

Preconstruction Background Noise Level Survey

Limerick Gasworks

Ref: 1021927/R/01

November 2009



Prepared by

David Ward
Acoustic Consultant

St John's House
Queen Street
Manchester
M2 5JB

T 0161 838 5929
F 0161 835 2038
E david.ward@mouchel.com
M 07966802976

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Document Control Sheet

Project Title Limerick Gasworks Noise Survey



Report Title Preconstruction Background Noise Level Survey

Revision 1021927/R/01

Status 1st Issue

Control Date 11th November 2009

Record of Issue

Issue	Status	Author	Date	Check	Date	Authorised	Date
A	1 st Issue	D Ward	11/11/09	P Tallantyre	11/11/09	T Brown	13/11/09
		D J Ward					

Distribution

Organisation	Contact	Copies
Bord Gáis Eireann	Karen McCarthy	1e
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Summary

A preconstruction noise survey has been completed during the daytime period (08:00 – 18:00) at the former Limerick Gasworks site located on the Dock Road in Limerick city.

Background noise levels at nearby noise sensitive receptors to the Gasworks site have been quantified so as to enable potential future noise impacts associated with the proposed remediation of the Gasworks site to be accurately assessed.

The noise climate of the site was quantified at 6 locations as identified on Figure 1 to be representative of noise sensitive receptors around the periphery of the gasworks site.

The noise climate of the locality immediately surrounding the site was quantified to be dominated by noise generated by vehicle movements on the surrounding road network and limited intermittent industrial noise from within the docklands area to the west.

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1 Introduction

1.1 Project description

Mouchel has been commissioned by Bord Gáis Eireann to carry out an assessment of the existing background noise climate around the former Limerick Gasworks site (herein referred to as the Site).

1.2 The need for the proposed works

The noise survey works were commissioned to establish the existing background noise climate around the Site prior to the implementation of proposed remediation works.

These quantified levels will allow potential noise impacts to be assessed by virtue of later comparison to future noise levels during the remediation works and any further development of the site.

1.3 Description of the proposed works

A noise survey has been completed so as to quantify existing background noise levels around the vicinity of the Site in locations taken to be representative of sensitive adjacent uses.

Noise measurements have been completed during the daytime period only between 0800 and 1800 hours in half hour rotational periods at a number of defined locations around the periphery of the site.

Monitoring was limited to the daytime period as defined to correspond with the proposed operational hours of the remediation works.

2 Project description

2.1 Description of the proposed project

It is proposed by Bord Gáis Eireann that the existing disused and contaminated former Limerick Gasworks site is remediated to improve the land to a condition which would allow for future development of the site.

2.2 Description of Existing Site

The Limerick Gasworks site is situated off Dock Road (N69), between O'Curry Street and St Alphonsus Street within the City of Limerick, County Limerick.

The site previously housed gas storage facilities and associated processing equipment and piping as well as administration and office buildings. The majority of the site equipment and structures have subsequently been removed leaving an area of approximately 1.4 ha of disused ground of varying quality, mostly covered with hard standing.

The site is bounded on all sides by mixed commercial and residential properties and is adjacent to the operational dockland area. Operations within the dockland area include recycling and scrap metal operations, which contribute significantly to the overall noise climate of the site area.

The closest residential receptors to the Gasworks Site are those on St James Mews to the east and St Alphonsus Street to the south both of which have rear façades which overlook the site.

3 Descriptive Noise Units

3.1 Noise Units

Noise is defined as unwanted sound. The range of audible sound is from 0dB to 140dB. The frequency response of the human ear is usually taken to be about 18Hz (number of oscillations per second) to 18,000Hz. The ear does not respond equally to different frequencies at the same level. It is more sensitive in the mid-frequency range than the lower and higher frequencies and, because of this, the low and high frequency components of a sound are reduced in importance by applying a weighting (filtering) circuit to the noise measuring instrument (the sound level meter). The weighting which is most widely used and which correlates best with subjective response to noise is the A-weighting. This is an internationally accepted standard for noise measurements.

For variable noise sources such as traffic, an increase of 1dB(A), which equates for example to an approximate 25% increase in road traffic, is barely perceptible. In addition, a doubling of traffic flow will increase the overall noise by 3dB (A), providing that a number of factors, including speed, remain unchanged. The 'loudness' of a noise is a purely subjective parameter, but it is generally accepted that an increase/decrease of 10dB (A) corresponds to a doubling or halving in perceived loudness.

External noise levels are rarely steady, but rise and fall according to surrounding activities. In an attempt to produce a figure that relates this variable noise level to the subjective response, a number of noise metrics have been developed. These include:

3.1.1 *The LAeq noise level*

This is the 'equivalent continuous A-weighted sound pressure level, in decibels', and is defined in British Standard BS 7445 as the 'value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time interval, T, has the same mean square sound pressure as a sound under consideration whose level varies with time'. It is a unit commonly used to describe construction noise, and noise from industrial premises and is the most suitable unit for the description of many other forms of environmental noise.

3.1.2 *The LAmax noise level*

This is the maximum noise level recorded over a particular measurement period.

3.1.3 *The LA10 noise level*

The LA10 is the noise level that is exceeded for 10% of the measurement period, and gives an indication of the noisier levels. It is a unit that has been used over many years for the measurement and assessment of road traffic noise.

3.1.4 *The LA90 noise level*

The LA90 is the noise level that is exceeded for 90% of the measurement period and gives an indication of the noise level during quieter periods. It is often referred to as the 'background' noise level.

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4 Survey Methodology

4.1 Survey Details

The noise survey was completed on the 13th October 2009 between 0800hrs and 1800hrs by Mr David Ward a qualified Mouchel Acoustic consultant. Furthermore the baseline survey was undertaken wholly in accordance with the principles of BS 7445.

A Norsonic 118 Type 1 Sound Level Meter (serial number 31787) was used to undertake the noise measurements and was calibrated with a Norsonic 1251 calibrator (serial number 31461) before and after the measurement. No significant calibration drift was recorded. The relevant external calibration certificates for the equipment used are contained within Appendix 1 of this report and are traceable to national standards.

The sound level meter was tripod mounted with the microphone at a height of approximately 1.5m above the ground. Due to site specific constraints relating to the practical monitoring positions available, some of the measurements were undertaken within the influence of nearby façades (within 3.5m), otherwise the measurements were conducted under free field conditions (no façades within 3.5m). Section 4.2 below discusses the measurement positions in more detail and references whether the locations were free field or façade in nature.

4.2 Measurement Locations

Six measurement locations were identified around the periphery of the site so as to represent the nearest noise sensitive receptors. The following six receptors locations were identified:

Table 4-1 : Noise Sensitive Receptors

Receptor Location	Location Description	Distance from Limerick Gasworks site perimeter	Monitoring Position	Receptor Type
1	Adjacent to No 7 O'Curry Street	10 metres	Free field	Residential
2	Adjacent to the Dock Road Office building	10 metres	Façade	Commercial
3	Adjacent to No 33 O'Curry Street	20 metres	Free field	Residential
4	On Site adjacent to the side of Ryan's Bar	Within the site perimeter	Free field	Commercial/Residential
5	On Site adjacent to the side of No 2 St Alphonsus St	Within the site perimeter	Façade	Residential
6	On Site adjacent to the side of No 10 St James Mews	Within the site perimeter	Free field	Residential

The above identified monitoring locations are presented graphically on Figure 1.

4.3 Weather Conditions

The meteorological conditions during the survey period were noted to be dry with approximately 70 – 80% humidity and some (roughly 75%) high level cloud cover. Temperatures were measured to be between 16 and 19 °C and wind speeds averaged 0.4ms^{-1} gusting up to 1.1ms^{-1} .

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5 Survey Results

5.1 Measured Results

The table below details the results of the noise survey. In addition to the measured noise levels a brief description of the noise climate at each location is also included.

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Preconstruction Background Noise Survey

Limerick Gasworks



Table 5-1 - Ambient Noise Level Survey Results

Site	Site Description	Period	Time (hrs)		Duration Hh:mm:ss	Overall Level (dB)				Site Notes
			Start	End		L _{Aeq}	L _{A10}	L _{A90}	L _{MAX}	
1	Adjacent to No 7 O'Curry Street	1	08:10	08:40	00:30:00	65.6	68.0	52.3	88.1	Steady Traffic on Dock Rd, Stop/Start traffic on O'Curry St. Industrial noises, tipper/crane noise from within the docks
		2	09:52	10:22	00:30:00	59.9	62.0	49.5	79.5	Less traffic on Dock Rd than period 1. Some local traffic present. Car door slams on adjacent roads, pedestrians etc.
		3	15:20	15:50	00:30:00	62.2	65.2	51.7	79.3	As above.
2	Adjacent to the Dock Road Office building	1	08:44	09:15	00:30:00	78.9	81.5	72.9	90.9	Traffic noise is the only source audible. Dock operations not audible. Traffic on Dock Road slow moving towards city centre. Steady flow away from city centre
		2	12:12	12:42	00:30:00	78.7	81.7	71.6	98.1	Traffic noise still the main noise source but flowing quicker than during period 1.
		3	15:52	16:22	00:30:00	77.2	80.0	71.3	96.8	Traffic noise only audible source of noise.
3	Adjacent to No 33 O'Curry Street	1	09:19	09:49	00:30:00	62.2	64.1	48.6	81.3	Intermittent traffic flow on O'Curry St. Pedestrians talking. Dock road is approx. 200m so less influence than at MP1
		2	13:05	13:35	00:30:00	60.6	63.8	45.5	79.4	As above.
		3	Out side agreed measurement window.							
4	On Site adjacent to the side of Ryan's Bar	1	10:29	10:59	00:30:00	64.3	67.3	58.0	74.3	Traffic noise from vehicles on Dock Rd dominant.
		2	13:40	14:10	00:30:00	63.5	66.4	56.9	80.4	As above.
		3	16:25	16:55	00:30:00	64.4	66.8	57.8	85.9	As above.
5	On Site adjacent to the side of No 2 St Alphonsus St	1	11:02	11:32	00:30:00	46.8	49.2	42.4	62.6	Traffic noise from vehicles on Dock Rd dominant plus some intermittent vehicle movements on St Alphonsus St.
		2	14:12	14:42	00:30:00	47.2	49.1	42.6	69.5	As above plus some distant noise heard from the scrap metal operations within the docks.
		3	16:57	17:27	00:30:00	45.8	47.5	41.9	68.4	Traffic on Dock Rd became congested after 1700hrs.
6	On Site adjacent to the side of No 10 St James Mews	1	11:34	12:04	00:30:00	52.0	52.5	46.6	71.5	Lorries came onto site delivering materials, otherwise distant traffic noise from Dock Rd predominates.
		2	14:44	15:15	00:30:00	47.5	49.1	45.3	61.9	Traffic noise from vehicles on Dock Rd dominant.
		3	17:29	17:59	00:30:00	45.2	46.9	42.5	59.1	Traffic on Dock Rd was slower moving due to congestion.

6 Discussion of Results

6.1 Summary of Measured Results

The following table summarises the results of the noise survey. This information is likely to be useful for comparison to the results of any post development completion noise survey.

The data presented within Table 6-1 has been calculated by the logarithmic (L_{Aeq} value) or the arithmetic (L_{A90} value) averages of the monitored data throughout the entire survey period.

Table 6-1 : Summary of Noise Levels

Site	Description	Overall Level (dB)	
		L_{Aeq}	L_{A90}
1	Adjacent to No 7 O'Curry Street	63.2	51.1
2	Adjacent to the Dock Road Office building	78.3	72.0
3	Adjacent to No 33 O'Curry Street	61.5	47.1
4	On Site adjacent to the side of Ryan's Bar	64.7	57.5
5	On Site adjacent to the side of No 2 St Alphonsus St	46.6	42.3
6	On Site adjacent to the side of No 10 St James Mews	49.2	44.8

6.2 Discussion of Measured Noise Levels

Monitoring Position (MP) 1 was situated in a freefield position to the north east of the Site. The noise climate in the area was dominated by traffic moving along Dock Road with some contribution from local traffic on O'Curry Street. Industrial noise was audible at this location particularly associated with unloading and vehicle movements within the scrap metal facility.

It is noted that MP 2 was situated within 3.5m of a reflecting surface other than the ground being the façade and door of the office building on the north side of Dock Road and as such should be considered as a façade noise level. This location was considered to be dominated by noise contributed by vehicle movements on the N69, Dock Road. It is noted that in general the N69 is the dominant noise source within the area, as shown by the much higher noise levels at this position.

MP 3 was positioned on the pavement in front of the disused Garda training building, adjacent to 33 O'Curry Street. The constraints of the location due to the pavement width and lack of access to the Garda building grounds, dictated that the meter was placed approximately 2m away from a 1.5m high perimeter wall surrounding the training building. The wall would have had some façade influence over the results and as such the noise levels presented should be considered as façade levels.

At MP3 noise levels were not dominated by road traffic noise due to the increased distance to Dock Road compared to MP1. Local traffic and the general movement of pedestrians, talking, door slams etc. was heard as well as the background noise of traffic on Dock Road and the operations on the Docks themselves.

The location used as MP 4 was a freefield location within the compound of the proposed remediation works, towards the rear of a number of commercial properties (public houses). Noise from the nearby Dock Road dominates the noise environment at this location.

MP 5 was positioned between the compound retaining wall and a 2m high perimeter wall that had previously enclosed site workings. Again, due to the positioning of this location, the noise levels should therefore be considered as façade levels taken to be representative of the noise levels inherent at the most exposed façade of the closest residential receptors on St Alphonsus St. The façades of all the buildings looking on to the site at this location include opening windows. This position was the quietest of the six positions, mostly due to the attenuation of the N69 afforded by the surrounding walls and buildings and was dominated by low level background traffic noise on Dock Road.

MP 6 was positioned in a freefield location close to an exposed earth bank on the site to the rear of St James Mews. The measured noise levels will be representative of the rear gardens and façades of the properties on St James Mews which have upper floor bedroom windows overlooking the site. The noise climate at MP6 was noted to be dominated by low level background traffic noise on Dock Road.

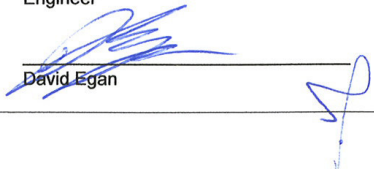

In general, the predominant noise source of the area as noted to be road traffic noise from Dock Road. This was coupled with industrial noises, particularly the unloading, moving and sorting of scrap metal from within the docklands site which were noted to be sporadic in nature.

Figure 1 – Noise Measurement Positions

See appended PDF file – Limerick Noise Figure 1.PDF

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Appendix 1 – Calibration Certificates

Calibration Report		Certificate No.:4132		
Norsonic Type : 118 Serial no : 31787				
Customer:	Mouchel Ltd			
Department:	Acoustics			
Place:	St. John's House, Queen Street			
City:	Manchester, M2 5JB			
Order No:	Letter			
Contact Person:	Mr Mark Harrison			
Phone/Mail:				
Microphone :	Norsonic	Type : 1225	Serial no : 69918	Sens:-25.61dB
Pre amplifier :	Norsonic	Type : 1206	Serial no : 30878	
Calibrator :	Norsonic	Type : 1251	Serial no : 31461	Level:114.10dB
Measured with Pre Amplifier		Mains adapter was included		
Microphone cable was included		RS232 cable was included		
This sound level meter has been calibrated as specified in BS 7580. PART 1 : 1997.				
Measurement Results:				
Noise test - BS 7580 #5.5.2				Passed
Level Linearity Test - BS 7580, #5.5.3				Passed
Frequency weightings: A Network - BS 7580 #5.5.4				Passed
Frequency weightings: C Network - BS 7580 #5.5.4				Passed
Time weightings F and S - BS7580 #5.5.5				Passed
Peak response - BS7580 #5.5.6				Passed
RMS accuracy - BS7580 #5.5.7				Passed
Time weighting I - BS7580 #5.5.8				Passed
Integrating Test : Time averaging - BS7580 #5.5.9				Passed
Integrating Test : Pulse range - BS7580 #5.5.10				Passed
Integrating Test : Sound exposure level - BS7580 #5.5.11				Passed
Overload SPL Test - BS 7580 #5.5.12				Passed
Overload Leq Test - BS 7580 #5.5.12				Passed
Acoustic tests - BS 7580 #5.4 and #5.6				Passed
Summation of acoustic tests - BS 7580 #5.5.4				Passed
The overall frequency response of the sound level meter including case reflections, microphone response and wind screen has shown to confirm with the requirements in #6 of the BS EN 60651 and #5.5.4 in BS 7580 Part 1.				
Comment :				
Correct calibration setting with associated calibrator is 114.0dB(A)				
Environmental conditions:				
Pressure :	Temperature :	Relative humidity :		
100.916 kPa	23.6 °C	57.1 %RH		
Date of calibration: 24/07/2008				
Date of issue: 24/07/2008				
Supervisor: Ian Campbell MSC MIOA				
Engineer				
 David Egan		 Campbell Associates www.campbell-associates.co.uk		

Sound Calibrator Certificate



Calibrator : Norsonic 1251

Serial no : 31461
Level : 114.10 dB
Frequency : 1000.09 Hz

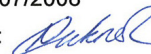
Reference conditions:
Pressure : 101.325 kPa
Temperature : 23.0 °C
Relative humidity : 50 %RH

The stated level is valid at measurement conditions.
Calibrator signal distortion: 0.02 %
Short term level stability : 0.06 dB
Frequency stability : 0.00 %

Measurement conditions :
Pressure : 101.636 ± 0.003 kPa
Temperature : 21.7 ± 1.5 °C
Relative humidity : 56.3 ± 3.4 %RH

Measured according to IEC 60942.
The stated level is relative to 20µPa.
The level is traceable to NPL, England,
with a calculated uncertainty less than 0.10 dB (2×sd).

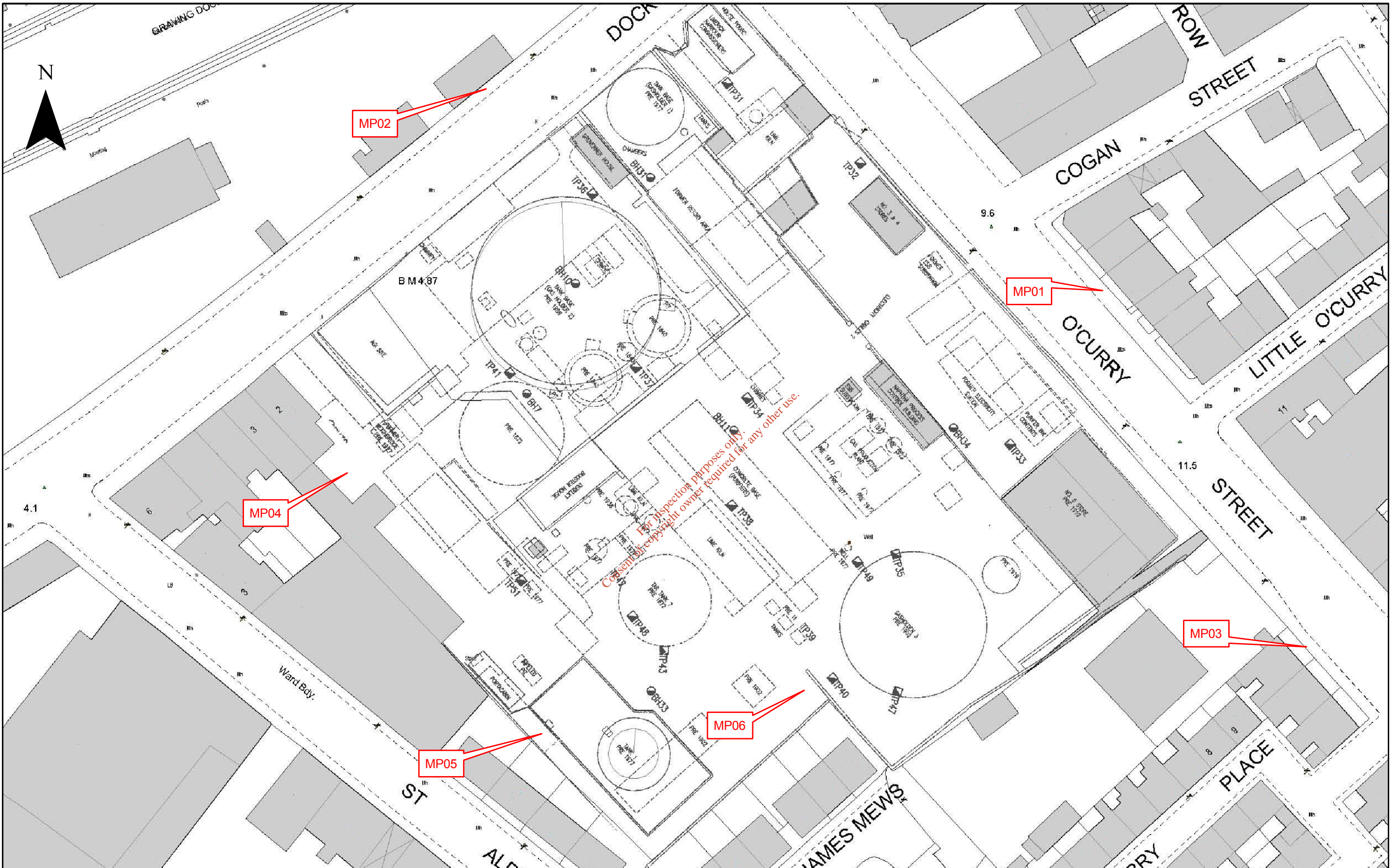
Date : 21/07/2008

Signature : 

Campbell Associates

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VER	DATE	AMENDMENT / VERSION DESCRIPTION	APPROVAL	DESIGNER	CLIENT	PROJECT TITLE	Limerick Gasworks		
		Not to scale				DESIGNED BY	DRAWING TITLE		
						DW	Figure 1:		
						MH	Noise Measurement Positions		
						CHECKED BY	1021927-FIG1		
						PT			
A	10/11/09	Noise Measurement Positions	PT			SCALE AT A3	PURPOSE OF ISSUE	INFORMATION	VERSION
						N/A			A