

A duty factor has been applied to selected items associated with the operation of the project to represent realistic noise emissions. The duty of a source is the assumed percentage of time that a source is likely to operate for anyone 15 minute period, and has been estimated based on previous experience and our current understanding of the project.

### 8.1.3 Noise Sensitive Locations

The noise sensitive locations have been determined at the EA stage. The receiver locations are presented in **Figure 2** and detailed in **Table 11**.

It is worth noting that the background noise monitoring was conducted at location M1 (6 Jean Street) in February 2005. The MCoA 2.17 noise criteria for the receivers located at “East end of Jean Street” area Enfield Preferred Project Report (SKM, 2006): Noise Technical Memorandum (Renzo Tonin, April 2006) were determined based on the ambient noise monitoring at location M1 conducted during February 2005. As 6 Jean Street is located approximately 75 m west of Roberts Road it would be expected to have lower ambient noise levels than those receivers at the eastern end of Jean Street, facing the arterial road Roberts Road and most impacted by the ILC. Hence the MCoA 2.17 noise criteria is applicable to 6 Jean Street, and receivers set back from Roberts Road, however higher criteria may be applicable for those receivers more exposed at the eastern end of Jean Street, and facing Roberts Road.

**Table 11 Receiver Locations**

Receiver	Description	Address
A1*	Eastern end of Jean Street	40 Roberts Road, Greenacre
A2	Eastern end of Ivy Street	106 Roberts Road, Greenacre
A3	Wentworth Street (south)	2 Wentworth Street, Greenacre
A4	Eastern end of Gregory Street	29 George Street, Strathfield South
A5	Western end of Blanche Street	53 Blanche Street, Strathfield South
A6	40 Bazentin Street	40 Bazentin Street, Strathfield South
A11	Begnell Park	-
A13	Greenacre Bowling Club	-
A14	Strathfield High School	-
A15	St Anne's School	-

\* Refer to text above in relation to monitoring and assessment locations in this vicinity

## 8.2 Construction Noise Impact Assessment

### 8.2.1 Construction Plant and Equipment

The construction equipment list and the typical sound power levels (SWLs) for the proposed MOD 14 are shown in **Table 12** below:

**Table 12 Typical Construction Equipment and Sound Power Levels**

Plant Item	Plant Description	Typical Sound Power Levels, L <sub>Aeq</sub> (15minute) (dBA re 1pW)
1	Asphalting Machine	106
2	Backhoe	104
3	Compactor	112
4	Concrete Kerb Machine	113
5	Concrete Pump	105
6	Concrete Trucks	110
7	Concrete Vibrator	102
8	Dozer	116
9	Grader	110
10	Mobile Crane	114
11	Pilling Equipment	114
12	Rollers	109
13	Scraper	114
14	Tracked Excavator	112
15	Truck (>20tonne)	108
16	Water Cart	109

### 8.2.2 Construction Modelling Scenario

Construction modelling scenarios have been developed to represent typical construction works for the proposed site. The construction scenarios together with the associated equipment have been presented in **Table 13**. It is assumed all the construction mobile plant equipment would be operating within the construction area for the worst-case 15 minute period. Note these results in a conservative assessment as normally there would only likely to be 2 or 3 equipment items operating simultaneously.

**Table 13 Construction Scenarios**

Scenario	Working Area	Plant	Number of Plant
Earthworks	Precinct A - H	Dozer (CAT D8)	1
		Excavators (30t)	2
		Water Cart (20t)	1
		Compactors	2
		Articulated Trucks	4
		Grader	1
		Scraper	1
Stormwater Drainage System	Precinct A - H	Excavators (30t)	1
		Water Cart	1
		Roller	2
		Backhole	1
		Mobile Crane	1
Retaining walls / embankments	Precinct A - H	Excavators (30t)	1
		Roller	1

Scenario	Working Area	Plant	Number of Plant
Internal road pavement works	Precinct A & B	Dozer (CAT D8)	1
		Truck	2
		Grader	1
		Roller	2
		Water Cart	1
		Backhole	1
		Asphalt Truck	2
		Concrete kerb machines	1
		Asphalting Machine	1
		Mobile Crane	1
Warehouse Construction	Precinct A - H	Pilling Equipment	1
		Grader	1
		Excavators (30t)	1
		Water Cart	1
		Delivery Trucks	2
		Concrete Trucks	1
		Concrete Pumps	1
		Concrete Vibrator	1

### 8.2.3 Construction Noise Predictions

Construction noise levels have been predicted at all receiver locations in the vicinity of the proposed works. A summary of the resultant LAeq(15minute) noise level predictions are presented in **Table 14** together with the maximum noise level exceedance above the nominated NMLs for the selected noise sensitive receivers.

**Table 14 Summary of Worst-case Construction Noise Predictions**

Receiver	Description	CNML	HNAL	Maximum Predicted LAeq (15 minute) Noise Level (dBA)					Maximum CNML Exceedance (dB)					Maximum HNAL Exceedance (dB)				
				Earthworks	Stormwater Drainage System	Retaining walls / embankment	Internal road pavement works	Warehouse Construction	Earthworks	Stormwater Drainage	Retaining walls /	Internal road pavement	Warehouse Construction	Earthworks	Stormwater Drainage System	Retaining walls /	Internal road pavement works	Warehouse Construction
A1	Eastern end of Jean Street	59	75	66	62	63	47	64	7	3	4	-	5	-	-	-	-	-
M1	6 Jean Street	59		47	43	44	26	45	-	-	-	-	-	-	-	-	-	-
A2	Eastern end of Ivy Street	58		52	48	49	45	50	-	-	-	-	-	-	-	-	-	-
A3	Wentworth Street (south)	54		60	56	57	57	58	6	2	3	3	4	-	-	-	-	-
A4	Eastern end of Gregory Street	54		59	55	56	54	57	5	1	2	0	3	-	-	-	-	-
A5	Western end of Blanche Street	51		81	77	78	78	79	30	26	27	27	28	6	2	3	3	4
A6	40 Bazentin Street	51		53	49	50	50	51	2	-	-	-	-	-	-	-	-	-
A11	Begnell Park	External 65 when in use		71	67	68	68	69	6	2	3	3	4	-	-	-	-	-
A12	51-55 Roberts Road	External 70 when in use		57	53	54	54	55	-	-	-	-	-	-	-	-	-	-
A13	Greenacre Bowling Club	External 70 when in use		55	51	52	52	53	-	-	-	-	-	-	-	-	-	-
A14	Strathfield High School	External 55 when in use		54	50	51	46	52	-	-	-	-	-	-	-	-	-	-
A15	St Anne's School	External 55 when in use		61	57	58	53	59	6	2	3	-	4	-	-	-	-	-

## 8.2.4 Discussion

The worst-case construction noise predictions presented in **Table 14** indicate that CNML exceedances of up to 30 dBA are to be expected at assessment locations during standard working hours. The HNAL exceedances of up to 6 dBA are to be expected due to the close proximity of location A5 (Western end of Blanche Street) during standard working hours. It is worth noted that the worst-case construction noise levels from the EA (2005) were predicted as same as up to 81 dBA at location A5 (Western end of Blanche Street). Thus, the worst-case noise impact at the noise assessable locations will be the same from construction activities associated with MOD 14 and the EA (2005).

The calculated noise levels will inevitably depend on the number of plant items operating at any one time and their precise location relative to the receiver of interest. In practice, the noise levels are likely to vary due to the fact that plant would move about the worksites and would not all be operating concurrently at all times. As such, noise levels are likely to be lower than the worst-case noise levels presented in **Table 14** for most, and probably all, of the time during the works.

## 8.3 Operational Noise Assessment

### 8.3.1 Modelling Scenario

#### Intermodal Terminal Operation

A modelling scenario comprising of mobile plant operations, idling, shunting and moving trains has been developed to represent site operations. The modelling scenario would be considered representative of the typical operations up to the approved container throughput of 300,000 Twenty Foot Equivalent Units (TEU) capacity.

The modelling scenarios adopted in this assessment were modified and refined with respect to previous assessments as follows:

- Truck movements and truck idling were redistributed throughout the day-evening-night periods based upon the predicted traffic generation data from Transport & Urban Planning (2016); and
- Truck-related container handling activities (i.e. reach stacker operations and container clangs) were correlated to the temporal and spatial distribution of container truck movements on the site.

#### Intrusive Noise

Based on key assumptions from the Ason Group's Traffic Impact Assessment, the predicted "Worse Case" hourly heavy vehicle movements within the Enfield ILC are shown in **Table 15** below.

**Table 15 Predicted "Worse Case" Hourly Heavy Vehicle Movements**

Period <sup>1</sup>	Hour Commencing	Total Heavy Vehicles			
		Intermodal & Warehouse A	Precinct B	Other Warehouses	Total
Daytime	14:00	102	2	20	124
Evening	18:00	34	0	13	47
Night-time	6:00	56	0	6	62

Note 1: Based on INP, "Daytime" period is defined as between 0700 to 1800 hour; Evening period is defined as between 1800 to 2200 hour; and "Night-time" period is defined as between 2200 to 0700 hour.

Therefore, the 15-minutes heavy vehicle movement can be calculated based on the predicted hourly heavy vehicle movement presented in **Table 15**. The calculated 15-minutes heavy vehicle movement (rounded to the nearest 0.1) for each period and the truck distribution for each route are shown in **Table 16**. Note rounding to the nearest 0.1 will accurately reflect heavy vehicle movements over a 15 minute period, as for example, 0.5 represents a truck for 7.5 minutes of 15 minutes.

**Table 16 Calculated 15-minutes Heavy Vehicle Movement and Distribution**

Route	Period		
	Daytime	Evening	Night
Intermodal and Warehouse A	12.8	4.3	7.0
Precinct B	0.3	0.0	0.0
Other Warehouses	2.5	1.6	0.8

The quantities of the industrial noise sources (rounded to the nearest 0.1) modelled on site during any one 15-minute period in the intrusive assessment period are shown in **Table 17**.

**Table 17 Industrial Source Quantity summary (15-minute period)**

Source	Operating Area	Daytime	Evening	Night-time
Idling Trucks	Intermodal	9.6	3.2	5.3
Moving Trucks	Intermodal	9.6	3.2	5.3
Idling Trucks	Warehouse A1	2.1	0.7	1.2
Moving Trucks	Warehouse A1	2.1	0.7	1.2
Idling Trucks	Warehouse A2	1.1	0.4	0.6
Moving Trucks	Warehouse A2	1.1	0.4	0.6
Reach Stacker	Intermodal	4	1.3	2.2
Reach Stacker	Warehouse A1 & A2	1	0.3	0.5
Clangs' @ 4.1m	Intermodal	6	2.0	3.3
Elevated 'Clangs'	Intermodal	9.6	3.2	5.3
Idling Trucks	Precinct B	0.3	0.0	0.0
Moving Trucks	Precinct B	0.3	0.0	0.0
Idling Trucks	Other Warehouses	2.5	1.6	0.8
Moving Trucks	Other Warehouses	2.5	1.6	0.8
Idling Train	Rail Line	1	1	1
Moving Train	Rail Line	1	1	1
Air Condenser Units	All Warehouses	4 Condenser Units per 300m <sup>2</sup>		
Exhaust Fans	All Warehouses	4 Exhaust Fans per 6000m <sup>2</sup>		
Forklift	All Warehouses	1 forklift per 3000m <sup>2</sup>		

## Amenity Noise

Using the key assumptions of the Ason Group report, the summarised period heavy vehicle movement within the Enfield ILC for daytime (11 hour), evening (4 hour) and night-time (9 hour) periods are shown in **Table 18**.

**Table 18 Heavy Vehicle Movement for Day (11 hour), Evening (4 hour) and Night (9 hour) Period**

Period	Total Heavy Vehicles
Daytime (11 hour)	1107
Evening (4 hour)	153
Night (9 hour)	161

The calculated heavy vehicle movement (rounded to the nearest 0.1) for daytime (11 hour), evening (4 hour) and night-time (9 hour) period together with the truck distribution for each route are shown in **Table 19**.

**Table 19 Calculated Heavy Vehicle Movement and Distribution for Daytime (11 hour), Evening (4 hour) and Night-time (9 hour) Period**

Route	Period		
	Daytime (11 hour)	Evening (4 hour)	Evening (4 hour)
Intermodal and Warehouse A	902	116	130
Precinct B	20	0	0
Other Warehouses	185	37	31

The quantities of the industrial noise sources (rounded to the nearest 0.1) modelled on site during daytime (11 hour), evening (4 hour) and night-time (9 hour) period in the amenity assessment period are shown in **Table 20**.

**Table 20 Industrial Source Quantity Summary (15 minute Period)**

Source	Operating Area	Daytime		Evening		Night-time	
		Proportional Quantity 15 minutes	Quantity 11 hours	Proportional Quantity 15 minutes	Quantity 4 hours	Proportional Quantity 15 minutes	Quantity 9 hours
Idling Trucks	Intermodal	7.7	338	2.7	44	1.4	49
Moving Trucks	Intermodal	7.7	338	2.7	44	1.4	49
Idling Trucks	Warehouse A1	1.7	74	0.6	10	0.3	11
Moving Trucks	Warehouse A1	1.7	74	0.6	10	0.3	11
Idling Trucks	Warehouse A2	0.9	39	0.3	5	0.2	6
Moving Trucks	Warehouse A2	0.9	39	0.3	5	0.2	6
Reach Stacker	Intermodal	3.2	Operating at 80% of the time	1.1	Operating at 23% of the time	0.6	Operating at 11% of the time
Reach Stacker	Warehouse A1 & A2	0.8	Operating at 80% of the time	0.3	Operating at 23% of the time	0.1	Operating at 11% of the time
Clangs' @ 4.1m	Intermodal	4.8	424	1.7	121	0.8	60
Elevated 'Clangs'	Intermodal & Warehouse A	7.7	677	2.7	192	1.4	96
Moving Trucks	Precinct B	0.2	10	0.0	0	0.0	0
Reach Stacker	Precinct B	0.2	10	0.0	0	0.0	0
Idling Trucks	Other Warehouses	1.1	93	1.2	19	0.4	16
Moving Trucks	Other Warehouses	1.1	93	1.2	19	0.4	16
Idling Train	Rail Line	0.1	7	0.0	3	0.1	6
Moving Train	Rail Line	0.1	15 Movement	0.1	5 Movement	0.1	12 movements

## 8.3.2 Operational Noise Predictions

### 8.3.2.1 Overview

The assessment procedure in terms of the NSW INP has two components:

- Controlling intrusive noise impacts in the short term for residences (Intrusive Criteria - 15 minutes) and;
- Maintain noise level amenity for residences and other land uses (Amenity Criteria - Period).

The Ministers Conditions of Approval (MCoA) 2.17 has established the design noise criteria for both the Intrusive criteria (15 minute) and Amenity criteria (period).



### 8.3.2.2 Predicted Noise Levels

**Table 21** to **Table 27** presents the predicted operational noise levels at each of the nominated assessment locations (as per MCoA 2.17).

For the assessment against the intrusive criteria (15 minutes) sources have been modeled as a typical 'worst case' 15 minute period. The predicted unmitigated LAeq(15minute) noise levels associated with the proposed modification are presented in **Table 21** to **Table 23**.

These tables show the design criteria compared to the predicted noise levels from the assumed worst-case site activity at each of the surrounding assessment locations, including both neutral and enhanced weather conditions. Where exceedances of the design criteria are identified, consideration is given to noise mitigation to minimise the noise impacts (refer to **Section 8.3.5**).

The noise contours for the proposed Mod 14 operation under daytime calm and night-time calm weather conditions are shown in **Appendix B1** and **B2**.

**Table 21 Intrusive Assessment - Daytime**

Location	Design Noise Criteria LAeq(15minute) dBA	Predicted LAeq (15 minute Noise levels) dBA				Exceedance dB			
		Neutral Weather	Enhanced Weather (Wind at 2.5 m/s)			Neutral Weather	Enhanced Weather (Wind at 2.5 m/s)		
			Westerly	North-Westerly	South-Westerly		Westerly	North-Westerly	South-Westerly
A1 - Eastern end of Jean Street	54	50	46	46	50	-	-	-	-
M1 - Eastern end of Jean Street (6 Jean Street)	54	42	36	37	41	-	-	-	-
A2 - Eastern end of Ivy Street	53	42	37	43	37	-	-	-	-
A3 - Wentworth Street (south)	49	41	43	45	36	-	-	-	-
A4 - Eastern end of Gregory Street	49	41	45	43	46	-	-	-	-
A5 - Western end of Blanche Street	46	45	<b>48</b>	<b>48</b>	<b>47</b>	-	2	2	1
A6 - 40 Bazentin Street	46	31	37	37	31	-	-	-	-
A11 - Begnell Park	-	-	-	-	-	-	-	-	-
A13 - Greenacre Bowling Club	-	-	-	-	-	-	-	-	-
A14 - Strathfield High School	-	-	-	-	-	-	-	-	-
A15 - St Anne's School	-	-	-	-	-	-	-	-	-

**Bold Red Text** - Noise level exceed the MCoA 2.17 criteria.

**Table 22 Intrusive Assessment - Evening**

Location	Design Noise Criteria LAeq(15minute) dBA	Predicted LAeq (15 minute Noise levels) dBA				Exceedance dB			
		Neutral Weather	Enhanced Weather (Wind at 2.5 m/s)			Neutral Weather	Enhanced Weather (Wind at 2.5 m/s)		
			Westerly	North- Westerly	Northerly		Westerly	North- Westerly	Northerly
A1 - Eastern end of Jean Street	54	49	45	45	47	-	-	-	-
M1 - Eastern end of Jean Street (6 Jean Street)	54	41	36	36	40	-	-	-	-
A2 - Eastern end of Ivy Street	52	41	37	42	45	-	-	-	-
A3 - Wentworth Street (south)	47	40	42	44	44	-	-	-	-
A4 - Eastern end of Gregory Street	47	40	44	42	38	-	-	-	-
A5 - Western end of Blanche Street	46	43	46	46	45	-	-	-	-
A6 - 40 Bazentin Street	45	30	35	36	36	-	-	-	-
A11 - Begnell Park	-	-	-	-	-	-	-	-	-
A13 - Greenacre Bowling Club	-	-	-	-	-	-	-	-	-
A14 - Strathfield High School	-	-	-	-	-	-	-	-	-
A15 - St Anne's School	-	-	-	-	-	-	-	-	-

**Table 23 Intrusive Assessment - Night-time**

Location	Design Noise Criteria LAeq(15minute) dBA	Predicted LAeq (15 minute Noise levels) dBA					Exceedance dB				
		Neutral Weather	Enhanced Weather (Wind at 2.5 m/s)				Neutral Weather	Enhanced Weather (Wind at 2.5 m/s)			
			Westerly	North-Westerly	South-Westerly	South-Easterly		Westerly	North-Westerly	South-Westerly	South-Easterly
A1 - Eastern end of Jean Street	48	<b>50</b>	45	45	<b>49</b>	<b>53</b>	2	-	-	1	5
M1 - Eastern end of Jean Street (6 Jean Street)	48	41	36	36	40	45	-	-	-	-	-
A2 - Eastern end of Ivy Street	47	41	37	42	37	44	-	-	-	-	-
A3 - Wentworth Street (south)	42	40	42	<b>44</b>	36	36	-	-	2	-	-
A4 - Eastern end of Gregory Street	45	40	44	42	45	42	-	-	-	-	-
A5 - Western end of Blanche Street	43	42	<b>45</b>	<b>46</b>	<b>44</b>	40	-	2	3	1	-
A6 – 40 Bazentin Street	41	30	36	36	30	26	-	-	-	-	-
A11 - Begnell Park	-	-	-	-	-	-	-	-	-	-	-
A13 - Greenacre Bowling Club	-	-	-	-	-	-	-	-	-	-	-
A14 - Strathfield High School	-	-	-	-	-	-	-	-	-	-	-
A15 - St Anne's School	-	-	-	-	-	-	-	-	-	-	-

**Bold Red Text** - Noise level exceed the MCoA 2.17 criteria.

The predicted unmitigated LAeq(period) noise levels for the proposed MOD 14 are presented in **Table 24** to **Table 26**.

**Table 24 Amenity Assessment - Daytime (11 hour)**

Location	Design Noise Criteria LAeq(period) dBA	Predicted LAeq(period) dBA				Exceedance dB			
		Neutral Weather	Enhanced Weather (Wind at 2.5 m/s)			Neutral Weather	Enhanced Weather (Wind at 2.5 m/s)		
			Westerly	North- Westerly	South- Westerly		Westerly	North- Westerly	South- Westerly
A1 - Eastern end of Jean Street	54	49	48	48	49	-	-	-	-
M1 - Eastern end of Jean Street (6 Jean Street)	54	41	39	39	40	-	-	-	-
A2 - Eastern end of Ivy Street	52	40	39	40	39	-	-	-	-
A3 - Wentworth Street (south)	52	40	40	41	38	-	-	-	-
A4 - Eastern end of Gregory Street	52	40	42	41	42	-	-	-	-
A5 - Western end of Blanche Street	58	44	46	46	45	-	-	-	-
A6 - 40 Bazentin Street	58	30	33	33	30	-	-	-	-
A11 - Begnell Park	50	44	46	45	45	-	-	-	-
A13 - Greenacre Bowling Club	55	41	39	42	39	-	-	-	-
A14 - Strathfield High School	45 <sup>1</sup>	39	40	38	42	-	-	-	-
A15 - St Anne's School	45 <sup>1</sup>	42	45	44	45	-	-	-	-

Note 1: External Amenity Noise Criteria.

**Table 25 Amenity Assessment - Evening (4 hour)**

Location	Design Noise Criteria LAeq(period) dBA	Predicted LAeq(period) dBA				Exceedance dB			
		Neutral Weather	Enhanced Weather (Wind at 2.5 m/s)			Neutral Weather	Enhanced Weather (Wind at 2.5 m/s)		
			Westerly	North- Westerly	Northerly		Westerly	North- Westerly	Northerly
A1 - Eastern end of Jean Street	49	49	47	47	48	-	-	-	-
M1 - Eastern end of Jean Street (6 Jean Street)	49	41	39	39	40	-	-	-	-
A2 - Eastern end of Ivy Street	51	40	38	40	42	-	-	-	-
A3 - Wentworth Street (south)	53	39	39	40	42	-	-	-	-
A4 - Eastern end of Gregory Street	46	39	42	40	38	-	-	-	-
A5 - Western end of Blanche Street	50	42	44	44	43	-	-	-	-
A6 - 40 Bazentin Street	54	29	33	33	33	-	-	-	-
A11 - Begnell Park	50	43	45	45	43	-	-	-	-
A13 - Greenacre Bowling Club	55	40	39	42	44	-	-	-	-
A14 - Strathfield High School	-	-	-	-	-	-	-	-	-
A15 - St Anne's School	-	-	-	-	-	-	-	-	-

**Table 26 Amenity Assessment - Night-time (9 hour)**

Location	Design Noise Criteria LAeq(period) dBA	Predicted LAeq(period) dBA					Exceedance dB				
		Neutral Weather	Enhanced Weather (Wind at 2.5 m/s)				Neutral Weather	Enhanced Weather (Wind at 2.5 m/s)			
			Westerly	North-Westerly	South-Westerly	South-Easterly		Westerly	North-Westerly	South-Westerly	South-Easterly
A1 - Eastern end of Jean Street	42	42	40	40	42	<b>45</b>	-	-	-	-	3
M1 - Eastern end of Jean Street (6 Jean Street)	42	34	31	31	33	37	-	-	-	-	-
A2 - Eastern end of Ivy Street	45	34	32	35	32	36	-	-	-	-	-
A3 - Wentworth Street (south)	38	34	35	37	32	32	-	-	-	-	-
A4 - Eastern end of Gregory Street	37	33	37	36	37	32	-	-	-	-	-
A5 - Western end of Blanche Street	43	37	39	39	38	35	-	-	-	-	-
A6 - 40 Bazentin Street	39	26	30	30	26	23	-	-	-	-	-
A11 - Begnell Park	50	36	39	39	38	35	-	-	-	-	-
A13 - Greenacre Bowling Club	55	35	33	36	32	35	-	-	-	-	-
A14 - Strathfield High School	-	-	-	-	-	-	-	-	-	-	-
A15 - St Anne's School	-	-	-	-	-	-	-	-	-	-	-

**Bold Red Text** - Noise level exceed the MCoA 2.17 criteria.

The predicted unmitigated LA1(1minute) noise levels for the proposed MOD 14 are presented in **Table 27**.

**Table 27 Sleep Arousal Assessment - Night-time<sup>1</sup>**

Location	Night - Sleep Arousal Criteria, LA1(1minute)	Predicted Noise Levels, LA1(1minute) dBA					Exceedance dB				
		Neutral Weather	Enhanced Weather (Wind at 2.5 m/s)				Neutral Weather	Enhanced Weather (Wind at 2.5 m/s)			
			Westerly	North-Westerly	South-Westerly	South-Easterly		Westerly	North-Westerly	South-Westerly	South-Easterly
A1 - Eastern end of Jean Street	58	<b>62</b>	57	<b>61</b>	57	<b>62</b>	4	-	3	-	4
M1 - Eastern end of Jean Street (6 Jean Street)	58	56	49	51	50	58	-	-	-	-	-
A2 - Eastern end of Ivy Street	57	50	46	51	45	52	-	-	-	-	-
A3 - Wentworth Street (south)	52	47	49	52	43	42	-	-	-	-	-
A4 - Eastern end of Gregory Street	55	46	50	49	51	47	-	-	-	-	-
A5 - Western end of Blanche Street	53	51	<b>56</b>	<b>56</b>	<b>54</b>	48	-	3	3	1	-
A6 - 40 Bazentin Street	51	38	43	43	38	31	-	-	-	-	-

**Bold Red Text** - Noise level exceed the MCoA 2.17 criteria.

The information presented in **Table 21** to **Table 27** has been assessed against the MCoA 2.17 criteria, and also compared with the results of Modification Application No. 6 (MOD 6) as assessed in the AECOM report 'Early Contractor Involvement Detailed Design Adjustment'. MOD 6 represents the acoustic assessment of the ILC, prior to the proposed modification assessed by this study. The findings are summarised as follows:

- Daytime period:
  - The worst-case operations for 15-minute period during daytime is predicted to comply with the LAeq(15minute) MCoA 2.17 intrusiveness criteria under neutral weather conditions. Under enhanced weather conditions the daytime LAeq(15minute) MCoA 2.17 criteria was exceeded at location A5 (Western end of Blanche Street) by up to 2 dBA.
  - Compliance of the MCoA 2.17 daytime external amenity criteria was achieved under both neutral and enhanced weather conditions.
- Evening period:
  - The worst-case operations for 15-minute periods during evening is predicted to comply with the LAeq(15minute) MCoA 2.17 criteria under both neutral and enhanced weather conditions.
  - Compliance of the MCoA 2.17 evening amenity criteria was achieved under both neutral and enhanced weather conditions.

- Night-time period:
  - The worst-case operations for 15-minute period during night-time is predicted to exceed the  $L_{Aeq(15\text{minute})}$  MCoA 2.17 intrusiveness criteria by up to 2 dBA at location A1 (Eastern end of Jean Street) under neutral weather conditions. Under enhanced weather conditions the night-time  $L_{Aeq(15\text{minute})}$  MCoA 2.17 criteria was exceeded by up to 5 dBA, 2 dBA and 3 dBA at location A1 (Eastern end of Jean Street), location A3 (Wentworth Street south) and location A5 (Western end of Blanche Street), respectively.
  - The MCoA 2.17 night-time amenity criteria was exceeded by up to 3 dBA at location A1 (Eastern of Jean Street) under South-Easterly wind conditions.
  - The MCoA 2.17 night-time sleep disturbance criteria was exceeded by up to 4 dBA at location A1 (Eastern of Jean Street) under neutral and enhanced weather conditions and by up to 3 dBA at A5 (Western end of Blanche Street) under enhanced weather conditions.
- The MCoA 2.17 noise criteria for “East end of Jean Street” area is based on the ambient noise monitoring conducted at location M1 (6 Jean Street) in February 2005. The predicted intrusive  $L_{Aeq(15\text{minute})}$  and amenity  $L_{Aeq(\text{period})}$  noise levels at receiver M1 (6 Jean Street) complies with the MCoA 2.17 noise criteria under both neutral and enhanced weather conditions. Compliance was also achieved for night-time sleep disturbance  $LA1(1\text{minute})$  noise levels at location M1 (6 Jean Street) under both neutral and enhanced weather conditions.
- Sensitive receptors at locations A1 (Eastern end of Jean Street) and A3 (Wentworth Street south) experience significant levels of night-time ambient noise as a result of existing road and/or rail activity on Roberts Road and the freight rail through line that is not associated with the Enfield ILC project. The worst case night-time impacts  $L_{Aeq(15\text{ minute})}$  of the Enfield ILC project (including the proposed MOD 14 modifications) predicted at A1 and A3 are lower than the baseline ambient noise levels measured at the corresponding monitoring locations in 2005 (Renzo Tonin, 2005). Therefore it is unlikely that the predicted noise contribution of the Enfield ILC would be perceived as intrusive at these locations, regardless of any criteria exceedances.

### 8.3.2.3 Sleep Disturbance Discussion

Based on the acoustic study from EA stage of the project Preferred Project Report (Renzo Tonin and Associates, April 2006), the “Background plus 15 dB(A)” criteria was exceeded at some residential assessment locations under both neutral and certain enhanced weather conditions. The likelihood of the sleep disturbance noise levels due to the operation of the Enfield ILC was minimised by a number of mitigating factors:

1. The night-time Rating Background Level (RBL) noise level is used for sleep disturbance  $LA1(1\text{minute})$  assessment. The RBL is most influenced by the quietest (lowest 10<sup>th</sup> percentile background) period during the night-time, typically 2:00 am to 4:00 am. The frequency of hourly truck movements at the Enfield ILC (and resulting the container movement and “Clangs”) during this period is very low when considering the hours commencing 3:00 am and 4:00 am (refer to the Road Traffic Assessment by Transport & Urban Planning Pty Ltd, dated November 2016). However, the period when there are significant numbers of container “Clangs” is the INP night-time ‘shoulder’ period (i.e. 6:00 am to 7:00 am) at which time there is a corresponding increase in background noise levels (resulting from traffic increases and industry commencement in the surrounding Urban area that occurs typically after 5 am) – in the order of 5 to 10 dBA. This has a corresponding effect of diminishing the relative impact of container “Clang” events by 5 to 10 dBA.
2. An analysis of existing night-time maximum noise levels at all residential receivers A1 to A6 revealed that existing maximum noise levels exceeded the predicted maximum noise levels due to ILC operation and the ‘Background plus 15 dB(A)’ criterion for each location. The predicted sleep disturbance noise levels  $LA1(1\text{minute})$  and the existing maximum noise levels are summarized in **Table 28**.

**Table 28 Predicted Sleep Disturbance Noise Levels and Existing Maximum Noise Levels**

Location	Night - Sleep Arousal Criteria, LA1(1minute)	Predicted Noise Levels, LA1(1minute) dBA					Existing Average LAmax <sup>1</sup>	
		Neutral Weather	Enhanced Weather (Wind at 2.5 m/s)				Min	Max
			Westerly	North-Westerly	South-Westerly	South-Easterly		
A1 - Eastern end of Jean Street	58	62	57	61	57	62	67	74
M1 - Eastern end of Jean Street (6 Jean Street)	58	56	49	51	50	58	67	74
A2 - Eastern end of Ivy Street	57	50	46	51	45	52	72	83
A3 - Wentworth Street (south)	52	47	49	52	43	42	68	81
A4 - Eastern end of Gregory Street	55	46	50	49	51	47	67	72
A5 - Western end of Blanche Street	53	51	56	56	54	48	67	72
A6 - 40 Bazentin Street	51	38	43	43	38	31	67	77

Notes 1: The existing average LAmax noise levels presented are taken from the Noise Technical Memorandum (Renzo Tonin 2006) which accompanied the Preferred Project Report submitted prior to the original approval of the ILC project.

The summary from **Table 28** shows the predicted LA1(1minute) noise levels consistently below the existing LAmax noise levels. Therefore, it is considered that the potential for sleep disturbance is minimal, irrespective of the prevailing background noise levels.

### 8.3.3 Tonality and Low Frequency

The noise character was tested based on Table 4.1 on the NSW INP and found that tonal and low-frequency characteristics were not present in predicted noise emissions from the site to assessment locations. Therefore, no modifying correction factor has been applied.

This is consistent with the EA report noise assessment undertaken for the site.

### 8.3.4 Net Impact of Proposed Modification

Interrogation of the noise prediction model indicates that the main contributors to the overall noise levels at the assessment locations vary according to receiver location. The main noise contributors at each of the assessment locations have been identified in **Table 29**.



**Table 29 Key Noise Contributors**

Location	Main noise contributor to overall predicted noise level at receiver			Worst Case Weather Conditions
	1	2	3	
A1 - Eastern end of Jean Street	Reach Stacker	Forklift	Truck Movements	Night-time South-Easterly Wind
M1 - 6 Jean Street	Reach Stacker	Forklift	Truck Movements	Daytime South-Easterly Wind
A2 - Eastern end of Ivy Street	Truck Movements	Reach Stacker	Forklift	Daytime South-Easterly Wind
A3 - Wentworth Street (south)	Truck Movements	Reach Stacker	Moving Train	Night-time North-Westerly Wind
A4 - Eastern end of Gregory Street	Reach Stacker	Forklift	Truck Movements	Daytime South-Westerly Wind
A5 - Western end of Blanche Street	Truck Movements	Reach Stacker	Idling trucks	Night-time North-Westerly Wind
A6 - 40 Bazentin Street	Forklift	Truck Movements	Reach Stacker	Daytime North-Westerly Wind
A11 - Begnell Park	Forklift	Truck Movements	Reach Stacker	Daytime Westerly Wind
A13 - Greenacre Bowling Club	Reach Stacker	Truck Movements	Forklift	Daytime North-Westerly Wind
A14 - Strathfield High School	Reach Stacker	Truck Movements	Forklift	Daytime South-Westerly Wind
A15 - St Anne's School	Truck Movements	Reach Stacker	Forklift	Daytime South-Westerly Wind

Note: Shaded rows indicate no identified criteria exceedances.

The information presented in **Table 29** indicates that the main noise contributor to the proposed MOD 14 operational noise levels at adjacent assessment locations is from the movement of reach stackers, forklift and trucks on site. However, MOD 14 does not propose to increase the number of reach stackers or forklifts used on the site, nor does it significantly affect their utilisation or the locations in which they operate. Noting that MOD 14 proposes a change in truck operations to increase flexibility of the vacant land, the incremental change in noise level has been examined and the net MOD 14 impacts compare with MOD 12 operations have been summarised as follows.

- The LAeq(15minute) intrusive noise levels are expected to increase by the minor amounts of up to 0.8 dBA during daytime and evening periods and up to 0.4 dBA during night-time periods.
- The LAeq(period) amenity noise levels are expected to increase by the minor amounts of up to 0.6 dBA during the daytime and evening periods and up to 0.9 dBA night-time periods, respectively.

These net increases are minor and would not be expected to result in any perceived change in noise level from the ILC at the receivers surrounding the site as a result of MOD 14.

### 8.3.5 Recommended Noise Mitigation

Review of the predicted noise impacts from the proposed MOD 14 operation in the Enfield ILC site indicates that receivers A1, A3 and A5 may be subjected to worst-case noise levels which have minor to marginal exceedance of the applicable design criteria (i.e. exceedances in a range of 1 to 5 dB). With reference to **Section 8.3.4**, considering the dominant noise sources from the site, the following additional mitigation measures should be considered where practicable:

- It is recommended that reach stackers be operated in a “Low Horse Power” or “Night Mode” at night to reduce the overall noise emissions. It is also recommended to fit all site-based mobile plant with non-tonal variable reverse alarms to reduce the site wide noise emissions.

- Following the commencement of MOD 14 operations, it is recommended that attended noise monitoring be conducted to further quantify the predicted noise emissions from the site. Monitoring will be used to validate the noise model and account for any variances in actual operating conditions compared to the input assumptions used in this assessment. In particular, the requirement for monitoring of empty container storage operations within 30 days of commencement as per Condition 3.3 of the Project Approval could be applied to the Precinct A area. This would ensure that potential impacts on receivers around Roberts Road and Jean St are assessed and addressed in a timely manner.
- Following noise monitoring, if exceedances are identified, the use of noise reducing kits should be investigated. Noise reducing kits may include high performance mufflers and acoustic louvers, if available and feasible, for noise intensive mobile plant used permanently on site.

As detailed in **Table 29**, the reach stackers and forklifts are typically the most dominant noise source on site. If required, the noise reducing kits may achieve a noise reduction of 4 dBA on all reach stackers forklifts and hence the potential predicted exceedances may not eventuate.

- All plant and equipment should be inspected regularly and kept in good running order, regularly maintained and free of defective components which may affect noise emissions.

As per the existing MCoA requirements, management measures will be put in place at the Enfield ILC site to control the noise emission, including:

- Preparation of a Noise Management Plan (in accordance with Project Approval condition 6.5);
- Compliance noise monitoring (in accordance with Project Approval condition 3.3) will be conducted at different annual throughput stages (i.e. 50,000, 150,000 and 250,000 TEU) and commencement of operation in ECS A to assess the compliance with the condition of 2.17 of the existing consent, including LA1(1minute) noise events during the night-time period; and

## **8.4 Traffic noise impact assessment**

### **8.4.1 Road Traffic Movements**

Road Traffic and Transport Assessment (dated October 2005) was prepared as part of the original Environmental Assessment (EA) (Chapter 7). Recent road traffic count and assessment have also been conducted by Transport and Urban Planning Pty Ltd in November 2016. The original assessment assumed the peak traffic movements during the daytime period. Using the key assumptions of the Ason Group report for the purposes of this modification, a new worst case traffic movement scenario has been developed to assess the impact of MOD 14 operation. The predicted 2016 weekday hourly truck movements generated by ILC from EA (2005) and proposed MOD 14 are presented in **Table 30**.

**Table 30 Weekday Hourly Traffic Movement**

Hour Commencing	Predicted 2016 ILC Truck Movement (2005) <sup>1</sup>	Proposed ILC MOD 14 Truck Movement <sup>2</sup>
0:00	7	7
1:00	11	11
2:00	11	12
3:00	0	4
4:00	0	6
5:00	18	22
6:00	57	62
7:00	88	110
8:00	86	116
9:00	78	105
10:00	84	104
11:00	81	88
12:00	81	88
13:00	97	110
14:00	103	124
15:00	92	108
16:00	69	89
17:00	53	65
18:00	34	47
19:00	33	38
20:00	28	37
21:00	21	31
22:00	18	26
23:00	9	11

Note 1: Road Traffic and Transport Assessment (dated October 2005) - EA (Chapter 7).

Note 2: Proposed truck movement figure was provided by AsonGroup Pty Ltd in 2017.

The Preferred Project Report (dated June 2006) prepared by Sinclair Knight Merz has recommended that approximately 75% of the truck movement would occur through the primary truck route via Wentworth Street and Roberts Road; and 25% of the truck movement would occur through the secondary truck route via Cosgrove Road and Liverpool Road (Hume Highway).

The results from the traffic counts conducted in 2005 and the estimated traffic movements with and without ILC operation in 2016 (as predicted in the original EA, 2005) are summarised in **Table 31**. **Table 31** also estimates the possible traffic movements associated with and without MOD 14 operation (i.e. a potential worst case scenario).