

City of York Council: Air Quality and freight feasibility study, summary report

Introduction

City of York Council (CoYC) have commissioned AECOM to conduct an Air Quality feasibility study to address emissions associated with deliveries in York. This is within the context of a council ambition to be carbon neutral by 2030, as well as an ambition that by 2023, there will be a plan to exclude all non-essential private motor vehicle journeys within the York City Walls.

As part of this, the Council needs an understanding of how deliveries are currently undertaken within York and how to reduce movement of goods by heavy goods vehicles (HGVs) and light goods vehicles (LGVs) in order to help reduce emissions in the city. This follows on from York's voluntary Clean Air Zone (CAZ), introduced in January 2020, which applies to buses entering the City more than five times a day. An expansion of 'foot streets' has also recently taken place which has changed the timings of vehicle restrictions in the city centre which has increased the number of businesses in the city centre affected by delivery restrictions.

The key requirements of the study were to address the following:

- / Assess the current situation in York, including quantification of baseline emissions associated with deliveries to aid understanding of the relative contribution that delivery vehicles make to current pollution levels in the City
- / Suggest alternative low-emission delivery options for deliveries, especially in the City Centre, and calculate their relative impacts on emissions and air quality. Provide a series of recommendations for the City to reduce emissions associated with deliveries, including considering the role of the public sector in implementing these

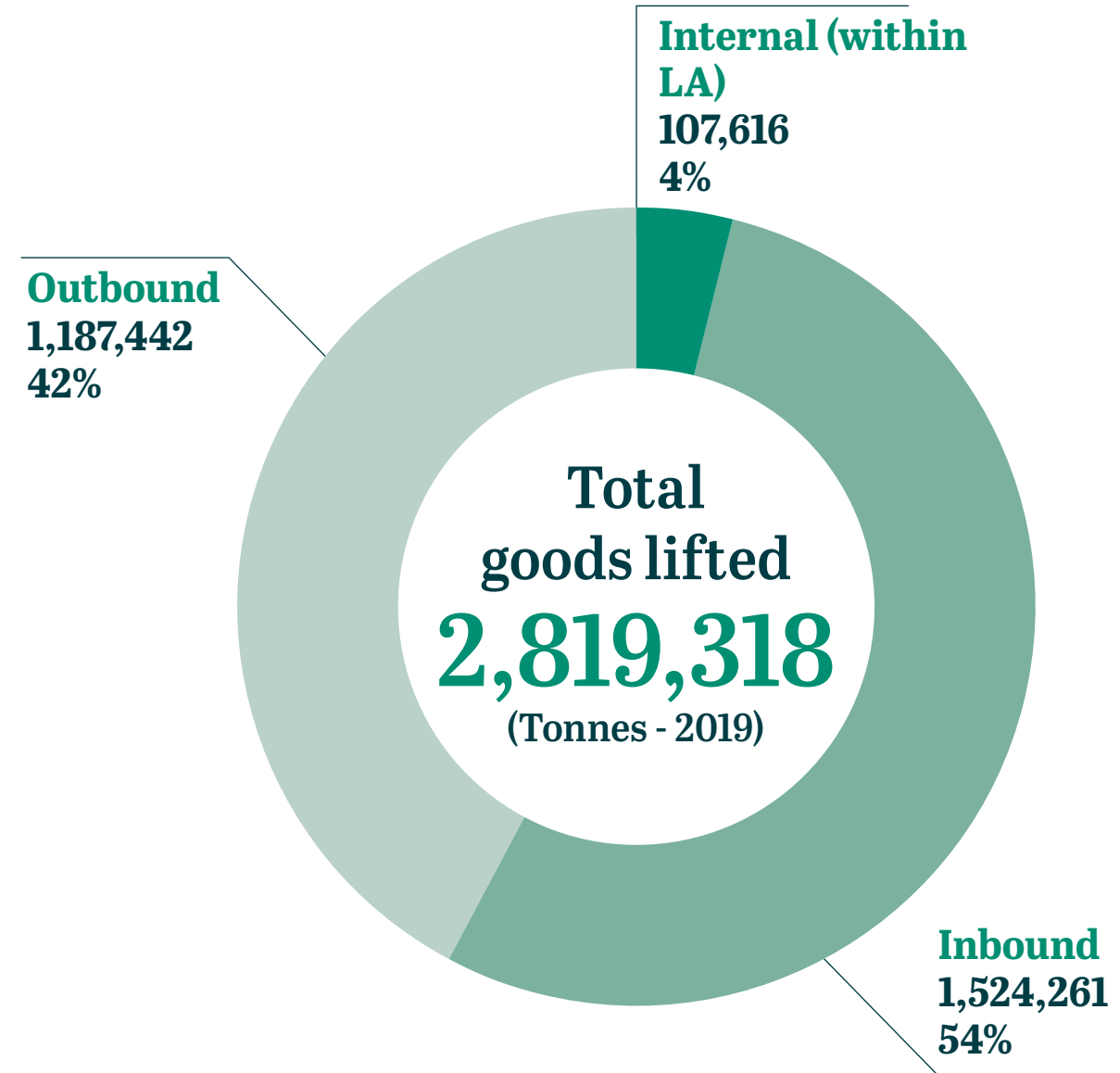
Structure overview

This report is a summary of the full York Air Quality Feasibility Study report and summarises:

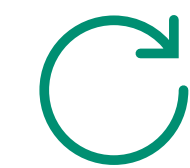
- / The review of new and existing Freight Data for the City of York
- / A summary of findings of the existing air quality and trends in the City of York
- / Interviews conducted with businesses regarding their current operations in York, information on their operations and suggestions of how to improve air quality in York
- / Understanding of Alternative sustainable delivery options
- / Conclusion and Solutions: Which provides an initial high-level list of potential solutions for CoYC to consider for the forthcoming pilot project.

CSRGT Data analysis

The Department for Transport (DfT) collects data on the activity of GB-registered HGVs (vehicles weighing 3.5+ tonnes) operating in the UK through its survey, Continuing Survey of Road Goods Transport Great Britain (CSRGT GB). In this study, 2019 CSRGT data analysis has been conducted to gain further insight into the movement of goods to, from and within the City of York Region.

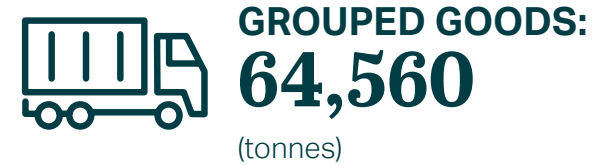


Top commodities and origin/destination by movement type - York - 2019

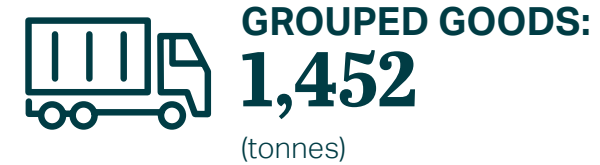


Internal

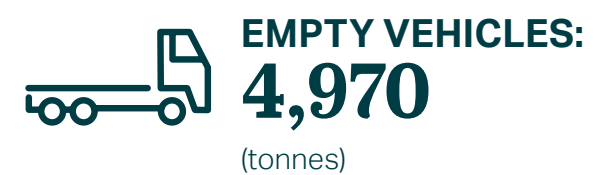
Top commodity by goods lifted



Top commodity by CO₂ output (estimated)



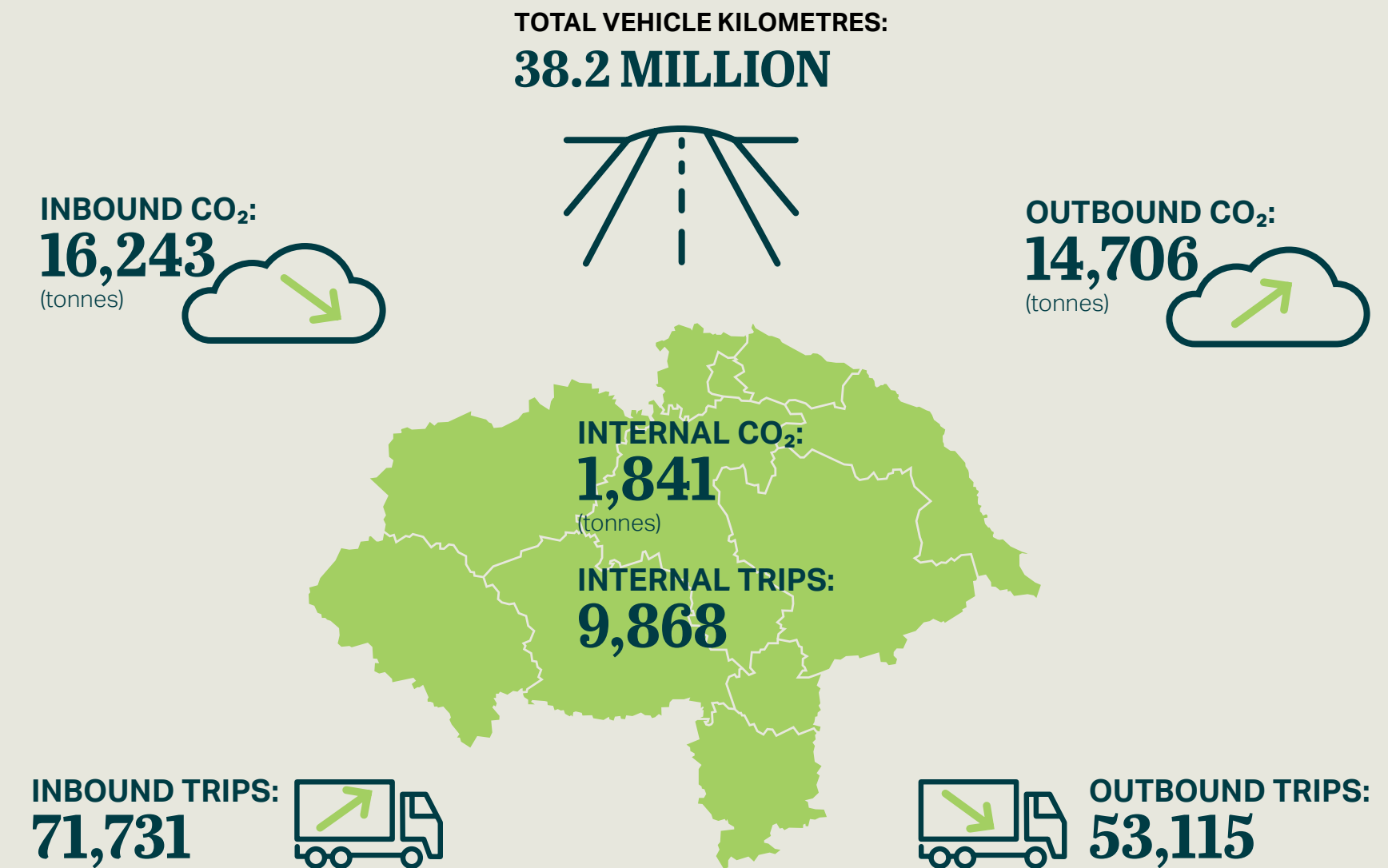
Inbound



Outbound



Summary of findings:



The predominant flow of goods was to North Yorkshire CC with 594,207 tonnes, this contributed to 21 per cent of the total goods lifted to and from York. The further from York you go the less goods are lifted so for example in Southern regions such as the South West of England (only 1 per cent of Total goods lifted) and Wales with 55,602 tonnes lifted.

The movements between York and the North West of England had the highest CO₂ emissions with approximately 5,571 tonnes (17 per cent of total CO₂ emissions), 49 per cent from inbound movements and 51 per cent from outbound movements. The greatest individual category to contribution of CO₂ emissions to and from York was from Empty Vehicles with approximately 10,975 tonnes.

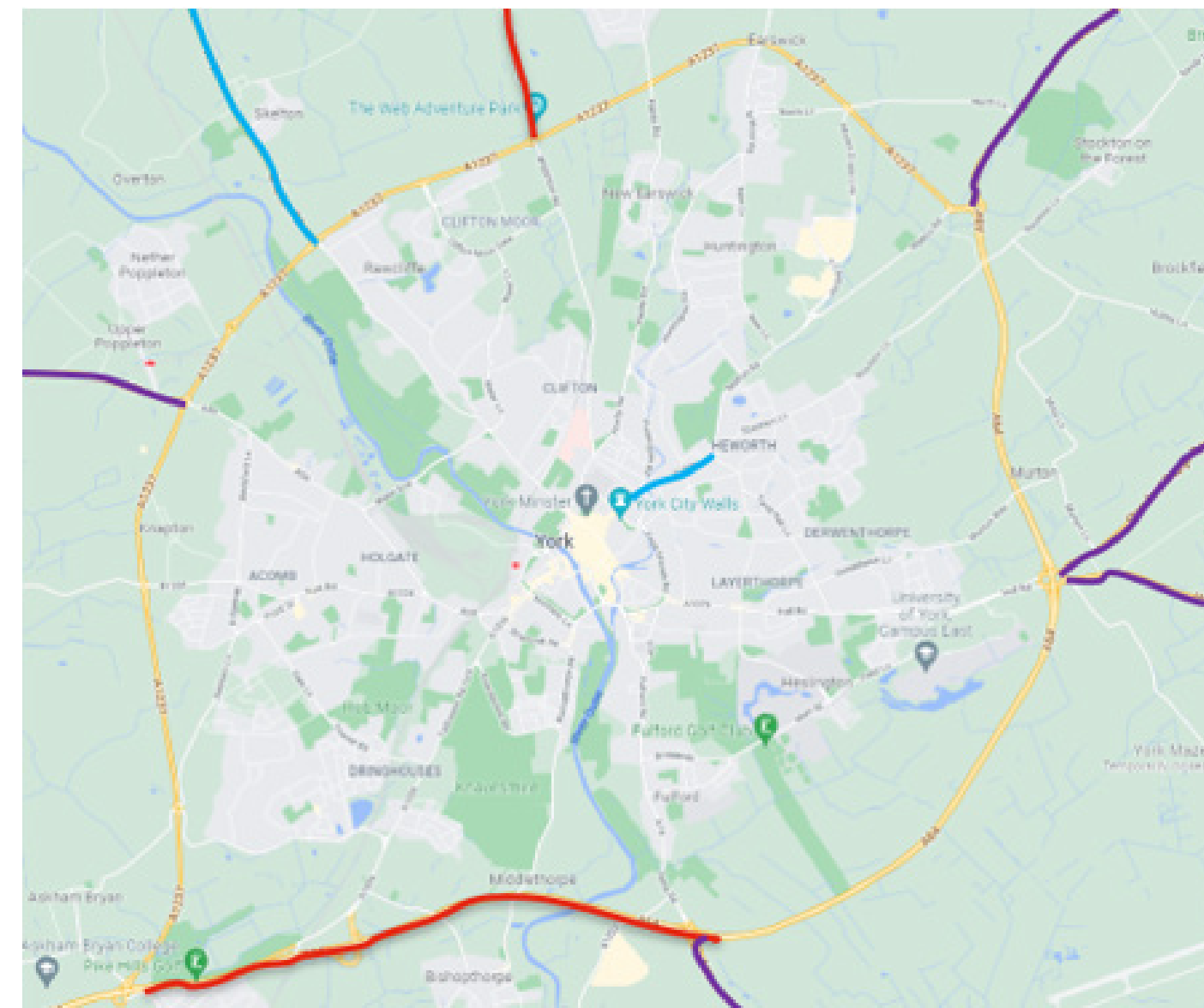
DfT traffic count analysis

Routes in the York region were examined using statistics from the Department for Transport (DfT) on road traffic flows. The data analysed is the average annual daily flow which captures the number of vehicles that travel past (in both directions) each count location on an average day of the year. This provides insight into the movement of Light Goods Vehicles (LGVs) and Heavy Goods Vehicles (HGVs) in the region. All data used is taken from the 2020 data set.

As there are higher volumes of LGV traffic flow compared to HGVs, the following scale has been used to indicate the level of traffic flow in the York Region. This is indicated in the below maps, which show the DfT count points and the traffic flow.

Light goods vehicles traffic flow scale

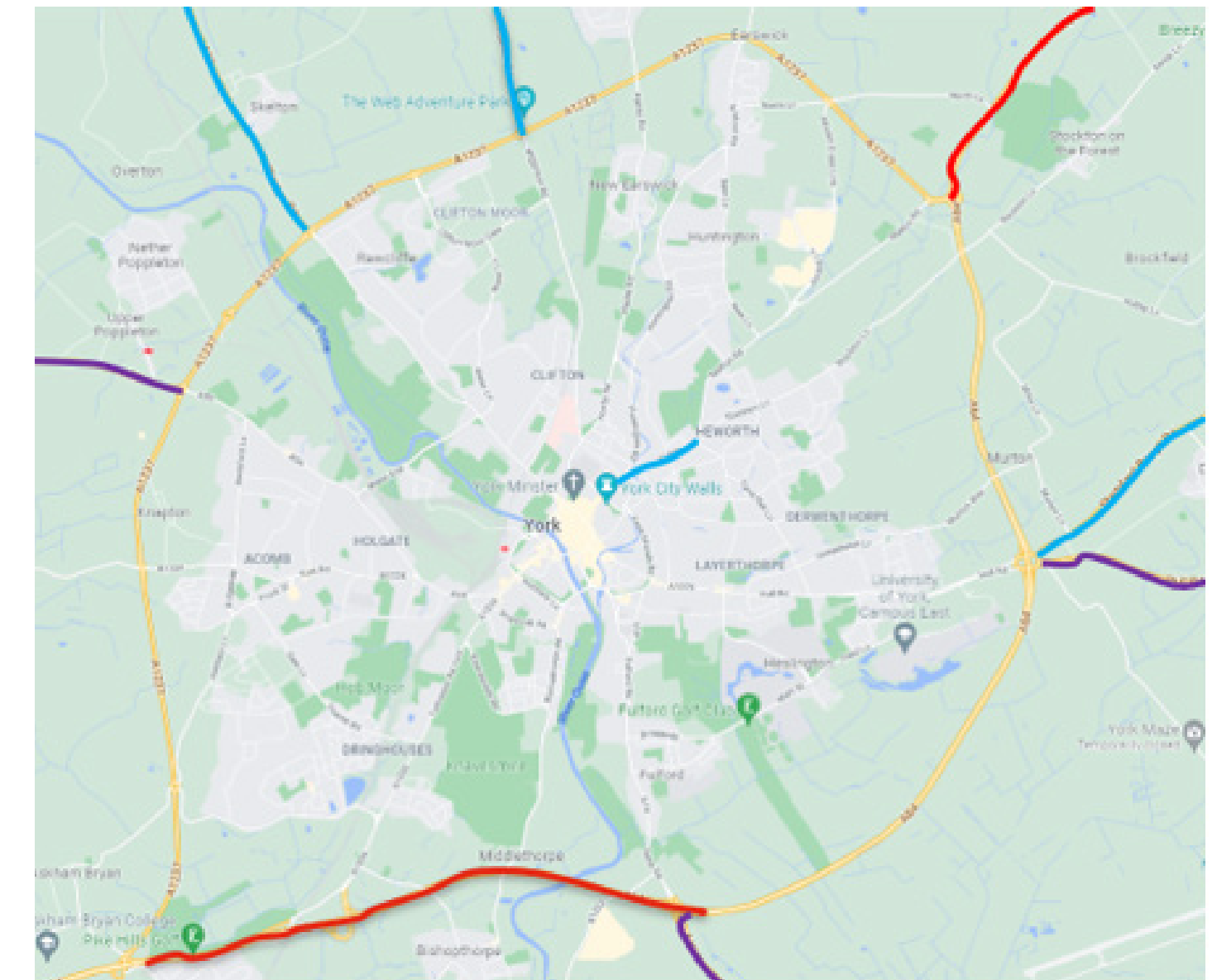
There are higher volumes of Light Goods Vehicles (LGVs) traffic flow on the A64 route with 7871 LGVs based on the DfT data collection. This is followed by A1237 with 3080 LGVs, and of course these are major through routes so these roads carry long distance traffic travelling through the area as well as vehicles destined for the city. Generally, there has been moderate levels of LGV traffic flow in the York Region but lower levels of LGV traffic flow on routes such as the A1036 which is one of the local arterial routes into the city.



- Low (Less than 1300 LGVs)
- Moderate (1301 to 2500)
- High (Greater than 2501)

Heavy goods vehicles traffic flow scale

The A64 Eastbound in the South West of the city has higher levels of traffic flow for Heavy Goods Vehicles, with two different DfT Count points along this route showing higher volume of HGVs traffic flow. There are lower levels of HGV traffic flow on routes such as the A1036 and low to moderate on routes that include; A19, A166, and A1237.



- Low (Less than 600)
- Moderate (601 to 1200)
- High (Greater than 1200)

Specialised Goods Vehicle Counts

AECOM's Specialised Goods Vehicle Count (SGVC) surveys are a tried and tested data collection technique that enables an understanding by providing a detailed snapshot of the nature of freight along specific routes. For this project, a SGVC survey was conducted which enabled the project team to grasp first-hand insight into freight vehicles within York City Centre.

The SGVC aimed to:

- / Collect primary data on the types of freight vehicles using the road network within York City Centre
- / Capture an inventory of hauliers who use the roads near York City Centre
- / Capture the nature of operations of freight vehicles travelling in York City Centre
- / Improve the understanding of the nature of freight movements

Members of the AECOM Freight and Logistics survey team carried out the SGVCs across 6 locations between Tuesday 17th and Thursday 19th August 2021. The SGVCs covered both inbound and outbound freight movements within the city centre within the AM and

PM peak periods. The AM peak period was 7-10:30am and the PM peak was 4:30-7pm.

Data was analysed by site as well as by comparing sites against each other to allow general trends to be seen. Key findings from the summary of overall analysis include:

- / Whilst there are some outliers for vans, such as the high percentage of '65' registered vehicles at Coney Street and '67' registered vehicles at Micklegate, the general trend for the average shows a trend towards newer registered vehicles. Across all sites the highest percentage for trucks were 66 plate vehicles (11.1%) and for vans 21 plate vehicles (6.6%).

- / For trucks, in general, the data shows that all the sites had around the same percentage of Euro VI vehicles, with Monk Bar having a lower proportion of Euro VI vehicles and the highest proportion of Euro V and Euro IV vehicles demonstrating that this may be an area for any interventions to focus on. Across all sites, 83.6% of trucks were Euro VI, with 10.6% Euro V, 2.2% Euro IV and 1.4% Euro III and earlier. For vans, there was less variation and data was very consistent between sites. 54.3% of vans were Euro 6 with 30.7% Euro 5, 12.6% Euro 4 and 2.3% Euro 3. 0.1% were

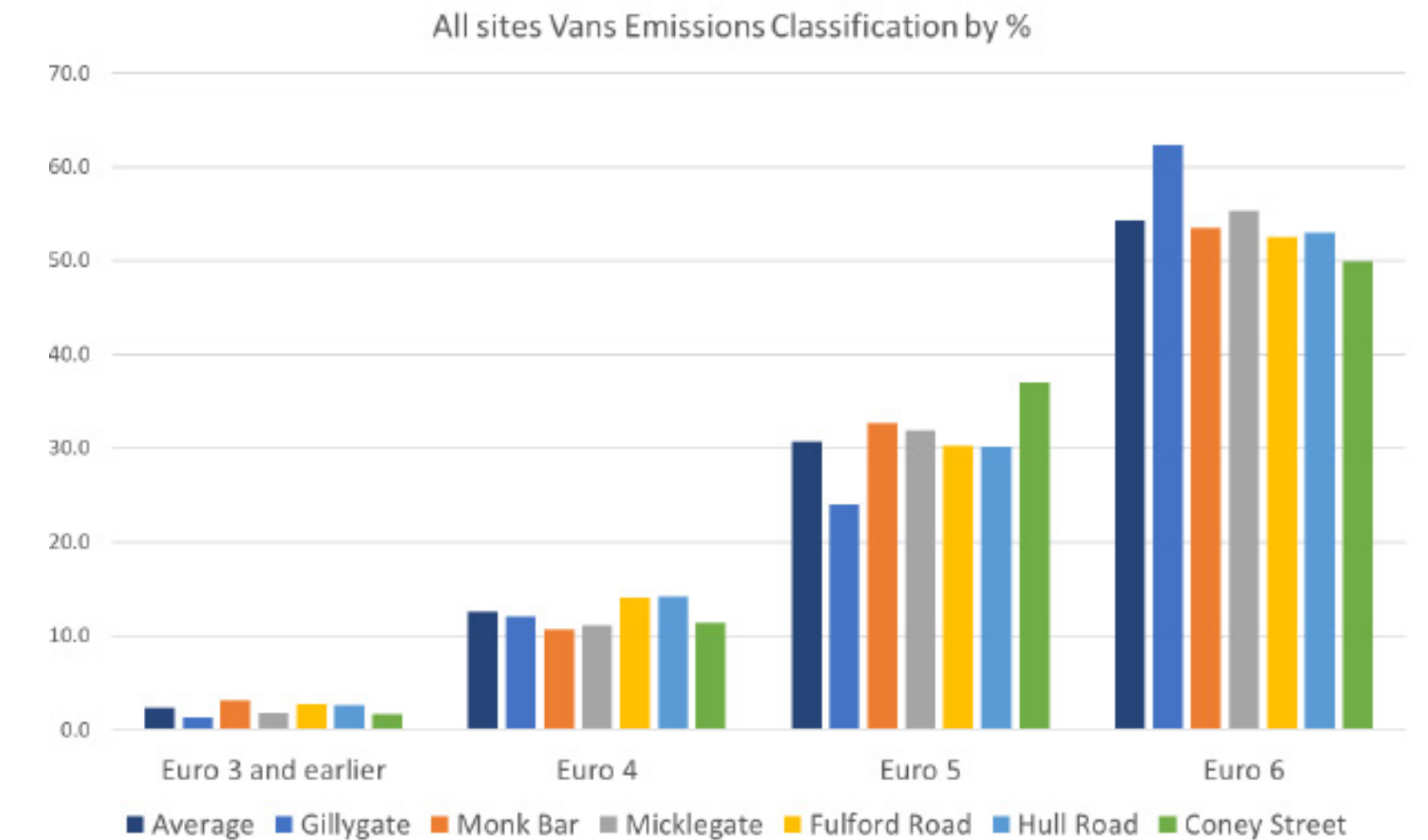
foreign vehicles that were unidentifiable. This shows that the majority of vehicles are compliant with the latest emission standards.

- / Across all sites, the highest industry classification percentage for trucks was Food retail (21.9%) followed by Building/Building services (18.9%) and Waste (15.7%). For vans the highest percentage was Building/Building services (12.6%) followed by Food retail (6.9%) and Post and parcels (4.5%). The remaining percentage not shown is 'General' which includes general haulage and unmarked vehicles and made up 31.6% of trucks and 63.9% of vans.

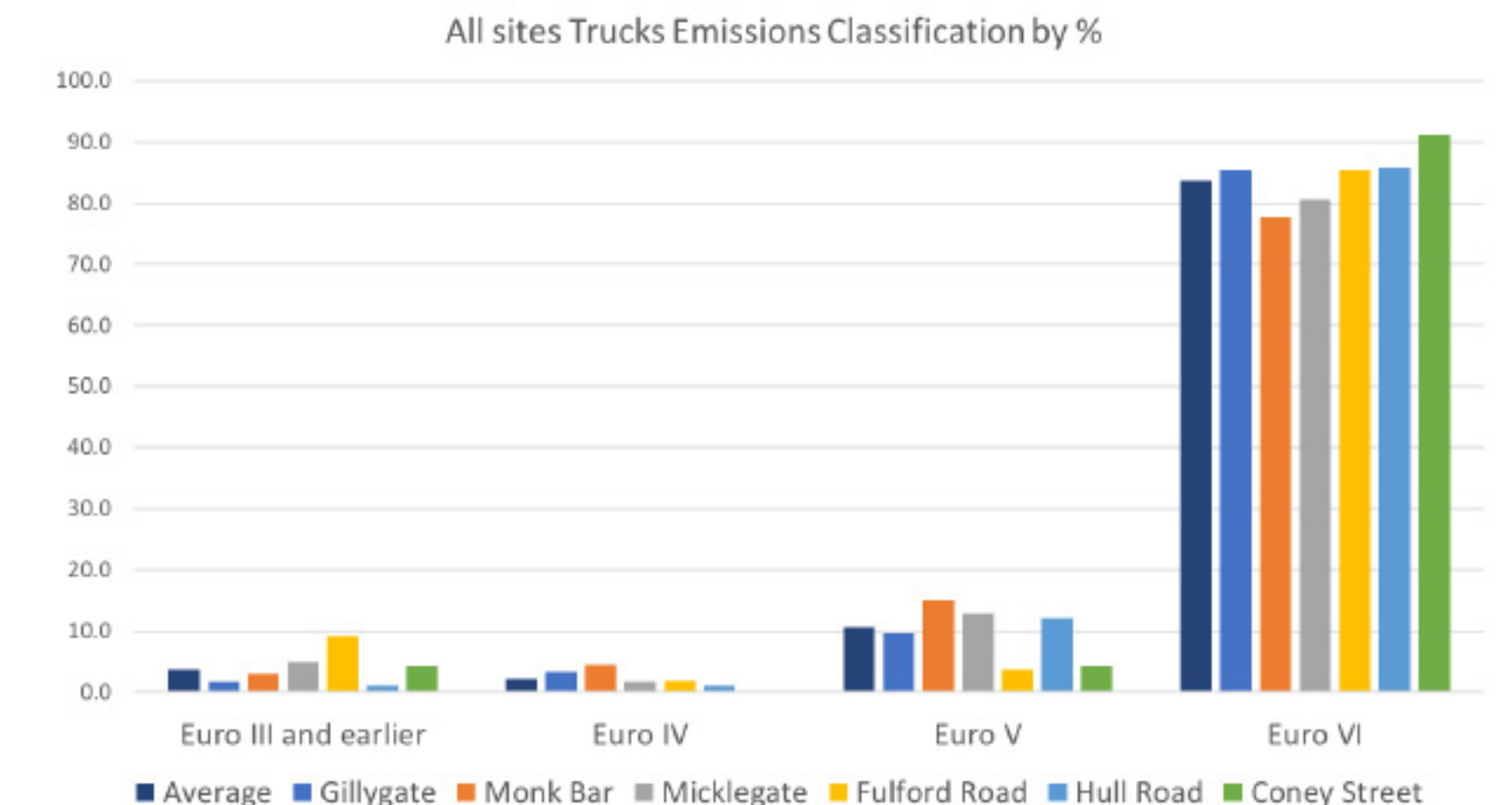
- / For food couriers, the data shows that, other than Micklegate where figures are around equal, pushbike food couriers were a clear majority across the city. Overall, 75% were pushbike couriers and 25% moped or motorcycle. As a general observation, it was noticeable that most moped couriers were using newer vehicles, mainly using those with post-2019 registration plates.

Food courier cars could not be recorded as part of the SGVC as these could not be identified. These are, however, covered in the fast-food delivery market study.

Euro VI LGV introduced 2016



Euro VI HGV introduced 2014



Roving surveys

Another survey which was conducted for the study was a 'Roving Survey'. The Roving Surveys the team walked round counting and writing down observations of the vehicles in the city centre. In addition to counting the vehicles, the Roving Surveys also provided more opportunities to engage with a range of businesses, haulers and drivers of delivery and service vehicles.



Key findings from the roving surveys included:

- / Over the course of both mornings we observed approximately a vehicle a minute, as well as 8 different industry sectors. The most common was General, with 38% of vehicles on Day 1 and 41% of vehicles on Day 2 having no identifiable markings as to which operator they were from and being categorised as General.
- / 9 companies were seen during both roving surveys in the city centre, highlighting that a significant amount of freight traffic in York city centre is regular with similar daily patterns.
- / The oldest vehicle seen was a 51 plate (2001) rigid V7 belonging to a market trader. Despite being 20 years old the vehicle was in a tidy condition for its age. The vehicle was parked in an approved parking bay on Foss Islands Road and was also seen parked in the same space during the middle of the day on 17th August.
- / We also observed no vehicles entering Coney Street pedestrian area after 10.15am, with the bollards restricting vehicle access being put in just before 10.30am.
- / The data collated revealed the daily freight movements began early with commercial waste collection and retail deliveries, along with food & drink vehicles also being delivered relatively early. Service vans were the next to arrive followed by parcel vans. The only electric vehicle observed was one of the two new CYC '21 plate Dennis eCollect RCVs.



Shop front surveys



During the SGVC survey from 17th to 19th August 2021, a shop front survey was undertaken with the objective to comprehend what the current commercial environment is for York city centre and the freight generated. The type of shops was recorded against 11 different retail categories, some example categories were; food establishments including cafes and restaurants, banks, health and beauty shops and empty retail premises. Key findings include:

- / The most popular premises in York City centre are cafes, restaurants, and pubs, with a total of 29% of the shops surveyed being in this category. The streets surveyed with the highest number of food premises included Fossgate / Franklins Yard (43%) and Castlegate (71%).
- / The survey also highlighted the number of empty units currently in York. The survey showed there are 78 available retail units, 9% of the 843 total premises counted in

the survey. The five areas with the highest number of empty units were located along Feasgate (42%), Piccadilly (36%), Spurriergate / Coney Street / Lendal (22%), Blake Street / Davygate / Parliament Street (16%) and Market Street (15%)

- / The 9% of vacant premises in York city centre is significantly lower than the high street national average of 13.7% reported by the Local Data Company (LDC) in Q4 2020. There are several explanations for York experiencing a lower vacancy rate. For example, pension fund owners have been selling large vacant shops which are then being bought by local developers and investors. Also, landlords are currently open to negotiating leases and with the current business rate reliefs smaller units are not staying vacant due to new businesses starting-up and independent shops expanding in York.

Additional data

/ AECOM also produced a model to help estimate the number of parking bays that would be required based on the current make-up of shops within the city centre that were surveyed as part of the shop front analysis. This uses survey data compiled on the number and categories of shops on different streets and makes calculations based on assumed trips, assumed delivery windows and assumed dwell times to come up with an overall figure. Based on the above, it was estimated that for the streets surveyed, the City of York would require approximately 45 delivery bays to facilitate deliveries to the city centre.

/ The current fast-food delivery movements taking place in York has also been investigated. Observations included that for cars making these deliveries the vehicles were relatively old, with vehicles including those as old as 2004 plate being driven. For motorcycles and mopeds, vehicle age was newer, ranging from 2018-2021. Other observations included that bicycles were another

popular mode of transportation used by takeaway couriers and that Deliveroo was the most seen delivery platform livery, ahead of Just Eat.

/ ANPR surveys were undertaken at four locations from 24 – 27 August 2021 to inform the fleet fuel profile and age compositions. Careful selection of locations across 4 strategic sites in York ensured that an effective insight into vehicles travelling into and out of the city could be captured. Locations were along the A19 (Shipton Road), A1036 (Tadcaster Road York), A19 (Main Street) and A1079 (Hull Road)

/ Findings for the ANPR survey included that the trend for cars and LGVs were towards newer Euro 5 and 6 engines, The HGV fleets were also predominantly Euro V and VI, although the rigid fleet was slightly older than the articulated, which is consistent with trends recorded in other cities and understood to be related to a larger component of owner-operator vehicles and longer retention of these vehicle types in the fleet.

Air quality analysis overview

This section provides a summary of data presented in the separate air quality baseline and report issued to CoYC. The air quality baseline report presents the existing air quality and trends in the City of York, along with a detailed breakdown of road transport emissions sources, and contribution from regional backgrounds. Key findings include:

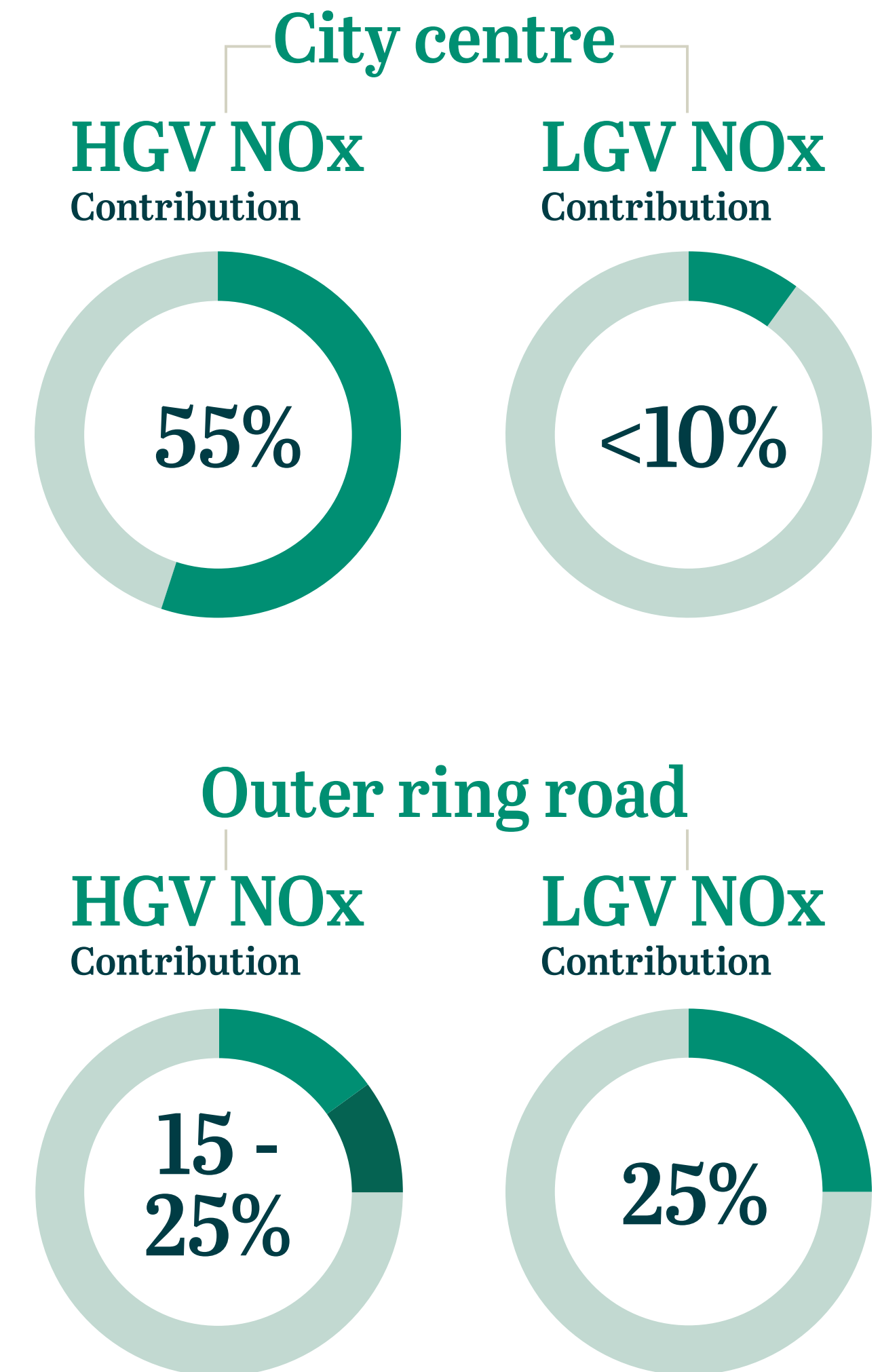
/ Whilst NOx emissions from private cars continue to make up a large proportion of the transport emissions across the AQMA and wider city, NOx emissions from LGVs and HGVs are still significant in certain areas, with HGVs in particular contributing disproportionately to elevated pollution levels in some areas of York.

/ The source contributions for NOx and PM pollutants are broadly similar, as expected, although cars tend to contribute a comparatively higher proportion of PM2.5.

/ Additionally, HGVs are a significant emission source on the majority of major roads including the outer ring road, key routes into York, and the inner ring road / AQMA, where they contribute between 15 – 25% of the total road NOx emissions, although there are a few areas around the city centre where HGVs are more significant and contribute up to 55% of the total road traffic NOx emissions.

/ Due to the relatively lower flows of HGVs in relation to cars, these larger vehicles are contributing disproportionately to pollution levels in a number of areas. LGVs are responsible for less than 10% of road traffic NOx emissions on the majority of roads but are more significant in certain areas such as the outer ring road and on key arterial routes, representing up to 25% of total road traffic emissions.

/ Measures to reduce emissions from HGVs and LGVs will be an important part of City of York Council's ongoing strategy for air quality improvement, especially in the city centre AQMA.



Stakeholder Engagement

Engagement was carried out with delivery operators to better understand how deliveries are currently made and received within York and to better understand their challenges and views on improving emissions in York and how they can contribute towards this. The engagement was conducted with a range of delivery operators of different scales and industries and offered a variety of views for consideration as part of the study. It was positive that the majority of operators were keen to be surveyed and there was a general willingness to be part of the freight forum. Logos of companies surveyed and sample suggestions on how to improve air quality in York are shown on this page.

In addition, driver and business surveys were also carried out, both as part of the site survey in York as well as follow-up phone calls. A majority of drivers and businesses surveyed wished to provide some sort of positive response and these responses provided essential intelligence.



- / Improve the domestic and freight movement relationship, as freight tends to be isolated when routes are managed
- / Enhance the Park and Ride as residents do not have the space for private electric vehicle charging
- / Reduce the number of stops on the bus to have a more direct route, as walking can be quicker than the bus in York



- / A mixture of public and private electric charging points
- / Also need a mix of soft and hard approaches to improve air quality
- / Micro-mobility solutions will play a key role going forward



- / Improve technology of e-cargo bikes to include refrigerated capacities
- / Provide more provisions for cyclists in York



- / Capturing grams of carbon produced per parcel on its journey
- / Working collaboratively with different parties, for example if the council mentioned they had barges to use for deliveries, Amazon would work with the council to test these initiatives



- / Measures to improve the cycle network in York
- / Introduce more electric charging points
- / Look into more incentives for people to switch to electric vehicles



- / More focus on cycling – for example, implement more food deliveries by bike, and a ‘Boris Bike Scheme’ would be a good strategy for the city



- / Not a good idea to use bus lanes for deliveries due to the potential impact on the movement of buses and may add to the traffic issues
- / Rail would be a good alternative but there is an absence of railheads and good connections to the ports



- / Understanding whether there are currently safe storage spaces for e-bikes in York
- / Understanding which commodities are best delivered on e-bikes



- / Cargo bikes can be highly effective but also unwieldy
- / Can rent and share vehicles

Review of low-emission transport providers

AECOM has conducted a desktop review of low emission transport providers, a literature review of best practices in low-emission delivery options and provided a series of UK and international best practice case studies which showcase how other regions are tackling emissions from freight vehicles.

There are several examples of local or regional firms that exclusively provide low-emission last mile transport solutions with either the whole or part of their operations in York.



Company	Types of operations	Low-Emission Transport Modes Used	Area of Operation
Green-Link	Courier services including urgent documents and postal deliveries	Electric vehicles, load-carrying cycles and trailers	York, Luton, and Darlington
York Collective	Courier services	Cycles	York
Royal Mail	Postal service	Electric Vans & Electric Rail	Nationwide
Centrica	Vans used for energy services	Electric Vans	Nationwide
Warburtons	Baked Food Deliveries	Trucks	Nationwide (low emission truck currently only around London)
DPD	Parcel delivery	Electric Vans	Nationwide
DHL	Parcel delivery	Electric Vans	Nationwide
Amazon	Parcel delivery	Electric Vans	Nationwide
WEGO Couriers	Courier services including local and UK-deliveries and fast-track rail	Electric Vans and Express Rail	Nationwide
Green Couriers	Courier services as well as road haulage, warehouse storage and distribution	Cycles and low-emission motorcycles, cars and vans	Nationwide
Indigo Couriers	Courier services	Vans	Nationwide
Intercity Rail Freight	Express Rail Freight	Rail	Various UK routes
Eversholt Rail	Express Rail Freight	Rail	Various UK routes
Zedify	Courier services including for local businesses, carriers and ecommerce	Bicycles, Tricycles and Vans	Several UK cities
Pedivan	Courier services	Tricycles	London
Pedal and Post	Courier services, mail collections, document exchanges, medical deliveries and storage	Bicycles and Tricycles	Oxford

Literature review of current best practice

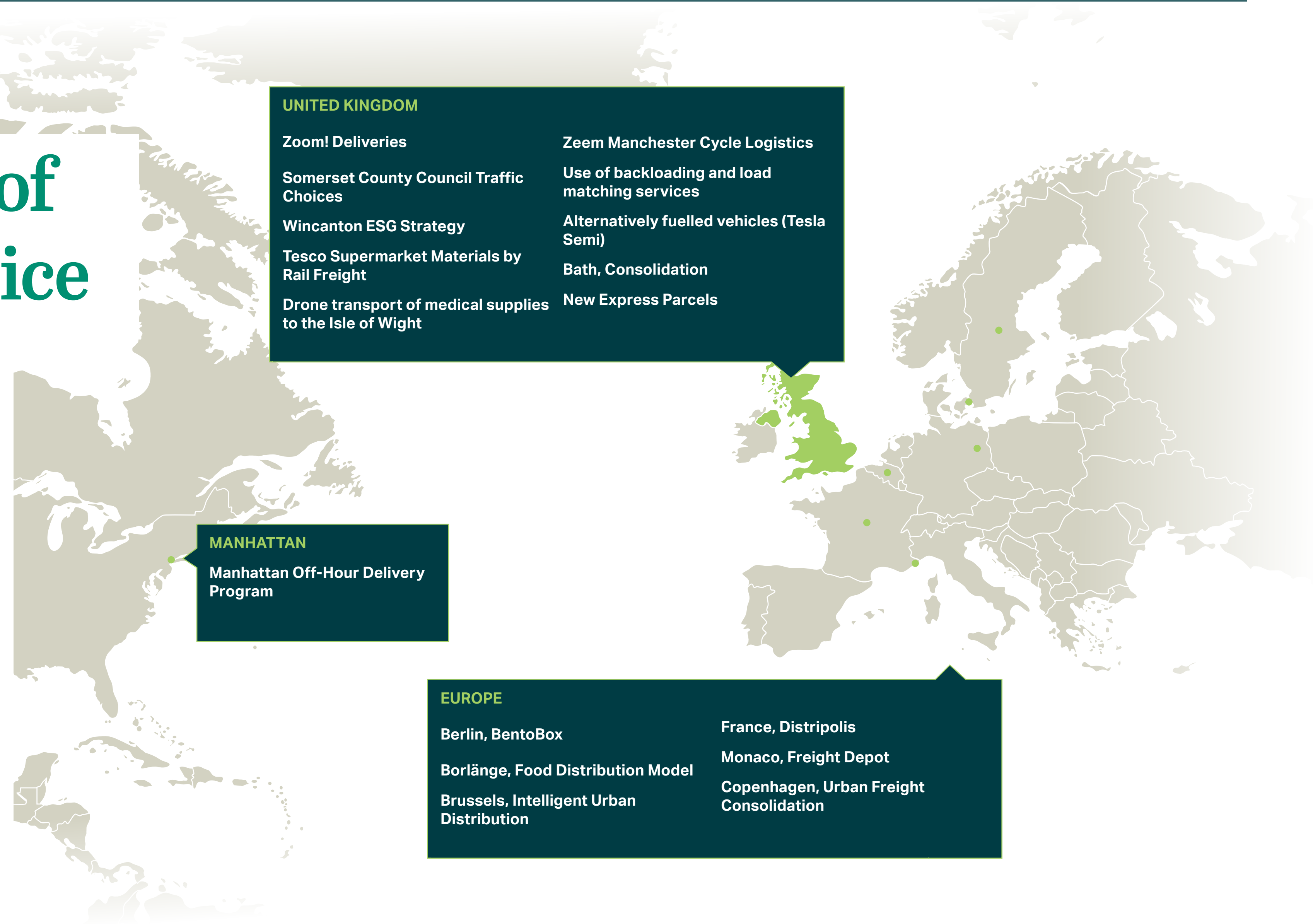
A literature review of best practice alternative last mile delivery solutions across the UK and internationally has been conducted to gain a comprehensive insight into existing best practice. This highlights how other cities, towns and regions across the world are reducing emissions from freight vehicles. Examples include:

- / Amsterdam's 'shared microhubs' and e-freight bikes (Netherlands)
- / Bristol-Bath Freight Consolidation Centre (BBFCC) (UK)
- / Edinburgh's fleet of electric minivans (UK)
- / Bordeaux's Nearby Delivery Areas (France)
- / Parma's EcoCity urban distribution centre (Italy)

- / Business owned UCC serving Paris (France)
- / Nijmegen's inner-city service (Netherlands)
- / Berlin's KoMoDo trial (Germany)
- / Dublin's pedestrian friendly deliveries (Ireland)
- / London's cream of the crop logistics hub (UK)

Several case studies have also been produced, best practice split by 10 UK case studies and 7 International case studies. These have been identified and selected as there are similarities to characteristics in York and therefore could be implemented in similar ways.

The case studies shown within this section are displayed on this map.



UNITED KINGDOM

Zoom! Deliveries	Zeem Manchester Cycle Logistics
Somerset County Council Traffic Choices	Use of backloading and load matching services
Wincanton ESG Strategy	Alternatively fuelled vehicles (Tesla Semi)
Tesco Supermarket Materials by Rail Freight	Bath, Consolidation
Drone transport of medical supplies to the Isle of Wight	New Express Parcels

MANHATTAN

Manhattan Off-Hour Delivery Program

EUROPE

Berlin, BentoBox	France, Distripolis
Borlänge, Food Distribution Model	Monaco, Freight Depot
Brussels, Intelligent Urban Distribution	Copenhagen, Urban Freight Consolidation

Conclusion and proposed solutions

Following the identification and review of best practice examples, this section sets out a list of potential solutions which can be used by CoYC to help inform the proposed pilot project which is expected to run for 12 months during 2022. The pilot project will test solution/s to reduce vehicle-based emissions from HGVs and LCVs.

We have presented six pilot solutions, with CoYC keen to explore four of these as pilot solutions. These four are as follows:



Solution 1: Scenario 1a) Pedestrian Portering service

This would see deliveries arrive via one or two large vans or HGVs per day at 3 - 4 micro consolidation hubs located around the city centre. Delivery to each hub could potentially be made once in the morning and once in the afternoon each day. Once at the hub the parcels would be sorted and then transferred to a network of pedestrian porters who would deliver parcels by foot to addresses within the city centre.

Solution 2: Scenario 2a) Light freight deliveries by Rail

By using former or existing passenger trains and allocating space for light freight (parcels) and delivering these goods directly to the station by rail. These goods would then be sorted at the station for final delivery by zero-emission vehicles. This scenario could be achieved in partnership with Network Rail and a third-party distribution firm such as Orion who are looking to launch this service from the Midlands to Scotland in the near future. There are two other companies also interested in using converted passenger rolling stock as parcel trains.

Solution 1: Scenario 1b) Zero-emission deliveries

In a similar manner to scenario 1a, this would see deliveries made twice a day to 3 - 4 smaller hubs or even a larger central micro-hub. The difference with this option would be that the goods would be delivered by zero-emission vehicles for the last mile. This could be in the form of cargo bikes or micro-electric vehicles such as an e-trike or electric-assisted trolley.

Solution 3: Food deliveries consolidation

As York is a popular tourist destination, its food and drink industry is vital to its success. There are many food and drink deliveries as identified by AECOM's SGVC surveys in York, therefore one obvious solution to cut emissions from HGVs and LCVs would be to examine food and drink deliveries and look for logistics efficiencies. There would need to be a fine balance to ensure that York's bars and restaurants are not affected by changes in delivery patterns that would impact their operation and the services they offer.

Options Assessment

The scenarios of 1a Pedestrian portering service, 1b Zero-emission deliveries, 2a Light freight deliveries by rail and 3 Food deliveries consolidation have been further analysed with regards to impact on air quality.

The below table presents a summary of the annual mean NO₂ impacts of each of the intervention option scenarios. The interventions option scenario 1b (zero-emission deliveries) was predicted to have the largest change in predicted annual mean NO₂ concentrations

with as much as -1.26 µg/m³ change predicted at receptor K5 (kerbside location at 11 Gillygate), on Gillygate with a number of similar level of changes predicted at other locations on the same street. Option 2a (light freight deliveries by rail) had a broader overall beneficial impact, improving annual mean NO₂ concentrations at Gillygate, Blossom Street Lawrence Street, and other areas of AQMA, however by a lesser change in concentration than Option 1b.

Intervention Option Scenario	Largest annual mean NO ₂ impact and location	Impact on areas of concern
1a	-0.91 µg/m ³ change at receptor K5 (kerbside location at 11 Gillygate), on Gillygate	Most beneficial on Gillygate, with notable improvements at the junction of Blossom Street and Nunnery Land, on Foss Islands Road, and other areas of AQMA
1b	-1.26 µg/m ³ change was predicted at receptor K5 (kerbside location at 11 Gillygate), on Gillygate	Especially beneficial on Gillygate, with notable improvements at the junction of Blossom Street and Nunnery Land, on Foss Islands Road, and other areas of AQMA
2a	-0.8 µg/m ³ change at monitor C58 on Fulford Road	Some improvement on Gillygate, Blossom Street Lawrence Street, and other areas of AQMA
3	-0.73 µg/m ³ change at monitor 110 on George Hudson Street	No impact on areas of concern, although improves conditions in AQMA on George Hudson Street



Additional solutions to reduce HGV and LGV movements

In addition to the solutions identified for the pilot scheme, there are several other initiatives outside of the pilot that we recommend CoYC consider. These include:

1. The use of backloading and load matching services
2. Dedicated Cycle logistics paths
3. Incentivising and encouraging

greater take-up of city centre parcel locker boxes for parcel drop off or collection

4. Review options to deliver smarter during quieter periods of the day or week
5. Encourage best practices from hauliers in York.

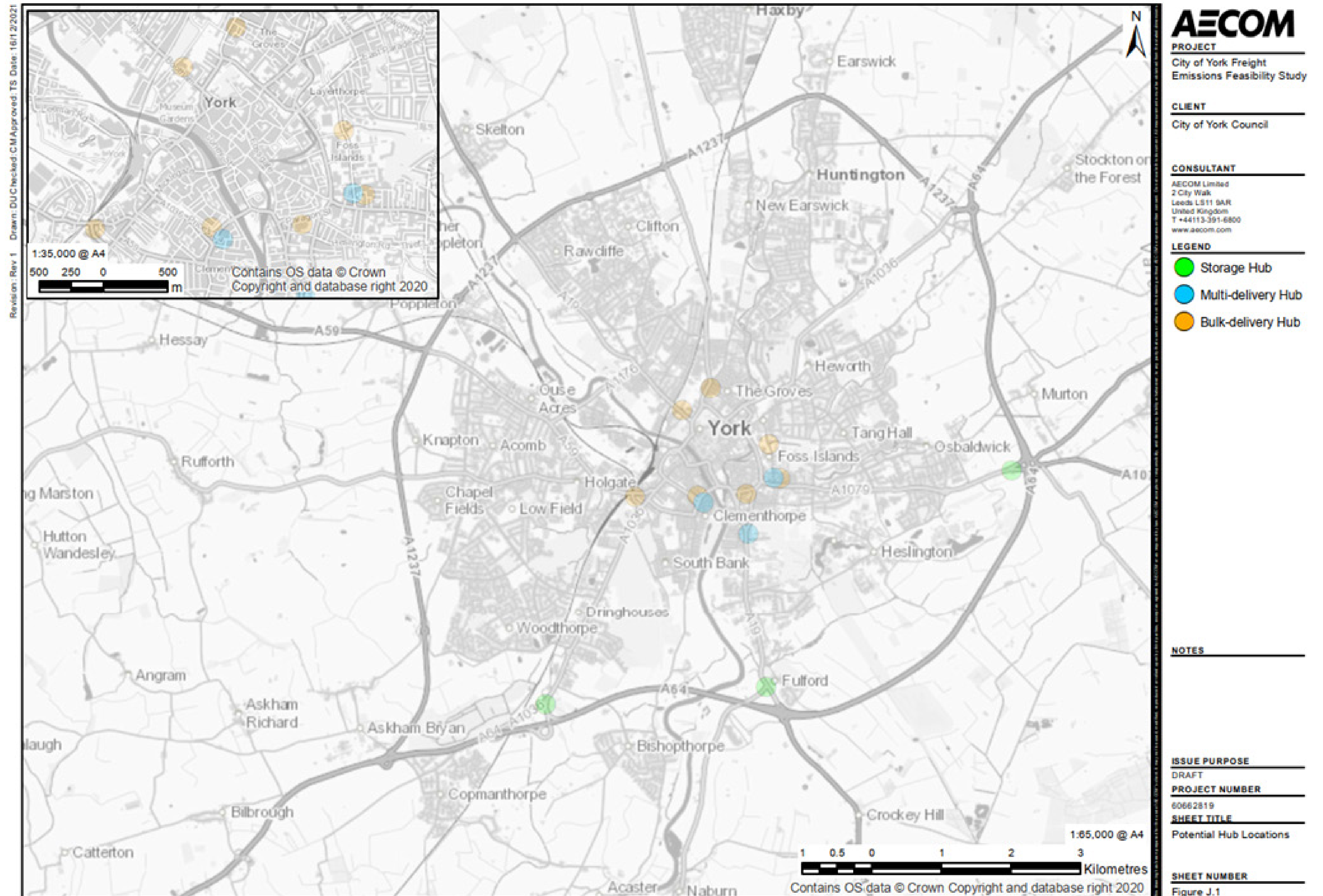
We view some of these initiatives as relatively easy “quick win” solutions for CoYC to introduce that will reduce the number of trips from freight vehicles.

Preliminary review of potential hub locations

The following map indicates potential locations that may be suitable in terms of emissions for:

- a. Bulk delivery / distribution hub;
- b. Multiple delivery consolidation / distribution hub; and,
- c. Storage hub, or just-in-time facility providing storage for the city centre.

These potential locations consider only the effects on the air quality and emissions, and at this stage do not consider the practicalities of implementing a hub.



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