



# triangulum

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## *D3.3.1 Mobility Technical Implementation Report*

**WP 3, Task5**

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## 0 Executive Summary

This report details the work undertaken by Arup on behalf of Manchester City Council (MCC) to produce a Mobility Technical Implementation Report for the Triangulum project. It sets out the current activities and initiatives being delivered by each of the Corridor Manchester partners (a partnership set up between MCC, Manchester Metropolitan University (MMU), the University of Manchester (UoM), the Central Manchester University Hospitals NHS Foundation Trust (CMFT) and Bruntwood). A key element is the plans to implement improvements within the Corridor Manchester district, due to be completed in late 2016. These including the removal of traffic along major sections of Oxford Road along with new and improved cycle lanes, advance stop lines along with 'Dutch-style' cycle lanes allowing cyclists and buses to pass each other more safely.

A series of face-to-face interviews were undertaken in order to understand the current and future initiatives already being implemented or considered. The interviews also included discussions on the existing transport movements associated with the main organisations and how data can be collected going forward.

Three key issues have been identified which the Mobility Task project should seek to address.

1. Air quality pollutants primary produced by vehicles;
2. Traffic congestion; and,
3. Greenhouse gas (GHG) emissions produced by vehicles.

Building on existing initiatives, opportunities are explored. These include modal shift, electrically powered vehicles, potential improvements to procurement (including joint procurement and sustainable procurement opportunities), the potential for either shared and/or off-peak deliveries and inventory management.

Data capture and the development of key performance indicators are considered in detail and being developed in conjunction with other Triangulum work packages. The contextual baseline identifies potential sources of quantitative data which will help to understand the scale of these issues. A subset of this data, and other data identified through on-going research, will be used to establish baseline conditions at a district scale. This baseline will be used to assess the extent to which projects contribute to addressing the three issues identified.

Action plans have been developed to support for electric vehicle purchases and a cargo bike scheme, with other propositions to be kept under review. The project will work with the Corridor Manchester Low Carbon Group to identify opportunities as changes progress in the area.

Also include are the proposals to identify relevant academic degree programmes at MMU and UoM with the potential to incorporate e-vehicle skills in to the curricula and a portfolio of applied student projects to support and monitoring activity.



# 1 Introduction

Arup was commissioned by Manchester City Council (MCC) to produce a Mobility Technical Implementation Report for the Manchester element of the Triangulum project. This report is focussed on the Corridor Manchester, an area of 243 hectares stretching from St Peter's Square in Manchester city centre, approximately 2.5km south of the city, along Oxford Road to Whitworth Park and from east to west including Birley Fields, Hulme.

The Corridor Manchester is a partnership set up between MCC, Manchester Metropolitan University (MMU), the University of Manchester (UoM), the Central Manchester University Hospitals NHS Foundation Trust (CMFT) and the property company Bruntwood. These organisations are defined for the purposes of this report as the 'Corridor partners'. The task of the partnership is to drive forward economic growth and investment in the area.

The Manchester element of the Triangulum project is led by MCC working alongside the UoM, MMU and Manchester-based businesses including Siemens and Clicks and Links. These organisations are defined for the purposes of this report as the 'Triangulum partners'.

This report sets out the current activities and initiatives being delivered by each of the Corridor Manchester partners (i.e. MCC, UoM, MMU and CMFT). It also sets out the initiatives being undertaken by other key stakeholders, including Transport for Greater Manchester (TfGM), the organisation responsible for implementing local transport policy within Greater Manchester.

Building on existing initiatives, future opportunities that could be developed as part of the Triangulum project have been explored with the key stakeholders. From this, a number of propositions have been put forward and discussed with the project partners to inform the projects that will make up the Mobility Task.

The areas explored in the study include modal shift, electrically powered vehicles, potential improvements to procurement (including joint procurement and sustainable procurement opportunities), the potential for either shared and/or off-peak deliveries, inventory management and data capture and the development of key performance indicators.

The structure of the report is as follows:

- Section 2 sets out the context of the Corridor Manchester, the issues to be addressed through the mobility task and potential sources of baseline data;
- Section 3 describes the initial round of consultation and data collection undertaken with each of the stakeholders;
- Section 4 provides a summary of the key themes that emerged from this initial consultation stage;
- Section 5 provides a summary of the propositions that have been developed based on the stakeholder consultation and emerging themes; and
- Section 6 sets out the projects to be delivered and sets out draft action plans to take the projects forward.



## 2 Context

### 2.1 The Corridor Manchester

Corridor Manchester is at the heart of Manchester's knowledge economy. Covering some 243 hectares it is home to a 60,000 strong workforce, generating £3bn GVA per annum, 20% of Manchester's economic output over the last 5 years. The area has one of the largest concentrations of higher education students in the UK, with almost 70,000 undergraduates and postgraduates, a population that underpins a large residential market and a vibrant social and cultural scene. The next 10 years of investment will reinforce Corridor Manchester's status as one of Europe's most distinctive and remarkable innovation districts with a committed and planned investment estimated at £1.5billion.<sup>1</sup>

It is also home to a proposed quality bus partnership implementation.



Figure 1 Corridor Manchester Area

<sup>1</sup> Corridor Manchester A Decade of Opportunity Strategic Vision 2025



## 2.2 Bus Priority Package

TfGM are currently implementing a number of improvements to bus travel within key bus routes in Greater Manchester, and specifically on Oxford Road within the Corridor Manchester area. Collectively, these improvements are termed the Bus Priority Package (BPP) and are due to be completed in late 2016.

Traffic will be removed along major sections of Oxford Road between 06:00 and 21:00. This will help to reduce harmful emissions and improve the local atmosphere.

A 'white list' of vehicles to be exempt from the time restrictions has been developed and agreed by MCC and TfGM. This will provide a permit for 12 months. Permits will be applied for through a web site and automatic number plate recognition (ANPR) will be installed to monitor the scheme.

Road layouts and traffic signals will be improved with localised parking and loading restrictions introduced to help cut down traffic congestion and delays. A number of pedestrian and cycle crossings will also be upgraded or installed to improve safety.

Cyclists will be able to ride along many more new and improved cycle lanes, with advance stop lines along all routes. 'Dutch-style' cycle lanes will allow cyclists and buses to pass each other more safely.

## 2.3 Focus of Mobility Task

As set out in Section 2.2, the BPP will result in a significant change to traffic and personal mobility within Corridor Manchester. If the objectives of the BPP are realised, then the area will benefit from:

- Faster, more reliable and more punctual bus services on an improved network;
- Improved routes to key destinations such as employment, education, health, leisure and retail centres;
- Simpler travel choices by helping many passengers to get to their destination in a single bus journey; and
- Improved access to the wider public transport network through better bus links.

The future baseline for the area will therefore be an environment where personal mobility using public transport, walking and cycling is more efficient and better integrated, and represents an exemplar district within the City Centre. The focus of the Triangulum project is to complement this improved personal mobility with more efficient and sustainable models of goods delivery, i.e. the movement and delivery of internal and external goods and services.

Three key issues within the Corridor have been identified which the Mobility Task of the Triangulum project should seek to address.

1. Air quality pollutants primary produced by vehicles;
2. Traffic congestion; and,
3. Greenhouse gas (GHG) emissions produced by vehicles.





## 2.4 Relationship to Other Workstreams

The aim of the Triangulum project is to integrate the work of the energy, ICT and mobility workstream to develop a low carbon district within Corridor Manchester. To this end the mobility projects need to align with the work of the energy and ICT workstream. These links will include:

- Integration with the energy workstream to integrate the charging infrastructure for EV's with the central controller and new energy generation assets installed as part of the project. There is also the opportunity to review charging times and load profiling relating to the use of electric vehicles.
- Alignment with the ICT workstream to ensure the data gathered around patterns of use, charging locations, frequency/ duration is compatible with the Open data platform being developed as part of the ICT workstream and is up loaded to the platform utilised in the development of relevant apps.

## 2.5 Contextual Baseline

Table 1 identifies potential sources of quantitative data which will help to understand the scale of these issues. A subset of this data, and other data identified through on-going research, will be used to establish baseline conditions at the district scale. This baseline will be used to assess the extent to which Triangulum projects contribute to addressing the three issues identified.

In order to establish the feasibility of replicating modules in other cities, contextual data describing the existing conditions is required (see Table 1). This contextual data will be collected at the start of the project and subsequently each year (annual average data). Where required, additional seasonal data counts will be conducted up to four times per year in accordance with TfGM data collection times.

The indicative Key Performance Indicators (KPIs) will be developed in conversation with work package 2 activities of Triangulum (Multi Level Impact Assessment and Monitoring) along with the parallel Horizon 2020 project CITYKeys<sup>2</sup> (Performance Measurement in Smart Cities, February 2015-2017). This suggests using the categories People, Planet and Prosperity. Following the CITYKeys approach, impacts, along with quantitative and qualitative units, will be captured to support replication of the activity. (NB the KPIs referred to in this document will be subject to amendment).

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<sup>2</sup> [www.citykeys-project.eu](http://www.citykeys-project.eu)



Issue	KPI area	Baseline Data	Comments
Air quality	People, Prosperity	<b>Air Quality Measurements on Oxford Road</b> NO: 55 µg/m3 (hourly mean) NO2: 57 µg/m3 (hourly mean) PM10: 24 µg/m3 (24 hour mean)	<a href="http://www.airqualityengland.co.uk/site/latest?site_id=MAN1">http://www.airqualityengland.co.uk/site/latest?site_id=MAN1</a>  NO2 is of most concern as currently over the 'safe' <a href="#">limit</a> of 40ug/m3
Traffic congestion	People, Prosperity	<b>Modal Split for Oxford Road</b> Petrol cars: 39% Diesel cars: 25% HGV: 1% Bus: 26% Other: 9% (includes cycles)	Source: TfGM Highways Forecasting and Analytical Services Annual Transport Statistics Reports (Site no 85319 – Oxford Road)
		<b>People Entering City Centre on foot</b> 524 (07:30-09:30) 1,160 (10:00-12:00)	
		<b>Road Traffic Entering City Centre 07:30-09:30</b> Car: 1,465 LGV: 74 OGV: 16 Bus: 253 Motorcycle: 24 Pedal cycle: 341 All Vehicles: 2,173	
		<b>Road Traffic Entering City Centre 10:00-12:00</b> Car: 687 LGV: 105 OGV: 16 Bus: 237 Motorcycle: 7 Pedal cycle: 85 All Vehicles: 1,137	
GHG emissions	Planet	<b>Car occupancy rates Entering City Centre</b> 1.3 (07:30-09:30) 1.41 (10:00-12:00)	To be calculated with traffic count data and <a href="#">DEFRA CO2e conversion factors</a>
		CO2e: x (tonnes per year) CO2: x (tonnes per year) N2O: x (tonnes per year) CH4: x (tonnes per year)	

Table 1 Mobility Related Issues within the Corridor Manchester and Potential Indicators and Sources of Data



## 2.6 Expected Impacts

Each project taken forward under this workstream has the potential to make impacts which contribute to addressing the three issues as well as achieving other benefits as shown in Figure 2.

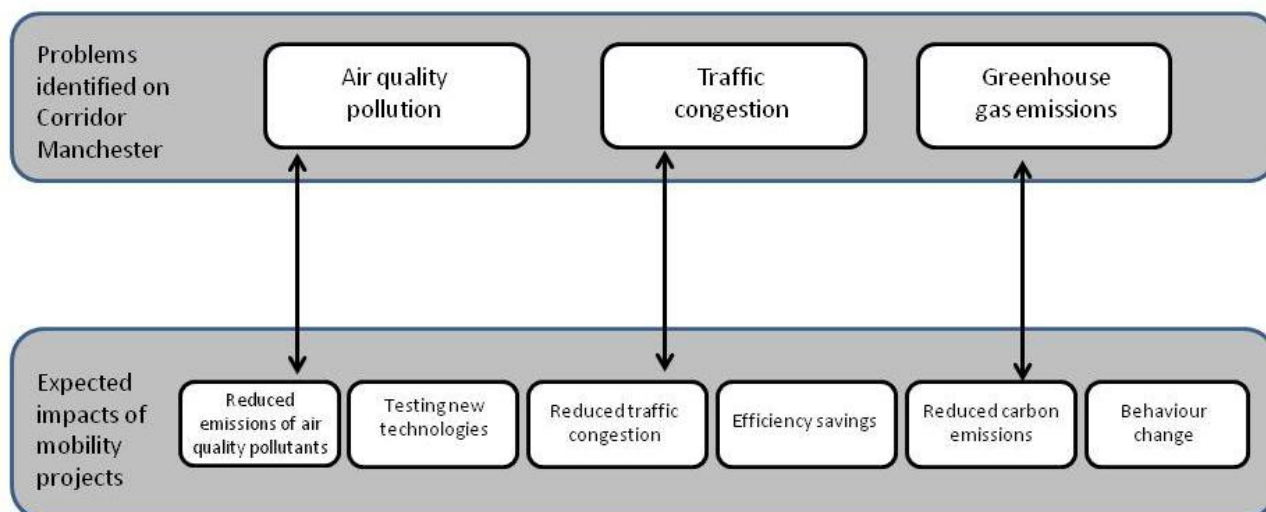


Figure 2 Expected Impacts of Mobility Projects

The indicators for assessing impacts and potential sources of baseline data are set out in Table 2.

Expected Impacts	Indicators Identified for Assessing Impacts	Potentially Quantifiable Units	Potential sources of baseline data
Reduced emission of air quality pollutants	Change in pollutants emitted by delivery vehicles	O3, PM2.5, PM10 emitted within the area by delivery vehicles	Could be calculated based on number of deliveries, estimated distance travelled, estimated split of vehicle types and pollutant emission per km.
	Change in pollutants emitted by own fleet	O3, PM2.5, PM10 emitted within the area by delivery vehicles	Could be estimated based on composition of the vehicle fleet, average annual distance travelled per vehicle, pollutant emissions per vehicle km
Testing of new technologies	Implementation rate	Number in Corridor	Data from partners
	User satisfaction	% registered customers/ questionnaires	No baseline required
	GIS tracking of use	% of vehicles enrolled	Data from partners. Baseline likely to be zero if no tracking is current taking place
	Utilisation	% of time used, number of uses	Data from partners



Expected Impacts	Indicators Identified for Assessing Impacts	Potentially Quantifiable Units	Potential sources of baseline data
Reduced traffic congestion	Number of journeys by vehicle type within Corridor	Number per day/week/year	TfGM datasets
	Modal split of journeys within Corridor	% by mode	TfGM datasets
	Change in number of deliveries made to partner organisations	Number of deliveries / year	Data from partner organisations on number of deliveries
Efficiency savings	Average delivery costs	£/km/kg	Data from partner organisations
	Cost of own fleet operation	£/km	Data from partner organisations
Reduced carbon emissions	Number of low emission vehicles within fleet	Number	Data from partners
	Percentage of low emission vehicles within fleet	%	Data from partners
	Change in total CO2e emissions	Tonnes of CO2	Could be estimated based on number of deliveries, approx. delivery distance and CO2e per km.
	Change in total CO2e emissions from vehicle fleet	Tonnes of CO2	Could be estimated based on number of petrol/diesel/electric vehicles within the fleet, average annual distance travelled per vehicle, CO2e per vehicle km
Behavioural change	People	Likert scale on satisfaction with service	Likert scale

Table 2 Indicators for Assessing Impacts and Potential Sources of Baseline Data



## 2.7 Personal Mobility

In accordance with the task description for mobility, the immediate focus of Triangulum is the delivery of goods within Corridor Manchester. These area goods delivered from external suppliers as well as internal deliveries. It is recognised that in the medium-term, other opportunities to further enhance personal mobility may emerge. These will seek to build upon the current works being implemented within Corridor Manchester as part of the BPP, particularly with reference to cycling. MCC, working in partnership with TfGM and Salford City Council (a neighbouring local planning authority), is currently developing a City Centre Cycling Infrastructure Plan. The plan will:

- Provide a strategy to guide future investment;
- Provide a pipeline of cycling schemes;
- Prioritise cycling and transport infrastructure more effectively; and
- Assist with bidding for future funding for investment in the city centre cycle network.

In this context, it is considered that it is prudent to set aside part of the mobility funding for future, medium term investment in personal mobility. This will be reviewed throughout the implementation stage. For example, CityVerve is an innovative project to begin in early 2016 in Manchester aimed at improving the services for its residents. This is a £10m Government-led technology competition which aims to test better services using the Internet of Things (IoT) technology and includes plans for talkative bus stops, which let bus operators know when commuters are waiting, and a network of sensors in parks and along commuter routes to encourage people to do more physical activity. The intention is that Triangulum and CityVerve will work closely.



## 3 Stakeholder Consultation

A series of face-to-face interviews were undertaken in order to understand the current and future initiatives already being implemented or being considered by the Corridor Manchester partners. The interviews also included discussions on the existing transport movements associated with the main organisations within the area, and how data can be collected going forward so that any schemes can be monitored.

### 3.1 Organisations Consulted

The interviews took place between 24 April 2015 and 03 August 2015. The interviews were held with each of the Corridor Manchester partners alongside representatives of other companies and organisations with an interest in transport movements and or/deliveries within Manchester and, more specifically, the area of Corridor Manchester. The organisations interviewed were as follows:

#### Triangulum Partners

- MCC (separate meetings for Procurement and Transport Policy/Strategy);
- UoM (separate meetings for Procurement and Transport Policy/Strategy);
- MMU (combined meeting for Procurement and Transport Policy/Strategy);

#### Corridor Partners

- CMFT;
- Bruntwood.

#### Other Stakeholders

- TfGM;
- DHL – a global post and logistics company;
- TNT – a global post and logistics company;
- Cycle Waggle – a ‘last-mile’ delivery company based in Manchester that use cargo bikes for city centre deliveries, including those within Corridor Manchester; and
- Duddle – a UK company that provides parcel sending and receipt services with stores primarily located in and around train stations, including Manchester Piccadilly Station, but with other stores within university campuses.

Full details are included in Section 9.1 List of Interviewees



## 3.2 Scope

Each of the interviews with the Corridor Manchester partners covered the broad areas for discussion detailed below. The interviews with the other consultees (i.e. TfGM and delivery companies) are similar in structure.

### 3.2.1 Existing Situation

The discussions included the size and nature of fleet owned and managed by the organisations in order to ascertain the scale of impact/opportunity that changes to fleet might have. The volume, type and frequency of deliveries and waste collection were discussed, alongside the recording and availability of data relating to these issues. The logistics of the receipt of deliveries by the organisation (e.g. centralised receipt and distribution within the internal site) was discussed. The consultees were asked about existing logistics and operational issues that were currently causing problems or inefficiencies.

The interviews also covered issues of procurement. Consultees were asked about roles and responsibilities within the organisation relating to procurement, whether the organisation had sustainable procurement policies and strategies in place and whether these extended to the type and number of vehicles used to undertake deliveries. Issues regarding contractual arrangements and their supply chain were also discussed in order to identify potential barriers to the implementation of changes to procurement as part of the Triangulum project.

The interviews also covered organisational issues regarding environment and sustainability. This included any organisational aims and objectives within these areas, whether deliveries and waste were included within the organisation's travel plan(s), what targets the organisation had in terms of sustainability and whether there were any policies covering the environmental impacts of construction.

### 3.2.2 Changes as Part of the Bus Priority Package

The introduction of restrictions to traffic along Oxford Road as part of the BPP scheme is a major catalyst for change to how deliveries and waste collection take place within the district. Through the interviews, it was therefore sought to understand any potential impacts of the proposed changes to each of the organisations.

The interviews sought to identify any constraints that had been/will be imposed as a result of the proposals as well as any opportunities that might occur as a result. Each of the organisations was asked about their level of involvement/influence in defining the restrictions. The impact of the proposals on deliveries and waste collection was discussed along with alternative north-south routes and east-west connectivity to these alternative routes.

### 3.2.3 Future Opportunities

The final aspect of the interviews was to identify and explore future opportunities that may be brought forward either as part of the Triangulum project or through other means. These opportunities covered three main areas; procurement, transport and environment/sustainability.

In terms of procurement, the interviews explored whether there might be opportunities for joint procurement (either internally and/or externally with others), procurement for third parties (including SMEs), opportunities to specify delivery vehicle types and areas for improved supply chain integration and management. In terms of transport, opportunities for consolidation of deliveries (in order to reduce delivery vehicle numbers) were explored, along with opportunities to undertake/specify off-peak deliveries and potential pilot schemes that could



be brought forward as part of Triangulum. The interviews also explored opportunities for mode shift for deliveries to more sustainable modes including cycles, electric assist bikes, or electric vehicles.





## 4 Key Themes

A list of interviewees is presented in 9.1. The key themes and areas of opportunity arising from the consultation are presented below.

### 4.1 Servicing and Deliveries

One of the main areas for discussion was how goods are currently delivered. This section sets out key considerations relating to the delivery of goods within the district, post, personal deliveries and freight. There are a number of working groups including the Transport & Estates Group (strategic) and the Corridor Manchester Sustainable Transport Group (operational).

#### 4.1.1 University of Manchester

The UoM does not currently have central goods receipt. It was felt that the Oxford Road Corridor works would have an impact on deliveries but that goods will still be able to reach all parts of UoM with the restrictions in place.

Freight is not currently included within the travel plan and is covered by the procurement department. The University has a target of a 40% reduction in CO2 by 2020 (Scope 1 and 2 definitions). It is currently looking to baseline Scope 3 emissions, in readiness for future requirements. This is currently estimated on spend (i.e. more spend assumes higher scope 3 carbon), which creates some issues given the UoM's growth aspirations.

There is a central post room with 4-5 post vans, which cover 30-40 miles per day.

#### 4.1.2 Manchester Metropolitan University

There are 10 key drop off points for deliveries within the All Saints and Birley Fields Campuses. Each delivery point serves a building with minimal internal goods movements between buildings. There is no formal MMU deliveries strategy as such and since deliveries are made to individual buildings, there are no vehicles undertaking internal deliveries around the site.

The Corridor Manchester proposals are unlikely to directly affect access/deliveries as the campus is all to the west of Oxford Road and can be accessed independently. MMU are looking to upgrade the internal public realm with a new north-south route, which may have more of an implication for mobility.

There is a central post facility at MMU. They have three post vehicles at the moment, one of which is electric. They are looking to potentially reduce this to two vehicles (which may both ultimately be electric). Charging facilities have recently been constructed at their Crewe campus (a campus of the university approximately 60km south of Manchester) to ensure that there are no range issues for deliveries.

Personal deliveries for staff are made straight to buildings and held at receptions. There is an Amazon locker facility for students in the new student union to collect Amazon purchases only. Students do not currently receive personal deliveries other than at their halls of residence.



### 4.1.3 Manchester City Council

An updated City Centre Transport Strategy is being developed by MCC and will include the Corridor Manchester district. It is anticipated that this document will be published in 2016. Low emission zones are now back on the agenda for national policy. These will focus on buses, HGVs and maybe LGVs. Construction logistics plans and delivery service plans could theoretically be enforced through the planning process.

There is minimal internal post between MCC buildings within the area.

### 4.1.4 Central Manchester University Hospitals NHS Foundation Trust

Most deliveries to the hospitals are from Upper Brook Street and take place overnight, therefore the impact of BPP proposals likely to be limited as these are focussed on Oxford Road (to the west of the hospital). There are no specific issues or problems caused by goods and waste other than the sheer volume of deliveries required to operate the site.

Receipt and deliveries are centralised. This is managed/operated by Sodexho. However, DHL vans etc. still use lay-bys around the site to deliver to specific buildings. Ground maintenance is also by Sodexho.

There is currently a large volume of internal post. There is a central post room (run by Sodexho) from which this is distributed (this is separate to goods inward). Post is generally transported across site by foot. Distribution of post using electric-assist bikes is of interest.

### 4.1.5 Bruntwood

Most Bruntwood buildings are manned 24 hours a day for delivery and security purposes. Failed deliveries are therefore not a major issue. Post between Bruntwood's sites is minimal.

### 4.1.6 Transport for Greater Manchester

Restrictions are likely to start in September 2016 and will restrict access to cycles, buses and taxis only from 6am to 9pm. No lay-bys are being provided along Oxford Road for loading and all deliveries and collections will need to be done from side roads.

### 4.1.7 Cycle Waggle

There are a number of cycle courier services operating in Manchester. Only Cycle Waggle are known to have a cargo delivery service with contacts with DHL and Hermes. They currently deliver an average of 10 parcels 3 to 4 times a week to the Corridor Manchester area, principally to the universities.

## 4.2 Fleet

Each of the partner organisations has its own fleet of vehicles, some of which are electric vehicles. Another key area for discussion was the extent of the organisation's fleet and planned changes to the size and mix of that fleet in the future.



#### 4.2.1 University of Manchester

UoM has approximately 100 vehicles. Whole life costs form part of the review criteria for vehicle purchase/lease. The University operates two electric vehicles, a Grouphill G3 utility vehicle and a Nissan Leaf pool car for staff. There are 4 electric vehicle charging points (in Booth Street West) car park. UoM are considering adding 4 more in summer. There are 8 fleet charging points. There is no fleet manager. Around 40 vehicles are under the control of the operations manager.

The University has had a Green Fleet Review undertaken by the Energy Savings Trust (EST). As well as the Green Fleet Review, the University has undertaken work in relation to the Plugged in Fleet Initiative to review the potential of electric vehicles. It was considered that there is an immediate opportunity to switch c.15-20 utility vehicles to electric. The central post room has 4-5 post vans that cover 30-40 miles per day. The University ran a one week trial of two electric vehicles (ENV200 and Renault Kangoo) c.12-18 months ago. Both proved very popular. They are interested in running a similar trial of electric-assist cargo bikes.

#### 4.2.2 Manchester Metropolitan University

MMU are looking to extend the use of electric vehicles across the fleet. Their total fleet is currently c.30 vehicles of which c.20 are on All Saints/Birley Fields with the remaining 10 at the Crewe campus. MMU has a MegaVan (electric powered) which is mainly used for maintenance and litter picking on site. The post service use a Nissan eNV 200, which has been in place since Jan 2015. Data from the first 3 months extrapolated for a year forecasts an annual saving of c. £3,600 over the previous diesel vehicle. Vehicle use is logged (mainly for insurance and/or fuel use) but this information is not widely used at present. MMU hope to have a suite of documents in place by this time next year to form a comprehensive vehicle policy. They intend to procure the first phase of vehicles by August 2016

There are 12 fast chargers on the MMU site (nine within a multi-storey car park) and one, higher power rapid charger. Charging an electric vehicle on a fast charger typically takes 3-4 hours, with a rapid charger being able to charge a vehicle to 80% in less than 30 minutes (depending upon battery capacity). The rapid charger is extremely well used. One fast charger is for the exclusive use of MMU, the others are available to the public and are implemented by TfGM. TfGM collect data on use and this is shared with MMU.

MMU are currently in discussions with City Car Club/Enterprise with regards to expanding the current offer of two pool cars (both Nissan Leafs). City Car Club is Britain's largest privately owned car club, providing its members with access to self-service vehicles across 17 different cities, including Manchester. They are also considering a range extender (hydrogen) for their electric van.

#### 4.2.3 Manchester City Council

MCC's own fleet is small, though they have two electric bikes. MCC are active in specifying vehicles standards within these contracts including the use of electric vehicles.

Most services are outsourced. Key contracts include:

- Refuse collection - undertaken by Biffa Waste Services via a subcontract.
- Manchester Working - a joint venture set up to deliver repairs to City Council-corporate property (Morrison PLC own 80% and the City Council 20%)



- Manchester Contracts - a construction and development company operated by MCC, delivering wide ranging services designed to maintain, improve and construct the region's highways, street lighting, parks and open spaces.

#### 4.2.4 Central Manchester University Hospitals NHS Foundation Trust

CMFT has a small fleet at present (c. 9 leased vehicles). There is also some grey fleet (vehicles owned and used by employees on business related journeys) and community staff use their own vehicles. CMFT currently operates an electric van (a Renault Kangoo) for transporting goods between the site and the dental hospital. However, problems have been experienced with the range of the vehicle not being as advertised. This could result in resistance to further use of electric vehicles. An electric 6-seater minibus provides patient transfer between the hospitals and car parks

Electric vehicles/buggies are used for on-site waste collection. A key driver for the introduction of electric vehicles is cost, however, sustainability is also important. The existing vehicles have been purchased partly using charities funding. There is currently one dual charging point and one van charging point within the hospital campus.

#### 4.2.5 Bruntwood

Bruntwood is a major property landlord in Manchester. They currently operate a large number of pool vehicles. These include pool bikes (not electric). Alphabet Fleet Management Services are currently reviewing their fleet (c.60 vans) with a view of a cost benefit analysis.

Bruntwood are currently participating in a project (Ebbs and Flows<sup>3</sup>) funded by Innovate UK (UK government) which includes the development and testing of two way charging infrastructure for electric vehicles – see Section 4.3.5. A further electric vehicle charging point is being installed at Alderley Park, (26km to the south of city in Cheshire). This represents the longest distance journey that is typically made by Bruntwood staff from their sites within Corridor Manchester. The provision of charging infrastructure at Alderley Park, therefore increases the feasibility of Bruntwood using electric vehicles to travel between the area and Alderley Park as they are able to recharge the vehicle at either end of the journey.

Bruntwood are increasingly looking to use electric vehicles both in terms of their own fleet and as a potential means of electricity storage. A key driver for this is the potential cost savings that could be achieved by purchasing electricity outside of the 'red periods'. Two Nissan Leaf vehicles have been purchased for use as pool cars.

#### 4.2.6 Transport for Greater Manchester

A white list of vehicles to be exempt from the Oxford Road time restrictions is being developed and agreed by MCC and TfGM. This will provide a permit for 12 months, but will only be allowed for Corridor organisation's own fleet (not suppliers). The criteria will ensure that the universities' own vehicles can access the entire campus. Permits will be applied for through a web site and *automatic number plate recognition* (ANPR) will be installed in to monitor the scheme (MCC).

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<sup>3</sup> [www.cenex.co.uk/case-studies/ebbs-flows-energy-systems-efes-project](http://www.cenex.co.uk/case-studies/ebbs-flows-energy-systems-efes-project)



The white list criteria will not include any exemptions for electric vehicles, however, the cycle lanes on Oxford Road should accommodate cargo bikes (at the most constrained point the cycle lanes will be 1.5m) and hence these will be permitted to use Oxford Road at all times.

## 4.3 Data Collection and Research Activities

Each of the organisations was asked about the current data that it collects with regards to mobility. Existing and future research activities undertaken by the organisations that could be relevant to Triangulum were also discussed.

### 4.3.1 University of Manchester

The procurement department have done some survey work on goods inwards and collated data regarding purchases. An opportunity was identified to link the business school to a study examining the UoM's supply chain and perhaps that of others (e.g. Hospital Trust).

The University Living Lab is a concept being developed for the UoM campus as a site for applied teaching and research around sustainability and low carbon. This provides a platform for collaboration between researchers, students, external stakeholders and the Directorate of Estates and Facilities to deploy and monitor new technologies and services in real world settings.

### 4.3.2 Manchester Metropolitan University

A survey has been completed based on information provided by the various facilities management teams on the frequency and times of deliveries. This is c.3 years old but gives reasonable estimate of existing data. Data is also held of vehicle use (of MMU fleet) and use and performance of the electric vehicles operated by the university.

There is potential for student research associated with the use of electric vehicles on the site.

### 4.3.3 Manchester City Council

Traffic modelling has been done of the BPP scheme and MCC have a good understanding of the number of freight vehicles going down the Oxford Road area. However, this data does not record which ones actually deliver in the area. Bus enforcement cameras are owned and monitored by MCC.

### 4.3.4 Central Manchester University Hospitals NHS Foundation Trust

No surveys on deliveries are known to have been undertaken, however, this is something that the procurement department at the hospital were keen to understand. Approximately 80% of deliveries were from the central NHS supplier.

### 4.3.5 Bruntwood

Bruntwood are increasingly monitoring the use of their pool vehicles both for business reasons and for the Energy Savings Opportunity Scheme (ESOS). Telemetry is currently being fitted to their electric vehicles to allow their performance to be monitored.



Bruntwood are involved in the Ebbs and Flows of Energy Systems (EFES) study, based at Manchester Science Park. This is a 2.5 year project (completing in June 2017), part-funded by Innovate UK and the Engineering and Physical Sciences Research Council. The intention is to provide a basis for the development of a variety of technologies including vehicle-to-grid, building energy management systems and a virtual power plant. These technologies are being developed to explore the impact electric vehicles could have on the future of UK electricity demand and supply using a virtual power plan model. A key area of interest is the impact on the degradation of electric vehicle batteries from two-way charging along with the potential for a low cost virtual power plan for domestic and business dwellings.

#### 4.3.6 Transport for Greater Manchester

TfGM are using monitors on various routes around Corridor Manchester to assess the impacts of the Bus Priority Package on journey times. TfGM currently collect and publish large amounts of data, particularly relating to the use of public transport and other sustainable transport modes.

Delivery Service Plans could be used by Corridor Manchester and TfGM are in the process of implementing a pilot scheme with UoM for the Brunswick Street area.

### 4.4 Procurement

Overall, it should be recognised that the partners have a wide range of, often complicated, existing contractual agreements in place with regards to procurement. This has been identified as a significant potential barrier to implementing changes to procurement through the Triangulum project. Notwithstanding this, procurement is a key influencing factor on the number and type of freight movements. The existing policies and procedures relating to procurement were discussed with each organisation.

#### 4.4.1 University of Manchester

UoM has a central procurement team. The procurement team has a list of nominated suppliers but each department/faculty controls their own orders (using the approved suppliers list). The University uses a 'net positive' tool for all suppliers.

UoM has a shared waste contract with Salford University and the RNCM. There are separate contracts on specialist items (e.g. clinical waste). There may be potential overlaps for such items with the hospitals.

UoM do not currently share their supply contracts with local small businesses, but this is something that is potentially of great interest in relation to the University's 2020 vision for social responsibility.

#### 4.4.2 Manchester Metropolitan University

Following rationalisation of the MMU estate over recent years, their policy is to look for a single supplier for deliveries where possible. Departments order goods independently but any items over £2,500 must be approved by procurement. Items below this value can be purchased independently but a new supplier form must be completed and approved by procurement if not on the approved list.



MMU has a sustainable procurement policy in place. There is a post of sustainable procurement officer (recently made vacant). The previous incumbent has done some work on where suppliers are based and delivery frequencies. MMU are part of the North West Universities Purchasing Consortium (as are UoM).

There is currently no joint procurement undertaken with other parties but it was stated that there was no reason why this could not be possible and it may be actively encouraged. One exception is the bus service (route 147). This provides a route from the city centre to Corridor using a low emission, hybrid electric bus and serves the hospital and the universities. Costs for this service are shared by MMU, UoM and the Hospital. Similarly, MMU does not currently purchase for any affiliated businesses or third parties.

#### 4.4.3 Manchester City Council

MCC has a central procurement team and use two main supply networks, the AGMA (Association of Greater Manchester Authorities) Procurement Hub and the iNetwork.

The AGMA Procurement Hub comprises 14 local authorities as well as the police, the fire and rescue service, TfGM and the waste disposal company. The range of contracts is diverse and not all contracts are applicable to all organisations. The Procurement Hub operates on a 'hub and spoke' principle – generally one of the member authorities will lead on a particular procurement exercise on behalf of the other members and the Procurement Hub supports by taking on the additional work associated with co-ordination of the collaborative element.

The iNetwork (formerly MWEG) has a broader membership than AGMA. It is a public sector partnership led by Tameside Council (an adjacent authority to MCC and member of AGMA) that is looking to help and enable the public sector. Membership is available to any local public service organisation in the UK and it gives access to a range of benefits including procurement, service redesign training, expert intelligence and advice, network and peer support, sector-led workshops and briefings on key policies.

#### 4.4.4 Central Manchester University Hospitals NHS Foundation Trust

Procurement is undertaken centrally with a nominated representative in each department. Each hospital within the campus has a buyer (with some shared between two). Equipment is scanned in and out to keep control of stock.

There is currently no joint procurement with either of the universities, and doing so was stated to be difficult (due to contractual arrangements). However, there is regular dialogue between organisations. Shared waste services and some supply chain items such as consumables may be possible.

There are staff park-and-ride services operated from sites in Trafford (to the west of Manchester city centre) and Bellevue (to the east of Manchester city centre). These are temporary services in operation during works to the one of the main car parks serving the hospitals). These are operated by a private coach company and run every c.30mins through the day. The universities are aware of these but have not expressed interest in sharing the service to date. As noted above, the universities and CMFT do collaborate on another bus service.

### 4.5 Waste Collection

As with procurement, existing frameworks and contracts limit the ability to influence how waste is collected within the area.





#### 4.5.1 University of Manchester

UoM has a shared waste contract with the University of Salford (UoS) and the RNCM. There are separate contracts on specialist items (e.g. clinical waste). There are potential overlaps here with the hospital. However it worthy of note that hospital waste is collected as part of a contract and, as such, there are likely to be significant barriers to implementing change to the existing processes.

Construction waste is currently monitored by the University on their existing projects rather than construction traffic.

#### 4.5.2 Manchester Metropolitan University

Veolia Waste currently run the waste collection for MMU. There are four main waste streams.

It was stated that shared waste collection with others may be possible. However, the contract has recently been extended by 12 months and is a 3-4 year contract.

#### 4.5.3 Manchester City Council

Biffa Waste Services currently hold MCC's street cleaning and waste contract.

#### 4.5.4 Central Manchester University Hospitals NHS Foundation Trust

Sodexo are currently responsible for managing waste contractors across the site. There are understood to be 19 different waste streams using c.6-10 contractors. Any changes to waste management/consolidation would require contractual changes and timescale for being able to achieve this is likely to be an issue. Recycling is collected as mixed recyclables (currently by Blakeley's Waste Management in Wigan).

#### 4.5.5 Bruntwood

Bruntwood have a single waste contract in place. There are two waste contracts at Citylabs, two Bruntwood properties adjacent to the hospital complex. These are shared with the hospital. There is currently no chemical/hazardous waste generated by Manchester Science Park.

### 4.6 Construction Projects

There are a number of large construction projects planned within Corridor Manchester over the next 5-10 years. Many of these are to be delivered by Corridor Manchester partners themselves, in addition to major projects by Network Rail and others. The resulting construction traffic generated will have a significant impact upon the key issues of air quality, congestion and GHG emissions. It is recognised, however, that the ability of the Triangulum project to achieve significant change with regards to these projects is limited by the scale of funding available.

#### 4.6.1 University of Manchester

The UoM currently has a c.£1bn construction programme. It was thought that a shared construction consolidation centre with other parties may be difficult to deliver given the number of parties and suppliers involved. However,





a consolidation centre for UoM construction projects may be more viable, particularly given the recently established framework of 3 construction suppliers. The construction manager for each of these suppliers will be based on site.

#### 4.6.2 Manchester Metropolitan University

Major construction projects coming forward for MMU include new teaching facilities, a new student residential scheme and a public realm scheme.

There were issues with the recent Birley Fields campus construction, particularly with contractor parking. The John Dalton construction will displace parking and therefore parking may be a major issue again.

#### 4.6.3 Central Manchester University Hospitals NHS Foundation Trust

There are a number of forthcoming construction projects including the redevelopment of adult accident and emergency. The concept of a construction consolidation was discussed and would be of interest.

#### 4.6.4 Manchester City Council

All highway construction/maintenance contracts up to £3m are undertaken by Manchester Contracts. Schemes above £3m are undertaken by way of bespoke contracts, typically using NW Construction Hub to procure. MCC has responsibility for major highway schemes. Other construction projects in the area to consider are Oxford Road station and other Network Rail plans.

#### 4.6.5 Transport for Greater Manchester

The enabling works for the BPP have already been completed and changes to the local road network have been (or will be) done prior to any closures to accommodate the additional traffic volumes.

The MCC contractor (Manchester Contracts) are undertaking the works. The concept of construction consolidation was discussed and would be of interest.



## 5 Propositions

Using the themes that emerged from the stakeholder consultations as a foundation, a number of propositions were developed to be presented back to the project partners.

Each of the propositions is described below alongside a summary of the feedback from project partners on the potential support for each proposition.

### 5.1 Proposition 1 – Supply Chain Review

#### 5.1.1 Description

As identified in Section 4.4, the number of delivery vehicles operating within Corridor Manchester is directly influenced by the procurement operations of the Corridor Manchester partners. Opportunities to increase joint procurement, either internally within organisations or between organisations (e.g. the two universities), have been identified. However, it is recognised that existing contractual arrangements may limit the ability to realise these opportunities within the timescales of the Triangulum project.

This proposition would involve a review of the approved suppliers' lists of each of the Corridor Manchester partners. The aim would be to identify overlaps in the supply chains in terms of the types of goods ordered on a regular basis and in large volumes. Given the scale of the procurement operations of the organisations, it would be necessary to initially focus a pilot study on a single item that is common to each of their partners and is less likely to be 'controversial', for example paper supply or stationary.

The partners have considered the issue of joint procurement via their Low Carbon working group. They concluded that it is a complex and challenging area due to the number of framework agreements and contracts. They remain committed to reviewing this and working towards sustainable procurement.

#### 5.1.2 Anticipated Impacts

By switching to a single supplier, deliveries of this pilot product for all Corridor partners could be made by a reduced number of deliveries compared to the existing situation where each organisation will have deliveries made by different suppliers. Some organisations even have multiple suppliers delivering to individual departments. The supplier could potentially consolidate deliveries to a single vehicle, which could deliver to all organisations within Corridor Manchester.

This proposition could therefore enable a reduction in the number of vehicles making deliveries to the partner organisations.

This would contribute towards the following impacts:

- Reduced emissions of air quality pollutants;
- Reduced traffic congestion;
- Efficiency savings; and



- Reduced carbon emissions.

### 5.1.3 Project Partner Support

MMU would be supportive of this initiative, but it is considered that this would need to be a focussed pilot study around a single item (e.g. stationary). This could be used to form basis of further roll out. This proposition would need senior-level support from procurement. Information on the top 20 suppliers (by volume) could be provided. The university has a vacant sustainable procurement post.

UoM is also supportive of this proposition. UoM currently has devolved procurement as opposed to MMU's more centrally focussed procurement team. A fall-back position was suggested whereby procurement within each partner organisation was reviewed. It is considered that there are opportunities for shared best practice between the two institutions in this regard.

It is understood that previous attempts have been made to explore the potential for shared procurement between organisations and that these had concluded that it would be difficult to achieve. Notwithstanding this, a review of each partner organisation's supply chain may identify saving opportunities, albeit it is acknowledged that the procurement teams within each organisations will already be focussed on identifying efficiency savings and thus, any further review may not identify significant benefits.

On balance, therefore it is considered that other propositions are likely to have greater support from the project partners. Greater focus and investment on these other propositions is therefore likely to result in a larger impact on the identified issues.

## 5.2 Proposition 2 – Support for Electric Vehicle Purchases

### 5.2.1 Description

As described in Section 4.2, electric vehicles within partners' fleet are increasing in number. However, the switch from diesel to electric is relatively slow, partially due to the higher capital cost of EV. The Triangulum project could help to accelerate the implementation of electric vehicles by subsidising the initial purchase of vehicles on behalf of the partner organisations.

MMU have already monitored the operating costs of EV and have demonstrated that these can be substantially lower than diesel vehicles. The funding available within the Triangulum project could be used to help subsidise the purchase of more EVs.

There may also be the potential for the funding to deliver additional charging infrastructure within the area.

### 5.2.2 Anticipated Impacts

A key part of this proposition will be the co-ordination, collection, interpretation and sharing of data on the use of electric vehicles by partner organisations within Corridor Manchester. This will be important in demonstrating the benefit of electric vehicles to the organisations, allaying potential concerns over the use of electric vehicles and support the business case for further purchases of electric vehicles. It is also a key proposition in the area as a smart energy district.



Triangulum would focus on smaller vans or cars. A wider SME public hire scheme for cargo bikes could also be facilitated.

This proposition could therefore enable a replacement of conventional vehicle journeys with low emission journeys (i.e. electric vehicles).

This would contribute towards the following impacts:

- Reduced emissions of air quality pollutants;
- Testing new technologies;
- Efficiency savings; and
- Reduced Carbon emissions.

### 5.2.3 Project Partner Support

MMU consider that the implementation of electric vehicles is building up some momentum. Charging facilities have recently been installed at the Crewe campus making the use of EV between their Crewe and Manchester campus more viable. The main problem historically has been the charging infrastructure available, though this has largely been addressed. There are opportunities to share chargers between Corridor partners and/or the general public. However, there is some benefit in having some dedicated to the university.

The latest van that MMU purchased (Nissan ENV200) cost c. £16,000. The last rapid charger that they purchased cost around £20,000 although costs do appear to be falling. MMU would be interested in purchasing more electric vehicles.

City Car Club are currently managing two pool cars on behalf of (and owned by) MMU. In contrast the UoM are managing their pool cars internally, which was said to be a difficult task. MMU are also investigating hydrogen range extenders for their EVs.

UoM felt that this proposition represents a potential 'quick-win'. The university does not have a fleet manager but there is an operations manager who has control over the fleet. It was stated that the primary opportunity for introducing electric vehicles is for the utility vehicles that operate within the area. These tend to use a traditional outdoor 3-pin socket. This may restrict opportunities for some aspects of monitoring and data collection.

MCC are unlikely to require the use of electric vehicles but are willing to commit to undertaking the GPS tracking of EVs purchased by the universities as part of the study. The universities were asked to consider what financial support they would require to take this proposition forward and how it would be used.

## 5.3 Proposition 3 – Personal Delivery Consolidation

### 5.3.1 Description

The stakeholder discussions identified post and personal deliveries as a particular opportunity for reducing the number of vehicle journeys. Within this proposition, a parcel storage/personal delivery service would be established within the area, similar to the Doddle service that currently operates at Manchester Piccadilly Station. The service allows users to send and receive parcels, managing the relationship with the courier so the users can collect and receive at their own convenience.



### 5.3.2 Anticipated Impacts

Personal deliveries to staff and students of the partner organisations would be delivered to this facility rather than being delivered directly to individual addresses. The main potential benefit of such a service would be to reduce the number of delivery vehicles circulating by providing a focal point for personal deliveries (enabling consolidation) and helping to reduce the number of failed/repeat deliveries. However there is also concern that it could attract more deliveries.

This proposition could therefore enable a reduction in the number of vehicles making deliveries to the partner organisations.

This would contribute towards the following impacts:

- Reduced emissions of air quality pollutants;
- Testing of new technologies;
- Reduced traffic congestion; and
- Reduced Carbon emissions.

### 5.3.3 Project Partner Support

MMU already have an Amazon collection point within the student union. However, this is for Amazon deliveries only. The University is currently considering the centralisation and relocation of its own internal postal services. MMU and MoU expressed concern that this kind of consolidation centre could attract more deliveries to the area. Both institutions provide student residences in the area. However these have concierge facilities and failed deliveries is not considered an issue. Both institutions would wish to see an evidence based analysis to justify this proposal. The proposal would be a more detailed piece of work to identify and map student residences and understand delivery facilities.

It was agreed that it is important that any parcel service is available to the public and not confined to staff/students. For MCC it is not considered to be relevant or appropriate to implement a personal delivery facility across the Town Hall Complex. Personal deliveries are prohibited and a concern was expressed that such a city centre location could actually encourage more delivery trips into the city.

## 5.4 Proposition 4 – Cargo Bike Scheme

### 5.4.1 Description

This proposition would aim to increase the use of bikes and electric-assist bikes for post and internal deliveries within Corridor Manchester. EAPC cargo bikes (Electric Power Assisted Cycles) could be provided to the partner organisations for use as a trial – “try before you buy” – or as a direct purchase. These bikes would be exempt from the restrictions on Oxford Road providing an advantage over the use of vans for post deliveries.

### 5.4.2 Anticipated Impacts

As with the use of electric-vehicles, monitoring and data collection on the use of these bikes will be an important factor in demonstrating the benefit and business case for further roll out of this technology.



This proposition could therefore enable a replacement of conventional vehicle journeys with low emission journeys (i.e. electric vehicles).

This would contribute towards the following impacts:

- Reduced emissions of air quality pollutants;
- Testing of new technologies;
- Reduced traffic congestion; and
- Reduced Carbon emissions.

### 5.4.3 Project Partner Support

MMU are keen to examine opportunities for e-cargo bikes. The main barriers to their implementation have been financial. There are additional issues identified by UoM relating to user acceptance and changes to working practices (e.g. trade unions) along with concerns regarding liability and insurance. The MMU security services have just taken receipt of an electric bike to increase their patrolling efficiency. It will be important to include a framework of how any bikes would be managed and maintained. Tracking and monitoring of the use of the bikes will also be important.

It was felt that the UoM postal team would be more likely to respond positively to a trial of electric-assist cargo bikes rather than it being imposed on them. They are also interested in an electric trolley to replace work done using a diesel van moving cargo bins.

MCC is supportive of the concept of trialling electric-assist cargo bikes.

Although not a direct project partner, CMFT is also interested in this proposition, which would provide a benefit. It was noted that this proposition would be deliverable within the timescales of the project and probably would not happen without some initial funding from a source such as Triangulum.

## 5.5 Proposition 5 – Delivery Service Plans

### 5.5.1 Description

A Delivery and Servicing Plan (DSP) aims to help an organisation to better manage deliveries. Delivery service plans could be developed for certain pilot areas. This would focus on improving the operational efficiency of deliveries to specific sites (e.g. a specific university department).

A number of initiatives could be taken forward as part of the delivery service plan. This may include engagement with facilities managers to consider more sustainable logistics practices within the overall management of the building. It may also require engagement with procurement, suppliers and contract managers to embed sustainable logistics freight practices within the procurement process (at a local/department level).

### 5.5.2 Anticipated Impacts

Outcomes that might be achieved by the implementation of delivery service plans include a reduction in the frequency of orders of certain supplies, more effective co-ordination and management of delivery and servicing activities, and improved layout and operation of loading areas.



This would contribute towards the following impacts:

- Reduced emissions of air quality pollutants;
- Reduced traffic congestion; and
- Efficiency savings.

### 5.5.3 Project Partner Support

In contrast to Proposition 1, which would require organisational change, the focus of this would be at local/building/department level. This may enable greater opportunity to achieve behavioural change. This proposition also builds on TfGM's work on delivery service plans and could be used as best practice examples for other organisations.

However, overall there was a lack of support for this proposition from project partners. It was considered that the proposition did not differ sufficiently from the work being undertaken by TfGM and that Triangulum should focus elsewhere.

## 5.6 Proposition 6 – Construction Traffic Reduction

### 5.6.1 Description

The stakeholder discussions identified construction traffic as a major existing and future issue for the area. This is likely to be an increasingly important issue given the programme of construction works planned for the area including the BPP works, the investments of the two universities and Bruntwood in particular.

There is support for the longer-term development of a construction consolidation centre for Corridor Manchester. A construction consolidation centre is a distribution facility through which material deliveries to construction sites would all be directed. On call-off from individual sites, the construction consolidation centre operator would make up consolidated loads and deliver them to sites within the area on a 'just-in-time' basis. This could be combined with on-site logistics specialists to deliver materials to the point of use and provides an excellent opportunity to improve the overall resource efficiency of individual construction projects and reduce the number of deliveries made directly to construction sites in the area. It is recognised, however, that the delivery of a construction consolidation centre is not achievable within the available budget of the mobility task of Triangulum.

Given the potential impact of construction traffic, it is considered that a proposition relating to construction traffic should still be developed. This proposition would therefore seek to identify whether there are any enabling or complementary measures that could facilitate the future implementation of a construction consolidation centre.

Tasks related to a construction consolidation centre that might be achievable within the time and budget constraints include the identification of a suitable site for a centre, the development of a coordinated programme of future construction works by Corridor Manchester partners and other major developments, or the establishment of a cross-party construction traffic working group.

Alternatively, there may be tasks that can be brought forward relating to construction traffic that do not relate to consolidation. These measures would seek to address other transport issues caused by construction traffic. For



example, it may be feasible to investigate the development of a park and ride site for construction traffic. In order to reduce costs this could potentially link with or expand the existing services operated by CMFT.

### 5.6.2 Anticipated Impacts

This proposition would aim to achieve a reduction in the number of construction related vehicles making deliveries to the partner organisations.

This would contribute towards the following impacts:

- Reduced emissions of air quality pollutants;
- Reduced traffic congestion;
- Efficiency savings; and
- Reduced carbon emissions.

### 5.6.3 Project Partner Support

Overall it was concluded by the partner organisations that the scale of funding within the Triangulum project was not sufficient to be able to achieve a measurable change in construction-related traffic. The delivery of a construction consolidation centre is not achievable within the available budget of the mobility task of Triangulum and the enabling measures identified would not result in an observable benefit. It was concluded that, at present, mitigation measures for construction projects within Corridor Manchester should be delivered on a scheme-by-scheme basis.

## 5.7 Proposition 7 – Appointment of Preferred Delivery Partner

### 5.7.1 Description

This proposition would enable consolidation of deliveries to take place without the need to establish a formal consolidation centre. Each of the partners would tender for a 'preferred delivery partner' (or a single preferred delivery partner could be appointed for all Corridor Manchester partners).

A zero-cost contract would be negotiated between the partner organisation and the delivery partner. The delivery partner would be responsible for deliveries from each of partners' suppliers. The delivery partner would renegotiate delivery costs with the suppliers and retain any savings in cost compared to the partner organisations existing agreed rate. Initially this would probably cover a single item as a pilot, but over time, the idea would be to extend the range of goods provided by the delivery partner.

### 5.7.2 Anticipated Impacts

The main potential benefit is that the increased volume of deliveries through a single delivery company will enable the consolidation of deliveries bound for the area within the warehouse of the delivery partner. This will potentially provide operational savings to the delivery partner (by reducing the number of separate) and will help to reduce the number of vehicles accessing the district.





The preferred delivery partner role would also provide the partners with greater influence and control on how and when deliveries will take place. This may include being able to specify the timing of deliveries, the type of vehicles used (e.g. use of electric vehicles) and/or the locations for delivery (i.e. a centralised receipt location).

The delivery partner would agree to collate and share data on deliveries with the Corridor Manchester partner organisations. This will help to inform the partners on the number and type of deliveries that are currently taking place. It will also help to provide a baseline against which future improvements can be measured.

This proposition could therefore enable a reduction in the number of vehicles making deliveries to the partner organisations.

This would contribute towards the following impacts:

- Reduced emissions of air quality pollutants;
- Reduced traffic congestion;
- Efficiency savings; and
- Reduced Carbon emissions.

### 5.7.3 Project Partner Support

Both universities felt that, whilst this idea has merit, the implementation of this proposition was likely to be a time-consuming task that will be constrained by existing framework agreements and contracts. Similar proposals have been discussed by the Sustainable Procurement Group as part of the Corridor Manchester Board's work and considered to be in the "too difficult" category. As such, it would require the buy-in of a significant wider group within each of the organisations at senior director level that cannot be achieved within the timescales of Triangulum.

It is therefore concluded that this proposition does not have sufficient project partner support to be taken forward within the Triangulum project. However, the concept has sufficient merit to continue to be considered outside of the Triangulum project as a long-term aspiration for the partners.

## 5.8 Summary

Table 3 provides a summary of the propositions considered; the mechanism by which they would impact upon the area scale issues; expected impacts.



Proposition #	Mechanism for creating impacts	Expected impacts					
		Reduced emissions of air quality pollutants	Testing new technologies	Reduced traffic congestion	Efficiency savings	Reduced carbon emissions	Behavioural change
Supply chain review - # 1	Reducing the number of vehicles making deliveries to partner organisations	*		*	*	*	*
Support for EV purchases- # 2	Replacing conventional vehicle journeys with low emission vehicle journeys (i.e. EVs)	*	*		*	*	*
Personal delivery consolidation- # 3	Reducing the number of vehicles by reducing failed deliveries and providing opportunities for consolidation	*	*	*		*	*
Cargo bike trial scheme- # 4	Replacing conventional vehicle journeys with low emission vehicle journeys (i.e. Cargo Bikes)	*	*	*		*	*
Delivery service plans- # 5	Increasing efficiency of deliveries	*		*	*		*
Construction traffic reduction- # 6	Reducing number of construction vehicles	*		*	*	*	
Appointment of preferred delivery partner- # 7	Reducing the number of vehicles making deliveries to partner organisations.  Replacing conventional vehicle journeys with low emission vehicle journeys (i.e. EVs)	*		*	*	*	*

Table 3 Mapping between Proposed Projects and Expected Impacts



## 6 Project Action Plans

On the basis of the discussions with the project partners, action plans have been developed for the following propositions.

- Support for electric vehicle purchases (Proposition #2);
- Cargo bike scheme (Proposition #4).

The following propositions will be kept under review and the project will work with the Corridor Manchester Low Carbon Group (reporting to the Corridor Manchester Board) to identify opportunities. These are outlined in Section 7.

- Supply chain review (Proposition #1);
- Personal delivery consolidation – linking with operations as changes progress. (Proposition #3).

The following propositions will not be taken forward at this stage due to a lack of support from the partner organisations.

- Delivery service plans (Proposition #5);
- Construction traffic reduction (Proposition #6) and
- Appointment of a preferred delivery partner (Proposition #7).

### 6.1 Project A – Support for Electric Vehicle Purchases - Proposition #2

#### 6.1.1 Project Description

This project involves supporting the provision of electric utility vehicles for each of the university partners. The use of these vehicles would be monitored and the financial and environmental savings achieved calculated and used to prepare marketing information to promote and influence the roll out of further purchases of electric vehicles.

**MMU** – the image below presents details of MMU's intentions and details current EV investments along with future plans including the investment funded by Triangulum. The latest model of the Nissan Leaf (extended range) is available late 2016 and final costs are awaited. It is intended that purchases would be in place by spring 2016. Procurement will be according to standard internal processes. They are using the direct purchase approach.

The proposal is to expand the current pool car fleet and further develop the charging infrastructure on campus. The current pool vehicle arrangement uses the City Car Club management facilities – [www.citycarclub.co.uk](http://www.citycarclub.co.uk). The project will use the City Car Club telematics installations in cars to understand behaviour and to generate data. In addition MMU will invest in EVs for its operational fleet by August 2016.

Preliminary surveys are underway to determine the optimum location for charge points.



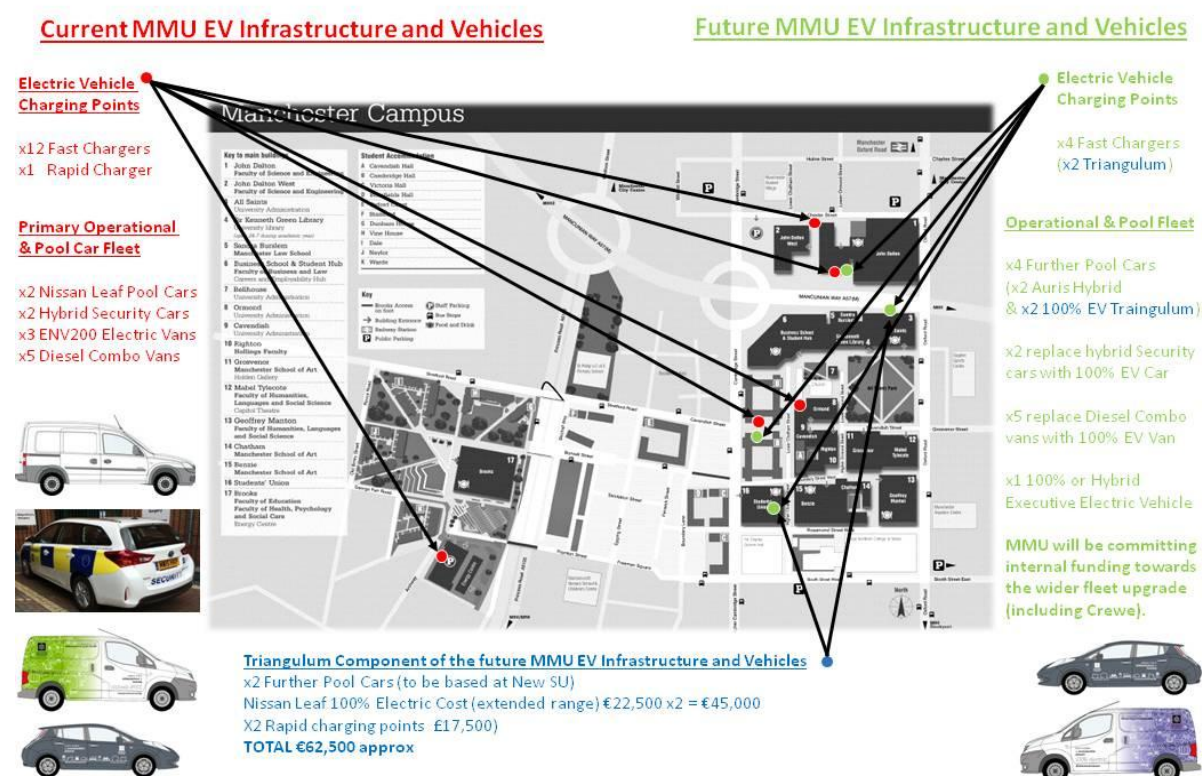




Figure 3 Outline of MMU Electric Vehicle Plan

**UoM** - The intention is to utilise the Triangulum investment to support the business and infrastructure case to replace existing diesel vehicles with EVs (the university has a current fleet of 100 diesel vehicles). The intention is to highlight the benefits of electric vehicle in terms of reduced emissions, improved air quality, usability and cost savings. This will allow the university fund the transfer to electric vehicles across the fleet, as operations allow. The table below outlines the Triangulum investment fleet changes using a lease model.

In addition, two rapid charging points 7kW will installed as part of the activity at an estimated cost of €8500.

Current vehicle and duties	Image / age	Proposed replacement	Mileage (mls)	Funding €
YT10 AVY – Ford Transit 280 LWB  North campus	  5 years old		13,000	€5,500













Current vehicle and duties	Image / age	Proposed replacement	Mileage (mls)	Funding €
EJ60 NXL – Ford Transit 280 LWB  Bio-medical building	  5 years old		1,560	€5,500
MM04 XHD  Postal	  11 years old		7,800	€5,500
PN12 LTK – Ford Transit 280 LWB  Postal	  3 years old		7,800	€5,500
MT08 LTV – Ford Transit Connect  Postal	  7 years old		7,800	€5,500
PN12 LUJ – Ford Transit 280 LWB  Feminine hygiene	  3 years old		9,100	€5,500
				<b>Total €33,000</b>

Table 4 Outline of MMU Electric Vehicle Purchases



### 6.1.2 Programme and Funding

The table below sets out an estimate of the implementation programme for the project alongside the level of funding required and the support required from the Corridor Manchester partners.

Specification/ deliverables	Programme/ timescale	Financial support	Organisation responsible
Agreement in principle to provide support for purchase of additional electric vehicles	By December 2015	N/A	UoM/ MMU
Agreement of specification of electric vehicles to be purchased and subsidy required to make viable	By January 2016	N/A	MCC/UoM/ MMU/
Purchase of electric vehicles	By March 2016	Up to €	UoM/ MMU
Definition of data monitoring and requirements	By April 2016	N/A	MCC/ UoM/ MMU
Scheme commences	June 2016 (assumes 3 month delivery timescale)	N/A	MCC/ UoM/ MMU
Monitoring commences	June 2016	€5,000	MCC/ UoM/ MMU
Monitoring ends/reporting	December 2017	N/A	MCC/ UoM/ MMU

Table 5 Implementation Programme Electric Vehicle Purchases

### 6.1.3 Deliverability

It is considered that this project would also fit well with the other tasks within the Triangulum project. There are opportunities to link the energy produced in the Energy Task to that required to power/charge the electric vehicles. Performance data relating to of the electric vehicles could be undertaken to provide data for use within the ICT task.

Where the funding would be used to subsidise the purchase of the vehicles, there would be a physical asset retained by the universities. A lease arrangement provides for a different, full cost of ownership model. Operational cost savings may also be achieved through a reduction in fuel costs for the existing alternative



vehicles and through a reduced requirement for vehicle ownership/leasing. It is envisaged additional activity will take place based on the early results of this investment.

Subject to the ability to purchase the vehicles within a suitable timeframe, the project is achievable and deliverable within the timeframe available. There are likely to be potential ongoing benefits to the Partner organisations beyond the lifetime of the Triangulum project. The intention is that the data obtained through the project would support the future purchase of more electric vehicles, helping to provide a sustainable growth in the use of electric vehicles.

As MMU would be taking on the long-term ownership of the vehicles, there is some risk associated with the ongoing maintenance and operation of the vehicles. However, as the fleets already include electric vehicles, the level of this risk is considered to be low.

There are potential carbon emission savings that may arise from the project. The data collection and interpretation stage of the project would seek to quantify this.

#### 6.1.4 Data Collection and Key Performance Indicators

The data to be collected is to be confirmed. Indicative KPI's which could be used for the project are set out below.

Expected Impacts	KPI Area	KPI Area	Indicators Identified for Assessing Impacts	Potentially Quantifiable Units
Reduced emission of air quality pollutants	People	Change in pollutants emitted by vehicle fleet	O3, PM2.5, PM10 emitted by vehicle fleet	No baseline required: change in emissions to be estimated based on distance travelled by the EVs purchased
Testing of new technologies	Prosperity	Electric vehicle charging stations	No	Data to be collected during WP6 study visit to Manchester (Jan 2016)
		User satisfaction with electric vehicles	% registered customer/passenger satisfaction	No baseline required
		GIS tracking of electric vehicles	% of vehicles enrolled	No baseline required (no tracking is currently taking place)
		Use of EV charging stations	% of time used, MWh/yr of electricity supplied	The feasibility of collecting baseline data on costs of vehicle fleet operation at MMU and UoM is currently being explored.
		Collaborations between Triangulum and Universities to promote student engagement with EV industry	Number of collaborative EV related student projects	No baseline required





Expected Impacts	KPI Area	KPI Area	Indicators Identified for Assessing Impacts	Potentially Quantifiable Units
Reduced traffic congestion				Not applicable
Efficiency savings	Prosperity	Cost of vehicle fleet operation	£/km	The feasibility of collecting baseline data on costs of vehicle fleet operation at MMU and UoM is currently being explored.
Reduced carbon emissions	Planet, prosperity	Number of electric vehicles in fleet	Number	MMU: 2 UoM: 2 MCC: 0  Source: Mobility Technical Implementation Report
		Percentage of electric vehicles in fleet	%	MMU: 10% UoM: 2% MCC: n/a  Source: Mobility Technical Implementation Report
		Change in total CO2e emissions from vehicle fleet as a result of module implementation	Tonnes of CO2e	No baseline required: change in emissions to be estimated based on distance travelled by the EVs purchased
Behavioural change	People	Likert scale on satisfaction with service	Likert scale	Survey of staff

Table 6 Indicative KPIs Electric Vehicle

## 6.2 Project B – Electric Power Assist Cargo Bike Trial – Proposition # 4

### 6.2.1 Project Description

This project aims to increase the use of bikes and electric-assist bikes for post and internal deliveries within Corridor Manchester. It will also seek to provide a public hire scheme for individuals and SMEs to trial the use of cargo bikes for deliveries. EAPC cargo bikes (Electric Assisted Pedal Cycles) in the form of cargo bikes will be provided to the partner organisations for use as a trial – “try before you buy” – or as a direct purchase as well as being available to SMEs and members of the public for short term hire. Use of the bikes will be tracked and





monitored over the life time of the project to provide an evidence base for future business cases along with being available on the open data platform as part of the ICT workstream.

An operator will be procured by Manchester City Council that will:

- Provide at least 4 EAPCs for use by Corridor partners along with 2 bikes for public hire.
- Maintain and manage the use of the EAPCs.
- Provide an on line booking and hire service.
- Provide appropriate training to users.
- Provide a data tracking service.

## 6.2.2 Programme and Funding

The table below sets out an estimate of the implementation programme for the project alongside the level of funding required and the support required from the Corridor Manchester partners.

Specification/ deliverables	Programme/ timescale	Financial support	Organisation responsible
Agreement in principle to provide support for purchase of EAPCs for use by Corridor Partners	By December 2015	N/A	Triangulum Board
Agreement of procurement specification.	By Dec 2016	N/A	MCC/UoM/ MMU/
Procurement of EAPC operator	By March 2016	Up to €40,000	MCC
Scheme commences	June 2016 (assumes 3 month delivery timescale)	N/A	MCC/ UoM/ MMU
Monitoring ends/reporting	Feb 2018	N/A	MCC/ UoM/ MMU

Table 7 Implementation Programme EAPC Cargo Bike

## 6.2.3 Deliverability

It is considered that this project fits well with the other tasks within the Triangulum project. There are opportunities to link the energy produced in the Energy Task to that required to power/charge the peaks in demand. Performance data relating to of the EAPCs could be undertaken to provide data for use within the ICT task.



The overall capital expenditure required for this phase is estimated to be 40,000 Euros. This is within the MCC budget for the Mobility Task of the Triangulum project. The specification of the EAPCs needs to be agreed with other partners to ensure the bikes purchased are fit for purpose and can be used for specific logistical purposes.

Subject to the ability to purchase the EAPCs within a suitable timeframe, the project is achievable and deliverable within the timeframe available. There are likely to be potential ongoing benefits to the Partner organisations beyond the lifetime of the Triangulum project. The intention is that the data obtained through the project would support the future purchase of more EAPCs, helping to provide a sustainable growth in the use of electric vehicles within. It is considered that visibility of EAPCs as a viable means of transport for goods is key element.

There are potential carbon emission savings that may arise from the project. The data collection and interpretation stage of the project would seek to quantify this.

#### 6.2.4 Data Collection and Key Performance Indicators

The data to be collected is to be confirmed. Indicative KPIs which could be used for the project are set out below.

Expected Impacts	KPI Area	Indicators Identified for Assessing Impacts	Potentially Quantifiable Units	Potential sources of baseline data
Reduced emission of air quality pollutants	People	Change in pollutants emitted by own fleet	O3, PM2.5, PM10 emitted within by delivery vehicles	Could be estimated based on composition of the vehicle fleet, average annual distance travelled per vehicle within, pollutant emissions per vehicle km
Testing of new technologies	Prosperity	Implementation rate of EAPCs	Number of journeys made/distance travelled	Data from partners
		GIS tracking of use	% of vehicles enrolled	Data from partners. Baseline likely to be zero if no tracking is current taking place
		Utilisation of EAPCs	% of time used, number of uses	Data from partners
	People	User satisfaction	% registered users/questionnaires	No baseline required
Reduced traffic congestion	Planet	Number of journeys by motorised vehicles replaced by cargo bike journeys	Number	No baseline required: change in congestion to be estimated based on distance travelled by the cargo bikes purchased



Expected Impacts	KPI Area	Indicators Identified for Assessing Impacts	Potentially Quantifiable Units	Potential sources of baseline data
Efficiency savings	Prosperity	Cost of vehicle fleet operation	£/km	There is no baseline as no EAPCs operate currently
Reduced carbon emissions	Planet, prosperity	% of EAPCs within fleet	Number of EAPCs within fleet	Data from partners
	Planet, prosperity	The use of cargo bikes within the scheme	Number of rentals, number of journeys made, average hours bike in use per day	Baselines are zero
	Planet	% change in total CO2 emissions from vehicle fleet	Tonnes of CO2	Could be estimated based on number of petrol/diesel/electric vehicles within the fleet, average annual distance travelled per vehicle, CO2e per vehicle km
Behavioural change	People	Likert scale on satisfaction with service	Likert scale	Survey of staff and users

Table 8 Indicative KPIs EAPC cargo bikes



## 7 Project Action Plans to be Reviewed

### 7.1 Project C – Supply Chain Review – Proposition # 1

#### 7.1.1 Project Description

This project would involve a supply chain review of the Corridor Manchester partner organisations to identify potential areas for joint procurement. The top 20 suppliers for each organisation would be reviewed and a suitable product, common to all organisations would be identified. This product would be subject to a joint procurement trial whereby a single supplier would be used to procure for all Corridor partners. This product/service would need to be one that is common to all and is not currently supplied as part of a long-term contract.

#### 7.1.2 Deliverability

It is considered that this project has more limited integration with the other tasks within the Triangulum project. Although the potential benefits of implementing such a scheme are clear, the links with the energy and ICT tasks are less so. Data relating to procurement, deliveries and expenditure could, however, be used to provide graphical information on progress and benefits of the project over time and the procurement process could be used to specify the use of electric vehicles by the supplier.

The available expenditure required for this project would be limited. It is estimated that only cost related to the project would be to pay for the time/resource required to analyse and monitor the data. This is estimated to be £10,000. Whilst this is within the budget for the Mobility Task of the Triangulum project, implementation would require additional funding. Operational savings may be achieved through the consolidation of the supplier for the pilot product. Potentially large longer-term savings may also be achieved.

The first part of the project (i.e. the supply chain review) is achievable and deliverable within the timeframe available, subject to the Corridor Manchester partners being willing to share data. Only once this has been completed will the viability of finding a common product whose supply is not restricted by long-term agreements be known. However, the supply chain review is, in itself considered to be a worthwhile project. There are likely to be potential ongoing benefits to the Partner organisations beyond the lifetime of the Triangulum project of collating and monitoring such information. The intention is that the data obtained through the project would support the future purchase of more electric vehicles, helping to provide a sustainable growth in the use of electric vehicles.

There is little risk associated with the project, other than the potential restrictions relating to existing agreements. There may be benefits to SMEs by making the product of the pilot study available to a limited number of businesses.

There are potential carbon emission savings that may arise from the project. The data collection and interpretation stage of the project would seek to quantify this.

#### 7.1.3 Data Collection and Key Performance Indicators

The data to be collected is to be confirmed. Indicative KPIs which could be used for the project are set out below.



Expected Impacts	KPI Area	Indicators Identified for Assessing Impacts	Potentially Quantifiable Units	Potential sources of baseline data
Reduced emission of air quality pollutants	People, Prosperity	% change in pollutants emitted by delivery vehicles	O3, PM2.5, PM10 emitted within by delivery vehicles	Could be calculated based on number of deliveries, estimated distance travelled within, estimated split of vehicle types and pollutant emission per km.
Testing new technologies		Not applicable		
Reduced traffic congestion	People	% change in number of deliveries made to partner organisations	Number of deliveries / year	Data from partner organisations on number of deliveries
Efficiency savings	Prosperity	% change in average delivery costs	£/km/kg	Data from partner organisations
Reduced carbon emissions	Planet	% change in total CO2e emissions	Tonnes of CO2	Could be estimated based on number of deliveries, approx. delivery distance and CO2e per km.
Behavioural change	People	Likert scale on satisfaction with service	Likert scale	Staff survey

Table 9 Indicative KPIs Supply Chain Review

## 7.2 Project D – Personal Delivery Consolidation – Proposition # 3

### 7.2.1 Project Description

This project would involve the development of one or two ‘Parcel Delivery Storage’ sites located within Corridor Manchester. Potential sites include one of the Student Unions, within the hospital campus and within one of the university halls of residence at the south end of the area. These facilities would also be available to the public. It is considered that such a facility could be commercially viable as a standalone scheme on the basis that a similar facility has recently been opened within University of Salford. In itself, such a scheme is considered potentially beneficial by reducing the number of deliveries made directly to the area.

However, it is considered that additional elements could be included within the project in order to enhance the potential benefits and potentially link to other projects within the mobility task (e.g. electric-assist cargo bike trial). These additional aspects may be less likely to be commercially viable and may therefore need funding support to be viable. Collection of data relating to the use of the service and subsequent benefits would also be funded as part of this project. Issues of commercial sensitivity and data protection would need to be considered and accommodated within the design of the data collection exercise.



## 7.2.2 Deliverability

It is considered that this project could link well with the other tasks within the Triangulum project and could also potentially be linked to other projects within this task. No capital expenditure is expected to be required, as it is assumed that a scheme will be commercially viable.

Subject to the ability to establish the sites within a suitable timeframe, the project is achievable and deliverable within the timeframe available. There are likely to be potential ongoing benefits to the Partner organisations beyond the lifetime of the Triangulum project. The scheme implemented may change and expand over time.

As a private sector partner would be developing the sites and the service, the partner organisations would have limited risk associated with the projects. There are likely to be direct benefits to SMEs within the area from the introduction of the service. There are potential carbon emission savings that may arise from the project. The data collection and interpretation stage of the project would seek to quantify this.

## 7.2.3 Data Collection and Key Performance Indicators

The data to be collected is to be confirmed. Indicative KPIs which could be used for the project are set out below.

Expected Impacts	KPI Area	Indicators Identified for Assessing Impacts	Potentially Quantifiable Units	Potential sources of baseline data
Reduced emission of air quality pollutants	Planet	Change in pollutants emitted by delivery vehicles	O3, PM2.5, PM10 emitted by delivery vehicles	Could be calculated based on number of deliveries, estimated distance travelled within the corridor, estimated split of vehicle types and pollutant emission per km.
Testing new technologies		Not applicable		
Reduced traffic congestion	People, prosperity	Change in number of deliveries made to partner organisations	Number of deliveries / year	Data from partner organisations on number of deliveries
Efficiency savings		Not applicable		
Reduced carbon emissions	Planet	Change in total CO <sub>2</sub> e emissions	Tonnes of CO <sub>2</sub>	Could be estimated based on number of deliveries, approx. delivery distance and CO <sub>2</sub> e per km.
Behaviour change	People	User satisfaction	% registered customers/ questionnaires	No baseline required
	Prosperity	Utilisation	% of time used, number of uses	Data from service operator

Table 10 Indicatives KPIs Person Delivery Consolidation



## 8 Academic Programmes to Support Mobility Activity

The Triangulum Description of Work (DoW) refers to activity to identify relevant academic degree programmes at the Manchester institutions (MMU and UoM) with the “*potential to incorporate e-vehicle skills in to the curricula and develop a portfolio of applied student projects to support and extend monitoring activity*”. See Appendix 9.2.

The following academic departments have been initially identified as relevant.

- The School of Electrical and Electronic Engineering - [www.eee.manchester.ac.uk](http://www.eee.manchester.ac.uk)
- School of Engineering [www.soe.mmu.ac.uk](http://www.soe.mmu.ac.uk)
- School of Environment, Education and Development [www.seed.manchester.ac.uk](http://www.seed.manchester.ac.uk)
- Manchester Business School [www.mbs.ac.uk](http://www.mbs.ac.uk)

As the work programme and opportunities progress, these will be developed (in conjunction with MMU and UoM as project partners):



## 9 Appendices

### 9.1 List of Interviewees

#### **UoM**

Andrew Hough; Gabby Schilwa; Chris Martin

#### **MMU**

Andrew Taylor; Jenny Moore

#### **CMUHT**

Claire Igoe; Joe Hulme

#### **MCC**

Richard Elliott; Ian Brown

#### **Bruntwood**

Bev Taylor;

#### **TfGM**

Tim Morris; David Budd; Helen Smith

#### **Cycle Waggle**

Pavol Gajdos; Richard Armitage

#### **TNT**

Andrew Lowery

#### **DHL**

Andrew Burns

#### **Doddle**

Colin Preston; Wilson Smith; Colin Bryan

#### **Clicks and Links**

Michael King





## 9.2 Task 3.3 Mobility - Description of Works Extract

### Subtask 3.3.1 Detailed Design (Lead: MCC, months 1-6)

This activity will focus on capturing key data to develop the baseline position in detail for MCC, UoM, MMU and CMUH, including number of trips and deliveries, mileage travelled and procurement costs. From this the development of the business case/model for introducing sustainable urban mobility schemes and procurement for each organisation (central goods receipt points, sustainable procurement, electric distribution fleet, automated drop off points) will be developed within a Mobility Technical Implementation Report. In addition, academic degree programmes will be identified, which are currently offered at UoM and MMU with the potential to incorporate e-vehicle skills into curricula and develop portfolio of applied student projects to support and extend monitoring activity. This work and subsequent sub-tasks 3.2 – 3.4 will be overseen by the Task 3 Technical Sub-group.

### Subtask 3.3.2 Procurement and Implementation (Lead: MCC, months 6-60)

This activity will focus on the procurement and implementation of the bike and electric vehicles (including E-bikes) as part of the urban mobility schemes within the Corridor and across the various estates of each organisation. It will also include the implementation of delivery consolidation trials, which may cover the introduction of central goods receipt and distribution points to control deliveries onto estates and collaboration across UoM, MMU, MCC and the central hospital complex supply chains to consolidate deliveries.

### Subtask 3.3.3 Monitoring (Lead: UoM, months 6-55)

This will establish a logistics group forum to engage SMEs on the Corridor to ensure they can take advantage of the infrastructure implemented. The sub-task will also involve monitoring usage of the logistics centre(s), bikes and e-vehicle fleet in live time by fitting GPS tracking devices and monitoring docking stations to understand overall levels and patterns of use and charging locations/frequencies/duration. It will also require monitoring of user preferences and feedback through the user group and debriefing of users regularly to contextualise the GPS tracks for each vehicle. This will enable the continual improvement of the leasing schemes in response to user requirements. Finally, the sub-task will require test charging characteristics regularly to monitor performance of different technologies, and draw of power from the smart grid providing feedback to manufacturers; this latter component will be integrated within Task 4. The gathering of data and evaluation will also tie into the Smart City Framework in WP06.

### Subtask 3.3.4 Evaluation (Lead: MCC, months 55-60)

This task will focus on the production of an Evaluation Report setting out the benefits of the implemented urban mobility solutions including reduced vehicle travel, cost benefits and changes in service levels. It will provide feedback into WP06 on the most desirable and effective technologies and charging arrangements, which will in turn provide the information to update the business case with actual data to justify the implementation of similar solutions across other organisations/cities.



## 9.3 Mobility Work Programme

Activities		Partner	Deadline	Completed
WP 3: City Implementation Manchester			M3	
			M12	
			M24	
			M36	
			M12, 24, 36, 48, 60	
<b>Task 3.3: Mobility</b>				
Subtask 3.3.1: Detailed Design		MCC		
Activity 3.3.1.1	Procurement of consultants to develop baseline.		M8	✓
Activity 3.3.1.2	Stakeholder meetings with partners and relevant orgs e.g. TfGM. Outcome will be Mobility Technical Implementation Report		M8	✓
Activity 3.3.1.3	Baseline data collection		M8	✓
Activity 3.3.1.4	Coordination of task group to approve the plan & agree implementation plan		M8	✓
Subtask 3.3.2: Procurement and Implementation		MCC	M60	
Activity 3.3.2.1	Identification of suppliers and procurement		M12	✓
Activity 3.3.2.2	Implementation of actions		M30	
Activity 3.3.2.3	Ongoing review and revision / adjustment		M60	
Subtask 3.3.3: Monitoring		UoM	M55	
Activity 3.3.3.1	Identifying a monitoring framework for KPIs relating to mobility		M7	✓
Activity 3.3.3.2	Develop monitoring strategy		M7	✓
Activity 3.3.3.3	Implementation of monitoring with ongoing revision		M60	
Subtask 3.3.4: Evaluation		MCC	M60	
Activity 3.3.4.1	Development of evaluation framework based on monitoring		M12	
Activity 3.3.4.2	Implementation of evaluation framework based on monitoring		M60	

