ZEBRA Business Case for York

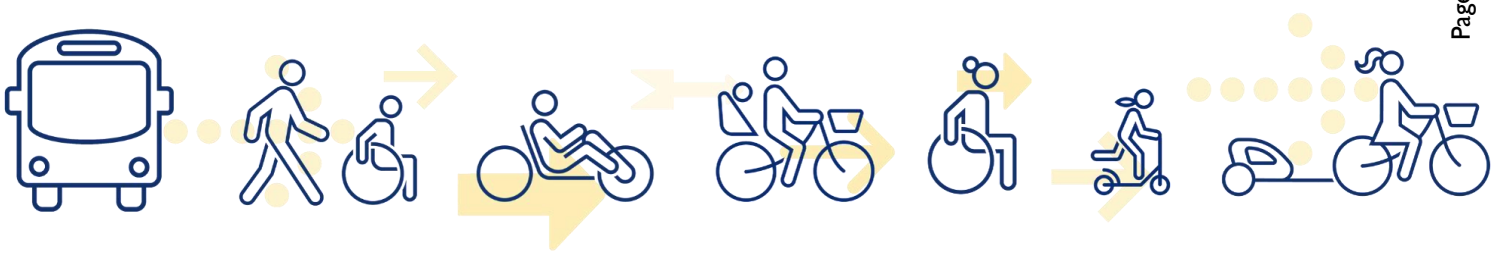
The Future of Zero Emission Public Transport

January 2022

CITY OF YORK COUNCIL

York by bus.

Contents



Executive Summary

Introduction

This document comprises City of York Council's ZEBRA bid to the Department for Transport. It is submitted on 31st January 2022. The document has been written using the template provided by the Department, which itself uses the Treasury five-case methodology.

Changes from Expression of Interest stage

The bid presented here is largely the same as that put forward in York's EOI. Changes are limited to some small changes in capital costs of infrastructure associated with the bid. There has been no change in the scope of the bid, routes concerned or numbers of vehicles bid for.

Funding Sources

	EOI	Business Case
DfT funding sought	£8,[redacted]	£8,[redacted]
First York	£10,[redacted]	£10,[redacted]
CYC	None	None
Total cost of the proposal	**£18,[redacted]**	**£18,[redacted]**

Strategic Case

The Strategic Case for York's ZEBRA bid rests on the principle that York presents an extremely good environment to support the DfT's ZEBRA fund objectives – particularly:

- Supporting the government's commitment to decarbonisation and reducing the transport sector's contribution to CO2 emissions
- Supporting the roll out of 4,000 Zero Emission Buses that the government committed to in February 2020
- Supporting bus manufacturers; in the development of zero emission bus technology
- Support partnership working between Local Transport Authorities and other local stakeholders as set out in the NBS
- Understanding better the challenges of introducing zero emission buses and supporting infrastructure to inform future government support for ZEBs.

In the bid document we set out how development of bus services in York for the past 35 years has resulted in an operating environment in the city where there is extensive support for services, including bus priorities on the principal radial routes in the city and a long established voluntary bus partnership, which is currently in transition to becoming an Enhanced Partnership. Bus use in York increased by around 60% between 2000 (when York's QBP was established) and 2019. Although this was assisted by development of the city's park and ride service, a substantial amount of this growth took place on the non-park and ride network. Consequent to this, York has set out an ambitious, but achievable, Bus Service Improvement Plan, which presents a plan to increase bus use in York by 25% above the 2019 level – which already gave York one of the highest per capita trip

rates for bus in the UK[1]. Electrifying the bus network is a central part of York's BSIP and this ZEBRA bid alongside additional bus priorities, other measures to improve service reliability and a range of reforms to fares across the city.

York developed a Zero Emissions Bus roadmap in 2012, and has been following this for the last 10 years, resulting in one of the largest electric bus fleets in the UK operating in the city. First York currently operate 33 electric buses on York's park and ride network, the oldest of which have been in use for 8 years. As such, City of York Council and First York have long experience of operating electric buses and DfT can be confident that the new vehicles can be easily introduced in York.

Phase 1 of the 2012 roadmap saw electrification of York's park and ride service. Phase 2, which this bid supports, sees electrification spread to York's high frequency non-park and ride network. This is seen both as an essential component in the transition of the York network to zero emission vehicles, but also providing the greatest benefit because:

- The services effected provide high frequency services in the centre of York – which is where air quality is currently poorest
- The new buses are likely to increase patronage on York's bus services, providing significant additional benefits as people switch to bus from car in response to the improved York fleet
- The new buses will also help meet wider government priorities around levelling up because they will serve a number of areas of York such as Westfield, Clifton and Tang Hall which are assessed to be deprived through the Index of Multiple Deprivation.

The compelling strategic case for the ZEBRA scheme means that it enjoys high levels of support from a range of stakeholders in the city. The letters of support provided by stakeholders for the EOI are attached to this bid document in Annex 6.

All operators in York were consulted about whether they wished to be partners in a ZEBRA bid. Of the seven operators in York only First York wished to bid for ZEBRA funds at this time. Consequently, this bid seeks funding to convert one park and ride route and 5 conventional bus routes to electric buses via assisted purchase of 44 battery electric buses.

Economic Case

An assessment of the economic case for York's ZEBRA bid, using the DfT supplied calculator spreadsheets, indicated a BCR of 1.27:1. This equates to the "low" value for money webtag category, although some of the sensitivity tests presented in the analysis return value for money assessments in the "medium" category. There are significant non-monetised benefits linked with staff training, knowledge cascade and amenity benefits in York.

Commercial Case

The commercial case for the scheme is significantly simplified by partnering with just one operator – First York – who already have significant experience of introducing and using battery electric vehicles. The knowledge so gained significantly de-risks the commercial case for the scheme.

[1] 11th in England excluding London.

The scheme is based around use of buses from [redacted] has emerged as First's preferred supplier following a round of supplier engagement. First take the view that the [redacted] product offers significant advantage over other products in the market. However, the commercial risks from using a new product are mitigated because it has been possible to obtain a similar quotation for similarly specified buses from an alternative supplier.

Financial Case

Total capital costs for the scheme are £19m, of which First are providing £10.5m and DfT funding of £8.5m is sought. Although not shown in the financial case, CYC is providing an additional £200k funding to provide tap-off readers on the buses (linked to introducing a capped fare multi-operator ticket in York) and a further £100k funding for monitoring and evaluation of the scheme.

First have agreed to underwrite financial risks on the project in the event that vehicle or infrastructure costs increase.

Management Case

As with the commercial case, use of an experienced partner significantly de-risks the management case for this scheme, which will be managed using City of York Council's pre-existing project management structures – which have been used in the past to deliver a range of innovative projects in York – not least the introduction of electric buses in 2014/15 and 2020/21. A full risk assessment is given in this section, as well as a monitoring and evaluation strategy.

York's Bus Service Improvement Plan

York's long term aspiration to electrify the city's bus network means it includes full electrification of the network as a key "ask" within the city's BSIP. The objectives of York's BSIP are to have a bus network which is:

- *Inclusive - minimizing social exclusion by offering easy, comprehensive and cheap transport around the city*
- *accessible to all – easy to use by everyone in the city, including people with impaired mobility or senses*
- *attractive – enough to mean driving is not the default option for many trips in York*
- *welcoming – to our many visitors, whether they are coming to York for a day at the races or a four year degree course*
- *A source of pride for the city and its residents*

Accordingly, the BSIP then sets out a comprehensive programme of upgrades of York's bus network, building on over 30 years of pro-active bus service development in the city – something which has seen bus patronage rise by 60% in York in the 20 years to 2019. As such, the BSIP sets out:

- *How punctuality of services will be improved in York by bus priorities, but also effective traffic management, enforcement, smart traffic signals and ticketing products which minimise boarding times*
- *A comprehensive plan to electrify all bus services – not just those in this bid*
- *Development of new multi-operator bus tickets, including capped fare multi-operator tickets*
- *Interventions to improve the reach of the network and plug gaps in service frequencies*
- *Improvements to information, stops and shelters, marketing and an enhancement of York's Bus Passenger Charter*
- *A comprehensive behaviour change exercise to encourage adoption of bus for more journeys (particularly in preference to car use)*
- *Plans to develop the existing park and ride terminals in multi-modal hubs giving access to a range of transport services, including long distance/ rural bus services, overnight parking, hired e-bikes and e-scooters, electric car charging infrastructure and shared cars.*
- *Plans for ensuring bus effectively serves the envisaged 20,000 new homes to be built around York over the period of the city's draft Local Plan*
- *Changes to the governance structure of the existing QBP to transition it to an EP for delivery of the measures which the BSIP seeks to fund.*

The BSIP sets a target to increase patronage by 25% on 2019 levels – to 20 million passenger trips a year – by 2024.

York's BSIP can be found by following this link: York's Bus Service Improvement Plan (itravelyork.info)

Strategic Case

Overview

In this section we describe the Strategic Case for the electric bus intervention in York. Specifically, we detail transport policy in York, the city's bus network and show the additionality which will be achieved through a successful ZEBRA bid.

Defining the Place

The Area

The area which this business case applies to comprises the whole built up area of York city, within the A64 and A1237 outer ring roads, plus the large villages of Skelton, Wigginton, Haxby, Strensall, Dunnington, Bishopthorpe, Copmanthorpe and Poppleton. As a whole this comprises the area covered by the York urban bus service, which is provided by the bus operators in the York QBP (Quality Bus Partnership). This area is shown in the figure below.

Map of area included in ZEBRA scheme showing Park & Ride sites

York and its Transport Policies

York is the historic capital of the North. With a current population of around 200,000 the city's draft Local Plan envisages strong growth - an increase of around 25% with a requirement for 20,000 more dwellings, mostly around the periphery of the city. Transport Policy in York is currently expressed in the city's Local Transport Plan, published in 2011; although York's draft Local Plan, published 2018, provides some updates to the 2011 policy.

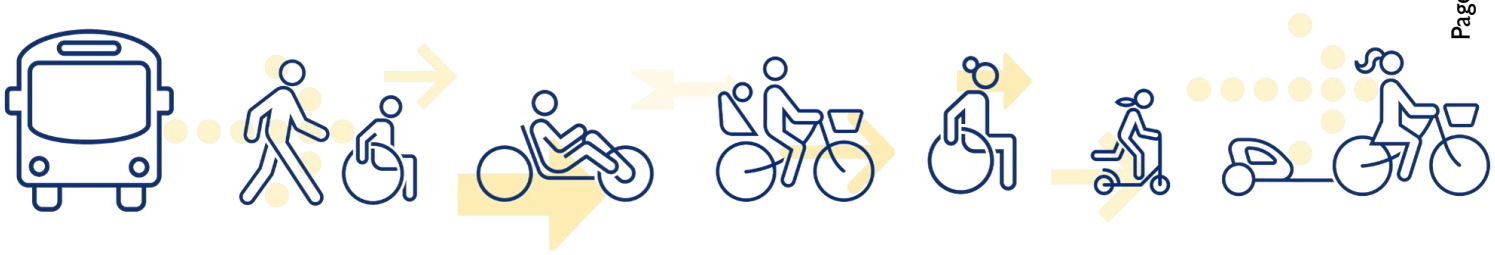
The draft Local Plan is currently in the Examination phase, and CYC are looking to revise the city's Local Transport Plan in the light of any recommendations from the Local Plan Examination; as well as the guidance expected on LTPs from DfT later this year. However, basic modelling and assessment of York's future transport needs is already underway.

The level of population growth envisaged in York's draft Local Plan poses a significant transport challenge to the city. For over 30 years City of York Council and its predecessor authority, York City Council, have followed transport policies designed to encourage use of sustainable transport modes. These policies have left York with an excellent set of sustainable transport assets, including 6 Park & Ride sites, bus priorities on all the city's principal radial routes and an extensive network of on and off road cycle routes. City of York Council was delighted to learn a week before submission of this bid that the city has been chosen as the base for Active Travel England. At the moment York has some of the highest per capita levels of trip making by bus, cycle and walking in the UK. Even after the growth envisaged in the Local Plan, York will remain a compact city which is easy to travel around using sustainable modes.

However, developing bus services is particularly important to the delivery of York's draft Local Plan. The Local Plan has sought to place new development near to existing high frequency bus routes, but it contains two substantial stand-alone sites at Langwith and Clifton Gate which between them will contain over 5,000 homes. The distance of these sites from York city centre (3-5 miles) means that bus services will be dominant non-car mode of access to these sites. Both sites have an ambitious 15% mode target to bus and electrifying the bus fleet is seen as crucial in delivering the mode share target at these sites.

As stated above, there are also a number of large scale developments taking place on existing high frequency bus routes, with effective bus services being seen as essential to mitigating the traffic impact of the development. Principal amongst the development sites is the York Central development, which is adjacent to York's railway station and at the heart of the city's bus network. The development, which is on brownfield (former railway) land on the edge of York city centre, will comprise of up to 100,000m^2 of office space and 2,500 homes. This development's planning conditions and Section 106 agreement include three new stretches of bus lane, substantial contributions to new bus services and green travel plan initiatives to ensure that bus services can play their vital role in serving the development.

York Central will be complemented by a rebuilding of the area in front of York Station, to provide a high quality bus interchange and improve its amenity for pedestrians, cyclists and visitors to the city. The new interchange provides substantially more bus stops (14, an increase from 9 stops currently) and the opportunity to turn buses, allow some bus layover and more effectively separate local buses



from rail replacement services and special event coaches, so that problems on the rail network do not adversely affect local buses. It will be a step change in provision for buses in central York, where there is currently no formal layover space or an easy way to turn buses around near the Station – although many terminate there.

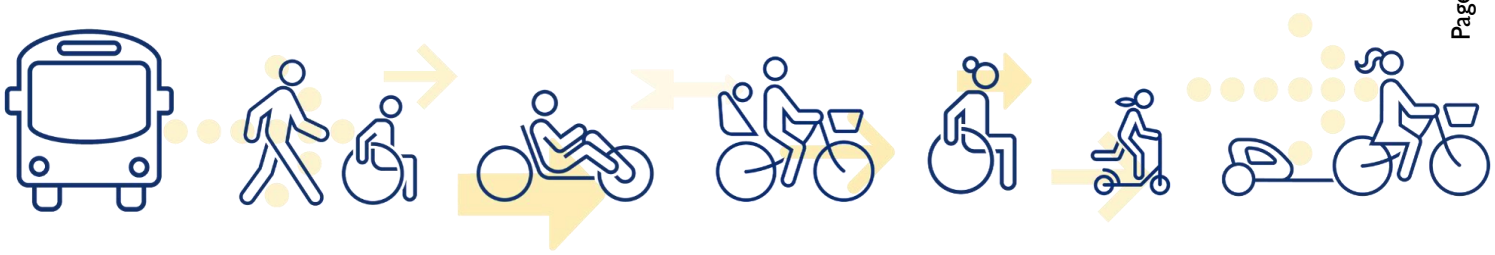
Also in the city centre, the Castle Gateway project, will improve the bus interchanges in the south eastern quadrant of York city centre, an area which is visited by many tourists. This project will comprise the closure of a 350 space car park in the city centre and, as a result, reassignment of significant volumes of traffic away from the area inside York's Inner Ring Road and the main bus spine route in the city, improving the reliability of bus services in central York.

The other development sites in the Local Plan have been carefully sited near to high frequency bus routes – in fact 12 of the 21 Strategic Sites, containing over 90% of the housing (outside of the sites at Langwith and Clifton Gate named above) are adjacent to existing high frequency bus routes. Some of these bus routes have already been electrified as they form part of the Park & Ride network. However, this funding bid seeks funds to electrify a large proportion of the remaining bus routes in York.

Modal Shift and the Role of the Bus

Although the Local Plan sets out in detail how "new" trips from the development around York will be carried on sustainable modes, there is an ongoing programme of sustainable transport promotion in York which will be supported by electrification of York's bus fleet. The electrification of the network is part of the programme of incremental improvements to the bus network over a 35 year period which have been pursued in York. As such, the electrification of the network will complement:

- A Quality Bus Partnership, established in 2002, and active ever since, which has driven a process of ongoing improvement of the city's bus service. Since 2012, York's bus operators have funded interventions through the QBP – via York's designation as a Better Bus Area – to a value approaching £1million. This has been spent on passenger information, traffic management to keep bus services running to time, maintenance of stops and shelters and improvements to road junctions where bus services experience delays
- Provision of Park & Ride sites and bus priorities on all 6 of the principal radials in York
- Introduction of a multi-operator smart ticket in 2014, which CYC is looking to develop into a tap-on-tap-off product through the city's BSIP
- Improvements to stops/ shelters and other passenger infrastructure across the city
- A complete overhaul of passenger information across York, including:
    - Providing composite timetables showing all services and route maps at all stops in the city;
    - Installation of a large number of real time screens (there are currently around 90 across the city)
    - Provision of a dedicated travel website – http://www.itravelyork.info – which is a one stop shop for all sustainable travel information in York



The work around improving the bus network takes place against a more general policy background which looks to encourage the use of sustainable modes and discourage car use. This work has included controlling car park pricing and supply in central York to encourage use of non-car modes, use of resident's parking zones to reduce parking availability for car commuters on the edge of York city centre, travel plans for new developments and development of extensive active mode networks both on and off road.

Development of York's Bus Network

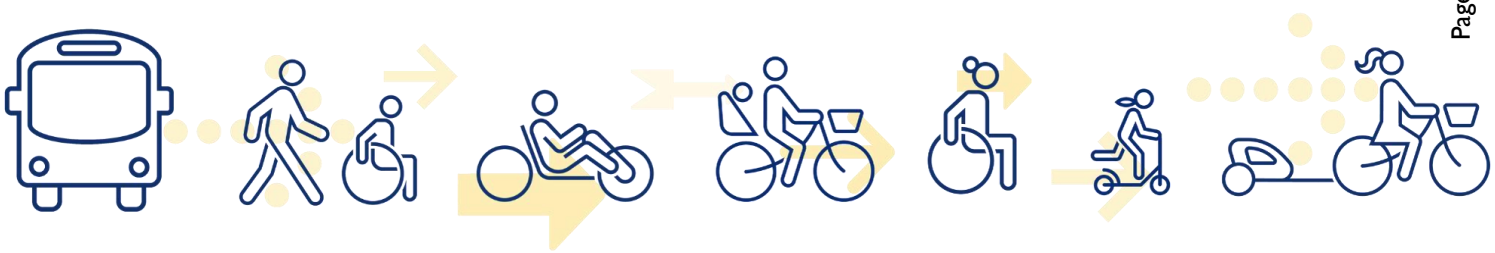
For bus services, work done around 10 years ago identified a hierarchy of bus user needs, which in turn informed development of York's bus network. Concentration on the key passenger requirements at the base of the strategy (e.g. punctuality, reliability, vehicle cleanliness, information) have largely been tackled through interventions co-ordinated by the Quality Bus Partnership. These actions resulted in a 16% increase in bus use in York between 2013 and 2017, with around 20% of these trips estimated to come from car travel. An important part of the network improvement plan now is fleet renewal. The average age of the buses in the York fleet to be replaced through this bid is 11 years. By replacing these, more elderly, vehicles with new vehicles we will improve the amenity of the York bus fleet and drive patronage higher. By using the ZEBRA bid process to ensure that the new vehicles are electric we will be making a further incremental quality improvement which we expect to lead to further mode shift – however, the ZEBRA bid is a catalyst. If the bid is not successful the likelihood is that there will not be significant investment in the York bus network, with vehicles continuing to age, detracting from the amenity of the service on offer in the city and frustrating the plans we have to use bus to serve the new developments around York.

More information about CYC's plans to develop York's bus network can be found in York's Bus Service Improvement Plan at: https://www.itravelyork.info/downloads/file/82/york-s-bus-service-improvement-plan

York and Levelling Up

Effective bus services are also a key component in the City Council's programmes to reduce poverty, disadvantage and social exclusion in York. The original work by the Cabinet Office's Social Exclusion Unit made it clear that availability of reliable and affordable public transport allows people without access to cars to reach training, healthcare, childcare, a range of job opportunities and simply allows people to visit, and be visited by, their friends and relatives, and this link is re-emphasised in the National Bus Strategy and correspondence from Baroness Vere more recently. The routes selected for electrification in this bid serve areas of York with high deprivation – for example, Westfield, Tang Hall and Clifton – so more effective services in these areas will assist in reducing deprivation there.

In the first round of Levelling Up funding allocations, City of York Council was not successful. However, it remains committed to the bid it submitted which requested funding to improve streetscapes in the centre of York – with a particular emphasis on replacing tired street surfacing which presents an obstacle to people with restricted mobility. Electrifying the bus fleet in York complements this investment in two important ways: firstly, the bus network is focussed on the city centre and is a very important mode of access to the city centre; secondly, improvements to the bus fleet more generally improve the amenity of the city centre where there is a high concentration of buses.



The Bus Network

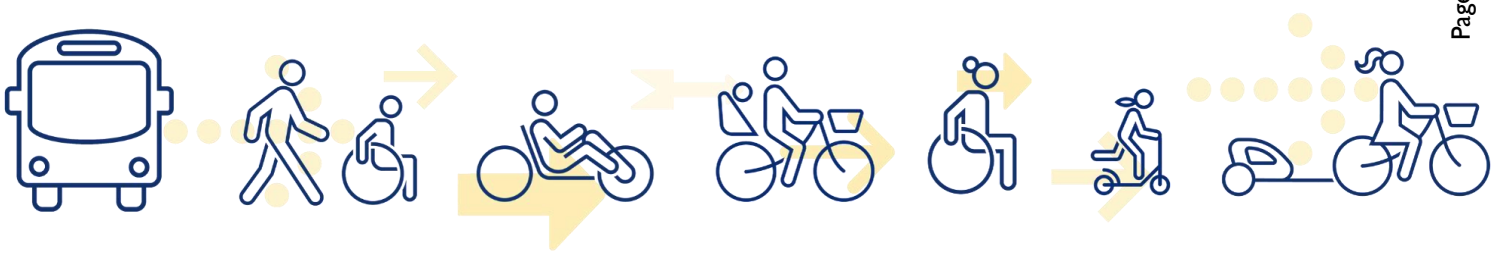
York's bus network primarily serves York city centre, where two thirds of all trips on the network begin or end. The city's largest operator (First York) operates almost entirely within the city boundary. However, nearly all corridors in York feature services provided by more than one operator, connecting other regionally important towns and cities (for example, Hull, Leeds, Scarborough, Selby and Harrogate) through the rural area around York. Because so many corridors are contested by more than one operator, CYC see delivering a tap on/ tap off capped fare system as a priority for the city – as it would act to significantly increase effective frequency on many corridors in York. This has informed CYC's match funding of this bid with a £200,000 intervention to fit tap off equipment on all buses in the city.

The city also has an established Park & Ride network, comprising six sites serving the city's principal approach roads. This service, which carries 25% of passengers in York, is operated under a licence agreement to CYC by First York. Under this, First York pay CYC a fee for operating the service and, in return, CYC contractually specify aspects of the service, including vehicle specifications, fare levels, routes and frequencies. This arrangement has allowed CYC, and First York, to take advantage of a number of rounds of green bus funding, resulting in 5 of the 6 Park & Ride services being operated using fully electric vehicles – one of the largest fleets of electric buses outside London. As such, there is already significant experience in operating electric buses in York, which this will build upon – and demonstrates the strong experience in electric bus delivery in York.

A further service, to York University, is controlled through an agreement with the University, and around 15% of bus mileage in York is operated through conventional subsidised tenders.

As such, only around 50% of bus journeys in York take place on a fully deregulated bus service which is entirely free of specification of aspects of the service by CYC or other organisations such as York University.

The table below sets out the division of services in York between the city's different operators, including an assessment of their fleets. As can be seen, seven operators provide local bus services in York, which is a relatively large number of operators for an authority of York's size. As already set out, the operators are co-ordinated through the York Quality Bus Partnership.



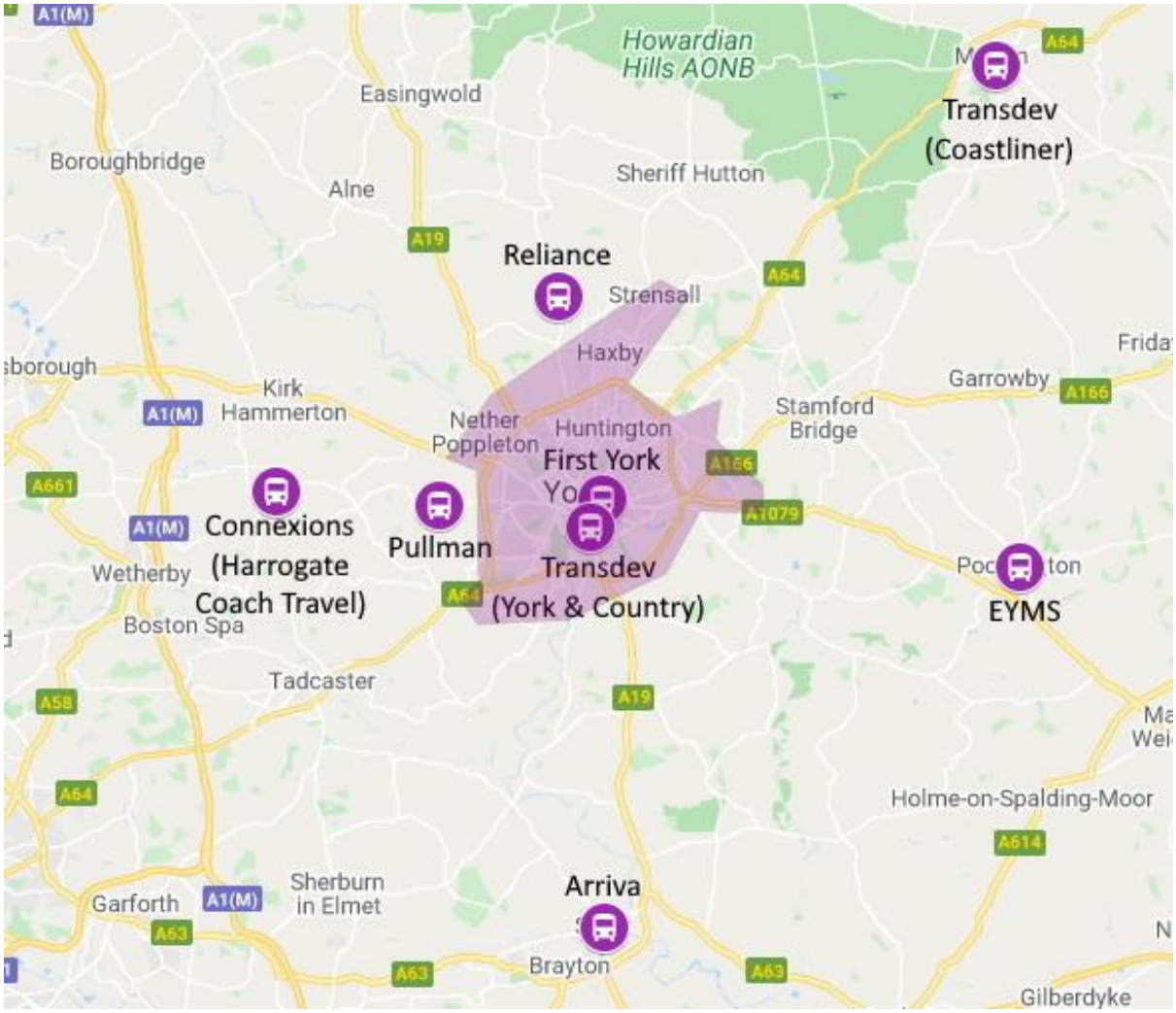
Operators of Local Bus Services within City of York Council area

Operator	Address	Local Fleet Size	Vehicle Type		Market Share
			Double Deck	Single Deck (& Articulated)	
First York	First Floor, 20 George Hudson Street, York YO1 6WR	103 (of which 33 are already electric)	65	32 + 6	69%
Transdev	Blazefield House, Russell Street, Keighley BD21 2JX	19 (plus 18 inter-urbans)	23	14	14%
East Yorkshire Buses	252 Anlaby Road, Hull HU3 2RS	1 (plus 7 inter-urbans)	8	0	4%
Arriva	24 Barnsley Road, Wakefield, West Yorkshire WF1 5JX	8	8	0	5%
Harrogate Coach Travel	6 St Thomas's Way, Green Hammerton, York YO26 8BE	6	2	4	4%
Reliance	Reliance Garage, York Road, Sutton-on-the-Forest, York YO61 1ES	9	6	3	3%
York Pullman	Wetherby Road, Rufforth, York YO23 3QA	3	2	1	1%
TOTAL		**174**	**114**	**60**	

Depot Locations

First have a centrally located depot on James Street, just outside the city walls, in a mixed commercial area close to the council's own depot and recycling centre. Transdev's urban routes are depoted on CYC leased land in the city as discussed above. All the other operators have depots

either (a) in the rural areas surrounding the York built up area or (b) outside the City of York Council area which is the defined area of this bid.



Map showing operator depot locations and defined area

Zero Emission Buses in York

Currently 33 of 174 buses (20%) in York are fully electric. With the ZEBRA funding requested in this bid the number of electric buses in York would increase to 77 (45%). The (Euro VI diesel) inter-urban services to Leeds, Hull and the Yorkshire Coast comprise only around 5% of the mileage in the urban defined area of this bid. Excluding those buses would increase the number of urban electric services to 55% of the total in York.

Air Quality

In this section we present information on air quality in York.

The problem

The main air pollutants of concern in York are NO_2 and particulate matter (PM). Motor traffic is responsible for 50-70% of the total NO_2 and analysis of the central area exceedance confirms that diesel buses are still having a disproportionate impact on air quality in York.

CYC has three Air Quality Management Areas (AQMAs) for nitrogen dioxide (NO_2) based on breaches of health based standards. Two have recently been revoked, but the largest, covering the centre of York, has recently been extended to incorporate an additional street (Coppergate). See Annex 7 for a map of the area.

York's tall buildings and, particularly, narrow streets result in canyonisation, where emissions from buses and other vehicles are trapped and dispersion is hindered. This acts to intensify air quality hotspot areas, especially around the inner ring road within which almost all bus routes operate, and which encircles York's five bus interchanges. The highest recorded levels of NO_2 recorded in York's city centre AQMA during 2019 were 47µg/m3, which is considerably in excess of the 40µg/m3 health based objective level.

Based on national estimates, pro rata, between 94 and 163 people die prematurely in York each year due to the impacts of poor air quality. This is more than the combined estimate of those who die prematurely from obesity and road accidents.

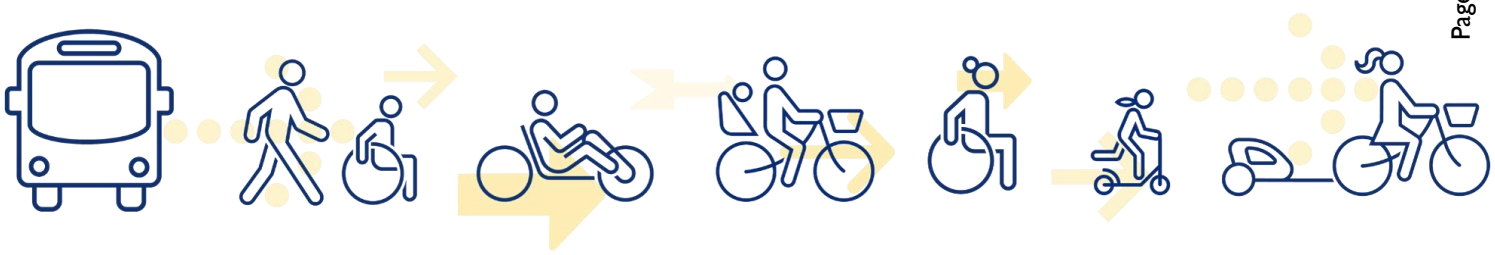
Consequently, there is great scope for reducing pollution levels in York by improving the emissions standards on the bus network – which is why policies to do this have formed a fundamental part of York's air quality management plans for some time.

Addressing the problem

All the proposed ZEBRA bus routes pass through the city centre AQMA. CYC has undertaken several detailed source apportionment studies to support the declaration of its AQMAs and development of its Air Quality Action Plan. The studies consistently show that diesel buses have a disproportionate impact on local air quality. While they typically make up only 2-3% of the total motor traffic, they are responsible for up to 27% of NO_2 emissions.

As part of the development of CYC's third Air Quality Action Plan (AQAP3) the emission impact of converting 90% of the bus fleet to electric was modelled. The introduction of 90% electric buses was estimated to deliver a 27.6% reduction in NOx and a 10.3% reduction in PM10 compared with a 2021 do-nothing scenario (with national technology improvements only in place). Air quality benefits will also extend beyond the AQMA into other residential areas of the city that fall on key bus routes.

First estimate that replacing 44 Euro VI diesel vehicles with EVs would lead to a reduction in carbon emissions of almost 2,300 tonnes per annum. When applying an air emissions inventory approach



this equates to a reduction in local air quality related emissions (NOx and PM2.5) of circa 1.16 tonnes.

Whilst SOx emissions have not been formally identified as breaching national air quality objectives (as is the case for most places in the UK), it is recognised that diesel buses emit significant quantities of SOx and reducing this will help to protect the many internationally important heritage sites in York from the impacts of acid deposition, including York Minster and the city walls.

An additional advantage of electrifying the bus fleet is a reduction in bus idling. An independent vehicle idling study commissioned using DEFRA grant funding included observations of idling events at a number of key locations around York city centre. This showed that in the city centre the majority of idling events were associated with diesel buses.

ZEBRA Scheme Objectives

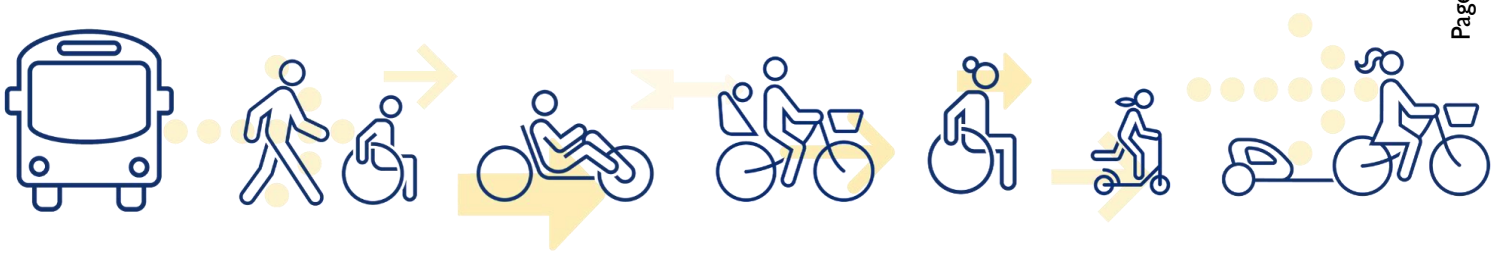
Consequently, the objectives of York's ZEBRA bid are:

- To reduce congestion in York by promoting a clean, regular, affordable and attractive bus service as alternative to private car use.
- To improve air quality, particularly within the city centre and main corridor routes.
- To further decarbonise the bus fleet in York by replacing First York's remaining urban diesel buses with electric ones.
- To work with manufacturers [redacted] to road test their next generation of electric buses.
- To build on First York's existing experience of running and maintaining electric buses and to share and encourage other operators to electrify their fleets.

Choice of ZEBRA Operator Partner

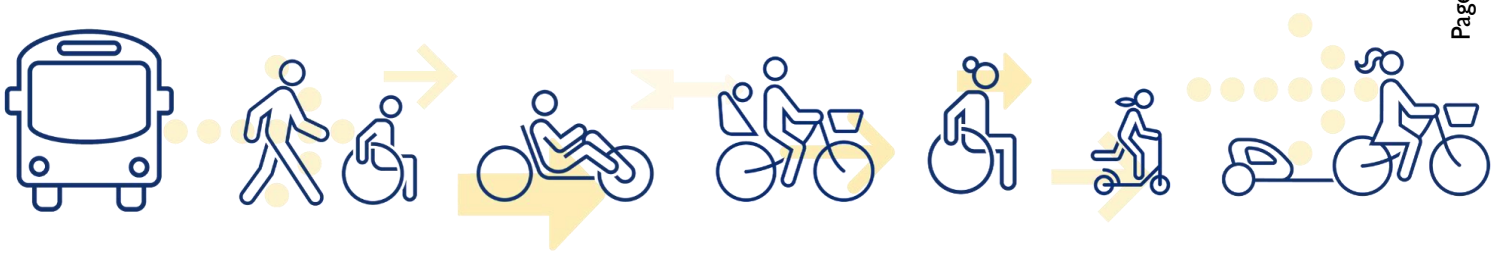
Conversion of York's bus fleet to electric vehicles has been a key policy objective for CYC since the production of an "*Electric Bus Roadmap*" for York by Arup in 2012. As such, the measure enjoys support across the political spectrum with, for example, the declaration of a Climate Emergency by the council in 2019. More recently, a consensus has emerged on transport policy, particularly around policies to reduce private vehicle trips into the city centre and reallocate road space to active modes and public transport.

The ZEBRA bid being made here is a part of long-term strategy aimed to electrify all the bus services in York which it is practical to electrify. In terms of a phased approach, this bid can be seen as Phase 2 of a four phase transition to electric power, as follows:



- **Phase 1** saw conversion of York's Park & Ride fleet. In this phase 33 electric buses were introduced to serve the 5 Park & Ride sites in York for which electric buses are practicable. This phase was completed in late 2020 with the delivery of the final electric Optare Metrodecker to York;
- **Phase 2** (of which this funding application is a part) sees roll out of an electric fleet to York's frequent, urban non-Park & Ride routes – maximising the benefit of emissions reductions in the centre of York where air quality is poorest. This funding bid covers around two–thirds of these routes (plus a final Park & Ride route which could previously not be electrified because of a lack of suitable vehicles[2] on the supply market at the time of procurement). York's BSIP requests a funding allocation to electrify the remaining frequent urban routes in York (those serving the University);
- **Phase 3** of the process seeks to convert non-frequent routes in York and those which are urban/ rural in character. Vehicles for this phase are also included in York's BSIP. This phase of the electrification programme will involve nearly all of York's operators. The positive conversion of York's largest operator, First, will be important in familiarising the other operators in the city with electric vehicles;
- **Phase 4** will convert the inter-urban routes. To date, no suitable vehicle has been marketed for this stage, but that is likely to change as battery technology develops. It is also possible that the Phase 4 conversions will rely on an alternative technology, such as hydrogen. Phase 4 conversion is not included in York's BSIP because of the considerable uncertainty which exists around the availability of suitable technology within the BSIP timescales.

[2] One park and ride route (Rawcliffe Bar) requires single deck high capacity vehicles because it passes under two low bridges. These were not available as a right hand drive product in 2018 when the vehicle procurement was made for park and ride.



	Year in service	Number of Buses	% of Buses Electrified		Model/Type	Routes	Chargers
			First York Fleet	All York Buses			
PHASE 1	2014/5	12	12%	7%	Optare Versa Single deck	59, 9	25 x 400V 32A 22kW AC commando sockets
	2020	21	32%	20%	Optare Metrodecker Double deck	3,7,8	68 x Mode 3 Type 2 22kW AC sockets* 1 x 80kW DC fast charger
PHASE 2	*2023*	*34*	*65%*	*39%*	[redacted] *Single deck*	*1, 2, 4, 5/5A, 6, HSB*	*24 x Heliox DC high power 150kW 2 x Heliox DC mobile 40kW*
	2024	*10*	*75%*	*45%*			
	TOTAL	**77**					

** Each bus requires 2 sockets per charger. Includes 4 AC sockets in the workshop.*

Actual and proposed electrification of bus services in York

At the outset of this process the seven bus operators in York were invited to bid with CYC for ZEBRA funding. Although all operators expressed an interest in ultimately electrifying their York fleets (something which is captured in the BSIP), First York was the only operator who wished to be considered for a ZEBRA bid at this time. The services operated by First York, and which this bid looks to electrify, fit into the category of Phase 2 services using the roadmap above, so the conversion of these services to electric buses is seen as a priority for City of York Council and in line with its route prioritisation. Of the other operators in the city:

- Transdev (operating the Leeds to Yorkshire Coast "Coastliner" service), Arriva (York to Selby) and East Yorkshire (York to Hull) all operate longer interurban routes and have only recently refreshed their fleets with mostly brand new Euro VI diesel vehicles – and are thus in Phase 4 of the process. Arriva have expressed an interest in electrifying the 415 Selby route (a 34 mile round trip) (Phase 3) and this ambition is included in the BSIP as part of CYC's phased approach to electrification and as Arriva's depot is outside the defined ZEBRA area.
- Transdev's urban routes, City Sightseeing and City ZAP York to Leeds services currently use a depot off Fulford Road on CYC owned land. [redacted]

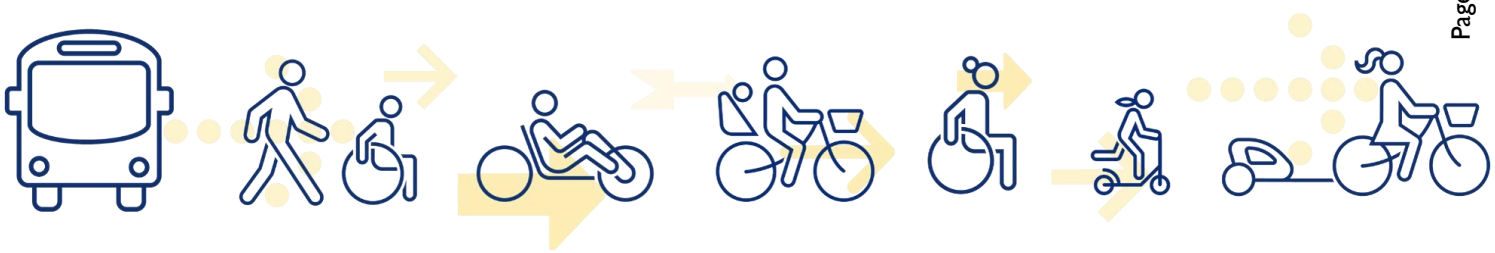
[redacted]. These services fit into the Phase 3 description above, because they are relatively low frequency, and their electrification forms part of the longer term electrification programme described in York's BSIP.

- Harrogate Coach Travel (Connexions), Reliance and York Pullman are three smaller operators running local suburban and school bus services. They are all supportive of the move to electric operation, but as these operators tend to buy and run second hand vehicles, the capital outlay for brand new electric buses and charging infrastructure is proportionally greater to them. It is hoped that shared charging facilities, perhaps on CYC sites, may provide a more affordable route to electrification in the near future. Electrification of these Phase 3 services forms part of York's BSIP. CYC are also in discussion with North Yorkshire Council about how charging facilities in York can be used to electrify various North Yorkshire routes which terminate in York and can act as a catalyst for electrifying services in the rural areas to the north of York – and the two proposals may be taken forward together.

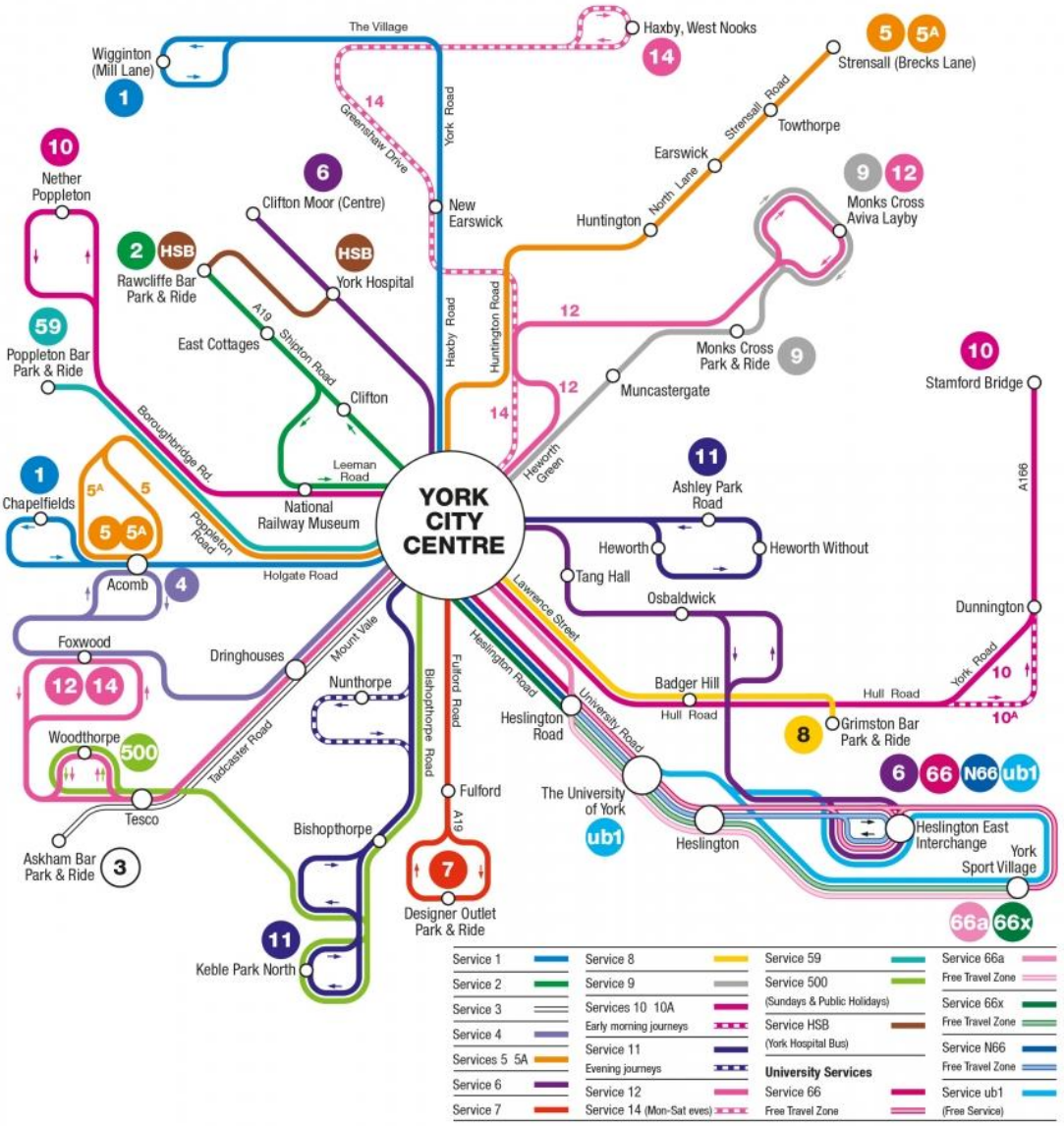
Transport Innovation in York

City of York Council is involved in a number of transport innovations, particularly focussed on carbon reduction and developing new transport modes and means of managing transport demand. Particular innovations are:

- *Early adoption of electric buses – our first set of vehicles in 2014 were amongst the first in the UK. We now have one of the largest fleets of electric buses in the UK operating in York;*
- *We are one of the UK e-scooter trial locations, with a trial involving TIER. E-scooter bays have been installed across the city and geo-fencing has been used to ensure that the e-scooters cannot be used in powered mode inside York's pedestrianised area;*
- *We have installed two "hyper-hub" fast charging stations at park and ride sites. These provide much needed fast charging capacity for the city and are topped with a solar canopy providing a proportion of the energy required by the chargers;*
- *We have developed a "real time" traffic management model, which collects date from a number of sources – for example mobile phone movement data – and uses this to monitor traffic speeds and flows across the city – informing changes to York's UTMC. This technology will be adapted, through the BSIP, to provide signals based priorities to buses – focusing particularly on buses which are running behind schedule so that they can be got back on time;*
- *We introduced the UK's first voluntary clean air zone, working with bus operators to upgrade all the vehicles operating frequently in the city centre to Euro VI with CYC providing grants for vehicle conversions*
- *We are now working with DEFRA on a study to look at how air quality can be improved in York through freight transhipment in the city centre, and use of small electric vehicles, including innovations such as e-cargo bikes*
- *We have both e-bike and e-cargo bike loan to purchase schemes running, co-ordinated through CYC's travel behaviour change unit, iTravelYork*
- *CYC's BSIP also contains a number of innovations, including commitment to introduce tap on tap off capped ticketing and a commitment to develop the existing park and ride terminals into "mobility hubs" offering a wider range of services (for example, bike and e-scooter hire, inter-urban bus services, overnight parking for hotel guests and rail users).*



The services which will be converted through this bid are First's services 1, 2, 4, 5/5A, 6 and the Hospital Shuttle Bus – see network map below:



First York's network: *3, 7, 8, 9 and 59 Park & Ride services are already fully electric. With ZEBRA support, services 1, 2, 4, 5/5A, 6 and HSB will also be electrified.*

Route Selection

Several factors were considered when selecting which First bus routes should be electrified under the ZEBRA scheme:

1. Routes with potential for bus priority measures

2. Air quality along the route
3. Commercial attractiveness of the route
4. Route length and frequency (range)
5. Passenger capacity of the replacement bus
6. Physical space for charging at the depot

In York the length of service routes and the general topography lends itself well to electrification. An initial shortlist was drawn up based on the expected range of the electric vehicles and the local operating environment (e.g. topography), plus the commercial performance of the services.

Capacity analysis using pre-pandemic 'normal world' data from 01-Sep-2019 to 30-Nov-2019 [redacted] (See following table for a summary.)

Service	% seats occupied for at least one stop				Number of passengers standing for at least one stop			
	>60%	>70%	>80%	>90%	1+	10+	15+	30+
1	[redacted]							
4	[redacted]							
5	[redacted]							
5A	[redacted]							
6	[redacted]							

Capacity analysis for selected routes

Replacing double deck vehicles with high capacity single deck buses has several advantages:

- Single deck vehicles are significantly cheaper to procure.
- Single deck vehicles are cheaper to operate having a lower weight resulting in reduced fuel/electricity use.
- All the seating is available to passengers who have difficulty negotiating stairs.
- The buses are brighter inside with large areas of roof glazing.
- Single deck buses are less susceptible to damage from overhanging trees along the route.

All the proposed ZEBRA bus routes pass through the city centre AQMA. Specifically, routes 1, 5, 5A and 6 all pass along Gillygate, a highly congested section of York's inner ring, while routes 4 and 6 traverse Rougier Street, the city's central spine for motor traffic. More generally, they all operate in urbanised areas for nearly all of their routes, with all services operating along residential streets for a proportion of their journey.

Another factor considered was the potential to add Bus Priority Measures along a route. These can improve the punctuality of the service making bus travel a more attractive alternative to private car

use and thereby further reducing pollution and congestion. City of York Council's BSIP sets out a comprehensive policy on bus priorities for York which is included in Annex 5.

The limit of 44 new electric vehicles also takes into account the available space at First's James Street depot where analysis has shown a complete transfer to battery electric vehicles (BEVs) would put the depot over capacity (due to decreased parking space as additional space is required for the charging infrastructure).

First Bus is working with CYC and partner organisations to evaluate the best solution to both increase parking on site and assess other charging and parking locations such as the Park & Ride sites. Two possible solutions are:

1. The new buses will use DC charging in line with First's Charging Strategy and more space could be created at the depot by relocating the existing AC chargers to a Park & Ride site serviced by the (AC) Optare electric buses.
2. As the diesel fleet continues to be replaced by electric buses in Phases 3 and 4 of the electric bus roadmap, the requirement for a diesel refuelling station at the depot will become redundant and can be removed, freeing up more space in what is a space constrained depot.

A proposed parking plan for the upgraded depot with additional chargers is shown in Annex 2.

The table below summarises the results of the route selection process with a total of 44 new high capacity single deck electric buses required. These will replace 23 single (including 6 articulated) and 21 double deck diesel buses. As stated above, we consider that this conversion will still allow adequate capacity on the routes specified.

Route No.	Type	No. of Buses	Route Length (round trip) in miles	Peak Frequency (mins)	Selected for ZEBRA electrification
1	Suburb – City Centre	10	16.6	12	Yes
2	Park & Ride*	6	5.7	8	Yes
4	Suburb – City Centre	6	15.0	11	Yes
5/5A	Suburb – City Centre	10	21.4	15	Yes
6	Suburb – City Centre	10	18.0	12	Yes
10/10A	*Interurban*	*(6)*	*26.6*	*30*	*No*
11	*Suburb – City Centre*	*(4)*	*13.4*	*30*	*No*
12	*Suburb – City Centre*	*(5)*	*20.4*	*30*	*No*
66	*University - City Centre*	*(8)*	*7.2*	*8*	*No*
67	*University - City Centre*	*(2)*	*5.4*	*20*	*No*
ub1	*University of York internal shuttle*	*(1)*	*3.2*	*30*	*No*
HSB	Hospital Service	2	5.6	25	Yes
	Total Selected	**44**			

**3, 7, 8, 9 and 59 Park & Ride services are already fully electric (33 buses).*

Why Battery Electric Technology?

Battery electric was chosen as the zero emission technology given the advanced state of the market, the confidence First Bus has developed through operating battery electric vehicles (BEVs) from a number of manufacturers and the experience they have of being able to install and safely operate the infrastructure and vehicles in York. See Annex 2 for examples of First BEV deployments.

The relatively compact area of York means all urban routes can be comfortably operated by a BEV for a full day without breaks for re-charging and without the requirement for any additional vehicles compared to diesel operation.

The development of alternative fuelled vehicles such as hydrogen is continually assessed by First as one element of a longer term strategy. However, the timelines for deployment required for this funding and the price point of available BEV verses hydrogen vehicles and fuel makes battery electric the most suitable choice for this deployment.

It is also currently easier to guarantee 100% renewable fuel for BEVs (i.e. electricity – see First's REGO certificate in Annex 2) than a source of green hydrogen fuel.

In addition to the planned upgrade of the First York depot as part of the ZEBRA scheme, CYC and First are in discussions with third party companies with a view to expanding charging operations into other council owned assets such as the Park & Ride sites. Asset ownership, maintenance and leasing agreements still need to be agreed, but this could also provide a more cost effective way of electrifying the other operators' fleets, particularly the smaller operators who have tended to purchase second hand diesel buses in the past and for whom the capital cost of electric vehicles and infrastructure is a major investment.

Such charging facilities may also be used by other operators, council fleet vehicles, e-bikes, e-scooters and possibly private electric vehicles at certain times. This will all serve to increase the rate of decarbonisation of the transport sector in York.

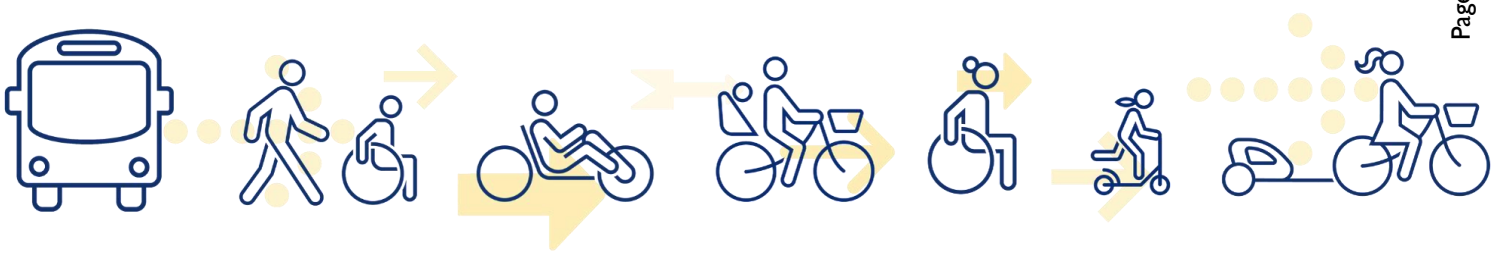
Charging Solution

The selected BEV has been specified with a range to provide a full day of operation on all the selected routes on a single charge. Vehicles will be charged overnight in the depot using high power 150kW DC chargers.

This has several operational benefits over opportunity charging including:

1. Improved punctuality through removal of any opportunity charging requirement which can exacerbate any journey delays.
2. Cheaper electricity by taking advantage of overnight, low demand tariffs.
3. Cost and ongoing maintenance requirements of opportunity charging locations.
4. Flexibility of route alterations or emergency diversions, which may not be possible if vehicles must return to specific locations at points within their duty cycle.

York is also a historic city with many narrow streets originally laid out in medieval times. This severely limits the possible locations for pantograph opportunity chargers in terms of both the



physical space required and the visual impact. Kerb space is also at a premium, and there are few potential locations for opportunity charging in the city centre.

Additional benefits of the chosen charging model are the future proofing of depots allowing for potential shared use of charging equipment to benefit the wider community as well as ensuring compatibility with future vehicles through common charging protocols. Business to business charging services rather than private cars would be simpler to implement initially due to on site safety and security concerns.

Third Party Business to Business Charging

First Bus is investigating solutions to dual utilise their Rapid Electric Vehicle Chargers during the day which will enable other business users to transition to electric vehicles without the need to invest in their own chargers and Infrastructure. Since the chargers will only be used to re-energise buses overnight they could be used by other businesses during the daytime.

The DC rapid dual headed CCS plug chargers are interoperable with the majority of EV manufacturers' vehicles. Fleet Managers will be able to use the service via a bookable platform offering a very competitive kWh rate and providing confidence that a charger will be available when the vehicle arrives.

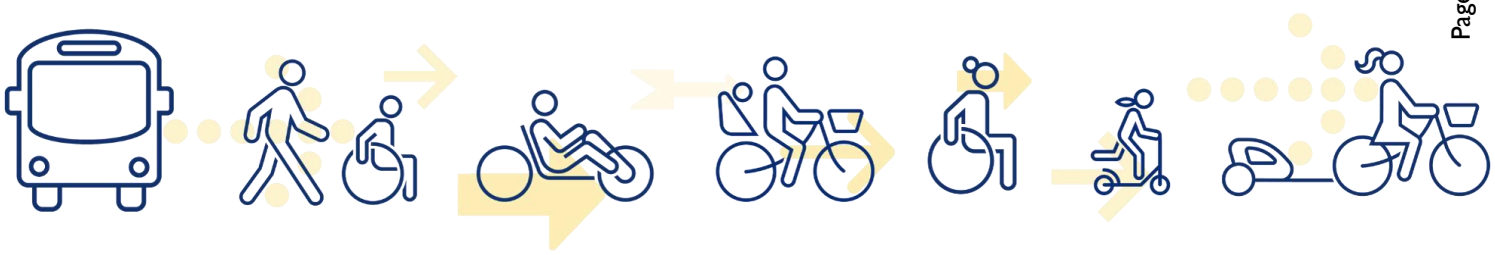
Infrastructure Suppliers

[redacted]

Heliox are the charger supplier, [redacted]

[redacted]

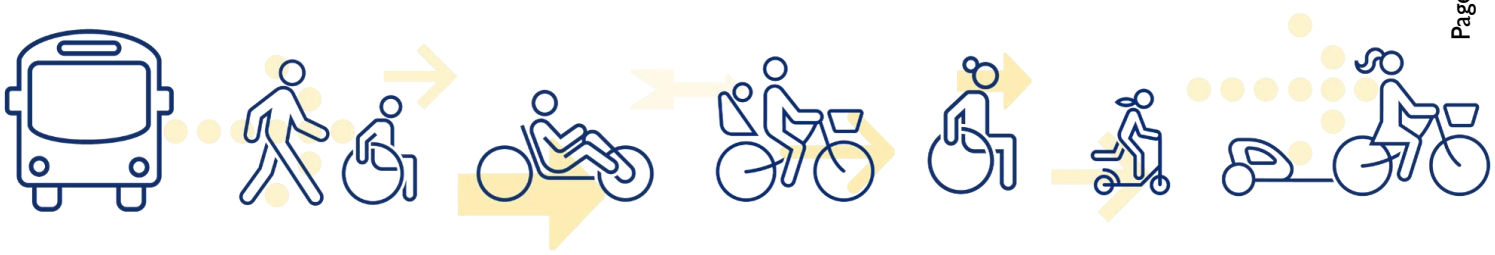
Northern PowerGrid are the DNO for the York area responsible for upgrading the power connection to First York's depot.



ZEBRA Core Policy Objectives and Wider DfT Strategic Priorities

The following table summarises the scheme objectives and how they relate to the ZEBRA core policy objectives and wider DfT strategic priorities.

Scheme Objectives	Map to ZEBRA Objectives/ DfT Strategic Priorities	How do the outcomes of the scheme meet the objectives?
Increase electric bus fleet in York to serve all First York's urban routes	• Support the roll-out of the 4,000 Zero Emission Buses that the government committed to in Feb 2020	• 44 additional electric buses (replacing 44 diesel buses) • Key CYC transport policy objective
Work with manufacturers to real-world road test next generation of electric buses	• Support bus manufacturers in the development of zero emission bus technology	• Provide essential feedback of new vehicle operation in real world conditions
Reduce congestion by promoting clean, regular, attractive bus use as alternative to private car use	• Support partnership working between Local Transport Authorities, bus operators, and other local stakeholders as set out in the NBS • Grow and level up the economy • Improve transport for the user	• Reduction in number of private vehicles, particularly in the city centre area. • Makes it easier to do business and more attractive to visit the city
Improve air quality, especially in York city centre	• Reduce environmental impacts/Air quality	• Electric buses emit no particulates and harmful emissions.
Build on existing experience of running and maintaining electric buses	• Understand better the challenges of introducing zero emission buses and supporting infrastructure to inform future government support for ZEBs	• First's York depot to become a centre of excellence for training technicians in maintaining electric buses
Support the local economy	• Grow and level up the economy	• Encouraging more bus use to the city centre results in greater spend with local businesses
Levelling up	• Grow and level up the economy	• Availability of reliable and affordable public transport allows people without access to cars to reach training, healthcare, childcare, and a wider range of job opportunities
A better experience for the passenger	• Improve transport for the user	• Clean, efficient public transport gives a consistently good impression of the city and encourages greater use.
Third party B2B charging	• Support partnership working between Local Transport Authorities, bus operators, and other local stakeholders as set out in the NBS	• Make better and fuller use of infrastructure to support decarbonisation of other transport sectors.



Complementary transport projects e.g. hyperhubs	• Improve transport for the user • Support the government's commitment to decarbonisation and to reduce the transport sector's contribution to CO2 emissions	• Make better and fuller use of infrastructure to support decarbonisation of other transport sectors.
Bus Priority Schemes	• Improve transport for the user • Support partnership working between Local Transport Authorities, bus operators, and other local stakeholders as set out in the NBS	• Improve journey times and punctuality making bus travel a more attractive option.

Impact on Local Air Quality

The removal of diesel vehicles and replacement with battery electric will improve air quality in the locality the vehicles are operated. The use of a REGO certificated green energy source further supports the air quality improvements through use of 100% renewable electricity. (See Annex 2 for a copy First Group's REGO certificate.)

Summary of Process for Monitoring of Outcomes

CYC has a robust data framework which can be used to extract maximum evaluation and monitoring information from an electric bus project in York. It has also been tested through the monitoring and evaluation of existing electric bus projects in the city. Data sources available for evaluating the project will be:

- Changes to air quality can be monitored using York's existing network of 233 diffusion tubes and 9 real time monitoring stations. Data for this monitoring network has been collected for over 20 years, giving a very good historic data set for evaluating the project
- The remote diagnostics and telematics equipment in use across the First York electric fleet, will allow real time monitoring of a range of operational data including (but not limited to) energy consumption and recuperation, speed, mileage.
- Fuel consumption monitoring will be conducted for the current fleet and drivers operating all of the routes to be switched. This will be set against the topography and route characteristics of the services. High resolution battery data will be collected following introduction of the electric buses to understand how electricity consumption varies under different route, loading and driver combinations. This will also tie in to analysis of battery performance, charge times and degradation across the year in order to provide real-world data for manufacturers and operators across a range of operating conditions. The detailed evaluation will also enable a full scale evaluation of CO2 benefits and indicate how these could be optimised.
- The QBP will provide a more informal framework for collecting information and observations on operating electric buses from bus operators and drivers and promote roll out across other operators in York.
- Attitudinal data about passenger perception can be assessed using the annual Transport Focus bus passenger satisfaction survey. Through the BBA (Better Bus Area), the QBP has funded collection of Transport Focus bus passenger satisfaction surveys, and now has an

annual data series going back to 2012. This can be used to track passenger perception of service quality and how this changes in response to the adoption of electric vehicles. Anecdotal evidence suggests that there is a positive passenger response to use of electric buses, but it will be possible to use this data set to consider the change in passenger perceptions of an entirely un-electrified network (2012-2013), to a partly electrified network (2014-present) to a largely electrified network post ZEBRA.

Through the DecarboN8 partnership the project will benefit from transport, economics, engineering and public health evaluation expertise. (See Annex 3 for a letter of support from DecarboN8.)

More information on the Monitoring and Evaluation Strategy for this bid is included in the Management Case section of the document.

Stakeholder Support

The ZEBRA scheme enjoys strong support from other local stakeholders who recognise the importance of electrifying York's bus network. Annex 6 contains letters of support from a range of other stakeholders in York's business, social and education and environmental communities including York Civic Trust, York Chamber of Commerce, York Older People's Assembly and York Bus Forum[3].

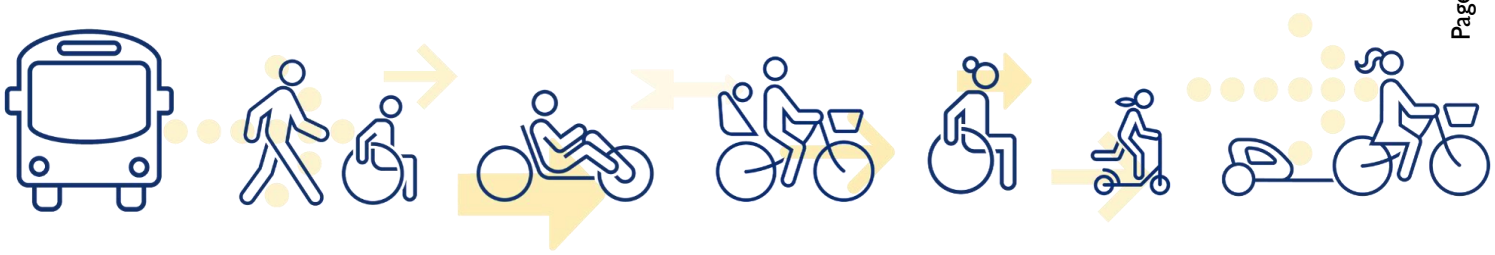
Summary

The ZEBRA scheme for York builds on the policies in the Local Transport Plan and draft Local Plan. It will help York to meet the city's BSIP objectives – to have a bus network which is:

- Inclusive - minimizing social exclusion by offering easy, comprehensive and cheap transport around the city;
- accessible to all – easy to use by everyone in the city, including people with impaired mobility or senses;
- attractive – enough to mean driving is not the default option for many trips in York;
- welcoming – to our many visitors, whether they are coming to York for a day at the races or a four year degree course, and
- a source of pride for the city and its residents.

Electrifying the First York urban diesel bus fleet and upgrading their charging infrastructure is a major stepping stone to a fully zero emission public transport network for York and delivering against a range of local and national objectives.

[3] To note – these letters are carried over from the EOI. It was not felt appropriate to re-approach the organisations and ask them to restate support given the relatively short timescale between the EOI and the bid.



Economic Case

In this section we set out the Economic Case for York's ZEBRA bid.

Greener Bus Model

The Economic Case calculation within this funding bid has been undertaken using the standard DfT Economic Case modelling suite for ZEBRA bids. Here we present the inputs, outputs, costs, benefits and sensitivity analyses.

The central case appraised here assumes any grant received by CYC is used for purchase of the [redacted] product, which is judged at this stage as being the most economically advantageous option the electrification of York's bus fleet. A sensitivity analysis is run at the end of the section which assumes purchase of the alternative product from Alexander Dennis.

Proposal Summary

DfT funding sought	£8,[redacted]
First York contribution	£10,[redacted]
Total cost of the proposal	**£18,[redacted]**

Key Inputs

Input	Value	Comment	Source/Quote
Number of new vehicles	44	[redacted] single deck 12m BEV	
Battery replacement costs	[redacted]	[redacted]	See Annex 4
Infrastructure maintenance costs	[redacted]	For chargers at York depot per annum for 15 years	See Annex 3
Vehicle life expectancy	17 years		
Vehicle annual average distance	62,860km	Anticipated average based on specific route information from First York for year 2019-20	Provided by First
Diesel replacement bus	[redacted]	Each ex VAT	See Annex 4
[redacted] 12m single deck ZEB	[redacted]	Each ex VAT	See Annex 4

Key Outputs

The standard case output summary is:

Present Value of Benefits	PVB	10,[redacted]
Present Value of Costs	PVC	8,[redacted]
Net Present Value	NPV	2[redacted]
Benefit Cost Ratio	BCR	1.27
Cost Effectiveness Indicator	CEI	177.8

Benefits Summary from GBT Standard Case

Carbon		
Incremental Impact of Carbon	£9,875,302	2022, PV
Incremental Carbon Emissions (reduction)	39423	tonnes CO2e
Emissions		
Incremental Impact of Nox	£199,820	2022, PV
Incremental Nox Emissions (reduction)	18808	kg
Incremental Impact of PM2.5	£94,979	2022, PV
Incremental PM2.5 Emissions (reduction)	470	kg
Electricity Consumption		
Incremental Electricity Consumption	47,019,181	kWh

Sensitivity Analysis

First have managed to negotiate a very favourable price for a replacement single deck Euro VI diesel bus [redacted], which is used in the sensitivity analysis. However, using the default value in the GBT results in a further slight increase in the BCR.

Euro VI Diesel Bus Equivalent Price		**First**	**Default**
Present Value of Benefits	PVB	10,[redacted]	11,[redacted]
Present Value of Costs	PVC	8,[redacted]	8,[redacted]
Net Present Value	NPV	2,[redacted]	2,[redacted]
Benefit Cost Ratio	BCR	1.27	1.33
Cost Effectiveness Indicator	CEI	177.8	166.1

The results of the other sensitivity analysis are:

Mileage (km)		**Current** (62,860km)	**+10%** (69,146km)	**-10%** (56,574km)	**Change** **+10%**	**-10%**
Present Value of Benefits	PVB	10,[redacted]	12,[redacted]	9,[redacted]		
Present Value of Costs	PVC	8,[redacted]	8,[redacted]	8,[redacted]		
Net Present Value	NPV	2,[redacted]	3,[redacted]	906,[redacted]		
Benefit Cost Ratio	BCR	1.27	1.44	1.11	0.17	-0.16
Cost Effectiveness Indicator	CEI	177.8	149.9	211.8		

Forecast ZEB vehicle mileage reduced/increased 10%

BSOG		22p	06p	Change
Present Value of Benefits	PVB	10,[redacted]	6,[redacted]	
Present Value of Costs	PVC	8,[redacted]	4,[redacted]	
Net Present Value	NPV	2,[redacted]	2,[redacted]	
Benefit Cost Ratio	BCR	1.27	1.55	0.28
Cost Effectiveness Indicator	CEI	177.8	177.8	

BSOG based sensitivity, BSOG remains at 6p (assuming base case assumption is 22p)

Carbon Rate		Central	High	Low	Change	
					High	Low
Present Value of Benefits	PVB	10,[redacted]	15,[redacted]	6,[redacted]		
Present Value of Costs	PVC	8,[redacted]	8,[redacted]	8,[redacted]		
Net Present Value	NPV	2,[redacted]	7,[redacted]	-2,[redacted]		
Benefit Cost Ratio	BCR	1.27	1.81	0.73	0.54	-0.54
Cost Effectiveness Indicator	CEI	177.8	177.8	177.8		

Low and High Carbon values (in addition to central base case)

The effect of varying the replacement battery costs by +/-10% are not shown as a replacement battery at year 8 is included in the capital cost of the bus via the 16 year warranty.

[redacted]

[redacted]

Non-Monetised Benefits

It is assessed that York's ZEBRA bid does not contain any level 2 or 3 economic benefits which City of York Council wish to present.

There is a range of non-monetarised benefits which we wish to draw to the attention of the bid assessors:

- Granting this bid will assist in expanding the UK's capacity for electric bus construction. Both the companies who have provided quotes for the Economic Case are based in the UK and the buses will be produced by UK based factories.
- Whilst First York already operates a mixed fleet of diesel and fully electric vehicles with 33 electric buses currently based at the James Street depot, the success of this bid will allow

the continued development of the Engineering team (18 people) for the new design of vehicles whilst also benefiting from the existing knowledge of EV maintenance. The opportunity to operate and maintain a variety of electric bus models at one location allows them to build up an invaluable knowledgebase that can be shared and repeated with their operations across the country - a significant contribution towards a zero emission public transport network.

- Drivers for First York are already trained in electric bus driving techniques so any additional training required for the new vehicles would be building on an existing solid base of experience. Data shows that the variance between the most and least efficient driver in York is only 5% whereas it is normally around 30% in depots where electric vehicles are deployed for the first time.
- Through the York Quality Bus Partnership and the recently announced Enhanced Partnership with bus operators, CYC hopes that First's knowledge and experience of operating and maintaining electric buses can be shared with other operators in the city.
- Moving to electric operation means lower noise pollution and running costs making night time and fringe services more viable, thus benefitting York's night time economy. There is also the potential, in time and assuming it is publically acceptable, for wider bus access to the city centre with the greater public acceptability and zero pollution of electric vehicles.
- First York's bus depot, located just outside the city walls, will become a safer, more pleasant working environment for employees and also neighbouring businesses. Diesel fuel deliveries to the depot will be more than halved if this bid is successful, reducing HGV movements on the strategic road network.

Considerations of Risks

The principal risks impacting on the Economic Case are:

1. The vehicle range is insufficient for full day's operation, thereby requiring more than the equivalent number of diesel vehicles to support it. *All routes have been selected on the basis of their ability to be operated by the selected BEV. First's existing experience with BEVs mean that many of the routes have already been operated, on occasion by BEVs.*
2. The [redacted] bus fails its type approval and homologation tests resulting in a delay to its availability. *First are free to use an alternative supplier's approved vehicle.*

[redacted]

4. BEV maintenance costs are higher than expected resulting in higher ongoing OpEx. *First agrees to cover any extra costs.*
5. Battery life/range is less than expected meaning a replacement battery required before 8 years. *Replacement battery costs are covered under the vehicle warranty.*
6. Vehicle manufacturer ceases trading voiding the warranty. *First agrees to cover any extra costs.*

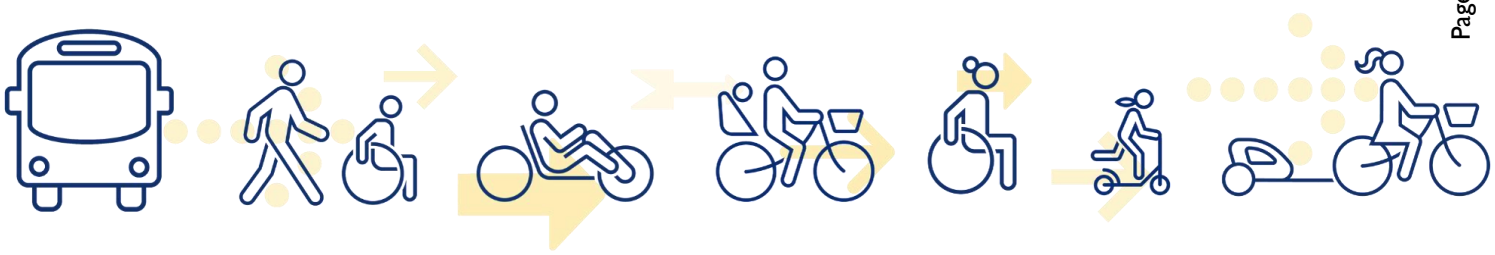
7. [redacted] bus reaches end of life before 17 years requiring replacement vehicles to continue operation. *First will work with the manufacturer to manage vehicle longevity. Ultimately First will provide suitable replacement vehicles.*

A detailed table of all project risks and mitigations is provided in the Management Case.

Summary - Value for Money

The Benefit Cost Ratio for the standard case in the GBT is 1.27, which equates to "low" value for money within the webtag vfm categorisation. The results of the sensitivity analysis show the BCR is most susceptible to the carbon rate, varying from 0.73 to 1.81, and upper values associated with the sensitivity analysis are in the "medium" vfm category.

There are significant non-monetised benefits, as set out above.



Commercial Case

In this section we present the commercial strategy for introducing the electric fleet, the procurement process and how CYC will support the introduction of the new fleet. The figures, options and strategies presented here have been refined by CYC and First's experience of operating electric buses in York since 2014.

Commercial Strategy

The Commercial Model

CYC will continue to work closely with First York to ensure the successful delivery and ongoing operation of the ZEBRA project. CYC will convene a project board and First Bus will appoint a project manager who will oversee the deployment. They will work closely with a project manager from the First Bus Property Team who will oversee the infrastructure upgrade. The CYC Board and First's Senior Leadership Team will be kept up to date with regular reports to ensure any operational risks are mitigated and managed.

See the Project Team and Governance Structure in the Management Case for more details.

Procurement and Ownership of Assets

First Bus will procure and own the vehicles and charging infrastructure purchased and installed as part of the ZEBRA scheme.

Flow of Payments

CYC will receive the funding from the DfT which will be passed directly on to First Bus via a grant drawdown. The legal position around this is set out in Annex 8.

Procurement Strategy

Background

CYC do not currently own or operate any bus services of their own, with the exception of three Dial & Ride mini buses which are operated under a Section 19 permit for residents who find it difficult to use standard buses due to age or mobility problems. All other vehicles are procured, owned and maintained by the commercial operators under contract for a particular route or via the deregulated commercial bus network. The operators are also responsible for providing depot facilities for their fleets.

The Park & Ride sites are (with one exception) owned or leased by CYC, but the operation and maintenance of the sites are entirely the responsibility of First York under the contract.

As a result, the CYC Sustainable Transport department is a lean operation, with no spare resource for procuring and maintaining their own bus fleet within the existing organisation. Given the timescales of the ZEBRA scheme and the positive working relationship with First York in electrifying the Park & Ride services, it is logical to expand this to other First routes under a similar arrangement. The legal process for this has been used in the previous procurement of the electric bus fleet for York's Park & Ride operation, as stated earlier, and is set out in Annex 8.

A further advantage is that First, being a national organisation, have the option to cascade the vehicles to other areas of the country before the end of their useful life, but after the end of the

period during which they have to be used in York under the ZEBRA grant conditions, and replace them in York with newer, more efficient and advanced models. This would be much more difficult to achieve if CYC were to own the vehicles.

First York Procurement Process

First York are following the First UK Procurement Policy [redacted]

	[redacted]	[redacted]
	[redacted]	
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
	[redacted]	
[redacted]		[redacted]

[redacted]

Procurement Mitigation Steps

1. "Soft" market testing of alternative suppliers ([redacted]).
2. A formal pre-qualification process for all potential suppliers including [redacted]
3. A final ITT invitation tender process conducted through the First Bus procurement process

[redacted]

Market Engagement

[redacted]

[redacted]

Lessons Learnt

Vehicle Types

Battery Electric is First's current preferred choice of Zero Emission Vehicle. This has been shaped by the experience of operating the vehicles, the increasing understanding of depot electrification and the benefits of a homologous power approach for fleet cascade planning across the business.

Charging Method

Having operated smaller battery sizes on a fleet of vehicles for 7 years, the operational impacts of opportunity charging including having to add additional vehicles into a duty cycle to avoid delays through buses having to charge mid-route were assessed as significant. As a result, First's current preference is for vehicles with the range for a full day of operation that can be charged overnight in a depot. This also provides the flexibility to amend routes as required without a reliance on specific opportunity charging locations.

Infrastructure

First have worked with a number of contractors, consultancies and suppliers to install charging infrastructure as well as a variety of charging regimes and power supply solutions. These have included both AC and DC chargers, full substation upgrades and grid connections as well as on site battery storage.

The final choice of infrastructure depends on each individual site, given the varying power availability and physical layouts of our operating centres. First have taken a strategic decision to favour DC charging on all new deployments for a number of factors including safety, interoperability with all bus types and the future potential of shared use with other vehicles.

Specifications and Features

[redacted], is the preferred supplier for the York ZEBRA proposal, which is based on the purchase of 44 of their single deck high capacity 12m battery electric buses to replace a mix of 44 diesel vehicles - 23 single (including 6 articulated) and 21 double deck.

Details of the vehicle are outlined below:

[redacted]

[redacted]

[redacted]

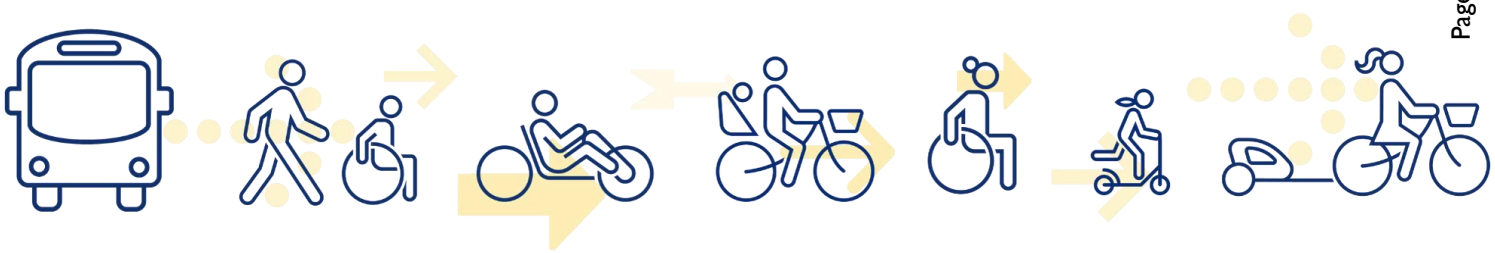
[redacted]

[redacted]

[redacted]

[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	
[redacted]	[redacted]	

[redacted]

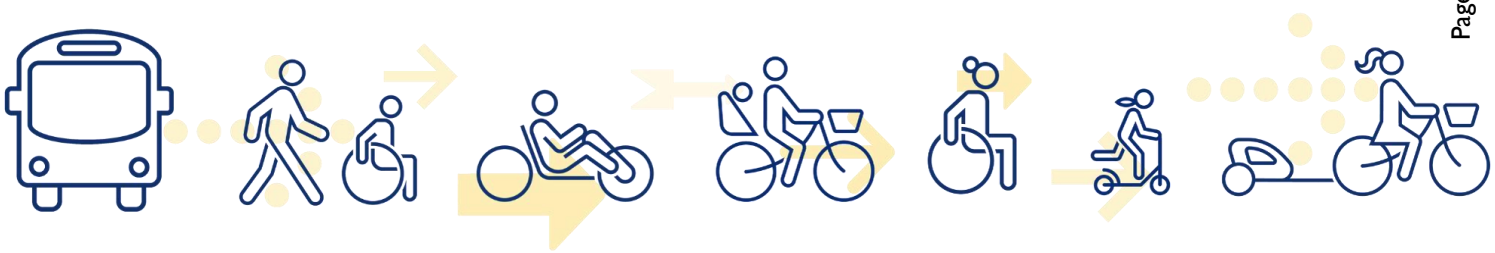


[redacted]

[redacted]

[redacted]

[redacted]



[redacted]

[redacted]

Chargers

The existing Optare BEVs all use 22kW AC chargers. The new buses will use DC chargers provided by Heliox. The 44 [redacted] buses will be recharged overnight using 24 x 150kW DC units.

2 x 40kW DC mobile units are also included in the proposal. These have two uses:

1. They can be taken by van to a stranded bus so it may be recharged and recovered under its own power without the need for a low loader recovery vehicle.
2. As space is so restricted in the depot, they can be used in place of one of the 150kW units in the event of a failure, to avoid having to manoeuvre the bus to another fixed charger.

Heliox mobile charger (Note: vehicle is not part of the ZEBRA proposal)

The Heliox charger specification is provided in Annex 3.

Protected Characteristics and Enhanced PSVAR Standards

The vehicle has been specified to comply with the latest PSVAR+ standards. [redacted]

Marketing Strategy

The launch of the new fleet will be supported with substantial marketing assistance from CYC.

The council have significant experience of successfully launching electric bus services in partnership with First and will co-ordinate their promotion closer to the entry into service of the new buses. In the past this has included partnerships with local businesses, promotions through large employers or education establishments, and working with local media broadcasters.

Marketing of the new vehicles will include a range of online and offline communications including social media, the council's iTravel website (www.itravelyork.info) and the city-wide 'Our City' publication which is distributed to all households across the city.

Key messages in any campaign will target commuters, students and visitors who most regularly use York's public transport services. In addition, the marketing narrative will reflect our wider organisations priorities to be carbon net zero by 2030; to promote sustainable travel and to build a greener, cleaner city for residents, businesses, and visitors. The promotion of the new vehicles will also support a key strand to the city's brand narrative (adopted by city-wide partners), 'Pioneering with purpose' and demonstrate our commitment to innovation. A recent sustainable transport promotional video can be found here: https://youtu.be/WqBLbTHrKpM

The promotion of the vehicles will build on the work done to promote the most recent electric buses in York where a marketing campaign featured choreographed driving of park and ride vehicles around the city. The video produced can be found here: https://vimeo.com/showcase/8212739/video/522697643

The new vehicles will also be publicised through our ongoing travel behaviour change work with employers, education providers and developers in York.

Procurement, subsidy control and TCA compliance

The LTA has sought legal advice from its own internal Legal Services Department. A copy of this advice has been appended to this Business Case as Annex 8, but in summary:

- It is the intention of the LTA that the funding will be passed to its local bus service operator to finance their purchase of an electric vehicle to replace one of their existing conventional Euro VI

diesel buses, along with the relevant infrastructure (e.g. charging station) for their local York depot. As the local bus service operator is not subject to procurement law, and the LTA is not commissioning any goods or supplies or works itself, the LTA believes that there are **no procurement implications**. In addition, the LTA can demonstrate that it has approached and consulted all seven (7) of the local bus companies operating within and across the city centre of York when compiling its ZEBRA funding bid, but only the Local Bus Company responded to the LTA's enquiries stating that they would like to be considered for this project. The LTA will be happy to provide evidence this if requested.

- Further, the LTA believes that there should be no implications under the UK Subsidy Control Regime or the UK-EU TCA because:
    - The grant funding does not meet all the requirements to be deemed a, "Controlled Subsidy," under the UK-EU TCA.
    - The grant funding does not fall within one of the categories of a, "Prohibited Subsidy," under the UK-EU TCA.
    - At any rate, notwithstanding and without prejudice to either of the above sub-bullet points, the grant funding and its proposed use meets the principles set out under Art. 366 of Chpt. 3 of Title XI of the UK-EU TCA.

Financial Case

In this section we set out the financial case for the scheme. [redacted]

Project Summary

Input	Value	Comment	Source/Quote
Number of new vehicles	44	[redacted] single deck 12m BEV	
Battery replacement costs	[redacted]	[redacted]	See Annex 4
Infrastructure maintenance costs	[redacted]	For chargers at York depot per annum for 15 years	See Annex 3
Vehicle life expectancy	17 years		
Vehicle annual average distance	62,860km	Anticipated average based on specific route information from First York for year 2019-20	Provided by First
Diesel replacement bus	[redacted]	Each ex VAT	See Annex 4
[redacted] 12m single deck ZEB	[redacted]	Each ex VAT	See Annex 4

Warranty

[redacted]

Warranty	Length
Vehicle	[redacted]
Battery	[redacted]
Powertrain	[redacted]
Structural	[redacted]

More details of [redacted] warranty are provided in their letter of support and quotation in Annex 4.

Overall Funding for Proposal

	Business Case	EOI
DfT funding sought	£8,[redacted]	£8,[redacted]
First York	£10,[redacted]	£10,[redacted]
CYC	None	None
Total cost of the proposal	**£18,[redacted]**	**£18,[redacted]**

Whole Life Costs

	2022	2023	2024	Total
Number of Single Deck buses delivered	0	34	10	44
Number of Double Deck buses delivered	0	0	0	0
Cost of vehicles for proposed scheme				
Total purchase cost of vehicles [redacted]		£12,[redacted]00	£3,[redacted]00	**£16,[redacted]00**
Proposed sources of funding:				
Cost proposed to be covered by the ZEBRA grant		£5,[redacted]00	£1,[redacted].00	£6,[redacted].00
Funding from local government and any other public sector funding		£0.00	£0.00	£0.00
Investment from operators (First York)		£7,[redacted].00	£2,[redacted].00	£9,[redacted].00
Other HMG Funding		£0.00	£0.00	£0.00
All other private sector contributions		£0.00	£0.00	£0.00
Cost of infrastructure of the proposed scheme				
DNO (Northern PowerGrid) Connection + civils for incoming cables (after OFGEM support)	[redacted]			[redacted]
Civils Work ([redacted])	[redacted]			[redacted]
Chargers (Heliox)	[redacted]			[redacted]
Legal, Design & Management	[redacted]			[redacted]
Total cost of infrastructure	£2,[redacted].60			**£2,[redacted].60**
Proposed sources of funding:				
Cost proposed to be covered by the ZEBRA grant	£1,[redacted].95			£1,[redacted].95
Funding from local government and any other public sector funding	£0.00			£0.00
Investment from operators (First York)	£5[redacted].65			£5[redacted].65
Other HMG Funding	£0.00			£0.00
All other private sector contributions	£0.00			£0.00
Overall Scheme Costs				
Total costs to be covered by the ZEBRA grant				£8,[redacted].95
Total investment from operators (First York)				£10,[redacted]65
Total Scheme Costs				**£18,[redacted].60**

Estimated Lifetime Operational and Maintenance Costs

Item	Year to 31 March					
	2023	2024	2025		2037	2038
BEV Depreciation	[redacted]	[redacted]	[redacted]		[redacted]	[redacted]
BEV Maintenance	[redacted]	[redacted]	[redacted]		[redacted]	[redacted]
Replacement Battery	[redacted]	[redacted]	[redacted]	*until*	[redacted]	[redacted]
Operation	[redacted]	[redacted]	[redacted]		[redacted]	[redacted]
Charger SLA	[redacted]	[redacted]	[redacted]		[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]		[redacted]	[redacted]

Notes:

1. *All costs will be borne by First Bus*
2. *Depreciation cost of vehicles assumes full year in 2023 with 34 vehicles delivered and balance of 10 in 2024*
3. *Material and Labour costs -* [redacted]
4. *Replacement battery included in capital cost*
5. *Electricity (fuel) cost uses current prices and assumes BSOG remains* [redacted]

CYC will be funding the estimated Monitoring and Evaluation costs of £100k over 5 years.

Changes from the EOI

There are no changes to the proposed plan to purchase 44 new [redacted] single deck electric buses and upgrade the First York depot with sufficient capacity to charge them.

However, firm quotes for all the infrastructure costs were not available at the time the EOI was submitted, [redacted] Civils cost, generally, have risen in recent months and consequently the quote from [redacted] (see Annex 3) is higher than the estimate. Two mobile chargers have been added to the proposal, as described in the Charging Strategy section, so the quote from Heliox (see Annex 3) is also greater than the estimate in the EOI.

In contrast, the updated quote from Northern PowerGrid, the DNO (see Annex 3), is significantly lower than their original budget estimate, so that the overall cost of the proposal and amount of grant funding requested is a little less than the EOI - down from £18,[redacted] to £18,[redacted]

Cost Summary

	EOI	Business Case
Buses	£16,[redacted]	£16,[redacted]
Infrastructure (Depot Upgrade)		
DNO	£[redacted]	£[redacted]
Civils (SSE)	£1,[redacted]	£1,[redacted]
Chargers (Heliox)	£[redacted]	£[redacted]
TOTAL	**£18,[redacted]**	**£18,[redacted]**

Funding Sources

	EOI	Business Case
DfT funding sought	£8,[redacted]	£8,[redacted]
First York	£10,[redacted]	£10,[redacted]
CYC	None	None
Total cost of the proposal	**£18,[redacted]**	**£18,[redacted]**

Funding profile

[redacted]. The infrastructure, ongoing maintenance and extended warranty are being funded by First Bus.

Funding Profile Streams

Funding is primarily from the ZEBRA grant and First Bus private investment.

[redacted]

CYC have agreed to provide a match funding commitment of £200k for tap-off readers to introduce a new ticketing scheme alongside the vehicles.

CYC will also cover the £100k cost of the Monitoring and Evaluation Strategy which is set out in the Management Case.

OFGEM

[redacted] OFGEM's Green Recovery Fund. The fund makes strategic investments in the electricity network to create new capacity that will significantly reduce the cost of connecting

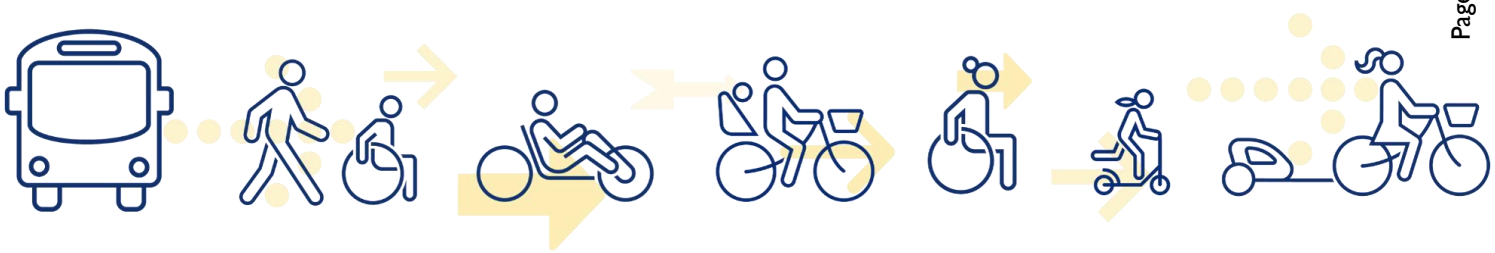
green infrastructure projects. In this case, it will provide support for upgrading grid connections that only the DNO can carry out.

[redacted]

Long Term Financial Viability

In 2020 First Bus made a commitment to buy no further diesel buses after December 2022 and to operate an entirely zero-emission bus fleet by 2035.

A statement noting that the operator accepts financial responsibility for the project and that cost risk increases will not be met by increased further grant is included in First Bus Letter of Support – see Annex 2.



Management Case

This section sets out the Management Case.

Deliverability and Governance

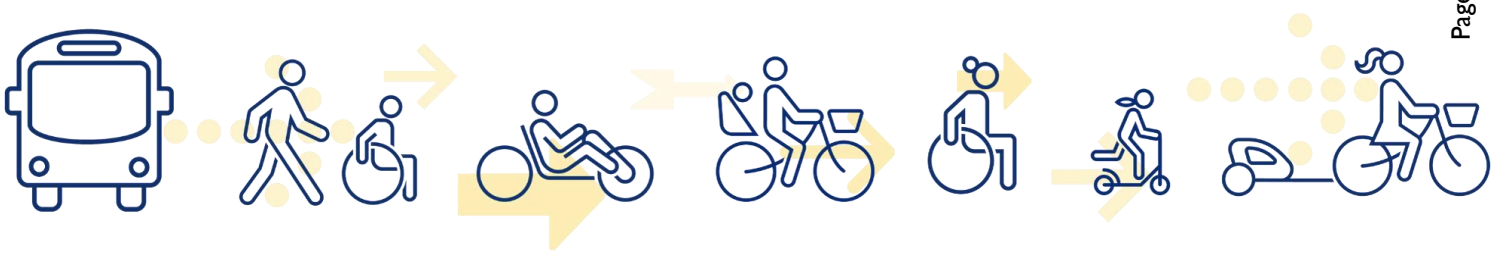
The team structure has been designed to allow CYC and First to work together to introduce the new vehicles. It will ensure CYC are responsible for administering the grant from the DfT whilst First are responsible for introducing the vehicles themselves.

Project Team and Governance Structure

Project team structure showing communication pathways

The following table sets out the roles of staff involved in the project:

	Role Description and Interactions
Senior Responsible Owner (SRO)	Dave Atkinson, Head of Programmes and Smart Place at CYC, is the SRO. He chairs the CYC Project Board.
City of York Council Project Board	Receives grant payment from DfT and is responsible for the overall delivery of the project. Receives updates on project progress and facilitates decision making at a joint Council and Operator perspective.
First Bus Project Board	First's management board for the project - receives regular project updates to track progress and support decision making. Exec level attendees act as an escalation channel if required.
First Bus Project Manager (reports to Decarbonisation Delivery Programme Director)	Overall coordination of deployment, liaising with all work stream leads internally and externally to ensure a timeline delivery. Compiles and presents update reports to the steering boards internally and externally as well as ensuring all Central Function teams that impact or are impacted by the deployment are engaged.
Property Project Manager	Leads infrastructure delivery. Owns relationships with DNO, civils contractors, architects and key suppliers for infrastructure delivery.
Depot Project Lead	Coordinates the readiness of the Operating Company to accept the vehicles. Works with the PM and Property PM the Depot Lead to ensure information is shared to the correct colleagues. They will take the lead on ensuring training is undertaking by the required staff.
Head of Fleet	Owns relationship with vehicle manufacturer, final approval of specification and manages updates to and from manufacturer.
Head of Procurement (and team)	Leads on all aspects of procurement.
Legal support	Drafts and reviews all contracts.
First Bus Central Functions	All pan-business departments are impacted by the deployment of new vehicles. These teams include Retail Operations, Commercial, IT, Marketing, Business Development and the Strategic Change Team.



Delivery Experience

This project will be a beneficiary of knowledge and experience accrued by CYC and First through the delivery of York's two previous electric bus projects for the Park & Ride network.

City of York Council

In addition to working closely with First on electrification projects, CYC is working with EvoEnergy to deliver two new public charging stations (Hyperhubs) with solar canopy arrays and battery storage solution in order to support the energy grid during peak hours. A letter of support illustrating our close and productive working relationship with EvoEnergy is included in Annex 3.

The section on Transport Innovation in York provides further examples of successfully delivered public transport projects.

First Bus

First Bus has experience of deploying battery electric vehicles into service at a number of locations in the UK including York, Leeds and Glasgow as well as hydrogen vehicles in Aberdeen. First's central support functions work with local and regional business management teams to collate and share best practice and learning from each undertaking to improve the next project outcome.

See Annex 2 for examples of First Bus zero emission deployments around the UK.

Contract Management

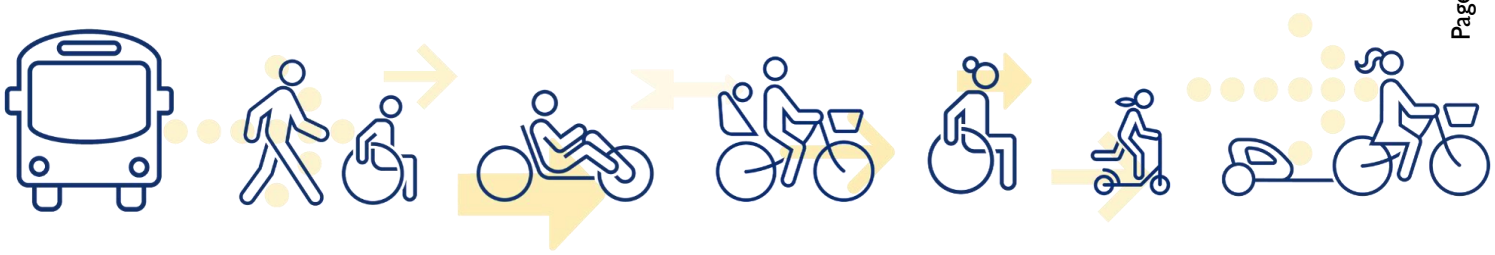
As [redacted] are new to manufacturing production vehicles, an enhanced level of contract management will be in place throughout the vehicle procurement. Several conditions will be tied to key milestones in the [redacted] bus development timeline. As [redacted] meets and achieves each milestone the contractual conditions will fall away. Failure to meet any conditions will allow First to back out and place an order with another OEM, should that course of action be required.

CYC and First have worked together to successfully bring two fleets of BEVs into service in 2014/15 and 2220. We will apply the lessons learned for these successful projects to the introduction of the new fleet this ZEBRA bid seeks funding for.

Project Plan

An outline project plan showing milestones and interdependencies for the delivery of the York ZEBRA scheme is shown in Annex 9.

It follows the Project Lifecycle Methodology of First's Strategic Programme Office (see Annex 9).



Communications and Stakeholder Engagement Strategy

A full Communications Plan will be developed along with the Marketing Strategy closer to the entry into service of the new buses. This will follow on from the proven comms plans used previously in York, but particularly for:

- The city's better bus area, where a two year marketing campaign took place to promote the many improvements to the city's bus network which were delivered by York's Better Bus Area
- The Quality Bus Partnership's existing marketing group
- Ongoing promotion of park and ride in York, something which is managed jointly by CYC and First
- The promotion of the recent Metrodecker fleet, which is referred to in the Commercial Case.

Risk Management

A complete list of risks associated with the ZEBRA scheme including impacts and mitigation plans is summarised in the following table:

	Risk	Impact	Action or Mitigation Plan	Likelihood (1-3)	Severity (1-3)	RAG Status (1-9)
1	Vehicle range insufficient for full day's operation	Route requires more than equivalent number of diesel vehicles	Routes selected on the basis of their ability to be operated by the selected BEV	1	3	3
2	Vehicle capacity insufficient for passenger levels	Passengers waiting for longer at peak periods	BEV sized to handle current and anticipated passenger numbers	1	2	2
3	[redacted]	[redacted]	[redacted]	1	3	3
4	[redacted]	[redacted]	[redacted]	2	3	6

5	Power upgrade quote from DNO expires before ZEBRA funding allocated	New quote required resulting in possible delay and higher cost	Northern PowerGrid have agreed to extend the existing quote until 30 March. First will assess placing power order before ZEBRA funding decision if quote cannot be extended further.	2	3	6
6	First's James St depot is space constrained and BEVs require a larger footprint due to charging infrastructure	James Street depot capacity insufficient to charge all the BEVs overnight	The parking plan (see Annex 2) provides space for all current and planned BEVs. Longer term future additions may require a redesign or additional parking	1	2	2
7	Power upgrade not completed in time by DNO	Temporary limit on charging capacity	Contractual agreement to deliver power upgrade by required date once ordered. Regular communication to monitor risk of overrun.	1	3	3
8	Chargers not available or installed on time	Temporary limit on charging capacity	Contractual agreement to supply charging infrastructure by required date once ordered. Regular communication to monitor risk of overrun.	1	3	3
9	Driver knowledge and technique for BEV operation	Insufficient drivers to operate new BEVs	Driver training plan developed with supplier input, incorporating lessons from previous EV deployment	1	2	2
10	Engineer knowledge on BEV maintenance	Insufficient engineers to maintain new BEVs	Engineers to be trained on safe EV maintenance and upskilled as required	1	2	2

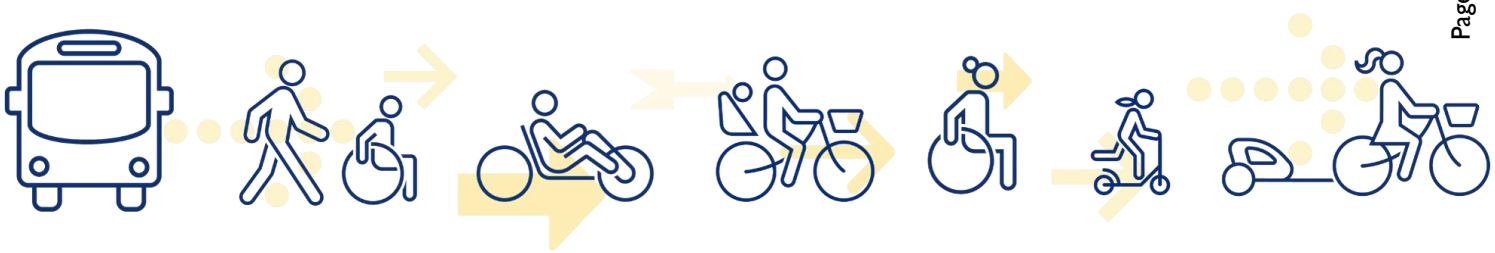
11	BEV maintenance costs higher than expected	Higher ongoing OpEx	First agrees to cover extra costs	1	2	2
12	Battery life/range less than expected	Replacement battery required before 8 years	Replacement battery available under warranty	1	3	3
13	Vehicle manufacturer ceases trading	Warranty void	First agrees to cover extra costs	1	3	3
14	Change in operator environment	New operator does not honour commitment to BEVs	Contract between CYC and operator must be enforced	1	3	3
15	[redacted] bus reaches end of life before 17 years	Replacement vehicles required before 17 years to continue operation	First will work with manufacturer to manage vehicle longevity. Ultimately First will provide suitable replacement vehicles	1	2	2

Monitoring and Evaluation Strategy

Overview

We have worked with the Institute of Transport Studies at Leeds University to design a monitoring and evaluation strategy, which is presented here. Our core assumptions are that:

- The M&E Strategy will follow the standard DfT methodology where schemes are evaluated at one, three and five years after introduction
- It will make use of existing data sources in York, supplemented by stated preference/ revealed preference attitudinal surveys, collected with the assistance of ITS Leeds.
- It will be based around the York ZEBRA bid objectives of:
  - To reduce congestion in York by promoting a clean, regular, affordable and attractive bus service as alternative to private car use.
  - To improve air quality, particularly within the city centre and main corridor routes.
  - To further decarbonise the bus fleet in York by replacing First York's remaining urban diesel buses with electric ones.
  - To work with manufacturers to road test their next generation of electric buses.
  - To build on First York's existing experience of running and maintaining electric buses and to share and encourage other operators to electrify their fleets.
- And the DfT's ZEBRA bid objectives of:



- Support the roll-out of the 4,000 Zero Emission Buses that the government committed to in Feb 2020
- Support bus manufacturers in the development of zero emission bus technology
- Support partnership working between Local Transport Authorities, bus operators, and other local stakeholders as set out in the NBS
- Grow and level up the economy
- Improve transport for the user
- Reduce environmental impacts/Air quality
- Understand better the challenges of introducing zero emission buses and supporting infrastructure to inform future government support for ZEBs
- Support the government's commitment to decarbonisation and to reduce the transport sector's contribution to CO2 emissions

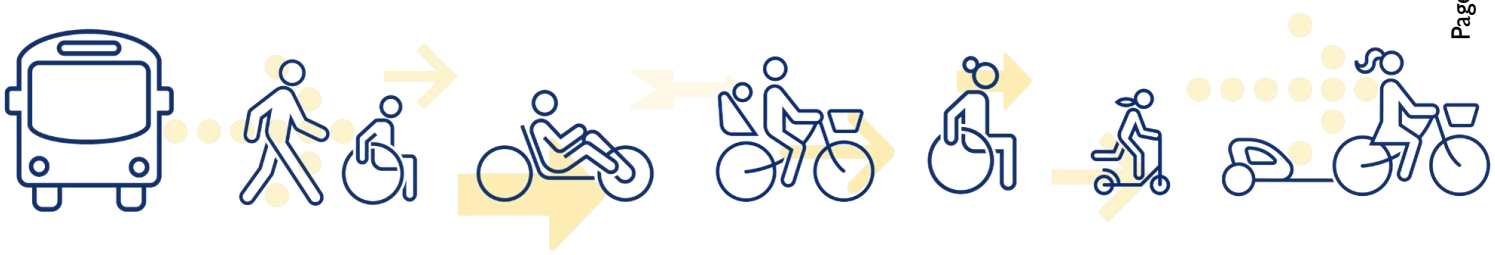
The relationship between the two objective sets is shown in this bid's Strategic Case – however, it can be seen that there are significant areas of overlap between the two.

Data Collection

The M&E strategy will make use of data which is already available, which is extensive in York, particularly:

- The city has an extensive evidence base on bus services in York. Principal amongst this is an unbroken set of Transport Focus bus passenger satisfaction surveys, which the York QBP has paid to have undertaken every year since 2012[4]. These surveys allow us to track passenger perception of vehicle quality and how it changes. This will be particularly crucial in allowing a comparison between:
  - The existing bus fleet
  - The bus fleet as supplemented by the Optare Versas and Metrodeckers which currently comprise York's electric fleet
  - The new buses which will be introduced if this funding bid is successful
- Changes to air quality can be monitored using York's existing network of 233 diffusion tubes and 9 real time monitoring stations. Data for this monitoring network has been collected for over 20 years, giving a very good historic data set for evaluating the project. We will also take advantage of the Institute for Transport's work for DEFRA on air quality monitoring where ITS are working with 33 authorities to update their air quality plans on the basis of monitored outcomes. This will allow us to compare the theoretical changes to air quality with what occurs in the city
- This will be used to assess the differences to air quality ***on the ground*** in York (as opposed to the theoretical changes posited in this bid).
- CYC also has access to a range of other indicator data, including a network of counters, including traffic counters on roads across the city, pedestrian footfall counters in the pedestrianised area of the city centre and cycle counters on the key cycling routes in the city. This data can be called on as required (for example, to see if any changes in bus

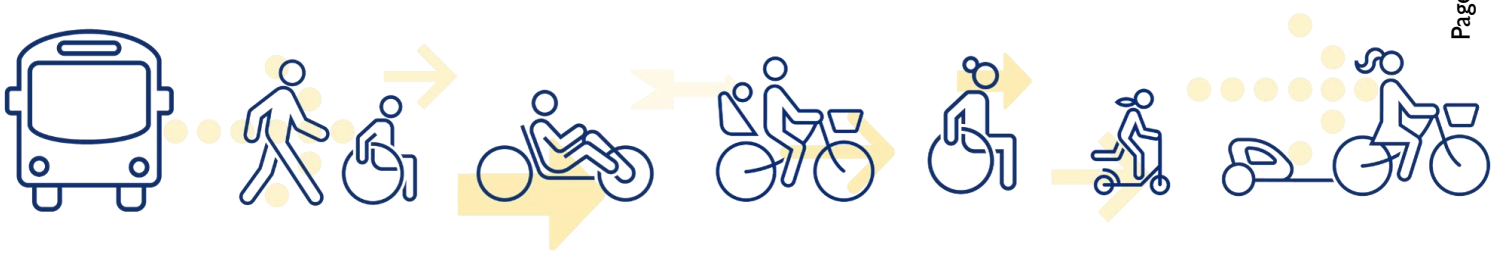
[4] Surveys were not undertaken in 2020 or 2021 because of the covid pandemic, but CYC is represented in the group advising Transport Focus about how the surveys may return in 2022.



patronage levels are coincident with changes in the use of other modes – we are particularly keen to target reduced car use with this intervention).

- ITS Leeds have suggested that the project devises stated/ recommended preference experiments to define transfer to the new vehicles and identify how customers react to the new generation vehicles, the relative weights they give to the new vehicles' attributes and the overall weight given to the new buses in comparison to alternatives such as a continuation of the existing fleet, modern diesel powered buses and the first generation electrics in use on park and ride. We will repeat this survey work to assess how passenger appreciation of the new buses decays over time (or holds up).
- The project will have full access to the telematics capabilities of the buses. The remote diagnostics and telematics equipment in use across the First York electric fleet, will allow real time monitoring of a range of operational data including (but not limited to) energy consumption and recuperation, speed, mileage.
- Fuel consumption monitoring will be conducted for the current fleet and drivers operating all of the routes to be switched. This will be set against the topography and route characteristics of the services. High resolution battery data will be collected following introduction of the electric buses to understand how electricity consumption varies under different route, loading and driver combinations. This will also tie in to analysis of battery performance, charge times and degradation across the year in order to provide real-world data for manufacturers and operators across a range of operating conditions. The detailed evaluation will also enable a full scale evaluation of CO2 benefits and indicate how these could be optimised.
- The QBP will provide a more informal framework for collecting information and observations on operating electric buses from bus operators and drivers and promote roll out across other operators in York. A key output of the monitoring and evaluation strategy for this project will be a lessons learned statement which will be applied as CYC moves forward to electrify more of its bus network – particularly involving smaller operators who will have fewer resources to market test electric buses before adoption. We see an important output of this project to be a cascade of knowledge on day to day use of electric buses from First to York's other operators.
- We will also study the extent to which adoption of electric buses on some routes in York acts as a spur to their adoption across the city on other routes/ by other operators.
- We will work with the existing passenger groups, such as York Bus Forum, to explore attitudinal changes which result from adoption of electric buses. We will work with hard to reach groups in York to assess the impact of the new buses on deprived areas of the city, and in particular whether the vehicle upgrades requested in this bid act as a catalyst to encourage people to access new employment and training.
- We will work with the developers of new housing in York to assess how the new buses are helping them achieve the ambitious target mode shares to bus for their new developments[5].

[5] NB: This will be in year 5 only – to give time for the developments to be sufficiently built out to see behaviour change in response to the new vehicles.



The Gantt chart below outlines the M&E strategy against the 5 year monitoring period for the scheme.

Item	Year 1	Year 2	Year 3	Year 4	Year 5
Transport Focus surveys					
AQ Monitoring					
Modal Use indicators					
Bus Telematics data/carbon					
SP/RP					
QBP Research					
Users and hard to reach					
Developers					
Report produced					

Funding

CYC has identified a £100,000 M&E budget for this work (over 5 years). This is for work specifically required for the ZEBRA bid and does not include previously committed workstreams such as the Transport Focus surveys, AQ data collection and general transport data collection. Bus telematics data will be provided free of charge by First. Of the £100,000:

- £70,000 relates to the SP/RP work undertaken by ITS
- £30,000 relates to the production of the M&E reports in years 1, 3 and 5.

Working with ITS Leeds brings the potential for significant additional research work through Masters and PhD assignments. We would look to identify/discuss these through the year 1 and 3 monitoring reports – should they identify research/knowledge gaps. There is also potential for further M&E after year 5 should it be identified as a useful thing to do (for example to monitor the performance of the vehicles or batteries beyond 5 years).

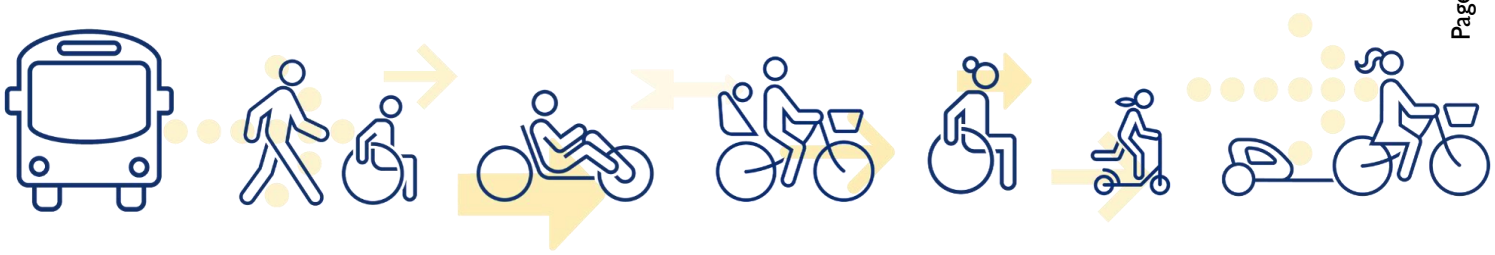
ITS/DecarboN8

Through the DecarboN8 partnership the project will benefit from transport, economics, engineering and public health evaluation expertise. (See Annex 3 for a letter of support from DecarboN8.)

[redacted]

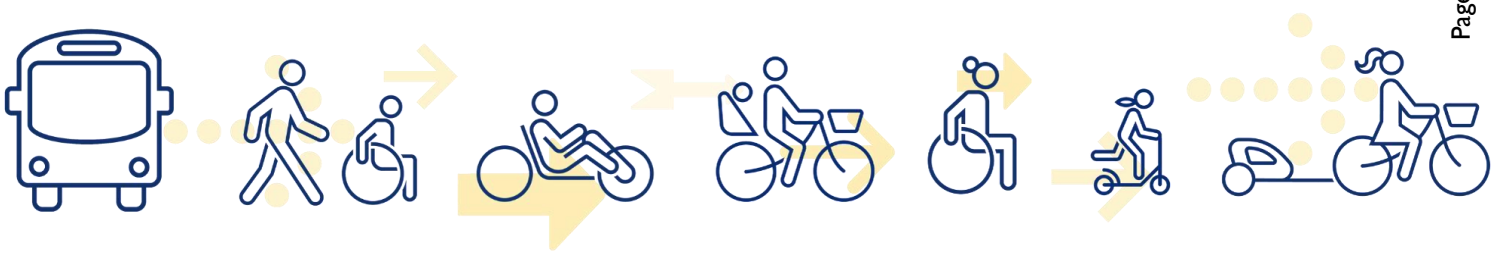
Equality Impact Assessment

City of York Council has an established equalities impact assessment methodology. A report for the ZEBRA scheme following this methodology is attached in Annex 10.



List of Annexes:

1. Defined area included in the ZEBRA Scheme
2. First York Support & Commitment
3. Power Distribution and Technical Stakeholders
4. Bus Information
5. Complementary Measures in York
6. Letters of Support from other Stakeholders
7. York Air Quality Management Area (AQMA)
8. CYC Legal Response to Procurement, Subsidy Control and Compliance
9. Project Delivery Plan & Methodology
10. Equality Impact Assessment



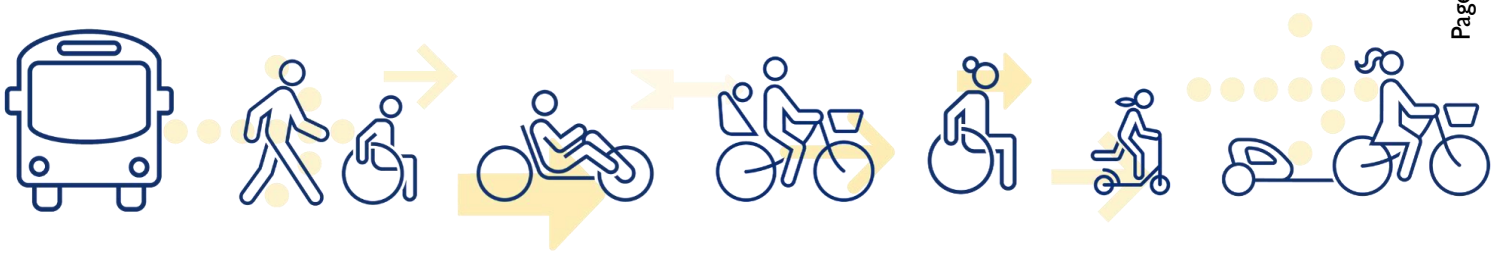
Annex 1: Defined area included in the ZEBRA Scheme

The defined area covered by this bid is the York contiguous built up area. This comprises the whole built up area of York city, within the A64 and A1237 outer ring roads, plus the large villages of Skelton, Wigginton, Haxby, Strensall, Dunnington, Bishopthorpe, Copmanthorpe and Poppleton.

The six existing Park & Ride sites that serve the city centre are also shown.

Annex 2: First York Support & Commitment

Letter of Support and Commitment



REGO Energy Label

Energy Label Business Renewable: REGO Backed

100% Renewable Electricity

First Group Holdings Limited

Supply Period: 1st April 2021 - 31st March 2022

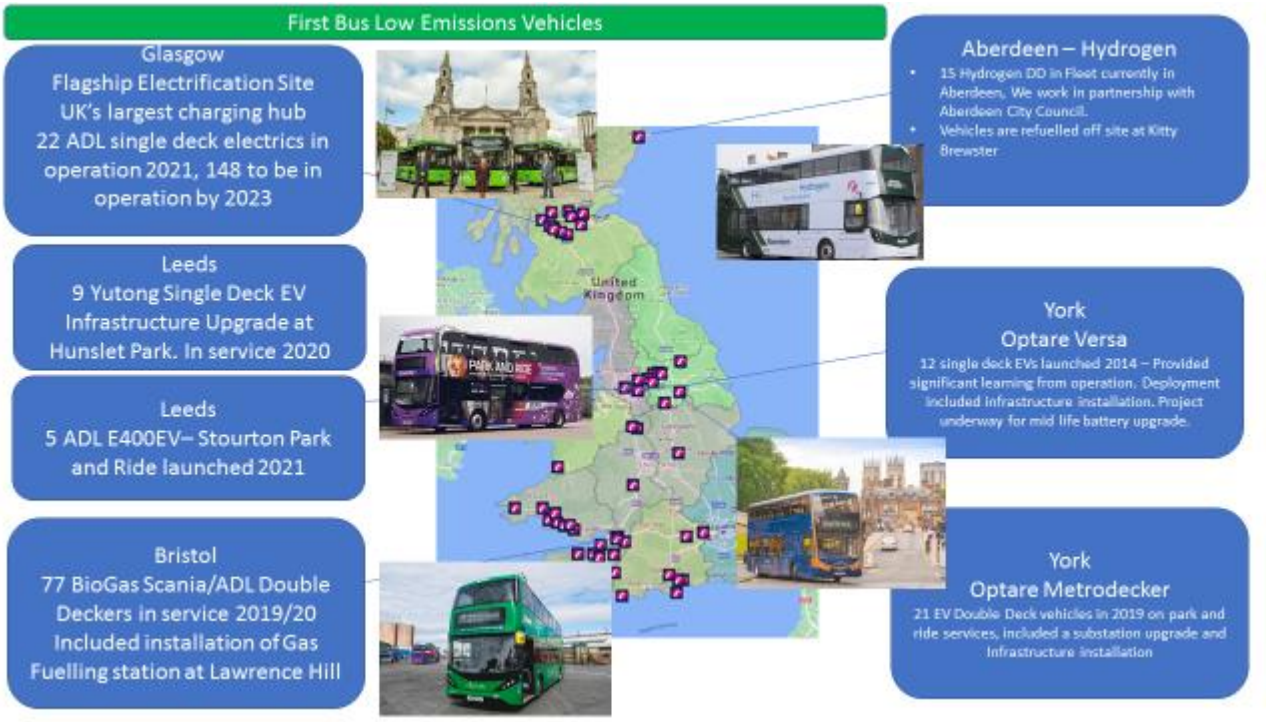
	Electricity Source	CO_2/kWh emissions	Consumption
A	Renewable	0g	A
B	Low Carbon/CCS	<200g	
C	Gas CHP	<300g	
D	CCGT Gas	<400g	
E	UK Average/Gas	<600g	
F	Coal/Oil	<800g	
G	Coal	>800g	

You have chosen to use the npower Business Renewable product for its supply of electricity. This meets the quality criteria of the GHG Protocol (2015) for reporting zero carbon emissions and has been independently assured by EcoAct.

Renewable Electricity assured by

npower Business Solutions

First Bus Low Emissions Vehicles Deployments



Proposed Parking Plan – *upgraded depot with additional chargers*

Annex 3: Power Distribution and Technical Stakeholders

Northern Power Grid - *Quote for electricity connection upgrade at First's York Depot*

Northern Power Grid - *Quote Extension Confirmation Letter*

OFGEM – *Green Recovery Fund Confirmation Email*

[redacted] – *Quote for civils work for depot upgrade*

Heliox – Quote for supply and maintenance of chargers for depot

heliox

Modular
150kW DC Charger

CE

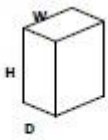
The Heliox Modular 150 kW Charger is High Performance Charger consisting of a power cabinet and a charge post. This Dual CCS charger is ideal for motorway charging, public charging and other places where really fast charging is needed. Because of the connection with the power cabinet, you remain very flexible and it is easy to increase the power in the future → for example 80kW, 100kW, 120kW, 150kW, 300kW

With a touchscreen and a payment terminal the use of the charger is very easy. After identification with the RFID reader or a direct payment the user only has to plug the plug into the vehicle and the charging process starts automatically. On the display, the charging status/process is easy to follow.
The charger delivers power up to 150kW without the need for liquid cooled cables. Liquid cooled cables are available as an option, if desired.

Dimensions

Power Cabinet
H: 2325 mm
W: 700 mm
D: 800 mm

Charge Post
H: 2325 mm
W: 700 mm
D: 800 mm



PRE INSIDE

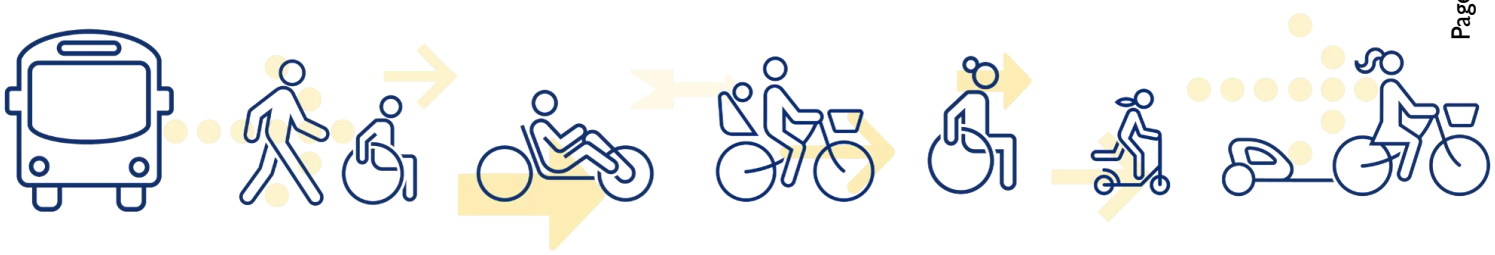
Specifications

General	Charger
Environment operating	Outdoor
Temperature	-20 to 50 °C
Charging standard	IEC61851-1/23/24 / DIN 70121 / ISO15118
Compliance and safety	CE / EN 55011 / IEC61000 -6-4-2 / Eichrecht (by mid 2021)
CCS Output DC voltage range	150 - 1000 V (CCS; IEC 62196)
CCS Rated DC output power	150 kW
CCS Output DC current range	0 - 400 A
Input connections	3P + PE + N
Input AC line-line voltage range	400 V +/-10%
Input AC current; maximum	200A
Power factor	> 0,99
Power conversion efficiency	> 94%
Network connection	GSM / LTE modem
Display	10" Touchscreen LCD
Payment terminal (optional)	VISA / MasterCard / Maestro / Apple Pay / Google Pay / Samsung Pay
Protocol	OCPP 1.5 / 1.6
Protection	IP54 / IK10
System weight	550 kg

94% Efficiency
Highest up time
Back office systems
Zero Emissions
Support services
Industry's quietest

Heliox Automotive B.V.
De Waal 24, 5684 PH Best,
The Netherlands

+31 88 5016 300
info@heliox.nl
www.heliox.nl



Consult · Develop · Design · Construct · Maintain

EVOENERGY
Powering the Future

EvoEnergy Letter of Support for ZEBRA

To whom it may concern,

EvoEnergy are a multisystem integrator of solar carports, batteries, private smart grids and electric vehicle charging systems. We were awarded the tender to install HyperHubs (high speed public electric vehicle charging hubs) next to the Monks Cross and Poppleton Bar Park & Ride sites in York.

From our first pre-tender award interview with the CYC team, we knew that we were talking to a competent, experienced team, focussed on improving their city's infrastructure and from the tender requirements were seeking to do it in broadly a sensible manner.

What came from the meeting and materialised through the subsequent tender award, was that the team were open to suggestions and keen to learn about the journeys that EvoEnergy had been on with batteries and solar canopies. From our point of view a really healthy mutually supporting partnership was formed.

The expertise of EvoEnergy's battery and solar modelling team was combined with usage data and knowledge of CYC's EV infrastructure to further refine the HyperHub design with best of class knowledge and experience from all parties. This all helped to make the preliminary studies, planning approvals and grid connections simple and straightforward.

It was a pleasure working with CYC's project management team, through the usual twists and turns that civils projects may encounter. For example, one of the sites was turned into a COVID19 test site very early in the project, but both parties worked hard to ensure that this did not cause disruption to the programme.

Overall, we look forward to the opening day for Monks Cross and progressing the Poppleton site and others to further support CYC in their future thinking and progressive clean air, public transport and electric vehicle strategy.

Yours sincerely,

Jonathan Roper
Senior Design Engineer

evoenergy.co.uk

08448 150 200 • info@evoenergy.co.uk
27 Eldon Business Park, Nottingham, NG9 6DZ

HV/LV SOLAR BATTERY EV O&M

Registered in England & Wales. No: 06259559 • VAT No: 917891581

DecarboN8

2nd June 2020

ZEBRA Bid

Dear Julian

I am pleased to write in my capacity as Director of the DecarboN8 research network in support of the bid from City of York Council for the ZEBRA funding. DecarboN8 was funded by the UK Research Councils to support the adoption of low carbon transport innovations across the North. In particular we have a goal to support collaboration between government, industry and academia to maximise the adoption of and learnings from innovative new technology. This bid is a great fit and builds on the existing innovations which the Council has led on and on a very clear commitment from First Bus to decarbonise their fleet. First Bus have been active participants in our network.

If the bid is taken through to the next stage then the DecarboN8 network will work closely with the bid team assembled by City of York Council to:

- Connect the bid team to academic experts in electrification of heavy fleets, battery management and vehicle to grid charge interactions
- Identify supporting funds from within the remaining DecarboN8 programme to support the analysis and understanding of the whole life benefits of this transition.

DecarboN8 will also work with the Decarbonising Transport through Electrification network based in Cardiff to explore whether there is the potential to find further support and our hope would be that we act as a leverage point to bring academic expertise to focus around this exciting opportunity.

I note here that the bid team also includes expertise in evaluation and monitoring which it is intended will be delivered by colleagues at the Institute for Transport Studies.

I am delighted to have had the chance to discuss this opportunity with you and wish you the best of luck with the bid.

Yours sincerely

Professor Greg Marsden
Director DecarboN8

Annex 4: Bus Information

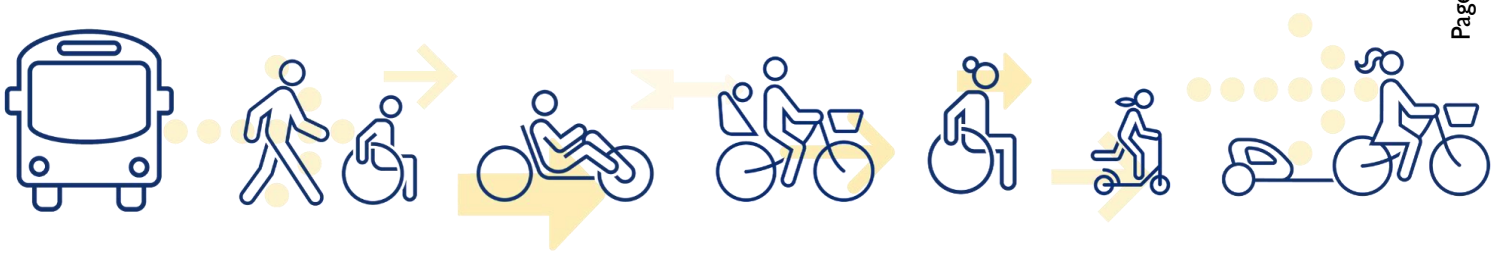
[redacted]

[redacted]

[redacted]

[redacted]

[redacted] Electric and Diesel Single Deck Quotes



Annex 5: Extract from York's BSIP describing Complementary Measures

1. Making the buses run on time – tackling slow journeys, delays and unreliability

Introduction

1.1 69% of the respondents to York's Local Transport Plan questionnaire said that more reliable bus services would encourage their use of buses in the city. Poor perceptions of punctuality can also be seen in the data collected about passenger satisfaction in York by Transport Focus. We have worked with First York to identify the most congested locations on York's bus network in assembling the data behind this BSIP. The analysis produced by First York can be seen in the Evidence Base for this document.

Background

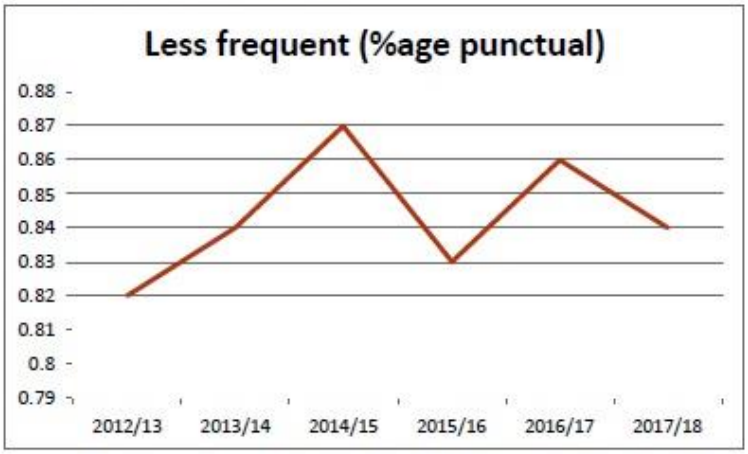
1.2 As the National Bus Strategy sets out, poor punctuality of services is a serious problem for passengers and bus operators alike and suppresses use of the network. In parts of York congested roads slow services down, making them less attractive, and increase operating costs, because more buses are required to operate a given service as end to end journey time increases. Furthermore, buses stuck in traffic are, when diesel, usually still emitting pollution and using carbon, so there is an important relationship between measures to cut congestion and CYC's work to improve air quality and reduce carbon emissions across York. This was reinforced to us during Lockdown, when it was possible to operate some routes in York with far fewer buses, but at the same frequencies as normal, because lower traffic volumes meant end to end journey times were much shorter.

1.2 Consistently slow journeys are one problem, but what is worse is inconsistent journey times. As bus services operate to a timetable, a stage of a bus journey which takes 5 minutes one day, but 10 the next is a significant operating problem. The service would need to either be timed to be late on the "10 minute" day, or to wait time somewhere on the "5 minute" day. Both options are frustrating for passengers – and bring wider problems. If the bus has to wait somewhere, kerb space must be provided for it to do that, which is a problem in a city like York where waiting space for buses is in very short supply in the city centre.

1.2 In this section we consider how the BSIP will improve service speeds and punctuality.

1.1 How does York perform now?

Figure 4.1: Bus Punctuality in York



1.1 As can be seen from Figure 4.1, punctuality of less-frequent bus services in York is generally between 80% and 90%, a significant improvement compared to earlier years – for example, in 2007/8 only 47% of less-frequent services were assessed to be on time. This change is the product of much work by York's QBP, through its Performance Group, which focuses on service reliability.

1.2 These figures compare well against other urban areas, particularly other historic towns and cities with similarly constrained and congested road networks. Nonetheless, there remains room for improvement - with other towns and cities, for example Nottingham, able to demonstrate higher still levels of timetable adherence. Furthermore, whilst timetables are adhered to, we want to make bus services as fast and competitive as we can. Some timetables now undoubtedly include "padding" time to counter inconsistent journey times on some roads in York, and we are seeking to eliminate this, as much as possible, through the measures set out in this document.

Targets: punctuality

1.1 Consequently, our targets for 2024/5, in relation to bus punctuality in York are:

- 90% of less frequent services will be punctual
- Excess wait time for frequent services (not reported here) will be no more than 45 seconds.

Proposed Measures: punctuality

1.2 In relation to bus service punctuality, we have a number of objectives, specifically:

- To continue to improve punctuality of services in York
- To improve the end to end journey speed of existing bus services in York
- To ensure that any new bus services are punctual and have journey times which are competitive with those by car.

1.1 There are six strands to our strategy, these are:

- Maintaining our assets to get the best use of our existing highways capacity
- Actively managing traffic to keep buses running to time
- Tackling bottlenecks
- Improving whole corridors to make bus services faster
- Managing services in the city centre
- Other strategies which can reduce bus journey times (for example, ticketing strategies which minimize boarding times).

These figures compare well against other urban areas, particularly other historic towns and cities with similarly constrained and congested road
1.2 networks. Nonetheless, there remains room for improvement - with other towns and cities, for example Nottingham, able to demonstrate higher
1.3 still levels of timetable adherence. Furthermore, whilst timetables are adhered to, we want to make bus services as fast and competitive as we can. Some timetables now undoubtedly include "padding" time to counter inconsistent journey times on some roads in York, and we are seeking to eliminate this, as much as possible, through the measures set out in this document.

These are explained below:

Making the most of what we have already: maintaining our assets

It's obvious really, but measures which improve traffic flow, particularly reducing queuing, also improve the flow and reliability of bus services. Whilst there are innumerable products and techniques available to manage traffic effectively, there is a very important role in maximising the use of the many systems York already has installed. As such, City of York Council will commit to maintaining the equipment it already has installed in the city to manage traffic.

These include:

- Extensive bus priorities on many key radials – particularly supporting inbound movements;
- An Urban Traffic Control (UTC) system covering much of the city. This system gathers data about the amount of traffic on key roads in York and sets the traffic lights accordingly to minimise delays;
- CCTV cameras covering key junctions across York, including many on the inner ring road, key road junctions on the city's principal routes, and junctions with major roads such as the A64(T);
- Variable Message Signs (VMS) on York's principal roads which can be used to direct traffic if necessary (for example, away from a road traffic accident) and real time screens at bus stops which can be used to relay messages to passengers;
- Use of apps, twitter etc to relay information to bus passengers and road users in real time;
- **More recently, CYC has developed a "real time model" for assessing traffic flows in York and optimising signals to minimise congestion.** This takes data from a number of sources (for example, mobile phone signals), assessing traffic flows and speeds. We are exploring how this model can be used to give signals based bus priority in the future.

1.1 At the time of writing much work is in progress on this front, including resurfacing many of the major junctions around York and replacing the vehicle counting loops installed in the road surface which send data to the UTC, often with cameras able to identify and count different types of vehicle. The City Council is also refurbishing the VMS signs around the city and adding to the number of sites where traffic cameras are installed.

1.2 Below we set out the **"commitments"** which we propose to take forward without National Bus Strategy funding, and **"asks"** which do require NBS funding.

1.3 **BSIP Commitment R1:**

City of York Council will commit to continuing this work with the intention of using best endeavours and whatever funding is available to ensure all existing systems in the city are kept in good working order, and to demonstrate their value in improving bus journey times in York.

1.4 **BSIP Commitment R2:**

City of York Council will use its traffic real time model to provide signals based bus priorities. The model will identify late running buses and prioritise them at junctions, using the methodology which is already proven in South Yorkshire. This can be used, particularly, to tackle inconsistent journey times.

Active management of traffic

1.5 The Traffic Control Centre in the council's offices has an important role in managing traffic flows in York to minimise disruption day to day, and inform bus passengers (and other road users) of any delays. Since 2013 "Network Monitoring Officers", initially funded by York's Better Bus Area Fund, but more recently funded voluntarily by York's bus operators, have been on duty 12 hours a day, Monday to Saturday, monitoring traffic flows and adjusting traffic signals to reduce congestion and delay to bus users.

1.1 They are also a key line of communication with bus operators – advising them of delays and any incidents which may cause late running.

The Network Monitoring Officers can:

- Change traffic lights to reduce the length of a traffic jam;
- Send messages to the real time screens and variable message signs around York to advise bus passengers and road users of any delays;
- Co-ordinate action between operators to overcome problems on street.

They are also a key line of communication with bus operators – advising them of delays and any incidents which may cause late running.

The Network Monitoring Officers can:

- Change traffic lights to reduce the length of a traffic jam;
- Send messages to the real time screens and variable message signs around York to advise bus passengers and road users of any delays;
- Co-ordinate action between operators to overcome problems on street.

1.2 **BSIP Commitment R3:**

Is that City of York Council will consider taking the powers to enforce moving traffic offences (for example, entering a yellow box junction before the exit is clear) if they are offered to local transport authorities outside London. These offer the opportunity to tackle some of the problems on the road network which delay buses.

1.3 They also have an important role managing traffic during York's many festivals and special events – for example, they are extremely important in co-ordinating the city council and bus operators during York's race meetings and festivals, and they take a leading role in planning bus services around roadworks in the city.

1.4 The city council has also, through the Better Bus Area Fund, employed two "Bus Wardens" who act as the bus network's "boots on the ground".

The Wardens undertake many important functions, including:

- Keeping bus routes, bus lanes and bus stops clear of obstructions – for example, by moving vehicles on which are parked (including for loading) in such a way that they obstruct buses, or by assisting whenever a highway is blocked – for example by utilities work, maintenance work or by an accident;
- Maintaining many of the bus stops, shelters and bus timetables around the city;
- Inspecting and sorting out problems which are reported about the bus network – for example, vegetation which obscures bus stops;
- Assisting passengers during special events – during one-off major events, or for regular special events, such as race meetings or the university open days;
- Assisting passengers from day to day with enquiries;
- Collecting information about persistent causes of delay (for example, poorly phased traffic signals, loading vehicle obstructions) so that rectification action can take place.

1.5 This work is co-ordinated through the "Performance Group" of the Quality Bus Partnership. This group meets monthly and discusses upcoming special events and major roadworks. It also reviews a monthly performance indicator (see Evidence Base) to consider performance across York's bus network as a whole and agree any action required to remedy a dip in punctuality. This indicator is published on the CYC website every month.

1.6 **Ask R1:**

£150k pa for three years to continue to fund the two Network Monitoring Officers and Bus Wardens, as set out above. After the three year period, if successful, funding for these posts would revert to the operators. We are requesting this to help the network recover from the covid pandemic as this funding would provide operator relief from these charges

1.7 **Commitment R4:**

Is that the Performance Group of the QBP will take an important role in planning for special events, including sports events and festivals. This will include making decisions on warden and NMO cover for these events – and provision of other staff by operators or CYC.

1.8 **Commitment R5:**

The Performance Group will continue to review performance on a monthly basis, publish its punctuality indicator, and agree appropriate mitigations as required.

Tackling hotspots and bottlenecks

1.9 Bus service reliability suffers due to bottlenecks on the network. Figure 4.2 shows delayed representation of bus delays in the centre of York, identified as part of the work preparing this BSIP. A key challenge for the BSIP is to work to identify, and where possible, eliminate the various bottlenecks on the network. This work will be taken forward by the York Enhanced Partnership, and schemes will be advised in the 2022 update to the BSIP.

Figure 4.2 Bus Delays in central York (by permission, FirstYork) – example – more maps available in the Evidence Base

1.11 **Commitment R6:**

City of York Council will continue to work with the bus operators to develop a series of small schemes to, where practicable, tackle bottlenecks. This will be financed through an annual capital "fund of £50,000 pa for small schemes, or targeted capital spend for larger schemes, which may require preparation of a business case. The Performance Group and Better Bus Area Groups of the Quality Bus Partnership will be instrumental in prioritizing the schemes for action.

Ask R2:

CYC request that the DfT match the £50,000 small measures fund with a further £50,000 pa which can be used to tackle small scale sources of unreliability on York's bus network, or make the case for larger scale interventions. This is requested to help stabilise the bus network in the medium term.

1.12 **Commitment R7:**

CYC will work with developers to use S106 settlements to fund and deliver localised bus priority schemes where these are needed to offset the impact of development related traffic. We already have a significant programme of work being progressed this way – particularly connected with the York Central site, but this approach will be applied to other development sites as they come forward.

1.13 **Whole corridor measures:**

Often, a series of junctions along a corridor will conspire to delay bus services seriously, because a service will accumulate delay at each junction, leading to a very large cumulative delay over the whole corridor.

In these instances it is appropriate to look not just at individual bottlenecks, but whether there is scope for measures to improve services along the corridor as a whole – an approach we have recently taken on the A1036 Tadcaster Road to the west of York.

Such measures might be bus lanes, co-ordination of signals or schemes to reduce traffic volumes on a particular route (for example, through access restrictions, changes to signs to direct traffic away from the route or measures to encourage motorists to travel in a different way – for example the "Travel behaviour change" projects being undertaken by York's I-Travel sustainable transport behavior team).

Obviously, there is also scope to reduce cumulative delays through a series of stand-alone measures at individual junctions on the corridor.

1.14 In some cases work will need to take place to improve conditions for bus services in advance of extra traffic from new residential or employment development using a route. In these instances, there may also be a need to develop bus priority measures to ensure a competitive public transport service is provided to the new development. In some locations changes in traffic flow since the pandemic (particularly a smaller AM peak and larger PM peak) may mean a new emphasis on bus priorities for buses heading outbound from York city centre.

For more details, please see:
www.itravelyork.info and
Section 11 of this document.

1.15 CYC's planning team has been working alongside developers in York, and a programme of Section 106 funded bus priorities has been developed, in particular measures on the A59/ Water End/ Leeman Road corridor to provide reliable services to the York Central development. We are currently assessing the impact of additional traffic on two key radial corridors in the city – Wigginton Road and Fulford Road – to assess the potential for bus priorities on these corridors using micro-simulation models. This work, which predates BSIP preparation, is being funded from CYC's transport capital programme. We are working alongside West Yorkshire Combined Authority to deliver a Transforming Cities Fund project to improve bus services on the Tadcaster Road corridor.

1.16 **Commitment R8:**

The Performance Group of the Quality Bus Partnership/ future Enhanced Partnership will work to identify and prioritise routes requiring "whole corridor" measures. These will be financed through a variety of vehicles, including City of York Council's Capital Programme, the DfT BSIP support funding and other funds as they become available. The CYC's transport scheme development funding will be used to make the case for bidding for funds to make larger interventions.

1.17 **Commitment R9:**

City of York Council will work with developers through the Local Plan to upgrade corridors to ensure that new developments have bus services with journey times that are competitive with the private car. Measures will be funded through developer contributions (either Section 106 contributions or, if appropriate, tariffs or Community Infrastructure Levies (CIF)). Bus operators will have an important advisory role in these negotiations. This is discussed at more length in the section of this document which sets out policy in relation to the Local Plan development of York. BRT may be considered at the larger sites.

1.18 **Ask R3:**

City of York Council request an indiciative fund of £15m to provide radial bus priority measures on corridors where these are not currently available/ improvements to existing radial bus priority provision or delivery of high quality services to the sites identified in the Local Plan. The deployment of these funds is contingent on a number of studies which are currently underway (for example, looking at bus routing in central York and on key radials such as Wigginton Road, Tadcaster Road and the A19 Fulford Road and for sustainable transport access to the larger sites allocated in the Local Plan (see Section 13)). A detailed programme will be advised in the BSIP published in 2022, so the funding ask set out here is an indication with specific information to be advised later – following technical studies and publication of York's new Local Transport Plan in 2022. This measure is required to improve the customer offer for buses.

The city centre

1.19 94% of the area inside the York's city walls is a conservation area. The character and fabric of the city have been preserved through retention of York's historic road network with relatively few concessions to motorised traffic, when considered alongside the 1960s inner ring roads constructed in many other historic towns and cities. However, although this means the city centre's character is intact, it imposes constraints on the easy operation of bus services. As nearly all of York's bus services either serve or pass through the city centre, the effective management of traffic there has a bearing on the operation of the whole of the bus network. Consultation with adjacent authorities has also shown that the effective operation of York city centre for buses is key for reliable provision of bus services in North and East Yorkshire.

A city centre bus priority route

1.20 Although there are short stretches of bus/ taxi only streets in the centre of York there is currently no complete bus priority spine route all the way through York city centre. **Commitment R10** is that bus operators will work with City of York Council to consider the feasibility of such a route and will work to make the necessary financial case for delivering the route if a positive business case can be made for the intervention once its full impacts are assessed. Progress on this aspect of the BSIP will be advised in the 2022 BSIP update, following a study commissioned by CYC, as part of the LTP process, in late 2021. Costs of delivery are assumed to be within the £15m block "ask" for whole corridor measures as advised above.

Other reliability measures

1.21 Complementary measures to improve reliability, by reducing boarding times by changing ticketing systems, or reducing traffic volumes through behavior change campaigns have an important part to play and are discussed in sections 6 and 11 of this document.

Annex 6: Letters of Support from other stakeholders

York's ZEBRA bid is also supported by a wide range of local business, social, educational and environmental organisations including:

Business

York & North Yorkshire Chamber of Commerce

York & North Yorkshire Local Enterprise Partnership (LEP)

Make It York

Social

York Older People's Assembly

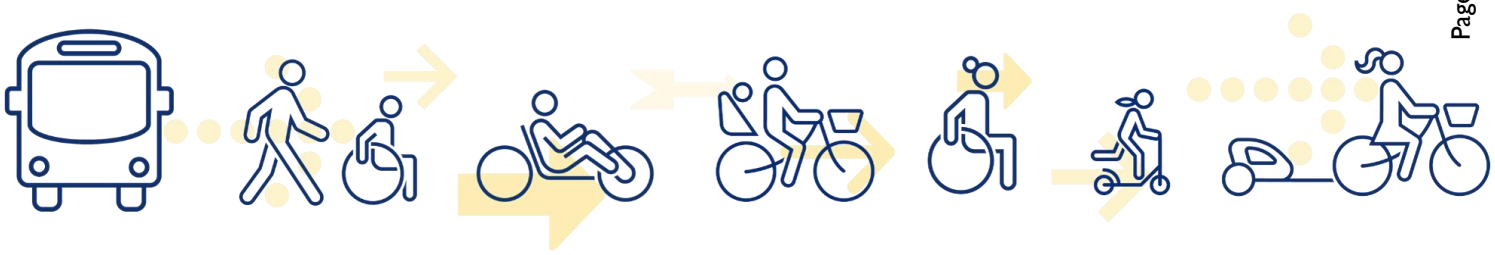
York Bus Forum

Education

York College

Environment

York Civic Trust



York & North Yorkshire Chamber of Commerce
YORK & NORTH YORKSHIRE CHAMBER
INNOVATION CENTRE,
YORK SCIENCE PARK,
INNOVATION WAY, YORK, YO10 5DG
T +44 (0) 1904 567 838
E info@yorkchamber.co.uk
W www.yorkchamber.co.uk

17th June 2021

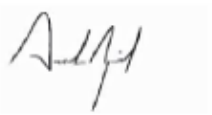
To whom it may concern,

I write on behalf of York & North Yorkshire Chamber of Commerce to express our support of City of York Council's ambition to extend the electric bus presence in York through the ZEBRA scheme.

We strongly support this project which is expected to bring a variety of environmental, economic and health benefits to York.

As an organisation with a presence in York, we recognise our role in creating a sustainable community which acts as a beacon to other towns and cities in the UK and the world and we believe that this project further enables York to reach this goal and assume a leading position in delivering a sustainable public transport system.

Yours faithfully



Andrew Digwood

President

York & North Yorkshire Chamber of Commerce

James Farrar COO
Chief Operating Officer
York & North Yorkshire LEP
County Hall
NORTHALLERTON
North Yorkshire
DL7 8AH

Tel: 01609 533269
James.farrar@businessinspiredgrowth.com

Date 21 June 2021

Our Ref M24SJB024. JF

To whom it may concern,

I write on behalf of York & North Yorkshire Local Enterprise Partnership to express our support of City of York Council's ambition to extend the electric bus presence in York through the ZEBRA scheme.

We strongly support this project which is expected to bring a variety of environmental, economic and health benefits to York. In line with Climate Emergency declarations and ambitions from across our region, the LEP are pushing for fast decarbonisation of our region's economy in advance of the Government's 2050 deadline set out in the Climate Change Act. We aim to hit carbon neutrality in the region by 2034 and then continue progress to become a carbon negative region, contributing disproportionately to the UK's overall target.

Decarbonising transport is a huge challenge in the UK and in York and North Yorkshire particularly, where a disproportionally high number of people travel by car (85% of distance travelled, compared to 78% across England). In order to meet our ambitious vision, we'll need to increase passenger kilometres travelled by bus by two thirds between now and 2030 – a target that now seems even more stretching given the impact of COVID-19 on public transport. This increase in passenger numbers needs to be achieved alongside a shift in vehicle stock from internal combustion engines to battery electric – we require 25% of York & North Yorkshire's fleet to be battery electric by 2030 and 66% by 2038 to hit our decarbonisation targets.

As an economic development organisation with a presence in York, we recognise the city's potential to act as a beacon for sustainability across North Yorkshire's towns and far beyond. We believe that this project further enables York to reach this goal and assume a leading position in delivering a sustainable public transport system.

Yours Faithfully

James Farrar
Chief Operating Officer,
York and North Yorkshire Local Enterprise Partnership

Make It York

18th June 2021

To whom it may concern

Dear Sir/Madam

To whom it may concern,

I write on behalf of Make It York to express our support of City of York Council's ambition to extend the electric bus presence in York through the ZEBRA scheme.

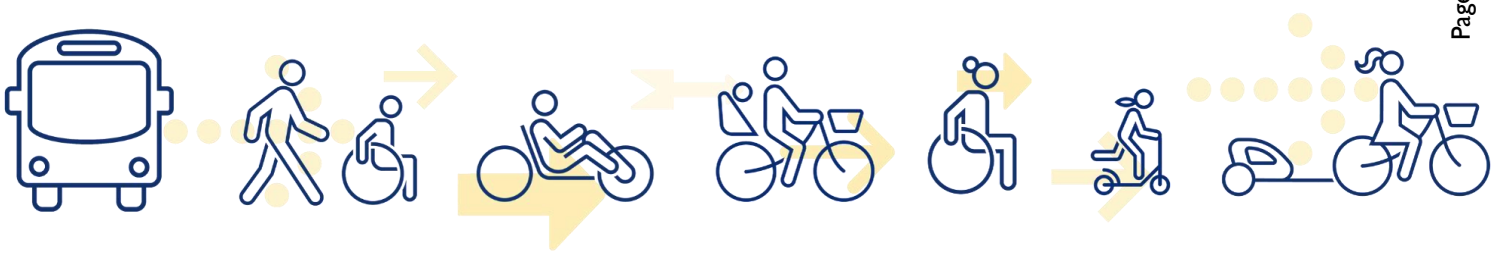
We strongly support this project which is expected to bring a variety of environmental, economic and health benefits to York.

As an organisation with a presence in York, we recognise our role in creating a sustainable community which acts as a beacon to other towns and cities in the UK and the world and we believe that this project further enables York to reach this goal and assume a leading position in delivering a sustainable public transport system.

Yours sincerely

Greg Dyke,
Chair, Make It York

One Museum Street, York, YO1 7DT Tel: 01904 554455 email:info@makeityork.com
Registered in England and Wales | Company registration number 9308493 | VAT number 208087610



York Older People's Assembly

Unit 24, SPARK: YORK
17-21 Piccadilly, York. YO1 9PB.

Registered Charity 1101018

Tel 01904 412832 (temp)

Email: yorkolderpeoplesassembly@outlook.com

Website: www.yorkassembly.org.uk

17th June 2021

To whom it may concern

I write on behalf of York Older People's Assembly to express our support of City of York Council and the York Quality Bus Partnership in their ambition to extend the electric bus presence in York through the ZEBRA scheme.

We strongly support this project which is expected to bring a variety of environmental, economic and health benefits to York.

As an organisation with a presence in York, we recognise our role in creating a sustainable community which acts as a beacon to other towns and cities in the UK and the world and we believe that this project further enables York to reach this goal and assume a leading position in delivering a sustainable public transport system.

Yours sincerely,

James Cannon

Chair, York Older People's Assembly
Charity number 1101018
Home Tel: 01904 332613
Mobile: 07818 047232

Email: yopachair@outlook.com

York's Voice for Bus Users

https://www.yorkbusforum.org

To whom it may concern,

I write on behalf of York Bus Forum... to express our support of City of York Council's ambition to extend the electric bus presence in York through the ZEBRA scheme.

We strongly support this project which is expected to bring a variety of environmental, economic and health benefits to York.

As an organisation with a presence in York, we recognise our role in creating a sustainable community which acts as a beacon to other towns and cities in the UK and the world and we believe that this project further enables York to reach this goal and assume a leading position in delivering a sustainable public transport system.

Sincerely,

Doreen Magill (Chair, York Bus Forum)

Sim Balk Lane, York YO23 2BB
01904 770100
www.yorkcollege.ac.uk
Email: customer-services@yorkcollege.ac.uk

June 2021

To whom it may concern

I write on behalf of York College to express our support of City of York Council in their ambition to extend the electric bus presence in York through the ZEBRA scheme.

We strongly support this project which is expected to bring a variety of environmental, economic and health benefits to York.

As an organisation with a presence in York, we recognise our role in creating a sustainable community which acts as a beacon to other towns and cities in the UK and the world and we believe that this project further enables York to reach this goal and assume a leading position in delivering a sustainable public transport system.

Yours faithfully

Lee Probert
Chief Executive and Principal

York Civic Trust

Fairfax House, Castlegate, York, YO1 9RN

Tel: 01904 655543

To whom it may concern

22nd June 2021

I write on behalf of York Civic Trust to express our support of City of York Council's and York Quality Bus Partnership in their ambition to more than double the number of electric busses in the city through the government's ZEBRA scheme (Zero Emission Bus Regional Areas).

The Civic Trust is actively involved in helping to develop a sustainable transport strategy for York. We conducted a survey of residents, commuters and visitors in September 2019, which demonstrated that air pollution and the impact on climate change were along with congestion, their three most significant concerns. Around 80% of residents and commuters felt that the impacts of both on the city were serious, and they identified enhancement to public transport as the highest priority among solutions. These findings were reinforced by our ground-breaking Citizens' Transport Forum held in February 2020, involving a representative group of 100 residents. The Forum's report concluded that York needs a holistic, bold and visionary transport plan which achieves significant changes in travel behaviour in the near future. Converting the bus fleet to be all electric will contribute significantly to this by directly reducing pollution and carbon emissions, and by increasing the attractiveness of public transport and hence helping to stimulate the behaviour change which we seek. On this basis, we strongly support this application.

York Civic Trust is an organisation with a long history and interest in championing the development of York as a sustainable community which acts as a beacon to other towns and cities in the UK and the world. We are committed to holistically looking at the issues that citizens face today to inform the present and future development of the city. York Civic Turst have played a leading role in successful campaigns over the last 70 years to develop our city in sustainable ways. We believe that this project further enables York to reach this goal and assume a leading position in delivering a sustainable public transport system.

Yours sincerely

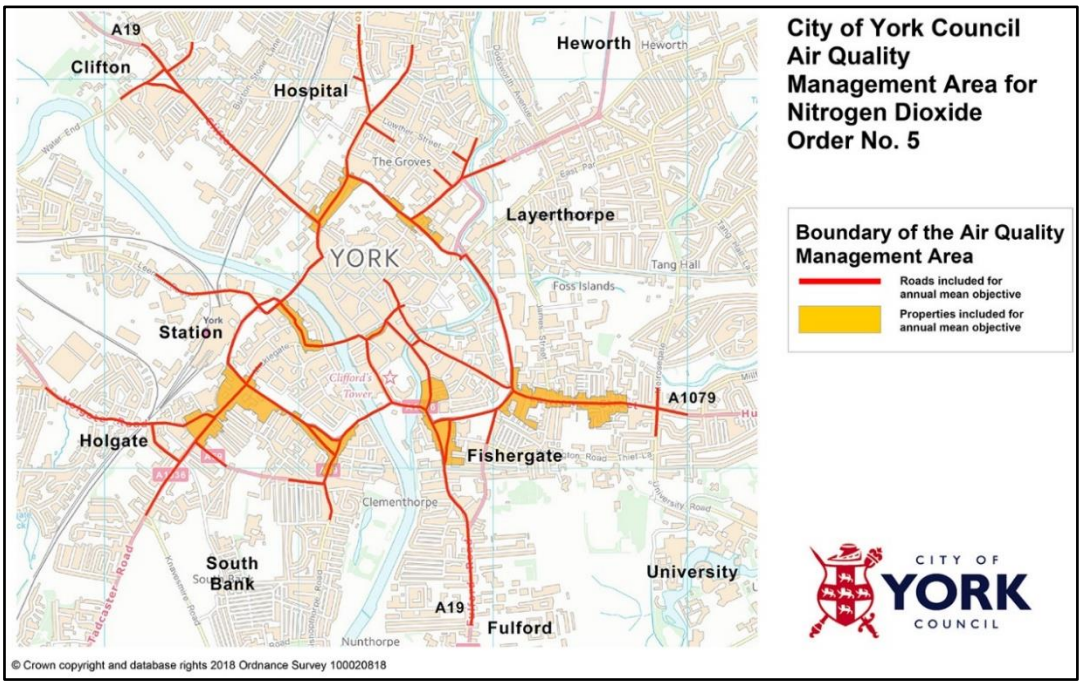
Andrew Morrison

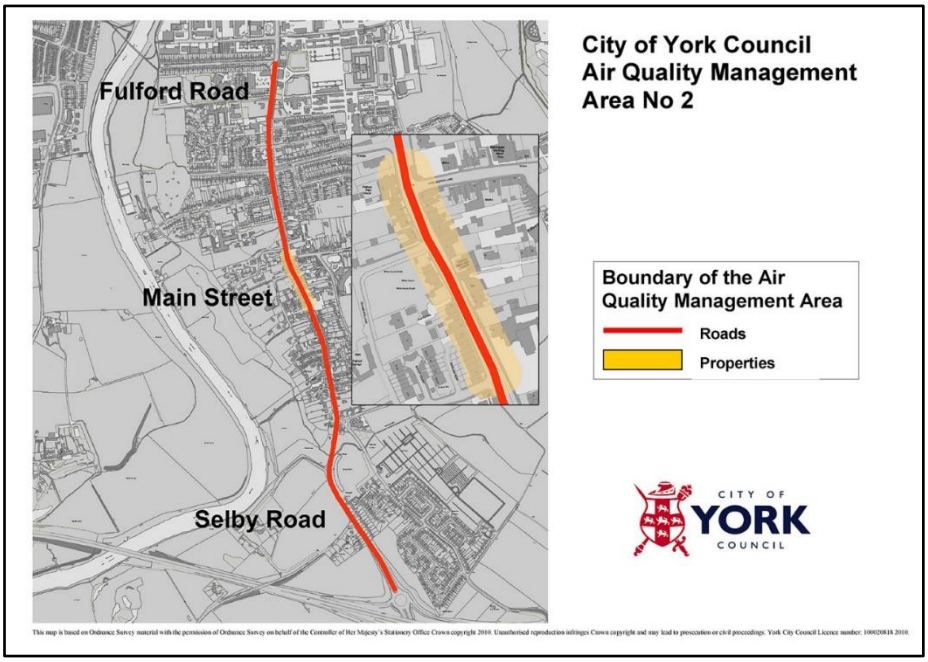
Chief Executive

York Civic Trust

Annex 7: York Air Quality Management Area (AQMA)

York is subject to two active AQMAs focussed around the city centre ring road and Fulford village Main Street to the south:





http://jorair.co.uk/air-quality-in-york/aqmas/

Annex 8: CYC Legal Response to Procurement, Subsidy Control and Compliance

Legal Services

West Offices
Station Rise
York YO1 6GA

Email: dan.moynihan@york.gov.uk
Direct Line: 01904 55 4143
Fax: 01904 55 1047

Our ref: C&C DM LCS1.3576
Your ref:

Department for Transport

Great Minster House
33 Horseferry Rd
London SW1P 4DR

5th November 2021

Dear Sirs,

PROCUREMENT & SUBSIDY CONTROL STATEMENT

Re. Grant Funding Application by the City of York Council (the "Local Transport Authority" or "LTA") to the UK Department for Transport ("DfT") under the Zero Emission Bus Regional Areas ("ZEBRA") Scheme

Introduction

In this particular case, the capital grant funding being sought comes from a public authority, as this is a grant by HM Government (in this case the DfT), which in turn will be distributed further by a Local Transport Authority (in this case the City of York Council) ("**LTA**") to a single Local Bus Company (in this case First York Limited) (the "**Local Bus Company**").

The Local Bus Company shall then use the funding to finance their purchase of an electric vehicle to replace an existing conventional Euro 6 diesel bus, along with the relevant infrastructure (e.g. charging station) for their local York depot. None of the funding will in fact be used by the LTA itself.

Procurement Implications

As the Local Bus Company will be purchasing the vehicle and infrastructure for itself, and the LTA is only providing the company with financial assistance, there should be no procurement implications for this project under the Public Contract Regulations 2015, but the assistance provided by the LTA to the Local Bus Company will be subject to the UK's current Subsidy Control Regime.

Subsidy Control and UK-EU TCA Implications

However, there should also be no implications under the UK's current Subsidy Control Regime and the UK-EU Trade and Cooperation Agreement ("**UK-EU TCA**") for the following reasons set out below:

a) The capital grant funding does not meet the criteria for a Controlled Subsidy

Under Art. 363(1) (b), Chpt. 3 of Title XI of the UK-EU TCA a, "Controlled Subsidy," for the purposes of the UK's Subsidy Control Regime is one that generally speaking meets **all** of the following characteristics below:

- a subsidy must constitute a financial (or in kind) contribution such as a grant, loan or guarantee;
- in addition, the financial contribution must be provided by a, "public authority," including, but not limited to, central, devolved, regional or local government;
- thirdly, the award of the subsidy must also confer a benefit on the recipient in the sense of an economic advantage that is not available on market terms; and
- finally, the subsidy must cause a distortion in or harm to competition, trade or investment between the UK and the EU.

Whilst the financial aid being sought in this instance will not confer any kind of advantage on the LTA, it has the potential confer economic advantages on other specific economic actors; in this case the Local Bus Company currently providing services to the City of York and the surrounding areas.

Further, it has the potential to distort competition, not only between other operators in the local bus services market but potentially also competing services in other markets (e.g. local taxi firms; rail services).

However:

- the primary objective of this funding is to contribute to the reduction of CO_2 emissions across the City of York. It is therefore reasonably anticipated that there will not be any significant material change to the market amongst the Local Bus Company that receive a share of this capital funding from LTA and those other local bus service providers who do not; and
- at this point, one could argue that there will be no unfair advantage given to bus service providers over any other competing markets. For example, local taxi firms have access to separate grant funding schemes to upgrade their fleet vehicles with electric vehicles; further, it can be argued that local cab firms, rail services and bus services cater to slightly different customers, so any funding granted to local bus service providers is unlikely to give these undertakings any unfair advantage over local taxi firms and rail services.

It is therefore argued that the aid will not create any advantage for one specific group of economic actors over any other, and will not have any impact on competition.

Finally, the grant in question is highly unlikely to have any impact on trade or investment between the UK and the EU given its highly localised nature. Furthermore, it's highly unlikely the grant will be subject to WTO Agreement on Subsidies and Countervailing Measures ("**WTO ASCM**"), the provisions of the Northern Ireland Protocol, and any other free trade agreements with any of the UK's other international trade partners, again due to the fact that its primary focus being restricted to the immediate York area.

Finally, the grant does not constitute a, "**Prohibited Subsidy**," for the purposes of Art. 3 of the WTO ASCM and Art. 367 of the UK-EU TCA as it is not an unlimited guarantee, nor is it dependent upon any kind of export performance, nor does it relate to restructuring an ailing or insolvent enterprise.

It is therefore arguable that the grant does not meet the strict definition of a Controlled Subsidy under the UK-EU TCA, and therefore would fall outside of the UK Subsidy Control Regime entirely.

b) *The capital funding grant complies with the principles of Art. 366 of Chpt. 3 of Title XI of the UK-EU TCA*

Notwithstanding and without prejudice to the above arguments, the grant funding sought by the LTA should be within the scope of the principles set out under Art. 366 of Chpt. 3 of Title XI of the UK-EU TCA for the following reasons:

- There is a clear public policy objective for the funding, which is to reduce carbon emissions, improve air quality and encourage travel across the City of York by means other than private motor vehicles to help the City of York meet its climate change and air quality commitments and reduce traffic congestion, particularly in the city centre.

- The funding being sought is both necessary and proportionate to the achievement of the objective. The fund is designed to overcome the cost barrier and encourage take up of zero emission buses instead of conventional fossil fuel vehicles. The funding will provide 75% of the additional cost of an electric vehicle over a conventional Euro 6 diesel bus. It will also provide up to 75% of infrastructure e.g. charging station costs.

- The funding is necessary to ensure that the transition to zero emission vehicles happens sooner than otherwise required; without the subsidy Euro 6 diesel vehicles are currently about half the price and can be purchased until 2031.

- Per the second bullet point above, the subsidy is required to fund approximately 75% of the additional capital cost of an electric vehicle over a conventional Euro 6 diesel bus, along with the purchase and installation of the relevant infrastructure (e.g. charging station) capital expenditure. The LTA and the Local Bus Company would not be able to fund this in the absence of the subsidy.

- There are no other appropriate policy instruments available to the LTA for this project other than the subsidy sought under this application.

- Further to the arguments above, the LTA is of the opinion that the project is highly unlikely to have an impact on investment, trade and competition between the UK and the EU, as well as the UK's the other trading partners due to the specific and localised nature of the project. Regardless, the public policy objective described above is one that should take priority over such concerns due to the overriding concerns of climate change, air quality, road traffic safety and congestion, and public health issues, which this project will help to mitigate and/or alleviate.

For these reasons also, the grant funding being sought should be considered compliant with the principles of the UK-EU TCA.

Yours faithfully,

Dan Moynihan
Senior Solicitor – Commercial and Contracts Team
Legal Services

Director: Janie Berry

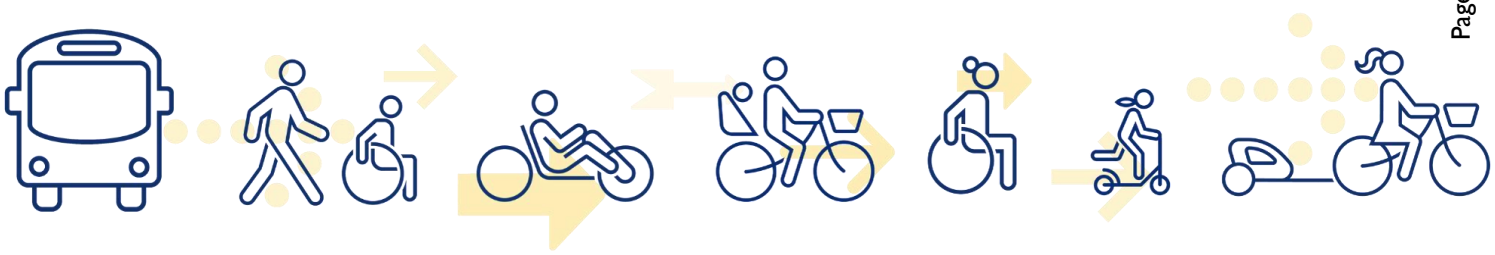
www.york.gov.uk

C&C DM LPR1.7942

Annex 9: Project Delivery Plan & Methodology

First Project Delivery Methodology

York ZEBRA EV Deployment Project Plan



Annex 10: Equality Impact Assessment

City of York Council

Equalities Impact Assessment

Who is submitting the proposal?

Directorate:	Place
Service Area:	Transport
Name of the proposal :	York Zero Emissions Bus Regional Areas (ZEBRA) bid
Lead officer:	Julian Ridge
Date assessment completed:	20/01/2022

Names of those who contributed to the assessment :

Name	Job title	Organisation	Area of expertise

EIA 02/2021

Step 1 – Aims and intended outcomes

1.1	**What is the purpose of the proposal?** Please explain your proposal in Plain English avoiding acronyms and jargon.
	To upgrade 44 buses in York to electric traction.

1.2	**Are there any external considerations?** (Legislation/government directive/codes of practice etc.)
	PSVAR legislation governs accessibility requirements for buses.

1.3	**Who are the stakeholders and what are their interests?**
	The principal stakeholder groups are identified as: - Bus passengers, who will use the buses - Bus drivers, who will operate the buses - Bus operators, who will own the buses - Other transport users in York, who will interact with the buses (e.g. cyclists, pedestrians, those with impaired mobility or sensory impairments) - York residents, who will be positively impacted by improvements to air quality as a result of the scheme - All citizens of the world who will be benefitted by reductions in carbon emissions as a result of this scheme

EIA 02/2021

1.4	What results/outcomes do we want to achieve and for whom?
	The project seeks to introduce 44 electric buses, improving local air quality and reducing carbon emissions by approximately 2,300 tonnes per year. The buses will also raise the quality of the York bus fleet significantly, attracting more passengers to use the bus and encouraging greater travel to opportunities such as work and training.

Step 2 – Gathering the information and feedback

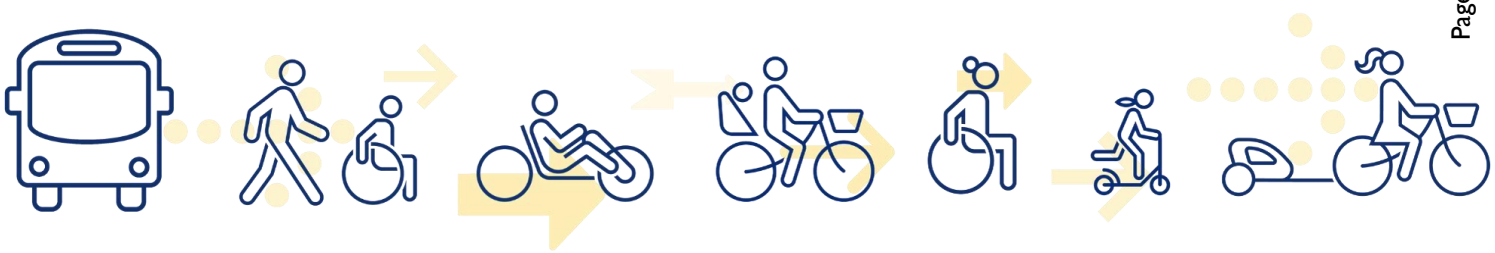
2.1	**What sources of data, evidence and consultation feedback do we have to help us understand the impact of the proposal on equality rights and human rights?** Please consider a range of sources, including: consultation exercises, surveys, feedback from staff, stakeholders, participants, research reports, the views of equality groups, as well your own experience of working in this area etc.
Source of data/supporting evidence	**Reason for using**
Real world introduction of electric buses on 5 routes in York since 2014	The introduction of electric buses on York's park and ride service has been welcomed by people who have appreciated the improvement to air quality and the travelling experience as a result of the electrification of these routes.

Step 3 – Gaps in data and knowledge

3.1	What are the main gaps in information and understanding of the impact of your proposal? Please indicate how any gaps will be dealt with.
Gaps in data or knowledge	**Action to deal with this**
None	NA

Step 4 – Analysing the impacts or effects.

4.1	**Please consider what the evidence tells you about the likely impact (positive or negative) on people sharing a protected characteristic, i.e. how significant could the impacts be if we did not make any adjustments?** Remember the duty is also positive – so please identify where the proposal offers opportunities to promote equality and/or foster good relations.		
Equality Groups and Human Rights.	**Key Findings/Impacts**	**Positive (+) Negative (-) Neutral (0)**	**High (H) Medium (M) Low (L)**
Age	No effect	0	
Disability	All buses will, as now, be fully accessible.	0	
Gender	No effect	0	



Gender Reassignment	No effect	0	
Marriage and civil partnership	No effect	0	
Pregnancy and maternity	No effect	0	
Race	No effect	0	
Religion and belief	No effect	0	
Sexual orientation	No effect	0	
Other Socio-economic groups including :	**Could other socio-economic groups be affected e.g. carers, ex-offenders, low incomes?**		
Carer	No effect	0	
Low income groups	The services improved by the new buses will serve areas of York with higher deprivation – for example, Westfield, Clifton and Tang Hall. The new buses will improve air quality in these areas and act to encourage travel to training and work, reducing deprivation in these areas.	+	**M**
Veterans, Armed Forces Community	No effect	0	
Other	No effect	0	
Impact on human rights:			

List any human rights impacted.	None	0	

Use the following guidance to inform your responses:

Indicate:

- Where you think that the proposal could have a POSITIVE impact on any of the equality groups like promoting equality and equal opportunities or improving relations within equality groups
- Where you think that the proposal could have a NEGATIVE impact on any of the equality groups, i.e. it could disadvantage them
- Where you think that this proposal has a NEUTRAL effect on any of the equality groups listed below i.e. it has no effect currently on equality groups.

It is important to remember that a proposal may be highly relevant to one aspect of equality and not relevant to another.

High impact (The proposal or process is very equality relevant)	There is significant potential for or evidence of adverse impact The proposal is institution wide or public facing The proposal has consequences for or affects significant numbers of people The proposal has the potential to make a significant contribution to promoting equality and the exercise of human rights.
Medium impact (The proposal or process is somewhat equality relevant)	There is some evidence to suggest potential for or evidence of adverse impact The proposal is institution wide or across services, but mainly internal The proposal has consequences for or affects some people The proposal has the potential to make a contribution to promoting equality and the exercise of human rights
Low impact (The proposal or process might be equality relevant)	There is little evidence to suggest that the proposal could result in adverse impact The proposal operates in a limited way The proposal has consequences for or affects few people The proposal may have the potential to contribute to promoting equality and the exercise of human rights

Step 5 - Mitigating adverse impacts and maximising positive impacts

5.1	**Based on your findings, explain ways you plan to mitigate any unlawful prohibited conduct or unwanted adverse impact. Where positive impacts have been identified, what is been done to optimise opportunities to advance equality or foster good relations?**
NA	

Step 6 – Recommendations and conclusions of the assessment

6.1	**Having considered the potential or actual impacts you should be in a position to make an informed judgement on what should be done. In all cases, document your reasoning that justifies your decision. There are four main options you can take:**
- **No major change to the proposal** – the EIA demonstrates the scheme is robust. There is no potential for unlawful discrimination or adverse impact and you have taken all opportunities to advance equality and foster good relations, subject to continuing monitor and review.	

- **Adjust the proposal –** the EIA identifies potential problems or missed opportunities. This involves taking steps to remove any barriers, to better advance quality or to foster good relations.

- **Continue with the proposal** (despite the potential for adverse impact) – you should clearly set out the justifications for doing this and how you believe the decision is compatible with our obligations under the duty

- **Stop and remove the proposal –** if there are adverse effects that are not justified and cannot be mitigated, you should consider stopping the proposal altogether. If a proposal leads to unlawful discrimination it should be removed or changed.

Important: If there are any adverse impacts you cannot mitigate, please provide a compelling reason in the justification column.

Option selected	**Conclusions/justification**
No major change to the proposal.	The EIA demonstrates the proposal is robust

Step 7 – Summary of agreed actions resulting from the assessment

7.1	What action, by whom, will be undertaken as a result of the impact assessment.		
Impact/issue	**Action to be taken**	**Person responsible**	**Timescale**

Step 8 - Monitor, review and improve

8. 1	**How will the impact of your proposal be monitored and improved upon going forward?** Consider how will you identify the impact of activities on protected characteristics and other marginalised groups going forward? How will any learning and enhancements be capitalised on and embedded?
	Providing a comprehensive monitoring and evaluation report is a condition of the business case for the project. This will consider impact on all groups in the population, including marginalised groups, and consider any modifications to the scheme required to respond lessons learned.