

## **Appendix G**

### **Details of Noise Survey Results**



**Appendix G - Details of Noise Survey Results**

Where appropriate and possible, the measurement procedures outlined in British Standard 4142(1997) were followed. The microphone height was set at 1.2–1.5m and a foam windshield was used on all occasions. The microphone was positioned at a distance remote from any major reflecting surface. Precision measuring equipment (sound level meters) were used meeting the requirements of BS EN 60804 Class 1, and/or BS EN 60651 Class 1. Measurement samples were 5 – 10 minutes in duration and with the meter set to 'fast' response and 'A' weighting. Where considered appropriate, measurements were paused for local traffic movements to ensure that the  $L_{A90}$  was as representative of the underlying background as possible. As meteorological conditions can have effects on noise generation and acoustic propagation, wind speed, wind direction and general weather conditions were noted during each of the surveys.

All noise measurement equipment used is maintained in calibration by regular certification by a laboratory accredited to UK standards. Each set of measurements was preceded and followed by a calibration check using the sound level meter's acoustic calibrator and in all cases no significant change in the response of the equipment was detected. Details of the equipment used in the surveys and their respective calibration certificates are given in Table G.1.

**Table G.1 - Details of Noise Measurement Equipment**

<b>Survey</b>	<b>Description</b>	<b>Item</b>	<b>Model</b>	<b>Serial Number</b>	<b>Last Calibration Date</b>	
Attended surveys	Acoustic Calibrator	B&K Calibrator	4231	1883787	Feb. 2008	
		RION NA-27	Sound Level Meter	NA-27	00121711	Oct. 2008
			Microphone	UC-53A	102413	
			Preamplifier	NH-20	05399	
Continuous Monitoring	Larson Davis 870	Sound Level Meter	870	0184	May 2008	
		Microphone	2541	3167		
		Preamplifier	900B	1231		
	Larson Davis 820	Sound Level Meter	870	0941	Oct. 2008	
		Microphone	40AE	45726		
		Preamplifier	828	2247		
	RION NL-32	Sound Level Meter	NL-32	00451267	Feb. 2008	
		Microphone	UC-53A	308501		
		Preamplifier	NH-21	15260		
	Acoustic Calibrator	B&K Calibrator	4231	1762168	Sep. 2008	

Summaries of the noise level measurements undertaken on the 8/9<sup>th</sup> October, 12/13<sup>th</sup> October and 27/28<sup>th</sup> October 2008 are given in Tables G.2 to G.4.

**Table G.2 - Noise survey results - 8/9<sup>th</sup> October 2008**

Code	Description	Date/ Time	[dB(A)]			Note(s)
			L <sub>Aeq</sub>	L <sub>A10</sub>	L <sub>A90</sub>	
PB01	Pier Street, Portishead	08/ 22:52	33.0	34.5	28.4	M5 distant noise; local traffic; domestic exhausts
		09/ 00:55	39.8	41.2	38.3	
PB02	Stonechat Green, Portishead	08/ 21:00	34.7	36.3	32.6	M5/distant traffic noise; nearby substation; background port noise
		23:15	33.8	34.7	32.6	
		09/ 01:14	41.9	42.9	41.2	
PB03	Wharf Lane, Sheepway	08/ 21:17	38.3	39.6	36.1	M5/distant traffic noise; background port noise; (some) wildlife noise
		08/ 23:32	38.4	39.3	35.4	
		09/ 01:29	43.1	44.9	40.6	
PB04	Marsh Lane, Portbury Docks	08/ 21:41	51.5	52.8	48.4	Ship unloading/handling noise; crane noise, reverse alarms; ship engine noise
		23:50	53.7	55.5	51.6	
		09/ 01:47	54.3	55.1	53.3	
PB05	Napier Square, Avonmouth	08/ 22:07	48.3	48.7	47.2	Mill and ship noise from port area; conveyor noise
		09/ 00:09	50.3	50.9	49.8	
		02:07	49.9	50.8	49.2	
PB06	Farr Street, Avonmouth	08/ 22:22	46.7	48.5	44.7	Mill, ship and general noise from port area; M5 traffic noise
		09/ 00:22	48.5	49.9	46.9	
		02:17	46.6	47.5	45.8	
Meteorological Conditions		SW wind direction; calm/very light winds, clear skies; small amount of early morning mist				
Additional Comments		5 minute representative samples employed, measurements paused to exclude local traffic movements				

**Table G.3 – Noise survey results – 12/13<sup>th</sup> October 2008**

Code	Description	Date/ Time	[dB(A)]			Note(s)
			L <sub>Aeq</sub>	L <sub>A10</sub>	L <sub>A90</sub>	
PB01	Pier Street, Portishead	12/ 16:36	40.0	41.8	37.0	Distant M5 traffic noise; pm local traffic noise; domestic activity
		19:47	42.5	44.2	40.9	
		22:27	41.8	42.9	40.8	
		13/ 00:30	35.5	36.9	32.9	
		02:24	36.5	37.9	34.5	
PB02	Stonechat Green, Portishead	12/ 16:52	39.5	40.9	38.3	Distant M5 traffic noise; domestic activity; early am substation noise
		20:03	51.0	47.3	45.5	
		22:44	42.7	44.2	41.2	
		13/ 00:48	38.0	39.4	36.4	
		02:39	38.5	40.7	35.3	
PB03	Wharf Lane, Sheepway	12/ 17:46	43.9	45.4	42.2	M5 traffic noise; pm domestic activity; small animal life; early am discernible port and substation noise
		20:18	48.3	49.6	46.7	
		23:01	41.4	42.5	39.8	
		13/ 01:06	38.6	39.8	37.2	
		03:14	40.3	43.7	35.5	
PB04	Marsh Lane, Portbury Docks	12/ 23:29	51.4	52.1	50.8	Ship unloading/handling noise; conveyer and crane noise
		13/ 01:24	54.0	55.3	52.5	
		02:56	54.0	54.7	53.3	
PB05	Napier Square, Avonmouth	12/ 18:22	52.0	53.0	51.1	Mill or ship noise from port area; (some) conveyer noise; pm wharf traffic noise
		20:40	49.3	50.1	48.5	
		23:48	42.8	43.6	42.1	
		13/ 01:43	48.1	48.6	47.7	
PB06	Farr Street, Avonmouth	12/ 18:35	48.9	50.3	46.8	Mill or ship noise from port area; (some) conveyer noise; pm M5 traffic noise
		20:50	47.0	47.8	45.8	
		13/ 00:03	44.1	44.9	43.1	
		02:00	44.7	46.3	42.7	

Meteorological Conditions	S/SW wind direction; calm/very light winds, predominantly clear skies
Additional Comments	5 minute representative samples employed, measurements paused to exclude local traffic movements

**Table G.4 – Noise survey results – 27/28<sup>th</sup> October 2008**

Code	Description	Date/ Time	[dB(A)]			Note(s)
			L <sub>Aeq</sub>	L <sub>A10</sub>	L <sub>A90</sub>	
PB01	Pier Street, Portishead	27/ 14:37	37.4	40.3	34.1	Quiet; occasional local traffic noise; (some) pm construction noise
		19:42	36.4	35.5	30.7	
		22:43	33.4	33.9	29.8	
		28/ 00:43	28.8	29.3	27.9	
PB02	Stonechat Green, Portishead	27/ 15:09	44.4	46.5	39.4	Quiet; distant and local traffic noise; hum from port activity; pm construction noise
		20:01	37.3	36.6	34.4	
		23:04	34.7	35.9	33.5	
		28/ 01:03	31.4	31.6	29.9	
PB03	Wharf Lane, Sheepway	27/ 15:28	42.0	43.7	38.3	Quiet; background hum from port activity; M5 traffic noise; (some) pm construction noise
		20:27	33.6	34.5	31.8	
		23:27	35.1	36.6	33.5	
		28/ 01:21	31.7	32.7	30.7	
PB04	Marsh Lane, Portbury Docks	27/ 15:55	67.0	68.4	65.8	Steady noise field dominated by ship exhaust and associated internal plant
		20:45	65.8	66.9	64.8	
		23:44	65.7	66.3	65.2	
		28/ 01:47	65.6	66.2	65.2	
PB05	Napier Square, Avonmouth	27/ 16:23	51.5	53.4	49.3	Avonmouth port noise (machine movements); steady background ship noise at Portbury Dock
		21:05	46.4	49.1	40.7	
		28/ 00:05	49.0	49.7	48.5	
		02:06	49.9	50.8	49.1	
PB06	Farr Street, Avonmouth	27/ 16:43	53.5	54.0	46.7	Steady background ship noise at Portbury Dock; occasional Avonmouth Dock movement noise
		21:19	46.1	47.4	44.9	
		28/ 00:17	44.3	45.7	42.8	
		02:18	47.9	49.0	46.7	
Meteorological Conditions		W/SW or still wind direction; calm; clear skies to slight cloud				

Additional Comments	Portbury Dock ship noise dominated close receptors; 5min representative samples employed, measurements paused to exclude local traffic movements
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A summary of the continuous noise measurement results collected at Avonmouth Docks (PB08) and Stonechat Green (PB09) is given in Table G.5 below and shown graphically as time-series in Figure G.1 and G.2.. Measurement data gathered during wet or windy conditions has been excluded from the analysis.

**Table G.5 - Continuous noise survey results - Averages October 2008**

Code	Description	[dB(A)]							
		Day [07:00-19:00]		Evening [19:00-23:00]		Night [23:00-07:00]		All	
		L <sub>Aeq</sub>	L <sub>A90</sub>	L <sub>Aeq</sub>	L <sub>A90</sub>	L <sub>Aeq</sub>	L <sub>A90</sub>	L <sub>Aeq</sub>	L <sub>A90</sub>
		Mean ±Std. Dev.	Mean ±Std. Dev.	Mean ±Std. Dev.	Mean ±Std. Dev.	Mean ±Std. Dev.	Mean ±Std. Dev.	Mean ±Std. Dev.	Mean ±Std. Dev.
PB08	Avonmouth Dock	55.1 ±3.5	<b>51.7</b> ±2.9	50.2 ±3.7	<b>48.2</b> ±3.8	51.4 ±2.0	<b>50.0</b> ±2.6	52.5 ±3.6	<b>50.2</b> ±3.2
PB09	Stonechat Green	47.1 ±4.4	<b>41.9</b> ±3.9	40.3 ±4.4	<b>37.5</b> ±4.5	39.4 ±4.7	<b>36.8</b> ±4.7	42.3 ±5.7	<b>38.7</b> ±5.0

A condensed summary of the mean night time L<sub>A90</sub> and L<sub>Aeq</sub> measured during the 3 attended monitoring surveys and the continuous monitoring exercises is given in Table G.6 below.

**Table G.6 - Summary of night time noise survey results –October 2008**

Code	Description	Attended Monitoring		Continuous Monitoring	
		Average		Average	
		L <sub>Aeq</sub> dB	L <sub>A90</sub> dB	L <sub>Aeq</sub> dB	L <sub>A90</sub> dB
PB01	Pier Street, Portishead	34.5	<b>32.0</b>	--	--
PB02/PB09	Stonechat Green, Portishead	37.3	<b>35.7</b>	39.4	36.8
PB03	Wharf Lane, Sheepway	38.4	<b>36.1</b>	--	--
PB04	Marsh Lane, Portbury Docks #	53.5	52.3	--	--
PB05/PB08	Napier Square, Avonmouth	48.3	<b>47.7</b>	51.4	50.0
PB06	Farr Street, Avonmouth	46.0	<b>44.7</b>	--	--

# high values correspond to ship dominated noise field on 27/28th October 2008 have been excluded

### Other Sources of Background Noise Data

To put the October 2008 noise survey results into context, results from other environmental noise impact assessments have been collated. A summary of the overnight noise levels at the various receptors considered are given in Table G7.

**Table G.7 - Key Results from Background Noise Surveys for proposed developments around Portbury Dock**

Project	Location	L <sub>Aeq</sub>	L <sub>A90</sub>	Comment	Comparable Receptor	Relevance to Renewable Energy Plant
Shipway Farm Development Jan 2001	Shipway Farm, Sheepway	45	41	Mean night time levels of 47dB L <sub>Aeq,1hr</sub> and 43dB L <sub>A90,1hr</sub> but lower	PB03, Wharf Lane, Sheepway	As average night-time measurements within Sheepway village in 2001 were considerably higher

				levels considered to be representative of noise climate across Sheepway Community		than measured at PB03 in Oct. 2008 it remains appropriate to base the impact assessment on the recent lower levels
Bristol Port Renewable Energy project (3 Wind Turbines)  Jun 2004	20 Napier Square	---	41	Continuous Monitoring in back garden. 10 Percentile of $L_{A90}$ 36dB. Noise levels during low wind speeds	PB05, Napier Square	Measurements were made within back garden with screening benefit.  PB05 and PB07 results considered to best represent the current ambient noise climate affecting Napier Square community
	Portbury Docks South Offices	--	51	Continuous Noise Monitoring. 10 Percentile $L_{A90}$ 46dB. Noise levels during low wind speeds	PB04, Marsh Lane	Although made in 2004, these $L_{A90}$ levels are based on continuous monitoring over several days and therefore can be considered to be statistically more significant than spot measurements. Hence an overnight background noise level of 46dB $L_{A90}$ shall be adopted as a representative value on which to base the assessment.

Bristol Deep Sea Container Terminal  May 2008	Woodlands Road, Portishead	42	41	Weekday night- time average	PB01, Pier Street	The mean night time noise level at PB01 has been measured to be less than measured at Woodlands Road, therefore an assessment based on the PB01 values should be robust.
		38	35	Weekend night- time average		

Taking into consideration the results of noise monitoring within the community undertaken for other projects 'representative' night-time background noise levels have been identified on which to base the assessment. Typically these are the lowest mean values from the recent attended and continuous monitoring. However, in the case of Marsh Lane (PB04) a lower noise level that had been measured during a continuous noise monitoring survey in 2004 has been adopted. These representative night time background noise levels are summarised in Table G.8.

**Table G.8 - Representative Night time Background Noise Levels**

Code	Description	Representative Background Noise Level*
		L <sub>A90</sub> dB
PB01	Pier Street, Portishead	32
PB02/PB09	Stonechat Green, Portishead	36
PB03	Wharf Lane, Sheepway	36
PB04	Marsh Lane, Portbury Docks	46
PB05/PB08	Napier Square, Avonmouth	48
PB06	Farr Street, Avonmouth	44

\* Taken as the lowest of the mean attended or continuous L<sub>A90</sub> values, or in the case of PB04 from other recent, statistically robust surveys where considered appropriate. Rounded down to the nearest whole number.

**Table G.9- Summary Statistics for Continuous Noise Monitoring at Portbury Dock Northern Seawall**

Parameter	Sound Pressure Level - dBA		
	L <sub>Aeq</sub>	L <sub>Amax</sub>	L <sub>A01</sub>
Mean Average	54	66	61
10% Percentile	47	53	50
50% Percentile	53	67	61
90% Percentile	62	77	71

Figure G.1 – Time-series of  $L_{Aeq}$  and  $L_{A90}$  noise levels measured at Avonmouth Dock/Near Napier Square (PB08)

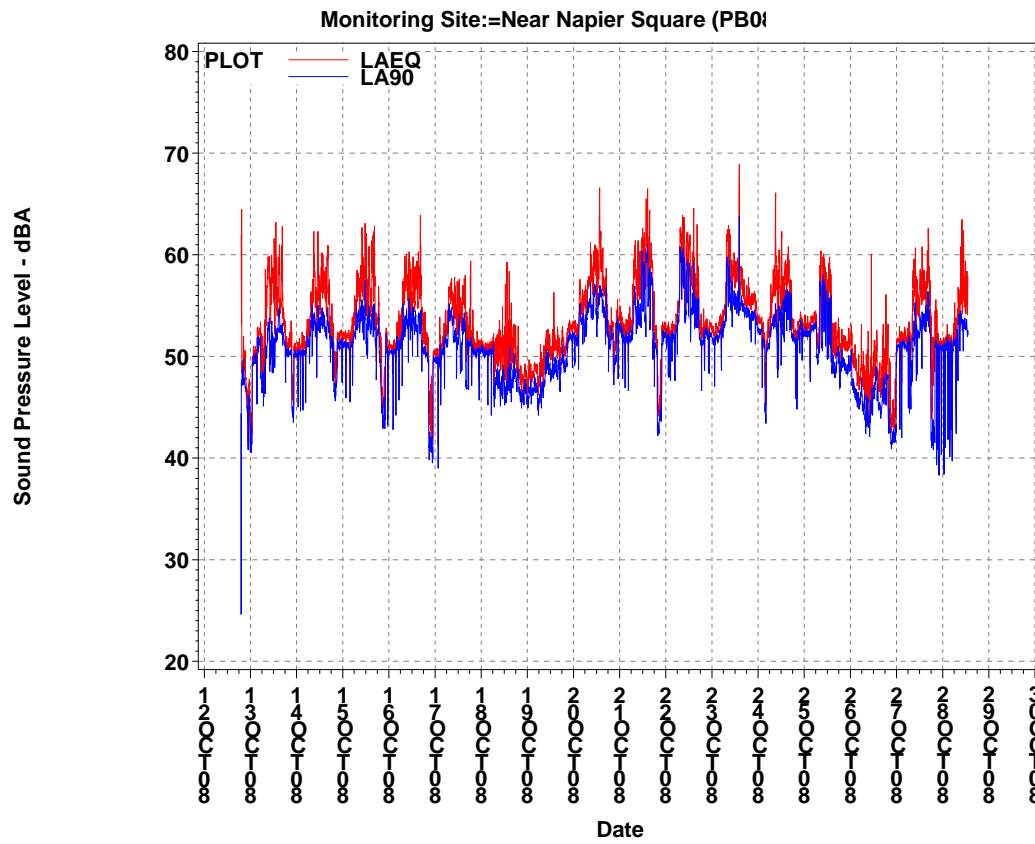


Figure G.2 - Time-series of  $L_{Aeq}$  and  $L_{A90}$  noise levels measured at Stonechat Green (PB09)

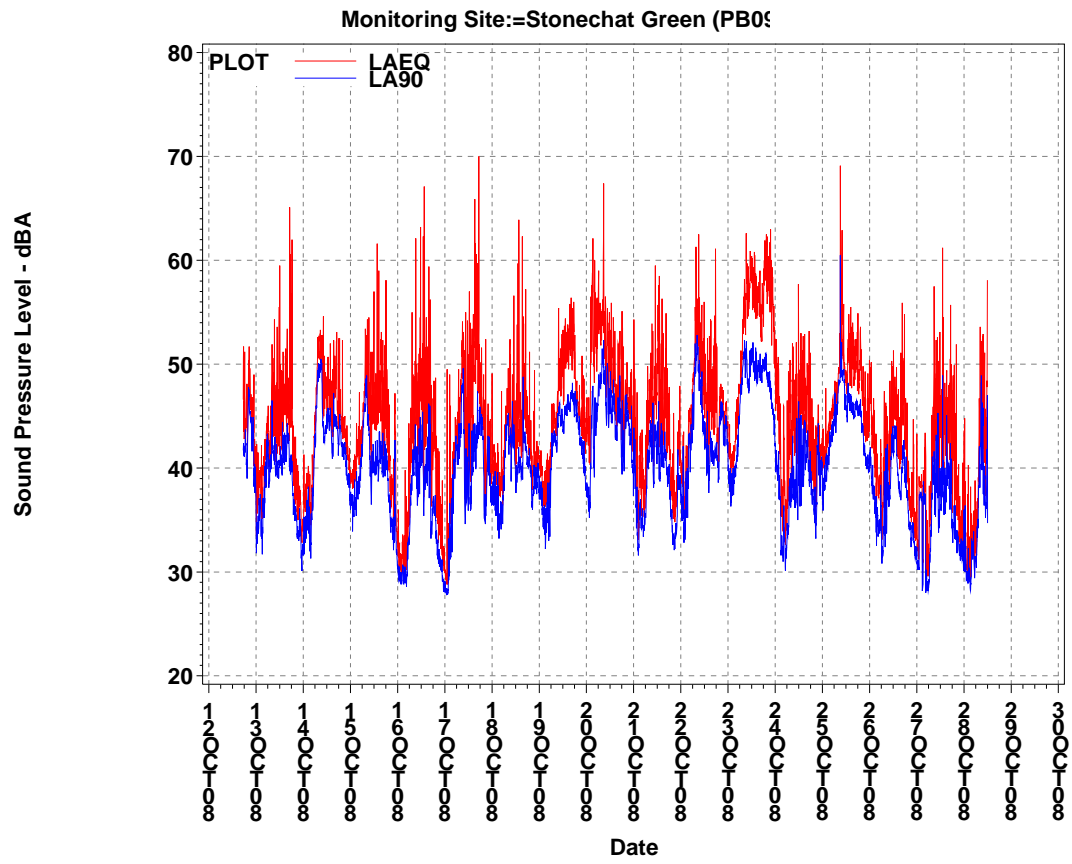
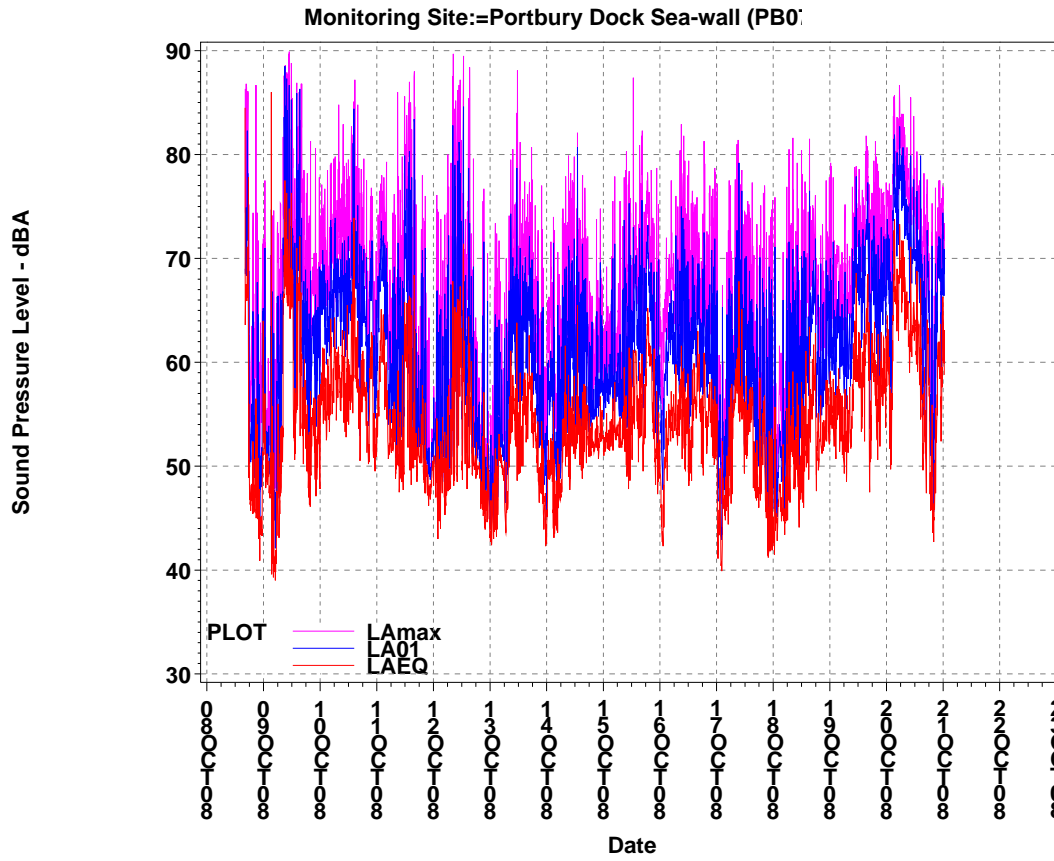


Figure G.3 – Time-series of  $L_{Aeq}$  and  $L_{A90}$  noise levels measured at Portbury Dock Northern Seawall (PB07)



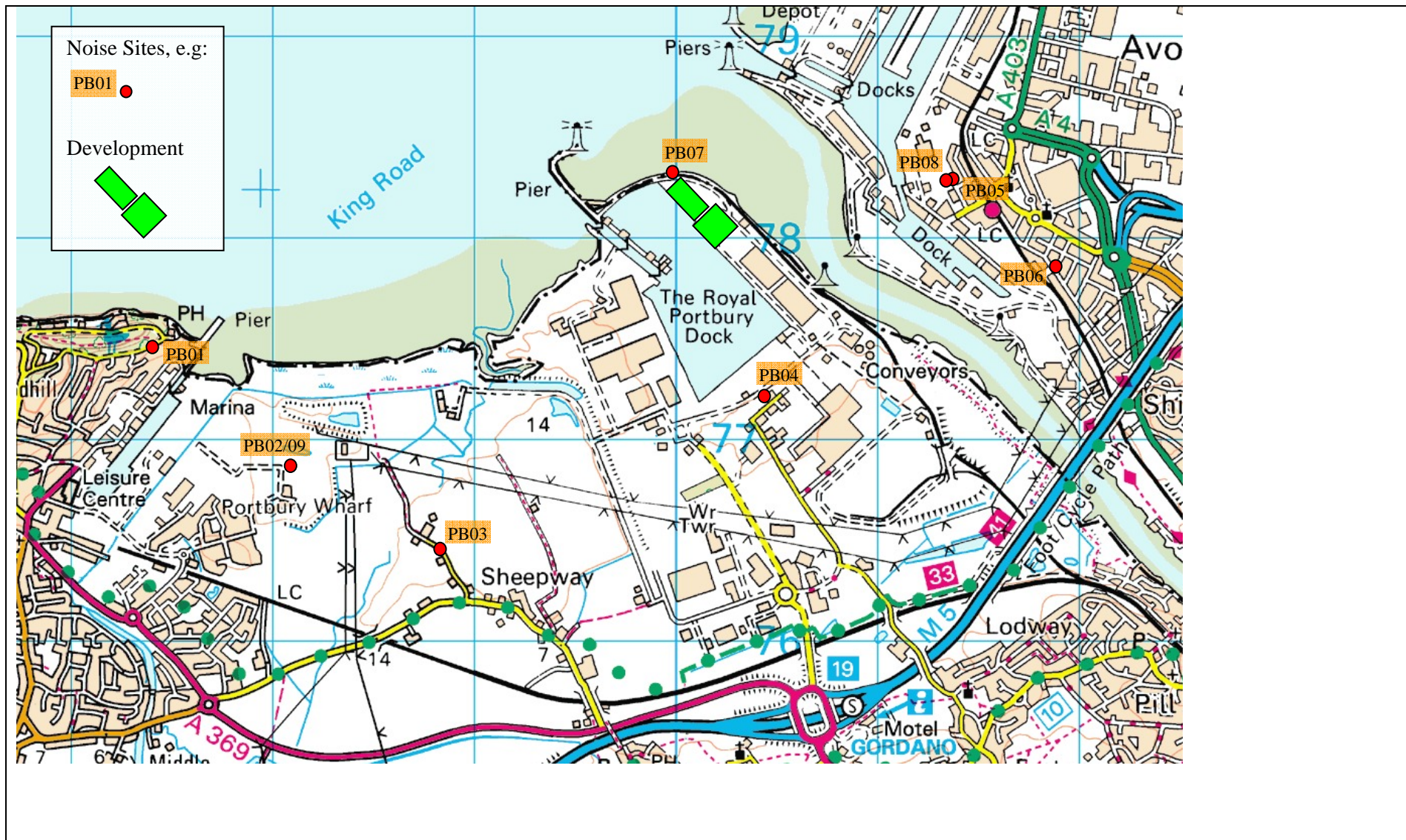


Figure 3.8.1 – Map showing position of key noise receptors and nominal plant centre

