Full Business Case

Single Assurance Framework

West Midlands Combined Authority

Strategic Hub
Performance | Risk | Assurance | Support

FULL BUSINESS CASE

ZEBRA 2021/22 – WMCA

Version		**Date**	20/08/2021
Prepared By		**Job Title**	

Lead WMCA Directorate	
Lead WMCA Executive Director	

Has BCAT been submitted to Strategic Hub?	**Yes**	
Has this OBC been approved by Lead WMCA Executive Director?	**Yes**	

Approved By	WMCA Board (for submission)
Signature	Decision - Financial Monitoring 2021/22 :WMCA
Date	23/07/2021

Please refer to the Strategic Hub FBC Guidance Document and HM Treasury Green Book / Blue Book for assistance when completing this template

APPLICANT DETAILS

Strategic Hub
Performance | Risk | Assurance | Support

FULL BUSINESS CASE

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1 EXECUTIVE SUMMARY

Project Name:	ZEBRA 2021/22 – WMCA	WMCA Project Code:	n/a
Lead Organisation:	TfWM - Integrated Transport Services		
Lead Contact:		Job Title:	
Phone Number:	-	Email:	
Address:	16 Summer Lane, Birmingham		
Local Authority Area (lead organisation)	n/a	Local Authority:	Birmingham; Dudley; Sandwell; Solihull; Walsall; Wolverhampton
Other Organisations involved in project bid:	Bus Operators: West Midlands Travel. Central Government: Department for Transport		

FACTUAL SUMMARY

	OBC (£M)	FBC (£M)		OBC (£M)	FBC (£M)
Total Project Costs	n/a	148.8	Operational Costs		1.0
WMCA Funding	n/a	2.8	Revenue		3.7
Funds Secured (in principle)	n/a	91.1	Financial Benefit	n/a	1.9
Funds Not Secured	n/a	54.9	Monetarized Benefit	n/a	66.2
Unit Cost		1.6	NPV		11.0
BCR (High Carbon)	n/a	1.2	ROI		20%

To support better spending, investment decisions and better procurement, this Full Business Case should be written using FBC guidance from the Strategic Hub. In addition, it is a requirement that all bids for public funds submitted to WMCA are guided and based around the HM Treasury's Green Book 2020 and supporting information which can be found here.

FULL BUSINESS CASE

Single Assurance Framework

1A – Summary – Please provide a one-page stand-alone summary of the project which includes a brief project description, objectives, expected outputs and details of the spend for which approval is being sought.

Government has made available up to £120million through the Zero Emission Bus Regional Scheme (ZEBRA) 2021/22 to support the government's commitment to decarbonisation, deliver the roll-out of the Government's 4,000 zero emission buses commitment and to support partnership working between LTAs, bus operators and other stakeholders as set out in the National Bus Strategy for England.
This Business Case sets out the proposal for the:

- **World's largest single hydrogen bus order** of 200 hydrogen double deck buses for commercial bus services using green hydrogen
- **World's largest hydrogen Bus Rapid Transit system** with 24 articulated hydrogen vehicles
- **UK's first subsidised zero emission bus services** (5 single deck electric buses) and **UK's first 2 public owned pantographs**, one new at Bilston bus station and one upgraded at Wolverhampton bus station.
- As well as 2 hydrogen refuelling systems (HRS) infrastructure for green hydrogen dispensing.

Reducing Environmental Impacts

The hydrogen component would make the West Midlands and the UK a real-world leader for green hydrogen transportation and decarbonisation – directly supporting the UK **Transport Decarbonisation Plan** and Regional **#WM2041** Action Plan to tackle climate change by reducing CO2e by over 20,800 tonnes each year the buses are operational.

Growing and Levelling up the Economy

It provides the WMCA and Government with a unique opportunity to put into prompt action and deliver on the commitments laid out in the UK's first **Hydrogen Strategy**. The deliverables of this project would go beyond decarbonisation. It could lead to the creation of new, sustainable, UK supply chains; creating new high-quality jobs, skills; inward investment and capitalising on British innovation and expertise to deliver the stated ambition for the UK in taking a leading role in developing green hydrogen technologies and markets, with a centre of excellence and critical mass for green hydrogen in the West Midlands for bus and potentially other modes.

Improving Transport for the User

For transport, the project would provide a blueprint for how authorities and operators can work together to **Bus Back Better** and improve bus services. It would deliver the world's largest and UK's first zero emission BRT network – providing the opportunity to begin to deliver one of the five proposed BRT systems from the NBS. The £54.9m government funding, would be complemented by a £91m investment by bus operators for the new vehicles, alongside complementary bus measures by the WMCA totalling over £240m (including £55m of new bus priority investment subject to the vehicle investment) and £1.8billion of wider transport connectivity (linked to HS2).

Economic Case

The economic case (central carbon values) shows a Value for Money Benefit Cost Ratio (BCR) of 0.5: 1 in the poor VfM category. This is in the central carbon value scenario over 18 years, inclusive of optimism bias (see the table below). Given limitations of the Greener Buses Tool to calculate wider benefits, another indicator for the project is the Cost Effectiveness Indicator (CEI) that demonstrates the cost per tonne carbon reduced and is 278.5.

In part due to recent changes in the UK's GHG emission targets of achieving net zero emissions by 2050 (adopted in June 2019) as well as the Paris Climate Agreement (signed in 2016), it is required to report the project GHG impacts using high carbon values. In the High Carbon Value scenario, the **BCR is 1.2: 1** as a **Low VfM Category.**

	Central	**High**
Present Value of Benefits	27,721,447	66,150,129
Present Value of Costs	55,153,235	55,153,235
Net Present Value	-27,431,788	10,996,894
Benefit Cost Ratio	0.50	1.20
VfM Category	Poor	Low
Cost Effectiveness Indicator	278.5	278.5

Several sensitivity tests around these base case scenarios have been assessed. These are reported and detailed in the Economic Case Appendix, along with a further breakdown of the base case benefits and costs between the electric and hydrogen project components. The BCR also likely further underrepresents the true value of the investment in zero emission buses and associated infrastructure. Additional cost benefits that are not monetised in the BCR analysis are detailed and explained in the Economic Case Appendix.

Financial Case

The Department for Transport grant is for up to 75% of the additional costs of zero emissions vehicles over the costs of diesel vehicles, and for up to 75% of the costs of upgrading associated infrastructure for those vehicles, with operators providing the rest of the funding. In respect of the electric bus element, WMCA is also an operator in this instance as they provide supported services via sub-contracts to bus operators.

Element	**Total**	**Grant Funding**	**Local Contribution**	**Local Funder**
Total	£148,770,607	**£54,849,905**	£93,920,702	**-**
[redacted]				

Commercial Case

[redacted]

[redacted] WMCA will conduct a competitive regulated grant application process to allocate the Grant Funding to commercial bus operator/s, who will the use the Grant Funding towards acquiring hydrogen buses and associated infrastructure (in line with the grant funding requirements detailed above and outputs of the business case).

WMCA will go out to tender for the 5 subsidised bus services (7 vehicles) for operators to use single deck electric buses with OppCharge capability. The pantograph infrastructure will be procured using WMCA's existing Pantograph Supply Framework.

WMCA have concluded that Regulation 13 of the Public Contract Regulations 2015 is not relevant for the FBC.

Management Case

The project management team and governance structure has been established, with agreed Terms of Reference (ToR) and has been operational to develop this FBC. This will continue through the life of the project, being adjusted as necessary to best support the project as it develops and grows. This will be reviewed and confirmed for the start of the project delivery stage, subject to award of funding. It is anticipated that a new Project Manager and Technical Hydrogen Specialist will be appointed in TfWM, with the core project team members from TfWM/WMCA for Senior Responsible Officer (Pete Bond), Sponsor (Steve Hayes), Finance and Legal remaining throughout project delivery to ensure that there is both consistency in delivery approach and knowledge retention, whilst strengthening the project management and technical delivery resource for TfWM, whilst working closely with the Department for Transport and other Government Departments as necessary.
The project management approach follows successful delivery arrangements of other similar projects, such as Coventry All-Electric Bus City (£140m) and Dudley Interchange (£24m).

Equality Impact Assessment (EqIA)

A thorough EqIA has been conducted that highlights positive impacts for people from protected characteristics (Appendix 8). This was informed through engagement with people from protected characteristics. It is noted, there is a concern around the quiet noise zero emission vehicles can pose as a safety risk for passengers from some equality groups, namely passengers with hearing impairments. As they are quieter than traditional buses, it can be difficult for these individuals to be aware of when a bus is within close proximity. As a mitigation, Acoustic Vehicle Alerting Systems (AVAS) will be installed on all zero emission vehicles to ensure people are aware of an approaching vehicle.

1B - Project Progress - If applicable, bullet point what has been achieved since previous business case stage below (add additional bullet points as required):

- The expected project outputs for the number of zero emission buses has been confirmed as 231 buses (200 hydrogen double deck; 24 articulated hydrogen and 7 single deck electric).
- Confirmation of charging infrastructure needs for project delivery - 1 new 450kW pantograph at Bilston Bus Station and 1 upgraded 450kW pantograph at

Wolverhampton Bus Station, as well as two depots with Hydrogen Refueling Systems infrastructure.

- Updated the Strategic Case to be clear on the case for change and how the project delivers key regional and national policies, including but not limited to #WM2041; National Bus Strategy for England, UK Hydrogen Strategy and Levelling Up.
- Management Case developed with appropriate governance and management framework and risk management.
- Economic Case developed using DfT Greener Buses Model.
- Confirmation of the proposed Commercial delivery approach.
- Financial Case developed to identify and secure WMCA contribution, in principle private bus operator contributions and grant funding request to Government for £54.9m.
- Confirmation that Regulation 13 of the Public Contracts Regulations 2015 is not relevant for the FBC.

1C – Changes - Complete the table below to highlight any key changes and the rationale behind the changes:

What has changed since previous business case stage i.e. OBC?	**Outline the rationale for this change**
Reduction in electric buses for subsidised services from 10 to 7	Contracts peak vehicle requirement is 7, so additional 3 vehicles are not required
Inclusion of 1 x new pantograph and 1 x power upgrade (to 450kW) of existing for subsidised services	Provides contingency and resilience for charging infrastructure in addition existing funded 150kW pantograph and wider platform for more electric bus uptake by commercial services in the local area

2 STRATEGIC CASE

2A - Project Objectives – Outline the objectives of the project and how they will be measured within the table below. In defining your objectives, please consider whether these can defines in such a way that progress towards meeting them can be monitored as **SMART** objectives (**S**pecific, **M**easureable, **A**chievable, **R**elevant and **T**ime-bound). Please ensure the information below is aligned with the Plan on a Page **(POAP)** submitted for the project.

Objective	Critical Success Factors	Measure of Success	WMCA Strategic Alignment	Government Alignment / *ZEBRA Objectives*	Start Date
Move 200 double deck buses to hydrogen by September 2023	200 double deck buses operating local bus services as hydrogen	Number of double deck hydrogen buses	A greener West Midlands with carbon emitted reduced	Reducing Environmental Impacts (18,220 tonnes carbon savings per annum) *All 5 ZEBRA Objectives*	Autumn 2021 – Autumn 2023
Move 5 subsidised bus services in the Black Country to zero emission by September 2023	7 electric buses with OppCharge capability on local subsidised bus services	Number of electric buses with OppCharge compatibility on subsidised bus services	A greener West Midlands	Reducing Environmental Impacts (380 tonnes carbon savings per annum) *All 5 ZEBRA Objectives*	Autumn 2021 – Autumn 2023
Implement 24 new zero emission articulated buses for Sprint by September 2023	24 articulated zero emission buses	Having 24 articulated zero emission buses operating on commercial bus services by the end of 2023	A greener West Midlands	Reducing Environmental Impacts (2,200 tonnes carbon savings per annum) *All 5 ZEBRA Objectives*	Autumn 2021 – Autumn 2023
Reduce bus emissions and the impact on air quality in the West Midlands	Annual Emissions savings (tonnes) in CO_2e TTW of 1,156; NOx 8.6; PM 0.2	Assessment of zero emission bus service mileage and operation against baseline (2020) quantifying CSF using published figures	A greener West Midlands with 1,156 tonnes less carbon emitted; 8.6 tonnes less NOx and 0.2 less PM	Reduce Environmental Impacts in the region and directly supporting National Priorities to reduce transport sector contribution to CO2e emission by 20,800 tonnes per annum	Summer 2022 – Winter 2025

				To support the government's commitment to decarbonisation and to reduce the transport sector's contribution to CO2 emissions	
Improve the understanding, awareness and satisfaction with operators, passengers and industry stakeholders in operating hydrogen buses and electric buses with OppCharge	Monitoring increased operator understanding for running zero emission buses Monitoring higher operator satisfaction with running zero emission bus fleet Monitoring higher passenger satisfaction with electric buses (currently 85% bus satisfaction in the region)	Improve >85% operator satisfaction with bus fleet Improve >85% passenger satisfaction with bus fleet	A better-connected West Midlands as passengers have access to 25 better bus services (10% region)	Improves Transport for the User and meets Govt ambition to provide better bus services *To support bus manufacturers in the development of zero emission bus technology* *To support partnership working between LTAs, bus operators and other local stakeholders as set out in the National Bus Strategy* *To understand better the challenges of introducing zero emission buses and supporting infrastructure to inform future government support for ZEBs*	Summer 2022 – Winter 2025
Determine bus operating costs compared to a diesel bus fleet for subsidised bus services and for hydrogen bus operation	Lower operating costs for bus operators / subsidised bus services	Determining electric and hydrogen bus fleet operating costs compared to diesel using bus operator data on in-service operation for new zero emission buses and comparing to previous diesel	A fairer West Midlands as residents have access to 25 better bus services	Improves Transport for the User and meets Govt ambition to provide better bus services by understanding changes in operating costs of previous disel buses and new zero emission buses.	Summer 2022 – Winter 2025

		operation (and other similar diesel bus operations in the region).		*To support partnership working between LTAs, bus operators and other local stakeholders as set out in the National Bus Strategy* *To understand better the challenges of introducing zero emission buses and supporting infrastructure to inform future government support for ZEBs*	
Support economic growth and levelling up in the West Midlands with Europe's largest hydrogen bus order and new refuelling investment	Completed order placed with bus manufacturers and their supply chain Investment in new job creation and upskilling existing workforce	Placed orders for zero emission buses (FBC identifies up to 231 new buses but this may change over the course of the project) New apprenticeships and jobs directly created for the project	A more prosperous West Midlands	Grow and Level Up the Economy *To support bus manufacturers in the development of zero emission bus technology* *To support partnership working between LTAs, bus operators and other local stakeholders as set out in the National Bus Strategy*	Autumn 2021 – Autumn 2023
Increase bus patronage and passenger satisfaction on services as they transition to zero emission operation	Passenger growth on services and modal shift along the routes	Increase in bus patronage on local bus services and increased modal share by bus	A better-connected West Midlands A fairer West Midlands A more prosperous West Midlands	Grow and Level Up the Economy Reduce Environmental Impacts Improve Transport for the User *To support partnership working between LTAs, bus operators and other local stakeholders as set out in the National Bus Strategy*	Summer 2022 – Winter 2025

2B – Strategic Objectives – Revalidate how the proposed project will contribute to each of the key elements that relate to the WMCA's Strategic Objectives

Policy Aim	Alignment with Proposed Project
A healthier West Midlands, increasing healthy life expectancy and tackling health inequalities **Reduce Environmental Impacts** *To support the government's commitment to decarbonisation and to reduce the transport sector's contribution to CO2 emissions*	• Improved air quality delivered through the project benefiting residents within the West Midlands is in line with #WM2041 (our action to meet the climate challenge). Carbon emission reductions due to the transition of the bus fleet to zero emission within this business case projects CO2e savings of 20,803 tonnes. • Existing air quality roadside monitoring and all new buses fitted with telematics to monitor emissions.
A happier West Midlands, improving mental health and driving inclusion for all our communities **Improve Transport for the User** *To support partnership working between LTAs, bus operators and other local stakeholders as set out in the National Bus Strategy*	• See a fairer West Midlands, where the bus directly supports marginalised and vulnerable groups. • Bus services play a crucial role in helping to tackle loneliness[1]. More than one in 10 Britons feel lonely every day, with a fifth of people saying they have struck up a conversation with a stranger on a bus just to have some form of human interaction. • WMCA and bus operators working in partnership to improve the bus offer to passengers; through new £90m private sector fleet investment, complementary £55m bus priority measures to speed up buses and £55m Grant Funding from Government for new vehicles.
A better-connected West Midlands, where transport connects all communities to opportunities **Improve Transport for the User** **Grow and Level Up the Economy** *To support partnership working between LTAs, bus operators and other local stakeholders as set out in the National Bus Strategy*	• Region's first BRT system, and world's largest hydrogen BRT system with articulated, tram style buses will be introduced to make good use of new bus priority infrastructure and enable the full benefits of reduced vehicle dwell time at bus stops to be achieved, delivered by multi-door boarding & alighting and off board ticketing or the use of conductors. An articulated tram style bus's dwell time would be around 1 minute (compared to 5 for double deck), enabling us to transform our network and introduce true cross city region BRT services. • Investment in the bus network with new vehicles will provide a better customer experience for local communities to access places. • Further £55m complementary bus priority investment to support the private sector investment by bus operators in new vehicles. • All new buses will have enhanced accessibility standards and WiFI enabling bus users to be connected digitally whilst in transit. • Investment in new buses, coupled with other improvements of bus priority are known to have a positive impact on modal shift from private car to bus (c. 10%-20%).

[1] https://www.stagecoachgroup.com/media/news-releases/2019/2019-07-01.aspx

	• Complementary bus priority measures to the vehicle investment that will have enhanced next-stop audio visual announcements will help make it easier and quicker to travel by bus. All measures will be protected through a revised Enhanced Partnership.
A more prosperous West Midlands, where everyone can contribute to and benefit from a globally competitive regional economy **<u>Grow and Level Up the Economy</u>** *To understand better the challenges of introducing zero emission buses and supporting infrastructure to inform future government support for ZEBs* *To support bus manufacturers in the development of zero emission bus technology*	• Business opportunities for West Midlands businesses related to the manufacture and supply of electric buses and associated charging infrastructure. • Business opportunities for West Midlands businesses related to the manufacture and supply of hydrogen buses and associated refuelling and maintenance infrastructure. • See a fairer West Midlands, where we support marginalised and vulnerable groups. More bus trips and walk trips are made by the lowest income group than any other group whereas more rail and bicycle trips are made by those from high income group than others • Further £55m complementary bus priority investment to support the private sector investment by bus operators in new vehicles, will provide journey time benefits to all bus users and directly support the lowest income group who rely on the bus. • New buses will have enhanced next stop audio visual announcements and WiFi ensuring everyone travelling on the buses can enjoy a better bus experience and have an easier, more informed journey. • The deliverables of this project go beyond decarbonisation into developing sustainable, home-grown supply chains, creating new high-quality jobs and capitalising on British innovation and expertise. Transport is a crucial early market for green hydrogen, driving some of the earliest low carbon production in the UK. This project is key to providing a foundation on which to put the UK Hydrogen Strategy words into action; delivering the stated ambition for the UK and taking a leading role in developing green hydrogen technologies and markets on the international stage.
A greener West Midlands, where we reduce carbon emissions to address the climate crisis **<u>Reduce Environmental Impacts</u>** *To support the government's commitment to decarbonisation and to reduce the transport sector's contribution to CO2 emissions* *To support the roll-out of the 4,000 ZEBs that the government committed to in February 2020*	• The project will deliver the world's largest single order for hydrogen buses (200), the UK's first and World's largest zero emission bus rapid transit system (24) and UK's first zero emission subsidised bus services (7); improving local air quality for local residents, visitors and businesses in line with #WM2041 and local Industrial Strategy. • The case for change is the climate challenge facing the region, for which bus emissions are a contributor. This is also present at a national and international level, demonstrated by the Government's identification of problems summarised in the Transport Decarbonisation Plan, July 2021 and IPCC Report, August 2021, respectively. • Carbon emission reductions due to transition of the bus fleet to zero emission within this business case projects CO2e savings of 20,803 tonnes. • Upgrades to the power grid will providing a legacy and improved energy supply capacity for future generations. • 231 zero emission buses support the NBS priority for more zero emission buses and is 6% of Government's 4,000 ZEB target
A fairer West Midlands, where we support marginalised and vulnerable groups	• Around a fifth of disabled people report having difficulties related to their disability in accessing transport. New buses will have next stop audio visual announcements and most with WiFi ensuring everyone in the city

Improve Transport for the User *To support partnership working between LTAs, bus operators and other local stakeholders as set out in the National Bus Strategy*	can enjoy a better bus experience and have an easier, more informed journey. • Two-thirds of job seekers are without access to a car. Car availability also tends to be lower amongst BME groups and that may be linked to the fact that poverty is higher amongst BME groups. Other groups heavily reliant on public transport, largely due to lower car ownership, are disabled people and older age groups as well as single parents. • More bus trips and walk trips are made by the lowest income group than any other group whereas more rail and bicycle trips are made by those from high income group than others. • Only 14% of households in the richest fifth did not have access to a car, compared to almost half of those in the poorest fifth (48%). Car ownership is also much lower amongst BME people, disabled people, older people, and young people. Fewer women hold driver's licenses and fewer women own cars. All these groups are more reliant on public transport. • The investment in new buses and complementary bus priority measures will ensure the standard of bus services for these marginalised and vulnerable groups is improved, which without the project would not otherwise happen. • If bus operating costs are reduced through zero emission operation, then passengers could see the benefits of lower operating costs through lower fares/increased frequency/new services.

2C – COVID-19 Recovery – Please outline any specific measures included within the proposed project to support COVID-19 recovery? (max. 250 words)

Evidence locally shows that patronage is projected to increase up to c. 80% pre-Covid-19 levels without additional action through adapted change made in partnership with bus operators. The West Midlands is uniquely placed for a partnership-based recovery through the West Midlands Bus Alliance. At a time when reliance on the private car needs to be reduced to help cut carbon emissions from transport and clean our air, the WMCA remains committed to getting more people to use public transport, not fewer.

A passenger-led, devolved, green recovery to **Bus Back Better** directly supports the Government's National Bus Strategy (NBS) for England (March 2021) including greater ambition in the region's emerging Bus Service Improvement Plan and investment and outcomes protected through an Enhanced Partnership.

- **Service and network review** in the emerging Bus Service Improvement Plan with bus operators, recognising travel demand will have changed significantly and identifying opportunities for new solutions and closer partnership working to deliver the bus network that we want to see supporting recovery**.**
- **Bus Rapid Transit (BRT)** – the NBS will support more BRT. The NBS sees that "BRT could be a game-changer for bus networks". The first BRT corridor in the West Midlands is due to be complete ahead of the Commonwealth Games in July 2022. There are plans to grow the BRT network across the West Midlands, to support the recovery of the network and to fully integrate to the main zero emission bus services and radial routes.

- **Introduction of new zero emission buses**, which will help meet the carbon objectives and support manufacturing, as well as fuel savings which bus operators can commit to reinvesting in the local bus network.
- **Region-wide Enhanced Partnership**, made in June 2021, committing to £88m bus priority investment for our rapid transit network, with a further £55m identified subject to future funding; the EP will be amended to widen the scope to directly support and protect new bus priority and vehicle investment to the project, as well as emerging BSIP and NBS priorities.
- **Manufacturing sector protected and air quality improved:** more Zero Emission Buses, less emissions and improved air quality, which will also help to propel the West Midlands as the UK (and world-leading) region for electric and hydrogen technology and have a positive impact on other sectors, reputations and drive up use and adoption of zero emission vehicles.

2D - Strategic Case Summary – Set out a summary of the Strategic Case and how the case for change has been reviewed, recording any changes since last business case stage (max. 500 words)

The case for change has been reviewed against the Phase 2 guidance and Transport Business Case Guidance. Alignment to the Phase 2 guidance is included in the Strategic Case Appendix. The case for change is the climate challenge facing the region, for which bus emissions are a contributor. This is also present at a national and international level, as demonstrated by the Government's identification of problems summarised in the Transport Decarbonisation Plan, July 2021 and IPCC Report, August 2021, respectively. Appendix 10 provides further detail on the need for intervention and case for change.

National priorities

- Major boost for bus services as PM outlines new vision for transport[2] (February 2020) – at least 4,000 new zero emission buses, driving forward the UK's progress on its net zero ambitions.
- The Ten Point Plan for a Green Industrial Revolution[3] (November 2020) – Point 5 Green Public Transport, Cycling and Walking.
- Spending Review 2020[4] (November 2020) – Investing in a recovery for all regions of the UK; Green Transport. SR20 provides £120 million for zero emission buses in 2021-22.
- ***Bus Back Better***: National Bus Strategy for England[5] - A green bus revolution
- UK Transport Decarbonisation Plan[6] (July 2021) - sets out the government's commitments and actions need to decarbonise the entire transport system in the UK
- UK Plan for tackling roadside nitrogen dioxide (NO_2) concentrations (July 2017)
- UK Hydrogen Strategy, August 2021

The project **meets the core policy objectives of ZEBRA**:

- To support the government's commitment to decarbonisation and to reduce the transport sector's contribution to CO2 emissions. **231 zero emission buses to reduce bus emissions**

[2] Major boost for bus services as PM outlines new vision for local transport - GOV.UK (www.gov.uk)
[3] https://www.gov.uk/government/publications/the-ten-point-plan-for-a-green-industrial-revolution/title
[4] https://www.gov.uk/government/publications/spending-review-2020-documents/spending-review-2020#investing-in-a-recovery-for-all-regions-of-the-uk-1
[5] Local transport update: national bus strategy for England published - GOV.UK (www.gov.uk)
[6] Decarbonising transport: a better, greener Britain (publishing.service.gov.uk)

and their impact on air quality in the West Midlands, with over 20,800 tonnes CO2e savings per annum.

- To support the roll-out of the 4,000 ZEBs that the Government committed to in February 2020. **231 zero emission buses as: 200 hydrogen double deck buses; 7 electric buses with OppCharge capability; 24 articulated zero emission buses. (6% of the target)**
- To support bus manufacturers in the development of ZEB technology. **Supports economic growth and levelling up in the West Midlands with the world's largest single order of hydrogen buses and £15m of new refuelling investment.**
- To support partnership working between LTAs, bus operators and other local stakeholders as set out in the National Bus Strategy. **Delivery will be through the West Midlands Bus Alliance – seeing the TfWM (LTA) and its local bus operators make complementary investment to bus priority (£55m) and new buses (£150m) respectively. This packaged investment is known to increase bus patronage and passenger satisfaction on services, more than single investment in new buses. All the investment and project outcomes will be protected by the Enhanced Partnership, made for the region in June 2021.**
- To understand better the challenges of introducing ZEBs and supporting infrastructure to inform future government support for ZEBs. **Improve the understanding, awareness and satisfaction with operators, passengers and industry stakeholders in operating green hydrogen buses and electric buses with OppCharge. Puts in place early actions that deliver on the UK's Hydrogen Strategy commitments.**

Strategic alignment with local and regional priorities

Environment is one of the WMCA's corporate priorities, integrated into our ***Local Industrial Strategy***[7] with Clean Growth.

Zero emission buses are key to the regional action plan for transport and the environment.

- ***West Midlands Bus Alliance***, the first of its kind in the UK, brings together local bus operators, WMCA, the local authorities and other partners to deliver improvements in our bus services. Our focus is on making bus travel in the West Midlands cleaner, greener, safer and faster, with a key objective to improve the bus emission standards.

- West Midlands ***Vision for Bus***[8] sets the benchmark for what we want from bus in the region, where bus forms the backbone of achieving a world-class integrated, reliable, zero emission transport system providing inclusive travel for all. This will be updated by the emerging West Midlands Bus Service Improvement Plan (BSIP).

- ***West Midlands Enhanced Partnership (EP),*** the first metropolitan EP in England was made in June 2021, covering the defined area with the objective to have zero emission corridors serving the most affected areas of air quality; and an EP Scheme on the Sprint corridor setting the UK's first non-diesel bus only operation deadline of May 2030 for larger operators and May 2033 for all operators – where the majority of the hydrogen double deck buses and the articulated hydrogen buses will operate. The articulated buses will operate on new cross-region BRT services along this corridor.

[7] https://www.wmca.org.uk/media/3094/west-midlands-local-industrial-strategy-single-page.pdf
[8] https://www.tfwm.org.uk/media/38969/final-strategic-vision-for-bus.pdf

- Double award-winning ***West Midlands Low Emission Bus Delivery Plan***[9] sets our high ambition scenario for the future uptake of zero emission buses.
- Birmingham ***Clean Air Zone***, the UK's first CAZ D, to reduce levels of NO2 to a maximum of 40µg/m3 as soon as possible.

The plans and commitment of the WMCA and West Midlands Bus Alliance demonstrates we are serious about tackling the challenges of poor air quality with a credible strategy and plan in place to achieve our ambitions to improve bus emission standards. Other WMCA and partner projects and programmes directly supported include:

- WMCA #2041 Tackling the Climate Challenge - A programme for implementing an environment recovery.
- Commonwealth Games 2022 – the first ever carbon-neutral Commonwealth Games.
- West Midlands Ultra Low Emission Vehicle Strategy (February 2020) - evidenced-based strategy for the future pathway and transition to ultra-low emission vehicles for all road-based transport.
- National Express Group zero emission vision (February 2020) - to not buy another diesel bus for UK operations and an ambition that their UK bus fleet will be fully zero emission from 2030.

Complementary measures to increase public transport usage

Through the Bus Alliance, we continue to work together to deliver high levels of passenger satisfaction and drive forward investment in our bus services. Our existing Bus Alliance commitments will complement the delivery of the zero emission buses across the West Midlands to maximise bus usage. In addition to the partner investment, other ***complementary bus measures totalling over £240 million*** support this project and £1.8 billion of wider transport connectivity:

- Sprint bus rapid transit (BRT) (£88m)
- Further Sprint BRT bus priority measures (£55m) - subject to zero emission bus investment
- Cross-city bus priority (£28.5m)
- Account-based ticketing (£20m)
- New pantograph charging at Wolverhampton Bus Station (£0.3m)
- Dudley Interchange (£24m)
- National Express 29 Electric Double Deck Buses (£14m)
- Birmingham City Council 20 Hydrogen Double Deck Buses (£10m)
- Upgrade of 5 Diamond buses to electric (£0.6m)
- Wolverhampton Interchange (£175m) – new hub for rail, metro and bus with mixed-use commercial development in the city centre
- Midlands HS2 Growth Strategy – Connectivity Programme (£1.6bn)

The new 150kW pantograph at Wolverhampton bus station (funded), with £143,000 funding from the Office of Zero Emission Vehicles through the Government's 2018 Ultra-low emission bus scheme, will

[9] https://www.wmca.org.uk/media/1366/west-midlands-low-emission-delivery-plan_elementenergy-for-transport-for-west-midlands_july2016.pdf

be upgraded to provide the on-route charging at Wolverhampton for the subsidised bus services included in the business case.

The selected routes for hydrogen buses will be on corridors with existing or funded bus priority investment (i.e. Sprint BRT) to maximise the passenger benefits. The investment in zero emission buses would unlock a further £55m investment in additional bus priority on the Spritnt BRT network.

The project investment and delivery are protected through an ***Enhanced Partnership Scheme*** that sets minimum operator requirements for vehicles and captures the wider infrastructure investment. This already includes the delivery of complementary bus priority measures.

The current (August 2021) spatial coverage of bus services captured in this FBC is shown in Appendix 7. This highlights the extensive coverage of bus services to be operated by zero emission buses, across the West Midlands and into Staffordshire, the two bus stations for pantographs (Bilston and Wolverhampton) as well other infrastructure locations and the local exceedance of NO2.

Click below to access each of the Strategic Case supporting appendices:

2E	STRATEGIC CONTEXT (Template) (Guidance – Page 8)
2F	BENEFITS REALISATION PLAN (Guidance – Page 9)
2G	RISK MANAGEMENT STRATEGY (Guidance – Page 10)
2H	COMMUNICATIONS STRATEGY (Guidance – Page 10)

3 ECONOMIC CASE

3A - Economic Case Summary – Set out a summary of the economic case and how the options appraised have been reviewed, recording any changes since last business case stage (max. 500 words)

[redacted]

Number of vehicles for the Full Business Case (August 2021)

[redacted]

CBA Costs	Grant	Non-Grant	Total
[redacted]			
Total	**£54,849,905**	**£92,920,702**	**£147,770,607**

The economic case (central carbon values) for the project shows a Value for Money Benefit Cost Ratio (BCR) of 0.5: 1 in the poor VfM category. This is in the central carbon value scenario over 18 years, inclusive of optimism bias (see the table below). Given limitations of the Greener Buses Tool to calculate wider benefits for the BCR, a robust indicator for the project is the Cost Effectiveness Indicator (CEI). The CEI demonstrates the cost per tonne of carbon and is 278.5.

The carbon impacts of the project have been monetised using unpublished carbon values for the valuation of greenhouse gas (GHG) emissions, supplied by BEIS. The values applied to changes in GHG emissions for transport appraisal are currently under review by the Department for Business, Energy & Industrial Strategy (BEIS). In part due to recent changes in the UK's GHG emission targets of achieving net zero emissions by 2050 (adopted in June 2019) as well as the Paris Climate Agreement (signed in 2016). In recognition of this and until updated carbon values are available, we have been requested to report the project GHG impacts using unpublished high carbon values. In the High Carbon Value scenario, the **BCR is 1.2: 1** in the **Low VfM Category.**

	Central	High
Present Value of Benefits	27,721,447	66,150,129
Present Value of Costs	55,153,235	55,153,235
Net Present Value	-27,431,788	10,996,894

Benefit Cost Ratio	0.50	1.20
VfM Category	Poor	Low
Cost Effectiveness Indicator	278.5	278.5

The results exclude indirect tax impacts and operating cost (fuel/electric VAT) as bus operators (business) do not pay. This is consistent with the Supplementary Green Book guidance (Tag Unit A1-3) on valuation of energy use and greenhouse gas emissions; "For business, the perceived fuel cost should include fuel duty but not VAT (which is reclaimable)".

Several sensitivity tests around the base case scenario have been assessed. These are reported and detailed in the Economic Case Appendix, along with a further breakdown of the base case benefits and costs between the electric and hydrogen project components.

Non-monetised benefits

It should be noted that these results do not consider Well-to-Wheel CO2 savings, which generates most of the project benefits as would be expected in moving from diesel to zero emission for a positive carbon impact to society. The carbon savings are only limited to Tank-to-Wheel however, it is known that the project would deliver wider WTW CO2 savings. This would be expected to improve the BCR to a positive 1.07: 1 in the Central carbon scenario and Low VfM category.

The BCR also likely further underrepresents the true value of the investment in zero emission buses and associated infrastructure. Additional cost benefits that are not monetised in the BCR analysis are detailed and explained in the Economic Case Appendix.

Click below to access each of the Economic Case supporting appendices:

3B	ECONOMIC CONTEXT (Template) (Guidance – Page 11)
3C	ECONOMIC APPRAISAL (Guidance – Page 13)
3D	APPROPRIATE TOOLS (Guidance – Page 14)

4 COMMERCIAL CASE

4A – Procurement Arrangements – Provide an overview of the procurement arrangements in place to ensure the preferred option can be delivered (max. 500 words)

This answer should identify the market-place opportunity which offers optimum VfM and set out an overview of the commercial and contractual arrangements for the negotiated deal.

A competitive, regulated Grant Application Process is required and will be undertaken to allocate grant funding to commercial bus operators to deliver the hydrogen buses in the scheme.

The payments will be made under a grant funding agreement, which will give WMCA rights to step into the Operator's supply contracts if conditions have been breached. These conditions and approach will be similar to the successful undertaking for Coventry Electric Bus City.

The total value of money available for the scheme will be set by Government, but not all of this will be used for the procurement under this option. Some will be set aside for procurements which will happen separately for supported subsidised services operated by WMCA. More detail of this is set out in section 4C below.

The procurement for electric charging infrastructure will call off the WMCA existing Pantograph Supply Framework with Furrer & Frey, which provides fixed costs for a range of pantograph equipment including 450kW pantographs. This framework was entered into in February 2021 and is a 5 year framework. Services will most likely take the form of a competitive procurement by WMCA for the operation of the subsidised services using electric buses with OppCharge capability under a 5+2 contract. A first procurement for the 57 service (2 vehicles) is currently live and closes 23 August 2021. This will allow lessons to be learnt from this initial process for the remaining contracts and vehicles procurement in 2022, for operation from 2023.

4B – Procurement Outcome - Provide a summary of the outcome of the Procurement and details that confirm that the deal is still affordable (max. 500 words)

The Grant funding cannot be allocated until the Grant funding has been received by WMCA, therefore the competitive Grant Application Process is yet to take place. As WMCA will have a limited amount of grant available, grants will be limited to a fixed number of buses, with recipients being selected based on quality ranking.

To be eligible for funds bidders will need to meet criteria prescribed by WMCA, which will include the Commercial Operators demonstrating that they have a viable plan to operate the hydrogen buses in the areas prescribed in the FBC. This will include evidence of having advanced towards a supply agreement for the new buses and HRS, access to depots and credible business plan for running commercial services.

There will also be a quality threshold for the vehicles and HRS provided, and bidders would be required to provide evidence of the incremental costs being incurred over and above those for conventional diesel vehicles.

The amount of payment made will be linked solely to capital expenditure capped at the grant level, and initially be set as per the ZEBRA funding formulae:

- 75% of the demonstrable incremental cost of the zero-emission vehicle over a comparable diesel.
- 75% of the cost of infrastructure specific to the zero emission vehicles.

The evidence regarding capital expenditure will need to show the costs of delivery of the assets, and installation, and cannot include any operating or maintenance costs. Bidders will also have to provide a high level of detail and transparency in their bids.

The indicative high-level timeline and stages of procurement are as follows. These timeframes have been reduced by learning lessons from the Coventry EBC process and feedback from market engagement in developing the FBC. Please note this remains subject to refinement prior to any Grant Application Process commencing.

Activity	Indicative Start Date
Prepare Grant Application Process Document Define award criteria Internal sign off	06/09/2021
DfT Decision to Award Funding	17/09/2021
Publish Grant Application Process Opportunity and Contract Notice	11/10/2021
Deadline for Clarification Requests	12:00 noon 22/10/2021
Grant Application Submission Deadline (assumes a single stage process - potential to include qualification stage can be if needed)	12:00 noon 29/10/2021
Evaluation / Interviews (if required)	01/11/2021
Contract Approval Report (internal approval to award)	22/11/2021
Grants awarded	06/12/2021

4C - Commercial Case Summary – Set out summary of the commercial case and how options appraised have been reviewed, recording any changes since last business case stage (max. 500 words)

The proposed project is hugely significant for the West Midlands region and for the UK as a whole, as it marks a step change in decarbonisation capability from demonstration projects of the order of 10 -20 hydrogen vehicles, to full-scale conversions of a bus depots to zero emission bus operation using green hydrogen. The scale of the project is such that it could kick start wider deployments of hydrogen bus and vehicle fleets nationally. Whilst the technology is proven, the supply chain is not as fully developed as other technologies, but this means that the relatively small number of supply chain actors are well known, and their capabilities and shortcomings are fully understood.

The project presents an opportunity to put in place early actions that deliver on the commitments laid out in the UK's Hydrogen Strategy. The deliverables of this project go beyond decarbonisation into developing sustainable, home-grown supply chains, creating high quality jobs, and capitalising on British innovation and expertise. Transport is a crucial early market for hydrogen, driving some of the earliest low carbon production in the UK. This project is key to providing a foundation on which to put Hydrogen Strategy words into action; delivering the stated ambition for the UK and taking a leading role in developing low carbon hydrogen technologies and markets on the international stage. with that position TfWM recognise the need to share learnings and experience both with other operators in the region, but also with other parts of the UK. This need to share learnings will be embedded within the execution and commercial strategy to build and operate the hydrogen facilities.

Click below to access each of the Commercial Case supporting appendices:

4D	COMMERCIAL CONTEXT (Template) (Guidance – Page 16)
4E	PROCUREMENT (Guidance – Page 17)
4F	AGREED DEAL (Guidance – Page 17)

5 FINANCIAL CASE

5A - Capital Funding - Provide an overview of the proposed funding package to deliver the project within the table below. Please provide written confirmation of all confirmed funding with details of any conditions etc

Funder	**Amount**	**% of Total**	**Status** *(Confirmed/ Pending Approval)*	**Details of Funding Status / Timing / Conditions etc.**
Department for Transport	£54,849,905		Pending Approval	17-Sep-21

5B - Financial Case Summary – Set out a summary of the financial case and how it has been revisited and reviewed, recording any changes since last business case stage (max. 500 words)

The scheme costs of £148.7m are comprised of the following elements:

Expenditure Stream	Revenue / Capital	£m

The Department for Transport grant is for up to 75% of the additional costs of zero emissions vehicles over the costs of diesel vehicles, and for up to 75% of the costs of upgrading infrastructure for those vehicles, with operators providing the rest of the funding. In respect of the electric bus element, WMCA is also an operator in this instance as they provide supported services via sub-contracts to bus operators. The table below shows the funding statement breakdown:

[redacted]

A condition of the Department for Transport grant is that any additional costs of the scheme are to be borne by WMCA. In relation to the hydrogen vehicles, this will be mitigated through a process of grant application by the operators to WMCA which will consider the projected usage of the Department for Transport grant on each application, with WMCA seeking to cap the available grant funding to operators to the £53m thereby transferring the risks of any cost overruns e.g. inflation to operators and minimising the risk to WMCA. In respect of the electric vehicles the risk sits with WMCA.

For the WMCA operator contribution has been factored into the Transport for West Midlands revenue budget submission for 2021/22 and the MTFP funded by transport levy. Any overruns are to be mitigated through savings made in the revenue budget. Commercial bus operators will fund their contributions through their revenue budgets. The Department for Transport grant will be held by WMCA to be drawn down against for the remaining 75% cost difference of upgrading to zero emission vehicles and associated infrastructure.

Click below to access each of the Financial Case supporting appendices:

5C	FINANCIAL CONTEXT (Template) (Guidance – Page 18)

6 MANAGEMENT CASE

6A – Management and Governance – Provide an overview of the management and governance arrangements in place to deliver the project (max. 500 words)

The project management team and governance structure has been established, with agreed Terms of Reference (ToR) and has been operational to develop this FBC. This will continue through the life of the project, being adjusted as necessary to best support the project as it develops and grows. This will be reviewed and confirmed for the start of the project delivery stage, subject to award of funding. It is anticipated that a new Project Manager and Technical Hydrogen Specialist will be appointed in TfWM, with the core project team members from TfWM/WMCA for Senior Responsible Officer, Network Transformation (Sponsor), Finance and Legal remaining throughout project delivery to ensure that there is both consistency in delivery approach and knowledge retention, whilst strengthening the project management and technical delivery resource for TfWM.

A formal Governance structure has been implemented for the FBC phase and this can be seen in diagram form within the management context appendix and below. This will be taken forward into successful delivery. The structure shows the persons or organisations that either provide a management role or a supporting role. The structure defines the specific groups that are established together with the Boards that the project either reports for decisions or to provide information to. The structure identifies the areas where briefing/updates are to be provided and the clear route for approvals. The Activity specific working groups are also identified that will be established from and report into the Project Delivery Steering Group.

The role and function of the Activity Working Groups are to be responsible for the delivery of the discrete components to the project (some of these Groups are subject to change depending on the outcome of the competitive, grant application process to allocate grant funding to bus operator/s):

The Governance structure also identifies the management of the project, this will be primarily controlled by the members of the Steering Group. The membership of the Project Delivery Steering Group consists of a healthy mix of skill sets and organisations led by TfWM together with bus operators (as they are appointed via a separate procurement exercise). The Steering Group defines and establishes separate task specific working groups, these are led by an identified member of the Steering Group who has the responsibility to manage the working group to deliver agreed outcomes and to report these back to the Steering Group.

The current risk register is based upon a simple Excel form used within TfWM, the intention is to move from this format to utilise ARM (Active Risk Manager) which is a software Enterprise package used on many large projects within WMCA. ARM allows us to identify, analyse, control, monitor, mitigate and report on risks, issues and opportunities.

As the project enters delivery phase the development of the Activity specific working groups, provision of briefings and updates to Stakeholders and interested partners and reporting through TfWM formal Boards will develop to ensure that the project is robustly managed. This will follow existing successful project management and governance structures within TfWM Integrated Transport Services Directorate, applied for other successful project delivery (i.e. Coventry All-Electric Bus City).

The Project Delivery Steering Group will again agree and establish the formal roles and responsibilities of the members and those of Activity specific groups reporting into the Steering Group that impact upon the delivery of the project. These will be established through formal ToR for each group and assigning roles and responsibilities specific to the membership, the ToR will be approved by TfWM Network Programme Board as the primary approval route. Changes to the management and governance structures will be reviewed through the lifecycle of the project deliver on the monthly basis and any proposed changes approved through the relevant governance structures and implemented in line with the change management (and project management) approach.

6B - Monitoring & Evaluation – Set out a summary of how success of the project will be measured, monitored and evaluated in delivery towards the objectives and benefits outlined in this business case (max. 500 words)

A Monitoring and Evaluation Plan (MEP) has been prepared in line with both the DfT Framework and the TfWM M&E Framework. In line with the Frameworks, the project is required to undertake Fuller Evaluation and Enhanced Monitoring given the size and cost (greater than £50 million). This will be developed and monitored to support and as part of the Department's programme-level evaluation as it is developed. This includes the commitment to provide the required data and participate with the programme-level evaluation. The key elements of Enhanced Monitoring include:

- Project delivery (including the assessment of schedule, stakeholder engagement, risk and benefits)
- Costs
- Actual delivered project (compared with that proposed)
- Project Objectives
- Bus travel demand (i.e. patronage)
- Bus travel times (absolute and reliability)
- Bus operational performance
- Impacts on the economy (including the percentage of working age population accessible to jobs and the percentage of residents able to access strategic centres in 45 minutes)
- Carbon impacts (including air quality CO_2e, NOx and PM)
- Accidents involving bus
- Bus operating costs
- Charging usage, costs and performance

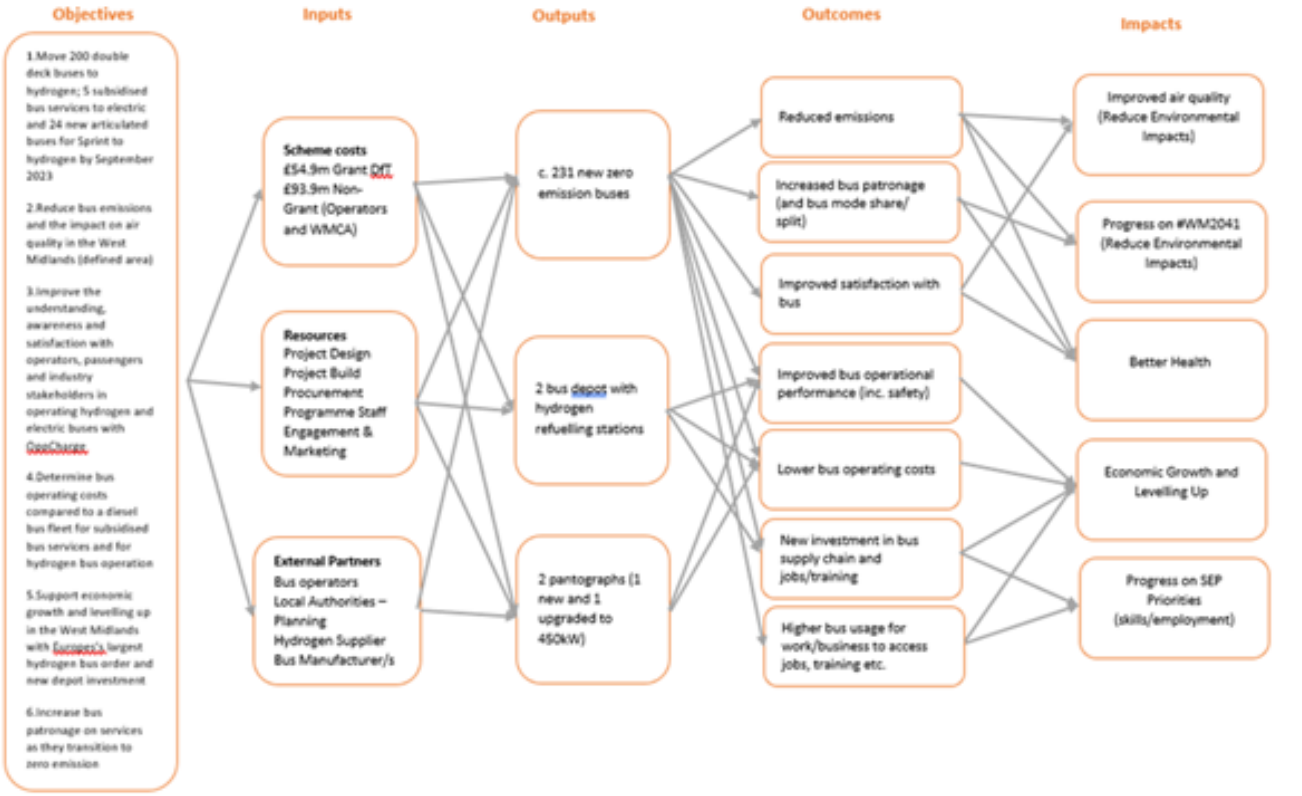
In addition to the above, it is proposed to undertake a review of the project's value for money alongside a wider set of outcome monitoring. The proposed approach is therefore more comprehensive than the core requirements and reflects the intent to undertake a robust assessment of the project, both during and post-completion. Elements of impact evaluation, process evaluation and economic evaluation are included within this MEP, as it is proposed to undertake a Fuller Evaluation because this is an innovative project (as a pilot for Government); with an adjusted cost benefit ratio of less than 2, and due to the ability to generate beneficial evidence on the effectiveness of this type of scheme.

- **Impact evaluation**: to provide reliable evidence of the extent to which the project has caused the changes in the outcomes and impacts. This will be considered through an outcomes report, which assess the outcomes in relation to the defined objectives identified in the logic map (shown below) and comparing the post intervention situation with the pre intervention situation.
- **Process evaluation**: to identify what lessons have been learnt during implementation. This is likely to be presented through the series of quarterly progress reports produced during the

implementation stage, followed by an end of delivery report to fully assess how the project has been delivered.

- **Economic evaluation**: aimed to establish the benefits of the scheme and relating these to the cost of the interventions.

Logic Map showing a project-level Theory of Change. The Logic Map will be reviewed and tested throughout the project monitoring. The logic map is shown separately in Appendix 6B Logic Map.



Data requirements and collection approaches

The approach to monitoring aims to minimise data collection costs. The bus operators and TfWM already collect a vast range and breadth of data, to be supplemented by new data collection on the zero emission vehicle operation, performance, costs and infrastructure usage and costs. The types of data are detailed in the MEP, covering and committing to the minimum data requirements under ZEBRA with additional data requirements for our local circumstances and design of the scheme.

Resourcing, Delivery and Dissemination including expected milestones

The project evaluation outlined within the MEP needs to be budgeted and resourced by TfWM across the programme period. Although the majority of data is already collected as part of routine monitoring activities, there should be expectation and planning for areas of additional expenditure required. These include the process monitoring during scheme implementation, additional primary data collection and ongoing collation/analysis of data. The revenue budget identified within the FBC to deliver the monitoring and evaluation is set out below.

- Process Evaluation Reporting (including End of Actual Project Delivery Report – Q1 2024)
- Baseline Reporting (Q1 2022)
- Interim Annual Data Reports x 1 (Q1 2023) - including process evaluation for learnings through each phase of the delivery

- One Year Post Completed Delivery (Opening) Reporting (Q1 2025)
- Five Year Post Completed Delivery (Opening) Reporting (Q1 2029)
- Meetings and Project Management

The MEP will operate a risk register that feeds into the programme risk register and will be subject to the same review process as the scheme risk registers. The sub-contractor will be responsible for updating the MEP risk register whenever a new risk is identified as well as on a standard monthly basis throughout the evaluation activity period.

The logic map enables the identification of suitable monitoring points within the chain to guide the approach for evaluation.

Attach Link to Monitoring & Evaluation Plan here:

Separate Appendix: ZEBRA Appendix 6B MEP v3

6C - Management Case Summary – Set out a summary of the management case and how it has been revisited and reviewed, recording any changes since last business case stage (max. 500 words)

Diligent project management will be key to successful commercial delivery of the project which will look like:

- Hydrogen buses delivered on time and on budget
- Hydrogen refuelling stations delivered on time and on budget
- Hydrogen articulated vehicles secured and delivered on time and on budget
- Project spend completed by September 2023
- Positive customer experience measured through the MEP
- Delivery of at least 20 new jobs in the supply chain and for engineers in the local support network
- [redacted]
- Enhancement of the green hydrogen supply chain in the region and the facilitation of additional hydrogen deployments (not just hydrogen) leveraging the low cost hydrogen supply into the region

There is nothing further to add within this section at this stage given that the project has commenced at FBC with no prior OBC or management structure to refer to or that has changed from that already proposed within this document.

Click below to access each of the Management Case supporting appendices:

6D	MANAGEMENT CONTEXT (Template) (Guidance – Page 25)

6E	SCHEDULE (Guidance – Page 26)
6F	PROJECT MANAGEMENT STRATEGY (Guidance – Page 27)
6G	RISK REGISTER AND ISSUE LOG (Guidance – Page 27)
6H	CHANGE MANAGEMENT STRATEGY (Guidance – Page 28)
6I	CONTINGENCY PLAN (Guidance – Page 28)
6J	PDPOAP (Template) (Guidance – Page 28)