has been evaluated against the established criteria under this wind condition. Results are provided in Table 2.4.

Table 2.4: Noise Levels at Residential Receiver Location A5 (Western end of Blanche St) (without Warehouses A and B or LIC buildings, and with stacked shipping containers)

Scenario	Criterion	Result	Compliance
Neutral Conditions			
Daytime Intrusive	46	44	Yes
Daytime Amenity	50	42	Yes
Night-time Intrusive	43	42	Yes
Night-time Amenity	43	35	Yes
Sleep Disturbance	53	53	Yes

The noise levels at the Madeleine Street receiver have also been modelled under this scenario and the results are shown in Table 2.5.

Table 2.5: Noise Levels at Madeline Street (without Warehouses A and B or LIC buildings, and with stacked shipping containers)

Scenario	Criterion	Result	Compliance
Neutral Conditions			
Daytime Intrusive	46	46	Yes
Daytime Amenity	50	44	Yes
Night-time Intrusive	43	44	Marginal exceedance 1dB(A)
Night-time Amenity	43	37	Yes
Sleep Disturbance	53	51	Yes

Tables 2.4 and 2.5 show that with the temporary stacked boundary containers as described above, noise emissions from the site comply with the established noise criteria for all assessment periods under the most adverse meteorological conditions relevant to the assessment. The exception is a 1 dB(A) exceedance of the night-time intrusive criteria at Madeleine St. AECOM concluded that this exceedance is considered insignificant and inconsequential and notes that the sleep disturbance criterion is satisfied at all sites with the stacked containers in place.

Sub-scenario: No warehouses and ILC buildings present and operations occurring in the northern third of the southern ECS

As indicated above, typically under the scenario where Warehouses and ILC buildings are not present, equipment is likely to operate in the northern one-third of the southern ECS storage area only. This is because the site would not be at capacity without Warehouses and LIC buildings (refer to Section 2.3.1) and to minimise container handling distances by being closer to the entrance to the facility.

In this scenario, noise sources have been modelled in the northern third of the southern ECS area. All noise sources in the centre of the site and the north of the site remain as per the original noise model.

Noise levels from the operation of the Enfield ILC under this scenario have been considered under two meteorological conditions, being neutral conditions and a north-westerly wind at 2.5 m/s. This latter condition represents a worst-case scenario when considering the location of residential receiver location A5 with respect to the remaining noise sources in the northern one-third of the southern empty container storage area and the central and northern sections of the site.

Results have been compared to the daytime and night-time intrusive and amenity criteria and also the sleep disturbance criterion (the latter under worst case meteorological conditions) for residential receiver location A5 (western end of Blanche Street)

Table 2.6: Noise Levels at residential receiver A5 (without Warehouses A and B or LIC buildings, and operations in the northern 3rd of the southern ECS area)

Scenario	Criterion	Result	Compliance
Neutral Conditions			
Daytime Intrusive	46	40	Yes
Daytime Amenity	50	37	Yes
Night-time Intrusive	43	38	Yes
Night-time Amenity	43	30	Yes
North-westerly wind 2.5 m/s			
Daytime Intrusive	46	43	Yes
Daytime Amenity	50	40	Yes
Night-time Intrusive	43	41	Yes
Night-time Amenity	43	34	Yes
Sleep Disturbance	53	45	Yes

Table 2.6 show that under the scenario where Warehouses A and B and the light industrial buildings are absent and sources in the centre and north of the site are operating at capacity, compliance is achieved under all meteorological conditions and for all assessment periods.

It was observed that the absence of Warehouses A and B could result in higher operational noise levels at residential receivers to the east of the site, namely in the vicinity of Madeline Street, east of Jim Begnell Park. Calculation results show that under the scenario where Warehouses A and B have not yet been built, noise levels at the most potentially-affected receiver in Madeline Street are 1-2 dB(A) lower than at Blanche Street, and as such would comply with the project amenity, intrusive and sleep disturbance criteria derived from the Blanche Street unattended noise logging location from the Environmental Assessment stage.

Other receivers to the East

Regarding receivers other than residential receivers, the temporary operation of the container terminal and ECS Areas without Warehouses and LIC buildings will not have non-compliant acoustic impacts on the industrial areas to the east of the site.

The majority of receivers nearest to the ILC's eastern frontage are industrial in nature and would be classed as 'industrial' receivers according to the NSW Industrial Noise Policy. In this respect they would be subject to an industrial noise criterion of 70 dB(A) 'when in use' and results indicate daytime amenity noise levels below 70 dB(A) due to the operation of the container terminal and ECS areas without warehouses and ILC buildings.

In addition, the residential receivers further to the east of the industrial area (St Anne's School and western end of Gregory St) are located more than 600 m east of the terminal and ECS operational areas and shielded by existing industrial development and would therefore experience noise levels below their respective criteria.

The absence of warehouses and LIC buildings does not have any effect on land uses to the north and west of the site.

2.3.3 Summary – Proposed Temporary Controls (Operations without Building)

In summary, until Warehouses A and B, or alternatively the buildings in the southern half of the LIC area are constructed, and before operations in the Southern ECS area is substantially commenced, Sydney Ports proposes the following temporary controls:

- If operations are to occur across the entire Southern ECS, Sydney Ports will require the ECS operator to enter into a formal agreement to only operate behind a stack of shipping containers located along the eastern boundary of the Southern ECS site (stacked four high, effectively a 10.4m high barrier). The barrier would extend for an equivalent length as if Warehouses A and B existed, (i.e. approximately two-thirds of the length of the Southern ECS and commencing from a point approximately 20m from the southern-most boundary of the Southern ECS area); or
- The operator would be required to enter into a formal agreement to restrict operations in the Southern ECS to the northern third of the Southern ECS.

2.4 Application of Noise Criteria to Model Results under Adverse Meteorological Conditions

The operational noise criteria of Condition of Approval 2.17 apply to all of the modelling results reported in the AECOM reports (August 2009, November 2009 and March 2010) attached to Sydney Ports reports (August 2009, November 2009 and this report), including results obtained under adverse meteorological conditions.

3 Conclusion

This report provides additional information to the Department of Planning regarding the operational noise assessment and management at the ILC site. This information is provided to support Sydney Ports' Modification Application (Sydney Ports, 31 August 2009).

It is concluded that the proposed noise control adjustments will result in improved operational noise management of the ILC site.

4 References

AECOM (24 August 2009). *Enfield Acoustics – Sleep Disturbance Summary and Response to Submissions.* Prepared for Sydney Ports.

AECOM (November 2009). *Enfield Intermodal Logistics Centre Detailed Design Acoustic Assessment.* Prepared for Sydney Ports.

SKM (October 2005). *Environmental Assessment: Intermodal Logistics Centre at Enfield.*

SKM (June 2006). Intermodal Logistics Centre: Preferred Project Report.

Sydney Ports Corporation (31 August 2009). *Intermodal Logistics Centre at Enfield – Modification Application 4.* ILC – E – PT3A – Modification Application No. 4

Sydney Ports Corporation (November 2009). *Intermodal Logistics Centre at Enfield – Modification Application 05_0147 – Project Adjustments Response to Stakeholder's Submissions.* ILC – E – PT3A – Response to Stakeholder's Submissions

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Appendix A: Noise Memorandum (AECOM, March 2010)

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AECOM

Memorandum

To	Sydney Ports Corporation	Page	1 of 6
CC	Cassie Free (AECOM)		
Subject	Enfield Intermodal Logistic Centre DoP Comments Warehouses A and B		
From	Matthew Verth		
File/Ref No.	60051533 Warehouses Enfield Additional Acoustic Queries 20100324	Date	24-Mar-2010

1.0 Introduction

It is understood that the Department of Planning (DoP) has provided comments in relation to the acoustic assessment of Enfield Intermodal Logistics Centre (ILC) presented in AECOM's report 60051533 MV001.REP.06 dated 30 September 2009 (attached to Sydney Ports' Modification Application report dated 31 August 2009).

The purpose of this memorandum is to address the DoP comments which relate to the following:

1) Operational noise levels under the scenario where Warehouses and Light Industrial Commercial buildings (LIC) have not yet been constructed and the ILC and Empty Storage Container (ECS) areas are operating. Specifically, this scenario examines operational noise levels at residential areas south-east of the ILC site (which are best represented by residential receiver location A5 – 'Western end of Blanche Street'). (Refer to Section 2.0) and
2) Identification of measures at the south-eastern part of the ILC site to protect residential areas located to the south-east (represented primarily in this assessment by receiver residential receiver A5 – 'Western end of Blanche Street') under the scenario where Warehouse A is moved to the south by 37 m and all warehouses and industrial buildings are present. (Refer to Section 3.0).

Residential receiver location A5 (referenced in AECOM's report 60051533 MV001.REP.06) is of primary interest to this study. However, it has been observed that other nearby residential receivers to the south-east and east of the ILC site (for example, receivers in Madeline Street) could be affected by the movement or temporary absence of the warehouse buildings and due comments are made regarding these receivers where appropriate.

The variability of the orientation of affected receivers also affects determination of the most relevant adverse wind condition. For this reason, north-westerly wind at 2.5 m/s has been considered with respect to residential receiver location A5 in Blanche Street and westerly winds at 2.5 m/s have been considered with respect to the Madeline Street receiver catchment.

For reference, an aerial image identifying the southern portion of the currently undeveloped ILC site and the residential land use areas referred to in this report (to the south-east and east of the site) is presented in Figure 1:

Figure 1 – ILC study area

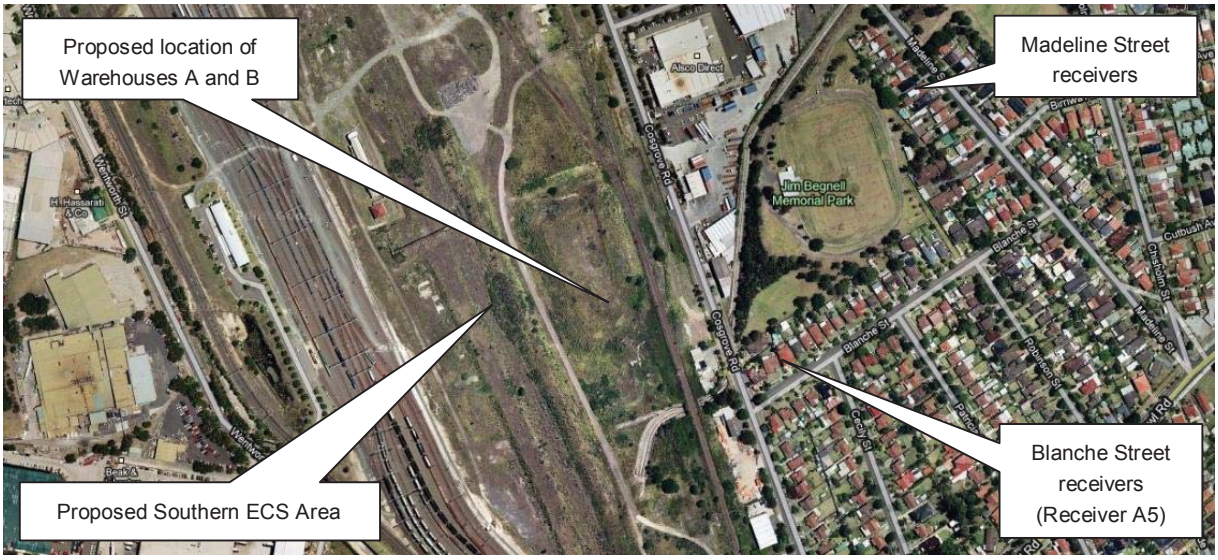

Image courtesy of Google

2.0 Scenario – Warehouses and ILC buildings not present, all southern noise sources

This section examines noise levels at residential receiver location A5 (i.e.: the south-east residential catchment) under the scenario where Warehouses A and B (and also the ILC buildings at the south east of the site adjacent to Cosgrove Road) have not yet been built. The reason that only this receiver catchment is considered is because it is only these receivers that could be potentially affected by the presence, movement or absence of this specific group of buildings.

Under this scenario, it is important to note that typically, the majority of noise sources (that were included in the original noise model) in the south end of the ILC site would also be absent, given that there are no warehouses to serve and that the facility is not operating at capacity. However, for the purposes of this assessment, all noise sources in the southern area have been retained in the noise model. This represents a conservative assessment to examine the potential necessity for noise controls under a worst-case scenario.

All noise sources in the centre of the site and the north of the site remain as per the original noise model.

The scenario above has been computer noise modelled (using the model used to derive results presented AECOM's report dated 30 September 2009). Noise levels from the operation of the Enfield ILC under this scenario have been considered under three meteorological conditions, being neutral conditions, north-westerly wind at 2.5 m/s and a westerly wind of the same speed. These latter conditions represent worst-case scenarios.

In Table 1, results have been compared to the daytime and night-time intrusive and amenity criteria and also the sleep disturbance criterion (the latter under worst case meteorological conditions) for residential receiver location A5:

Table 1 – Noise levels at residential receiver location A5 without Warehouses A and B or LIC buildings (with all southern ECS noise sources)

Scenario	Criterion	Result	Comment
Neutral conditions			
Daytime Intrusive	46	48	Marginal exceedance (2 dB(A))
Daytime Amenity	50	46	Complies
Night-time Intrusive	43	45	Marginal exceedance (2 dB(A))
Night-time Amenity	43	39	Complies
North-westerly wind 2.5 m/s			
Daytime Intrusive	46	49	Exceedance of 3 dB(A)
Daytime Amenity	50	48	Complies
Night-time Intrusive	43	47	Exceedance of 4 dB(A)
Night-time Amenity	43	41	Complies
Sleep Disturbance	53	59	Exceedance of 6 dB(A)
Westerly wind 2.5 m/s			
Daytime Intrusive	46	50	Exceedance of 4 dB(A)
Daytime Amenity	50	48	Complies
Night-time Intrusive	43	47	Exceedance of 4 dB(A)
Night-time Amenity	43	41	Complies
Sleep Disturbance	53	59	Exceedance of 6 dB(A)

Results presented in Table 1 show that under the scenario where Warehouses A and B and the light industrial buildings are absent and all ILC sources are operating as per the scenarios presented in AECOM's report 60051533 MV001.REP.06, compliance is achieved for daytime and night-time amenity periods under neutral conditions. However, with no mitigation, there is a trend of non-compliance for intrusive periods (i.e.: busy 15 minute periods) and under adverse source to receiver wind conditions.

It is therefore necessary to consider mitigation in the form of barriers between the ILC sources in the southern ECS area and the catchment of receivers to the south-east and east. It is recommended that 'temporary' barriers (in the form of stacked shipping containers) are considered to mitigate the exceedances demonstrated in Table 1. Stacked shipping containers are considered appropriate as it is considered unreasonable to require the use of permanent barriers, as the exceedances will only prevail until such time that the Warehouse buildings are constructed. After the 12 m high Warehouse buildings are constructed, they will provide equal or better noise mitigation for receivers to the south-east and east of the ILC site.

Therefore stacked shipping containers, (stacked four high, i.e.: effectively a 10.4 m high barrier) have been included in the model and located where the western facades of Warehouses A and B are proposed; extending from the north-western corner of Warehouse B to within 20 m of the southern-most boundary of the southern ECS area. Given that the westerly wind condition has been demonstrated to be the controlling meteorological condition, the effectiveness of the barrier has been evaluated against the established criteria under this wind condition only. Results are presented in Table 2:

Table 2 – Noise levels at residential receiver location A5 without Warehouses A and B or LIC buildings, with stacked shipping containers as mitigation

Scenario	Criterion	Result	Comment
Westerly wind 2.5 m/s			
Daytime Intrusive	46	44	Complies
Daytime Amenity	50	42	Complies
Night-time Intrusive	43	42	Complies
Night-time Amenity	43	35	Complies
Sleep Disturbance	53	53	Complies

For completeness, noise levels at the Madeline Street receiver location have also been reviewed under the scenario with stacked shipping containers in place. Results are presented in Table 3:

Table 3 – Noise levels at Madeline Street without Warehouses A and B or LIC buildings, with stacked shipping containers as mitigation

Scenario	Criterion	Result	Comment
Westerly wind 2.5 m/s			
Daytime Intrusive	46	46	Complies
Daytime Amenity	50	44	Complies
Night-time Intrusive	43	44	Marginal exceedance (1 dB(A))
Night-time Amenity	43	37	Complies
Sleep Disturbance	53	51	Complies

A review of Table 3: reveals that with the stacked shipping containers in place in the locations described above, noise emission from the site complies with the established project criteria for all assessment periods under the most adverse meteorological condition relevant to the assessment, except for a 1 dB(A) exceedance during the night-time period. This exceedance is considered insignificant and inconsequential. It is noted that the sleep disturbance criterion is also satisfied with the stacked containers in place.

It is therefore recommended that stacked shipping containers stacked four high are an appropriate and effective noise mitigation method to control noise emission from the Enfield ILC until such time that Warehouses A and B are constructed in the southern part of the site.

Regarding receivers other than residential receivers, the temporary operation of the container terminal and ECS Areas without Warehouses and LIC buildings will not have non-compliant acoustic impacts on the industrial areas to the east of the site.

The majority of receivers nearest to the ILC's eastern frontage are industrial in nature and would be classed as 'industrial' receivers according to the NSW Industrial Noise Policy. In this respect they would be subject to an industrial noise criterion of 70 dB(A) 'when in use' and results indicate daytime amenity noise levels below 70 dB(A) due to the operation of the container terminal and ECS areas without Warehouses and ILC buildings.

In addition, the residential receivers further to the east of the industrial area (St Anne's School and western end of Gregory St) are located more than 600 m east of the terminal and ECS operational areas and shielded by existing industrial development and would therefore experience noise levels below their respective criteria. The absence of Warehouses and LIC buildings does not have any effect on land uses to the north and west of the site.

2.1 Scenario – Warehouses and ILC buildings not present, noise sources only in northern third of southern ECS area

As noted above in Section 2.0, typically, under the scenario where warehouses and LIC buildings are not present equipment is likely to operate in the northern third of the southern ECS only as the site would not be operating at capacity. This would minimise container handling distances (by being closer to the entrance to the ILC).

For completeness, this section assesses the scenario where sources are only operational in the northern third of the southern ECS area. All sources in the centre and the north of the site remain as per the original model.

This scenario has been computer noise modelled (using an updated version of the model used to derive results presented AECOM's report dated 30 September 2009). Noise levels from the operation of the Enfield ILC under this scenario have been considered under two meteorological conditions, being neutral conditions and a north-westerly wind at 2.5 m/s. This latter condition represents a worst-case scenario when considering the location of residential receiver location 5 with respect to the remaining noise sources in the northern one-third of the southern empty container storage area and the central and northern sections of the site.

Results have been compared to the daytime and night-time intrusive and amenity criteria and also the sleep disturbance criterion (the latter under worst case meteorological conditions) for residential receiver location A5 set out in report 60051533 MV001.REP.06:

Table 4 – Noise levels at residential receiver location A5 without Warehouses A and B or light industrial buildings (with operations only in the northern third of the southern ECS area)

Scenario	Criterion	Result	Compliance
Neutral Conditions			
Daytime Intrusive	46	40	Yes
Daytime Amenity	50	37	Yes
Night-time Intrusive	43	38	Yes
Night-time Amenity	43	30	Yes
North-westerly wind 2.5 m/s			
Daytime Intrusive	46	43	Yes
Daytime Amenity	50	40	Yes
Night-time Intrusive	43	41	Yes
Night-time Amenity	43	34	Yes
Sleep Disturbance	53	45	Yes

Results presented in Table 4 show that under the scenario where Warehouses A and B and the light industrial buildings are absent and sources in the centre and north of the site are operating as the scenarios presented in AECOM's report 60051533 MV001.REP.06, compliance is achieved under all meteorological conditions and for all assessment periods.

It was observed that the absence of Warehouses A and B could result in higher operational noise levels at residential receivers to the east of the site, namely in the vicinity of Madeline Street, east of Jim Begnell Park. Calculation results show that under the scenario where Warehouses A and B have not yet been built, noise levels at the most potentially-affected receiver in Madeline Street are 1-2 dB(A) lower than at Blanche Street, and as such would comply with the project amenity, intrusive and sleep disturbance criteria derived from the Blanche Street unattended noise logging location from the Environmental Assessment stage.

3.0 Scenario – Move Warehouse A

This section examines noise levels at residential receiver location A5 under the scenario where Warehouse A is relocated to approximately 37 m south. The relocation of Warehouse A has been identified as an effective measure to mitigate noise emission from the ILC and southern ECS area to the south-east residential area. The previously proposed L-shaped 80 m long 5 m high noise wall located at the south-eastern extremity of the hard-stand area to the south-east of Warehouse A (as described in AECOM's report 60051533 MV001.REP.06 and shown in Figure 2 of the Modification Application report (Sydney Ports, August 2009) has been shortened by 37 m at its northern end, as this noise wall section does not provide a required noise mitigation function if Warehouse A is relocated in the manner described.

For the purposes of this assessment, the noise sources of particular interest are those (previously identified) with the potential to cause sleep disturbance. Therefore, this section essentially examines the difference in the noise level of container 'bangs' at 10.4 m above ground (from activity in the southern empty container storage area), due to the relocation of Warehouse A. Whilst examining this scenario, checks have been undertaken at potentially affected receivers, regarding operational noise compliance with the previously established intrusive and amenity criteria, to ensure that these criteria are still satisfied, despite Warehouse A having been moved. The receivers of primary interest are residential receiver location 5 and also at receivers to the east of Jim Begnell Park in Madeline Street.

Under this scenario, the stacked containers at the eastern edge of the southern ECS area (previously suggested to mitigate sleep disturbance events from the sources described above) have been removed from the model. Note that in report 60051533 MV001.REP.06, the sleep disturbance criterion of L_{A1} 53 dB(A) was exceeded by 4 dB(A) under the scenario with additional mitigation measures in place (i.e. these now-removed stacked containers).

In Table 5, results have been compared to the daytime and night-time intrusive and amenity criteria and also the sleep disturbance criterion (the latter under worst case meteorological conditions) for residential receiver location A5 set out in report 60051533 MV001.REP.06:

Table 5 - Noise levels at residential receiver location A5 with Warehouse A relocated approximately 37 m to the south

Scenario	Criterion	Result	Compliance
Neutral conditions			
Daytime Intrusive	46	40	Yes
Daytime Amenity	50	38	Yes
Night-time Intrusive	43	38	Yes
Night-time Amenity	43	31	Yes
North-westerly wind 2.5 m/s			
Daytime Intrusive	46	42	Yes
Daytime Amenity	50	40	Yes
Night-time Intrusive	43	40	Yes
Night-time Amenity	43	33	Yes
Sleep Disturbance	53	47	Yes

Results presented in Table 5 show that under the scenario where Warehouse A is relocated approximately 37 m to the south and:

- the truck line source included in the original model is reconfigured so that trucks no longer turn around south of Warehouse A; and
- noise sources at the site are operating as per the scenarios presented in AECOM's report 60051533 MV001.REP.06,

compliance is achieved under all meteorological conditions and for all assessment periods.

It was observed that whilst relocating Warehouse A could result in a noise benefit at the Blanche Street receivers, it may also result in higher operational noise levels at receivers to the east of the site, namely in the vicinity of Madeline Street, east of Jim Begnell Park. This is due to the larger resultant 'gap' between the warehouses and, principally, the increased exposure of this receiver catchment to the truck line source that passes across this gap.

Calculation results show that whilst noise levels at the most potentially-affected receiver in Madeline Street are up to 3 dB(A) higher than at Blanche Street, (with the night-time intrusive noise emission equalling the criterion), noise levels comply with the project amenity, intrusive and sleep disturbance criteria derived from the Blanche Street unattended noise logging location from the Environmental Assessment stage.

I trust the above information is of assistance.

Sincerely,

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