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UPDATE OF THE ENVIRONMENTAL NOISE ASSESSMENT OF THE PROPOSED DAMPIER PORT UPGRADE PHASE B (145 Mtpa THROUGHPUT)

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1	Paul Keswick	Jim Mcloughlin	15-May-07	Incorporating DEC comments
2	Paul Keswick	Jim Mcloughlin	29-May-07	Incorporating DEC request for 120Mtpa CD3/4 case

CONTENTS

1 EXECUTIVE SUMMARY

This report presents a review of the environmental noise assessment of the 145 Mtpa Dampier Port Upgrade Project. The noise modelling undertaken for the review is based on as built noise measurements taken during the commissioning of 120 Mtpa upgrade project.

1.1 Fixed plant assessment

Noise emissions from fixed plant have been assessed assuming 100% plant utilisation for a worst case wind condition (which represents the maximum noise emission likely from the plant), and also the worst case noise emission for the proposed plant taking into account plant utilisation (ie in practice not all of the plant is always operating, there will always be some plant shutdown).

The following presents the maximum L_{A10} noise emission likely from the plant assuming 100% plant utilisation, including the power station, for a worst case wind (northerly) both including and excluding the eastern bulking operations based on the as-built 95/120 Mtpa upgraded plant noise measurements taken during commissioning. In reality the maximum noise emission case can not happen because it is not possible for all plant at Parker Point to operate at once.

Equipment operating	**Maximum L_{A10} noise emission levels assuming all equipment running together in dB(A)**			
	80 Mtpa (Original Plant)	**95 Mtpa/ 120 Mtpa**	**120 Mtpa**	**145 Mtpa**
		CD1&CD3 Operating	CD3&CD4 Operating	
Total (excluding bulking)	49.0	50.3	50.5	50.5
Total (including bulking)		50.4	50.7	50.7

The maximum noise emission from the 145 Mtpa case when bulking is not being undertaken is:

- the same as the 120 Mtpa with CD3&CD4 operating case (this is because the same plant is used by both the 120 Mtpa with CD3&CD4 operating and the 145 Mtpa case);
- greater than the 95 Mtpa/120 Mtpa with CD1&CD3 operating case by 0.2 dB; and
- greater than the original 80 Mtpa plant by 1.5 dB.

When bulking is being undertaken, the maximum noise emission levels increase by 1.7 dB for the 145 Mtpa case when compared with the original plant. Previous assessments have indicated that the maximum noise levels would decrease with the 145 Mtpa case, however, recent site noise verification measurements indicate that noise emission from the conveyors and conveyor drives is higher than originally anticipated.

To account for how the plant operates a noise emission assessment has been undertaken which incorporates how the plant is utilised (ie is what plant is running at any given time) Based on this assessment the following table presents the average noise levels for the worst case wind conditions taking into account plant utilisation (including the power station) for the

85 Mtpa (original plant), 95 Mtpa, 120 Mtpa with CD1&CD3 operating, 120 Mtpa with CD3&CD4 operating, 145 Mtpa cases.

Description	Average noise levels taking into account plant utilization in dB(A)				
	80 Mtpa	95 Mtpa	120 Mtpa		145 Mtpa
			CD1&CD3 Operating	CD3&CD4 Operating	
Excluding bulking	48.2	48.5	49.8	47.8	48.3
Including bulking		48.6	49.8	47.8	48.4

Taking into account plant utilisation, and excluding bulking activities, noise emission from the 145 Mtpa case is expected to be:

- 0.5 dB louder than the 120 Mtpa with CD3&CD4 operating case,
- 1.5 dB quieter than the 120 Mtpa with CD1&CD3 operating case,
- 0.2 dB quieter than the 95 Mtpa case, and
- 0.1 dB louder than the 80 Mtpa (original plant case)

When bulking is being undertaken the 145 Mtpa case is expected to be:

- 0.6 dB louder than the 120 Mtpa with CD3&CD4 operating case,
- 1.4 dB quieter than the 120 Mtpa with CD1&CD3 operating case, and
- 0.2 dB quieter than the 95 Mtpa case.

High noise emission from the plant is primarily due to higher than anticipated conveyor idler noise due to wax from the conveyor belt being deposited on the idler casing. All conveyor belts contain some wax as part of its rubber formulation; it is not possible to purchase conveyor belt from a commercial supplier that does not have some level of wax, as the wax is an important component of the manufacturing and belt preservation process. When the wax falls off the idlers during the course of the conveyors being used, the noise from the conveyor idlers should reduce by 3 to 8 dB. If the conveyors achieve a 3 dB noise reduction with time, then the overall noise emission from the plant will reduce by 1.3 dB.

Bridgestone, Pilbara Iron's main supplier, was recently requested to review the potential to eliminate wax from supplied belts. They have successfully reduced the volume of wax to the minimum. Replacement belts will therefore have a reduced level of wax, a decrease in wax build up and noise is therefore anticipated.

The assessment shows that noise emission from the 145 Mtpa upgraded case can exceed the day, evening and night time assigned noise levels under the Environmental Protection (Noise) Regulations 1997 by the following amounts when there is a northerly wind:

Day- 3.3 dB without bulking, and 3.4 dB(A) with bulking
Evening- 8.3 dB without bulking, and 8.4 dB(A) with bulking
Night-time- 13.3 dB without bulking, and 13.4 dB(A) with bulking

It should be noted that for Dampier the noise impacts are greatest when winds are from the northern quadrant and when the wind is calm. During night time hours, (when noise limits are

most stringent), the worst-case conditions for noise impacting Dampier from the Parker Point facility occur for 7.1 % of the time each year. During the winter and spring months (when residents are less likely to use their air-conditioning) the worst-case conditions for noise impacting Dampier from the Parker Point facility occur for 6.2 % of the time.

1.2 Train impact assessment

With the upgrade from 95 Mtpa /120 Mtpa to 145 Mtpa locomotives are not used continuously to index the train through the new car dumpers. Hence the upgrade will significantly remove the time and the noise generated from locos operate along the track adjacent to Dampier.

To ensure that the assumptions made for the 120 Mtpa assessment remain the same, significant work has been undertaken to investigate and reduce noise from the brake cars used for the train unloading. Pilbara Iron has been aware of the potential of high squealing noise from the brakes of the new compressor brake cars that are used during the unloading of the trains. To ensure that the squeal noise does not become an annoyance, the following work has been undertaken:

- investigating the cause of the high brake noise squeal,
- applying damping treatments to the brakes,
- installing rubber backing to the brake pads, and
- reviewing brake pad material

The noise treatments installed have now reduced the brake car squeal which was previously clearly audible at Lawson Drive in the town of Dampier.

The following presents the results of the train assessment, where it has been assumed that the number of trains arriving at Parker Point is on average evenly distributed throughout the day, and hence the day time and night time LAeq are the same value.

Train activity	**95 Mtpa**		**120 Mtpa**		**145 Mtpa**	
	Day time	**Night time**	**Day time**	**Night time**	**Day time**	**Night time**
	LAeq dB(A)		**LAeq dB(A)**		**LAeq dB(A)**	
Number of trains in use	6		9		11	
Total for train activities	34.3	34.3	34.6	34.6	34.2	34.2

Although there is an increase in train movements going from Phase A (120 Mtpa) to Phase B (145 Mtpa) there is a reduction in the LAeq day and night time noise levels by 0.4 dB. This noise reduction is achieved because CD1 will become redundant, and hence the noise from idling locomotives used to push the ore cars into the dumper on the CD1 line will be removed. The trains using the new CD3 & CD4 lines do not use locomotives to position wagons during the unloading process.

To assess the train noise impact, the Draft Statement of Planning Policy: Road and Rail Transport Noise, prepared by the Western Australian Planning Commission, and the EPA draft statement for environmental impact assessment (No.14, Version 3) entitled “Road and

Rail Transportation Noise" has been used. The Draft Statement of Planning Policy: Road and Rail Transport Noise recommends a target LAeq day time level of 55 dB(A) and an LAeq night time level of 50 dB(A) for noise sensitive premises adjacent to rail corridors. The estimated day time and night time LAeq noise levels at the closest noise sensitive premises are well below those target noise levels. The EPA draft statement for environmental impact assessment uses a Noise Amenity Rating (NAR) to determine acceptable noise levels for residential developments near to existing road or rail transportation routes. Noise emission from the train activities will meet the lowest noise amenity of rating of N0, and hence is considered suitable for both Residential or Open space use.

1.3 Noise initiatives

The following outlines the noise initiatives which have been incorporated intothe existing plant to enable the plant to go up to the 145 Mtpa case:

- use of low noise idlers for a majority of conveyors;
- use of low speed (6 pole) motors as against high speed (4 pole) motors for all conveyor drives;
- installation of acoustic screens to the south, west and east sides of the new screen house SHP3;
- use of low noise motors for car dumper positioner;
- application of damping treatment to compressor brake car wheels and the installation of rubber behind the brake pads;
- replacement of CD1 and SH1P with the low noise CD4 and SH3P;
- removal of locos pushing cars into dumper and empty wagon shunting noise when CD1 is decommissioned and;
- reduction in alarm noise levels to minimise the alarm noise on the town of Dampier when they are in operation.

In addition to above initiatives, the Port operations is replacing the idlers on 5E conveyor at East Intercourse Island (EII) with low noise idlers. The replacement of the 5E idlers with low noise idlers results in a 2.7 dB reduction in predicted noise levels from the EII operations from 41.6 dB(A) to 38.9 dB(A).

The project has not met design noise levels and hence the Port Operations has developed a comprehensive Noise Improvement Plan. This has been reviewed by the DEC and has been incorporated into the revised Environmental Noise Management Plan.

As part of the noise initiatives contained in the Noise Improvement Plan, a permanent noise monitor has been installed on the north side of Dampier to monitor noise emission from the Parker Point facility, with another permanent noise monitor scheduled to be installed to the southwest of Dampier.

2 INTRODUCTION

This report presents a review of the impact of noise emission from the Dampier Port Upgrade Phase B which will provide capacity for 145 Mtpa. The noise assessment presented in this report is based on noise modelling which has been based on as built noise measurements taken during the commissioning of the 120 Mtpa upgrade project in December 2006.

Pilbara Iron proposes to increase the throughput of its Dampier Port facilities from 120 Mtpa to 145 Mtpa. The following gives an overview of the recent expansion phases for the project.

Case	Phase	Primary equipment changes
80Mtpa	Pre-upgrade throughput	None
95 Mtpa	Phase A	New CD3, SH3P, SL2P, addition of new stock piles and extension of existing stockpiles
120 Mtpa- CD1/CD3 operating	Phase A	Increase in utilisation of CD1 and in bulking
120 Mtpa- CD3/CD4 operating	Phase A	CD3/CD4 operating- CD1 decommissioned
145 Mtpa	Phase B	Decommissioning of CD1, SH1P, SL1P and replacement with CD4, SH3P and SL3P
Notes: CD1, CD3 and CD4 are car dumpers; SH1P, SH2P, SH3P are screen houses; and SL1P, SL2P, SL3P are ship loaders		

Currently Pilbara Iron has environmental approvals for a throughput of 120 Mtpa and has completed the commissioning activities associated with the 120 Mtpa upgrade. The upgraded works required to achieve an increase in throughput from 120 Mtpa to 145 Mtpa are nearing completion.

2.1 Work undertaken

The following outlines the work undertaken as part of this assessment:

i. Updating of the existing plant noise model developed for the 95 Mtpa and 120 Mtpa cases (Phase A) to include as built noise data (taken in December 2006) and to include the equipment associated with the 145 Mtpa case (Phase B).

ii. Prediction of noise levels for the 145 Mtpa plant assuming 100% equipment utilisation (ie all plant operating).

iii. Prediction of average noise levels for the 145 Mtpa plant based on the proposed plant utilisation (i.e. not all equipment running at all times).

iv. Review of the noise impact on the residents of Dampier due to the increase in train movements.

v. Review of noise impact at Dampier due to the installation of low noise idlers along the 5E conveyor.

3 CHANGES IN FACILITIES FROM 95 MTPA AND 120 MTPA (Phase A) TO THE 145MTPA UPGRADED PLANT

Figure A1 (Appendix A) presents the proposed plant layout for the 145 Mtpa case.

3.1 Plant added as part of the 145 Mtpa plant upgrade

The 145 Mtpa case makes the following changes to the plant at Parker Point:

- replace original car dumper (CD1) and associated conveyors with new car dumper (CD4) and conveying to stockyard;
- install rail line for CD4 on pre-existing embankment;
- upgrade and replace the original (pre Phase A) stockyard conveyors and transfers from 1500mm to 1800mm wide conveyors;
- replace existing screenhouse (SH1P) with a new and more flexible facility (SH3P);
- new and modified conveying to/from screenhouse, including return fines conveying to all stackers;
- installed sampling facility for as shipped and return fines;
- upgrade and extend the existing wharf;
- upgrade the existing shiploading conveyors on the access jetty and wharf from 1350mm to 1800mm wide conveyors;
- replace existing shiploader (SL1P) with new shiploader (SL3P);
- provide additional bulking stockpile area; and,
- decommission CD1, SH1P and SL1P and remaining original conveyors.

All equipment and standards are identical to those applied to the 95 Mtpa and 120 Mtpa Phase A upgrade.

The increase in capacity from 120 Mtpa to 145 Mtpa is achieved by duplicating the new car dumper and screen house, and by increasing the wharf loading capacity through an additional berth, with the original in-loading and out-loading circuits being decommissioned (CD1, SH1P, SL1P).

Table 3-1 presents the plant utilisation for the Phase B operating scenarios. Two operating cases have been presented for the 120 Mtpa case, the first is with CD1 and CD3 operating, and the second is with CD3 and CD4 operating. The 120 Mtpa with CD3 And CD4 operating case occurs because CD1 is decommissioned.

Table 3-1 Plant Utilisation for the various Operating Scenarios

Plant Operating	Plant Utilisation in Percentage time				
	80Mtpa	95Mtpa	120Mtpa CD1&CD3 Operating	120Mtpa CD3&CD4 Operating	145Mtpa
Car dumpers					
CD4 and CD3 Running, CD1 Stopped				40.6	49.0
CD4 Running and CD1, CD3 Stopped				17.4	21.0
CD3 Running and CD1, CD4 Stopped		62.6	25.9	17.4	21.0
CD1, CD4 and CD3 Stopped		26.8	11.1	7.4	9.0
CD1 Running and CD3, CD4 Stopped	74.0	3.2	18.9		
CD1 and CD3 Running, CD4 Stopped	36.0	7.4	44.1		
Ship loading					
SL1 and SL2 Running, SL3 Stopped		32.6	68.9		
SL1 Running and SL2 and SL3 Stopped		24.5	14.1		
SL2 and SL3 Running and SL1 Stopped				54.6	66.0
SL2 Running and SL3 and SL1 Stopped				12.4	15.0
SL3 Running, SL1 and SL2 Stopped		24.5	14.1	12.4	15.0
SL1 Running and SL2 and SL3 Stopped	79.0				
SL1, SL2 and SL3 Stopped	21.0	18.4	2.9	3.3	4.0
Screen house					
SH1P and SH2P Running and SH3P Stopped		5.2	11.0		
SH1P Running and SH2P and SH3P Stopped		17.6	22.2		
SH3P and SH2P Running and SH1P Stopped				8.8	10.6
SH3P Running and SH2P and SH1P Stopped				18.2	22.0
SH2P Running and SH1P and SH3P Stopped		17.6	22.2	18.2	22.0
SH1P Running and SH3P and SH2P Stopped	79.0				
SH1P, SH3P and SH2P Stopped	21.0	59.6	44.6	37.6	45.4
Power Station					
Power Station	100	100	100	100	100
Notes: Note 1- for the 145 Mtpa case CD1, SL1 and SH1P do not operate Note 2- For the 120 Mtpa CD3/CD4 case CD1 is decommissioned					

3.2 Bulking

Bulking for the 120 Mtpa and 145 Mtpa cases uses the same mobile equipment and operating philosophy. The following mobile equipment is used for both bulking operations: 4 x 777 Trucks, 2 x Loaders. When bulking is being undertaken, it has been assumed that ingoing and outgoing bulking from the bulking areas is occurring 22% of the time.

3.3 Train movement changes

The number of trains per day for 120Mtpa is 9. The number of trains will increase to 11 for 145 Mtpa.

3.4 Noise initiatives

A number of noise initiatives have been undertaken by Pilbara Iron as part of the 145 Mtpa case, and as part of the Dampier Port Environmental Noise Management activities.

The following outlines noise initiatives carried out as part of the 145 Mtpa case:

- use of low noise idlers for a majority of conveyors;
- use of low speed (6 pole) motors as against high speed (4 pole) motors for all conveyor drives;
- installation of acoustic screens to the south, west and east sides of the new screen house SH3P;
- use of low noise motors for car dumper positioner;
- application of damping treatment to compressor brake car wheels and the installation of rubber behind the brake pads;
- replacement of CD1 and SH1P with the low noise CD4 and SH3P;
- removal of locos pushing cars into dumper and empty wagon shunting noise when CD1 is decommissioned and;
- reduction in alarm noise levels to minimise alarm noise impact on the town of Dampier when they are in operation.

In addition to above initiatives, Port operations has replaced the 5E idlers with low noise idlers. The replacement of the 5E idlers with low noise idlers results in noise from the EII operations reducing from 41.6 dB(A) to 38.9 dB(A), ie a 2.7 dB reduction.

Furthermore, Port Operations has developed a comprehensive Noise Improvement Plan. This has been received by the DEC and has been incorporated into the revised Environmental Noise Management Plan.

As part of the above noise initiatives contained in the Noise Improvement Plan, a permanent noise monitor is installed on the north side of Dampier to monitor noise emission from the Parker Point facility, with another permanent noise monitor scheduled to be installed to the southwest of Dampier.

4 NOISE LEVEL IMPACT FOR FIXED PLANT AND EQUIPMENT

The impact of noise emission from fixed plant operations from the 145 Mtpa plant on the town of Dampier is presented here. The noise impact assessment is based on as built noise measurements taken during the commissioning for the 120Mtpa plant in December 2006. Since most of the plant and equipment being used for the 120 Mtpa plant is also being used for the 145 Mtpa upgrade the noise model should give a very good indication of the expected noise emission from the plant.

Table 4-1 presents the plant that will be operating under the 145 Mtpa upgrade and the various Phase B options.

Table 4-1 Plant Operating for the 145 Mtpa Upgrade

Car dumpers
For CD3 Running, the following conveyors operate: 101P, 107P, ST3P, Dust Collectors
For CD4 Running, the following conveyors operate: 201P, 121P, 103P, 3P, ST6P, Dust Collectors
Ship loading
For SL2P Running, the following conveyors operate: RC3P, 109P, 110P, 114P, 115P, 116P, SL2P
For SL3P Running, the following conveyors operate: RC2P, 5AP, 210P, 214P, 215P, 216P, SL3P
Screen house
For SH2P Running, the following conveyors operate: (in addition to ship loading conveyors) 112P, VF01–VF07 – Vibrating Feeders (total 7), VS01–VS07 – Screens (total 7), 131P–137P – Conveyor Feeders (total 7), 117P, 108P, ST5P
For SH3P Running, the following conveyors operate: (in addition to ship loading conveyors) 212P, VF21–VF27 – Vibrating Feeders (total 7), VS21–VS27 – Screens (total 7), 231P–237P – Conveyor Feeders (total 7), 217P, 218P, 3P, ST6P
Bulking
For bulking four 777 Haul trucks assumed to be operating on the Haul Road, and one Dozer and Front End Loader assumed to be operating at bulking stock pile.
Power Station operating

SVT's previous assessments have assumed that all of the equipment is in operation for the noise modelling case with a northerly wind, which represents a worse case modelling scenario. Table 4-2 presents the maximum L_{A10} noise levels at the closest noise sensitive position in the town of Dampier for a 3m/s northerly wind and a 2C/100 m inversion for each of the major equipment items running (as listed in Table 4-1). Table 4-2 also presents the maximum L_{A10} noise emission level for the entire Parker Point facility.

The maximum noise level represents the sum of all of the individual noise levels for each of the individual plant items, including and excluding bulking activities, ie all equipment running at once.

Appendix B presents noise contours for the 145 Mtpa case for the maximum noise level case (ie all plant running with down wind conditions) when bulking is being undertaken and when bulking is not being undertaken.

Table 4-2 Maximum L_{A10} Noise Levels at Dampier for all Plant Running (including the power station)

Equipment operating	Maximum L_{A10} noise emission levels assuming all equipment running together in dB(A)			
	80 Mtpa	**95 Mtpa/ 120 Mtpa CD1/CD3 Running**	**95 Mtpa/ 120 Mtpa CD3/CD4 Running**	**145 Mtpa**
Car dumpers				
CD4 Running			41.9	41.9
CD3 Running		42.2	39.9	39.9
CD1 Running	43.1	40.9		
Ship loading				
SL1P Running	44.7	45.8		
SL2P Running		44.2	42.1	42.1
SL3P Running			42.7	42.7
Screen house				
SH1P Running	39.8	32.8		
SH2P Running		36.8	36.8	36.8
SH3P Running			36.6	36.6
Bulking				
Northern and Eastern bulking stock pile		36.8	36.8	36.8
Power Station	42.9	42.9	42.9	42.9
Overall plant noise levels				
Total (excluding bulking)	49.0	50.3	50.5	50.5
Total (including bulking)		50.5	50.7	50.7

The maximum noise emissions for the 145 Mtpa operating case is 0.2 dB greater than the 120 Mtpa with CD1&CD3 operating case. This increase is due to higher than anticipated noise emission from the conveyors and conveyor drives. It should be noted that previous assessments have indicated that the maximum noise levels would decrease with the installation of the 145 Mtpa operating case due to anticipated low noise emission from conveyors and conveyor drives. However, the maximum noise emissions for the 145 Mtpa operating case is the same as that for the 120 Mtpa with CD3&CD4 operating case because the same equipment is used for both cases.

The maximum noise emission levels presented in Table 4-2 do not provide a representative indication of the expected noise emission from the plant, since not all of the plant will be operating all of the time. The maximum noise emissions presented will therefore be an over-estimate.

During normal operation some plant will not be operating. Table 3-1 presents the plant utilisation for 145 Mtpa operating case. To account for the plant utilisation, an average noise level based on the L_{A10} maximum noise levels has been developed for the plant. Table 4-3 presents the average noise levels that could be expected at Dampier from plant at Parker Point based on the plant utilisation data provided in Table 3-1, i.e. long term equivalent noise levels have been evaluated based on plant utilisation. The same weather conditions have been assumed (i.e. a 3m/s northerly wind combined with at 2C/100m temperature inversion). No

data is available to confirm the frequency and duration of thermal inversions but it is highly unlikely that the occurrence of worst-case wind conditions will always coincide with the occurrence of a thermal inversion.

Table 4-3 Average LA10 Noise Levels at Dampier from Plant at Parker Point Based on Plant Utilisation (includes power station noise emission)

Description	Average noise levels taking into account plant utilization in dB(A)				
	80 Mtpa	**95 Mtpa**	**120 Mtpa CD1/CD3 Running**	**120 Mtpa CD3/CD4 Running**	**145 Mtpa**
Individual plant noise levels					
Car dumpers	41.8	41.1	42.9	41.7	42.5
Ship loading	43.7	45.7	47.3	43.6	44.5
Screen house	38.8	31.8	33.5	34.1	34.9
Bulking		30.0	30	30.0	30.0
Power Station	42.9	42.9	42.9	42.9	42.9
Overall plant noise levels					
Excluding bulking	48.2	48.5	49.8	47.8	48.3
Including bulking		48.6	49.8	47.8	48.4

Taking into account plant utilisation (including the power station's noise emission) and excluding bulking activities noise emission from the 145 Mtpa case is expected to be:

- 0.5 dB louder than the 120 Mtpa with CD3&CD4 operating case,
- 1.5 dB quieter than the 120 Mtpa with CD1&CD3 operating case,
- 0.2 dB quieter than the 95 Mtpa case, and
- 0.1 dB louder than the 80 Mtpa (original plant case)

When bulking is being undertaken the 145 Mtpa case is expected to be:

- 0.6 dB louder than the 120 Mtpa with CD3&CD4 operating case,
- 1.4dB quieter than the 120 Mtpa with CD1&CD3 operating case, and
- 0.2 dB quieter than the 95 Mtpa case.

Table 4-4 gives an indication of the contribution of the noise from the various noise source types for the 145 Mtpa operating case assuming all plant operating.

Table 4-4 Noise contributions for the 145 Mtpa operating case

Sources of noise	Noise contribution in dB(A)
Conveyors (idler noise)	44.1
Conveyor Drives	47.9
Transfer Chutes	36.5
Other Plant	31.6
Power Station	42.9
Bulking	36.8
Total	**50.7**

The highest noise contributors from the 145Mtpa case are due to noise emissions from conveyor idlers and from conveyor drives.

The noise emission from conveyor idlers is currently higher than what would normally be expected due to wax from the conveyor belt being deposited on the idler casing. The deposited wax results in the idler surface becoming rough which directly impacts the noise emission from the idlers. All conveyor belts contain some wax as part of its rubber formulation; it is not possible to purchase conveyor belt from a commercial supplier that does not have some level of wax. The wax is an important component of the manufacturing and belt preservation process. When the wax falls off the idlers during the course of the conveyors being used, the noise from the conveyor idlers should reduce by 3 to 8 dB. If the conveyors achieve a 3 dB noise reduction with time, then the overall noise emission from the plant will reduce by 1.3 dB.

The above modelling is conservative, with the modelling accuracy currently falling between --1.2 to +3.2 dB.

Bridgestone, Pilbara Iron's main supplier, was recently requested to review the potential to eliminate wax from supplied belts. They have successfully reduced the volume of wax to the minimum. Replacement belts will therefore have a reduced level of wax, a decrease in wax build up and noise is therefore anticipated.

4.1 Comparison of noise emission levels with the maximum permissible noise levels allowed by the Environmental Protection (Noise) Regulations 1997

The assigned noise levels for day, evening and night time give the maximum permissible noise levels allowed by the Environmental Protection (Noise) Regulations 1997. The assigned noise levels for noise sensitive premises in the town of Dampier are presented in Table 4-5.

Table 4-5 Assigned Noise Levels for Dampier

Time of day	Assigned level dB(A)		
	L_{A10}	L_{A1}	$L_{A\ max}$
0700 to 1900 hours Monday to Saturday	45	55	65
0900 to 1900 hours Sunday and public holidays	40	50	65
1900 to 2200 hours all days	40	50	55
2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays	35	45	55

Noise emission from the plant is steady state in characteristic, and hence the average noise levels calculated should be compared with the L_{A10} noise level. Noise emissions from the 145 Mtpa case for a northerly wind is on average 48.3 dB(A) without bulking occurring, and 48.4 dB(A) with bulking occurring. Hence for a northerly wind direction noise emission from the

plant can exceed the day, evening and night time assigned noise levels by the following amounts:

Day- 3.3 dB without bulking, and 3.4 dB(A) with bulking
Evening- 8.3 dB without bulking, and 8.4 dB(A) with bulking
Night-time- 13.3 dB without bulking, and 13.4 dB(A) with bulking

These exceedances assume that noise emissions from the upgraded facility are free of tonal, modulating or impulsive characteristics. Noise measurements taken for the existing Parker Point facility in December 2006 for a northerly wind did not show any of these characteristics. The 145 Mtpa upgraded plant has been designed to be free of tonal, modulating or impulsive characteristics hence the noise emission from the plant is expected to remain free of these characteristics.

4.2 Likelihood of the exceedance

Likelihood of the exceedance occurring is dependent on the wind direction, ie high noise emission from the Parker Point facility only occurs when the winds are calm and are from the north.

Table 4-6 presents wind speed and direction data collected by the Bureau of Meteorology at Dampier Port that has been analysed to determine the percentage occurrence of light winds (3m/s or less) which have the most significant effect on sound propagation. Historical data dating back over 10 years was used in the analysis. The table below represents the percentage occurrence of winds of 3m/s or less in each month, each season and annually. The values were extracted from data collected during night time hours (10pm to 7am) since this is the period when noise limits are most stringent.

Table 4-6 Percentage occurrence of winds from various directions in Dampier for winds less than 3 m/s

Month	Calm	Percentage Occurrence of Winds from Each Direction								Total % Occurrence
		N	NE	E	SE	S	SW	W	NW	
Jan	1.2	1.4	2.3	0.7	2.6	1.7	0.9	3.0	3.5	17.4
Feb	1.2	1.0	1.6	0.4	0.7	1.6	0.7	2.8	2.2	12.3
Mar	1.7	1.8	2.2	0.3	1.7	2.7	1.5	4.1	4.9	20.8
Apr	2.4	0.8	3.3	1.7	3.1	2.9	2.4	1.7	1.7	19.9
May	2.1	2.4	3.1	1.3	2.8	2.8	2.0	1.3	1.5	19.3
Jun	1.0	1.8	3.4	1.6	1.4	3.1	0.7	0.7	2.0	15.7
Jul	1.4	1.1	3.2	2.1	1.3	2.5	0.8	1.5	0.6	14.5
Aug	0.4	2.0	2.8	2.2	0.6	3.6	2.4	1.1	1.4	16.5
Sep	1.4	0.4	1.8	0.3	0.6	4.1	1.7	3.4	3.8	17.5
Oct	1.1	0.1	1.1	0.3	0.6	2.7	1.3	2.1	2.5	11.8
Nov	1.4	0.6	0.7	0.1	0.6	1.6	0.3	1.7	1.4	8.4
Dec	1.6	1.3	1.2	0.6	1.5	2.6	0.1	1.9	2.3	13.2
Winter	0.9	1.6	3.1	2.0	1.1	3.1	1.3	1.1	1.3	15.6
Spring	1.3	0.4	1.2	0.2	0.6	2.8	1.1	2.4	2.6	12.6
Summer	1.3	1.3	1.7	0.6	1.6	2.0	0.6	2.6	2.7	14.3

Month	Calm	Percentage Occurrence of Winds from Each Direction								Total % Occurrence
		N	NE	E	SE	S	SW	W	NW	
Autumn	2.1	1.7	2.9	1.1	2.5	2.8	2.0	2.3	2.7	20.0
Annual	1.4	1.2	2.2	1.0	1.4	2.7	1.2	2.1	2.3	15.6

No data was available to assess the frequency of occurrence or strength of thermal inversions, but it is highly unlikely that the occurrence of worst-case wind conditions will always coincide with the occurrence of a thermal inversion. Therefore, actual percentage times of exceedance (and levels of exceedance) are likely to be lower.

For Dampier the noise impacts are at their greatest when winds are from the north west to north east and when the wind is calm (those columns that are shaded in Table 4-6). During night time hours, (when noise limits are most stringent), the worst-case conditions for noise impacting Dampier from the Parker Point facility occur for 7.1 % of the time each year. During the winter and spring months when residents are less likely to use their air-conditioning the worst-case conditions for noise impacting Dampier from the Parker Point facility occur for an average of 6.2 % of the time over these seasons.

5 5E CONVEYOR NOISE ABATEMENT

The Dampier Port operation has undertaken a program to reduce noise from the 5E conveyor (leading to East Intercourse Island port) by replacing the existing conveyor idlers with low noise idlers.

Noise testing was undertaken on a section of 5E conveyor which has a dust cover fitted and low noise idlers installed over various sections of the 5E conveyor. The testing undertaken on the trial section indicates that the new low noise idlers with the dust covers installed is 10 dB quieter than the conveyor sections with standard idlers.

Noise emission from the 5E conveyor is at its highest when a south westerly wind is prevalent. The following presents the noise reduction that can be expected at Dampier from implementation of the replacement of 5E conveyors with low noise idlers.

Table 5-1 Noise Levels Before & After Noise Reduction Measures

Wind Direction	Before Noise control in dB(A)	After Noise Control in dB(A)	Noise reduction achieved in dB(A)
South Westerly wind	41.6	38.9	2.7

The results presented are for 100% plant operation, i.e. plant utilisation is not accounted for, and assuming existing plant operating conditions.

6 NOISE LEVEL IMPACT FOR TRAIN MOVEMENTS

To ensure that the initial assumptions made as part of the 120 Mtpa upgraded plant remain the same, significant work has been undertaken to investigate and reduce noise from the brake cars used for the train unloading. Pilbara Iron has been aware of the potential of high squealing noise from the brakes of the new compressor brake cars that are used during the unloading of the trains. To ensure that the squeal noise does not become an annoyance, the following work has been undertaken:

- investigating the cause of the high brake noise squeal,
- applying damping treatments to the brakes,
- installing rubber backing to the brake pads, and
- reviewing brake pad material.

The noise treatments installed has now removed the brake car squeal which was previously clearly audible at Lawson Drive at the town of Dampier.

The primary noise impacts from the trains when dumping ore at Parker Point are:

- trains arrival and departure noise
- idling locomotive noise (only present when CD1 is in use)
- noise from ore car collisions

With the increase in throughput, there will be an increase in the number of trains per day in use. The following table presents the changes in the number of trains in use for the various stages of the project.

Table 6-1 Train Arrivals for Various Project Phases

Project	**95 Mtpa**			**120 Mtpa**			**145 Mtpa**		
Car Dumper	CD1	CD3	CD4	CD1	CD3	CD4	CD1	CD3	CD4
No of Trains	6	-	-	6	3	-	Shut down	5.5	5.5

Table 6-2 presents the noise impact in the town of Dampier for the 95 Mtpa, 120 Mtpa and 145 Mtpa cases based on the train numbers given Table 6-1 and assuming that the number of trains arriving at Parker Point is, on average, evenly distributed throughout the day and night. The assessment has been undertaken at the corner of Lawson Drive and Yule Cresant, which has the highest noise impact from train movements.

Table 6-2 Predicted Noise Levels for Various Project Phases

Train activity	95 Mtpa		120 Mtpa		145 Mtpa	
	Day time	Night time	Day time	Night time	Day time	Night time
	LAeq dB(A)		LAeq dB(A)		LAeq dB(A)	
Trains arrival and departures	28.0	28.0	25.0	25.0	30.6	30.6
Noise from ore car collisions	29.4	29.4	30.2	30.2	31.6	31.6
Idling locomotives	30.7	30.7	31.9	31.9	0.0	0.0
Total for train activities	34.3	34.3	34.6	34.6	34.2	34.2

Although there is an increase in train movements going from 120 Mtpa to 145 Mtpa, there is a reduction in the LAeq day and night time noise levels by 0.4 dB. This noise reduction is achieved because CD1 is made redundant, and hence the noise from idling locomotives used to push the ore cars into the dumper on the CD1 line is removed. The trains using the new CD3 & CD4 lines do not use locomotives to position wagons during the unloading process.

To assess the train noise impact, the Draft Statement of Planning Policy: Road and Rail Transport Noise, prepared by the Western Australian Planning Commission, and the EPA draft statement for environmental impact assessment (No.14, Version 3) entitled "Road and Rail Transportation Noise" which addresses noise emission from new rail infrastructure has been used.

The Draft Statement of Planning Policy: Road and Rail Transport Noise recommends the following exposure levels for various LAeq and LASmax for noise sensitive land uses next to rail and road transport corridors.

Table 6-3 Draft Recommended Noise Levels for Noise Sensitive Land Uses Next to Rail and Road Transport Corridors

Time Period	Exposure level 1 (Target)	Exposure level 2	Exposure level 3
Day 6.00am – 10.00pm	Less than LAeq of 55	LAeq between 55 -60	Above an LAeq of 60
Night 10.00pm – 6.00am	Less than LAeq of 50	LAeq between 50 -55	Above an LAeq of 55
Additional criteria for railways	Less than LAS Max of 75	LAS Max between 75-80	Above an LAS Max 80
Recommendations made by draft policy	No additional action is required under this policy in relation to the management or amelioration of transport noise	Acceptable for residential and other noise-sensitive development, subject to appropriate measures to ameliorate noise impact	Not generally regarded as acceptable for conventional residential or other noise-sensitive development

The predicted day and night LAeq noise levels provided in Table 6-2 are well below those recommended for the Exposure Level 1 (Target) category for noise sensitive premises next to rail corridors. Although the LAS Max has not been assessed, it is unlikely that maximum noise levels will exceed a noise level of 75 dB(A) since the closest noise sensitive premises is some 350 metres from the rail corridor.

The EPA draft statement for environmental impact assessment (No.14, Version 3) entitled "Road and Rail Transportation Noise" guideline uses a Noise Amenity Rating (NAR) to determine acceptable noise levels for residential developments near to existing road or rail transportation routes. Land which is being used for noise sensitive uses should comply with the following table of land uses.

Table 6-4 Noise levels and plant utilisation for various operating cases

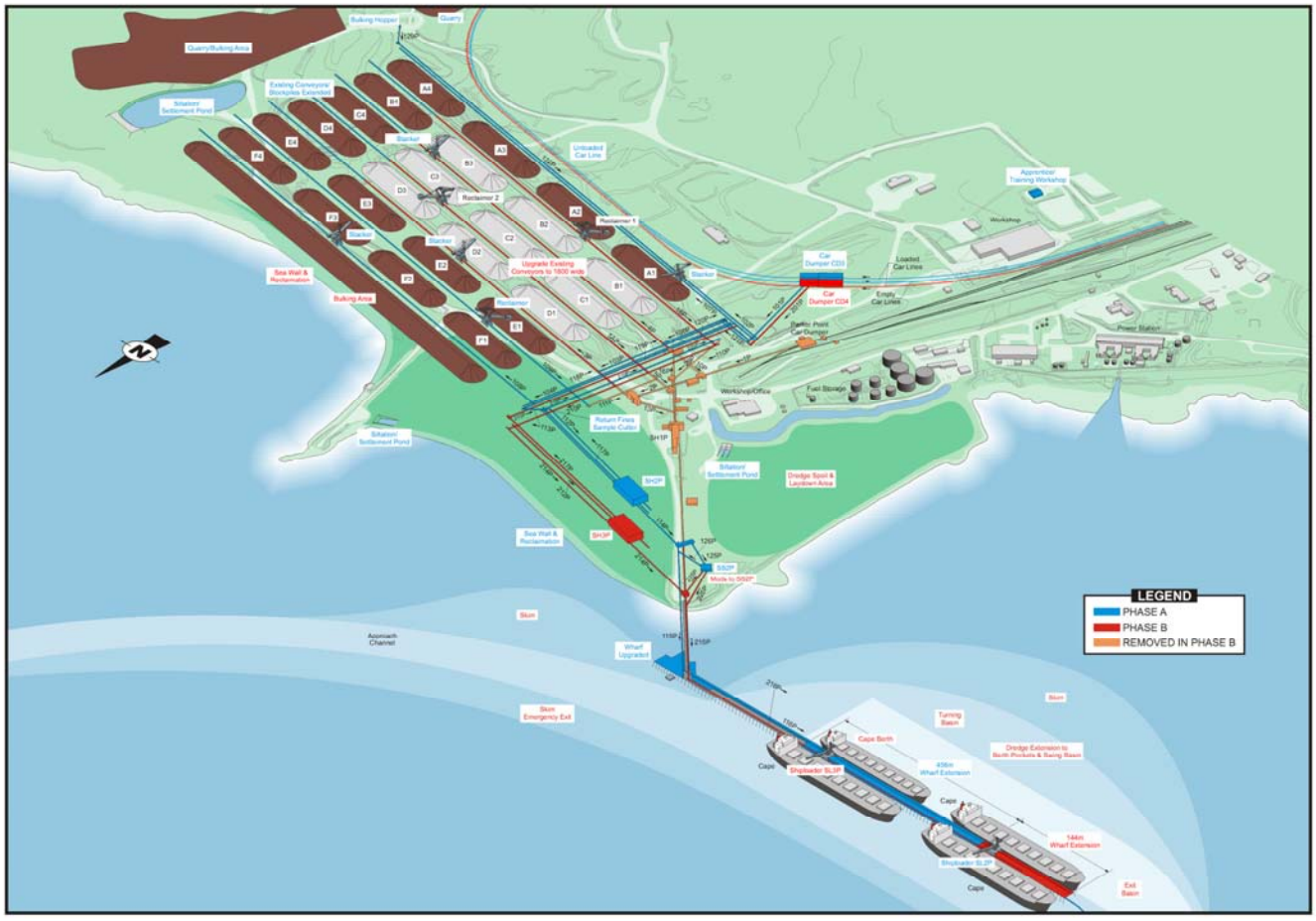
NAR Rating	LAeq(Day) dB(A)	LAeq(Night) dB(A)	Acceptable	Conditionally Acceptable	Unacceptable
N0	≤ 50	≤ 40	Residential		
N1	51 – 55	41 - 45	Residential		
N2	56 – 60	46 – 50	Open space	Residential	
N3	61 – 65	51 – 55		Residential units, open space	Residence + yard
N4	66 – 70	56 – 60		Residential units, open space	
N5	≥ 70	≥ 60		Residential units	Open space

Notes:

(i) "Day" means 7.00 am to 10.00 pm and "Night" means 10.00 pm to 7.00 am.
(ii) The NAR for a location is the higher of the day and night ratings.
(iii) Noise levels refer to external locations at 1m from a building façade.
(iv) Conditionally acceptable means the development will require acoustic measures.
(v) Residential units means residential apartments where there is no external space facing the road or railway, and acceptable internal levels can be achieved through acoustic treatment of the façade.

The guidance note requires that an N2 rating is achieved for external spaces and that internal noise levels should correspond to an external equivalent of an N1 rating (typically 10 dB lower than the corresponding external levels). The noise emission from the train activities is below the N0 requirement, and hence is considered suitable for both Residential or Open space use.

APPENDIX A – Proposed Phase B upgrade plant layout



APPENDIX B – Maximum noise emission case noise contours

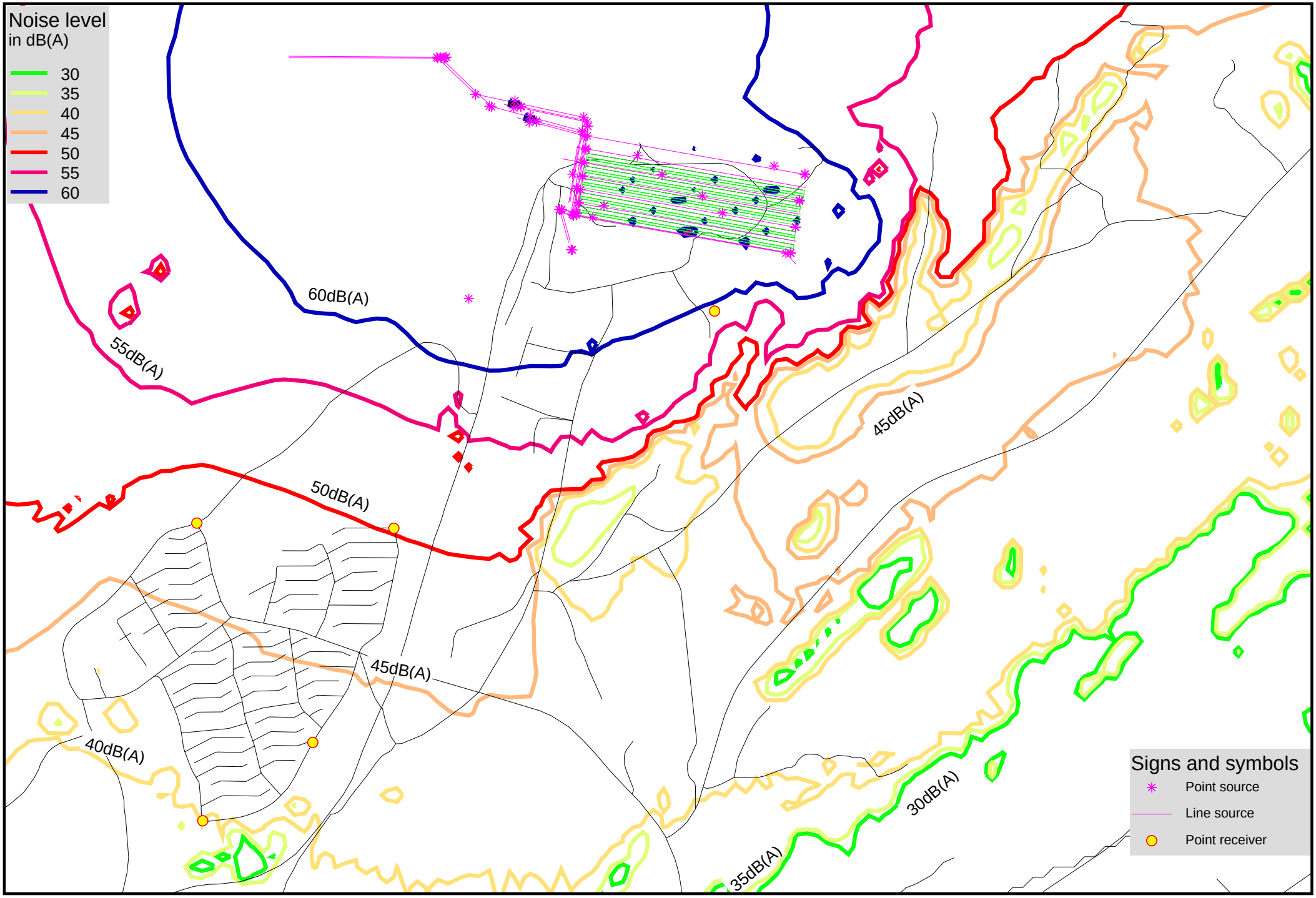


Figure B1. Worst-case night-time noise level contours for Phase B (Power House ON).

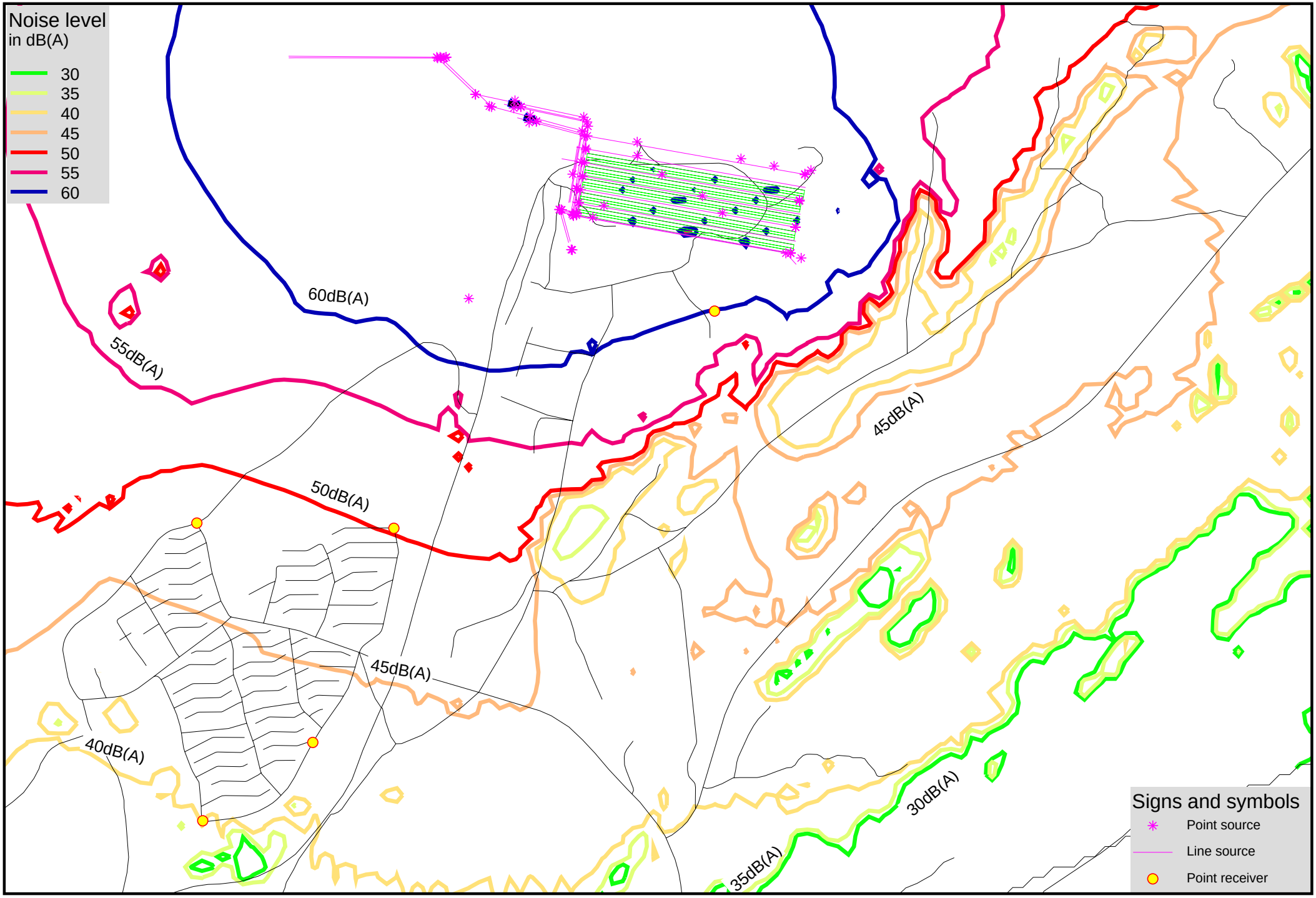


Figure B2. Worst-case night-time noise level contours for Phase B (power house on and including bulking).