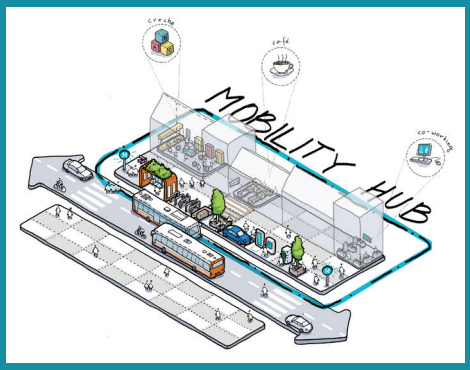
Leeds City Region Future Mobility Zone

September 2019



West Yorkshire Combined Authority

Working in partnership with the

Leeds City Region Enterprise Partnership

Contents

Executive summary

Our proposed package of schemes represent a step change in mobility in the Leeds City Region that is firmly focused on local needs, places and people, particularly targeting the hardest to reach communities that could be left behind as technology moves forward. In developing this submission we have revised our stage 1 submission in response to feedback from Department for Transport officers.

The Future Mobility Zone funding will enable:
- the provision of affordable, accessible travel in the City Region through introduction of small demand responsive transport bus vehicles that respond to passenger journey requests and enable pick up / drop off from locations nearer to people's homes. We will test this in communities who would normally be left out of commercial operations to understand how they could become viable;
- the booking and provision of travel information will be more integrated and accessible through the provision of a Mobility as a Service app including the ability for people to book through voice activated software;
- new community mobility hubs will provide ebikes, car club vehicles and smaller responsive bus services to complement the existing bus and rail networks;
- we will examine how more people can be encouraged to use transport services by reducing the cost of travel through mobility credits and by ensuring they can access the best fares even if they don't have a bank account.

With a diverse economic geography we are well placed to test this at scale and monitor the outcomes for different communities.

Our Strategic Economic Plan for the City Region clearly sets out our ambition to rebalance the economy and move towards economic self-sufficiency. Our emerging focus for our Local Industry Strategy is to stimulate inclusive growth, tackle our productivity gap, improve living standards, particularly in areas of deprivation and contribute towards our clean growth ambitions for a post-2030 economy. The Future Mobility Zone (FMZ) Fund offers a major opportunity to help realise these priorities through investment in future mobility – particularly enabling the Combined Authority and partner Districts to deliver Inclusive Growth and address the growing Climate Emergency (which was declared in the region in June 2019). Improved access to transport will also help to accelerate the regeneration of our high streets.

Our FMZ will provide long-term sustainable alternatives to the private car, help improve congestion, tackle air quality issues and help provide access to jobs, skills and opportunities, especially for people currently less likely to access these opportunities. Our proposed approaches to overcoming Leeds City Region's challenges are directly replicable elsewhere in the UK, Europe and for other global cities and rural areas. From peri-urban valleys and local towns to culturally and economically significant cities, our FMZ places diverse geographies and communities at its core. Our submission brings together collaboration between the public and private sectors, as well as being shaped through the leading academic thinking and research based in our City Region.

Our Future Mobility Zone submission builds on existing experience and capabilities, our shared experiences and processes developed through our current Growth Deal and Leeds Public Transport Investment programmes and will complement our Transforming Cities Fund ambitions.

Leeds City Region TCF Future Mobility Zone Submission

Application Form – Final Proposal

30 September 2019

Applicant Information

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INDUSTRIAL STRATEGY
TRANSFORMING CITIES FUND

SECTION A – Name, location and description of the FMZ

A1. FMZ name and location

The FMZ name is: Leeds City Region Future Mobility Zone.
Our submission includes a package of interventions – some of which will benefit the entire region and other more bespoke interventions which will have a more targeted impact in the districts of Bradford, Calderdale, Craven, Harrogate, Kirklees, Leeds, Selby, Wakefield and York.

A2. FMZ description

Please provide a short description of the proposed FMZ (maximum 300 words).

In addition, please provide a brief list of any changes made to the original outline proposal, submitted in Phase 1, as a result of the feedback received from the Department.

Our region has four priorities: enabling inclusive growth; boosting productivity; delivering 21st century transport; and enabling clean growth including being net zero-carbon by 2038. To achieve these ambitions, we have adopted transport strategy targets, which focus on increasing sustainable and active public transport modes and reducing car trips.

Through this final submission, we have listened to the DfT feedback, to evolve our bid to create a unique innovative package which uses world class technologies to transform the mobility offer for some of our hardest to reach urban and rural communities: our communities of greatest economic need.

Our objectives for FMZ are designed to help us realise our ambition, as it will:
- **Enable Inclusive Growth through improving equity of access to transport / mobility services.** *People need good transport and mobility to be economically active and productive. Our FMZ will improve transport for all, and reduce barriers to mobility for people who are currently excluded;*
- Deliver transformed innovative local connectivity, particularly between deprived communities and employment / skills opportunities;
- Address the affordability of public transport, particularly for low income workers, job seekers and those in areas of deprivation;
- Utilise new technologies to encourage the transition to low carbon and sustainable mobility modes, reducing transport related emissions and contributing to the City Region achieving its ambition to be net zero carbon by 2038; and
- Ensure digital and financial inclusion is at the heart of the development of new solutions to help boost productivity.

The DfT investment in our FMZ submission will fund:
- A regional ‘Mobility as a Service’ platform;
- A programme of mobility credits;
- Innovative digital demand responsive services;
- Next generation Mobility Hubs to enable access to services; and
- Dynamic network management to manage future kerb and road-space mobility more effectively.

SECTION B – The Strategic Case

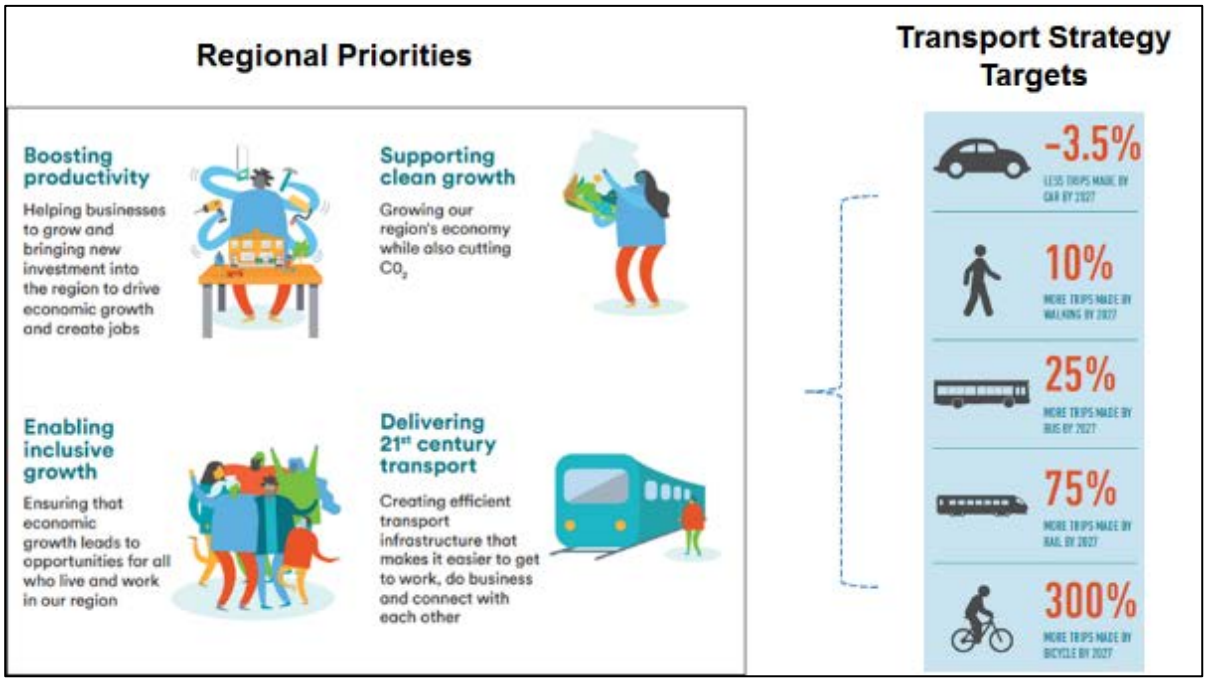
B1. Background - What are the zone's objectives?

Please provide a short description of which issues are to be addressed by the zone - congestion, access to employment sites etc. (maximum 300 words).

The FMZ will address the following key issues:
- Removing barriers to transport and mobility access for those people for whom the cost of travel is a major issue – **through streamlining booking and payment systems (including for the digitally and banking excluded), underpinned by a suite of mobility credits.**
- Focusing transport provision and access at established nodes within different challenging urban, peri-urban and semi-rural geographies to test modal shift, **through the provision of mobility hubs.**
- Reducing private vehicle usage, improving utilisation and demonstrating the benefits of access vs ownership **through the provision of on demand transport options**
- Tackling local connectivity issues, particularly between emerging centres of jobs and opportunities **through the provision of digitally enabled dynamic demand responsive services.**
- Improving transport connectivity in poorly served rural areas **by providing on demand services to link into the existing core transport network.**
- Access issues in an historic city centre, particularly for those with specific mobility needs and challenges **through provision of on demand services.**
- Providing faster, more reliable journey times for hard to reach areas **through a combination of dynamic demand responsive services and data-led traffic management techniques.**

We have four strategic priorities as illustrated in Figure 1. To achieve these from a transport perspective, we have a series of interim targets for the transport system, which focus on delivering on increasing sustainable and active public transport modes and reducing car trips.

Figure 1: Leeds City Region Priorities



Our FMZ is designed to support regional priorities and targets as stated above and these objectives will also help contribute to the objectives of our large TCF bid, particularly in terms of improving access to employment opportunities and contributing towards inclusive growth.

B2. Strategic Case - What does the FMZ contribute to the programme objectives?

Please provide brief details of each of the projects to be included in the FMZ scheme alongside an explanation of how the FMZ will fit with the aims of the Future Mobility Zones, including:

- *trialling new mobility services, modes and models to create a functioning marketplace for mobility that combines new and traditional modes;*
- *improving the integration of services;*
- *increasing the availability of real-time data;*
  providing access to digital planning and payment options;
- *exploring options for providing mobility credits, or other low-cost options for low income household; and*
  exploring options for delivering efficiencies through shared (dynamic) demand responsive transport.

Please provide information to show how the FMZ will help to meet strategic transport objectives in the area.

Please indicate, briefly, what you expect to learn from each of the projects to be included in the overall FMZ scheme.

How innovative is the proposed FMZ?

Strategic transport objectives in the Leeds City Region
The core policy objectives within the Leeds City Region are inclusive growth, productivity and clean growth. The following section demonstrates how these objectives are reflected in our adopted Strategic Economic Framework and emerging Local Industrial Strategy (LIS). The vision of the Leeds City Region is *'to be a globally recognised economy where good growth delivers high levels of prosperity, jobs and quality of life for everyone.'*

In order to deliver this, we have four priorities:
- Boost productivity;
- Enabling inclusive growth;
- Delivering 21st Century Transport; and
- Reduce Carbon emissions and establish Clean Growth.

As set out in our Strategic Economic Plan (SEP), the City Region will:
- Deliver upwards of 35,000 additional jobs and an additional £3.7 billion of annual economic output by 2036;
- Become a positive, above average contributor to the UK economy;
- Seek to exceed the national average on high level skills and to become a NEET (not in employment, education or training) free City Region; and
- Make good progress on Headline Indicators of growth and productivity, employment, earnings, skills and environmental sustainability.

The Combined Authority and partners are currently developing a **Local Industrial Strategy** (LIS) which builds on the SEP and focuses on bold steps aimed at boosting productivity and driving both inclusive and clean growth for a post-2030 economy. The LIS will identify key priorities against the five foundations of productivity – people, place, infrastructure, ideas and business environment. The LIS will also demonstrate how and where it can contribute towards one or more of the Industrial Strategy's grand challenges by identifying nationally significant strengths, assets and opportunities including, notably, future mobility.

The economic evidence reports that have been compiled for the LIS have also helped to inform the development of the evidence base and economic case for our FMZ proposals. A final draft of the LIS will be submitted to Government by December 2019.

A world-class, integrated mobility system is a vital requirement of the competitive, inclusive economy that the West Yorkshire Combined Authority and its partners are working to create. It connects people to jobs, brings businesses closer together, gets raw materials to manufacturers, goods to local, national and global markets, provides opportunities for education, training and investment, and reduces social exclusion so that everyone benefits from economic growth.

The **West Yorkshire Transport Strategy** outlines the vision for transport across the region that will serve the needs of businesses and residents as well as enhancing prosperity, health and wellbeing for people and places across West Yorkshire.

It also takes into account the necessity to provide 21st Century infrastructure (physical and digital) that will support the City Region to grow and compete globally, so it is able to meet the ambitions of the Leeds City Region Strategic Economic Plan (SEP) and the Government's Industrial Strategy. Focused on West Yorkshire but recognising the importance and impact of links with the wider Leeds City Region, the Transport Strategy 2040 vision is: *To enhance business success and people's lives by providing modern, world-class, well-connected transport that makes travel around West Yorkshire easy and reliable.*

The key objectives that we must address to realise this ambition are:

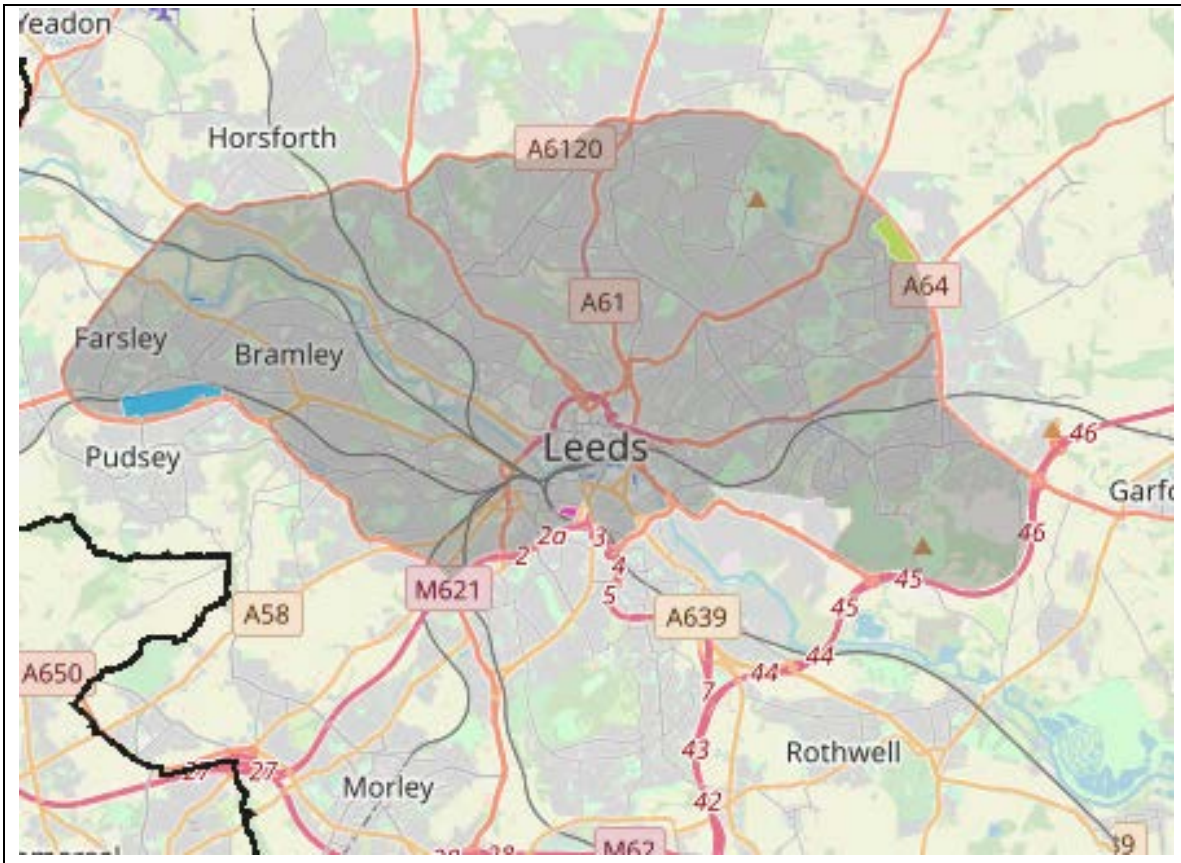
- *Economy:* Create a more reliable, less congested, better connected transport network;
- *Environment:* Have a positive impact on our built and natural environment; and
- *People and place:* Put people first to create a strong sense of place.

The Transport Strategy clearly sets ambitious mid-point targets to be achieved by 2040. These include:

- 25% increase in trips made by bus;
- 75% increase in trips made by rail; and
- 300% increase in cycling trips.

Whilst our FMZ bid covers the Leeds City Region, recognising its wider connectivity, we are keen to work with neighbouring areas, particularly Greater Manchester to share knowledge and learning, innovate and seek to avoid replication of scheme proposals. We have had initial discussions with TfGM but would be happy to continue this dialogue after the announcement of successful bids. We will also work with Transport for the North to potentially develop an approach to knowledge sharing, procurement and wider deployment across the North if our bid should be successful.

Leeds was identified by Defra as one of the areas that is likely to fail legal limits for air pollution by 2020 and as a result Leeds City Council will be introducing a Clean Air Charging Zone (CAZ) in autumn 2020. The Zone will cover the majority of urban Leeds (see map below) and will enforce charges for HGVs, buses, coaches, taxis and private hire vehicles that do not meet the set emissions standards. Bradford are currently in the process of developing a plan to tackle levels of air pollution.



The **Leeds City Region Energy Strategy** and delivery plan is our response to the global challenge of providing a secure, affordable energy supply for local residents and businesses, while also reducing carbon emissions to help combat climate change with the ultimate ambition to make Leeds City Region a zero-carbon energy economy. The strategy focuses on five priority action areas, including creating an efficient and integrated transport system, which the components of this FMZ bid will contribute towards.

In June 2019 the Combined Authority, in line with most of the region's local authorities, formally declared a climate emergency. This declaration strengthens the city region's ambition to become net zero-carbon by 2038, with significant progress being made by 2030. The scale of this target is not to be underestimated – with the Tyndall Centre for Climate Change estimating that a 14.5% reduction in emissions will be required year on year in order to meet this target.

The Combined Authority in declaring a climate emergency strengthened its corporate priorities to include support for clean growth as one of four priorities. The **Clean Growth Action Plan** sets out how, as an organisation, we will deliver against the priority through growing our regional economy whilst also cutting greenhouse gas emissions, including CO2. The key aim of the Action Plan is to lead by example and reduce our environmental impacts, tackle the climate emergency and create clean growth.

The **Leeds City Region Green and Blue Infrastructure Strategy** and Delivery Plan outlines how we will make the most of the region's green spaces and waterways to help our economy to prosper, enable people to enjoy a great quality of life, and combat the effects of climate change. This 'green and blue infrastructure' will contribute towards a strong economy, a sustainable environment and outstanding quality of life. The Green and Blue Infrastructure Delivery Plan identifies seven priorities, three of which are of relevance to the FMZ: building Green and Blue Infrastructure into physical development and housing; enhancing Green and Blue networks and corridors; and improving community access to and enjoyment of Green and Blue infrastructure.

The key themes of the FMZ and how they help to address our policy objectives set out above are discussed later in this section of our response.

Transforming Cities Fund – large bid

The draft vision for the TCF large bid is "to support delivery of Inclusive Growth across the Leeds City Region, through an innovative and coordinated walking, cycling and bus package, which provides genuine sustainable and healthy travel options for our communities along our corridors of greatest economic need, and transforms accessibility from new development sites and accommodates growth at key public transport hubs".

Delivery of our TCF package will contribute to delivery of the Combined Authority's core aims of enabling inclusive growth, boosting productivity, delivering 21st century transport and enabling clean growth."

The core themes of inclusive growth, boosting productivity and enabling clean growth are common to both the large TCF bid and the Future Mobility Zone bid. The FMZ schemes proposed integrate with many of the thematic interventions currently under development for the large bid, particularly:

- Connecting deprived communities to new employment and skills opportunities;
- Creating an attractive bus, rail and active travel offer from new housing sites for new residents; and
- Building on the benefits of DfT funded Connecting Leeds programme of investment in transport infrastructure and services currently being delivered across Leeds.

The FMZ proposals will help to support the large TCF bid through both trialling technology (including clean energy) to improve public transport provision on key corridors (linking into real time information provision in the large bid); examining how new models of demand responsive services will be able to improve access to public transport for areas with poor accessibility and, providing links into the core network identified for investment in the large bid. There are several aspects of the FMZ bid which will trial behaviour change techniques such as encouraging car sharing (particularly with the partnership of large employers) that if successful will be programmed alongside the large bid for wider roll out.

Emerging Leeds City Region Future Mobility Strategy

The Combined Authority is currently in the process of developing a Future Mobility Strategy for the Leeds City Region which will develop a series of priorities for our future mobility work, together with a set of principles for new mobility services and technology in the City Region that relate directly to the principles established in the DfT's Future of Mobility: Urban Strategy. We hope that the FMZ programme and its learning will help bring our Future Mobility Strategy to life, demonstrating the efficacy and viability of future mobility interventions across the city region. Importantly, the Leeds City Region Future Mobility strategy will explicitly cover the peri-urban and rural needs going beyond the Department's own work to date. We would of course be willing to share our insights, thinking and learning for the benefit of wider examination of non-urban needs in other regions.

Key themes of Leeds City Region Future Mobility Zone

The Leeds City Region Future Mobility Zone proposal has five core themes:

- Mobility as a Service (MaaS) platform and customer interfaces – delivering a MaaS interface that will enable planning, booking and payment for travel in one place and also provide the framework for the proposed mobility credits (see below). The MaaS interface will help contribute to our strategic objectives by making it easier for people to understand and pay for public transport encouraging more people to use these options, improving awareness and use of walking and cycling whilst also improving transport integration and accessibility for all users, not just those who are normally early adopters.

- Mobility Credits will help to tackle the affordability of transport particularly for those on lower incomes, job seekers, those in education, young people and carers. The mobility credits will be accessed through the MaaS interface and will help contribute towards our strategic objectives including delivering inclusive growth, improving access to transport services, improving access to employment opportunities and contributing towards increased productivity and economic growth.

- Digital demand responsive services will provide first and last mile transport links into the existing public transport network and also increase the reach of existing transport services to areas that currently have poor public transport accessibility (including peri-urban employment areas). By targeting our interventions in these areas, the demand responsive services will contribute towards our strategic objectives including delivering inclusive growth, increasing public transport usage and accessibility for users.

- Mobility hubs will provide existing transport facilities with new future mobility and community functions to create a singular focused location, each with a clear presence in the areas they serve. This will help to ensure that local transport services are visible to the potential user through improving both the physical presence of interchange facilities and also marketing and ensuring that services have a coherent branding across the mobility hubs within the City Region. The hubs will link with the demand responsive transport services whilst also providing new services including cycle hire and car club/car sharing. The mobility hubs will help contribute towards improving public transport accessibility, improving integration and contributing towards increasing levels of public transport patronage and walking/cycling. They should also reduce the number of trips people need to make and could be a tool to revitalise our high streets.

- Dynamic network management will deliver improved signal priority for public transport vehicles, emergency vehicles and cyclists, whilst also managing traffic flows to help achieve improvements to local air quality. This will help to deliver more reliable bus, cycle and DRT journey times which will help contribute towards increases in bus patronage when rolled out across a wider area.

Table B9 provides detail of the outputs which will be delivered as a result of the bid and a quick reference guide to how this links to our strategic objectives.

Each theme is described in more detail below. For each theme we have undertaken initial analysis to determine the potential propensity of populations within each FMZ project geography to engage and ultimately use the interventions. This analysis is based upon their existing retail, socio-economic and other behaviours and also utilises Mosaic data. The analysis is summarised in Tables B1 to B4 both at a District level and also at a specific scheme level (using buffer areas to examine the populations in scope for each bid element). The conclusions of this analysis are referenced in each of the thematic sections below.

Tables B1 and B2 – Scheme level analysis

Propensity Scores

CATEGORY	A58	A62	Bradford	Calderdale Valley	East Leeds	Greater Harrogate	Pontefract	Wakefield City Centre	Wakefield East	Wakefield North	Wakefield South	Combined FMZ Buffer
Affluent Achievers	78	83	88	88	87	87	88	88	73	88	75	78
Rising Prosperity	98	96	93	99	92	96	96	94	97	99	99	95
Comfortable Communities	107	110	121	115	100	119	101	109	96	113	111	113
Financially Stretched	157	157	0	157	157	157	0	157	0	0	0	157
Urban Adversity	105	105	105	106	107	108	107	105	106	107	107	106

Populations

CATEGORY	A58	A62	Bradford	Calderdale Valley	East Leeds	Greater Harrogate	Pontefract	Wakefield City Centre	Wakefield East	Wakefield North	Wakefield South	Combined FMZ Buffer
Affluent Achievers	4,387	7,223	2	3,819	5,798	18,825	652	645	3,342	1,427	2,484	48,604
Rising Prosperity	43	152	0	7	620	2,792	0	9	0	0	0	9,623
Comfortable Communities	47,333	81,360	59,463	16,151	37,802	46,190	30,327	12,776	14,370	20,757	9,139	375,668
Financially Stretched	10,916	31,198	15,770	2,268	26,103	14,350	8,330	8,390	4,668	1,590	226	123,809
Urban Adversity	25,980	50,913	20,704	7,753	22,169	10,072	17,388	17,469	10,835	5,114	601	188,998
Total Population	***88,659***	***170,846***	***95,939***	***29,998***	***92,492***	***92,229***	***56,697***	***39,289***	***33,215***	***28,888***	***12,450***	***746,702***

Tables B3 and B4 – District level analysis

Propensity Scores

CATEGORY	Barnsley	Bradford	Calderdale	Craven	Harrogate	Kirklees	Leeds	Wakefield	Selby	York	Total
Affluent Achievers	73	83	76	65	71	81	84	82	67	80	77
Rising Prosperity	0	186	202	238	216	191	184	189	0	194	200
Comfortable Communities	113	124	119	127	124	115	109	105	128	109	119
Financially Stretched	148	142	156	202	194	147	159	136	170	175	164
Urban Adversity	160	142	157	183	162	147	138	141	178	140	151

Populations

CATEGORY	Barnsley	Bradford	Calderdale	Craven	Harrogate	Kirklees	Leeds	Wakefield	Selby	York	Total
Affluent Achievers	11,185	36,166	17,198	19,289	60,178	37,697	64,019	16,708	24,583	25,122	312,144
Rising Prosperity	0	90	49	9	2,597	139	3,252	9	0	5,183	11,328
Comfortable Communities	120,442	307,411	116,122	28,880	69,362	246,327	334,358	172,308	49,061	103,295	1,547,567
Financially Stretched	27,879	85,373	23,873	2,123	15,451	58,564	208,892	50,692	5,358	57,203	535,408
Urban Adversity	85,694	108,133	52,840	6,531	12,945	96,000	178,674	105,321	10,103	19,090	675,330
Total Population	***245,199***	***537,173***	***210,082***	***56,832***	***160,533***	***438,727***	***789,194***	***345,038***	***89,106***	***209,893***	***3,081,777***

1. Mobility as a Service (MaaS) platform and customer interfaces

Mobility as a Service (MaaS) platform which comprises the development of a digital transport platform to facilitate planning, booking and purchase of travel / mobility services on account and enabling access to **mobility credits** (see below) for targeted groups.

The FMZ programme involves **early roll out of the MaaS technology** in Kirklees District (Huddersfield and selected outlying villages) utilising some of the principles and findings of the Ubigo Gothenburg pilot approach; a programme to which we have direct access through our collaboration with Huddersfield Business School. We propose an agile approach to development of the MaaS technology to enable an iterative process of testing, validation and learning throughout the delivery process. Where the other deliverables of the programme require MaaS to operate, these would form part of the early deliverables of the platform as described below.

The Kirklees early deployment will include the introduction of a **bike-sharing scheme, public transport information and incentives, and enhanced local car-sharing and ride-sharing options** all incorporated (on a phased basis) into a single back office system and mobile app providing (depending upon final local requirements) monthly or pay-as-you-go MaaS offer for a combination of shared transportation modes.

The MaaS app will be the core customer facing element combining trip planning, booking and payment functionality. The application will be expandable to include additional transport modes and will be scalable across the whole City Region and potentially neighbouring areas. In addition to mobile devices, its **functionality will be incorporated into on-site information/ vending kiosks and web applications.** Support will also be made for voice activated personal assistance technology such as Siri and Alexa and accessible technology such as Voiceover and Talkback. This will ensure that the platform is as inclusive to the broadest range of customers.

Having undertaken initial analysis into the potential customer base for MaaS we believe that over 3.1m people would be "in-scope" for initial deployment. There are several groups which have a higher than average propensity to use MaaS – particularly the Mosaic groups 'rising prosperity', 'financially stretched', 'urban adversity' and 'comfortable communities' based upon their existing retail and social behaviours – further information is presented in Annex 5 in full. Locations: coverage across the whole FMZ area.

2. Mobility credits

Mobility credits - Once established, the MaaS application will allow the **targeting of specific customer groups who could benefit from mobility credits**. They would be allocated funds to be spent on travel purchased through the MaaS system. Potential groups may include **job seekers, those returning to work, accessing education and / or healthcare**. Lifestyle credits could also be developed to encourage and reward sustainable behaviours across a large user cohort.

Additionally, the provision of mobility credits will enable the more rapid adoption of MaaS across the City Region through this specific use case.

Early roll out of mobility credits within the first year of funding will be across locations in Bradford where we have identified specific demographic groups that the credits will be targeted towards.

We are working with partners to identify funding sources for mobility credits including developer contributions via Section 106 and innovative use of existing revenue funds in adjacent funding pots to refocus investment with existing and new target groups. During the delivery of the bid we will also look to develop relationships with higher education institutions to help administer at a reduced cost the travel vouchers that they already provide to students. We hope that this will become part of the mobility credit package available.

Locations: coverage across the bid area for specific target groups. Mosaic analysis indicates that the potential market for mobility credits across Leeds City Region is approximately 500,000 (based on the 'financially stretched' group).

3. Mobility hubs

Mobility hubs – will provide the next generation of local interchange and mobility access, building upon established multi-modal thinking, but radically extending this to include emerging and future mobility modes and using the hub as a catalyst to kick starting local and district centres. Mobility hubs will agglomerate existing transport, future mobility and community functions into singular focused locations, each with a clear presence in the areas they serve.

They will be designed with **best in class customer experience** at the heart of their design, providing ancillary services such as parcel pick-up, hot and cold food, and even hub working spaces as well as larger hubs enabling nearby creche facilities, part-time medical facilities and pop-up retail.

Re-inventing access to transport through mobility hubs we will use them as a tool to **revitalise our high streets**, encouraging activity and investment and importantly helping to **reduce local vehicle miles travelled through the combination of functions / utility at a single location.**

Mobility hubs will provide a focus for existing linear public transport services (bus and rail), provide a focus for demand responsive and first/last mile services and provide facilities for lift share and EV taxi charging.

The **MaaS platform and associated applications** will provide the means by which services are accessed and the hubs themselves will have clear confident branding, as per other FMZ interventions, indicating the presence and potential.

The illustrations below show **initial concepts for large and small hub deployments**. Both will feature a modular approach to integration with the local community and built environment. They will focus firmly on the customer, removing friction from day to day travel and providing access to other services whilst trip making.

Our mobility hub concept is **built upon a grid basis with each unit being a single standard parking space**, this making of easier implementation and monetisation. It should be noted that whilst certain core elements will be funded via the FMZ we will make the provision for the market to capitalise on the initiative to provide solutions such as food vending, parcel lockers etc. as well the re-invigoration of adjacent retail for functions such as co-working, creche etc. Indicative visualisations for our mobility hubs are presented in figures B5 and B6.

Figure B5 - Large mobility hub – concept sketch

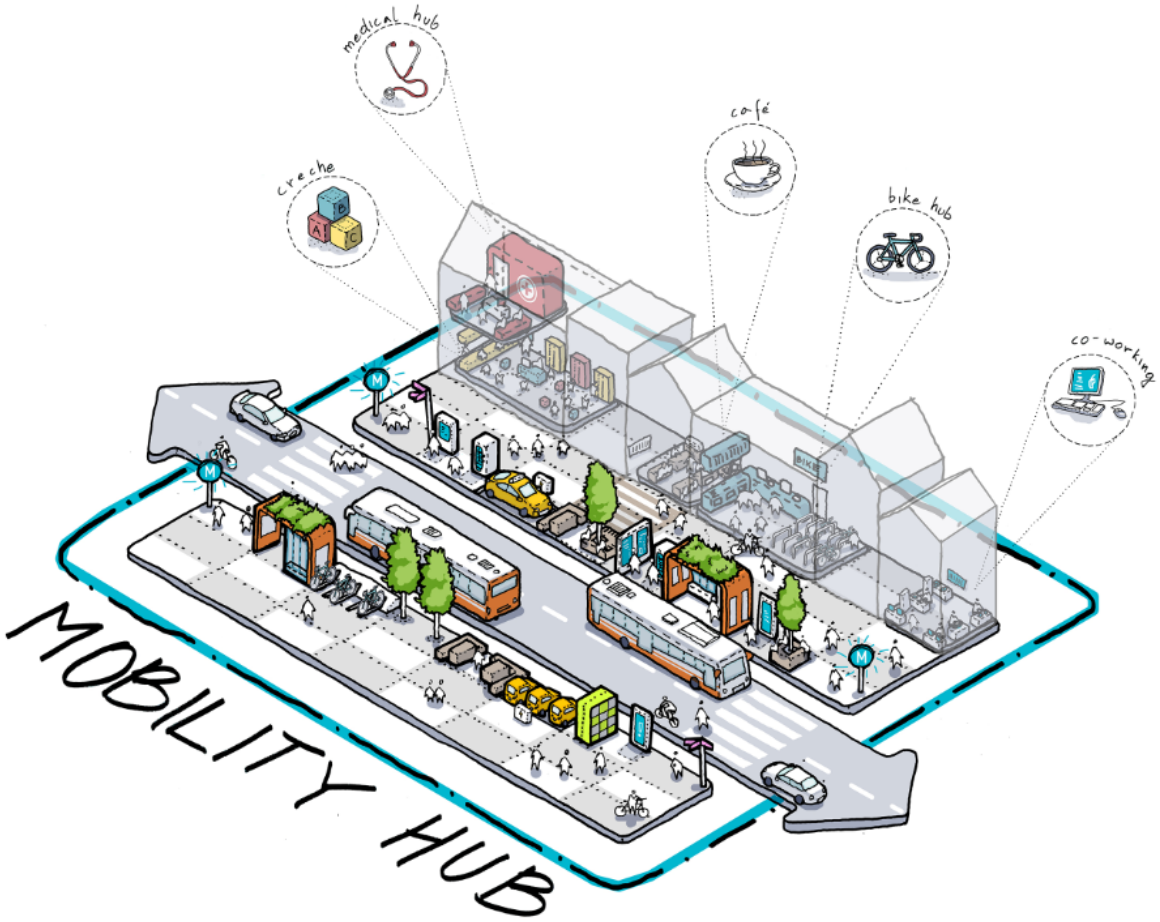
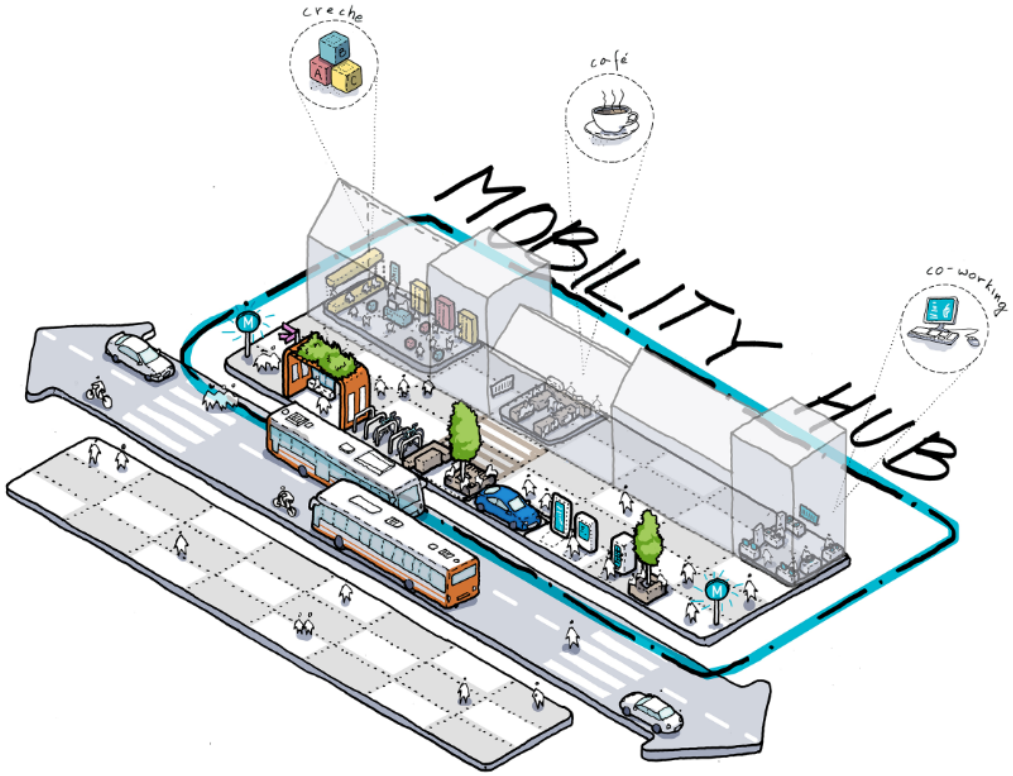


Figure B6 - Small mobility hub – concept sketch



Our mobility hub locations are closely linked with the FMZ projects where they provide access to existing public transport and new mobility services.

Our customer analysis estimates a potential target user base of over 740,000 people for the mobility hub programme across the FMZ. Almost all of the social groups in scope for the mobility hub locations have a higher than average propensity to use public transport – with the 'financially stretched' group having the highest propensity.

Locations: Across the bid area.

MaaS / mobility hub pilot in Kirklees
We will **test previously unexplored contexts for the application of MaaS** (i.e. the unique context of a University town and its rural hinterland) through a pilot in Kirklees as mentioned above. This will be an evidence-based approach to examine how MaaS can be effective for smaller societies and to provide early evidence to refine and inform the delivery of the wider FMZ programme. Through this early pilot we will also **identify any new and innovative use cases for MaaS and mobility hubs** (particularly focusing on the rural and peri-urban context). We will also use the pilot to examine and test our approaches to MaaS with students and young people which will help to ensure our design and marketing of MaaS is relevant to these groups.

This pilot **will introduce new policy delivery and marketing angles and set leading methodologies for trialling and monitoring future transport initiatives** across the world for areas with similar socio-economic characteristics. This work has the confirmed support of national and international MaaS pioneers (i.e University of Huddersfield and its links with Chalmers University of Technology, Sweden).

The scheme elements located in Kirklees will offer a **highly innovative approach for the improvement of places, air quality, road safety and congestion.** In additional to a network of mobility hubs offering a range of mobility services including scooters, e-bikes and cargo

bikes, and car club provision, the proposal will establish a lift-sharing and dynamic parking solution to prioritise shared trips in key centres across the district.

Our customer analysis estimates a potential target user base of over 479,000 people for the programme in Kirklees. The Mosaic categories that have the highest propensity to use public transport in this area are the 'urban adversity' and 'financially stretched' groups.
The following example illustrates how development of a MaaS offer would improve journey options for young people:

The independent youngster – Emily is 15 and becoming more independent, increasingly spending time with her friends in town. Whilst she appreciates her parents giving her lifts, she's increasingly aware of climate change and is questioning car use and whether she really ever wants to own one. The FMZ will provide Emily with real alternatives to use and ultimately owning a car. Through her smartphone, which she always carries, Emily can request a demand responsive bus, just as easily as ordering take-out, and can get to town quickly and easily. With mobility being so easy, Emily is quickly persuading her friends that the bus is the way to go.

Mobility hub pilot with small EVs in Harrogate
The Harrogate proposal will establish a **network of multi-modal mobility hubs alongside a new shared mobility system based on small, one or two-seater electric vehicles** providing a viable alternative to multi-car ownership (through ensuring that trips that cannot be made by public transport can be made using a shared vehicle that results in emissions savings for each journey). The mobility hubs with small EVs will be integrated with public transport and active travel measures all accessed via the MaaS platform, offering a range of mobility alternatives to provide maximum flexibility for consumers. We are taking learning from existing trial programmes including the Lake District pilot scheme and commercial uses of similar vehicles to inform what will be an ambitious programme of up to 100 vehicles.

The introduction of mobility hubs (see Annex 4 for locations) at key entry points into Harrogate will enable a new personal e-mobility solution utilising mini single/twin seater electric vehicles, such as the Renault Twizy (or similar), to create a car club linking mobility hubs at major rail stations and centres and district hubs. The proposal will support the **delivery of a demand responsive solution for first / last mile connectivity** through the hubs, enhancing access to key employment sites and providing services beyond scheduled public transport operational hours. The service will adopt the MaaS platform, offering preferential charging rates for those on lower incomes or unemployed.

The programme will introduce unique models of mobility targeted at reducing multi-car ownership of local residents, reducing vehicle miles travelled, as well as enhancing the accessibility offer provided for the visitor economy.

Our customer analysis estimates a potential target user base of 92,200 for the programme in Harrogate.

(See below for Calderdale specific examples)

<u>4. Digital demand responsive services</u>
Digital demand responsive services – next generation rural and urban, digitally enabled dynamic, on demand services that will be **accessible through app, web, kiosk and voice devices.** An automated solution will be trialled to meet specific city core use cases for mobility impaired access in York. Digital demand responsive services will be implemented across: Leeds, Wakefield and York:

York – mobility impaired last mile demand responsive solution

The York proposal looks to trial a **'last-mile' automated transport solution** in the heart of the historic core of the city, which is undertaking a programme of excluding all but essential vehicle. The FMZ will provide a new access mode **specifically aimed at mobility impaired users as registered under the 'Blue Badge' scheme (including 'visible' and 'hidden' disabilities).** The scheme will introduce a dedicated automated shuttle service in the pedestrianised streets of the city centre, providing mobility impaired access to areas to the shopping and historic core from a dedicated park and ride facility.

The City Centre operation will connect Blue Badge car parks with key city centre amenities, and tourist destinations. The shuttles will have a full connection to the city's smart infrastructure and Demand Responsive Transport (DRT) functionality will be incorporated into the vehicle operation, with the routing of shuttles being flexible dependent upon customer trip requests. The targeted operation will ensure the service is carefully targeted at this specific user group for short distance city centre travel, without abstracting from conventional bus services.

We will develop the service offer, customer environment and interfaces with user groups to ensure that it specifically meets their needs and expectations and provides as frictionless as possible a journey to the heart of one the UK's premier tourist cities. **It should be noted that whilst operation will be automated it is envisaged that customer care assistants will accompany users.**

Having undertaken initial analysis into the potential customer base for the York automated shuttle we believe that in the region of 20,000 people would be "in-scope" for initial deployment based upon existing Blue Badge registrations in the "Greater York" area. It should be noted that York's 'draw' far exceeds this area with the potential to be used by customers from an extremely large area.

Wakefield - improving access to employment locations
This FMZ programme will see the introduction of a **dynamic electric demand responsive service in north Wakefield**, with a point to point and fixed-route services to key employment centres, transport hubs, and healthcare services, enabled through a digital interface with usability for those without access to a bank account (through the development of a partnership with a local credit union through the MaaS interface). The service will be complemented by the provision of **mobility hubs at several key points** – a complete list of mobility hubs is included in Annex 4.

Currently, the north Wakefield area has well established public transport corridors running north and south, providing good interurban access to Wakefield and Leeds. However, the infill between the core corridors is less well served; east to west desire lines are particularly poorly linked, leaving some localities (particularly employment sites) on the periphery of the urban area with limited access to the public transport network. The north Wakefield area includes the well-established employment areas as well as a proposed large mixed-use development at Snow Hill. The dynamic electric demand responsive service will also serve the rural south Wakefield and south-east Wakefield areas, encompassing the hinterland around the A61 corridor.

As part of the planning consents for the Snow Hill site, **funding is currently being secured through Section 106 contributions for a combination of site specific travel planning**, wider area travel planning and bus service improvements in the form of demand responsive. This project will in part draw on these potential private sector funds that would enable the Snow Hill demand responsive project to be scaled to cover a significantly wider area in north Wakefield and engage innovative demand responsive technology, providing for a broader range of journeys, achieving a greater profile, and achieve greater impacts for the wider community.

Our analysis indicates a market potential of some 39,000 customers for the Wakefield services. Within the area proposed for demand responsive services, there is a higher than average propensity to use public transport – particularly amongst the 'financially stretched' Mosaic group.

(See below for Leeds specific demand responsive service examples)

5. Dynamic network management

Dynamic network management - We will take a data-led approach to the management, access and use of our kerb and road-space we will be able to manage future mobility components more effectively. We will be able to **monitor and manage air quality issues in real time**, we will be able to **prioritise demand responsive and other services with ease** and we will be able to **re-balance priorities for pedestrians and cyclists** thus providing a catalyst for improved air quality and place-led outcomes. Our proposed approach provides a data led approach to asset management, **kerb-space management and parking integrated within the MaaS offer**, enabling next generation booking and payment for parking and associated kerb-side activities. This would be targeted towards Calderdale and Leeds.

Calderdale – real time monitoring of parking demand, capacity and car sharing programme
Calderdale Council have engaged with the trip share platform Liftshare who have already established a successful working relationship with Appy Parking. Appy Parking sensor technology is already in limited operation in Halifax as part of a trial **sponsored by Visa.**

The FMZ scheme will see this technology rolled out to the local centres as well as a number of large local employers, including Lloyds banking group who have seven sites across Leeds City Region and a total of 4,600 employee parking spaces that would be in scope for this intervention.

The partnership of Appy Parking and Liftshare will enable the Council to **monitor and visualise parking utilisation, trends and patterns**, have full and dynamic control of kerbside restrictions, support the uptake of mobility services including car clubs, carpooling and ride sharing. Making **real-time information on the availability of parking spaces part of the MaaS offer** we will tackle local levels of congestion associated with people searching for parking spaces and encourage more users to share journeys through the Liftshare platform.

Additionally, the proposal will introduce a dynamic approach to traffic and air quality management in **Sowerby Bridge, which itself will have a mobility hub and has recently been designated as part of the Government's High Street Fund**, using technology to control signalisation with a specific priority for pedestrian movements to facilitate place making and environmental improvements.

The proposed interventions focus on the key attractor towns of Halifax, Sowerby Bridge, Brighouse and Hebden Bridge and will see the introduction of a network of mobility hubs (providing test opportunities in rural and peri-urban contexts). The projects look to target the local resident and commuter employee populations, as well as the burgeoning visitor economy in these centres. In all cases these interventions will offer elements supplementary to the existing programme of the West Yorkshire Plus Transport Fund programme.

The following example illustrates how development of a digital demand responsive offer would improve journey options for commuters and tackle social isolation:

The frustrated commuter – Joanna is sick and tired of sitting in traffic queues every day. She knows that there's a train into Leeds a few miles from home but she's always worried that she won't be able to park at the station or the journey might take just as long. Using the MaaS app to hail an East Leeds electric demand responsive bus, Joanna will be able to get to Crossgates and hop on a train into town, all without having to buy different tickets. She soon realises that

she's got more time to catch up with social media on the train and soon forgets that driving was ever her main choice.

Leeds – demand responsive solution linked to traffic signal optimisation
The Leeds programme will develop a **digital enabled electric demand responsive transport solution** complemented by traffic signal optimisation designed to rebalance the mobility hierarchy in favour of more sustainable travel modes. The proposals will **integrate future mobility technology solutions with signal infrastructure** to increase access to transport hubs and employment opportunities in an area of the city with higher levels of deprivation, while supporting the shift to a low carbon transport sector.

It will support the air quality, place making and behaviour change agenda of Leeds City Council through the prioritisation of more sustainable travel options. The operational areas of Crossgates and Cross Green in East Leeds suffer from higher levels of deprivation and the lack of orbital public transport provision inhibits access to wider employment and skills opportunities.

The proposal will establish a demand responsive solution to link surrounding communities into the local bus interchange and rail stations, operating as a first/last mile style service connecting people to mobility hubs at Seacroft Centre, Crossgates station and Seacroft hospital, enabling onward journeys with scheduled public transport services.

A **dynamic connected traffic signal optimisation system** will also be implemented to complement the digital demand responsive solution, reducing journey times and prioritising more sustainable travel modes. This system will target public transport and demand responsive services initially as these vehicles are already equipped with tracking equipment for operational purposes.

The scheme will develop the **artificial intelligence (AI) and machine learning capabilities to identify cyclists, pedestrians** and emergency vehicles to afford them greater priority. A research project with the University of Leeds would investigate the safety factors of displaying traffic signal status via the vehicle dashboard to the driver, as a precursor to the rollout of Connected and / or Autonomous Vehicles.

Our customer analysis indicates that there is a potential user base of 88,600 users in the Leeds corridor that would be in scope to benefit from this scheme, and nearly 30,000 in Calderdale. The 'financially stretched' Mosaic groups have the highest propensity to use public transport in both of these locations.

In summary
Table B7 illustrates how the FMZ components meet the principles set out in the Future of Mobility: Urban Strategy as published by DfT earlier this year. It should be noted that many of our proposals will be deployed in peri-urban and rural areas and we would be willing to work with the Department sharing insights to help formulate a similar rural strategy.

Table B7 – Relationship between FMZ components and Future of Urban Mobility principles

Future of Mobility Urban Strategy Principle	Leeds City Region Future Mobility Zone Proposal					
	MaaS	Mobility Credits	Digital ecosystem	Digital Demand Responsive	Mobility Hubs	Dynamic Network Management
New modes and new mobility services must be safe and secure by design				✓	✓	✓
Benefits of innovation in mobility must be available to all parts and segments of UK society.	✓	✓	✓	✓	✓	
Walking, cycling and active travel must remain the best options for short urban journeys.	✓	✓			✓	✓
Mass transit must remain fundamental to an efficient transport system.	✓		✓		✓	✓
New mobility services must lead the transition to zero emissions.	✓	✓		✓		
Mobility innovation must help to reduce congestion	✓			✓	✓	✓
The marketplace for mobility must be open to stimulate innovation and give the best deal to consumers.	✓	✓	✓	✓	✓	
New mobility services must be designed to operate as part of an integrated transport system combining public, private and multiple modes for transport users	✓	✓	✓		✓	
Data from new mobility services must be shared where appropriate to improve choice and the operation of the transport system.	✓	✓	✓		✓	✓

Additionally, Table B8 illustrates how the FMZ components address the objectives of the FMZ fund.

Table B8 – LCR Future Mobility Zone elements and FMZ fund principles

Future Mobility Zone fund principles	Leeds City Region Future Mobility Zone Proposal					
	MaaS	Mobility Credits	Digital ecosystem	Digital Demand Responsive	Mobility Hubs	Dynamic Network Management
Trialling new mobility services, modes and models to create a functioning marketplace for mobility that combines new and traditional modes;	✓	✓	✓	✓	✓	✓
Improving the integration of services;	✓		✓		✓	✓
Increasing the availability of real-time data;	✓		✓	✓		✓
Providing access to digital planning and payment options	✓	✓	✓			
Exploring options for providing mobility credits, or other low-cost options for low income household	✓	✓	✓			
Exploring options for delivering efficiencies through shared (dynamic) demand responsive transport.				✓	✓	✓

Finally, Table B9 illustrates how the FMZ components address Leeds City Region policy objectives.

Table B9 – LCR Future Mobility Zone components and LCR policy objectives

Leeds City Region policy objectives	Leeds City Region Future Mobility Zone Proposal					
	MaaS	Mobility Credits	Digital ecosystem	Digital Demand Responsive	Mobility Hubs	Dynamic Network Management
WYTS: Increases in bus, rail, walking and cycling trips	✓	✓	✓	✓	✓	✓
SEP: Inclusive growth	✓	✓	✓	✓	✓	
Leeds Clean Air Zone	✓			✓	✓	✓
Leeds City Region Energy Strategy: creating an efficient and integrated transport system	✓		✓	✓	✓	✓
Climate emergency	✓	✓	✓	✓	✓	✓

Monitoring and Evaluation – key learnings

Monitoring and evaluation will form an important part of the FMZ programme as it will help to assess whether the benefits of any specific aspect of the programme have been realised and to inform future implementation and investment in future mobility both in Leeds City Region and elsewhere. The basis for the proposed approach to monitoring and evaluation is the DfT's "Monitoring and Evaluation Framework of Local Authority Major Schemes" (September 2012). The proposed approach also takes into account the learnings from the Leeds Public Transport Investment Programme (LPTIP) evaluation.

We have outlined our proposed approach to monitoring and evaluation in detail within section E4. The key learnings points from the bid are as follows:

- To develop a better insight into the potential of different innovative future mobility interventions to meet local travel needs and to ensure that this is available to inform subsequent projects;
- To determine the potential contribution of future mobility solutions to promoting take-up of sustainable travel options and public transport use;
- To better understand the barriers to achieving sustainable change. Specifically, perceptions and behaviours and how these might be overcome;
- To understand the ability of different interventions to enable excluded and vulnerable groups to better connect to local services, employment and education opportunities; and
- To understand how the availability and use of data can best be used to optimise the delivery, management and use of new transport options.

Targeted users

Table B10 identifies which user segments are most expected to benefit from the components proposed as part of the FMZ.

Table B10 – LCR Future Mobility Zone - user segments expected to benefit from investment

Future Mobility Zone Fund Components	Leeds City Region Future Mobility Zone User Segments					
	Existing Commuters	Prospective Workers	Job Seekers	People on Lower Incomes	Young People	Carers
Streamlining booking and payment systems (including the digitally excluded), underpinned by a suite of mobility credits	✓	✓	✓	✓	✓	✓
New mobility nodes/hubs	✓	✓	✓	✓	✓	✓
Trials of on-demand alternatives		✓	✓	✓	✓	✓
Combining dynamic demand responsive services with data-led traffic management techniques	✓	✓	✓	✓	✓	✓

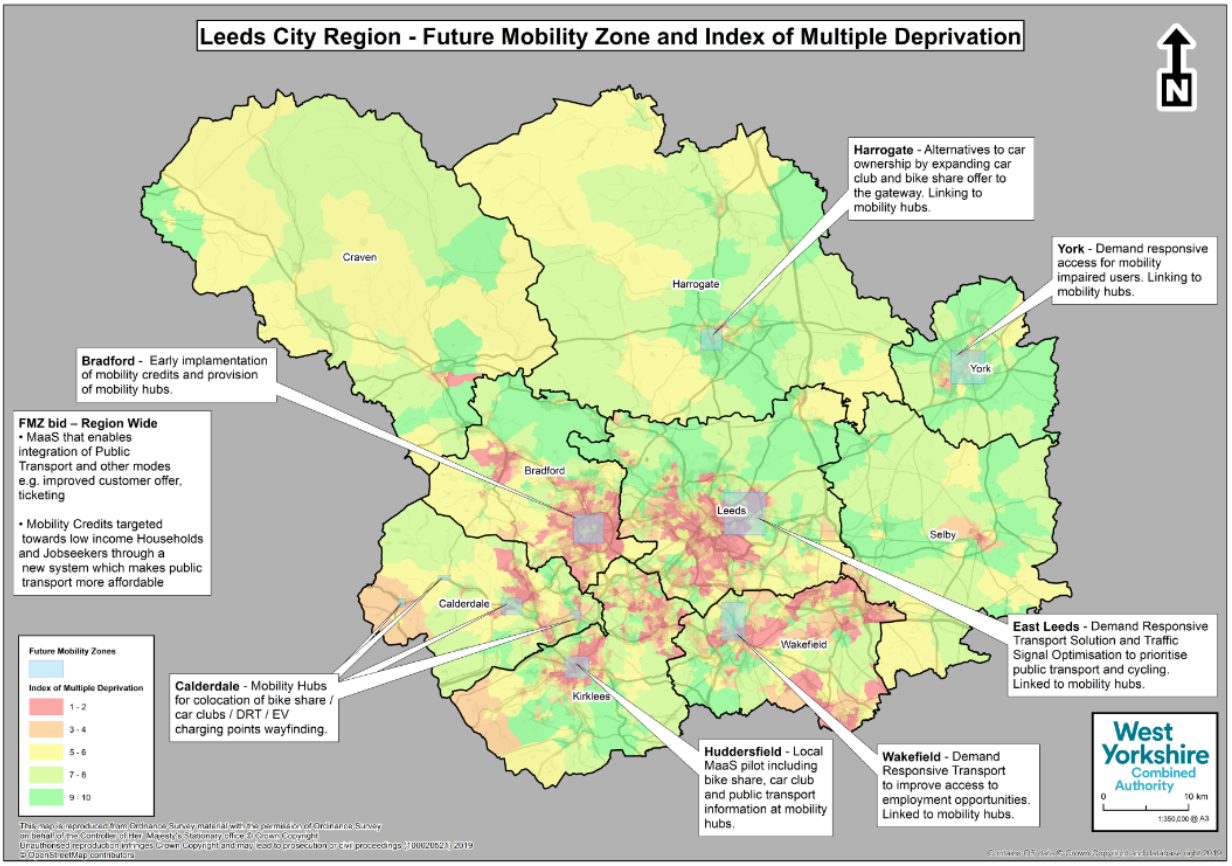
Responses to specific DfT questions

The following section addresses each of the specific questions to be covered in the response to E2.

A. Trialling new mobility services, modes and models to create a functioning marketplace for mobility that combines new and traditional modes;

The FMZ will include the trial of new mobility services in different locations – based on identified needs and strategic priorities at both a City Region and District level. The individual schemes within the FMZ build upon existing transport networks to provide services that meet unaddressed transport demand and provide links from these areas into the existing transport network. The components also provide a link with the TCF large bid currently under development. The map below (also included in Annex 3 to this document) demonstrates the links between the FMZ components, the TCF large bid and existing programmes of investment currently being delivered through the West Yorkshire plus Transport Fund (WYTF) and the Leeds Public Transport Improvement Programme (LPTIP).

Figure B11 - FMZ proposals and Index of Multiple Deprivation (IMD)



The simplification of payment systems and cost bases to help re-balance the equity of access to transport services will be addressed as part of the FMZ through the development of an overarching Mobility as a Service (MaaS) offer will combine new and existing models of transport into one network. The MaaS offer will enable frictionless planning, purchase and payment for transport and provide a platform for a tailored suite of mobility credits to be accessed and utilised.

Both West Yorkshire Combined Authority (the CA) and the Districts included within the FMZ are working with partners to explore the commercial barriers, challenges and realities involved in delivering new models of mobility and are actively engaged in the development of strategies to address these issues.

The FMZ will enable real trials of innovative technology in different use cases that are directly replicable to other cities in the UK and elsewhere during the four-year programme. The programme includes the following innovations:

- The development of a **MaaS platform and application** to facilitate planning, booking and purchase of travel on account across all user groups and provide access to mobility credits. Through the development of a unified platform we will capture data across the whole transport / mobility spectrum including operational, network and operator sources to provide us with a single 'version of the truth' that will help manage our network effectively and provide enhanced information to customers;
- A suite of **mobility credit solutions** to target specific user groups, including job seekers, those returning to work, access to education and healthcare, lifestyle credits and to encourage sustainable travel behaviours. Initial roll out will be focussed on Bradford;
- **Digital demand responsive services** that will focus on providing access to the transport network in locations where this is currently poor (Wakefield), together with improving access to employment opportunities from housing growth areas in East Leeds. The FMZ will also include

a trial of automated solutions to meet specific city core use cases for the mobility impaired in York – a first in a public environment in the UK and to our knowledge in the world.
- **Mobility hubs** which will provide interchange and integration for existing and new modes, together with community functions and real-time information provision (Calderdale, Harrogate and Kirklees). The mobility hubs will be enabled by the development of the MaaS offer across all modes. Annex 4 presents further information about the locations where mobility hubs are planned and the facilities to be provided in each location.
- **Dynamic network management** that will enable new mobility modes to serve congested areas without impacting on traffic flow, focused initially on East Leeds and the Bradford to Leeds corridor. The dynamic network management will also provide a catalyst for improved air quality, congestion management and place-led outcomes within the FMZ.

Together, these interventions will deliver a step-change in the potential that transport / mobility has in meeting the needs of our communities and businesses. It will showcase how new interventions can supplement and integrate with the existing transport eco-system and importantly provide viable alternatives to owning or perceiving the need to own a private car.

The following example illustrates how development of a digital demand responsive offer would improve journey options for commuters and tackle social isolation:

The lonely widow – Anne has recently lost her husband with whom she spent much of her time. Like many older people, Anne is worried she'll become isolated and lonely. As she doesn't drive and isn't familiar with technology she's at a loss as to how to get around. After a little training and using a voice activated device, Annie can plan, book and pay for travel with ease. She regularly books the on- demand bus service to take her to the social club where she's made new friends. She's told them how she speaks to a computer to book her travel and they've asked where they can get one.

B. Improving the integration of services;
The integration of existing and new mobility modes is integral to this bid and will be facilitated through the development of the MaaS offer. The following elements of the FMZ will particularly help to improve integration:

- The development of a MaaS platform that encompasses both existing modes (bus, rail, walking and cycling) and new demand responsive, cycle hire and car club services, which will be delivered as part of this bid. The MaaS solution will be tailored to the city region's needs and will test how customers engage not only with a new means of accessing mobility, but how they do this in the context of the new interventions within the FMZ. For instance, in Harrogate the MaaS platform would test existing car drivers' interactions as part of the mobility hubs with small EVs offer. In the later years of the FMZ programme we anticipate being able to add other functions to the MaaS offer including the ability to pay for leisure and other services and potentially at other retail outlets to streamline the friction in trip making.

- Improvements to the bus real-time information offer that will be delivered as part of the large TCF bid. This is focussed on improving the current bus real time provision on the corridors where there is greatest potential for improving access to employment opportunities (particularly from areas of deprivation) and improving connectivity between new housing and employment sites and the existing transport network. The real-time provision will be expanded to integrate it with demand responsive services being delivered as part of the FMZ. It is anticipated that this expansion will be delivered through the large TCF programme (subject to funding).
- We will also work to develop additional functionality to the journey planning element of the MaaS offer which will help to provide disruption and other trip information including traffic and weather to help add functionality and intelligence to the travel planning offer.

- Digital integration for hard to reach groups through voice and other devices. Much of the technology innovation around MaaS has focussed on the use of apps to access the service.

We are currently developing partnerships with payment solution providers (e.g. credit unions) for people who do not have access to bank accounts. We will develop this to ensure that the MaaS offer is as inclusive as possible.

As part of the FMZ, the bid partners will work closely with the Leeds Clinical Commissioning Group and the Centre for Ageing Better to identify ways in which digital transport services can be made accessible to elderly and mobility impaired groups. An example of this might include building facilities into the MaaS offer to enable booking through voice activated software (e.g. Alexa) and providing these to specific groups in certain locations to test how such solutions can remove barriers to access.

Leeds City Council already have an initiative to promote digital skills and inclusion called '100% Digital Leeds', which is helping to improve digital inclusion particularly across groups which have traditionally been harder to reach with skills and training. Improving digital inclusion can help to positively impact upon people's lives and help improve access to employment, pay less for things, become better informed, access health and social care opportunities, reduce isolation and live longer lives. If successful, we will work closely with Leeds City Council and our other partner Districts to help fund the roll out of the approach used in Leeds across the City Region.

We will also take into account the results of research currently underway on older people and autonomous, digitised/shared transport.

C. Increasing the availability of bus real-time data;
As part of the development of the large TCF bid for the City Region, a comprehensive roll out of real time technology across the corridors identified in the bid is being proposed. This equates to at least 300 new real-time units (a mixture of battery and mains powered) that will be located on the corridors identified within the large bid. The new real-time units complement the existing investment being made through the LPTIP programme.

The investment in real-time information proposed as part of the large TCF bids represents a step change in provision direct to users across the City Region outside of Leeds. This will particularly be targeted at areas of deprivation or where existing public transport accessibility is low and the FMZ will enable additional services digital demand responsive, car club and bike hire services to be provided. Annex 4 indicates the facilities to be provided at each hub location across the FMZ and the interactions with existing funded programmes which will provide complementary facilities at hub locations including real time information.

The MaaS platform will put real time and predictive information in the hands of smartphone users across the City Region. Importantly, as mentioned above, the use of voice activated devices will not only allow for the booking and payment of services, but will unlock real time travel information for those who currently have no access at all.

D. Providing access to digital planning and payment options;
The development of a digital platform will be the enabler for the MaaS platform, drawing upon network and service information and enriching this with real time performance data in order to deliver tailored solutions for all users. The digital eco-system represents a step change in acquiring, storing and harnessing value from mobility data that will result in a significantly improved user experience of planning travel.

The FMZ funding will enable the development of an overarching MaaS offer for the City Region that can be accessed through an app, online, by phone or voice activation (e.g. Alexa). This will build on our existing MCard (public transport smart card) platform (thus helping de-risk development) to enable users to plan, book and pay for travel in one place.

The development and delivery of the MaaS offer will be user centric and will be guided through engagement with key user groups including (but not limited to) existing MCard users and

current car users to enable them to shape how improvements can be made. The first deployments of this technology will be for specific use cases in Kirklees, which will allow different aspects of the functionality and user experience to be delivered and tested in an iterative manner.

The building blocks for MaaS in the City Region already exist: the Combined Authority, bus and rail operators are all engaged in a joint venture company - West Yorkshire Ticketing Company which manages the current smart ticketing offer. It also co –owns Yorcard Ltd which is a ticketing technology development company managing the current smart ticketing platform. Both companies have indicated their support for working in partnership to deliver the FMZ proposals. The CA also has a strong relationship with the bus operators through the Bus Alliance partnership and, as a result of developing the MCard over the past decade, the CA has an existing procurement relationship with Yorcard. Through early engagement with South Yorkshire PTE, who jointly own Yorcard, we have developed a shared understanding of the opportunity to create a common back office for MaaS across the Combined Authority areas.

E. Exploring options for providing mobility credits, or other low-cost options for low income household;

Building on the MaaS offer that will be developed, a segmented approach to the provision of mobility credits will be taken to address the affordability of travel. This will include:
- People on lower incomes;
- Job seekers (building on the existing programme of reduced price MCards offered in partnership with JobCentre plus);
- Young people;
- People in education (including those returning to education in later life); and
- Those caring for relatives on a long-term basis.

There are a variety of ways in which the mobility credits could be administered. We have undertaken pre-market engagement with MaaS providers as part of the development of this Stage 2 bid and are aware that different providers would take slightly different approaches to the delivery of the mobility credits element.

There is already technology deployed in the MaaS sector which would enable credits to be pre-loaded onto an app and made available for defined modal choices. Initially a roll out of £2,000 mobility allowance made available to 1,500 users across the segments identified above has been included in the budget at a cost of £2,000,000. This would be further developed as part of the first six months of the bid as we assess and review the segments to receive credits. The demographic analysis undertaken using Mosaic data indicates that in Bradford the potential size of the market for mobility credits is approximately 85,000 (based on the 'financially stretched' mosaic group).

This element of the package will contribute toward our inclusive growth and productivity objectives.

As part of the FMZ package, the provision of digital demand responsive services will be examined in a number of different use cases, including rural area (Kirklees and Calderdale); locations with high concentrations of deprived wards (East Leeds); and services that specifically enable access improvements for mobility impaired people to the pedestrian area of York city centre. These demand responsive services will help to enable the provision of services that better address the needs of lower income households in areas that the existing public transport network does not currently address. The suite of mobility credits are an enabler to better access to these and existing services for some of our most challenged groups.

In parallel with the development of the FMZ package, the Combined Authority is working with Districts, transport operators and other partners to address the affordability of transport through

both the Bus Alliance partnership and the delivery of the Digital Payment for Travel Strategy. An example of the deliverables of these work streams includes development of a maximum fare for a single journey for young people which was launched in summer 2019. This initiative will help to deliver our inclusive growth objectives.

The outcome of developing the mobility credits programme will be that for the groups outlined above, there is a measurable and more sustained use of public transport; that it reduces the burden of needing (or the perception of needing) to own a car (for example to access employment opportunities or other key services); and that it facilitates a shift to accessing a car as part of a mobility mix, in place of ownership.

The following example illustrates how mobility credits would improve journey options for apprentices and people re-entering training later in life:

The hopeful apprentice – Tyler is leaving school soon and wants an apprenticeship. He knows that there are quite a few he can apply for but as he can't drive and public transport might be expensive he's worried that it might just be impractical. The combination of mobility credits and new demand responsive and first / last mile mobility will provide Tyler with access to significantly more apprenticeships to apply for. He can look further afield, safe in the knowledge that he'll be able to get work easily.

The mid-life re-skiller – Charlie has worked all his life in warehousing but recently his job which was close to home has been replaced by a robot. Determined to make the most and train to do something new, he's applied to the local college to train to be a bricklayer. Whilst he has a redundancy pay out he doesn't want this to be swallowed up in bus fares Mobility credits specifically targeted at those re-skilling will help Charlie and those in similar positions. It will help them use public transport to get to training and through MaaS and other mobility solutions help show Charlie that he has alternatives to the car.

E. Exploring options for delivering efficiencies through shared (dynamic) demand responsive transport.

The FMZ will test a number of different use cases for demand responsive services, including peri-urban in Wakefield, linking deprived areas and new development / employment sites into the existing transport network (East Leeds and Wakefield) and to specifically improve access for mobility impaired users to the pedestrian core area of York. Additionally, the introduction of mini EVs in Harrogate looks to support a shift away from car reliance with the potential to reduce vehicles kilometres travelled and congestion around the urban core.

The development of the demand responsive services has been driven by the potential customer use cases that are currently not catered for by the existing bus network. *This element of the package will help contribute towards our inclusive growth objectives.*

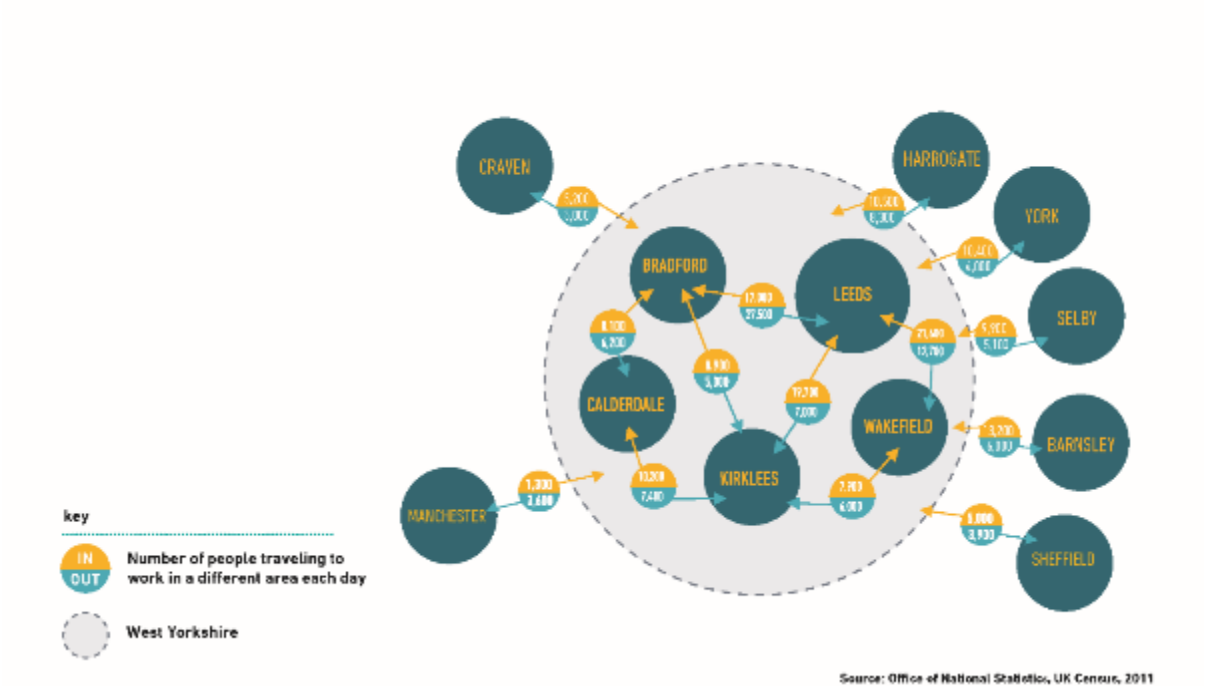
There is also flexibility for these demand responsive services to provide capacity for other uses e.g. access to hospitals and healthcare and if successful we would work to develop the offer particularly for health-related journeys in partnership with the Leeds Clinical Commissioning Group and the Centre for Ageing Better, who we are already working with on a project in Leeds to help provide digital integration and management of community transport services.

As part of the monitoring and evaluation of the demand responsive pilots, we will examine how best to deliver efficiencies and improve outcomes from the services (for example through varying the hours of operation or geographical coverage provided).
As part of the pilot proposed in York, we will trial and evaluate the role that automation can play in helping to reduce the longer term operating costs of demand responsive services, in this case through an electric, driverless solution. This unique proposal, targetted at customers with visible and hidden disabilities, will test of the first time automated solutions for these groups – learning that could be critical in addressing increasing Social Care and Special Education Needs transport in the future.

The scheme will provide small, automated shuttles to operate a new service which will give mobility impaired people access to the heart of York's pedestrian area.
The proposed scheme, which is assessed to have costs of around £4m, is easily scalable, and additional routes or higher frequency services could be added if funding becomes available, or in response to high levels of demand.

Contribution of schemes by District towards strategic transport objectives
The following section summarises the local conditions in each District and identifies the planned intervention, the target audience for the intervention that will be benefitted, how this will meet the objectives of the FMZ and the anticipated outcomes of the schemes for each District. The key commuting flows to/from each District are identified in Figure B12.

Figure B12 – Leeds City Region Transport Characteristics



City region wide schemes
The development of a MaaS application will help to encourage travel behaviour change and encourage more people to use active modes to travel shorter distances. In developing the MaaS offer, we will ensure that both digital and financial inclusion are at the heart of its design and implementation. The mobility credits scheme delivered as part of the MaaS application will help to tackle the affordability of public transport for key groups across the City Region including prospective workers, job seekers, people on lower incomes, young people and carers.

Kirklees

- Total Population = 437,100
- % Workless Households = 16.6%
- Average Weekly earnings (FT Gross) = £531.10
- IOMD Average Score = 77
- Air Quality (see Annex 3)
- Key commuting flows – to/from Calderdale, Leeds, Bradford, and Wakefield (see diagram above)

The Huddersfield programme of MaaS and mobility hubs will provide the opportunity for a diagonal slice of participants from across Huddersfield and its hinterland to change their car usage rates and car ownership status, as well as alter their travel behaviour and life-style. MaaS subscribers will be rewarded with points for every ton of CO2 emissions avoided by using more sustainable travel modes. These points will be redeemable for a range of goods and services.

This element of the programme will have substantial sustainability merits for the area including reduced traffic congestion, environmental degradation and air pollution, and create more efficient use of the transport network and living space, all of which are priorities across the local area and City Region. This will be a true behavioural experiment that will provide the target area with viable transport mode additions (e.g. bike-sharing).

Bradford

- Total Population = 534,800
- % Workless Households = 16.8%
- Average Weekly earnings (FT Gross) = £488.70
- IOMD Average Score = 26
- Air Quality (see Annex 3)
- Key commuting flows - to/from Leeds, Kirklees, Calderdale and Craven (see diagram above)

Initial pilots of mobility credits in Bradford will help to tackle the affordability of transport for specific user groups including young people, those on lower incomes and job seekers. These pilots will help contribute towards reducing social exclusion and addressing unemployment and will help to inform the roll out of the mobility credits scheme across the rest of the City Region. A communications plan is included as part of section E4 which will seek to ensure that the groups we seek to target with the mobility credits and other interventions are aware of them and understand how they will be administered.

Investment in mobility hubs that strongly link into existing schemes (either committed through the large TCF bid or already funded through the West Yorkshire Plus Transport Fund and Corridor Improvement Programme) will help to improve the integration of new technology with existing transport modes, facilitated through the MaaS platform.

If successful in the early years of the programme, we will look at the potential for roll out the digital demand responsive offer into Bradford in the later years of the programme.

Calderdale

- Total Population = 209,500
- % Workless Households = 13.9%
- Average Weekly earnings (FT Gross) = £534.60
- IOMD Average Score = 105
- Air Quality (see Annex 3)
- Key commuting flows - to/from Kirklees and Bradford (see diagram above)

The Calderdale elements of the programme offer the opportunity to trial globally significant innovation in future mobility concepts through the use of new inter-organisational partnership for example with Lloyds Banking Group (see letter of support provided in Annex 8) to provide new products and approaches to influence and change travel behaviour. The integration of services will develop an exportable template for new models of delivery for mobility services.

These solutions will provide businesses and local authorities with oversight of a real-time view of car-sharing occupancy in car parks and establish an incentivisation system for sustainable travel behaviours through use car-sharing schemes. Additionally, the enhanced data understanding will provide the local authority and employers with a richer understanding of parking behaviours and allow for a more dynamic approach to management and fare structuring.

Harrogate

- Total Population = 160,000
- % Workless Households = (not available - Sample size too small for reliable estimate)
- Average Weekly earnings (FT Gross) = £603.70
- IOMD Average Score = 282
- Air Quality (see Annex 3)
- Key commuting flows – to/from Leeds (see diagram above)

The Harrogate mobility hub proposals offer a test case opportunity for an innovate adoption of personal electric mobility targeted at increasing transport agility and reducing car ownership to advance a low carbon transport agenda, with wider applications to car dependent areas, such as rural hinterlands, as part of the climate change driven agenda. In addition to personal electric vehicles, bikes, e-bikes and car club vehicles will also be provided at hub locations. A complete list of the facilities to be provided at each hub is included in Annex 4.

The use of small, zero emission vehicles will provide a demand responsive transport service which is flexible, accessible and makes efficient use of road space with modal appeal to a wide segment of the community and provides a new innovative option for travel to keep younger people from needing to own a car. By adopting a targeted personal mobility approach, the Harrogate programme looks to provide viable long-term alternatives to single and multi-car ownership and to raise the profile of cycling as a viable journey option. The programme aims to encourage behaviour change in relation to private car use in and around Harrogate, by reducing dependence on private cars and providing innovative options for travel to improve both accessibility and flexibility of alternative travel options.

York

- Total Population = 208,200 – of which 20,090 are blue badge holders who would be in scope for the proposed demand responsive shuttle scheme in York (30 minute travel time isochrones used - DfT 2018 Blue Badge statistics).
- % Workless Households = 13.9%
- Average Weekly earnings (FT Gross) = £512.60
- IOMD Average Score = 234
- Air Quality (see Annex 3)
- Key commuting flows – to/from Leeds (see diagram above)

The York programme introduces an innovative approach to address mobility equity while delivering place-making and air quality benefits to the city centre. York's position as a tourist destination, will not only raise the profile of the scheme and technology utilised, but the large visitor numbers will ensure significant numbers of users in the target demographic. The FMZ programme will benefit from a live trial of an automated vehicle service through a comprehensive evaluation of its effectiveness and interaction with a wide variety of groups in the community. Additionally, the siting of this visible demonstration of leading edge technology in central York will ensure it will be seen by visitors to the UK, encouraging formation of a view that the UK is a leader in autonomous vehicle technology.

The scheme looks to build on the use of this type of vehicle to deliver last-mile solutions already in operation in several other European cities, tailoring the service for the needs of this specific user group to create a globally significant future mobility demonstrator project.

This project will form an exportable template for other cities specifically looking to address equity of access, and will demonstrate a solution that can replicated in cities across the globe looking to maintain access whilst improving environments and protecting citizens.

Wakefield

- Total Population = 340,800
- % Workless Households = 13%
- Average Weekly earnings (FT Gross) = £520.20
- IOMD Average Score = 67
- Air Quality (see Annex 3)
- Key commuting flows – to/from Kirklees, Leeds, Selby and Barnsley (see diagram above)

This proposal will use innovative demand responsive technology to open up opportunities in key employment zones, with an emphasis on reducing car reliance and supporting those without a car to access jobs and services. Mobility hubs will also help to improve interchange between the demand responsive services and other existing transport modes across the locations identified for investment.

The introduction of the demand responsive service will encourage public transport use, provide a viable alternative to car use for local travel in this area, and help to secure equity of access to jobs, opportunities and healthcare. The schemes will also reduce parking challenges locally at workplaces and railway stations, as well as easing the pressures around parking space in residential areas through reducing the dependency on multiple car ownership. The Wakefield project offers a globally significant opportunity to pilot innovative demand responsive solutions in a non-metropolitan context with significant wider application potential for across the UK.

Leeds

- Total Population = 784,800
- % Workless Households = 12.6%
- Average Weekly earnings (FT Gross) = £548.30
- IOMD Average Score = 68
- Air Quality (see Annex 3)
- Key commuting flows – to/from Wakefield, Kirklees, Bradford, Harrogate, York and Selby (see diagram above)

The proposal links smart technology and artificial intelligence (AI) capabilities to deliver an optimised demand responsive solution that links into mobility hub locations. This will help to promote links with existing transport modes and more sustainable travel choices, particularly for first/last mile journeys. The complementary nature of these technology solutions has significant potential to rebalance the mobility hierarchy in favour of low carbon modes, enhance scheme outcomes and present a significant global demonstrator opportunity.

The schemes within the FMZ programme are directly applicable to transport corridors to rebalance priorities, improve performance and deliver low carbon outcomes in cities across the UK and elsewhere.

SECTION C – The economic case

C1. The economic case – Government funding

Please provide brief details of why government funding is needed to create each of the projects in the overall FMZ scheme including:

- *why the private sector is unable to fund the project?*
- *what would happen to the project if government funding was not available (e.g. how would it be scaled back)?*

There is currently little evidence that the market alone (within the UK or globally) would be able to deliver the projects outlined within this FMZ bid. Whilst many of the interventions included within our FMZ have been delivered elsewhere in part, we would argue that the commercial realities of interventions could be somewhat different from perception. As we have seen there have been numerous market failures, either because the business models were incorrect for the markets served, or that little conscience was given to local needs and conditions.

In preparing this bid we have thought long and hard about these matters. We believe that an approach where the public sector (in our case WYCA and its partners) who understand those local conditions, needs and expectations implicitly, create an environment to pump prime, pilot and encourage 3rd parties to engage – is the recipe for sustained success and a new Business As Usual.

With this thinking in mind, below we outline the areas where we believe that intervention is essential to deliver the overall objectives set out in this bid, those of the FMZ fund (within the broad parameters set out on the Future of Mobility: Urban Strategy) and potentially those of UK and international colleagues wrestling with similar challenges

MaaS – whilst the market is moving towards delivery of some elements of MaaS, this has not yet been successfully at-scale within the UK marketplace. Learnings to date have been valuable, as have those of international deployments and we will build upon these. The objectives we have outlined in this bid – particularly around addressing social need (including digital and financial inclusion and ensuring that those with disabilities are also included in the technology solutions developed) would not necessary be delivered by the market. Market led implementation of MaaS has to date focused on the sectors of society where greatest commercial profit can be gained and this generally does not include the most vulnerable and those on low incomes. The market engagement that we have undertaken with MaaS providers via the PIN notice indicates that the market is generally focussed on delivery where the commercial gains are likely to be greatest. Importantly we have not been able to find any at-scale examples of mobility credits operating through apps or smart cards, our FMZ would enable Leeds City Region to deliver the first example of this in the UK, if not globally. Investment is MaaS, at scale, carefully specified to meet the needs of the City Region, in close collaboration with commercial providers would provide the laser sharp focus necessary for sustained success and social value.

DRT – The commercial applications of demand responsive transport currently focus on urban areas where the opportunities for commercial return are highest. Whilst headline data seems to be impressive in terms of journey times and modal shift this obscures any potential negative issues relating to exclusion. The implementations of DRT proposed within this bid aim to test the concept in peri-urban areas (fringing some rural areas) and locations where the social objectives of the schemes will make it more difficult to operate the service on the purely commercial models largely adopted to date. This distinction is important. We believe that with the right specification DRT (especially downstream once autonomy is a reality) could unlock whole swathes of the market which have been abandoned over recent decades. Our market engagement with DRT suppliers suggests that operators are at an early stage of implementing

DRT elsewhere in the UK and there is still some fluidity in the commercial models being adopted. Our FMZ makes the direct link between socio-economic needs, potential markets and the significant opportunities that DRT provides. There could be considerable, translateable learnings from the establishment of the interventions in the specific locations we have outlined within this bid.

Mobility hubs – Like many city regions across the UK the Leeds City Region has a long history of developing and implementing multi modal interchanges, an interactive process that started in the 1970s and 1980s. However, the mobility landscape has changed, as has the shape form and use of our built environments. The potential now exists, for mobility to be the catalyst to reinvigorate our district centres and high streets, to agglomerate transport and utility functions together to not only reduce stress, friction and inconvenience in peoples' lives but importantly to reduce trip making and overall vehicle miles travelled. In developing our mobility hub proposals we have considered the City Region's needs carefully. The infrastructure elements of these mobility hubs would not normally be delivered by the market as commercial providers do not generally have access to capital funding streams or the relevant powers to enable the delivery of this type of infrastructure. Coupling our modular approach to mobility hubs with the services proposed in our FMZ, underpinned by common branding, we will not only increase access but also enhance commercialisation and long term viability.

Dynamic Network Management – The infrastructure elements of our dynamic network management would not be delivered by the market as commercial providers do not generally have access to capital funding streams or the relevant powers to enable the delivery of this type of infrastructure. Indeed cases where private entities have made pre-emptive, innovation led investment in local infrastructure are almost non-existent

In the absence of funding from DfT, we would not be able to deliver the programme as set out within this bid. Whilst there are some smaller amount of funding available to the Combined Authority, these would not be large enough to enable us to deliver schemes with the geographic scope suggested or at the speed outlined in our delivery plan.

Whilst our ambitions remain strong to deliver this programme, if we are not successful in being awarded the funding we would ensure that the ambition that this programme represents is reflected in our emerging Future Mobility Strategy.

C2. The economic case – Benefits to transport users and wider society

Please outline which user segments are most expected to benefit from the FMZ (e.g. existing commuters, prospective workers with new access to work).

Please outline the benefits to transport users and wider society. User impacts could include: cost savings; improved journey times; improved journey reliability. Societal impacts could include: improvements in safety; improvements in air quality.

Please provide details of how the mobility credits proposed in section B2 will benefit low income households.

In all cases, please provide clear evidence to show how the proposed innovations will lead to the expected outcomes and impacts (e.g. a logic map/theory of change). In particular, how will you manage the risk that users do not behave in ways that allow the expected outcomes to be realised?

Overview

The Leeds City Region FMZ will transform the way people travel. In doing so it is expected make a significant positive contribution to the region's economy. In broad terms, the FMZ programme has been designed to:

- support economic growth (by reducing congestion and improving access to jobs, skills and opportunities)
- reduce economic inequality (by improving accessibility for marginalised groups)

reduce carbon emissions from transport

- Reducing carbon emissions will itself bring real economic benefits. The Stern Report in 2010 made it clear that the economic costs of climate change would far outweigh the costs of taking concerted action to limit it. The government has agreed a set of carbon values to be used in policy appraisal and evaluation1.

Economic objectives

The Strategic Case (Section B) sets out our five objectives for the FMZ. All are associated in some way with economic benefits for transport users and wider society, as described below:

[1] https://www.gov.uk/government/collections/carbon-valuation--2

FMZ objective	Impact
Inclusive growth through improving equity of access to transport / mobility services.	People need good transport and mobility to be economically active and productive. FMZ will improve transport for all, and reduce barriers to mobility for people who are currently excluded.
Improving local connectivity issues, particularly between deprived communities and employment / skills opportunities.	People in deprived or isolated areas will have better access to employment opportunities, whilst employers will have access to a larger potential workforce.
Improving the affordability of public transport (in its widest sense), particularly for low income workers, job seekers and those in areas of deprivation.	The high cost of travelling to work can be a barrier to employment. FMZ will help more people to enter work, or find better jobs, leaving them with more disposable income, benefitting themselves and the local economy.
Utilising technology and associated services to **enable a shift to low carbon and sustainable mobility modes, reducing transport related emissions** and contributing to the City Region achieving its ambition to be net zero carbon by 2038.	The climate emergency means that it is essential to reduce carbon and other emissions from transport. FMZ will make it easier and cheaper for people to access and use low-carbon modes of transport, helping to build new, more sustainable travel habits and stimulating the growth of the UK sustainable technology sector. Reducing the rate of climate change will provide huge long-term economic benefits to wider society.
Ensuring digital and financial inclusion is at the heart of the development of new solutions.	FMZ will ensure that people are not excluded from access to better, more sustainable transport due to a lack of familiarity with information or financial technology. This will help more people to become, and remain, economically active.

A high level assessment of the contribution of the FMZ programme against these objectives has been undertaken. This is presented after a discussion of each of the FMZ components.

Potential users

The individual FMZ objectives and their associated economic benefits relate to different population groups. Consistent with these, we have identified six user segments to target and to benefit most from the components proposed as part of the FMZ programme. The six user segments are not exclusive. They are:

- existing commuters
- prospective workers
- job seekers
- people on lower incomes
- young people
- carers

Existing commuters will benefit from increased transport choice, more flexible services, and the opportunity to use more sustainable forms of transport, as well as from reduced congestion resulting from mode shift away from the car. For each of the other groups, participation in activities may at present be constrained by a lack of mobility, leading to social exclusion and a poorer quality of life. There is strong evidence for a direct connection between the cost of transport and the degree of accessibility to work and study opportunities for individuals . People without access to a car are heavily reliant on public transport. Their ability to travel to work may be constrained by the limited times and routes available in an unregulated market. Among this group increasingly, are young people, whose travel characteristics are markedly

different from previous generations due to factors such as the propensity to stay in education longer, to leave the family home at a later age due to adverse economic circumstances, and not to hold a driving licence , all the while being natives of the app economy, comfortable using smart devices and other technology. These target groups are considered most likely to make use of the services provided by the FMZ, since they have most to gain by having more, and better, transport options, as described below.

The population of the Leeds City Region is just over 3 million. Of these:
- 604,057 are aged 0-15 years
- 1,927,000 are of working age
- 531,480 are aged over 65 years
822,829 (26.9%) are in the most deprived quintile of the index of multiple deprivation
- 2.1% travel to work by train
- 5.7% travel to work by bus
- 8.7% travel to work on foot, or by bicycle

Elements of the FMZ programme
The economic benefits of the FMZ programme will be achieved through a package of connected components:
- Mobility as a Service and the digital eco-system
- Mobility Credits
- Mobility Hubs
- Digital demand-responsive services
- Dynamic Network Management
As already described, the FMZ will be delivered in different areas of the City Region, with its components tailored to the needs of each area, and designed to test different aspects of the programme.

Logic maps (causal chain analysis)
It is important to demonstrate clearly why we believe the FMZ programme will achieve the economic and other objectives, even though this generally has to be done in qualitative, rather than quantitative terms. To do this, a set of five logic maps (provided in Annex 7) has been developed for:
- The overall FMZ programme
- Mobility as a Service and Mobility Credits
- Mobility Hubs
- Digital demand responsive services
- Dynamic Network Management
These logic maps illustrate the expected causal links between the FMZ measures (inputs), through activities and outputs, to the expected direct and indirect outcomes, leading finally to the long-term impacts of the FMZ (fulfilment of the objectives). Critical assumptions are highlighted. Managing the risk that the responses to the components will be as illustrated is key to delivering the expected outcomes.

Overall economic impacts of the FMZ programme
The first logic map shows, at a fairly high level, how the various components of the FMZ will combine to transform the way transport is delivered and used in the City Regions. Each link is considered to be logical, and to represent causation. For example, Mobility Hubs will lead to accessible, co-location of a range of mobility and community functions (e.g. bus services, DRT services, car sharing, etc) and it is reasonable to assume that this will lead to modal shift and a reduction in private car mileage. This in turn will lead directly to reduced carbon emissions and reduced congestion, both of which are associated with real economic benefits for local users and wider society.

In similar ways, the first logic map illustrates the causal links by which the FMZ programme is expected to contribute towards:

- Reduced unemployment
- Fewer “NEETS”
- Greater equity of access
- Reduced carbon emissions and improved air quality
- Reduced road maintenance costs
- Reduced congestion leading to improved productivity
- Increased inward investment and regeneration
- Expansion of the market for future mobility
- Inclusive economic growth

Overall, the FMZ programme will reduce the cost of mobility (economically, financially, socially and environmentally), providing benefits to its direct users and other transport users across the region. In addition, there will be indirect outcomes and long-term impacts on other transport users and wider society. As identified in the logic maps for MaaS & Mobility Credits and Mobility Hubs, these encompass economic, environmental, health and social effects.

The potential transfer of existing road users and public transport users to alternative modes within the FMZ could reduce crowding and congestion on transport networks benefitting those who depend on them. This would improve journey times and reliability, and hence improve accessibility to employment, education and services, benefitting the targeted user segments. Further benefits could derive from highway accident reductions and lower vehicle operating costs.

In addition to the changes for transport users, there will be wider economic impacts on society as recognised in DfT guidance, including induced investment, employment effects and agglomeration effects. Improvements in accessibility due to the FMZ programme will make locations in the region more attractive to people and businesses, influencing the levels of activity which take place, expanding labour and customer markets and supporting a more productive economy. Productivity would also be expected to strengthen due to the lowering of transport costs effectively making businesses and people closer to each other.

Further, it is anticipated that there would be savings in unemployment benefits such as Job Seekers Allowance (JSA) due to the better access provided by the FMZ programme to employment, education and services. Associated with this and the greater accessibility of opportunities is the expectation of a reduction in the number of people not in education, employment or training (NEETS), reducing the burden they impose on local services and resources. Addressing this issue will increase the spending power of the local population, benefiting the local economy, increasing the tax base, and increasing the attractiveness of the area for investment, leading to higher levels of productivity for the region and a greater GVA contribution to the national economy.

Implementation of the FMZ will provide the opportunity to attract further investment seeking to capitalise on the potential of future mobility directly and the broader impacts of it.
The FMZ programme is expected to result in positive long-term impacts including improved inclusivity and equity of access and reduced social exclusion. These are significant distributional impacts. Enabling individuals to remain in work, education or other activities, including caring for others, and to continue to actively participate, offers the opportunity to support a good quality of life for people and reduce the burden on others (e.g. reducing the need for them to give up work) or the state. In addition to the cost of social care, the encouragement through the FMZ programme for greater use of active modes will benefit public health budgets, as will a reduction in carbon emissions and improvements in air quality.

The other logic maps illustrate in more detail how specific components of the FMZ will lead to changes in the way transport is perceived, provided and used, leading to changes in behaviour which will deliver the economic and other benefits to local transport users, the local economy and wider society.

Whilst the logic maps are intended to be self-explanatory, a complementary economic narrative for each is provided below:

MaaS and Mobility Credits – economic impacts

MaaS will provide an improved multi-modal offer in parallel with reducing the barriers to accessing this improved offer. In doing so it will offer an improved travel experience, and make alternatives to private car use more attractive. For MaaS users, including those in the target user segments, mobility will be greatly improved, unlocking the potential to gain productive time due to reduced journey times and/or a better journey experience and to access new employment (potentially at unsocial hours), education and training opportunities, with resulting higher pay and/or lower travel costs. In the case of using active modes to access the public transport network, or for the whole journey, MaaS users could benefit from positive physical and mental health effects. Increased use of active modes is associated with greater life expectancy, economic benefits from people remaining longer in employment, and reduced absenteeism.

For those on low incomes, Mobility Credits will be available to reduce the affordability barrier and ensure they can access the improved transport offer and therefore the resulting benefits that those on higher incomes could experience. Specifically, providing mobility credits reduces the marginal cost of transport for those currently "priced out" of travel. This can provide a boost / nudge into employment, which could be self-sustaining, as people can then better afford to meet the costs of transport.

Inequality at district level within the City Region is reflected in disparities in household income. For example, income per head in Bradford is less than two-thirds that of Harrogate. Income per head across the City Region is 80% of the national average, with seven of the 10 districts falling below the national average:

Gross disposable income per head (2017 prices)	
England	£19,988
Leeds City Region	£16,240
Bradford	£13,969
Barnsley	£15,243
Kirklees	£15,532
Calderdale	£15,538
Wakefield	£15,845
Leeds	£16,603
York	£17,917
Craven	£20,388
Selby	£20,660
Harrogate	£21,184

Mobility Hubs – economic impacts

Across the region, Mobility Hubs will provide the physical infrastructure for users to access transport services and transition between transport modes. Alongside their role in providing physical access to the wide range of means of transport accessed through the MaaS digital platform, and infrastructure such as EV charging and cycle lockers, they will also provide a location for community functions, e.g. delivery lockers, café, meeting facilities, which would help reduce short distance trips and increase sustainable economic activity. They will underpin improved accessibility and more convenient mobility from the hubs to existing destinations, as well as creating new highly accessible destinations for valuable community functions. This in turn, will deliver improvements for all users for all purposes, including mobility impaired groups, both by reducing the need to travel and by ensuring that there are convenient options for those trips which need to be made. As part of the overall FMZ offer, the reduction in barriers to mobility will benefit users through lowering the cost of access to opportunities to an improved quality of life.

Specifically, in relation to the Mobility Hubs, the provision of EV charging points will benefit EV owners, helping to reduce range anxiety.

Digital demand-responsive services – economic impacts

Digital demand-responsive services will be introduced as described below.

In **York**, as part of the Digital Demand Responsive Services, an automated shuttle service will be introduced in the city centre for the benefit of mobility impaired users. Providing access from dedicated park and ride facilities on the fringe of the city to locations within the pedestrianised city centre, the service will address last mile/first mile challenges for the mobility impaired. Being responsive to demand, the service will improve both the geographic coverage of public transport and the inter-peak and evening offer. Along with providing flexibility, and an easier transition between public transport options, the service will reduce the barriers to accessibility for the mobility impaired in York. This will benefit users' mobility and increase the opportunities for them to access amenities, services and locations for employment and education. This can improve their quality of life and meet their needs as existing commuters, prospective workers, job seekers, people on lower incomes or young people.

For other transport users and wider society, the service will improve the efficiency of the transport network, reducing the need for private car journeys to central York for the mobility impaired, reducing vehicle miles travelled and congestion. The transfer of trips to demand-responsive services, which will be connected to the city's smart infrastructure, is anticipated to reduce noise and emissions in central York, with associated public health benefits and support economic productivity benefits arising from lowering the transport cost for the mobility impaired and therefore realising the wider economic impacts and the long term impacts anticipated for the FMZ programme, including reduction in NEETS, equity of access and investment in the region.

In **Wakefield**, the proposed Digital Demand Responsive Service will target the needs of those accessing, or wishing to access, the key employment centres, transport hubs and healthcare services around the periphery of Wakefield. This will address the gaps in the existing public transport network, improving mobility for MaaS users. The scheme will therefore directly benefit the target user segments in the area served, with associated benefits for transport users in general and wider society as existing barriers to employment and other opportunities are lowered and the long-term outcomes of the FMZ programme are realised.

In **Leeds**, the Digital Demand Responsive Service will be complemented by traffic signal optimisation. This will further enhance the attraction of the MaaS services by seeking to rebalance the mobility hierarchy in favour of the DDRS and other sustainable travel modes, in turn increasing accessibility for MaaS users and providing environmental benefits. The geographical location will target a low-income area of the city, which currently has poor accessibility to employment, education and training opportunities, helping to rebalance the economy towards more deprived groups. Addressing these issues will result in the direct and indirect impacts, as well as the long-term outcomes identified for the components of the MaaS programme.

Dynamic network management – economic impacts

Further dynamic network management elements are proposed for Calderdale. As with traffic signal optimisation, real time monitoring of parking demand and capacity will enable action to be taken in real-time to encourage sustainable mobility services and minimise inefficient use of the transport network, including the kerbsides, e.g. circulating to find a parking space and contributing to congestion, pollution. Among the targeted user segments to benefit will be existing commuters as well as local residents who may include carers, job seekers and those on lower incomes.

The MaaS programme will enable the transport network across the region to meet the varied needs of various transport user segments and to establish the foundation for encouraging further travel behavioural change that benefits individuals and the wider community through improved access and quality of life, whilst also providing a sustainable future for transport.

High-level assessment of FMZ impacts

A high level assessment of the contribution of the FMZ programme against these objectives has been undertaken, using a 7-point scale from large beneficial to large adverse. This indicates the scale of the anticipated impacts of each component and the overall impact of the programme, which will be evaluated through the monitoring and evaluation process.

FMZ objective	Associated economic benefits	MaaS	Mobility Credits	Mobility Hubs	Digital demand-responsive services	Dynamic network management	Overall economic impacts of the FMZ programme
Inclusive growth through improving equity of access to transport / mobility services.	People need good transport and mobility to be economically active and productive. FMZ will improve transport for all, including those targeted by specific interventions, and reduce barriers to mobility for people who are currently excluded.	Moderate beneficial	Moderate beneficial	Moderate beneficial	Moderate beneficial	Moderate beneficial	Moderate beneficial
Improving local connectivity issues, particularly between deprived communities and employment / skills opportunities.	People in deprived or isolated areas will have better access to employment opportunities, whilst employers will have access to a larger potential workforce.	Moderate beneficial	Large beneficial	Moderate beneficial	Large beneficial	Moderate beneficial	Moderate beneficial
Improving the affordability of public transport (in its widest sense), particularly for low income workers, job seekers and those in areas of deprivation.	The high cost of travelling to work can be a barrier to employment. FMZ will help more people to enter work, or find better jobs, leaving them with more disposable income, benefitting themselves and the local economy.	Slight beneficial	Large beneficial	Slight beneficial	Moderate beneficial	Neutral	Slight beneficial
Utilising technology and associated services to **enable a shift to low carbon and sustainable mobility modes, reducing transport related emissions** and contributing to the City Region achieving its ambition to be net zero carbon by 2038.	The climate emergency means that it is essential to reduce carbon and other emissions from transport. FMZ will make it easier and cheaper for people to access and use low-carbon modes of transport, helping to build new, more sustainable travel habits and stimulating the growth of the UK sustainable technology sector. Reducing the rate of climate change will provide huge long-term economic benefits to wider society.	Moderate beneficial	Large beneficial	Large beneficial	Moderate beneficial	Large beneficial	Large beneficial
Ensuring digital and financial inclusion is at the heart of the development of new solutions.	FMZ will ensure that people are not excluded from access to better, more sustainable transport due to a lack of familiarity with information or financial technology. This will help more people to become, and remain, economically active.	Large beneficial	Slight beneficial	Moderate beneficial	Moderate beneficial	Slight beneficial	Moderate beneficial

Evidence base

There is considerable evidence that interventions proposed in the FMZ have been effective in other areas. Some examples are set out below:

<u>Mobility as a Service (MaaS) platform - evidence</u>

2014, UbiGo pilot test, Gothenburg (Sweden): User centred problem-solving solution of UbiGo in Gothenburg, Sweden was trialled in 2014. This involved 70 households paying their transport costs upfront while earning a bonus for making sustainable travel choices. The change in mobility habits involved a 50% reduction in private car use and a less positive

attitude towards private car use and a more positive opinion on alternative modes of transport. 97% of those who reported behavioural changes were satisfied with the change in their travel habits. Hence through the introduction of new integrated transport services, the pilot has helped to transition the city towards adopting greener choices of transport. This case study has proven that MaaS does have the potential to create more sustainable travel behaviours.

2018, Navigogo, Scotland - NaviGoGo is Scotland's first MaaS service and exists to improve how young people aged 16-25 use and combine travel modes and services to suit the needs of their lifestyle such as accessing educational and employment opportunities. The NaviGoGo web app service was trialled in 2018 by 98 16-25 year olds in Dundee and north east Fife, and used to plan over 2000 journeys, and book and pay for 480 journeys. This tailored MaaS service has increased journey options with more than 50% of surveyed users agreed or strongly agreed their travel was made easier by the app given the benefits in terms of convenience, provision of better information, and options that can be customised to enhance end to end journey competition.

Mobility credits - Relevant Evidence

2012 MobiMart pilot test, Bologna (Italy)"Mobimart" was conducted in 2012 as a pilot test in Bologna as part of the European project co-funded by European Commission- CIVITAS MIMOSA designed to award residents who cycle, use public transport or car-share with mobility credits, which can be obtained at an individual and community level. The project is based on the idea that economic incentives will encourage the switch to more sustainable ways of travel, as captured by the Kyoto incentive mechanism for pollutant emissions. Testing of a flexible urban transport service, a bike campaign targeted at monitoring the habits and frequency of bike usage, a carpool system and a car-sharing initiative has been completed. The drive behind this system is to help convince people to consider alternatives to the private car and instead start considering multimodal transport. Public transport or using car sharing/ pooling in replace of travelling by private car will be rewarded with a complementary amount of mobility eco-savings (mobility credits).

2018, Lyft, Rider loyalty program, US The launch of Lyft Rewards, a loyalty program for riders will allow everyday riders to earn points for each dollar spent, which can be used for upgrades, savings on future rides or other things. The aim of this program is to help Lyft maintain a competitive edge against rivals such as Uber. The programme was launched in December 2018 and available to select riders in various cities, before rolling out to more riders in 2019.

Digital demand responsive services – Relevant evidence

ArrivaClick pilot, Kent ArrivaClick allows customers to book a journey in real-time, for a time and place that suits them. The key aim is to encourage people to use the public transport opportunities available to them. The transparent service with the high quality trackability option presents a highly convenient and accessible service to the user. Arriva Click also promotes shareability which helps to reduce the number of cars on the road. The pilot in Kent was successful in encouraging 50% of the participants surveys to switch from private car to ArrivaClick. 43% adopted the service for their daily commute and 9 out of 10 said they would recommend it to a friend. This service is part of making public transport more of a natural choice of travel for passengers.

2018, Arriva Click, Liverpool - ArrivaClick launched their first UK city service in Liverpool, August 2018 which combines the cost effectiveness of bus travel with the convenience of personalised transit. The app-based on demand public transport service allows passengers to 'order' and track a vehicle from the app. The service is easy to pay for with a guaranteed fare and is flexible in terms of the pick-up point and seat reservation. This on demand public transport allows passengers to be picked up and dropped off by bus in the order most convenient for them.

Mobility hubs – Relevant Evidence

2018, Integrated mobility platform Switchh, Hamburg. This MaaS service provided by Hamburger Hochbahn (Harmburg) will be based on a platform that will provide digital infrastructure for the Hamburg mobility market. The Hochbahn is creating inter-modal mobility hubs and Swiitch points across the city to enable physical integration between the various transport modes. The creation of multimodal interchanges aims to offer visibility to all mobility options and encourage the use of sustainable transport choices. In 2018, 17 Switchh points with metro connection and 28 decentralised neighbourhood mobi-hubs were available. The switch interchange at Berliner Tor in Hamburg includes a 'shuttle on demand' service essentially represents the 'dial-a-ride' concept in the digital age of today2. The app provides travellers with access to conveniently located cars and bike-sharing schemes for their onwards journey. The provision of digital infrastructure will enable sustainable and equitable access to all publicly available mobility services.

Dynamic network management
Southwark's Draft Kerbside Strategy This strategy provides a framework to managing the kerbside space using a 'Street wise' approach that uses data on Southwark's modes and travel patterns, as well as population, demographics, health and air quality trends. Southwark council will ensure that kerbside operations are fit for purpose and reflective of the needs of a 21st century borough in London. Operations may include dynamic parking and virtual loading bay systems and on street parking. These interventions can contribute to the creation of healthier streets through the monitoring or air quality and the creation of functional streets which reduce air pollution and support people to walk and cycle in Southwark.

[2] https://www.uitp.org/sites/default/files/cck-focus-papers-files/Report_MaaS_final.pdf

C3. The economic case – Benefits from new markets and business models

Are any new jobs likely to be created in the UK as a result of the FMZ? If so, what type of jobs will be created?

Are any new products and markets likely to be created in the UK as a result of the FMZ? If so, what is the potential revenue benefit?

Will other areas in the UK be able to replicate the innovations in the FMZ? Could these innovations be used in countries outside the UK?

Are any new jobs likely to be created in the UK as a result of the FMZ? If so, what type of jobs will be created?
The Leeds City Region FMZ is predicated on establishing a new Business As Usual for public transportation and mobility in all its guises across the City Region. The skills and resources that will need to be developed and nurtured during the 4-year programme and beyond do not necessarily exist today, some will be iterations from similar roles, others new.

Given the constituent primary components of our FMZ we consider the following to be new jobs created within UK industry as a result of the innovations proposed;

MaaS – depending upon the results of our procurement exercise we anticipate a significant upskilling of mobility specific software developers, analytic, machine learning and customer interface experts. These all being critical skills in delivering a viable MaaS solutions that not only meets customer needs, but can flex as those needs change also accommodating what we expect to be a shifting and expanding "public transport" / mobility marketplace. Whilst the component needs already exist in part in sections of the UK transportation and adjacent sector, digital mobility experts will play a vital role in moving the sector to similar maturity levels as say retail.

Mobility hubs – our mobility hubs envisage a catalytic effect for our conurbations. Whilst the fundamental components in themselves are tried and tested, the bringing together of transport, new mobility and supporting utility function will need a new approach to urban design. The skills needed in considering the human factors associated in eliminating the traditional pain points associated with mobility, coupling these with distinctive urban design within the concept of integrated placemaking will need multi-disciplinary future mobility / place planners. Again, whilst these skills exist in pockets at the moment, the new vernacular needed to make mobility hubs realise their true potential will need a new breed of planner.

Demand responsive transport – Our demand responsive proposals will require a new breed of public transport planners and engineers. Digitally driven, AI enabled planning will need digital natives who understand customer needs, public transport operations and the enabling platforms. The move to electric drive trains will need a new breed our automotive electrical engineers support (in the case of our Automated Shuttle proposal) autonomous vehicle engineers. Our proposed fleet of mini-EVs in Harrogate will need specialist support, automotive vehicle specialist expert in small electric vehicles, a first for the UK.

Digitally enabled highway interventions – our FMZ proposes a number of innovations with the digital highway space. This will need the next generation of ITS specialists, schooled in delivering improved outcomes, working within wider digital eco-systems. The overlap between big-data, AI and highways will blur through these interventions developing new roles and associated skill-sets.

Generally – the FMZ and development of the future mobility agenda will arguably need more multi-disciplinary planners who can bridge the mobility, digital, energy and place agendas, fully

embedded with customer centric thinking. We propose to use the FMZ to upskill WYCA and partner staff over the programme period, through our existing relationships with academia we see the FMZ as a way of influencing course design and through our commercial partners we will see new jobs created to deliver our aspirations.

Are any new products and markets likely to be created in the UK as a result of the FMZ? If so, what is the potential revenue benefit?
In a similar to jobs and skills we envisage a number of unique products and services arising from our FMZ programme and associated interventions;

MaaS – our MaaS will be an exemplar in building from an existing, tried, tested and proven ticketing suite to develop a tailored MaaS solution applicable to a complex urban, peri-urban and importantly rural city region. We believe that the conditions framing the ultimate MaaS solution will lead to solutions (or suites of component solutions) which will be translatable right across the UK – particular to metropolitan and market towns and fringing rural areas.

Mobility hubs – our integrated approach to mobility hubs will influence the design of the next generation of mobility street furniture developed by commercial entities, ultimately influencing the look and feel of transportation right across the UK. Through our agglomeration of functions at the mobility hubs it is conceivable that next generation retail kiosks, working spaces, medical hubs etc. could all result from our approach. By establishing the conditions for innovation to flourish we hope that we can kick start the future high street using mobility as the catalyst for change and long-term viability.

Demand responsive transport – our automated shuttle service for Blue Badge holders will be unique. It will set a high bar for automated transit focused on a specific user groups. We believe that the use case is replicable in numerous other locations and our efforts in ensure a customer centric, needs based approach to design will kick-start a new mode of transport. Similar our Mini-EV proposals, unique at scale in the UK, will provide new products which tackle the perception of need for multiple car ownership with fleet based mini-EV services being a new concept within the marketplace.

Will other areas in the UK be able to replicate the innovations in the FMZ? Could these innovations be used in countries outside the UK?
Throughout the development of our FMZ proposal we have considered a layered approach to the replicability of innovation;

1- replication beyond the core FMZ to the rest of the city regions urban, peri-urban and rural areas
2- replication to similar geographies / use cases across the UK
3- replication to global markets, particularly Europe, USA, Middle East and Australasia

For example, our modular approach to mobility hubs have been driven by the needs of our district centres but have in mind a programme of wider implementation across the region. The constituent components, within a modular framework, can then be applied to almost any other location, based on local geography, networks and services. At its heart is the customer, a universal constant across all territories. Similarly, our approach to demand responsive transport, particularly the automated shuttle and Mini-EV solutions could meet needs in many cities and towns across the UK. Finally, whilst MaaS will undoubtedly be considered by many FMZ proposals, our use case, building upon investments to date, building upon a strong customer base familiar with a suite of products, provides an approach directly replicable across the globe.

We a firmly committed to sharing our ongoing learning throughout the four-year programme with our near and far neighbours and colleagues. As we stated earlier we see the opportunities

through the FMZ to establish a new Business As Usual not just for Leeds City Region but exportable as an exemplar the world over.

SECTION D – The financial case

D1. Financial case – Scheme costs

This should include total scheme cost, total Future Mobility Zones Fund contribution, total public sector contribution, total local and private contributions and any contributions in kind. Where appropriate, letters of support should be included, to confirm contributions.

Please include a detailed breakdown of costs by individual project, and a profile of costs for each financial year up to 2022/23. For each project please indicate the level of certainty in your cost estimates.

Please indicate which projects would take priority if it was not possible to fund the FMZ, as proposed, in its entirety.

Total scheme cost (£m):
Total DfT (FMZ) funding contribution (£m):
Total public sector contribution (£m):
Total local and/or private contribution (£m):
Details of any 'contributions in kind' (e.g. operators agreeing to run a service):

Notes:
1) DfT funding will be awarded in 2019/20.
2) Please provide details of the source of any local and/or private contribution.

Tables D1 and D2 set out the costs for both the full and core packages. The guidance sets out that the response should highlight "which projects would take priority if it is not possible to fund the FMZ, as proposed in its entirety. We have reviewed the programme and package and have identified in Table D2, the minimum/lowest 'core' cost package interventions. The major difference between the core and full packages is that we have identified a list of mobility hubs that have been prioritised for delivery and are therefore included in the core package. These hubs have been assessed as priorities on the basis of deliverability, fit with FMZ objectives and local objectives.

We have included a risk/contingency figure of 20% in our cost estimates and a 2% allowance for inflation.

The local / public sector contributions are from a combination of developer (section 106) funding and Local Transport Plan allocations. Letters confirming these contributions are included in Annex 9. We will explore the potential for third party contributions to the programme as we develop the proposals in detail (if successful) post award. We have already had interest from a number of MaaS suppliers and DRT operators expressed through the pre-market engagement that we have undertaken and will also use the publicity around the bid submission to develop interest with potential suppliers and operators for working in closer partnership going forwards.

Table D3 sets out the spend by year for the full cost package and table D4 indicates the level of certainty attached to the costs developed for each of the bid elements.

All of the schemes included in this programme are scalable to some extent apart from the MaaS development which covers the FMZ area. There are a number of elements that are reliant on the MaaS platform so this has been included in both the core and full costs.

Table D1: LCR FMZ Bid – full costs

Scheme element	Total scheme cost (£m):	Total DfT (FMZ) funding contribution (£m):	Total public sector contribution (£m):	Total local and/or private contribution (£m):	Details of any 'contributions in kind' (e.g. operators agreeing to run a service):
Digital Demand responsive	[redacted]				
Mobility hubs					
Dynamic network management					
Mobility as a Service					
Mobility credits					
Monitoring and evaluation					
Marketing, Communications & Engagement					
Programme Management & Support					
Inflation (2% pa)					
Contingency (20%)					
TOTAL COST	**£31.75**	**£27.28**	**£31.45**	**£4.31**	**£0.00**

Table D2: LCR FMZ Bid – core package costs

Scheme element	Total scheme cost (£m):	Total DfT (FMZ) funding contribution (£m):	Total public sector contribution (£m):	Total local and/or private contribution (£m):	Details of any 'contributions in kind' (e.g. operators agreeing to run a service):
Digital Demand responsive	[redacted]				
Mobility hubs					
Dynamic network management					
Mobility as a Service					
Mobility credits					
Monitoring and evaluation					
Marketing, Communications & Engagemer					
Programme Management & Support					
Inflation (2% pa)					
Contingency (20%)					
TOTAL COST	**£26.64**	**£23.25**	**£27.23**	**£3.31**	**£0.00**

Table D3 provides a summary of DfT spend by component for each financial year up to 2022/23.

Table D3: DfT Spend by Financial Year – full cost package

Scheme element	2019/20	2020/21	2021/22	2022/23	Total DfT (FMZ) funding contribution (£m):
Digital Demand responsive	[redacted]				
Mobility hubs					
Dynamic network management					
Mobility as a Service					
Mobility credits					
Monitoring and evaluation					
Marketing, Communications & Engagement					
Programme Management & Support					
Inflation (2% pa)					
Contingency (20%)					
TOTAL COST	**£2.56**	**£11.87**	**£7.43**	**£5.42**	**£27.28**

Table D4: Certainty of Cost Estimates

Scheme element	Certainty (low/medium /high)	Justification
Digital Demand responsive	Medium	Some (incomplete) evidence provided by operators in advance of procurement process
Mobility hubs	Medium/High	Costs based on previous implementations of similar infrastructure.
Dynamic network management	High	Costs based on previous implementations of similar infrastructure as part of trial in Leeds.
Mobility as a Service	Medium	Some (incomplete) costs provided by commercial partners as part of pre-market engagement process. These require some further testing with a larger number of suppliers.
Mobility credits	Low/medium	Some initial work completed on demographic of potential user groups but more detailed work required to develop costings.
Monitoring and evaluation	Medium	Costs based on similar M&E programmes already delivered. Little evidence of similar data collection in future mobility sector so a degree of uncertainty exists.
Marketing, Communications & Engagement	High	Costs based on similar M&E programmes already delivered.
Programme Management & Support	High	Costs based on similar programmes already delivered.

D2. Financial case – Risk

Please provide details of any financial risks around delivery of the projects within the FMZ (both short and long term) and any mitigating actions.

The table below outlines the key financial risks within the FMZ programme and the proposed mitigating actions.

Table D5 – Key financial risks and potential mitigation

Project/ Programme element	Key Risks	Probability	Impact of risk	Potential mitigation
Mobility Credits	1. Finding the correct mix of incentives to achieve desired outcomes may be challenging. 2. Avoiding unintended consequences of a credit based system 3. Ongoing revenue requirement for Combined Authority	1. Possible 2. Possible 3. Possible	1. Minor 2. Major disruption 3. Moderate	1. Identify and engage with necessary stakeholders / communities early in programme delivery to minimise risk. 2. Keep the offer clear and simple to ensure legibility for users and develop clear messaging around mobility credit intentions. 3. Explore use of revenue streams generated by the programme (eg Harrogate etc) or redeployment of current public funding seeking similar outcomes (eg concessionary fares)
Digital Demand Responsive	1. Financial revenue risk to Council /others 2. Excessive public subsidy because the service does not generate the forecast patronage	1. Possible 2. Possible	1. Major disruption 2. Moderate	1. Secure longer-term revenue funding opportunities if required (e.g. Section 106). Work with chosen operator to ensure that service becomes commercially viable post 2023. Ensure robust monitoring and evaluation approach to closely monitor delivery of the programme in first year of funding. 2. Robust demand forecasting and pricing strategy supported by effective promotion of the service.

SECTION E – The management case

E1. Management case – Delivery and risk management

Please provide details of key milestones across the four years of the fund (2019 to 2023) and a detailed project plan for the first 12 months of the scheme.

Please provide details of any risks around delivery of the projects within the FMZ scheme (both short and long term), the likelihood of these risks materialising and any mitigating actions. This should include any uncertainty relating to the proposed measures (e.g. performance of new technology, delivery).

We have outlined our delivery programme for the FMZ in Annex 6 and Table E1. Table E2 provides details of the key risks identified and mitigating actions.

Table E1 – FMZ delivery programme

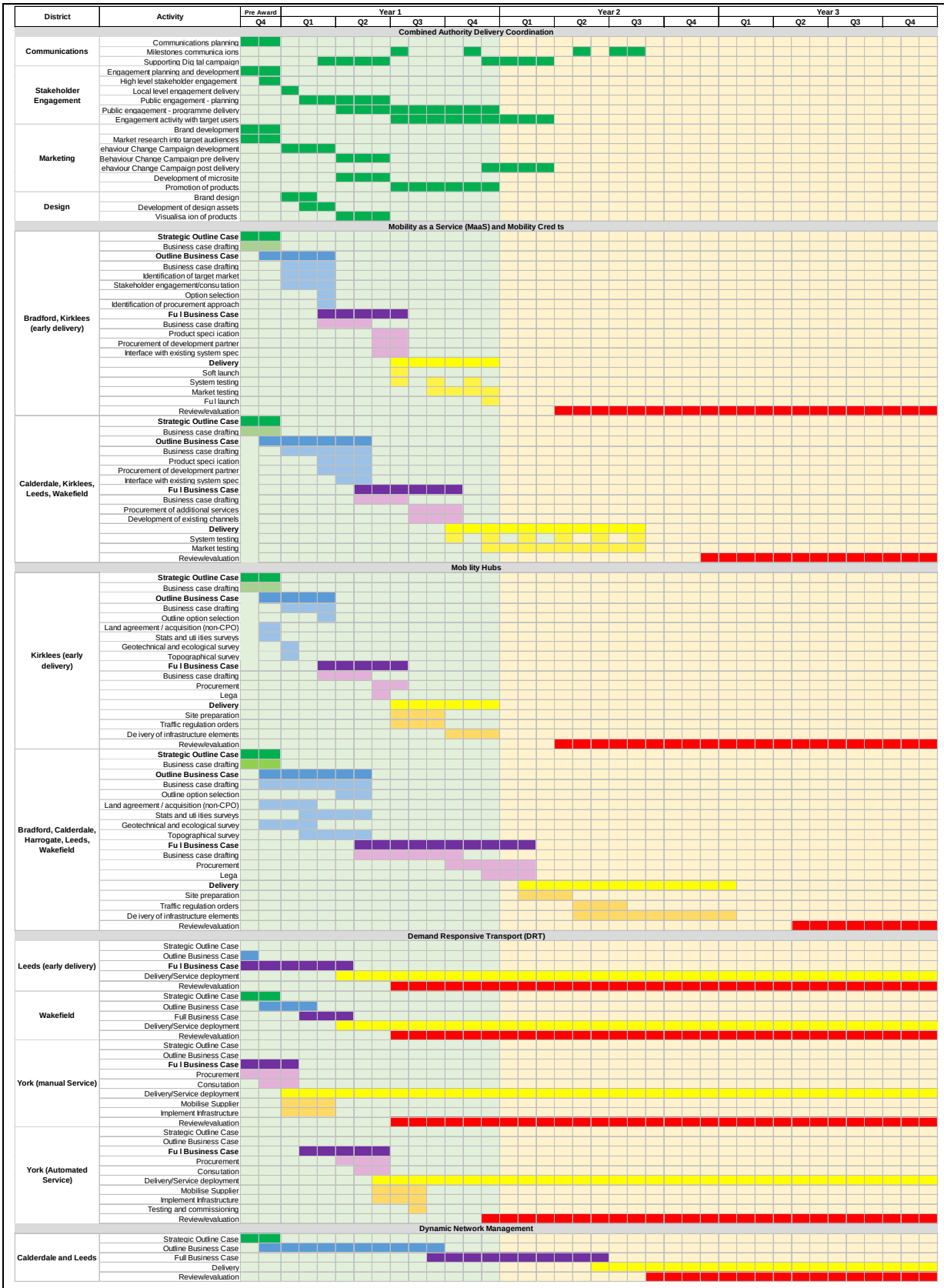


Table E2 – Key risks identified and mitigating actions

Project/ Programme Element	Key Risks	Probability	Impact of risk	Potential mitigation
Market risks	Understanding of suppliers, engagement with suppliers, uptake of FMZ components by market	Possible	Moderate	Ensure that early in the programme consultation and engagement is undertaken both with potential users and also suppliers. This process has already been started with pre-market engagement with potential suppliers.
Mobility as a Service Platform	1. Buy in from operators/suppliers 2. Development lead times 3. Technical complexity	Possible	Moderate	1. Identify and engage with necessary stakeholders / communities early in programme delivery to minimise risk. 1. Development of a City Region MaaS narrative to simply explain the opportunity and potential benefits 2. Building on previous platform (MCard and YorCard) to implement solution – allows for early programme delivery. 3. Integrating MCard and YorCard into an existing MaaS user interface that will enhance our mobility offering across the geographical area. Any MaaS platform would have to be white labelled to maintain consistency from the user perspective. Adoption of MaaS may require different UIs dependent on the application within a given area, as different areas/organisations may have variable modal requirements.
Mobility Credits	1. Finding the correct mix of incentives to achieve desired outcomes may be challenging. 2. Avoiding unintended consequences of a credit based system	Unlikely	Minor	1 and 2. Keep the offer clear and simple to ensure legibility for users and develop clear messaging around mobility credit intentions.
Digital ecosystem	Willingness of districts / operators to share contemporary network operation information	Unlikely	Moderate	Early engagement to demonstrate the benefits of a unified approach to digital data to improve operations, help manage

Project/ Programme Element	Key Risks	Probability	Impact of risk	Potential mitigation
				supply and demand and to facilitate wider objectives
Digital Demand Responsive	1. Buy in from operators/suppliers 2. Financial revenue risk to Council /others 3. New services conflict or compete with established transport services 4. Operational risk (York) of Automated services 5. Cyber security risks (York) with Automated services	1. Unlikely 2. Unlikely/possible 3. Unlikely/possible 4. Unlikely/possible 5. Unlikely/possible	1. Minor 2. Moderate 3. Major disruption 4. Major disruption 5. Major disruption	1. Early dialogue with main operators already underway for the East Leeds demand responsive scheme. Specification of the East Leeds DRT scheme has already been shaped as a result of feedback received from operators. Ongoing engagement through established channels such as the Bus Alliance. Letters of support from the bus operators demonstrate partners' enthusiasm to develop the bid. Secure longer-term revenue funding opportunities if required The use case in York will be developed through traditional vehicle running and shadow AV running. The deployment will build upon learning from the CAV 1 to 4 trials and those of commercial partners. We will involve CCAV, DfT and other partners at all stages of development and deployment and will build this into specifications. With regards explicitly to cyber security, this is expected to be a lower risk as the deployment is an automated rather than autonomous system, but again this will be built into specification and discussed in detail with CCAV and DfT.
Mobility hubs	1. Permission required from Network Rail to develop hub at Wakefield Kirkgate station. 2. Land negotiations required with Network Rail at Glasshoughton	1. Possible 2. Possible	1. Moderate 2. Moderate	1. We will engage with Network Rail Innovations team at the earliest opportunity. If permission is not forthcoming, a plan for the hub that does not require NR permission will be developed. 2. If permission is not forthcoming, a plan for the hub that does not require NR permission will be developed.

E2. Management case – Governance

Do you have governance processes in place to deliver the scheme?
Yes
Please give details of the governance processes for the FMZ, and indicate any cross-over with the governance process for the TCF.

Yes, we have clear and appropriate governance approaches to deliver the package of works set out in this submission.

Governance

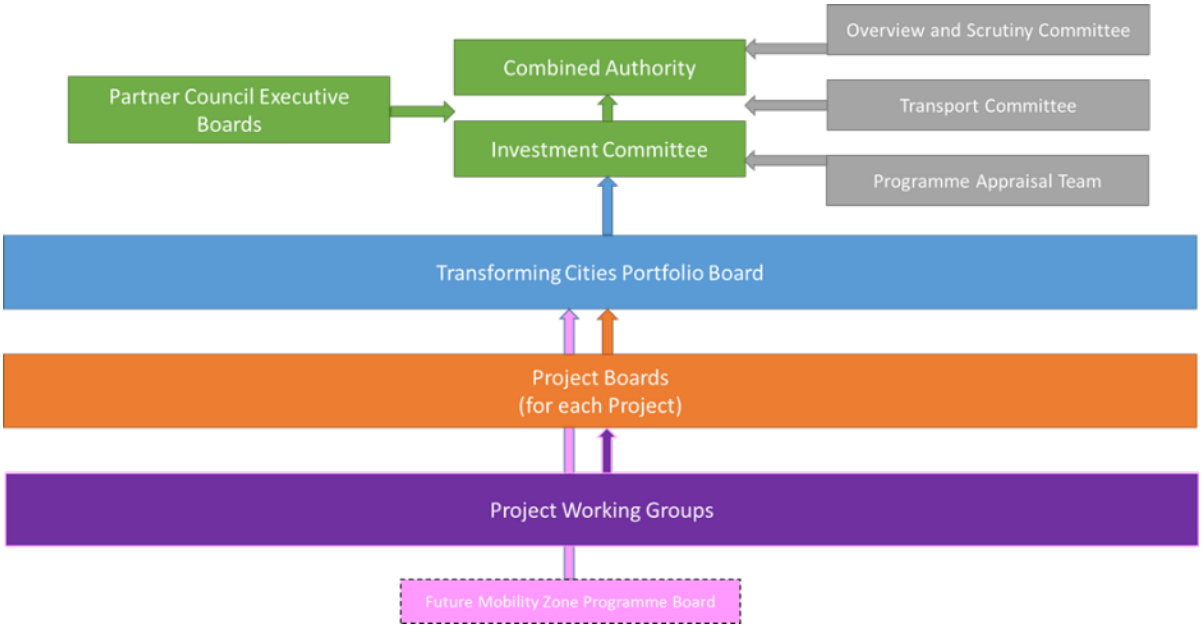
West Yorkshire Combined Authority, our West Yorkshire partner councils (Bradford, Calderdale, Kirklees, Leeds, Wakefield and York) and wider Leeds City Region Partners

(Harrogate, Selby and Skipton) adopt and apply the PRINCE2 and Managing Successful Programmes (MSP) methodologies in managing and delivering its programmes and projects. It is proposed to use these for developing and delivering the Transforming Cities FMZ programme and its constituent projects.

At their meeting on 13 December 2018 the Combined Authority delegated authority to the Transport Committee to oversee and submit the 'Future Mobility Zone bid' to the Department for Transport and to utilise member working groups to develop the detailed scope and specification of the bids.

As part of the development of the FMZ bid, Combined Authority officers have actively worked with District council partners and other organisations, including transport operators, universities and businesses to determine the shape of the bid.

In order to streamline and maximise efficiency of delivery, it is proposed that the FMZ bid will utilise some of the same governance as the main Transforming Cities bid. The Combined Authority, Investment Committee and Transport Committee, who are the main CA assurance and decision-making bodies for the FMZ programme all meet in public. We have an Overview and Scrutiny Committee of Members that meets frequency to review and make recommendations. The Programme Appraisal Team is a separate officer body that scrutinises the businesses cases before submission to Members.



The Combined Authority and each partner council will also assemble a dedicated programme board, with a clear and accountable Senior Responsible Officer, programme team and project manager(s) in order to develop and deliver the programme they are responsible for delivering. All programme boards will include Combined Authority representation, where schemes are cross boundary, and representation from the relevant partner council and bus and rail operators and the CA's procured car club operator Enterprise Car Club. If successful, membership and terms of reference will be determined after award of funding.

Capability to Deliver

West Yorkshire Combined Authority, our Partner Councils and bus operators have extensive experience of delivering programmes and projects together, as part of large programmes (West Yorkshire plus Transport Fund (WY+TF) and the Leeds Public Transport Infrastructure Programme (LPTIP)) and smaller, technology centred programmes such as the Smart Card Innovation Programme (SCIP) and the Ultra-Low Emission Vehicle (ULEV) programme. The Senior Responsible Owner for the programme is Liz Hunter, Head of Transport Policy at the Combined Authority who has 15 years' experience of delivering major investment programmes.

Having worked at HM Treasury and DfT, Liz has significant experience of developing successful business cases.

The delivery of programmes mentioned above has developed a significant body of knowledge in project delivery and management which has been retained, developed and will be applied in the successful delivery of the FMZ programme.

Assurance

The Leeds City Region Assurance Framework will be applied to the Transforming Cities FMZ programme and the individual projects in the programme. The structure of the Assurance process is outlined below:

It is proposed that all projects within the Future Mobility bid utilise the Assurance Framework. The Assurance Framework covers capital and significant revenue expenditure funded by Government or local sources and invested by the Combined Authority in projects and programmes, including all Government funding received by the LCR and LEP (via the Combined Authority as the LCR LEP's accountable body). We see the Assurance Framework as essential good practice for a partnership that must be trusted by the public and government to take its own investment decisions. The Assurance Framework has been peer reviewed, signed off by BEIS and CLG and is seen as an exemplary framework.

The Assurance process is a three-stage system for project control to deliver value for money in a transparent and accountable way. It should be noted that all schemes identified at this stage are at Strategic Assessment (Activity 1) stage and will be subject to detailed development through the Assurance Framework. As schemes develop, there may be the need to change or alter the programme to reflect challenges which arise through development. Where alternative schemes are brought forward, these will also go through the Assurance Framework to ensure a rigorous sifting process.

Members are actively involved in our assurance process with papers being reviewed by the Investment Committee and then the Combined Authority. In accordance with the devolution of other DfT funding to the CA, investment decisions will be made by the CA, unless specifically delegated to the Investment Committee or Managing Director. As mentioned above the Member meetings are held in public. All key decisions taken by the Managing Director are also published this includes projects over a £1m.

The information presented to Investment Committee and the Combined Authority is assessed by a team separate from the project team to challenge all five cases in the business case and to ensure vfm and scheme viability. The Overview and Scrutiny Committee will also provide independent scrutiny of FMZ, as they do with all of the funding programmes that the Combined Authority are responsible for. Parallel approvals will also be required from partner council Executive Boards including approvals of any matched funding. They too benefit from their own Scrutiny Panels.

A key lesson learned from WY+TF and LPTIP is that schemes need to undertake development work whilst the programme FMZ is being developed and whilst a decision relating to funding award is awaited. The assurance process outlined allows for schemes to progress between Decision Point 1 and 2 which will give more assurance of deliverability by March 2023 and it shows that the Combined Authority is fully supportive of the TCF.

Our governance model has been developed with the express intention of establishing a new Business As Usual for the Leeds City Region, taking an agile approach to deployment so that we can rapidly evaluate, learn and then standardise.

E3. Management case – Monitoring

A monitoring report should be prepared following the completion of each year of the scheme. The Department will work with successful bidders on the exact format of the report to ensure a consistent approach.

Do you agree, in principle, to undertake monitoring for each project in the FMZ scheme?

Yes

A monitoring and evaluation report will be provided for the Leeds City Region Future Mobility Zone on an annual basis – the format of this report will be agreed with DfT.

Learning from monitoring would be fed into the communications plan and benefits into Yorkshire and other UK industrial areas.

E4. Management case – Evaluation

Please set out an initial evaluation plan for the FMZ. This should cover:

- priorities for evaluation of the projects within the overall FMZ scheme;
- broad timescales for evaluation activity; and
- how you will ensure that the lessons emerging from your projects will be of relevance to other areas.

The evaluation plan should include, for each project within the overall FMZ scheme, initial consideration of:

- *the evaluation/learning objectives;*
- *the broad type of evaluation approach;*
- *the resourcing (funding and staffing) needed for delivery of evaluation proposals; and*
- *the source of this funding.*

Evaluation and Learning Objectives

The overall aim of the evaluation is to develop our understanding of the potential of innovative future mobility interventions to meet local travel needs and to use the FMZ as a means of gathering knowledge, learning and best practice to inform future projects and programmes. Key considerations throughout the evaluation process will include impact, attribution and persistence, key metrics which will demonstrate the efficacy of our proposals as well as providing a strong evidence base for our own transition to a new Business as Usual and to provide the foundations for others contemplating similar interventions.

The logic maps developed for each of the themes within the bid are presented in Annex 7 to this document. These will form the foundation for the monitoring and evaluation that will be undertaken, we anticipate periodically revising these throughout the programme as they provide a useful touchstone for our FMZ thinking.

The overarching objectives of our evaluation approach are to:

- Assess the impact of changes in transport behaviour and performance resulting from future mobility interventions on the wider economy and labour market including effects on unemployment, public health, inward investment, productivity and inclusion.
- Test the market potential for and user acceptance of future mobility services.

- Assess the potential of future mobility interventions in providing improved access to employment, education, skills and services.
- Assess the potential contribution of future mobility solutions to promoting take-up of sustainable travel options and public transport use, at the same time reducing vehicle miles travelled.
- Evaluate the effectiveness of our future mobility interventions in addressing inequality in transport, including issues around connectivity for deprived communities, transport affordability and digital and financial exclusion.
- Assess the relevance of mobility solutions to a variety of contexts by evaluating a range of different and distinctive use cases.
- Assess the impact of changes in travel behaviour resulting from future mobility interventions on the performance of the wider transport network, including emissions, air quality and congestion.
- Assess the potential for mobility hubs and associated services to re-invigorate the communities within which they are placed
- Present evaluation findings that can be used to inform the development of Leeds City Region's future mobility offer and wider connectivity strategy.
- Developing comparison data and understanding through working closely with other FMZ's to compare and contrast process, performance and impacts
- Share the lessons learnt from developing and implementing a range of mobility solutions with a wider community of practice.

Objectives at project-level

The logic models developed for projects (and the programme) will form the basis of our approach to evaluation. These set out our underlying theory of change and the sequential chain of interventions, outputs and impacts. The evaluation will include an assessment of this and the critical assumptions identified. To simplify consideration we have broken this down by the constituent elements of our FMZ;

Mobility Hubs

Our overall evaluation objective in respect of this project is to develop our understanding of the effect on modal travel patterns of focusing transport provision at established nodes within different spatial settings. Within this we will examine the following specific assumptions:

- That expanded modal choice offered through hubs can promote a shift to sustainable modes.
- That the availability of modal interchange facilities, leading to easier transition between transport options, results in improved connectivity to employment, education and services.
- That availability of digital demand responsive services via hubs can support improved access to public transport options.
- That the services available through hubs (including Blue Badge shuttle facilities) can address barriers faced by mobility impaired groups (including the disabled).
- That the presence of co-located community functions promotes usage of mobility hubs and that hubs contribute to a reduction in vehicle miles travelled sense of community cohesion among local residents.
- That mobility hubs can act as an anchor within communities to agglomerate mobility and other functions together to re-establish a critical mass on our high streets which in turn encourage other business to move in and provide wider services.
- That investment in marketing and communication activity can raise awareness of mobility options available via hubs, leading to a commercially-viable critical mass of users.
- As set out in the accompanying logic model the potential of hubs in promoting modal shift will examined from the point of view of a range of sustainable options, including car share, electric vehicles and active travel.

These assumptions will also be examined in the context of different spatial contexts and a variety of user groups (across all ages, abilities and backgrounds), including job seekers and labour market returners, students and users of a variety of services such as healthcare. A key

focus will be on the potential to connect residents of deprived communities to employment and education and skills opportunities via the mobility hubs and providing links into the demand responsive transport services delivered as part of this fund.

Mobility as a Service (MaaS) platform and Mobility Credits
For this project we are firstly seeking to understand the potential of the MaaS platform in facilitating the take-up of an integrated package of mobility solutions that meets customer travel needs, reduce friction within the mobility system and, secondly, to assess the role of mobility credits in reducing barriers to take-up of these solutions among these specific groups. We will test the following assumptions:

- That the integrated ticketing offer, with information and payment function, available through the MaaS platform, facilitates take-up of the multi-modal travel offer.
- That there is user acceptance and associated up-take of the Mobility as a Service concept.
- That the mobility as a service offer can meet users' travel needs and provide an improved travel experience compared with conventional travel options and importantly is attractive to provide an impetus for modal shift..
- That mobility credit solutions can reduce barriers to services for the digitally excluded and for people without a bank account, leading to an increased propensity to use available transport options.
- That mobility credits can provide a reduction in travel costs for low income groups, making travel more affordable and leading to an increased propensity to use available mobility options.
- That a sustainable travel incentive scheme can promote behaviour change around propensity to use sustainable travel options.
- That enhanced transport data available from MaaS platform can be used to drive targeted transport improvements and efficiencies.

Digital demand-responsive services
Our overall learning objective for this project is to build our understanding of the potential of DRT services to connect people to local employment, education and services in a flexible and responsive manner and to address gaps in existing travel provision. We will test the following key assumptions:

- That a demand-responsive transport service can provide a flexible offer to better meet user needs leading to improved access to employment, education / skills and services.
- That demand-responsive options can promote modal shift away from car usage / ownership to public transport use.
- That targeted demand-responsive services for the mobility impaired can reduce travel barriers for vulnerable groups
- That the interventions will deliver employment increase in the areas of operation
- That Demand Responsive Transport can deliver efficiencies across the mobility eco-system

The evaluation will include a focus on specific groups and contexts including those facing labour market exclusion, residents of deprived communities and residents of rural communities.

Dynamic network management
Our key learning objective for this project is to better understand the potential for a data-led, real-time approach to enable us to optimise our management of our future mobility components. We will examine the following specific assumptions:

- That the improved transition between transport options, including optimised DRT to public transport connectivity, promotes increased public transport use and improved accessibility to employment education and services.
- That rebalancing of the mobility hierarchy through dynamic signalling priority for pedestrians and cyclists can promote an improved active travel experience and journey times, leading to a reduction in vehicle miles travelled.

- That dynamic public transport signal priority can drive improved journey times for public transport leading to an increase in public transport use.
- That priority parking for lift share and car clubs promotes sustainable travel behaviour and results in reduced vehicle miles travelled.

Evaluation Approaches

Detailed evaluation plans will be developed for each project. These will include a draft approach that will be adopted within each projects but this is likely to change as the project is delivered and consultants are commissioned to carry out the work.

The innovative nature of the programme means that learning is a key part of the appraisal resulting in an increased emphasis on identifying and understanding the 'why' behind success and failure. As such the approaches adopted across the programme will include a significant emphasis on qualitative data.

Each of the projects will generate quantitative data relating to measures such as travel demand and connectivity; and, qualitative data around user attitudes and behaviour; and formative and process-driven evidence / lessons.

The approach to evaluation will be constrained by the nature of the projects and the ability to gather evidence in terms of impact, outcomes and learning. Some of the elements adopted are likely to apply across the programme but the approach will be tailored to each project.

The innovative nature of the programme means that learning is a key part of the appraisal resulting in an increased emphasis on identifying and understanding the 'why' behind both success and failure. There will be a requirement to drill-down to understand who and why the beneficiaries were (and who they weren't) and how this compares to expectations.

We will look to provide a counterfactual positions through comparison with similar areas within the Combined Authority area and explore how different types of projects have fared in different areas.

The effectiveness of baselining and evidencing change will be helped through the ability to join up with other FMZs, to identify comparable samples and to develop compatible approaches and methodologies to developing the baseline, evidence base, impact and attribution.

The approaches adopted in terms of the evidence base for the evaluation will include:

- Stakeholder surveys and interviews
- User/non-user questionnaires interviews
- Travel Diaries
- On-line questionnaires
- Focus groups
- Employer surveys
- Transport provider surveys
- Training and Education provider surveys

These will focus on securing a range of information depending on the different element of the FMZ being considered. This will include:

- Understanding and awareness
- User numbers / take up
- Individual scheme performance/availability
- Accessibility and quality of experience
- Environmental impacts
- Accessibility to access training and employment
- Journey times
- Traffic counts

Timescales

The preference where able would be to start the evaluation early and where applicable establish a baseline in terms of indicators. A detailed evaluation plan would be developed with consultants and this would detail the approach that would be adopted for the programme and the individual projects. Each plan would include detailed timescales of the regularity of data collection and the accompanying ability to identify, measure and attribute impact. At this stage we anticipate this being undertaken at six-monthly intervals upon deployment of FMZ interventions.

It is anticipated that there would be evaluations carried out for each of the work-streams and that these would be brought together to consider whether the approach as a whole has delivered additional impacts and behaviour change. Monitoring data will be used to assess the ongoing progress and the delivery against forecasts an interim evaluation(s) may be required to better understand progress.

Resourcing

Staffing

A Project Working Group will be created to oversee the evaluation of the programme. This will be made up of partner representatives and will link to the wider overall management of the development and delivery of the FMZ. The Working Group will provide the direction and overall management of the evaluation process.

We would look to explore the possibility of developing economies of scale with other FMZs in terms of designing, commissioning and delivering evaluation. This approach would support consistency in terms of the ensuring that the approaches adopted and the accompanying results are comparable, that duplication can be avoided and efficiencies improved.

Budget

The initial estimate for the evaluation was £350,000. However this would need to be worked up in more detail with resources split between the different project evaluations whilst exploring the most efficient and effective way to structure and commission the work.

Sources of Funding

At this stage it is anticipated that evaluation funding will be provided through the FMZ bid.

Lessons learnt and sharing learning with other areas

Sharing information and learning with other FMZ's will be a key consideration throughout the development of execution of monitoring and evaluation. We would look to understand the projects and programmes being developed by the other FMZ's and develop an approach to cross-working.

All of the evaluations carried out will have a focus on learning and ensuring that a depth of learning regarding schemes and their effectiveness will be secured. All projects will be required to develop a detailed options appraisal in terms of the factors that have driven the choices regarding the content and process of the different options. This would contextualise decision making and enable a greater understanding of the rationale supporting projects.

In assessing the learning from projects all projects will be required to consider 'transferability' where key issues will be identified in terms of the key factors that would drive the suitability and effectiveness of projects in different circumstances. This approach will be explored with other FMZ's with the potential to include scenarios in order to gain more detailed understanding.

As part of wider communications planning we will consider how we externalise learning within the FMZ community, within wider UK industry, and of course to global audiences. We believe that embedded sharing as a fundamental ethos over the 4-year period will be key to demonstrating the efficacy of FMZ interventions and their wider potential / value.

Monitoring and evaluation as part of the Combined Authority's Assurance Process

As part of the Assurance process at decision points 6 and 7 a project closure report is required, that includes lessons learned. Therefore, to ensure that all lessons are captured each project will have a lessons learned log and lessons learned workshops will be undertaken and fed into the FMZ programme board. The Assurance process requires that an ASR is developed and projects evaluated against this. Within the OBC promoters are required to detail their monitoring and evaluation plan. Furthermore, the template cost summary that projects are required to complete includes a line for monitoring and evaluation.

Communications plan

This section sets out the approach to communications and stakeholder management in shaping the programme of work, from inception through to successful delivery.
The Leeds City Region Future Mobility Zones (FMZ) objectives are to:
- Inclusive growth through improving equity of access to transport / mobility services
- Improving local connectivity issues, particularly between deprived communities and employment / skills opportunities
- Improving the affordability of public transport (in its widest sense), particularly for low income workers, job seekers and those in areas of deprivation
- Utilising technology and associated services to enable a shift to low carbon and sustainable mobility modes
- Ensuring digital and financial inclusion is at the heart of the development of new solutions

The communications and stakeholder management plan will help deliver these objectives, ensuring that key stakeholders and communities are brought along throughout the process of developing the programme. Individual communication / consultation / engagement plans will be required for each element of the FMZ package, across their geographical location.

Communications, consultation and stakeholder management has three broad roles:
- Enabling us to understand what customers need and want, and therefore select and shape a package of schemes in the best way possible to meet those requirements
- Understand which stakeholders are key to deliver the project, and what strategy is needed to engage them most effectively. It is important that stakeholders are engaged at the start of the project to ensure buy in and hope they will become ambassadors for the projects. Build support base for schemes and advocate for the Combined Authority and partners
- Reflecting our objective of delivering measures that promote inclusive growth, ensuring that the needs and practical requirements of communities play a key role in the design of schemes

The Leeds City Region Future Mobility Zones bid has been developed in partnership with key stakeholders, including:
- Partner local authorities
- Department for Transport
- Bus operators
- Universities (Leeds, Huddersfield and York)
- Businesses
- Workshops and meetings have been held with key partners to discuss and identify emerging priorities for the Future Mobility Zones bid.

Combined Authority Communication/ Consultation/ Engagement Expertise

Communications and Marketing

The West Yorkshire Combined Authority has a specialised communication and marketing team which includes dedicated teams for consultation and engagement, corporate communications, marketing, external affairs and digital.

The team works to secure the means to deliver projects and services needed for growth in the City Region, be its voice nationally and internationally, and build the partnerships to ensure the best economic outcomes.

Consultation and Engagement Team

The team has substantial experience of consulting on and involving people in the development of Combined Authority schemes. The online engagement platform, Your Voice, has had 106,472 site visits since it launched in June 2018 from 77,000 individuals, enabling people to become more informed about and help shape transport and economic regeneration development in the region.

The Combined Authority has adopted consultation and engagement protocols to ensure a consistent approach to activities, ensure quality standards are maintained and legal obligations are met.

CityConnect Engagement

The CityConnect programme is a series of infrastructure based projects with integrated behaviour change activity, being delivered in partnership by the West Yorkshire Combined Authority and partner councils including Leeds City Council. The programme is funded primarily through the DfT's Cycle City Ambition Grant (CCAG) and is a £60m programme aimed at increasing more journeys by bike or on foot.

Through the programme, CityConnect Communications and Engagement team work in partnership with a range of public, private and community organisations to encourage more people to cycle and walk. CityConnect puts people at the centre of the programme, opening up walking and cycling routes to some of the region's most disadvantaged communities and increasing people's access to opportunities for work, training and leisure, delivering behaviour change activity across West Yorkshire, resulting in 25,000 engagements since 2014.

Across phase 1 and 2 projects CityConnect has undertaken an extensive consultation programme, resulting in 13,000 interactions and a 78% approval rate.

Experience

Through previous engagement and consultation we have gained extensive knowledge about the transport priorities of Leeds City Region residents / businesses, which has helped shape the priorities for the Future Mobility Zones bid. Significant information has been gleaned from regional exercises such as Leeds Public Transport Conversation, Transport Strategy, Bus Strategy, Connecting Leeds and CityConnect projects, as well as work on the Bus Alliance and the Local Industrial Strategy.

10 key lessons learnt that we will apply to Leeds City Region Transforming Cities Fund

- Communication, consultation and engagement requirements need to be considered at the very early stages of project planning
- Communication, consultation and engagement requirements should be included as an essential part of any project with sufficient time programmed for planning, activities, analysis and outcome reporting

- It is important that suitable tools are available (e.g. websites / digital engagement hub / social media / survey software / analysis software etc.) and that staff are fully qualified to carry out the activities with expertise in key areas such as project planning, data collection techniques, community engagement, promotion, equalities, analysis, report writing etc.
- Robust stakeholder mapping and engagement is essential at an early stage and continually updated throughout the project life.
- A range of consultation / engagement methods should be used as appropriate but digital is becoming more important and is allowing us to access a wider, more diverse audience
- All face-to-face sessions need to be well planned, resourced and timed with the needs of protected characteristic groups considered
- Consultation / engagement exercises need to be as broad as possible, while still ensuring that significant voices are not lost. The opinions of young people (that are likely to be the main beneficiaries of longer term transport schemes),older people, disabled people and those from more deprived communities who need to be heard and will benefit from the increased inclusivity and accessibility from measures outlined by bid.
- A realistic budget should be agreed in advance, with input from the consultation and engagement team, to enable suitable communication / consultation / engagement activities to take place
- It is essential that a consistent, coordinated approach is taken to activity to avoid public confusion and make best use of resources (e.g. align project consultation activities if they are happening at the same time in a similar geographical area). A programme level communications plan is required.
- Programme and project risk registers need to include communication, consultation and engagement risks and mitigations as public protests, lack of political support and legal challenges etc. can cause significant delays.

<u>Stakeholder Management</u>

Stakeholders can be viewed through the lens of five broad interacting roles, as outlined in the table below. In the context of the Future Mobility Zones proposals, stakeholders include both those will benefit from the interventions, as well the communities that will be impacted by the development e.g. local councillors, MPs, young people, local businesses across the Leeds City Region, and the harder to reach communities that need to be engaged with the programme so we can be responsive to their needs. Leaders include both senior staff and political leaders, who are required to set the direction of the programme, and realisers include staff both within the Combined Authority and local authority partner councils.

Table E1: Stakeholder Groups

Role	Purpose
Leaders	Senior staff and politicians providing direction
Realisers	Staff involved in delivering activity
Ambassadors	Champions in the community e.g. cycle clubs and action groups and staff in related areas who can cross sell e.g. staff in travel centres
Disseminators	Intermediaries who can pass on info and support events e.g. business travel plan coordinator, champions in schools
Customers	End users who need good information, services and facilities

A detailed stakeholder mapping exercise will be conducted as part of the initial planning stage of the programme, following the September 30 2019 submission date. High level stakeholder mapping has already taken place and includes the following groups:

- Partner local authorities – teams to include transport, planning and regeneration, locality, public health etc.
- Politicians
- Government agencies e.g. Homes England, Highways England, NHS
- Department for Transport
- Accessibility groups
- Community groups
- Localities teams and networks
- End users and current customers
- Current public transport users
- DWP and Job Centre Plus
- Bus operators
- Rail operators
- Community Transport providers
- Universities
- Businesses
- Local groups representing cycling and walking
- Media – at a local, regional and national level

Evaluation of the engagement programme

We will use Government Communications Service's evaluation framework to ensure we're capturing not just output measures (e.g. number of attendees at drop-ins, hits on websites etc.), but also outtakes (changes in sentiment – measured through initial benchmarking survey and then temperature checks throughout the development) and outcomes (people actively using the infrastructure after the build; the right kinds of audiences using the infrastructure).

Project communication and engagement plans

Separate plans will be produced for each measure at an early stage. All activity will adhere to the agreed programme level communications and stakeholder management plan and the Combined Authority's adopted consultation and engagement protocols.

Consultation will be used when there is a legal requirement for it, or an opportunity for public /stakeholder feedback to influence decision making.

The plans are likely to include the following:

- Objectives – project specific but will include the need to obtain constructive feedback from a wide audience
- Audience insight
- Strategy
- Implementation, including:
    - Activities - what will be carried out as part of the consultation? E.g. surveys, public drop-in sessions, political briefings etc.
    - Channels - What methods will be used for promotion and how will people be able to "have their say" e.g. digital, face-to-face, social media etc. Digital engagement via Your Voice is likely to play a key part
    - Risks e.g. legal, political, cost, timescale
    - Costs - A consultation / engagement budget will be required to carry out planning, activities, design work, collateral production, promotion, analysis, report writing etc.
- Scoring/evaluation - This could include number of responses, demographic analysis of responders, lessons learnt etc.

Communications and engagement prior, during and after delivery

Prior to delivery

- Market research into target audiences for the elements of the bid

- Planning and local level stakeholder mapping to deliver engagement within the most impacted communities

During delivery

- Promotion of the benefits and changes to new products and infrastructure; focused around accessing mobility hubs and use of mobility credits
- Promotion of partners through appropriate branding
- Media opportunities to highlight scheme progress and objectives
- Offer regular opportunities to listen to concerns and build up support for schemes e.g. public drop-in sessions
- Proactive, consistent approach to communications during construction

After construction

- Feedback and lessons learnt
- Monitoring success and evaluation
- Importance of behaviour change to ensure people use infrastructure and benefits are realised
- Media opportunities to promote use of new measures and to highlight role of partners
- Multi-channel promotional activity as appropriate to each measure

SECTION F – The commercial case

F1. Commercial Case

Please provide a description of the level of market engagement to date.

Please describe the outline procurement strategy for each of the schemes contained in the FMZ. Is there an overarching procurement strategy for the whole FMZ?

Details of market engagement undertaken

The FMZ bid has been developed in partnership with the districts within the City Region and with input from key stakeholders, including potential suppliers and users of the proposed FMZ programme elements.

We have undertaken pre-market engagement on the following areas of the bid, to help ensure that we have access to the most up to date evidence on the benefits of the components proposed as part of the FMZ – this has helped to inform both the economic case and monitoring and evaluation plans proposed for this bid. We have also engaged with potential suppliers to help develop the budget outlined in this bid and ensure that these costs are as robust as possible at this point.

Pre-market engagement with MaaS providers

We have engaged with potential MaaS providers through issuing a PIN notice in the European Journal and have received a number of responses from UK and global entities to this engagement which have helped to inform our bid. We also include letters of support from several organisations including Moovit, Yorcard, PTG, Fleet on Demand and Masabi as Annex 8 to this document which demonstrate their willingness to continue working with us (subject to a procurement process) to deliver our MaaS ambitions.

Engagement with demand responsive transport providers

Through the West Yorkshire Bus Alliance, the Combined Authority has an ongoing dialogue with the bus industry regarding how we can best align the future mobility needs of Leeds

City Region passengers with next generation technology and service development in the industry.

We are currently undertaking a procurement process to select a supplier to deliver the demand responsive transport service for East Leeds as described in this document. We have undertaken pre-market engagement (via a PIN notice and supplier day) and are currently drafting the tender documents for the service. We hope that the service will form one of the early deliverables of this fund and be launched in early 2020. Through this process we have engaged with several potential operators and have included letters of support from Arriva/ArrivaClick, First and ViaVan that demonstrate partners enthusiasm to help deliver DRT services as part of this bid (subject to the completion of the procurement process).

For the DRT services we are considering developing a Dynamic Purchasing System which could (once established) then be used to deliver the Wakefield DRT scheme and our pipeline of other DRT projects across the City Region.

Other market engagement undertaken

- As part of the mobility hub proposal, Harrogate Borough Council (HBC) have engaged with a number of car club suppliers to test the viability of introducing a scheme based on small electric vehicles. ***Based on an initial market viability assessment, HBC have been able to secure letters of support for their proposals from their existing current car club operator, Co-wheels and Enterprise Car Club who currently deliver the West Yorkshire car club. We have also secured a letters of support from Seat and Renault to work with us to provide vehicles for the Harrogate element of the FMZ programme.***
- Appy Parking is already operational in both Harrogate and Halifax. ***Appy parking and Liftshare have both demonstrated that they would be willing to work in partnership and have provided letters of support for the FMZ bid and expressed a high level of interest in the scheme. Lloyds Banking Group have also provided a letter of support for the bid and have six sites across the City Region where they would be prepared to work in partnership with Calderdale, Appy Parking and Liftshare to deliver a programme of behaviour change and promotion of car sharing***
- As part of the development of the mobility hub concept, Calderdale Council have already engaged with potential partners including local car club operators ***Hourcar and Enterprise car club, who have both provided letters to confirm that they would support the delivery of the bid.***
- Leeds are already working with Vivacity to deliver a small-scale pilot of traffic signal optimisation in Leeds and ***Vivacity have provided a letter of support indicating their willingness to work with both Leeds and Calderdale to develop elements of the proposed FMZ.***
- We have worked with academic partners at the Universities of Huddersfield, Leeds and York in the development of this submission. ***We have received letters of support from all three institutions indicating their willingness to continue working with us to develop our plans in further detail if we are successful post-award.***

Confirmation of local funding contributions

We have included letters confirming local funding contributions that have been presented as part of this bid as follows:

- **Developer/Section 106 contributions** from both Leeds and Wakefield Councils;
- Funding to be included from the **Leeds Public Transport Investment Programme** – whilst we are aware that this is not eligible as match it is included as a local contribution.
- Match funding from the **Corridor Improvement Programme (CIP)** in Calderdale; and
- **Local Transport Plan** funding for the DRT and MaaS elements of the bid.

Procurement strategy - an output based specification approach

In the development of this bid we have examined the possible procurement options available and have developed an approach to procuring the elements outlined within this bid. We would welcome discussion and input from DfT to our proposed approach if successful at the post funding award stage.

As is typical for an application of this type, the commercial case will be developed further as the programme and individual schemes within the programme progress through the Leeds City Region Assurance Framework, as set out in the Management Case. The commercial case is based on a number of essential requirements:

- delivering the programme within the available funding;
- ensuring stakeholders' acceptance and support;
- ensuring Best Value is delivered; and
- ensuring that appropriate quality is delivered.

The delivery of the programme will be achieved by engaging with suitable contractors (inc. operators) at an early-stage in the planning and delivery phase, mobilising their appropriate strengths by:

- Using the contractor's experience and input in reviewing the construction estimates;
- Obtaining the contractor's experience and input to the design and construction programme to ensure the programme is robust and achievable;
- Using and building upon the partners' in-house knowledge and experience by engaging through consultation with all stakeholders;
- Engaging the contractor in the final detailed design process to confirm and improve buildability and ensure value for money with any value engineering solutions; and
- Being incentivised to achieve 'a right first-time approach' that is measured by key performance indicators agreed with the contractor.

Procurement, Delivery Strategy and Pricing Framework

Whilst acknowledging the programme is in the early stages of development, and therefore represents outline detail of scheme components, Combined Authority Officers and Partner Councils have sought to establish key principals under which we would proceed if successful in gaining funding for our FMZ proposals.

1. Development of procurement approach
We have explored the potential routes to procuring the different elements of the FMZ bid and considered the use of the following options:
Development of a Dynamic Purchasing System – this might particularly be appropriate for the DRT elements of the programme;
Development of a framework to cover one or several elements of the bid delivery.
Use of separate procurement processes for each element of the FMZ bid.

We have examined the potential benefits of each approach and would appreciate the opportunity to work with DfT on finalising this procurement strategy post award.

Within the FMZ budget we have included internal resource to oversee the delivery of this bid and ensure consistence across the elements that are to be delivered by the Districts.

Once established, a framework agreement could be used centrally procure FMZ scheme elements that sit across the broad scope of the LCR geography (elements including the MaaS platform, Mobility Credits and digital connectivity infrastructure components). This would allow for greater consistency and control of delivery in areas where interoperability of services and infrastructure is key.

2. Elements to be delivered locally

It is envisaged that District Partners will be best placed to deliver locally specific FMZ elements (such as dynamic demand responsive and mobility hubs). If we established a framework to cover some or all of the bid delivery, the districts could utilise this or any existing internal frameworks to procure the necessary resources to deliver schemes. Procurement will be controlled alongside scheme development through the LCR assurance framework, with the use of funding agreements to control and monitor the funding allocations for each stage of scheme development. If it is deemed partner councils are not able to procure using existing frameworks or internal procurement structures, The Combined Authority could call off against any framework that is developed.

Furthermore, as scheme options become refined, it may become apparent that there is significant overlap across scheme elements in a number of district areas. Under such circumstances, The Combined Authority could seek to procure a call off supplier that is able to provide the necessary resources to deliver schemes.

Further detail of the procurement strategy will be refined as we progress through our Assurance Framework and added scheme detail is developed. Our procurement strategy is output based, meaning we will adapt our procurement approach to meet the desired requirements of project outcomes and objectives.

SECTION G – Additionality

G1. Additionality

Please provide details of how the projects contained in the FMZ differ from and/or complement projects expected to be funded as part of the wider TCF programme. There should be a clear demarcation between individual projects that will be funded through the TCF and those that will be funded by the FMZ Fund.

Please indicate if any FMZ projects will be dependent on initial funding from the TCF.

Our TCF big bid and FMZ proposals have been developed alongside each other, and whilst sit in different funding programmes of development, the benefits from both programmes are considered to be complementary to one another and will contribute towards the achievement of our overall aims outlined in section B2.

Some of the FMZ proposals are region wide, others are location specific. However, the FMZ proposals fund and deliver entirely separate outputs to big bid but together they will help realise our priorities for the region.

Region Wide Additionality through FMZ

The FMZ planned investment in MaaS, mobility credits and the digital ecosystem aim to maximise the impact of the wider programme of TCF interventions. Sitting across the programme as a whole, these outputs delivered through the FMZ submission will deliver an improved customer experience that will drive greater use of sustainable modes developed by offering users a suite of clear, affordable mobility alternatives to sole occupancy car and single user taxi use.

Similarly, MaaS and the digital ecosystem also aim to maximise the large TCF bid investment in real time information provision, particularly across the corridors identified. The FMZ submission will enable a greater quality and depth of journey information improving customers' experiences and increase awareness of the portfolio of mobility options available to make any particular journey. The proposed mobility hubs will also be able to take advantage of an improvement in real time information offer and MaaS which will enable better information about travel options to be provided at the mobility hub locations.

The FMZ submission will enable the acceleration of future mobility technology and solutions thus enabling an up-skilling of the district and WYCA teams associated with their development, implementation and monitoring, which would not be delivered through the TCF big bid. Enhancing the day-to-day understanding of not only how such interventions operate and the business models they employ but importantly the potential impacts they have upon existing networks and services.

The intended and unintended consequences of the FMZ are something we will be closely monitoring as these local impacts, their drivers and the mitigating measures are the key to future deployment and success across West Yorkshire and beyond. We plan to use the FMZ as a way of equipping our transportation and planning professionals with the tools to enable future evidence based decision making for the benefit of all our communities.

The relationships we will develop with industrial partners will be of significant value, helping us to understand emerging markets thoroughly (essential from a value for money point of view) and us helping those in the future mobility space to understand the practical challenges associated with embedding new solutions into our established landscapes.

Location Specific Additionality through FMZ

Our TCF Tranche 2 bid includes three separate scenarios - 'Lower', 'Core' and 'Higher'. The level of added value which the FMZ proposal adds depends on the decisions made by Ministers on the approved funding scenario for the Tranche 2 bid, which we expect to be made in March 2020.

Examples of the type of additionality provided through the FMZ submission are outlined in table G1.

Table G1 – Location specific additionality through FMZ

TCF Tranche 2 Bid Ref	Location	TCF Tranche 2 Bid Description	Summary of Transport Challenges	Strategic Linkages	TCF Big Bid Financial Ask (£m)	Scope of TCF FMZ Scheme	FMZ Additionality to Big Bid
10	Halifax	Transformed gateways in Halifax town centre (bus and rail), creating seamless walking, cycling and bus access from the town centre to the most deprived areas of Halifax	Severance between North Halifax/Park Ward and town centre No multimodal interchange facility in town centre Poor accessibility to rail station Bus station not up to modern standard Unreliable bus offer	FMZ Calderdale LCWIP (Park Ward)	Lower £39.9m Core £39.9m Higher £53.9m	Dynamic network management Investment in Mobility Hubs	Investment in dynamic network management with a focus on parking will reduce unnecessary car trips around the town centre, having a positive impact on air quality and encouraging car sharing, car club use etc. – incentivise sustainable travel behaviours Investment in Mobility Hubs aims to compliment investment in some of our key commuter gateways. In Halifax this means establishing a network of mobility hubs to radically improve connectivity as rail stations and local centres to include scooters, e and cargo bikes, car club provision. This is directly complementary to the Tranche 1 bid scheme which will create an enhanced multimodal interchange in the centre of Halifax.
16	Harrogate	This package is a set of walking, cycling and interchange improvements to enhance public transport interchange facilities and access to the town centre and other key towns/trip attractors across the borough. This will better connect people with bus, rail, healthcare, employment, new development and three rail stations.	Severance between Harrogate Rail Station/ Bus Station and town centre Poor multi-modal interchange Inadequate cycling/walking routes to station from residential areas Congestion impacting across Harrogate and into Leeds.	FMZ	Lower £7.9 Core £7.9 Higher £14.1	Investment in Mobility Hubs	Investment in Mobility Hubs aims to compliment investment in some of our key commuter gateways. Through the FMZ submission, Harrogate will introduce a quadricycle electric mobility hub to maximise and compliment investment in improvements to station access. The proposal will support key aims of both TCF and FMZ investment by offering a demand responsive solution for first and last mile connectivity that enhances access to key employment sites and providing services beyond scheduled public transport operational hours. Through the Tranche 1 bid, a cycle superhighway between Knaresborough and Harrogate is proposed which would link three rail stations. The FMZ element will further enhance the opportunities to access improved rail services and enables the impact of the cycle route infrastructure planned through the TCF bid to be maximised.
15	Huddersfield	A package of measures to improve capacity, multimodal interchange and pedestrian accessibility at key transport hubs in Huddersfield town centre	Capacity and quality at rail and bus stations Preparation needed for TRU which will lead to growth in demand Accessibility issues to bus and rail stations – currently lack adequate disabled access	TRU Huddersfield Blueprint FMZ	Low £16.5 Core £17 Higher £28	Investment in Mobility Hubs Introduction and piloting of MaaS offer	The Huddersfield programme of MaaS and mobility hubs will aim to change travel behaviour for Huddersfield residents, encouraging them to shift to more sustainable modes through rewarding residents for every ton of CO2 saved. This will complement the investment through the Huddersfield gateways project through reducing the number of single occupancy car trips – thus reducing congestion, improving air quality and making more efficient use of the road network. This will also contribute to placemaking by shifting

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							emphasis away from cars and towards more sustainable modes This will be a true behavioural experiment that will provide the target area with viable transport mode additions (e.g. bike-sharing), which will complement the new multimodal hub provision unlocked through the TCF Tranche 2 bid.
5	East Leeds	This scheme will provide a bus rapid transit solution and Park and Ride from East Leeds Housing and Employment Growth Zones to Leeds City Centre. This is the start of a wider ambition for a larger bus rapid transit solution along our prioritised corridors.	Overcrowding on the rail network at East Leeds Major planned housing and employment growth Poor bus journey times/reliability as a result of congestion	FMZ	Low £7 Core £22 Higher £22	Dynamic network management Digital demand responsive transport	Digital demand responsive transport in East Leeds will enhance connectivity from areas of deprivation to the key employment sites, enhancing accessibility to opportunity. This will complement the TCF tranche 2 bid, by expanding accessibility for communities who may currently be poorly served by the public transport offer.

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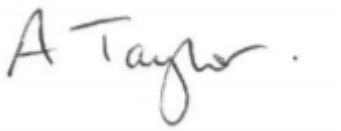
26	York	A package to support future growth at York Station and York Central through creation of a transport interchange that better accommodates all modes, as interventions to enable people to access the station from surrounding communities via sustainable modes	Planned employment and housing growth at York Central Poor accessibility for walking/cycling at both the main and western entrance Inadequate cycle infrastructure on some key routes in to the city centre Poor legibility between city centre and rail station Poor provision for multi-modal interchange Poor air quality Unreliable journey times on park and ride routes due to congestion		Low £18 Core £21.7 High £32.2	Digital demand responsive transport Autonomous vehicle trials	The FMZ scheme for York is distinctly separate but complementary to the TCF tranche 2 scheme for York which will create a world class multimodal interchange gateway to the city centre. Both schemes will enhance the visitor experience in terms of wayfinding and accessibility to key trip attractors.

SECTION H – Declarations

H1. Senior Responsible Owner Declaration	
As Senior Responsible Owner for Leeds City Region FMZ I hereby submit this request for approval to DfT on behalf of Leeds City Region and confirm that I have the necessary authority to do so. I confirm that Leeds City Region will have all the necessary statutory powers in place to ensure the planned timescales in the application can be realised.	
Name: Liz Hunter	Signed: 
Position: Head of Transport Policy	

H2. Section 151 Officer Declaration	
As Section 151 Officer for Leeds City Region I declare that the scheme cost estimates quoted in this bid are accurate to the best of my knowledge and that Leeds City Region • has allocated sufficient budget to deliver this scheme on the basis of its proposed funding contribution; • accepts responsibility for meeting any costs over and above the DfT contribution requested, including potential cost overruns and the underwriting of any funding contributions expected from third parties; • accepts responsibility for meeting any ongoing revenue and capital requirements in relation to the scheme; • accepts that no further increase in DfT funding will be considered beyond the maximum contribution requested and that no DfT funding will be provided after 2022/23; • Confirms that the authority has the necessary governance and assurance arrangements in place and the authority can provide, if required, evidence of a stakeholder analysis and communications plan in place.	
Name: Angela Taylor	Signed: 

Submission of Bids

The deadline for bids is: 23:59pm on Monday 23 September 2019.

An electronic copy (including supporting material) should be submitted to: FutureMobilityZones@dft.gov.uk. However, if you must send hard copies of papers, please provide three copies to:

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