



Glasgow LEZ - Integrated Impact Assessment

Integrated Impact Assessment

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Executive Summary

Purpose of Glasgow's Low Emission Zone (LEZ) and this report

Glasgow's LEZ aims to contribute towards achieving legally required improvements in air quality and realise the associated health outcomes by restricting non-compliant vehicles from entering an area including approximately the city centre of Glasgow. This Integrated Impact Assessment (IIA) helps Glasgow City Council (GCC) to understand potential impacts that the LEZ may have on different individuals and organisations. It presents the types of impacts anticipated and analysis that helps to assess the effectiveness of the mitigation measures in place.

Phase 1 of Glasgow's LEZ came into effect in the city centre on 31st December 2018, being the first LEZ in Scotland. Phase 1 only applies to local services buses, while Phase 2 will apply to all vehicles, that will have to comply with specific emission standards.

How might Glasgow be affected by a LEZ?

The LEZ has the potential to cause a range of positive and negative impacts, from improving health of a large spectrum of society to potentially reducing access to the city centre for those who rely on private vehicle transport. The most significant impact of the LEZ will be the improvement in air quality and the resulting health benefits, that will impact residents, visitors, and workers. The LEZ also has a potential further positive health impact through encouraging the use of active travel and public transport for certain trips and changing existing travel behaviours.

Given the focus of the IIA to look at how certain protected groups are potentially differentially affected, there are instances where the LEZ could disproportionately affect some groups in society. For example, those who have a diminished ability to upgrade to a compliant vehicle due to low income (including people on benefits, single parents, or disabled people). Those on lower incomes may experience reduced access to locations and in turn the goods, services, or employment opportunities available to them. However, it should be noted that people with lower income are less likely to own a car and that Glasgow has a higher share of population without access to a car compared to the Scottish average. Community transport providers rely on cars and minibuses that may be subject to a LEZ, therefore the services they provide to a range of protected groups (e.g. those receiving care) may be affected. Mitigation can reduce these potential impacts. For example, the LEZ Mobility Fund¹, retrofitting schemes², and potential exemptions outlined in the draft LEZ regulations³ all look to reduce any negative impacts of the proposed LEZ scheme.

ANPR data shows that in 2018, the compliance rate of vehicles entering the LEZ was 61% across all vehicles. More recent data, from Q3 2020, that provides information on ownership of vehicles within the LEZ and Glasgow Travel to Work Area (TTWA) shows compliance rates of 76% for all vehicles within both areas. As some vehicles will be upgraded in the period before the LEZ is enforced this number will be even lower when the Glasgow's LEZ Phase 2 will be effective (it is expected that Phase 2 will be enforced from 2023 onwards). By vehicle type, buses and coaches, light goods vehicles and heavy goods vehicles are less likely to be compliant than cars.

¹ Energy Savings Trust, 2020, *Low Emission Zone Support Fund*, <https://energysavingtrust.org.uk/scotland/grants-loans/low-emission-zone-support-fund>

² Low Emission Zones Scotland, 2020, *Funding*, <https://www.lowemissionzones.scot/funding>

³ Transport Scotland, 2019, *Scotland's Low Emission Zones – Consultation on Regulations and Guidance*, <https://www.transport.gov.scot/media/46548/scotland-s-low-emission-zones-consultation-on-regulations-and-guidance.pdf>

Table 1-1 Number of compliant and non-compliant vehicles in Glasgow TTWA and LEZ

Vehicle class	Glasgow TTWA				LEZ			
	Compliant	Non-compliant	% Compliant	% Non-compliant	Compliant	Non-compliant	% Compliant	% Non-compliant
Cars	448,473	117,539	79%	21%	2,037	580	78%	22%
Buses & Coaches	1,042	1,347	44%	56%				
Heavy goods	4,333	2,360	65%	35%				
Light goods	32,304	29,194	53%	47%	1,273	454	74%	26%
Total	486,152	150,440	76%	24%	3,329	1,034	76%	24%

Source: DVLA data analysis.

Note: DVLA data on compliant vehicles does not include vehicles that have been retrofitted.

There will be significant economic impacts related to the upgrading of non-compliant vehicles, however targeted exemptions for some non-compliant vehicles within the LEZ will mean that not all vehicles will need to be upgraded. In addition, some non-compliant vehicles will not interact with the LEZ in the first place therefore avoiding the need to be upgraded. In addition to the financial outlay required to purchase an upgraded vehicle, there are other potential economic costs associated with replacing a large number of vehicles such as consumer welfare loss and asset value loss.

What insights were gained through the analysis?

The IIA shows that while the overall health benefits of the LEZ positively impacts all users of the city centre and may boost some sectors of business, there are some protected members of society whom will be negatively impacted by the LEZ. Therefore, national and local policy makers need to consider the scale of these impacts on the affected groups and potential opportunities to remove or mitigate negative impacts where possible. In particular, small local businesses operating in the accommodation and good services, wholesale and retail trade, transport and storage and construction sectors.

1. Introduction

1.1 Purpose of this report

This report presents the findings of an Integrated Impact Assessment (IIA) of Glasgow's Low Emission Zone (LEZ) following the NHS Lothian guidance and reporting structure⁴. The same guidance was previously applied for assessing the integrated impacts of the Edinburgh Low Emission Zone. A LEZ will restrict non-compliant vehicles from travelling in certain areas, therefore the analysis considers a range of consequential impacts on different population groups and objectives.

The report is structured as follows:

- Section 1 provides an introduction to air pollution, LEZs and integrated impact assessment.
- Section 2 provides detailed background on policy and Glasgow's LEZ.
- Section 3 presents analysis on Glasgow's LEZs and potential impacts on different population groups.
- Section 4 presents impacts under Equality, health and wellbeing and human rights objectives.
- Section 5 presents impacts under Environmental objectives.
- Section 6 presents impacts under Economic objectives.
- Section 7 presents mitigation relating to Glasgow's LEZ.
- Section 8 presents Strategic Environmental Assessment

1.2 Health and Air pollution

Pollutants caused by vehicle emissions are largely invisible, but these gases and particulates can be hazardous to human health. A 2019 review⁵ highlighted a growing body of scientific evidence which links higher levels of air pollution with increased ill health. Particularly at risk are the very young, older people/pensioners and those with pre-existing health conditions and illnesses such as asthma. In December 2020, a coroner's court found that air pollution made a material contribution to the death of a child, following this the coroner submitted a report to the UK government with a series of concerns and recommendations relating to the damage air pollution causes⁶. Glasgow City Council (GCC) and the Scottish Environment Protection Agency (SEPA) provided robust evidence of traffic pollution exceeding accepted air quality standards levels in Glasgow which underlines the need for intervention (further detail provided in section 2.2)⁷. GCC produce annual Local Air Quality Management (LAQM) reports that tracks the progress of Air Quality Management Areas (AQMAs) in Glasgow and interventions that affect air quality over time⁸; the LEZ is an example of such an intervention that is focussed on the city centre AQMA.

1.3 Low Emission Zone

LEZs are a policy response aimed to reduce air pollution issues. A LEZ restricts entry to an area by setting an emission standard as a requirement, this means the LEZ can achieve a reduction in NO₂ concentrations by improving the Euro emission standard of vehicles that enter/exit/operate within the area. The potential benefit comes from the reduction in emissions associated with vehicles and resulting increase in health outcomes. LEZs may also encourage modal shift away from private cars to public transport and active travel with the potential for fewer vehicles overall to enter/exit/operate within the zone. The Scottish Government is committed to

⁴ NHS Lothian, 2017, *Integrated Impact Assessment Guidance*, <https://www.nhslothian.scot.nhs.uk/YourRights/EqualityDiversity/IA/Documents/IntegratedImpactAssessmentGuidance.pdf>

⁵ Health & Environment Working Group, June 2019, *The Cleaner Air for Scotland Review 2019*, <http://www.scottishairquality.scot/assets/documents/Health-Environment-Working-Group-Report.pdf>

⁶ Barlow, P (2021), *Regulation 28: Report to Prevent Future Deaths*, <https://www.judiciary.uk/wp-content/uploads/2021/04/Ella-Kissi-Debrah-2021-0113-1.pdf>

⁷ SEPA Report: Positive Impact of Glasgow's LEZ (Oct 2020), Figure 3. <https://www.glasgow.gov.uk/CHttpHandler.ashx?id=50447&p=0>

⁸ Glasgow City Council, 2021, *Local Air Quality Management*, <https://www.glasgow.gov.uk/localairqualitymanagement>

incentivising compliance with vehicle access restrictions put in place to support air quality improvements through a penalty based system⁹.

LEZs can vary in terms of the areas they occupy, the vehicles they target, and the dates they come into effect. The vehicle emission standard the LEZs are based on are called Euro emissions standards: to enter/exit/operate within a LEZ in Scotland a diesel vehicle will need to be Euro 6 (new diesel vehicle purchased after 2016) and a petrol vehicle Euro 4 (new petrol vehicle purchased after 2006)¹⁰.

1.4 Integrated Impact Assessment

The National Low Emission Framework¹¹ (NLEF) requires assessment of any air quality intervention therefore the IIA provides this. The Equality Act 2010 (Specific Duties) (Scotland) 2014, requires public bodies, to assess the impact of applying a proposed new or revised policy or practice where necessary to fulfil the requirements of the Public Sector Equality Duty (PSED) as set out in s149 of the Act. In addition, The Fairer Scotland Duty (FSD) places a legal responsibility on public bodies in Scotland to actively consider ('pay due regard' to) how they can reduce inequalities of outcome caused by socio-economic disadvantage, when making strategic decisions. As such, an IIA is an effective mechanism for meeting these legal requirements by considering the needs of different groups and to assess proposals for potential equality impacts to prevent unlawful discrimination.

The NHS Lothian IIA guidance¹² sets out a 7-stage process to completing an IIA, as outlined in Table 1-1. When undertaking an IIA, the likely impacts of the policy or proposal on the following groups are assessed:

- People with protected characteristics (e.g. age, gender, disability, ethnicity, religion).
- Those vulnerable to falling into poverty (e.g. unemployed, single parents, homeless people, carers, and vulnerable families).
- Geographical communities (e.g. urban, rural, and business communities); and
- Staff (where applicable).

These impacts are organised by the following themes:

- Equalities and Human Rights.
- Environmental; and
- Economic.

A proposal is assessed by identifying how it differentially impacts on different population groups, as shown in section 3.7. Sections 4, 5, and 6 presents impacts under objectives associated with the aforementioned themes. This report is stage 4 of a 7-stage process of assessment undertaken in accordance with the guidance.

⁹ Scottish Government, 2019, *National Low Emission Framework*, <https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2019/01/national-low-emission-framework/documents/national-low-emission-framework/govscot%3Adocument/00545018.pdf>

¹⁰ Scottish Government, 2020, *Frequently Asked Questions*, <https://www.lowemissionzones.scot/get-ready/faqs>

¹¹ Scottish Government, 2019, *National Low Emission Framework – 2.5.3 to 2.5.7*, <https://www.gov.scot/publications/national-low-emission-framework/>

¹² NHS Lothian, 2017, *Integrated Impact Assessment Guidance*, <https://www.nhslothian.scot.nhs.uk/YourRights/EqualityDiversity/IADocuments/IntegratedImpactAssessmentGuidance.pdf>

Table 1-1 Integrated Impact Assessment Stages

Stage	Activity	Status/Actionee
1	Relevance Assessment	Glasgow City Council decided that an Integrated Impact Assessment (IIA) should be progressed.
2	Undertake IIA	Initial assessment was undertaken by Jacobs between April and May 2021
3	Consider results	Initial assessment results and wider IIA issues were discussed with a group of stakeholders from Glasgow City Council on April 22 nd 2021 through Microsoft Teams.
4	Report findings	This report presents IIA findings.
5	Sign-off	Glasgow City Council – Sustainable Glasgow - Dom Callaghan
6	Publication	Glasgow City Council – Sustainable Glasgow - Dom Callaghan
7	Act on the IIA	Glasgow City Council – Sustainable Glasgow - Dom Callaghan

2. Background

2.1 Policy context

In 2015, the Scottish Government made a commitment to significantly improve Scotland's air quality through the Cleaner Air for Scotland strategy, LEZs were identified as a potential tool within the strategy. The Programme for Government 2017–18 committed¹³ to introduce LEZs in Aberdeen, Dundee, Edinburgh, and Glasgow by 2020. Glasgow was the first city to commit to a LEZ in 2017, implementing the phase 1 which only applied to local bus services at the end of 2018. Phase 2, extending restrictions to other vehicle types, was originally expected to be implemented in 2022¹⁴ but due to the COVID-19 pandemic this timeline has been extended to 2023, including a one year grace period¹⁵.

In order to comply with the legislation, the Scottish Government and Local Authorities must reduce annual average NO₂ concentrations to below the legal limit of 40 µgm⁻³¹⁶. At present, Glasgow has only one AQMAs due to NO₂ legal limit exceedances mainly as a result of road traffic, i.e. the City Centre. The Parkhead Cross AQMA was revoked recently. The Byres Road / Dumbarton Road AQMA was amended to revoke the PM10 component: it has met the NO₂ objective for some years now but at present remains an AQMA¹⁷.

The Transport (Scotland) Bill was introduced to the Scottish Parliament in June 2018 and in November 2019 became the Transport (Scotland) Act 2019, reflecting a considerable amount of consultation and engagement in its development. The Act allows the Scottish Government to set (through regulations) consistent national standards for key aspects of LEZs including emissions, penalties, exemptions, and parameters for grace periods¹⁸. Local Authorities have the powers to create, enforce, operate, or revoke a LEZ, and to design the boundary and vehicle scope of their LEZ¹⁹. Regulations were split into two statutory instruments and laid before Scottish Parliament in January 2021²⁰.

2.2 Air quality in Glasgow

The Clearer Air For Scotland – National Modelling Framework, Air Quality Evidence Report – Glasgow is being undertaken by SEPA. A draft report dated August 2019 was provided, together with an updated document on Glasgow's Low Emission Zone dated October 2020. Both documents provided robust evidence that despite monitoring records showing a general improvement in air quality in recent years, a significant amount of the city centre Air Quality Management Area (AQMA) is modelled to exceed the annual average NO₂ legal limit value at the roadside of 40 µgm⁻³. The majority of roadside pollution is due to emissions from road traffic. The latest model simulations referring to 2019 conditions show that there are continuing areas of exceedance, with the highest levels of NO₂ estimated along Hope Street and Renfield Street, two important bus corridors. Therefore, an intervention, such as a LEZ, that aims to increase the proportion of cleaner vehicles travelling through the city is required to reduce these emissions. Since the implementation of phase 1 of the Glasgow LEZ in December 2018, with the consequent start of a gradual renewal of the bus fleet, positive effects in terms of reduction of NO₂ concentration have already been registered.

¹³ Scottish Government, 2017, <https://www.gov.scot/publications/nation-ambition-governments-programme-scotland-2017-18/>

¹⁴ Glasgow City Council, 2018, *Low Emission Zone: Report by Councillor Anna Richardson, City Convener for Sustainability and Carbon Reduction*, <https://www.glasgow.gov.uk/CouncillorsandCommittees/viewDoc.asp?c=P62AFQDN2UZLDXZ3DN>

¹⁵ Glasgow City Council, 2021, *Glasgow's Low Emission Zones*, <https://www.glasgow.gov.uk/LEZ>

¹⁶ Scottish Government, 2010, *The Air Quality Standards (Scotland) Regulations 2010*, <http://www.legislation.gov.uk/ssi/2010/204/schedule/2>

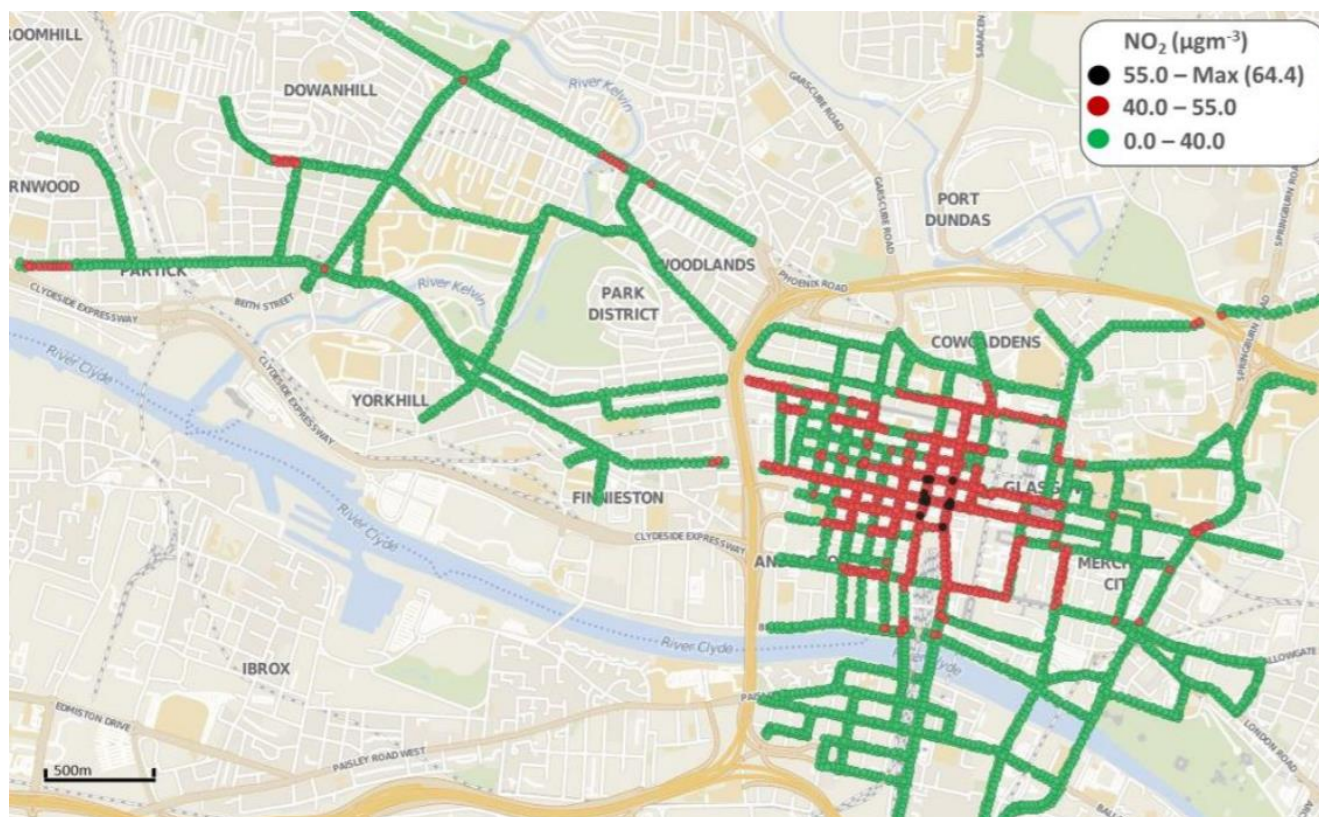
¹⁷ Information provided by GCC

¹⁸ Period of time that non-compliant vehicles are allowed to operate in a LEZ without incurring a penalty charge. It may vary between vehicle types.

¹⁹ Low Emission Zones Scotland, 2020, *Developing Low Emission Zones in Scotland*, <https://www.lowemissionzones.scot/development>

²⁰ Scottish Government, 2021, *The Low Emission Zones (Emission Standards, Exemptions and Enforcement) (Scotland) Regulations 2021*, <https://www.legislation.gov.uk/sdsi/2021/9780111048887/contents>

Scottish Government, 2021, *The Low Emission Zones (Scotland) Regulations 2021*, <https://www.legislation.gov.uk/ssi/2021/26/contents/made>

Figure 1 Modelled Roadside Pollution in Glasgow (2019 Annual Average NO₂)

Source: SEPA Report: Positive Impact of Glasgow's LEZ (Oct 2020), Figure 3.
<https://www.glasgow.gov.uk/CHttpHandler.ashx?id=50447&p=0>

2.3 Glasgow's LEZ

As stated earlier, a LEZ is an area that only allows entry to vehicles of a certain emission standard but the design of a LEZ can vary in multiple ways:

- Geographical coverage
- Type of vehicles included (for example, car or bus)
- The date the LEZ is implemented (this can differ from the date a LEZ is enforced, for example by providing residents with grace periods – see next point).
- Grace periods – a length of time for particular vehicle types or individuals before enforcement of the LEZ begins.

On September 2017, the City Administration Committee (CAC) approved the proposal to introduce a LEZ in Glasgow. Phase 1 of Glasgow's LEZ came into effect in the city centre on 31st December 2018, being the first LEZ in Scotland. Phase 1 only applies to local services buses, while Phase 2 will apply to all vehicles, that will have to comply with specific emission standards.

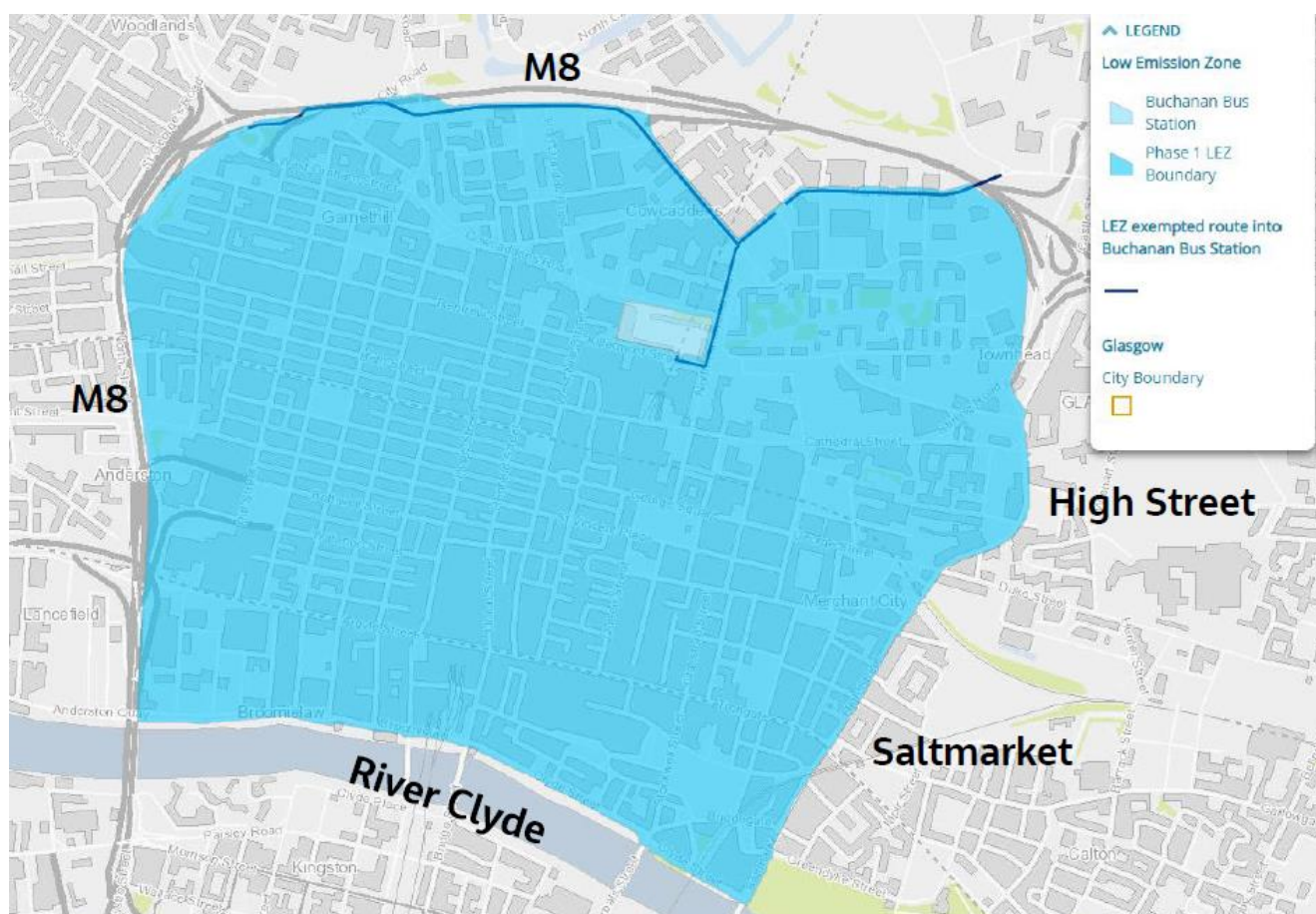
The proposed emission standards for Glasgow's LEZ are:

- Euro 4 standard for petrol vehicles
- Euro 6 standard for diesel vehicles
- Euro VI standard for heavy duty diesel vehicles e.g. buses/coaches and HGVs

Phase 1 of the LEZ was approved subject to a progressive improvement in the bus fleet, according to the following schedule:

- 20% of all bus journeys to be compliant with a Euro VI standard by the end of 2018;
- 40% of all bus journeys to be compliant with a Euro VI standard by the end of 2019;
- 60% of all bus journeys to be compliant with a Euro VI standard by the end of 2020;
- 80% of all bus journeys to be compliant with a Euro VI standard by the end of 2021;
- 100% of all bus journeys through the city centre being by vehicles with Euro VI engines or better by the end of 2022.

Figure 2 Phase 1 Map of Glasgow LEZ



Source: Glasgow's LEZ interactive map.

<https://glasgowgis.maps.arcgis.com/apps/MapSeries/index.html?appid=a1cca42f50834e9ab30bec4769af1a09>

Phase 2 of the LEZ will impact all vehicles and the geographic boundary will be similar to the existing Phase 1 boundary. During the consultation process two slightly different boundary options were proposed and Option A was agreed, including the Broomielaw, Clyde St, Saltmarket, High St and Castle St from the southern and eastern boundaries (see Figure 3). Phase 2 was initially planned to start on 31st December 2022 but due to the impact of the COVID-19 outbreak, there was a temporary pause in plans to implement Low Emission Zones in Scotland and a revised indicative timescale aims to see their introduction between February and May 2022.

Therefore, Phase 2 of Glasgow's LEZ will be legally enforced from 2023 as Scotland's LEZ legislation requires a compulsory grace period of at least one year after the LEZ's initial introduction. The dates for scheme implementation (1st May 2022) and enforcement (1st June 2023) will be put forward for consultation.

Exemptions for vehicle categories will be defined at national level and include:

- Vehicles for disabled persons (including blue badge holders);
- Police vehicles;
- Ambulance and emergency vehicles;
- Scottish Fire and Rescue;
- Her Majesty's Coastguard;
- National Crime Agency;
- Military vehicles;
- Historic vehicles;
- Showman's vehicles.

The Council has also the power to issue temporary exemptions for other specific vehicle categories. GCC will not propose vehicle type exemptions, but will set out a process for exemption applications under exceptional circumstances.

2.4 Stakeholder Engagement

2.4.1 Consultation process

Glasgow City Council's consultation process aimed to understand public and stakeholder opinions on the proposed LEZ in Glasgow. GCC invited comments on the two proposed boundary options, emission standards, vehicle types, grace periods and any unintended consequences. Glasgow City Council ran an online public consultation on the implementation of its LEZ between 17th February 2020 and the 29th March 2020. In addition, a stakeholder workshop was held on the 10th March 2020 to capture views, with 24 participants attending this event.

The findings from both the survey and workshop were summarised and analysed by Scott Porter Research and Marketing Ltd to inform the development of the next stage of the Glasgow LEZ. The survey had 992 responses of which 19 were removed as they did not fully answer the questionnaire, resulting in a total of 973 responses. Among these:

- 8% of respondents (75) were city-centre residents;
- 54% of respondents work in the city centre;
- 65% of respondents visit for shopping/leisure;
- 4% of respondents (37) say they own a business within the city centre;
- 6% of respondents (57) state they study in the city centre.

The majority of respondents, therefore, are travelling in and out of the city for work or shopping/leisure, rather than being city centre residents. Overall, the majority of respondents supported the use of LEZs in general, with:

- 68% saying they support the principle of LEZs;
- 22% saying they do not support LEZs;
- 9% don't know/no opinion;
- 1% not answering.

62% specifically supported the implementation of an LEZ within Glasgow. In response to the implementation of the LEZ:

- 25% of respondents would do nothing as their vehicle complies with regulations
- 21% stated that they will use public transport more
- 16% will walk more

- 12% will cycle more
- 12% will change route and
- 11% will upgrade their vehicle

53% of respondents see unintended consequences following the LEZ introduction, 94% of which are negative consequences. The main concerns stated for those that did not support the LEZ were:

- The perceived inadequacies of the public transport system in and around Glasgow and how the public transport system itself might possibly be affected by the LEZ – for example, the feasibility of changing to and using public transport in terms of its availability, the time it takes and overall cost (23% of responses).
- The adverse effect it could potentially have on businesses based in and travelling to and through the city centre – for example less footfall for city-centre businesses and the costs associated with upgrading vehicles to comply (20% of responses).
- The adverse effects on individuals, mainly involving increased costs due to upgrades and alternatives. Also, in terms of using the city centre and also for those who live and work there – for example being able to access the city centre to shop, for leisure activities (particularly in the evening), the ability to work across all shift patterns and the associated costs of any changes (16% of responses).
- The fact some vehicles are still on the road such as taxis, HGVs and buses which are all considered to be some of the most polluting vehicles (11% of responses).

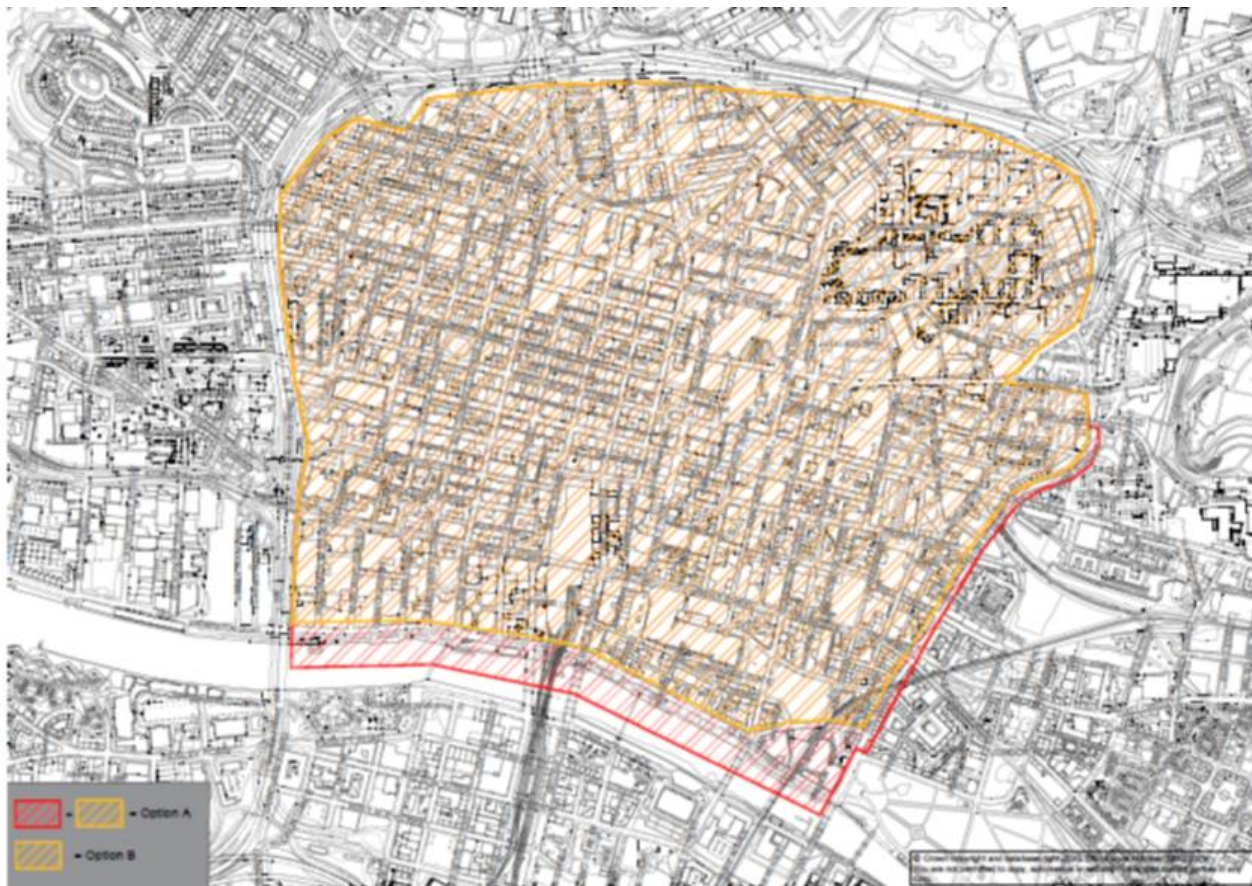
Other concerns included:

- Not needed, not an issue, emissions reducing anyway (8% of responses).
- A money making exercise for the council (8% of responses).
- Resources within Glasgow better placed elsewhere (7% of responses).
- That the scheme was displacing pollution rather than getting rid of pollution (4% of responses).

The survey asked questions about the 2 proposed Glasgow LEZ boundary options, shown in Figure 3.

- Option A includes the yellow and red shaded area;
- Option B includes only the yellow shaded area (excluding the Broomielaw, Clyde St, Saltmarket, High St and Castle St from the southern and eastern boundaries).

Figure 3 Boundary Options



Source: Glasgow City Council (GCC) - Low Emissions Zone (LEZ) Consultation - Summary of findings.

The responses show that:

- 37% prefer Option A for the city centre LEZ
- 21% prefer Option B for the city centre LEZ
- 12% choose neither option
- 21% do not support a LEZ in Glasgow
- 9% not answered

Overall, the data shows that there is more support for the implementation of LEZs in general and specifically in Glasgow city centre, than opposition.

Table 2-1 Support for LEZs in principle

	Total n=973	Resident n=75	Work in centre n=521	Visit for leisure n=631	Business owner n=37	Study n=57
Yes, support in principle	68%	79%	66%	72%	62%	75%
No, do not support	22%	16%	26%	19%	35%	16%
Don't know/no opinion	9%	5%	8%	9%	3%	9%
Not answered	1%	-	-	0%	-	-

Source: Glasgow City Council (GCC) - Low Emissions Zone (LEZ) Consultation - Summary of findings.

Table 2-2 Support for Glasgow's LEZ

	Total n=973	Resident n=75	Work in centre n=521	Visit for leisure n=631	Business owner n=37	Study n=57
Yes, support in principle	62%	77%	60%	64%	54%	65%
No, do not support	29%	20%	31%	27%	41%	30%
Don't know/no opinion	9%	3%	8%	9%	5%	5%
Not answered	1%	-	-	-	-	-

Source: Glasgow City Council (GCC) - Low Emissions Zone (LEZ) Consultation - Summary of findings.

Most residents and students are in support of LEZs in principle and the Glasgow LEZ, whereas business owners and people who work in the city are the least in favour. However, more respondents supported the Glasgow LEZ (62% stating 'yes'). When looking at responses based on the mode of transport, we see that those who cycle are significantly more in favour of LEZs (91% in support) compared to those using other modes of transport.

2.4.2 Stakeholder engagement during the IIA

In the process of the IIA, Jacobs has been in regular dialogue with the GCC staff to obtain information on the relevant elements and associated data to inform the assessment of the impacts included in this report.

We undertook a workshop on the 22nd of April 2021 with several representatives of the GCC. During the workshop, we provided a view on the main findings of the IIA ongoing process, with the aim of understanding any potential impacts not included in the analysis and obtaining additional information to support our findings. Additional information and documents were received after the workshop and, where relevant, we have included it in this report.

During the IIA, we also had dialogue with SEPA, in relation to the air quality model, and Systra, who developed the traffic model for the Glasgow LEZ. The relevant information and outcomes of these dialogues have been included in this report.

3. Analysis

3.1 Vehicle fleet analysis

One of the most important elements to evaluate is the number of vehicles that will be compliant with the LEZ requirements. This provides information on the potential number of vehicles that will need to be replaced or upgraded. Two different sources of information were analysed:

- Automatic Number of Plate Recognition (ANPR) data: the ANPR survey was conducted over a 24-hour period on January 2018 by 8 ANPR cameras located on key routes within or in the proximity of the city centre. Data included information on vehicle type, fuel and Euro standard passing through the identified locations. ANPR data provides information of the vehicles entering/exiting the LEZ but was collected for a limited period of time and is less recent compared to DVLA data.
- Driver and Vehicle Licensing Agency (DVLA) data: we requested and received information from DVLA on vehicle ownership by vehicle type, fuel and Euro standard for residents and businesses located within the Glasgow LEZ boundary and Glasgow travel to work area (TTWA)²¹ for Q3 of 2020.

The outcomes of the analysis of the two datasets are provided in the following chapters. As expected, there are some differences in the compliance rate between them, mainly for two reasons: the overall level of vehicle upgrades in the time period between the collection of the two datasets and the different geographic areas considered.

3.2 ANPR data analysis

ANPR data provides information on vehicle type, fuel and Euro standard passing through the identified locations. The fleet information was collected over a 24-hour period on January 2018 by 8 ANPR cameras located on key routes within or in the proximity of the city centre and therefore is representative of types of vehicles likely to visit the city centre in one day.

Table 3-1 Number of vehicles by fuel and Euro standard registered by ANPR cameras

Fuel	Vehicle class	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6	N.A.	Total
Diesel	Car	3	33	306	3,042	8,485	7,027	107	19,003
Diesel	Bus	2	4	133	179	106	355	3	782
Diesel	Light Goods	6	10	328	1,093	3,174	1,225	12	5,848
Diesel	Heavy Goods	0	1	15	65	269	336	91	777
Petrol	Car	3	43	592	2,582	10,172	6,209	40	19,641
Petrol	Bus	0	0	0	0	0	1	0	1
Petrol	Light Goods	0	1	3	2	3	12	1	22
Petrol	Heavy Goods	0	1	0	0	0	0	0	1
Hybrid	Car	0	0	0	35	170	233	2	440
Hybrid	Bus	0	0	0	0	0	0	0	0
Hybrid	Light Goods	0	0	0	0	0	0	0	0

²¹ TTWAs are boundaries based on statistical analysis rather than administrative boundaries. The criteria for defining TTWAs are that at least 75% of the area's resident workforce work in the area and at least 75% of the people who work in the area also live in the area. The area must also have an economically active population of at least 3,500. However, for areas with a working population in excess of 25,000, self-containment rates as low as 66.7% are accepted as part of a limited "trade-off" between workforce size and level of self-containment. The 2011 TTWAs were produced by Newcastle University, using an algorithm to identify commuting patterns from a 2011 Census matrix of commuting flow data by origin and destination for workers aged 16 and over, based on residence postcode and address of the place of work in main job.

Fuel	Vehicle class	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6	N.A.	Total
Hybrid	Heavy Goods	0	0	0	0	0	0	0	0
Electric	Car	0	0	0	0	8	48	6	62
Electric	Bus	0	0	0	0	0	2	0	2
Electric	Light Goods	0	0	0	0	3	2	0	5
Electric	Heavy Goods	0	0	0	0	0	0	0	0

Source: ANPR survey

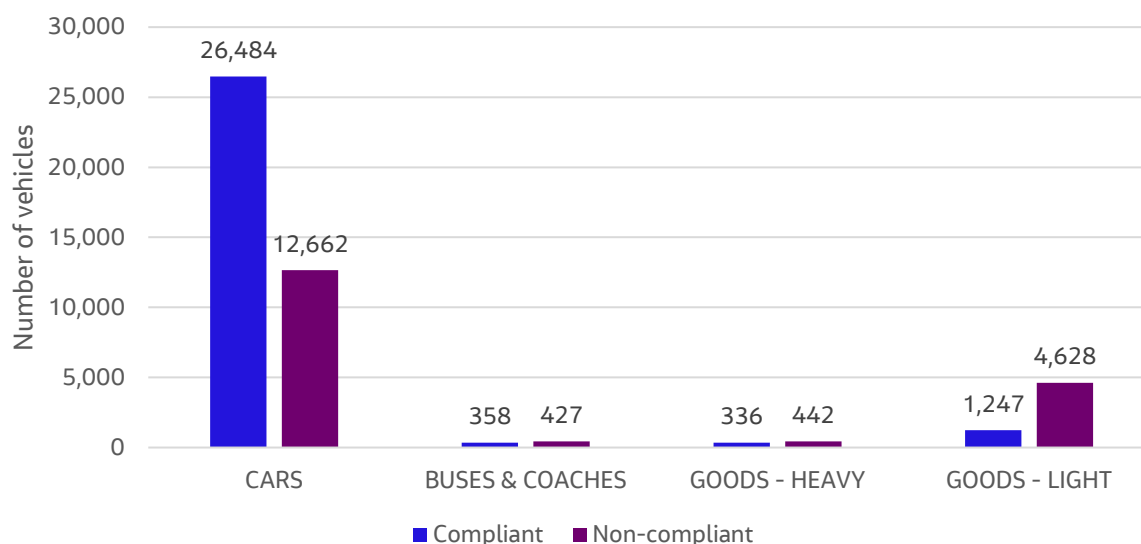
Table 3-2 and Figure 4 provides the number of vehicles compliant and non-compliant with the LEZ requirements, according to the ANPR data.

Table 3-2 Number of compliant and non-compliant vehicles from ANPR data

Vehicle class	Glasgow TTWA			
	Compliant	Non-compliant	% Compliant	% Non-compliant
Cars	6126,484	12,662	68%	32%
Buses & Coaches	358	427	46%	54%
Heavy goods	336	442	43%	57%
Light goods	1,247	4,628	21%	79%
Total	28,425	18,159	61%	39%

Source: ANPR data analysis.

Figure 4 Number of compliant and non-compliant vehicles from ANPR data

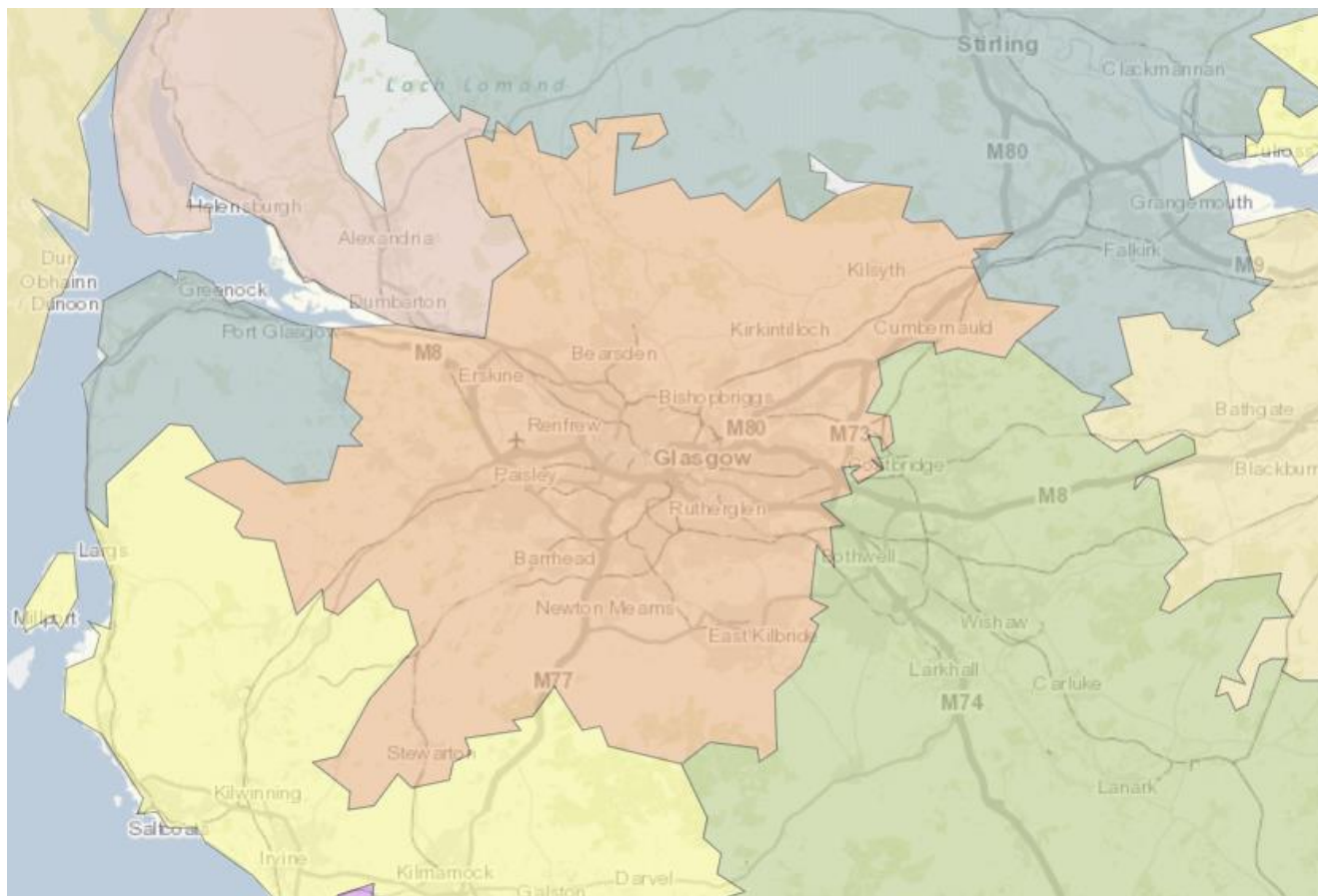


Source: ANPR data analysis

3.3 DVLA data analysis

We requested and received information from the Driver and Vehicle Licensing Agency (DVLA) on vehicle ownership by vehicle type, fuel, and Euro class for residents within the Glasgow LEZ boundary and for residents with the Glasgow travel to work area (TTWA) for Q3 of 2020.

Figure 5 Glasgow Travel To Work Area (TTWA)



Source: Office for National Statistics,

<https://ons.maps.arcgis.com/apps/MapSeries/index.html?appid=397ccae5d5c7472e87cf0ca766386cc2>

Across the Glasgow TTWA, cars, and light good vehicles (LGVs) are the most numerous vehicle categories and have a non-compliance rate of 21% and 47% respectively (ca. 117,500 cars and ca. 29,200 LGVs). The non-compliance rate is 22% for cars and 26% for LGVs considering only the vehicles registered in the LEZ area, corresponding to 580 cars and 454 LGVs.

Table 3-3 shows the number of vehicles registered in the Glasgow TTWA by fuel, Euro class and vehicle type. Vehicles included in the "Tax Exempt" category include vehicles registered as disabled, electric vehicles, historic and other vehicles. For the purpose of the IIA, these vehicles have been considered as compliant with the LEZ requirements as they are likely to be exempted. It is worth noting that this category includes both vehicles with low emission standard performances (i.e. electric vehicles) and vehicles missing information on their Euro class that are likely to include a number of vehicles with lower emission standards than the LEZ requirements (i.e. disabled, historic and other).

Regarding historic vehicles, we understand that the data provided by DVLA include in this category vehicles aged 25 years and older; while for the LEZ exemptions, historic vehicles are classified as being 30 years or older. This discrepancy is leading to a slight (due to the low numbers of this category) overestimation of the number of LEZ-exempt vehicles due to their age.

Table 3-3 Number of vehicles by fuel and Euro standard in Glasgow TTWA (2020 Q3)

Fuel	Vehicle class	Tax Exempt - Disabled	Tax Exempt - Electric	Tax Exempt - Historic	Exempt - Other	Euro 0	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6	Total
Diesel	Cars	7,939	0	0	1,880	27	32	117	4,793	25,481	71,902	101,423	213,594
Diesel	Buses & Coaches	90	0	17	67	6	13	37	278	368	645	848	2,369
Diesel	Heavy goods	0	0	0	345	25	35	77	333	491	1,399	3,937	6,642
Diesel	Light goods	272	0	47	1,495	160	212	134	1,082	11,904	15,478	29,610	60,394
Petrol	Cars	15,774	0	1,300	1,068	635	424	1,021	13,107	56,439	86,146	159,162	335,076
Petrol	Buses & Coaches	0	0	15	0	0	0	0	0	0	0	0	15
Petrol	Heavy goods	0	0	0	0	0	0	0	0	0	0	0	0
Petrol	Light goods	0	0	176	75	159	23	7	35	113	54	205	847
Other ²²	Cars	751	3,449	0	123	0	11	33	72	355	1,137	11,411	17,342
Other	Buses & Coaches	0	5	0	0	0	0	0	0	0	0	0	5
Other	Heavy goods	0	0	0	0	0	0	0	0	0	0	51	51
Other	Light goods	0	200	0	15	6	0	0	0	23	0	13	257

Source: DVLA data analysis

²² Include all alternative fuels, including hybrid vehicles. Vehicles of this category have been considered as compliant with the LEZ standards.

Table 3-4 and figures 5 and 6 provide the number of vehicles compliant and non-compliant with the LEZ requirements for vehicles registered in the Glasgow TTWA and in the LEZ. Within the LEZ, data were provided for cars and LGVs, that represent the most numerous categories.

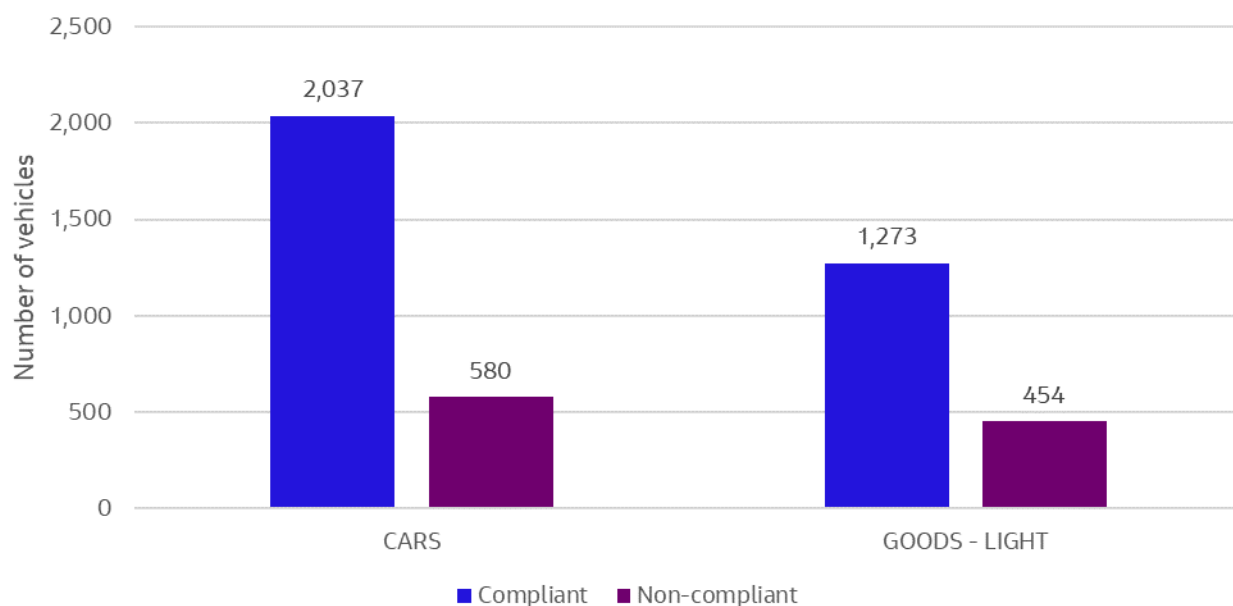
Table 3-4 Number of compliant and non-compliant vehicles in Glasgow TTWA and LEZ

Vehicle class	Glasgow TTWA				LEZ			
	Compliant	Non-compliant	% Compliant	% Non-compliant	Compliant	Non-compliant	% Compliant	% Non-compliant
Cars	448,473	117,539	79%	21%	2,037	580	78%	22%
Buses & Coaches	1,042	1,347	44%	56%				
Heavy goods	4,333	2,360	65%	35%				
Light goods	32,304	29,194	53%	47%	1,273	454	74%	26%
Total	486,152	150,440	76%	24%	3,329	1,034	76%	24%

Source: DVLA data analysis.

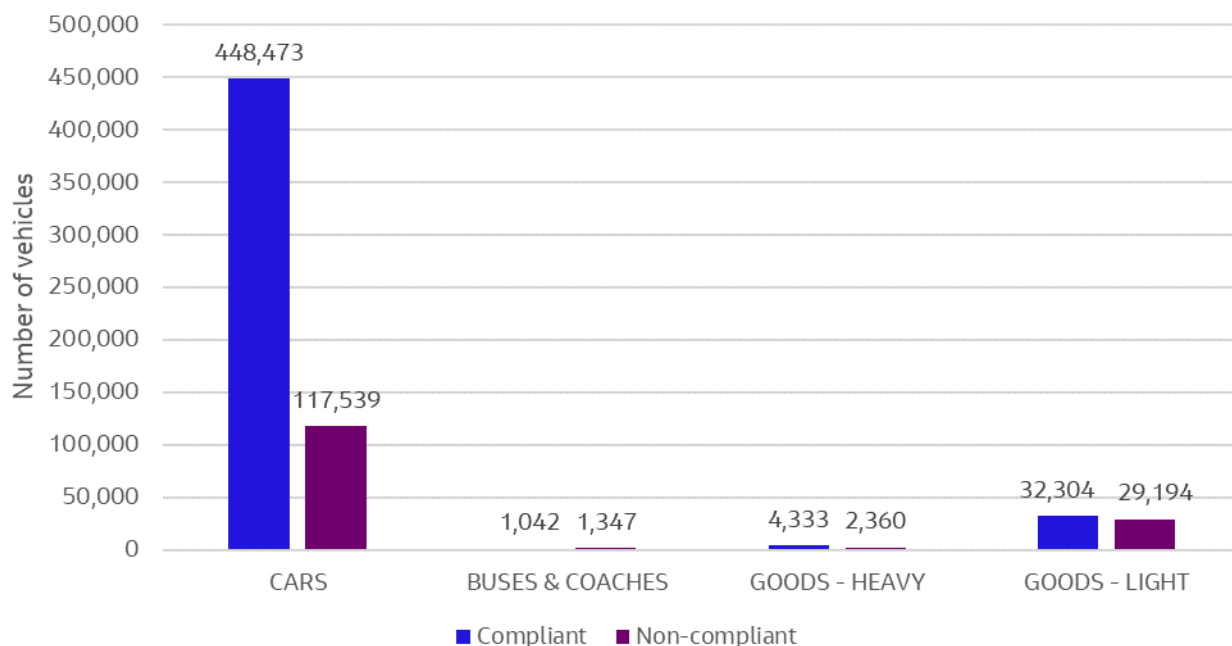
Note: DVLA data on compliant vehicles does not include vehicles that have been retrofitted.

Figure 6 Number of compliant and non-compliant vehicles in Glasgow LEZ



Source: DVLA data analysis.

Figure 6 Number of compliant and non-compliant vehicles in Glasgow TTWA



Source: DVLA data analysis.

3.3.1 Correlation between vehicle fleet and deprivation

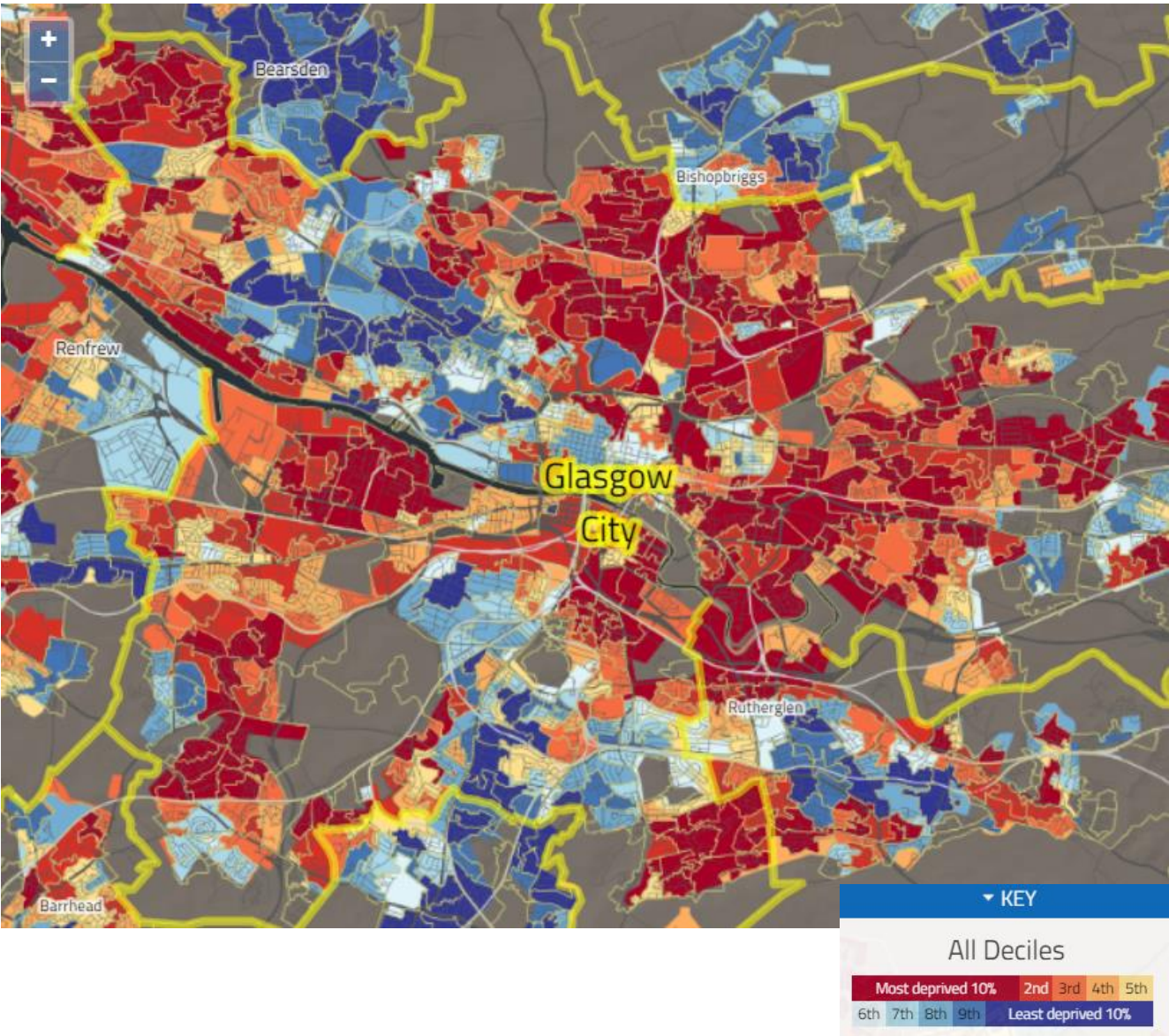
The Scottish Index of Multiple Deprivation (SIMD) is used to determine levels of deprivation in Scotland. It is based on seven different domains of income, employment, education, health, access to services, crime, and housing. A rank is assigned to each small area from 1 (most deprived zone) to 6,976 (least deprived zone).

According to the latest available data (SIMD 2020), Glasgow has a relatively high level of deprivation, if compared with the national average: 30% of the zones considered in Glasgow City are among the 10% most deprived zones in the country²³. In addition, 29% of Glasgow City population is in the most deprived SIMD decile²⁴.

²³ <https://www.gov.scot/publications/scottish-index-of-multiple-deprivation-2020v2-local-and-national-share-calculator-2/>

²⁴ <https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/population/population-estimates/2011-based-special-area-population-estimates/small-area-population-estimates/mid-2019>

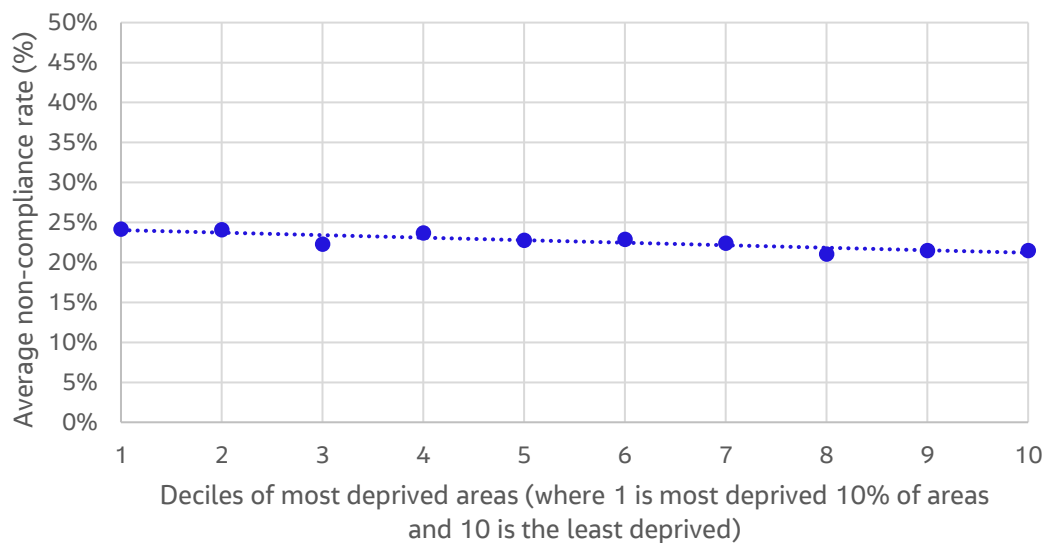
Figure 7 Scottish Index of Multiple Deprivation (SIMD) in Glasgow City



Source: Scottish Index of Multiple Deprivation. <https://www.gov.scot/collections/scottish-index-of-multiple-deprivation-2020/>

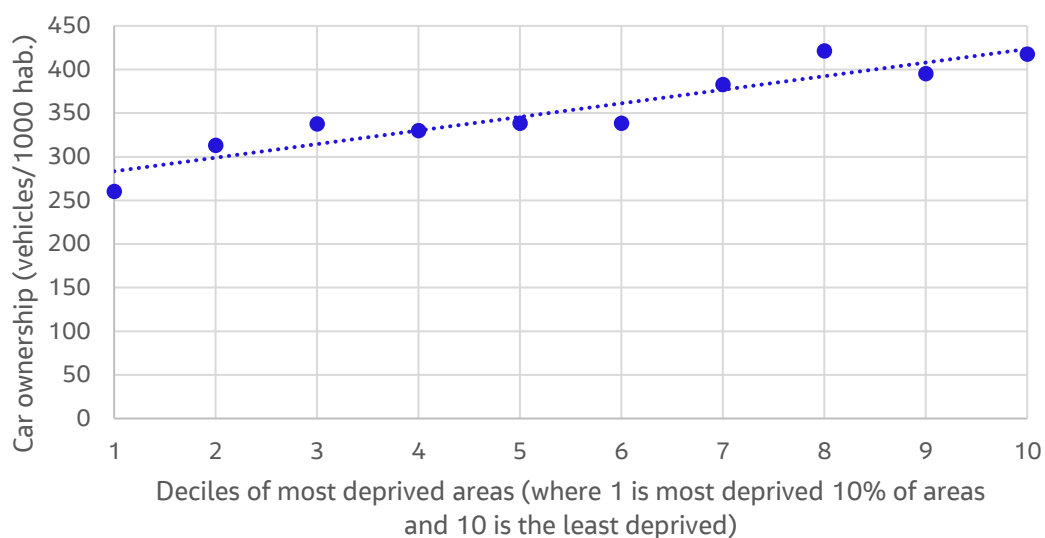
The number of non-compliant cars by location were correlated with the SIMD to determine if more deprived communities were more likely to be owners on non-compliant vehicles. As shown in Figure 8 there is a correlation between the SIMD and the share of non-compliant cars, that tends to be higher for the zones considered as the most deprived, as shown in Figure 8. Nevertheless, it is worth noting that car ownership tends to be lower in the most deprived areas, as shown in Figure 9 (data on Figure 8 and Figure 9 refer to Glasgow City). Therefore, the negative impact related to a high share of non-compliant vehicles in specific areas is reduced by the lower presence of vehicles in absolute numbers.

Figure 8 Correlation between SIMD and non-compliance rate in Glasgow City



Source: Jacobs analysis of DVLA and SIMD data.

Figure 9 Correlation between SIMD and car ownership in Glasgow City



Source: Jacobs analysis of DVLA and SIMD data.

3.3.2 Bus fleet

Figure 10 shows the proportion of all bus journeys by Euro class up to the end of 2019. The bus fleet of operators has been progressively improving to meet the LEZs requirements with 40.9% of bus journeys within the LEZ in 2019 being on a compliant bus.

Figure 10 Bus journeys through LEZ by Euro class



Source: SEPA Report: Positive Impact of Glasgow's LEZ²⁵ (Oct 2020).

Recent information was also provided by Glasgow City Council regarding the different operators' fleets:

- First confirmed that they have funding for 126 vehicles through the Scottish Ultra-Low Emission Bus Scheme (SULEBS).
- McGills' fleet should be 100% LEZ compliant by April 2021 and about 50% zero emissions by the start of 2022.
- The smaller operators are expected to be almost 100% compliant by April 2021 due to the Bus Emissions Abatement Retrofit (BEAR) scheme.

3.3.3 Taxis

Data on the age of 1,420 registered taxis (including only black cabs) has been provided by Glasgow City Council, showing a relatively old fleet. The majority of the fleet is diesel vehicles and wheelchair accessible. 996 vehicles are more than 5 years old and it can be assumed they will not comply with the LEZ regulations. Therefore, there is potentially a large number of vehicles that will need to be upgraded.

Transport Scotland reopened its taxi retrofit fund on April 2021: a total of £3.7M is available for all the mitigation grants with c. £1.7M allocated for the retrofitting in 2021/22 for Taxis, Vans and HGVs, with some flexibility depending on the uptake of the other available grants. According to Transport Scotland, just over 100 taxis were retrofitted over the previous financial year and approximately 40 of them were registered in Glasgow²⁶.

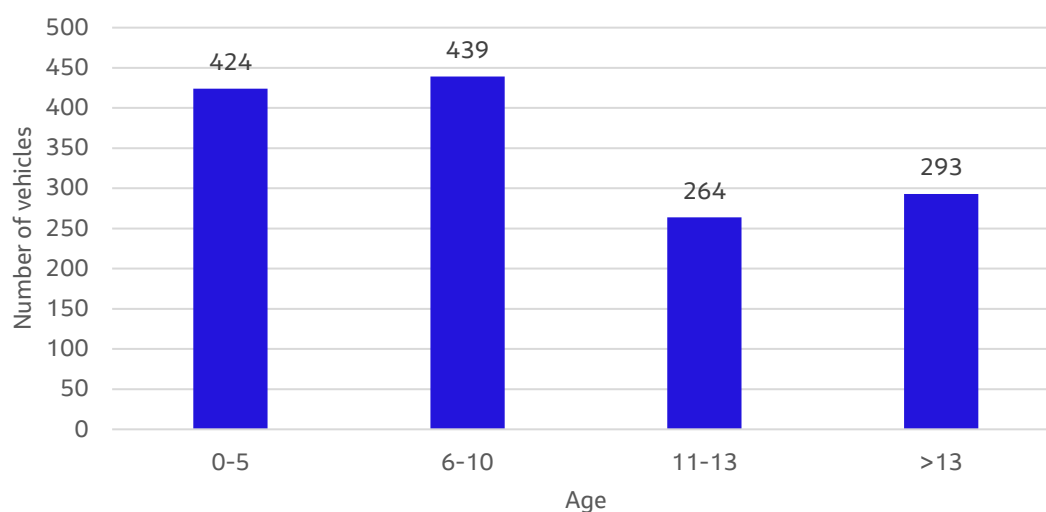
²⁵ SEPA, 2020, *Positive Impact of Glasgow's LEZ*, <https://www.glasgow.gov.uk/CHttpHandler.ashx?id=50447&p=0>

²⁶ Information received from GCC.

LPG engine retrofitting for TX4s has been common in Glasgow, while also exhaust retrofitting has received a number of recent applications. The number of makes/models which can be retrofitted is slowly increasing.

Some of the taxis currently operating are relatively old and beyond the age when they would be suitable for retrofitting to meet the LEZ requirements. According to the eligibility criteria defined by the Energy saving Trust, taxis can apply for the retrofit fund if they are not more than 13 years old. At present, of 1420 taxis, 293 are older than 13 years and therefore are not eligible. In these cases, if the applicant's vehicle exceeds the maximum age limit, it is possible for the drivers to purchase a slightly newer vehicle (although still non-compliant) suitable for retrofitting and to apply anyway for the retrofit fund, the purchase cost will need to be met by the vehicle owner but it is believed that there are many available due to the implementation of the LEZ schemes within other major UK cities.

Figure 11 Taxi fleet by age



Source: information received from GCC.

Regarding private hire vehicles, according to the information received by GCC, they will be fully compliant with the LEZ, due to the current licensing requirements.

3.4 Air quality impacts

The initial implementation of Glasgow's LEZ was ahead of the publication of National Low Emission Frameworks (NLEF). The National Low Emission Framework (NLEF) and National Modelling Framework (NMF) were then introduced to provide the tools and mechanisms to assess a LEZ; both frameworks resulted from the Cleaner Air for Scotland Strategy (CAFS) which set out proposals to further reduce air pollution to protect human health²⁷. NLEF is an air quality-focused, evidence-based appraisal process developed by Scottish Government to help local authorities consider transport related actions to improve local air quality, where transport is identified as the key contributor to air quality problems. Therefore, through this framework the Glasgow City Council is obligated to assess the potential impacts of implementing a LEZ which involves estimating vehicular movements, the resulting effect on air quality, and as wide a range of impacts as possible²⁸. This IIA is therefore part of the assessment under the NLEF; the IIA assessment takes inputs from air quality and transport modelling processes that are part of the NMF.

²⁷ Ricardo Energy and Environment, 2020, *Cleaner Air for Scotland (CAFS) strategy*, <http://www.scottishairquality.scot/lez/>

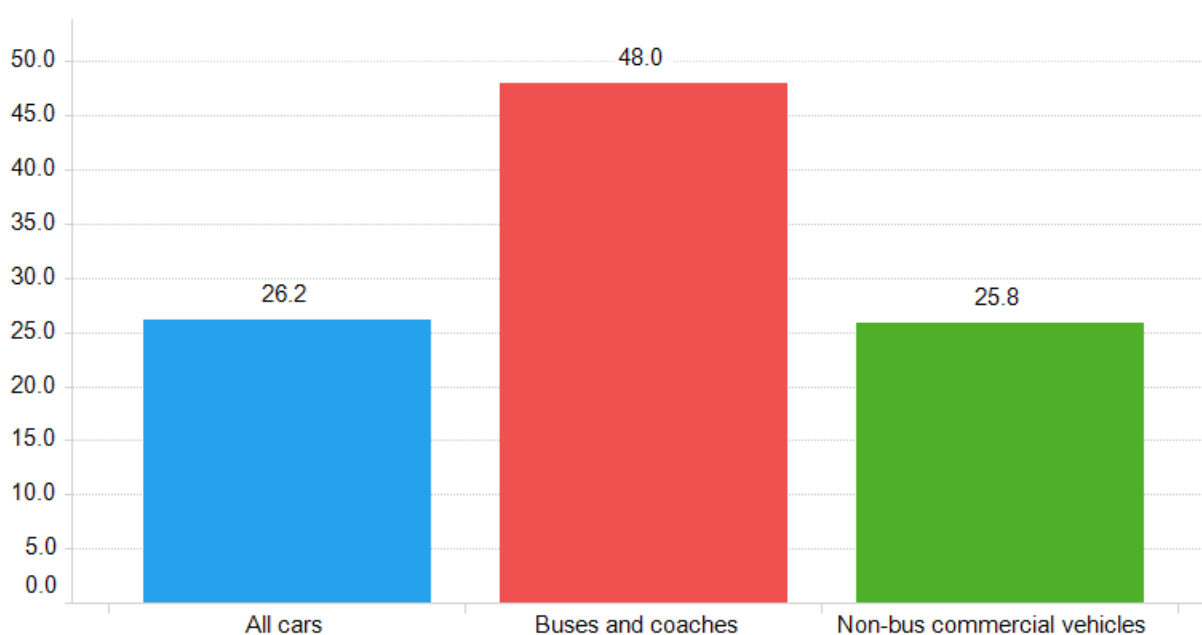
²⁸ Scottish Government, 2019, *National Low Emission Framework – 2.5.3 to 2.5.7*, <https://www.gov.scot/publications/national-low-emission-framework/>

The NMF provides a standardised approach to modelling air quality in Scotland which SEPA are currently conducting for the four cities in Scotland (Aberdeen, Dundee, Edinburgh, and Glasgow) ²⁹.

A draft Air Quality Evidence Report, dated August 2019 and based on 2017 traffic data, provides the main outcomes of the air quality modelling undertaken by SEPA.

The model shows that emissions from buses are the main source of Nitrogen Oxides (NO_x) on many roads, including those in the city centre, while diesel cars are the second biggest source of NO_x (it is worth noting that their impact is produced by a greater number of vehicles). The NO_x emissions of all cars together create a similar but higher level of air quality impact to the collective impacts of non-bus commercial vehicles (LGV's, Rigid HGV's, Taxis and Artic, HGV's), as shown in Figure 12.

Figure 12 Percentage contribution to annual average total NO_x within a zone for each vehicle type



Source: SEPA - Cleaner air for Scotland – National Modelling Framework

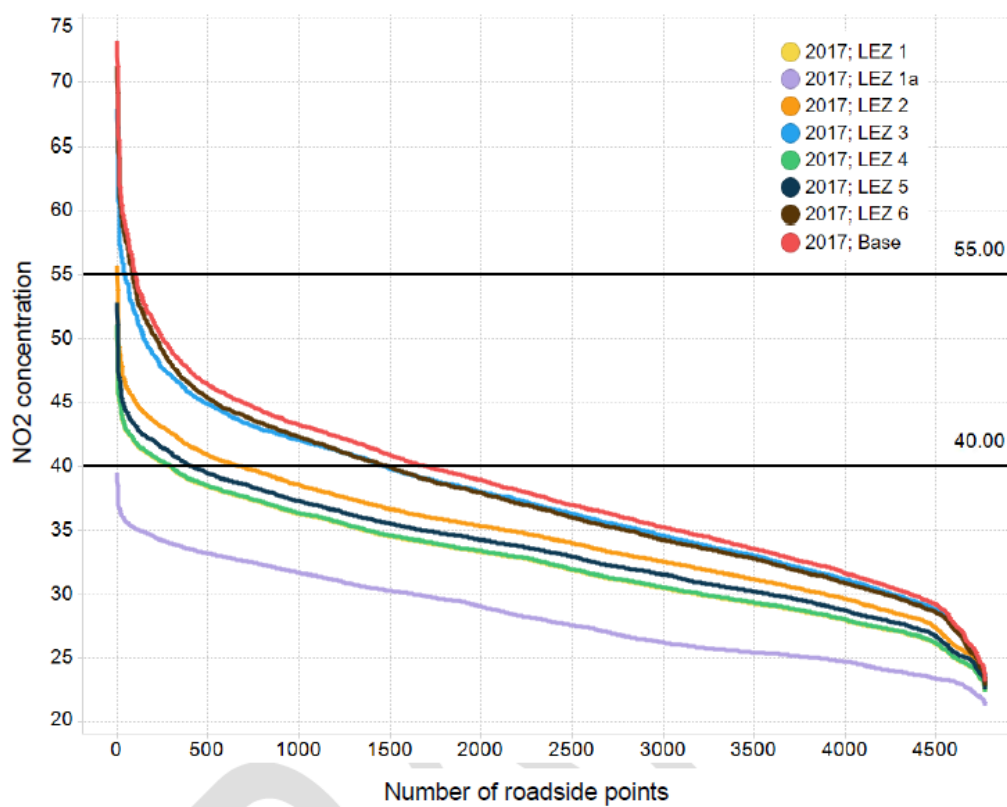
The air quality model was run for a number of scenarios, described in Table 3-5, assuming the same traffic flows and speed of the Base scenario 2017 but improved emissions from the vehicle fleet. Figure 13 shows that for each scenario assuming higher vehicle emission standards, the number of roadside points lying above the annual average NO₂ limit value of 40 µg m⁻³ is lower compared to the base case.

²⁹ Ricardo Energy and Environment, 2020, *Cleaner Air for Scotland (CAFS) strategy*, <http://www.scottishairquality.scot/lez/>

Table 3-5 LEZ scenarios definition

Scenario	Description
LEZ1	Vehicles classed as Euro 1 to 5 have been changed to Euro 6
LEZ1a	Buses and Coaches, HGV's have been changed to Euro 6. Petrol Cars and Petrol LGV's have been changed to Euro 6c. Diesel Cars, LGV's and Taxis have been changed to Euro 6d
LEZ2	Buses and Coaches have been changed to Euro 6. Other vehicles are unchanged
LEZ3	Buses and Coaches classed as Euro 1 to 4 have been changed to Euro 5. Other vehicles are unchanged
LEZ4	Buses and Coaches, HGV's, Diesel LGV's, Taxis, Diesel Cars have been changed to Euro 6. Petrol Cars classed as Euro 1 to 3 have been changed to Euro 4
LEZ5	Buses and Coaches, HGV's, LGV's and Taxis (i.e., Buses/Coaches and Non-Bus Commercial) classed as Euro 1 to 5 have been changed to Euro 6. Diesel and Petrol Cars are unchanged
LEZ6	Diesel and Petrol Cars classed as Euro 1 to 5 have been changed to Euro 6. Buses and Coaches, HGV's, LGV's and Taxis unchanged

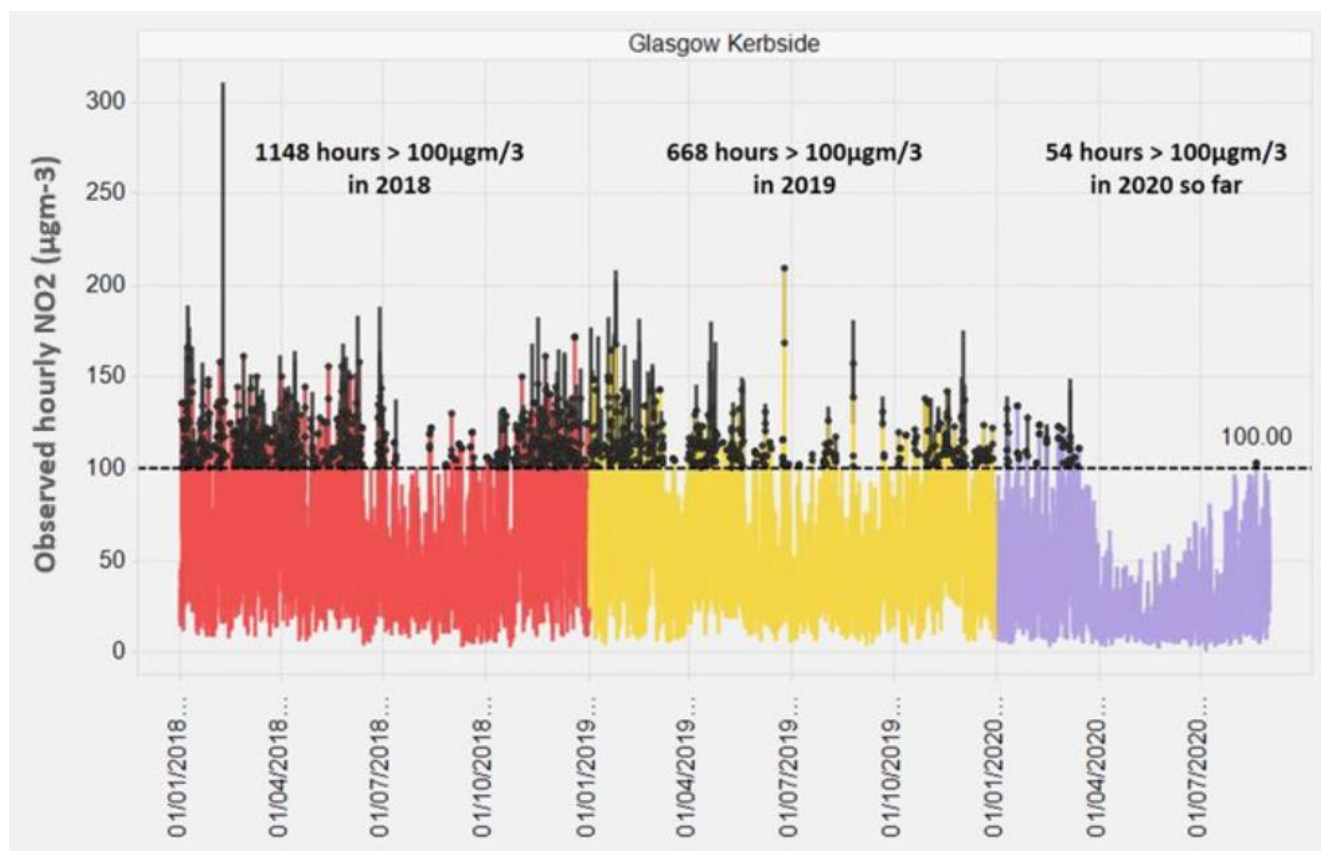
Source: SEPA - Cleaner air for Scotland – National Modelling Framework.

Figure 13 Distribution of Annual Average NO₂ at roadside points for different scenarios


Source: Source: SEPA - Cleaner air for Scotland – National Modelling Framework.

The correlation between vehicles' emission standards and air pollution is also confirmed by the actual data on air quality registered in recent years. Data collected at Hope Street from the beginning of 2018 to the end of August 2020 show the positive impact of the LEZ (introduced on buses) in terms of NO₂ concentrations. As shown in Figure 14, there is a reduction in the number of hours each year where NO₂ concentrations peaked over 100 $\mu\text{g m}^{-3}$ during 2019, with a greater reduction in the second half of 2019. Over this period, there were progressive changes to bus operator fleets, with an increase in Euro VI vehicles used on services through Glasgow's LEZ and along Hope Street.

Figure 14 Observed hourly NO₂ (µgm⁻³) concentrations at the Kerbside automatic monitor on Hope Street from the beginning of 2018 to August 2020



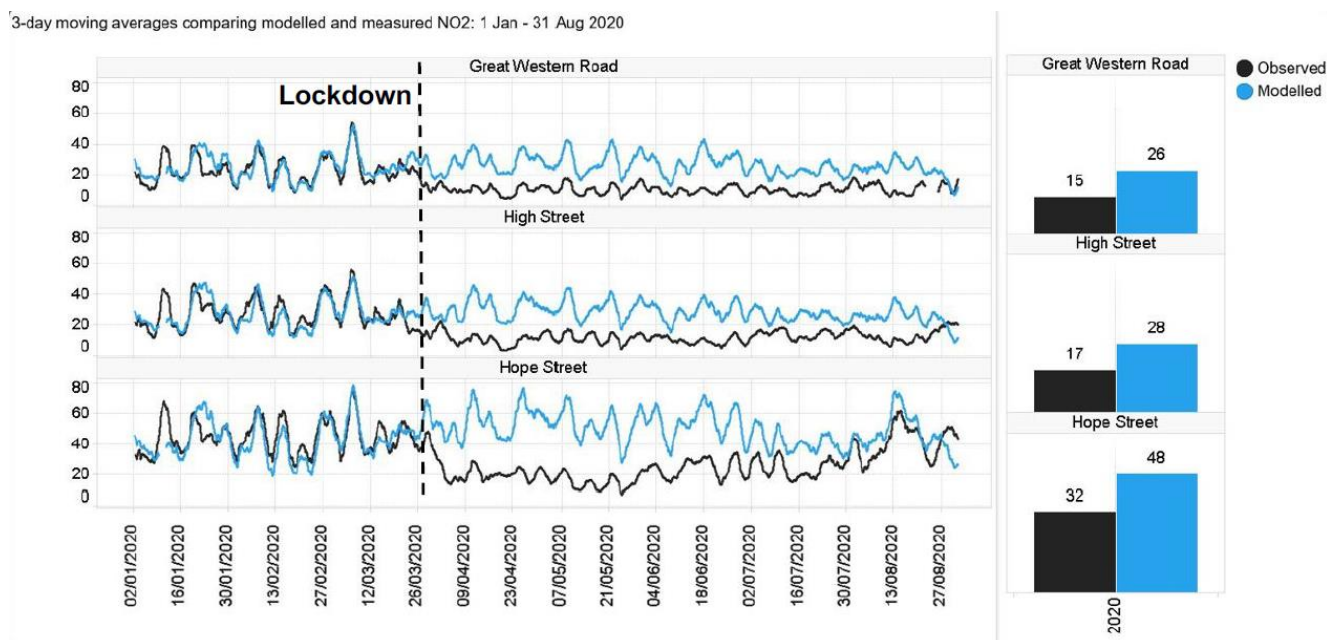
Source: SEPA Report: Positive Impact of Glasgow's LEZ (Oct 2020).

<https://www.glasgow.gov.uk/CHttpHandler.ashx?id=50447&p=0>

The emission standard of the vehicle fleet is a fundamental factor influencing air pollution. There is clear evidence of the correlation between air pollution and traffic volumes, as demonstrated by the data registered during the lockdown period caused by the Covid pandemic. Traffic flows registered along High Street, Great Western Road and Hope Street decreased to their lowest levels at the beginning of April 2020, with reductions of around 50%, 60% and 85% respectively. From May 2020, traffic levels started recovering gradually.

SEPA has tested the Glasgow NMF model to provide an indication of what the NO₂ concentrations would have been at Great Western Road, High Street and Hope Street if traffic levels had remained at normal levels without lockdown restrictions during 2020. The results in Figure 15, provides the three-day moving average of observed and modelled NO₂ concentration, and the average up to the end of August. Modelled and observed NO₂ concentrations are very similar before the beginning of lockdown at the end of March. From April, the observed NO₂ concentrations at the three sites reduce for much of the period, due to the reduction in traffic volumes caused by the lockdown measures. The bar charts show the average observed and modelled NO₂ concentrations, suggesting that traffic related NO₂ concentrations reduced to 60% of normal levels during the period considered.

Figure 15 Three-day moving averages of modelled and observed NO₂ concentrations



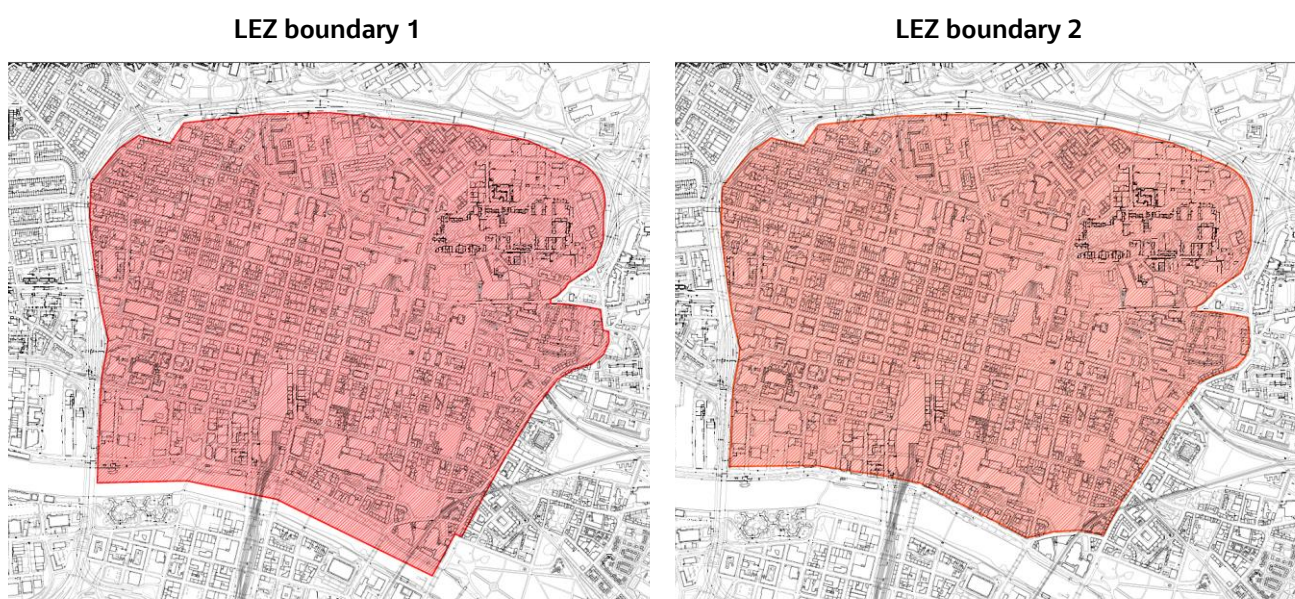
Source: SEPA Report: Positive Impact of Glasgow's LEZ (Oct 2020).

<https://www.glasgow.gov.uk/CHttpHandler.ashx?id=50447&p=0>

3.5 Displaced traffic

Information provided by Systra was reviewed to identify possible issues related to displaced traffic. The information provided did not allow us to identify if there will be specific locations facing a significant vehicle increase due to traffic displacement arising from the LEZ introduction. Two slightly different boundary options were tested by Systra in the traffic model, as shown in Figure 16. The difference between the two proposals is that High Street and Broomielaw are within the LEZ boundary 1 and outside the LEZ boundary 2.

Figure 16 LEZ boundaries tested in the traffic model



Source: Systra Report – GCC LEZ Traffic Modelling.

However, Systra estimates a relatively low number of displacements in terms of cars. The results are shown Table 3-4 below for AM and PM peaks, for 2 different LEZ boundaries tested and assuming a 2023 fleet.

Table 3-6 Number of displaced vehicles on peak hours

	Total trips	2023 fleet, displaced cars	% of total trips
AM, Boundary 1	30,948	608	2.0%
PM, Boundary 1	41,425	709	1.7%
AM, Boundary 2	29,629	334	1.1%
PM, Boundary 2	39,150	339	0.9%

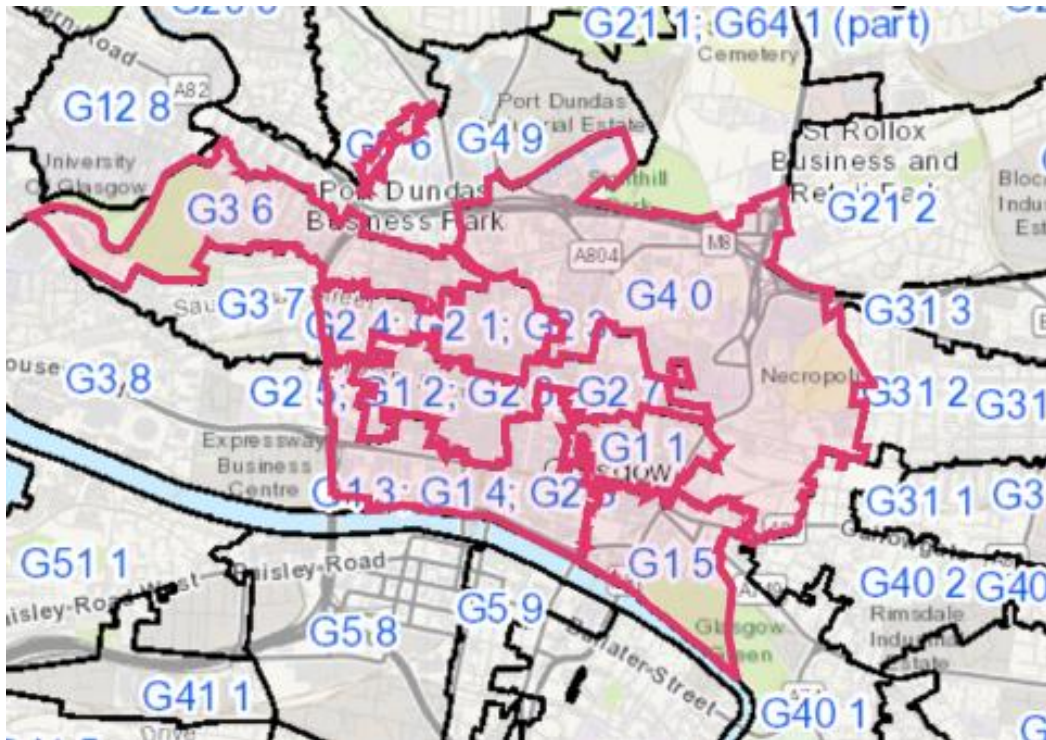
Source: Systra Report – GCC LEZ Traffic Modelling.

3.6 Data sources

Several sources of information were retrieved to provide a robust view of the likely impacts on different groups within the LEZ. Demographic, air quality, vehicle fleet compliance levels, including both publicly available databases and data provided by members of the GCC and other companies involved in the LEZ process were considered in the analysis. Whenever possible, we retrieved local data specific for the LEZ area or the wider Glasgow City area. Different geographies have been considered, depending on the source available:

- The most recent Census data from 2011 was used to understand demographic characteristics of the resident population within the LEZ. Data were retrieved for the boundary shown in Figure 17, that include different zones identified by postcode. The data extracted from the selected area can be considered representative of the future LEZ area.
- Ward 10 (Anderston/City/Yorkhill) from the census was used to provide demographic data. The boundary of Ward 10 is shown in Figure 18 and includes the future LEZ area.
- DVLA provided vehicle data by type, age, and Euro class for the LEZ area and Travel To Work Area (TTWA). Details on the TTWA boundary and its definition are provided in Section 3.3.
- Scottish Index of Multiple Deprivation (SIMD) was used to identify potential impacts in relation to the level of deprivation of different areas in the LEZ and Glasgow City. In Figure 19, the green bullets are SIMD areas that fall within the LEZ area.

Figure 17 Data boundaries considered for Census 2011



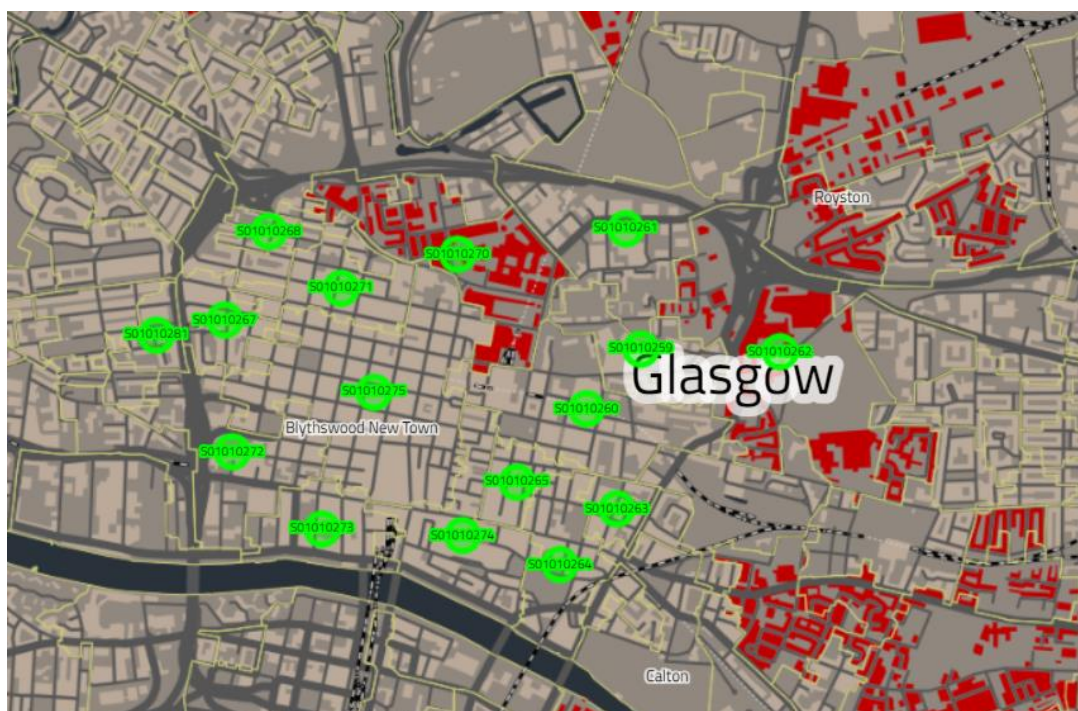
Source: Scotland Census 2011. <https://www.scotlandscensus.gov.uk/ods-web/standard-outputs.html>

Figure 18 Data boundaries considered for Anderston/City/Yorkhill – Ward 10



Source: Glasgow City Council website. <https://www.glasgow.gov.uk/article/18820/Local-Ward-Factsheets>

Figure 19 Data boundaries considered for Scottish Index of Multiple Deprivation (SIMD) data



Source: SIMD 2020.

Table 3-7 Sources of information for the IIA

Evidence	Available?	Comments: what does the evidence tell you?
Data on population in need	Yes	<p>Population data were retrieved from different sources:</p> <ul style="list-style-type: none"> National Records of Scotland-Mid-2019 Small Area Population Estimates; Census 2011; Glasgow Household Survey 2019. <p>Data were analysed with respect to age, religion, disabilities, minority ethnicities in the LEZ area, if available, or for Glasgow City. In addition, information was provided by GCC contacts.</p>
Data on service uptake/access	Yes	<p>Nomisweb data on local companies and number of jobs were retrieved, specifically for the LEZ area.</p>
Data on equality outcomes	Yes	<p>The following sources were consulted to understand the level of deprivation in the study area and assess any issues in relation to equality:</p> <ul style="list-style-type: none"> The Scottish Index of Multiple Deprivation (SIMD); National Records of Scotland Mid 2019 Small Area Population Estimates; Equality evidence finder; Equality Impact Assessment (EqIA) for Glasgow Transport Strategy.

Evidence	Available?	Comments: what does the evidence tell you?
Research/literature evidence	Yes	The document " <i>Estimating the health impact of air pollution in Scotland, and the resulting benefits of reducing concentrations in city centres</i> ", dated 2019, is one of the most recent studies showing a clear correlation between air pollution and respiratory diseases.
Public/patient/client experience information	No	
Evidence of inclusive engagement of service users and involvement findings	Yes	The LEZ Consultation undertaken in 2020 by the Glasgow City Council reports provides evidence of the support of interviewed people for the LEZs in principle and Glasgow's LEZ specifically.
Evidence of unmet need	No	
Good practice guidelines	Yes	National regulations for LEZs: <ul style="list-style-type: none"> ▪ The Low Emission Zones (Emission Standards, Exemptions and Enforcement) (Scotland) Regulations 2021³⁰; ▪ The Low Emission Zones (Scotland) Regulations 2021³¹.
Environmental data	Yes	Report from SEPA ³² on Glasgow's LEZ provides data from: <ul style="list-style-type: none"> ▪ automatic monitors and diffusion tubes in city centre, including NO₂, PM₁₀ and PM_{2.5} concentration; ▪ Glasgow NMF model on pollutant concentration. Both data sources show that some areas of the city centre are failing to meet the annual mean concentration required to protect human health. In addition, we were given access to a Spotfire interactive tool, with data on vehicle fleet, air pollution levels and simulations from the air quality model.
Risk from cumulative impacts	No	
Other (please specify)	Yes	The following sources of information were reviewed: <ul style="list-style-type: none"> ▪ Data on vehicles characteristics in the TTWA were provided by DVLA; ▪ Data on displacements were retrieved from the Systra traffic model for Glasgow's LEZ.

³⁰ Scottish Government. <https://www.legislation.gov.uk/sdsi/2021/9780111048887/contents>

³¹ Scottish Government. <https://www.legislation.gov.uk/ssi/2021/26/contents/made>

³² SEPA Report: Positive Impact of Glasgow's LEZ (Oct 2020). <https://www.glasgow.gov.uk/CHttpHandler.ashx?id=50447&p=0>

3.7 Differential impacts by population groups

The total population of Glasgow City was around 633,000 people in 2019, including 19,000 residents in the LEZ area. 85,000 residents in Glasgow City are aged 65 years and older (ca. 13% of total population), while in the city centre only 1,200 people (6%) are aged 65 years and older³³.

It is estimated that there are around 150,000 jobs within the LEZ³⁴. By comparing job numbers with the number of residents in the LEZ (20,000 people), it is clear that there are a large number of frequent commuters to the city centre, that will also be impacted by the LEZ introduction if commuting by car.

However, only 30% of commuters into Glasgow city centre, travel to work by car (excluding those working from the home). This is significantly lower when compared to around 50% for those travelling work to all destinations in Glasgow City. In terms of traffic volumes, around 40,000 journeys are made by car every day to the city centre, from a total of around 160,000 travellers to work throughout the city as a whole (including drivers and passengers)³⁵.

Residents in the LEZ area and regular commuters to the city centre will be the most impacted by the LEZ introduction, both positively and negatively. People visiting the city centre for shopping and other activities will also be impacted by the LEZ. In 2015, 2.2 million overnight visits were recorded in Glasgow city, most of them including activities in the city centre³⁶.

Table 3-8 Impacts by population groups

Population Groups	Differential impacts (how may each group be affected in different ways?)
People with protected characteristics	
Older people and people in their middle years	<p>Glasgow population is relatively young compared to the rest of Scotland. In Glasgow City, 13% of people is aged 65 years or older, compared to the 19% of the whole country. This share is even lower for Glasgow city centre, where only 6% of the population is aged 65 years or older.</p> <p>Older people (residents and visitors) and people in their middle years will benefit from the reduction in emissions and the improved air quality in the city centre following the introduction of the LEZ, particularly those suffering with respiratory illnesses.</p>
Young people and children	<p>6.5% of residents in Ward 10 of Glasgow (that includes the city centre) are aged below 16 years old³⁷.</p> <p>Young people and children are one of the categories that will benefit differentially from the air quality improvement that the LEZ will bring, particularly those with respiratory illnesses.</p> <p>This benefit will be perceived not only by residents, but also by young people and children visiting the city centre, e.g. students. Pupils attending the 2 primary schools within the LEZ (Garnetbank and St. Mungo's) will also benefit from improved air quality.</p>

³³ <https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/population/population-estimates/2011-based-special-area-population-estimates/small-area-population-estimates/mid-2019>

³⁴ <https://www.nomisweb.co.uk>

³⁵ Glasgow City Council Workplace Parking Levy Scoping Study

³⁶ Scotland visitor survey 2015 & 2016

³⁷ Glasgow City Council - City Ward Factsheets 2017 - Ward 10 - Anderston/City/Yorkhill

Population Groups	Differential impacts (how may each group be affected in different ways?)
Men (including trans men), Women (including trans women) and Non-binary people (Include issues relating to pregnancy and maternity including same sex parents)	<p>Health benefits related to improved air quality are applicable to all people living, working, or visiting the LEZ particularly those who suffer from respiratory illnesses.</p> <p>Men are slightly more likely to travel than women and drive more frequently, therefore may be more impacted by the LEZ. Men are also more likely to cycle to work and walk and cycle more frequently. Women use buses more frequently than men and are less likely to have a driver's licence than men, therefore they may be less impacted by the LEZ³⁸.</p>
Disabled people (includes physical disability, learning disability, sensory impairment, long-term medical conditions, mental health problems)	<p>30% of respondents to the Glasgow Household Survey 2019 said that they (or someone in their household) had a long-term illness, health problem or disability which limits their daily activities or the work they can do³⁹.</p> <p>Within the LEZ, according to Census 2011 data, 3,400 people of 23,450 residents had a disability limiting their day-to-day activities (with the majority being male (54%))⁴⁰.</p> <p>GCC has issued blue badges to 21,815 people in Glasgow. No detailed information is available on their home locations. In addition, there are 100 vehicle tax registered disable vehicles within the LEZ, increasing to around 25,000 in the Glasgow TTWA.</p> <p>We expect a limited direct impact on blue badge holders or owners of vehicles for disable people, as these user categories will be exempt from the LEZ requirements. In addition, disabled people are less likely to drive and more likely to use buses, compared to non-disabled people⁴¹.</p> <p>Impacts experienced by those providing care support for vulnerable people may adversely affect those receiving care, for example, if the cost of care is increased.</p> <p>Carers who own a non-compliant vehicle and cannot afford to upgrade it may have to increase the cost or reduce the quantity of the care they provide, to offset the charge, where this is not paid by their employer.</p> <p>The fleet owned by Glasgow City Council Social Services will be fully compliant at the time of implementation of the LEZ scheme. However, it is worth noting that GCC staff may use their personal vehicles for work purposes and the compliance levels of these vehicles is unknown. Therefore there is a risk that services provided by GCC staff to vulnerables people may be negatively impacted if the staff personal vehicles are not upgraded to be compliant.</p>

³⁸ Equality Impact Assessment (EqIA): screening form <https://www.glasgow.gov.uk/transportstrategy>

³⁹ Glasgow Household Survey 2019 – Report for Glasgow City Council

⁴⁰ Census 2011 data

⁴¹ Equality Impact Assessment (EqIA): screening form <https://www.glasgow.gov.uk/transportstrategy>

Population Groups	Differential impacts (how may each group be affected in different ways?)
<p>Minority ethnic people (includes Gypsy/Travellers, migrant workers, non-English speakers)</p>	<p>According to Census 2011 data, within the LEZ, 23% of people identify as non-white, with the largest communities being Chinese (7.3%, i.e. 1,700 people), Indian (3.5%, i.e. 830 people) and Pakistani (3.2%, i.e. 750 people).</p> <p>Some minority ethnic people, particularly non-English speakers, may struggle to be aware of the introduction of the LEZ. If they travel within the city centre with a non-compliant vehicle, they may incur fines and subsequently face financial issues.</p> <p>The equality evidence finder provides data at national level and suggests the minority ethnic groups are more likely to be in poverty compared to white-British. E.g. 33% of people from mixed, black, black British and other ethnic groups, and 31% of 'Asian or Asian British' ethnic groups were in relative poverty before housing costs. In comparison 16% of 'White - British' people were in relative poverty⁴². This may limit their ability to upgrade any non-compliant vehicles that they have access to.</p> <p>At national level, the ethnic groups most likely to have access to a car or van at the time of the 2011 Census were White: Other British and Pakistani (both 83% of households). African households, at 47%, were least likely to have access to a car, followed by Caribbean or Black⁴³.</p>
<p>Refugees and asylum seekers</p>	<p>The Scottish Refugee Council are located within the LEZ boundary. Refugees and asylum seekers are likely to have very low income levels and will be negatively impacted if any vehicles that they have access to are non-compliant.</p> <p>Nevertheless, the car ownership of this specific population group is likely to be significantly lower than for the population as a whole and this will reduce the impact on this group.</p>
<p>People with different religions or beliefs (includes people with no religion or belief)</p>	<p>There are several locations for religious congregation and places of worship in the city centre. These include: Church of Scotland, St. George's Tron, The Apostolic Church, St. Aloysius Church, Society of Saint Pius X, St. Columbia Church, Garnethill Hebrew Congregation.</p> <p>People relying on non-compliant cars and that are not able to change their vehicle may find it more difficult to access these locations, with the potential for negative impacts on their wellbeing.</p>
<p>Lesbian, gay, bisexual, and heterosexual people</p>	<p>People of non-heterosexual orientation are potentially more likely to use their own cars to go to the city centre due to concerns over their personal security using public transport. Of these, some may be using a non-compliant vehicle. This issue may be relevant particularly for trips done at night-time, that may be foregone.</p> <p>Local data on sexual orientation are not available, but at national level, 2% of adults identified as Lesbian, Gay, and Bi-sexual and</p>

⁴² Equality Evidence Finder: <http://www.equalityevidence.scot/>

⁴³ Equality Evidence Finder: <http://www.equalityevidence.scot/>

Population Groups	Differential impacts (how may each group be affected in different ways?)
	<p>Other, 3% do not know or refused to answer⁴⁴.</p> <p>According to the Glasgow Household Survey 2019, 22% of all respondents are worried about being insulted, pestered, or intimidated. By protected characteristics this breaks down into 10% worried about sectarianism, 6% in relation to their ethnic origin, disability, religion, gender, 4% in relation to their age, 3% their sexual orientation, 2% their trans status). Among the respondents who experienced hate crime or harassment, 8% reported that it happened on public transport.</p>
People who are unmarried, married or in a civil partnership	No readily identified impacts.
Those vulnerable to falling into poverty	
Unemployed	<p>Due to lower income, these groups are less able to upgrade a non-compliant vehicle. They may experience a potentially negative impact on their ability to take up a job within the LEZ if they do not have easy access to affordable public transport or active travel alternatives. Nevertheless, unemployed and people on benefits are less likely to have access to a car, due to low income.</p>
People on benefits	
Single parents	<p>Due to lower income, single parents who own a non-compliant vehicle may have difficulties in upgrading it and as a result potentially have reduced access to formal and informal childcare within the LEZ.</p>
Vulnerable families e.g. young mothers, people experiencing domestic abuse, children at risk of statutory measures	<p>Potentially lower access to nurseries, schools, and support groups within the LEZ (e.g. Glasgow Women's Aid office and Turning Point Scotland, located in the city centre) if they do not have access to a compliant vehicle, public transport, or active travel alternative.</p>
Pensioners	<p>The share of older people within the LEZ is lower compared to Glasgow City and the Scottish average. Pensioners who own a non-compliant vehicle, may face financial constraints upgrading it. Nevertheless, people over 60 are eligible to receive free bus passes and may have a higher propensity to modal shift (over a third of bus journeys are by concessionary pass holders and older people are more likely to use the bus than average⁴⁵). Older people are also less likely to drive every day and less likely to hold a driving license than average.⁴⁶</p>
Looked after children and young people	<p>"The Fostering Network" is located within the LEZ. There is a potential risk of lower access for visitors and staff if they do not have access to a compliant vehicle, public transport, or active travel alternatives.</p>

⁴⁴ Sexual orientation in Scotland 2017: summary of evidence base. <https://www.gov.scot/publications/sexual-orientation-scotland-2017-summary-evidence-base/pages/3/>

⁴⁵ Equality Impact Assessment (EqIA): screening form <https://www.glasgow.gov.uk/transportstrategy>

⁴⁶ Equality Evidence Finder: <http://www.equalityevidence.scot/>

Population Groups	Differential impacts (how may each group be affected in different ways?)
Those leaving care settings (including children and young people and those with illness)	Care leavers have a higher risk of lower incomes which could hinder them from travelling within the LEZ if they do not have access to public transport or active travel alternatives and are currently using a non-compliant vehicle to access the city centre.
Homeless people	The Glasgow City Mission is located in the city centre and provides support to homeless people, including emergency overnight accommodation. Homeless people may be indirectly impacted if volunteers do not have access to a compliant vehicle, public transport, or active travel alternatives
Carers (including young carers and carers with protected characteristics)	Carers who own a non-compliant vehicle and cannot afford to upgrade it may have to reduce the quantity or increase the cost of the care they provide.
Those involved in the criminal justice system	The High Court of Justiciary is Located within the LEZ boundary. There is a potential risk of lower access for visitors and staff if they do not have access to a compliant vehicle, public transport or active travel alternatives In addition, there may be a possible issue in relation to the transport of prisoners: GeoAmey is responsible for these services, but no information was available on the level of compliance of their vehicle fleet.
Those living in the most deprived communities	<p>People living in more deprived communities may be more affected by the introduction of the LEZ as they are likely to have a larger financial challenge in upgrading any non-compliant vehicles that they use.</p> <p>16 SIMD zones have been identified within the LEZ border: according to the latest available data (SIMD 2020), 2 areas are in the most deprived decile and 4 in the most deprived quintile of the whole country.</p> <p>Considering all Glasgow City, 745 SIMD zones have been included in the analysis: among these, 30% are in the most deprived decile and 45% in the most deprived quintile of the whole country.</p> <p>People living in the most deprived areas are more likely to have a non-compliant vehicle and to have difficulties in upgrading it. Nevertheless, it is worth noting that car ownership tends to be lower in the most deprived areas compared to the average (see Section 3.3.1). Across Glasgow City, 11,270 cars are estimated to be registered in the areas included in the 10% most deprived areas; and 18,339 cars in the 20% most deprived areas.</p>
People with low literacy/numeracy	Non-English speakers or people with low literacy/numeracy, may not be aware of the introduction of the LEZ. If they travel within the city centre with a non-compliant vehicle, they may incur in fines and financial issues.
People misusing substances	Potentially lower access to support groups within the LEZ (Turning Point Scotland, located in the city centre) if they do not have access to a compliant vehicle, public transport, or active travel alternative.

Population Groups	Differential impacts (how may each group be affected in different ways?)
Others e.g. veterans and students	<p>Strathclyde University and Glasgow Caledonian University are located in the city centre. Students may see a reduction in access if they rely on a non-compliant vehicle and are unable to transfer to active or public transport modes.</p> <p>Students are less likely to own a car compared to other population groups. There are few parking spaces for student residents in the LEZ, but there may be students travelling in the LEZ that may arrive by car. The number of total students at Glasgow Caledonian University and Strathclyde University in the academic year 2019/20 was 17,540 and 24,330 respectively. This number includes 2,210 and 4,880 non-UK domiciled students⁴⁷, that are even less likely to own a car.</p>
Geographical communities	
<ul style="list-style-type: none"> • Rural/ semi-rural communities • Urban communities • Coastal communities • Business community 	<p>Due to Glasgow's position as an economic hub in the central belt of Scotland, those from surrounding rural/semi-rural communities may regularly visit the city for leisure, work or study. These communities may be adversely affected by the LEZ due to being forced to upgrade due to lack of viable alternative modes of transport caused by their location. This may result in consumer welfare loss.</p> <p>Census 2011 data showed that of the 165,920 travelling into Glasgow (local authority area) for work, 99,278 travelled via car or van which is around 60%. Although this includes a much larger geographical area than the LEZ, it highlights the reliance on private vehicle transport for people from Glasgow's surrounding areas, who may be from rural/semi-rural communities⁴⁸.</p>
Employees	
<ul style="list-style-type: none"> • Full-time • Part-time • Shift workers 	<p>Shift workers with a non-compliant vehicle will have less public transport alternatives, particularly at night, to commute to/from the LEZ. This will result in potential issues in keeping or finding a job in the city centre for specific employee categories (e.g. people working in nightclubs and bars, receptionists, people working in emergency services, cleaners etc).</p>

⁴⁷ HESA - Higher Education Student Data

⁴⁸ Nomis, 2014, *Location of usual residence and place of work by method of travel to work*, <https://www.nomisweb.co.uk/census/2011/wu03uk>

4. Equality, health and wellbeing and human rights

4.1 Introduction

In this chapter, we present the positive and negative impacts identified in relation to equality, health and wellbeing and human rights.

Air quality benefits are the most relevant direct consequence of the LEZ introduction and will benefit all people living, working, and visiting within the zone. In accordance with the NHS Lothian IIA guidelines we assess all impacts, positive and negative, in relation to the introduction of the LEZ. However, it is important to bear in mind that the scale of each impact will vary widely depending on the numbers of individuals who fall within the protected characteristic group. Nevertheless, it is important to identify negative impacts in order to highlight specific issues and to determine possible mitigation actions.

4.2 Impacts

Table 4-1 presents the impacts identified as part of the IIA related to equality, health and wellbeing and human rights.

Table 4-1 Impacts on equality, health and wellbeing and human rights

Objectives	Positive/negative impacts
Advance equality of opportunity e.g. improve access / quality of services	<p>Negative impacts:</p> <ul style="list-style-type: none"> Bus operators may remove non-profitable routes in response to LEZ related costs for upgrading their fleet. People with a disability who do not use public transport (due to the nature of their disability) but own a LEZ non-compliant vehicle and cannot afford to upgrade, may choose to forego their journey into the city centre. This will potentially adversely affect their opportunity to access community and leisure facilities and have a negative impact on their social activity; The LEZ includes LGVs which could affect minibuses providing community transport services (care providers, youth groups, school groups, elderly care providers). Any impacts experienced by those providing care support for vulnerable people may also adversely affect those receiving care, for example, if the cost of care is increased. To be noted that draft regulations indicate that disabled tax class and Blue Badge holders will be exempt from LEZ requirements. Self-employed carers who own a non-compliant vehicle and cannot afford to upgrade (to a compliant or adapted vehicle) may have to increase the cost and /or reduce the quantity of the care they provide. There is a particularly disproportionate impact on unpaid carers of family members, who not only experience a reduction in the care they can offer to others but may also suffer reductions in access for themselves and family members (as they are limited by the access available for those they care for).
Enable people to have more control of their social/work environment	<p>Positive impacts:</p> <ul style="list-style-type: none"> Improved health due to improved air quality during the time of work will be a benefit for all people working in the LEZ. The LEZ is also likely to reduce traffic levels encouraging modal shift from private cars to public transport and/or sustainable travel modes.

Objectives	Positive/negative impacts
	<p>Some population groups that are more likely to walk and cycle will benefit from reduced traffic levels and may feel safer and perceive a more pleasant environment. E.g. men are more likely to walk and cycle than women; Other White (not Scottish, British or Polish) are most likely to walk and cycle compared to other ethnic groups; people between 16 and 19 years old are the most likely to walk and cycle, with the frequency of these means of transport tending to decrease with the age⁴⁹.</p> <p>Negative impacts:</p> <ul style="list-style-type: none"> There are several locations for religious congregation and places of worship in the city centre. These include St. George's Tron, St. Aloysius Church, Society of Saint Pius X, St. Columbia Church, Garnethill Hebrew Congregation etc. Visitors who live outside of the city centre and are reliant on cars, may be adversely affected if they forego their journey.
Reduce differences in status between different groups of people	<p>Positive impacts:</p> <ul style="list-style-type: none"> The LEZ policy is likely to discourage the most polluting vehicles from enter/exit/operating within the LEZ. This will reduce emissions and improve air quality and in turn have a positive effect on health of those most at risk of respiratory illness including older people/pensioners and children (including unborn children). This is the most significant positive impact of the LEZ and will have health and wellbeing benefits for a large population of residents, workers, and visitors to the area over a long period of time; therefore, the magnitude of the effect is substantial. The LEZ will encourage more active travel and use of public transport: according to the consultation results presented in Section 2.4, 21% of respondents answered they will use public transport more, 16% will walk more, 12% will cycle more. <p>Negative impacts:</p> <ul style="list-style-type: none"> People with higher income will be able to upgrade their vehicle more easily compared to people with lower income, thereby increasing differences in status between the groups of people.
Promote participation, inclusion, dignity, and control over decisions	<p>Negative impacts:</p> <ul style="list-style-type: none"> Impacts due to low awareness of LEZ being in place on people from low income households with a non-compliant car who are also non-English speaking to enter LEZ by mistake and enter into financial difficulty due to the fine incurred and an inability to pay.
Build family support networks, resilience, and community capacity	<p>Negative impacts:</p> <ul style="list-style-type: none"> Some people that currently use their own cars to go to the city centre to visit their family and have a non-compliant vehicle may no longer be able to make that journey. Community Transport Providers, usually LGV (minibuses), whose fleet renewal period typically runs between seven and ten years and are not aware of the funding options that are available to upgrade their non-compliant fleet may shift services to areas outside LEZ. This has the potential to affect older people/pensioners, disabled people and

⁴⁹ Equality Evidence Finder: <http://www.equalityevidence.scot/>

Objectives	Positive/negative impacts
	<p>children who are dependent on their service to undertake health/social and education related travel.</p> <ul style="list-style-type: none"> Cost of replacing a vehicle with a compliant mode of transport will impose a greater burden on older people/pensioner, low income individuals and families for whom a vehicle is necessary due to the disproportionately large amount of income for an unexpected replacement. For example, a single parent may have a decreased earning potential compared to a two parent family. The population groups mentioned are less likely to have access to a car in the first place.
<p>Reduce crime and fear of crime including hate crime</p>	<p>Negative impacts:</p> <ul style="list-style-type: none"> There is a potential for people who currently use their own cars to access facilities for employment and recreation to be negatively affected if they perceive there to be personal security concerns with public transport. As a result, passengers may forego their journey into the city centre, particularly at night-time.
<p>Protect vulnerable children and adults</p>	<p>Positive impacts:</p> <ul style="list-style-type: none"> All residents and visitors of the city centre will have health benefits from the reduction in emissions and the improved air quality in the city centre following the introduction of the LEZ. The positive impact will be particularly important for vulnerable children and adults suffering from respiratory illnesses. <p>Negative impacts:</p> <ul style="list-style-type: none"> Private Hire Vehicle and Taxi/ Black cab owners on the H2S (Home to School) contract with Glasgow City Council to transport school children with a non-compliant LEZ vehicle may not be able to afford to upgrade their vehicle. This may impact on the H2S services offered by the council and potentially affect school children. Black taxis are all fully wheelchair accessible. There is a risk that should taxi drivers choose to leave the industry rather than upgrade their vehicles that there will be fewer travel options for mobility impaired people wishing to access or travel around the LEZ.
<p>Promote healthier lifestyles including:</p> <ul style="list-style-type: none"> diet and nutrition sexual health substance misuse physical activity lifeskills 	<p>Positive impacts:</p> <ul style="list-style-type: none"> The LEZ is likely to encourage a modal shift from cars to public transport and active travel which will have a positive impact on health. Schemes like the cycle hire can contribute to this if sponsored adequately. Given that obesity is more strongly linked to deprived communities this travel mode change will more strongly benefit those from deprived communities.ⁱ

5. Environmental

5.1 Introduction

A review of the Glasgow City Development Plan interactive maps⁵⁰ and Scotland's environment web⁵¹ has been undertaken to identify potentially sensitive environmental receptors.

The LEZ is characterised by city centre development. There are no international designations within the LEZ. The LEZ is bounded to the south by the River Clyde which is a city wide Site of Importance for Nature Conservation and there are some areas of amenity greenspace, predominantly in the north of the LEZ between Townhead and Garnethill. There are also a number of Sites of Special Landscape Importance (e.g. Buchanan Street, George Square, Strathclyde University Campus, Ramshorn Churchyard and Blythswood Square), listed buildings and scheduled monuments while most of the southern part of the LEZ makes up the Glasgow Central Conservation Area.

The SEPA flood map⁵² indicates that an area south of St Enoch's has a low likelihood of flooding from the River Clyde and that there are pockets of the LEZ highly likely to experience surface water flooding.

Other potentially sensitive environmental receptors generally relate to human receptors (e.g. workplaces, visitors, and residential property).

5.2 Impacts

As the LEZ does not involve any physical construction, potential impacts generally relate to indirect effects resulting from a change in vehicle use and the resulting reduction in local air pollution, as described in Table 5-1.

Table 5-1 Impacts on IIA environmental objectives

Objectives	Positive/negative impacts
Reduce greenhouse gas (GHG) emissions (including carbon management)	<p>Positive impacts:</p> <ul style="list-style-type: none"> Interventions that reduce local air pollution (NO₂ and PM^{2.5}/PM¹⁰) are likely to generate a positive effect on reducing factors contributing to climate change through reduced greenhouse gas emissions (measured in CO₂ equivalent tonnes).
Plan for future climate change	<p>While the LEZ is likely to reduce factors contributing to climate change, it is unlikely to improve or reduce the resilience of buildings and infrastructure to future climate change.</p>
Pollution: air/ water/ soil/ noise	<p>Positive impacts:</p> <ul style="list-style-type: none"> Implementing the LEZ will improve vehicle standards which in turn will bring air quality improvements and health & wellbeing improvements particularly those population groups which are most sensitive to poor air quality e.g. those suffering from chronic respiratory illness, young children, and the elderly. Air quality improvements may also reduce diffuse pollution of water and infiltration of soils, although this is not expected to be significant.

⁵⁰ <https://glasgowgis.maps.arcgis.com/apps/MinimalGallery/index.html?appid=d37af2d80977490f85484c9de55b6d33> (accessed 22/04/21).

⁵¹ <https://www.environment.gov.scot/maps/scotlands-environment-map/> (accessed 22/04/21).

⁵² <https://map.sepa.org.uk/floodmap/map.htm> (accessed 22/04/21).

Objectives	Positive/negative impacts
	<ul style="list-style-type: none"> Quieter (alternatively fuelled) vehicles and reduced traffic flows caused by modal shift towards public transport and active travel, are likely to lead to a reduction in inner-city background noise. Lower noise pollution is anticipated to have health and productivity benefits.
Enhance biodiversity	<p>Positive impacts:</p> <ul style="list-style-type: none"> The introduction of the LEZ is not likely to significantly affect biodiversity, however there are potential benefits from a reduction in air pollution deposition on areas of greenspace through reduced traffic. Traffic reduction is likely to reduce potential risks of collisions with animals on roads.
<p>Public Safety e.g.:</p> <ul style="list-style-type: none"> minimise waste generation infection control accidental injury fire risk 	<p>Positive impacts:</p> <ul style="list-style-type: none"> A reduction in vehicle movements is likely to reduce the risk of road traffic accidents. <p>Negative impacts:</p> <ul style="list-style-type: none"> A shift towards compliant vehicles would lead to redundant non-compliant vehicles being removed from the fleet. The scrappage of these surplus vehicles may cause environmental harm if not disposed of correctly (e.g. battery disposal). The potential modal shift from private vehicles to public transport could potentially increase disease transmission, particularly with uncertainty around the longevity of the COVID-19 impact. Increased public transport usage could increase the likelihood of transmission, potentially leading to an increase in contagion and a negative effect on city-wide health. Studies are ongoing to understand the risks of Covid on public transport and scientific literature on this topic is developing. Potential risks are suggested by ONS data (May 2020), indicating that road transport drivers including male taxi and cab drivers and chauffeurs, and bus and coach drivers had significantly higher rates of death from COVID-19⁵³
Reduce need to travel and promote sustainable forms of transport	<p>Positive impacts:</p> <ul style="list-style-type: none"> LEZ is likely to promote sustainable forms of transport via modal shift from cars to buses, shared cars, bicycles, or walking. This in turn will have positive effect on air quality. Dependent on what modes people shift to there may be positive effects on the health and well-being of people due to physical activity (cycling/ walking). Carplus and ComoUK annual reports suggests that members of car clubs are also more likely to walk and cycle, therefore will benefit from the modal shift encouraged by the LEZ.
<p>Improve the physical environment e.g.</p> <ul style="list-style-type: none"> housing quality 	<p>Positive impacts:</p>

⁵³ EMG: Evidence for transmission of SARS-CoV-2 on ground public transport and potential effectiveness of mitigation measures, 18 May 2020

Objectives	Positive/negative impacts
<ul style="list-style-type: none">▪ public space▪ access to and quality of green space	<ul style="list-style-type: none">▪ Decrease in vehicle traffic and improvements in air quality may lead to an increase in the quality of public space in Glasgow and therefore the wellbeing of residents, workers, and visitors.

6. Economic

6.1 Introduction

The most recent statistics available from Glasgow City Council on local economy refer to the pre-Covid period (up to 2019). Both Brexit and Covid will have had impacts on Glasgow's economy, but at this stage it is not possible to measure the impacts of these events.

The total Gross Value Added (GVA) produced in Glasgow in 2018 was £20,441m, an increase of 3.9% on 2017. In the medium-term, Glasgow's GVA has increased by 14.2% from £17,902m in 2013, a lower growth compared to the majority of UK Core Cities⁵⁴.

Job numbers in Glasgow increased by 3.2% between 2018 and 2019, one of the largest increases of the UK Core Cities. In 2019, Glasgow's employment rate increased for the first time since 2016 to 67.3% in 2019, while unemployment fell to 4.7%, the lowest recorded unemployment rate in Glasgow since estimates began in 2004.

The LEZ area has an important concentration of economic activities with around 4,000 enterprises located within its boundary, most of them having fewer than 10 employees⁵⁵. most important sectors are:

- Professional, scientific, and technical activities (835 enterprises);
- Accommodation and food service activities (475 enterprises);
- Real estate activities (390 enterprises).

The introduction of an LEZ will create an additional cost to businesses that do not use compliant vehicles. As was shown earlier in the report, the sectors that are most dependent on LGVs vehicles are construction; wholesale and retail trade; accommodation and food service activities; and transportation and storage. There are around 1,180 business in Glasgow's LEZ that fall within these sectors. Figure 20 shows the employment size band of such industries in 2020. It is apparent that most of the enterprises have 0-49 employees and it is typically this size of company that will have the most difficulty in upgrading their vehicles to become LEZ compliant.

Table 6-1 Number of companies by size within the LEZ

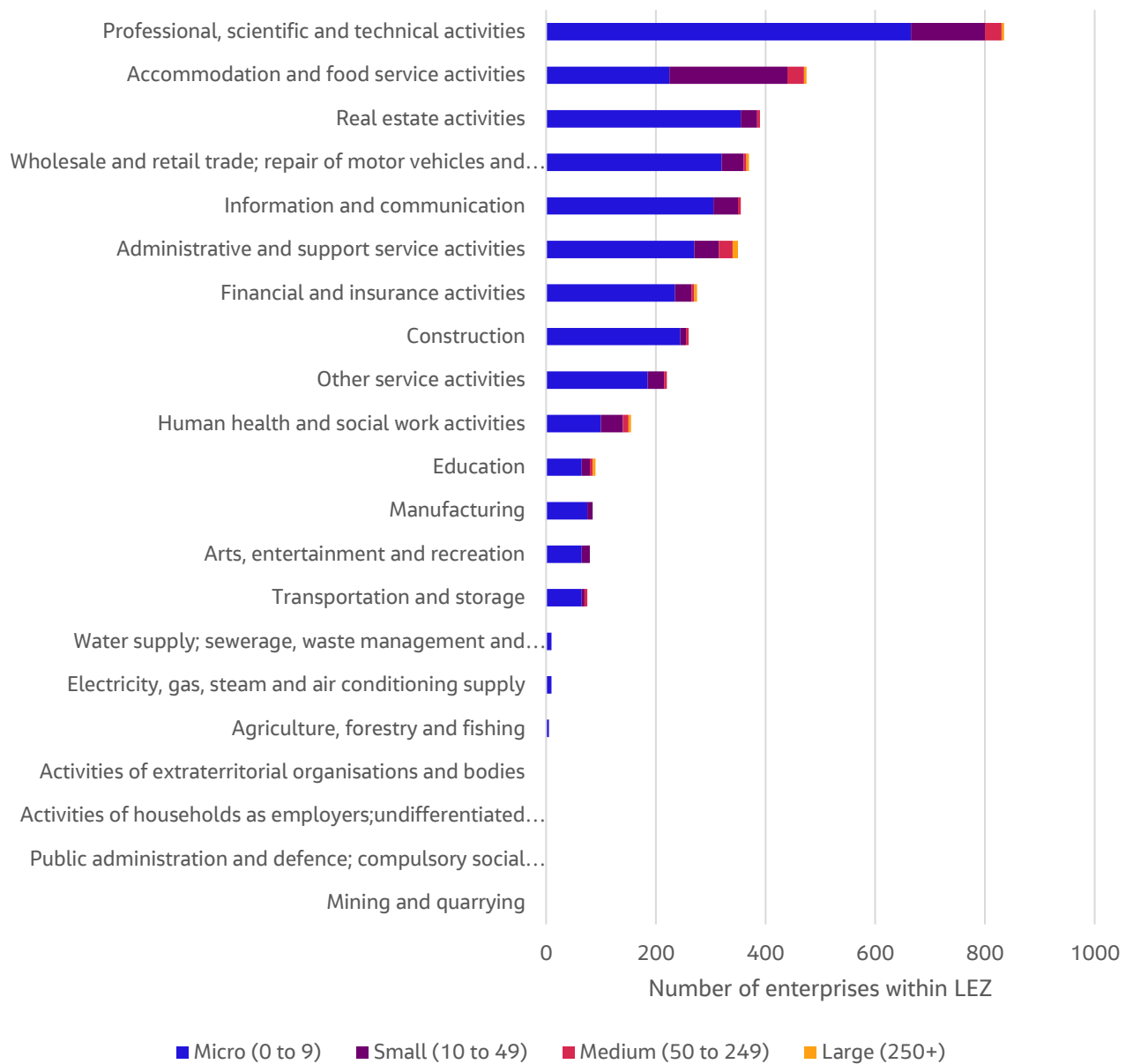
	Micro (0 to 9)	Small (10 to 49)	Medium (50 to 249)	Large (250+)	Total
Number of companies	3,200	675	140	50	4,065

Source: nomis-official labour market statistics.

⁵⁴ UK Core Cities: Leeds, Birmingham, Liverpool, Glasgow City, Manchester, London, Cardiff, Sheffield; Nottingham; Bristol.

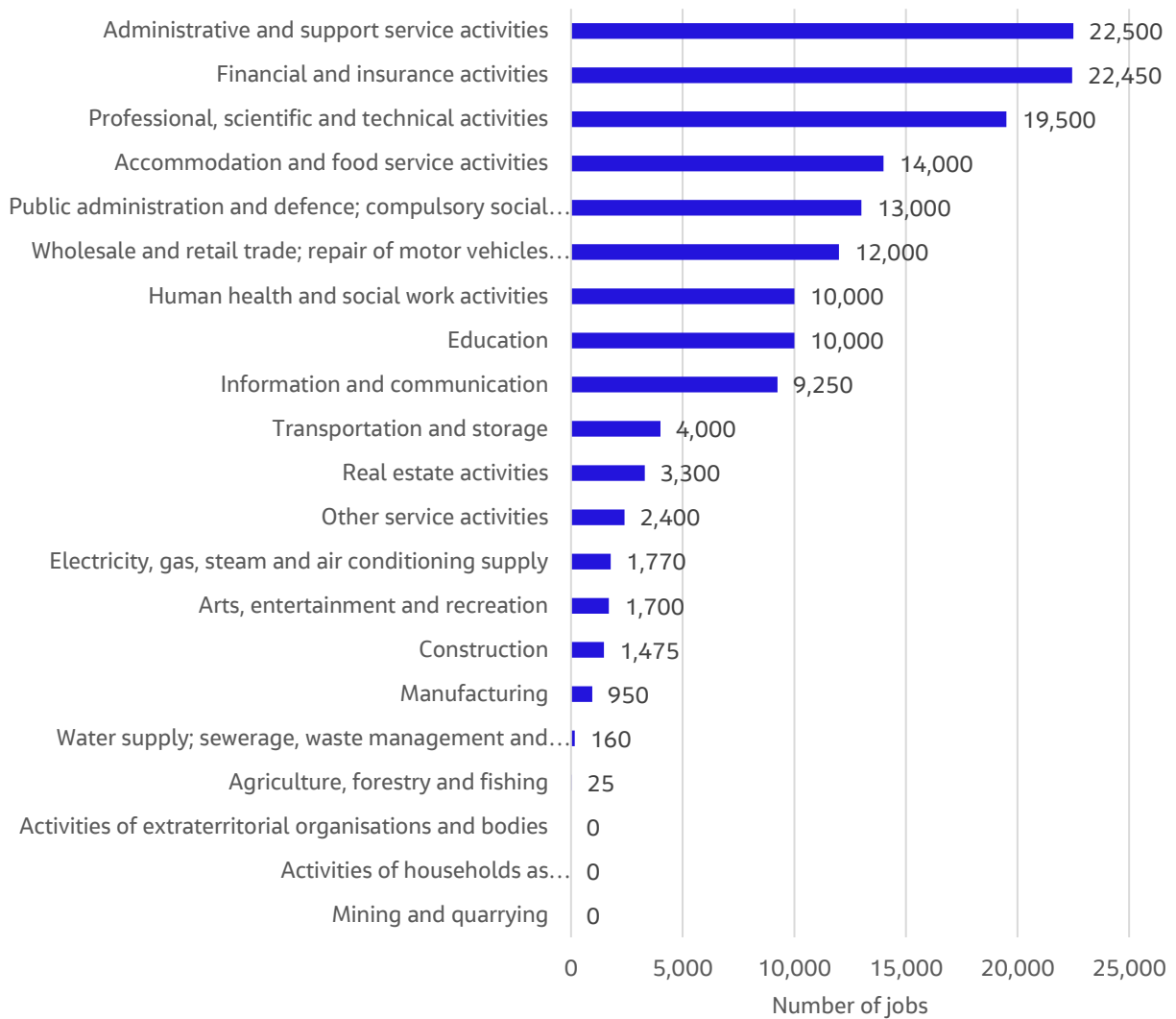
⁵⁵ <https://www.nomisweb.co.uk>

Figure 20 Number of enterprises by sector and size within the LEZ



Source: nomis-official labour market statistics.

Figure 21 Number of jobs by sector within the LEZ



Source: nomis-official labour market statistics.

6.2 Impacts

The economic impacts identified in line with the IIA objective are shown in Table 6-2.

Table 6-2 Economic impacts

Objectives	Positive/negative impacts
Maximise income and /or reduce income inequality	<p>Negative impacts:</p> <ul style="list-style-type: none"> ▪ Consumer welfare loss: A proportion of non-compliant vehicle owners will upgrade their vehicle as a result of the LEZ allowing entry only to compliant vehicles (Euro 4 petrol and Euro 6 diesel). Owners will place an inherit value in their vehicle between its original price and resale value, this difference is the consumer welfare loss. If a group of individuals' or local businesses' welfare is reduced as a result of an intervention then it is seen as a loss to the economy. The loss experienced reduces income as it is redirected to compensate for a loss of welfare. ▪ Asset value loss: Similar to consumer welfare loss but completely associated with non-compliant vehicles that have to be scrapped that otherwise would not have been. This loss of value is a loss to individuals, businesses and the economy. ▪ People from low income households who use cars to visit the city centre for work on a regular basis may face financial difficulty to upgrade their vehicle. Income inequality may increase as those on low incomes may take on credit to pay for vehicle changes that they would not otherwise have purchased. This increases the debt obligation for those on low incomes and decreases their disposable income. Those on higher incomes may have capital that allows them to access further capital at lower rates of interest. ▪ Potential increase in income inequality due to a changing urban environment as a result of the LEZ is likely to distort current house prices/rent valuations. Improvements in air quality and urban amenity will place upward pressure on prices, while displaced traffic may increase congestion in some communities and reduce property value. ▪ Impacts due to low awareness of LEZ being in place on people from low income households with a non-compliant car who are also non-English speaking to enter LEZ by mistake and enter into financial difficulty due to the fine incurred and an inability to pay.
Help young people into positive destinations	No readily identified issues.
Support local business	<p>Positive impacts:</p> <ul style="list-style-type: none"> ▪ Decreased traffic and cleaner atmosphere in the city may lead to higher quality of public spaces in the city. This could lead to more opportunities for businesses (employment, expenditure, human capital development) as more people are attracted to the city/city centre due to less polluted area becoming more attractive. This possible positive impact is also confirmed by the findings of "The Pedestrian Pound" report, that highlights how improvements to public spaces can boost

Objectives	Positive/negative impacts
	<p>footfall and trading. Through an analysis of several case studies, particularly referring to city centres and high streets, it provides evidence that investment in better streets and places delivers quantifiable commercial returns. Businesses, residents, developers and visitors all benefit from investments in the public realm and walkability, like the introduction of an LEZ⁵⁶. Potential positive impacts in this regard find support in the outcomes of the consultation undertaken by GCC, with a relatively large support for Glasgow's LEZ (62% of the answers).</p> <ul style="list-style-type: none"> ▪ Increased economic activity for a number of sectors: second-hand car traders, vehicle scrappage, vehicle leasing operators, active-travel distributors/repairers, and public transport operators through increased patronage. The development of the retrofitting and Low Emission Vehicle (LEV) industries as a result of the LEZ may create employment opportunities throughout the supply chain. Jobs involving the manufacture, maintenance, and sales/operation of lease or rental vehicles should be created. <p>Negative impacts:</p> <ul style="list-style-type: none"> ▪ The cost incurred from enter/exit/operating within the LEZ may cause changes in consumer travel patterns. Financial penalties implemented as part of the LEZ may deter residents living outside of the LEZ from entering the city centre, potentially changing previously established shopping patterns. Residents may choose to visit a store outside of the LEZ, rather than the store they previously visited inside the LEZ. This will have a negative impact on the footfall of businesses located within the LEZ, potentially causing the relocation of 'footloose' businesses to outside of the 'charge zone'. This may result in an increase in business premises prices in the sub-urban area, while city centre prices may decrease. ▪ Some vehicles (especially bus, LGV and HGV) have relatively long turnover periods. The LEZ may require users to change their vehicles earlier than anticipated. The need to purchase compliant vehicles and sell/scrap their non-compliant vehicle means that the users will incur additional financial cost. Given the potential number of vehicles required to upgrade or alter behaviours, it is conceivable that some businesses may be forced to alter operations in order to comply. This could entail reducing services, cutting staff, or reducing training. For example, a decrease in service provision could arise if a plumber using a non-compliant van is no longer be able to enter/exit/operate within the city centre due to the LEZ including LGVs. If such service providers are unable to afford to change to a compliant vehicle this would potentially lead to a decrease in access to such services and/or an increase in the cost of providing these services. It may decrease employment opportunities for those that cannot afford to change their vehicle to a compliant one. ▪ Most of the companies located in the LEZ are small (many of them have fewer than 10 employees). Small companies are likely to have more difficulties in complying with the LEZ requirements by upgrading their

⁵⁶ The Pedestrian Pound. <https://www.livingstreets.org.uk/media/3890/pedestrian-pound-2018.pdf>

Objectives	Positive/negative impacts
	<p>fleet. The impact may be relevant for some sectors that typically own vehicles for business purposes:</p> <ul style="list-style-type: none"> ○ Accommodation and food service activities; ○ Wholesale and retail trade; ○ Construction; ○ Transportation and storage.
Help people to access jobs (both paid and unpaid)	<p>Negative impacts:</p> <ul style="list-style-type: none"> ▪ Decreased access to the city centre due to the LEZ restricting entry to cars may cause certain members of society (lower income households) to be dissuaded from applying for a job in the city. This will have a negative effect on the size and diversity of the potential workforce in Glasgow.
Improve literacy and numeracy	No readily identified issues
Improve working conditions, including equal pay	<p>Positive impacts:</p> <ul style="list-style-type: none"> ▪ Positive impact due to the improvement of air quality for all people working in the LEZ.
Improve local employment opportunities	<p>Positive impacts:</p> <ul style="list-style-type: none"> ▪ The LEZ introduction is likely to impact positively specific business activities, as mentioned in the objectives above (second-hand car traders, vehicle scrappage, vehicle leasing operators, active-travel distributors/repairers, and public transport operators etc.), with consequent increase in employment opportunities. ▪ Decreased access to the city centre due to the LEZ restricting entry to cars may reduce opportunities to apply for a job in the city centre for people relying on a non-compliant vehicle.
Improve quality of and access to services	<p>Negative impacts:</p> <ul style="list-style-type: none"> ▪ Restrictions to vehicles allowed to access the LEZ will cause a reduction in access to services for those people using a non-compliant vehicle to visit the city centre. Residents in the LEZ may experience difficulties in receiving services provided by companies using non-compliant vehicles (e.g. carers, domestic assistance, trades people).

7. Mitigation

7.1 Introduction

Mitigation forms a key part of the overall impact assessment as it can reduce the negative impacts and maximise positive impacts, therefore providing insight into the potential residual impact associated with the LEZ. Mitigation can take multiple forms and is constantly evolving given both the LEZ implementation and support offered by local council and Transport Scotland is constantly evolving. It therefore should be noted that the mitigation within this section is not exhaustive and may change in the future.

7.2 Exemptions

Exemptions for some vehicle categories from the LEZ's Euro standards are stated in 2.3 of the report and set out in the regulation⁵⁷. These exemptions are a form of mitigation as they decrease the negative impacts of Glasgow's LEZ on emergency services and disabled individuals.

According to the DVLA data, as of Q3 2020, 35,000 vehicles in the Glasgow TTWA would be exempt under the conditions set out in 2.3. There would likely be more exemptions because although this figure includes vehicles that are classed as for the disabled, it does not include vehicles exempt due to use by blue badge holders.

7.3 Available Funding

Funding has been available for qualifying individuals and organisations who may struggle with the introduction of Glasgow's LEZ; it is not certain to what extent funding will continue to be provided and therefore negative effects minimised and positive effects maximised. Funding specifically mitigates the negative impacts caused by issues with upgrade costs and mode shift.

The Low Emission Zone Retrofit Fund

This fund will provide micro-businesses with Clean Vehicle Retrofit Accreditation Scheme approved retrofit technology measures, making sure the vehicles meet the minimum proposed emission standards. The grants can cover up to 80% of the cost of a retrofit solution subject to the following terms and conditions:

- Light commercial vehicles (LCVs) – 80% of the cost, up to a maximum of £5,000
- Taxis – 80% of the cost, up to a maximum of £10,000
- Heavy goods vehicles (HGVs) and refuse collection vehicles (RCVs) – 80% of the cost, up to a maximum of £16,000

For the Retrofit Fund, Glasgow has been awarded 23 grants worth £188,336 for taxis. Another 20 grants were awarded before the Energy Saving Trust (EST) administration of the scheme.

Bus Emissions Abatement Retrofit (BEAR) programme

This fund aims to fit buses and coaches with Clean Vehicle Retrofit Accreditation Scheme (CVRAS) accredited retrofit technology solutions to support the delivery of LEZ by increasing the number of compliant buses.

Phase 3 of this grant is taking place in 2020/21. The Vehicle operating companies and the value of the grants awarded are publicly available. At national level, a significant number of grants (594) were awarded to bus operators in Scotland, with a total value of £9,757,000.

⁵⁷ Scottish Government, 2021, *The Low Emission Zones (Emission Standards, Exemptions and Enforcement) (Scotland) Regulations 2021*, <https://www.legislation.gov.uk/sdsi/2021/9780111048887/contents>

Scottish Ultra-Low Emission Bus Scheme (SULEBS)

SULEBS provides support for the purchasing of new ultra-low emission buses by up to a maximum of 75% of the differential costs against diesel buses, depending on their zero-emission running capability. It also supports the infrastructure for this technology up to a maximum of 75% of its capital costs

The fund supports the Scottish Government's net-zero targets and is a development of the Scottish Green Bus Fund, held each year from 2011-2018. SULEBS ran its second round in Jan/Feb 2021.

The funding available was significant. At national level, £10.1M were available in round 1 and £40.5M in round 2 (with a total of 215 buses financed in round 2 in Scotland).

LEZ Support Fund: Households & Businesses

From this fund, Glasgow has been awarded 39 grants worth £78,000 towards households and 122 grants worth £305,000 towards businesses.

Funding has been made available for qualifying households and businesses, through Transport Scotland's Low Emission Zone Support Fund, administered by the Energy Saving Trust⁵⁸. Qualifying households are those on low incomes who are in receipt of specific means-tested benefits. Qualifying businesses include micro-businesses, with 9 or fewer full-time employees, and sole traders. Grants of up to £2,000 are available for qualifying households to take non-compliant vehicles off the road to be scrapped at Scottish authorised treatment facilities. Up to £2,500 has been made available for qualifying business that do the same. These are otherwise referred to as "Disposal Grants".

The LEZ Support Fund, and the grants issued as part of it, incentivises both households and businesses to take older vehicles off the road which do not comply with the LEZ emission standards. Due to its qualifying criteria, it specifically targets those identified in this IIA, households on low incomes and small/medium enterprises, as being disproportionately affected by the LEZ due to decreased ability to meet the LEZ standards.

Travel Better Fund

From this fund, Glasgow has been awarded 2 grants worth £850.

Once a person has received their grant from the Low Emission Zone Support Fund, they can claim a further £500 towards better sustainable travel options, along with another member from their household. They can claim items/services on up to 2 occasions and each claim must be worth a minimum of £80. The travel options covered include new/recycled/used bikes, bike repair/servicing/maintenance costs, cycling accessories multi-trip transport tickets and membership and cycling credits for car clubs and city bike hire schemes. This further mitigates potential impacts on individuals who may encounter difficulties in maintaining access to the LEZ due to lack of funds.

eBike Grant Fund

This fund has been operating for the past 3 financial years (2018/19 – 2020/21) providing "Local authorities, public sector agencies, further and higher education institutions, active travel hubs and community groups" the opportunity to adopt eBikes in various forms⁵⁹. By facilitating mode shift from private and commercial vehicle transport to eBikes, this fund contributes to the LEZ's aim of improving air quality in Glasgow. It also focuses on mitigating the financial barrier that some protected groups may face when altering travel choices and therefore potentially affecting quality of life.

There is also similar support for businesses in the form of an **eBike Business Loan**. This aims to mitigate the same impacts as the eBike grant fund except for private sector businesses. These impacts could include, for

⁵⁸ Low Emission Zones Scotland, 2021, *Funding*, <https://www.lowemissionzones.scot/funding>

⁵⁹ Energy Savings Trust, 2021, *eBike Grant Fund*, <https://energysavingstrust.org.uk/grants-and-loans/ebike-grant-fund/>

example, services being reduced due to lack of access to an area and enterprises that lack access to affordable finance⁶⁰.

Additional financial support for businesses in obtaining a compliant vehicle

In addition to the financial support offered to businesses outlined above relating to vehicle replacement and retrofit, a number of loans have been offered to businesses that facilitate the acquisition of LEZ compliant vehicles. These include the Low Carbon Transport Business Loan⁶¹, Used Electric Vehicle Loan for Business⁶², and Switched on Taxis Loan⁶³. The finance available for taxis alleviates pressure on these small business owners who are especially exposed to risk when purchasing a new vehicle due to their relatively small revenues and reliance on regional economic performance. Loans for low carbon and used electric vehicles for businesses again serve to remove the barriers when switching to a compliant vehicle and therefore mitigating impacts such as asset value loss.

7.4 Associated Glasgow transport schemes that will mitigate the LEZ impacts

There are several future projects planned in Glasgow that are relevant to the LEZ and the impacts associated with it. Some of these projects will mitigate negative impacts related to the LEZ by providing better public transport alternatives and increased access to the city centre for owners of non-compliant vehicles that have issues upgrading their vehicle. In addition, some projects aim at improving the attractiveness of the city centre through transformation initiatives that will mitigate the negative economic impacts for business activities located within the LEZ.

Glasgow Transport Strategy

Glasgow City Council is developing a new City-wide Glasgow Transport Strategy, offering a framework for investments and decision making on transport-related issues over the next 10 years, covering the Glasgow City area. This strategy will replace the Local Transport Strategy for the City (2007-09) and will be used to identify transport project priorities.

GCC is embarking on the production of new transport plans for the City:

- Glasgow Transport Strategy
- City Centre Transformation Plan
- Liveable Neighbourhoods Plan
- Active Travel Strategy

Key components of the strategy that will mitigate some of the LEZ's negative impacts include:

- Walking
- Cycling
- Public transport (including the role of Bus Service Improvement Plans and Partnerships in the city)
- Placemaking (where active travel and accessibility to services and destinations play a role in this)
- Other road-based transport
- Movement of goods

⁶⁰ Energy Savings Trust, 2021, *eBike Business Loan*, <https://energysavingtrust.org.uk/grants-and-loans/ebike-business-loan/>

⁶¹ Energy Savings Trust, 2021, *Low Carbon Transport Business Loan*, <https://energysavingtrust.org.uk/grants-and-loans/low-carbon-transport-business-loan/>

⁶² Energy Savings Trust, 2021, *Used Electric Vehicle Load for Business*, <https://energysavingtrust.org.uk/grants-and-loans/used-electric-vehicle-loan-for-business/>

⁶³ Energy Savings Trust, 2021, *Switched on Taxis Loan*, <https://energysavingtrust.org.uk/grants-and-loans/switched-on-taxis-loan/>

The Strategic Environmental Assessment for the strategy assessment⁶⁴ states that the main focus of the Transport Strategy will be on sustainable transport, with a modal shift away from vehicles, ultimately aiming to reduce transport emissions and improve health. The SEA assessment believes the cumulative impacts of the strategy on climatic factors and air will be positive, and that there will also be a positive contribution to human health and the population.

The transport interventions that will take place are unlikely to require land take from green spaces and more likely to focus on existing road space as Glasgow is a large urban area. Because of this, the SEA report suggests it is unlikely for there to be significant impacts against biodiversity flora fauna, water, cultural heritage, and landscape. The impacts will be assessed as part of the SEA process for the Glasgow Transport Strategy.

Connectivity Commission Report

The report, dated 2019, addresses the strategic transport issues in Glasgow. It is split into Phase 1 and Phase 2, focusing on the recommended solutions to improve the connectivity within Glasgow city centre and reshape the strategic road and rail network, to improve connectivity in the Glasgow City Region over the coming decades. Some of the connectivity issues Glasgow currently faces include:

- Bus networks experiencing steep declines, even though they're responsible for carrying a greater number of passengers compared to the Glasgow rail network where passenger numbers have risen exponentially. This growth in rail travel has created an issue as national investment cannot keep up with rising demand.
- High levels of historic investments in strategic road networks, although Glasgow has one of the lowest levels of car ownership in Britain.
- High congestion levels – particularly the difference between peak and off-peak journey times.
- People with disabilities face issues if they do not own a vehicle as much of the transport network is inaccessible.

The Phase 1 report recommends, , that 'Glasgow City Council adopts and adheres to the recognised transport hierarchy for street space prioritizing the movement of people, cyclists, public transport use and private vehicles, in that order.'⁶⁵ Phase 2 recommendations include the creation of a Glasgow City Region Development Agency to plan and coordinate transport infrastructure at the city-region level.

Bus Partnership Fund

The Scottish Government committed to investing over £500 million into bus priority measures on local and trunk roads, this investment takes the form of the Bus Partnership Fund and the roll-out infrastructure for the trunk road network. Glasgow City Council is a part of the Bus Development Group and intends to use the fund to aid investment in bus priority infrastructure. This will focus on:

- Decreasing the negative effects of congestion on the bus service,
- Addressing the fall in bus patronage,
- Tackling the climate emergency
- Reducing private car use

The fund will allow for local authorities and local bus operators to work in partnership together, to achieve the goals stated and provide an inclusive and convenient bus service. Some methods include:

- Using Bus Priority Signalling,
- Wireless alerts to approaching traffic lights, making them stay green for buses

⁶⁴ <https://www.glasgow.gov.uk/CHttpHandler.ashx?id=49403&p=0>

⁶⁵ <https://www.glasgow.gov.uk/CHttpHandler.ashx?id=450648&p=0>

- Creation of bus lanes/gates, giving buses head starts against traffic and priority driving routes

These will decrease delays, congestion, and emissions, as well as increase patronage.

Avenues Programme

To deliver this programme, approximately £115 million will be invested in Glasgow City Centre as part of the Glasgow City Region Deal Funding. This will lead to the transformation of the City Centre's streetscape and public realm, making these areas; more people-friendly, more aesthetically pleasing, greener, more sustainable, and more economically competitive, by 2027.

Specific improvements include:

- Increased pedestrian and cycle space
- Continuous footways
- Segregated cycle lanes
- Green/Blue Infrastructure
- Reduced street clutter
- Intelligent Street Lighting (ISL) and improved lighting features

This aims to redesign the city, creating space for cyclists and pedestrians; improving connectivity, increasing biodiversity, and improving the accommodation of public transport.

8. Strategic Environmental Assessment

Strategic Environmental Assessment (SEA) is legislated through the Environmental Assessment (Scotland) Act 2005 and is a means to assess the likely impact of a public plan on the environment and to seek ways to minimise that effect if it is likely to be significant. Under the Act all public bodies are required to undertake an SEA of a plan if it is likely to have significant environmental effects. This is both positive and negative effects. After consideration against the criteria set out in Schedule 2 of the Act it was the opinion of Glasgow City Council as the Responsible Authority, that the LEZ can be exempted from Strategic Environmental Assessment as its implementation is unlikely to have significant environmental impacts. This was primarily due to the following:

- The LEZ is not required under Section 5(3) of the Environmental Assessment (Scotland) Act and it has been prepared as a response to the Scottish Government's Programme for Government 2017-18 and the Glasgow City Council commitment on September 2017.
- The LEZ does not set the framework for future consent of projects, including but not limited to, projects listed in annexes I and II of the Act and does not affect sites listed under the Habitats Directive.
- While there are no anticipated environmental problems in line with Schedule 2 1(d) of the Environmental Assessment (Scotland) Act 2005, the LEZ will be included within the series of interventions assessed under the Glasgow Transport Strategy (GTS) which is subject to full SEA. This will ensure a detailed assessment is undertaken on the LEZ proposal and assess the cumulative environmental effects of a LEZ alongside wider transportation interventions.
- The LEZ is not a plan, programme or strategy and will not contain any additional interventions than what will be considered within the GTS SEA.

This decision was set out in a formal SEA Pre-Screening template and submitted to the gateway on the **TBC**. A copy of this Pre-Screening is presented as Appendix A of this report.

In summary, while an LEZ specific SEA is not being undertaken the LEZ will be included within the series of interventions assessed under the Glasgow Transport Strategy which is subject to full SEA. Environmental effects have also been considered as part of this IIA. This will ensure a detailed assessment is undertaken on the LEZ proposal and assess the cumulative environmental effects of a LEZ alongside wider transportation interventions.

**Appendix A. Pre-Screening Notification, Strategic Environmental
Assessment**

PRE-SCREENING NOTIFICATION

SEA PRE-SCREENING DOCUMENT

Responsible Authority:

Glasgow City Council

Title of the plan:

Glasgow Low Emissions Zone (LEZ)

What prompted the plan:
(e.g. a legislative, regulatory or administrative provision)

Poor air quality (predominantly due to road transport) is an issue in number of Scotland's towns and cities and leads to impacts on human health. In the Scottish Government's 2015 Cleaner Air for Scotland: The Road to a Healthier Future (CAFS) strategy, a commitment was made to ensuring Scotland's air quality will be the best in Europe.

CAFS set a clear intention that improving air quality must be at the centre of the transport and placemaking decision making, to ensure the health benefits of cleaner air are realised.

Plans to establish Low Emission Zones in four of Scotland's cities (Aberdeen, Dundee, Edinburgh, and Glasgow) were set out within the First Minister's Programme for Government 2017-18.

Proposals to introduce Scotland's first LEZ in Glasgow by the end of December 2018 were approved by the council's City Administration Committee in September 2017. It was agreed that initially, the LEZ would apply to local service buses only. In June 2018, the same committee granted approval to extend the LEZ to all vehicle types.

The Transport (Scotland) Act 2019 provides the legislation to enable the creation and civil enforcement of LEZs.

The Scottish Government has developed regulations and guidance, relating to a number of key aspects including emissions, penalties, certain exemptions and parameters for grace periods. The council will then have the powers to create, enforce, operate or revoke a Low Emission Zone and to design its shape, size and vehicle scope, based on local requirements.

The proposed regulations were laid in the Scottish Parliament in January 2021. The regulations were subject to an SEA Screening.

Plan subject:
(e.g. transport)

Air Quality

Brief summary of the plan: (including the area or location to which the plan related)	<p>The purpose of developing an LEZ in Glasgow is to improve air quality and reduce the impact of air pollution on human health. The development of LEZ is being undertaken in line with the following principles:</p> <ul style="list-style-type: none"> • achieving air quality compliance in current Air Quality Management Areas • taking an evidence based approach to target interventions that reduce the impact of air pollution on human health • making the most of opportunities to reduce congestion, promote sustainable forms of transport, and achieve improved placemaking outcomes across Glasgow <p>Combinations of LEZ options are being explored, based around geographic limits and vehicle-types. The LEZ will comprise a proposed boundary and scheme that meets the LEZ provisions in The Transport (Scotland) Act 2019.</p>
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Brief summary of the likely environmental consequences: (including whether it has been determined that the plan is likely to have no or minimum effects, either directly or indirectly)	<p>The LEZ is not required under Section 5(3) of the Environmental Assessment Act and it has been prepared as a response to the Scottish Government's Programme for Government 2017-18 and the Glasgow City Council's commitment.</p> <p>The LEZ does not set the framework for future consent of projects, including but not limited to, projects listed in annexes I and II of the Act and does not affect sites listed under the Habitats Directive.</p> <p>While there are no anticipated negative environmental effects in line with Schedule 2 1(d) of the Environmental Assessment (Scotland) Act 2005, the LEZ will be included within the series of interventions assessed under the Glasgow Local Transport Strategy (GTS) which is subject to full SEA. This will ensure an assessment is undertaken on the LEZ proposal and importantly assess the cumulative environmental effects of a LEZ alongside wider transportation interventions.</p> <p>The LEZ is not a plan, programme or strategy and as such will not contain any additional policy/interventions than those that will be considered within the GTS SEA.</p> <p>It is therefore the opinion of Glasgow City Council as the Responsible Authority, that the LEZ can be exempted from Strategic Environmental Assessment as its implementation is unlikely to have significant environmental impacts in accordance with Schedule 2 of the Environmental Assessment (Scotland) Act 2005.</p> <p>With regard for the criteria set out under Schedule 2 of the Environmental Assessment (Scotland) Act 2005, we have provided more detailed responses to the criteria questions below which demonstrates that the LEZ is likely to have no significant environmental effects.</p>
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1(a) the degree to which the PPS sets a framework for projects and other activities, either with regard to the location, nature, size and operating conditions or by allocating resources

The LEZ does not set a framework for projects but instead the LEZ will be included within the series of interventions, including those to reduce transport-related emissions (predominantly NO₂ as well as fine particulate matter (PM_{2.5} and PM₁₀)). and achieve air quality compliance in current Air Quality Management Areas, under the Glasgow Transport Strategy which is subject to full SEA.

1(b) the degree to which the PPS influences other PPS including those in a hierarchy

The LEZ responds to commitments made by Scottish Government and Glasgow City Council as set out above and therefore has limited influence over other PPS.

1(c) the relevance of the PPS for the integration of environmental considerations in particular with a view to promoting sustainable development

The LEZ is being developed closely in line with the emerging Glasgow Transport Strategy and Glasgow City Development Plan 2. This collaborative approach ensures continued alignment and the LEZ will be a supporting measure to meeting the sustainable development objectives coming out of these plans and strategies which are undertaking SEAs.

1(d) environmental problems relevant to the PPS

There are no anticipated environmental problems associated with the implementation of the LEZ. It is considered that there will only be positive impacts across the SEA topics associated with reduced emissions anticipated. Consequential impacts (and mitigating interventions) as a result of the LEZ will be assessed as part of the GTS SEA.

1(e) the relevance of the PPS for the implementation of Community legislation on the environment (for example, PPS linked to waste management or water protection)

Not relevant

2 (a) the probability, duration, frequency and reversibility of the effects

This will be assessed as part of the GTS SEA

2 (b) the cumulative nature of the effects

This will be assessed as part of the GTS SEA

2 (c) transboundary nature of the effects (i.e. environmental effects on other EU Member States)

The LEZ does not give rise to transboundary effects.

2 (d) the risks to human health or the environment (for example, due to accidents)

Achieving air quality compliance in current Air Quality Management Areas will deliver positive benefits to human health (for NO₂ and fine particulate matter (PM_{2.5} and PM₁₀)).

2 (e) the magnitude and spatial extent of the effects (geographical area and size of the population likely to be affected)

The positive effects will likely be focused at the Air Quality Management Areas and pollution hot spots. It is not anticipated that there will not be significant large-scale environmental effects.

This will be assessed as part of the GTS SEA

2 (f) the value and vulnerability of the area likely to be affected due to- (i) special natural characteristics or cultural heritage; (ii) exceeded environmental quality standards or limit values; or (iii) intensive land-use.

2 (g) the effects on areas or landscapes which have a recognised national, Community or International protection status

It is not anticipated that the LEZ will have any direct negative significant environmental effects on any of these aspects or assets.

Overall it is considered that the implementation of a LEZ will deliver direct positive effects by improving air quality and reducing the impact of air pollution on human health and the natural environment. Indirect positive effects are also anticipated from a modal shift to more sustainable transport options and active travel measures. This will be assessed as part of the GTS SEA.

Contact details:

TBC

Date of opinion:

When completed send to: SEA.gateway@scotland.gsi.gov.uk or to SEA Gateway, Scottish Government, Area 2H (South), Victoria Quay, Edinburgh, EH6 6QQ

¹ Please note: (A) The plan has to fall into Section 5(4) of the Environmental Assessment (Scotland) Act 2005 & (B) you should apply the criteria specified within Schedule 2 of this Act to reach a conclusion on no or minimal environmental effects: www.legislation.gov.uk/asp/2005/15/contents (delete this note before submission)

ⁱ https://www.understandingglasgow.com/indicators/lifestyle/obesity/by_deprivation