Appendix O

Noise Assessment

Report Ref Lake Macquarie Materials Recycling Facility
Acoustic Assessment Report September 2009.doc

Acoustic Assessment
For
Proposed Recycling Facility

DP 16062
Lots 42, 43, 54 and 53
Racecourse Rd, Teralba

.

Prepared For:
CiviLake

by

HUNTER ACOUSTICS

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CONTENTS

1. INTRODUCTION

Hunter Acoustics has been engaged to conduct an acoustic assessment of a proposed Materials Recycling Facility at Lots 42, 43, 54 and 53 Racecourse Rd, Teralba. The location of the site is shown in Figure 1 below. The site planning constraints are described in the Environmental Assessment prepared by AECOM dated September 2009 that this report supports. This report describes the methodology, results, and findings of the assessment and makes recommendations, as appropriate, for noise control measures to ensure that the operation of the facility does not become a source of offensive or intrusive noise.

2. TERMS AND DEFINITIONS

dB(A) ..... Unit of sound pressure level, modified by the A-weighting network to represent the sensitivity of the human ear.

SPL..... The incremental variation of sound pressure from the reference pressure level expressed in decibels.

SWL (L_W)..... Sound Power Level of a noise sources per unit time expressed in decibels from reference level $W_{O.}$

L_X ..... Statistical noise descriptor. Where (x) represents the percentage of the time for which the specified noise level is exceeded.

L_{eq}..... Equivalent continuous noise level averaged over time on an equivalent energy basis.

L_1..... Average Peak Noise Level in a measurement period.

L_{10}..... Average Maximum Noise Level in a measurement period.

L_{90}..... Average Minimum Noise Level in a measurement period.

L_{max}..... Maximum Noise Level in a measurement period.

Background Noise Level..... Noise level determined for planning purposes as the one tenth percentile of the ambient L_{A90} noise levels.

P_O ..... Reference Sound Pressure for the calculation of SPL in decibels.

W_O..... Reference Sound Power for the calculation of SWL in decibels.

3. DESCRIPTION OF THE DEVELOPMENT

3.1 SITE OPERATIONS

The facility will reprocess up to 200,000 tonnes per annum of hard waste material for resale and reuse within CiviLake operations. Materials that will be stored, sorted, reprocessed and stockpiled on the site include concrete, asphalt, recycled asphalt pavement, road base, green waste, bricks, gravel, crushed rock, tiles and soil.

Hours of operation for the facility are divided into crushing and processing operations, and pickup/delivery operations. The facility is proposed to operate crushing and processing works Monday to Friday between 7:00am and 6:00pm and on Saturdays between 7:00am and 1:00pm. No processing of incoming material will be conducted at night or on Sundays or public holidays.

The facility will cater for after hour's deliveries of materials resulting from CiviLake site works. After hours deliveries are necessary to the operation of the facility, as much of CiviLake's site works are carried out at night, where construction and maintenance work times is defined by the Roads and Traffic Authority (RTA) and may occur at any time during the night. Receipt of deliveries at night is proposed up to 50 nights per year. Receipt of materials on Sundays and public holidays is proposed between 8:00 and 5:00pm.

3.1.1 Site Access

Materials will be delivered to the site by medium to large rigid trucks. Transportation will be from two directions, with approximately 60 percent of materials being delivered from the south via Teralba and Racecourse Road and the remaining 40 percent of material from the west via Barnsley and The Weir Road.

3.2 CONSTRUCTION

The site will be raised by an average of 2m to between RL 4.2 and RL4.7 in order to ensure that all works within the site are clear of the 100 year floor level. An estimated 200,000 tonnes of fill is required to raise the site to its proposed level. The fill will be obtained from CiviLake construction works within the area, and will be stockpiled at an offsite location prior to being transported to the site. Once onsite, fill materials will be progressively stockpiled and will gradually feed the construction of the sites freeboard, until the proposed level is achieved.

In addition to site filling, other primary elements of the earthworks and construction phase of the proposal are as follows:

- Construction of a bund wall which runs around the perimeter of the site. The bund will be 1 metre in height and have batter slopes of 3:1.
- Construction of a series of stormwater detention ponds to store all rainwater that falls on the site for operational use and dust suppression. These ponds are integral to the 'store-treat-release' water management strategy proposed for the site.

Construction works will be conducted during the following hours:

- Monday to Friday, 7am to 6pm;
- Saturday, 8am to 1pm (or 7am to 1pm if inaudible at residential premises); and
- no construction on Sundays or public holidays.

4. ACOUSTIC ISSUES

4.1 ACOUSTIC ENVIRONMENT

The acoustic climate for the proposed facility and surrounding areas is regarded as suburban. The closest residential receptors, which are located in Martin Place, Edgeworth, are within a suburban environment that is exposed to consistent traffic noise and urban hum. The proposed materials recycling facility will generate both on site vehicle noise and industrial noise from plant operations. The site proposed for the development is located on The Weir Road, Teralba and will generate traffic noise from truck movements to and from the site. The primary on site noise sources for this type of facility are the operation of the mobile screen and a mobile crusher which will be used on a campaign basis for four to six weeks per year depending on demand and the green waste shredding machine that will operate on a semi-continuous basis.

The potentially affected residences are shown below in Figure 1.

Figure 1 Location of the Site, Receptors and Surrounding Industries

Note The Weir Road is the western extension of Racecourse Road and the subject site is on the Weir Road.

4.2 NOISE IMPACTS FROM SITE OPERATIONS

The proposed development will crush, grind and separate waste construction and demolition materials such as bricks, concrete, gravel and crushed rock road base, asphalt, soils, green waste and tiles.

Noise emissions capable of generating adverse noise impacts may come from:-

a) Truck movements and truck generated noise from material receiving and stockpiling operations,

b) Noise from materials handling equipment such as loaders used to manage stockpiles and relocate materials for processing and despatch,

c) Noise from the operation of crushing and screening plant,

d) Noise from green waste shredding,

e) Noise from operation of the Pug Mill for the production of Road Base material,

f) Noise from the concrete batching plant,

g) Noise from deliveries of cement and fly ash to the site for the concrete batching plant and the Pug Mill, and;

h) Noise from asphalt recycling equipment.

Daytime Noise emissions may come from any of the equipment listed above but night time noise emissions will only come from the operation of trucks and loaders on the site for materials receiving and stockpile handling.

The layout of the equipment is shown on the site plan in Appendix 1.

4.2.1 Materials Processing

Materials entering the facility will be weighed on a 60 tonne weighbridge upon entry, with materials deposited into respective feed stockpiles until processed. A mobile screening plant will be utilised to sort materials into different sizes. Oversized materials will be crushed or ground into smaller aggregates using a mobile crusher on a campaign basis. Crushed and screened materials will either be sold or used on council projects, or processed in the pug mill where materials are mixed for uses such as road base.

The recycling facility will operate on a batch basis to service the requirements of incoming and outgoing products as required. This means that on any given day there will be variations in the amount of time the equipment within the facility operates and the number of trucks that it services to meet demands.

The Materials Recycling plant and equipment such as crushers and shredders may operate continuously throughout the day to process the available feedstock material into product. Although equipment may operate on a campaign basis it is regarded as a continuous sound source.

Batching plants such as the pug mill and concrete plant operate intermittently throughout the day with typically less than a 50 % duty cycle to meet demands and truck availability. These would normally be regarded as discontinuous sources, however, observations of the operations of the pug mill at Teralba showed that when it was in operation it was operational continuously for a number of hours and, therefore, this plant is also regarded as a continuous noise source.

4.2.2 Traffic Noise from the Proposed Development.

Traffic movements to and from the recycling facility have been determined in the Traffic Impact Assessment by AECOM dated 28th of August 2009. Total truck movement is expected to be 111 movements per day from incoming feedstock and 112 movements per day for outgoing product, with peak hourly truck movements of 11 vph and 15 vph for incoming feedstock and outgoing product respectively. The vehicles will be primarily truck and dog combinations.

Access for vehicles to and from the facility is via two roads, via The Weir Road, running East / West towards Barnsley, or via Racecourse Road, running North / South towards Teralba. CiviLake expect that 60 % of the traffic movements or 134 movements per day to and from the facility will be via Racecourse Road with the remaining 99 movement travelling via Barnsley.

Residential receptors that may be potentially affected by traffic noise on the route along Racecourse Road are located approximately three kilometres by road to the south of the proposed facility. There are a number of residences and commercial facilities in York Street that are exposed to potential increases in traffic noise due to traffic from the proposed development.

An assessment of the traffic noise impact has been based on the expected peak hourly trucking volume of 15 heavy vehicles per hour from the AECOM traffic report.

5. ASSESSMENT CRITERIA

5.1 PLANNING LEVELS

This assessment is conducted in accordance with the Industrial Noise Policy released by the DECC in December 1999. Ambient and background noise levels for the area were established by acoustic data logging with a Rion NL-04 Sound Level Meter (Serial Number: 10206334, Last calibrated: July 2008) at the base of the power pole on site over the period 17th to 22nd of November 2008. The Rating Background Level was determined in accordance with Section 3 and Appendix B of the Industrial Noise Policy and the appropriate intrusiveness criteria determined. Rating Background Levels and the associated Intrusiveness Criteria are set out in Table 1 below.

Table 1 Intrusiveness Criteria

	Day Time 07:00-18:00 hrs Mon –Sat 08:00-18:00 hrs Sun & P/Hol	Evening 18:00-22:00 hrs any day	Nightime All other times
Rating Background Level	40	42	38
Suburban Amenity Criteria (ANL)	55	45	40
Intrusiveness Criteria	45	47	43
Sleep Disturbance Criteria			53 dB(A) L_{A01}

5.1.1 Criteria for Daytime Operations

The limiting criteria for normal daytime operating conditions, in accordance with the DECC Industrial Noise Policy 1999, is the day time intrusiveness criteria, at 45 dB(A) $L_{eq15\ min}$ for all types of operations including receiving and stockpile materials handling, processing operations and production operations. Compliance with the day time intrusiveness criteria will ensure compliance with the daytime ANL levels

5.1.2 Criteria for Night-time Operations

The limiting criterion for the night time receiving and unloading material and for stockpile operations is the night time Acceptable Noise Level (ANL) criteria of 40 dB(A) $L_{eq15\ min}$ and the sleep disturbance criteria of 53 dB(A)L_{A01}. Compliance with the night time ANL criteria will ensure compliance with the night time intrusiveness levels.

5.2 METEOROLOGY

The proposed facility will conduct processing and production operations only during daytime hours, therefore, the effects of noise enhancing temperature inversion conditions need not be considered for processing operations as they temperature inversions generally occur outside the operating times from processing.

Night time noise enhancing atmospheric conditions need to be considered for receiving and handling of feedstock at night time.

Wind speeds of less than 3 metres per second do not occur in any given direction for more than 30% of the time in any season, therefore, noise enhancing conditions caused by wind are not required to be assessed. Wind roses showing wind speed and direction for the area have been taken from Williamtown AWS and are shown in Appendix 2.

6. METHOD OF ASSESSMENT

6.1 SITE AND STATIONARY NOISE SOURCES

Sound Power Levels for general sources used in the modelling process including, trucking and loader operations, crushers with screens, mobile screens, and concrete plants have been taken from Hunter Acoustics data base of similar equipment that has previously been measured by Hunter Acoustics in accordance with AS 1217 and AS 1055.

The sound emission levels of specialised plant for this facility, including the pug mill, asphalt recycler, and cement delivery truck have been measured on site by Hunter Acoustics at the Teralba quarry where they are currently in operation.

The Sound Power Levels for sources used in the modelling process are shown below in Table 2.

Table 2 Sound Power Levels of Sources

	Sound Power Level (dBL)										
Source	**32**	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	**16k**	**Total dB(A)**
Daytime Sound Sources											
Mobile Crushers	109	113	115	109	110	109	109	110	111	110	117.0
Mobile Screens	105.7	104.5	107.5	104.1	103.7	102.7	101.7	98.0	92.8	92.8	108.1
Pug mill	67	80	89	94.5	100.5	100	99	99	92.5	92.5	105.8
Loaders	97	105.5	101	93.8	91.4	96.6	95.8	88.9	82	82	100.8
Concrete Batching Plant	105.2	113.1	105.5	103.7	106.3	104.7	104.5	104.8	106.2	104.6	112.8
Asphalt Recycling Plant	99	102.5	97.4	98.7	98.6	91.6	88.4	85.2	77.1	66.2	98.7
Cement Delivery	109.2	105.6	96.3	93.5	102.6	97.7	98.5	93.6	85.4	78.2	104.4
On Site Trucking L_{Aeq}	93.7	101.8	88	86	88	89	86	77	71	65	93
Night Time Sound Sources											
Loaders	97	105.5	101	93.8	91.4	96.6	95.8	88.9	82	82	100.8
On Site Trucking L_{A01}	93.7	101.8	102	98	102	98	95	77	71	65	103
On Site Trucking L_{Aeq}	93.7	101.8	88	86	88	89	86	77	71	65	93

To determine the predicted received noise levels at affected receivers from the proposed recycling facility, the measured noise source levels from Hunter Acoustics data base were propagated as octave band spectra using ENM software that includes allowance for distance attenuation, topographic and man made barriers, atmospheric absorption and ground absorption and reflection.

The noise predictions were made for the proposed operations under neutral conditions for daytime and for 3 degree C temperature inversion conditions for night time emissions. Noise contour models for the noise emissions from the site to the surrounding area were produced and are shown in Appendix 3. Points to point calculations were also conducted to sensitive receivers to more accurately quantify the received noise levels. The calculated point to point received noise levels are shown in Table 3 and assessed against the relevant criteria in Table 1, to determine the acceptability of the received noise levels.

6.1.1 Affected Receptors

The most affected receptors (marked as "Receiver 1") are located on Martin Place, Edgeworth, approximately 500 metres to the NNE of the proposed recycling facility. Other affected receptors (marked as "Receiver 2") are located on The Weir Rd approximately 750 metres to the West of the proposed facility.

6.2 TRAFFIC NOISE

Traffic generation data was taken from the AECOM Traffic Impact Study and shows that the future 2022 traffic volume without the development is 503 vehicles per hour with 10% heavy vehicles on Northville Drive and 174 vph with 10% heavy vehicle on the northern end of The Weir Road. The corresponding 2022 traffic volumes at York Street and along Racecourse Road via Teralba are 308 vph with 20 percent heavy vehicles.

The majority of the heavy vehicle movements from the site are expected to travel along Racecourse Road via York Street increasing the heavy vehicle numbers in York Street from 20 to 25 percent of the 2022 hourly traffic volume heavy. The likely increase in the volume of heavy vehicles in York Street has the potential to cause adverse noise impacts for dwellings and commercial premises on York Street.

The 2022 traffic volumes with the development on York Street are 408 with 24% heavy vehicles indicating a shift in the traffic composition.

6.3 CONSTRUCTION NOISE

Table 4.1 from the Interim Construction Noise Guideline issued by the Department of Environment & Climate Change NSW in July 2009 gives a management level of RBL + 10dB(A) for construction carried out within the recommended standard hours of 7am to 6pm, Monday to Friday. This results in an allowable limit of 50 dB(A) $L_{eq\ 15\ min}$. for residential receptors for the construction of the proposed facility.

Typical construction equipment noise levels that are likely to be associated with the construction of the recycling facility were taken from Hunter Acoustics data base and predicted received construction sound pressure levels were determined at sensitive receptors.

7. RESULTS

7.1 SITE NOISE LEVELS

7.1.1 Modelling Assumptions

The plant types and the respective plant locations for the proposed recycling facility that were used in this assessment are taken from the preliminary site layout and are shown in Appendix 1. The location of some of the plant has not been determined at this stage and will be part of the detailed design process and the following assumptions have been made in respect of the plant configuration.

1. The two mobile screens were modelled in the location as shown in the site layout shown in Appendix 1. The location of the mobile crusher with screen was modelled 10 metres to the East of the mobile screen.
2. The model assumes the simultaneous operation of 3 loaders / excavators located around the site to service the feed stock, the green waste area and the finished product area,
3. The model also assumes the simultaneous operation on site of three heavy trucks,

4. The model assumes simultaneous operation of all major plant items including the crusher and green waste shredder.
5. The concrete batching plant has been located at the north-eastern end of the site and is assumed to be operating simultaneously with one concrete mixer truck.
6. Noise barriers were modelled adjacent to the green waste shredder and the mobile crushing plant with a height of 3 metres above the finished ground level.

None of the sound sources measured showed adverse characteristics such as tonality, impulsiveness, or excessive low frequency noise components, with the exception of equipment reversing alarms. A requirement to use broadband reversing alarms has been included in the recommendations to avoid the problems associated with tonal alarms.

Table 3 below shows the predicted received noise levels at each of the receiver locations for normal operating conditions and operating with a mobile crusher. Table 3 also shows the predicted received noise levels at the receiver locations for night time materials drop off under 3 degree C temperature inversion conditions.

Table 3 Point to Point Calculations

Name	**Location**	**Total Received Noise Level dB(A)**	
		All Plant (including Crusher and Shredder)	All Plant (including shredder and without crusher)
Receiver 1	Martin Place	47	45
Receiver 2	The Weir Road	45	44
	Daytime Criteria Residential	**45**	
Worm Farm**	Griffen Road	52	51
	Daytime Criteria Commercial	**65**	
		Night Time Material Drop Off 3 Deg C Inversion	
		$L_{Aeq\ 15min}$	$L_{A01\ 1min}$
Receiver 1	Martin Place	38	48
Receiver 2	The Weir Road	33	43
	Night Time Criteria Residential	**40**	**53**

** Classified as a Commercial Receiver.

Table 3 shows that the received noise levels at the receivers are consistent with the daytime target noise goals for the worst case operating conditions and less than the target noise goals when either the crusher or the shredder is not operational. The model assumes the presence of sound barrier walls adjacent to both the green waste shredder and the crusher. The predicted received noise levels are consistent with the daytime ambient acoustic climate and noise is not likely to be identified as a source of concern during the day.

The night time predicted received sound levels are below the target noise goals under noise enhancing conditions and are also below the sleep disturbance criterion under noise enhancing conditions.

7.2 TRAFFIC NOISE

Changes in traffic noise levels for the worst peak hour resulting from the inclusion of the development traffic in traffic flows on York Street are shown in Table 4 below.

The night time traffic volumes are taken to be 3% of the daily traffic flow which typically represents the time between 10pm and 11pm. The night time development traffic volumes are considered to be the peak volume for the supply of feed stocks or 11 vehicles per hour.

Table 4 Worst Case 1 hour Peak Noise level at York Street Residences for 2022.

	Daytime Traffic noise Without Development Traffic	Daytime Traffic noise With Development Traffic	Night Time traffic noise Without Development Traffic	Night time traffic noise With Development Traffic
	67 dB(A)	68 dB(A)	60	60
ECRTN Criteria	60		55	
	But in All Cases less than 2 dB(A) increase due the development			

The traffic noise predictions in table 4 show that while the future traffic noise on the York Street is above the DECC targets in the ECRTN the proposed development does not increase the traffic noise level by more than 2dB(A) and therefore the traffic noise impacts from the proposed development are considered acceptable.

7.3 CONSTRUCTION NOISE

Table 5 shows the Sound Power Levels of plant and equipment likely to be used in the construction process of the facility and predicted received construction noise levels.

Table 5 Sound Power Levels for the Construction Process

Plant Item	**Individual Sources SWL dB(A)**	**Worst Case SWL dB(A)**
Excavator	110	114
Dozer	112	116
Concrete mixing truck	107	
Concrete pump	103	
Mobile crane	88	88
Pneumatic hand tools	114	114
Total		**114**
Worst Case Received at Receiver 1		40
Worst Case Received at Receiver 2		35
Construction Noise Limit		**50**

The total Sound Power Level for the worst case scenario during the construction process of the proposed facility is assessed as having a worst case received noise level of 40 dB(A) which is less than the operational noise of the facility and well below the target noise goals for operation, therefore, will remain non intrusive during the construction process.

8. DISCUSSION

The assessment has shown that the proposed recycling facility will comply with the requirements of the NSW Industrial Noise Policy and is not likely to become a source of offensive or intrusive noise.

9. RECOMMENDATIONS

The following recommendations are made to ensure that noise emissions from the proposed plant are adequately controlled and do not become a source of offensive noise:-

1. Reversing alarms or audible warning devices on loaders and other equipment are to be of broadband type and to have levels that do not to exceed 85 dB(A) when measured at a distance of 7 meters directly behind the rear of the equipment. Fit BBS-TEK Alarms - Medium & Light Duty Model 600-BBS087 or equivalent.
2. Construct sound attenuation barriers as shown in Appendix 1 to have a minimum crest height that is 3 metres above the finished ground level. The design and location of the bunds are to be at the direction of a suitably qualified acoustics consultant and be coordinated with the operational requirements of the facility. The specifics of the design shall be detailed during final project design and be submitted with an application for a construction certificate.
3. Sound power levels of the proposed plant to be verified by an appropriately qualified acoustic consultant after commissioning.
4. Maintain road surfaces in good condition to avoid excessive noise being generated by empty truck bodies at night.

10. CONCLUSION

The assessment has shown that the operation of the proposed recycling facility at this particular location will meet the noise criteria for both daytime and night time operations and will not cause an excessive increase in traffic noise along the access roads. Based on the outcomes of this assessment, I see no acoustic reason to withhold permission for the proposed development.

If you have any questions regarding this report please do not hesitate to contact me on 02 49208999.

Thank you for the opportunity to provide this assessment, please do not hesitate to contact the undersigned if you have any questions regarding this or any other acoustic or environmental matter

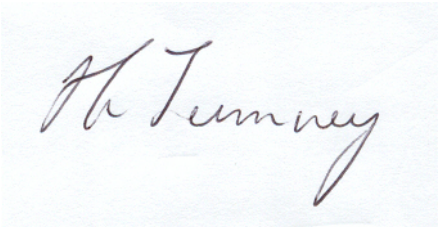
Yours Sincerely
Hunter Acoustics

Prepared by

Matthew Bain ADip, Des Sci (Audio Design)
Acoustics Technician

Date 6 November 2009

Document Control
Reviewed and Authorised by



Ray Tumney BEng(Mech), MEnv Stud, MAAS, MIEAust, MSEE,
Principle Consultant

Appendix 1 Site Plan

Cad ref: K:\60101141_LMRCLS_CADD\LS.3 Working\Drgs\10_Concept\60101141-DWG-10-CI0002.dwg Last modified: 11 Jun 10 - 16:07

NOTE:

BASED ON ADVICE FROM ENERGY AUSTRALIA, TOTAL GROUND HEIGHT INCLUDING ANY STOCKPILES WITHIN THE ELECTRICAL TRANSMISSION EASEMENT MUST BE MAINTAINED BELOW THE FOLLOWING:

- AREA 1 - BELOW RL10.0
- AREA 2 - BELOW RL8.0
- AREA 3 - BELOW RL6.0

OPERATIONS WITHIN THE ELECTRICAL TRANSMISSION EASEMENT TO BE IN ACCORDANCE WITH AN OPERATIONAL SAFETY MANAGEMENT PLAN, TO BE APPROVED BY ENERGY AUSTRALIA.

LEGEND

- SECURITY FENCE
- STOCK FENCE
- GATE
- FEED AND PRODUCT STOCKPILING AREAS
- ECOLOGICAL ENDANGERED COMMUNITY (EEC) BOUNDARY
- APPROX ZONING BOUNDARY

RETAINING WALLS TO PROTECT ANGOPHORA INOPINA TREES WHERE PRACTICABLE TO BE CONFIRMED IN DETAIL DESIGN

PROPOSED FIRE ACCESS GATES

ELECTRICAL TRANSMISSION EASEMENT

FINE ACCESS TRACK

5.0m MIN

BIORETENTION POND

MAIN WATER STORAGE POND

SITE BOUNDARY FENCE

DIRTY WATER POND

AREA 3 (REFER NOTES)

DECANT PUMP RISER

TRUCK BODY WASH AREA

THICK SCRUB

APPROX. ZONING BOUNDARY

FIRE ACCESS TRACK

Mulching Machine

ASPHALT RECYCLING PLANT

Crusher

APPROXIMATE LIMIT OF EXISTING CLEARING

PROPOSED ENTRY INTERSECTION. SEE DRG F2009/01646-2663-01 FOR MORE DETAILS.

SMALL AREA OF EEC TO BE DISTURBED

WESTERN WATER STORAGE POND

PROPOSED WATER TRUCK FILLING AREA

PRODUCT BINS

OFFICE

ACCESS ROADWAY

ROAD RESERVE

AREA 2 (REFER NOTES)

CONCRETE BATCHING PLANT

FEED STOCKPILE

WEIGHBRIDGE

GREEN WASTE STOCKPILE

CARPARK

20m MINIMUM APZ

OFFICE

THE WEIR ROAD

MAIN ENTRANCE GATE

AREA 1 (REFER NOTES)

EASTERN WATER STORAGE POND

PUG MILL

FIREWATER TANK (TYP)

STORAGE SHED

STORAGE SHED

SURVEYED BOUNDARY OF EEC

FIRE ACCESS TRACK

TRANSMISSION TOWER

12m

EXISTING TRANSMISSION TOWER

12m x 12m ACCESS AREA FOR TRANSMISSION TOWER AS REQUIRED BY ENERGY AUSTRALIA

PROPOSED FIRE ACCESS GATE

APPROXIMATE LIMIT OF EXISTING CLEARING

THICK SCRUB

PLAN
SCALE 1:500

No.	BY	DATE	DESCRIPTION	APPD
03	TT	11.06.10	POST ADEQUACY REVIEW VERSION	JL
02	MT	04.11.09	FINAL CONCEPT PLAN	JL
01	J.S.	23.09.09	DRAFT FOR CIVILAKE APPROVAL	JL

REVISIONS

SCALES:

5 0 5 10 15m

1 : 500 FULL SIZE A1

THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED IN ACCORDANCE WITH THE AECOM QUALITY ASSURANCE SYSTEM TO ISO 9001:2000

DESIGNED	W.WAN	CHECKED	A.KIELNIACZ
DRAWN	M.TARRANT	CHECKED	J.ALLSOP
APPROVED	J.LASKY	DATE	

Mobile Plant

Noise Barrier

DESIGNER:

AECOM

AECOM Australia Pty Ltd A.B.N. 20 093 846 925

TERALBA SUSTAINABLE RESOURCE CENTRE

GENERAL ARRANGEMENT

STATUS:	DRAWING NO:	REV:
CONCEPT	60101141-DWG-10-CI0002	03

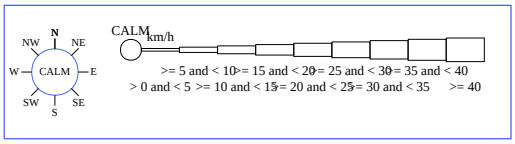
Appendix 2 Roses of Wind Direction Vs. Wind Speed – Williamtown RAAF

Roses of Wind direction versus Wind speed in km/h (10 Sep 1942 to 31 May 2007)

Custom times selected, refer to attached note for details

WILLIAMTOWN RAAF

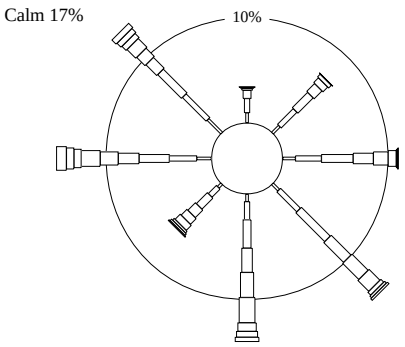
Site No: 061078 • Opened Jan 1942 • Still Open • Latitude: -32.7932° • Longitude: 151.8359° • Elevation 9m



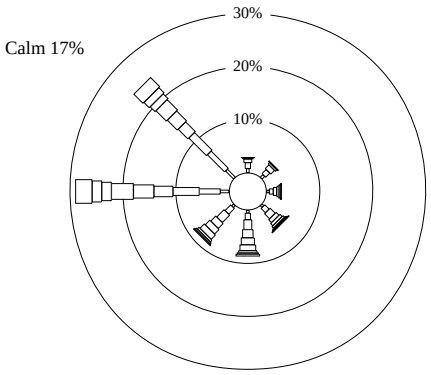
An asterisk (*) indicates that calm is less than 0.5%.

Other important info about this analysis is available in the accompanying notes.

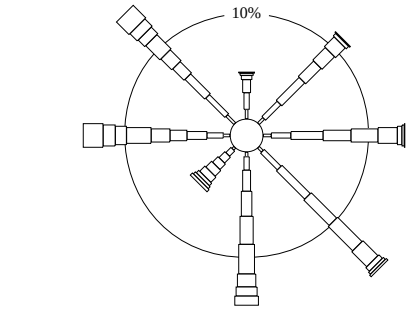
Autumn 22003 Total Observations



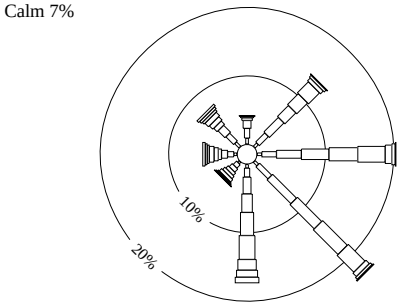
Winter 21784 Total Observations



Spring 21836 Total Observations



Summer 20936 Total Observations

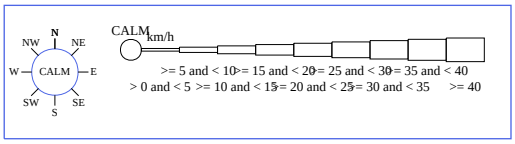


Roses of Wind direction versus Wind speed in km/h (10 Sep 1942 to 31 May 2007)

Custom times selected, refer to attached note for details

WILLIAMTOWN RAAF

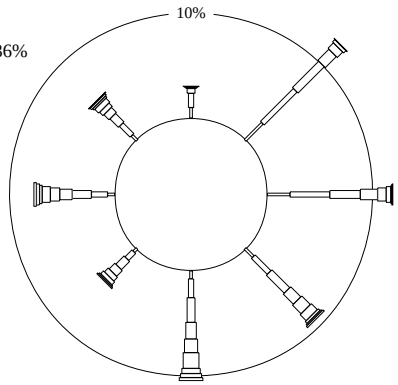
Site No: 061078 • Opened Jan 1942 • Still Open • Latitude: -32.7932° • Longitude: 151.8359° • Elevation 9m



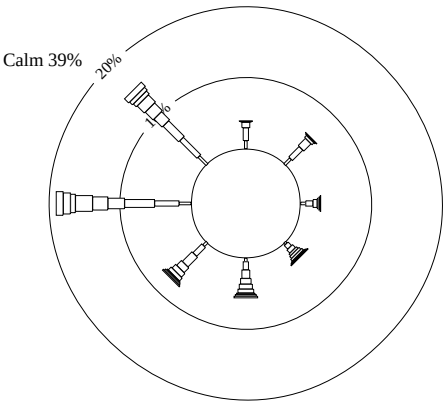
An asterisk (*) indicates that calm is less than 0.5%.

Other important info about this analysis is available in the accompanying notes.

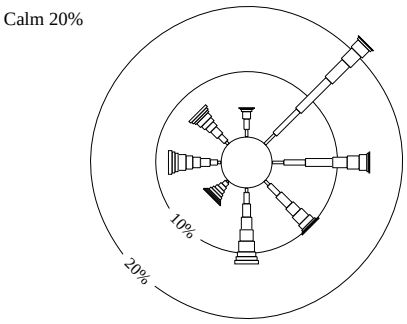
Autumn 10856 Total Observations



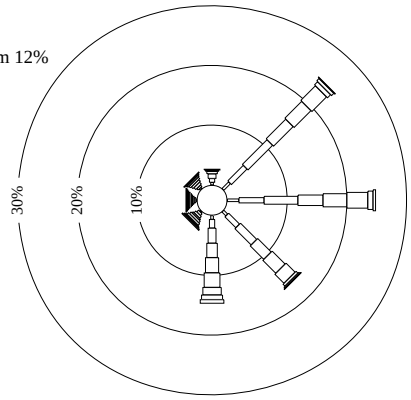
Winter 10819 Total Observations



Spring 10859 Total Observations



Summer 10338 Total Observations

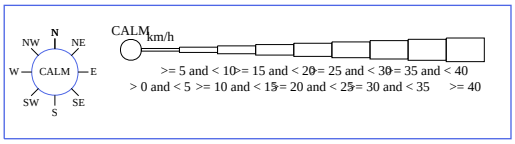


Roses of Wind direction versus Wind speed in km/h (11 Sep 1942 to 31 May 2007)

Custom times selected, refer to attached note for details

WILLIAMTOWN RAAF

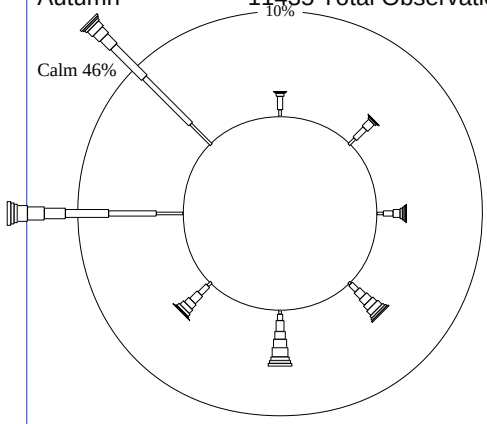
Site No: 061078 • Opened Jan 1942 • Still Open • Latitude: -32.7932° • Longitude: 151.8359° • Elevation 9m



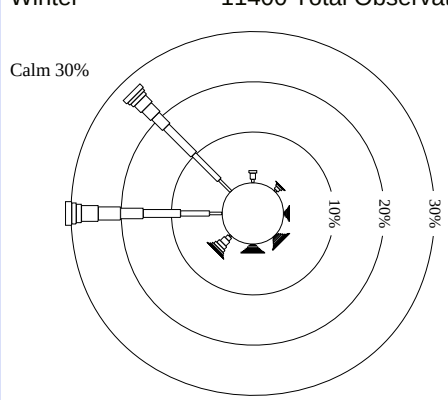
An asterisk (*) indicates that calm is less than 0.5%.

Other important info about this analysis is available in the accompanying notes.

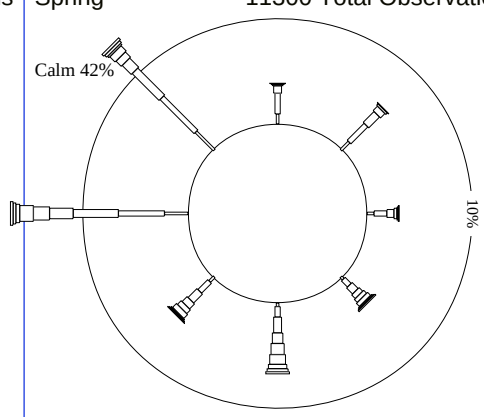
Autumn 11435 Total Observations



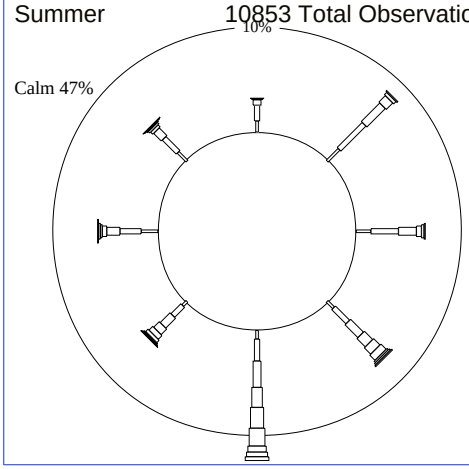
Winter 11400 Total Observations



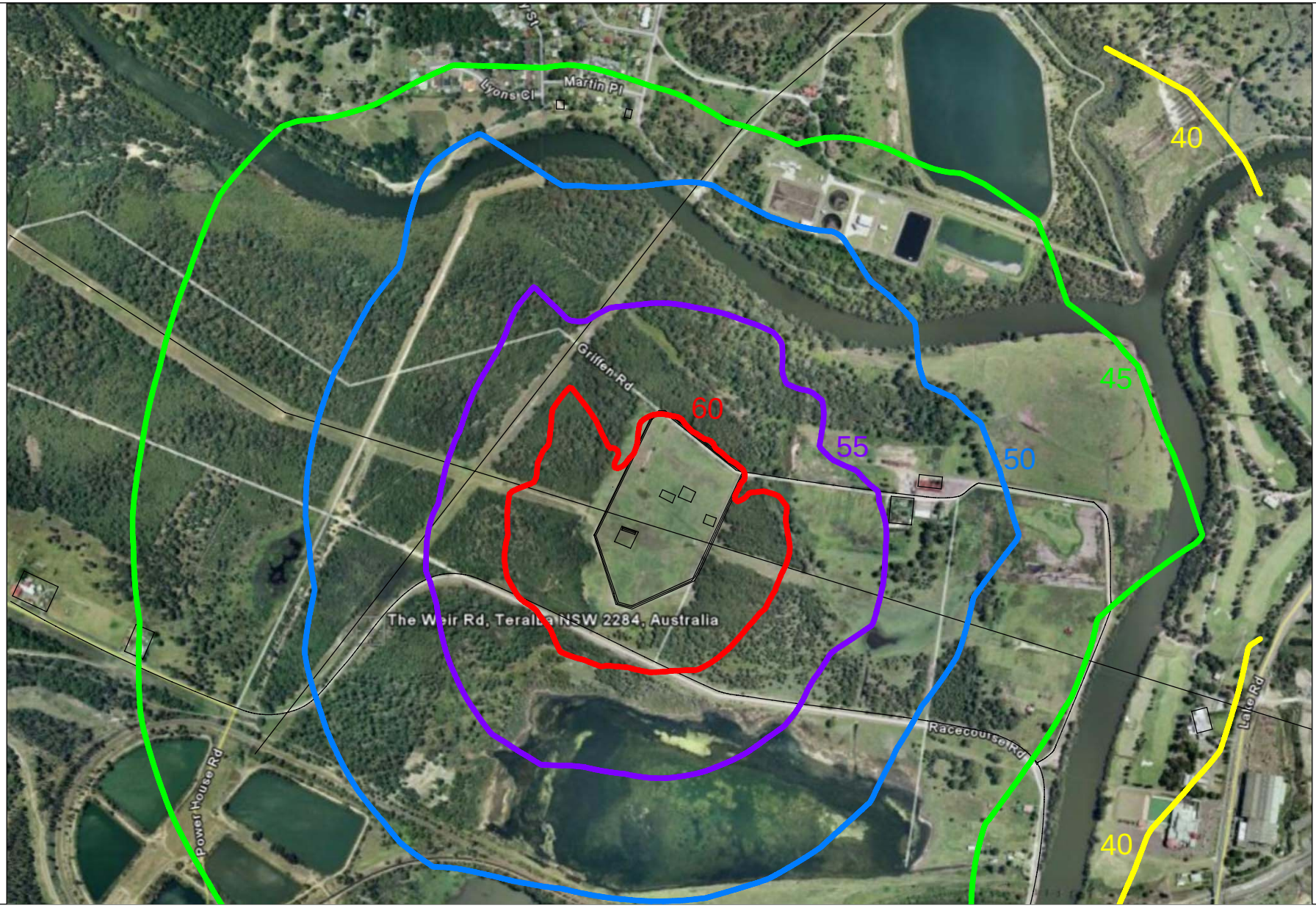
Spring 11300 Total Observations



Summer 10853 Total Observations



Appendix 3 Noise Impact Contours



HUNTER ACOUSTICS

Date	Project	Lake Macquarie Recycling Facility
06/11/2009	Title	Figure 1: All Equipment Operational including crusher (Neutral Conditions)

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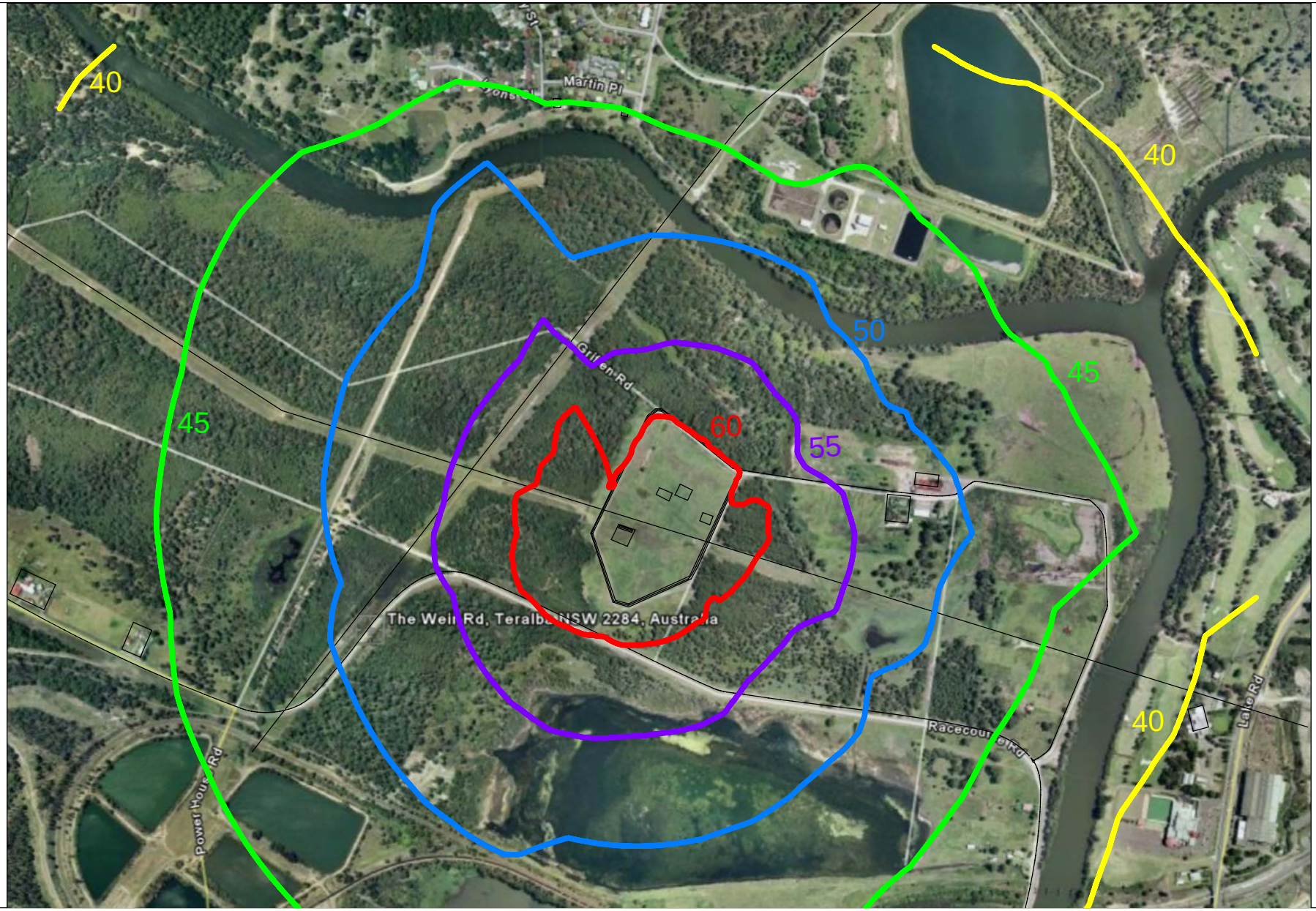
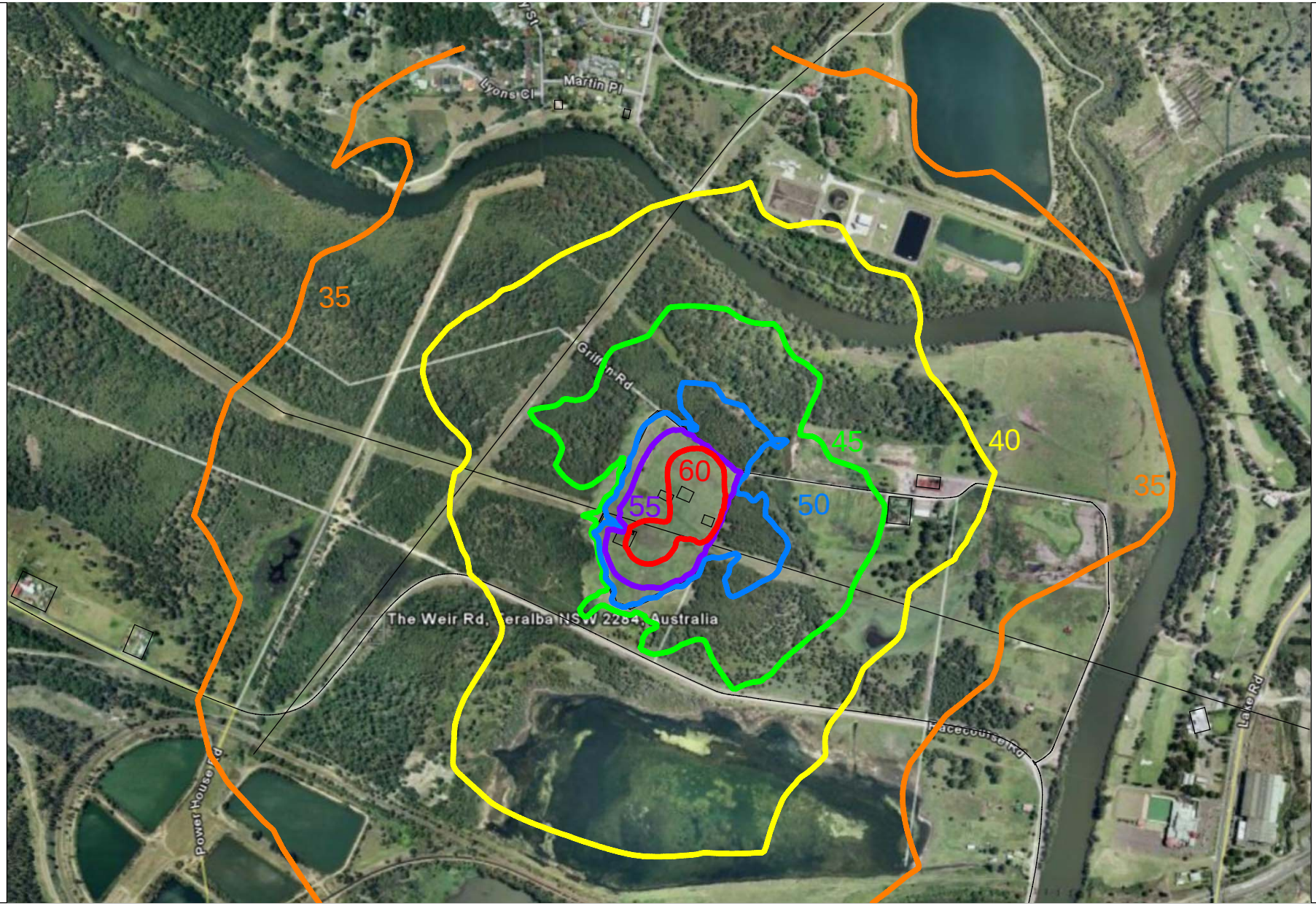


HUNTER ACOUSTICS

Date	Project	Lake Macquarie Recycling Facility
06/11/2009	Title	Figure 2: All Equipment Operational Without Crusher (Neutral Conditions)

P.O. Box 565 KOTARA, 2289. Tel 02 49208999, Fax 02 49424452



HUNTER ACOUSTICS

Date	Project	Lake Macquarie Recycling Facility
06/11/2009	Title	Figure 3: Night Operations (Neutral Conditions)

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