APPENDIX B: ENVIRONMENTAL ASSESSMENT

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=100

APPENDIX C: SUBMISSIONS

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=100

APPENDIX D: PREFERRED PROJECT REPORT

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=100

APPENDIX E: ADDITIONAL NOISE INFORMATION

WILKINSON MURRAY

9 April 2014

WM Project Number: 03124-DA
Our Ref: NEP090414 NG_ltr
Email: kennan@ozemail.com.au

Mr Neil Kennan
Nexus Environmental Planning Pty Ltd
PO Box 212
CONCORD NSW 2137

Dear Neil

Re: Moorebank Recycling Facility - Noise and Traffic Review

Introduction

Since the preparation of the Wilkinson Murray Noise Impact Statement Version D in August 2013, further detailed investigations to support (and update) this report have been carried out in the following areas:

- Review of existing and forecast traffic volumes on Brickmakers Drive, including updated traffic counts since the 5t limit was imposed. This has been undertaken by McLaren Traffic Engineering in a letter dated 1 April 2014 and the salient pages summarised at the end in this letter.
- Review of the relationship between background noise levels (RBL) and traffic volumes on Brickmakers Drive as volumes increase as Georges Fair and other residential development occurs. This is assessed in Year 2018 when Moorebank Recyclers is planned to achieve capacity.
- Review of mitigation of noise from trucks using the Moorebank Recyclers access handle and proposed ramps to the proposed bridge and Brickmakers Drive.

The appropriate Project Specific Noise Levels (PSNL) or noise criteria and therefore the need and extent of mitigation is dependent on the background noise levels at the nearest potentially affected residences. These residences don't exist yet and the EPA *Industrial Noise Policy* does not address the situation where both the proposed development (at capacity) and potentially affected residences will not exist for 5 years in an area which is changing as a result of residential development.

This change in the area will result in increased traffic on Brickmakers Drive which will lead to an increase in background noise levels at the potentially affected residences. It is therefore essential that the future background noise level can be established now, in a robust way, such that the Regulator can have confidence in approving a development which can comply with the requirements of the *INP*.

October 2013 Traffic and Ambient Noise Surveys

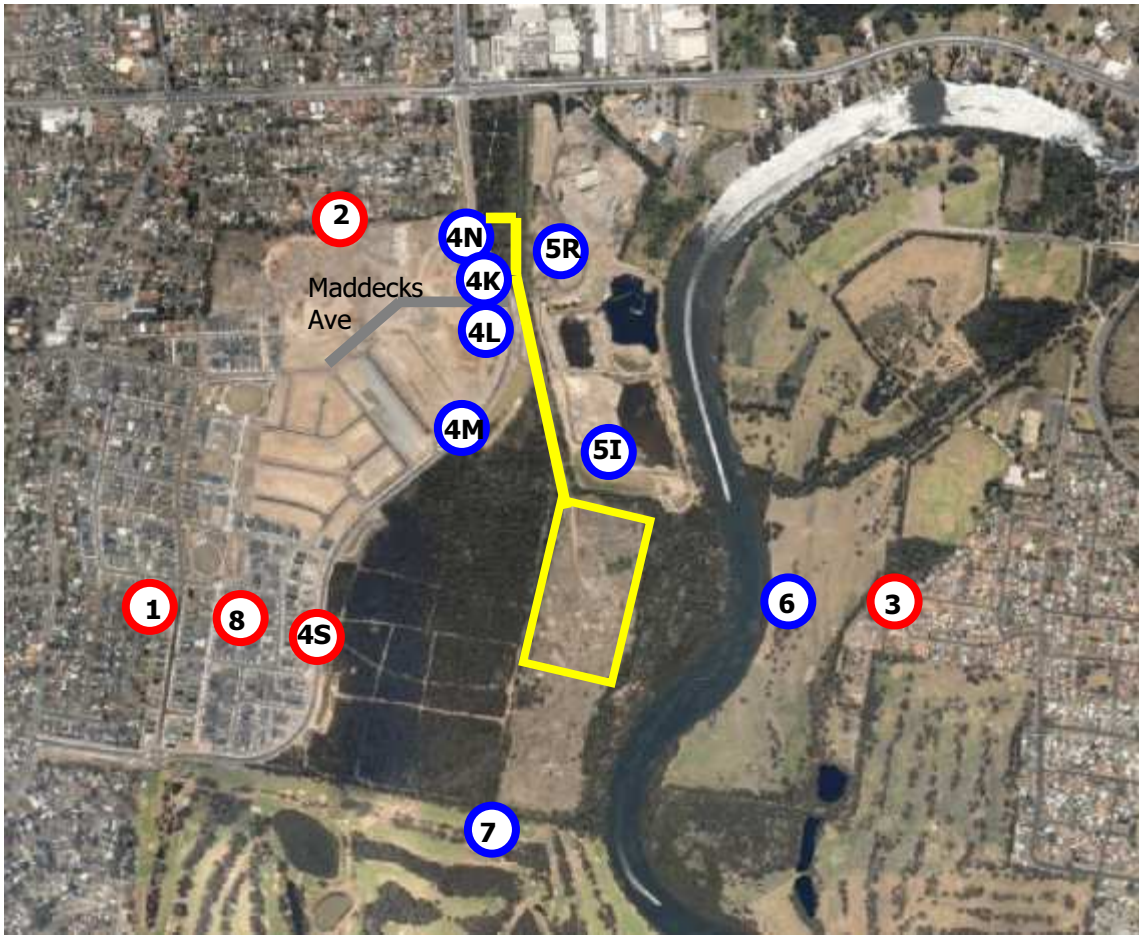
There were two main purposes of this aspect of the work which was to:

- determine a relationship between traffic volumes on Brickmakers Drive and background noise levels at a residence fronting Brickmakers Drive to demonstrate that background noise levels at residences fronting Brickmakers Drive increase as traffic volumes on Brickmakers Drive increase; and
- undertake a simultaneous classified count once the 5t load limit had been imposed on Brickmakers Drive. This included data for two Saturdays.

This would provide the most up to date, relevant and comprehensive noise and traffic data for the analysis.

Noise monitoring was undertaken at Location 4S (12 Bushview Lane as 16 Bushview Lane was not available). The location 4S and Maddecks Avenue is shown in Figure 1. This Figure now includes an additional assessment location called 4L just south of the intersection of Brickmakers Drive and Maddecks Avenue.

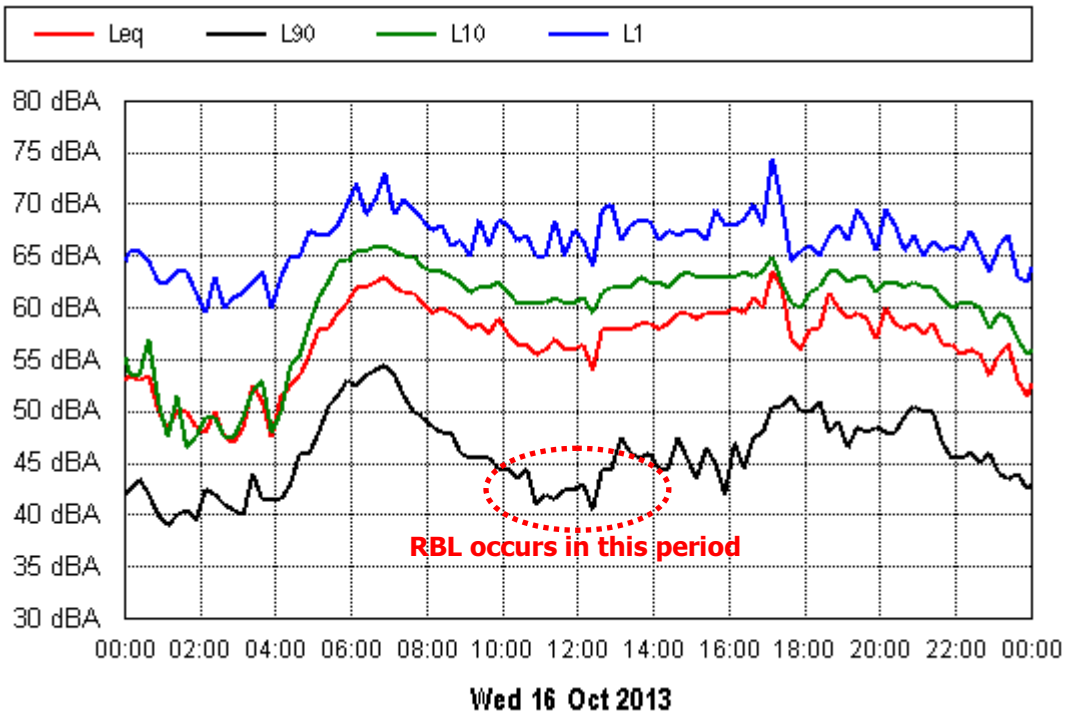
Figure 1 Unattended Noise Monitoring (Red) Locations & Prediction (Red and Blue) Locations (Revised Figure 3-1 from Report)



Simultaneous classified traffic counts by Austraffic at a location on Brickmakers Drive representative of the traffic flow at Location 4S, but not sufficiently close to affect noise levels from vehicles passing over the tubes. The traffic counts were in place from Friday, 11 until Sunday, 20 October 2013.

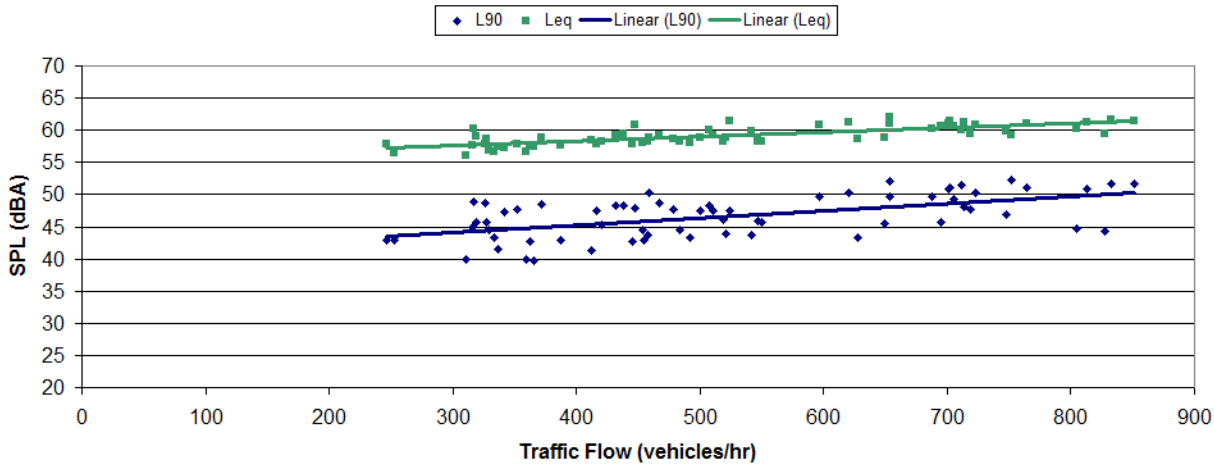
The noise monitoring data is shown attached to this report. A typical weekday is shown in Figure 2. The quieter periods of background noise, which dictate the daytime RBL, generally occur in the middle of the day between the peak hours.

Figure 2 Typical Daytime Ambient Noise Levels



The graph (Figure 3 below), which has been derived from the October 2013 traffic and noise monitoring data, shows the weekday daytime hourly traffic volume plotted against the average of the four 15 minute background L_{A90} noise levels in the hour in blue and log average of L_{Aeq} levels in green. The solid line shows the best fit linear curve through the background (L90) noise data points.

Figure 3 Daytime Hourly Traffic Volume vs L_{90} and L_{eq}



This approach is a similar concept to the *INP* which requires use of ABLs to get the lowest L_{90} value for each day and then using the median of the ABLs to get the RBL for a week. Each data point is the equivalent of an ABL (in relation to vehicle numbers on Brickmakers Drive) and the best fit curve being the median of the points.

This graph can then be used to estimate the future RBL based on the forecast hourly traffic volumes for Year 2018.

Existing and Future Traffic Volumes on Brickmakers Drive

The purpose of determining future traffic volumes on Brickmakers Drive in the quieter middle of the day is to be able to predict future background noise levels at residences fronting Brickmakers Drive. Traffic models generally focus on peak hour volumes so it was necessary for a traffic engineer to advise on likely traffic volumes between the peak periods on weekdays and on Saturday mornings.

Since the preparation of the Wilkinson Murray noise report Version D in August 2013 and previous noise monitoring associated with that report, we understand that a 5t load limit has been placed on Brickmakers Drive, therefore limiting the number of heavy vehicles and potentially changing the existing background noise level.

The previous traffic modelling undertaken by Road Delay Solutions in July 2010, (prepared for the Georges Fair development) adopted the 5t load limit and traffic calming devices; hence future projections of traffic growth remain unchanged.

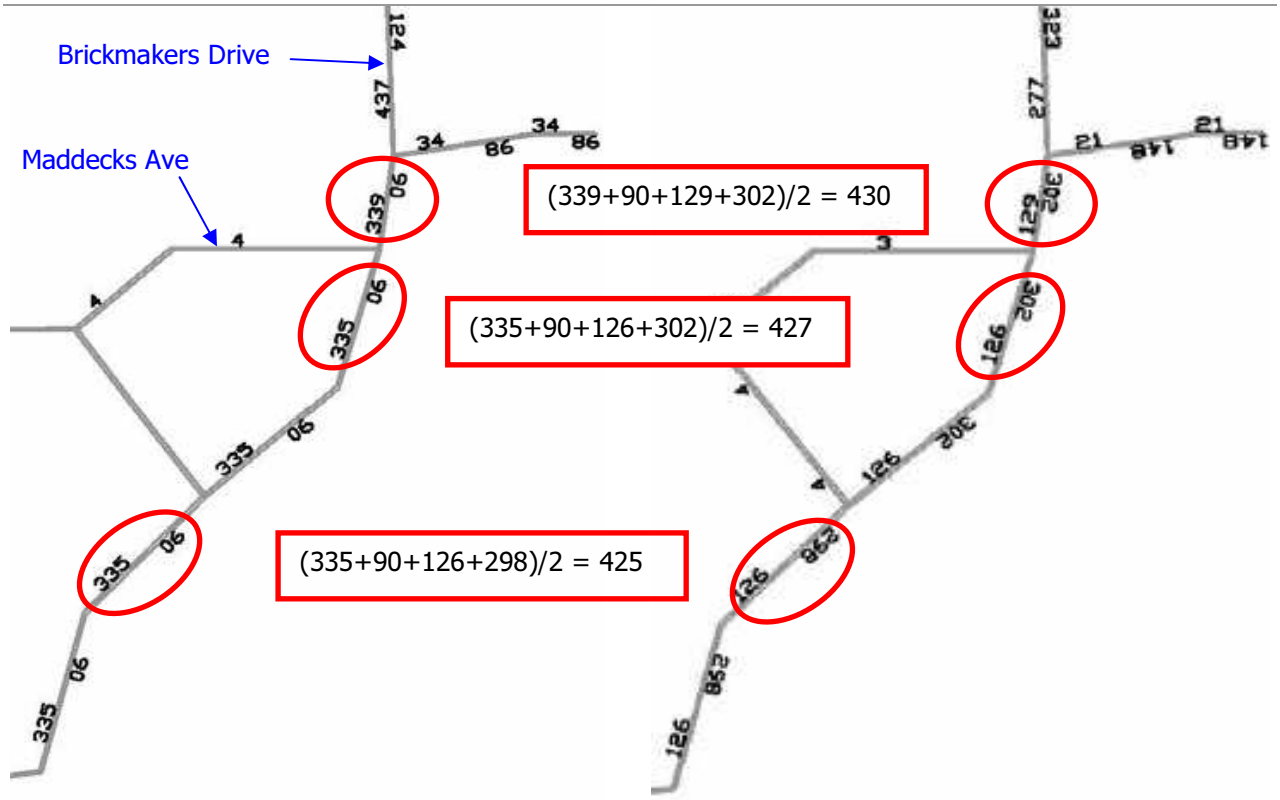
The traffic modelling report by Road Delay Solutions (RDS) presents the morning and afternoon peak hour volumes in both directions along Brickmakers Drive between various intersections for the Years 2011 and 2021 in Figures 11-14 of that report and are copied and shown in Figure 4 below.

The numbers on each side of the black line (representing the road) are the vehicle numbers in each direction. These 2 numbers need to be added together to get the total volume in both directions during the morning and afternoon peak hours. For example in 2011 (circled in red) in the morning peak there are 339 vehicles heading northbound and 90 vehicles heading southbound making a total of 429 vehicles per hour. Similarly for the same section of Brickmakers Drive in the afternoon peak there are 129 vehicles heading northbound and 302 heading southbound so a total of 431 vehicles. The average of the morning and afternoon peak is therefore 429 + 431 divided by 2 which equals 430. This sum and average calculation is shown in the top red box for this section of Brickmakers Drive.

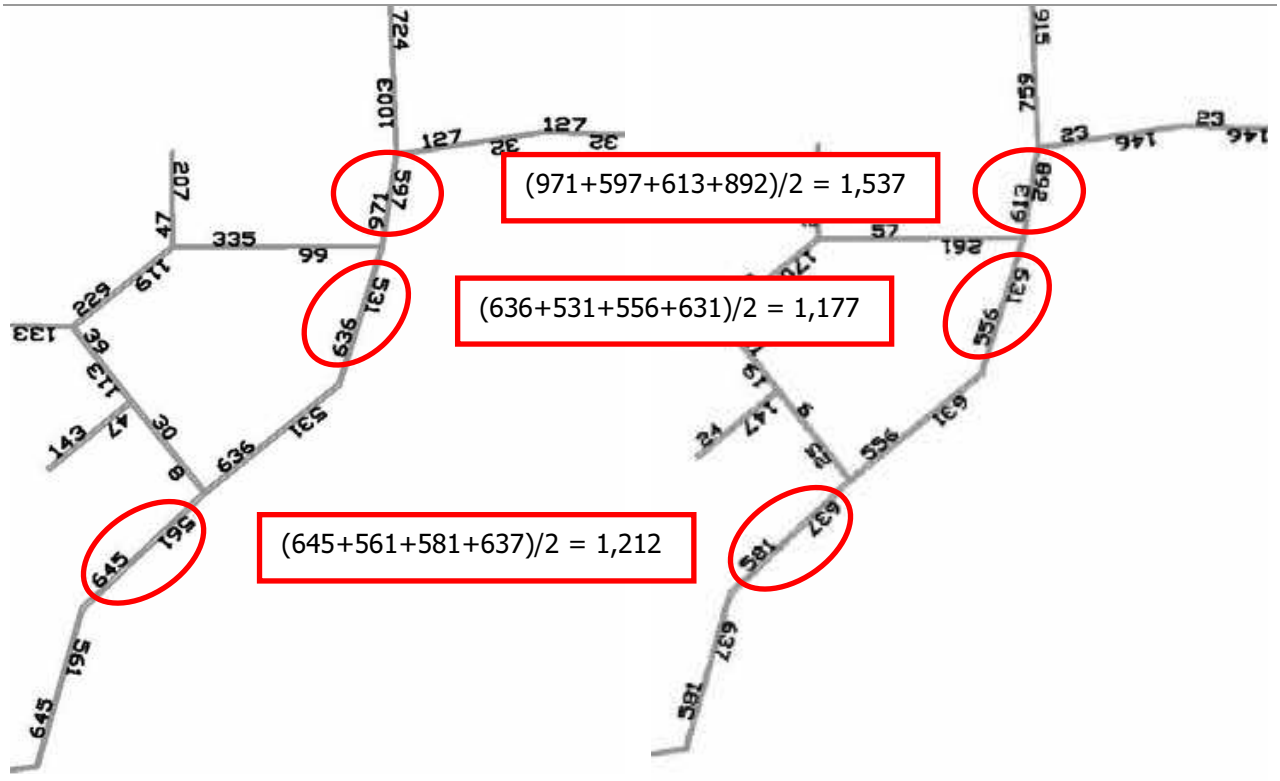
The traffic volumes can be summed (as shown in Figure 4) for the other sections and years to determine overall volumes in 2011 and 2021 and indicates that the average of the morning and afternoon peak hour traffic volumes in 2011 were projected to be 425-430 vehicles per hour (from Figures 11 & 12 of the RDS report), and by 2021 to be 1177-1537 per hour (Figures 13 & 14 of the RDS report). The higher volumes are at the northern end of Brickmakers Drive, north of Maddecks Avenue. These traffic volumes are in the vicinity of the potentially most affect receivers denoted 4N & 4K used in our assessment (refer Figure 1). The lower traffic volumes are in the vicinity of receivers 4L, 4M and 4S

Figure 4 Road Delay Solutions – Extracted Parts of Figures 11, 12, 13 & 14

Morning peak hour volumes 2011 **Evening peak hour volumes 2011**



Morning peak hour volumes 2021 **Evening peak hour volumes 2021**

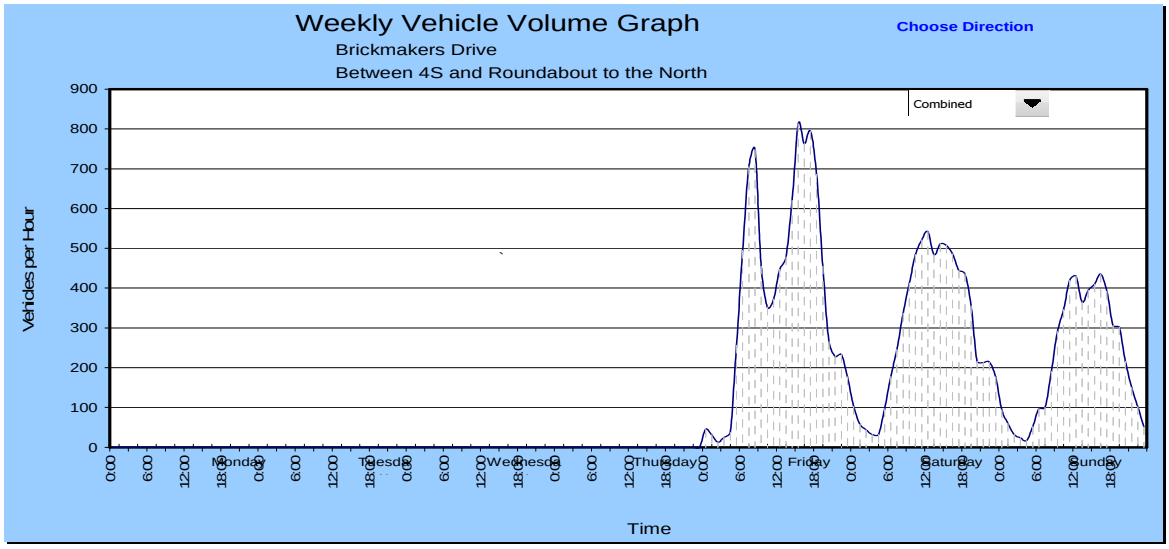


We have used the "McLaren Traffic Engineering" review of the various traffic data (extracts shown attached as Appendix B) which determined a relationship between the hourly flow volumes in the "quieter" part of the day, between the morning and afternoon peak hours, as a percentage of the average of the peak hours and this review indicates in Appendix B highlighted the following conclusion:

"Accordingly the 51.9% figure is the more robust figure to adopt in the circumstances."

The RDS report provided data for the Year 2021, however the proposed recycling facility is due to reach capacity by the Year 2018. The McLaren Review (Appendix B) has calculated the average of the peak hours for the Year 2018 ranging from 1,138 to 1,486 vehicles. For weekdays, adopting 51.9% of the average of the peak hour volumes results in 771 vehicles per hour (51.9% of 1,486) at the northern end of Brickmakers Drive north of Maddecks Avenue (near receivers 4N & 4K) with 609 vehicles per hour (51.9% of 1,172) vehicles at the southern end near receiver 4S and 591 vehicles per hour (51.9% of 1,138) in the middle section of Brickmakers Drive south of Maddecks Avenue near receivers 4L and 4M. This data is highlighted in Appendix B.

Figure 5 Hourly Traffic Volumes Brickmakers Drive (October 2013)



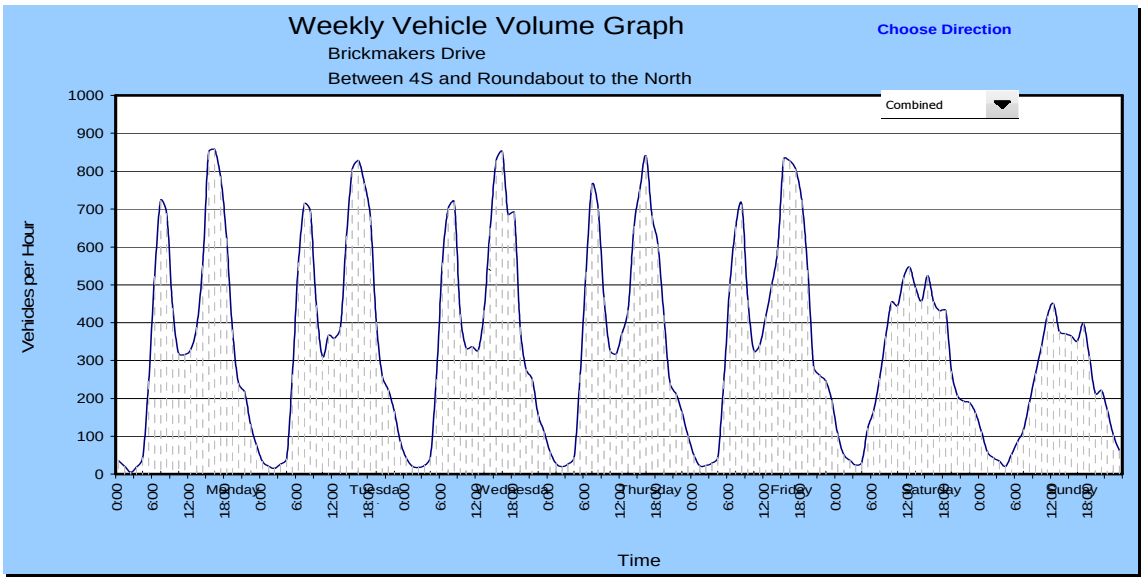


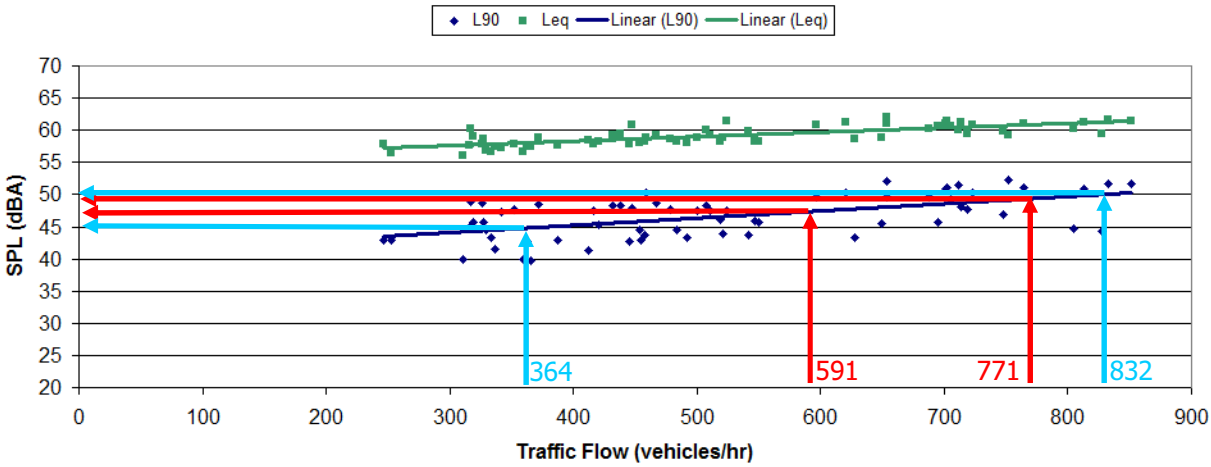
Figure 5 shows the weekly volumes by hour and indicates that Saturday volumes are typically higher than the lowest weekday volumes, with the exception of 7.00am to 9.00am. Similarly the McLaren review has also determined the traffic flow volumes for the first 3 hours on a Saturday morning as a percentage of the average of the peak hours as shown in Table 1 as follows:

Table 1 Saturday Morning Volumes (Refer McLaren Review Page 3)

Saturday Morning	North of Maddecks	South of Maddecks
7.00-8.00am	476	364
8.00-9.00am	669	512
9.00-10.00am	832 (higher than weekday)	637 (higher than weekday)

Figure 6, which is a graph of background noise level versus traffic volume, can be used to predict a future background noise level based on hourly vehicle volumes. For the range of weekday hourly traffic volumes of 591 per hour (South of Maddecks) to 771 per hour (North of Maddecks) the data indicates a background noise level of 47-49dBA (see the red lines in Figure 6). For Saturday mornings the hourly traffic volume range is 364 per hour (South of Maddecks from 7.00am to 8.00am) to 832 per hour (North of Maddecks from 8.00am to 9.00am) and the background noise level would range between 45-50dBA (blue lines in Figure 6)

Figure 6 Hourly Traffic Volumes and Background Noise (L90)



It is recommended that updated background noise measurements should be carried out once the northern release areas (5D & 5E) of Georges Fair are occupied and PSNL limits set accordingly for both the weekday and Saturday as appropriate.

We consider this traffic volume and background noise data supports the adoption of 49dBA as a background noise level (and a PSNL of 54dBA) at receivers 4N and 4K with a lower background level of 47dBA at 4L, 4M and 4S (south of Maddecks Avenue) with a PSNL of 52dBA.

Table 3-2 from our Noise Assessment report Version D has been revised as shown below for the receivers fronting Brickmakers Drive.

Table 2 Estimated Future Daytime RBL Values (Revised Table 3-2)

Location	Daytime RBL (dBA)			
	Weekday	Sat 7-8	Sat 8-9	Sat 9-10
4N – Georges Fair near Link Road (1)	49	46	48	50
4K – Georges Fair north of Maddecks Avenue(1)	49	46	48	50
4L – Georges Fair south of Maddecks Avenue(1)	47	45	46	48
4M – Georges Fair Middle area(1)	47	45	46	48
4S – Georges Fair Southern area (Bushview Lane?) (1)	47	45	46	48

Note: 1. At residences not shielded from Brickmakers Drive.

Mitigation of Truck Noise at Georges Fair

Whilst the Version D report indicated compliance with the 53dB criteria in accordance with *INP* requirements under neutral meteorological conditions, we have undertaken further review to reduce noise levels in this vicinity from truck noise on the up ramp where noise levels are predicted to be higher, and also from the down ramp where trucks are at their closest to receivers. This was in order to demonstrate compliance under adverse meteorological conditions as well. Whilst the recent analysis of background data indicates higher background noise levels are likely to exist in the future the proponent will still construct the noise barriers previously advised in January 2014 and shown in Figure 7.

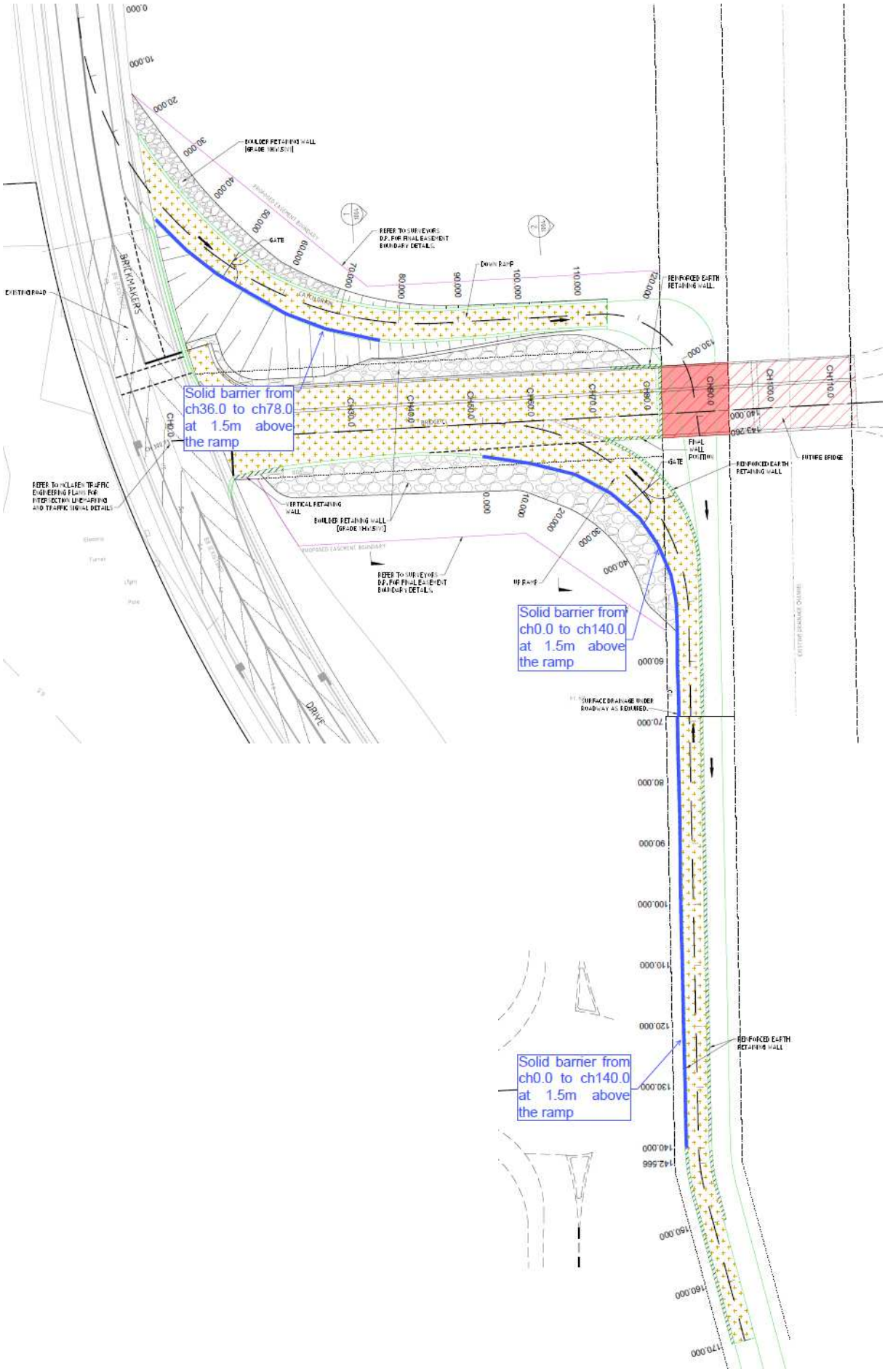
Figure 7 shows the extent of a 1.5m high barrier sufficient to control engine / transmission noise, noting the truck source is split into an engine component (1-1.5m) and exhaust component (3.6m) commonly used in traffic noise assessment. The purpose is to extend the screening along the down ramp from a point close to Brickmakers Drive until the ramp is approximately 1.5m below the level of the proposed new bridge (approx 33m) and along the full length of the up ramp to where is meets the proposed bridge and a location 10m beyond the end of the start of the up ramp (approx 140m).

The predicted noise levels at receivers under neutral conditions (for *INP* compliance) and adverse conditions (for information) with the inclusion of the barriers alongside the ramps are shown in Table 3.

Table 3 Predicted Operational Noise Levels (Revised Table 5-3)

Receiver No.	Operational Noise Criterion, $L_{Aeq,15min}$ (dBA)			Predicted Operational Noise Level $L_{Aeq,15min}$ (dBA) 10 Truck Movement/15minutes	
	Weekday	S 7-8	S 8-9	Neutral Conditions	Adverse Conditions
4N – Georges Fair	54	51	53	50	52
4K – Georges Fair	54	51	53	52	53
4L – Georges Fair	52	50	51	51	52
4M – Georges Fair	52	50	51	48	51
4S – Georges Fair	52	50	51	44	48
5R – Benedict (Future)	51	-	-	54-58	55-58
5I – Benedict	70-75 $L_{Aeq,period}$			57 (55 $L_{Aeq,period}$)	58 (56 $L_{Aeq,period}$)

Figure 7 Ramp Arrangement showing Location of Barrier



Noise levels at the most affected future receivers in Georges Fair (4N and 4K) have been reduced with the inclusion of the 1.5m barrier and are predicted to be lower than the recommended criteria under neutral conditions and lower than predicted noise levels provided in the Version C report of 2012.

We note that under adverse conditions, noise levels are predicted to comply with weekday criteria and after 9.00am on Saturday mornings.

For Saturday mornings between 8.00am and 9.00am, the predicted noise levels based on the assumed 10 truck movements per 15-minute period comply at all receivers under neutral meteorological conditions, but marginally exceed criteria at Location 4L under adverse meteorological conditions.

For Saturday mornings between 7.00am and 8.00am, the predicted noise levels based on the assumed 10 truck movements per 15-minute period comply at receivers 4N, 4M and 4S, but exceed at 4L and 4K. Under adverse conditions the criteria are exceeded at 4N, 4L, 4K and 4M.

It is expected that truck movements between 7.00am and 8.00am are not likely to reach 10 per 15 minutes, but are more likely to be 6 per 15 minutes or 24 per hour; similarly, between 8.00am to 9.00am the numbers would be no more than 32 per hour. Table 4 shows the revised noise predictions with these lower assumed truck numbers at receivers within Georges Fair.

Table 4 Predicted Operational Noise Levels Saturday Mornings

Receiver No.	Saturday Operational Noise Criterion, $L_{Aeq,15min}$ (dBA)		Predicted Operational Noise Level $L_{Aeq,15min}$ (dBA) 6 Truck Movement/15minutes		Predicted Operational Noise Level $L_{Aeq,15min}$ (dBA) 8 Truck Movement/15minutes	
	S 7-8	S 8-9	Neutral	Adverse	Neutral	Adverse
4N – Georges Fair	51	53	48	50	49	51
4K – Georges Fair	51	53	50	51	51	53
4L – Georges Fair	50	51	49	50	50	51
4M – Georges Fair	50	51	47	50	47	51
4S – Georges Fair	50	51	43	48	44	48

With the reduced truck numbers the criteria for Saturday mornings between 7-8am and 8-9am would be achieved under adverse conditions.

Mitigation of Truck Noise East of the Access Road

We have also considered noise levels in the land to the east of the access road which is currently operated by Benedict Sand as a sand dredging and waste recycling facility. Part of the Benedict Sand site is zoned R3 Medium Density Residential. Receiver 5R in the above table is located on the R3 zoned part of the Benedict Sand site. Noise levels outside residences located in the south west corner of the R3 zoned land on the Benedict Sand site are up to 58dBA.

Whilst an intrusive criterion was established in the Version D report to assist in assessing future impacts (in a similar fashion to the other existing residences), this criterion is not currently appropriate as there is no approved residential dwellings at this location. Given that, to date there is no approval for residential development on the Benedict Sands R3 zoned land then the industrial criteria would

apply. This is confirmed by the EPA in its 2 May 2013 letter to the Department of Planning and Infrastructure (see attached Appendix C).

In the absence of any details about the future development of the R3 zoned section of the Benedict Sand site, but assuming that at some time in the future it could be residential, then the recommended amenity criterion for a suburban area at daytime is considered to be a reasonable target. This is 55dBA measured over 11 hours between 7.00am and 6.00pm.

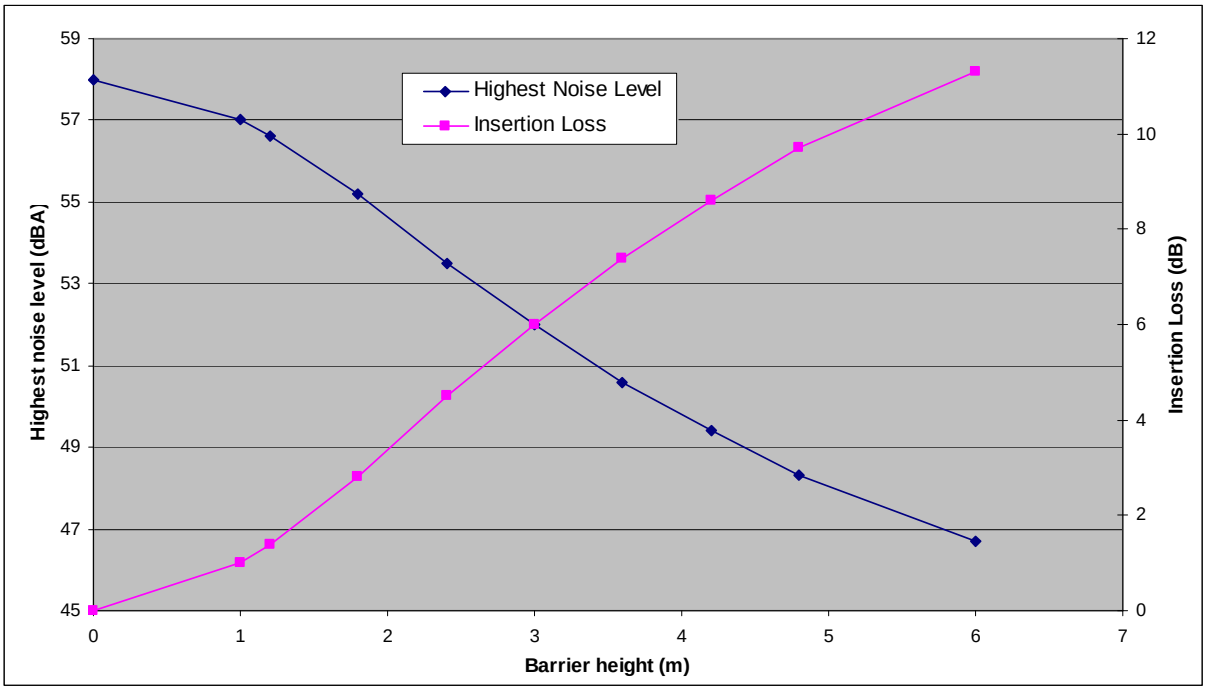
Allowing for the total truck movements over the day (324), the $L_{eq,11hour}$ value is predicted to be 1.3dB lower than the 15 minute value which is based on 10 movements in a 15-minute period (i.e. 440 movements in 11 hours).

The street pattern of future residential development on the R3 zoned section of the Benedict Sand site is depicted on Figure 2 of Part 2.10 of the Liverpool Development Control Plan; an extract from which is at Figure 8. We have undertaken a concept design of an indicative barrier assumed to be located at the western edge of the collector road on the Benedict Sand site as depicted on Figure 8. This could be a combination of earth mound and wall.

Figure 8 Benedict Sand Site

The graph at Figure 9 indicates the height of a barrier needed to control noise to various noise levels (under neutral conditions) at the potentially most affected residential location on the R3 zoned section of the Benedict Sand site.

Figure 9 Barrier Noise Reduction and Resulting Highest Noise Level



No barrier is required to meet the industrial criteria. In order to meet an amenity criterion of 55dB $L_{eq,11hour}$, then a low mound/barrier of approximately 1.5m is required. In order to meet an intrusive limit of 51dBA, a higher barrier of up to 3m would be required.

This range of barrier heights is typical of measures at the perimeter of residential developments to control traffic noise.

Summary

This letter provides a robust argument why it is reasonable to adopt higher background noise levels by the time the proposed recycling facility reaches capacity of 500,000 tpa in the Year 2018.

The Proponent has included noise barriers along the western side of the northern part of the access handle to meet project specific noise limits under adverse meteorological conditions even though in this instance the EPA Industrial Noise Policy only requires the consideration of neutral meteorological conditions to achieve Project Specific Noise Limits (PSNL).

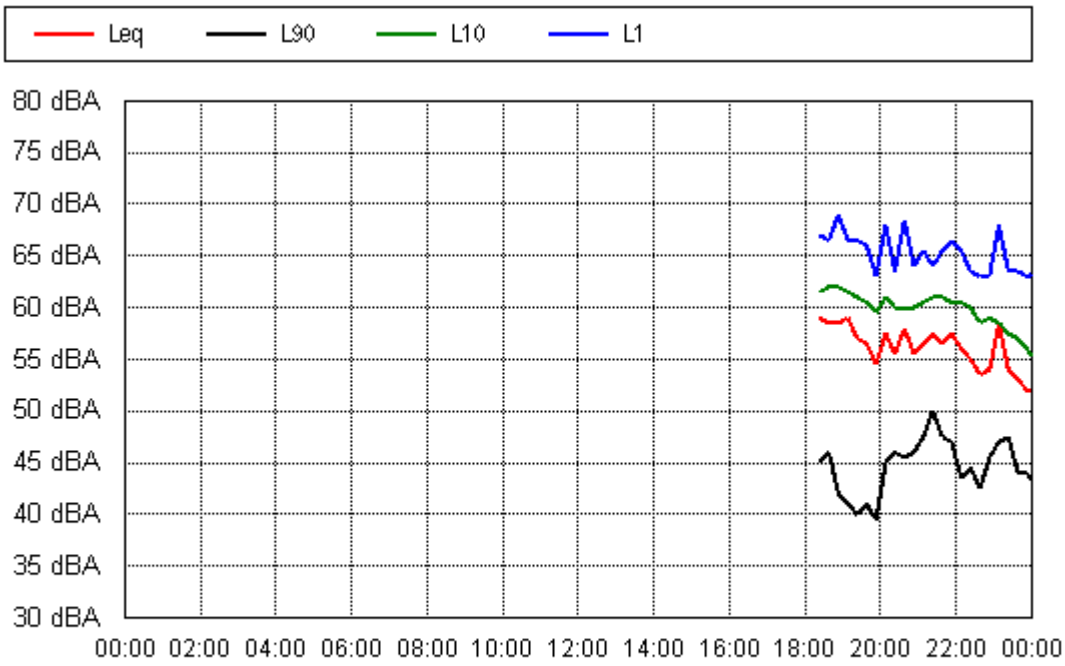
A reduction in truck numbers (24 per hour from 7.00am to 8.00am and 32 per hour from 8.00am to 9.00am) is required to meet PSNL for Saturday mornings under adverse meteorological conditions. Higher truck numbers of 32 between 7.00am and 8.00am and 40 between 8am and 9am would be possible under neutral conditions.

Whilst it is irrelevant in setting noise criteria, it is important to note that existing L_{Aeq} noise levels at the quieter times in the middle of the day or early on Saturday mornings are consistently above 60dBA, some 6-8dBA higher than the proposed PSNLs. The potential impacts of truck noise at these times are therefore considered negligible in relation to other traffic on the road network.

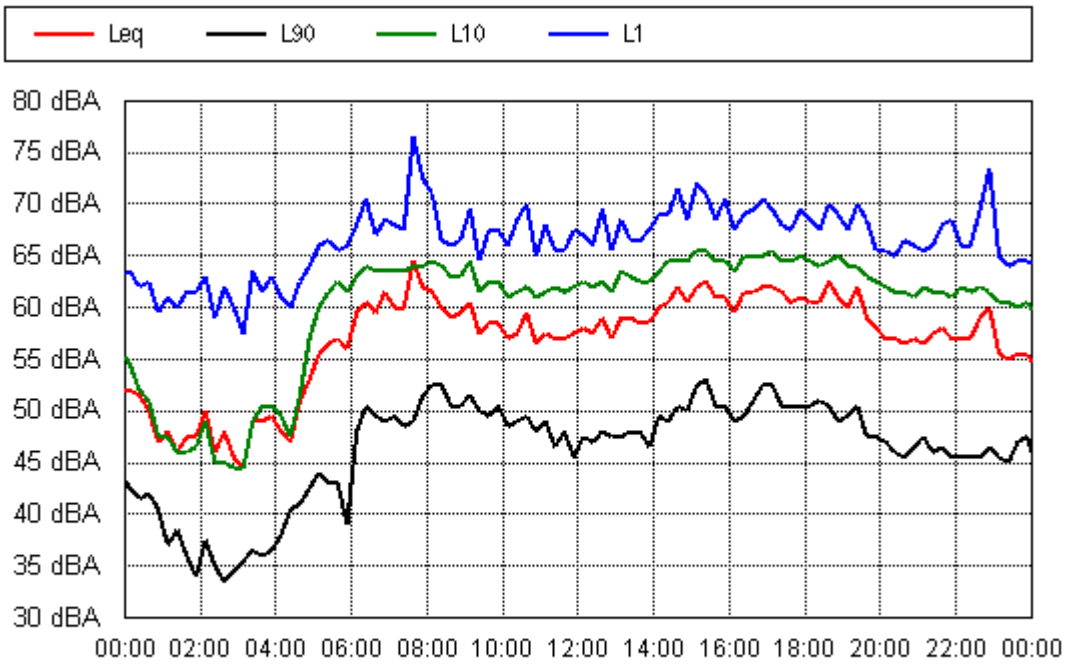
Yours faithfully
WILKINSON MURRAY

Neil Gross
Director

Location: 12 Bushview Lane, Georges Fair

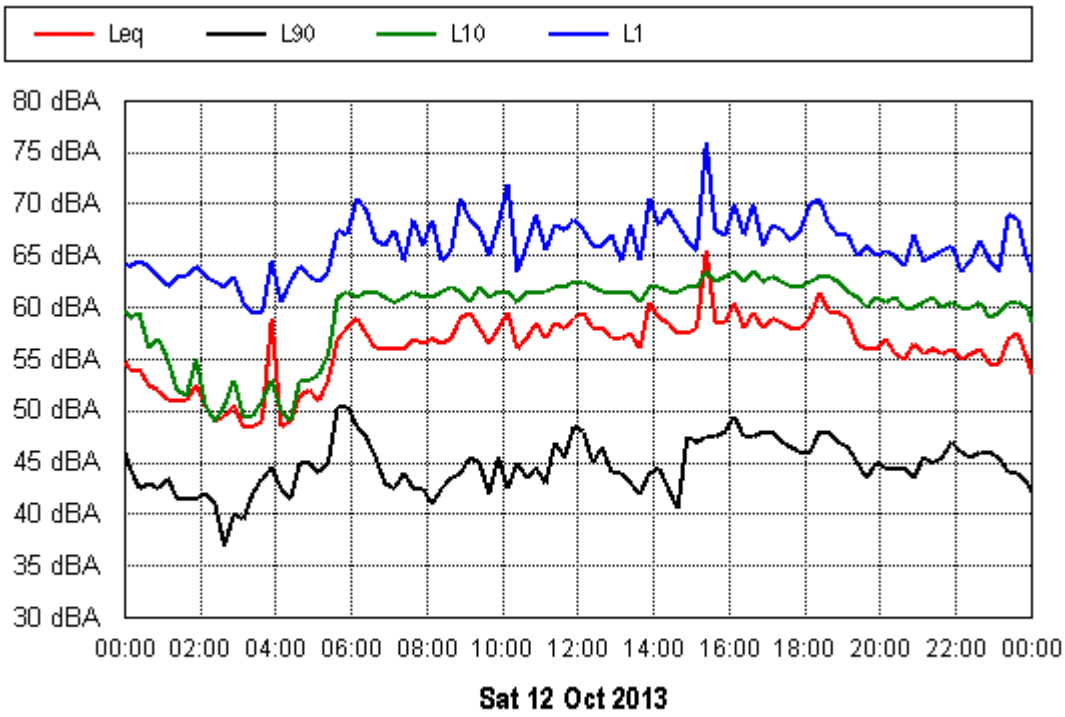


Thu 10 Oct 2013

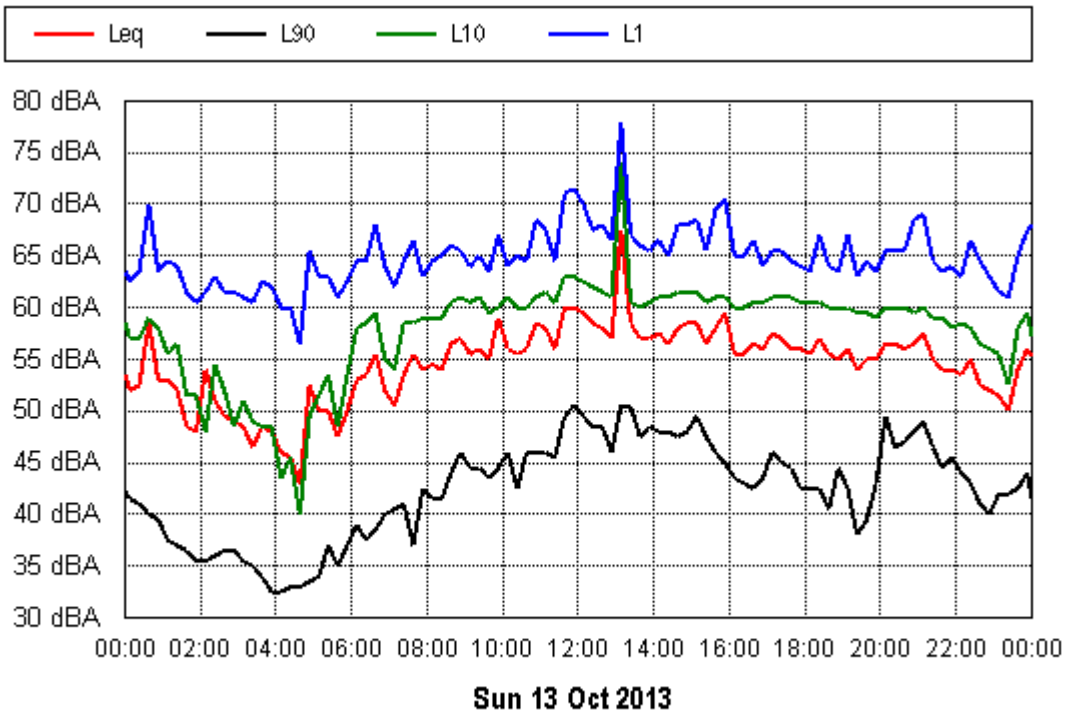


Fri 11 Oct 2013

Location: 12 Bushview Lane, Georges Fair

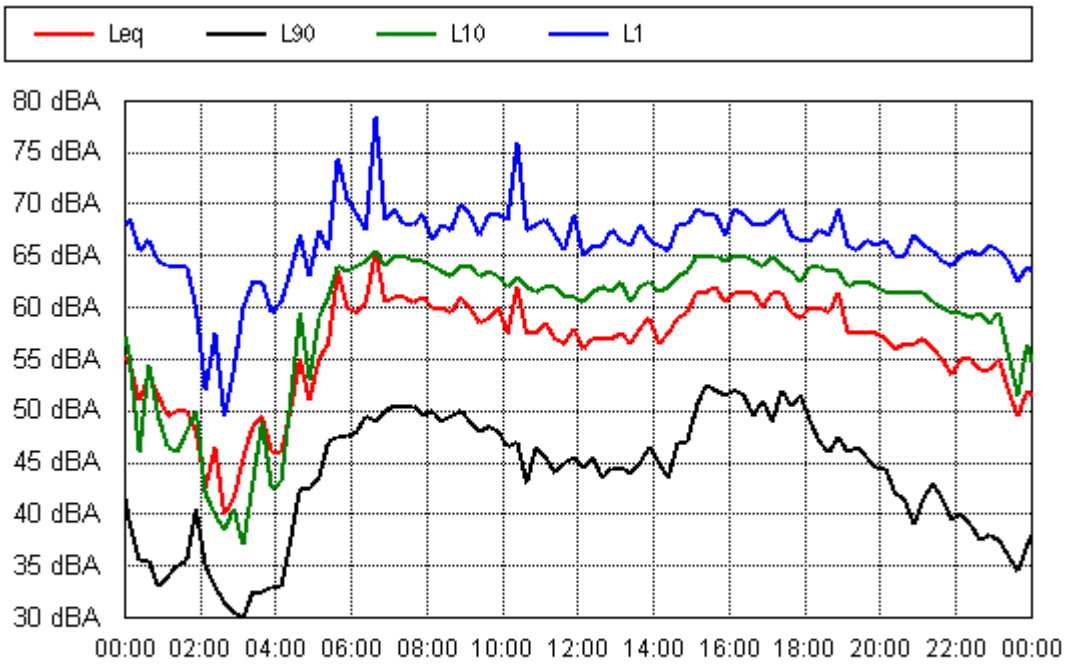


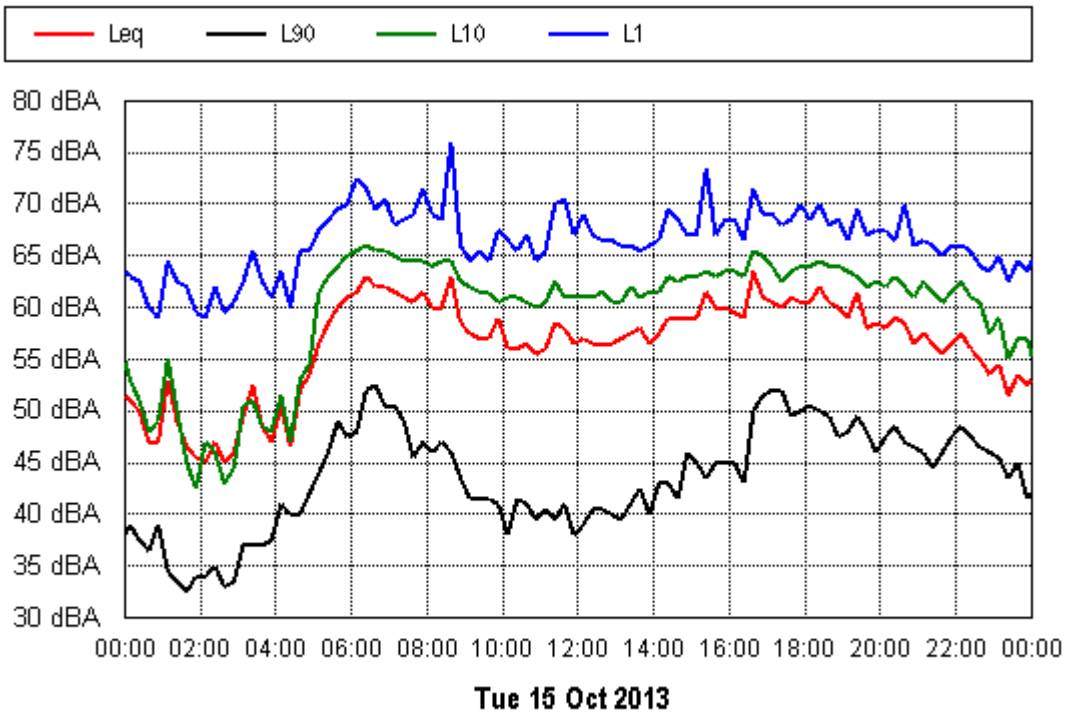
Sat 12 Oct 2013



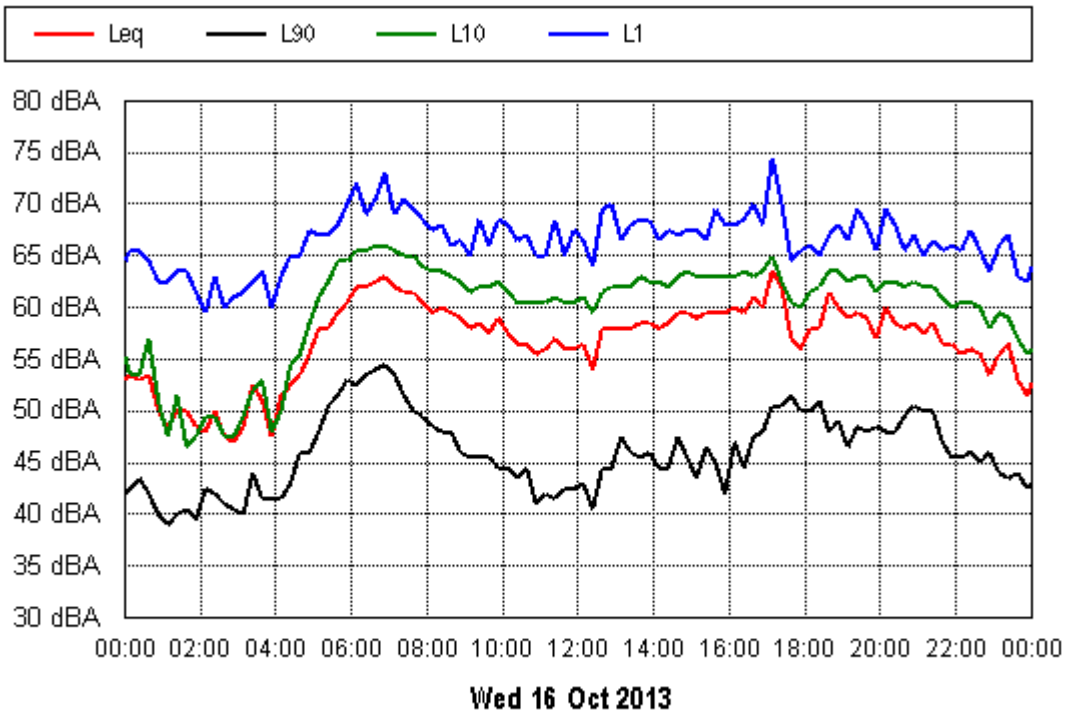
Sun 13 Oct 2013

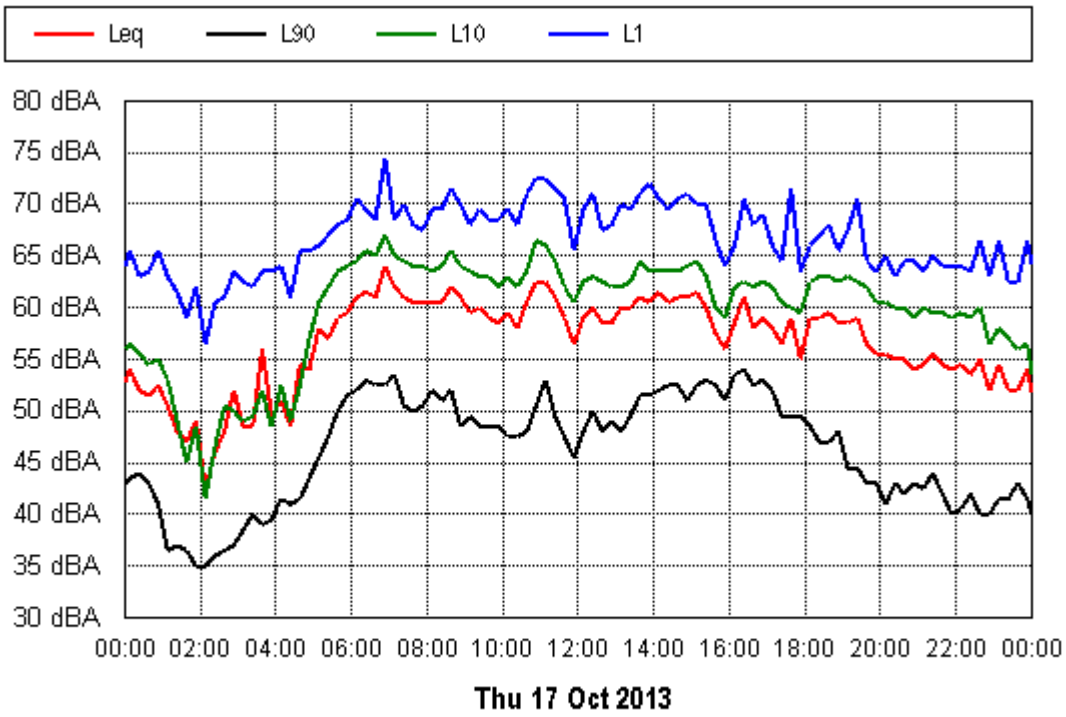
Location: 12 Bushview Lane, Georges Fair



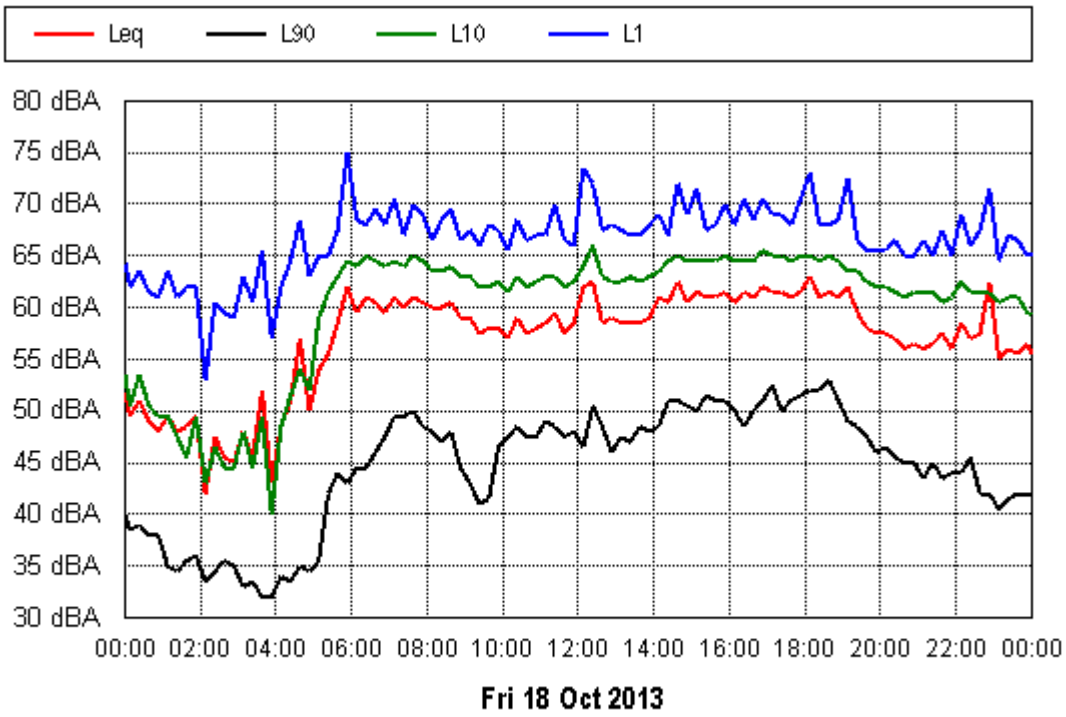


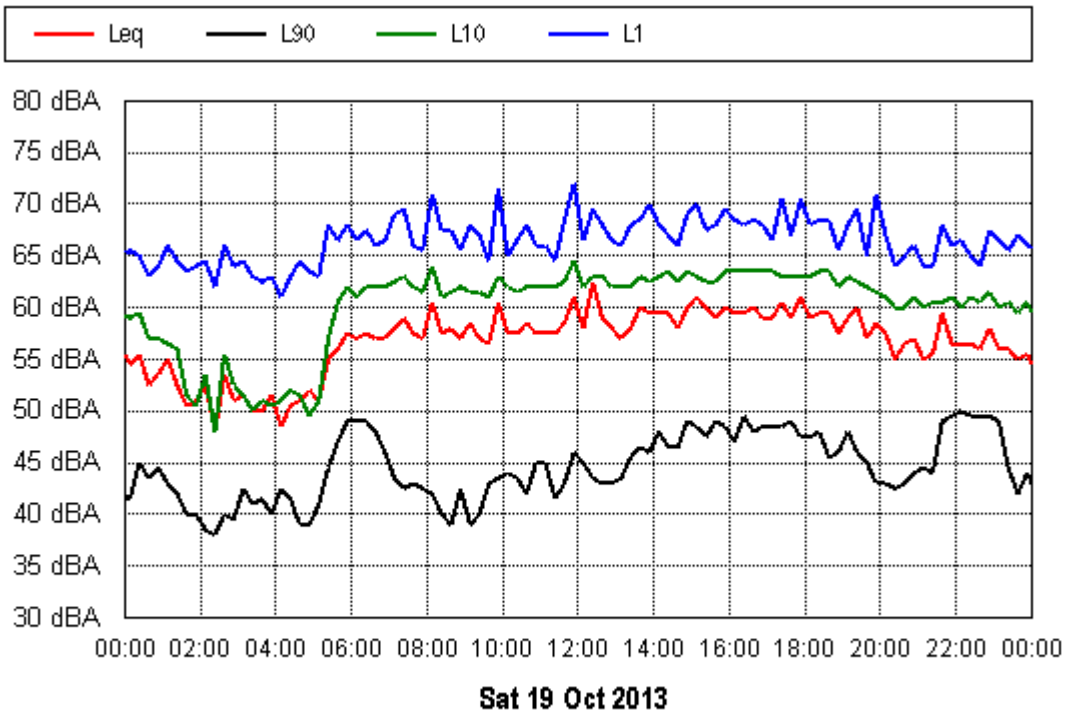
Location: 12 Bushview Lane, Georges Fair



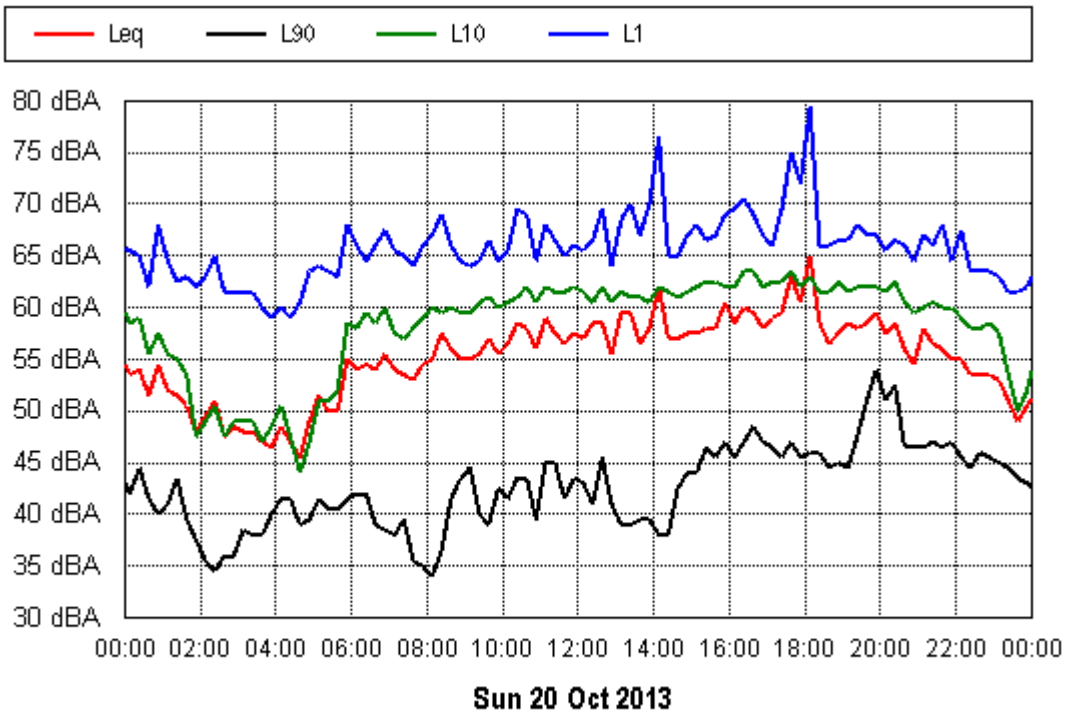


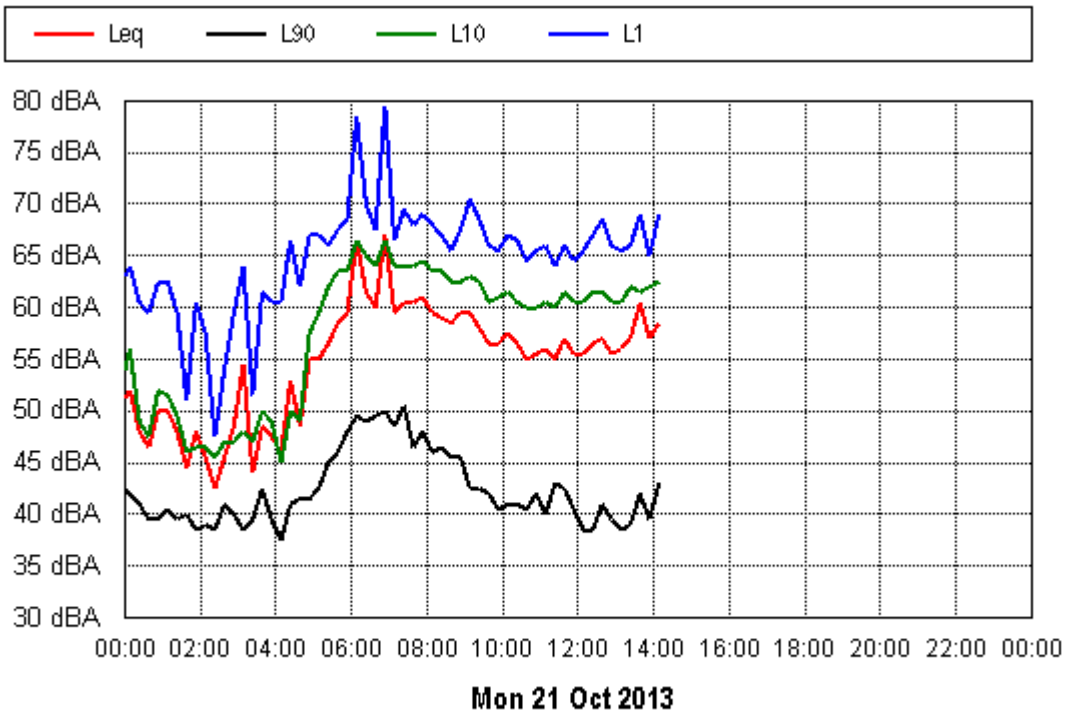
Location: 12 Bushview Lane, Georges Fair





Location: 12 Bushview Lane, Georges Fair





Weekday 10am to 2pm Non Peak Daytime Proportion of the Average of Commuter Peak Hours

From the typical annualised weekday profile of traffic flow (refer to Annexure B) it is calculated that the 10am to 2pm non-peak daytime proportion of the average of the AM & PM commuter peak hours is 51.9%. The calculation is derived from **Annexure** C, as follows:

[Average of Non-Peak (10am to 2pm) in 2004] / [Average of Peak Hours in 2004]

= 250,000 travellers / 482,000 travellers

=51.9%

It is noted that the Wilkinson Murray acoustic assessment dated 14 March 2014 estimated a non-peak weekday proportion of 42% based upon counts conducted over a nine day period in October 2013 at a location within Brickmakers Drive south of the future connection of Maddecks Avenue. Whilst MTE is unsure as to the local conditions that occurred during that nine day count, the non-peak figure of 42% should not be used instead of the derived 51.9% as the latter figure is an annualised figure derived from the *Bureau of Transport Statistics* (BTS).

There will be variations from week to week, it is considered that the 42% is low in the circumstances given both the BTS figure and that the Georges Fair Estate was not fully developed in October 2013.

Accordingly the 51.9% figure is the more robust figure to adopt in the circumstances.

Saturday Morning Proportion of the Average of Commuter Peak Hours

The traffic counts previously conducted by Liverpool Council as referred to in the RDS advice presented in **Annexure A** was undertaken prior to the installation of 5 tonne light traffic thoroughfare restrictions along Brickmakers Drive. Accordingly, these surveys are no longer valid with reference to forecast projections given that 5 tonne load limits are now in place along Brickmakers Drive. The installation date of the 5 tonne load limit was on 19 August 2013, as presented by Liverpool City Council in their website newsletter, refer to **Annexure D**.

Traffic counts referred to in the Wilkinson Murray letter dated 14 March 2014 as presented in **Annexure E** provides localised hourly comparison data over a week period in October 2013 to determine Saturday morning flow comparison to the average weekday AM and PM peak hour. It should be noted that during that survey period, Maddecks Avenue connection to Brickmakers Drive was not constructed.

WEEKDAY COMMUTER PEAK AVERAGES (October 2013)

2013 Date	WEEKDAY AM PEAKS (TWO WAY)	TIME	WEEKDAY PM PEAKS (TWO WAY)	TIME
Averages	711	7-8AM	841	4-5PM
Combined Averages = (711 + 841)/2 = 776 vehicles per hour				

For the two recorded Saturday time periods of 7am to 8am, 8am to 9am and 9am to 10am the corresponding measured flows from the October 2013 counts are 253, 363 and 454 respectively for 12 October 2013 and 246, 337 and 412 respectively for 19 October 2013. These average Saturday time periods equate to 0.32 (250/776), 0.45 (350/776) and 0.56 (433/776) respectively.

Forecast 2021 Weekday AM and PM commuter peak hour flows along Brickmakers Drive, north and south of Maddecks Avenue

The forecast 2021 weekday AM & PM commuter peak hour traffic flows along Brickmakers Drive, north and south of its connection with Maddecks Avenue is presented in **Annexure F**. It should be noted that the traffic flows are read in the direction of travel on those diagrams that are an extract of the July 2010 RDS report.

The forecast average weekday peak hour flow for 2021 north and south of Maddecks Avenue is 1,537 and 1,177 vehicles per hour respectively. Using the non peak hour factor of 51.9% as calculated previously yields non peak hour flows of 798 and 611 vehicles per hour along Brickmakers Drive north and south of Maddecks Avenue respectively.

The forecast 2021 Saturday traffic flows along Brickmakers Drive for the morning times are estimated as follows:

North of Maddecks Avenue

- 492 during the 7am to 8am time period.
- 692 during the 8am to 9am time period.
- 861 during the 9am to 10am time period

South of Maddecks Avenue

- 377 during the 7am to 8am time period.
- 530 during the 8am to 9am time period.
- 659 during the 9am to 10am time period.

Estimated 2018 Weekday AM and PM commuter peak hour flows along Brickmakers Drive, north and south of Maddecks Avenue

The forecast 2018 traffic flows based upon a compound growth rate of 1.1% per annum using the same factors discussed above are as follows:

The forecast average weekday peak hour flow for 2018 north and south of Maddecks Avenue is 1,486 and 1,138 vehicles per hour respectively. Using the non peak hour factor of 51.9% as calculated previously yields non peak hour flows of 771 and 591 vehicles per hour along Brickmakers Drive north and south of Maddecks Avenue respectively.

Projected 2018 Saturday Traffic Flows - North of Maddecks Avenue

- 476 during the 7am to 8am time period.
- 669 during the 8am to 9am time period.
- 832 during the 9am to 10am time period

Projected 2018 Saturday Traffic Flows - South of Maddecks Avenue

- 364 during the 7am to 8am time period.
- 512 during the 8am to 9am time period.
- 637 during the 9am to 10am time period.

NSW EPA
ENVIRONMENT PROTECTION AUTHORITY

Our reference: DOC13/12794

Mr Chris Ritchie
Manager - Industry
Planning & Infrastructure
GPO Box 39
SYDNEY NSW 2001

EMAIL & STANDARD POST

Dear Mr Ritchie

Re: Moorebank Waste Recycling Project MP05_0157

I refer to your correspondence received on 27 February 2013 by the Environment Protection Authority ("EPA") requesting comments on the Moorebank Waste Recycling Project MP05_0157.

I refer to the Nexus Environmental Planning Pty Ltd "*Environmental Assessment Materials Recycling Facility Lot 6, DP 1065574 Newbridge Road Moorebank*" dated 19 February 2013 and attached with your correspondence (the "EA").

The EPA has reviewed the EA for the proposed materials recycling facility at Lot 6 DP 1065574 at Newbridge Road, Moorebank, NSW ("the Proposal"). The proposed facility would receive building and construction waste including concrete, brick, asphalt, sandstone, and sand from the Sydney metropolitan area for crushing, stockpiling and resale. The proposed facility would have a maximum capacity of 500,000 tonnes per annum with a maximum daily processing rate of 1600 tonnes and proposed hours of operation are Monday to Saturday 7am to 6 pm, with crushing equipment operated from 7 am to 5:30 pm.

I also refer to the EMM "*Submission regarding Moorebank Waste Facility*" prepared for Investa Land Pty Limited 5 April 2013, received by EPA on 5 April 2013. Environ Australia Pty Ltd ("Environ") was appointed by EMM to conduct a peer review of the air quality impact assessment of the EA.

Air Quality Assessment

The EPA has reviewed the EA and submissions provided for the proposed Moorebank facility and in particular a peer review of the air quality impact assessment for the proposal conducted by Environ. The EPA notes that Environ have highlighted the following issues:

- That the use of a 2005 meteorological dataset may under represent worst case dispersion conditions for the proposal.
- Impacts have not been predicted at the nearest sensitive receptors given the increase residential development since the AQIA was compiled in 2010
- Concern as to whether impacts from the adjacent Benedict Sands facility were adequately included in the background data set used for the cumulative impact assessment
- Whether the emissions reductions used in the emissions inventory have been adequately accounted for.

The EPA acknowledges that these are areas where the assessment could be improved.

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To ensure assessment robustness, additional information is requested from the proponent. The proponent should provide:

- Predicted impacts at the nearest sensitive receptors as of 2013 (ie account for new residential development),
- Demonstration that the meteorological data used in the assessment adequately describes the meteorological patterns at the site by correlating it against a longer duration site representative meteorological database of at least five years duration (preferably consecutive),
- Incorporation of Benedict Sands operations in the cumulative assessment, and
- Clear justification for all emissions calculations reductions in the emissions inventory and all proposed management measures.

The EPA would then need to assess this revised information prior to providing any recommended conditions of approval for the proposal.

If the proposal is approved the focus will need to be on conditions of approval that formalise the requirement for both proactive and reactive dust management strategies. As previously stated, no information was provided in the air quality impact assessment addressing dust management in detail, for example potential complaints management or planning day to day activities with consideration of meteorological conditions to minimise the risk of impacts. These issues should also be addressed in the revised air quality impact assessment.

Noise

The EPA usually assesses noise impacts at existing noise-sensitive receivers, or locations where a development approval has been granted but building has not commenced, or where a development application has been lodged but not yet determined. Where residences do not currently exist but might conceivably in the future it would be unreasonable for EPA to assign conditions or limits on industry for something that may or may not occur and for which the timing cannot be specified. Exceptions to this approach may occur where for example an area has been identified in planning documents for future residential land release.

There do not appear to be residences to the immediate west of Brickmakers Drive in the area described as the "Boral" area or the Georges Fair residential development. However, the area is zoned R3 residential in the Liverpool LEP, some houses do already exist and housing construction appears to be progressing from the west of this area eastwards towards Brickmakers Drive. Assuming residential development across this entire site is already approved then there are limited options for adding noise mitigation measures, such as setbacks or roadside noise mounds or barriers. Therefore it does appear reasonable and appropriate to consider the entire area west of Brickmakers Drive as residential.

The area to the north of the proposed facility, described as "Tanlane" in the Noise Impact Assessment Appendix and elsewhere as the Benedict Sands site does not, however, have any residences existing or being constructed on it and appears currently to be still operating as an industrial activity. It too is zoned R3 Residential in the Liverpool LEP and the EPA understands that there is an eighteen month sunset clause on the existing industrial activity. However, if residential development is not yet approved for this site then it would be unreasonable for EPA to not support the proposed facility because approval for residential development is not guaranteed or may not occur for some time in the future. In addition, conceivably there are options such as setbacks, roadside barriers or building layout and design measures that are still available for noise mitigation measures that could be incorporated in any residential development approval.

EPA assesses noise from the proposed facility against the NSW Industrial Noise Policy (INP). The INP generally required that Project Specific Noise Levels ("PSNL") are set, based on existing background noise levels. The proponent, however, has set PSNL based on estimated future background noise levels for nearby residential areas. The EPA would only consider adopting these estimate future background noise levels and associated PSNL if more detail and justification about how these have

been set, can be provided and are to the EPA's satisfaction. Based on the current information provided to the EPA, the future background levels appear to be unjustifiably high.

Background noise levels appear from the assessment provided to be around 43 / 44 dBA daytime at nearby residences, giving Project Specific Noise Levels (PSNL) for this proposal of around 48 / 49dBA. Predicted noise levels are either less, or marginally more, than the PSNLs for the Boral area. There may be additional feasible and reasonable noise mitigation measures that the proponent could incorporate in the proposed facility to reduce predicted levels for the Boral area.

The predicted noise level for Tanlane is acceptable for the existing industrial use, but exceeds a level the EPA would usually licence to for a residential area. Truck movements on the access road to the proposed facility are the significant noise source and there are likely to be limited options for the proponent to reduce these levels, other than to limit truck speeds. However, noise mitigation options may be available to the residential developer of the Tanlane area.

Before providing recommended GTAs, the EPA requests:

- Planning provide advice from Liverpool Council, as the consent authority for any application for residential development of Tanlane, confirming that any such consent would include requirements for noise mitigation measures to be incorporated that provide for an acceptable noise amenity for residents; and
- The proponent provide more details on the feasible and reasonable noise mitigation measures that would be incorporated in the proposal with the objective of not exceeding the PSNLs for the Boral residential area.

EPA is aware that an application has been submitted for a marina development in the vicinity of this development. It has not been considered in preparing this advice; however, this proposal is not likely to be significant because the marina would be considered a commercial land use and not a noise-sensitive receiver.

If you have any further queries regarding this matter, please contact Alex Bourne on 9995 5595.

Yours sincerely

21/5/13

JACQUELINE INGHAM
Unit Head Waste Operations
Environment Protection Authority

M^CLAREN TRAFFIC ENGINEERING

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Division of RAMTRANS Australia ABN: 45067491678

Transport Planning, Traffic Impact Assessments, Road Safety Audits, Expert Witness

1 April 2014
Ref: 2013/060.F01A.CM/hc

Nexus Environmental Planning Pty Ltd
PO Box 212
CONCORD NSW 2137

Attention: Mr Neil Kennan
Dear Neil,

MOOREBANK RECYCLING FACILITY : BACKGROUND & FORECAST TRAFFIC VOLUMES

Reference is made to your request to provide a robust reasoning as to the appropriate design peak hourly figures to adopt, for acoustic assessment, within Brickmakers Drive, north and south of its future junction with Maddecks Avenue during the following time periods, as specified by Mr Neil Gross from *Wilkinson Murray*:

- Average weekday non-peak hour daytime period occurring between 10.00am to 2.00pm.
- Average Saturday morning period from 7am to 10am.

The undersigned has discussed this matter at length with Mr Glen Varley from *Road Delay Solutions* (RDS) and attaches in **Annexure A** the advice received.

The RDS clearly states that the projections for the daytime adopted a *"regulated speed of 50km/hr, three (3) strategically located traffic calming devices and a 5 tonne weight limit."* It is relevant to note that the RMS Table 10 derives from the *RMS Economic Analysis Manual*, Appendix B, page 2, 2009.

Further, the weekday time profile shown in the diagram on the second page of **Annexure B**, developed as an average outcome over a full year of traffic volume data collection, is appropriate for application in forecasting future traffic flows at other times of a typical weekday. While there may be fluctuations from day to day and week to week at any discrete time of the year, those fluctuations are inappropriate for application instead of the RMS annualised average weekday time profile, depicted in **Annexure B**.

Regional models, such as those used in the RDS report, focus on weekday AM and PM commuter peak hour periods in order to appropriately plan for road infrastructure investment.

In relation to the Saturday morning projections, these are not generally undertaken by regional models.

The regional modelling report undertaken by RDS in July 2010 (prepared for the Georges Fair development) is the most recent and readily available report and incorporates the known future development and road network changes in the vicinity of the Georges Fair precinct. These

modelling reports take months to prepare in consultation with local Council and the Roads & Maritime Services (RMS).

Weekday 10am to 2pm Non Peak Daytime Proportion of the Average of Commuter Peak Hours

From the typical annualised weekday profile of traffic flow (refer to Annexure B) it is calculated that the 10am to 2pm non-peak daytime proportion of the average of the AM & PM commuter peak hours is 51.9%. The calculation is derived from **Annexure C**, as follows:

[Average of Non-Peak (10am to 2pm) in 2004] / [Average of Peak Hours in 2004]

= 250,000 travellers / 482,000 travellers

=51.9%

It is noted that the Wilkinson Murray acoustic assessment dated 14 March 2014 estimated a non-peak weekday proportion of 42% based upon counts conducted over a nine day period in October 2013 at a location within Brickmakers Drive south of the future connection of Maddecks Avenue. Whilst MTE is unsure as to the local conditions that occurred during that nine day count, the non-peak figure of 42% should not be used instead of the derived 51.9% as the latter figure is an annualised figure derived from the *Bureau of Transport Statistics* (BTS).

There will be variations from week to week, it is considered that the 42% is low in the circumstances given both the BTS figure and that the Georges Fair Estate was not fully developed in October 2013.

Accordingly the 51.9% figure is the more robust figure to adopt in the circumstances.

Saturday Morning Proportion of the Average of Commuter Peak Hours

The traffic counts previously conducted by Liverpool Council as referred to in the RDS advice presented in **Annexure A** was undertaken prior to the installation of 5 tonne light traffic thoroughfare restrictions along Brickmakers Drive. Accordingly, these surveys are no longer valid with reference to forecast projections given that 5 tonne load limits are now in place along Brickmakers Drive. The installation date of the 5 tonne load limit was on 19 August 2013, as presented by Liverpool City Council in their website newsletter, refer to **Annexure D**.

Traffic counts referred to in the Wilkinson Murray letter dated 14 March 2014 as presented in **Annexure E** provides localised hourly comparison data over a week period in October 2013 to determine Saturday morning flow comparison to the average weekday AM and PM peak hour. It should be noted that during that survey period, Maddecks Avenue connection to Brickmakers Drive was not constructed.

WEEKDAY COMMUTER PEAK AVERAGES (October 2013)

2013 Date	WEEKDAY AM PEAKS (TWO WAY)	TIME	WEEKDAY PM PEAKS (TWO WAY)	TIME
Averages	711	7-8AM	841	4-5PM
Combined Averages = (711 + 841)/2 = 776 vehicles per hour				

For the two recorded Saturday time periods of 7am to 8am, 8am to 9am and 9am to 10am the corresponding measured flows from the October 2013 counts are 253, 363 and 454 respectively for 12 October 2013 and 246, 337 and 412 respectively for 19 October 2013. These average Saturday time periods equate to 0.32 (250/776), 0.45 (350/776) and 0.56 (433/776) respectively.

Forecast 2021 Weekday AM and PM commuter peak hour flows along Brickmakers Drive, north and south of Maddecks Avenue

The forecast 2021 weekday AM & PM commuter peak hour traffic flows along Brickmakers Drive, north and south of its connection with Maddecks Avenue is presented in **Annexure F**. It should be noted that the traffic flows are read in the direction of travel on those diagrams that are an extract of the July 2010 RDS report.

The forecast average weekday peak hour flow for 2021 north and south of Maddecks Avenue is 1,537 and 1,177 vehicles per hour respectively. Using the non peak hour factor of 51.9% as calculated previously yields non peak hour flows of 798 and 611 vehicles per hour along Brickmakers Drive north and south of Maddecks Avenue respectively.

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South of Maddecks Avenue

- 377 during the 7am to 8am time period.
- 530 during the 8am to 9am time period.
- 659 during the 9am to 10am time period.

Estimated 2018 Weekday AM and PM commuter peak hour flows along Brickmakers Drive, north and south of Maddecks Avenue

The forecast 2018 traffic flows based upon a compound growth rate of 1.1% per annum using the same factors discussed above are as follows:

The forecast average weekday peak hour flow for 2018 north and south of Maddecks Avenue is 1,486 and 1,138 vehicles per hour respectively. Using the non peak hour factor of 51.9% as calculated previously yields non peak hour flows of 771 and 591 vehicles per hour along Brickmakers Drive north and south of Maddecks Avenue respectively.

Projected 2018 Saturday Traffic Flows - North of Maddecks Avenue

- 476 during the 7am to 8am time period.
- 669 during the 8am to 9am time period.
- 832 during the 9am to 10am time period

Projected 2018 Saturday Traffic Flows - South of Maddecks Avenue

- 364 during the 7am to 8am time period.
- 512 during the 8am to 9am time period.
- 637 during the 9am to 10am time period.

It should be noted that while accelerated traffic activity has occurred in recent times above the trend line shown in the RDS document (refer to Sheet 2 of 6 of **Annexure A**) it is expected that future predicted traffic flows will stabilise to the forecast 2021 traffic flows by 2021.

Please contact the undersigned should you require further information or assistance.

Yours faithfully

M^{C}LAREN TRAFFIC ENGINEERING

Craig M^{C}Laren
Director
BE Civil. Graduate Diploma (Transport Eng) MAITPM MITE [1985]
RMS Accredited Level 3 Road Safety Auditor
RMS Accredited Traffic Control Planner, Auditor & Certifier (Orange Card)

ANNEXURE A: ROAD DELAY SOLUTIONS ADVICE (Page 1 of 6)

ROAD DELAY SOLUTIONS

Traffic and Transport Modelling

Our Reference: 20100097
Date: Wednesday, 26 February 2014

memorandum

Attention: Craig McLaren, *MTE*

GEORGES FAIR, MOOREBANK
STRATEGIC MODELLING

Road Delay Solutions have been approached by McLaren Traffic Engineering with regard to the method for estimating traffic flows during the shoulder, business and off peak hours of operation on the Sydney Metropolitan road network.

The RMS *Economic Analysis Manual*, 2009, prescribes the use and application of various parameters in traffic modelling to facilitate the economic evaluation of road based infrastructure.

Brickmakers Drive has been modelled as a flow restricted corridor with a regulated speed of 50km/hr, three (3) strategically located traffic calming devices and a 5 tonne weight limit. Nuwarra Road, a classified main road, was modelled as the preferred heavy vehicle corridor between Newbridge Road and Heathcote Road. The projected modelling volumes will in fact be slightly lower than estimated given that heavy vehicles (HV) currently use Brickmakers Drive which were excluded from the corridor during modelling.

Traffic counts were collected by Liverpool City Council in November, 2012 (*see attached*) detailing the current traffic volume and degree of light commercial vehicle (LCV) and heavy vehicles (HV) activity on Brickmakers Drive. The traffic counts indicate a peak flow factor of x12 in estimating the AADT. When applied, the projected AADT in 2011 would be in the order of 5,100 and in 2021, 14,400 as shown in *Figure 1*.

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ANNEXURE A: ROAD DELAY SOLUTIONS ADVICE (Page 2 of 6)

ECONOMIC PARAMETERS FOR 2009

TABLE 10
URBAN – AVERAGE HOURLY VALUE FOR TRAVEL TIME, SEPTEMBER 2009

Period	Time + Freight Value ($) per Vehicle (1)	Default Yearly Hours (2)	Proportion of Peak Hourly Volume * (3)
No flow	0	660	0.00
Off Peak	23.28	1000	0.11
Medium Off Peak	23.28	1650	0.28
Medium Business Peak	28.57	1650	0.53
Business Peak	28.57	1800	0.70
AM Peak Shoulder	18.33	400	0.75
AM Peak	18.33	600	1.00
PM Peak Shoulder	18.33	400	0.75
PM Peak	18.33	600	1.00
		8760	

* Expressed as a fraction of the average of AM and PM peak hour flows.

Average Hourly Value = Annual travel time cost / total vehicle hours for time cost per vehicle
= sum [(1)* (2) * (3)] / sum [(2) * (3)]
= $23.81 per vehicle hour in September 2009

Source: Estimated from Tables 7-9, default yearly hours and proportion of peak hourly traffic volume.

Table 10
Source: *RMS Economic Analysis Manual, Appendix B, page 10, 2009*

The following graph presents a comparison between the modelled projections and the actual counts, undertaken by Council in 2012.

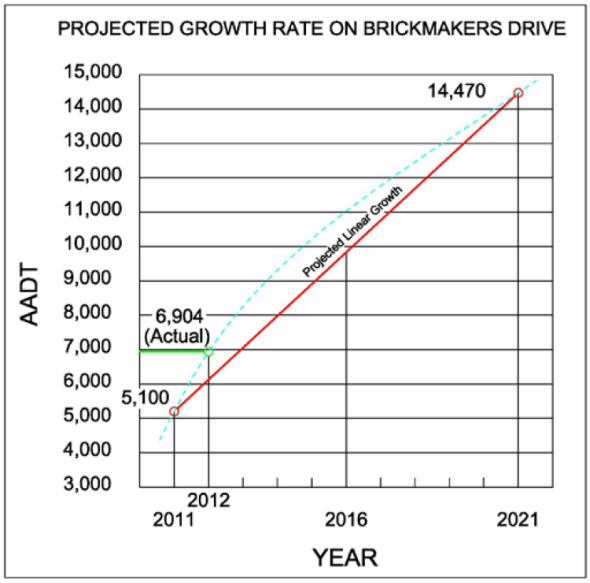


Figure 1
Source: *Road Delay Solutions, 2014*

ANNEXURE A: ROAD DELAY SOLUTIONS ADVICE (Page 3 of 6)

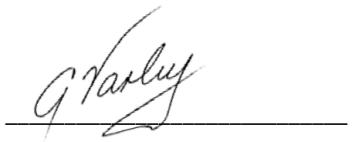
ROAD DELAY SOLUTIONS

Traffic and Transport Modelling

The BTS prescribe that HV movements in Sydney are forecast to increase by 2.2% per annum between 2006 and 2036, faster than LCV trips which are predicted to grow by 1.1% per year.

It is concluded that the methodology, adopted by Wilkinson Murray, in deriving the non peak hour flows from the modelled peak commuter period projections, published in the *Road Delay Solutions* report, complies with current modelling practice as outlined in the RMS *Economic Analysis Manual, Appendix B, page 2, 2009*, as prescribed in the above extract (*Table 10*).

Should you require clarification of any aspect, pertaining to this document, please contact Glen Varley on mobile 0414 800 912.



Glen Varley
Director - Traffic and Transport
Road Delay Solutions Pty Ltd

//Attached

ANNEXURE A: ROAD DELAY SOLUTIONS ADVICE (Page 4 of 6)

ROAD DELAY SOLUTIONS

Traffic and Transport Modelling

TRAFFIC COUNTS – NOVEMBER 2012

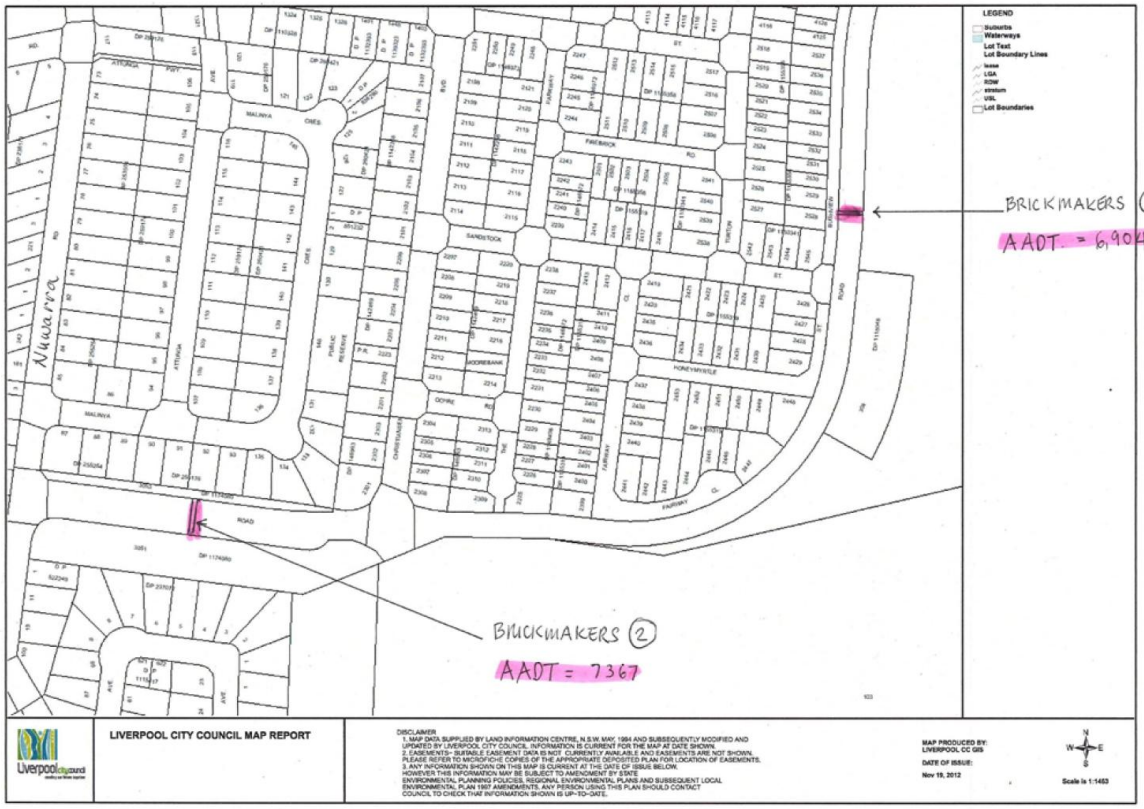


Figure 2 **Count Locations**
Source: *Liverpool City Council, 2012*

ANNEXURE A: ROAD DELAY SOLUTIONS ADVICE (Page 5 of 6)

ROAD DELAY SOLUTIONS

Traffic and Transport Modelling

Site OPPOSITE H#8 BUSHVIEW LANE — Street Index BRICKMAKERS 1 — Block Index BETWE — File unts_2012\BRICKMAKERS 115Nov2012
Created by MetroCount Traffic Executive — Copyright (c)1997 - 2005 MetroCount — Version 3.16.12856.0
File Name G:\Asset_Systems\Databases\Traffic\Counts_2012\BRICKMAKERS 115Nov2012.EC0 — **Creation Time** 2012-11-19T21:00:21
Direction Text 8 - East bound A>B, West bound B>A. — **Direction** East West — **Lane** 0
Setup Time 2012-11-07T11:47:45 — **Operator** AA — **Class Scheme** AustRoads94 — **AADT**
Start Time 2012-11-07T11:47:45 — **Filter Start** 2012-11-08T00:00:00 — Speed Range 0 to 200 — **6904**
Finish Time 2012-11-15T11:22:45 — **Filter End** 2012-11-15T00:00:00

Daily Summary

Date	Day	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12	Cls 13	V 85 %	V 95 %	Vmax	Vmin	Mean	V 50%
08/11/2012	Thu	7675	7298	43	236	28	26	8	5	1	27	2	0	0	1	61.2	65.9	96.3	7.1	54	54.4
09/11/2012	Fri	7162	6825	66	220	18	17	0	0	2	11	1	0	0	21	61.2	65.5	104	8.5	55.2	55.1
10/11/2012	Sat	5371	5193	62	83	13	6	1	1	1	10	1	0	0	0	61.9	67.3	103.5	18.7	55.5	55.1
11/11/2012	Sun	4440	4351	38	41	1	6	0	1	0	2	0	0	0	0	61.9	67	103.9	13.7	55.5	55.1
12/11/2012	Mon	7688	7275	70	233	42	26	4	2	5	25	2	2	0	2	61.9	67	103.4	10.9	55.9	55.4
13/11/2012	Tue	7965	7523	72	251	37	25	6	8	4	32	5	2	0	0	61.6	66.2	105.7	15.3	55.3	55.1
14/11/2012	Wed	8028	7621	37	241	32	28	4	3	5	51	4	2	0	0	61.2	66.2	94	13.1	55.1	54.7

Weekly Summary	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12	Cls 13	V 85 %	V 95 %	Vmax	Vmin	Mean	V 50%
7 Day Totals	48329	46086	388	1305	171	134	23	20	18	158	15	6	0	5	61.6	66.2	105.7	7.1	55.2	55.1
7 Day Average	6904.1	6583.7	55.429	186.43	24.429	19.143	3.2857	2.8571	2.5714	22.571	2.1429	0.8571	0	0.7143						

Hourly Data

Date	Time	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12	Cls 13	V 85 %	V 95 %	Vmax	Vmin	Mean	V 50%
08/11/2012	00:00	66	66	0	0	0	0	0	0	0	0	0	0	0	0	66.2	76.7	81	19.5	59.5	58.7
08/11/2012	01:00	22	22	0	0	0	0	0	0	0	0	0	0	0	0	62.3	68	73.4	43.2	56.8	56.9
08/11/2012	02:00	11	11	0	0	0	0	0	0	0	0	0	0	0	0	62.6	67.3	68.1	47.3	59.3	60.1
08/11/2012	03:00	10	10	0	0	0	0	0	0	0	0	0	0	0	0	-	-	79.6	32.1	56.9	-
08/11/2012	04:00	17	16	0	1	0	0	0	0	0	0	0	0	0	0	62.6	72	81.1	28.4	55.4	53.3
08/11/2012	05:00	40	38	0	1	0	1	0	0	0	0	0	0	0	0	64.4	69.8	72.5	41.9	57.7	57.2
08/11/2012	06:00	199	185	0	12	1	0	0	0	0	1	0	0	0	0	64.4	67.3	77.7	28.9	58.1	58
08/11/2012	07:00	460	440	2	14	0	2	1	0	0	1	0	0	0	0	64.1	68.8	77.5	39.3	58	57.6
08/11/2012	08:00	621	589	2	22	2	4	0	0	0	2	0	0	0	0	61.9	65.9	79.9	31.2	56.2	56.2
08/11/2012	09:00	654	623	5	22	0	2	1	0	0	1	0	0	0	0	61.2	65.9	93.3	14.9	55.1	54.7
08/11/2012	10:00	318	296	0	14	1	1	2	1	0	3	0	0	0	0	62.6	67.3	80.6	28.5	55.8	55.4
08/11/2012	11:00	246	220	2	17	2	3	0	0	0	1	1	0	0	0	61.6	67.7	96.3	39.3	56	55.1
08/11/2012	12:00	249	225	4	13	3	1	0	2	0	1	0	0	0	0	62.3	68	82.4	38.7	55.5	55.1
08/11/2012	13:00	271	245	5	17	2	1	0	0	0	1	0	0	0	0	61.9	65.9	76.1	40	56.3	56.2
08/11/2012	14:00	291	270	2	15	3	2	0	0	1	3	1	0	0	0	61.9	66.2	83.6	19.7	55.5	55.1
08/11/2012	15:00	456	418	8	22	4	3	1	0	0	2	0	0	0	0	60.8	65.2	78.1	40.3	55.1	54.7
08/11/2012	16:00	721	689	2	17	3	3	2	0	0	5	0	0	0	0	59.8	63	87.1	18.2	53.8	53.6
08/11/2012	17:00	876	843	4	16	6	3	1	0	0	2	0	0	0	1	59	63.7	77.8	31.3	53.7	53.3
08/11/2012	18:00	712	688	5	17	1	0	0	0	0	1	0	0	0	0	56.5	60.5	75.4	7.1	42.7	48.2
08/11/2012	19:00	613	601	1	9	0	0	0	2	0	0	0	0	0	0	59	62.3	72.4	26.2	53.1	52.9
08/11/2012	20:00	292	287	1	3	0	0	0	0	0	1	0	0	0	0	59.4	64.8	75.9	33	54	53.6
08/11/2012	21:00	206	204	0	2	0	0	0	0	0	0	0	0	0	0	60.1	64.4	77.3	37.1	54.3	54
08/11/2012	22:00	199	196	0	1	0	0	0	0	0	2	0	0	0	0	62.3	67.3	75.4	38.8	56.4	56.5
08/11/2012	23:00	117	116	0	1	0	0	0	0	0	0	0	0	0	0	63	65.9	75.1	32.5	55.9	56.2
09/11/2012	00:00	64	62	2	0	0	0	0	0	0	0	0	0	0	0	63	71.6	75.2	44.3	57.5	56.5
09/11/2012	01:00	41	41	0	0	0	0	0	0	0	0	0	0	0	0	59.8	64.8	69.5	37.8	54.5	54
09/11/2012	02:00	16	16	0	0	0	0	0	0	0	0	0	0	0	0	67.7	71.3	73.9	49.1	59.1	56.9
09/11/2012	03:00	12	12	0	0	0	0	0	0	0	0	0	0	0	0	60.5	64.4	69.3	48.6	56.8	56.5
09/11/2012	04:00	16	16	0	0	0	0	0	0	0	0	0	0	0	0	68	69.5	78	26	58.6	56.5
09/11/2012	05:00	37	37	0	0	0	0	0	0	0	0	0	0	0	0	63	65.9	70.1	36.5	57.3	58
09/11/2012	06:00	174	160	1	12	0	1	0	0	0	0	0	0	0	0	64.8	69.5	86.5	26.4	57.7	56.9
09/11/2012	07:00	453	425	5	20	2	0	0	0	0	1	0	0	0	0	63.4	69.1	104	42.3	57.5	56.5
09/11/2012	08:00	604	563	10	24	2	4	0	0	0	1	0	0	0	0	60.8	65.2	83.3	25.2	55.2	55.1
09/11/2012	09:00	627	599	4	17	2	2	0	0	0	2	0	0	0	1	59.8	63.7	88.6	27.6	54.3	54
09/11/2012	10:00	147	131	0	10	1	4	0	0	0	1	0	0	0	0	50	56.2	63.9	8.5	42.3	43.6
09/11/2012	11:00	10	3	0	7	0	0	0	0	0	0	0	0	0	0	-	-	55.3	30.3	43.9	-
09/11/2012	12:00	5	3	0	2	0	0	0	0	0	0	0	0	0	0	-	-	59.5	43.1	51.9	-
09/11/2012	13:00	66	58	0	5	0	1	0	0	0	2	0	0	0	0	60.1	66.2	68.3	27.8	54.4	55.1
09/11/2012	14:00	337	314	3	15	2	2	0	0	0	0	0	0	0	1	60.5	65.5	70.9	24.7	54.8	54.7
09/11/2012	15:00	488	447	9	29	2	0	0	0	0	0	1	0	0	0	60.8	64.1	76.7	39.2	54.9	54.4
09/11/2012	16:00	749	711	9	23	2	2	0	0	0	2	0	0	0	0	60.5	64.4	82.3	32	54.5	54.4
09/11/2012	17:00	785	759	7	16	3	0	0	0	0	0	0	0	0	0	60.8	64.8	77.2	22.6	55.1	55.1
09/11/2012	18:00	824	798	9	13	0	1	0	0	0	3	0	0	0	0	61.2	64.8	79.3	22.9	55.7	55.4
09/11/2012	19:00	686	666	4	15	0	0	0	0	0	1	0	0	0	0	61.2	64.8	75.8	32.7	56.1	55.8
09/11/2012	20:00	410	402	1	6	1	0	0	0	0	0	0	0	0	0	61.6	67	84	34	55.7	55.1
09/11/2012	21:00	249	245	2	1	1	0	0	0	0	0	0	0	0	0	62.3	66.2	92.4	34.3	56	55.4
09/11/2012	22:00	208	207	0	1	0	0	0	0	0	0	0	0	0	0	62.3	67.7	100.6	18.2	56.1	55.4
09/11/2012	23:00	154	150	0	4	0	0	0	0	0	0	0	0	0	0	62.6	67.7	79.1	41.3	55.9	55.1
10/11/2012	00:00	138	134	0	4	0	0	0	0	0	0	0	0	0	0	61.6	67.7	84.2	32.2	56.2	55.8
10/11/2012	01:00	76	76	0	2	0	0	0	0	0	0	0	0	0	0	65.9	70.9	80.6	45.4	58.3	57.2
10/11/2012	02:00	29	28	0	1	0	0	0	0	0	0	0	0	0	0	70.2	87.1	90.2	47.4	60.8	59
10/11/2012	03:00	24	23	0	1	0	0	0	0	0	0	0	0	0	0	64.4	66.2	76.5	26.5	56.6	56.5
10/11/2012	04:00	19	18	1	0	0	0	0	0	0	0	0	0	0	0	64.8	68.4	69.7	44.6	57.6	57.6
10/11/2012	05:00	24	24	0	0	0	0	0	0	0	0	0	0	0	0	69.1	74.2	74.5	45.8	59	58.3
10/11/2012	06:00	82	80	0	2	0	0	0	0	0	0	0	0	0	0	70.6	76	86.6	43.8	61.6	59.8
10/11/2012	07:00	111	105	1	3	1	1	0	0	0	0	0	0	0	0	65.9	70.6	89	18.7	57.9	56.9
10/11/2012	08:00	204	194	2	4	3	1	0	0	0	0	0	0	0	0	64.1	72	86.4	41.4	57.7	56.9
10/11/2012	09:00	281	268	3	7	2	0	0	0	0	1	0	0	0	0	63.4	68.8	74.7	42	57.1	56.2
10/11/2012	10:00	330	314	5	4	3	0	1	0	0	2	1	0	0	0	61.6	65.5	79.3	37.7	55.3	55.1
10/11/2012	11:00	367	345	7	10	2	1	0	0	0	2	0	0	0	0	60.8	64.4	76.8	38.2	54.5	54
10/11/2012	12:00	454	434	7	7	1	0	0	1	1	3	0	0	0	0	60.5	64.8	79.7	36.6	54.2	53.6
10/11/2012	13:00	393	378	7	5	1	0	0	0	0	2	0	0	0	0	61.6	65.5	80.4	20.5	54.9	55.1
10/11/2012	14:00	376	364	4	7	0	1	0	0	0	0	0	0	0	0	61.9	67.3	88.4	18.9	55.7	55.8
10/11/2012	15:00	400	386	7	7	0	0	0	0	0	0	0	0	0	0	60.5	63.4	99	39	54.7	54.4
10/11/2012	16:00	371	364	3	4	0	0	0	0	0	0	0	0	0	0	60.8	65.2	103.5	24	54.5	54.4
10/11/2012	17:00	352	346	4	2	0	0	0	0	0	0	0	0	0	0	60.8	64.8	94.1	37.3	55.2	54.7
10/11/2012	18:00	360	352	4	4	0	0	0	0	0	0	0	0	0	0	60.8	64.8	79.5	28.1	54.4	54.7
10/11/2012	19:00	345	340	4	1	0	0	0	0	0	0	0	0	0	0	61.9	67.3	85.1	20.6	55.8	55.1
10/11/2012	20:00	211	209	1	1	0	0	0	0	0	0	0	0	0	0	62.3	69.5	91.7	27.7	54.3	53.6
10/11/2012	21:00	133	128	1	4	0	0	0	0	0	0	0	0	0	0	63.4	69.5	87.5	40.2	56.5	55.8
10/11/2012	22:00	147	144	1	2	0	0	0	0	0	0	0	0	0	0	63.7	67.7	73.3	37.5	56.2	55.4
10/11/2012	23:00	142	139	0	1	0	2	0	0	0	0	0	0	0	0	61.2	65.9	76.5	36.2	55.5	54.4
11/11/2012	00:00	118	118	0	0	0	0	0	0	0	0	0	0	0	0	61.6	64.8	73	44.8	56.2	56.2

ANNEXURE A: ROAD DELAY SOLUTIONS ADVICE (Page 6 of 6)

ROAD DELAY SOLUTIONS

Traffic and Transport Modelling

11/11/2012	01:00	66	66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	63	70.2	84.8	43	58	56.5
11/11/2012	02:00	52	52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	64.8	69.8	79.2	36.6	56.9	55.1
11/11/2012	03:00	21	20	0	1	0	0	0	0	0	0	0	0	0	0	0	0	64.4	66.6	75.9	50.7	57.1	54
11/11/2012	04:00	18	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68.8	77.4	83.8	41.1	60.6	59.4
11/11/2012	05:00	12	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66.2	67	87.4	42.2	59.9	59.4
11/11/2012	06:00	25	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68	77.8	82.1	44.9	61.1	61.9
11/11/2012	07:00	82	78	2	2	0	0	0	0	0	0	0	0	0	0	0	0	67	70.2	82.8	41.9	58.8	57.6
11/11/2012	08:00	64	63	0	1	0	0	0	0	0	0	0	0	0	0	0	0	63.4	69.8	76.8	44.2	57.8	57.6
11/11/2012	09:00	135	133	1	1	0	0	0	0	0	0	0	0	0	0	0	0	64.8	69.1	78.3	30.6	57.2	56.2
11/11/2012	10:00	218	209	4	2	0	2	0	0	0	1	0	0	0	0	0	0	62.6	67	103	21.5	55.6	54.7
11/11/2012	11:00	302	289	5	7	0	0	0	1	0	0	0	0	0	0	0	0	61.6	67.3	83.7	27.6	55.7	54.7
11/11/2012	12:00	349	340	5	4	0	0	0	0	0	0	0	0	0	0	0	0	61.6	65.5	72.5	42.8	55.7	55.1
11/11/2012	13:00	395	388	3	2	0	1	0	0	0	1	0	0	0	0	0	0	60.8	65.2	92.3	27.8	54.5	54
11/11/2012	14:00	376	367	4	4	1	0	0	0	0	0	0	0	0	0	0	0	61.6	64.8	75.5	41.2	55.3	55.1
11/11/2012	15:00	345	337	4	1	0	3	0	0	0	0	0	0	0	0	0	0	61.2	64.8	74.9	23.7	54.5	54
11/11/2012	16:00	331	328	1	2	0	0	0	0	0	0	0	0	0	0	0	0	60.5	64.4	86.4	26.5	54.2	54
11/11/2012	17:00	337	332	3	2	0	0	0	0	0	0	0	0	0	0	0	0	61.2	65.2	93.2	31.7	55.2	55.1
11/11/2012	18:00	303	300	2	1	0	0	0	0	0	0	0	0	0	0	0	0	61.9	66.2	77	36.5	55.8	55.1
11/11/2012	19:00	277	271	3	3	0	0	0	0	0	0	0	0	0	0	0	0	62.3	67.7	89.1	26.8	55.3	55.1
11/11/2012	20:00	205	200	0	5	0	0	0	0	0	0	0	0	0	0	0	0	63	66.2	79.3	13.7	54.9	55.1
11/11/2012	21:00	184	182	1	1	0	0	0	0	0	0	0	0	0	0	0	0	60.8	66.2	103.9	34.7	54.1	53.3
11/11/2012	22:00	129	127	0	2	0	0	0	0	0	0	0	0	0	0	0	0	64.1	70.2	90.7	43.2	57.3	56.2
11/11/2012	23:00	96	96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	62.3	69.5	84.2	44.2	58.1	57.2
12/11/2012	00:00	53	52	1	0	0	0	0	0	0	0	0	0	0	0	0	0	67	74.9	82.7	48.6	59.7	58
12/11/2012	01:00	29	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66.2	69.5	77.3	41.9	59.6	59.8
12/11/2012	02:00	16	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	73.4	94.3	103.4	49.3	63	58
12/11/2012	03:00	7	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	80.9	48	61.7	-
12/11/2012	04:00	16	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72.7	74.2	75.7	47.2	61.2	59.4
12/11/2012	05:00	40	38	0	0	2	0	0	0	0	0	0	0	0	0	0	0	69.1	76	77.4	35.2	59.9	57.6
12/11/2012	06:00	190	174	3	10	1	1	0	1	0	0	0	0	0	0	0	0	66.2	72	78.5	43.1	59.5	58.3
12/11/2012	07:00	456	428	6	16	2	3	0	0	0	1	0	0	0	0	0	0	64.8	68.8	81.6	41.2	58.4	57.6
12/11/2012	08:00	616	585	6	21	1	2	0	0	0	1	0	0	0	0	0	0	61.9	66.6	86	22.4	56.1	56.2
12/11/2012	09:00	635	599	6	23	2	2	0	0	1	2	0	0	0	0	0	0	60.8	64.1	79.7	33.6	55.1	54.7
12/11/2012	10:00	316	292	3	14	1	3	0	0	0	3	0	0	0	0	0	0	63	69.1	76	42	56.6	55.8
12/11/2012	11:00	228	192	4	19	3	5	1	0	0	2	2	0	0	0	0	0	60.8	66.2	77.1	38.3	55.5	55.4
12/11/2012	12:00	256	217	6	24	4	3	0	0	0	2	0	0	0	0	0	0	62.3	65.9	76.8	33.1	55.4	55.1
12/11/2012	13:00	263	237	6	11	5	1	0	0	0	2	0	1	0	0	0	0	63.4	70.6	91.4	42.3	57.1	56.2
12/11/2012	14:00	318	290	3	11	9	2	0	0	1	2	0	0	0	0	0	0	62.6	67.3	78.6	30.9	55.9	55.8
12/11/2012	15:00	465	426	3	26	5	2	1	0	0	2	0	0	0	0	0	0	63	68	86.9	10.9	56.7	56.2
12/11/2012	16:00	712	674	4	20	4	0	2	0	1	5	0	1	0	0	1	0	60.5	64.8	79.9	36.6	54.4	54.4
12/11/2012	17:00	852	824	5	18	1	0	0	1	1	2	0	0	0	0	0	0	61.2	64.8	80.3	37.3	54.8	54.7
12/11/2012	18:00	810	792	7	5	1	2	0	0	1	1	0	0	0	0	1	0	60.5	64.1	89.2	26.2	54.7	54.4
12/11/2012	19:00	641	632	2	6	1	0	0	0	0	0	0	0	0	0	0	0	60.5	64.4	77.2	27.1	55.1	54.7
12/11/2012	20:00	306	295	4	7	0	0	0	0	0	0	0	0	0	0	0	0	63.4	69.1	94.3	10.9	56.8	56.9
12/11/2012	21:00	201	200	0	1	0	0	0	0	0	0	0	0	0	0	0	0	61.6	67.3	79.4	40	56.1	55.4
12/11/2012	22:00	166	165	0	1	0	0	0	0	0	0	0	0	0	0	0	0	61.9	67.3	82.3	34.1	56.8	56.2
12/11/2012	23:00	96	95	1	0	0	0	0	0	0	0	0	0	0	0	0	0	64.8	67.7	77.5	41.5	58.1	57.6
13/11/2012	00:00	58	58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	61.6	71.6	86.8	44	58	56.5
13/11/2012	01:00	36	35	0	0	1	0	0	0	0	0	0	0	0	0	0	0	68.8	69.8	81.5	46.5	61.2	59
13/11/2012	02:00	15	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	64.1	68	70	47	57.1	58
13/11/2012	03:00	12	11	1	0	0	0	0	0	0	0	0	0	0	0	0	0	71.6	77.4	78.3	41.8	58.9	55.4
13/11/2012	04:00	16	15	0	0	0	0	0	0	0	1	0	0	0	0	0	0	77	77.4	79.6	49.2	61.6	58.7
13/11/2012	05:00	44	42	0	2	0	0	0	0	0	0	0	0	0	0	0	0	63	68	69.5	30.6	57.2	57.6
13/11/2012	06:00	190	178	0	11	0	0	0	0	0	1	0	0	0	0	0	0	65.5	70.2	80.5	45.4	59.4	58.7
13/11/2012	07:00	489	459	7	13	4	3	0	1	0	1	0	1	0	0	0	0	63.7	68.8	85.7	17.1	57.8	57.6
13/11/2012	08:00	623	596	4	16	1	2	0	1	0	3	0	0	0	0	0	0	61.9	65.9	85.1	30.8	55.8	56.2
13/11/2012	09:00	613	575	9	21	1	2	0	1	0	4	0	0	0	0	0	0	61.2	65.9	78.8	32.6	55.5	55.4
13/11/2012	10:00	347	318	2	18	5	0	1	1	0	2	0	0	0	0	0	0	61.9	66.6	75.1	36.1	55.4	55.1
13/11/2012	11:00	216	192	2	13	3	2	0	0	0	4	0	0	0	0	0	0	61.9	66.6	85.2	35.5	55.8	55.1
13/11/2012	12:00	265	234	5	14	3	3	2	0	0	4	0	0	0	0	0	0	60.5	65.9	83.2	35.6	54.9	55.1
13/11/2012	13:00	301	270	5	13	2	2	0	1	1	5	2	0	0	0	0	0	61.9	65.5	74.1	37.2	54.7	54.4
13/11/2012	14:00	344	316	4	13	3	4	1	0	0	1	1	1	0	0	0	0	62.3	67	84.1	23.3	55.6	55.1
13/11/2012	15:00	498	448	10	25	5	3	0	1	2	3	1	0	0	0	0	0	60.8	64.1	76.6	32	54.9	54.7
13/11/2012	16:00	699	661	4	24	2	3	0	1	0	3	1	0	0	0	0	0	60.5	64.4	89	34.6	54.6	54.4
13/11/2012	17:00	854	808	9	30	5	0	0	1	0	1	0	0	0	0	0	0	60.1	64.8	85	20.5	53.8	53.6
13/11/2012	18:00	838	816	3	18	1	0	0	0	0	0	0	0	0	0	0	0	59.8	64.1	96.2	27.7	53.8	53.6
13/11/2012	19:00	666	653	2	9	1	0	1	0	0	0	0	0	0	0	0	0	59.4	63	90.1	15.3	53.5	53.3
13/11/2012	20:00	344	331	4	8	0	1	0	0	0	0	0	0	0	0	0	0	62.3	68.4	105.7	29.4	56.1	55.4
13/11/2012	21:00	203	203	0	0	0	0	0	0	0	0	0	0	0	0	0	0	62.3	69.5	78.6	37.6	55.5	54.4
13/11/2012	22:00	168	164	1	2	0	0	1	0	0	0	0	0	0	0	0	0	64.1	70.9	103.8	39.7	57.3	56.2
13/11/2012	23:00	126	125	0	1	0	0	0	0	0	0	0	0	0	0	0	0	65.5	72.7	78.2	24.9	58.5	57.6
14/11/2012	00:00	60	58	0	1	0	0	0	1	0	0	0	0	0	0	0	0	63.4	68.4	79.6	44.2	58.1	57.2
14/11/2012	01:00	33	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	64.1	68	77.7	44.7	58.7	58.3
14/11/2012	02:00	14	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	64.4	64.4	70.1	48	59.8	58.3
14/11/2012	03:00	13	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	65.5	66.2	69.3	45.7	59.2	59.4
14/11/2012	04:00	13	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	62.6	64.1	66.6	46.5	58.2	58.3
14/11/2012	05:00	43	42	0	0	1	0	0	0	0	0	0	0	0	0	0	0	63.7	69.1	75.2	38	57.4	58
14/11/2012	06:00	200	187	0	13	0	0	0	0	0	0	0	0	0	0	0	0	64.8	72	79	43.7	59.1	58.3
14/11/2012	07:00	451	423	3	20	1	2	1	0	0	1	0	0	0	0	0	0	64.4	68.4	81	13.1	57.6	57.2
14/11/2012	08:00	664	631	5	19	3	2	0	0	1	3	0	0	0	0	0	0	60.8	64.8	83.3	19.5	54.8	55.1
14/11/2012	09:00	673	642	2	21	3	1	0	1	0	3	0	0	0	0	0	0	60.1	64.1	87.2	27.1	54.9	54.7
14/11/2012	10:00	376	343	1	18	3	2	0	0	0	7	1	1	0	0	0	0	60.5	64.8	82.6	29.4	54.7	54.4
14/11/2012	11:00	235	208	3	9	5	4	0	0	0	6	0	0	0	0	0	0	62.3	67	80	16.6	55.3	54.7
14/11/2012	12:00	239	208	4	13	4	4	1	0	0	5	0	0	0	0	0	0	61.9	66.6	81.1	36.5	54.9	55.1
14/11/2012	13:00	278	260	1	9	1	2	0	0	0	4	1	0	0	0	0	0	62.3	66.2	73.7	29.9	55.2	55.4
14/11/2012	14:00	289	252	2	18	1	3	1	0	2	9	1	0	0	0	0	0	61.9	67.7	80.5	32.6	54.7	54
14/11/2012	15:00	447	414	2	19	5	2	0	0	1	4	0	0	0	0	0	0	60.8	67	77.1	18.4	54.5	54.4
14/11/2012	16:00	738	699	3	21	4	5	0	0	1	5	0	0	0	0	0	0	58.3	62.6	80.1	23.4	53.4	53.3
14/11/2012	17:00	851	818	4	20	1	1	1	0	0	4	1	1	0	0	0	0	60.1	64.8	82.7	27.2	53.9	53.6
14/11/2012	18:00	903	883	6	14	0	0	0	0	0	0	0	0	0	0	0	0	60.1	64.8	77.4	34	54.3	54
14/11/2012	19:00	654	644	1	9	0	0	0	0	0	0	0	0	0	0	0	0	60.5	64.8	74.9	36.3	55.3	55.4
14/11/2012	20:00	303	289	0	14	0	0	0	0	0	0	0	0	0	0	0	0	61.6	65.2	79.7	25.5	55.4	55.4
14/11/2012	21:00	204	203	0	1	0	0	0	0	0	0	0	0	0	0	0	0	64.8	70.6	92.2	42.3	58.2	56.9
14/11/2012	22:00	197	194	0	2	0	0	0	1	0	0	0	0	0	0	0	0	63	69.1	94	41.1	56.5	55.8
14/11/2012	23:00	150	150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	62.3	68.4	90.8	43.8	57.4	56.5

ANNEXURE B: TYPICAL WEEKDAY TRAFFIC FLOW PROFILE
(*Source: ROAD DELAY SOLUTIONS*) (Page 1 of 2)

Figure 1 below shows that the highest numbers of Sydney Metropolitan residents, using motorised modes, travel around 8:30am, 3:30pm and 5:30pm on an average weekday in 2012. During these periods, the increase in demand in terms of additional travellers was also the highest.

In annual percentage terms, the growth was 2.4% per year around the 8:30am period, 1.8% in the 3:30pm period and 2.3% in the 5:30pm period. These rates all exceeded the average annual increase in population of 1.2% between 1991 and 2004.

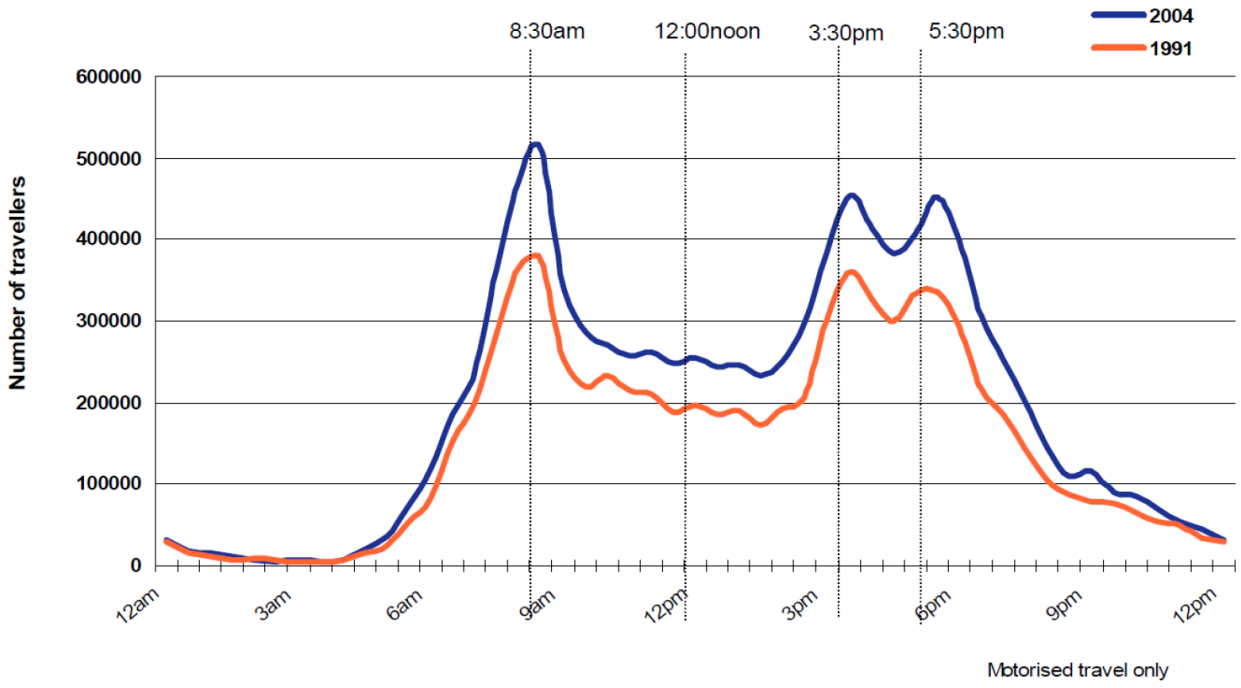


Figure 1 **Number of travellers in motorised modes by time of day, average weekday**

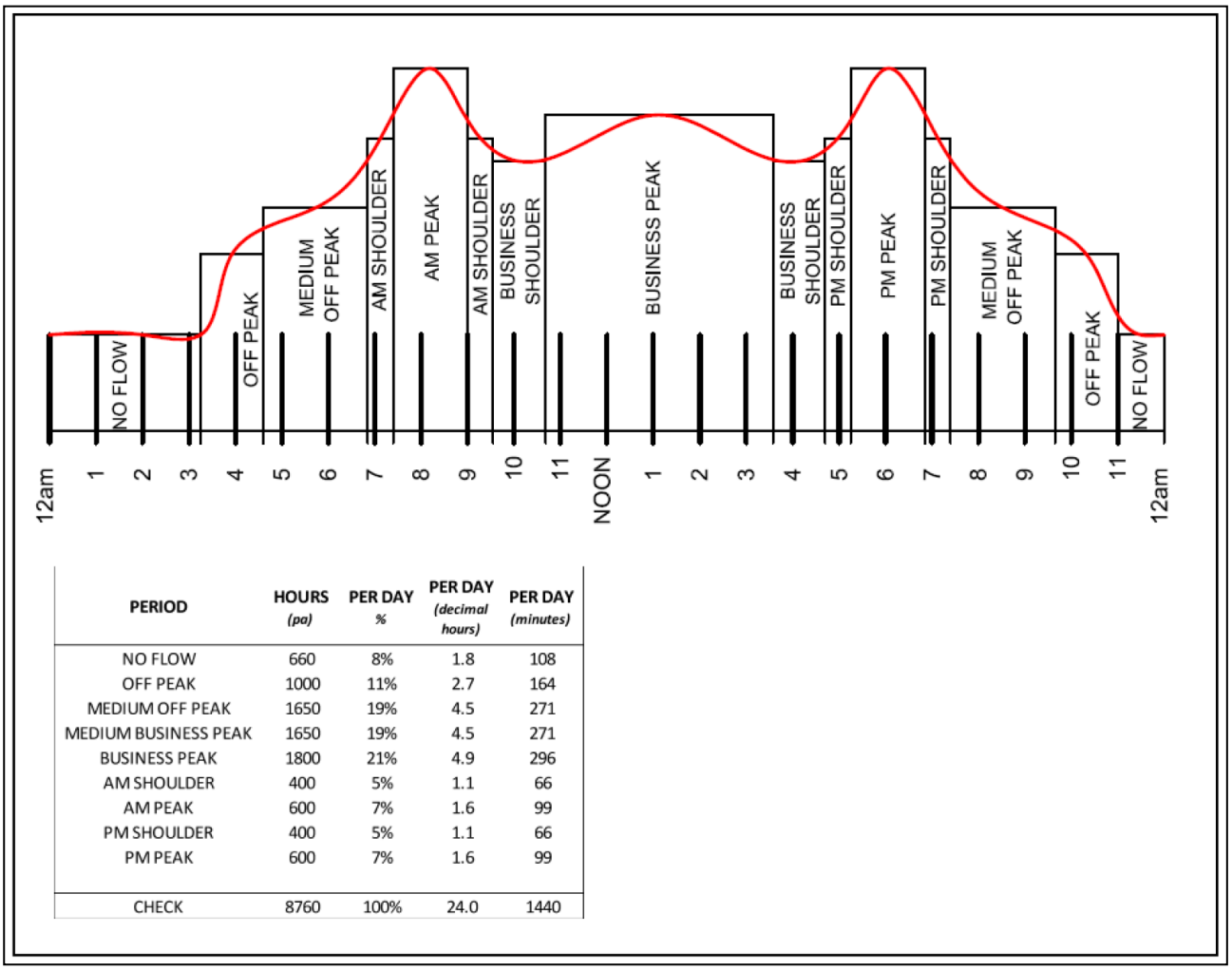
Source *Bureau of Transport Statistics (BTS), 29th Australasian Transport Research Forum*

There is also evidence of peak spreading in response to the increase in demand (Figure 1). In 1991, the periods when demand exceeded 300,000 travellers occurred between 8 to 9am and 3 to 6pm. In 2004, demand was at least at this level for longer periods, 7:30 to 9:30 in the morning and 2:30 to 7:00 in the afternoon.

Historically, the peak periods have remained relatively constant over time and are shown in Figure 2.

ANNEXURE B: TYPICAL WEEKDAY TRAFFIC FLOW PROFILE

(*Source: ROAD DELAY SOLUTIONS*) (Page 2 of 2)



PERIOD	HOURS *(pa)*	PER DAY *%*	PER DAY *(decimal hours)*	PER DAY *(minutes)*
NO FLOW	660	8%	1.8	108
OFF PEAK	1000	11%	2.7	164
MEDIUM OFF PEAK	1650	19%	4.5	271
MEDIUM BUSINESS PEAK	1650	19%	4.5	271
BUSINESS PEAK	1800	21%	4.9	296
AM SHOULDER	400	5%	1.1	66
AM PEAK	600	7%	1.6	99
PM SHOULDER	400	5%	1.1	66
PM PEAK	600	7%	1.6	99
CHECK	8760	100%	24.0	1440

ANNEXURE C: CALCULATION OF NON-PEAK TRAFFIC FLOW AS A PROPORTION OF THE AVERAGE OF THE COMMUTER PEAK HOURS

Figure 1 below shows that the highest numbers of Sydney Metropolitan residents, using motorised modes, travel around 8:30am, 3:30pm and 5:30pm on an average weekday in 2012. During these periods, the increase in demand in terms of additional travellers was also the highest.

In annual percentage terms, the growth was 2.4% per year around the 8:30am period, 1.8% in the 3:30pm period and 2.3% in the 5:30pm period. These rates all exceeded the average annual increase in population of 1.2% between 1991 and 2004.

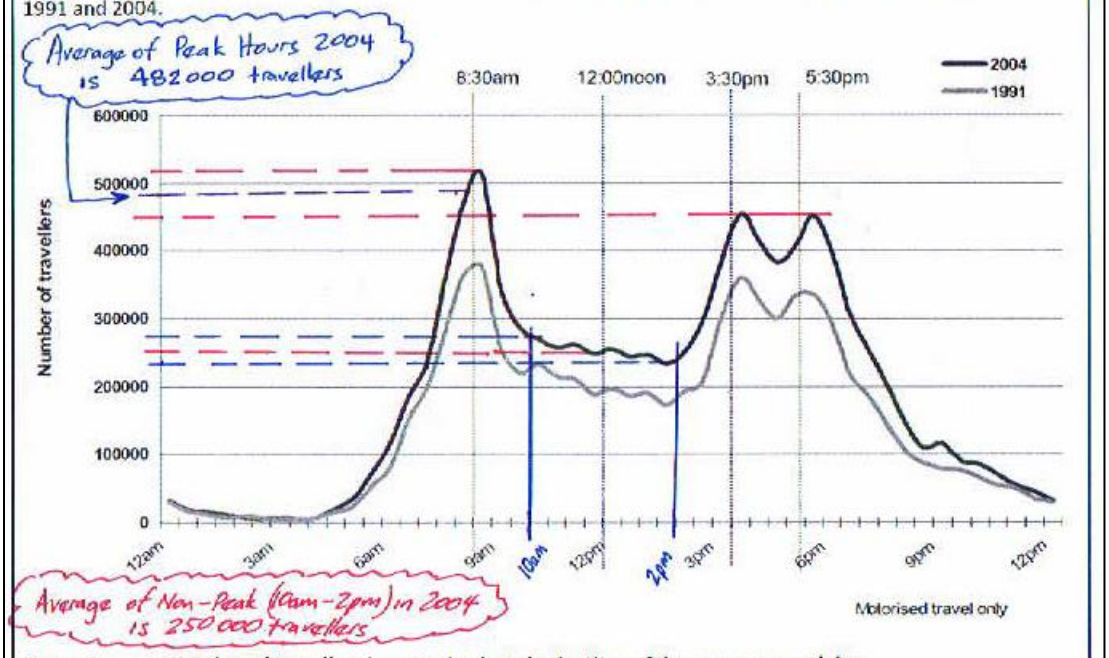


Figure 1 **Number of travellers in motorised modes by time of day, average weekday**

Source *Bureau of Transport Statistics (BTS), 29th Australasian Transport Research Forum*

There is also evidence of peak spreading in response to the increase in demand (Figure 1). In 1991, the periods when demand exceeded 300,000 travellers occurred between 8 to 9am and 3 to 6pm. In 2004, demand was at least at this level for longer periods, 7:30 to 9:30 in the morning and 2:30 to 7:00 in the afternoon.

Historically, the peak periods have remained relatively constant over time and are shown in Figure 2.

ANNEXURE D: NOTICE OF DATE OF 5 TONNE LOAD LIMIT INSTALLATION

BRICKMAKERS DRIVE, MOOREBANK – 5 TONNE LOAD LIMIT In accordance with Section 115 of the Roads Act 1993, notice is hereby given that following concurrence of the Roads and Maritime Services and the NSW Police, Council imposed a five (5) Tonne Load Limit along the full length of Brickmakers Drive, between Newbridge Road and Nuwarra Road, Moorebank commencing 19 August 2013.

The purpose of the load limit restriction is to prevent pavement damage caused by heavy vehicles with a gross weight in excess of five (5) tonnes and to maintain residential amenity.

Heavy vehicles with an origin or destination along Brickmakers Drive are exempt from this restriction.
An alternate route is available via Newbridge Road and Nuwarra Road.

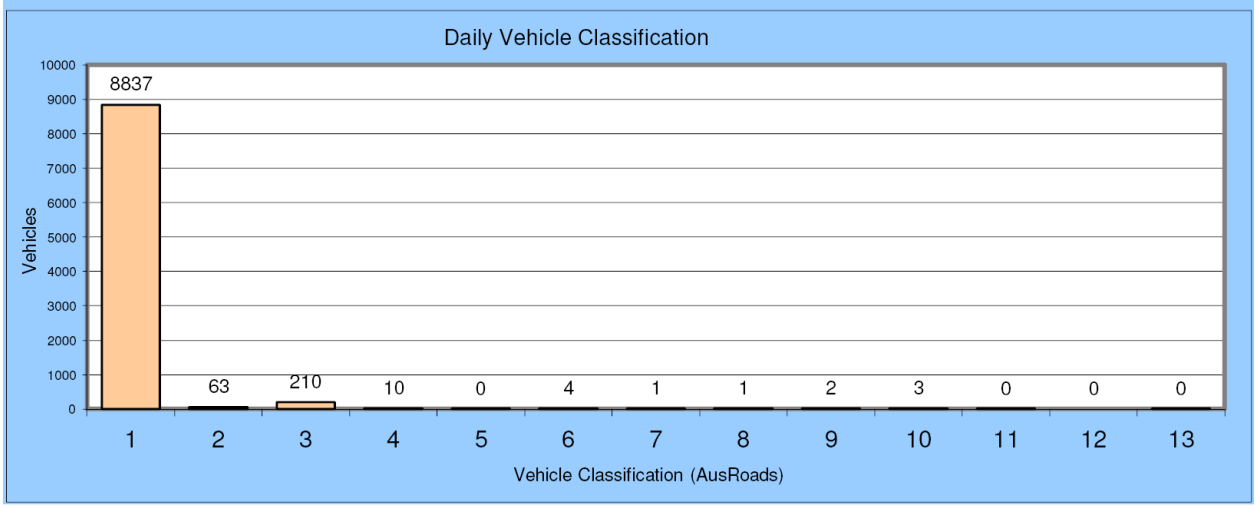
For any further information, please contact Charles Wiafe, Manager Traffic and Transport on 9821 9122

ANNEXURE E: OCTOBER 2013 TRAFFIC COUNTS (Sheet 1 of 3)

austraffic
TRAFFIC & TRANSPORT DATA SPECIALISTS

Road	Brickmakers Drive		AADT	9,132	
Location	Between 4S and Roundabout to the North		Ave Speed	54.5	
Site No.	1		85%ile	61	
Direction	Combined		% Heavy's	2.5%	
Day	Weekday Average		AM Peak	7:00	711
Date	Week Day Ave		PM Peak	16:00	841
Start Date	Friday	11/10/2013			

Time	Vehicle Classification													Hour	Speed	
Starting	1	2	3	4	5	6	7	8	9	10	11	12	13	Total	Ave.	85%ile
0:00	44	0	0	0	0	0	0	0	0	0	0	0	0	44	59.1	66
1:00	22	0	0	0	0	0	0	0	0	0	0	0	0	23	59.9	71
2:00	16	0	0	0	0	0	0	0	0	0	0	0	0	16	59.7	69
3:00	25	0	0	0	0	0	0	0	0	0	0	0	0	25	59.4	68
4:00	42	0	0	0	0	0	0	0	0	0	0	0	0	43	58.5	67
5:00	245	2	5	0	0	0	0	0	0	0	0	0	0	253	56.4	63
6:00	519	4	11	0	0	0	0	0	0	0	0	0	0	535	55.6	62
7:00	691	4	14	1	0	0	0	0	0	1	0	0	0	711	54.3	60
8:00	682	5	14	1	0	0	0	0	0	1	0	0	0	703	53.2	59
9:00	422	4	17	3	0	1	0	0	0	0	0	0	0	446	54.0	60
10:00	304	2	15	1	0	0	0	0	0	1	0	0	0	323	54.4	61
11:00	314	4	17	1	0	0	0	0	0	0	0	0	0	336	54.6	61
12:00	341	4	14	0	0	0	0	0	0	0	0	0	0	361	55.3	62
13:00	405	5	17	0	0	0	0	0	0	0	0	0	0	428	55.6	62
14:00	592	5	17	1	0	0	0	0	0	0	0	0	0	616	55.2	61
15:00	786	5	19	1	0	1	0	0	1	0	0	0	0	814	52.6	60
16:00	812	8	20	0	0	0	0	0	0	0	0	0	0	841	54.0	61
17:00	731	4	10	0	0	0	0	0	0	0	0	0	0	745	52.6	61
18:00	651	3	10	0	0	0	0	0	0	0	0	0	0	665	55.7	62
19:00	418	1	6	0	0	0	0	0	0	0	0	0	0	425	55.2	61
20:00	258	1	2	0	0	0	0	0	0	0	0	0	0	260	55.5	61
21:00	232	0	0	0	0	0	0	0	0	0	0	0	0	233	55.6	62
22:00	172	0	1	0	0	0	0	0	0	0	0	0	0	173	56.3	62
23:00	114	1	0	0	0	0	0	0	0	0	0	0	0	115	55.7	62
Total	8837	63	210	10	0	4	1	1	2	3	0	0	0	9132	54.5	61
%Class	97	1	2	0	0	0	0	0	0	0	0	0	0			

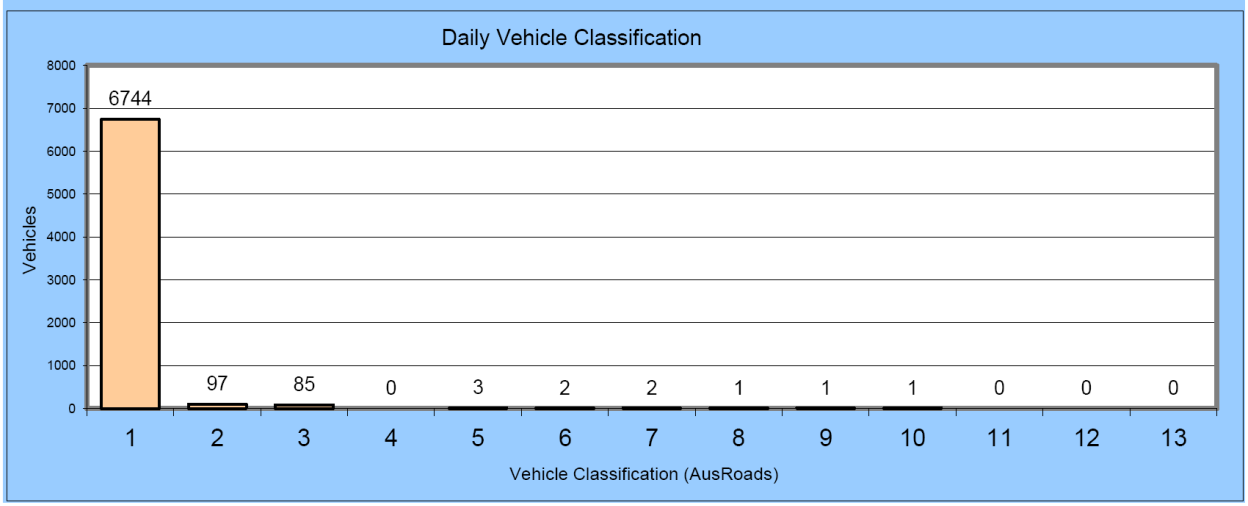


ANNEXURE E: OCTOBER 2013 TRAFFIC COUNTS (Sheet 2 of 3)

austraffic
TRAFFIC & TRANSPORT DATA SPECIALISTS

Road	Brickmakers Drive		AADT	6,936	
Location	Between 4S and Roundabout to the North		Ave Speed	55.4	
Site No.	1		85%ile	62	
Direction	Combined		% Heavy's	1.4%	
Day	Saturday		AM Peak	11:00	519
Date	12/10/2013		PM Peak	12:00	547
Start Date	Friday	11/10/2013			

Time	Vehicle Classification													Hour	Speed	
Starting	1	2	3	4	5	6	7	8	9	10	11	12	13	Total	Ave.	85%ile
0:00	107	0	0	0	0	0	0	0	0	0	0	0	0	107	57.3	64
1:00	52	0	0	0	0	0	0	0	0	0	0	0	0	52	58.7	67
2:00	37	0	0	0	0	0	0	0	0	0	0	0	0	37	57.7	65
3:00	24	0	0	0	0	0	0	0	0	0	0	0	0	24	54.5	61
4:00	31	0	0	0	0	0	0	0	0	0	0	0	0	31	58.0	65
5:00	118	0	3	0	0	0	0	0	0	0	0	0	0	121	57.1	65
6:00	161	0	6	0	0	0	0	0	0	0	0	0	0	167	57.1	65
7:00	246	2	5	0	0	0	0	0	0	0	0	0	0	253	55.5	62
8:00	344	11	5	0	2	0	1	0	0	0	0	0	0	363	55.7	62
9:00	440	6	8	0	0	0	0	0	0	0	0	0	0	454	54.6	60
10:00	427	9	7	0	0	0	1	1	0	0	0	0	0	445	54.1	61
11:00	502	6	8	0	0	1	0	0	1	1	0	0	0	519	54.8	61
12:00	532	8	7	0	0	0	0	0	0	0	0	0	0	547	55.6	62
13:00	475	12	4	0	1	0	0	0	0	0	0	0	0	492	55.3	62
14:00	439	13	6	0	0	0	0	0	0	0	0	0	0	458	55.8	62
15:00	510	6	7	0	0	1	0	0	0	0	0	0	0	524	55.1	61
16:00	439	12	5	0	0	0	0	0	0	0	0	0	0	456	56.3	63
17:00	423	4	4	0	0	0	0	0	0	0	0	0	0	431	55.8	62
18:00	424	4	4	0	0	0	0	0	0	0	0	0	0	432	55.3	61
19:00	269	2	1	0	0	0	0	0	0	0	0	0	0	272	54.9	62
20:00	206	0	1	0	0	0	0	0	0	0	0	0	0	207	55.2	62
21:00	190	2	1	0	0	0	0	0	0	0	0	0	0	193	55.5	61
22:00	186	0	3	0	0	0	0	0	0	0	0	0	0	189	54.5	61
23:00	162	0	0	0	0	0	0	0	0	0	0	0	0	162	55.3	62
Total	6744	97	85	0	3	2	2	1	1	1	0	0	0	6936	55.4	62
%Class	97	1	1	0	0	0	0	0	0	0	0	0	0			

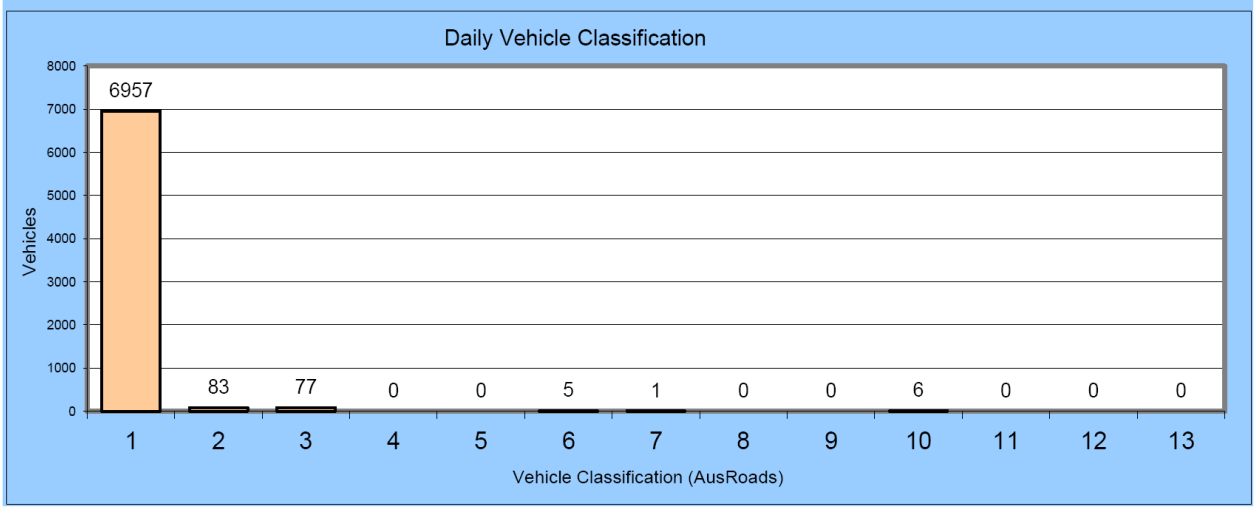


ANNEXURE E: OCTOBER 2013 TRAFFIC COUNTS (Sheet 3 of 3)

austraffic
TRAFFIC & TRANSPORT DATA SPECIALISTS

Road	Brickmakers Drive		AADT	7,129	
Location	Between 4S and Roundabout to the North		Ave Speed	55.4	
Site No.	1		85%ile	62	
Direction	Combined		% Heavy's	1.2%	
Day	Saturday		AM Peak	11:00	521
Date	19/10/2013		PM Peak	12:00	542
Start Date	Friday	18/10/2013			

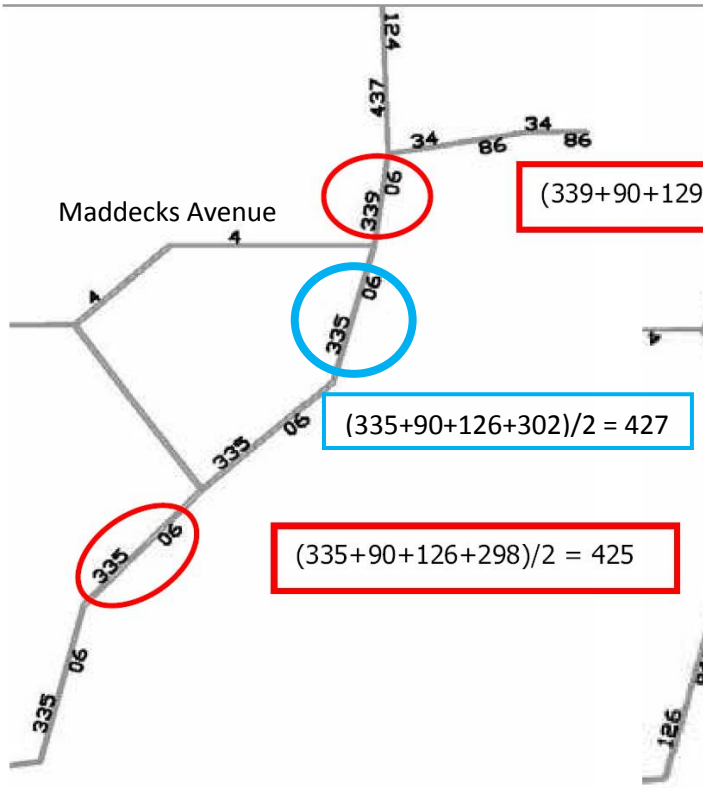
Time	Vehicle Classification													Hour	Speed	
Starting	1	2	3	4	5	6	7	8	9	10	11	12	13	Total	Ave.	85%ile
0:00	100	1	2	0	0	0	0	0	0	0	0	0	0	103	57.2	63
1:00	58	0	0	0	0	0	0	0	0	0	0	0	0	58	59.4	67
2:00	44	0	0	0	0	0	0	0	0	0	0	0	0	44	62.9	71
3:00	31	0	1	0	0	0	0	0	0	0	0	0	0	32	57.2	64
4:00	32	0	0	0	0	0	0	0	0	0	0	0	0	32	62.8	70
5:00	95	0	1	0	0	0	0	0	0	0	0	0	0	96	58.2	67
6:00	174	2	2	0	0	0	0	0	0	0	0	0	0	178	57.5	65
7:00	237	1	6	0	0	1	0	0	0	1	0	0	0	246	56.7	64
8:00	327	7	2	0	0	0	0	0	0	1	0	0	0	337	56.2	63
9:00	399	8	4	0	0	0	0	0	0	1	0	0	0	412	54.9	62
10:00	473	8	2	0	0	0	0	0	0	1	0	0	0	484	54.2	61
11:00	506	5	9	0	0	0	0	0	0	1	0	0	0	521	54.5	59
12:00	525	8	6	0	0	1	1	0	0	1	0	0	0	542	54.3	61
13:00	474	5	5	0	0	0	0	0	0	0	0	0	0	484	55.4	61
14:00	495	7	8	0	0	1	0	0	0	0	0	0	0	511	54.8	61
15:00	497	7	3	0	0	0	0	0	0	0	0	0	0	507	55.1	61
16:00	468	7	10	0	0	1	0	0	0	0	0	0	0	486	55.5	62
17:00	437	5	3	0	0	0	0	0	0	0	0	0	0	445	55.8	63
18:00	423	5	7	0	0	1	0	0	0	0	0	0	0	436	55.4	62
19:00	348	4	3	0	0	0	0	0	0	0	0	0	0	355	54.6	61
20:00	216	0	0	0	0	0	0	0	0	0	0	0	0	216	55.8	63
21:00	208	3	2	0	0	0	0	0	0	0	0	0	0	213	53.6	61
22:00	213	0	1	0	0	0	0	0	0	0	0	0	0	214	55.2	62
23:00	177	0	0	0	0	0	0	0	0	0	0	0	0	177	56.3	63
Total	6957	83	77	0	0	5	1	0	0	6	0	0	0	7129	55.4	62
%Class	98	1	1	0	0	0	0	0	0	0	0	0	0			



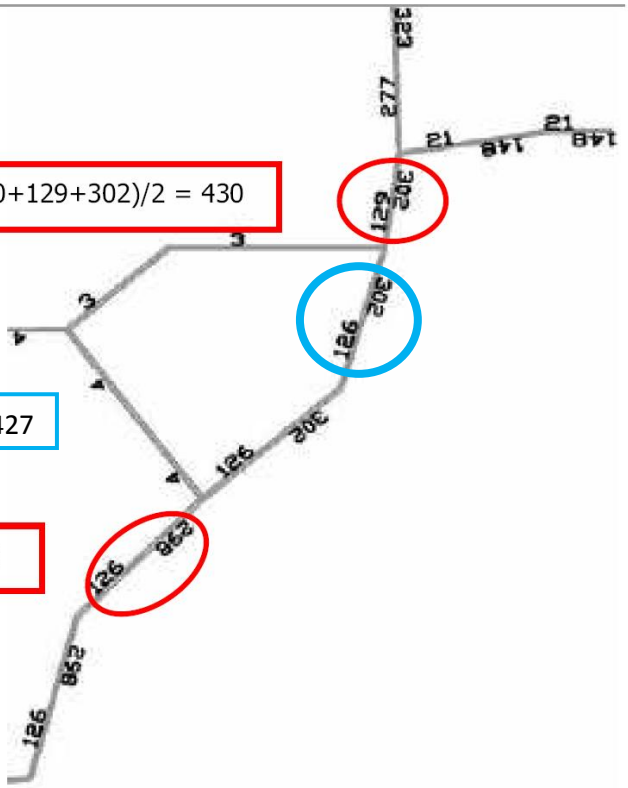
ANNEXURE F: FORECAST 2021 AM & PM COMMUTER PEAK HOUR PROJECTIONS

Table 1 Road Delay Solutions – Extracted Parts of Figures 11,12,13 & 14

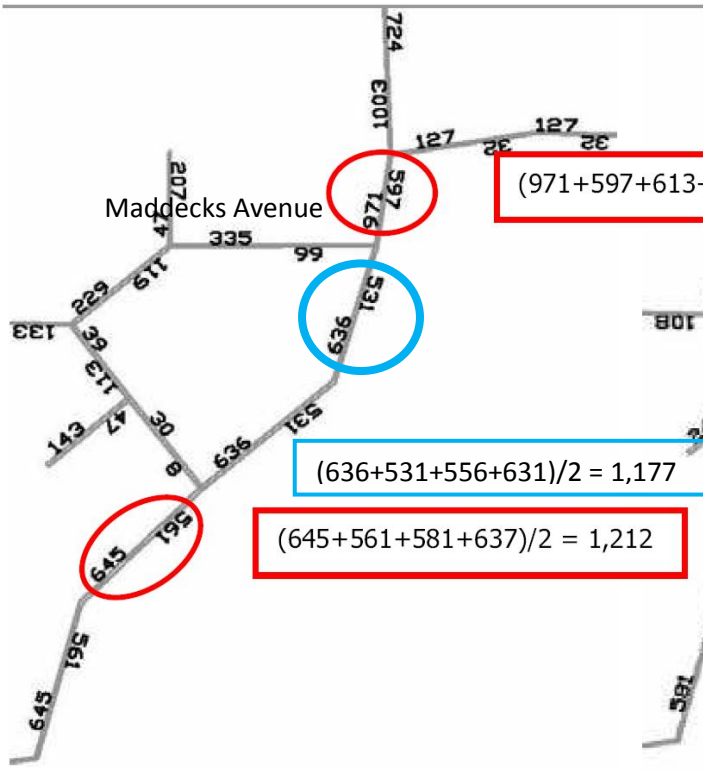
Morning peak hour volumes 2011



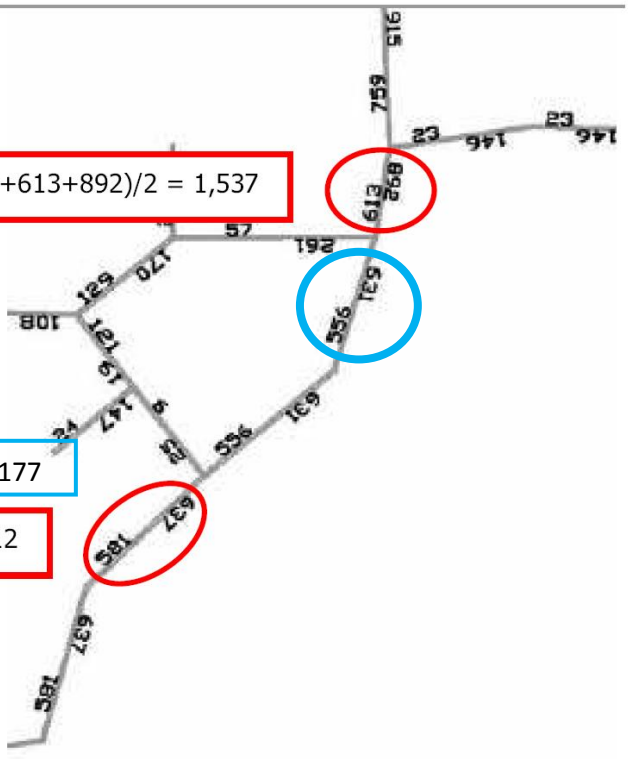
Evening peak hour volumes 2011



Morning peak hour volumes 2021



Evening peak hour volumes 2021



M^CLAREN TRAFFIC ENGINEERING

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Division of RAMTRANS Australia ABN: 45067491678

Transport Planning, Traffic Impact Assessments, Road Safety Audits, Expert Witness

14 March 2014
Ref: 2013/060.F01A.CM/hc

Nexus Environmental Planning Pty Ltd
PO Box 212
CONCORD NSW 2137

Attention: Mr Neil Kennan
Dear Neil,

MOOREBANK RECYCLING FACILITY – BACKGROUND TRAFFIC VOLUMES

Reference is made to your request to provide a robust reasoning as to why, from a traffic engineering perspective, the conclusion drawn by Mr Neil Gross to use a figure of 600 vehicles per hour as the daytime (occurring between 10.00am to 2.00pm) traffic volume for background noise evaluation is appropriate.

The undersigned has discussed this matter at length with Mr Glen Varley from Road Delay Solutions (RDS) and attaches in **Annexure A** the advice received.

The RDS clearly states that the projections for the daytime adopted a *"regulated speed of 50km/hr, three (3) strategically located traffic calming devices and a 5 tonne weight limit."* Further, the RMS Table 10 derives from the *RMS Economic Analysis Manual*, Appendix B, page 2, 2009.

It is concluded that the methodology adopted by Wilkinson Murray (29 October 2013 & 14 March 2014 letters) in deriving the non peak hour flows from the RDS modelled peak commuter period projections complies with current modelling practice as outlined in the *RMS Economic Analysis Manual.* The 600 vehicles per hour is derived for the northern end of Brickmakers Drive by applying the surveyed October 2013 non peak daytime proportion (i.e. 42%) of the average of the peak hours as calculated in the Wilkinson Murray assessment.

Please contact the undersigned should you require further information or assistance.
Yours faithfully
M^CLAREN TRAFFIC ENGINEERING

Craig M^CLaren
Director
BE Civil. Graduate Diploma (Transport Eng) MAITPM MITE [1985]
RMS Accredited Level 3 Road Safety Auditor
RMS Accredited Traffic Control Planner, Auditor & Certifier (Orange Card)

ANNEXURE A: ROAD DELAY SOLUTIONS ADVICE (Page 1 of 6)

ROAD DELAY SOLUTIONS

Traffic and Transport Modelling

Our Reference: 20100097
Date: Wednesday, 26 February 2014

memorandum

Attention: Craig McLaren, *MTE*

GEORGES FAIR, MOOREBANK
STRATEGIC MODELLING

Road Delay Solutions have been approached by McLaren Traffic Engineering with regard to the method for estimating traffic flows during the shoulder, business and off peak hours of operation on the Sydney Metropolitan road network.

The RMS *Economic Analysis Manual*, 2009, prescribes the use and application of various parameters in traffic modelling to facilitate the economic evaluation of road based infrastructure.

Brickmakers Drive has been modelled as a flow restricted corridor with a regulated speed of 50km/hr, three (3) strategically located traffic calming devices and a 5 tonne weight limit. Nuwarra Road, a classified main road, was modelled as the preferred heavy vehicle corridor between Newbridge Road and Heathcote Road. The projected modelling volumes will in fact be slightly lower than estimated given that heavy vehicles (HV) currently use Brickmakers Drive which were excluded from the corridor during modelling.

Traffic counts were collected by Liverpool City Council in November, 2012 (*see attached*) detailing the current traffic volume and degree of light commercial vehicle (LCV) and heavy vehicles (HV) activity on Brickmakers Drive. The traffic counts indicate a peak flow factor of x12 in estimating the AADT. When applied, the projected AADT in 2011 would be in the order of 5,100 and in 2021, 14,400 as shown in *Figure 1*.

ROAD DELAY SOLUTIONS PTY LTD G64/79-91 Macpherson Street WARRIEWOOD NSW 2102 AUSTRALIA
☎ 0414 800 912 gvarley@bigpond.com
A.B.N. 40 127 220964

ANNEXURE A: ROAD DELAY SOLUTIONS ADVICE (Page 2 of 6)

ECONOMIC PARAMETERS FOR 2009

TABLE 10
URBAN – AVERAGE HOURLY VALUE FOR TRAVEL TIME, SEPTEMBER 2009

Period	Time + Freight Value ($) per Vehicle (1)	Default Yearly Hours (2)	Proportion of Peak Hourly Volume * (3)
No flow	0	660	0.00
Off Peak	23.28	1000	0.11
Medium Off Peak	23.28	1650	0.28
Medium Business Peak	28.57	1650	0.53
Business Peak	28.57	1800	0.70
AM Peak Shoulder	18.33	400	0.75
AM Peak	18.33	600	1.00
PM Peak Shoulder	18.33	400	0.75
PM Peak	18.33	600	1.00
		8760	

* Expressed as a fraction of the average of AM and PM peak hour flows.

Average Hourly Value = Annual travel time cost / total vehicle hours for time cost per vehicle
= sum [(1)* (2) * (3)] / sum [(2) * (3)]
= $23.81 per vehicle hour in September 2009

Source: Estimated from Tables 7-9, default yearly hours and proportion of peak hourly traffic volume.

Table 10
Source: *RMS Economic Analysis Manual, Appendix B, page 10, 2009*

The following graph presents a comparison between the modelled projections and the actual counts, undertaken by Council in 2012.

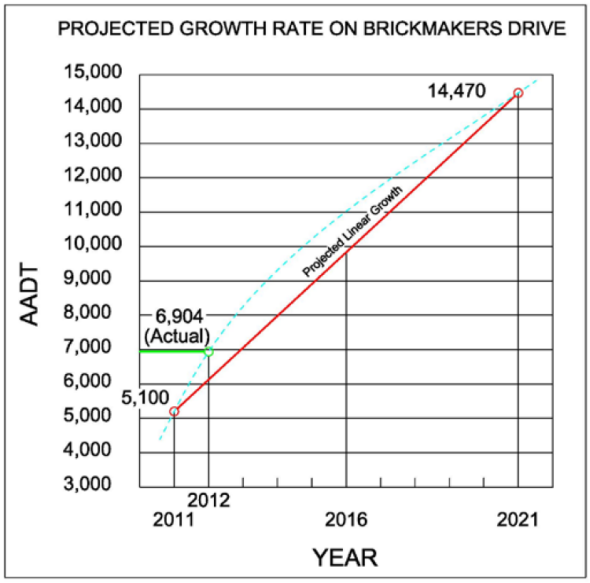


Figure 1
Source: *Road Delay Solutions, 2014*

ANNEXURE A: ROAD DELAY SOLUTIONS ADVICE (Page 3 of 6)

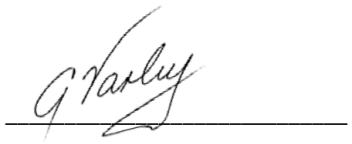
ROAD DELAY SOLUTIONS

Traffic and Transport Modelling

The BTS prescribe that HV movements in Sydney are forecast to increase by 2.2% per annum between 2006 and 2036, faster than LCV trips which are predicted to grow by 1.1% per year.

It is concluded that the methodology, adopted by Wilkinson Murray, in deriving the non peak hour flows from the modelled peak commuter period projections, published in the *Road Delay Solutions* report, complies with current modelling practice as outlined in the RMS *Economic Analysis Manual, Appendix B, page 2, 2009*, as prescribed in the above extract (*Table 10*).

Should you require clarification of any aspect, pertaining to this document, please contact Glen Varley on mobile 0414 800 912.



Glen Varley
Director - Traffic and Transport
Road Delay Solutions Pty Ltd

//Attached

ANNEXURE A: ROAD DELAY SOLUTIONS ADVICE (Page 4 of 6)

ROAD DELAY SOLUTIONS

Traffic and Transport Modelling

TRAFFIC COUNTS – NOVEMBER 2012

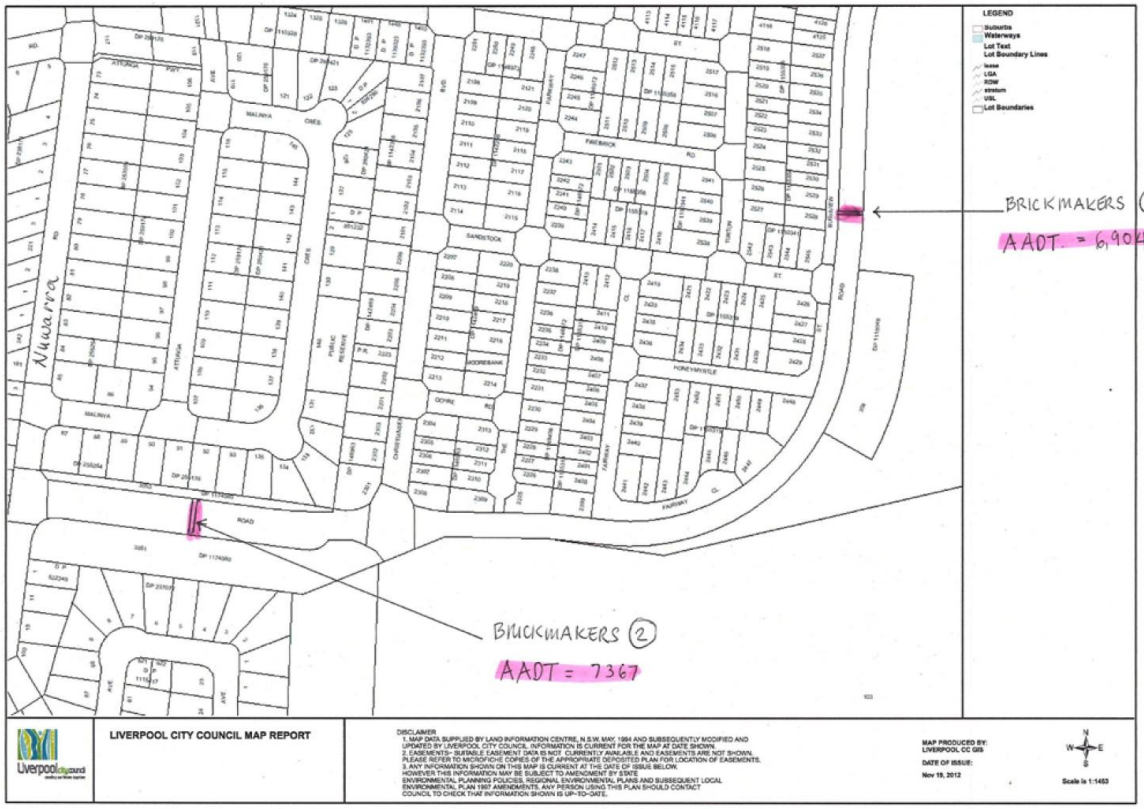


Figure 2 **Count Locations**
Source: *Liverpool City Council, 2012*

ANNEXURE A: ROAD DELAY SOLUTIONS ADVICE (Page 5 of 6)

ROAD DELAY SOLUTIONS

Traffic and Transport Modelling

Site OPPOSITE H#8 BUSHVIEW LANE — Street Index BRICKMAKERS 1 — Block Index BETWE — File unts_2012\BRICKMAKERS 115Nov2012
Created by MetroCount Traffic Executive — Copyright (c)1997 - 2005 MetroCount — Version 3.16.12856.0
File Name G:\Asset_Systems\Databases\Traffic\Counts_2012\BRICKMAKERS 115Nov2012.EC0 — **Creation Time** 2012-11-19T21:00:21
Direction Text 8 - East bound A>B, West bound B>A. — **Direction** East West — **Lane** 0
Setup Time 2012-11-07T11:47:45 — **Operator** AA — **Class Scheme** AustRoads94 — **AADT**
Start Time 2012-11-07T11:47:45 — **Filter Start** 2012-11-08T00:00:00 — Speed Range 0 to 200 — **6904**
Finish Time 2012-11-15T11:22:45 — **Filter End** 2012-11-15T00:00:00

Daily Summary

Date	Day	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12	Cls 13	V 85 %	V 95 %	Vmax	Vmin	Mean	V 50%
08/11/2012	Thu	7675	7298	43	236	28	26	8	5	1	27	2	0	0	1	61.2	65.9	96.3	7.1	54	54.4
09/11/2012	Fri	7162	6825	66	220	18	17	0	0	2	11	1	0	0	21	61.2	65.5	104	8.5	55.2	55.1
10/11/2012	Sat	5371	5193	62	83	13	6	1	1	1	10	1	0	0	0	61.9	67.3	103.5	18.7	55.5	55.1
11/11/2012	Sun	4440	4351	38	41	1	6	0	1	0	2	0	0	0	0	61.9	67	103.9	13.7	55.5	55.1
12/11/2012	Mon	7688	7275	70	233	42	26	4	2	5	25	2	2	0	2	61.9	67	103.4	10.9	55.9	55.4
13/11/2012	Tue	7965	7523	72	251	37	25	6	8	4	32	5	2	0	0	61.6	66.2	105.7	15.3	55.3	55.1
14/11/2012	Wed	8028	7621	37	241	32	28	4	3	5	51	4	2	0	0	61.2	66.2	94	13.1	55.1	54.7

Weekly Summary	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12	Cls 13	V 85 %	V 95 %	Vmax	Vmin	Mean	V 50%
7 Day Totals	48329	46086	388	1305	171	134	23	20	18	158	15	6	0	5	61.6	66.2	105.7	7.1	55.2	55.1
7 Day Average	6904.1	6583.7	55.429	186.43	24.429	19.143	3.2857	2.8571	2.5714	22.571	2.1429	0.8571	0	0.7143						

Hourly Data

Date	Time	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12	Cls 13	V 85 %	V 95 %	Vmax	Vmin	Mean	V 50%
08/11/2012	00:00	66	66	0	0	0	0	0	0	0	0	0	0	0	0	66.2	76.7	81	19.5	59.5	58.7
08/11/2012	01:00	22	22	0	0	0	0	0	0	0	0	0	0	0	0	62.3	68	73.4	43.2	56.8	56.9
08/11/2012	02:00	11	11	0	0	0	0	0	0	0	0	0	0	0	0	62.6	67.3	68.1	47.3	59.3	60.1
08/11/2012	03:00	10	10	0	0	0	0	0	0	0	0	0	0	0	0	-	-	79.6	32.1	56.9	-
08/11/2012	04:00	17	16	0	1	0	0	0	0	0	0	0	0	0	0	62.6	72	81.1	28.4	55.4	53.3
08/11/2012	05:00	40	38	0	1	0	1	0	0	0	0	0	0	0	0	64.4	69.8	72.5	41.9	57.7	57.2
08/11/2012	06:00	199	185	0	12	1	0	0	0	0	1	0	0	0	0	64.4	67.3	77.7	28.9	58.1	58
08/11/2012	07:00	460	440	2	14	0	2	1	0	0	1	0	0	0	0	64.1	68.8	77.5	39.3	58	57.6
08/11/2012	08:00	621	589	2	22	2	4	0	0	0	2	0	0	0	0	61.9	65.9	79.9	31.2	56.2	56.2
08/11/2012	09:00	654	623	5	22	0	2	1	0	0	1	0	0	0	0	61.2	65.9	93.3	14.9	55.1	54.7
08/11/2012	10:00	318	296	0	14	1	1	2	1	0	3	0	0	0	0	62.6	67.3	80.6	28.5	55.8	55.4
08/11/2012	11:00	246	220	2	17	2	3	0	0	0	1	1	0	0	0	61.6	67.7	96.3	39.3	56	55.1
08/11/2012	12:00	249	225	4	13	3	1	0	2	0	1	0	0	0	0	62.3	68	82.4	38.7	55.5	55.1
08/11/2012	13:00	271	245	5	17	2	1	0	0	0	1	0	0	0	0	61.9	65.9	76.1	40	56.3	56.2
08/11/2012	14:00	291	270	2	15	3	2	0	0	1	3	1	0	0	0	61.9	66.2	83.6	19.7	55.5	55.1
08/11/2012	15:00	456	418	8	22	4	3	1	0	0	2	0	0	0	0	60.8	65.2	78.1	40.3	55.1	54.7
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08/11/2012	22:00	199	196	0	1	0	0	0	0	0	2	0	0	0	0	62.3	67.3	75.4	38.8	56.4	56.5
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09/11/2012	05:00	37	37	0	0	0	0	0	0	0	0	0	0	0	0	63	65.9	70.1	36.5	57.3	58
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09/11/2012	12:00	5	3	0	2	0	0	0	0	0	0	0	0	0	0	-	-	59.5	43.1	51.9	-
09/11/2012	13:00	66	58	0	5	0	1	0	0	0	2	0	0	0	0	60.1	66.2	68.3	27.8	54.4	55.1
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09/11/2012	15:00	488	447	9	29	2	0	0	0	0	0	1	0	0	0	60.8	64.1	76.7	39.2	54.9	54.4
09/11/2012	16:00	749	711	9	23	2	2	0	0	0	2	0	0	0	0	60.5	64.4	82.3	32	54.5	54.4
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09/11/2012	18:00	824	798	9	13	0	1	0	0	0	3	0	0	0	0	61.2	64.8	79.3	22.9	55.7	55.4
09/11/2012	19:00	686	666	4	15	0	0	0	0	0	1	0	0	0	0	61.2	64.8	75.8	32.7	56.1	55.8
09/11/2012	20:00	410	402	1	6	1	0	0	0	0	0	0	0	0	0	61.6	67	84	34	55.7	55.1
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09/11/2012	22:00	208	207	0	1	0	0	0	0	0	0	0	0	0	0	62.3	67.7	100.6	18.2	56.1	55.4
09/11/2012	23:00	154	150	0	4	0	0	0	0	0	0	0	0	0	0	62.6	67.7	79.1	41.3	55.9	55.1
10/11/2012	00:00	138	134	0	4	0	0	0	0	0	0	0	0	0	0	61.6	67.7	84.2	32.2	56.2	55.8
10/11/2012	01:00	76	76	0	2	0	0	0	0	0	0	0	0	0	0	65.9	70.9	80.6	45.4	58.3	57.2
10/11/2012	02:00	29	28	0	1	0	0	0	0	0	0	0	0	0	0	70.2	87.1	90.2	47.4	60.8	59
10/11/2012	03:00	24	23	0	1	0	0	0	0	0	0	0	0	0	0	64.4	66.2	76.5	26.5	56.6	56.5
10/11/2012	04:00	19	18	1	0	0	0	0	0	0	0	0	0	0	0	64.8	68.4	69.7	44.6	57.6	57.6
10/11/2012	05:00	24	24	0	0	0	0	0	0	0	0	0	0	0	0	69.1	74.2	74.5	45.8	59	58.3
10/11/2012	06:00	82	80	0	2	0	0	0	0	0	0	0	0	0	0	70.6	76	86.6	43.8	61.6	59.8
10/11/2012	07:00	111	105	1	3	1	1	0	0	0	0	0	0	0	0	65.9	70.6	89	18.7	57.9	56.9
10/11/2012	08:00	204	194	2	4	3	1	0	0	0	0	0	0	0	0	64.1	72	86.4	41.4	57.7	56.9
10/11/2012	09:00	281	268	3	7	2	0	0	0	0	1	0	0	0	0	63.4	68.8	74.7	42	57.1	56.2
10/11/2012	10:00	330	314	5	4	3	0	1	0	0	2	1	0	0	0	61.6	65.5	79.3	37.7	55.3	55.1
10/11/2012	11:00	367	345	7	10	2	1	0	0	0	2	0	0	0	0	60.8	64.4	76.8	38.2	54.5	54
10/11/2012	12:00	454	434	7	7	1	0	0	1	1	3	0	0	0	0	60.5	64.8	79.7	36.6	54.2	53.6
10/11/2012	13:00	393	378	7	5	1	0	0	0	0	2	0	0	0	0	61.6	65.5	80.4	20.5	54.9	55.1
10/11/2012	14:00	376	364	4	7	0	1	0	0	0	0	0	0	0	0	61.9	67.3	88.4	18.9	55.7	55.8
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10/11/2012	17:00	352	346	4	2	0	0	0	0	0	0	0	0	0	0	60.8	64.8	94.1	37.3	55.2	54.7
10/11/2012	18:00	360	352	4	4	0	0	0	0	0	0	0	0	0	0	60.8	64.8	79.5	28.1	54.4	54.7
10/11/2012	19:00	345	340	4	1	0	0	0	0	0	0	0	0	0	0	61.9	67.3	85.1	20.6	55.8	55.1
10/11/2012	20:00	211	209	1	1	0	0	0	0	0	0	0	0	0	0	62.3	69.5	91.7	27.7	54.3	53.6
10/11/2012	21:00	133	128	1	4	0	0	0	0	0	0	0	0	0	0	63.4	69.5	87.5	40.2	56.5	55.8
10/11/2012	22:00	147	144	1	2	0	0	0	0	0	0	0	0	0	0	63.7	67.7	73.3	37.5	56.2	55.4
10/11/2012	23:00	142	139	0	1	0	2	0	0	0	0	0	0	0	0	61.2	65.9	76.5	36.2	55.5	54.4
11/11/2012	00:00	118	118	0	0	0	0	0	0	0	0	0	0	0	0	61.6	64.8	73	44.8	56.2	56.2

ANNEXURE A: ROAD DELAY SOLUTIONS ADVICE (Page 6 of 6)

ROAD DELAY SOLUTIONS

Traffic and Transport Modelling

11/11/2012	01:00	66	66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	63	70.2	84.8	43	58	56.5
11/11/2012	02:00	52	52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	64.8	69.8	79.2	36.6	56.9	55.1
11/11/2012	03:00	21	20	0	1	0	0	0	0	0	0	0	0	0	0	0	0	64.4	66.6	75.9	50.7	57.1	54
11/11/2012	04:00	18	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68.8	77.4	83.8	41.1	60.6	59.4
11/11/2012	05:00	12	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66.2	67	87.4	42.2	59.9	59.4
11/11/2012	06:00	25	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68	77.8	82.1	44.9	61.1	61.9
11/11/2012	07:00	82	78	2	2	0	0	0	0	0	0	0	0	0	0	0	0	67	70.2	82.8	41.9	58.8	57.6
11/11/2012	08:00	64	63	0	1	0	0	0	0	0	0	0	0	0	0	0	0	63.4	69.8	76.8	44.2	57.8	57.6
11/11/2012	09:00	135	133	1	1	0	0	0	0	0	0	0	0	0	0	0	0	64.8	69.1	78.3	30.6	57.2	56.2
11/11/2012	10:00	218	209	4	2	0	2	0	0	0	0	1	0	0	0	0	0	62.6	67	103	21.5	55.6	54.7
11/11/2012	11:00	302	289	5	7	0	0	0	1	0	0	0	0	0	0	0	0	61.6	67.3	83.7	27.6	55.7	54.7
11/11/2012	12:00	349	340	5	4	0	0	0	0	0	0	0	0	0	0	0	0	61.6	65.5	72.5	42.8	55.7	55.1
11/11/2012	13:00	395	388	3	2	0	1	0	0	0	0	1	0	0	0	0	0	60.8	65.2	92.3	27.8	54.5	54
11/11/2012	14:00	376	367	4	4	1	0	0	0	0	0	0	0	0	0	0	0	61.6	64.8	75.5	41.2	55.3	55.1
11/11/2012	15:00	345	337	4	1	0	3	0	0	0	0	0	0	0	0	0	0	61.2	64.8	74.9	23.7	54.5	54
11/11/2012	16:00	331	328	1	2	0	0	0	0	0	0	0	0	0	0	0	0	60.5	64.4	86.4	26.5	54.2	54
11/11/2012	17:00	337	332	3	2	0	0	0	0	0	0	0	0	0	0	0	0	61.2	65.2	93.2	31.7	55.2	55.1
11/11/2012	18:00	303	300	2	1	0	0	0	0	0	0	0	0	0	0	0	0	61.9	66.2	77	36.5	55.8	55.1
11/11/2012	19:00	277	271	3	3	0	0	0	0	0	0	0	0	0	0	0	0	62.3	67.7	89.1	26.8	55.3	55.1
11/11/2012	20:00	205	200	0	5	0	0	0	0	0	0	0	0	0	0	0	0	63	66.2	79.3	13.7	54.9	55.1
11/11/2012	21:00	184	182	1	1	0	0	0	0	0	0	0	0	0	0	0	0	60.8	66.2	103.9	34.7	54.1	53.3
11/11/2012	22:00	129	127	0	2	0	0	0	0	0	0	0	0	0	0	0	0	64.1	70.2	90.7	43.2	57.3	56.2
11/11/2012	23:00	96	96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	62.3	69.5	84.2	44.2	58.1	57.2
12/11/2012	00:00	53	52	1	0	0	0	0	0	0	0	0	0	0	0	0	0	67	74.9	82.7	48.6	59.7	58
12/11/2012	01:00	29	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66.2	69.5	77.3	41.9	59.6	59.8
12/11/2012	02:00	16	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	73.4	94.3	103.4	49.3	63	58
12/11/2012	03:00	7	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	80.9	48	61.7	-
12/11/2012	04:00	16	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72.7	74.2	75.7	47.2	61.2	59.4
12/11/2012	05:00	40	38	0	0	2	0	0	0	0	0	0	0	0	0	0	0	69.1	76	77.4	35.2	59.9	57.6
12/11/2012	06:00	190	174	3	10	1	1	0	1	0	0	0	0	0	0	0	0	66.2	72	78.5	43.1	59.5	58.3
12/11/2012	07:00	456	428	6	16	2	3	0	0	0	1	0	0	0	0	0	0	64.8	68.8	81.6	41.2	58.4	57.6
12/11/2012	08:00	616	585	6	21	1	2	0	0	0	1	0	0	0	0	0	0	61.9	66.6	86	22.4	56.1	56.2
12/11/2012	09:00	635	599	6	23	2	2	0	0	1	2	0	0	0	0	0	0	60.8	64.1	79.7	33.6	55.1	54.7
12/11/2012	10:00	316	292	3	14	1	3	0	0	0	3	0	0	0	0	0	0	63	69.1	76	42	56.6	55.8
12/11/2012	11:00	228	192	4	19	3	5	1	0	0	2	2	0	0	0	0	0	60.8	66.2	77.1	38.3	55.5	55.4
12/11/2012	12:00	256	217	6	24	4	3	0	0	0	2	0	0	0	0	0	0	62.3	65.9	76.8	33.1	55.4	55.1
12/11/2012	13:00	263	237	6	11	5	1	0	0	0	2	0	1	0	0	0	0	63.4	70.6	91.4	42.3	57.1	56.2
12/11/2012	14:00	318	290	3	11	9	2	0	0	1	2	0	0	0	0	0	0	62.6	67.3	78.6	30.9	55.9	55.8
12/11/2012	15:00	465	426	3	26	5	2	1	0	0	2	0	0	0	0	0	0	63	68	86.9	10.9	56.7	56.2
12/11/2012	16:00	712	674	4	20	4	0	2	0	1	5	0	1	0	0	1	0	60.5	64.8	79.9	36.6	54.4	54.4
12/11/2012	17:00	852	824	5	18	1	0	0	1	1	2	0	0	0	0	0	0	61.2	64.8	80.3	37.3	54.8	54.7
12/11/2012	18:00	810	792	7	5	1	2	0	0	1	1	0	0	0	0	1	0	60.5	64.1	89.2	26.2	54.7	54.4
12/11/2012	19:00	641	632	2	6	1	0	0	0	0	0	0	0	0	0	0	0	60.5	64.4	77.2	27.1	55.1	54.7
12/11/2012	20:00	306	295	4	7	0	0	0	0	0	0	0	0	0	0	0	0	63.4	69.1	94.3	10.9	56.8	56.9
12/11/2012	21:00	201	200	0	1	0	0	0	0	0	0	0	0	0	0	0	0	61.6	67.3	79.4	40	56.1	55.4
12/11/2012	22:00	166	165	0	1	0	0	0	0	0	0	0	0	0	0	0	0	61.9	67.3	82.3	34.1	56.8	56.2
12/11/2012	23:00	96	95	1	0	0	0	0	0	0	0	0	0	0	0	0	0	64.8	67.7	77.5	41.5	58.1	57.6
13/11/2012	00:00	58	58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	61.6	71.6	86.8	44	58	56.5
13/11/2012	01:00	36	35	0	0	1	0	0	0	0	0	0	0	0	0	0	0	68.8	69.8	81.5	46.5	61.2	59
13/11/2012	02:00	15	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	64.1	68	70	47	57.1	58
13/11/2012	03:00	12	11	1	0	0	0	0	0	0	0	0	0	0	0	0	0	71.6	77.4	78.3	41.8	58.9	55.4
13/11/2012	04:00	16	15	0	0	0	0	0	0	0	1	0	0	0	0	0	0	77	77.4	79.6	49.2	61.6	58.7
13/11/2012	05:00	44	42	0	2	0	0	0	0	0	0	0	0	0	0	0	0	63	68	69.5	30.6	57.2	57.6
13/11/2012	06:00	190	178	0	11	0	0	0	0	0	1	0	0	0	0	0	0	65.5	70.2	80.5	45.4	59.4	58.7
13/11/2012	07:00	489	459	7	13	4	3	0	1	0	1	0	1	0	0	0	0	63.7	68.8	85.7	17.1	57.8	57.6
13/11/2012	08:00	623	596	4	16	1	2	0	1	0	3	0	0	0	0	0	0	61.9	65.9	85.1	30.8	55.8	56.2
13/11/2012	09:00	613	575	9	21	1	2	0	1	0	4	0	0	0	0	0	0	61.2	65.9	78.8	32.6	55.5	55.4
13/11/2012	10:00	347	318	2	18	5	0	1	1	0	2	0	0	0	0	0	0	61.9	66.6	75.1	36.1	55.4	55.1
13/11/2012	11:00	216	192	2	13	3	2	0	0	0	4	0	0	0	0	0	0	61.9	66.6	85.2	35.5	55.8	55.1
13/11/2012	12:00	265	234	5	14	3	3	2	0	0	4	0	0	0	0	0	0	60.5	65.9	83.2	35.6	54.9	55.1
13/11/2012	13:00	301	270	5	13	2	2	0	1	1	5	2	0	0	0	0	0	61.9	65.5	74.1	37.2	54.7	54.4
13/11/2012	14:00	344	316	4	13	3	4	1	0	0	1	1	1	0	0	0	0	62.3	67	84.1	23.3	55.6	55.1
13/11/2012	15:00	498	448	10	25	5	3	0	1	2	3	1	0	0	0	0	0	60.8	64.1	76.6	32	54.9	54.7
13/11/2012	16:00	699	661	4	24	2	3	0	1	0	3	1	0	0	0	0	0	60.5	64.4	89	34.6	54.6	54.4
13/11/2012	17:00	854	808	9	30	5	0	0	1	0	1	0	0	0	0	0	0	60.1	64.8	85	20.5	53.8	53.6
13/11/2012	18:00	838	816	3	18	1	0	0	0	0	0	0	0	0	0	0	0	59.8	64.1	96.2	27.7	53.8	53.6
13/11/2012	19:00	666	653	2	9	1	0	1	0	0	0	0	0	0	0	0	0	59.4	63	90.1	15.3	53.5	53.3
13/11/2012	20:00	344	331	4	8	0	1	0	0	0	0	0	0	0	0	0	0	62.3	68.4	105.7	29.4	56.1	55.4
13/11/2012	21:00	203	203	0	0	0	0	0	0	0	0	0	0	0	0	0	0	62.3	69.5	78.6	37.6	55.5	54.4
13/11/2012	22:00	168	164	1	2	0	0	1	0	0	0	0	0	0	0	0	0	64.1	70.9	103.8	39.7	57.3	56.2
13/11/2012	23:00	126	125	0	1	0	0	0	0	0	0	0	0	0	0	0	0	65.5	72.7	78.2	24.9	58.5	57.6
14/11/2012	00:00	60	58	0	1	0	0	0	1	0	0	0	0	0	0	0	0	63.4	68.4	79.6	44.2	58.1	57.2
14/11/2012	01:00	33	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	64.1	68	77.7	44.7	58.7	58.3
14/11/2012	02:00	14	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	64.4	64.4	70.1	48	59.8	58.3
14/11/2012	03:00	13	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	65.5	66.2	69.3	45.7	59.2	59.4
14/11/2012	04:00	13	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	62.6	64.1	66.6	46.5	58.2	58.3
14/11/2012	05:00	43	42	0	0	1	0	0	0	0	0	0	0	0	0	0	0	63.7	69.1	75.2	38	57.4	58
14/11/2012	06:00	200	187	0	13	0	0	0	0	0	0	0	0	0	0	0	0	64.8	72	79	43.7	59.1	58.3
14/11/2012	07:00	451	423	3	20	1	2	1	0	0	1	0	0	0	0	0	0	64.4	68.4	81	13.1	57.6	57.2
14/11/2012	08:00	664	631	5	19	3	2	0	0	1	3	0	0	0	0	0	0	60.8	64.8	83.3	19.5	54.8	55.1
14/11/2012	09:00	673	642	2	21	3	1	0	1	0	3	0	0	0	0	0	0	60.1	64.1	87.2	27.1	54.9	54.7
14/11/2012	10:00	376	343	1	18	3	2	0	0	0	7	1	1	0	0	0	0	60.5	64.8	82.6	29.4	54.7	54.4
14/11/2012	11:00	235	208	3	9	5	4	0	0	0	6	0	0	0	0	0	0	62.3	67	80	16.6	55.3	54.7
14/11/2012	12:00	239	208	4	13	4	4	1	0	0	5	0	0	0	0	0	0	61.9	66.6	81.1	36.5	54.9	55.1
14/11/2012	13:00	278	260	1	9	1	2	0	0	0	4	1	0	0	0	0	0	62.3	66.2	73.7	29.9	55.2	55.4
14/11/2012	14:00	289	252	2	18	1	3	1	0	2	9	1	0	0	0	0	0	61.9	67.7	80.5	32.6	54.7	54
14/11/2012	15:00	447	414	2	19	5	2	0	0	1	4	0	0	0	0	0	0	60.8	67	77.1	18.4	54.5	54.4
14/11/2012	16:00	738	699	3	21	4	5	0	0	1	5	0	0	0	0	0	0	58.3	62.6	80.1	23.4	53.4	53.3
14/11/2012	17:00	851	818	4	20	1	1	1	0	0	4	1	1	0	0	0	0	60.1	64.8	82.7	27.2	53.9	53.6
14/11/2012	18:00	903	883	6	14	0	0	0	0	0	0	0	0	0	0	0	0	60.1	64.8	77.4	34	54.3	54
14/11/2012	19:00	654	644	1	9	0	0	0	0	0	0	0	0	0	0	0	0	60.5	64.8	74.9	36.3	55.3	55.4
14/11/2012	20:00	303	289	0	14	0	0	0	0	0	0	0	0	0	0	0	0	61.6	65.2	79.7	25.5	55.4	55.4
14/11/2012	21:00	204	203	0	1	0	0	0	0	0	0	0	0	0	0	0	0	64.8	70.6	92.2	42.3	58.2	56.9
14/11/2012	22:00	197	194	0	2	0	0	0	1	0	0	0	0	0	0	0	0	63	69.1	94	41.1	56.5	55.8
14/11/2012	23:00	150	150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	62.3	68.4	90.8	43.8	57.4	56.5

M^CLAREN TRAFFIC ENGINEERING

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Division of RAMTRANS Australia ABN: 45067491678

Transport Planning, Traffic Impact Assessments, Road Safety Audits, Expert Witness

3 March 2014
Ref: 2013/060.F01A.CM/hc

Nexus Environmental Planning Pty Ltd
PO Box 212
CONCORD NSW 2137

Attention: Mr Neil Kennan
Dear Neil,

MOOREBANK RECYCLING FACILITY – BACKGROUND TRAFFIC VOLUMES

Reference is made to your request to provide a robust reasoning as to why, from a traffic engineering perspective, the conclusion drawn by Mr Neil Gross to use a figure of 600 vehicles per hour as the daytime (occurring between 10.00am to 2.00pm) traffic volume for background noise evaluation is appropriate.

The undersigned has discussed this matter at length with Mr Glen Varley from Road Delay Solutions (RDS) and attaches in **Annexure A** the advice received.

The RDS clearly states that the projections for the daytime adopted a *"regulated speed of 50km/hr, three (3) strategically located traffic calming devices and a 5 tonne weight limit."* Further, the RMS Table 10 derives from the *RMS Economic Analysis Manual*, Appendix B, page 2, 2009.

It is concluded that the methodology adopted by Wilkinson Murray (29 October 2013 & 25 February 2014 letters) in deriving the non peak hour flows from the RDS modelled peak commuter period projections complies with current modelling practice as outlined in the *RMS Economic Analysis Manual.* The 600 vehicles per hour is derived by applying the surveyed October 2013 non peak daytime proportion (i.e. 42%) of the average of the peak hours (i.e.[1200+1500]/2 = 1350).

Please contact the undersigned should you require further information or assistance.
Yours faithfully
M^CLAREN TRAFFIC ENGINEERING

Craig M^CLaren
Director
BE Civil. Graduate Diploma (Transport Eng) MAITPM MITE [1985]
RMS Accredited Level 3 Road Safety Auditor
RMS Accredited Traffic Control Planner, Auditor & Certifier (Orange Card)

ANNEXURE A: ROAD DELAY SOLUTIONS ADVICE (Page 1 of 6)

ROAD DELAY SOLUTIONS

Traffic and Transport Modelling

Our Reference: 20100097
Date: Wednesday, 26 February 2014

memorandum

Attention: Craig McLaren, *MTE*

GEORGES FAIR, MOOREBANK
STRATEGIC MODELLING

Road Delay Solutions have been approached by McLaren Traffic Engineering with regard to the method for estimating traffic flows during the shoulder, business and off peak hours of operation on the Sydney Metropolitan road network.

The RMS *Economic Analysis Manual*, 2009, prescribes the use and application of various parameters in traffic modelling to facilitate the economic evaluation of road based infrastructure.

Brickmakers Drive has been modelled as a flow restricted corridor with a regulated speed of 50km/hr, three (3) strategically located traffic calming devices and a 5 tonne weight limit. Nuwarra Road, a classified main road, was modelled as the preferred heavy vehicle corridor between Newbridge Road and Heathcote Road. The projected modelling volumes will in fact be slightly lower than estimated given that heavy vehicles (HV) currently use Brickmakers Drive which were excluded from the corridor during modelling.

Traffic counts were collected by Liverpool City Council in November, 2012 (*see attached*) detailing the current traffic volume and degree of light commercial vehicle (LCV) and heavy vehicles (HV) activity on Brickmakers Drive. The traffic counts indicate a peak flow factor of x12 in estimating the AADT. When applied, the projected AADT in 2011 would be in the order of 5,100 and in 2021, 14,400 as shown in *Figure 1*.

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ANNEXURE A: ROAD DELAY SOLUTIONS ADVICE (Page 2 of 6)

ECONOMIC PARAMETERS FOR 2009

TABLE 10
URBAN – AVERAGE HOURLY VALUE FOR TRAVEL TIME, SEPTEMBER 2009

Period	Time + Freight Value ($) per Vehicle (1)	Default Yearly Hours (2)	Proportion of Peak Hourly Volume * (3)
No flow	0	660	0.00
Off Peak	23.28	1000	0.11
Medium Off Peak	23.28	1650	0.28
Medium Business Peak	28.57	1650	0.53
Business Peak	28.57	1800	0.70
AM Peak Shoulder	18.33	400	0.75
AM Peak	18.33	600	1.00
PM Peak Shoulder	18.33	400	0.75
PM Peak	18.33	600	1.00
		8760	

* Expressed as a fraction of the average of AM and PM peak hour flows.

Average Hourly Value = Annual travel time cost / total vehicle hours for time cost per vehicle
= sum [(1)* (2) * (3)] / sum [(2) * (3)]
= $23.81 per vehicle hour in September 2009

Source: Estimated from Tables 7-9, default yearly hours and proportion of peak hourly traffic volume.

Table 10
Source: *RMS Economic Analysis Manual, Appendix B, page 10, 2009*

The following graph presents a comparison between the modelled projections and the actual counts, undertaken by Council in 2012.

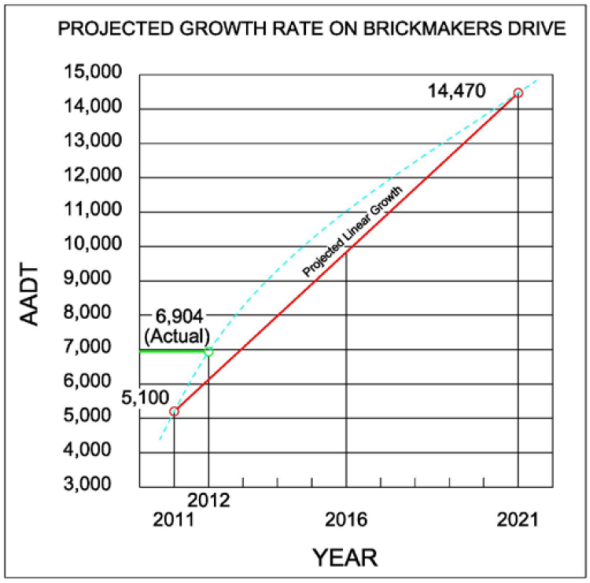


Figure 1
Source: *Road Delay Solutions, 2014*

ANNEXURE A: ROAD DELAY SOLUTIONS ADVICE (Page 3 of 6)

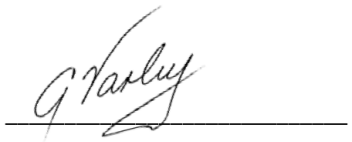
ROAD DELAY SOLUTIONS

Traffic and Transport Modelling

The BTS prescribe that HV movements in Sydney are forecast to increase by 2.2% per annum between 2006 and 2036, faster than LCV trips which are predicted to grow by 1.1% per year.

It is concluded that the methodology, adopted by Wilkinson Murray, in deriving the non peak hour flows from the modelled peak commuter period projections, published in the *Road Delay Solutions* report, complies with current modelling practice as outlined in the RMS *Economic Analysis Manual, Appendix B, page 2, 2009*, as prescribed in the above extract (*Table 10*).

Should you require clarification of any aspect, pertaining to this document, please contact Glen Varley on mobile 0414 800 912.



Glen Varley
Director - Traffic and Transport
Road Delay Solutions Pty Ltd

//Attached

ANNEXURE A: ROAD DELAY SOLUTIONS ADVICE (Page 4 of 6)

ROAD DELAY SOLUTIONS

Traffic and Transport Modelling

TRAFFIC COUNTS – NOVEMBER 2012

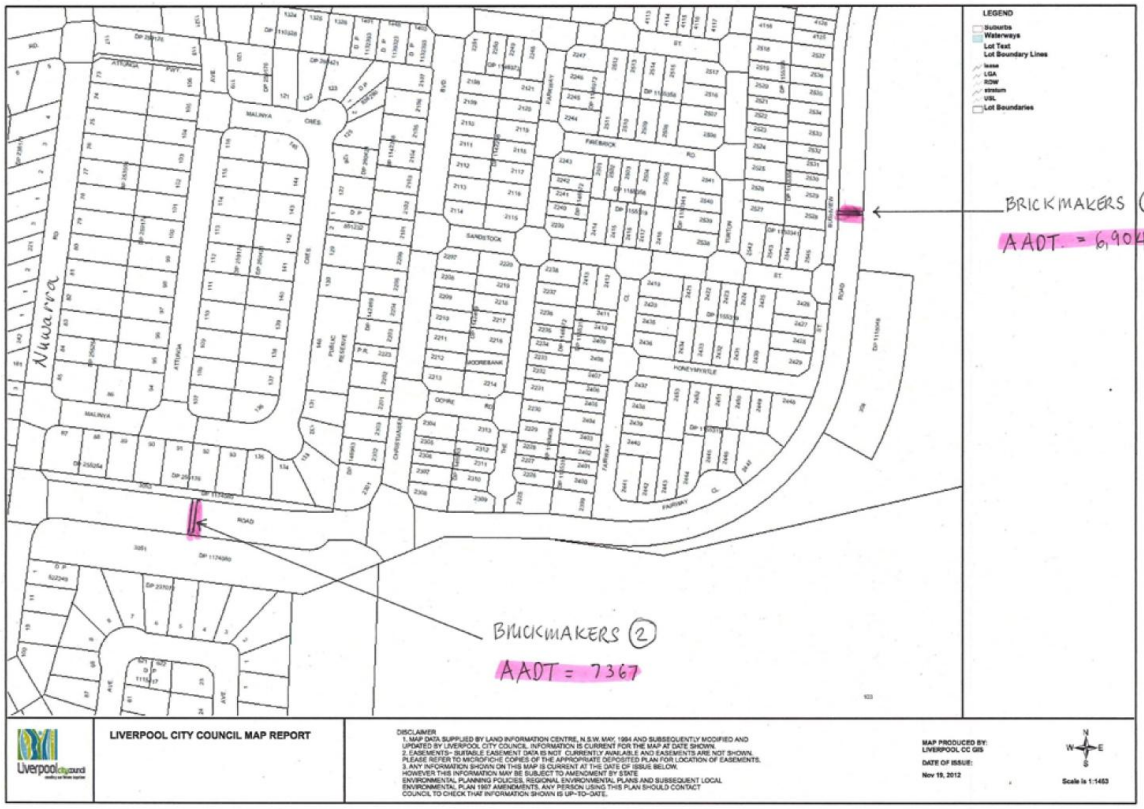


Figure 2 **Count Locations**
Source: *Liverpool City Council, 2012*

ANNEXURE A: ROAD DELAY SOLUTIONS ADVICE (Page 5 of 6)

ROAD DELAY SOLUTIONS

Traffic and Transport Modelling

Site OPPOSITE H#8 BUSHVIEW LANE — Street Index BRICKMAKERS 1 — Block Index BETWE — File unts_2012\BRICKMAKERS 115Nov2012
Created by MetroCount Traffic Executive — Copyright (c)1997 - 2005 MetroCount — Version 3.16.12856.0
File Name G:\Asset_Systems\Databases\Traffic\Counts_2012\BRICKMAKERS 115Nov2012.EC0 — **Creation Time** 2012-11-19T21:00:21
Direction Text 8 - East bound A>B, West bound B>A. — **Direction** East West — **Lane** 0
Setup Time 2012-11-07T11:47:45 — **Operator** AA — **Class Scheme** AustRoads94 — **AADT**
Start Time 2012-11-07T11:47:45 — **Filter Start** 2012-11-08T00:00:00 — Speed Range 0 to 200 — **6904**
Finish Time 2012-11-15T11:22:45 — **Filter End** 2012-11-15T00:00:00

Daily Summary

Date	Day	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12	Cls 13	V 85 %	V 95 %	Vmax	Vmin	Mean	V 50%
08/11/2012	Thu	7675	7298	43	236	28	26	8	5	1	27	2	0	0	1	61.2	65.9	96.3	7.1	54	54.4
09/11/2012	Fri	7162	6825	66	220	18	17	0	0	2	11	1	0	0	2	61.2	65.5	104	8.5	55.2	55.1
10/11/2012	Sat	5371	5193	62	83	13	6	1	1	1	10	1	0	0	0	61.9	67.3	103.5	18.7	55.5	55.1
11/11/2012	Sun	4440	4351	38	41	1	6	0	1	0	2	0	0	0	0	61.9	67	103.9	13.7	55.5	55.1
12/11/2012	Mon	7688	7275	70	233	42	26	4	2	5	25	2	2	0	2	61.9	67	103.4	10.9	55.9	55.4
13/11/2012	Tue	7965	7523	72	251	37	25	6	8	4	32	5	2	0	0	61.6	66.2	105.7	15.3	55.3	55.1
14/11/2012	Wed	8028	7621	37	241	32	28	4	3	5	51	4	2	0	0	61.2	66.2	94	13.1	55.1	54.7

Weekly Summary	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12	Cls 13	V 85 %	V 95 %	Vmax	Vmin	Mean	V 50%
7 Day Totals	48329	46086	388	1305	171	134	23	20	18	158	15	6	0	5	61.6	66.2	105.7	7.1	55.2	55.1
7 Day Average	6904.1	6583.7	55.429	186.43	24.429	19.143	3.2857	2.8571	2.5714	22.571	2.1429	0.8571	0	0.7143						

Hourly Data

Date	Time	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12	Cls 13	V 85 %	V 95 %	Vmax	Vmin	Mean	V 50%
08/11/2012	00:00	66	66	0	0	0	0	0	0	0	0	0	0	0	0	66.2	76.7	81	19.5	59.5	58.7
08/11/2012	01:00	22	22	0	0	0	0	0	0	0	0	0	0	0	0	62.3	68	73.4	43.2	56.8	56.9
08/11/2012	02:00	11	11	0	0	0	0	0	0	0	0	0	0	0	0	62.6	67.3	68.1	47.3	59.3	60.1
08/11/2012	03:00	10	10	0	0	0	0	0	0	0	0	0	0	0	0	-	-	79.6	32.1	56.9	-
08/11/2012	04:00	17	16	0	1	0	0	0	0	0	0	0	0	0	0	62.6	72	81.1	28.4	55.4	53.3
08/11/2012	05:00	40	38	0	1	0	1	0	0	0	0	0	0	0	0	64.4	69.8	72.5	41.9	57.7	57.2
08/11/2012	06:00	199	185	0	12	1	0	0	0	0	1	0	0	0	0	64.4	67.3	77.7	28.9	58.1	58
08/11/2012	07:00	460	440	2	14	0	2	1	0	0	1	0	0	0	0	64.1	68.8	77.5	39.3	58	57.6
08/11/2012	08:00	621	589	2	22	2	4	0	0	0	2	0	0	0	0	61.9	65.9	79.9	31.2	56.2	56.2
08/11/2012	09:00	654	623	5	22	0	2	1	0	0	1	0	0	0	0	61.2	65.9	93.3	14.9	55.1	54.7
08/11/2012	10:00	318	296	0	14	1	1	2	1	0	3	0	0	0	0	62.6	67.3	80.6	28.5	55.8	55.4
08/11/2012	11:00	246	220	2	17	2	3	0	0	0	1	1	0	0	0	61.6	67.7	96.3	39.3	56	55.1
08/11/2012	12:00	249	225	4	13	3	1	0	2	0	1	0	0	0	0	62.3	68	82.4	38.7	55.5	55.1
08/11/2012	13:00	271	245	5	17	2	1	0	0	0	1	0	0	0	0	61.9	65.9	76.1	40	56.3	56.2
08/11/2012	14:00	291	270	2	15	3	2	0	0	1	3	1	0	0	0	61.9	66.2	83.6	19.7	55.5	55.1
08/11/2012	15:00	456	418	8	22	4	3	1	0	0	2	0	0	0	0	60.8	65.2	78.1	40.3	55.1	54.7
08/11/2012	16:00	721	689	2	17	3	3	2	0	0	5	0	0	0	0	59.8	63	87.1	18.2	53.8	53.6
08/11/2012	17:00	876	843	4	16	6	3	1	0	0	2	0	0	0	1	59	63.7	77.8	31.3	53.7	53.3
08/11/2012	18:00	712	688	5	17	1	0	0	0	0	1	0	0	0	0	56.5	60.5	75.4	7.1	42.7	48.2
08/11/2012	19:00	613	601	1	9	0	0	0	2	0	0	0	0	0	0	59	62.3	72.4	26.2	53.1	52.9
08/11/2012	20:00	292	287	1	3	0	0	0	0	0	1	0	0	0	0	59.4	64.8	75.9	33	54	53.6
08/11/2012	21:00	206	204	0	2	0	0	0	0	0	0	0	0	0	0	60.1	64.4	77.3	37.1	54.3	54
08/11/2012	22:00	199	196	0	1	0	0	0	0	0	2	0	0	0	0	62.3	67.3	75.4	38.8	56.4	56.5
08/11/2012	23:00	117	116	0	1	0	0	0	0	0	0	0	0	0	0	63	65.9	75.1	32.5	55.9	56.2
09/11/2012	00:00	64	62	2	0	0	0	0	0	0	0	0	0	0	0	63	71.6	75.2	44.3	57.5	56.5
09/11/2012	01:00	41	41	0	0	0	0	0	0	0	0	0	0	0	0	59.8	64.8	69.5	37.8	54.5	54
09/11/2012	02:00	16	16	0	0	0	0	0	0	0	0	0	0	0	0	67.7	71.3	73.9	49.1	59.1	56.9
09/11/2012	03:00	12	12	0	0	0	0	0	0	0	0	0	0	0	0	60.5	64.4	69.3	48.6	56.8	56.5
09/11/2012	04:00	16	16	0	0	0	0	0	0	0	0	0	0	0	0	68	69.5	78	26	58.6	56.5
09/11/2012	05:00	37	37	0	0	0	0	0	0	0	0	0	0	0	0	63	65.9	70.1	36.5	57.3	58
09/11/2012	06:00	174	160	1	12	0	1	0	0	0	0	0	0	0	0	64.8	69.5	86.5	26.4	57.7	56.9
09/11/2012	07:00	453	425	5	20	2	0	0	0	0	1	0	0	0	0	63.4	69.1	104	42.3	57.5	56.5
09/11/2012	08:00	604	563	10	24	2	4	0	0	0	1	0	0	0	0	60.8	65.2	83.3	25.2	55.2	55.1
09/11/2012	09:00	627	599	4	17	2	2	0	0	0	2	0	0	0	1	59.8	63.7	88.6	27.6	54.3	54
09/11/2012	10:00	147	131	0	10	1	4	0	0	0	1	0	0	0	0	50	56.2	63.9	8.5	42.3	43.6
09/11/2012	11:00	10	3	0	7	0	0	0	0	0	0	0	0	0	0	-	-	55.3	30.3	43.9	-
09/11/2012	12:00	5	3	0	2	0	0	0	0	0	0	0	0	0	0	-	-	59.5	43.1	51.9	-
09/11/2012	13:00	66	58	0	5	0	1	0	0	0	2	0	0	0	0	60.1	66.2	68.3	27.8	54.4	55.1
09/11/2012	14:00	337	314	3	15	2	2	0	0	0	0	0	0	0	1	60.5	65.5	70.9	24.7	54.8	54.7
09/11/2012	15:00	488	447	9	29	2	0	0	0	0	0	1	0	0	0	60.8	64.1	76.7	39.2	54.9	54.4
09/11/2012	16:00	749	711	9	23	2	2	0	0	0	2	0	0	0	0	60.5	64.4	82.3	32	54.5	54.4
09/11/2012	17:00	785	759	7	16	3	0	0	0	0	0	0	0	0	0	60.8	64.8	77.2	22.6	55.1	55.1
09/11/2012	18:00	824	798	9	13	0	1	0	0	0	3	0	0	0	0	61.2	64.8	79.3	22.9	55.7	55.4
09/11/2012	19:00	686	666	4	15	0	0	0	0	0	1	0	0	0	0	61.2	64.8	75.8	32.7	56.1	55.8
09/11/2012	20:00	410	402	1	6	1	0	0	0	0	0	0	0	0	0	61.6	67	84	34	55.7	55.1
09/11/2012	21:00	249	245	2	1	1	0	0	0	0	0	0	0	0	0	62.3	66.2	92.4	34.3	56	55.4
09/11/2012	22:00	208	207	0	1	0	0	0	0	0	0	0	0	0	0	62.3	67.7	100.6	18.2	56.1	55.4
09/11/2012	23:00	154	150	0	4	0	0	0	0	0	0	0	0	0	0	62.6	67.7	79.1	41.3	55.9	55.1
10/11/2012	00:00	138	134	0	4	0	0	0	0	0	0	0	0	0	0	61.6	67.7	84.2	32.2	56.2	55.8
10/11/2012	01:00	76	76	0	2	0	0	0	0	0	0	0	0	0	0	65.9	70.9	80.6	45.4	58.3	57.2
10/11/2012	02:00	29	28	0	1	0	0	0	0	0	0	0	0	0	0	70.2	87.1	90.2	47.4	60.8	59
10/11/2012	03:00	24	23	0	1	0	0	0	0	0	0	0	0	0	0	64.4	66.2	76.5	26.5	56.6	56.5
10/11/2012	04:00	19	18	1	0	0	0	0	0	0	0	0	0	0	0	64.8	68.4	69.7	44.6	57.6	57.6
10/11/2012	05:00	24	24	0	0	0	0	0	0	0	0	0	0	0	0	69.1	74.2	74.5	45.8	59	58.3
10/11/2012	06:00	82	80	0	2	0	0	0	0	0	0	0	0	0	0	70.6	76	86.6	43.8	61.6	59.8
10/11/2012	07:00	111	105	1	3	1	1	0	0	0	0	0	0	0	0	65.9	70.6	89	18.7	57.9	56.9
10/11/2012	08:00	204	194	2	4	3	1	0	0	0	0	0	0	0	0	64.1	72	86.4	41.4	57.7	56.9
10/11/2012	09:00	281	268	3	7	2	0	0	0	0	1	0	0	0	0	63.4	68.8	74.7	42	57.1	56.2
10/11/2012	10:00	330	314	5	4	3	0	1	0	0	2	1	0	0	0	61.6	65.5	79.3	37.7	55.3	55.1
10/11/2012	11:00	367	345	7	10	2	1	0	0	0	2	0	0	0	0	60.8	64.4	76.8	38.2	54.5	54
10/11/2012	12:00	454	434	7	7	1	0	0	1	1	3	0	0	0	0	60.5	64.8	79.7	36.6	54.2	53.6
10/11/2012	13:00	393	378	7	5	1	0	0	0	0	2	0	0	0	0	61.6	65.5	80.4	20.5	54.9	55.1
10/11/2012	14:00	376	364	4	7	0	1	0	0	0	0	0	0	0	0	61.9	67.3	88.4	18.9	55.7	55.8
10/11/2012	15:00	400	386	7	7	0	0	0	0	0	0	0	0	0	0	60.5	63.4	99	39	54.7	54.4
10/11/2012	16:00	371	364	3	4	0	0	0	0	0	0	0	0	0	0	60.8	65.2	103.5	24	54.5	54.4
10/11/2012	17:00	352	346	4	2	0	0	0	0	0	0	0	0	0	0	60.8	64.8	94.1	37.3	55.2	54.7
10/11/2012	18:00	360	352	4	4	0	0	0	0	0	0	0	0	0	0	60.8	64.8	79.5	28.1	54.4	54.7
10/11/2012	19:00	345	340	4	1	0	0	0	0	0	0	0	0	0	0	61.9	67.3	85.1	20.6	55.8	55.1
10/11/2012	20:00	211	209	1	1	0	0	0	0	0	0	0	0	0	0	62.3	69.5	91.7	27.7	54.3	53.6
10/11/2012	21:00	133	128	1	4	0	0	0	0	0	0	0	0	0	0	63.4	69.5	87.5	40.2	56.5	55.8
10/11/2012	22:00	147	144	1	2	0	0	0	0	0	0	0	0	0	0	63.7	67.7	73.3	37.5	56.2	55.4
10/11/2012	23:00	142	139	0	1	0	2	0	0	0	0	0	0	0	0	61.2	65.9	76.5	36.2	55.5	54.4
11/11/2012	00:00	118	118	0	0	0	0	0	0	0	0	0	0	0	0	61.6	64.8	73	44.8	56.2	56.2

ANNEXURE A: ROAD DELAY SOLUTIONS ADVICE (Page 6 of 6)

ROAD DELAY SOLUTIONS

Traffic and Transport Modelling

11/11/2012	01:00	66	66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	63	70.2	84.8	43	58	56.5
11/11/2012	02:00	52	52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	64.8	69.8	79.2	36.6	56.9	55.1
11/11/2012	03:00	21	20	0	1	0	0	0	0	0	0	0	0	0	0	0	0	64.4	66.6	75.9	50.7	57.1	54
11/11/2012	04:00	18	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68.8	77.4	83.8	41.1	60.6	59.4
11/11/2012	05:00	12	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66.2	67	87.4	42.2	59.9	59.4
11/11/2012	06:00	25	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68	77.8	82.1	44.9	61.1	61.9
11/11/2012	07:00	82	78	2	2	0	0	0	0	0	0	0	0	0	0	0	0	67	70.2	82.8	41.9	58.8	57.6
11/11/2012	08:00	64	63	0	1	0	0	0	0	0	0	0	0	0	0	0	0	63.4	69.8	76.8	44.2	57.8	57.6
11/11/2012	09:00	135	133	1	1	0	0	0	0	0	0	0	0	0	0	0	0	64.8	69.1	78.3	30.6	57.2	56.2
11/11/2012	10:00	218	209	4	2	0	2	0	0	0	1	0	0	0	0	0	0	62.6	67	103	21.5	55.6	54.7
11/11/2012	11:00	302	289	5	7	0	0	0	1	0	0	0	0	0	0	0	0	61.6	67.3	83.7	27.6	55.7	54.7
11/11/2012	12:00	349	340	5	4	0	0	0	0	0	0	0	0	0	0	0	0	61.6	65.5	72.5	42.8	55.7	55.1
11/11/2012	13:00	395	388	3	2	0	1	0	0	0	1	0	0	0	0	0	0	60.8	65.2	92.3	27.8	54.5	54
11/11/2012	14:00	376	367	4	4	1	0	0	0	0	0	0	0	0	0	0	0	61.6	64.8	75.5	41.2	55.3	55.1
11/11/2012	15:00	345	337	4	1	0	3	0	0	0	0	0	0	0	0	0	0	61.2	64.8	74.9	23.7	54.5	54
11/11/2012	16:00	331	328	1	2	0	0	0	0	0	0	0	0	0	0	0	0	60.5	64.4	86.4	26.5	54.2	54
11/11/2012	17:00	337	332	3	2	0	0	0	0	0	0	0	0	0	0	0	0	61.2	65.2	93.2	31.7	55.2	55.1
11/11/2012	18:00	303	300	2	1	0	0	0	0	0	0	0	0	0	0	0	0	61.9	66.2	77	36.5	55.8	55.1
11/11/2012	19:00	277	271	3	3	0	0	0	0	0	0	0	0	0	0	0	0	62.3	67.7	89.1	26.8	55.3	55.1
11/11/2012	20:00	205	200	0	5	0	0	0	0	0	0	0	0	0	0	0	0	63	66.2	79.3	13.7	54.9	55.1
11/11/2012	21:00	184	182	1	1	0	0	0	0	0	0	0	0	0	0	0	0	60.8	66.2	103.9	34.7	54.1	53.3
11/11/2012	22:00	129	127	0	2	0	0	0	0	0	0	0	0	0	0	0	0	64.1	70.2	90.7	43.2	57.3	56.2
11/11/2012	23:00	96	96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	62.3	69.5	84.2	44.2	58.1	57.2
12/11/2012	00:00	53	52	1	0	0	0	0	0	0	0	0	0	0	0	0	0	67	74.9	82.7	48.6	59.7	58
12/11/2012	01:00	29	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66.2	69.5	77.3	41.9	59.6	59.8
12/11/2012	02:00	16	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	73.4	94.3	103.4	49.3	63	58
12/11/2012	03:00	7	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	80.9	48	61.7	-
12/11/2012	04:00	16	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72.7	74.2	75.7	47.2	61.2	59.4
12/11/2012	05:00	40	38	0	0	2	0	0	0	0	0	0	0	0	0	0	0	69.1	76	77.4	35.2	59.9	57.6
12/11/2012	06:00	190	174	3	10	1	1	0	1	0	0	0	0	0	0	0	0	66.2	72	78.5	43.1	59.5	58.3
12/11/2012	07:00	456	428	6	16	2	3	0	0	0	1	0	0	0	0	0	0	64.8	68.8	81.6	41.2	58.4	57.6
12/11/2012	08:00	616	585	6	21	1	2	0	0	0	1	0	0	0	0	0	0	61.9	66.6	86	22.4	56.1	56.2
12/11/2012	09:00	635	599	6	23	2	2	0	0	1	2	0	0	0	0	0	0	60.8	64.1	79.7	33.6	55.1	54.7
12/11/2012	10:00	316	292	3	14	1	3	0	0	0	3	0	0	0	0	0	0	63	69.1	76	42	56.6	55.8
12/11/2012	11:00	228	192	4	19	3	5	1	0	0	2	2	0	0	0	0	0	60.8	66.2	77.1	38.3	55.5	55.4
12/11/2012	12:00	256	217	6	24	4	3	0	0	0	2	0	0	0	0	0	0	62.3	65.9	76.8	33.1	55.4	55.1
12/11/2012	13:00	263	237	6	11	5	1	0	0	0	2	0	1	0	0	0	0	63.4	70.6	91.4	42.3	57.1	56.2
12/11/2012	14:00	318	290	3	11	9	2	0	0	1	2	0	0	0	0	0	0	62.6	67.3	78.6	30.9	55.9	55.8
12/11/2012	15:00	465	426	3	26	5	2	1	0	0	2	0	0	0	0	0	0	63	68	86.9	10.9	56.7	56.2
12/11/2012	16:00	712	674	4	20	4	0	2	0	1	5	0	1	0	0	1	0	60.5	64.8	79.9	36.6	54.4	54.4
12/11/2012	17:00	852	824	5	18	1	0	0	1	1	2	0	0	0	0	0	0	61.2	64.8	80.3	37.3	54.8	54.7
12/11/2012	18:00	810	792	7	5	1	2	0	0	1	1	0	0	0	0	1	0	60.5	64.1	89.2	26.2	54.7	54.4
12/11/2012	19:00	641	632	2	6	1	0	0	0	0	0	0	0	0	0	0	0	60.5	64.4	77.2	27.1	55.1	54.7
12/11/2012	20:00	306	295	4	7	0	0	0	0	0	0	0	0	0	0	0	0	63.4	69.1	94.3	10.9	56.8	56.9
12/11/2012	21:00	201	200	0	1	0	0	0	0	0	0	0	0	0	0	0	0	61.6	67.3	79.4	40	56.1	55.4
12/11/2012	22:00	166	165	0	1	0	0	0	0	0	0	0	0	0	0	0	0	61.9	67.3	82.3	34.1	56.8	56.2
12/11/2012	23:00	96	95	1	0	0	0	0	0	0	0	0	0	0	0	0	0	64.8	67.7	77.5	41.5	58.1	57.6
13/11/2012	00:00	58	58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	61.6	71.6	86.8	44	58	56.5
13/11/2012	01:00	36	35	0	0	1	0	0	0	0	0	0	0	0	0	0	0	68.8	69.8	81.5	46.5	61.2	59
13/11/2012	02:00	15	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	64.1	68	70	47	57.1	58
13/11/2012	03:00	12	11	1	0	0	0	0	0	0	0	0	0	0	0	0	0	71.6	77.4	78.3	41.8	58.9	55.4
13/11/2012	04:00	16	15	0	0	0	0	0	0	0	1	0	0	0	0	0	0	77	77.4	79.6	49.2	61.6	58.7
13/11/2012	05:00	44	42	0	2	0	0	0	0	0	0	0	0	0	0	0	0	63	68	69.5	30.6	57.2	57.6
13/11/2012	06:00	190	178	0	11	0	0	0	0	0	1	0	0	0	0	0	0	65.5	70.2	80.5	45.4	59.4	58.7
13/11/2012	07:00	489	459	7	13	4	3	0	1	0	1	0	1	0	0	0	0	63.7	68.8	85.7	17.1	57.8	57.6
13/11/2012	08:00	623	596	4	16	1	2	0	1	0	3	0	0	0	0	0	0	61.9	65.9	85.1	30.8	55.8	56.2
13/11/2012	09:00	613	575	9	21	1	2	0	1	0	4	0	0	0	0	0	0	61.2	65.9	78.8	32.6	55.5	55.4
13/11/2012	10:00	347	318	2	18	5	0	1	1	0	2	0	0	0	0	0	0	61.9	66.6	75.1	36.1	55.4	55.1
13/11/2012	11:00	216	192	2	13	3	2	0	0	0	4	0	0	0	0	0	0	61.9	66.6	85.2	35.5	55.8	55.1
13/11/2012	12:00	265	234	5	14	3	3	2	0	0	4	0	0	0	0	0	0	60.5	65.9	83.2	35.6	54.9	55.1
13/11/2012	13:00	301	270	5	13	2	2	0	1	1	5	2	0	0	0	0	0	61.9	65.5	74.1	37.2	54.7	54.4
13/11/2012	14:00	344	316	4	13	3	4	1	0	0	1	1	1	0	0	0	0	62.3	67	84.1	23.3	55.6	55.1
13/11/2012	15:00	498	448	10	25	5	3	0	1	2	3	1	0	0	0	0	0	60.8	64.1	76.6	32	54.9	54.7
13/11/2012	16:00	699	661	4	24	2	3	0	1	0	3	1	0	0	0	0	0	60.5	64.4	89	34.6	54.6	54.4
13/11/2012	17:00	854	808	9	30	5	0	0	1	0	1	0	0	0	0	0	0	60.1	64.8	85	20.5	53.8	53.6
13/11/2012	18:00	838	816	3	18	1	0	0	0	0	0	0	0	0	0	0	0	59.8	64.1	96.2	27.7	53.8	53.6
13/11/2012	19:00	666	653	2	9	1	0	1	0	0	0	0	0	0	0	0	0	59.4	63	90.1	15.3	53.5	53.3
13/11/2012	20:00	344	331	4	8	0	1	0	0	0	0	0	0	0	0	0	0	62.3	68.4	105.7	29.4	56.1	55.4
13/11/2012	21:00	203	203	0	0	0	0	0	0	0	0	0	0	0	0	0	0	62.3	69.5	78.6	37.6	55.5	54.4
13/11/2012	22:00	168	164	1	2	0	0	1	0	0	0	0	0	0	0	0	0	64.1	70.9	103.8	39.7	57.3	56.2
13/11/2012	23:00	126	125	0	1	0	0	0	0	0	0	0	0	0	0	0	0	65.5	72.7	78.2	24.9	58.5	57.6
14/11/2012	00:00	60	58	0	1	0	0	0	1	0	0	0	0	0	0	0	0	63.4	68.4	79.6	44.2	58.1	57.2
14/11/2012	01:00	33	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	64.1	68	77.7	44.7	58.7	58.3
14/11/2012	02:00	14	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	64.4	64.4	70.1	48	59.8	58.3
14/11/2012	03:00	13	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	65.5	66.2	69.3	45.7	59.2	59.4
14/11/2012	04:00	13	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	62.6	64.1	66.6	46.5	58.2	58.3
14/11/2012	05:00	43	42	0	0	1	0	0	0	0	0	0	0	0	0	0	0	63.7	69.1	75.2	38	57.4	58
14/11/2012	06:00	200	187	0	13	0	0	0	0	0	0	0	0	0	0	0	0	64.8	72	79	43.7	59.1	58.3
14/11/2012	07:00	451	423	3	20	1	2	1	0	0	1	0	0	0	0	0	0	64.4	68.4	81	13.1	57.6	57.2
14/11/2012	08:00	664	631	5	19	3	2	0	0	1	3	0	0	0	0	0	0	60.8	64.8	83.3	19.5	54.8	55.1
14/11/2012	09:00	673	642	2	21	3	1	0	1	0	3	0	0	0	0	0	0	60.1	64.1	87.2	27.1	54.9	54.7
14/11/2012	10:00	376	343	1	18	3	2	0	0	0	7	1	1	0	0	0	0	60.5	64.8	82.6	29.4	54.7	54.4
14/11/2012	11:00	235	208	3	9	5	4	0	0	0	6	0	0	0	0	0	0	62.3	67	80	16.6	55.3	54.7
14/11/2012	12:00	239	208	4	13	4	4	1	0	0	5	0	0	0	0	0	0	61.9	66.6	81.1	36.5	54.9	55.1
14/11/2012	13:00	278	260	1	9	1	2	0	0	0	4	1	0	0	0	0	0	62.3	66.2	73.7	29.9	55.2	55.4
14/11/2012	14:00	289	252	2	18	1	3	1	0	2	9	1	0	0	0	0	0	61.9	67.7	80.5	32.6	54.7	54
14/11/2012	15:00	447	414	2	19	5	2	0	0	1	4	0	0	0	0	0	0	60.8	67	77.1	18.4	54.5	54.4
14/11/2012	16:00	738	699	3	21	4	5	0	0	1	5	0	0	0	0	0	0	58.3	62.6	80.1	23.4	53.4	53.3
14/11/2012	17:00	851	818	4	20	1	1	1	0	0	4	1	1	0	0	0	0	60.1	64.8	82.7	27.2	53.9	53.6
14/11/2012	18:00	903	883	6	14	0	0	0	0	0	0	0	0	0	0	0	0	60.1	64.8	77.4	34	54.3	54
14/11/2012	19:00	654	644	1	9	0	0	0	0	0	0	0	0	0	0	0	0	60.5	64.8	74.9	36.3	55.3	55.4
14/11/2012	20:00	303	289	0	14	0	0	0	0	0	0	0	0	0	0	0	0	61.6	65.2	79.7	25.5	55.4	55.4
14/11/2012	21:00	204	203	0	1	0	0	0	0	0	0	0	0	0	0	0	0	64.8	70.6	92.2	42.3	58.2	56.9
14/11/2012	22:00	197	194	0	2	0	0	0	1	0	0	0	0	0	0	0	0	63	69.1	94	41.1	56.5	55.8
14/11/2012	23:00	150	150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	62.3	68.4	90.8	43.8	57.4	56.5

WILKINSON MURRAY

25 February 2014

WM Project Number: 03124-DA
Our Ref: NEP250214 NG_ltr
Email: kennan@ozemail.com.au

Mr Neil Kennan
Nexus Environmental Planning Pty Ltd
PO Box 212
CONCORD NSW 2137

Dear Neil

Re: Moorebank Recycling Facility - Background Noise & Traffic Volumes

Introduction

The Department of Planning have requested further details of how future background noise levels (RBL) have been determined in our noise assessment. This information is summarised below with more detailed cross referencing to the source of data.

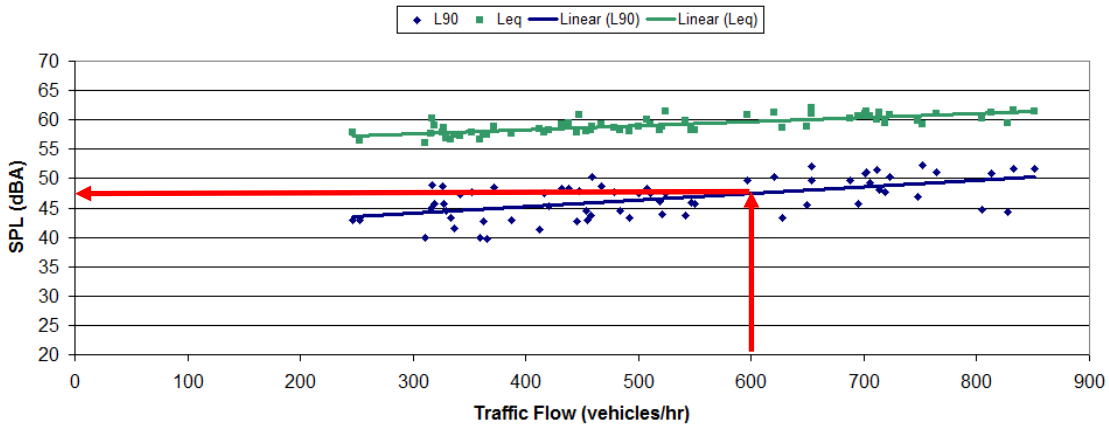
Previous Correspondence

In our letter of 29 October 2013 we summarised further background noise measurements and simultaneous traffic counts to demonstrate that background noise levels at residences fronting Brickmakers Drive increase as traffic volumes on Brickmakers Drive increase.

This graph shows the weekday daytime hourly traffic volume plotted against the average of the four 15 minute background L_{A90} noise levels in the hour in blue and log average of L_{Aeq} levels in green. The solid line shows the best fit linear curve through the data points.

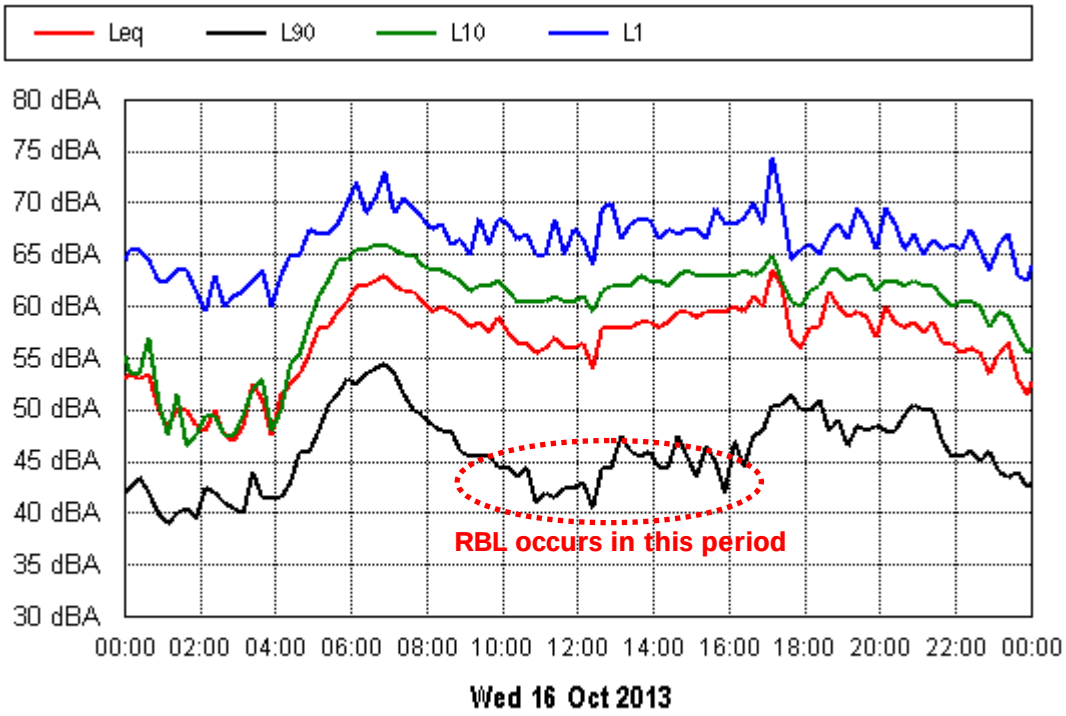
This approach is a similar concept to the use of ABLs to get the lowest L90 value for each day and then using the median to get the RBL for a week. Each data point is the equivalent of an ABL (in relation to vehicle numbers on Brickmakers Drive) and the best fit curve being the median of the points.

Figure 1 Daytime Traffic Volume vs L_{90} and L_{eq}



The quieter periods of background noise, which dictate the daytime RBL, generally occur in the middle of the day between the peak hours, as shown in a typical day.

Figure 2 Typical Daytime Ambient Noise Levels



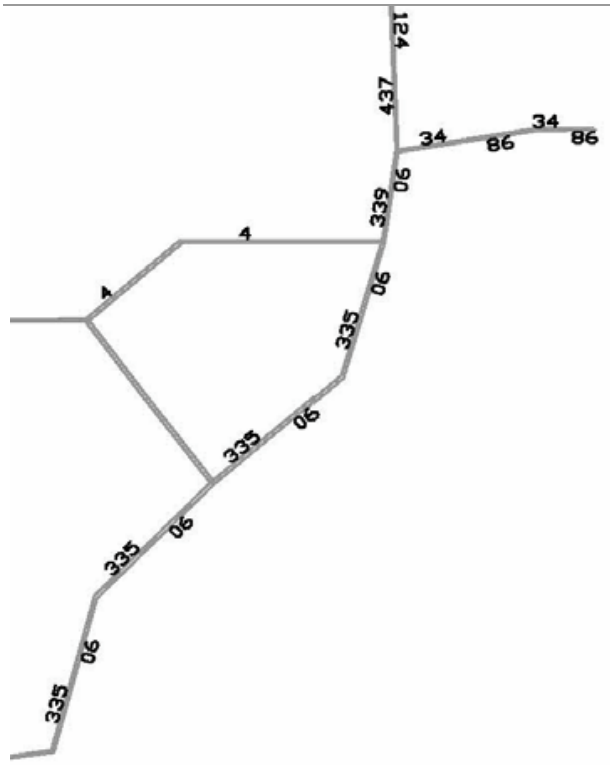
We then used peak hour data in the previous traffic study undertaken by Road Delay Solutions (July 2010) and RMS data which relates typical flows in non peak hours to peak hours to show that by the time the Georges Fair development has been fully populated what typical hourly flows may occur during non peak hours.

The traffic modelling report by Road Delay Solutions in July 2010, (prepared for the Georges Fair development) indicates peak hour traffic volumes in 2011 were projected to be approximately 400-450 vehicles per hour (Figures 11 & 12), and by 2021 to be 1200-1500 per hour (Figures 13 & 14) in the peak hours (depending on which section of Brickmakers Drive), with the higher numbers just south of the proposed new ramps to the access road. The morning peak volumes in both directions are shown below, which can be summed to determine overall volumes.

The Roads and Maritime Services (RMS) published economic assessment data in Table 10 (shown below) enables us to estimate traffic volumes in the non peak hour periods (the period of day between 10.00am and 2.00pm) and are likely to be between 53-70% of the average of the am and pm peak periods.

Road Delay Solutions – Extracted Figures 11 & 13

Morning peak hour volumes 2011



Morning peak hour volumes 2021

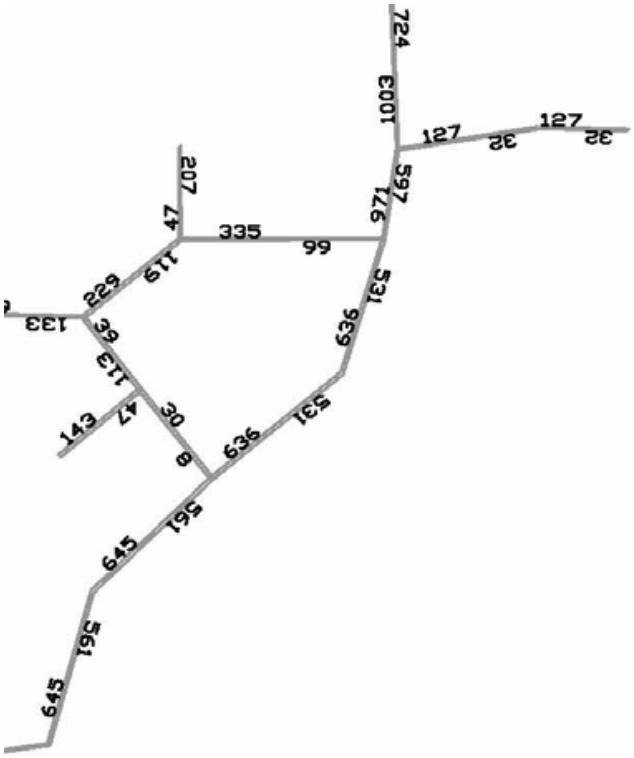


TABLE 10
URBAN – AVERAGE HOURLY VALUE FOR TRAVEL TIME, SEPTEMBER 2009

Period	Time + Freight Value ($) per Vehicle (1)	Default Yearly Hours (2)	Proportion of Peak Hourly Volume * (3)
No flow	0	660	0.00
Off Peak	23.28	1000	0.11
Medium Off Peak	23.28	1650	0.28
Medium Business Peak	28.57	1650	0.53
Business Peak	28.57	1800	0.70
AM Peak Shoulder	18.33	400	0.75
AM Peak	18.33	600	1.00
PM Peak Shoulder	18.33	400	0.75
PM Peak	18.33	600	1.00

The October 2013 Traffic volumes showed am and pm peaks in the vicinity of approximately 700-730 and 800-830 vehicles respectively with minimum volumes during the middle of the day of typically 320 vehicles. The non peak daytime hours are approximately 42% of the average of the peak hours. This is closer to the 53% - 70% range adopted in the RMS guide.

Based on future average of peak hours of between 1200-1500 vehicles on Brickmakers Drive this 42% equates to between 500-600 vehicles per hour during the middle of the day. Noting that it is 600 vehicles per hour at the northern end of Brickmakers Drive (4N).

When considering vehicle numbers of 600 per hour, we have extrapolated from the graph of background noise level versus traffic volume to predict a future background noise level. The best line fit indicates a background noise level of 47.5dBA (see Figure 1).

As further support, currently vehicle numbers of greater than 600 vehicles per hour occur during the 7.00am-9.00am period and also between 3.00pm-6.00pm. At these times, the current data consistently results in background noise levels above 48dBA.

It is recommended updated background noise measurements should be carried out once the northern release areas (5D & 5E) of Georges Fair are occupied and PSNL limits set accordingly for both the weekday and Saturday as appropriate.

We consider this traffic volume and background noise data supports the adoption of 48dBA as a background noise level and a PSNL of 53dBA at receivers 4N and 4K with a lower level of 47dBA at 4M and 4S.

We trust this information is sufficient. Please contact us if you have any further queries.

Yours faithfully
WILKINSON MURRAY

Neil Gross
Director

NEXUS
Environmental Planning Pty Ltd
ABN 58 061 284 615

Consultants in:

Town Planning
Environmental Assessment

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Principal:
NEIL KENNAN
B.A., Dip. Urb. Reg. Plan., MPIA,
Ord 4, Dip. Cart.
Certified Practising Planner

Our Ref: B950

20 January 2014

The Director General
Department of Planning
GPO Box 39
SYDNEY NSW 2000

Attention: Mr David Mooney
A/Team Leader
Industry Projects

Dear David,

MP05/0157 - Proposed Materials Recycling Facility
Lots 208, 209 & 210, DP 1118048 and Lot 6, DP 1065574, Newbridge Road, Moorebank

We refer to your 12 November 2013 email (refer **Attachment 1**) seeking a response to the 8 November 2013 submission of Benedict Industries Pty Ltd (**Benedict**) with regard to *"Noise Issues"*. A copy of the 8 November 2013 submission from Benedict, minus its attachment, is at **Attachment 2**.

In order to address the submission from Benedict, we have requested that Wilkinson Murray Pty Limited (**Wilkinson Murray**) provide additional information to assist the Department. We provide a copy of a 13 January 2014 letter of Wilkinson Murray to this office at **Attachment 3**.

Having regard to the Wilkinson Murray response, we make the following points of clarification for the Department:

1. The Environmental Assessment which was submitted to the Department with the Part 3A application contained, as its **Part 5** and **Appendix 11**, an assessment of the acoustic impact of the proposed materials recycling facility. The report at **Appendix 11** of the Environmental Assessment was Version C of the Wilkinson Murray report.

2. Subsequent to the receipt of submissions to the Environmental Assessment, and as part of the preparation of the Preferred Project Report (**PPR**), Wilkinson Murray prepared Version D of its report. Version D was included as Attachment 12 to the PPR.

3. The submission from Benedict at **Attachment 2**, refers to the Version D report of Wilkinson Murray report.

4. Wilkinson Murray remains of the opinion that additional acoustic mitigation measures to those provided in Version D of its report are not required. Notwithstanding, the 13 January 2014 letter from Wilkinson Murray includes additional information in the form of the acoustic mitigation which might occur as a result of an acoustic mitigation barrier being constructed on part of the proposed access ramps to and from the Moorebank Recyclers' land and Brickmakers Drive (refer to Figure 2 of the Wilkinson Murray letter).

5. As stated in the Wilkinson Murray letter, for the purposes of responding to the Benedict submission, it is assumed that the residentially zoned part of the Benedict land is indeed developed for residential purposes. In this regard, we note that the R3 Medium Density zoned part of the Benedict land does not contain any residential development. Indeed, that R3 zoned land is currently extensively utilised as industrial development. To our knowledge, no development application has been lodged with Liverpool City Council to either remediate that land as a precursor to its use for residential purposes or to establish residential development on that land. As such, as stated by the Environment Protection Authority in its 2 May 2013 response to the Department relating to acoustic assessment of any future residential development of the Benedict R3 zoned land:

> *..... if residential development is not yet approved for this site then it would be unreasonable for EPA to not support the proposed facility because approval for residential development is not guaranteed or may not occur for some time in the future. In addition, conceivably there are options such as setbacks, roadside barriers or building layout and design measures that are still available for noise mitigation measures that could be incorporated in any residential development approval.*

6. Notwithstanding the advice of the EPA that Moorebank Recyclers does not need to account for any future residential development on the Benedict site, Wilkinson Murray has undertaken a conceptual exercise assuming that, at some stage in the future, there maybe residential development of the R3 zoned portion of the Benedict land. In this regard, as stated in the Wilkinson Murray letter:

> *In the absence of any details about the future development of the R3 zoned section of the Benedict Sand site, but assuming that, at some time in the future it could be residential, then the recommended amenity criterion for a suburban area at daytime is considered to be a reasonable target. This is 55dBA measured over 11 hours between 7.00am and 6.00pm.*
>
> *Allowing for the total truck movements over the day (324) the $L_{eq,11hour}$ value is predicted to be 1.3dB lower than the 15 minute value which is based on 10 movements in a 15-minute period (i.e. 440 movements in 11 hours).*
>
> *The street pattern of future residential development on the R3 zoned section of the Benedict Sand site is depicted on Figure 2 of Part 2.10 of the Liverpool Development Control Plan .... We have undertaken a concept design of an indicative barrier assumed to be located at the western edge of the collector road on the Benedict Sand site as depicted on Figure 3 below* [Figure 3 of the

Wilkinson Murray letter]. *This could be a combination of earth mound and wall.*

The graph at Figure 4 [of the Wilkinson Murray letter] *indicates the height of a barrier needed to control noise to various noise levels (under neutral conditions) at the potentially most affected residential location on the R3 zoned section of the Benedict Sand site.*

No barrier is required to meet the industrial criteria. In order to meet an amenity criterion of 55dB$L_{eq,11hour}$, then a low mound/barrier of approximately 1.5m is required. In order to meet an intrusive limit of 51dBA, a higher barrier of up to 3m would be required.

This range of barrier heights is typical of measures at the perimeter of residential developments to control traffic noise.

Having regard to the above and attached information from Wilkinson Murray, although it is considered that additional mitigation measures to those proposed in the PPR are not warranted, Moorebank Recyclers is prepared to further modify the PPR to include the acoustic mitigation barriers on the ingress and egress ramps as depicted on Figure 2 of the Wilkinson Murray letter.

In order that the abovementioned additional acoustic barriers are included in any approved development, the Cardno Plans would need to be altered to include the acoustic barriers. If this approach is agreed to by the Department, we will commissioned Cardno to amend its plans accordingly and submit those amended plans to the Department.

Please contact Mr Neil Kennan of this office if additional information is required.

Yours faithfully,
NEXUS ENVIRONMENTAL PLANNING PTY LTD
per:

Neil Kennan

Attachment 1

Neil Kennan

From: David Mooney <David.Mooney@planning.nsw.gov.au>
Sent: Tuesday, 12 November 2013 10:43 AM
To: Brent Lawson; kennan@ozemail.com.au
Subject: Fwd: Submissions re PPR Major Project 0157
Attachments: 2013-11-08 Benedict Industries_ -Submission to DoPI - Letter to David Mooney.pdf; EMMGA noise report - PPR 0157_ November 2013.pdf

Neil, Brent,

Could you arrange to have your noise consultant review and respond to this submission.
We will have our noise expert review it as well.

Regards,

David Mooney | Senior Planner
Industry Projects | Department of Planning & Infrastructure
23-33 Bridge Street SYDNEY 2000 | GPO Box 39 SYDNEY 2001
t: 02 9228 2040 | f: 02 9228 6466 | e: david.mooney@planning.nsw.gov.au

NSW GOVERNMENT | Planning & Infrastructure

>>> On 12/11/2013 at 7:28 am, <davidw@benedict.com.au> wrote:

> Please find attached submissions including the latest noise assessment for noise impacts.
>
> Regards
>
> David White
> Consultant
>
> **for Benedict related matters**
> **Email**: davidw@benedict.com.au
>
> david.white@raconsulting.net.au
> 12 Wongalee Ave WAHROONGA NSW 2076
>
> **Mobile : 0434 560 022**

Attachment 2

BENEDICT INDUSTRIES PTY LTD

ABN 46 001 926 503

8 November 2013

Mr David Mooney
Senior Planner Industry Projects
Department of Planning & Infrastructure

By email: david.mooney@planning.nsw.gov.au

Re: Major Project 0157 - Exhibition of Preferred Project Report

Dear David

We wish to make the following submissions in relation to the Preferred Project Report:

1. **Air Quality**

We note that the air quality report prepared by Pacific Environment Limited states that it was prepared by a Ms J Cox and it was reviewed by Mr B Lawson and Mr N Kennan, neither of whom have qualifications or experience in air quality science and who are clearly associated with the proponent. On this basis we would question the technical integrity of the report. Accordingly, we submit that this report cannot be relied upon as an experts report.

2. **Noise Issues**

We contend that the noise impact assessment prepared by Wilkinson Murray (Report No. 03124/DA Version D, August 2013) contains significant errors and omissions. This report indicates that, based on advice from the EPA, there is no need to consider that the Tanlane land (which is currently zoned R3 Residential in the Liverpool LEP) as being considered as residential premises for the purposes of the noise assessment. The apparent rationale expressed by the EPA is that the proponent is somehow not obliged to consider the Tanlane land as residential as approval for residential development is not guaranteed or may not occur for some time. This is clearly a major error as the LEP identifies a significant portion of the northern part of the Tanlane site as Residential Zone R3. In addition, the northern portion of the site currently has an existing residence which has been overlooked by the proponent and various consultants undertaking the noise impact assessments. The existence of this longstanding residence has been pointed out to the proponent but has been deliberately ignored in the noise impact assessments undertaken to date. We also note that the EPA's own Industrial Noise Policy (INP) mandates that the appropriate noise amenity criteria is based on the existing zoning of the land.

.

In relation to the residential R3 zoned land on the northern portion of the Tanlane site not yet being approved for residential development, we note that a Voluntary Planning Agreement has been executed with the Council which provides for up to 225 separate dwelling lots. This fact, in addition to the already existing residence on the property confirms the need for the proponent to adequately assess the impacts of the proposed development on this residential zone.

In addition, no mention is made of the noise impacts on the areas zoned public and private recreation. In particular we are very concerned that the impact on the amenity on the public recreation areas will exceed the amenity criteria outlined in the EPA's Industrial Noise

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Policy which is set at 50dBA and 55dBA for passive and active recreation respectively.. We request that additional noise studies be undertaken to ascertain the impact on the public and private recreation areas. We note that the noise monitoring and predicted noise locations set out on page 9 of the report do not include any of the public recreation areas. This is a major oversight and requires rectification before any approval could be granted.

We note that Table 4-1 of the Wilkinson Murray report summarises the noise criteria adopted for the assessment of the materials recycling facility. The report goes on to state that "this also includes amenity criteria for active and passive recreation." However, the report itself does not have any monitoring or predictive levels for the private and public recreation zones immediately adjoining the proposed Moorebank Recyclers development.

In fact, Figure 2-23 shows clearly that the private recreation zones on the Benedict land will experience noise levels predicted by the proponent themselves which clearly exceed the amenity criteria outlined in the EPA's Industrial Noise Policy, being 50 and 55 dbA respectively for passive and active recreation areas. As the proponent has not addressed either of these recreational area issues the assessment is seriously deficient and the proposal should not be approved.

These issues have been addressed in a report by our acoustic expert which is attached. The Results of this assessment as as follows:

- ***Noise levels are predicted to exceed criteria at proposed Georges Fair residences adjacent Brickmakers Drive by up to 9 dB (location GF_01). The barrier versus no barrier result is unchanged as this receiver as it is almost directly opposite the bridge crossing and hence the barrier does not provide any shielding to this property from the closest trucking operations on the ramps. Our results are higher than those presented by both Wilkinson Murray and Renzo Tonin, which cannot be explained;***

- ***Noise levels are predicted to exceed criteria at existing Elouera Crescent residences;***

- ***Noise levels are predicted to exceed criteria at future Tanlane residences by up to 9 dB (location T_14) with no access road barrier. This Tanlane location is potentially the closest future receiver to the access road and bridge crossing. The noise contours (Figure A in Appendix A) shows that the criteria (49 dB(A)) is predicted to be exceeded across approximately 50% of the Tanlane land, which is a significant impact. Discussions around the feasibility of a road barrier or tunnel is provided below. Our predictions are 6 dB higher than Renzo Tonin's barrier scenario.***

- ***Noise levels are predicted to exceed criteria at existing Bradbury Street residences by 3 dB, without a barrier and by 2 dB with a barrier.***

- ***Noise levels are predicted to exceed criteria at future passive recreation areas (foreshore area) of the proposed marina.***

There is a significant discussion around adoption of road side noise barriers or even a tunnel to achieve compliance with noise criteria. One consideration of this is cost. Typical road side barrier cost estimates we have been provided on other projects suggest a minimum cost of approximately $2000 per lineal metre of barrier. For the current project, this would total $4M for both sides of the access road and ramps. We cannot hazard a guess at the cost of a tunnel as suggested required by Renzo Tonin to achieve criteria. In our opinion a barrier or tunnel option do not constitute reasonable and feasible noise mitigation and should not be considered further.

The full report is attached

3. **Water Management**

The water management and pollution control assessment undertaken by Evans & Peck raises a number of serious concerns.

We note that on page 3 the applicant states "The works which have been approved to date (under Liverpool Council approved Earthworks Development Application 1417/05) involved the excavation of approximately 40,000m^3 of spoil from the southern portion of the site in order to reinstate the original natural ground levels." We are concerned that this 40,000m^3 (i.e. 60,000 plus tonnes) will contain significant amounts of construction and demolition waste and possibly other industrial and hazardous waste materials which may be entirely unsuitable for use on the northern end of the site as proposed by Moorebank Recyclers. We note that the proponent proposes that "the excavated material from the southern end of the site will be used to construct a series of perimeter mounds and to fill the operational areas of the site, designated as Area 1 on Figure 1."

Our Flood Expert Mr Mark Tooker of NPC Consultants has also made the following comments in relation to the Proposed Site Filling claimed to be approved by Council previously (DA 1417/05).

"The use of a one dimensional (1D) flood model to assess the impacts of significant filling in a complex flood area is technically inappropriate as it would be technically unable to accurately determine impacts on flood levels and velocities on surrounding properties.

In addition to this, there is no assessment of the impact on flood velocities on adjacent properties especially around the 8m high mound. While it is claimed that excavation at the southern end of the site will balance the fill volume, this will not mitigate the impacts on adjoining properties of the 8m mound at the northern end of the site.

The flood impacts of this extensive filling needs to be assessed with a 2D flood model so the potential impacts can be accurately assessed. This is accepted practice by the Council and the industry and to not model it in this way is highly irregular. The assessment of such a large project should not rely upon outdated methods and substandard inappropriate flood models."

4. **Waste Issues**

As the spoil material is clearly waste and may well contain hazardous materials, the EPA will be required to license the northern portion of the site as a landfill activity. In addition, any approval to utilise this material in this manner will need to incorporate stringent conditions relating to the classification and assessment of the waste material that is being exhumed as spoil from the southern portion of the site. It may well be that this material will need to be transported off the site to an appropriately licensed landfill to deal with this material. The point which we wish to highlight is that this spoil is waste material which has the potential to be severely contaminated due to the activities formerly carried out on the site owned by the proponent, which was an industrial landfill operated by the TNT Group.

We suggest that the construction of the bund wall and the raising of the land for the platform should only be undertaken with material that was certified as virgin excavated natural material (VENM) as defined by the EPA.

5. **Operating Hours**

We note that the proponent still seeks to obtain approval for operations from Monday to Saturday 7:00 AM to 6:00 PM with the operation of the crushers being restricted to 7:00 AM to 5:30 PM. Standard industry operating hours imposed by the EPA on other recycling facilities and quarries require operations on Saturdays to be from 8:00 AM to 1:00 PM only.

Given that the hours of operation was one of the principal issues raised by numerous submissions this demonstrates that the proponent will not accommodate the interests of adjoining residences and neighbours. Accordingly, there is no willingness by the proponent to submit a Preferred Project Report that had bona fide intentions of minimising the environmental impact of the proposed development.

6. **Other Matters**

At page 2-53 of the Submissions Preferred Project Report and Revised Statements of Commitments, the proponent states at paragraph 2.6.2: “There is no evidence presented which would lead to a conclusion that the Benedict Sand and Gravel operations will cease within the next 18 months.”

This statement is deliberately misleading. Benedict (the owner of the Tanlane land) has indicated that it is our intention to cease operations there within the next 18 months. The land is zoned residential and we are currently dealing with major development companies to develop a residential precinct on the R3 zoned Tanlane land. Benedict has spent millions of dollars in legal fees and court cost to secure an easement to facilitate access for this residential precinct. No residential development is possible until this access is secured. The hearing to determine the costs of this easement is scheduled for 11 and 12 November 2013. Moorebank Recyclers have been misleading in suggesting that there has been no attempt by Benedict to undertake residential development when Moorebank Recyclers have embarked on court action since 2008 to oppose the access to allow this development to occur.

6. **Traffic Movements**

In respect of traffic movements we note that the proponent contends that the site will be operational for 292 days per annum. We believe that this is an excessively optimistic view and that this figure has been used to spread the proposed vehicle movements over the longest period of time possible. Accordingly the traffic studies, with particular reference to the Impact on Intersection Performance, should be re-done with a more realistic assumption of the number of working days which specifically takes into account public holidays, Christmas shutdown, and other operational interruptions.

7. **Visual Amenity**

We note that the report states on page 2-75 that: “It is proposed once the Marina Function Centre development has been approved and the construction levels obtained by way of a construction certificate, that the visual impact would be reassessed and, if required, the northern bund would be raised by way of an amendment pursuant to Section 75W.” We note that the marina is currently being considered by the JRPPand that the visual impacts of the proposed development on the marina precinct are well known by the proponent. Accordingly, the visual impact statement needs to be re-done immediately in order to assess the impact on this development.

Yours sincerely

Ernest Dupere
Director

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Email: ernest@benedict.com.au

Attachment 3

WILKINSON MURRAY

13 January 2014

WM Project Number: 03124-DA
Our Ref: NEP130114 NG_ltr
Email: kennan@ozemail.com.au

Mr Neil Kennan
Nexus Environmental Planning Pty Ltd
PO Box 212
CONCORD NSW 2137

Dear Neil

Re: Moorebank Recycling Facility - Review of Mitigation

Our Report 03124-DA Version D provided consolidated information which revised criteria based on future background noise levels and also updated noise predictions as the design of the proposed access to the Moorebank Recycling Facility evolved and more concise data regarding truck noise on the access road was obtained. The access road plans and long sections are attached as Appendix A.

This Version D report (compared with Version C) resulted in marginally higher criteria and also marginally higher predicted noise levels at the potentially most affected receivers in the future Georges Fair development, which were labelled 4N and 4K to represent the receivers in the northern end of Georges Fair and those near the kink in the access road which are closest to future receivers. Figure 1 shows the Figure 3-1 copied from the Version D report.

Whilst the Version D report indicated compliance with the 53dB criteria in accordance with *INP* requirements under neutral meteorological conditions, we have undertaken further review to reduce noise levels in this vicinity from truck noise on the up ramp where noise levels are predicted to be higher, and also from the down ramp where trucks are at their closest to receivers.

Figure 2 shows the extent of a 1.5m high barrier sufficient to control engine / transmission noise, noting the truck source is split into an engine component (1-1.5m) and exhaust component (3.6m) commonly used in traffic noise assessment. The purpose is to extend the screening along the down ramp from a point close to Brickmakers Drive until the ramp is approximately 1.5m below the level of the proposed new bridge (approx 33m) and along the full length of the up ramp to where is meets the proposed bridge and a location 10m beyond the end of the start of the up ramp (approx 140m).

Figure 1 **Figure 3-1 : Unattended Noise Monitoring (Red) Locations & Prediction (Red and Blue) Locations**

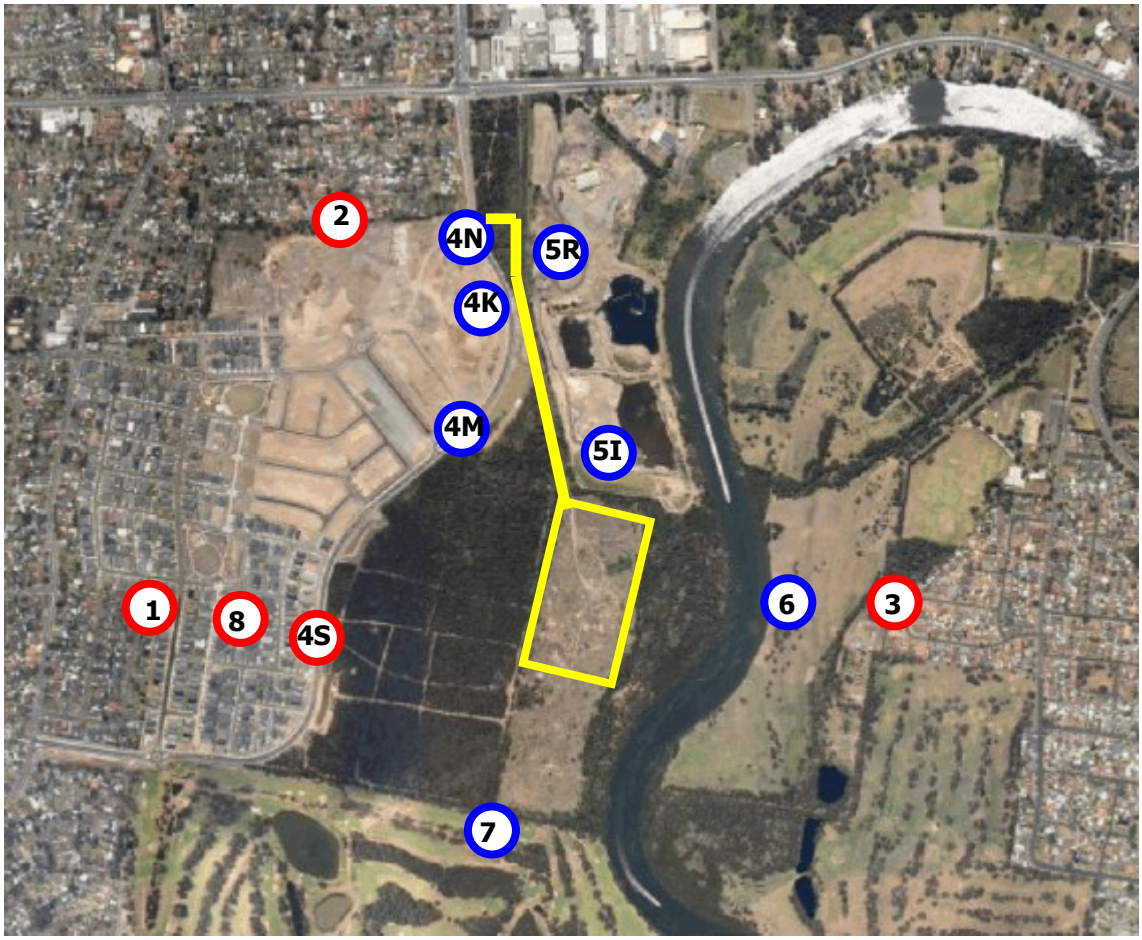
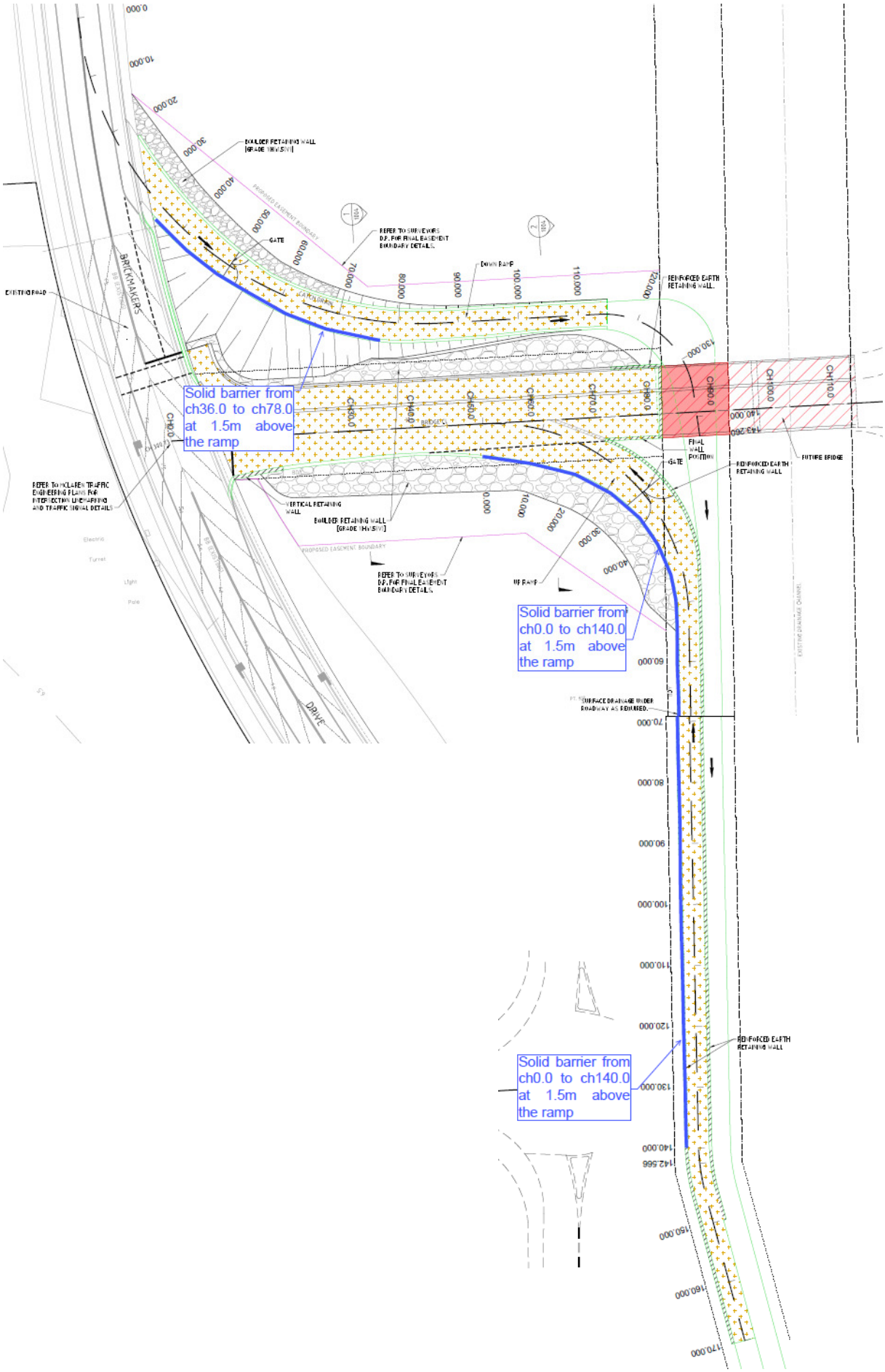


Figure 2 Ramp Arrangement Showing Location of Barrier



The predicted noise levels at receivers under neutral conditions (for *INP* compliance) and adverse conditions (for information) with the inclusion of the barriers alongside the ramps are as follows:

Receiver No.	Operational Noise Criterion, $L_{Aeq,15min}$ (dBA)	Predicted Operational Noise Level $L_{Aeq,15min}$ (dBA)	
		Neutral Conditions	Adverse Conditions
1 – Malinya	49	39	44
2 – Elouera	48	40	44
3 – Martin	48	44	48
4N – Georges Fair	53	50	52
4K – Georges Fair	53	52	53
4M – Georges Fair	53	48	51
4S – Georges Fair	53	44	48
5R – Benedict (Future)	51	54-58	55-58
5I – Benedict	70-75 $L_{Aeq,period}$	57 (55 $L_{Aeq,period}$)	58 (56 $L_{Aeq,period}$)
6 – Vale of Ash	50-55 $L_{Aeq,period}$	48 (46 $L_{Aeq,period}$)	52 (50 $L_{Aeq,period}$)
7 – New Brighton GC	55-60 $L_{Aeq,period}$	44 (42 $L_{Aeq,period}$)	48 (46 $L_{Aeq,period}$)
8 – Bradbury St	42	29	33

Noise levels at the most affected future receivers in Georges Fair (4N and 4K) have been reduced with the inclusion of the 1.5m barrier and are predicted to be lower than the recommended criteria under neutral conditions and lower than predicted noise levels provided in the Version C report of 2012. We also note that under adverse conditions noise levels are predicted to comply.

We have also considered noise levels in the land to the east of the access road which is currently operated by Benedict Sand as a sand dredging and waste recycling facility. Part of the Benedict Sand site is zoned R3 Medium Density Residential. Receiver 5R in the above table is located on the R3 zoned part of the Benedict Sand site. Noise levels outside residences located in the south west corner of the R3 zoned land on the Benedict Sand site are up to 58dBA.

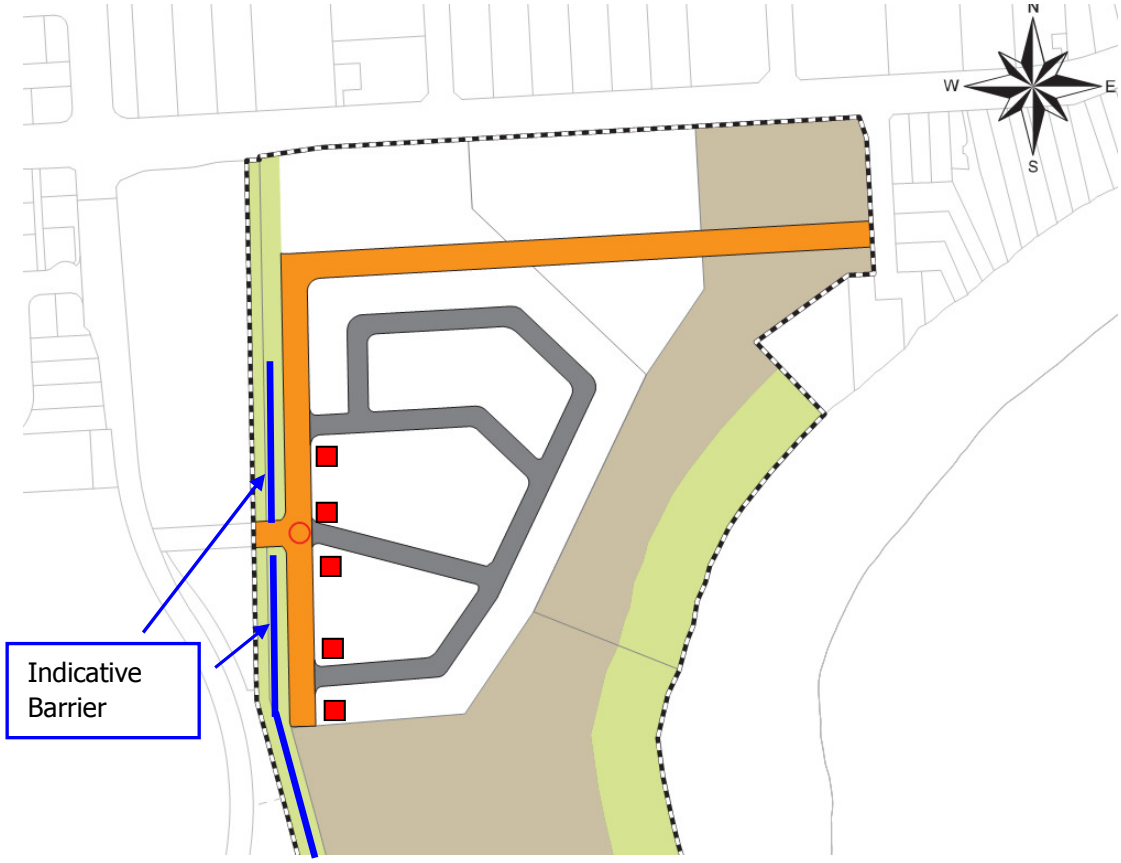
Whilst an intrusive criterion was established in the Version D report to assist in assessing future impacts (in a similar fashion to the other existing residences) this criterion is not currently appropriate as there is no approved residential dwellings at this location. Given that, to date, there is no approval for residential development on the Benedict Sands R3 zoned land, then the industrial criteria would apply. This is confirmed by the EPA in its 2 May 2013 letter to the Department of Planning and Infrastructure (see attached).

In the absence of any details about the future development of the R3 zoned section of the Benedict Sand site, but assuming that, at some time in the future it could be residential, then the recommended amenity criterion for a suburban area at daytime is considered to be a reasonable target. This is 55dBA measured over 11 hours between 7.00am and 6.00pm.

Allowing for the total truck movements over the day (324) the $L_{eq,11hour}$ value is predicted to be 1.3dB lower than the 15 minute value which is based on 10 movements in a 15-minute period (i.e. 440 movements in 11 hours).

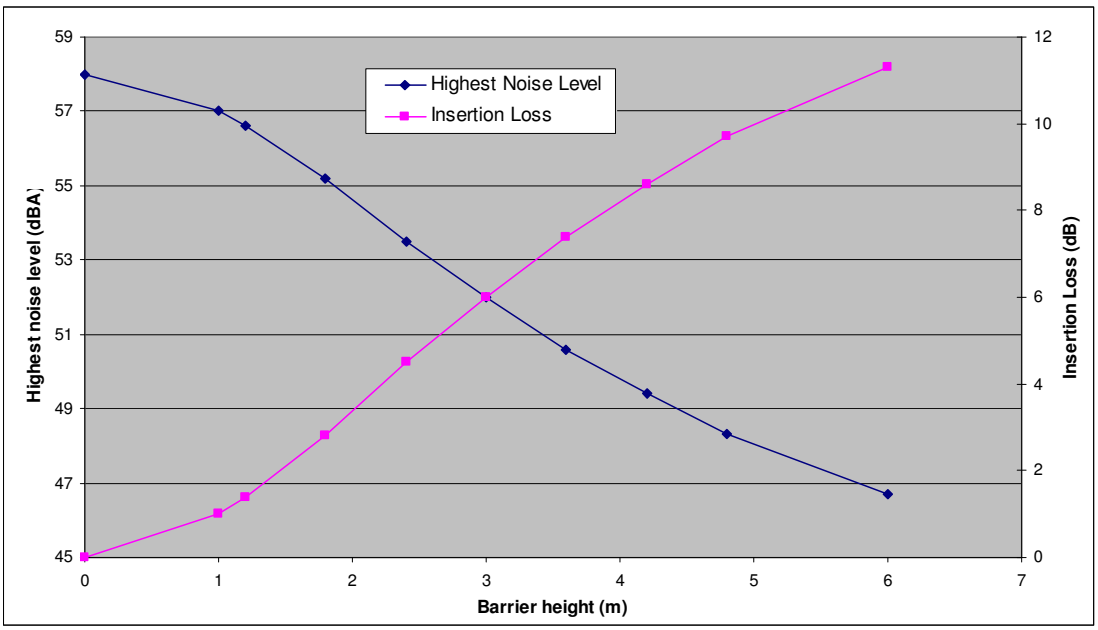
The street pattern of future residential development on the R3 zoned section of the Benedict Sand site is depicted on Figure 2 of Part 2.10 of the Liverpool Development Control Plan, an extract from which is at Figure 3 below. We have undertaken a concept design of an indicative barrier assumed to be located at the western edge of the collector road on the Benedict Sand site as depicted on Figure 3 below. This could be a combination of earth mound and wall.

Figure 3 Benedict Sand



The graph at Figure 4 indicates the height of a barrier needed to control noise to various noise levels (under neutral conditions) at the potentially most affected residential location on the R3 zoned section of the Benedict Sand site.

Figure 4 Barrier Noise Rediction and Resulting Highest Noise Level



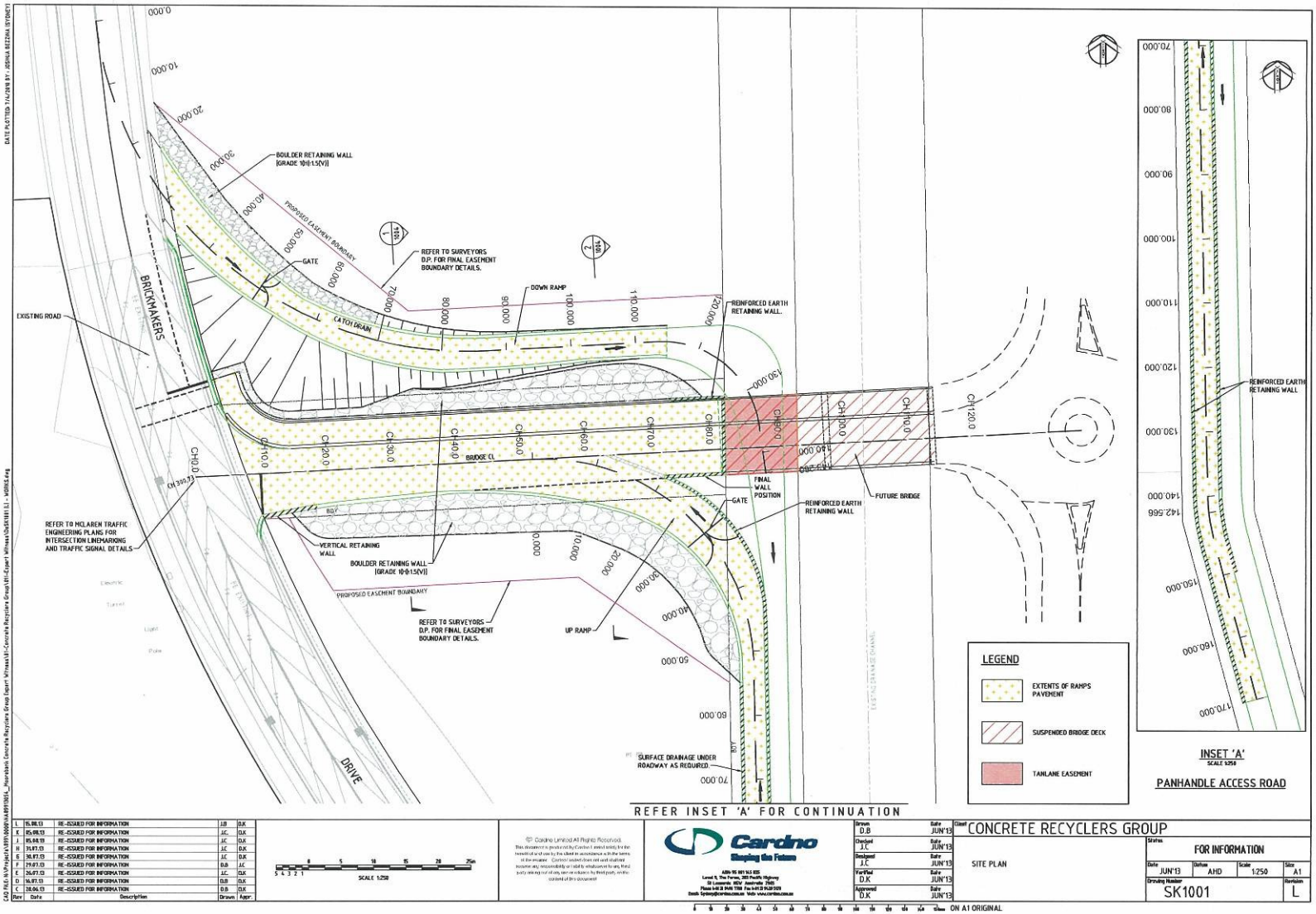
No barrier is required to meet the industrial criteria. In order to meet an amenity criterion of 55dB $L_{eq,11hour}$, then a low mound/barrier of approximately 1.5m is required. In order to meet an intrusive limit of 51dBA, a higher barrier of up to 3m would be required.

This range of barrier heights is typical of measures at the perimeter of residential developments to control traffic noise.

We trust this information is sufficient. Please contact us if you have any further queries.

Yours faithfully
WILKINSON MURRAY

Neil Gross
Director



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J	05.08.13	RE-ISSUED FOR INFORMATION	JC	DJK
H	31.07.13	RE-ISSUED FOR INFORMATION	JC	DJK
G	30.07.13	RE-ISSUED FOR INFORMATION	JC	DJK
F	29.07.13	RE-ISSUED FOR INFORMATION	DJB	JC
E	26.07.13	RE-ISSUED FOR INFORMATION	JC	DJK
D	16.07.13	RE-ISSUED FOR INFORMATION	DJB	DJK
C	28.06.13	RE-ISSUED FOR INFORMATION	DJB	DJK

SCALE 1:250

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Drawn	D.B	Date JUN'13
Checked	J.C	Date JUN'13
Designed	J.C	Date JUN'13
Verified	D.K	Date JUN'13
Approved	D.K	Date JUN'13

Client: CONCRETE RECYCLERS GROUP

SITE PLAN

Status: FOR INFORMATION

Date	Datum	Scale	Size
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Drawing Number: SK1001 Revision: L

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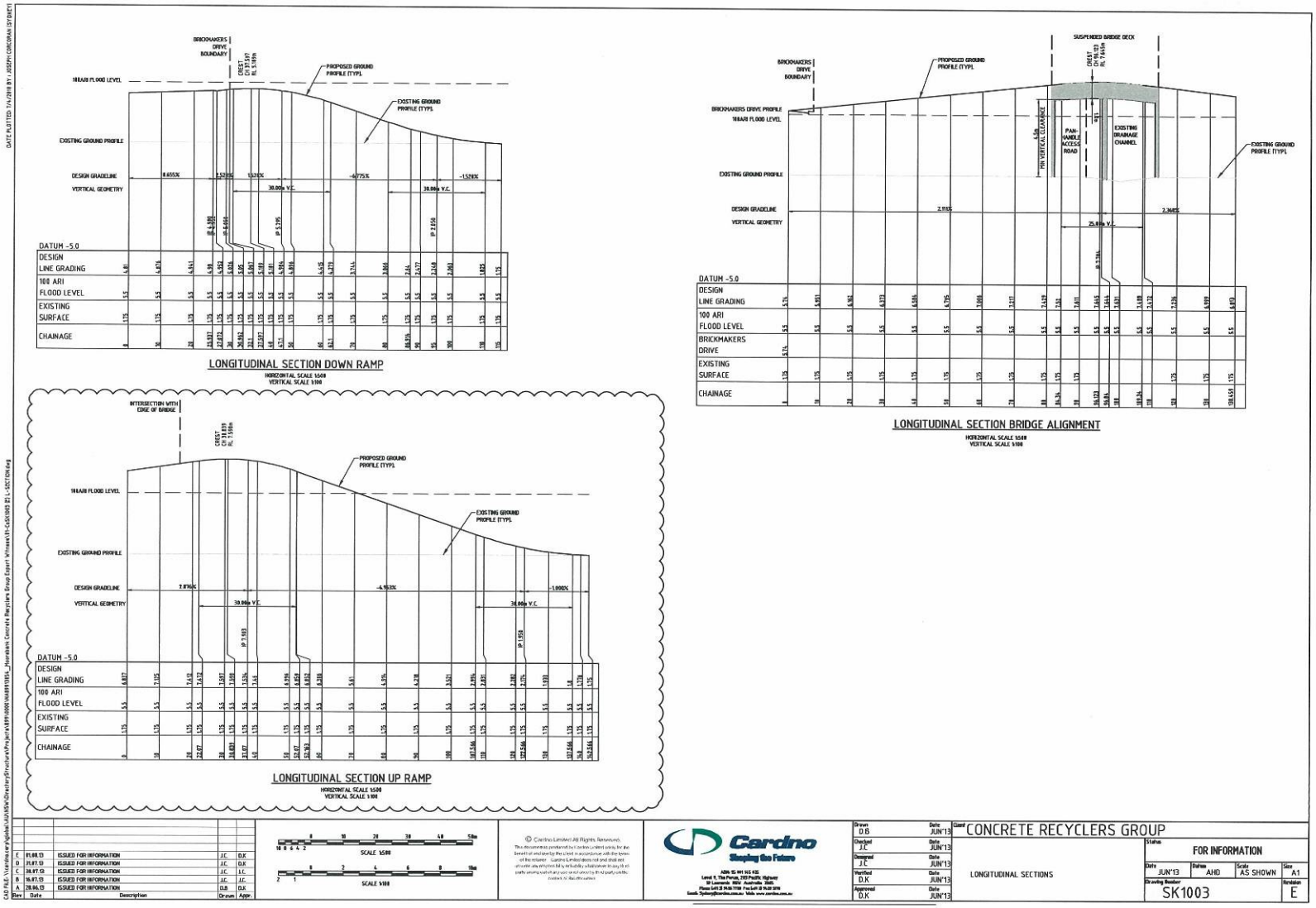
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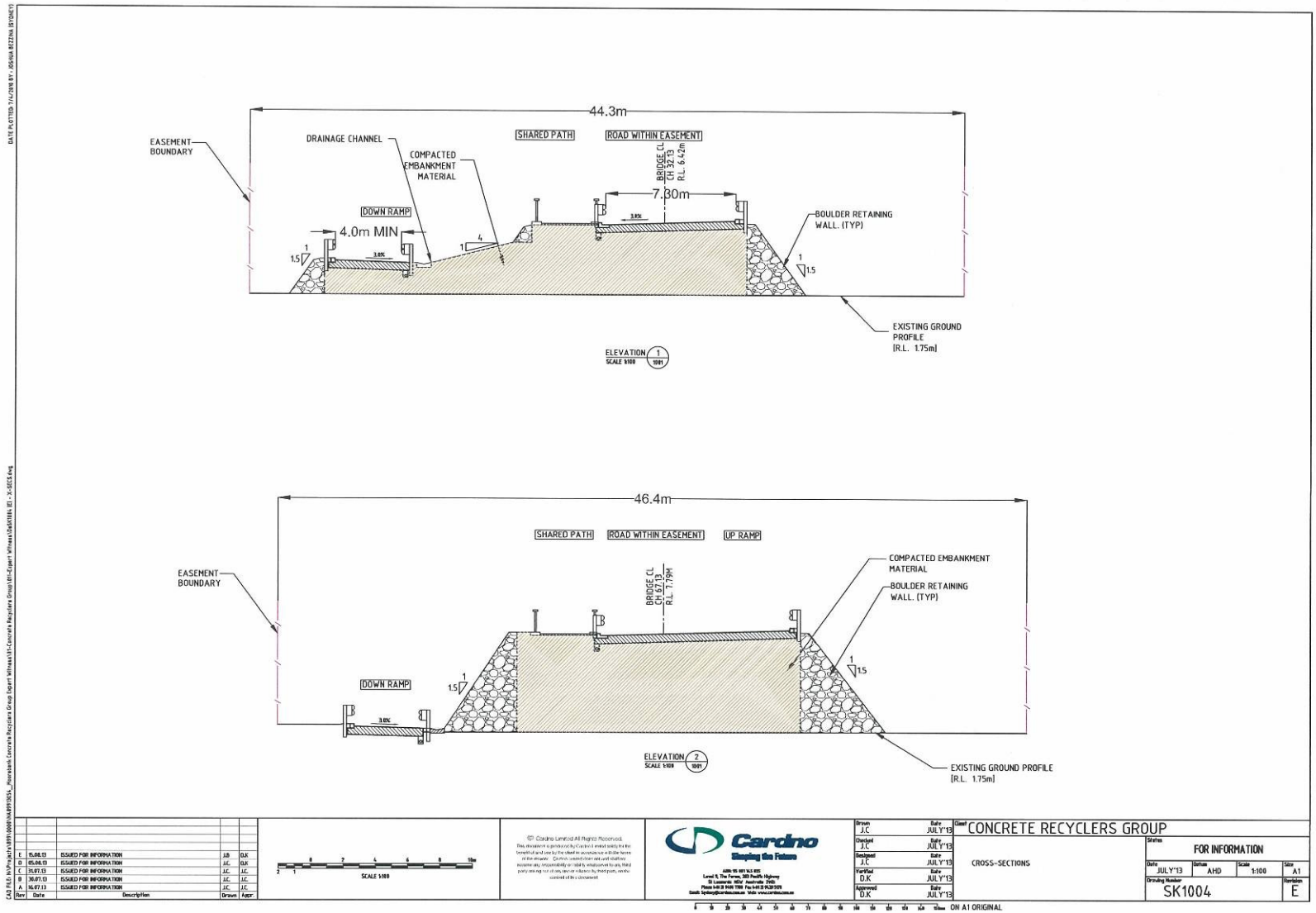
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SHARED PATH
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7.30m
DOWN RAMP
4.0m MIN
BOULDER RETAINING WALL. (TYP)
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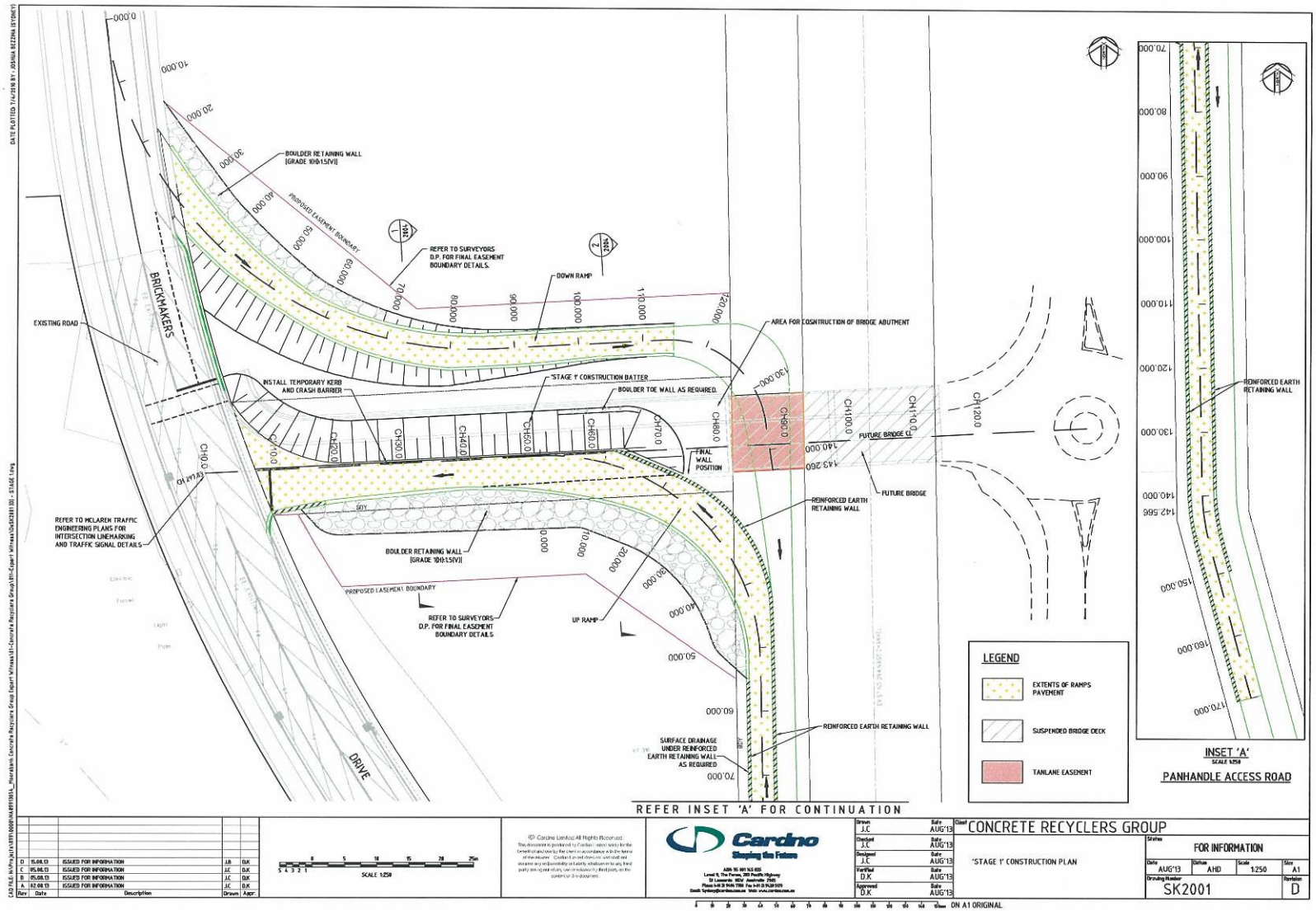

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A	02.08.13	ISSUED FOR INFORMATION	JC	DK

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Checked	J.C	AUG'13
Designed	J.C	AUG'13
Verified	D.K	AUG'13
Approved	D.K	AUG'13

Client: CONCRETE RECYCLERS GROUP

'STAGE 1' CONSTRUCTION PLAN

Status: FOR INFORMATION

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Drawing Number: SK2001

Revision: D

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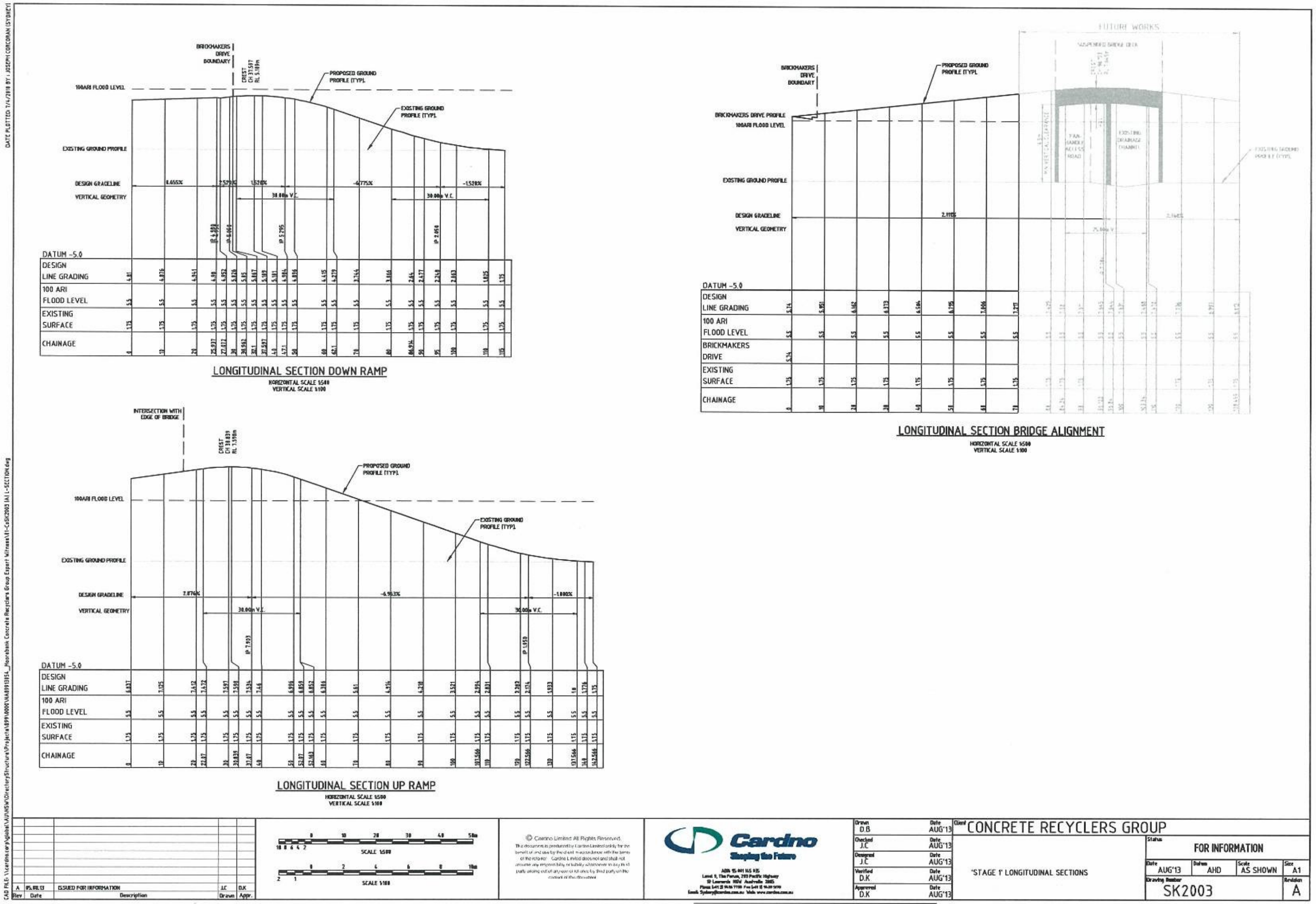
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DESIGN GRADELINE
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DATUM -5.0
DESIGN LINE GRADING
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EXISTING SURFACE
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BRICKMAKERS DRIVE
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CONCRETE RECYCLERS GROUP
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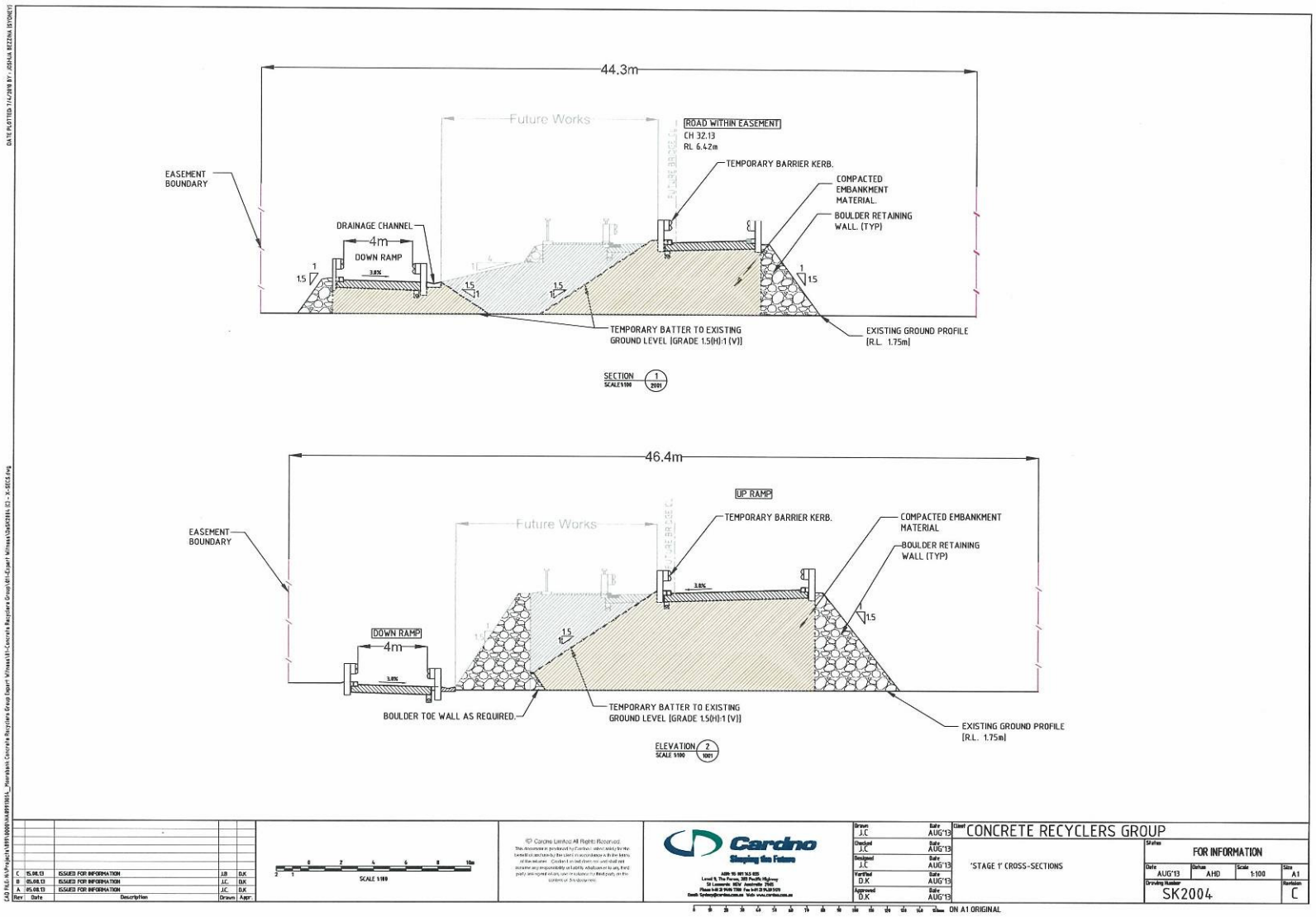
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Future Works
ROAD WITHIN EASEMENT
CH 32.13
RL 6.42m
EASEMENT BOUNDARY
TEMPORARY BARRIER KERB.
COMPACTED EMBANKMENT MATERIAL.
BOULDER RETAINING WALL. (TYP)
DRAINAGE CHANNEL
4m
DOWN RAMP
3.8%
1.5
TEMPORARY BATTER TO EXISTING GROUND LEVEL (GRADE 1.5(H):1(V))
EXISTING GROUND PROFILE (R.L. 1.75m)
SECTION 1 SCALE 1:100 2001
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UP RAMP
Future Works
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TEMPORARY BARRIER KERB.
COMPACTED EMBANKMENT MATERIAL
BOULDER RETAINING WALL (TYP)
DOWN RAMP
4m
3.8%
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B 15.08.13 ISSUED FOR INFORMATION J.C. D.K
A 15.08.13 ISSUED FOR INFORMATION J.C. D.K
Rev Date Description Drawn Appr.
SCALE 1:100
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Cardno Shaping the Future
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Status FOR INFORMATION
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Drawing Number SK2004 Revision C
ON A1 ORIGINAL

NSW EPA
ENVIRONMENT PROTECTION AUTHORITY

Our reference: DOC13/12794

Mr Chris Ritchie
Manager - Industry
Planning & Infrastructure
GPO Box 39
SYDNEY NSW 2001

EMAIL & STANDARD POST

Dear Mr Ritchie

Re: Moorebank Waste Recycling Project MP05_0157

I refer to your correspondence received on 27 February 2013 by the Environment Protection Authority ("EPA") requesting comments on the Moorebank Waste Recycling Project MP05_0157.

I refer to the Nexus Environmental Planning Pty Ltd *"Environmental Assessment Materials Recycling Facility Lot 6, DP 1065574 Newbridge Road Moorebank"* dated 19 February 2013 and attached with your correspondence (the "EA").

The EPA has reviewed the EA for the proposed materials recycling facility at Lot 6 DP 1065574 at Newbridge Road, Moorebank, NSW ("the Proposal"). The proposed facility would receive building and construction waste including concrete, brick, asphalt, sandstone, and sand from the Sydney metropolitan area for crushing, stockpiling and resale. The proposed facility would have a maximum capacity of 500,000 tonnes per annum with a maximum daily processing rate of 1600 tonnes and proposed hours of operation are Monday to Saturday 7am to 6 pm, with crushing equipment operated from 7 am to 5:30 pm.

I also refer to the EMM *"Submission regarding Moorebank Waste Facility"* prepared for Investa Land Pty Limited 5 April 2013, received by EPA on 5 April 2013. Environ Australia Pty Ltd ("Environ") was appointed by EMM to conduct a peer review of the air quality impact assessment of the EA.

Air Quality Assessment

The EPA has reviewed the EA and submissions provided for the proposed Moorebank facility and in particular a peer review of the air quality impact assessment for the proposal conducted by Environ. The EPA notes that Environ have highlighted the following issues:

- That the use of a 2005 meteorological dataset may under represent worst case dispersion conditions for the proposal.
- Impacts have not been predicted at the nearest sensitive receptors given the increase residential development since the AQIA was compiled in 2010
- Concern as to whether impacts from the adjacent Benedict Sands facility were adequately included in the background data set used for the cumulative impact assessment
- Whether the emissions reductions used in the emissions inventory have been adequately accounted for.

The EPA acknowledges that these are areas where the assessment could be improved.

PO Box A290 Sydney South NSW 1232
59-61 Goulburn St Sydney NSW 2000
Tel: (02) 9995 5000 Fax: (02) 9995 5999
TTY (02) 9211 4723
ABN 43 692 285 758
www.environment.nsw.gov.au

To ensure assessment robustness, additional information is requested from the proponent. The proponent should provide:

- Predicted impacts at the nearest sensitive receptors as of 2013 (ie account for new residential development),
- Demonstration that the meteorological data used in the assessment adequately describes the meteorological patterns at the site by correlating it against a longer duration site representative meteorological database of at least five years duration (preferably consecutive),
- Incorporation of Benedict Sands operations in the cumulative assessment, and
- Clear justification for all emissions calculations reductions in the emissions inventory and all proposed management measures.

The EPA would then need to assess this revised information prior to providing any recommended conditions of approval for the proposal.

If the proposal is approved the focus will need to be on conditions of approval that formalise the requirement for both proactive and reactive dust management strategies. As previously stated, no information was provided in the air quality impact assessment addressing dust management in detail, for example potential complaints management or planning day to day activities with consideration of meteorological conditions to minimise the risk of impacts. These issues should also be addressed in the revised air quality impact assessment.

Noise

The EPA usually assesses noise impacts at existing noise-sensitive receivers, or locations where a development approval has been granted but building has not commenced, or where a development application has been lodged but not yet determined. Where residences do not currently exist but might conceivably in the future it would be unreasonable for EPA to assign conditions or limits on industry for something that may or may not occur and for which the timing cannot be specified. Exceptions to this approach may occur where for example an area has been identified in planning documents for future residential land release.

There do not appear to be residences to the immediate west of Brickmakers Drive in the area described as the "Boral" area or the Georges Fair residential development. However, the area is zoned R3 residential in the Liverpool LEP, some houses do already exist and housing construction appears to be progressing from the west of this area eastwards towards Brickmakers Drive. Assuming residential development across this entire site is already approved then there are limited options for adding noise mitigation measures, such as setbacks or roadside noise mounds or barriers. Therefore it does appear reasonable and appropriate to consider the entire area west of Brickmakers Drive as residential.

The area to the north of the proposed facility, described as "Tanlane" in the Noise Impact Assessment Appendix and elsewhere as the Benedict Sands site does not, however, have any residences existing or being constructed on it and appears currently to be still operating as an industrial activity. It too is zoned R3 Residential in the Liverpool LEP and the EPA understands that there is an eighteen month sunset clause on the existing industrial activity. However, if residential development is not yet approved for this site then it would be unreasonable for EPA to not support the proposed facility because approval for residential development is not guaranteed or may not occur for some time in the future. In addition, conceivably there are options such as setbacks, roadside barriers or building layout and design measures that are still available for noise mitigation measures that could be incorporated in any residential development approval.

EPA assesses noise from the proposed facility against the NSW Industrial Noise Policy (INP). The INP generally required that Project Specific Noise Levels ("PSNL") are set, based on existing background noise levels. The proponent, however, has set PSNL based on estimated future background noise levels for nearby residential areas. The EPA would only consider adopting these estimate future background noise levels and associated PSNL if more detail and justification about how these have

been set, can be provided and are to the EPA's satisfaction. Based on the current information provided to the EPA, the future background levels appear to be unjustifiably high.

Background noise levels appear from the assessment provided to be around 43 / 44 dBA daytime at nearby residences, giving Project Specific Noise Levels (PSNL) for this proposal of around 48 / 49dBA. Predicted noise levels are either less, or marginally more, than the PSNLs for the Boral area. There may be additional feasible and reasonable noise mitigation measures that the proponent could incorporate in the proposed facility to reduce predicted levels for the Boral area.

The predicted noise level for Tanlane is acceptable for the existing industrial use, but exceeds a level the EPA would usually licence to for a residential area. Truck movements on the access road to the proposed facility are the significant noise source and there are likely to be limited options for the proponent to reduce these levels, other than to limit truck speeds. However, noise mitigation options may be available to the residential developer of the Tanlane area.

Before providing recommended GTAs, the EPA requests:

- Planning provide advice from Liverpool Council, as the consent authority for any application for residential development of Tanlane, confirming that any such consent would include requirements for noise mitigation measures to be incorporated that provide for an acceptable noise amenity for residents; and
- The proponent provide more details on the feasible and reasonable noise mitigation measures that would be incorporated in the proposal with the objective of not exceeding the PSNLs for the Boral residential area.

EPA is aware that an application has been submitted for a marina development in the vicinity of this development. It has not been considered in preparing this advice; however, this proposal is not likely to be significant because the marina would be considered a commercial land use and not a noise-sensitive receiver.

If you have any further queries regarding this matter, please contact Alex Bourne on 9995 5595.

Yours sincerely

21/5/13

JACQUELINE INGHAM
Unit Head Waste Operations
Environment Protection Authority

David Mooney

From: Brent Lawson <brent@concreterecyclers.com.au>
Sent: Friday, 22 November 2013 11:49 AM
To: David Mooney
Cc: 'Neil Kennan'
Subject: FW: Moorebank

Hi David
Neil Gross has made some comments below regarding the noise assessment report. When you meet with the EPA would you be able to discuss with them these issues and see if they agree with Neils direction.
I'm away until next Wednesday. If you need to discuss anything please call me on mobile 0418 230898.
Thanks
Brent Lawson

From: Neil Gross [mailto:neilg@wilkinsonmurray.com.au]
Sent: Friday, 22 November 2013 10:57 AM
To: Brent Lawson
Subject: Moorebank

Brent

The letter and report raises the following issues with our previous assessment and advice provided by the EPA.

- Existing residence in northern portion
- Existing R3 residential zoning
- public recreation areas (foreshore)
- private recreation (marina)
- exceedences of criteria
- background noise levels - they adopt lower levels than us
- predicted noise levels - they predict higher levels than us

My preliminary comments below which will require some clarification from EPA/DoP re approach.

The existing residential building is within the site boundary with sign posts for Benedicts Sands. It is not clear whether it is used as a residence. The property would clearly constitute an isolated residence in an industrial zone, for which the industrial amenity criteria would apply. Background noise levels at this receiver would be dominated by Benedict existing activities as well as Newbridge Road and would be significantly higher at this location than others in the residential zones. There would be no impacts at this property that warrant any further analysis within the report. ie compliance at other receivers would indicate compliance here.

Residential Zone - We note the comments that the northern part of the site is residential, however the LEP provided shows it as Enterprise zone ??? I am unclear how to deal with this. EPA advised that whilst it is still being used as industrial and no development has been approved to ignore it for our assessment. This is what we have done.

Public Recreation. The LEP plan provided in the letter indicates an area at the waterfront as public recreation. A passive/active recreation criteria of 50/55dBA has been nominated for this land, although the passive seems to be adoptyed in teh compliance table. EPA previously advise the marina development should be considered as commercial. Not sure if this extended to the waterfront area as well. It is debatable whether this land should be considered as passive or active recreation since there are no designated picnic spots or similar at the southern end. The public are likely to be transient in this area. Predicted noise levels at the southern part of this waterfront strip when considered over a whole day (not a busy 15 minute period) are likely to be 2-3dBA lower than the levels

presented in our report. On this basis only a very small proportion of the southern tip would result in noise levels above the 50dBA recommended level with the whole area satisfying the 55dBA maximum level. Beyond the 8m bund already proposed, No further mitigation is therefore considered warranted. Note on the likely busiest day of use (Sundays and public holidays) the recycling facility wont be operating.

Private recreation. The marina is shown zoned as private recreation. This does not form one of the recreation areas in the INP. EPA advise marina is commercial not recreation. Need confirmation.

Background noise levels. I have already put forward argument for adopting higher background noise levels as Georges Fair continues to develop. Your compliance depends on this being acceptable. This is the issue we need to agree with the EPA and may need to meet with them. I feel my approach is reasonable and robust, but it nominated higher background noise levels than curently exist on th basis of futurte higher traffic volumes on Brickmakers Drive. I feel I have done enough measurment and analysis for this to be a reasonable approach but it will need to be mobitored as you approach 500,000 tonnes to confirm it is valid.

Predicted noise levels It is not clear why noise levels are higher. We expect there must be an error in the modelling ie they have extended the ramps to Brickmakers Drive rather than at the road easement or have higher noise levels along the whole exist driveway rather than just the ramps at gradient near the northern end. Otherwise not sure why.

Their assessment shows exceedences based on higher predicted levels and lower criteria. Our assessment shows compliance rather than exceedences

Regards

Neil Gross | Director | **Wilkinson Murray Pty Limited**
Level 4, 272 Pacific Highway, Crows Nest, NSW 2065
t (02) 9437 4611 | **e** neilg@wilkinsonmurray.com.au www.wilkinsonmurray.com.au

WILKINSON MURRAY

29 October 2013

WM Project Number: 03124-DA
Our Ref: NEP291013 NG_ltr
Email: kennan@ozemail.com.au

Mr Neil Kennan
Nexus Environmental Planning Pty Ltd
PO Box 212
CONCORD NSW 2137

Dear Neil

Re: Moorebank Recycling Facility - Background Noise Review

Introduction

We understand the process to determine future background noise levels at residences fronting Brickmakers Drive in our report of August 2013 requires further justification.

Since the preparation of this report and previous noise monitoring we understand that a 5t load limit has been placed on Brickmakers Drive therefore limiting the number of heavy vehicles and potential changing the existing background noise level.

The previous traffic noise study undertaken by Road Delay Solutions always adopted this weight limit; hence future projections of traffic growth remain unchanged.

To provide more comfort in the adoption of 48dBA as a future RBL during the daytime, further measurements were undertaken at the southern end of Brickmakers Drive at Location 4S identified in our report. This is shown in Figure 1 from that report which is included overleaf.

Content of Previous Report

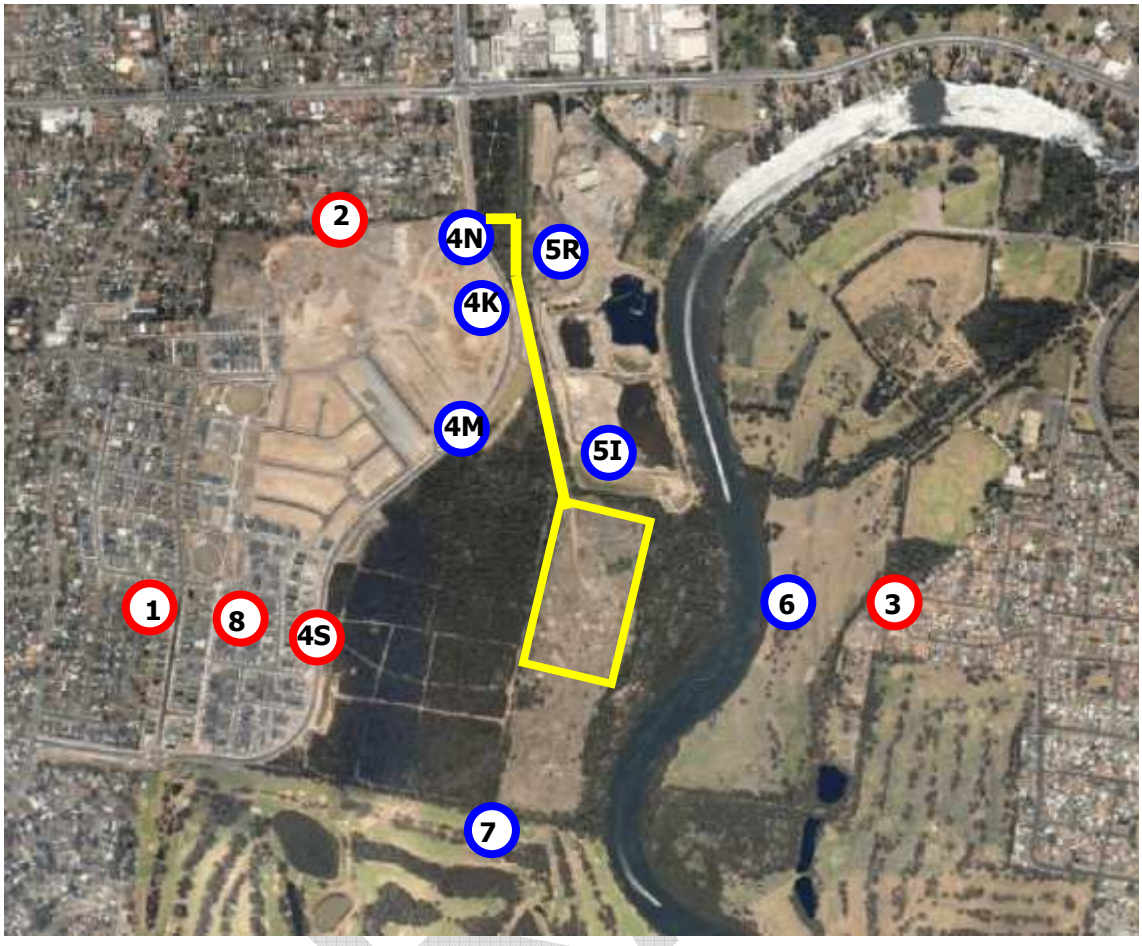
The information provided in our previous report is repeated below:

The measured background noise levels from 16 Bushview Lane (4S) which fronts Brickmakers Drive have been compared with the current hourly volumes (based on traffic counts north of Maddecks Avenue in October 2012 refer Appendix B) to understand the relationship between traffic volumes on Brickmakers Drive and background noise levels at existing residences which front Brickmakers Drive.

This data can then be used to determine future background noise levels at residences fronting Brickmakers Drive based on future projected traffic volumes.

A traffic modelling report by Road Delay Solutions in July 2010, (prepared for the Georges Fair development) indicates peak hour traffic volumes in 2011 were projected to be approximately 400-450 vehicles per hour, and by 2021 to be 1200-1500 per hour in the peak hours (depending on which section of Brickmakers Drive), with the higher numbers just south of the proposed new ramps to the access road.

Figure 1 Unattended Noise Monitoring (Red) Locations & Prediction (Red and Blue) Locations



Currently during daytime hours the vehicle volumes range between approximately 250-750 per hour, with the lower volumes occurring between 10.00am and 2.00pm and the higher volumes in the am and pm peak periods. The existing traffic count data from 2012 shows the projected 2011 data (prepared by Road Delay Solutions) is already being exceeded.

Using Roads and Maritime Services (RMS) published economic assessment data (Appendix C) it is possible to estimate traffic volumes in the non peak hour periods (the period of day between 10.00am and 2.00pm). The Table 10 in Appendix C indicates that traffic volumes are likely to be between 53-70% of the average of the am and pm peak periods.

This RMS expected percentage range is marginally high, based on the actual October 2012 hourly counts, which shows an average of peak hours of approximately 750 vehicles with a minimum of 250 vehicles (i.e. the non peak hours are approximately 33% rather than between 53% and 70%). On this basis there is no reason to believe the current percentages of average am and pm flows won't remain in the future, such that during the middle of the day in 2021 the hourly volumes in non peak hours are a similar (33%) percentage of the projected future peak hour flows estimated as (1200-1500). 33% of 1,200-1,500 is estimated to be approximately 400-500 vehicles. These traffic volumes (400-500) are lower than those projected by Lyle Marshall and Associates in 2011. The Lyle Marshall data is more in line with the RMS percentage range of 53-70% of the average am and pm peak hour flows.

The current traffic flow data indicates vehicle volumes of 400-500 occur in the shoulder peak periods. Review of existing background data at Bushview Lane in Appendix A indicates peak hour and shoulder peak background levels between 7.00am-10.00am and between 2.00pm-6.00pm, often at 50dBA or higher and mostly above 48dBA.

A review of the background noise data and traffic volumes indicates a weekday RBL of 48dBA would apply to residences fronting Brickmakers Drive in the future when the Recycling Facility has reached its maximum nominated capacity of 500,000 tonnes per annum, which is expected to be in 2018.

The weekday background noise levels away from Brickmakers Drive detailed in the EA were noted as "around 43/44dBA" based on data collected in 2007. It was this data, on which basis the EPA nominated a Project Specific Noise Level (PSNL) for this project of "around 48/49dBA" (43/44+5) in their submission letter of 3 April 2013 (Appendix B).

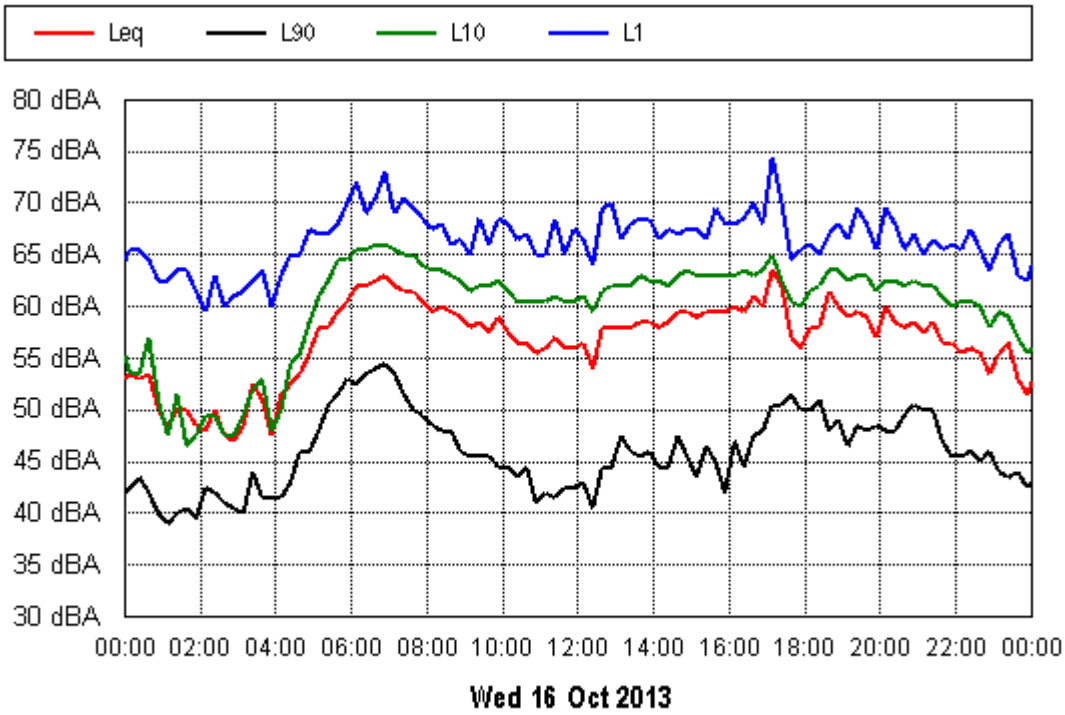
Based on more recent background noise data from May 2013 from Bushview Lane, a more realistic background level of 48dBA has been adopted and the PSNL should therefore be higher (53dBA). It is recommended updated background noise measurements should be carried out once the northern release areas (5D & 5E) of Georges Fair are occupied and PSNL limits set accordingly for both the weekday and Saturday as appropriate.

October 2013 Surveys

Noise monitoring was undertaken at 12 Bushview Lane and traffic counts on Brickmakers Drive were undertaken at the same time. The noise monitoring data is shown attached to this report.

A typical weekday is shown in Figure 2 below.

Figure 2 Daytime Ambient Noise Levels



This shows a similar pattern as before with background noise levels being higher during the morning and afternoon peak periods when vehicle volumes along Brickmakers Drive are at their highest.

The October 2013 Traffic volumes showed am and pm peaks in the vicinity of approximately 700-730 and 800-830 vehicles respectively with minimum volumes during the middle of the day of typically 320 vehicles. The non peak daytime hours are approximately 42% of the average of the peak hours. This is higher than the 33% previously measured and closer to the 53% - 70% range adopted in the RMS guide.

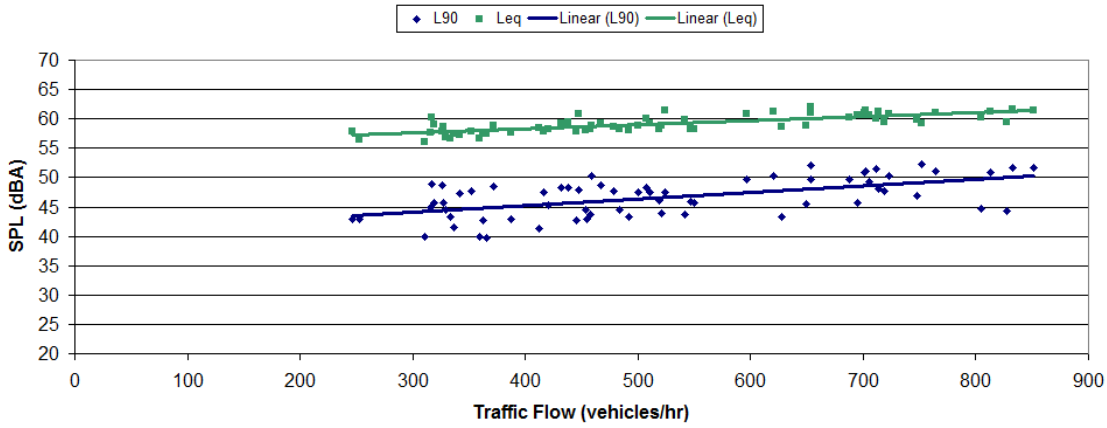
Based on future average of peak hours of between 1200-1500 vehicles on Brickmakers Drive this equates to between 500-600 vehicles per hour during the middle of the day. Noting that it is 600 vehicles per hour at the northern end of Brickmakers Drive (4N).

Vehicle numbers of greater than 600 vehicles per hour occur during the 7.00am-9.00am period and also between 3.00pm-6.00pm. At these times, the current data consistently results in background noise levels above 48dBA.

The data has been presented in a different format in the Figure 3 below, This shows the weekday daytime hourly traffic volume plotted against the average of the four 15 minute background noise levels in the hour in blue and log average of Leq levels in green. The solid line shows the best fit linear curve through the data points.

This approach is a similar concept to the use of ABLs to get the lowest L90 value for each day and then using the median to get the RBL for a week. The data has the equivalent of the ABLs in relation to vehicle numbers on Brickmakers Drive and the curve being the median of the points.

Figure 3 Daytime Traffic Volume vs L_{90} and L_{eq}



When considering vehicle numbers of 600 per hour, the curve indicates a background noise level of 47.5dBA.

We consider this data supports the adoption of 48dBA as a background noise level and a PSNL of 53dBA at receivers 4N and 4K with a lower level of 47dBA at 4M and 4S.

Table 3-2 from our previous report has been revised as shown below.

Table Error! No text of specified style in document.**-1 Estimated Future Daytime RBL Values (Revised)**

Location	Daytime RBL (dBA)
1 – Malinya Cr	44
2 – Elouera Cr	43
3 – Martin St	43
4N – Georges Fair near Link Road (1)	48
4K – Georges Fair near kink in access road(1)	48
4M – Georges Fair Middle area(1)	47
4S – Georges Fair Southern area (Bushview Lane?) (1)	47
5R – Tanlane	46
8 – Bradbury St	37

Note: 1. At residences not shielded from Brickmakers Drive

The predicted levels from our report are shown below. These still show compliance as previously discussed.

Table Error! No text of specified style in document.**-2 Predicted L_{Aeq} Operational Noise Levels, dBA**

Receiver No.	Operational Noise Criterion, $L_{Aeq,15min}$ (dBA)	Predicted Operational Noise Level $L_{Aeq,15min}$ (dBA)	
		Neutral Conditions	Adverse Conditions
1 – Malinya	49	39	44
2 – Elouera	48	41	45
3 – Martin	48	44	48
4N – Georges Fair	53	53	54
4K – Georges Fair	53	53	54
4M – Georges Fair	52	48	51
4S – Georges Fair	52	44	48
5R – Tanlane (Future)	51	52	53
5I – Benedict	70-75 $L_{Aeq,period}$	57 (55 $L_{Aeq,period}$)	58 (56 $L_{Aeq,period}$)
6 – Vale of Ash	50-55 $L_{Aeq,period}$	48 (46 $L_{Aeq,period}$)	52 (50 $L_{Aeq,period}$)
7 – New Brighton GC	55-60 $L_{Aeq,period}$	44 (42 $L_{Aeq,period}$)	48 (46 $L_{Aeq,period}$)
8 – Bradbury St	42	30	34

Whilst it is irrelevant in setting criteria it is important to note that existing L_{Aeq} noise levels at these quieter times in the middle of the day are consistently above 60dBA, some 7dBA higher than the proposed PSNL. Realistically it is almost immaterial whether the background noise level is 47 or 48dBA as the potential impacts from intermittent truck noise from the driveway or on site are likely to be insignificant in the context of existing traffic noise.

On this basis there are no feasible and reasonable mitigation measures which can be implemented.

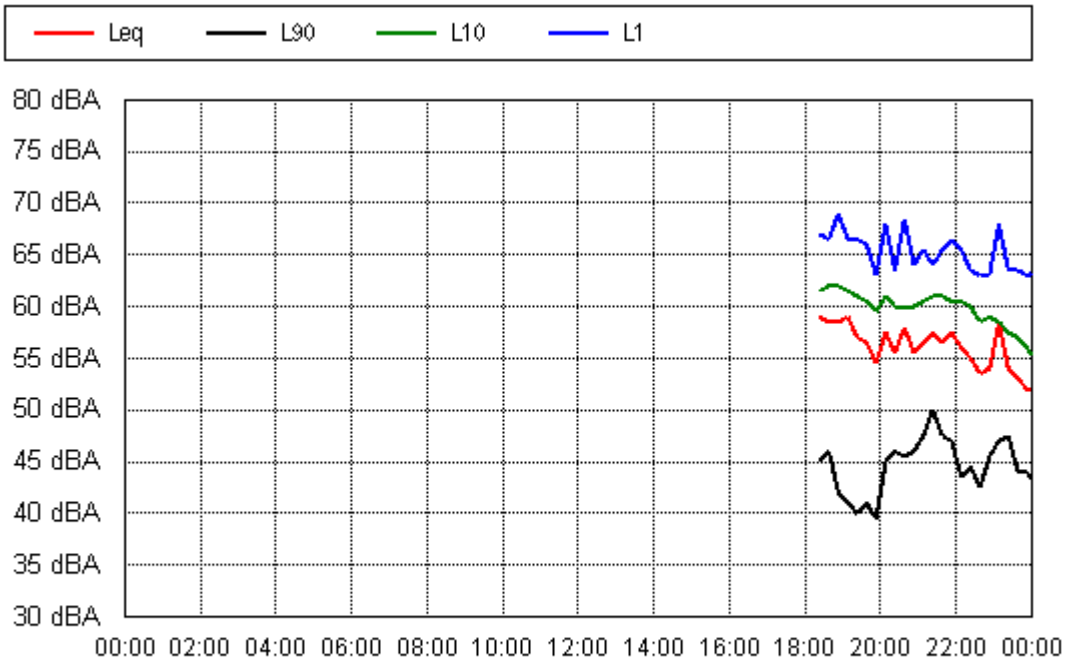
We recommend that future background monitoring is undertaken as production volumes ramp up towards 500,000 tonnes to confirm that there are no unacceptable noise impacts.

We trust this information is sufficient. Please contact us if you have any further queries.

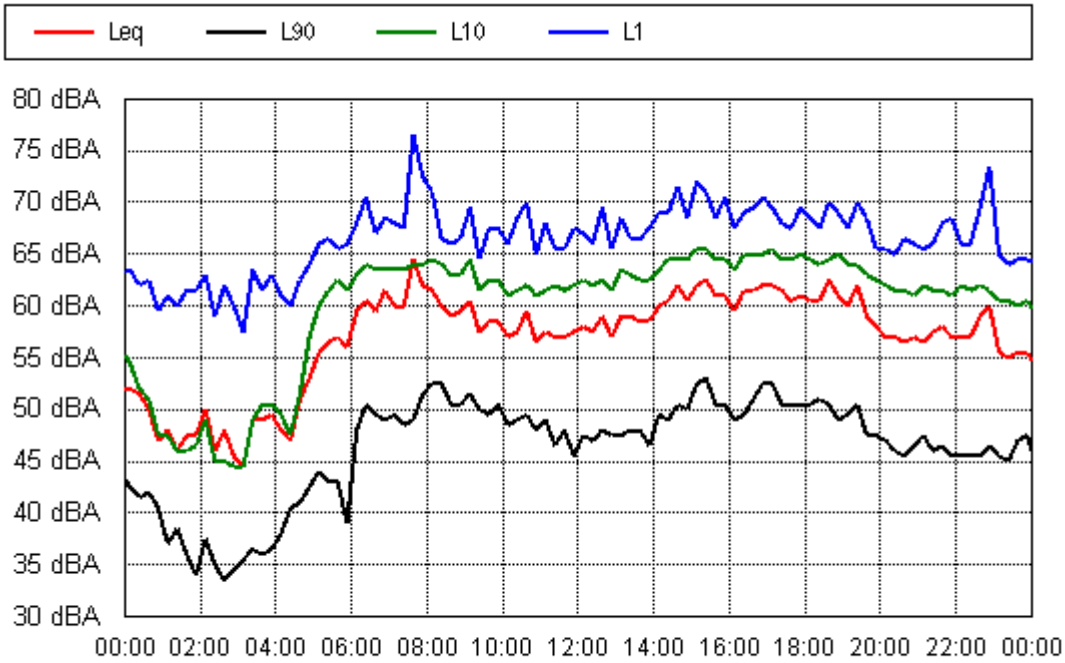
Yours faithfully
WILKINSON MURRAY

Neil Gross
Director

Location: 12 Bushview Lane, Georges Fair

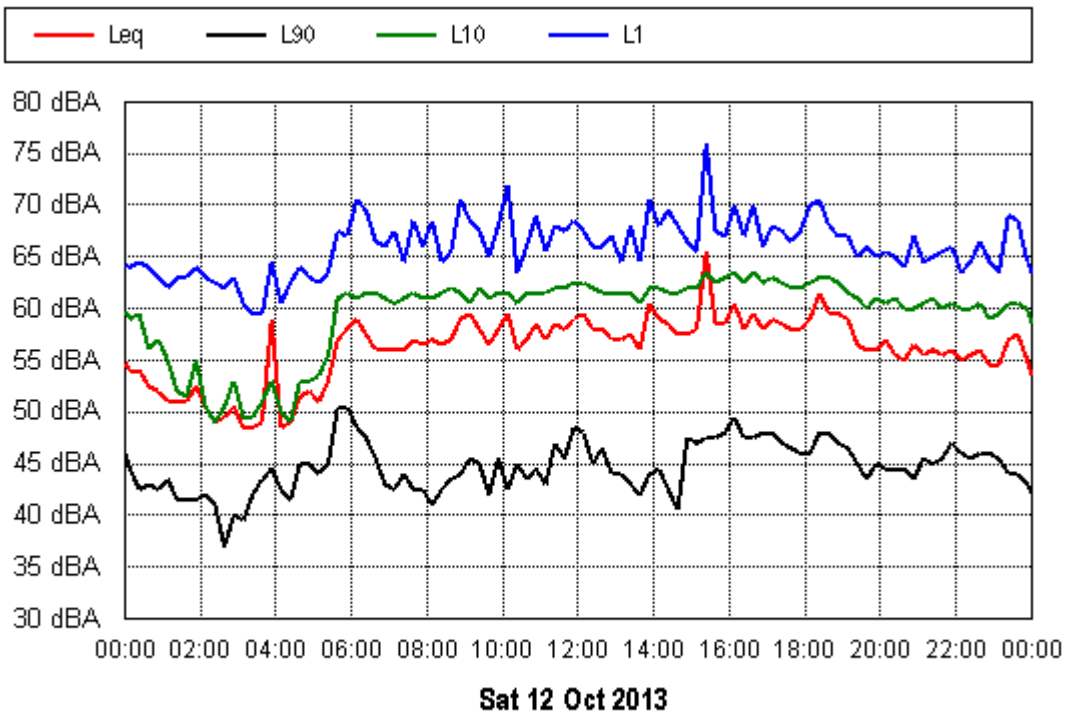


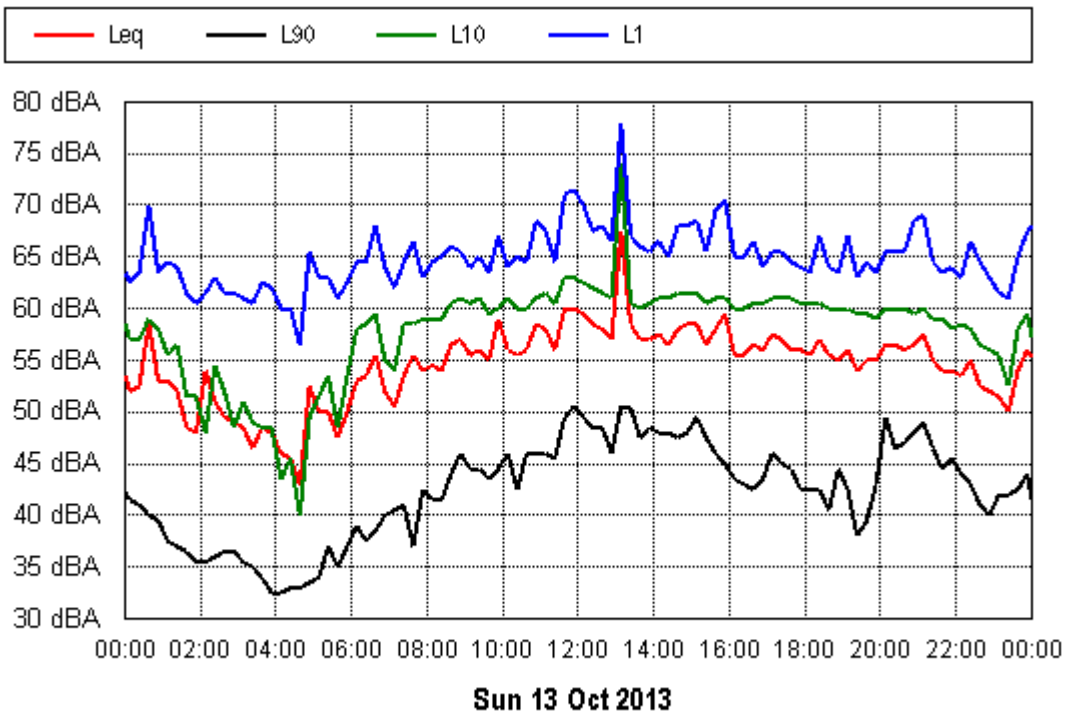
Thu 10 Oct 2013



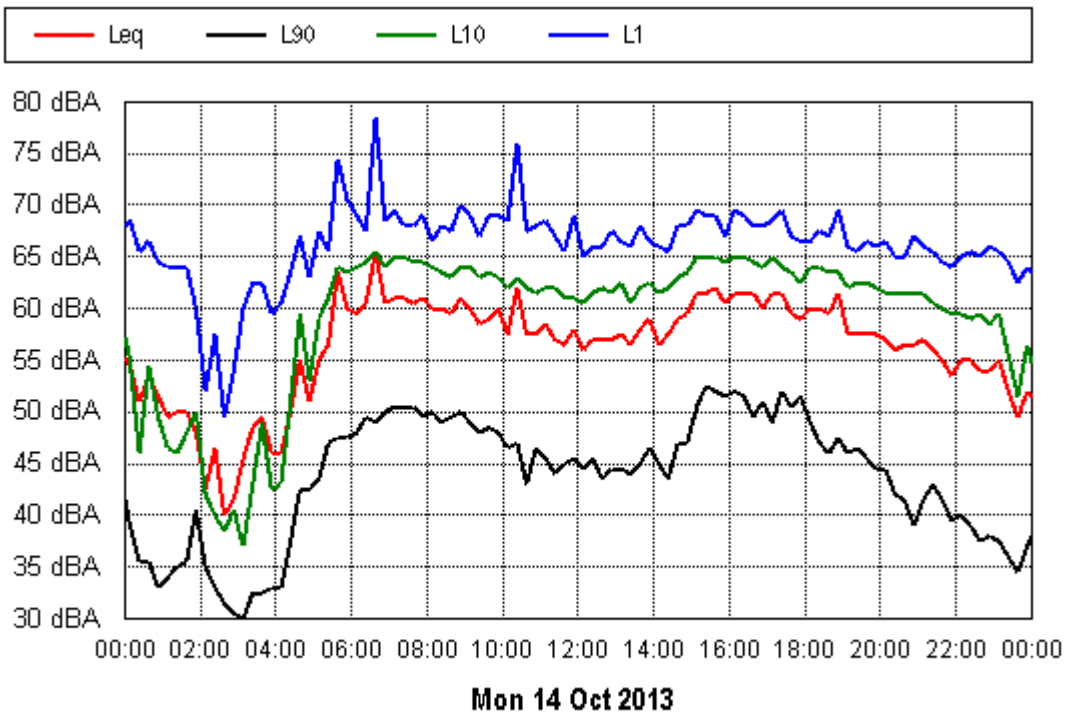
Fri 11 Oct 2013

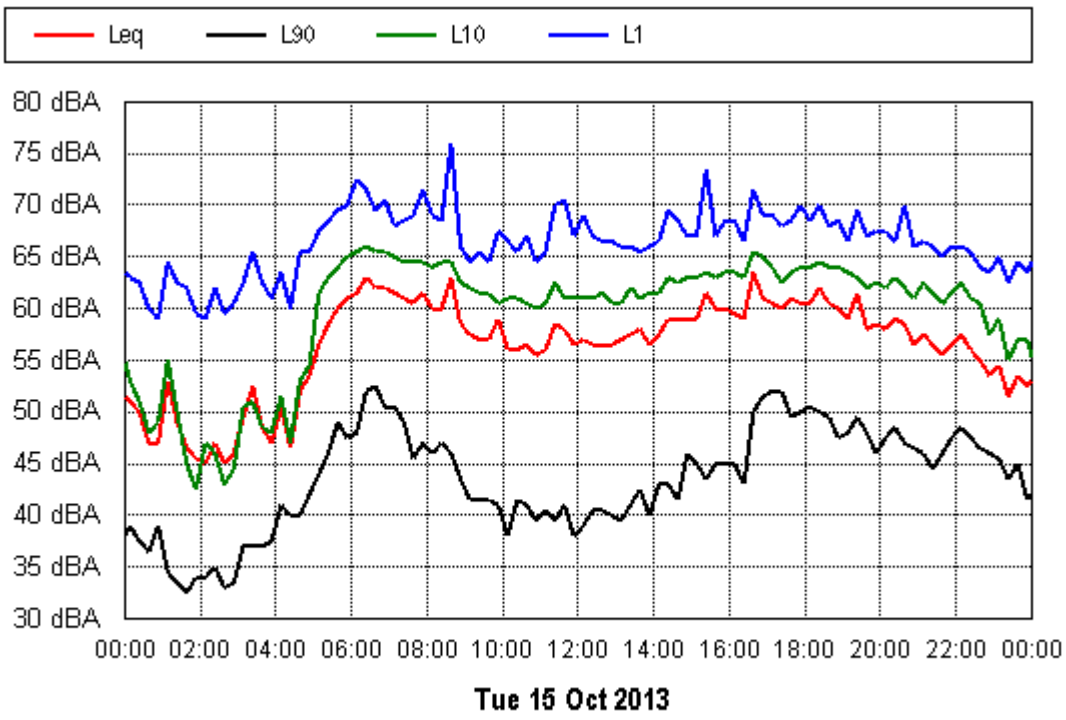
Location: 12 Bushview Lane, Georges Fair



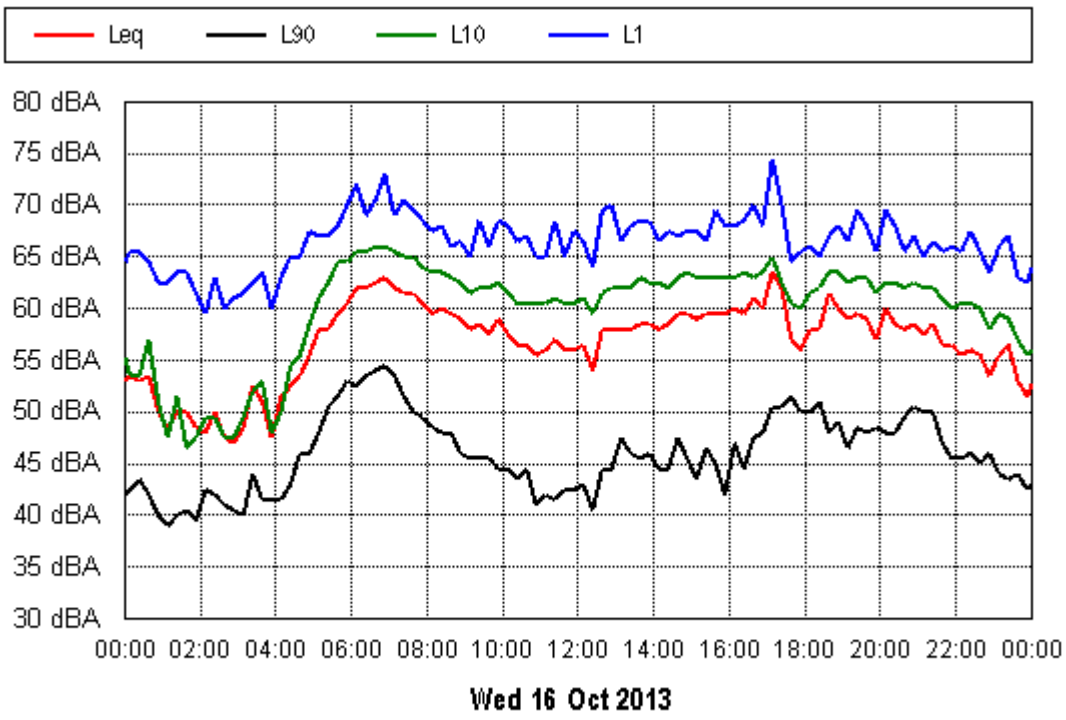


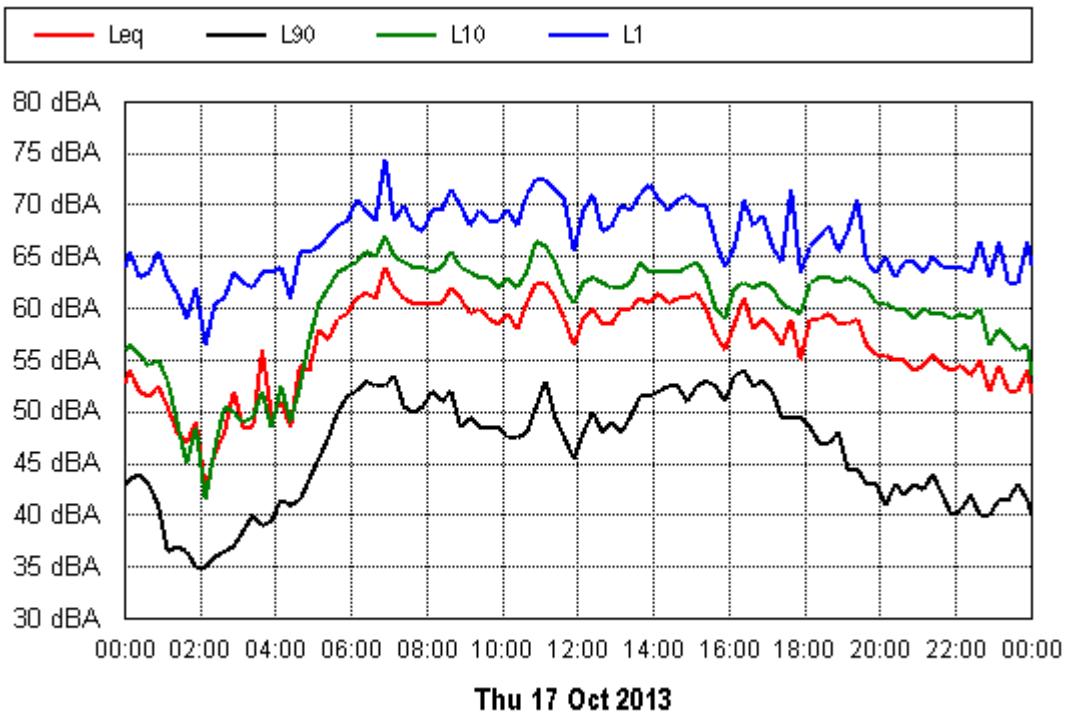
Location: 12 Bushview Lane, Georges Fair



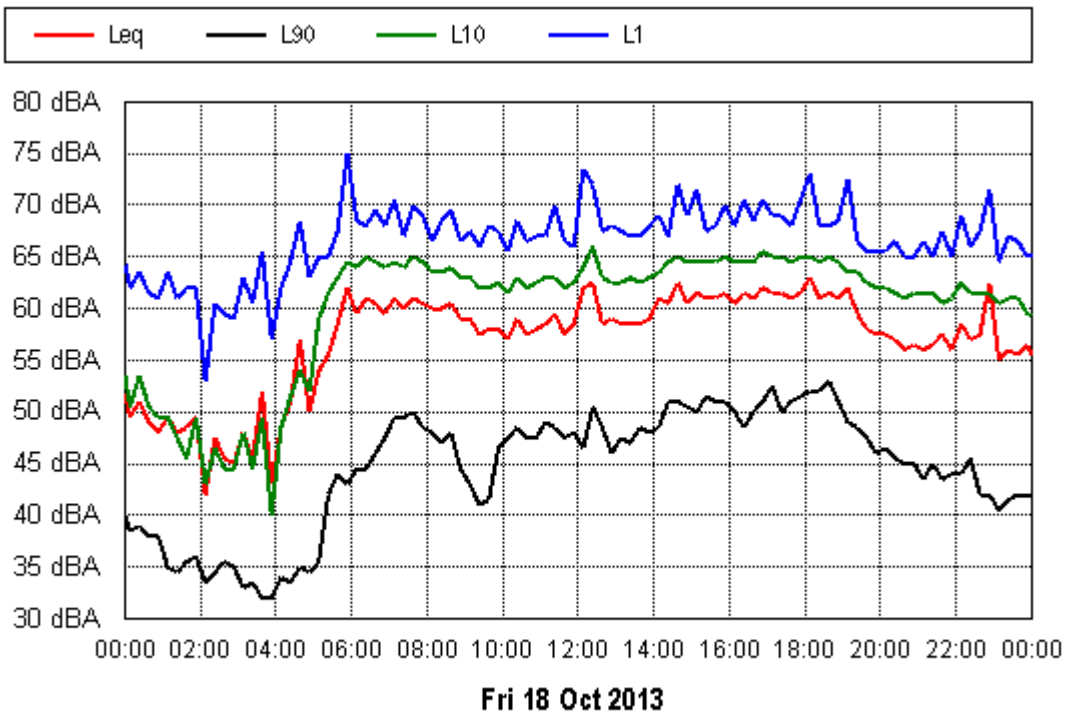


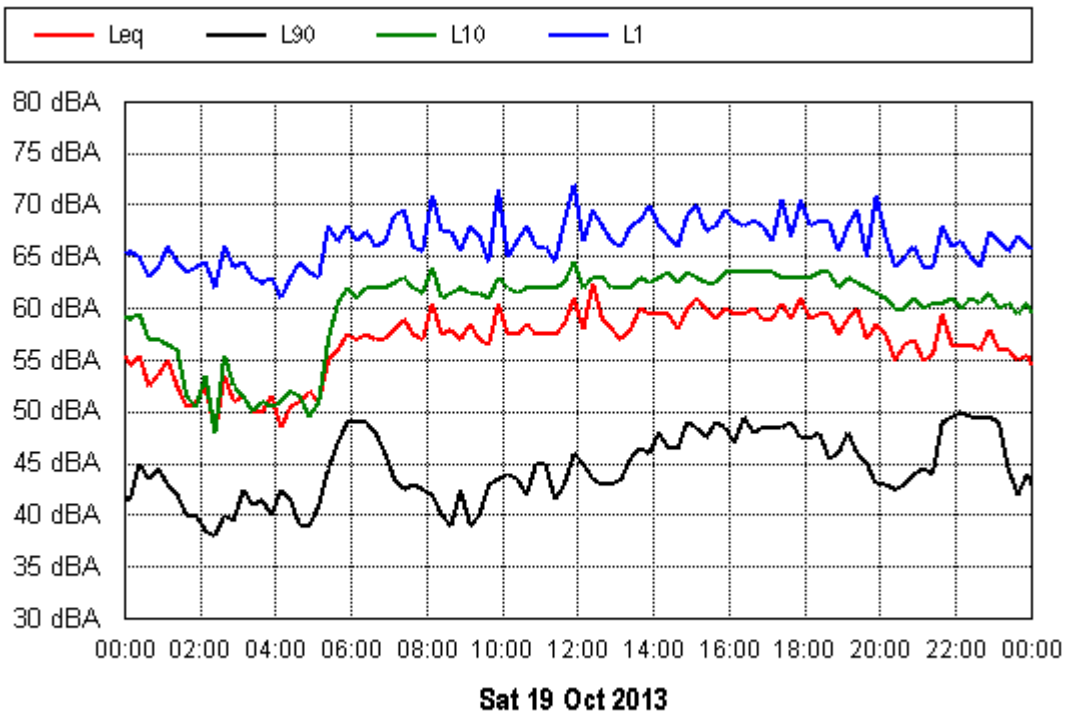
Location: 12 Bushview Lane, Georges Fair



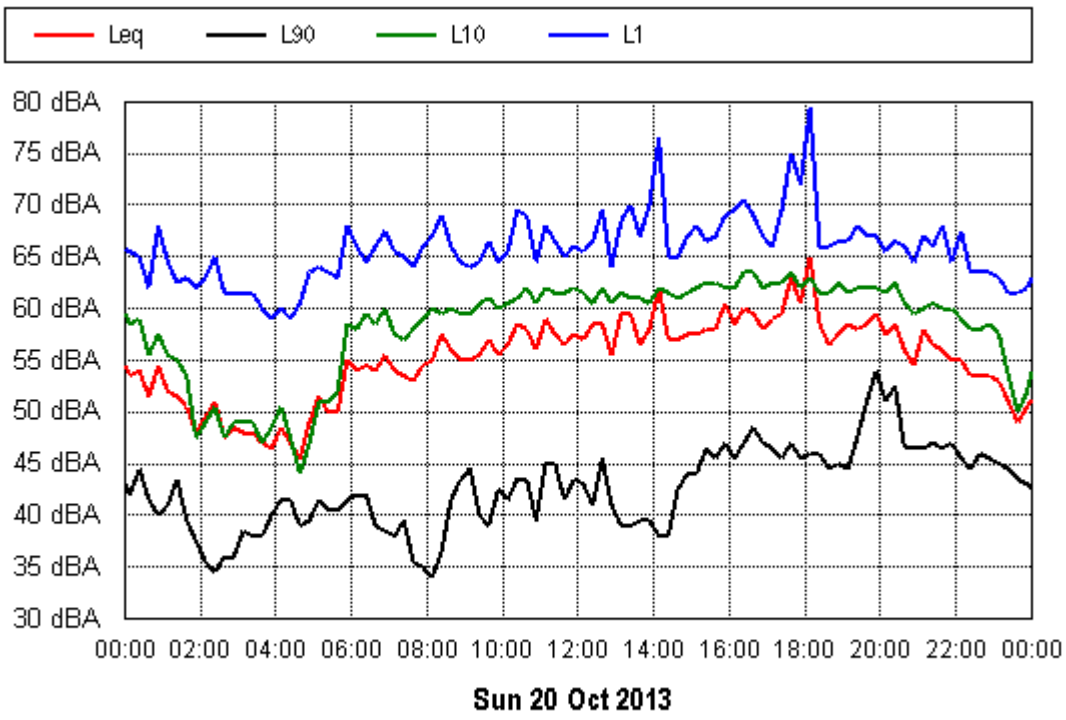


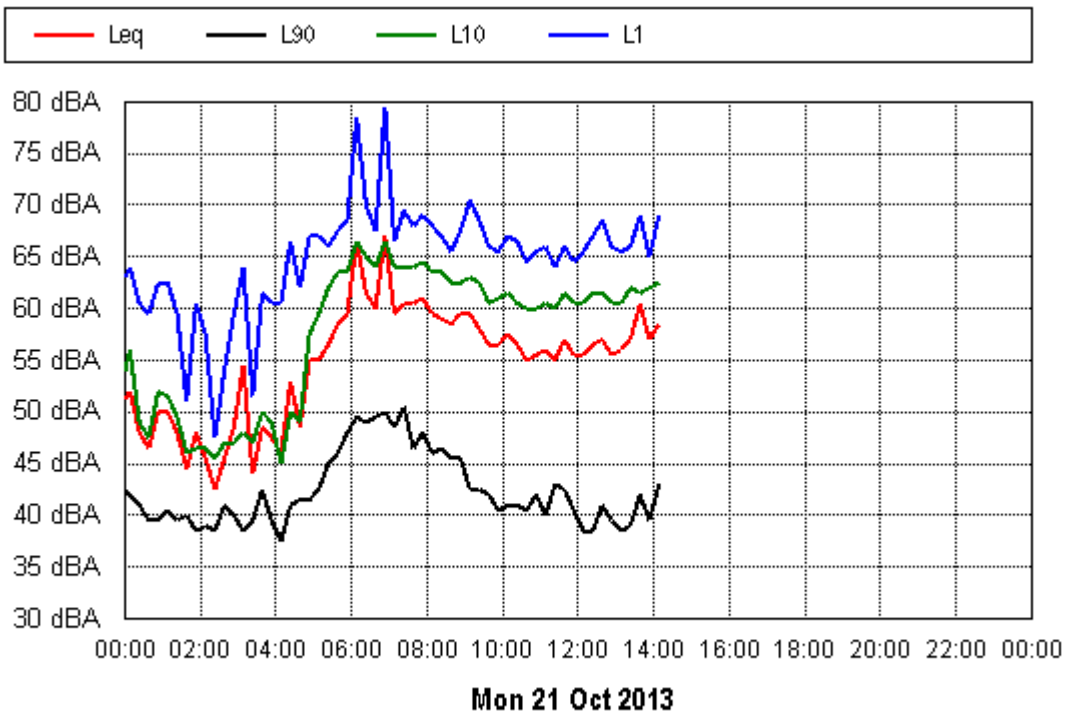
Location: 12 Bushview Lane, Georges Fair





Location: 12 Bushview Lane, Georges Fair





WILKINSON MURRAY

26 September 2013

WM Project Number: 03124-DA
Our Ref: NEP260913 NG
Email: kennan@ozemail.com.au

Mr Neil Kennan
Nexus Environmental Planning Pty Ltd
PO Box 212
CONCORD NSW 2137

Dear Neil

Re: Moorebank Recycling Facility - Noise Assessment

The current noise assessment has assumed, as a result of increased traffic flow along Brickmakers Drive and the ongoing suburban redevelopment in the area, that daytime background noise levels are expected to increase.

As a result, a Project Specific Noise Limit based on intrusiveness criteria has been based on an estimated elevated background noise level of 48dBA, compared with existing background levels of approximately 45dBA.

At 500,000 tpa, we have demonstrated that the PSNL can be complied with.

We propose to determine the noise levels associated with 200,000, 300,000 and 400,000 tpa, which can be compared to the intrusiveness criteria.

In addition, we can also provide the expected noise reduction from truck noise along the access driveway / ramps (as well as the overall noise reduction from truck noise and site noise) from a 4m high barrier on the eastern side of the access way. This would include a section of barrier in the vicinity of the ramps only; one the full length and perhaps 1 or 2 lengths in between.

We trust this is an acceptable approach. Please contact us if you have any further queries.

Yours faithfully
WILKINSON MURRAY

Neil Gross
Director

APPENDIX F: ADDENDUM REPORT FOR PROPOSED MARINA

NEXUS
Environmental Planning Pty Ltd
ABN 58 061 284 615

Consultants in:

Town Planning
Environmental Assessment

Suite 29
103 Majors Bay Road
P.O. Box 212
CONCORD NSW 2137

Tel: (02) 9736 1313
Fax: (02) 9736 1306
Email: kennan@ozemail.com.au

Principal:
NEIL KENNAN
B.A., Dip. Urb. Reg. Plan., MPIA,
Ord 4, Dip. Cart.
Certified Practising Planner

Our Ref: B950

20 October 2014

The Secretary
NSW Planning and Environment
GPO Box 39
SYDNEY NSW 2000

Dear Secretary,

Part 3A Application No.05-0157
Proposed Materials Recycling Facility, Lots 208, 209 & 210, DP 1118048 and Lot 6, DP 1065574, Newbridge Road, Moorebank
Attention: Mr David Mooney / Mr Chris Ritchie

We refer to the subject Part 3A application and to the recent approval by the Sydney West Joint Regional Planning Panel (**JRPP**) of a Marina development on the adjoining land in the ownership of Benedict Industries Pty Ltd, that land being Lot 7, DP 1065574.

As requested, we provide the following information to assist in the assessment of the subject Part 3A Application.

Access

Part 3A Development

As part of the 15 August 2013 Preferred Project Report relating to the Moorebank Recyclers Part 3A development, the issue of access to the proposed development was canvassed. In this regard, the following statements were made:

> *In order to establish an access to Lot 6, DP 1065574 for the proposed Materials Recycling Facility which would not prevent Tanlane from gaining access by way of the approved road bridge, it is now proposed to incorporate both an access ramp and an exit ramp within Lots 309 and 310, DP 1118048.*
>
> *....., the Council, as landowner of both Lot 309 and Lot 310, DP 1118048 had indicated, by resolution, that it would not grant landowners consent to amend the Part 3A application to change the proposed access to the Materials Recycling Facility from the at grade access proposed in the Environmental Assessment, as exhibited, to a ramps proposal.*

In response to the above, Moorebank Recyclers commenced proceedings pursuant to s.88K of the Conveyancing Act 1919 to, among other things, establish an easement over Lots 309 and 310, DP 1118048 which would permit, among other things, the use of that land for access ramps to and from the Moorebank Recyclers' land (refer Moorebank Recyclers v Liverpool City Council, Land and Environment Court Proceedings No.30141 of 2013).

With regard to the abovementioned s.88K proceedings, the Council states:

> *However as this matter is undetermined, the applicant at this time does not have owners consent to either lodge a development Application/Part 3A Application over Lot 310 not to access the property in any way.*

On 27 June 2013, Justice Biscoe of the Land and Environment Court handed down judgement in the above proceedings (refer Moorebank Recyclers v Liverpool City Council (No 2) [2013] NSWLEC 93). Justice Biscoe indicated that Orders would be issued to permit the easement sought by Moorebank Recyclers, including landowners consent to amend the Part 3A application as proposed.

.....

By letter dated 12 July 2013, the Council has granted its consent to the lodgement of both the Part 3A application and its amendment over Lots 308, 309 and 310, DP 1118048.
.....

<u>The Ramps Proposal</u>

It is proposed to amend the access arrangement for the Part 3A application from that which was exhibited with the Environmental Assessment to that provided for in plans prepared by Cardno, those plans being:

Drawing SK 1001, Revision L
Drawing SK 1003, Revision E
Drawing SK 1004, Revision E
Drawing SK 2001, Revision D
Drawing SK 2003, Revision A
Drawing SK 2004, Revision C

The amended access proposal has been designed to provide for access within the recently imposed easement over Lots 308, 309 and 310, DP 1118048 to accommodate access to the Moorebank Land while at the same time providing for a design which incorporates access to land to the east of the Moorebank pan handle.

Having regard to the Cardno plans, the following description of each plan is provided.

<u>Drawing SK 1001, Revision L</u>

This plan shows the proposed access arrangements from Brickmakers Drive to all land

to the east of Brickmakers Drive, assuming that all proposed developments to the east of Brickmakers Drive have been developed.

The plan details the location of the approved road bridge, as modified, to gain access to the Benedict Sands and Gravel site and also to the Flower Power site as envisaged in the Liverpool Development Control Plan 2008. In addition, entry and exit ramps are shown which would provide private access to the proposed Materials Recycling Facility.

This plan also shows proposed security gates located at the entrance and exit ramps which would be closed and locked outside of operating hours.

Drawing SK 1003, Revision E

This plan shows longitudinal sections:

(a) along the down ramp from Brickmakers Drive to the pan handle of the Moorebank Recyclers' land.

(b) along the road bridge alignment.

(d) along the up ramp from the Moorebank Recyclers' pan handle to the road bridge and Brickmakers Drive.

Drawing SK 1004, Revision E

This plan shows cross sections 1 and 2 through the completed final access to all land east of Brickmakers Drive. It can be seen from this plan and SK 1001 that the proposed construction is a [sic] *to be* [a] *compacted embankment materials held in place by boulder retaining embankments.*

Drawing SK 2001, Revision D

This plan shows the proposed Stage 1 construction works to be completed by Moorebank Recyclers to gain access to the proposed Materials Recycling Facility. The Stage 1 construction works would comprise:

(a) Construction of the entry or down ramp from Brickmakers Drive to connect to the pan handle of the Moorebank Recyclers' land.

(b) Construction of that part of the earth embankment along the alignment of the approved road bridge and the exit or up ramp from the Moorebank Recyclers' pan handle to the earth embankment and then to Brickmakers Drive. The Stage 1 construction works have been engineered to ensure that, at some time in the future, when access to the Tanlane land is required, the completion of the works shown in SK 1001 can be completed without significant impact to the operation of the Materials Recycling Facility.

Drawing SK 2003, Revision A

This plan shows the longitudinal sections for the proposed Stage 1 Construction works.

Drawing SK 2004, Revision C

This plan shows cross sections 1 and 2 through the Stage 1 access works. It can be seen from this plan and SK 2001 that the proposed Stage 1 construction is to be compacted embankment materials held in place by a combination of temporary construction batters and boulder retaining embankments.

Marina Development

The approved Marina development does not contain any plans showing how access to that Marina would be obtained from Brickmakers Drive. This anomaly was part of the submission raised by Nexus to the 10 October 2013 meeting of the JRPP.

Subsequently, Benedict Industries has applied for and obtained approval from Liverpool City Council:

1. To modify Development Consent No.1552-06 for construction of the approved Road Bridge, and

2. Development Consent No.61-2014 for use of the modified Road Bridge to gain access to the then proposed Marina development.

The modified Road Bridge Consent contains a diagram prepared by Worley Parsons which purports to show a Stage 1 construction of the Road Bridge to gain access to the Marina development on the assumption that the Moorebank Recyclers' Part 3A development has not occurred. This approach is similar to the approach adopted above by Moorebank Recyclers pending any future development to the east of the Moorebank Recyclers' land.

On the assumption that the Worley Parsons plan can be achieved, construction of Stage 1 access to either the Part 3A development on the Moorebank Recyclers' land or the Marina development could be accessed in accordance with the abovementioned plans. As such, on the assumption that the Part 3A development is approved, whichever development is constructed first would be undertaken such that a future completion of the Cardno access arrangement can be achieved to provide access to both developments.

In summary, on the assumption that Worley Parsons plan which is Stage 1 of the modified Road Bridge Consent can be constructed, it would appear that if that construction was undertaken before any development of the Part 3A development, there would be no conflict in the provision of access to either development.

Notwithstanding the above, McLaren Traffic Engineering has provided a response dealing with the access for both the Part 3A development and the Marina development, a copy of which is at **Attachment 1**. The McLaren Traffic Engineering document will assist in the understanding of the impact the proposed Part 3A development would have on the Marina development if

constructed.

Voluntary Planning Agreement

As part of the rezoning of Lot 6, DP 1065574, a Voluntary Planning Agreement (**VPA**) was prepared. The VPA was discussed at the 10 October 2013 meeting of the JRPP and a submission was made to the JRPP concerning the VPA by Nexus in the following terms:

> *Pursuant to a Voluntary Planning Agreement between Tanlane and the Council (the **VPA**), Tanlane is required to construct and dedicate the road bridge to the Council **before** residential development on the Tanlane Land can occur.*
>
> *Tanlane cannot, however, lawfully dedicate the part of the road bridge over the Moorebank Land without Moorebank's consent ..... This consent will not be given. As such:*
>
> *(a) the road bridge cannot be dedicated to the Council as required by the VPA;*
>
> *(b) the residential development on the Tanlane Land cannot occur, and*
>
> *(c) the permanent access to the marina development as contemplated in the Application cannot be provided.*
>
> *In those circumstances, the Application should ultimately be assessed and determined on the basis that the proposed permanent access to the marina development would not be provided.*
>
> *The Application should not be approved until permanent access to the marina development can be demonstrated.*

The Minutes of the 10 October 2013 meeting of the JRPP stated, among other things:

> *Item 1 - 2012SYW035 – Liverpool - DA-846/2012 - Marina Development - 146 Newbridge Road, Moorebank*
>
> *The Panel unanimously decides to defer the application for the following reasons:*
>
> - *Council is requested to provide an additional report which addresses the following concerns:*
>
> 1. *The impacts of flooding regarding the safety of persons and structures, assessed against the relevant Acts and Regulations;*
>
> 2. *The issues raised by the objector's representative namely that the access essential to the function of the use is not part of the application and consequently has received no planning assessment.*
>
> 3. *The cumulative impacts of the proposed traffic arrangements in terms of*

ability to provide legal, functional access that will be compatible with the needs and capacity of future uses of the precinct and provide a satisfactory level of environmental amenity to future occupants of the precinct.

4. *Report detailing the Director-General's requirements and how these have been met;*

5. *Report from the council on the concerns as expressed by the objector to the VPA;*

6. *Further analysis of the appropriateness of conditions in council's current report relating to access and flooding.*

A report prepared by Liverpool City Council was presented to the 22 August 2014 meeting of the JRPP. The report addressed the issue of the VPA as follows:

> ***At its meeting on 10 October 2013, the JRPP requested confirmation of the terms of the Voluntary Planning Agreement (VPA) executed between Council and Tanlane with regard to any dedication of the access road from Brickmakers Drive over Moorebank Recycler's* [sic] *land.***
>
> *On 11 June 2008, Tanlane entered into a VPA with Council. Amongst other things, if Council granted Tanlane development consent to a subdivision of up to 225 residential lots, Tanlane would dedicate and transfer certain designated land to Council. At Item 7 in Schedule 3 of the VPA, the approved road bridge over the drainage channel, embankment and road to Brickmakers Drive was required to be constructed and dedicated prior to the issue of the subdivision certificate for a plan when registered, would create the first residential lot with the development on the Tanlane land as follows:*
>
> > *"Construction and dedication of a road bridge over drainage channel, embankment and road to Brickmakers Drive".*
>
> *The drainage channel is located on Tanlane land, however part of the embankment and road to Brickmakers Drive is located in airspace over the panhandle to Moorebank Recycler's* [sic] *land.*
>
> *Tanlane is not able to dedicate that part of the road bridge "over the drainage channel, embankment and road to Brickmakers Drive" because that part of the road bridge is over Moorebank Recycler's* [sic] *land.*
>
> *As Tanlane has already agreed to dedicate and transfer certain designated land to Council, then any approval granted to this application should be subject to a condition requiring Tanlane to dedicate that part of the designated land it holds title to Council as contemplated under the VPA.*
>
> *It is noted that the applicant has had recent discussions with Council regarding proposed*

changes to the terms of the VPA.

In response to the report of the Council to the JRPP, Nexus made the following submission at the 22 August 2014 meeting of the JRPP:

Voluntary Planning Agreement

*As part of the rezoning of the Tanlane land a Voluntary Planning Agreement (**VPA**) has been prepared. The Council report presented to the 10 October 2013 Meeting of the Panel made reference to that VPA and, in particular, states that one of the requirements of the VPA is:*

> *9. Construction and dedication of a road bridge over drainage channel, embankment and road to Brickmakers Drive;*

Our submission to the 10 October 2013 Meeting of the Panel stated that:

> *Part of the road bridge referred to above is over the Moorebank Recyclers' land. The applicant does not have power to dedicate that land and it has been made clear by Moorebank Recyclers that it would not agree to such a dedication.*

The above statement has been confirmed in the 22 August 2014 Report of the Council to the Panel when it states, at page 53:

> *The drainage channel is located on Tanlane land, however part of the embankment and road to Brickmakers Drive is located in airspace over the panhandle to Moorebank Recycler's* [sic] *land.*
>
> *Tanlane is not able to dedicate that part of the road bridge "over the drainage channel, embankment and road to Brickmakers Drive" because that part of the road bridge is over Moorebank Recycler's* [sic] *land.*

In order to overcome this major hurdle to the gaining of access to the Marina development, the Council report, at page 53 states:

> *As Tanlane has already agreed to dedicate and transfer certain designated land to Council, then any approval granted to this application should be subject to a condition requiring Tanlane to dedicate that part of the designated land it holds title to Council as contemplated under the VPA.*
>
> *It is noted that the applicant has had recent discussions with Council regarding proposed changes to the terms of the VPA.*

Condition 3 of the proposed conditions of approval for the Marina states:

> ***Voluntary Planning Agreement***
>
> *3. The Voluntary Planning Agreement (VPA) executed between Liverpool*

City Council and Tanlane Pty Ltd dated 11 June 2008 shall be implemented with regard to the subject development.

The proposed Condition 3 appears to be directly in conflict with the statements made on page 53 of the Council report and does not solve the issue of the inability of the Council, or in this case the JRPP, to request dedication of land owned by Moorebank Recyclers.

The above statement raises the following questions:

1. *If there is a proposal before the Council to amend the VPA, why has the Panel, and indeed those affected by the VPA as proposed to be modified, not been notified of the plan of the Council to amend the VPA and what are the changes proposed to that VPA?*

2. *Can the JRPP approve the proposed development on the assumption that a VPA would be modified at some point in the future?*

3. *On the assumption that the VPA is amended to remove any reference to the Moorebank Recyclers' land, and only that part of the road bridge which is to be located on land in the ownership of Tanlane is dedicated to Council as part of this application, the following questions remain to be resolved:*

    (a) *What would be the status of that part of the road bridge and the intersection works to be constructed on Council land? Would that development be gazetted by Council as a public road and if so when?*

    (b) *What would be the status of that part of the road bridge which would traverse the Moorebank Recyclers' land which could not be gazetted as public road?*

Until such time as the above questions are resolved, the JRPP does not have sufficient information before it to determine that satisfactory access is available to the proposed Marina.

The JRPP concluded that the VPA was not relevant to the approval of the Marina development.

Notwithstanding the conclusion of the JRPP, Moorebank Recyclers has not been advised of any proposed amendment to the VPA.

Flooding

As part of the Part 3A application, it is proposed to provide for offset flood storage to compensate for any loss of flood storage which would result for the construction of the access from Brickmakers Drive to the Moorebank Recyclers' land.

Notwithstanding a condition of consent attached to the Marina approval which also seeks a flood storage offset, Moorebank Recyclers maintains its commitment to install the flood offset regardless of whether the Marina development is constructed or not.

Acoustic Impact

There is potential for the operation of the Part 3A development o impact on the operation of the Marina development. This potential impact has been addressed in the Acoustic Impact Assessment as part of the Environmental Assessment for the Part 3A application. Notwithstanding, additional detail is provided by Wilkinson Murray Pty Limited (refer **Attachment 2**). The Wilkinson Murray Pty Limited report states, among other things:

> ***Noise Criteria***
>
> *Our noise report of August 2013 to support the DA only addressed what existed (i.e. an industrial facility) which, in accordance with EPA Industrial Noise Policy had $L_{Aeq,period}$ amenity criteria of "recommended" 70dBA and "maximum" of 75dBA. The Marina would be classified as a commercial premises with "recommended" and "maximum" amenity limits of 65 and 70dBA respectively.*
>
> ***Predicted Noise Levels***
>
> *The noise report predicted $L_{Aeq,\ period}$ noise levels to a location on Benedict's site near the southern boundary (5I) and at current surface level (approx. RL 5). The predicted $L_{Aeq,period}$ levels were 55-56dBA under neutral and adverse conditions. This complied with the EPA amenity criteria.*
>
> *A layout of the proposed Marina extracted from their documents is shown overleaf. [in the Wilkinson Murray Pty Limited document] We note the southern boundary is an access road and carpark. The location of the 8m high bund on the Moorebank site is also shown.*
>
> *The closest part of the new building is a basement car park and boat storage, that are approximately 30m from the boundary at a ground level of approximately 4.6m. This is a very similar location to 5I in our noise report.*
>
> *Balconies facing east are located approximately 80m from the boundary at a FFL of 10.5m (5B).*
>
> *The previous assessment predicted $L_{Aeq,period}$ levels of 55-56 at this 5I location (at ground).*
>
> *Noise predictions at the elevated location on a balcony (5B) which are further away are 56-58dBA which still comply with the EPA amenity limit of 65-70dBA.*
>
> ***Summary***
>
> *Predicted noise levels at the approved Marina would comply with appropriate amenity criteria for a commercial development.*
>
> *It is also important to note that the likely busier times at the Marina (summer evenings and then Saturday afternoons and Sundays) the recycling plant is not operating.*

Please do no hesitate to contact this office if additional information is required.

Yours faithfully,
NEXUS ENVIRONMENTAL PLANNING PTY LTD
per:

Neil Kennan

Attachment 1

M^CLAREN TRAFFIC ENGINEERING

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Division of RAMTRANS Australia ABN: 45067491678

Transport Planning, Traffic Impact Assessments, Road Safety Audits, Expert Witness

15th October 2014
Ref: 2013/080.F02A.CM/pk

Nexus Environmental Planning Pty Ltd
PO BOX 212
Concord NSW 2137
Attention: Mr Neil Kennan

CUMULATIVE TRAFFIC IMPACT ASSESSMENT
LOTS 6 & 7, DP1065574 NEWBRIDGE ROAD, MOOREBANK

Dear Neil,

Reference is made to your request to provide a revised traffic assessment of the proposed Moorebank Recyclers Materials Recycling Facility on Lot 6, DP 1065574 following the recent Joint Regional Planning Panel (JRPP) approval of a marina development (Benedict Industries) on Lot 7, DP1065574.

Calculation of Traffic Generation

To analyse the impact of a development in terms of traffic, it is important to accurately estimate the number of vehicle trips which are likely to occur. The standard method for calculation is either by comparing the size of the development against the RMS supplied generic traffic generation rates or by comparing the development to a similar development in a reasonably similar location.

RMS 'Guide to traffic Generating Developments' supplies generic rates based on the size of a development following on from completing extensive traffic counts and analysis of developments. These traffic generation rates are separated into land uses for accuracy with some examples of land use being residential dwelling (house), supermarket, retail shops and further as reproduced in **Annexure A**. Likewise, the rates are generally applied as a multiplier such that for two developments the development with more Gross Floor Area (GFA) will have more traffic generation. The rates are sometimes also available for different times of the day, recognising that for example a school will generate traffic between 8-9am & 2-4pm on weekdays but an RSL club will generate most of its traffic at night, especially on weekends. For critical impact assessment the PEAK hour of the site is projected as this will be the maximum impact of the development. The method of calculation is GFA X RMS Rate = Peak Hour Traffic Generation. An example calculation is 500 Residential Dwellings (houses) X 0.85 weekday peak hour vehicle trips per dwelling = 425 trips. This means that 500 houses are projected to generate approximately 425 vehicle trips in the peak hour.

A similar method can be done based on surveys of similar developments. This requires a traffic count being done by a person or road tube counter to find the number of one way traffic trips a development generates a different times of the day. The volumes of traffic are then compared to

the size of the development to produce a rate in a similar fashion to the RMS. There is not a specific standard for the way these rates are to be applied, whether it is appropriate to apply an average, the maximum, the 85th percentile or a different rate though each of these have been used frequently by traffic engineers and assessors to project traffic impacts for purpose of assessment. An example is an imaginary survey being done regarding a tyre manufacturing which found that for a development of size 100sqm there were 1 trip in the peak hour. Now if we were to build a new tyre manufacturing factory of 200sqm then the projection would be that 2 trips would occur in the peak hour.

While effort is made to ensure traffic projections are accurate, even identical developments could have different traffic generation in the future based on the surroundings, access to the site or numerous other factors. Traffic Impact Assessments hence have to analyse a reasonable worst case scenario to ensure that even if the new development has a higher than normal level of traffic generation that the roads and intersection can both safely and efficiently support the development.

Lot 7 DP1065574 – Marina Development (Benedict Industries) Traffic Assessment

The approval from the JRPP is for a development consisting of a marina and multi use function centre for part of the lot with the remaining land intended for future medium density residential and some commercial development. The traffic assessment by Colston Budd Hunt & Kafes (CBHK) (July 2010) was considered by the JRPP and was the traffic report submitted in the Environmental Impact Statement (EIS) submitted by Benedict Industries with the development application. Important features of the traffic report include:

- CBHK - The marina and showroom will generate AM/PM peak hour volumes of 20-30 vehicle trips.
  MTE - This seems to be an arbitrary number though based on 1800sqm of showroom and workshop and applying the approximate RMS Bulky Goods Retail rate of 2 trips per 100sqm in the peak hour the weekday peak would approximately 36 trips. The high end of the 20-30 trips should be used but is reasonable at a rate of 1.5 trips per 100sqm or 27 trips.
- CBHK -The function centre will generate FRI&SAT peak hour volumes of 222 (220) vehicle trips
  MTE - The rate applied is an AVERAGE counted rate of 4.5 trips per 100sqm X 4938sqm = 222 trips in the peak hour. The traffic count data to support this is not presented in the report though the suggested AVERAGE rate of 4.5 trips per 100sqm is very similar to the RMS AVERAGE rate for restaurants of 5 trips per 100sqm. CBHK could have used a rate nearer to the MAXIMUM rate of 6.4 trips per 100sqm, however the AVERAGE rate used is in line with common practice.
- CBHK - *'Estimated Friday and Saturday evening traffic flows with development traffic*' are reproduced in **Annexure B.**
  MTE - The total generation is represented as 210 trips for the marina development despite noting generation rate earlier of at least 220 trips in the peak hour. It is unknown how the 210 trips (25 + 90 + 45 + 55) for the development were estimated as it is not stated in the report. The number is not excessively out of line with the estimation of 220 trips, however is not justified or explained in the report.
- *MTE* - Consideration was not given to the hours before and after the PM peak for Fridays which would have resulted in an overlap between Marina and Function Centre traffic.
- *MTE* - Consideration was not given to potential traffic on the 'Service Road' generated by the proposed adjacent residential dwellings and the subject materials recycling facility.

The PM overlap period for 5-6pm of 30 marina trips for staff as directed in the CBHK report should be considered alongside early guest and staff arrivals for the function centre which is not mentioned at all. While it may not be considered substantial, no justification or explanation is given regarding what the likely overlap rates would be.

The overall assessment has not provided adequate sensitivity testing of other developments which may affect traffic flows at the intersection of the link road & Brickmakers Drive. Lot 7 was analysed by CBHK in 2005/2006 for a rezoning comprising some 5700m^2 of commercial GFA and 216 detached residential dwellings. While the commercial component of the rezoning was greater than that in the approved marina development, the traffic generation for this component of the site will have different characteristics to the earlier projections.

- The marina generates traffic at approximately 1.5 trips per 100sqm while a commercial development would generate traffic at approximately 2 trips per 100sqm. The marina development will hence reduce the projected site traffic in the AM/PM peak hour by approximately 9 vehicle trips since it generates minorly less traffic than a commercial property of the same size (27 trips per hour instead of 36 trips per hour). The change in the peak hour is hence negligible.
- In the 6-8pm Peak and shoulder the marina development will generate 4.5 trips per 100sqm though a commercial-only development would generate approximately 1 trip per 100sqm depending on opening hours. This increases traffic generation from 60 trips by approximately 160 trips to 220 since a function centre will peak at night when a commercial-only development would have lower traffic generation. Based on reasonable estimates, in the 6-8pm period Lot 7 traffic is likely to be 100% of the function centre peak of 220 trips and 50% of the residential peak of 140 trips (0.85 trips per dwelling X 216 dwellings = 140). At this time the lot will be generating 290 two way trips (220 function centre + 70 residential) which is higher than the PM peak hour generation of 235 trips for the site calculated during court proceedings by Traffic Expert Tim Rogers (See **Annexure C**) and accepted by Traffic Expert Chris Hallam and the undersigned.
- This time period is outside the background commuter peak so while it is unlikely to affect overall road network capacity, there is potential for intersections to be impacted by a change of 55 (235 to 290) trips. In the future there is a proposed link road between Brickmakers Drive and Davy Robinson Drive which the traffic was distributed amongst. A 40% distribution onto Brickmakers Drive was utilised in court proceedings by the above traffic experts for Lot 7 traffic which would then project the future traffic at the intersection of the link road and Brickmakers Drive to be 290 X 40% + 280 X 35% + 50 = 264 trips which is an increase of 22 trips from 242 previously estimated. The impact is concentrated in the short term however where if the link road does not extend to Davy Robinson Drive, and the residential lots are occupied, then all Lot 7 traffic will be forced to utilise the intersection of the link road and Brickmakers Drive or a total of 290 trips in the PM peak hour.

Lot 6 DP1065574 (Materials Recycling Facility) Traffic Assessment

M^{c}Laren Traffic Engineering completed a Traffic Impact Assessment (7 August 2013) as part of the Environmental Assessment prepared by Nexus Environmental Planning Pty Ltd for the Moorebank Recyclers Materials Recycling Facility. Outlined in the report were projected traffic generation rates in the AM/PM peak hours of 38/21 truck trips. These rates are generated based on comparison to a nearby similar facility and account for the changing trip generation throughout the day. Considering the location of Lot 6 and its heavy vehicle traffic it is appropriate to project all Lot 6 traffic onto Brickmakers Drive. The materials recycling facility will have negligible traffic after 6pm.

Combined Moorebank East Traffic Assessment

The combined long term future peak traffic during PM peak hence becomes 264 vehicle trips according to the "Tim Rogers Distribution" where zero (0) recycling centre trips have been added to the PM combination since it has negligible generation after 6pm. For intersection analysis a recycling centre truck is equivalent to 4-6 cars, due to the low acceleration rates and is common practice; however this factor has been not included in the above rate. The nearer future projections place all Lot 6 & 7 traffic onto Brickmakers Drive so the traffic here is some 290 two way for the 6-8PM weekdays.

Signal Warrants

The intersection of Brickmakers Drive with the proposed link road on Lot 309 DP1118048 was referred to by CBHK as being constructed into a signalised intersection throughout their reports. This design was based on advice from various sources, some of which was provided during court proceedings, which referred to non-compliant sight distance for exiting trucks. AS2890.2 strictly refers to an eight (8) second gap time for right turning exiting vehicles to be safely accommodated. Comments from the RMS refused the construction of the signals based on traffic volumes which is the usual warrant for signalising an intersection as seen in RMS *'Traffic Signal Design – Section 2, Warrants*' (2008) and reproduced in **Annexure D**.

It is apparent that Roads and Maritime Services (RMS), in addition to consideration of traffic volumes, also considers installation of signals where safety requires a signal treatment as seen in RMS *'Traffic Signal Design – Section 15, Special Situations*' (2008) below:

"A signalised entrance to a private development refers to an entrance to a private development that consists of at least one traffic movement that is controlled by traffic control signals (normally a signalised intersection) and that adjoins the public road network. The focus should be on the safe and efficient movement of people and goods and a signalised entrance to a private development must be clearly indicated and differentiated from the footpath that crosses it."

"The Developer may be required to create an easement to allow the RTA to locate traffic signal components on their (private) property, or in lieu, dedicate a section of their property as public road to allow the RTA to locate and maintain traffic signal components. Splays, clear of obstructions are required at the property line to ensure adequate visibility between vehicles on the driveway and pedestrians on the footpath."

In the introduction to the signal warrants, the RMS states "*It must be emphasised that these are only a guide*" and then later "*the figures stated should only be used as a guide and each intersection should be considered in more detail before being accepted for signal design*". Even though traffic volumes are the usual threshold for signal provision, surely the "safe...movement of people and goods" is a more important outcome.

While the combination in the short term of the marina development and Material Recycling Facility will peak at 290 vehicle trips, the signal warrants regarding traffic and pedestrian volume are not met since Brickmakers drive does not meet the 4 hour volume flows in each direction. The subject intersection is analysed to impose a high risk though if priority or giveway controlled due to the volume of traffic and especially the volume of heavy vehicles which will certainly be utilising this intersection. An 8 second gap for exiting trucks is required and can't be achieved for the RIGHT OUT manoeuvre onto Brickmakers Drive without parts of a privately owned lot being donated or an easement applied to provide adequately safe sight distances. In lieu of the required MINIMUM

sight distances being provided, a set of traffic signals is warranted of grounds of safe movement of people and goods and the RMS 'guide' traffic volume warrants should not be required following the emphasis on safety.

Conclusion

The undersigned, in his qualification as a Level 3 RMS Accredited Road Safety Auditor, finds that not providing signals at the intersection of the link road and Brickmakers Drive, for both the Marina and Materials Recycling Facility developments, is contrary to the RMS signal warrant for special situations where "*The focus should be on the safe and efficient movement of people and goods".* Therefore it is recommended for traffic control signals to be installed for the private development accessed from Brickmakers Drive.

Please contact the undersigned should you require further information or assistance.
Yours faithfully
M^{C}LAREN TRAFFIC ENGINEERING

Craig M^{C}Laren
Director
BE Civil. Graduate Diploma (Transport Eng) MAITPM MITE [1985]
RMS Accredited Level 3 Road Safety Auditor
RMS Accredited Traffic Control Planner, Auditor & Certifier (Orange Card)

ANNEXURE A: EXTARCTS FROM RMS 'GUIDE TO TRAFFIC GENERATING DEVELOPMENTS' (Page 1 of 2)

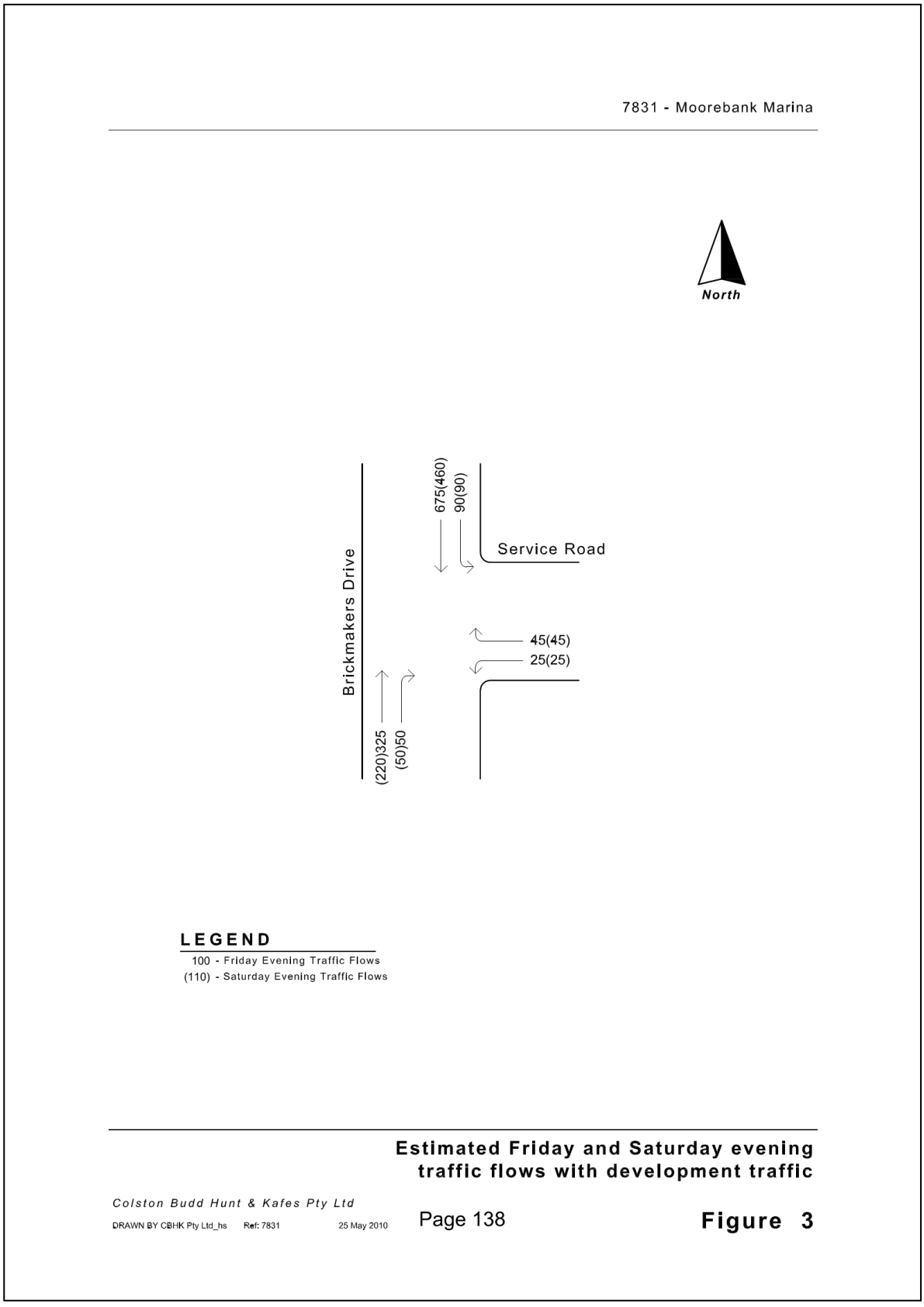
Table 3.7
Summary table of land use traffic generation Rates

Land Use	Traffic generation rates	
	Daily Vehicle Trips	Peak Hour Vehicle Trips
Residential		
Dwelling houses	9.0 / dwelling	0.85 per dwelling
hMedium density residential flat building	*Up to 2 bedrooms*	
	4-5 / dwelling	0.4-0.5 / dwelling
	3 bedrooms or more	
	5-6.5 / dwelling	0.5-0.65 / dwelling
High density residential flat building	*metropolitan regional centres*	
	-	0.24 / unit
	metropolitan sub-regional centre	
	-	0.29 / unit
Housing for aged and disabled persons	1-2 / dwelling	0.1-0.2 / dwelling
Casual accommodation		
Motels	3 / unit	0.4 / unit
Hotels - traditional Hotels - tourist	See section 3.4.2 See Section 3.4.3	-
Office and commercial		
Commercial premises	10 / 100m^2 GFA	2 / 100m^2 GFA
Retail		
Shopping centres	see section 3.6.1	-
Service stations and convenience stores	see section 3.6.2	-
Motor showrooms	-	0.7 / 100m^2 Site Area
Car tyre retail	10 / 100m^2 Site Area	1 /100m^2 Site Area
Road side stalls	-	-
Drive-in liquor	-	-
Markets	18 / stall	4 / stall
Bulky goods retail	see section 3.6.8	-
Video stores	see section 3.6.9	-

ANNEXURE A: EXTARCTS FROM RMS 'GUIDE TO TRAFFIC GENERATING DEVELOPMENTS' (Page 2 of 2)

Land Use	Traffic generation rates	
	Daily Vehicle Trips	Peak Hour Vehicle Trips
Drive-in take-away food outlets	See section 3.7.1	-
Restaurants	60 / 100m^2 GFA	5 / 100m^2 GFA
Clubs	see section 3.7.3	-
Recreation and Tourist facilities		
Squash courts	-	3 / Court
Tennis courts	4-5 / Court	4 / Court
Bowling greens	-	-
Gymnasiums	*metropolitan regional centre*	
	20 / 100m^2 GFA	3 / 100m^{2}GFA
	metropolitan sub-regional areas	
	45 / 100m^2 GFA	9 / 100m^2 GFA
Caravan parks	-	-
Marinas	see section3 .8.2	-
Road transport facilities		
Road transport terminals	5 / 100m^2 GFA	1 / 100m^2 GFA
Container depots	-	-
Truck stops	-	-
Industry		
Factories	5 / 100m^2 GFA	1 / 100m^2 GFA
Warehouses	4 / 100m^2 GFA	0.5 / 100m^2 GFA
Plant nurseries	See section 3.10.3	-
Business parks	See section 3.10.4	-
Health and community services		
Professional consulting rooms	-	-
Extended hours medical centres	see section 3.11.2	-
Child care centres	see section 3.11.3	
Private hospitals	see section 3.11.4	-
Public car parks		
Public car parks	see section 3.12	-

ANNEXURE B: CBHK ESTIMATED PEAK HOUR FLOWS FOR MARINA DEVELOPMENT



ANNEXURE C: DISTRIBUTION FOR TRIPS ONTO BRICKMAKERS DRIVE

2.4 The Tanlane land was rezoned to permit a residential subdivision plus some commercial uses. A traffic study was prepared in December 2005 for Tanlane by Colston Budd Hunt & Kafes – *Traffic Report for Rezoning of Benedict Sands Land, Moorebank*. It assessed the impact of the development of 216 dwellings plus 5,700 sq m of commercial floorspace.

2.5 Looking at the proposed mixed use development on the Tanlane land, based on RMS *Guide to Traffic Generating Developments,* and assuming the dwellings are medium density townhouse style, the 216 dwellings would have a weekday peak hour traffic generation of 140 veh/hr (approximately 70% in the peak tidal direction), while 5,700 sq m of commercial floorspace, intended to be used as a business park would have a weekday peak hour generation of about 65 veh/hr, with about 90% in the peak tidal direction. The total site traffic generation would thus be approximately 205 veh/hr. The DCP proposed road network shown on Figure 2 also provides for the redevelopment of the Flower Power site, which would add traffic to the service road at each end. I understand that there could be a 20,000 sq m commercial development (business park style) plus retention of the existing Flower Power store. The commercial space, at the business park rate of 1.1 veh/hr/100 sq m would have a weekday peak hour traffic generation of 220 veh/hr. I understand that the existing Flower Power store has a peak hour generation of approximately 60 veh/hr. Thus the total weekday peak hour traffic generation from the Flower Power site would be 280 veh/hr.

2.6 Benedict Industries Pty Ltd (Tanlane) have submitted a development application to Council for a marina and function centre on a part of their land previously identified for recreational purposes. This development is anticipated to be additional to the residential and commercial development discussed above. This current development application is for a marina with 250 dry berths, 188 wet berths, sales/showroom (1605 sq m), workshop (236 sq m) and a function centre of some 4,938 sq m, including kiosks, function centre, clubhouse and bar. A total of 490 car parking spaces are proposed.

2.7 The report of July 2010 by Colston Budd Hunt & Kafes Pty Ltd titled *Traffic Report for Proposed Georges Cove Marina, Moorebank, NSW,* sets out the traffic impact assessment. For the marina, the weekday peak hour generation was estimated to be 20-30 veh/hr, from employees, servicing and small usage of the marina. Added to the residential plus commercial generation of 205 veh/hr, the total weekday peak hour traffic from the Tanlane site would be 235 veh/hr. Peak activity for the marina is expected on weekends, particularly in Summer, with a peak generation of 60 veh/hr. The function centre is expected to be busiest in the evening, particularly Friday and Saturday evening. Based on the surveys by Conston Budd Hunt & Kafes at other function centres, the Friday and Saturday evening peak hour generation is expected to be some 220 veh/hr, two-way total.

2.8 I have considered the traffic generation and distribution estimates provided in the *Statement of Evidence* dated August 2011 of Tim Rogers, prepared for Supreme Court Proceedings No.1384 of 2008. For the purpose of assessing the traffic implications of the Moorebank Recyclers ramp proposal, I have adopted the traffic estimates in this Statement. A key consideration is the proportion of traffic from the Tanlane and Flower Power sites that will use the bridge to Brickmakers Drive, rather than via Davy Robinson Drive/Newbridge Road. The "Tim Rogers Distribution" is:

(Tanlane 235 veh/hr x 40%) + (Flower Power 280 veh/hr x 35%) + (Through traffic 50 veh/hr) = 242 veh/hr.

ANNEXURE D: RMS SIGNAL WARRANTS SECTION 2

Reference is made to the RMS Traffic Signal Design Section 2 –Warrants February 2008 which details the following warrants as a guide for signalisation of intersections.

a. Traffic Demand

For each of four one-hour periods of an average day:

i. The major road flow exceeds 600 vehicles per hour in each direction; and

ii. The minor road flow exceeds 200 vehicles per hour in one direction.

OR

b. Continuous Traffic

For each of four one-hour periods of an average day:

i. The major road flow exceeds 900 vehicles per hour in each direction; and

ii. The minor road flow exceeds 100 vehicles per hour in one direction; and

iii. The speed of traffic flow exceeds the major road or limited sight distance from the minor road causes undue delay or hazard to the minor road vehicles; and

iv. There is no other nearby traffic signal site easily accessible to the minor road vehicles

OR

c. Pedestrian Safety

For each of four one-hour periods of an average day:

i. The pedestrian flow crossing the major road exceeds 150 persons per hour; and

ii. The major road flow exceeds 600 vehicles per hour in each direction or, where there is a central median of at least 1.2m wide, 1000 vehicles per hour in each direction

OR

d. Pedestrian Safety-High Speed Road

For each of four one-hour periods of an average day:

i. The pedestrian flow crossing the major road exceeds 150 persons per hour; and

ii. The major road flow exceeds 450 vehicles per hour in each direction or, where there is a central median of at least 1.2m wide, 750 vehicles per hour in each direction; and

iii. The 85th percentile speed on the major road exceeds 75km/h

OR

e. Crashes

i. The intersection has been the site of an average of three or more reported tow-away or casualty traffic accidents per year over a three year period, where the traffic accidents could have been prevents by traffic signals; and

ii. The traffic flows are at least 80% of the appropriate flow warrants

Attachment 2

WILKINSON MURRAY

8 October 2014

WM Project Number: 03124-DA
Our Ref: NEP081014 NG_ltr
Email: kennan@ozemail.com.au

Mr Neil Kennan
Nexus Environmental Planning Pty Ltd
PO Box 212
CONCORD NSW 2137

Dear Neil

Re: Moorebank Recycling Facility - Review of Marina Development

Introduction

We understand a new marina has been approved on land directly to the north of the proposed recycling facility. This land was originally assessed as industrial land in line with its current use by Benedict Sand.

During the design development of the recycling facility the possibility of the marina was considered and on this basis the recycling facility increased the height of the northern bund to 8m (approx. RL 13) to reduce noise towards the Marina as much as possible.

Noise Criteria

Our noise report of August 2013 to support the DA only addressed what existed (i.e. an industrial facility) which, in accordance with EPA Industrial Noise Policy had $L_{Aeq,period}$ amenity criteria of "recommended" 70dBA and "maximum" of 75dBA. The Marina would be classified as a commercial premises with "recommended" and "maximum" amenity limits of 65 and 70dBA respectively.

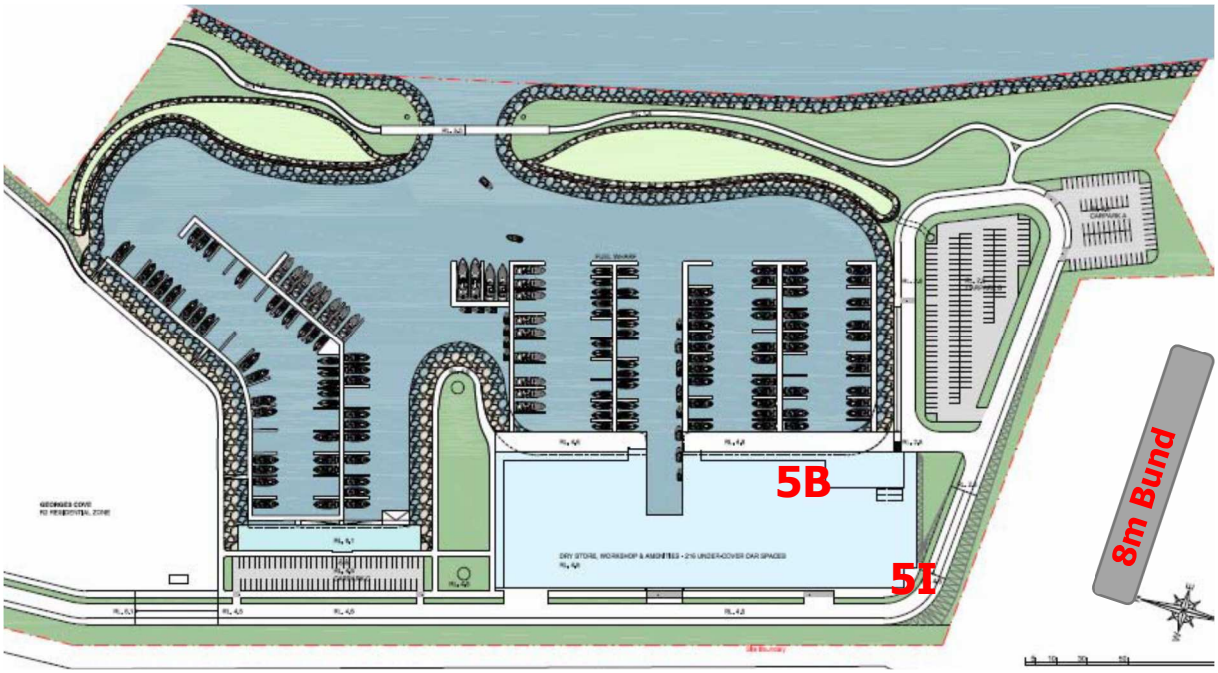
Predicted Noise Levels

The noise report predicted $L_{Aeq,period}$ noise levels to a location on Benedict's site near the southern boundary (5I) and at current surface level (approx. RL 5). The predicted $L_{Aeq,period}$ levels were 55-56dBA under neutral and adverse conditions. This complied with the EPA amenity criteria.

A layout of the proposed Marina extracted from their documents is shown overleaf. We note the southern boundary is an access road and carpark. The location of the 8m high bund on the Moorebank site is also shown.

The closest part of the new building is a basement car park and boat storage, that are approximately 30m from the boundary at a ground level of approximately 4.6m. This is a very similar location to 5I in our noise report.

Balconies facing east are located approximately 80m from the boundary at a FFL of 10.5m (5B).



The previous assessment predicted $L_{Aeq,period}$ levels of 55-56 at this 5I location (at ground).

Noise predictions at the elevated location on a balcony (5B) which are further away are 56-58dBA which still comply with the EPA amenity limit of 65-70dBA.

Summary

Predicted noise levels at the approved Marina would comply with appropriate amenity criteria for a commercial development.

It is also important to note that the likely busier times at the Marina (summer evenings and then Saturday afternoons and Sundays) the recycling plant is not operating.

We trust this information is sufficient. Please contact us if you have any further queries.

Yours faithfully
WILKINSON MURRAY

Neil Gross
Director

APPENDIX G: ENVIRONMENTAL PLANNING INSTRUMENTS

State Environmental Planning Policy (Major Development) 2005
While now substantially replaced by *State Environmental Planning Policy (State and Regional Development) 2011,* the project was lodged under this earlier policy and met the threshold criteria set out in Schedule 1 Item 9 because it is a resource recovery facility with an annual throughput of more than 75,000 tonnes. Consequently, the (then) Director-General declared the project a Part 3A project under Clause 6 on 19 December 2005.

State Environmental Planning Policy (Infrastructure) 2007
The policy aims to facilitate the effective delivery of infrastructure across the State by improving regulatory certainty and efficiency, identifying matters to be considered in the assessment of development adjacent to particular types of infrastructure development, and providing for consultation with relevant public authorities about certain development during the assessment process.

The project is defined traffic generating development under Schedule and was referred to the RMS for comment. A summary of RMS submission is detailed in Section 4 of this report. The project is considered to be consistent with the aims and objectives of the policy and consideration of the issues raised by RMS has been undertaken and detailed in Section 5 of this report.

State Environmental Planning Policy No. 33 – Hazardous and Offensive Development
The project is a defined 'potentially offensive industry' and the Department has considered the provisions of the Hazardous and Offensive Development Guidelines – Applying SEPP 33. Emissions and discharges from the site can be effectively managed with the implementation of an appropriate suite of mitigation measures, which are included as conditions of approval in the recommendation.

The project is not a defined 'potentially hazardous industry'. Notwithstanding, the Proponent submitted a Preliminary Hazard Analysis for the project, which references the Department's Hazardous Industry Planning Advisory Paper No 6 – Hazard Analysis Guidelines. The analysis shows that the project can be carried out with an acceptable risk profile with the implementation of appropriate protocols for handling potentially hazardous materials.

State Environmental Planning Policy No 44 – Koala Habitat Protection
The subject site is neither potential nor core koala habitat for the purposes of this policy as the requisite species of vegetation are not present.

State Environmental Planning Policy No. 55 – Remediation of Land
The site is a former landfill with an earthen landfill cap, which will require ongoing management. The site is subject to a Site Audit Statement, issued by a site auditor under the *Contaminated Land Management Act 1997* on 31 December 2001. The statement certifies that the site is suitable for the proposed use subject to a range of management measures, which are included in the project application. Both the Department and the EPA are satisfied that the site is suitable for the project subject to the implementation of these measures.

Greater Metropolitan Regional Environmental Plan No 2—Georges River Catchment
This plan specifies a number of general and specific planning principles for the assessment of development proposals on land subject to the plan. The principles relate to maintaining and improving the water and other environmental qualities of the Georges River and its catchment by protecting and encouraging the restoration of regionally significant environments and ecosystems.

The subject site is located on a flood plain of the Georges River, and it is already heavily modified by the former landfill operation. In its current state, the site would be difficult to restore for ecological or hydrological purposes. The landfill will require ongoing management to ensure the integrity of its cap and contents and to prevent downstream water quality impacts. In that respect, the ongoing management of the landfill associated with the project would be beneficial and it is not inconsistent with the aims of the plan. In addition, the project includes a range of environmental

controls to minimise impacts on water quality, the flood plain and its ecology, which are consistent with the aims of the plan.

Liverpool Local Environmental Plan 2008

The subject site is zoned E2 Environment Conservation. The zone objectives and relevant special provisions of the plan aim to protect, manage and restore areas of high ecological, scientific, aesthetic or cultural values. The subject site is a former landfill. It does not have such values and owing the volume of capped waste on the site, it would be very difficult to restore them. In addition, the project includes a suite of impact mitigation measures which address potential impacts on adjacent land, which is also zoned E2.