



Comhairle Cathrach
Bhaile Átha Cliath
Dublin City Council

Noise Maps, Report & Statistics

2017 Noise Mapping Project Dublin City Council



Produced by
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Environment & Transportation Department,
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Executive Summary

Under EU Directive 2002/49/EC relating to The Assessment and Management of Environmental Noise (known as the END), Dublin City Council, is required to review and revise, if necessary, 'Strategic Noise Maps' every 5 years. The last sets of maps were produced in June 2012. A review has been carried out by Dublin City Council and a decision was made to revise the 2012 road source noise maps in order to produce new maps for June 2017. It was agreed with the EPA, as in 2012, that major industrial sources would not be mapped. During the review phase it was found that major industrial plant did not have any strategic impact on the overall sound environment in the Dublin City Council area and produce sound emissions, at the boundary of their site, which were below the reporting threshold.

Irish Rail and the Rail Procurement Agency are required to produce noise maps for rail sources within the Dublin City Council area on behalf of the City Council.

Comparisons of the 'Noise Maps' and population exposure between the second round of mapping in 2012 and the current 2017 maps shows that there has been some minor changes in relation to the number of people categorised in the various decibel bands. There has been no change in the percentage of the Dublin population categorised as being exposed to 'Undesirable' daytime sound levels. However there has been a reduction in 1% in the number of people in the undesirable 'Night time' sound levels category. There has also been a 1% reduction in the number of people in the desirable night time category - from 69% to 68% and a 4% reduction in the number of people in the daytime desirable category - from 54% to 50%. The percentage number of people in the middle ground - that is, neither in the desirable or undesirable category, is 10% for night time and 46% for daytime, compared to 7% and 42% respectively in 2012.

The full statistics on population exposure to sound from road sources for the Dublin City Council functional area are presented in Table 1 on page 14. The modelled sound levels are displayed as 'noisemaps' on pages 21 - 35. Areas displaying 'desirable' and 'undesirable' sound contours, as defined in the Dublin Agglomeration Noise Action Plan, can be found on pages 36-37.

There is still a large percentage of the population (22%) in the Dublin City Council area being exposed to undesirable night time sound levels. There is no change in the percentage of the population being exposed to day time sound levels above 70dB(A) – at 5%. Consideration will be required to be given as to what action can be taken to reduce these numbers, during the revision of the Dublin Agglomeration Noise Action Plan. This revision is due at the end of 2018.

The 2017 Noise Maps can be found on the Dublin City Council website at the following address;- <http://www.dublincity.ie/WaterWasteEnvironment/NoiseMapsandActionPlans/Pages/default.aspx>

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1 Introduction

1.1 Background

Under EU Directive 2002/49/EC relating to The Assessment and Management of Environmental Noise, (known as the END) which was transposed by SI. number 140 of 2006, the relevant noise mapping bodies, are required to produce 'Maps' for noise emanating from Major Industry and Roads, including Major Roads, and for rail sources within the Dublin City Council area. The production of these maps is through the use of computer software in which a model of the entire Dublin City area is developed. The software calculates sound levels at 20m spacing's across Dublin. These calculated sound levels can then be colour coded to produce 'thematic noise maps'. There are no measurements of sound involved in the process. The outputs are all related to calculations produced by the computer model. The 'END' emphasises that Strategic maps are not to be used to address local noise nuisances such as neighbourhood or domestic noise nuisance.

The noise mapping bodies are required to review and revise, if necessary, 'Strategic Noise Maps' every 5 years. The last set of maps was produced in June 2012 (see web link:

<http://www.dublincity.ie/WaterWasteEnvironment/NoiseMapsandActionPlans/Pages/default.aspx>). As the next round of noise maps are required to be produced by June 2017, Dublin City Council carried out a review of their strategic noise maps in relation to road traffic. This review indicated that overall traffic volumes had increased slightly but not uniformly throughout Dublin in 2017. This was due to major changes in traffic management such as the College Green Bus Gate, restriction on left/right hand turns at critical junctions in the City and the introduction of the cross city Luas works. Therefore it was decided that the 2012 noise maps would be revised in total.

1.2 Sound and Effects of Noise

Environmental noise, commonly called noise pollution, is among the most frequent sources of environmental complaint in Europe, especially in densely populated urban areas and residential areas near highways, railways and airports, (WHO, European office). Noise contributes greatly to diminishing people's quality of life. Unwanted sound (noise) of sufficient intensity and duration can interfere with speech communication, the transmission of other auditory signals, can disturb sleep and act as a general source of annoyance or disturbance and interfere with the performance of complicated tasks and the opportunity for privacy. In particular, exposure of people to day time noise levels above 65dB(A) can cause severe health problems. In general sound levels in cities range between 60-70dB(A), with suburban levels between 50-60dB(A). The World Health Organisation has set guideline levels for annoyance at 55dB(A) representing daytime levels below which a majority of the adult population will be protected from becoming moderately or seriously annoyed. These guidelines are currently under review and maybe due for release by December 2017.

In 2009, the WHO European Regional Office published the '*Night Noise Guidelines for Europe*'. It presented evidence on the health damage of night time sound exposure and recommended threshold

values that, if breached at night, would threaten health. An annual average night exposure not exceeding 40dB(A) outdoors, is recommended in the guidelines. It is recommended that that this level should be the target for night noise guidelines to protect the public, including the most vulnerable groups such as children, the chronically ill and the elderly. A night time level of 55dB(A) is recommended as an interim target for countries that cannot meet these night noise guidelines in the short term for various reasons and where policy-makers choose to adopt a stepwise approach. The publication indicates that these guidelines can be considered an extension to the previous WHO 'Guidelines for Community Noise', which are mentioned above.

1.3 Purpose and Scope of the 'END' Directive

The over arching aim of this Directive is to provide a common framework to avoid, prevent or reduce, on a prioritised basis, the harmful effects of exposure to environmental noise. It aims to do this by:-

- Monitoring environmental noise problems by requiring competent authorities in Member States to draw up "strategic noise maps" for major roads, railways, airports and agglomerations, using harmonised noise indicators Lden (day-evening-night equivalent level) and Lnight (night equivalent level). These maps are to be used to assess the number of people annoyed and sleep-disturbed respectively throughout each member state in the European Union.
- Informing and consulting the public about noise exposure, its effects, and the measures to be considered to address noise problems.
- Addressing local noise issues by requiring competent authorities to draw up action plans to reduce noise where necessary and maintain the environmental acoustic quality where it is good. The directive does not set any limit value, nor does it prescribe the measures to be used in the action plans, which remain at the discretion of the competent authorities.
- Developing a long-term EU strategy, which includes objectives to reduce the number of people affected by noise in the longer term, and provides a framework for developing existing Community policy on noise reduction from source.

The Directive is also aimed at providing a basis for developing EU wide measures to reduce noise emitted by the major sources, in particular road and rail vehicles and infrastructure, aircraft, outdoor and industrial equipment. The Directive applies to environmental noise to which humans are exposed, in particular in built-up areas, in public parks or other quiet areas in an agglomeration, in quiet areas in open country, near schools, hospitals and other noise sensitive buildings and areas. It does not apply to noise that is caused by the exposed person himself\herself, noise from domestic activities, noise created by neighbours, noise at work places or noise inside means of transport or due to military activities in military areas. As these maps are **Strategic Noise Maps** they **should not be used for the assessment of local noise nuisances**.

1.4 Purpose and Scope of the Environmental Noise Regulations

The purpose and scope of the regulations are set out in the Statutory Instrument S.I. No. 140 of 2006, which transposes EU Directive 2002/49/EC relating to the assessment and management of environmental noise. It states that for the purposes of these Regulations, environmental noise means unwanted or harmful outdoor sound created by human activities, including noise emitted by means of transport, road traffic, rail traffic, air traffic, and from sites of industrial activity.

The Regulations set out a two-stage process for addressing environmental noise. Firstly, noise must be assessed through the preparation of strategic noise maps for areas and infrastructure falling within defined criteria, e.g. large agglomerations, major roads, railways and airports. Secondly, based on the results of the mapping process, the Regulations require the preparation of noise action plans for each area concerned. The fundamental objective of action plans is the prevention and/or reduction of environmental noise.

The Regulations designate noise-mapping bodies and action planning authorities for the making of strategic noise maps and action plans. Primary responsibility for both noise mapping and action planning is assigned to local authorities. While a number of other bodies also have noise mapping functions, these bodies carry out their functions on behalf of the local authorities concerned.

The Regulations designate the Environmental Protection Agency as the National Authority for the purposes of the Regulations. The Agency's role includes supervisory, advisory and coordination functions in relation to both noise mapping and action planning, as well as reporting requirements for the purpose of the Directive.

The Regulations provide for strategic noise maps and action plans to be made available to the general public. They also provide for public consultation on proposed action plans, and for the results of public consultation to be taken into account in finalising action plans or reviews of action plans.

1.5 Roles and Responsibilities of designated bodies

The roles of the noise mapping bodies are set out in the Environmental Noise Regulations 2006. The relevant noise mapping bodies for the Dublin City Council area are Dublin City Council, Transport Infrastructure Ireland (TII) and Irish Rail. There is a requirement for Dublin City Council to produce 'Maps' for noise emanating from Major Industry and Roads, including Major Roads. Irish Rail and TII are required to produce noise maps for rail sources within Dublin.

2. Review of 2012 round of Noise Maps

2.1 Developments since the 2nd round of Noise Mapping (2012)

Noise Maps for the 2nd round of mapping were completed and produced for the Dublin area in July 2012. Both these and the 1st round 'noise maps' in 2007 are currently available, on the Dublin City Council website.

A review of the strategic noise maps in relation to road traffic, rail and industrial processes was carried out. As mentioned previously this review indicated that overall traffic volumes had increased slightly but not uniformly throughout Dublin in 2017. This was due to major changes in traffic management such as the College Green Bus Gate, restriction on left\right hand turns at critical junctions in the City and the introduction of the cross city Luas works. Therefore it was decided that the 2012 noise maps would be revised. It was also found that there were no significant changes in relation to major industry that would require 'major industry' noise maps to be produced or revised. TII and Irish Rail reviewed the 'rail' noise maps and decided to revise the 2012 noise maps on behalf of the local authorities.

The EPA was advised of the outcome of these reviews. They subsequently notified Dublin City Council that the proposed approach to the third round of 'noise mapping' was acceptable to them.

3. Areas to be Mapped

3.1 Requirements of Directive

The Directive applies to environmental noise to which humans are exposed and in particular in built-up areas, in public parks or other quiet areas in an agglomeration, in quiet areas in open country, near schools, hospitals and other noise sensitive buildings and areas. The Directive defines an agglomeration as meaning *'part of a territory, delimited by the Member State, having a population in excess of 100,000 persons and a population density such that the Member State considers it to be an urbanised area'*. It also defines Major Roads as meaning *'a regional, national or international road, designated by the Member State, which has more than three million vehicle passages a year.'*

3.2 Description of Area to be Mapped and Modelled

The Dublin City Council region comprises an area of approximately 117Km² and is populated by 554,554 people, an increase on 2011 from 527,612. Approximately 1280Km of road was inputted into the noise model, 17% of which was designated as Major Road i.e. carrying more than 8,219 vehicles per 24 hours. The area to be modelled was slightly larger than the area to be mapped as a two kilometre buffer outside the Dublin City area boundary was included in the model in order to take into consideration the influence of traffic outside of the area to be mapped.

4.Sound Calculation Method

4.1 Requirements of Directive

The Environmental Noise Directive allows 'National Methods' to be used in the place of the prescribed 'Interim Method'. Although CRTN is not 'officially' a national method it is the most common method used in Ireland for the assessment of noise from road sources and is considered a 'de facto' national method. It also has been used in the last two rounds of noise mapping

4.2 Requirements of Regulations

The Environmental Noise Regulations prescribes two methods that can be used for the assessment of sound emissions from road sources. These are CRTN and the 'Interim Method' as described in the END. As with the previous two rounds it was decided to use CRTN, to ensure comparability of the outputs. The European common assessment method 'CNOSSOS' has been produced but it is not required to be used until 2018.

4.3 Method of Assessment & Factors Influencing its Selection

In the interest of consistency with the Round 1&2 noise mapping, it was decided to use the adapted version of the UK CRTN methodology for the assessment of road traffic sound levels. This is one of the designated methods under the Environmental Noise Regulations. Within this assessment procedure, Method 2 was used in the Dublin City Council region. Method 1 for conversion of L10, 18Hr to Lden and Lnight,(outlined in the TRL Project report PR/SE/451/02), in relation to low flow roads at night, was found to be unsuitable.

5. Input Data Requirements of CRTN – Road Source Noise Model

The information required for the source emission model for road traffic is specific to each method of assessment. The CRTN inputs are listed below. The information is required for each road section for an assessment using the adapted UK CRTN method:-

Road centreline locations, along with data for:

- Traffic volume, %HGVs, and mean vehicle speed; expressed as an annual average day, evening and night traffic flow;
- Direction of vehicle flow;
- Road width;
- Road surface type;
- Texture depth;
- Road gradient;
- Road classification;

6. Data Sources

The Environmental Noise Directive requires that data should not be more than 3 years old. All data sets used in the model were less than a year old with the most up-to-date dataset being the An Post 'Geodirectory' containing address point and building use information. The release version for 1st half of 2016 was used for this round of mapping. The model infrastructure datasets for Buildings, Road Centre lines, Contours and Green areas were supplied by OSI under licence and dated from the first half of 2016. Additional more up to date data was added to the building data set arising from survey work carried out. Dublin City Council used their traffic management system (SCATS) to produce annual hourly traffic volumes. The percentage of heavy goods vehicles (HGV) was estimated for those roads that did not have manual HGV count information. This estimation was based on comparing roads with similar profiles which had the information required.

7. Results

7.1 Results of Calculations

Table 1 sets out the population exposures to sound from traffic sources, both from all the roads and the major roads within the Dublin City Council area. Figures 1 - 8a are colour coded 'Noise Maps', indicating the various sound bands throughout the various areas within Dublin.

For the purpose of the Noise Action Plan for the Agglomeration of Dublin, which is to be revised in 2018, limits are set out as to what sound emissions are desirable and undesirable. It indicates that a night time level greater than 55 decibels and a daytime level greater than 70 decibels is undesirable. It identifies areas with desirable low sound levels as those areas with a night time level less than 50 decibels and/or a daytime level less than 55 decibels. Maps displaying areas exposed to these levels can be found in Figures 36 - 37.

From *Table 1* it can be calculated that 49% of the population are exposed to sound levels from traffic sources below a day time level of 55dB(A) as opposed 53% in 2012. Just over 68% of the population are being exposed to night time levels below 50dB(A) as opposed to 69% in 2012. Approximately 22% of the population are being exposed to undesirable night time sound levels of greater than 55dB(A) compared to 24% in 2012. And just under 5% are being exposed to day time sound levels above 70dB(A) – the same as 2012.

Rounding up or down to the nearest '100' of population in each decibel band, causes an over or under estimation of the total true population. However this 'rounding' is a requirement of the END and the 'error' is not considered significant. The population statistics are calculated by dividing the total population in each DED by the number of 'lived in' residential dwellings in the corresponding DED, which results in the average number of people living at each residential address point in each DED. The use of small area population statistics may marginal improve the robustness of these address point averages, but were not available before the publication date of this report.

Estimated Total Number of People (in hundreds) in relevant 5dB bands

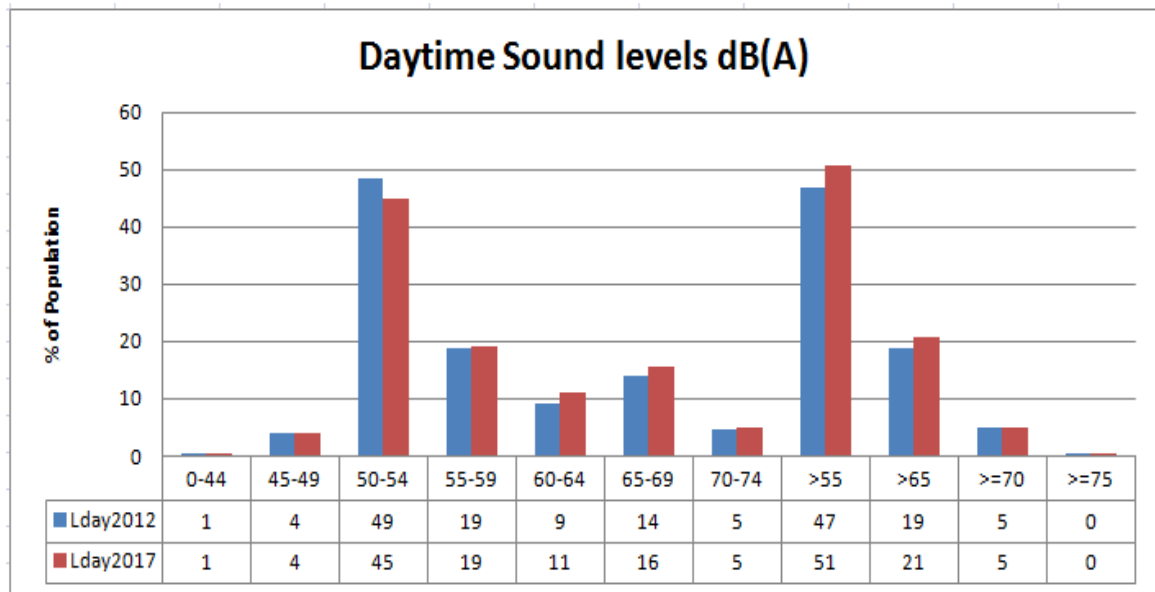
All Road Sources Dublin City Council in dB(A)	Lden 24Hr All Road Values	Lday Day All Road Values	Levening Evening All Road Values	Lnight Night All Road Values	No. Of QFs All Road QF	Lden QF No of People with Quiet Façade(QF) All Road	Lnight QF No of People with Quiet Façade All Road	Lden Area Area Exposed All Road	No. of Dwellings Exposed (Lden) All Road
0-44	2200	3000	5100	319000	0	0	100		1100
45-49	16600	21600	25300	57700	0	0	300		7500
50-54	210200	248300	264900	54600	0	100	8300		89200
55-59	139300	105300	96300	83300	100	200	30800		61800
60-64	48400	61000	72600	35100	1200	2700	20900		21200
65-69	92700	87100	73700	4800	15400	32400	3000		42300
70-74	42400	27100	16000	100	12300	26200	0		19700
>55	324700	281200	258700	123200	29900	63200	54500	43.25	145900
>65	137600	115200	90100	4800	28600	60300	2900	11.48	63200
>=70	45100	28300	16700	0	13200	28000	0		21000
>=75	2700	1300	600	0	900	1800	0	0.36	1300
Total	554500	554700	554500	554600	29900	63400	63400		244100
Major Road Sources Dublin City Council in dB(A)	Lden 24Hr Major Road Values	Lday Day Major Road Values	Levening Evening Major Road Values	Lnight Night Major Road Values	No. Of QFs Major Road QF	Lden QF No of People with Quiet Façade(QF) Major Road	Lnight QF No of People with Quiet Façade Major Road	Lden Area Area Exposed Major Road	No. of Dwellings Exposed (Lden) Major Road
0-44	208900	232800	271800	428800	0	0	700		98500
45-49	130300	118100	102800	28500	0	0	1200		60000
50-54	73500	68600	56500	30600	200	400	13800		29900
55-59	36400	33100	27900	48200	200	700	33000		15300
60-64	21700	23800	30300	16300	1600	3400	12200		7700
65-69	51400	54200	50300	2100	15800	33800	1500		19100
70-74	30200	22800	14300	100	10500	22500	0		12600
>55	141700	134800	123300	66500	28800	61800	46500	23.02	55500
>65	83800	78000	65200	2200	27000	57800	1400	7.71	32500
>=70	32300	23900	15000	0	11300	24100	0		13400
>=75	2100	1200	600	0	800	1600	0	0.31	800
Total	554500	554600	554500	554600	29100	62400	62400		243900

Table 1

7.2 Comparison with 2012 Noisemaps

7.3 Daytime Sound levels

Chart 1



In 2012 most of the population in Dublin (53%) was exposed to sound levels from traffic below 55dB(A), which is the sound level set by the Dublin Noise Action as 'desirable'. In 2017 this dropped to 49%. The number of people above the 'undesirable' daytime level of 70dB(A) remained the same as 2012 at 5%. The majority of the Dublin population - at 45%, fall within the 50 – 54dB(A) daytime band, a drop of 4% on 2012.

7.4 Night-time Sound Levels

Chart 2

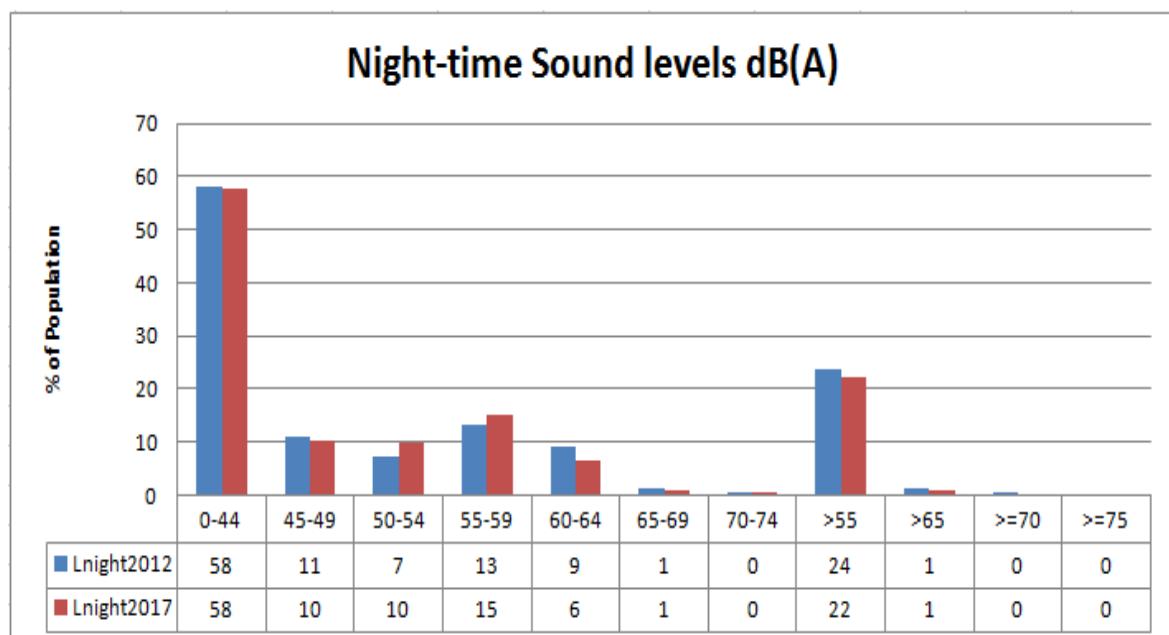
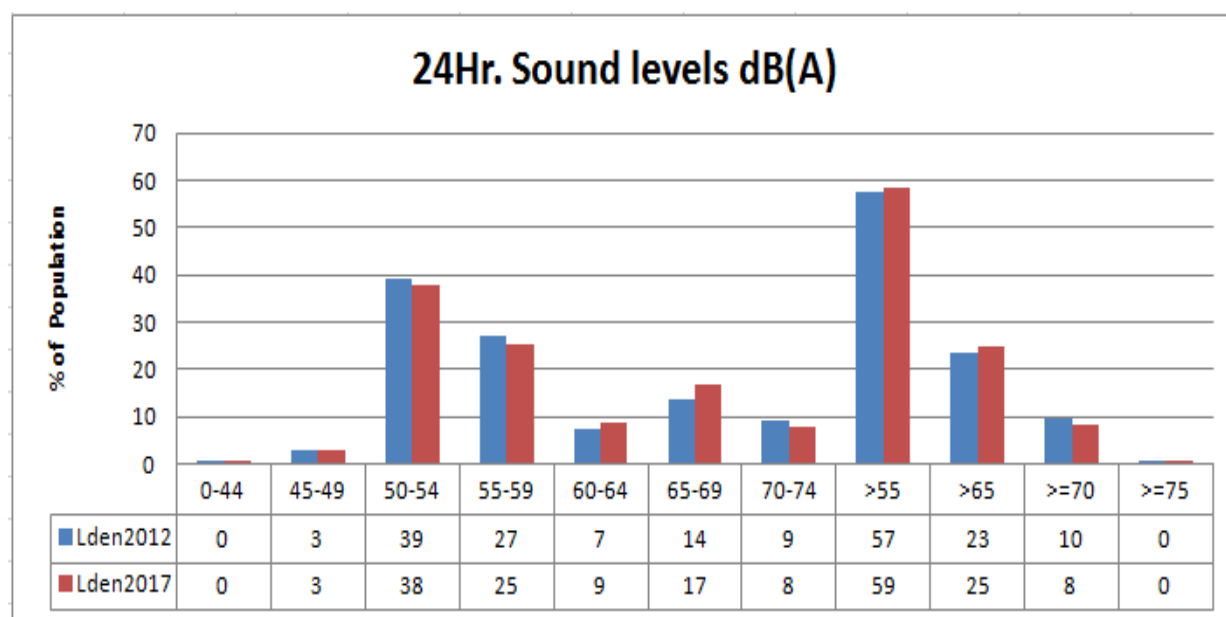


Chart 2 indicates that night time sound levels haven't changed significantly between 2012 and 2017 with a reduction of 1% in 2017 to 68% in the number of people within the 'desirable' night time sound level category. There was a slight reduction in 2017 of 2% in the number of people in the 'undesirable' night time sound level category to 22% of the population. The majority of the Dublin population - at 58%, fall within the 0– 44dB(A) night time band, similar to 2012.

7.5 24Hour Sound Levels

Chart 3



The 24 hour calculations indicate that there has been a slight reduction of 2% in the number of people in the 'greater than 70dB(A)' band, but an increase of 3% ,to 17% in 65 – 69 dB(A) band. The majority of the Dublin population - at 38%, fall within the 50 - 54dB(A) Lden band, 1% down on 2012.

8. Summary and Conclusions

The data on noise maps is required to be forwarded to the European Commission before the end of December 2017. The Noise Maps' show colour coded areas in Dublin based on sound levels, in 5 bands, incrementing in 5 decibels. The official Night time band starts at 50 decibels and the Daytime band starts at 55 decibels. The EU Directive does not give an indication as to what level of sound is acceptable. This is left to each member state. At this point in time, Ireland does not have any statutory limit values, as is the case for air pollution. In the absence of guidance, one could assume that the closer the calculated sound level is to the highest band of sound set out in the Directive, the more unacceptable it is. And conversely, the closer the calculated sound level is to the lowest sound level band, set out in the Directive, the more acceptable it is.

For the purpose of the Noise Action Plan for the Agglomeration of Dublin, which is to be revised in 2018, limits are set out as to what sound emissions are desirable and undesirable. It indicates that a night time level greater than 55 decibels and a daytime level greater than 70 decibels is undesirable. It identifies areas with desirable low sound levels as those area with a night time level less than 50 decibels and/or a daytime level less than 55 decibels.

There are two categories of sound sources to be mapped - 'All Roads' and 'Major Roads'. Dublin City Council is the designated body for producing 'noise maps' for these sources. The production of maps for 'Rail' source sound emissions falls to 'Irish Rail' and the TII - being the designated noise mapping bodies for these sources. The Irish Rail maps are being revised along with the population exposure statistics which will be amended to take into account the change in population identified by the 2016 Census. TII will revise the 'LUAS' maps due to the additional extension added to both the Red and Green lines since the last round of mapping in 2012. No maps were produced for Industrial point sources as this category has been found to have no strategic impact on overall sound levels within the Dublin City Council region.

Full details of population exposure to sound from traffic sources are given in *Table 1*. Overall there have been small changes in the number of people being exposed to undesirable sound levels, particularly at night – with a 2% reduction. However there is still a tranche of people (22%) who are being exposed to undesirable night-time sound levels. These maps and statistics will guide the revision of the Dublin Agglomeration Noise Action Plan December 2013 - Nov. 2018.

The 2017 Noise Maps can be found on the Dublin City Council website at the following address;-
<http://www.dublincity.ie/WaterWasteEnvironment/NoiseMapsandActionPlans/Pages/default.aspx>

Appendix A:

Glossary of acoustic and technical terms

Term\Definition

- **Agglomeration**- Major Continuous Urban Area as set out within the Regulations
- **CRTN** - The Calculation of Road Traffic Noise 1988. The road traffic prediction methodology published by the UK, Department of Transport.
- **dB** - Decibel
- **EC** - European Commission
- **END** - Environmental Noise Directive (2002/49/EC)
- **GIS**- Geographic Information System
- **LEQ** – Average sound level measured\calculated over a specified duration, outputted in decibels (dB).
- **Major Roads** – Roads with more than 3,000,000 vehicle passes per year
- **QF** – Quiet Facade
- **Sound Bands** - Areas lying between contours of the following levels (dB):-
 - Lden <55, 55 – 59, 60 – 64, 65 – 69, 70 – 74, 75
 - Lday <55, 55 – 59, 60 – 64, 65 – 69, 70 – 74, 75
 - Levening <55, 55 – 59, 60 – 64, 65 – 69, 70 – 74, 75
 - Lnight <45, 45-49, 50 – 54, 55 – 59, 60 – 64, 65 – 69, 70The assessment and reporting of the 45 – 49dB band for Lnight is optional under the Regulations
- **Sound Levels** - Free-field values of Lden, Lday, Levening, Lnight, and LA10,18h at a height of 4m above local ground level
- **Sound Level, Lday** - Ld (or Lday) = LAeq,12h (07:00 to 19:00)
- **Sound Level (Levening)**, - Evening = LAeq,4h (19:00 to 23:00)
- **Sound Level (Lnight)**, - Night = LAeq,8h (23:00 to 07:00)
- **Sound Level (Lden), Day/Evening/Night** - A combination of Lday, Levening and Lnight as follows:
$$L_{den} = 10 * \log \frac{1}{24} \{ 12 * 10^{((L_{day})/10)} + 4 * 10^{((Levening+5)/10)} + 8 * 10^{((L_{night}+10)/10)} \}$$
- **Sound Level, LA10,18h** - LA10,18h = LA10,18h (06:00 to 24:00)
- **WHO** – World Health Organisation

Noise Maps 2017

Dublin City

Fig.1

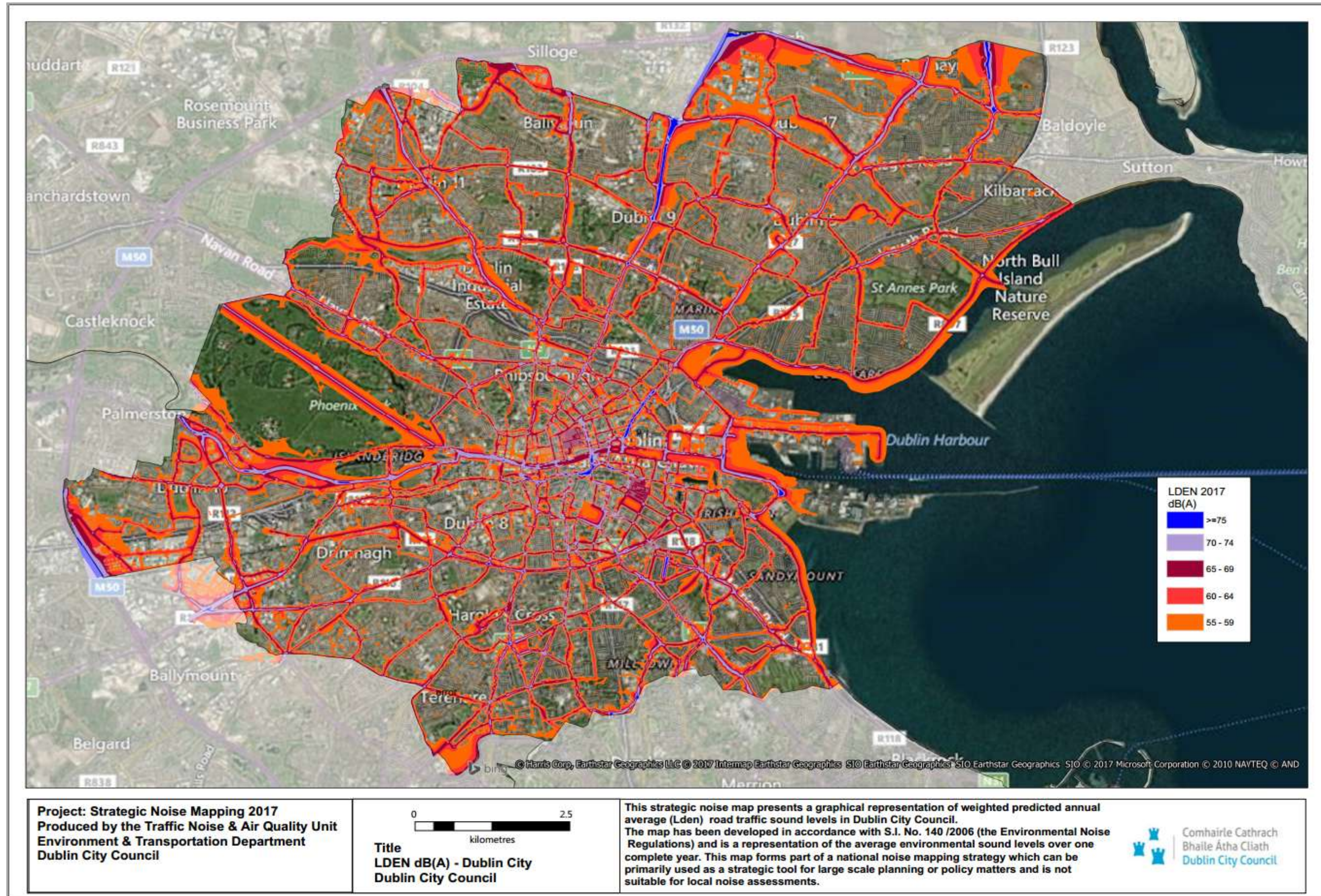


Fig.2

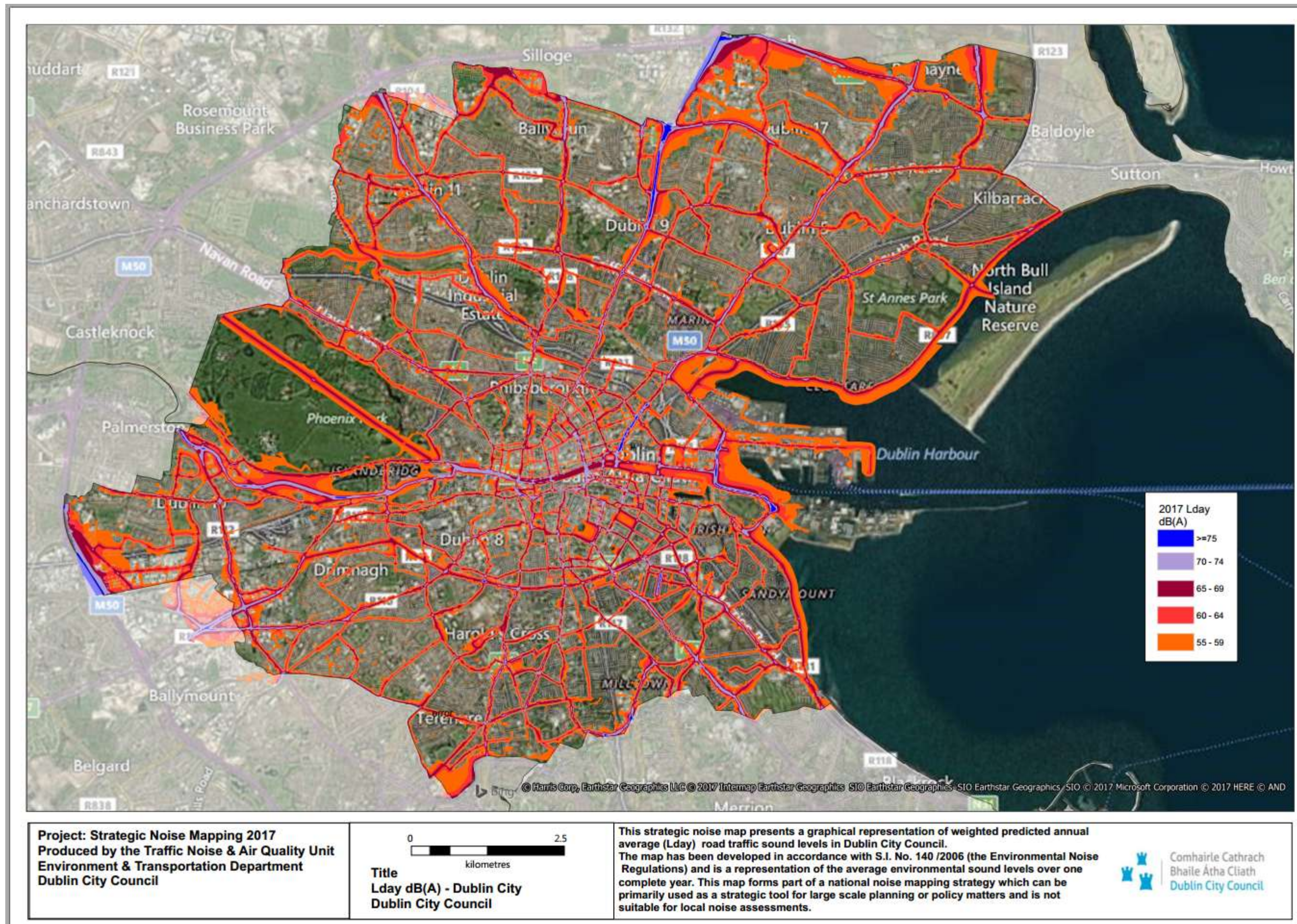


Fig.3

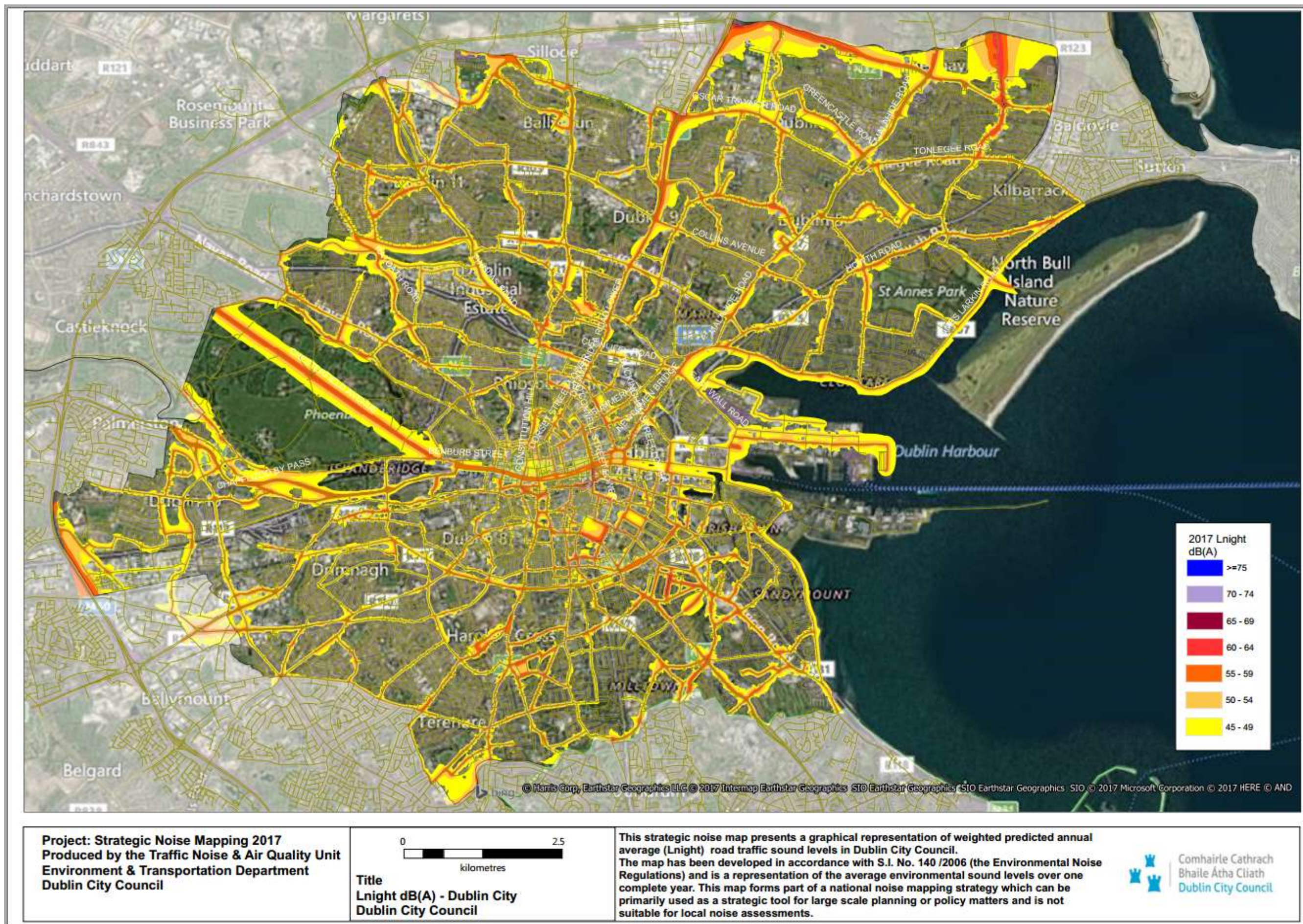


Fig.4



Project: Strategic Noise Mapping 2017
Produced by the Traffic Noise & Air Quality Unit
Environment & Transportation Department
Dublin City Council

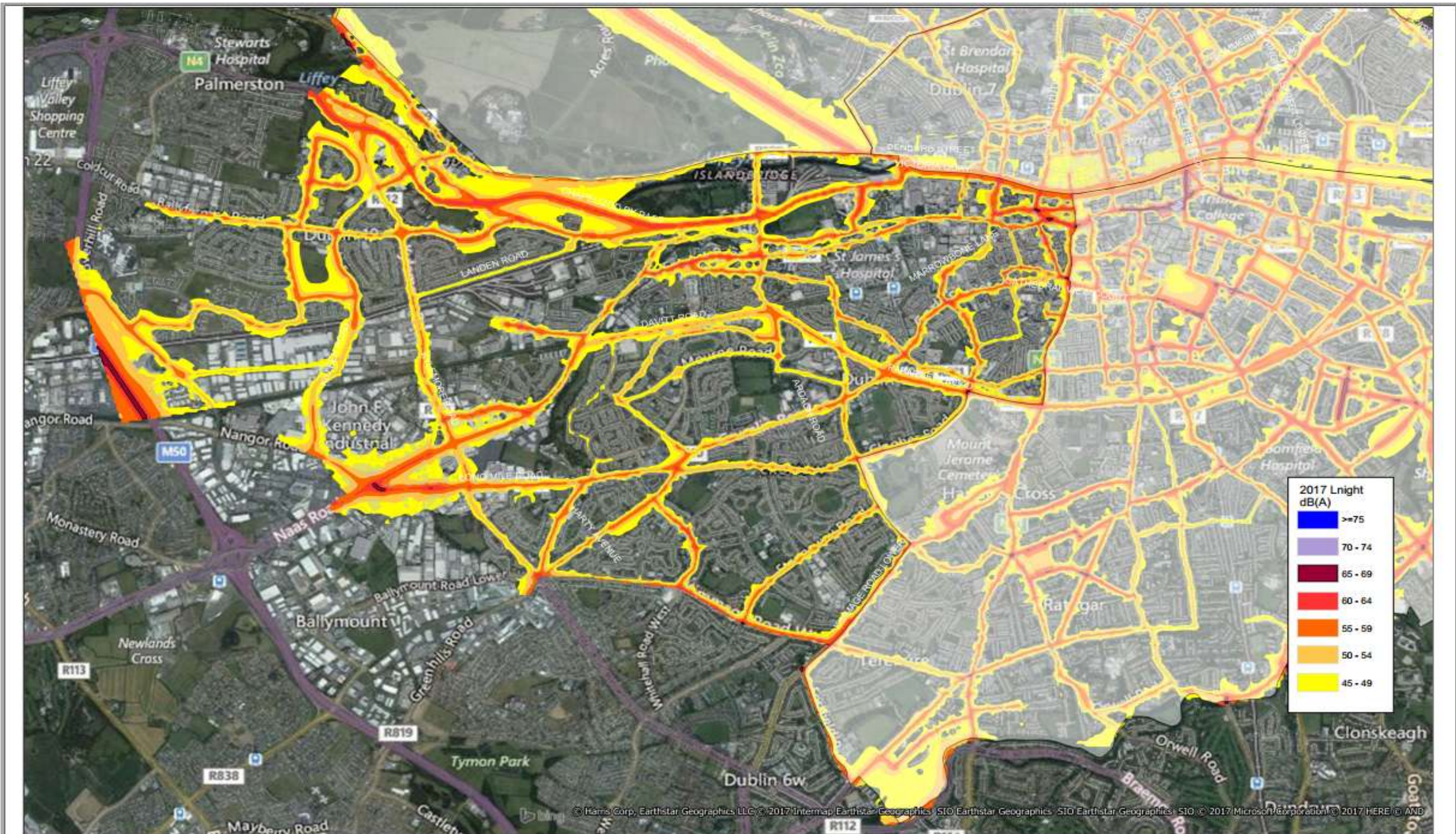
0 1
kilometres

Title
Lday dB(A) - South Central Area
Dublin City Council

This strategic noise map presents a graphical representation of weighted predicted annual average (Lday) road traffic sound levels in Dublin City Council. The map has been developed in accordance with S.I. No. 140 /2006 (the Environmental Noise Regulations) and is a representation of the average environmental sound levels over one complete year. This map forms part of a national noise mapping strategy which can be primarily used as a strategic tool for large scale planning or policy matters and is not suitable for local noise assessments.

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Fig.4a



Project: Strategic Noise Mapping 2017
Produced by the Traffic Noise & Air Quality Unit
Environment & Transportation Department
Dublin City Council

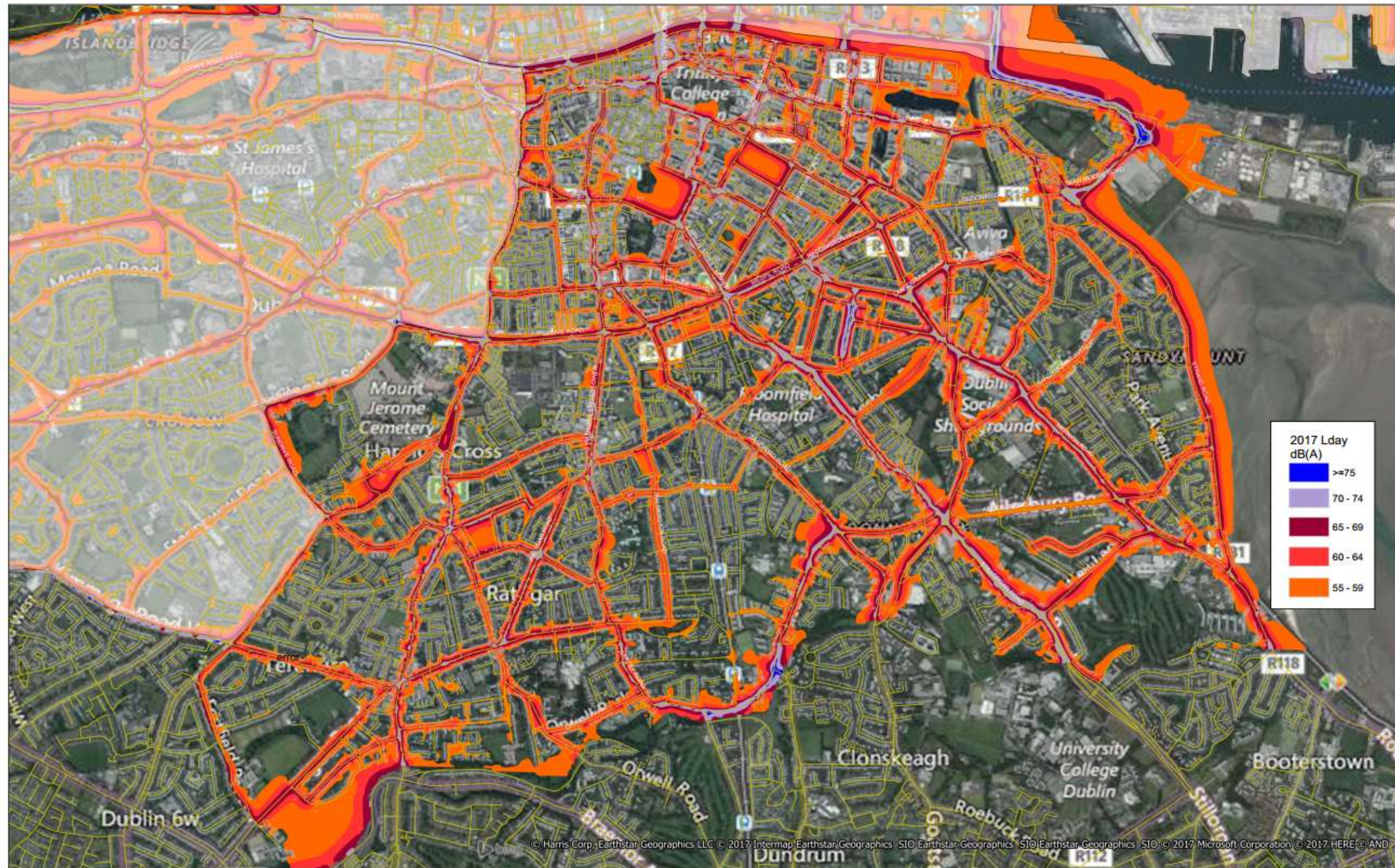
Title
Lnight dB(A) - South Central Area
Dublin City Council



This strategic noise map presents a graphical representation of weighted predicted annual average (Lnight) road traffic sound levels in Dublin City Council. The map has been developed in accordance with S.I. No. 140 /2006 (the Environmental Noise Regulations) and is a representation of the average environmental sound levels over one complete year. This map forms part of a national noise mapping strategy which can be primarily used as a strategic tool for large scale planning or policy matters and is not suitable for local noise assessments.

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Fig.5



Project: Strategic Noise Mapping 2017
Produced by the Traffic Noise & Air Quality Unit
Environment & Transportation Department
Dublin City Council

0 1
kilometres
Title
Lday dB(A) - South East Area
Dublin City Council

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Dublin City Council

Fig.5a

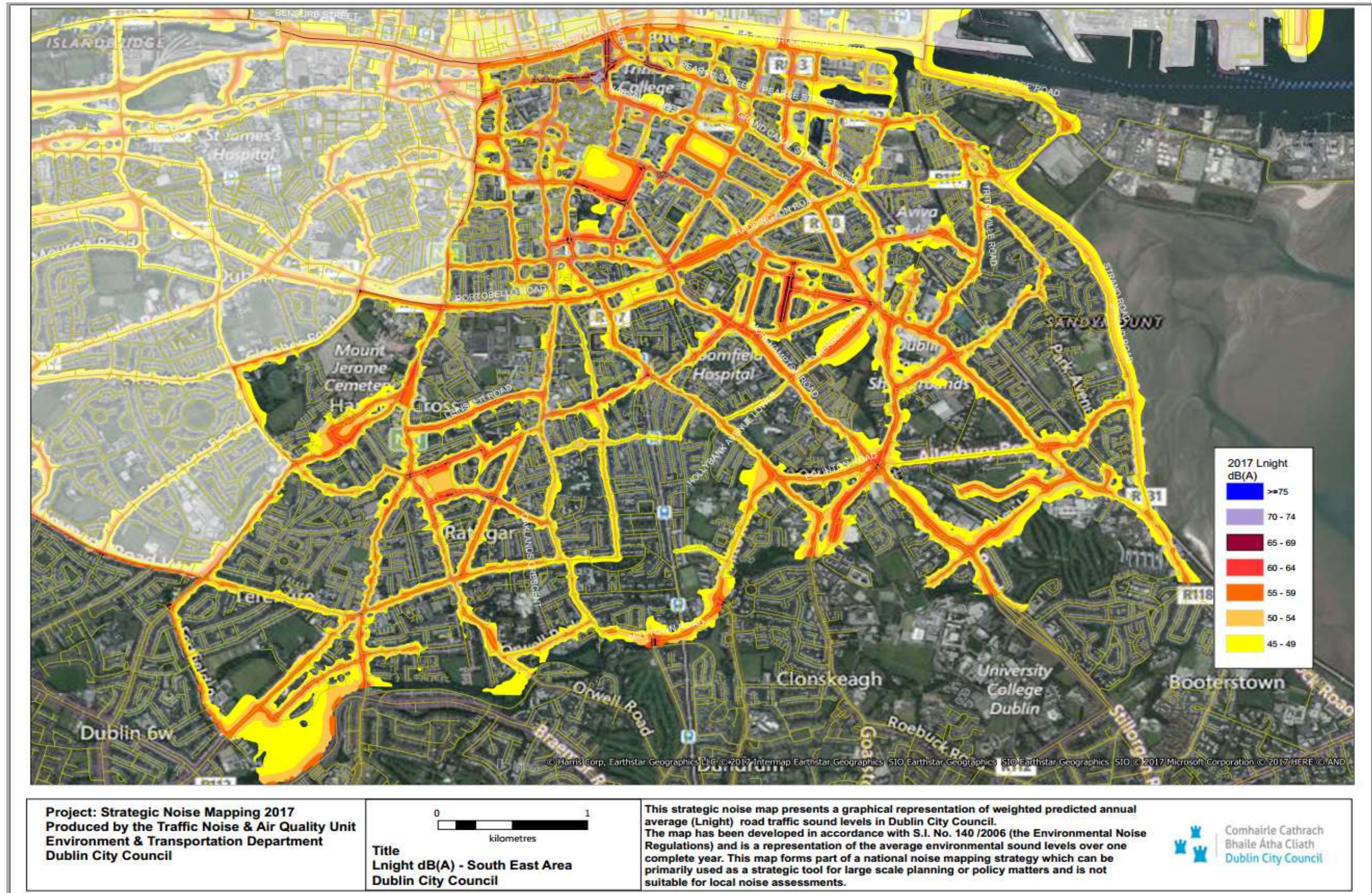


Fig.6



Project: Strategic Noise Mapping 2017
Produced by the Traffic Noise & Air Quality Unit
Environment & Transportation Department
Dublin City Council.

0 1
kilometres

Title
Lday dB(A) - North Central Area
Dublin City Council

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 Comhairle Cathrach
Bhaile Átha Cliath
Dublin City Council

Fig.6a

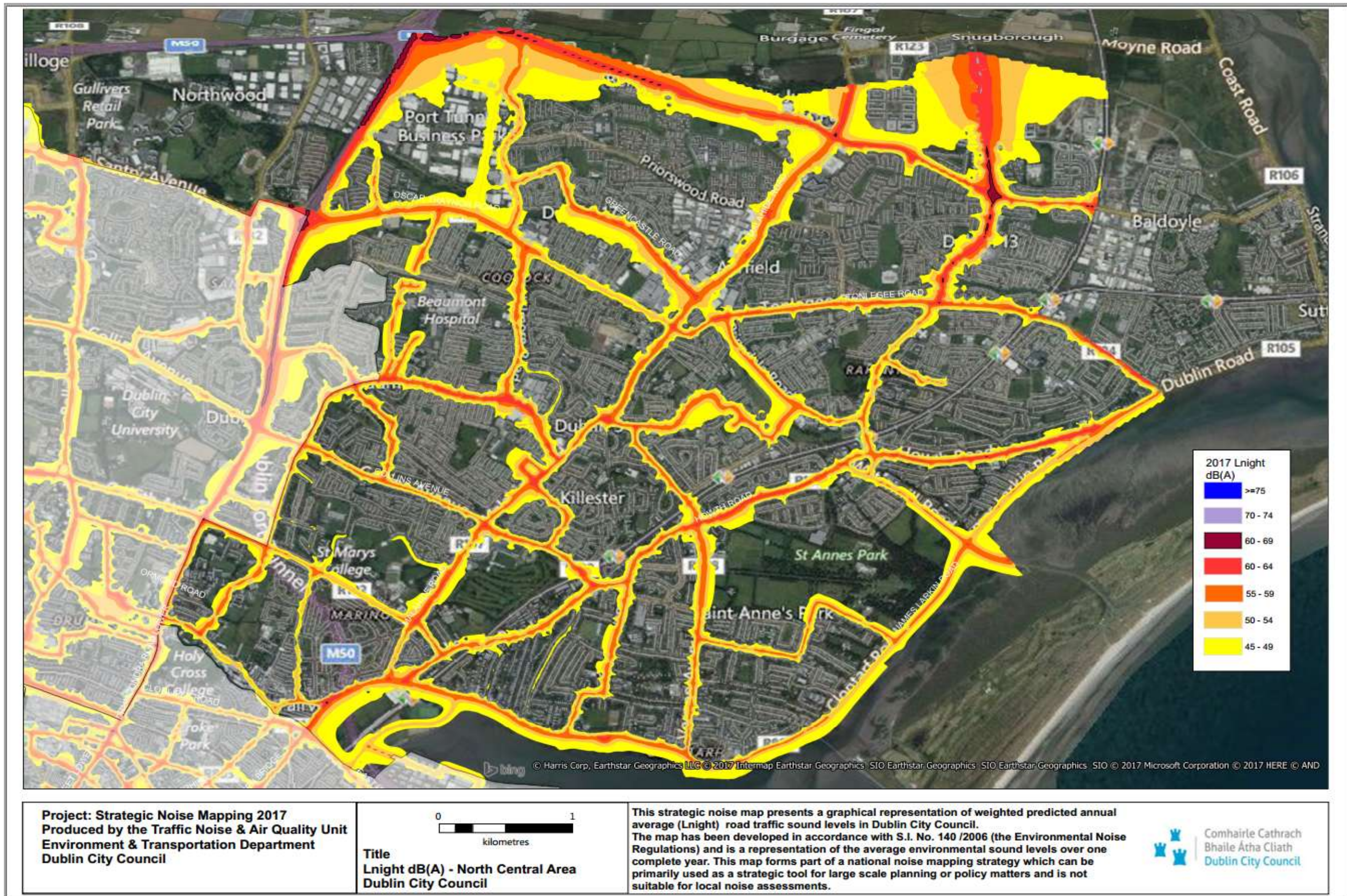
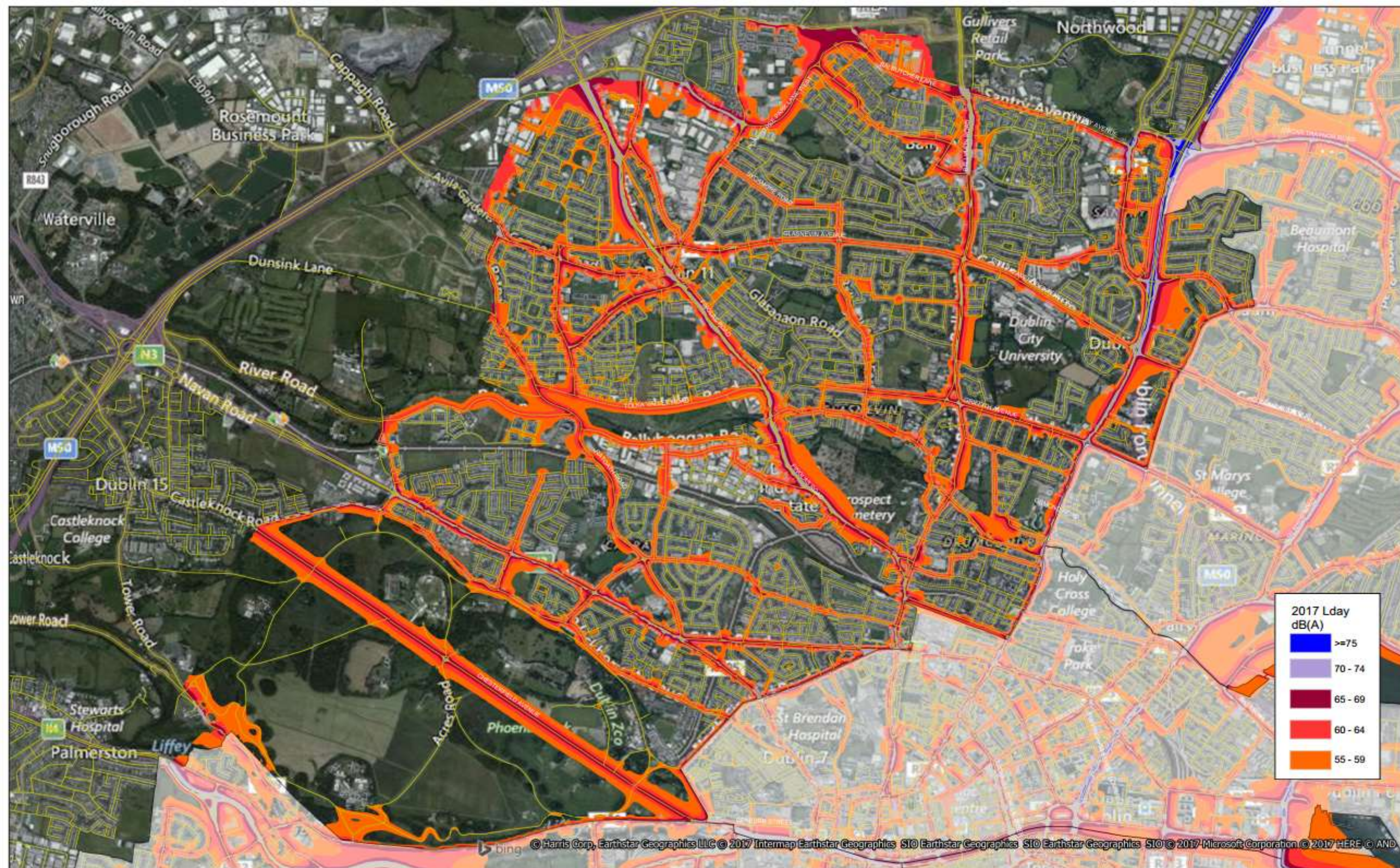


Fig.7



Project: Strategic Noise Mapping 2017
Produced by the Traffic Noise & Air Quality Unit
Environment & Transportation Department
Dublin City Council

0 2
kilometres

Title
Lday dB(A) - North West Area
Dublin City Council

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 **Comhairle Cathrach**
Bhaile Átha Cliath
Dublin City Council

Fig.7a

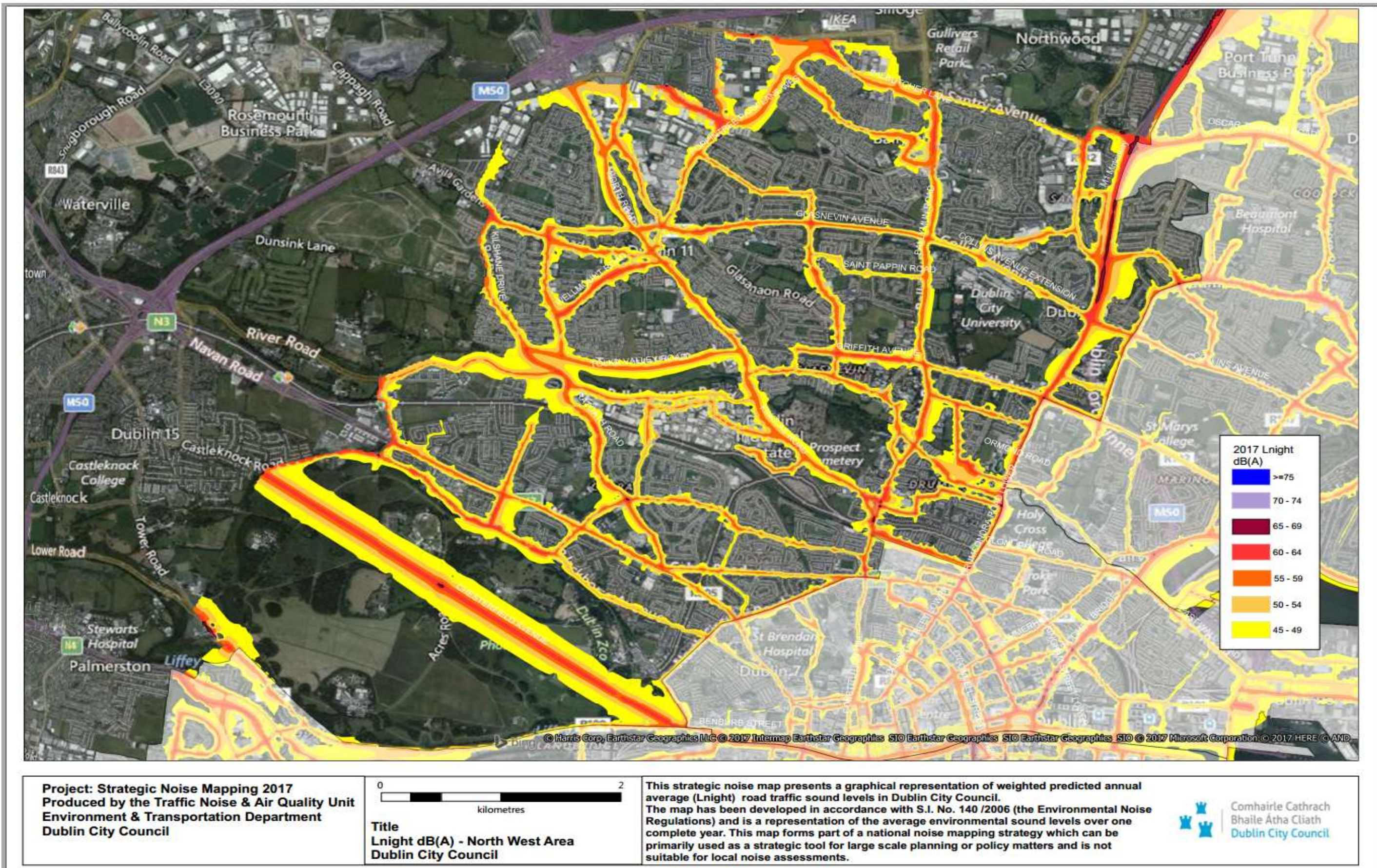
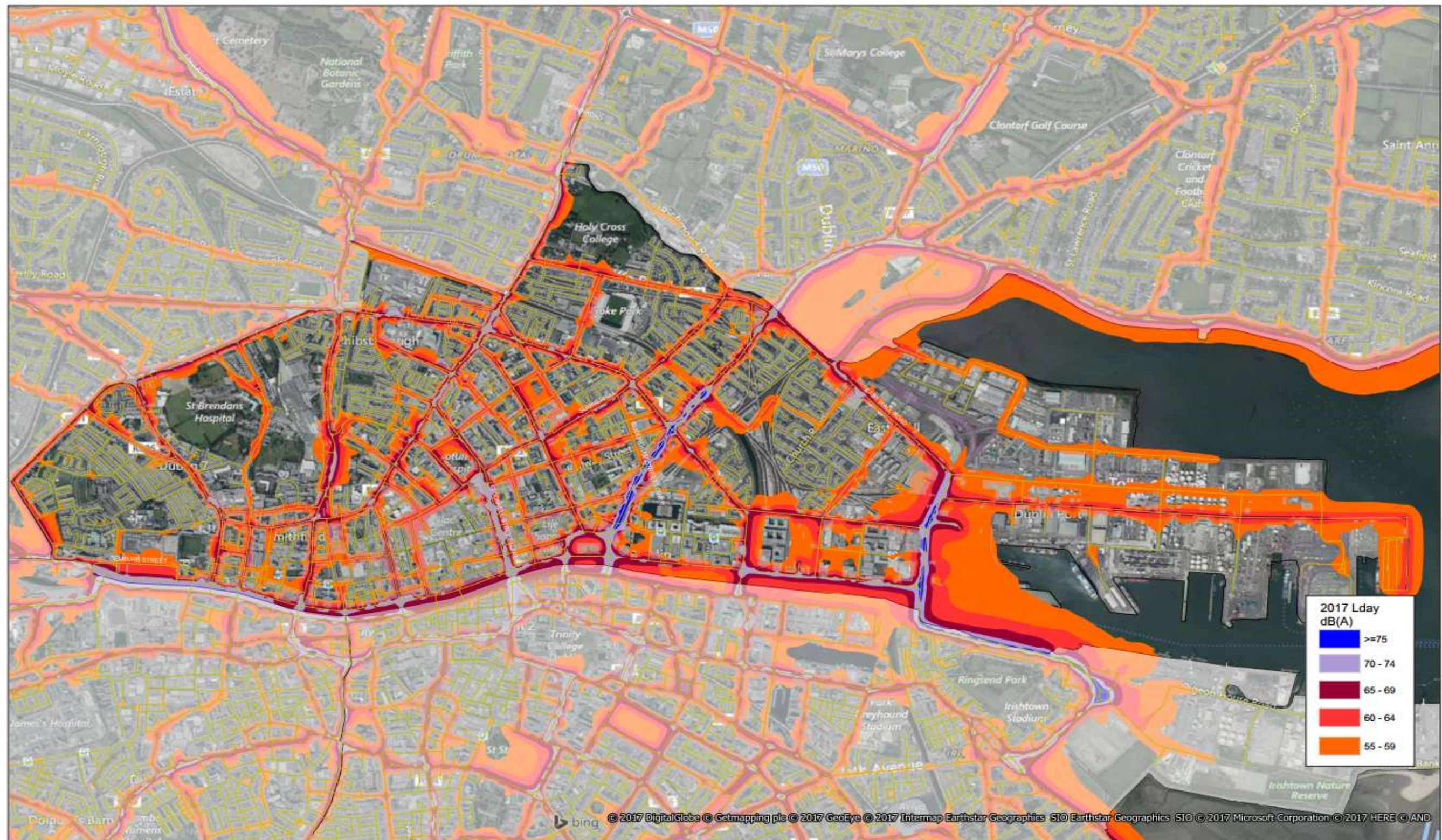


Fig.8



Project: Strategic Noise Mapping 2017
Produced by the Traffic Noise & Air Quality Unit
Environment & Transportation Department
Dublin City Council

0 1
kilometres
Title
Lday dB(A) - Central Area
Dublin City Council

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 **Comhairle Cathrach**
Bhaile Átha Cliath
Dublin City Council

Fig.8a

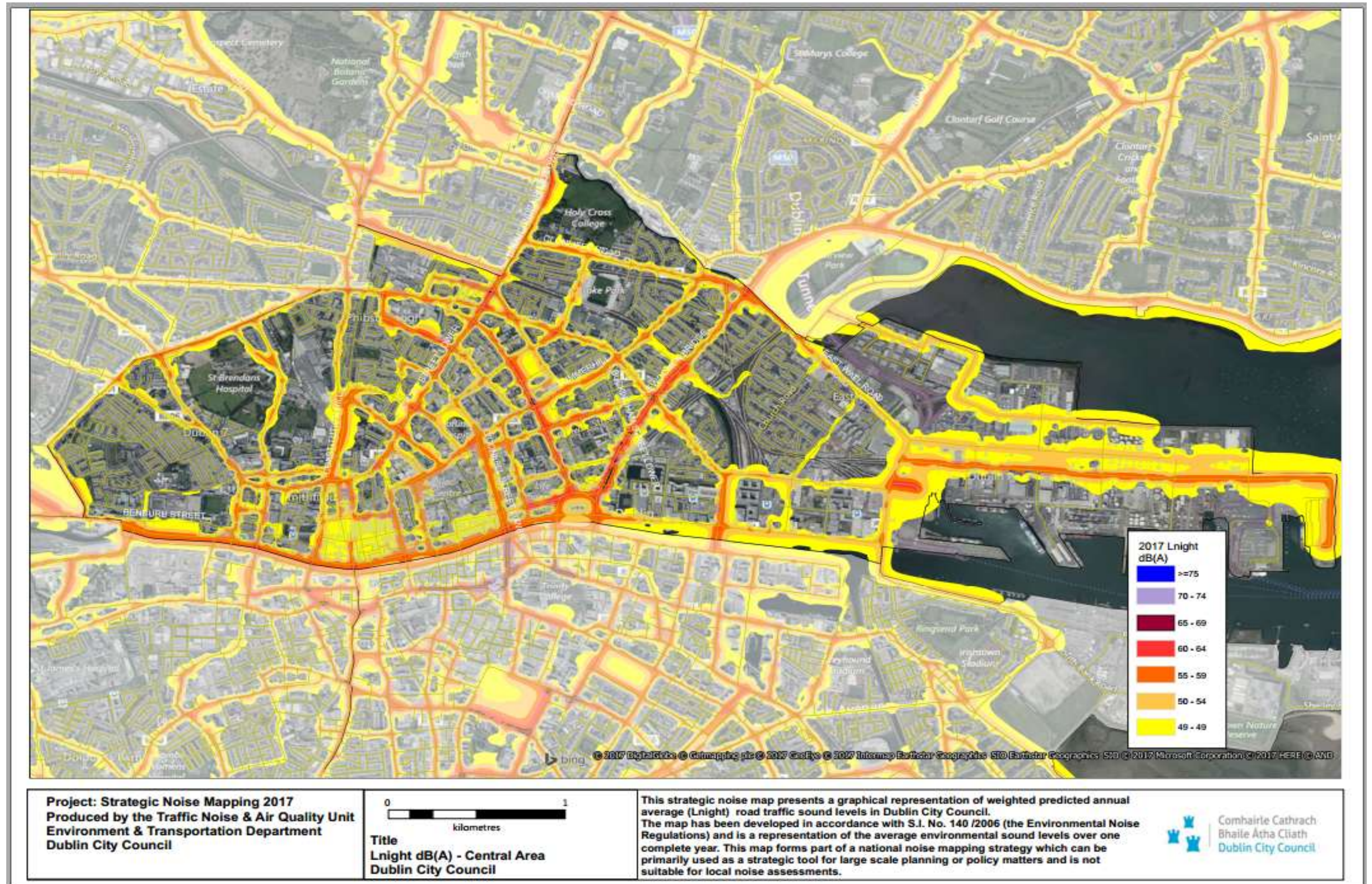


Fig.9

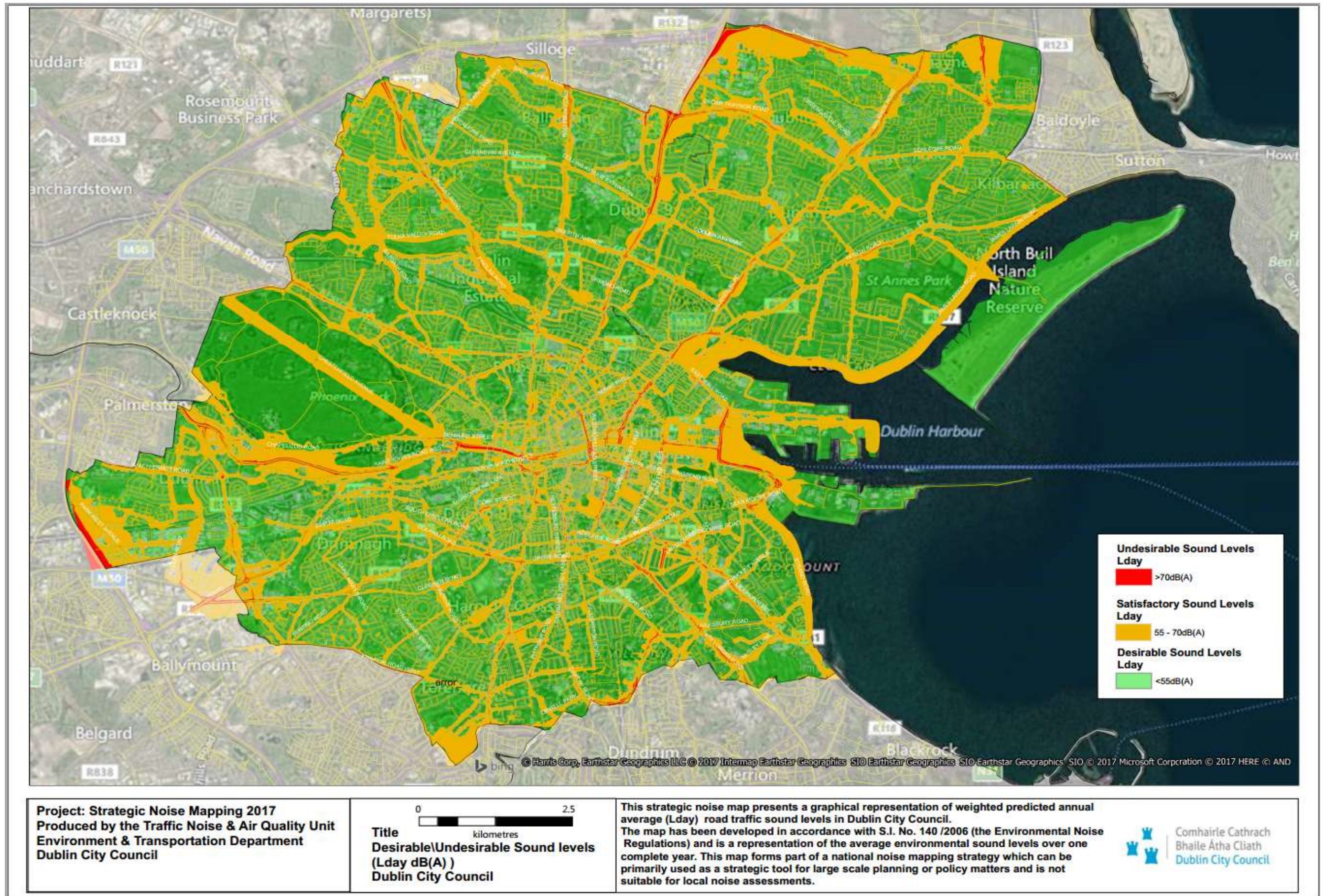
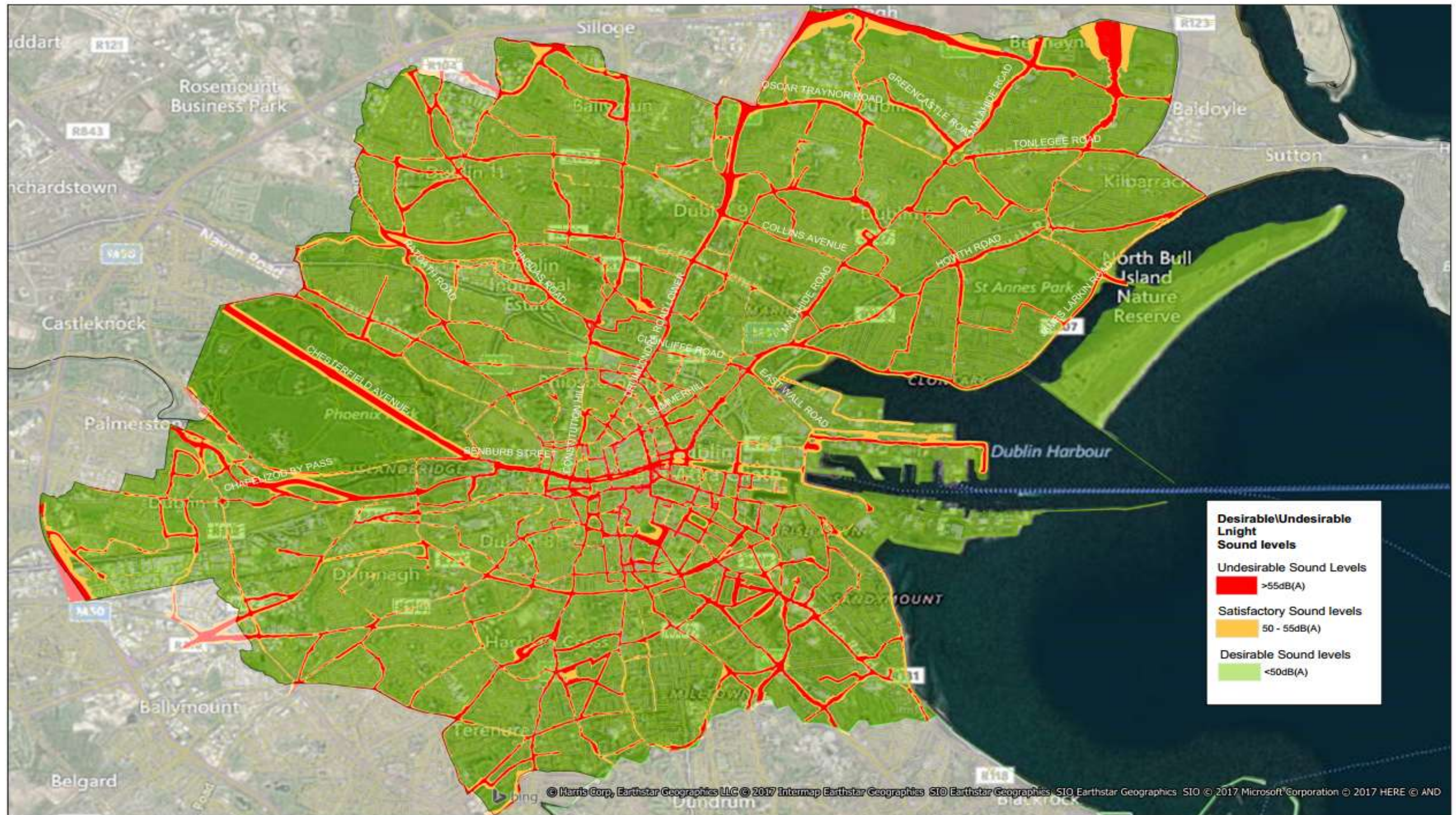


Fig. 10



Project: Strategic Noise Mapping 2017
Produced by the Traffic Noise & Air Quality Unit
Environment & Transportation Department
Dublin City Council

0 2.5
 kilometres
Title
Desirable/Undesirable Lnight dB(A)
Dublin City Council

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 **Comhairle Cathrach**
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Dublin City Council



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Bhaile Átha Cliath
Dublin City Council