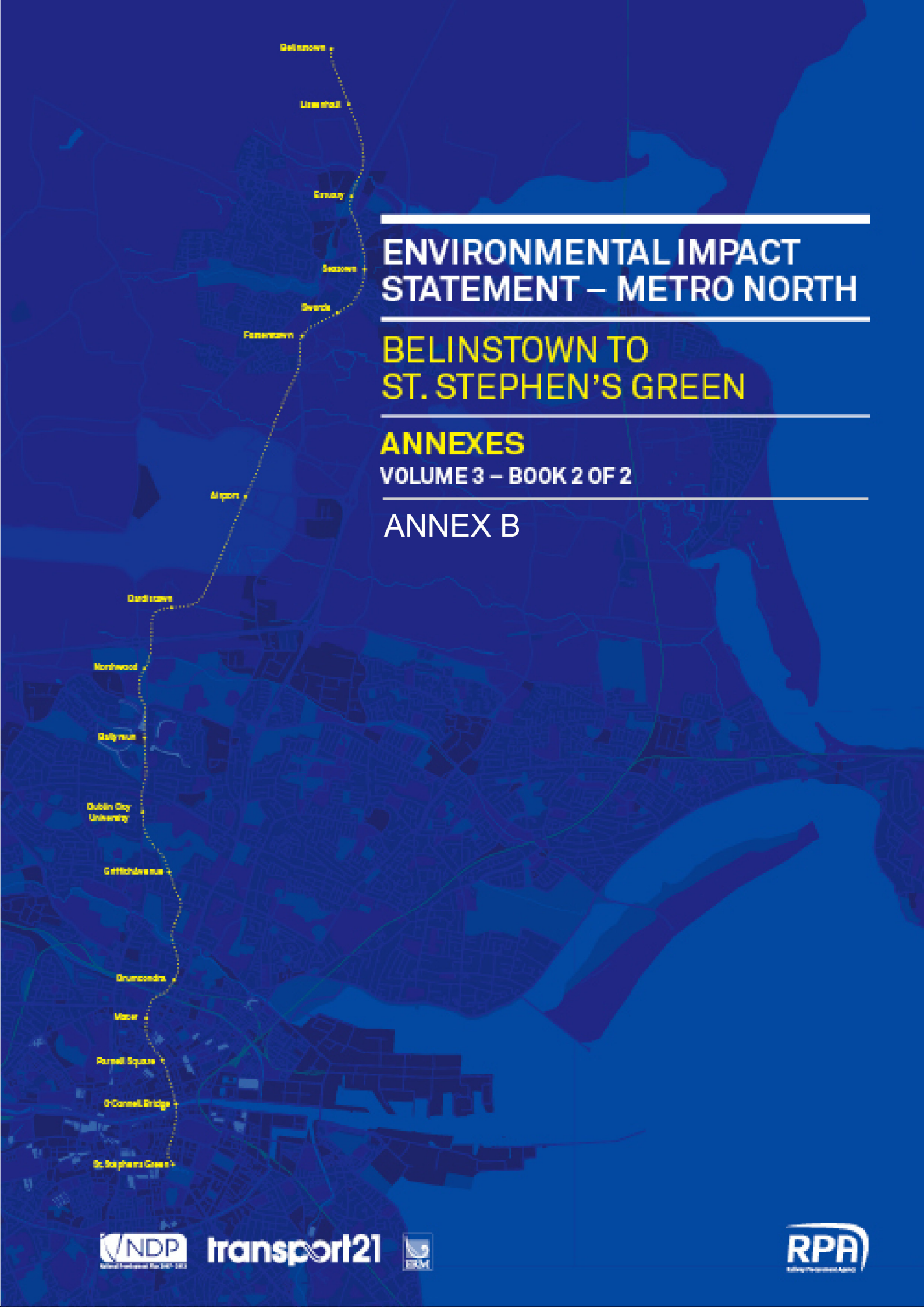

ENVIRONMENTAL IMPACT STATEMENT – METRO NORTH

BELINSTOWN TO ST. STEPHEN'S GREEN

ANNEXES

VOLUME 3 – BOOK 2 OF 2

ANNEX B

NDP transport21 RPA

Annex B

Metro North EIS

Information supporting the baseline noise chapter

- Baseline noise monitoring report

1 Baseline noise monitoring report

1.1 Introduction

In 2006, ERM was commissioned by RPA to carry out an Environmental Impact Assessment of Metro North. Baseline noise monitoring along the proposed Metro North alignment was carried out by ERM in order to inform the baseline noise chapter of the Environmental Impact Statement.

1.2 Methodology

1.2.1 General

Noise (and sound) is usually measured on the decibel scale (dB), which is a logarithmic scale. The human ear is not equally sensitive to all frequencies of noise. An 'A-weighting' is therefore applied to noise readings to represent the manner by which the human ear perceives noise. The readings are then annotated as dB(A) readings to indicate that the weighting has been applied.

Table 1.1 shows the typical range of noise levels that can be experienced in urban and rural settings, the range of potential noise levels and how people typically perceive them.

Table 1.1 Typical continuous noise levels experienced in various settings and perception of sound*

$L_{Aeq,T}$, dB(A)	Example
0	Absolute silence
25	Very quiet room
35 - 40	Quiet rural area during night with no wind
55	Day-time, flat to undulating topography, busy roadway 0.5km away
70	Busy restaurant
85	Very Busy pub, voice has to be raised to be heard
100	Disco or rock concert
120	Large chipping hammer. Uncomfortably loud and conversation impossible
140	Four propeller aircraft. Noise causes pain to the ears

*Adapted from EPA Guidance Note for Noise in Relation to Scheduled Activities (2nd Edition), 2006

The baseline noise survey for Metro North was carried out giving due regard to the methodologies laid out in the following guidance documents:

- ISO 1996-1 Acoustics Description, measurement and assessment of environmental noise Part 1: Basic quantities and assessment procedures;
- EPA Environmental Noise Survey Guidance Document, 2003;
- EPA, Guidance Note for Noise in relation to Scheduled Activities (2nd Edition, 2006);
- BS 4142: 1997 Method for rating industrial noise affecting mixed residential and industrial areas.

1.2.2 Noise surveyors

The noise monitoring survey was carried out by the ERM personnel detailed in Table 1.2. The noise monitoring report was prepared by the same personnel and reviewed by Mike Fraser (ERM, London).

Table 1.2 Noise monitoring survey - ERM Personnel

Personnel	Scope of Works
Mike Fraser	Task Director, Peer review
Steve Mitchell	Peer review
Tom McCarthy (ERM, Dublin)	Noise survey measurements. Preparation of noise report.
Caroline Kennedy (ERM, Dublin)	Noise survey measurements. Preparation of noise report.

1.2.3 Equipment used

The equipment that was used to carry out the survey is shown in Table 1.3.

Table 1.3 Survey equipment

Manufacturer	Equipment	Model Type	Serial Number
Brüel and Kjaer ®	Sound Level Meter	Mediator 2238	2448272
Brüel and Kjaer ®	Calibrator	4231	2463711
Brüel and Kjaer ®	Microphone	4188	2461743
Brüel and Kjaer ®	Windshield	N/A	N/A
Brüel and Kjaer ®	Tripod	N/A	N/A

All measurements were taken using a tripod at least 1.2 – 1.5m above the ground, to allow free-field noise measurements to be taken. Extraneous noise events (unusual or non-representative events) were paused out by the noise surveyor in order to minimise skew of the monitoring results over short sampling periods.

On-site calibration was carried out before and after all measurements. No drift in calibration was noted at any time.

1.2.4 Survey criteria

A number of samples were taken at each noise monitoring location. For each monitoring event, the following criteria were recorded: L_{AeqT}, L_{A90T}, L_{A10T}, L_{AFmax} and L_{AFmin}. A definition of these terms, as specified by the EPA (EPA, 2006), is provided below.

L_{AeqT}: The equivalent steady sound level in dB containing the same acoustic energy as the actual fluctuating sound level over the given period, T**.**

L_{A90T}: The noise level exceeded for 90% of the time interval, T. This level is generally taken to represent the ‘background noise’ level,

L_{A10T}: The noise level exceeded for 10% of the time interval, T. This parameter is often used to quantify traffic noise.

L_{AFmax}: The maximum instantaneous sound pressure measured over a given time interval.

L_{AFmin}: The minimum instantaneous sound pressure measured over a given time interval.

The duration of the samples varied between 10 and 15 minute periods depending on the sources of noise in the area. Traffic noise was the most significant source of noise in all areas where the monitoring was carried out. Given the relatively consistent nature of the traffic noise, especially from main roads and motorways, monitoring over extended periods of time of more than 15 minutes was not required.

All samples were taken as free field samples.

A frequency weighting of 'A' was used for all measurements and a time weighting of 'fast'.

1.2.5 Meteorological conditions

Measurements were only carried out during times of appropriate weather conditions i.e. during dry weather and when wind speeds were less than 5m/s.

Care was taken to avoid measurements being taken close to objects that might give rise to wind-derived noise e.g. trees.

1.2.6 Timing of the survey

Eight individual monitoring exercises were carried out between December 2006 and April 2007.

Monitoring was carried out during both day and night. Monitoring was focussed during off-peak or non-rush-hour times in order to obtain worst-case scenario measurements i.e. times when background noise levels are low and therefore areas are more sensitive to noise impact disturbance.

1.2.7 Selection of Noise monitoring locations

Appropriate and representative Noise Monitoring Locations (NMLs) within the study area were identified by means of a desktop scoping exercise, which included a review of the noise maps developed by Dublin City Council, a review of landuse maps produced for a 500m corridor on both sides of the proposed alignment and a site walkover of the route. The following points were considered when choosing the noise monitoring locations:

- The sensitivity of specific landuse areas;
- The sensitivity of specific receptors;
- Areas where background noise levels were perceived to be low;
- Areas where above ground features of the scheme would exist e.g. track, carparks, stop entrances, depots, work compounds.

A total of 31 monitoring locations were selected. These locations are described in Table 1.4 and are shown in the map that accompanies the noise chapter of the EIS.

Table 1.4 Noise Monitoring Locations (NMLs) for baseline assessment

NML	Location	Description
NML 1	Near a house to the north-west of the proposed depot.	Located to the east of the closest occupied residence to the west of the depot.
NML 2	In the front garden of house to the north-west of the proposed depot.	Located in the front garden of the closest occupied residence to the west of the depot.
NML 3	In the front garden of house to the south-west of the proposed depot.	The monitoring location is located in the garden of a house closest to the south-western part of the depot site.
NML 4	Lissenhall, in field opposite B&B	The monitoring location is west of the proposed Lissenhall stop. The location is parallel to the most exposed facade of the B&B.
NML 26	St. Patrick's College	Monitoring location is in the south-western corner of the site on a green area between the school and residential properties.
NML 22	Albert College Lawn – eastern end	NML 5 was parallel with the closest façade to Ballymun Road where as this is set at the opposite end of the road.
NML 23	Hampstead Park, Heritage Centre	Monitoring location is surrounded by buildings.
NML 24	Hampstead Avenue,- eastern end of row of houses	This residence is the furthest residence back from the Ballymun Road on this street. There is little traffic on the local road.
NML 8	Farm House East of Emmaus Retreat Centre	Monitoring location screened on three sides by buildings. The R132 is located approximately 200m to the east.
NML 5	Farm House North of Emmaus Retreat Centre	The residence is a bungalow and the family home of the owners of the farm at NML 17.
NML 6	Farm House North-North-East of Emmaus Retreat Centre	The farmhouse is now unoccupied but is still a working farm. The location is surrounded by fields and the M1 is approximately 500m to the east.
NML 7	Emmaus Retreat and Conference Centre	This location is set in the grounds of EMMAUS Retreat Centre and set back from the road approximately 20m.
NML 9	Samples taken from another side of the NML 15B building	As above.
NML 10	House identified as potential NSL south of Lissenhall	The monitoring location is in line with the façade of the house which faces onto the R132.
NML 11	Seatown Walk	This monitoring location is in line with the façades of houses to the north of the location. A wall along the length of the road acts as a noise barrier between the road and NML.
NML 12	Carlton Court Area	This location is in line with the façades of the houses facing towards the R132. A wall along the length of the road acts as a noise barrier between the road and NML.

NML	Location	Description
NML 13	Airside Shopping Centre entrance	This location is in line with the façade of a house to the south of the monitoring point. The closest NSL is located behind a boundary wall of approximately 2m height.
NML 14	Santry Lodge near M50/Old Ballymun Road	This location is along an old road that is now a cul de sac. The location is in line with the façade facing the M50.
NML 15	In area of proposed Northwood station – opposite sports ground and Statoil station	This location was chosen to reflect the noise levels being experienced at the properties located south of this point.
NML 16	Ballymun Road, opposite Tesco Sign on eastern side of the road	This location was set back from the road, level with the façade of the civic offices building to the south of the location.
NML 18	Junction of Shanliss Road and Ballymun Road	This location was chosen, so as to be in line with the façades of the houses located just north of this point. The houses are facing onto the Ballymun Road.
NML 17	Irish School, Ballymun Road	This location was chosen, so as to be in line with the façade of the school located just north of this point. The building is facing onto the Ballymun Road.
NML 19	Church of Our Lady of Lourdes, North East Corner	This location is in line with the façades of the houses located just north of this point. The houses are facing onto the Ballymun Road.
NML 21	Albert College Lawn, off Ballymun Road	A residential area. The road is a cul de sac and fronts onto the Ballymun Road. The monitoring location is in line with the façade of the houses facing onto the Ballymun Road.
NML 20	Albert College Grove, off Ballymun Road	A residential area. The road is a cul de sac and fronts onto the Ballymun Road. The monitoring location is in line with the façade of the houses facing onto the Ballymun Road.
NML 25	Griffith Avenue, at the edge of Elmhurst Convalescence Home.	The monitoring location is located at the boundary fence of Elmhurst Convalescence Home facing onto Griffith Avenue.
NML 27	School for the Deaf Drumcondra, rear of building on St. Joseph's Avenue	This is the location of a proposed stop. The location is set back from Drumcondra Road with little or no traffic on the road. Drumcondra train station is located near the monitoring location.
NML 28 NML 29 NML 30 NML 31	St. Stephen's Green	St. Stephen's Green will be the link between the Luas and Metro schemes. Monitoring was carried out at four locations around St. Stephen's Green – North (28), South (29), West (31) and Central (30).

1.3 Results

The results of the baseline monitoring are shown in Table 1.5.

Table 1.5 Baseline monitoring results

Location	Date	Time	Dura-	Parameters	Comment

				L_{Aeq}	L_{A90}	L_{A10}	L_{AFmax}	L_{AFmin}	
NML 1	28/10/07	15:08	15	55	55	57	68	51	Similar to the previous location but remote from the agricultural activity at NML 2. Fields were not being worked close to the location during monitoring. Rural area with little housing. The main noise source was the M1 and some traffic on the local road.
		16:10	15	55	55	57	65	52	
	02/10/07	22:06	15	50	50	53	57	44	
		23:08	15	48	48	51	56	41	
	03/10/07	00:09	15	47	46	51	55	38	
		00:25	15	45	44	49	53	34	
NML 2	28/09/07	14:34	15	54	53	58	68	49	Similar to NML 4 and 3. Farming activities to the south of the location in the adjoining fields may have influenced the readings slightly.
		16:29	15	55	54	59	73	50	
NML 3	28/09/07	14:10	15	51	51	53	60	48	This location is similar to NML 4 with the R132 and M1 being the main noise sources in the area.
		15:51	15	54	53	56	76	50	
	02/10/07	21:43	15	48	47	50	65	43	
		22:49	15	46	46	48	58	42	
		23:50	15	45	44	48	56	38	
	03/10/07	00:43	15	42	40	46	58	33	
NML 4	28/09/07	13:48	15	51	51	53	60	47	The location is set in a rural part of north Dublin where low density linear housing dominates. The main noise sources in the area arise from traffic on the R132 and M1. Residential areas of the south-west also influence the noise environment particularly at night. The airport is also audible at night.
		15:31	15	52	52	54	59	48	
	02/10/07	21:23	15	48	48	50	63	44	
		22:29	15	46	46	48	52	43	
		23:29	15	46	45	48	63	41	
NML 5	22/02/07	09:35	15	55	54	58	65	51	Quiet area well set back from the R132 although the distant noise of traffic is noticeable.
	22/02/07	14:13	15	53	52	57	68	47	
	17/04/07	22:56	15	51	47	50	74	41	
	18/04/07	00:48	15	43	41	47	58	30	
NML 6	22/02/07	09:06	15	60	60	62	68	57	Quiet area well set back from the R132 although the distant noise of traffic is noticeable. Some noise from cattle sheds nearby.
	22/02/07	12:06	15	56	56	59	72	52	
	17/04/07	23:19	15	47	43	51	72	37	
	18/04/07	01:08	15	46	45	51	61	30	
NML 7	21/12/06	12:37	15	56	52	56	80	49	Quiet area well set back from the R132 although the distant noise of traffic is no-
	22/02/07	10:04	15	54	52	59	64	49	
	22/02/07	13:24	15	53	51	58	73	47	
	22/02/07	13:50	15	53	52	57	66	48	

Location	Date	Time	Duration (mins)	Parameters					Comment
				L_{Aeq}	L_{A90}	L_{A10}	L_{AFmax}	L_{AFmin}	
	17/04/07	23:40	15	48	47	51	55	40	ticeable.
NML 8	22/02/07	11:05	15	60	59	63	72	52	Traffic on the R132/M1 is the dominant noise source in the area during both the day and night time.
	22/02/07	12:54	15	61	60	63	80	49	
	18/04/07	00:25	15	52	49	57	67	39	
	18/04/07	01:46	15	51	45	57	69	30	
NML 9	22/02/07	10:30	15	54	54	56	60	47	Traffic on the R132/M1 is the dominant noise source in the area during both the day and night time.
	22/02/07	12:29	15	54	53	56	66	49	
	18/04/07	00:02	15	53	51	58	67	42	
	18/04/07	01:28	15	50	48	55	69	37	
NML 10	21/12/06	12:12	15	63	58	64	82	55	
	25/01/07	21:47	15	58	55	62	76	47	
NML 11	21/12/06	11:47	15	63	61	65	70	56	Traffic on the R132 is the dominant noise source in the area. This is a residential area with little or no traffic movements within the estate during sampling periods.
	21/12/06	13:18	15	64	61	66	69	56	
	25/01/07	22:15	15	59	58	63	74	49	
	26/01/07	01:47	15	53	50	59	64	43	Wind interference
NML 12	18/12/06	16:26	15	64	60	66	82	55	Traffic on the R132 is the dominant noise source in the area. This is a residential area with little or no traffic movements within the estate during sampling periods.
	21/12/06	11:00	10	64	60	66	74	56	
	21/12/06	11:20	15	64	61	65	74	56	
	25/01/07	22:42	15	58	56	62	69	45	
	26/01/07	01:22	15	52	50	58	62	42	Wind interference
NML 13	18/12/06	15:58	15	66	63	69	78	58	Traffic on the R132 is the dominant noise source in the area. The large car park associated with Airside Shopping Centre also contributes to background noise levels.
	21/12/06	13:42	15	66	61	68	77	58	
	26/01/07	01:01	15	60	56	67	73	45	
NML 14	18/12/06	15:12	15	60	59	62	68	56	Although quieter, the distant noise from the M50 is the main noise source. The Tesco distribution centre is also nearby and noise from the HGVs was audible.
	21/12/06	14:38	15	60	58	61	67	55	
	26/01/07	00:34	15	57	56	60	65	48	Wind interference
NML 15	18/12/06	14:51	15	69	63	71	80	60	Traffic on the Ballymun Road/R108 is the dominant noise source in the area. Additionally, the monitoring location was on

Location	Date	Time	Dura-tion (mins)	Parameters					Comment
				L_{Aeq}	L_{A90}	L_{A10}	L_{AFmax}	L_{AFmin}	
									the delivery route to the Tesco distribution centre and a number of HGVs used the route.
	26/01/07	00:16	15	63	58	69	75	49	Wind interference
NML 16	18/12/06	14:05	15	66	62	69	82	58	Traffic on the Bally-mun Road is the dominant noise source in the area.
	24/01/07	22:39	15	62	59	67	76	50	
	25/01/07	00:44	15	60	56	66	75	48	
NML 17	18/12/06	13:00	15	63	56	65	88	49	Traffic on the Bally-mun Road is the dominant noise source in the area.
	24/01/07	22:17	15	62	61	67	75	49	
	25/01/07	00:23	15	57	54	62	68	45	
NML 18	18/12/06	13:22	15	68	60	71	83	52	Traffic on the Bally-mun Road is the dominant noise source in the area.
	24/01/07	22:58	15	62	59	69	75	46	
	25/01/07	01:04	15	61	53	68	76	43	
	17/04/07	06:28	15	54	53	57	63	47	
NML 19	18/12/06	12:24	15	73	56	74	98	50	Traffic on the Bally-mun Road is the dominant noise source in the area.
	24/01/07	23:17	15	64	59	71	77	46	
	25/01/07	01:24	15	61	52	67	80	43	
NML 20	18/12/06	11:20	15	63	55	67	72	51	Traffic on the Bally-mun Road is the dominant noise source in the area.
	24/01/07	23:37	15	60	56	65	77	45	
	25/01/07	01:43	15	56	51	61	75	43	
NML 21	18/12/06	11:57	15	66	57	70	74	50	Traffic on the Bally-mun Road is the dominant noise source in the area.
	24/01/07	23:56	15	61	56	67	80	45	
	25/01/07	02:02	15	57	52	63	75	43	
NML 22	22/02/07	16:33	15	55	54	59	70	47	Set further back from Ballymun Road than NML 21. However, traffic noise is still the dominant noise source.
	23/02/07	17:45	15	57	51	60	91		L_{AFmin} not recorded
NML 23	22/02/07	15:56	15	50	47	55	70	41	Located within the Heritage Centre grounds, the area is screened from noise arising from traffic on Ballymun Road due to the buildings on site.
	22/02/07	17:21	15	48	45	54	63	41	
NML 24	22/02/07	15:13	15	59	46	64	80	42	Urban area set back from Ballymun Road. Traffic on the Bally-mun Road is the main source of noise in the area.
	22/02/07	16:56	15	48	46	51	72	42	
	23/02/07	15:20	15	59	43	59	102		Field note L_{AFmin} not recorded
NML 25	18/12/06	10:42	15	66	53	70	79	46	Traffic noise from

Location	Date	Time	Dura-tion (mins)	Parameters					Comment
				L_{Aeq}	L_{A90}	L_{A10}	L_{AFmax}	L_{AFmin}	
									Griffith Avenue is the dominant source.
NML 26	22/05/07	15:16	15	44	43	48	59	38	Located in the south western corner of the College grounds near the playing fields and school (out of term), the area is surrounded by residential development. Noise sources in the area were the occasional traffic movements within the residential estates and the traffic noise from Drumcondra Road.
	22/05/07	15:32	15	46	44	49	60	39	
	22/05/07	23:27	15	37	36	40	60	33	
	22/05/07	23:43	15	38	36	41	63	33	
NML 27	18/12/06	09:55	10	58	47	58	79	42	Location is set back from Drumcondra Road. Noise levels are still dominated by traffic from Drumcondra Road but were noted, in field observations, to be lower than those on Drumcondra Road.
	18/12/06	10:07	10	56	47	58	76	43	
	18/12/06	10:17	10	58	46	60	76	42	
NML 28	23/02/07	10:08	15	66	63	70	89	56	Traffic noise
	23/02/07	11:26	15	66	61	69	102		L_{AFmin} not recorded, traffic noise
	17/04/07	04:21	10	56	52	61	82	42	Traffic noise
	17/04/07	05:14	15	54	51	57	76	41	Traffic noise
NML 29	23/02/07	10:47	15	76	71	80	101	53	Traffic noise
	23/02/07	12:00	10	75	59	79	106		L_{AFmin} not recorded, traffic noise
	17/04/07	04:56	15	64	56	70	80	40	Traffic noise
	17/04/07	05:52	15	65	54	72	80	43	Traffic noise
NML 30	23/02/07	10:27	15	56	56	58	63	52	Traffic noise and pedestrians in the park
	23/02/07	11:05	15	56	55	58	72	51	Traffic noise and pedestrians in the park
NML 31	23/02/07	09:49	15	63	60	70	75	54	Traffic noise and Luas
	23/02/07	11:44	10	66	57	70	99		L_{AFmin} not recorded, traffic noise and Luas
	17/04/07	04:37	15	54	48	59	73	41	Traffic noise
	17/04/07	05:31	15	56	52	62	70	44	Traffic noise

1.4 Traffic Flow Adjustment

Changes in traffic flows on local highways from the time that this baseline noise survey was undertaken to the opening year of operation of the proposed scheme in 2013, may result in a change in baseline noise levels. In addition to modelling the change in traffic

flows occurring as a result of the proposed scheme, this (do-nothing) change in baseline traffic flow has also been modelled. Traffic flow changes of 25% or more are considered to have potential effects on baseline noise levels (DoE, 1994). This relates to a noise level change of at least 1dB(A). Table 1.6 details these noise changes at affected baseline monitoring positions. These changes have been taken into account in the noise chapters of this EIS (Volume 1, Chapter 12 and Volume 2, Chapter 4).

Table 1.6 Significant Noise Changes Affecting Baseline Monitoring Positions

Road Link Location	Affected Noise Monitoring Location	Increase in Noise Level Due To Change In Traffic Flow, dB(A)
R132, north of Estuary Roundabout	NML 8	1.1
	NML 9	1.1
	NML 10	1.1
R132, between Seatown and Malahide Roundabouts	NML 11	1.2
Main Street, Ballymun, between Sillogue Road and Gateway Avenue	NML 16	1.7
Main Street, Ballymun, between Gateway Avenue and Collins Avenue	NML 18	1.5
Ballymun Road, between Collins Avenue and St. Pappin's Road	NML 19	1.0
	NML 20	1.0
Griffith Avenue between Griffith Lawns and Bantry Road	NML 25	1.3

1.5 Discussion

The results of this survey are discussed in the baseline noise chapter of this EIS (Volume 1, Chapter 12).