Acoustics RB Pty Ltd

30 Heather Street
PO Box 150
Wilston Q 4051
Ph 07 3356 5555
russell@acousticsrb.com.au
ABN 49 129 541 671

6 April 2020 Ref. RB/20-1160.R01

Cleanaway
PO Box 804
St Mary's NSW 1790

Attn: Mr Paul Antony

Dear Sir,

Re. Erskine Park Landfill, Erskine Park
Environmental Noise Impact Assessment of Airspace Modification

Further to your request, we have conducted an environmental noise impact assessment of the proposed airspace modification to the Erskine Park Landfill, Erskine Park.

The results of the assessment and our recommendations are presented below.

1.0 Introduction and Relevant Background

It is understood that Cleanaway is preparing to lodge a development application to seek approval to allow modifications to be made to the design of the Erskine Park Landfill to provide for expansion of the airspace of the landfill.

To support the DA application, a noise impact assessment (NIA) has been conducted (i) to evaluate the change, if any, in the level of noise generated by the operational activities at the landfill after the modifications have been made and (ii) to the address noise of construction activities associated with the expansion.

Two relevant noise assessments have previously been conducted for Erskine Park Landfill. The first was undertaken in 2005 by Holmes Air Sciences as part of the EIS for an updated final landform design. The second was carried out in 2019 by GHD to assess the effect of altering the final landform from two peaks (87m AHD and 92m AHD) to a single ridgeline at 92m AHD. GHD Report Ref. 2219620 *Cleanaway Waste Management Ltd - Cleanaway Erskine Park Landfill S4.55 (2) Modification Statement of Environmental Effects* dated March 2019 refers.

The currently proposed modification to the final landform design involves constructing a mechanically stabilised earthen (MSE) wall to the western, southern and eastern perimeter of the existing landfill site. This construction of the MSE wall will allow an increase in the airspace available for landfilling without altering the final RL of the landform.

Details of the MSE wall are presented in Figure A overpage.

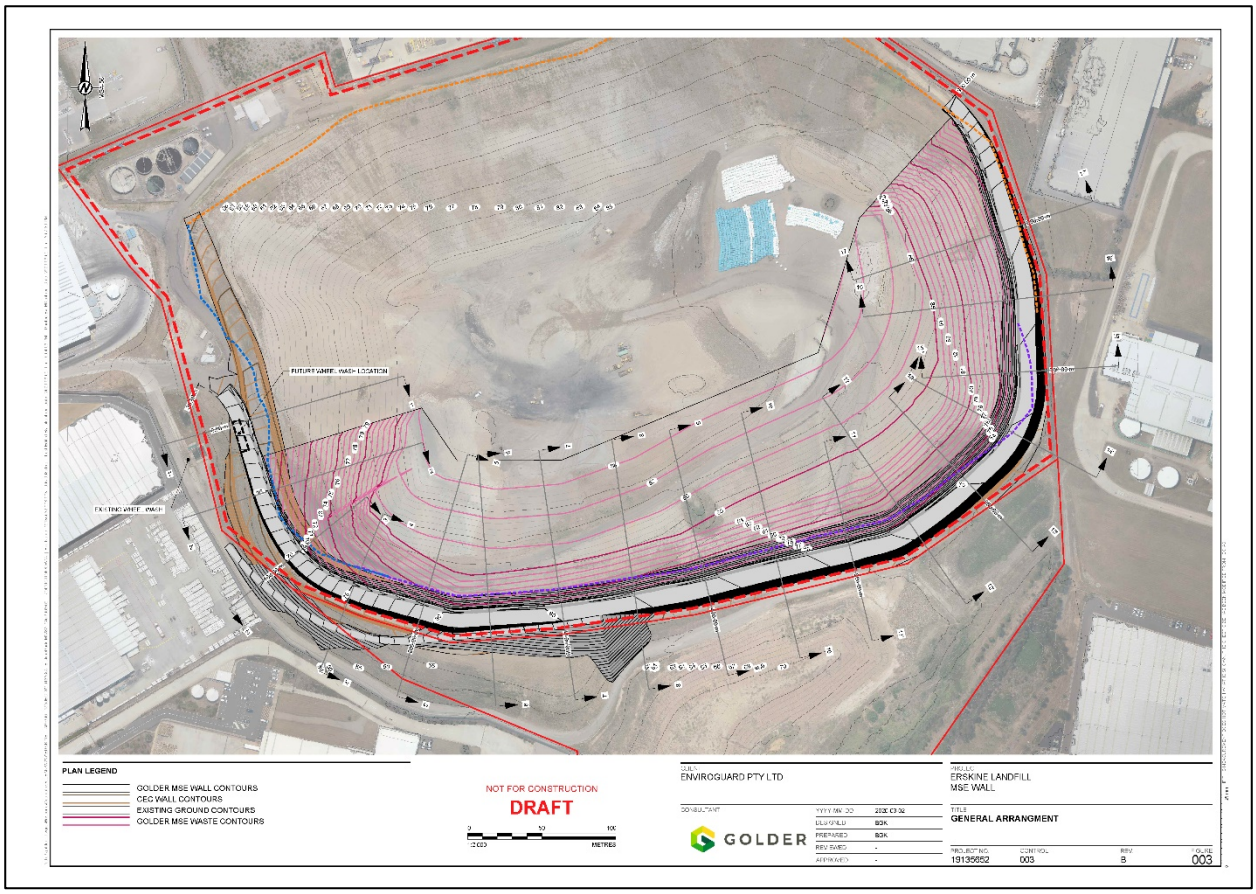

Figure A – General Arrangement of MSE Wall

2.0 Subject Site

The subject site is located at 4 Quarry Road Erskine Park and is accessed via 85-87 Quarry Road. The real property description of the site is Lot 4 on DP1094504.

The local authority is the Penrith City Council.

When measured from the centre of the landfill, the nearest residential receptors are located approximately 800m to the north, approximately 1200m to the west and approximately 1000m to the south.

The landfill site is surrounded by a large number of industrial buildings.

3.0 Noise Issues

The relevant noise issues are:-

1. The noise generated by the operations of the landfill at the proposed final landform
2. The noise associated with the construction of the MSE wall.

4.0 Acceptance Criteria and Relevant Sensitive Receptors

4.1 Acceptance Criteria

The Erskine Park Landfill operates under Environmental Protection Licence (EPL) No 4865, issued on 20 March 2019.

The limits for acceptable levels of noise emission from the landfill are set at Section L5 of EPL NO 4865.

Section L5 is re-produced below.

L5 Noise limits

L5.1

Location	Day
	LAeq (15 minutes)
Mamre Road Residence*	45
Erskine Park Road Residence*	54

Note: *As identified in section 7.8 of volume 1 of the document titles, *"Environmental Impact Statement - Enviroguard - Erskine Park Landfill - Revised Final Profile - National Environmental Consulting Services"* dated 17 October 2005.

Note: The noise limits represent the noise contribution from the landfill site for the modifications to the final profile.

L5.2 Noise from the premises is to be measured at the most affected point on or within the residential property boundary or, if that is more than 30 metres from the residence, at the most-affected point within 30 metres of the residence to determine compliance with condition L5.1.

L5.3 The noise emission limits identified in condition L5.1 apply under meteorological conditions of:
a) Wind speed up to 3m/s at 10 metres above ground level; or
b) Temperature inversion conditions of up to 3oC/100m and wind speed up to 2m/s at 10 metres above the ground.

It is noted that EPL No 4865 sets limits for acceptable levels of noise emission to residential premises solely. Consequently, provided compliance with the noise level limits noted above in the extract from Section L5 is achieved, there will be no warrant to implement any specific noise control measures to reduce the level of noise emission from the operations at the landfill.

Notwithstanding, it is noted that the results of an evaluation of the degree of compliance with external noise level criterion deemed applicable to educational facilities under NSW EPA Industrial Noise Policy (INP) were also presented in GHD Report Ref. 2219620. In making this determination, the external noise level limit derived from INP was 45dBA free field $L_{Aeq(15min)}$.

To maintain consistency with the assessment undertaken by GHD, a determination of the degree of compliance with both (i) the noise level limits set under EPL No 4865 for each of the two identified receptor locations and (ii) the 45dBA free field $L_{Aeq(15min)}$ derived from INP for educational facilities has also been made.

4.2 Sensitive Receptors

The locations of the Mamre Road Residence and the Erskine Park Road Residence are shown in Section 7.8 of Volume 1 of *Environmental Impact Statement - Enviroguard - Erskine Park Landfill - Revised Final Profile - National Environmental Consulting Services*" dated 17 October 2005 (Erskine Park Landfill EIS).

The relevant figure, ie Figure 7.4, has been extracted from Erskine Park Landfill EIS. Refer Figure B below.

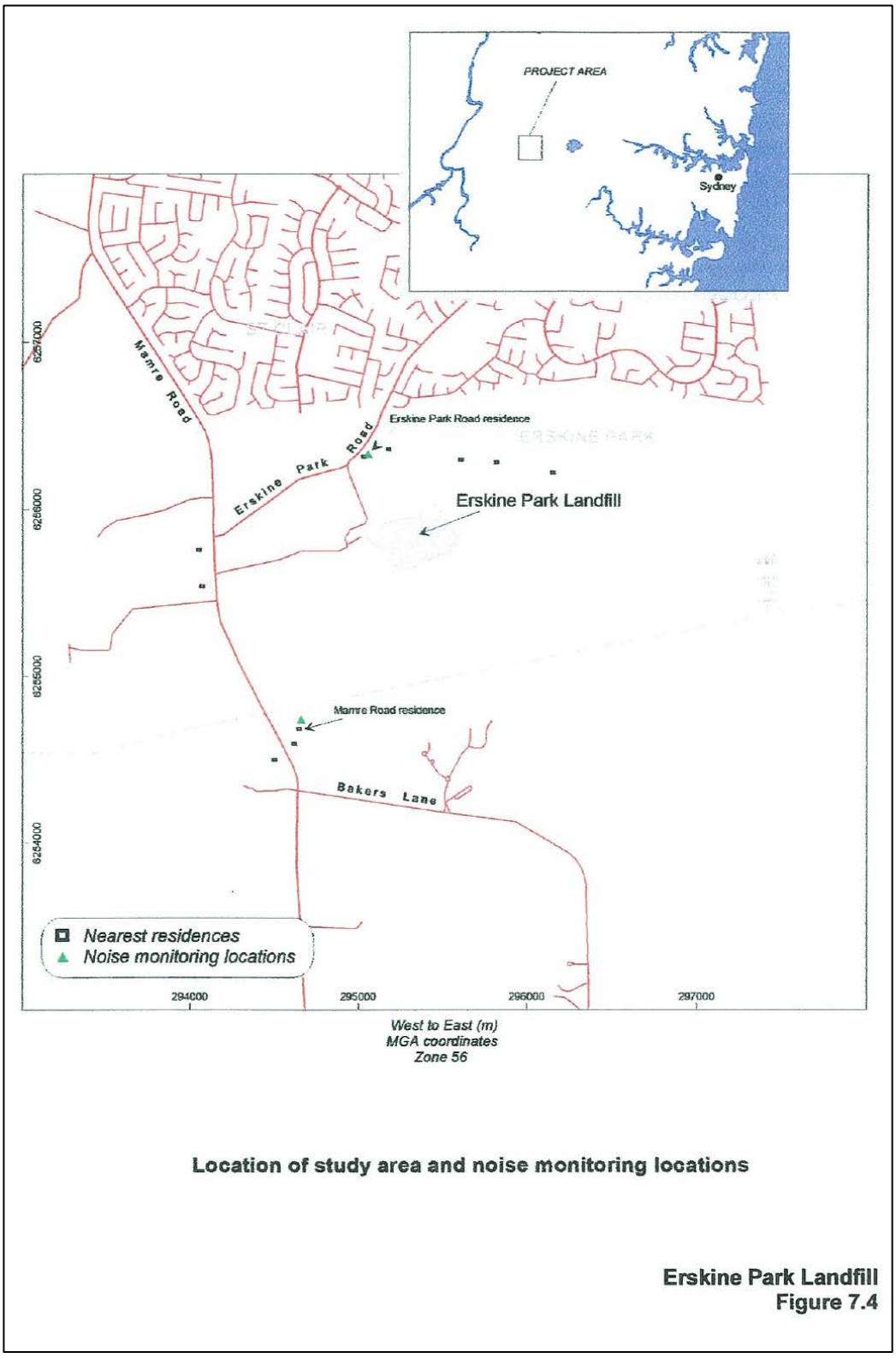

Figure B – Figure 7.4 Showing Locations of Mamre Road and Erskine Park Road Residences

The real property descriptions of the Mamre Road residence and the Erskine Park Road residence are Lot 1 on DP587334 and Lot 1 on DP1071114, respectively.

The locations of the Mamre Road and Erskine Park Residences relative to the current landfill are shown in Figure C below.

Figure C – Locations of Mamre Road and Erskine Park Road Residences Relative to Landfill

From a review of historical imagery, the Erskine Park Road residence identified in the 2005 EIS was demolished to make way for the construction of Lenore Drive sometime in the interval between August 2015 and October 2015. The remaining land is currently vacant.

Because the Erskine Park Road residence identified in EPL No 4865 has been demolished, it is no longer appropriate to include it as a sensitive receptor. As a remedy to the situation and as noted in GHD Report Ref. 2219620, two residences to the north of Erskine Park Landfill were identified as sensitive receptors to be used as substitutes for the demolished Erskine Park Road residence shown in Figure 7.4 of Volume 1 of Erskine Park Landfill EIS.

These sensitive receptors are located at 55 Coowarra Drive (designated by GHD as R01) and 66 Chameleon Drive (designated by GHD as R02). To maintain consistency with the GHD report, these sensitive receptors have been adopted together with the original Mamre Road Residence (designated by GHD as R01).

The two substitute "Erskine Park Road" are shown together with the original Mamre Road Residence in Figure D overpage.

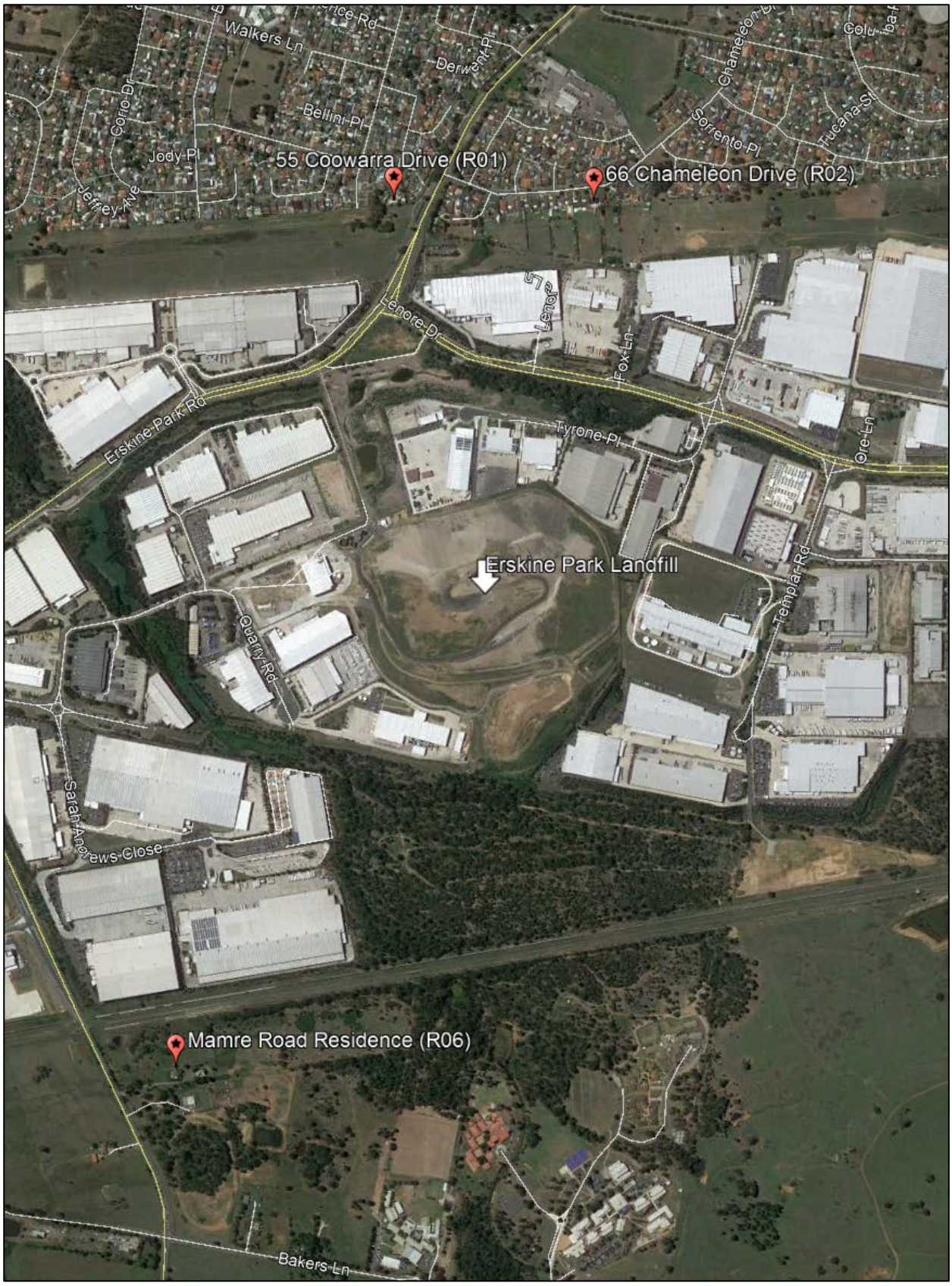

Figure D – Locations of Two Substitute Erskine Road Residences (R01 and R02) and Mamre Road Residence (R06)

5.0 Methodology

The most efficient method of undertaking the assessment of extent of noise intrusion into the community was determined to be as detailed in the following stages of work:-

Stage 1. A new noise model is to be prepared to replicate the work conducted by GHD in GHD Report Ref. 2219620 using the single ridgeline design and applying the same operational noise source assumptions as those adopted by GHD for each of the Scenarios 1 and 2, together with minor adjustment/s as deemed necessary to these assumptions to ensure a best-fit outcome to minimise any differences in the outputs from the two models. The results obtained using the new noise model would form the basis for assessment of the acoustical significance of the proposed modification. Or more specifically, the results of the new noise model would establish a new baseline which would be used for assessment of the impact of noise from landfilling operations conducted on the landfill after the MSE wall is constructed.

Stage 2. Thereafter, the noise model is to be updated using the earthworks contours for the proposed MSE wall modification to the design of the landfill, including necessary changes to the locations of the noise sources within the noise model in response to the changes to the final landform design and, notably, for GHD Scenario 2. By comparing the results obtained from the updated noise model (ie the noise model with the MSE wall modification in place) with those obtained from the new baseline, the acoustical significance of the proposed modification can be quantified directly.

Sound PLAN Accordingly, a SoundPLAN [1] model was created for Erskine Park Landfill and the surrounding area.

The initial inputs to the SoundPLAN noise model included (i) the final landform contours for the single ridgeline landform design adopted by GHD, (ii) the topography of the surrounding community, (iii) the built form of the industrial buildings surrounding the landfill site, (iv) the built form of the residential premises to the north, west and south and the built form of the educational facilities to the south and the child care centre to the west.

In order to replicate the work conducted by GHD, the following scenarios were evaluated for both Stage 1 and Stage 2:-

Scenario 1: A single excavator operating along the single ridgeline to quantify the effect of noise generated by landfill earthmoving equipment operating at the highest elevation of the site.

Scenario 2: A single excavator travelling around the perimeter of the landfill to quantify the effect of noise generated by landfill earthmoving equipment operating at the closest distances to the nearby sensitive receptors.

These two scenarios are shown in Figure 1.

[1] SoundPLAN is an integrated software package for noise and air pollution evaluation developed in Germany by Braunstein + Berndt GmbH. It has been configured to predict the extent of (i) road traffic noise intrusion by application of the CRTN '88 algorithms and (ii) industrial noise emission using the CONCAWE algorithms and ISO 9613-2 1996 algorithms. It is in use in more than 42 countries and has very widespread application throughout Australia.

6.0 Results of Operation Noise Modelling

6.1 Stage 1

The results obtained by GHD were presented as a set of noise contour plots in Figures 5-6 and 5-7 of GHD Report Ref. 2219620. These noise contour plots were presented at 5dBA intervals. They are re-produced as Figure 2A and 2B attached.

The results obtained from the new SoundPLAN noise model for Stage 1 (ie replication of the modelling assumptions adopted by GHD) are presented in the following figures:-

- Figure 3: Stage 1 Scenario 1 current approval, free field $L_{Aeq(15min)}$ noise levels at 5dBA intervals
- Figure 4: Stage 1 Scenario 2 current approval, free field $L_{Aeq(15min)}$ noise levels at 5dBA intervals

These figures are also attached.

It is noted that the 5dBA interval noise contours presented in Figures 3 and 4 have been prepared at a significantly finer resolution than those prepared by GHD in Figures 1 and 2. The decision to do so was taken so that small changes could be readily detected in the level of noise emission between Stage 1 (ie before proposed MSE wall modification) and Stage 2 (after proposed MSE wall modification) and, more especially, the small changes arising under the Scenario 2 operations.

It should also be noted that a precise comparison of the results obtained by GHD and the results of generated by the new model at Stage 1 is hampered by the relatively coarse gradation of the GHD noise contour plots for each of the two scenarios and by the absence of a comprehensive list of single point receiver results for the GHD scenarios. Notwithstanding, from the tabulated result data available in the GHD Report Ref. 2219620, the average difference between the results obtained between the GHD model and the new SoundPLAN noise model across the two scenarios was determined to be 0.2dBA with a standard deviation of 1.8dBA.

In the prevailing circumstances, this is judged to be a very good outcome.

Furthermore, it can be readily concluded that the compliance with the EPL noise level limits that was established by GHD in GHD Report Ref. 2219620 for each of Scenarios 1 and 2 and as shown in Figures 1 and 2 has been preserved in the results presented in Figures 3 and 4.

6.2 Stage 2

The results from the new SoundPLAN noise model for Stage 2 (ie after implement construction of the MSE wall and for landfilling at the final landform) are presented in the following attached figures:-

- Figure 5: Stage 2 Scenario 1 after MSE wall, free field $L_{Aeq(15min)}$ noise levels at 5dBA intervals
- Figure 6: Stage 2 Scenario 2 after MSE wall, free field $L_{Aeq(15min)}$ noise levels at 5dBA intervals

In addition, a pair of difference plots has been prepared to show the degree of change in the level of noise emission into the community arising from the implementation of the MSE wall modification. These figures are attached and are as follows:-

- Figure 7: Scenario 1 Stage 1-v-2, ie change in free field $L_{Aeq(15min)}$ noise levels in the community as a result of the changes to operations following the construction of the MSE wall.
- Figure 8: Scenario 2 Stage 1-v-2, ie change in free field $L_{Aeq(15min)}$ noise levels in the community as a result of the changes to operations following the construction of the MSE wall.

7.0 Discussion

From the results presented in Figures 5 and 6, it can be seen that compliance has been preserved with both (i) the 45dBA $L_{Aeq(15min)}$ limit applying to the Mamre Residence and (ii) the 54dBA $L_{Aeq(15min)}$ noise level limit applying to the two "Erskine Park Road" residences as set under EPL No 4865.

Furthermore, by reference to Figures 3, 5 and 7, it can be seen that at Receptors R01-R10 there is no difference in the level of noise emission for the Scenario 1 operations arising from the construction of the MSE wall.

By reference to Figures 4, 6 and 8, for the Scenario 2 operations it can be seen that there will be only a very minor change in the level of noise emission to Receptors R01-R10 arising from the construction of the MSE wall. As is evident in Figure 8, the changes will be both positive and negative, ie minor decreases and minor increases in the level of noise emission into the community.

To allow a more precise evaluation of degree of change in the level of noise emission into the community, a series of single point receptors noise level calculations has been conducted. The results are presented in Tables 1 and 2 below and overpage.

Note:

All predicted noise levels shown in Tables 1 and 2 have been reported to the nearest 0.1dBA. Typically, however, the tolerance on noise level predictions would be no better (ie no lower) than ±1dBA, which means that results should be reported to the nearest whole decibel only. The decision to report results to the nearest 0.1dBA was taken so that any small changes (ie <1dBA) in the level of noise emission generated as a result of the construction of the MSE wall could be detected.

Receptor			Resultant Noise Levels, $L_{Aeq(15min)}$ dBA		
No	**Description**	**Address**	**Stage 1 Before MSE**	**Stage 2 After MSE**	**Change**
R01	Erskine Road Residence 1	55 Coowarra Drive, Erskine Park	40.8	40.8	0
R02	Erskine Road Residence 2	66 Chameleon Drive, Erskine Park	41.0	41.0	0
R03	Mamre Residence West	19 Mandalong Close Orchard Hills	36.8	36.8	0
R04	Old MacDonald's Child Care Centre	21A Mandalong Close, Orchard Hills	37.4	37.4	0
R05	Mamre Residence SW	573 Mamre Road, Orchard Hills	37.3	37.3	0
R06	Mamre Residence South	674 Mamre Road, Kemps Creek	37.4	37.4	0
R07	Trinity Primary School	61-109 Bakers Lane Kemps Creek	38.5	38.5	0
R08	Catholic Healthcare Emmaus Village	61-109 Bakers Lane Kemps Creek	39.7	39.7	0
R09	Emmaus Catholic College	61-109 Bakers Lane Kemps Creek	37.4	37.4	0
R10	Mamre Anglican School	59 Bakers Lane Kemps Creek	37.0	37.0	0

Table 1 – Scenario 1 – Resultant Noise Levels Before and After Construction Wall
Note: "Change" column: +ve result = increase in noise level, -ve result = decrease in noise level.

Receptor			Resultant Noise Levels, $L_{Aeq(15min)}$ dBA		
No	**Description**	**Address**	**Stage 1 Before MSE**	**Stage 2 After MSE**	**Change**
R01	Erskine Road Residence 1	55 Coowarra Drive, Erskine Park	41.8	42.2	+0.4
R02	Erskine Road Residence 2	66 Chameleon Drive, Erskine Park	41.7	41.7	0.0
R03	Mamre Residence West	19 Mandalong Close Orchard Hills	39.0	39.0	0.0
R04	Old MacDonald's Child Care Centre	21A Mandalong Close, Orchard Hills	38.5	38.5	0.0
R05	Mamre Residence SW	573 Mamre Road, Orchard Hills	35.9	36.8	+0.9
R06	Mamre Residence South	674 Mamre Road, Kemps Creek	38.7	39.5	+0.8
R07	Trinity Primary School	61-109 Bakers Lane Kemps Creek	40.2	40.2	0.0
R08	Catholic Healthcare Emmaus Village	61-109 Bakers Lane Kemps Creek	40.6	40.9	+0.3
R09	Emmaus Catholic College	61-109 Bakers Lane Kemps Creek	39.1	38.9	-0.2
R10	Mamre Anglican School	59 Bakers Lane Kemps Creek	38.6	39.1	+0.5

Table 2 – Scenario 2 – Resultant Noise Levels Before and After Construction Wall
Note: "Change" column: +ve result = increase in noise level, -ve result = decrease in noise level.

From the results presented in Table 1, it can again be seen that, for the Scenario 1 operations, there will be no change in the level of noise emission after the MSE wall has been constructed.

From the results presented in Table 2, it can be seen that there will be a change at only some of the receptor locations and, where there is a change, the change will be <1dBA in all instances. A change of this magnitude is of no material significance. It is within the normal range of accuracy of noise level predictions. In addition, in the context of the prevailing ambient noise levels, ie noise levels generated by other otherwise prevailing noise sources, the degree of change would be neither detectable nor audible.

Further, with respect to the noise level limits set by EPL No 4865, and as noted above, it can be seen that full compliance is maintained under both of the GHD scenarios with both (i) the 45dBA $L_{Aeq(15min)}$ limit applying to the Mamre Residence and (ii) the 54dBA $L_{Aeq(15min)}$ noise level limit applying to the two "Erskine Park Road" residences.

Finally, by reference to the Stage 2 results in each of Table 1 and 2, it can be seen that the 45dBA free field $L_{Aeq(15min)}$ external noise level limit applicable to educational facilities is maintained at each of the nearby schools and the child care centre, ie Receptors R04, R07, R09 and R10, under both of the GHD scenarios.

8.0 Construction Noise

In order to expand airspace of Erskine Park Landfill, it is necessary to construct the MSE wall shown in Figure A. It is anticipated that the construction period for the MSE wall will be approximately 12 months.

In July 2009, *Interim Construction Noise Guideline* was prepared by Department of Environment & Climate Change (now EPA within Department of Industry, Planning and Environment).

While the Guideline is not mandatory, it is prudent to implement best practices to minimise the impact of noise emission from construction activities into the community. Having regard to the nature of the construction activities themselves as well as the significant distance of separation of the construction activities from the nearest residential premises, it is considered that the most appropriate means of minimising the level of noise emission from construction is to ensure that construction of the wall is undertaken any during the Recommended Standard Hours.

These Recommended Standard Hours are presented at Section 2.2 of *Interim Construction Noise Guideline*. The relevant extract from the Guideline is re-produced below.

Table 1: Recommended standard hours for construction work

Work type	Recommended standard hours of work*
Normal construction	Monday to Friday 7 am to 6 pm Saturday 8 am to 1 pm No work on Sundays or public holidays
Blasting	Monday to Friday 9 am to 5 pm Saturday 9 am to 1 pm No blasting on Sundays or public holidays

* The relevant authority (consent, determining or regulatory) may impose more or less stringent construction hours.

It is understood that there is no impediment to confining the hours of construction of the MSE wall to accord with the Recommended Standard Hours.

9.0 Conclusions and Recommendations

From the results of the assessment presented above, the following conclusions can be drawn:-

- For the Scenario 1 operations assessed by GHD, there will be no change in the level of noise emission after the MSE wall has been constructed.
- From the Scenario 2 operations assessed by GHD, the magnitude of the change in the emitted noise levels at the nearest receptor locations will be <1dBA in all instances. A change of this magnitude is of no material significance. It is within the normal range of accuracy of noise level predictions. In addition, in the context of the prevailing ambient noise levels, ie noise levels generated by other otherwise prevailing noise sources, the degree of change would be neither detectable nor audible.
- With respect to the requirements of EPL No 4865, full compliance will be maintained with both (i) the 45dBA $L_{Aeq(15min)}$ limit applying to the Mamre Residence and (ii) the 54dBA $L_{Aeq(15min)}$ noise level limit applying to the two "Erskine Park Road" residences.
- Furthermore, compliance with the 45dBA free field $L_{Aeq(15min)}$ external noise level limit applicable to educational facilities will be maintained at each of the nearby schools and the nearby child care centre.
- Having regard to the nature of the construction activities themselves as well as the significant distance of separation of the construction activities from the nearest residential premises, it is considered that the most appropriate means of minimising the level of noise emission from construction is to ensure that construction is undertaken any during the Recommended Standard Hours set at Section 2.2 of *Interim Construction Noise Guideline*. It is understood that there is no impediment to confining the hours of construction of the MSE wall to accord with the Recommended Standard Hours.

Having regard to these conclusions, there is no warrant for implementation of any particular noise control measures during the design or construction of the MSE wall, nor is there any warrant for the adoption of any additional noise control measures during the operation of the landfill after the completion of the MSE wall.

Report prepared by
Acoustics RB Pty Ltd

Russell Brown, Director
RPEQ 2799

Figures 1 – 8

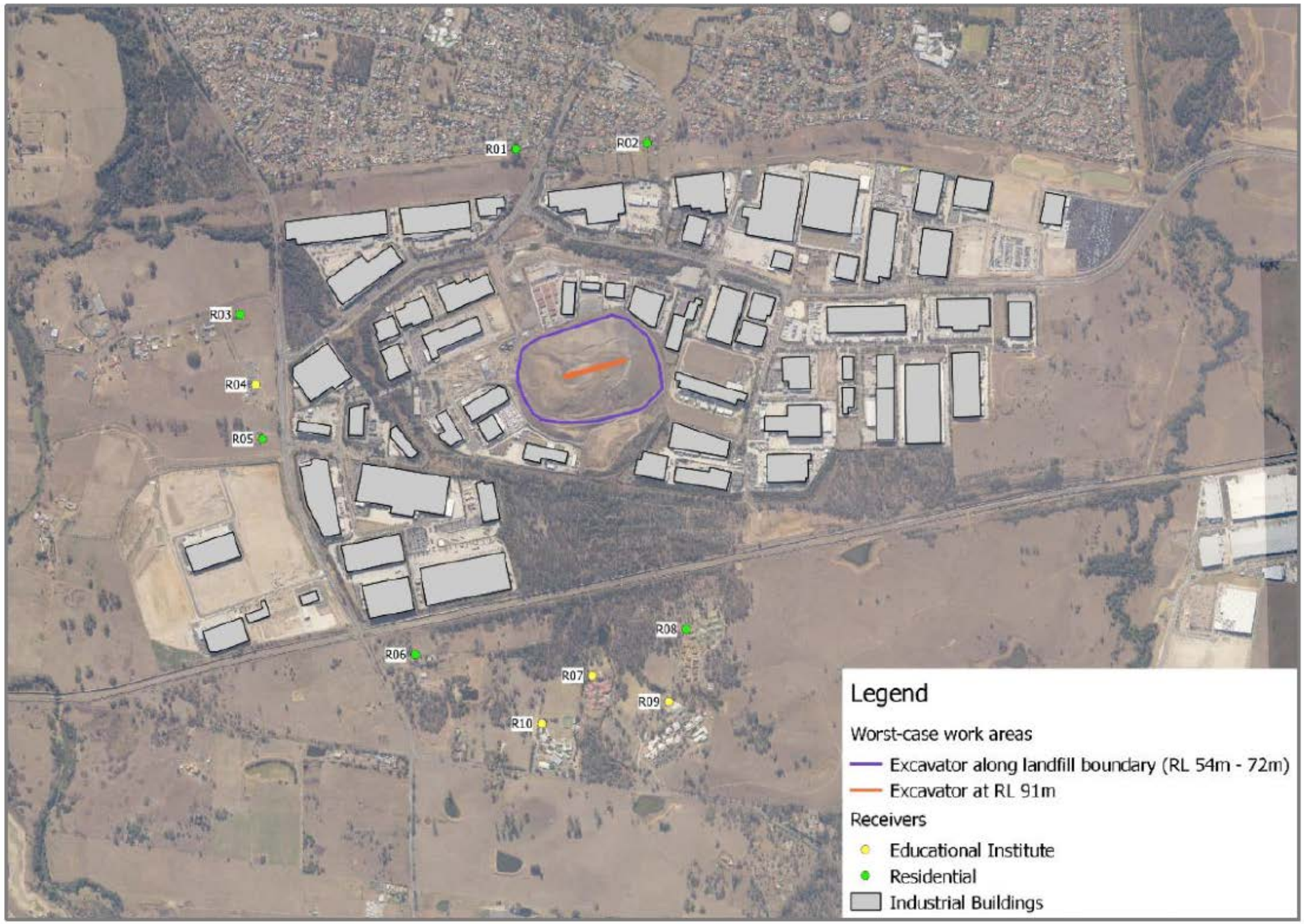

Figure 5-5 Site location and nearest sensitive receivers

Figure 1 – GHD Scenario 1 (Tan Movement Pattern) Scenario 2 (Purple Movement Pattern) Extracted from GHD Report Ref 2219620

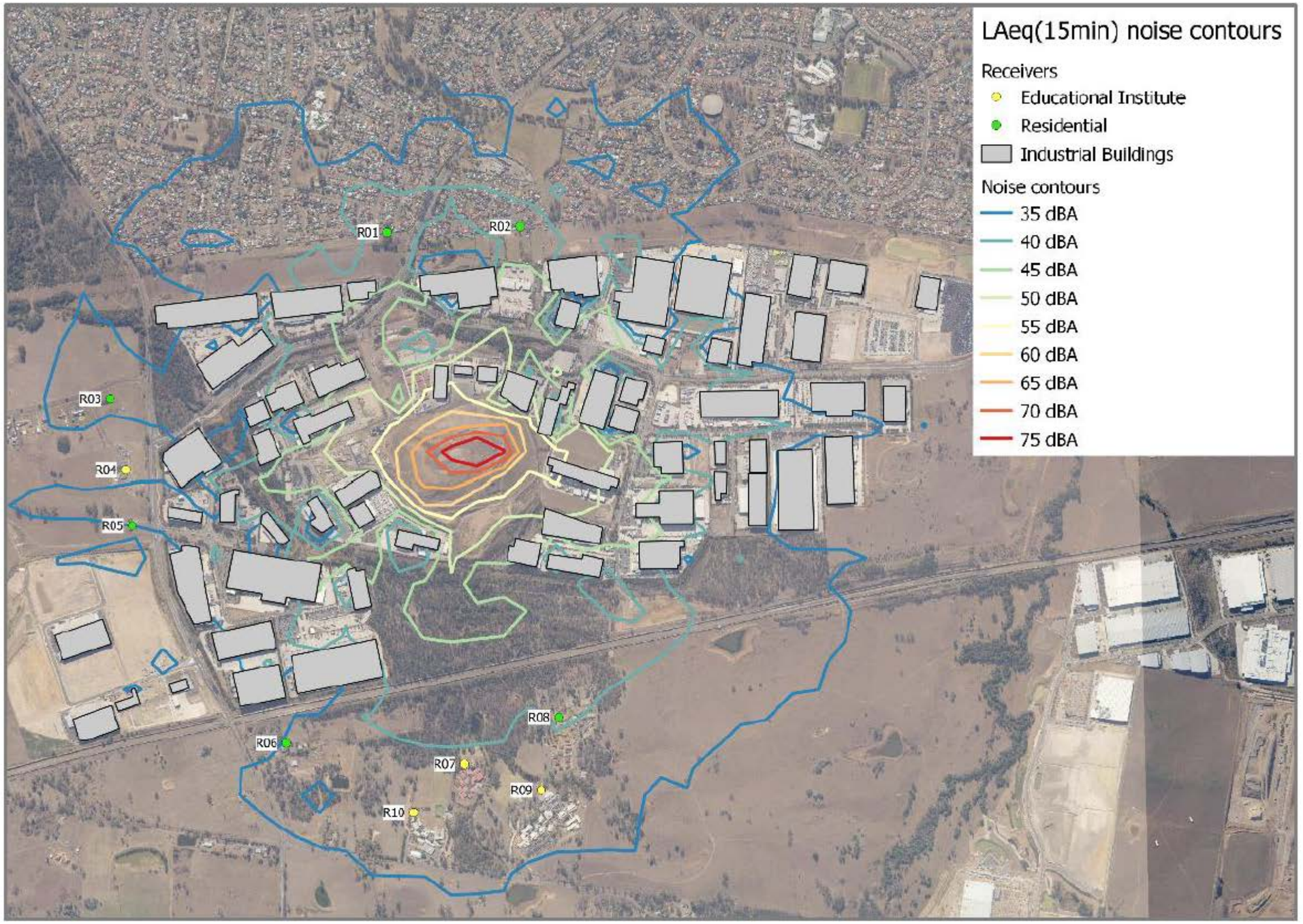

Figure 5-6 $L_{Aeq(15min)}$ noise contours (Scenario 1)

Figure 2A – GHD Scenario 1 Noise Level Contours Extracted from GHD Report Ref 2219620

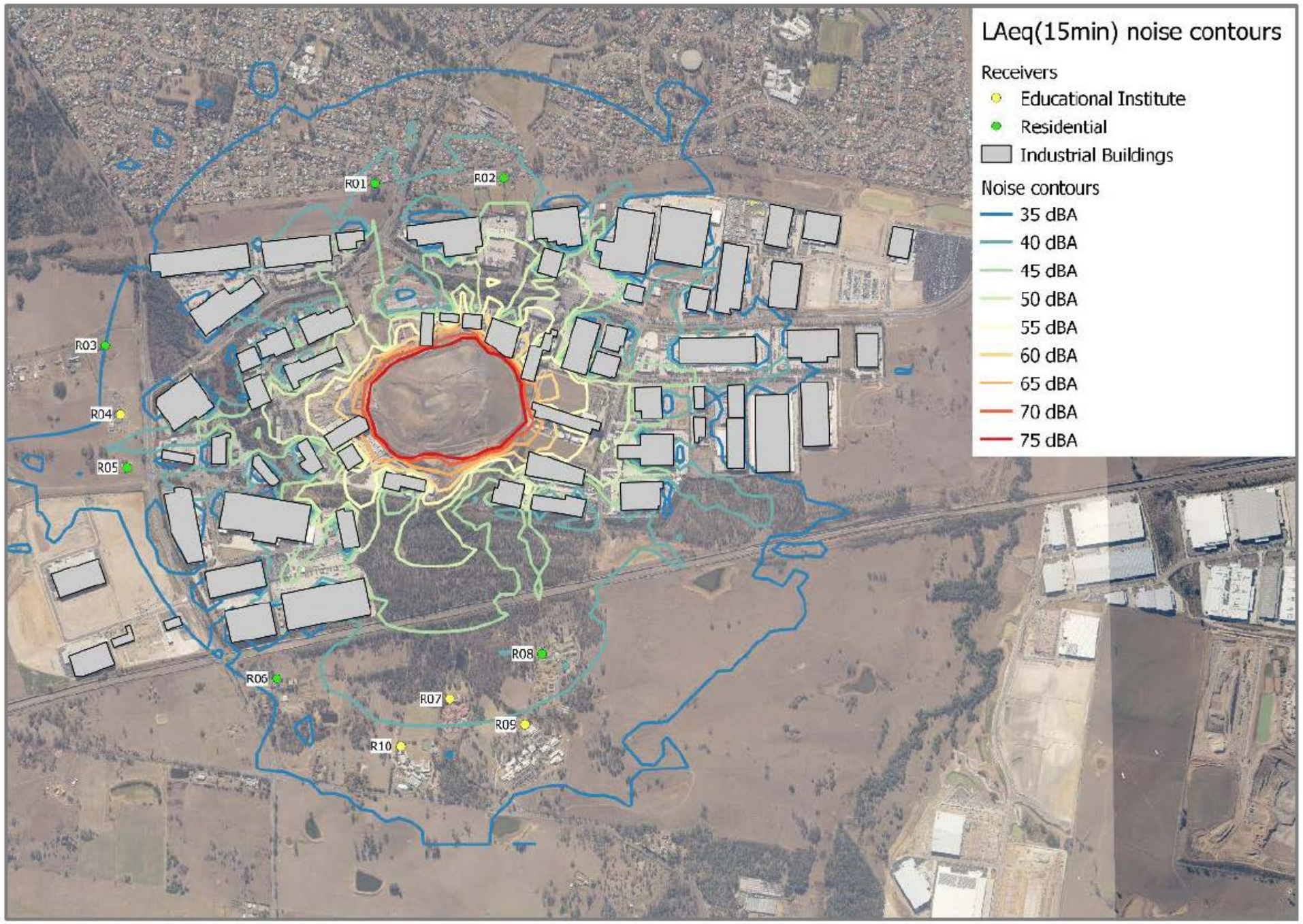

Figure 5-7 $L_{Aeq(15min)}$ noise contours (Scenario 2)

Figure 2B – GHD Scenario 1 Noise Level Contours Extracted from GHD Report Ref 2219620

Figure 3 – New Noise Model – Scenario 1 Noise Level Contours Before MSE Wall Modification

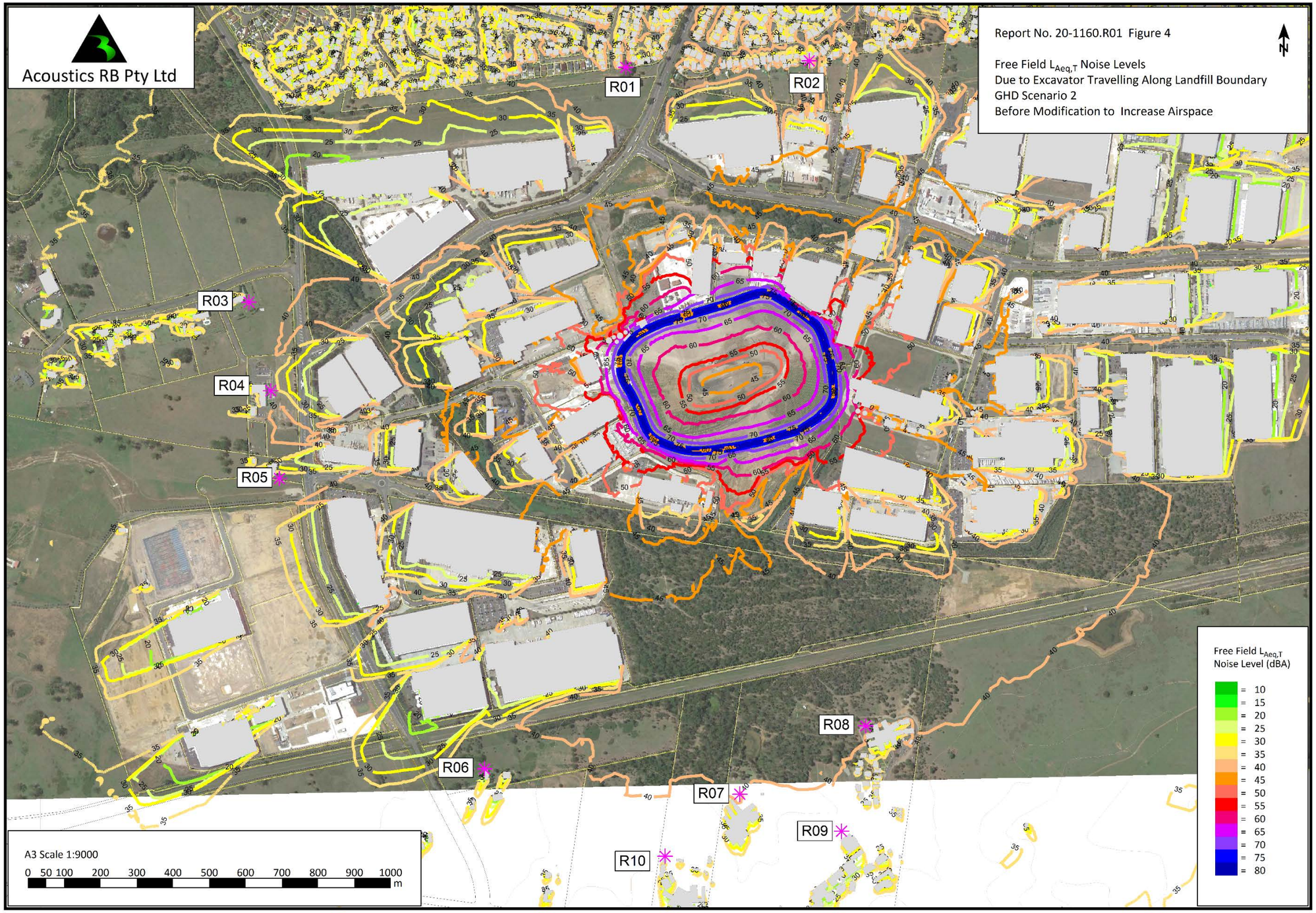

Figure 4 – New Noise Model – Scenario 2 Noise Level Contours Before MSE Wall Modification

Figure 5 – New Noise Model – Scenario 1 Noise Level Contours After MSE Wall Modification

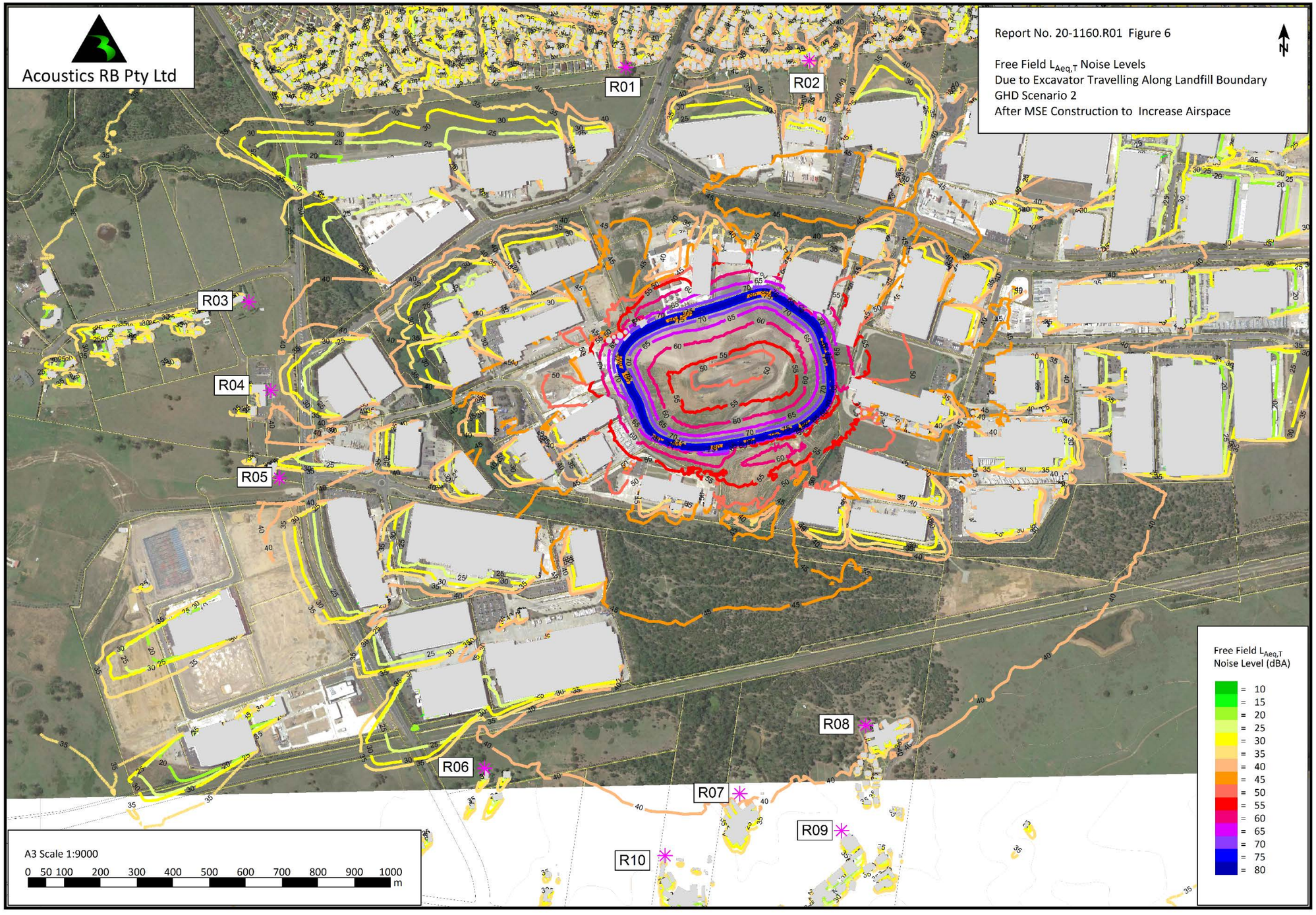

Figure 6 – New Noise Model – Scenario 1 Noise Level Contours After MSE Wall Modification

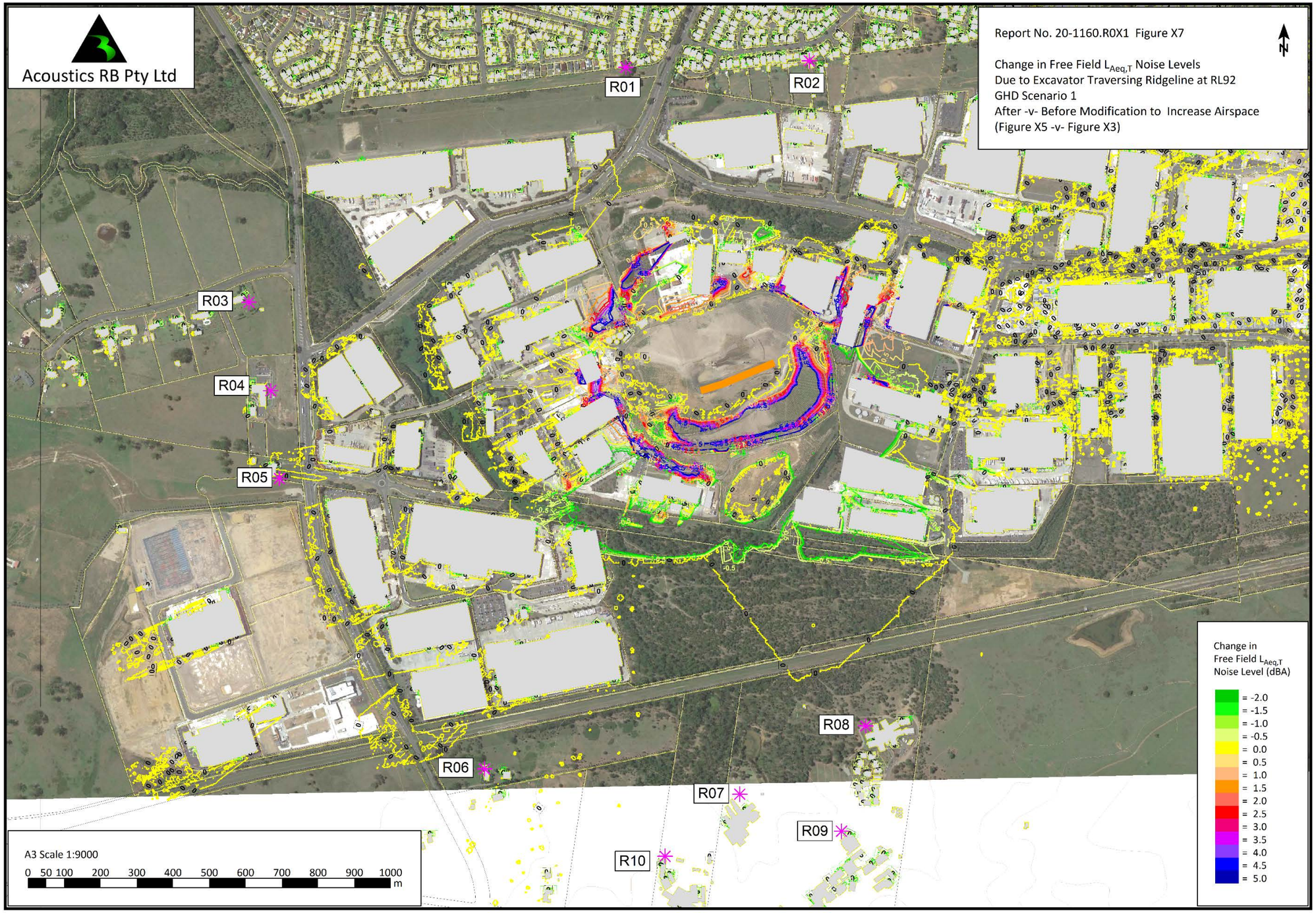

Figure 7 – New Noise Model – Scenario 1 – Change in Operational Noise Levels Due Construction of MSE Wall

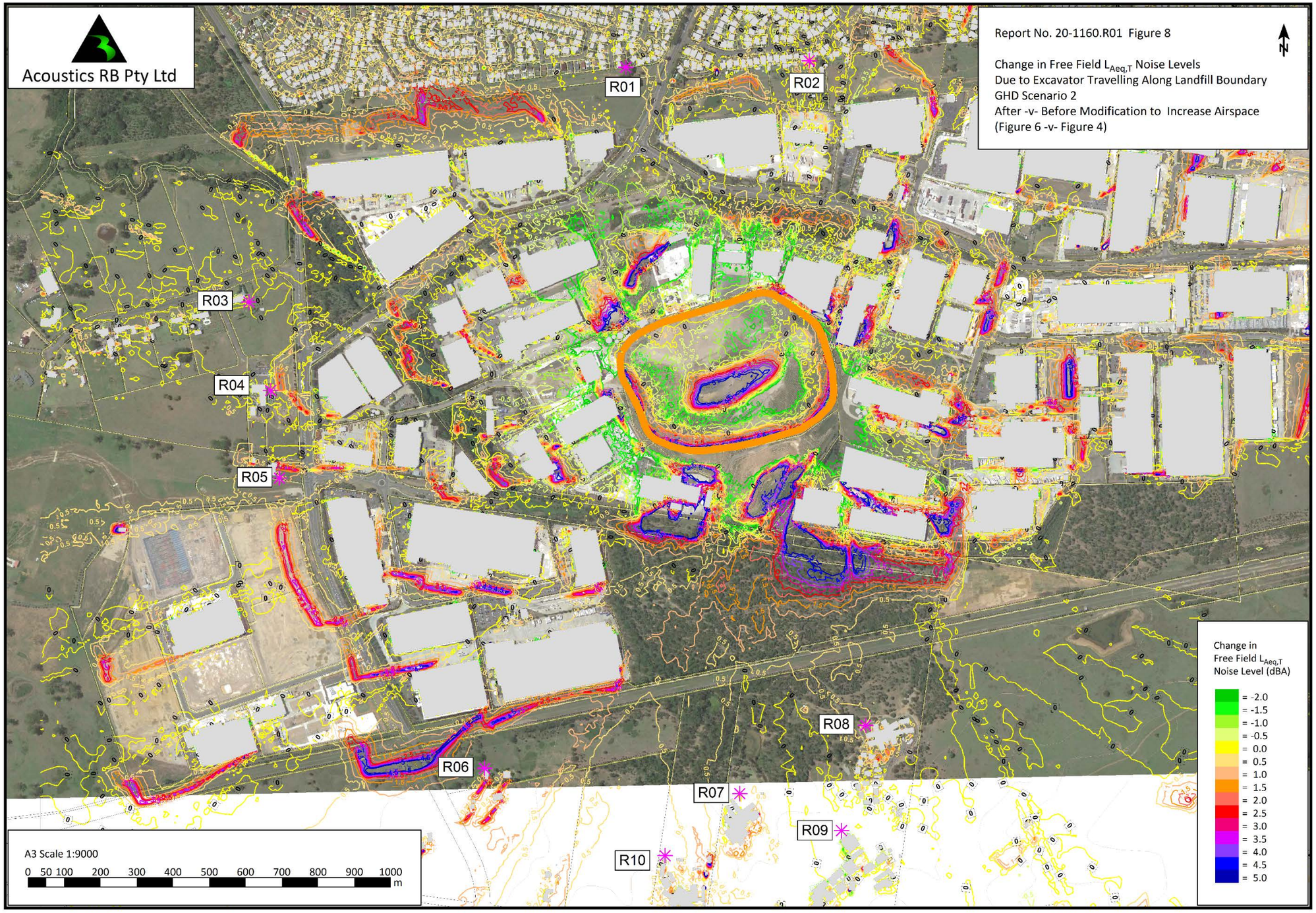

Figure 8 – New Noise Model – Scenario 2 – Change in Operational Noise Levels Due Construction of MSE Wall