

Merseytravel Clean Air Preliminary Options Study

Developing the Liverpool City Region Air Quality
Action Plan

Duncan Urquhart BSc(Hons) MSc Csci MIAQM

Objectives

Statutory requirements:

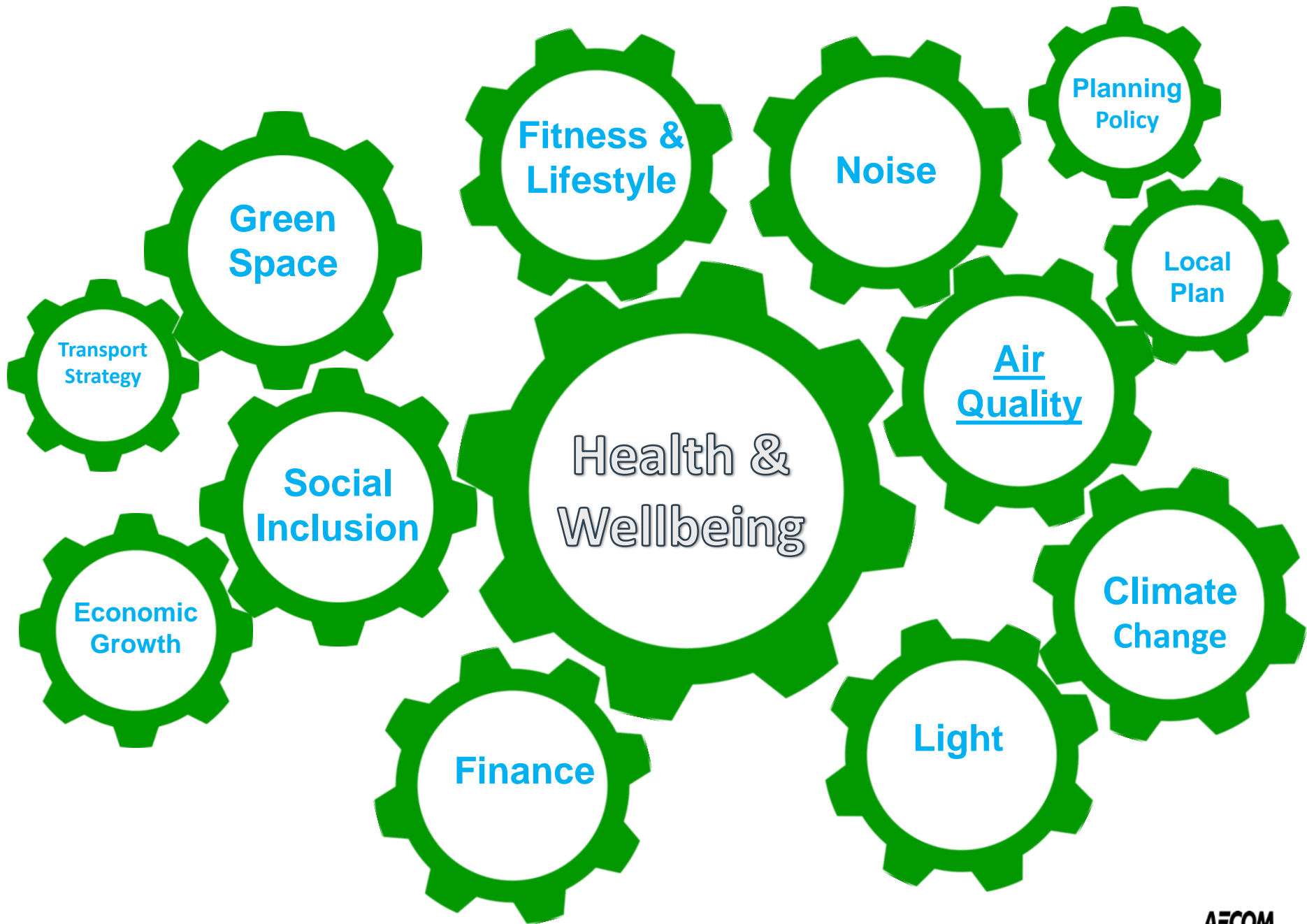
- National strategy is focused on
 - Relevant exposure
 - National modelling outcomes (PCM)
 - A plethora of guidance which can be challenging to apply (TG/PG16)
 - Policy overlaps (NPPF/PPGs)
 - Standard modelling approaches
 - National reporting and monitoring processes

The central concern is **Exposure**

Local needs:

- Review the PCM exceedance areas and incorporate them into the KPA
- Review the National Strategy approach to identify opportunities to integrate with the project, and where there may be conflicts.
 - E.g. areas of relevant exposure
 - There is a growing disparity between LAQM, the Defra national modelling approach and health effects

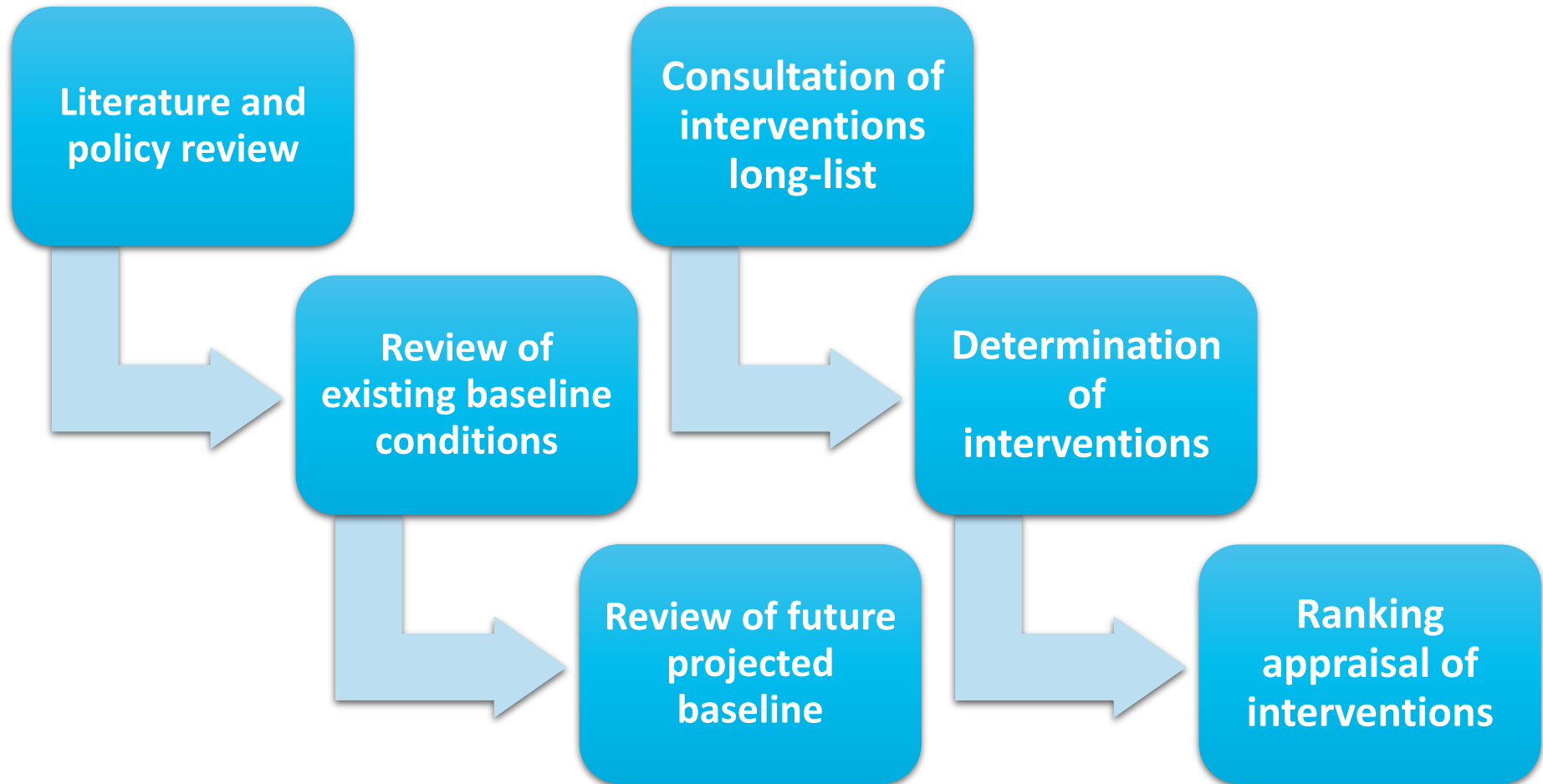
The key priority is **Health and Wellbeing**



Project Structure

Review

Implementation



The Liverpool City Region

Month, Day, Year

The Liverpool City Region

The Liverpool City Region is an economic and political area comprising:

- Liverpool
- Halton
- Knowsley
- Sefton
- St Helens
- Wirral

The Liverpool City Region Combined Authority was established in 2014 under the provisions of the Local Democracy, Economic Development and Construction Act 2009.

Membership of the CA comprised leaders of the six authorities and the local enterprise partnership.

The CA is represented by a Metropolitan Mayor



Baseline Review

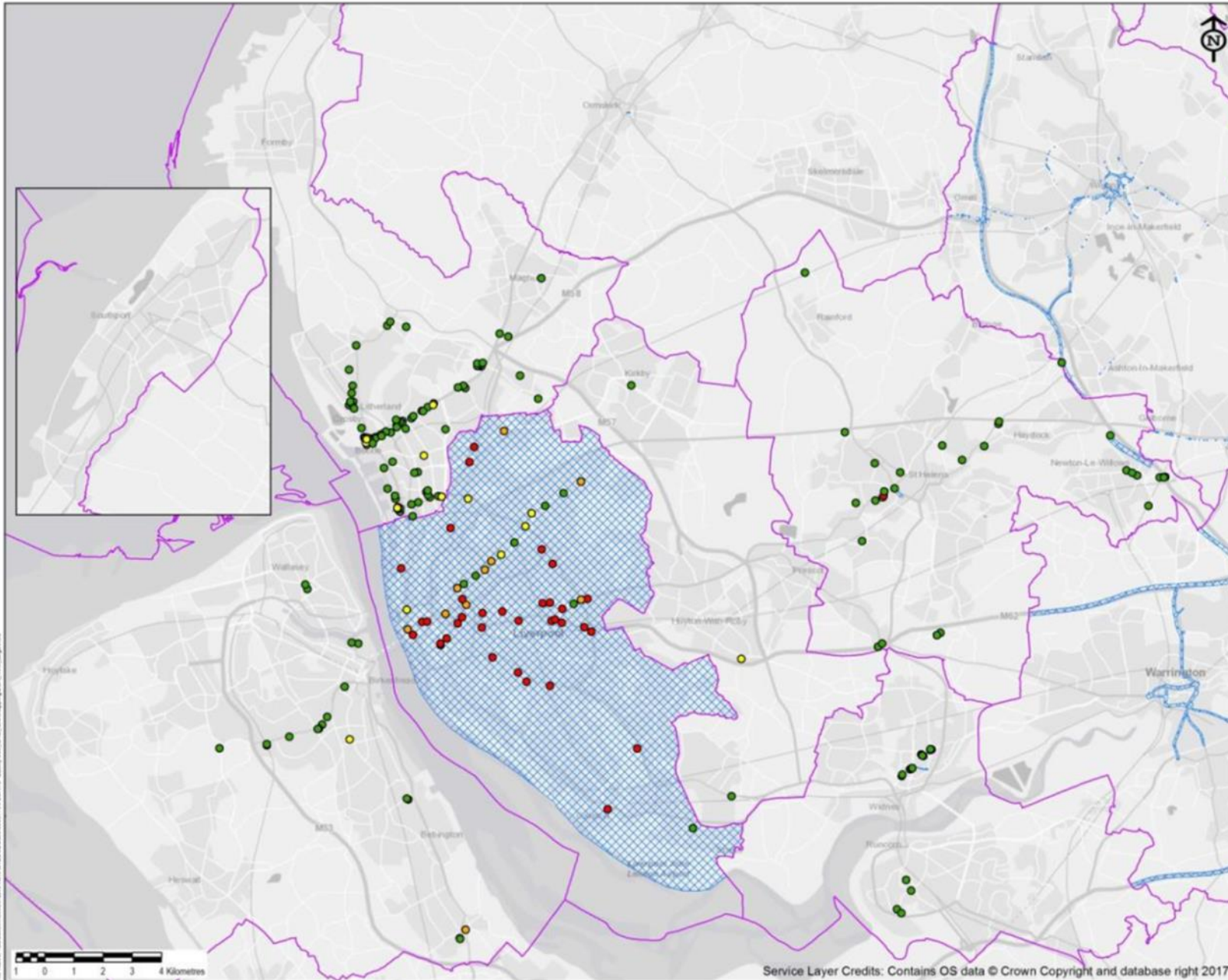
Local Air Quality

Review Existing Data

Screening Key Priority Areas

Economic Effects

Month, Day, Year



SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

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Legend

- Local Authority Boundary
- AQMA

Monitor Annual Mean NO₂, ug/m³

- <36
- 36 - 40
- 40 - 44
- > 44

Scale	1:50,000
North Arrow	True

FOR INFORMATION

Client: Liverpool City Region
 Project: AQMA
 Date: 15/02/2018

LIVERPOOL CITY REGION AIR QUALITY

BASELINE AIR QUALITY IN 2016

Designed	Drawn	Checked	Approved	Date
DM	DJ	TS	TS	15/02/2018

Project No: 10547484
 Scale: 1:50,000
 Date: 15/02/2018

Design Office

AECOM

15th Floor, 15th Floor, 15th Floor, 15th Floor, 15th Floor
 15th Floor, 15th Floor, 15th Floor, 15th Floor, 15th Floor
 15th Floor, 15th Floor, 15th Floor, 15th Floor, 15th Floor

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Baseline Review

Local Air Quality

Review Existing Data

Screening Key Priority Areas

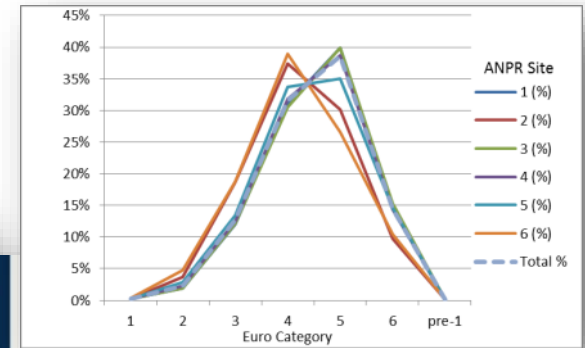
Economic Effects

Month, Day, Year

Using Existing Data

Existing information sources will be used with common tools:

- AirViro
- DfT data
- LA monitoring data
- Defra PCM
- Population and demographics
- Transport polices
- Development aspirations



Alternative fuels strategy for the Liverpool City Region
Final report for

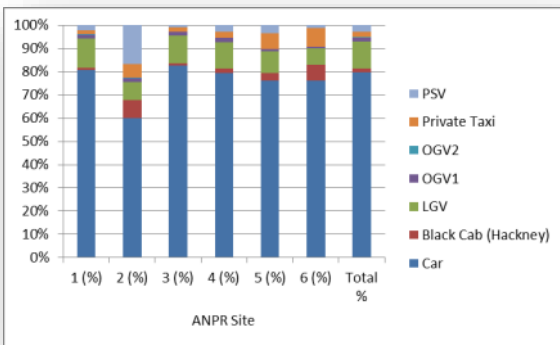
LCR Freight and Logistics Strategy

Technical Annex 7: Responding to Social Trends

October 2016
Merseytravel

Liverpool City Region Combined Authority

Plan for Growth

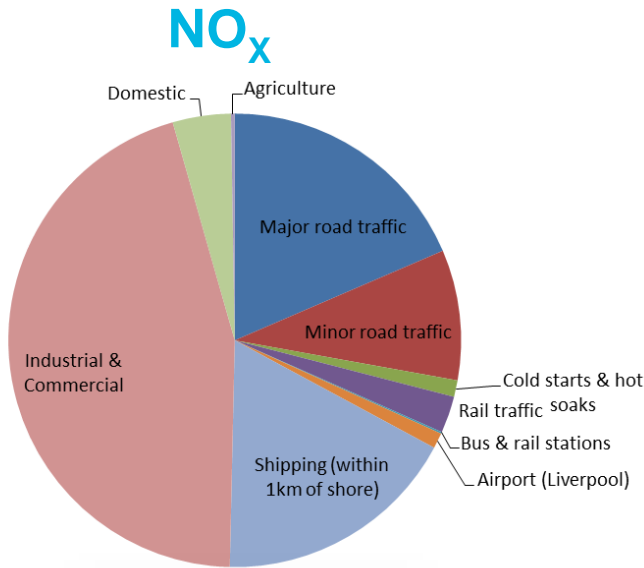


LCR Freight and Logistics Strategy

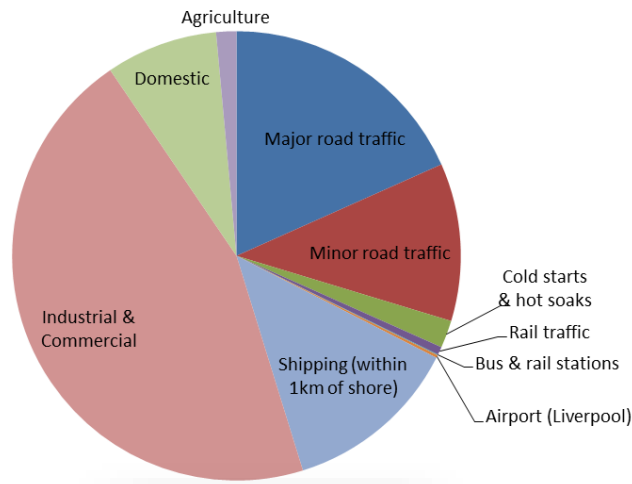
Strategy Report - Draft for Consultation

Emission Sources in LCR

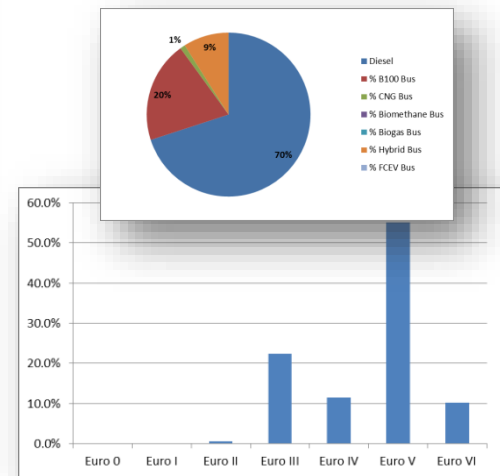
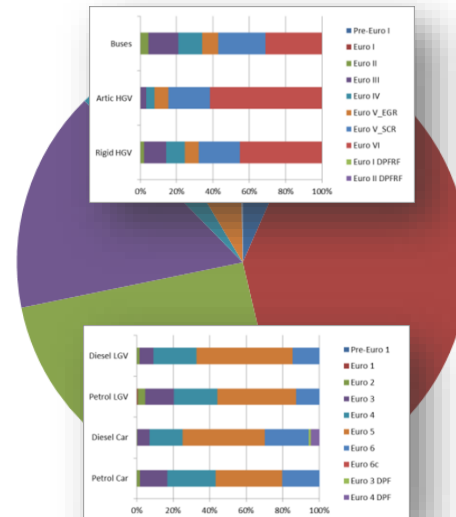
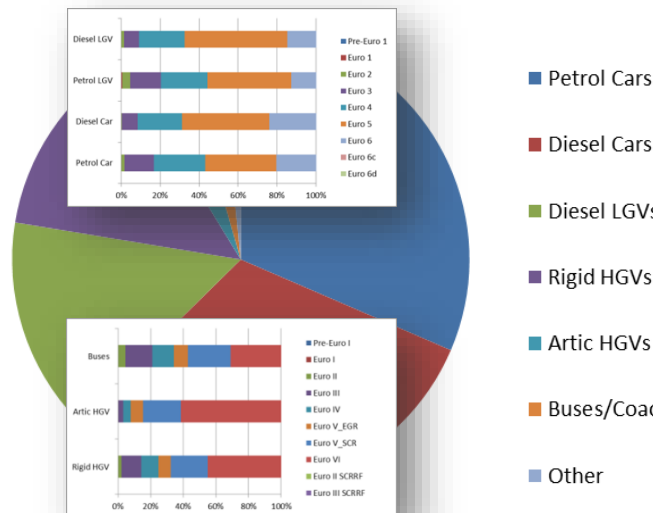
All Sources



PM₁₀



Transport Sources



Baseline Review

Local Air Quality

Review Existing Data

Screening Key Priority Areas

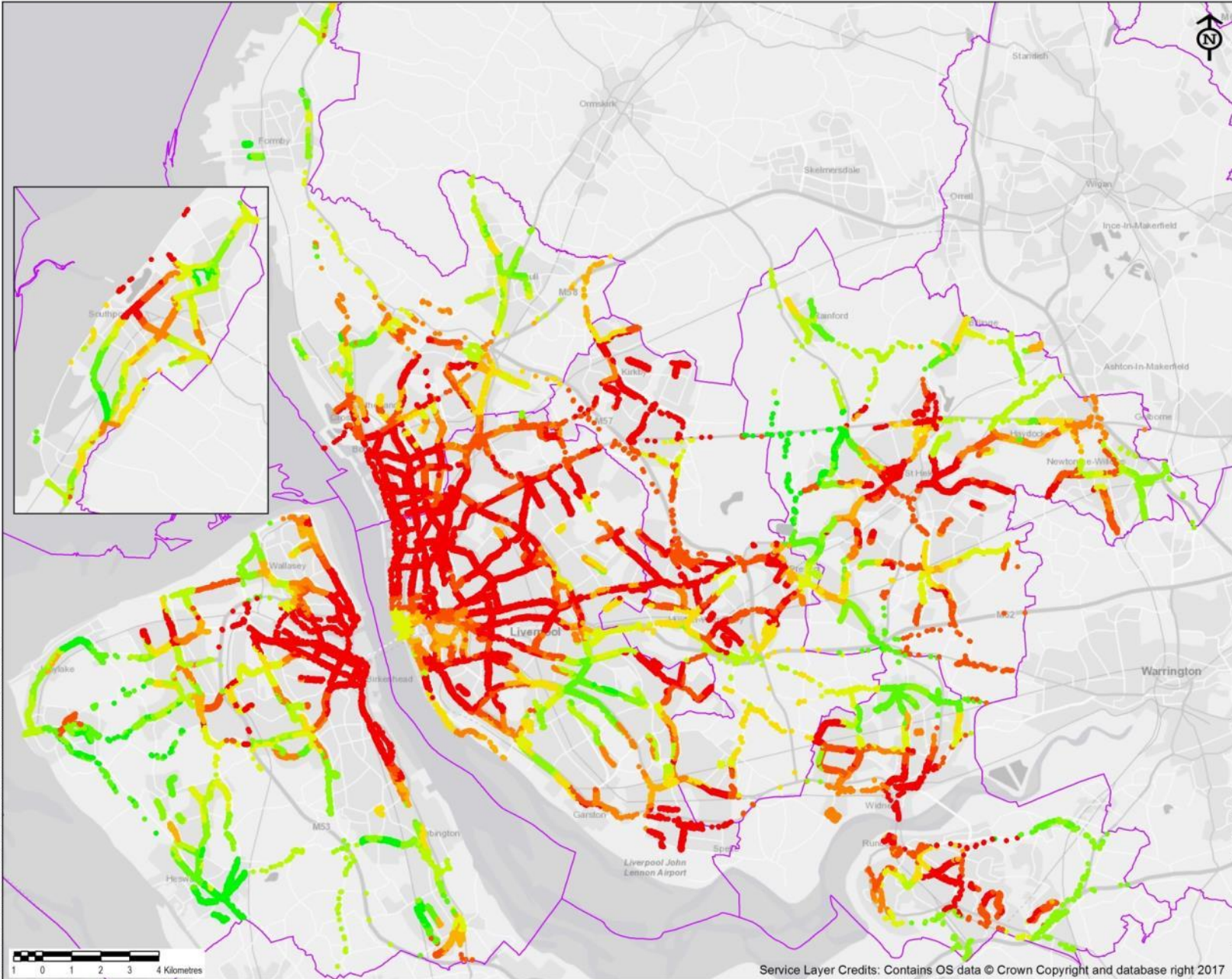
Economic Effects

Month, Day, Year



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MAINTENANCE / OPERATIONAL / DECOMMISSIONING / DEMOLITION				
Legend NOx Emission Rate (g/km/s) 0.000000 - 0.024430 0.024431 - 0.050620 0.050621 - 0.095250 0.095251 - 0.170710 0.170711 - 0.422030				
Plot Name:		No: 070011	Date:	Rev:
Revision Details:		Date:	Rev:	Author:
Purpose of issue: FOR INFORMATION				
Client: Highways England Management: Mersey Island PO Box 1576 Liverpool L69 3JH				
Project Title: LIVERPOOL CITY REGION AIR QUALITY				
Drawing Title: NOx EMISSIONS LCRTM 2020 MODELLED AS 2016				
Drawn by: DM	Checked by: HP	Approved by: MS	Date: 18/01/2018	
Internal Project No: 60547444	Subtitle: 50	Scale @ A3: Zone MS J10		
Scale @ A0: 1:150,000				
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Sheet No.	1	2	3	4	5	6	7	8	9
Revision									

FOR INFORMATION

Client: Microfund
 M62
 PO Box 1000
 Liverpool
 L69 3WR

Project Title:
LIVERPOOL CITY REGION AIR QUALITY

INDICES OF MULTIPLE DEPRIVATION SCORES WITHIN 50M OF MAJOR ROUTES

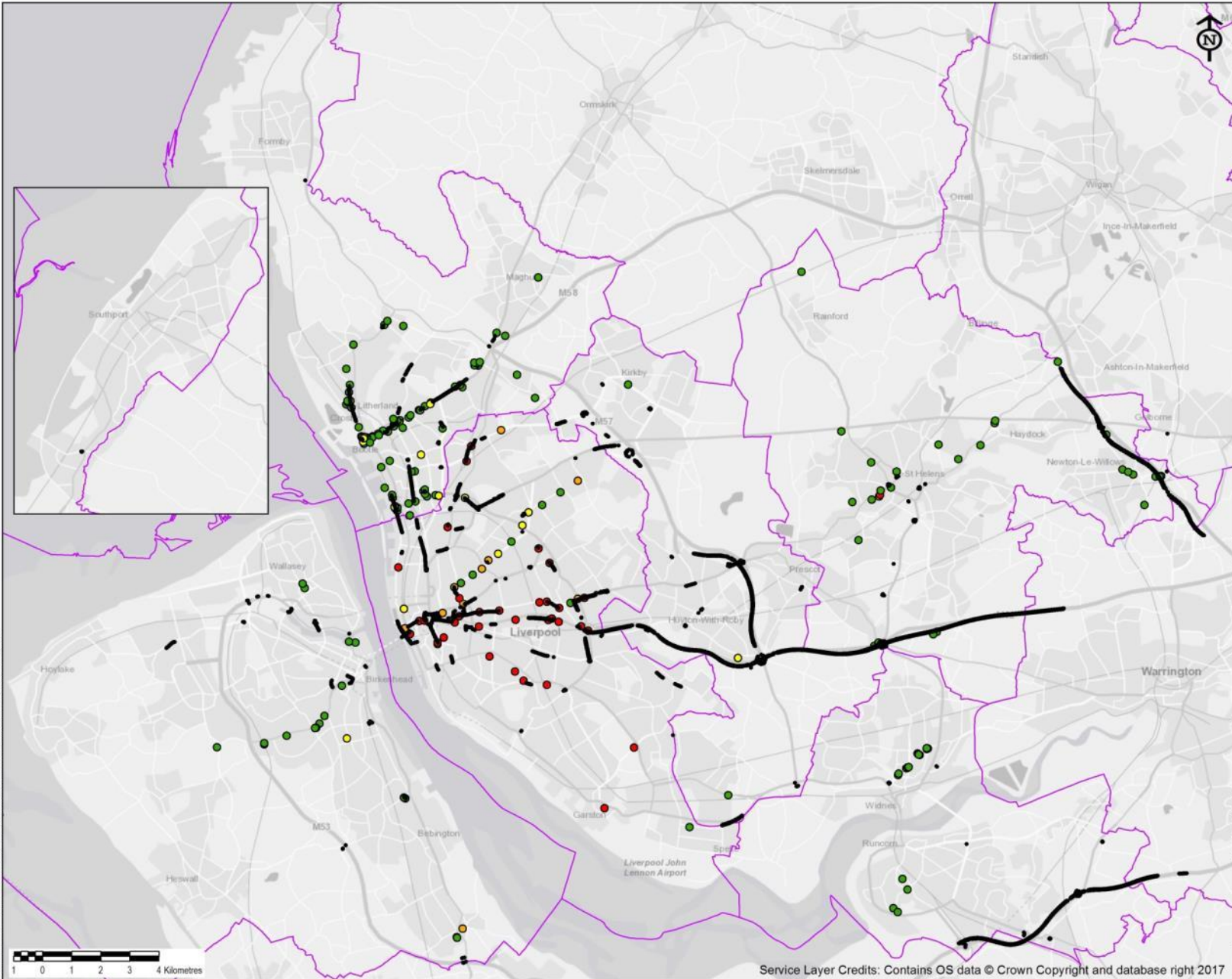
Drawn by: DM	Drawn Date: 05/04/2018	Checked by: TS	Approved by: TS	Date: 19/02/2018
Internal Project No: 05547444	Subsidiary:			
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Plot Date: 19 February 2018 09:26:39
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Roadside Annual Mean NO₂, ug/m³

<32

• >32

Monitor Annual Mean NO₂, ug/m³

● <36

● 36 - 40

● 40 - 44

● > 44

Local Authority Boundary

File Name	18_02_2018	REV
Revision Details	DATE	BY

FOR INFORMATION

Client: **Microfund**
 Microfund
 PO Box 9999
 Liverpool
 L8B 9SE

Project Title:

**LIVERPOOL CITY REGION
 AIR QUALITY**

**SCREENING HIGH
 ROADSIDE NO₂
 CONCENTRATIONS**

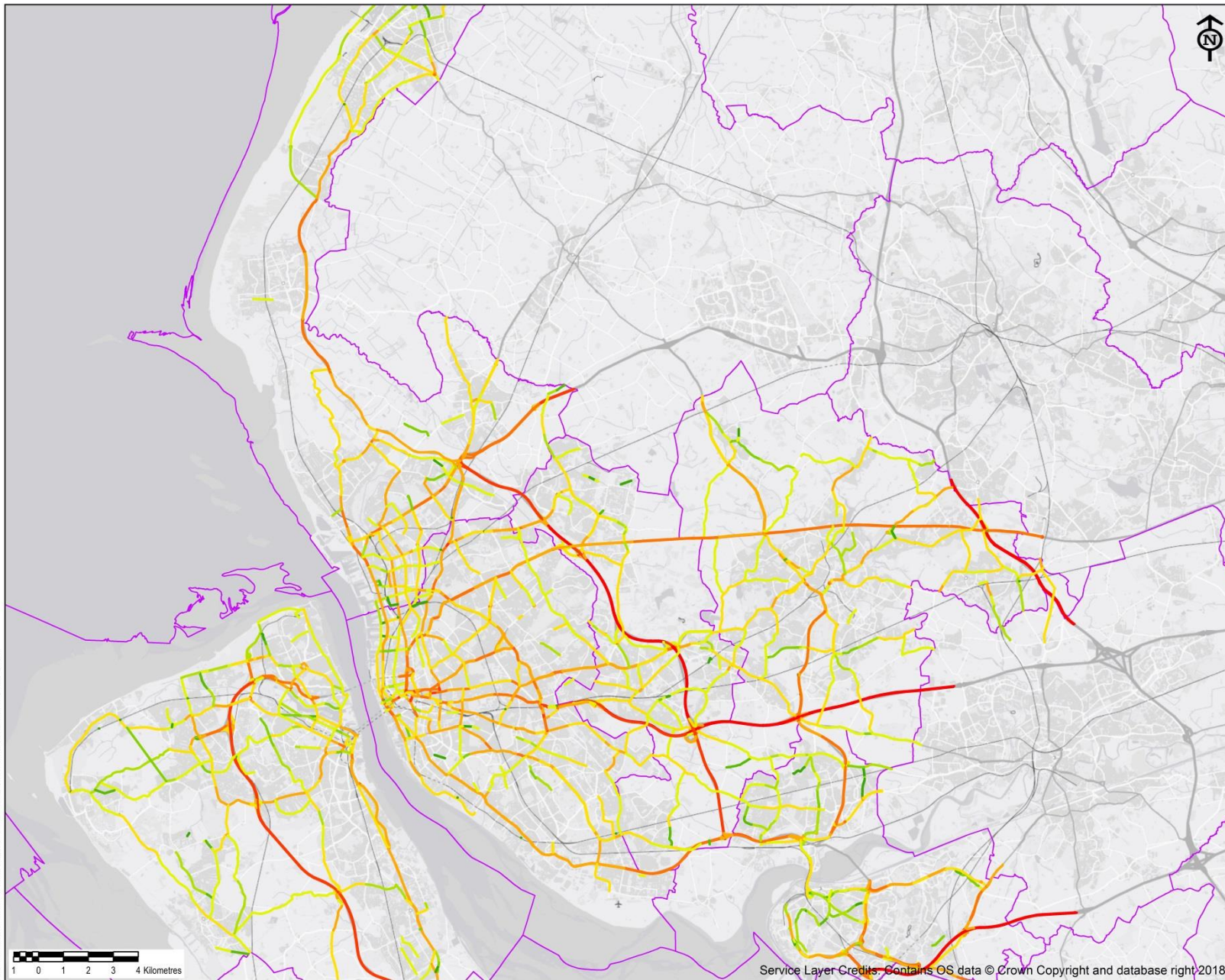
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Noise, LA₁₀ 18-hour

54.0 - 57.0
57.1 - 60.0
60.1 - 63.0
63.1 - 66.0
66.1 - 69.0
69.1 - 72.0
72.1 - 75.0
75.1 - 78.0
78.1 - 81.0
81.1 - 84.0

First Issue	DM	07/09/11	P01
Revision Details	DM		Date

FOR INFORMATION

Client
Merseytravel
Main Island
PO Box 1976
Liverpool
L69 3WQ

Project Title
**LIVERPOOL CITY REGION
AIR QUALITY**

Drawing Title
**ROAD TRAFFIC NOISE
LEVELS AT 10M**

Designed DM	Drawn DM	Checked TS	Approved TS	Date 19/02/2018
Internal Project No. 60547444		Stability		
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Rev
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Baseline Review

Local Air Quality
Review Existing Data
Screening Key Priority Areas
Economic Effects

Month, Day, Year

Damage Cost Estimates

Buses	NO _x Emissions, tonnes/yr		PM ₁₀ Emissions, tonnes/yr		Damage Cost, Central Value	
	Total	Per Bus	Total	Per Bus	Total	Per Bus
Total 2016	9,759	8.3	423	0.4	£229,963,357	£196,214
Diesel	7420	9.0	301	0.4	£173,640,016	£211,653
B100 Bus	1753	7.5	82	0.3	£41,656,092	£177,714
CNG Bus	75	6.4	3	0.3	£1,786,362	£152,420
Hybrid Bus	510	4.8	37	0.3	£12,880,887	£122,117

Grey Fleet	Emission Model Parameters		Basic EFT Fleet 2016		All Euro 6	
	Km/yr	km/hr	NOX	PM10	NOX	PM10
Urban	846382	48	55808	5255	50038	4916
Motorway	846382	90	68745	3344	61054	2855
			124553	8599	111092	7771
			£2,621,087	£499,805	£2,337,821	£451,671

HGVs	Annual Emission, kg		Annual Damage Cost	
	NO _x	PM ₁₀	NO _x	PM ₁₀
LGVs	834837	40759	£17,568,306	£2,369,137
- Rigid HGVs	517126	36206	£10,882,403	£2,104,479
- Artic HGVs	122141	11363	£2,570,328	£660,467
Total			£31,021,038	£5,134,083

Consultation

Month, Day, Year

Stakeholder Consultation

Key stakeholder consultation
throughout the process

- Key Stakeholder groups
 - Policy Work Group
 - Technical Steering Group
 - Task & Finish Group
- Commitment will be required for defined actions by individuals
 - Defined milestones
 - KPIs



**This must be a positive
engagement opportunity!
Nothing is 'off the table'!**

Draft Interventions

Month, Day, Year

Performance Indicators

Outcome Categories Description of Potential Outcome

Infrastructure Improvements	<p>Infrastructure improvements may be used to improve journey times and reduce congestion, and also to provide necessary resources for specific parts of the fleet, such as bus layover facilities.</p> <p>There has traditionally been a reliance on infrastructure changes, which has been used to directly or indirectly achieve beneficial local air quality effects.</p>
Modal Choice	<p>The choice and access to travel modes helps determine the baseline conditions. This will consider the access to, and choice of, vehicle type, age, and the overall proportion of journey mixes.</p>
Policy & Enforcement	<p>Encompassing policy and guidance to directly, or indirectly, regulate specific emission components.</p> <p>This may also include aspirational objectives, in terms of achieving best-practice</p>
Informed Travel Choice & Accessibility	<p>A focus on people and users, rather than the infrastructure being used, may empower and enable individual to make informed travel choices will ensure that long-term sustainability can be achieved.</p>
Engagement & Education	<p>‘Enabling’ will be achieved through awareness, education and engagement so that understanding air quality becomes a part of day-to-day conversation, much like the effects of smoking or drinking are understood with regard their health effects.</p>
Fleet Improvements	<p>Physical changes to the fleet that achieve reduced emissions, though increased adoption of low emission vehicles and exhaust abatement technologies.</p>

Performance Indicators

Type	Effect	Example
Reduce Traffic with Modal Shift	Reduce the number of vehicle movements, either during peak hours or more generally. This may affect the whole fleet or only part of it.	Reduce the number of private cars by redistribution onto alternative transport, and changing the need and requirements of travel.
Increase Efficiency	Reduce congestion and achieve lower emissions from the existing fleet.	Changing speeds to achieve less stop-start movement or more efficient driving profiles, such as through variable speed limits, traffic-light timing or driver education.
Improve Fleet	Change the composition of the existing fleet to increase the proportion of low emission vehicles.	Displace older vehicles in favour of vehicles that achieve ultra-low emissions, such as Electric Vehicles (EV).
Reduce Exposure	Reduce the level of exposure resultant from traveling on, or near, highways or other pollutant sources	Public education and empowerment, to promote an understanding of the exposure pathways, leading to change in behavior

Score	Cost	Timescales	Population Affected	Climate Change	Social Inclusion
High	3 No costs, or funds allocated	Immediate <10 months	Whole Region > 1000 properties	Negative	Negative
Medium	2 <£10,000	Short < 2020	Large Areas > 100 properties	Neutral	Neutral
Low	1 <£100,000	Long > 2020	Discrete areas <100 properties	Detrimental	Detrimental

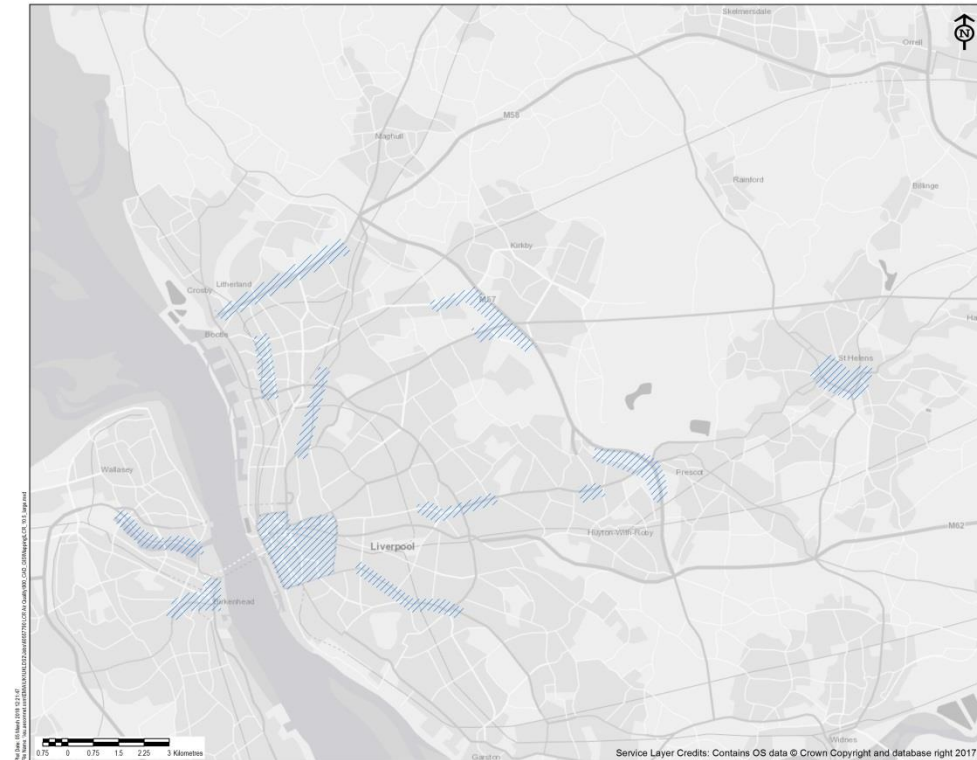
CAZ SCENARIO 1: 100% EURO 6 COMPLIANT CARS



CAZ SCENARIO 2: 100% EURO 6 COMPLIANT LGV



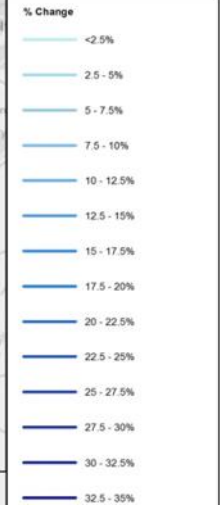
CAZ SCENARIO 3: 100% EURO 6 COMPLIANT LGV



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<p>FOR INFORMATION</p> <p>Client: Liverpool City Region Project Title: LIVERPOOL CITY REGION AIR QUALITY Drawing Title: PRELIMINARY EXTENTS OF POTENTIAL CAZ</p>	
<p>Scale: 1:100,000</p> <p>Scale bar: 0 0.75 1.5 2.25 3 Kilometres</p>	<p>Service Layer Credits: Contains OS data © Crown Copyright and database right 2017</p>

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<p>Client: Liverpool City Region Project Title: LIVERPOOL CITY REGION AIR QUALITY Drawing Title: PRELIMINARY EXTENTS OF POTENTIAL CAZ</p>	<p>Scale: 1:100,000</p> <p>Scale bar: 0 0.75 1.5 2.25 3 Kilometres</p>
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FOR INFORMATION

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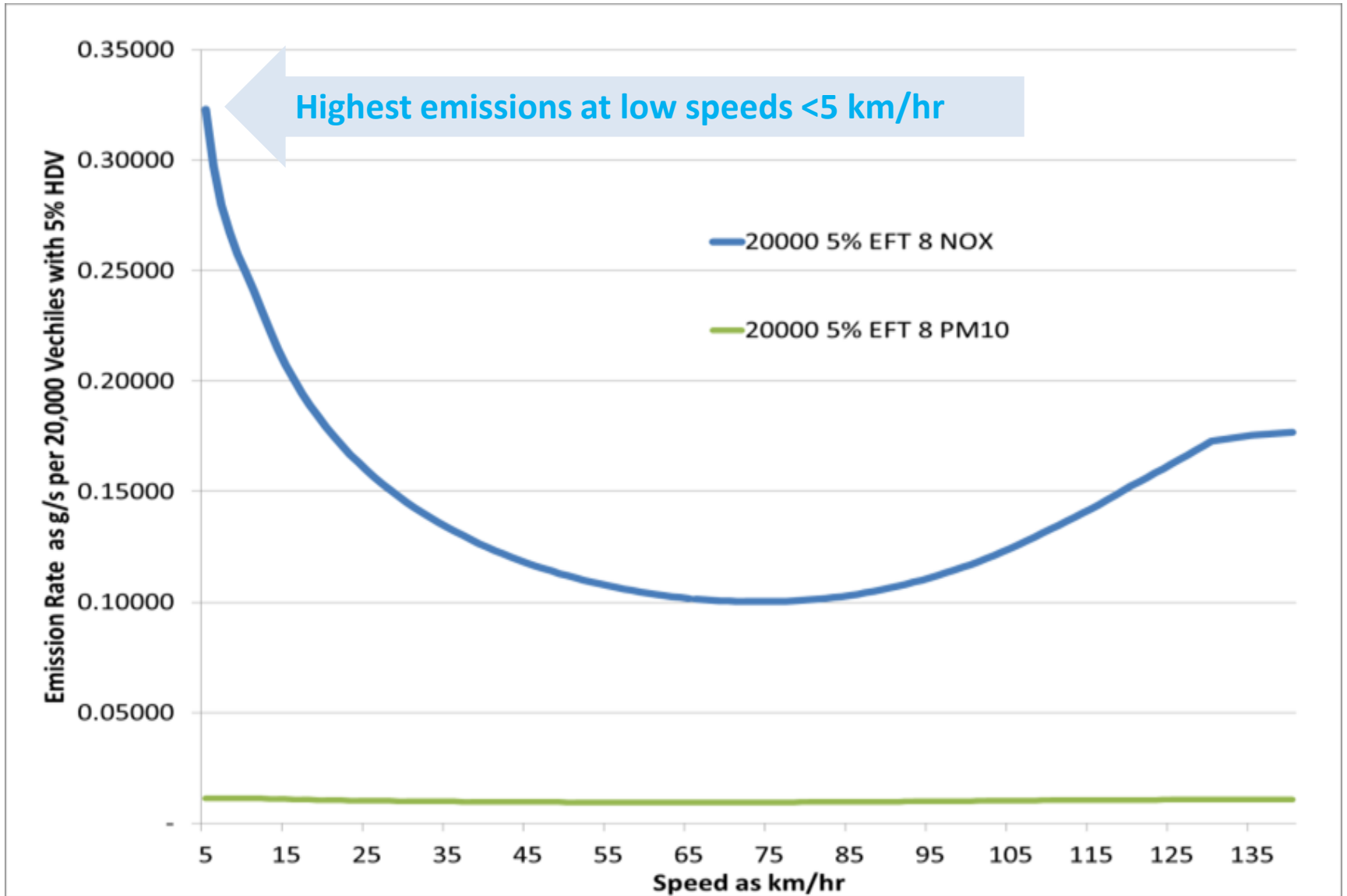
MODELLED CHANGE OF EMISSIONS RESULTANT FROM CAZ SCENARIOS

<p>Client: Liverpool City Region Project Title: LIVERPOOL CITY REGION AIR QUALITY Drawing Title: PRELIMINARY EXTENTS OF POTENTIAL CAZ</p>	<p>Scale: 1:100,000</p> <p>Scale bar: 0 0.75 1.5 2.25 3 Kilometres</p>
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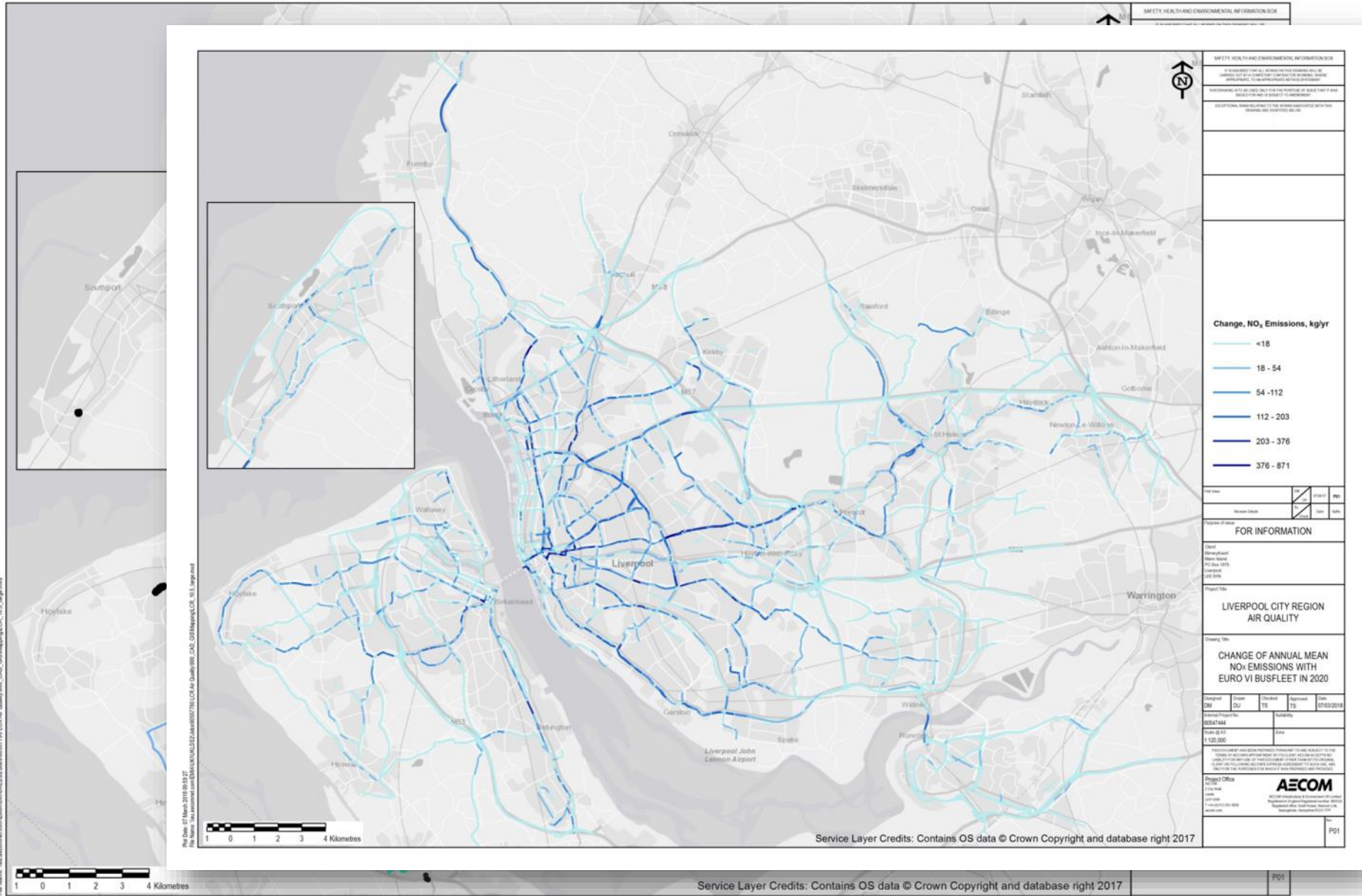
<p>Client: Liverpool City Region Project Title: LIVERPOOL CITY REGION AIR QUALITY Drawing Title: PRELIMINARY EXTENTS OF POTENTIAL CAZ</p>	<p>Scale: 1:100,000</p> <p>Scale bar: 0 0.75 1.5 2.25 3 Kilometres</p>
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<p>Client: Liverpool City Region Project Title: LIVERPOOL CITY REGION AIR QUALITY Drawing Title: PRELIMINARY EXTENTS OF POTENTIAL CAZ</p>	<p>Scale: 1:100,000</p> <p>Scale bar: 0 0.75 1.5 2.25 3 Kilometres</p>
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Speed Effects



Bus Retrofit

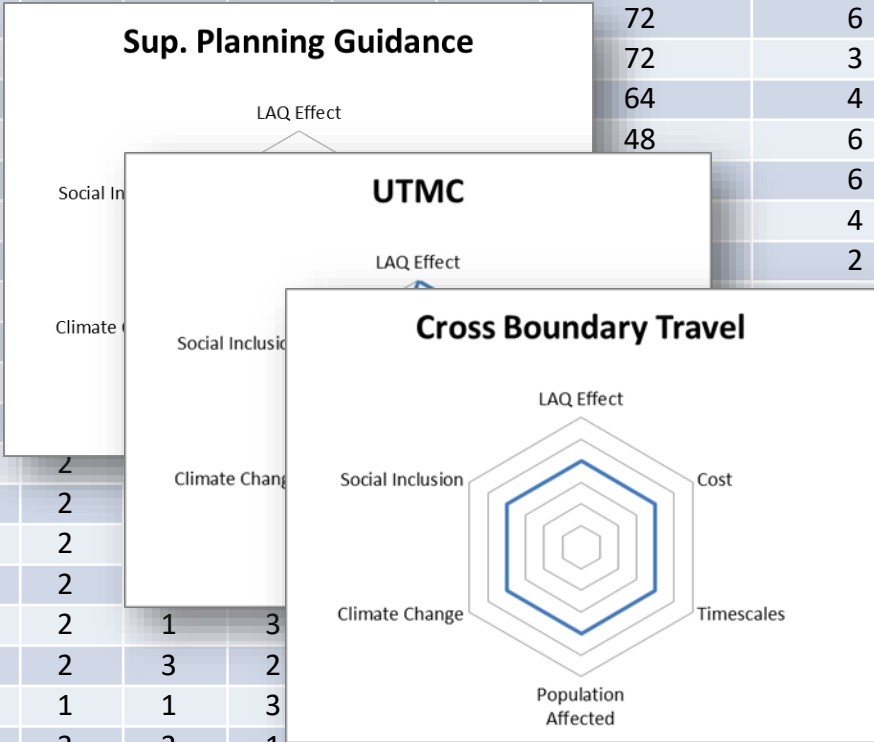


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Ranking and Scores

Intervention	LAQ Effect	Cost	Timescales	Population Affected	Climate Change	Social Inclusion	Ranking Score	Ranking Score for LAQ Effect and Timescale Only
UTMC	3	3	2	2	2	1	72	6
Sup. Planning Guidance	2	3	2	3	2	1	72	4
Fleet Recognition Scheme	2						72	6
Engagement & Education	1						72	3
Cross Boundary Travel	2						64	4
Bus Fleet Upgrades	3						48	6
Mersey Toll	3							6
Fleet Management	2							4
Travel Cards	1							2
Web Resources	1							
Car Clubs	1							
Pollution Event Forecasting	1							
Segregated Bus Lanes	2							
Red Routes	2	2						
Freight Coordination	3	2						
Taxi Management	2	2						
Real-time Passenger Information	1	2						
Travel Planning Resources	1	2	1	3				
Green Infrastructure	1	2	3	2				
CAZ	3	1	1	3				
Construction Emissions	2	3	3	1	1	1	18	6
Bus Layover Facilities	2	2	1	2	2	1	16	2
Cycling Infrastructure	1	2	1	2	2	2	16	1
School Audits	1	2	2	2	1	2	16	2
Alt Fuel Infrastructure	2	1	1	2	2	1	8	2
Shared Space	1	1	1	2	2	2	8	1



Outcomes

Month, Day, Year

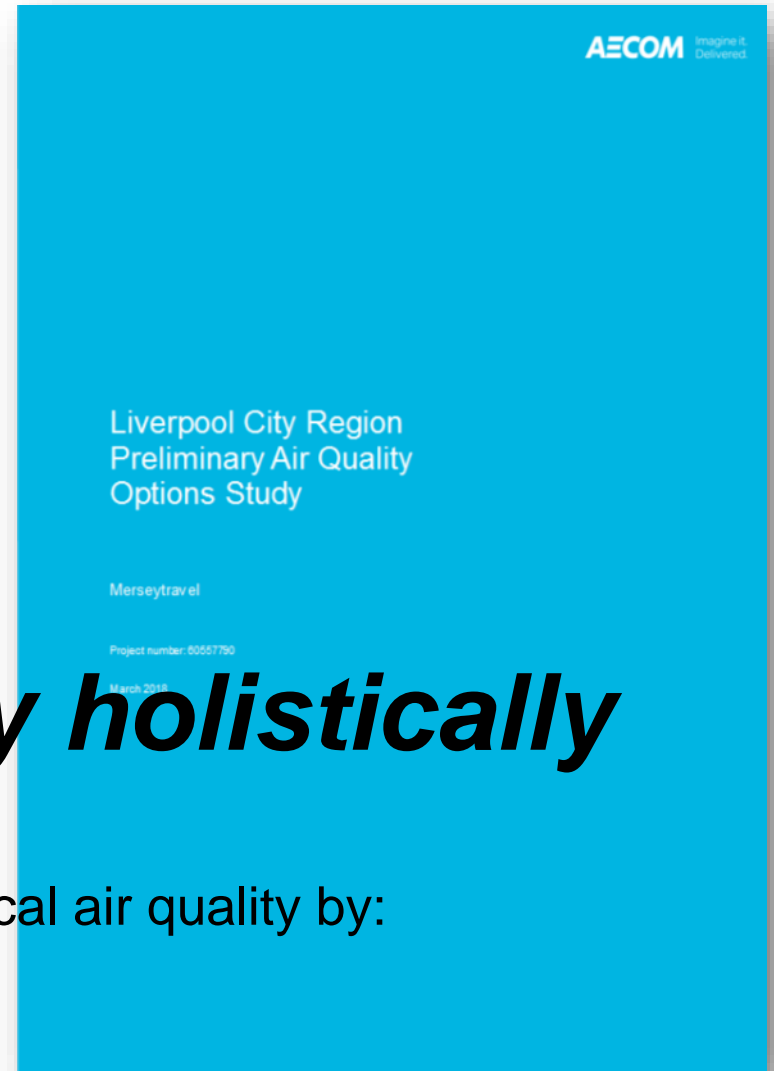
Key Principles

- Novel use of existing data
- Recognising the effects on AQ of planned works
- Create links to related disciplines
- Engagement with key stakeholders

Tackling air quality holistically

An optimistic strategic plan to improve local air quality by:

- Using local data
- Focussing on public health
- Ensuring interventions were achievable and practical, and would make a measurable difference





AECOM

Imagine it.
Delivered.