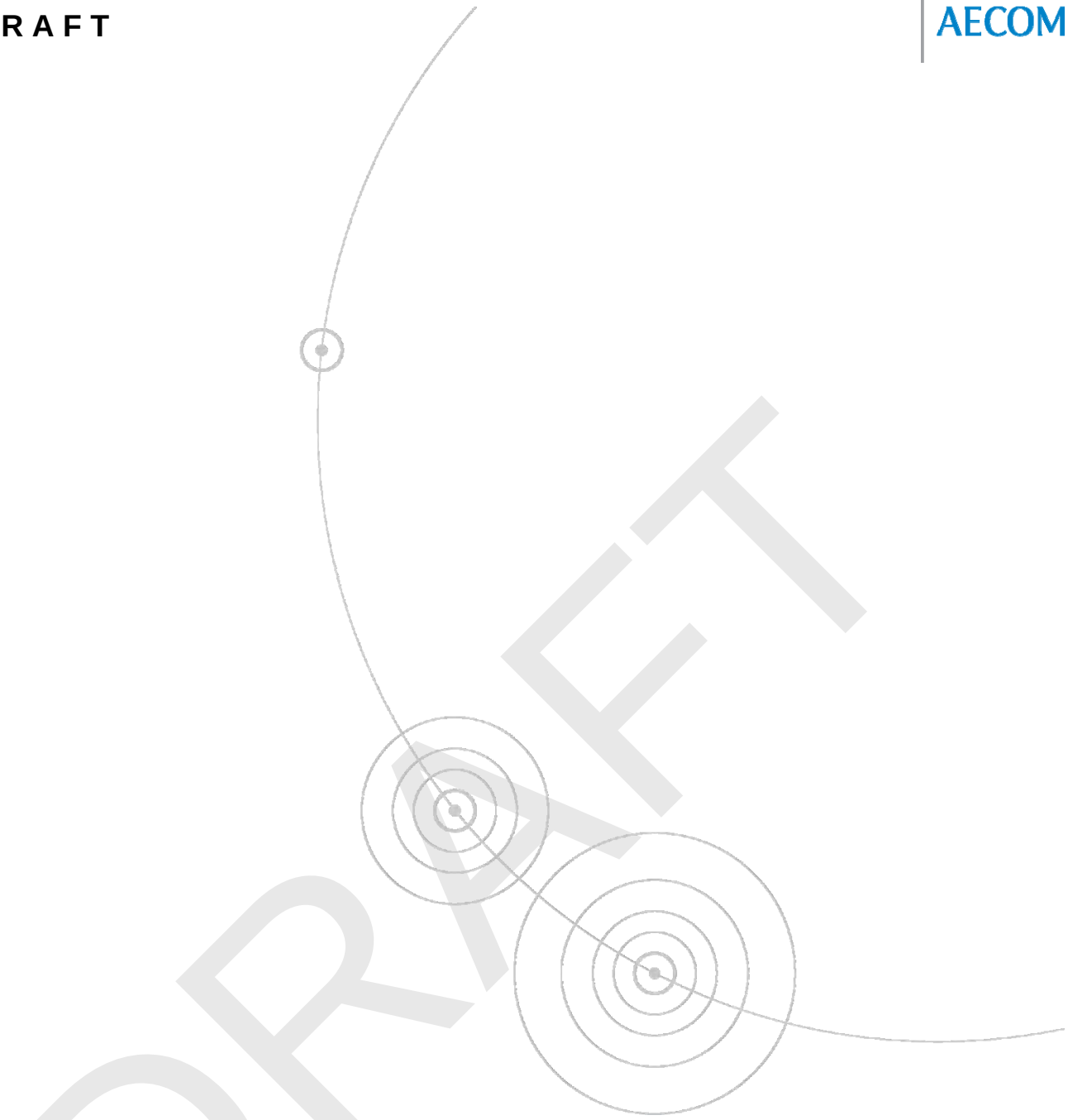
AECOM



Chapter 9.0 - Noise

Document No.: 60047441_EAR_RP_009_0
J:\Projects\60047441\6. Draft Docs\6.1 Reports\Environment\EAR_FinalDraft_PublicRelease\60047441_EAR_RP_009_0.doc

Table of Contents

List of Tables

List of Figures

9.0 Noise

9.1 Overview

The objective of this chapter is to determine the existing acoustic environment surrounding the preserved corridor and to determine any exceedances of the departmental criteria due to the KBP on the acoustic environment and recommend mitigation measures for these potential impacts.

9.2 Approach and Methodology

9.2.1 Methodology for Measuring the Existing Road Traffic Noise

Noise measurements were undertaken between September 2008 and March 2009 to survey the existing noise environment around the preserved KBP corridor; and near the Centenary Motorway in the vicinity of the proposed Centenary Motorway interchange. Noise measurements were conducted in accordance with DMR *Road Traffic Noise Management Code of Practice 2008* (COP 2008). A noise measurement for each location consisted of:

- 48 consecutive hours of unattended noise logging (involving the deployment of sound measurement equipment in a suitable location that logged noise levels continuously throughout the logging period); and
- Four sets of attended noise measurements per 24 hours, where an operator visited the unattended noise logger for a period of time with a sound level meter and verified the measurements taken by the unattended logger with a concurrent measurement. This attended measurement period also allowed the operator to note any extraneous noise events and climatic conditions.

All noise measurements excluded extraneous noise not typically representative of the ambient noise environment. For example, noise was excluded from construction noise, insects, air conditioners, pool pumps etc.

The selection of noise monitoring sites is to provide a representation of sensitive receptors within the study area that offer a range of topographical influences (e.g. houses positioned higher than the road, adjacent and below) and conditions, as listed below, to meet the noise assessment requirements. Whilst measurements are not required for every dwelling, the proposed alignment noise assessment considers every sensitive receptor with the vicinity of the proposed KBP, Moggill Road and Centenary Motorway works.

The monitoring locations were selected based on the following conditions:

- Dwellings directly facing the KBP preserved corridor;
- Dwellings directly facing the Centenary Motorway and Moggill Road;
- Dwellings on access and local roads that may be subject to increases in traffic volumes as a result of the KBP (both at completion and during construction);
- Dwellings recessed away, to consider the noise environment at elevated receivers further away, from existing and proposed road sources; and
- All education, health and community buildings within the vicinity of the KBP.

A summary of the site measurement dates is presented in Table 9.1 below. Figure 9.1 to Figure 9.3 overleaf provide a map of these locations surrounding the existing Centenary Motorway alignment and preserved KBP corridor.

Table 9.1: Site Measurement Dates

Date	Sites Completed
1 – 3 September, 2008	37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48
8 – 10 September, 2008	28, 30, 31, 32, 33, 34, 35, 36, 49, 50, 51
10 – 12 September, 2008	16, 19, 20, 21, 24, 25, 26, 29
15 – 17 September, 2008	9, 10, 11, 12, 13, 14, 17, 18, 22
17 – 19 September, 2008	15, 23, 27
9 – 11 February 2009	1, 2, 3, 4, 5, 6
2 – 4 March 2009	7, 8

9.2.2 Methodology for Future Road Traffic Noise Predictions

A road traffic noise model was created in SoundPLAN (Version 6.5). This noise modelling software implements the Calculation of Road Traffic Noise 1988 (CoRTN) algorithms to predict road traffic noise emissions. CoRTN is the most commonly accepted and verified form of calculating road traffic noise in Australia and, in addition with SoundPLAN, is recommended in the COP 2008.

A three dimensional representation of the proposed KBP, Centenary Motorway upgrade and surrounds was constructed within SoundPLAN. The inputs into the model included ground contours, buildings, location of sensitive receptors (including dwellings), retaining walls, concrete parapets, noise barriers and areas of hard and soft ground.

The forecast traffic volume was entered into the noise model and was based on information provided through the DMR document: *"Kenmore Bypass Traffic Need/Benefit Assessment, Modelling Output Report"* August 2007. These flows are summarised in Table 9.2 below.

Table 9.2: Forecast 2026 Road Traffic Volumes and Road Surface Type

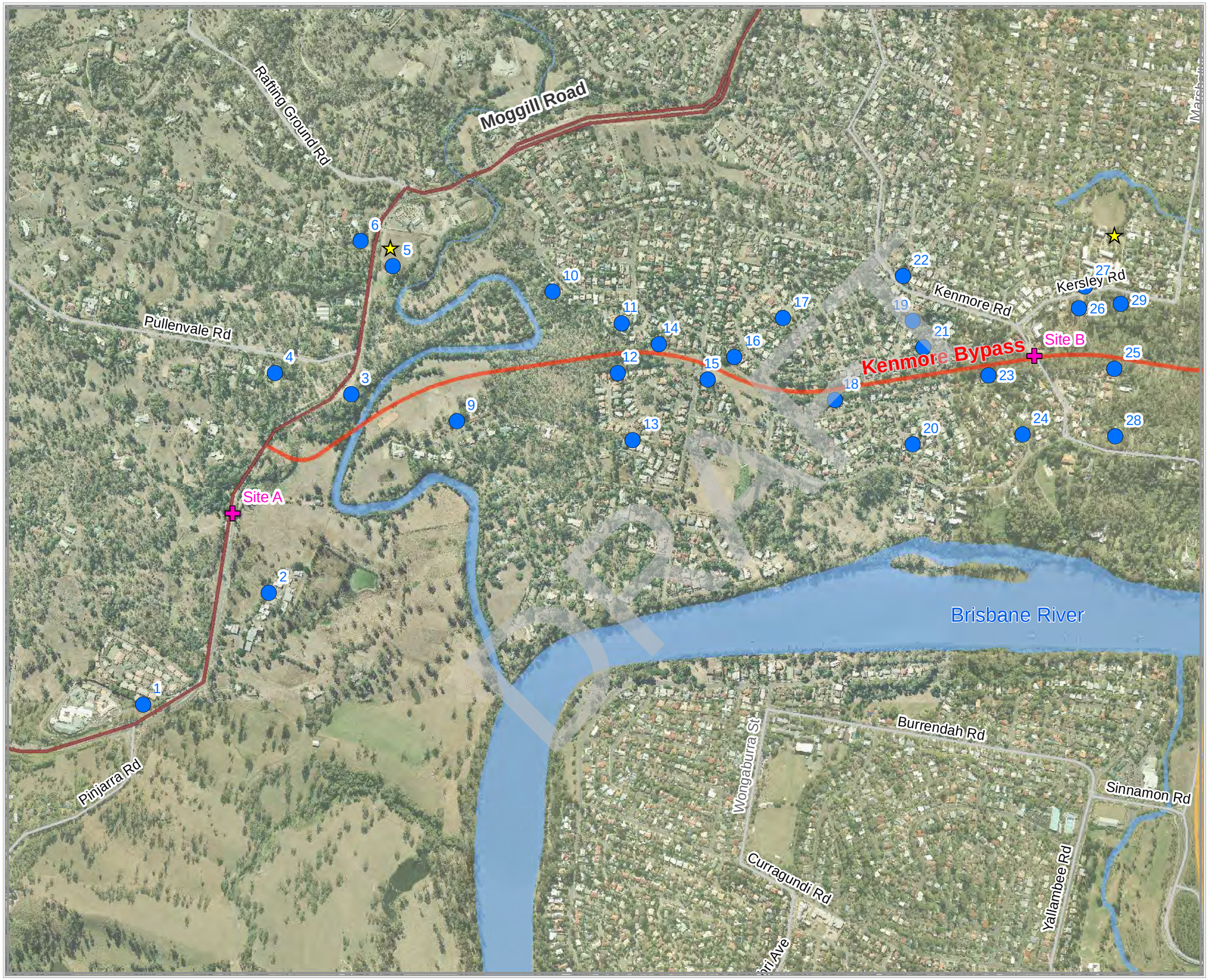
Road	AADT	Posted Speed (km/hr)	Commercial Vehicles	Road Surface Type
KBP – Eastbound	11,871	80	5%	Open Graded Asphalt
KBP – Westbound	11,820	80	5%	Open Graded Asphalt
Centenary Motorway Northbound – South of Interchange	46,491	100	6%	Open Graded Asphalt
Centenary Motorway Northbound – North of Interchange	40,072	100	6%	Open Graded Asphalt
Centenary Motorway Southbound – North of Interchange	38,394	100	6%	Open Graded Asphalt
Centenary Motorway Southbound – South of Interchange	45,744	100	6%	Open Graded Asphalt

The KBP and Centenary Motorway were modelled with an Open Graded Asphalt (OGA) pavement surface. Road traffic noise emission varies with differing pavement surfaces. Corrections for differing surface types have been developed by DMR and are published in the COP 2008, detailed further in Section 9.4.3.

Three assessment Scenarios were assessed to aid the design of noise barriers, comprising:

- Scenario 1: Proposed KBP alignment and Centenary Motorway upgrade with 2026 traffic volumes and no noise barriers;
- Scenario 2: Proposed KBP alignment with 2026 traffic volumes. A maximum barrier height of 4.0m, the maximum preferred barrier height for new roads (KBP only); and
- Scenario 3: Proposed KBP alignment and Centenary Motorway upgrade with 2026 traffic volumes. A maximum barrier height of 6.0m, the maximum preferred barrier height for existing roads (KBP and the Centenary Motorway).

J:\Projects\60047441\4. Tech Work Area\4.7 GIS\GIS data\Workspaces\Map_Edits_May_09_SB\60047441_Fig9_1_SB.mxd



AECOM

N

0 125 250 500

Metres

1:10,000 (when printed at A3)

Date - 13 May 2009

GDA

MGA94 Zone 56

Legend

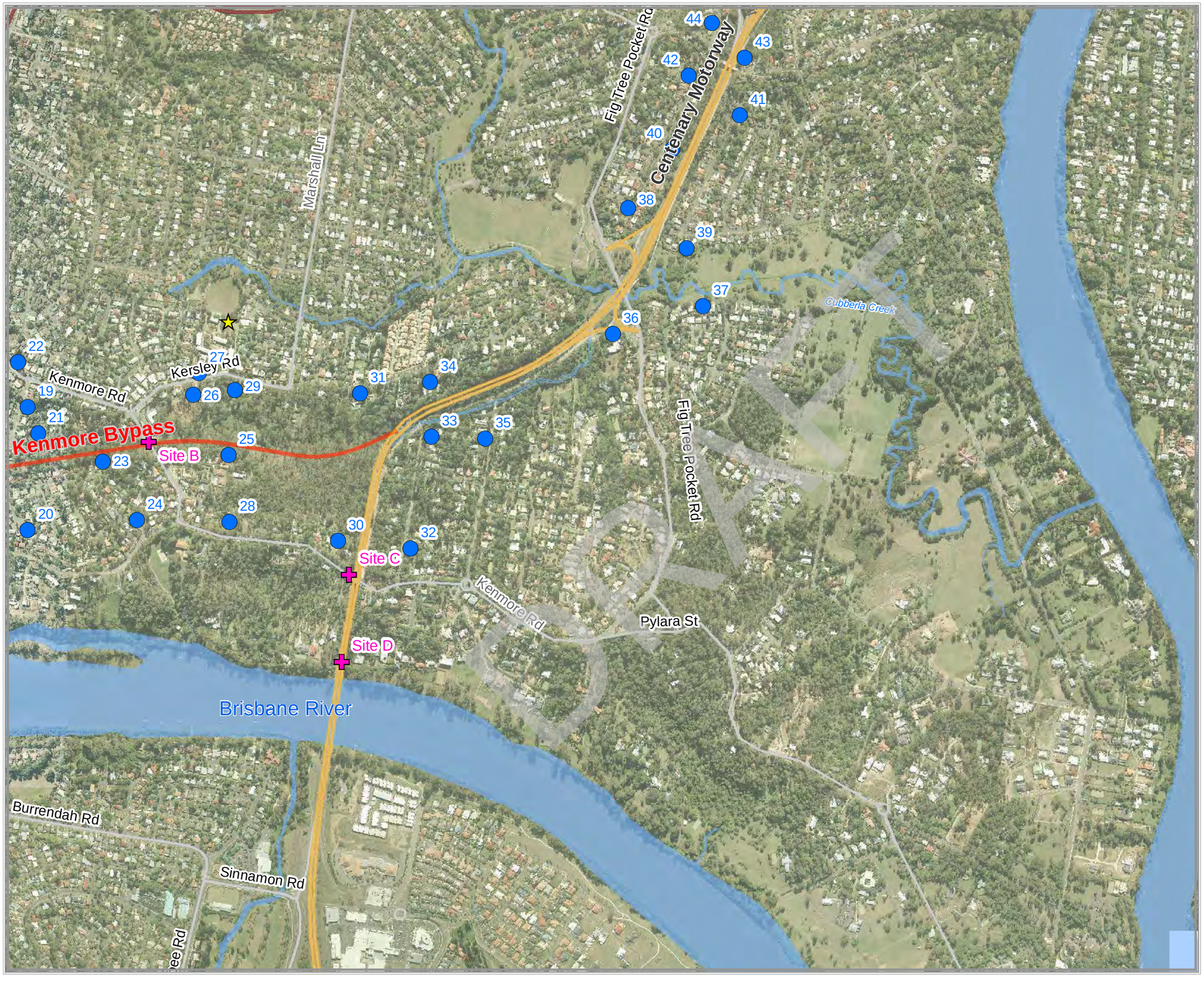
- Centenary Motorway
- Kenmore Bypass
- Moggill Road
- River/creek
- Noise Monitoring Location
- Kenmore Traffic Counter
- Weather Station Location

KENMORE BYPASS

Noise Monitoring, Weather Stations and Traffic Counting Locations

Figure 9.1

J:\Projects\60047441\4. Tech Work Area\4.7 GIS\GIS data\Workspaces\Map_Edits_May_09_SB\60047441_Fig9_1_SB.mxd



AECOM

N

0 125 250 500

Metres

1:10,000 (when printed at A3)

Date - 13 May 2009

GDA

MGA94 Zone 56

Legend

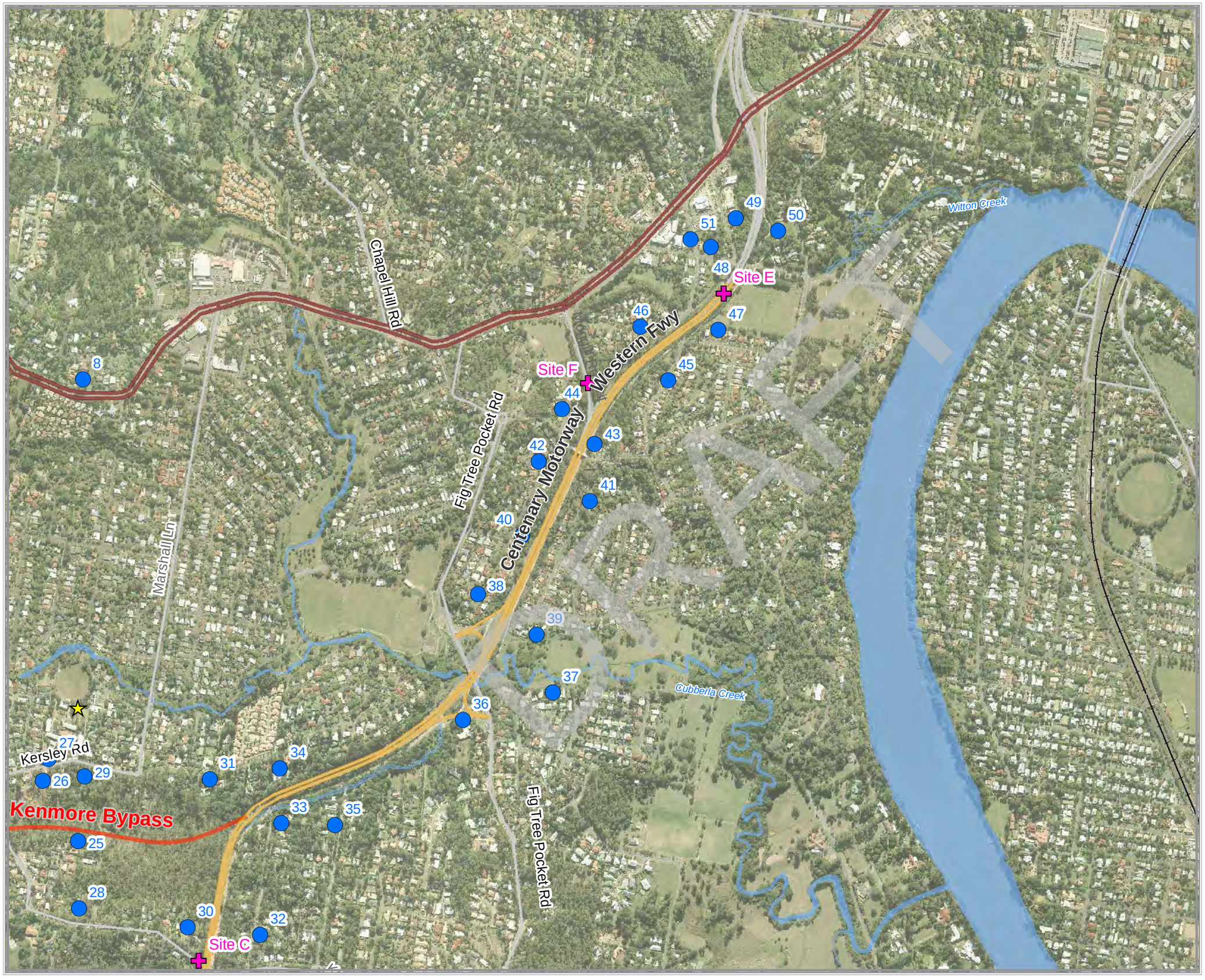
- Centenary Motorway
- Kenmore Bypass
- Moggill Road
- River/creek
- Noise Monitoring Location
- Kenmore Traffic Counter
- Weather Station Location

KENMORE BYPASS

Noise Monitoring, Weather Stations and Traffic Counting Locations

Figure 9.2

J:\Projects\60047441\4. Tech Work Area\4.7 GIS\GIS data\Workspaces\Map_Edits_May_09_SB\60047441_Fig9_1_SB.mxd



AECOM

N

0 125 250 500

Metres

1:10,000 (when printed at A3)

Date - 13 May 2009

GDA

MGA94 Zone 56

Legend

- Centenary Motorway
- Kenmore Bypass
- Moggill Road
- River/creek
- Noise Monitoring Location
- Kenmore Traffic Counter
- Weather Station Location

KENMORE BYPASS

Noise Monitoring, Weather Stations and Traffic Counting Locations

Figure 9.3

9.3 Description of Environmental Values

9.3.1 Road Traffic Noise Criteria

The $L_{A10\ (18h)}$ noise level is the descriptor used to assess the impact of road traffic noise in Queensland for residential dwellings. The L_{A10} noise level is representative of the level of noise exceeded for 10% of any period (usually 60 minutes). The $L_{A10\ (18h)}$ is the arithmetic average of the 18 hourly $L_{A10\ (1h)}$ noise levels over the consecutive hours between 6am and 12 midnight on a weekday. For DMR road traffic noise measurements, the average total of the two day measurement, which includes 36 hours of valid noise data, provides the recorded $L_{A10\ (18h)}$ noise level.

The maximum $L_{A10\ (1h)}$ of noise impact for schools between the hours of 8am to 4pm is considered for the assessment of noise intrusion into schools and child care centres during typical hours of operation.

Road traffic noise criteria within Queensland are provided in the following document - *Department of Main Roads: Road Traffic Noise Management: Code of Practice*, January 2008 (COP 2008).

Moggill Road and the Centenary Motorway are existing State-controlled roads. The road traffic noise criteria applicable to these roads are presented in Table 9.3 below. The criterion level applies to 1 metre in front of the most exposed façade of a sensitive building.

Table 9.3: Summary of Noise Criteria for Existing State-controlled Roads

Building Type	Measurement Location	Description	Criterion level dB(A)
Dwelling	1 metre in front of most exposed façade	Façade Corrected $L_{A10\ (18h)}$	68
Educational and Health Buildings	Outside Buildings	Façade Corrected $L_{A10\ (1h)}$	63

The KBP will be a new State-controlled road. Road traffic noise criteria for new roads are dependant on the existing ambient noise level at sensitive receptors surrounding the proposed road corridor. The criteria presented in Table 9.4 below are applicable to sensitive receptors to the KBP, based on the existing $L_{A10\ (18h)}$ noise levels.

Table 9.4: Summary of Noise Criteria New State-controlled Roads

Building Type	Existing $L_{A10\ (18h)}$ Noise Level	Measurement Location	Description	Criterion level dB(A)
Dwelling	Above 55 dB(A)	Outside Habitable Rooms	Façade Corrected $L_{A10\ (18h)}$	63
Dwelling	Below 55 dB(A)	Outside Habitable Rooms	Façade Corrected $L_{A10\ (18h)}$	60
Educational and Health Buildings	N/A	Outside Buildings	Façade Corrected $L_{A10\ (1h)}$	55

Measurements completed within the preserved KBP corridor indicate that the ambient noise level within the reserved corridor is below $L_{A10\ (18h)}$ 55 dB(A). Therefore, the $L_{A10\ (18h)}$ 60 dB(A) criterion level is applicable to all dwellings for the KBP.

9.3.2 Measured Road Traffic Noise Levels

A summary of the measured noise levels is presented in Table 9.5. A summary of the measured noise levels at educational facilities is presented in Table 9.6.

The values in **bold** indicate measured noise levels that exceed the DMR residential 68 dB(A) $L_{A10\ (18h)}$ noise criterion level; or the education, community and health 63 dB(A) $L_{A10\ (1h)}$ noise criterion level, for existing roads.

Table 9.5: Summary of Automated Measured Road Traffic Noise Levels

Site ID	Start Date	Microphone Position	Microphone height above ground level (m)	$L_{A10\ (18h)}$ dB(A)
1	9/02/2009	Façade	2.9	59.6
2	9/02/2009	Façade	3.0	58.1
3	9/02/2009	Façade	2.0	51.6
4	9/02/2009	Free Field	1.9	50.6
5	9/02/2009	Free Field	4.0	59.9
6	9/02/2009	Free Field	2.0	59.4
7	2/03/2009	Façade	4.3	61.8
8	4/03/2009	Façade	2.7	66.5
9	15/09/2008	Free Field	1.9	47.4
10	15/09/2008	Free Field	4.7	46.8
11	15/09/2008	Free Field	2.0	46.8
12	15/09/2008	Free Field	3.5	49.5
13	15/09/2008	Free Field	2.6	46.6
14	15/09/2008	Façade	1.8	46.3
15	17/09/2008	Façade	1.8	50.7
16	10/09/2008	Free Field	2.7	47.8
17	15/09/2008	Façade	4.3	47.7
18	15/09/2008	Free Field	2.1	49.9
19	10/09/2008	Façade	4.0	48.9
20	10/09/2008	Free Field	4.3	48.4
21	10/09/2008	Façade	4.0	52.5
22	15/09/2008	Free Field	1.8	59.9
23	17/09/2008	Free Field	3.2	48.6
24	10/09/2008	Free Field	2.0	53.0
25	10/09/2008	Free Field	2.0	49.0
26	10/09/2008	Free Field	3.9	54.6
28	8/09/2008	Façade	3.7	57.7
29	10/09/2008	Free Field	3.6	50.5
30	8/09/2008	Façade	1.8	62.1
32	8/09/2008	Free Field	1.8	57.7
33	8/09/2008	Free Field	3.7	63.2
34	8/09/2008	Free Field	4.0	61.9
35	8/09/2008	Free Field	2.0	56.8
36	8/09/2008	Free Field	3.2	**70.9***
37	1/09/2008	Free Field	1.5	52.4
38	1/09/2008	Façade	1.5	60.9
39	1/09/2008	Free Field	2.0	54.8
40	1/09/2008	Façade	3.7	63.8

Site ID	Start Date	Microphone Position	Microphone height above ground level (m)	$L_{A10\ (18h)}$ dB(A)
41	1/09/2008	Façade	2.5	54.0
42	1/09/2008	Free Field	1.5	53.5
43	1/09/2008	Free Field	3.9	**74.3**
44	1/09/2008	Free Field	3.0	61.6
45	1/09/2008	Free Field	2.3	61.5
46	1/09/2008	Free Field	3.1	61.5
47	1/09/2008	Free Field	3.0	59.9
48	1/09/2008	Façade	2.1	61.7
49	8/09/2008	Free Field	3.5	63.3
50	8/09/2008	Façade	2.7	65.0

*This measurement was taken adjacent the Centenary Motorway outside the property in the road reserve and is not likely to be representative of the noise levels in the adjacent property.

Table 9.6: Summary of Automated Measured Road Traffic Noise Levels (Education, Community and Health, 8am to 4pm)

Site ID	Address	Start Date	Microphone Position	Microphone height above ground level (m)	Maximum $L_{A10\ (1h)\ dB(A)}$
27	Kenmore South State School	17/09/2008	Free Field	1.8	60.1
31	ABC Learning Centre, Kenmore	8/09/2008	Free Field	2.0	55.4
51	ABC Learning Centre, Indooroopilly	8/09/2008	Free Field	2.0	59.4

As detailed above, from the 51 road traffic noise measurements, road traffic noise levels at one relevant site (site 43) currently exceed the residential $L_{A10\ (18h)}$ noise criterion level of 68 dB(A) for existing roads by 3 dB(A).

9.3.3 Weather

The rainfall and wind speed during the period of noise measurements was recorded using a local weather station.

The weather station was located at:

- Kenmore South State School (September 2008);
- Site 5 - 2302 Moggill Road (February 2009); and
- Site 7 – 9 Kilkivan Avenue (March 2009).

These locations were chosen as areas of open space allowing minimal wind interference from buildings, and with a location central to the concurrent noise monitoring locations. Figure 9.1 to Figure 9.3 include the weather station locations.

All weather conditions remained within the requirements of the COP 2008 during all noise measurements.

9.3.4 Traffic Counts

Traffic counting was completed during the noise monitoring exercise. The six automated traffic counting locations are presented graphically in Figure 9.1 to Figure 9.3.

These traffic counters were in operation for all noise monitoring locations with the exception of Sites 7 and 8, providing hourly traffic volume to supplement the noise measurement for further design works. Traffic volumes for Sites 7 and 8 are available through intersection loops.

9.4 Potential Impacts and Mitigation Measures

Noise sensitive places within 200m of the road corridor have been assessed as it is expected that locations further away are less likely to have road traffic noise levels from the KBP and Centenary Motorway corridors in excess of the nominated criteria. Table 9.14 provides a summary of the potential impacts and mitigation measures.

While the COP 2008 uses the terminology of 'attenuation treatments', for consistency of terminology within this EAR these treatments will be referred to as 'mitigation measures'.

9.4.1 Road Traffic Noise Impact - KBP

A summary of the predicted road traffic noise impact from the KBP for all Scenarios with OGA is presented in Table 9.7 below. The values for each building in the model have been predicted with a receptor point positioned at the most exposed façade of each building at heights representative of the ground and upper floors.

Table 9.7: Summary of Predicted KBP Noise Impacts

Scenario	No. of Modelled Dwellings	Number of sensitive receivers predicted to exceed the 60 dB(A) New Road $L_{A10\ (18h)}$ criterion level	Maximum above the criterion level (dB(A))
1 (2026 - No Barriers)	438	79	11
2 (2026 - 4m Max Barrier Height)	438	44	11
3 (2026 - 6m Max Barrier Height)	438	24	10

9.4.2 Road Traffic Noise Impact - Centenary Motorway

A summary of the predicted road traffic noise impact for the proposed Centenary Motorway upgrade (with OGA) is presented in Table 9.3 below. The values for each building in the model have been predicted with a receptor point positioned at the most exposed façade of each building at heights representative of the ground and upper floors.

Table 9.8: Summary of Predicted Centenary Motorway Noise Impacts

Scenario	No. of Modelled Dwellings	Number of sensitive receivers predicted to exceed the Existing Road $L_{A10\ (18h)}$ criterion level	Maximum above the criterion level (dB(A))
1 (2026 - No Barriers)	569	40	7
3 (2026 - 6m Max Barrier Height)	569	3	3

Noise contour maps showing the road traffic noise levels from the KBP and the Centenary Motorway upgrade are presented in Kenmore Bypass Operational Noise Report (Bassett, 2009).

9.4.3 Recommended Noise Treatment for Residential Dwellings

Treatments would be required in some areas to reduce the predicted noise level from the KBP and Centenary Motorway upgrade to meet the nominated criterion level. These treatments can include a combination of the following:

- choice of the road pavement surface type; and
- noise barriers.

Where the provision of the above mitigation options are not considered practical, individual treatments to dwellings may be considered under exceptional circumstances.

Road Surfaces

Various road pavement surfaces are in use throughout Queensland. The physical attributes of each surface create varying degrees of noise emission from the tyre/road interface, with some surfaces producing quieter noise levels than others. Table 9.9 below provides a comparison between the resultant noise levels of differing surfaces relative to Dense Graded Asphalt (DGA). DGA is the most common road surface, used on most suburban roads throughout Brisbane.

Table 9.9: Queensland Road Pavement Surface Corrections

Pavement Surface Type	Change in Noise Level (dB(A))
Portland Cement (PCC)	Increase by 5
16-20mm Bituminous Seal (BS)	Increase by 4-5
5-14mm Bituminous Seal(BS)	Increase by 2-4
Dense Graded Asphalt (DGA)	0
Stone Mastic Asphalt (SMA)	Decrease by 1
Low Noise Stone Mastic Asphalt (LNSMA)	Decrease by 2
Open Graded Asphalt (OGA)	Decrease by 2

An OGA road pavement surface has been implemented for the KBP and Centenary Motorway. However there are some slip roads within the interchange where DGA surfacing is used because of the lower posted speeds (< 80km/hr).

It is noted that the use of OGA has additional noise reduction benefits which has been taken into account with the noise barrier design. OGA is the quietest pavement surface available within Queensland and has been included within the noise model.

Therefore for this road project, road traffic noise barriers are the only option for attenuating external road traffic noise.

Noise Barriers and In-House Treatments

Noise barriers can be an effective form of controlling noise to sensitive receptors. A noise barrier is typically required to break the line of sight between the window of a noise sensitive building and the road surface to provide a suitable level of attenuation. Where the provision of a noise barrier is considered impractical, the provision of in-house treatments may be considered under exceptional circumstances with each case considered individually.

Two barrier design scenarios have been considered for the KBP:

- Scenario 2: Maximum barrier height of 4.0 m. This barrier height limit is preferred by DMR in the COP 2008, Chapter 4.4.1 (New Roads), which states: *"the maximum preferred height of a noise fence above the proposed ground level, natural ground level or earth mound level shall be 4.0 metres."*
- Scenario 3: Maximum barrier height of 6.0 m, the maximum preferred barrier height for existing roads.

Whilst the KBP is considered to be a new road, feedback from the community consultation process suggested some opposition to the provision of in-house treatments and their potential ongoing running costs. Scenario 3 was developed to investigate what at house treatments could be avoided by increasing the barrier heights up to a maximum of 6.0 m.

The provision of a barrier through the middle of the alignment was also considered, however the noise benefits from such a barrier were negligible.

On this basis, a combination of noise barriers and in-house treatments to dwellings whose road traffic noise levels are predicted not to meet the nominated criterion level has been recommended. In-house treatments vary with the level of noise expected above the nominated criterion level and are to be considered individually. A breakdown of in-house treatments recommended for ranges of noise levels that exceed the nominated criterion level are presented in Table 9.10 below.

Table 9.10: Summary of In-House Treatments

Noise level above the nominated criterion level (dB(A))	In-house treatments recommended
Up to 2 dB(A) over criterion level	Mechanical Ventilation
3 to 9 dB(A) over criterion level	Mechanical ventilation and air conditioning
10 dB(A) or more over criterion level	Mechanical ventilation, air conditioning and architectural treatments. Architectural treatments may include upgrading windows and glazing, solid core doors, upgrading window and door seals, sealing of wall vents etc.

The designed barriers for the KBP have been separated into the following:

KBP:

- Barrier A: Yarawa Street;
- Barrier B: West of Gem Road (North);
- Barrier C: West of Gem Road (South);
- Barrier D: Marland Street, Gem Road to Kenmore Road (North);
- Barrier E: Twilight Street, Gem Road to Kenmore Road (South);
- Barrier F: Lois Street; and
- Barrier G: Kersley Road.

Centenary Motorway:

- Barrier H: Vidgen Lane;
- Barrier I: Kersley Road East;
- Barrier J: Lant Street;
- Barrier K: Spinkbrae Street; and
- Barrier L: Musgrave Street.

A summary of the barrier and in-house treatment requirements for each scenario and barrier section is provided in Table 9.11 and Table 9.12 below.

Table 9.11: Summary of Proposed Noise Barriers and In-House Treatments - KBP

Barrier	Scenario	Barrier Length (m)	Average Barrier Height (m)	Number of Dwellings Requiring In-House Treatments	
				Air Con/ Mech Vent	Architectural Treatments
A	2	386	2.3	0	0
	3	386	2.3	0	0
B	2	177	3.3	0	0
	3	177	3.3	0	0
C	2	236	3.0	0	0
	3	236	3.0	0	0
D	2	930	4.0	29	0
	3	930	5.4	13	0
E	2	1012	3.1	10	5
	3	1012	3.7	10	1
F	2	140	3.0	0	0
	3	140	3.0	0	0
G	2	256	2.3	0	0
	3	256	2.3	0	0
TOTAL	***2***	***3137***	***3.2***	***39***	***5***
	3	***3137***	***3.8***	***23***	***1***

Table 9.12: Summary of Proposed Noise Barriers and In-House Treatments – Centenary Motorway

Barrier	Scenario	Barrier Length (m)	Average Barrier Height (m)	Number of Dwellings Requiring In-House Treatments	
				Air Con/ Mech Vent	Architectural Treatments
H	3	56	6.0	1	0
I	3	648	5.4	1	0
J	3	380	5.7	1	0
K	3	185	2.3	0	0
L	3	820	2.3	0	0
M	3	578	2.3	0	0
TOTAL	***3***	***3031***	***3.7***	***3***	***0***

9.4.4 Recommended Noise Treatments for Educational and Health Buildings

Educational institutions within approximately 200m the surrounding area of the preserved KBP corridor and Centenary Motorway upgrade, which included one school and one child care facility, were considered.

Whilst noise measurements were completed at the ABC Learning Centre at Indooroopilly, the project extents finish approximately 700m south of this sensitive receptor and as such is not considered in this assessment.

The ABC Learning Centre on Kersley Road and the Kenmore South State School are the sole educational sensitive receptors assessed in this report.

Peak hour traffic composition was modelled to assess the highest $L_{A10\ (1h)}$ noise level at these two educational facilities.

A summary of the predicted noise levels in comparison to the community, educational and health criteria is provided in Table 9.13 below.

Table 9.13: Summary of Predicted KBP Noise Impacts – Schools and Child Care Centres

School / Child Care Centre	$L_{A10\ (1h)}$ criterion level	Maximum Predicted $L_{A10\ (1h)}$		
		Scenario 1	Scenario 2	Scenario 3
ABC Learning Centre on Kersley Road	Scenario 1: 63 dB(A) Scenario 2: 55 dB(A) Scenario 3: 63 dB(A)	61 dB(A)	54 dB(A)	61 dB(A)
Kenmore South State School	Scenario 1: 63 dB(A) Scenario 2: 55 dB(A) Scenario 3: 63 dB(A)	51 dB(A)	50 dB(A)	54 dB(A)

Predicted noise levels at the ABC Learning Centre on Kersley Road or the Kenmore South State School do not exceed the educational noise criterion level.

No mitigation treatments other than barriers designed for dwellings have been recommended for these sensitive receptors.

Table 9.14: Potential Impacts and Mitigation Measures

Reference Code	Project Phase	Potential Impact	Potential Mitigation Measures
N 01	Design	Noise impacts from the KBP exceeding the criteria as set per the DMR COP (2008)	Ensuring that the proposed mitigation measures are consistent with the current design.
N 02	Construction		Implementation of noise mitigation measures as per detailed design which may include: • Choice of road pavement surface type; • noise barriers; and • individual in-house treatments to dwellings under exceptional circumstances, subject to negotiations with property owners.

9.5 Summary

Criteria have been developed for the KBP site with reference to the DMR COP 2008.

The predicted traffic noise levels at 79 receptor points in the study site are forecast to exceed this nominated external noise criterion level for the forecast traffic volume. The number and magnitude of dwellings that exceed the nominated noise criteria can be controlled through the implementation of noise barriers.

In-house treatments may be considered under exceptional circumstances to dwellings where the road traffic noise level from the KBP and Centenary Motorway exceeds the nominated criterion level and all other noise mitigation options have been exhausted. However, these will be the subject of negotiations with individual property owners.

Further community consultation is recommended in determining the heights, footprint and extents of the noise walls in developing an acceptable compromise between noise barrier height and road traffic noise impact.